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Contents

Intell	lectual Property Rights	2			
Forev	Foreword				
Forev	Foreword				
1	Scope	10			
2	References				
3	Definitions and abbreviations				
3.1	Definitions				
3.2	Abbreviations	12			
4	General	13			
4.1	Procedure Specification Principles	13			
4.2	Forwards and Backwards Compatibility	13			
4.3	Specification Notations	13			
5	PCAP Services	14			
6	Services Expected from Signalling Transport	15			
7	Functions of PCAP				
8	PCAP Procedures				
8.1	Elementary Procedures				
8.2	Position Calculation				
8.2.1	General				
8.2.2	1				
8.2.3 8.2.4	1				
8.2.4	Abnormal Conditions				
8.3.1	<u> </u>				
8.3.2					
8.3.3					
8.3.4	<u>.</u>				
8.4	Information Reporting				
8.4.1	* *				
8.4.2					
8.4.3	Abnormal Conditions	26			
8.5	Information Exchange Termination				
8.5.1	General				
8.5.2	1				
8.5.3					
8.6	Information Exchange Failure				
8.6.1					
8.6.2	1				
8.7 8.7.1	Error Indication				
8.7.1					
8.7.3					
8.8	Position Initiation				
8.8.1	General				
8.8.2					
8.8.3	1				
8.8.4	1				
8.9	Position Activation				
8.9.1	General	30			
8.9.2	Successful Operation	31			
8.9.3	Unsuccessful Operation	33			

8.9.4	Abnormal Conditions	33
8.10	Position Parameter Modification	33
8.10.1		
8.10.2		
8.10.3		
8.11	Abort	
8.11.1		
8.11.2		
8.11.3		
8.12	Position Periodic Report	
8.12.1		
8.12.2	*	
8.12.3		
8.13	Position Periodic Result	
8.13.1		
8.13.2	- I	
8.13.3		
8.14	Position Periodic Termination	
8.14.1		
8.14.2	- I	
8.14.3	Abnormal Conditions	
9	Elements for PCAP Communication	38
9.1	Message Functional Definition and Content	38
9.1.1	General	
9.1.2	Message Contents	
9.1.2.1		
9.1.2.2	- · · · · · · · · · · · · · · · · · · ·	
9.1.2.3		
9.1.2.4	•	
9.1.3	Position Calculation Request	
9.1.4	Position Calculation Response	
9.1.5	POSITION CALCULATION FAILURE	
9.1.6 9.1.7	Information Exchange Initiation Request	
	Information Exchange Initiation Response	
9.1.8 9.1.9	Information Report	
9.1.10	1	
9.1.10	· · · · · · · · · · · · · · · · · · ·	
9.1.12		
9.1.13		
9.1.14		
9.1.15	1	
9.1.16	1	
9.1.17	1	
9.1.18	1	
9.1.19		
9.1.20	ABORT	49
9.1.21	position Periodic Report	50
9.1.22	position Periodic Result	51
9.1.23	Position Periodic Termination	51
9.2	Information Element Functional Definitions and Contents	
9.2.1	General	
9.2.2	Radio Network Layer Related IEs	
9.2.2.1		
9.2.2.2		
9.2.2.3		
9.2.2.4	, .	
9.2.2.5		
9.2.2.6		
9.2.2.7	U 1	
9.2.2.8	8 GPS Acquisition Assistance	

9.2.2.9	GPS Almanac and Satellite Health	63
9.2.2.10	GPS Clock and Ephemeris Parameters	65
9.2.2.11	GPS Ionospheric Model	67
9.2.2.12	GPS Measured Results	68
9.2.2.13	GPS Navigation Model	69
9.2.2.14	GPS Real Time Integrity	70
9.2.2.15	GPS Reference Time	71
9.2.2.16	GPS Transmission TOW	72
9.2.2.17	GPS UTC Model	
9.2.2.18	GPS-UTRAN Time Relationship Uncertainty	72
9.2.2.19	Information Exchange ID	73
9.2.2.20	Void	
9.2.2.21	Information Report Characteristics	73
9.2.2.22	Information Type	74
9.2.2.23	Message Structure	78
9.2.2.24	Message Type	79
9.2.2.25	Method Type	79
9.2.2.26	Requested Data Value	80
9.2.2.27	Requested Data Value Information	81
9.2.2.28	Transaction ID	
9.2.2.29	Transmission TOW Indicator	82
9.2.2.30	Uncertainty Ellipse	82
9.2.2.31	Cell-ID Measured Results Info List	82
9.2.2.32	OTDOA Measured Results Info List	85
9.2.2.33	OTDOA Neighbour Cell Info	88
9.2.2.34	OTDOA Reference Cell Info	90
9.2.2.35	UE Positioning Measurement Quality	92
9.2.2.36	UTRAN Access Point Position with Altitude	94
9.2.2.37	UTRAN Cell Identifier (UC-ID)	94
9.2.2.37A	Extended RNC-ID	95
9.2.2.38	Horizontal Accuracy Code	95
9.2.2.39	Vertical Accuracy Code	95
9.2.2.40	Accuracy Fulfilment Indicator	96
9.2.2.41	Uplink DPCH information	
9.2.2.42	Frequency information	
9.2.2.43	PRACH parameters	
9.2.2.44	Compressed Mode Assistance Data	
9.2.2.45	C-RNTI	
9.2.2.46	Primary Scrambling Code	98
9.2.2.47	PRACH information	98
9.2.2.48	TFS	
9.2.2.49	CTFC	
9.2.2.50	Request Type	
9.2.2.51	UE Positioning Capability	
9.2.2.52	Response Time	
9.2.2.53	Positioning Priority	103
9.2.2.54	Client Type	104
9.2.2.55	Positioning Method	104
9.2.2.56	U-TDOA Bit Count	
9.2.2.57	U-TDOA Time Interval	105
9.2.2.58	Additional Method Type	
9.2.2.59	UE Positioning OTDOA Assistance Data	
9.2.2.60	UL TrCH information	
9.2.2.61	Semi-static Transport Format Information	
9.2.2.62	Environment Characterisation	
9.2.2.63	Chip Offset	
9.2.2.64	Frame Offset	
9.2.2.65	Position Data	
9.2.2.66	Transmission Gap Pattern Sequence Information	
9.2.2.67	Active Pattern Sequence Information	
9.2.2.68	CFN	
9 2 2 69	Positioning Response Time	115

9.2.2.71 UE Positioning IPDL Parameters	116
9.2.2.73 SFN-SFN Relative Time Difference	
9.2.2.74 UTDOA Group	11.
	116
9.2.2.75 Maximum Set of F-DPDCHs	
9.2.2.76 Puncture Limit	
9.2.2.77 E-DCH Transport Format Combination Set Information (E-TFCS Information)	118
9.2.2.78 Reference E-TFCI Power Offset	118
9.2.2.79 E-TTI	119
9.2.2.80 E-DPCCH Power Offset	119
9.2.2.81 Cell Parameter ID	119
9.2.2.82 TFCI Coding	119
9.2.2.83 Repetition Length	120
9.2.2.84 Repetition Period	120
9.2.2.85 TDD DPCH Offset	120
9.2.2.86 UL Timeslot Information	120
9.2.2.87 Time Slot	121
9.2.2.88 Midamble Shift And Burst Type	121
9.2.2.89 TFCI Presence	122
9.2.2.90 TDD UL Code Information	122
9.2.2.91 TDD Channelisation Code	123
9.2.2.92 Special Burst Scheduling	
9.2.2.93 Max PRACH Midamble Shift	
9.2.2.94 PRACH Midamble	123
9.2.2.95 USCH Parameters	
9.2.2.96 USCH Scheduling Offset	
9.2.2.97 Include Velocity	
9.2.2.98 Velocity Estimate	
9.2.2.99 Horizontal Speed and Bearing	
9.2.2.100 Vertical Velocity	
9.2.2.101 GPS Positioning Instructions	
9.2.2.102 UE Position Estimate Info	
9.2.2.103 UTRAN-GPS Reference Time	
9.2.2.104 UTRAN-GPS Reference Time Result	
9.2.2.105 T _{UTRAN-GPS} Drift Rate	
9.2.2.106 Periodic Position Calculation Info	
9.2.2.107 Periodic Location Info	
9.2.2.108 Amount of Reporting	
9.2.2.109 Measurement Instructions Used	
9.2.2.110 RRC State Change	
9.2.2.111 Periodic Position Termination Cause	
9.2.2.112 Requested Cell-ID Measurements	
9.2.2.113 DGANSS Corrections	
9.2.2.114 GANSS Almanac and Satellite Health	
9.2.2.115 GANSS Clock Model	
9.2.2.115A GANSS Additional Clock Models	
9.2.2.116 GANSS Ionospheric Model	
9.2.2.116A GANSS Additional Ionospheric Model	
9.2.2.117 GANSS Measured Results	
9.2.2.118 GANSS Navigation Model	
9.2.2.118A GANSS Additional Navigation Models	
9.2.2.119 GANSS Orbit Model	
9.2.2.119A GANSS Additional Orbit Models	
9.2.2.120 GANSS Positioning Instructions	
9.2.2.121 GANSS-UTRAN Time Relationship Uncertainty	
9.2.2.122 GANSS Real Time Integrity	
9.2.2.123 GANSS Reference Measurement Information	
9.2.2.124 GANSS Reference Time	
9.2.2.125 GANSS Time Model	
9.2.2.125A GANSS Additional Time Models	
9.2.2.126 GANSS UTC Model	

9.2.2.126	A GANSS Additional UTC Models	160
9.2.2.127	.127 GANSS Time Indicator	
9.2.2.127	A GANSS Data Bit Assistance	163
9.2.2.128	Additional GPS Assistance Data Required	164
9.2.2.129	Additional GANSS Assistance Data Required.	
9.2.2.130	GANSS ID	
9.2.2.131	GANSS Signal ID	
9.2.2.131	č	
9.2.2.132	GPS Reference Time Uncertainty	
9.2.2.133	GANSS Earth Orientation Parameters	
9.2.2.134	SBAS ID	
9.2.2.135	GANSS Auxiliary Information	
9.2.2.136	UTRAN-GANSS Reference Time Result	
9.2.2.137	GANSS Additional Ionospheric Model Request	
9.2.2.137	GANSS Earth Orientation Parameters Request	
9.2.2.138	Support for Non-Native Assistance Choices Indication	
9.2.2.139	Position Data UE-Based	
9.2.2.140	GANSS Code Phase Ambiguity Extension	
9.2.2.141	GANSS Integer Code Phase Extension	
9.2.2.142		
,	GANSS Carrier-Phase Measurement Requested	
9.2.2.144	GANSS Multi-frequency Measurement Requested	
9.2.2.145	GANSS Additional Ionospheric Model Required	
9.2.2.146	GANSS Earth Orientation Parameters Required	
9.2.2.147	GANSS Additional Navigation Models Required	
9.2.2.148	GANSS Additional UTC Models Required	
9.2.2.149	GANSS Auxiliary Information Required	173
9.2.2.150	SBAS IDs	
9.2.2.151	GANSS Additional Assistance Data Choices	
9.2.2.152	Cell-ID Measured Results Sets	
9.2.2.153	OTDOA Reference Cell Info SAS-centric mode	
9.2.2.154	DGNSS Validity Period	174
9.2.2.155	IRAT Measured Results Info List	174
9.2.2.156	GERAN Cell Global Identity	175
9.2.2.157	GSM BSIC	176
9.2.2.158	IMSI	176
9.2.2.159	IMEI	176
9.3	Message and Information Element Abstract Syntax (with ASN.1)	177
9.3.0	General	177
9.3.1	Usage of private message mechanism for non-standard use	177
9.3.2	Elementary Procedure Definitions	177
9.3.3	PDU Definitions	
9.3.4	Information Element Definitions	197
9.3.5	Common Definitions.	
9.3.6	Constant Definitions	
9.3.7	Container Definitions	
9.4	Message Transfer Syntax	
10 Ha	andling of Unknown, Unforeseen and Erroneous Protocol Data	296
10.1	General	296
10.2	Transfer Syntax Error	297
10.3	Abstract Syntax Error	298
10.3.1	General	
10.3.2	Criticality Information	
10.3.3	Presence Information	
10.3.4	Not comprehended IE/IE group.	
10.3.4.1	Procedure Code	
10.3.4.1A		
10.3.4.17	IEs other than the Procedure Code and Type of Message	
10.3.4.2	Missing IE or IE group	
10.3.5	IEs or IE groups received in wrong order or with too many occurrences or erroneously present	
10.3.6	Logical Error	
10.4	Exceptions	303
111)	DAVAJUUUIS	101

Anne	x A (informative):	Guidelines for Usage of the Criticality Diagnostics IE	304
A.1	EXAMPLE MESSA	GE Layout	304
A.2	Example on a Receiv	ed EXAMPLE MESSAGE	305
A.3	Content of Criticality	Diagnostics	307
A.3.1	Example 1		307
A.3.2	Example 2		309
A.3.3	Example 3		311
A.3.4	Example 4		313
A.3.5	Example 5		315
A.4	ASN.1 of EXAMPLE	E MESSAGE	316
Anne	x B (informative):	Change History	320
Histor	ry		321

Foreword

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1 Scope

The present document specifies the *Positioning Calculation Application Part (PCAP)* between the Radio Network Controller (RNC) and the Stand-Alone SMLC (SAS). It fulfills the RNC-SAS communication requirements specified in TS 25.305 [6] and thus defines the Iupc interface and its associated signaling procedures.

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.
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[1]	Void
[2]	Void
[3]	3GPP TS 25.452: "UTRAN Iupc interface signalling transport".
[4]	3GPP TS 25.331: "Radio Resource Control (RRC) Protocol Specification".
[5]	Void
[6]	3GPP TS 25.305: "Stage 2 functional specification of UE positioning in UTRAN".
[7]	ITU-T Recommendation X.680 (2002-07): "Information technology - Abstract Syntax Notation One (ASN.1): Specification of basic notation".
[8]	ITU-T Recommendation X.681 (2002-07): "Information technology - Abstract Syntax Notation One (ASN.1): Information object specification".
[9]	ITU-T Recommendation X.691 (2002-07): "Information technology - ASN.1 encoding rules: Specification of Packed Encoding Rules (PER)".
[10]	ICD-GPS-200: (12 April 2000) "Navstar GPS Space Segment/Navigation User Interface".
[11]	3GPP TS 23.032: "Universal Geographical Area Description (GAD)".
[12]	3GPP TR 25.921: "Guidelines and principles for protocol description and error handling".
[13]	3GPP TS 25.133: "Requirements for support of Radio Resource management (FDD)".
[14]	3GPP TS 25.123: "Requirements for support of Radio Resource management (TDD)".
[15]	3GPP TS 22.071: "Location Services (LCS); Service Description; Stage1".
[16]	3GPP TS 25.212: "Multiplexing and Channel Coding (FDD)".
[17]	3GPP TS 25.213: "Spreading and Modulation (FDD)".
[18]	3GPP TS 25.223: "Spreading and Modulation (TDD)".
[19]	3GPP TS 25.221: "Physical channels and mapping of transport channels onto physical channels (TDD)".
[20]	3GPP TS 25.101: "User Equipment (UE) radio transmission and reception (FDD)".

[21]	3GPP TS 25.102: "UE radio transmission and reception (TDD)".
[22]	Galileo OS Signal in Space ICD (OS SIS ICD), Draft 0, Galileo Joint Undertaking, May 23 rd , 2006.
[23]	IS-GPS-200, Revision D, Navstar GPS Space Segment/Navigation User Interfaces, March 7 th , 2006.
[24]	IS-GPS-705, Navstar GPS Space Segment/User Segment L5 Interfaces, September 22, 2005.
[25]	IS-GPS-800, Navstar GPS Space Segment/User Segment L1C Interfaces, March 31, 2008.
[26]	Specification for the Wide Area Augmentation System (WAAS), US Department of Transportation, Federal Aviation Administration, DTFA01-96-C-00025, 2001.
[27]	IS-QZSS, Quasi Zenith Satellite System Navigation Service Interface Specifications for QZSS, Ver.1.0, June 17, 2008.
[28]	Global Navigation Satellite System GLONASS Interface Control Document, Version 5, 2002.
[29]	3GPP TS 45.005: "Radio transmission and reception".
[30]	3GPP TS 45.008: "Radio subsystem link control".
[31]	Void
[32]	3GPP TS 25.413: "UTRAN Iu interface Radio Access Network Application Part (RANAP) signalling".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

Stand-Alone SMLC (SAS): logical node that interconnects to the RNC over the Iupc interface via the PCAP protocol. An SAS performs the following procedures:

- provide GNSS (i.e. GPS or GANSS (e.g. Galileo)) related data to the RNC;
- performs the position calculation function based upon UE Positioning measurement data;
- in SAS centric mode, selects the positioning method and controls the positioning procedure.

Elementary Procedure: PCAP consists of Elementary Procedures (EPs).

An Elementary Procedure is a unit of interaction between the RNC and the SAS. An EP consists of an initiating message and possibly a response message. Two kinds of EPs are used:

- Class 1: Elementary Procedures with response (success or failure).
- Class 2: Elementary Procedures without response.

For Class 1 EPs, the types of responses can be as follows:

Successful:

- A signalling message explicitly indicates that the elementary procedure successfully completed with the receipt of the response.

Unsuccessful:

- A signalling message explicitly indicates that the EP failed.

Class 2 EPs are considered always successful.

Information Exchange Context: Information Exchange Context is created by the first Information Exchange Initiation Procedure initiated by the RNC and requested from the SAS.

The Information Exchange Context is deleted after the Information Exchange Termination or the Information Exchange Failure procedure when there is no more Information Exchange to be provided by the RNC to the SAS. The Information Exchange Context is identified by an SCCP connection as, for Information Exchanges, only the connection oriented mode of the signalling bearer is used.

Positioning Initiation Context: In the SAS centric mode of operation each positioning request is assigned a unique logical connection identity, i.e., SCCP Source and Destination Local Reference numbers.

RNC Centric Mode of Operation: The RNC determines, initiates and controls the positioning method to be used for each positioning request.

SAS Centric Mode of Operation: The SAS determines, initiates and controls the positioning method to be used for each positioning request.

Positioning Event: The activity associated with the positioning of a UE resulting from the reception of UE positioning request from the CN.

3.2 Abbreviations

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

A-GANSS Assisted GANSS A-GPS Assisted GPS

ASN.1 Abstract Syntax Notation One

CN Core Network
CRNC Controlling RNC
DGANSS Differential GANSS
DGPS Differential GPS

ECEF Earth-Centered, Earth-Fixed

EGNOS European Geostationary Navigation Overlay Service

EP Elementary Procedure FDD Frequency Division Duplex

GAGAN GPS Aided Geo Augmented Navigation

GANSS Galileo and Additional Navigation Satellite Systems

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

GNSS Global Navigation Satellite System
GPS Global Positioning System
ICD Interface Control Document

MSAS Multi-functional Satellite Augmentation System

OTDOA Observed Time Difference Of Arrival PCAP Positioning Calculation Application Part

PRC Pseudorange Correction
QZSS Quasi-Zenith Satellite System
RNC Radio Network Controller
RNS Radio Network Subsystem
RRC Radio Resource Control
SAS Stand-Alone SMLC

SBAS Satellite Based Augmentation System SCCP Signalling Connection Control Part

SIB System Information Block
SMLC Serving Mobile Location Center

SRNC Serving RNC
SV Space Vehicle
TDD Time Division Duplex

TOD Time of Day
TOW Time of Week
UE User Equipment

UTC Universal Coordinated Time
U-TDOA Uplink Time Difference Of Arrival

UTRAN Universal Terrestrial Radio Access Network

WAAS Wide Area Augmentation System

4 General

4.1 Procedure Specification Principles

The principle for specifying the procedure logic is to specify the functional behaviour of the SAS exactly and completely. The RNC functional behaviour is left unspecified.

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 REQUEST 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.

4.2 Forwards and Backwards Compatibility

The forwards and backwards compatibility of the protocol is assured by 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:

[FDD] This tagging of a word indicates that the word preceding the tag "[FDD]" applies only to

FDD. This tagging of a heading indicates that the heading preceding the tag "[FDD]" and

the section following the heading applies only to FDD.

[TDD] This tagging of a word indicates that the word preceding the tag "[TDD]" applies only to

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only to 1.28Mcps TDD. This tagging of a heading indicates that the heading preceding the

	tag "[1.28Mcps TDD]" and the section following the heading applies only to 1.28Mcps TDD.
[7.68Mcps TDD]	This tagging of a word indicates that the word preceding the tag "[7.68Mcps TDD]" applies only to 7.68Mcps TDD. This tagging of a heading indicates that the heading preceding the tag "[7.68Mcps TDD]" and the section following the heading applies only to 7.68Mcps TDD.
[FDD]	This tagging indicates that the enclosed text following the "[FDD - " applies only to FDD. Multiple sequential paragraphs applying only to FDD are enclosed separately to enable insertion of TDD specific (or common) paragraphs between the FDD specific paragraphs.
[TDD]	This tagging indicates that the enclosed text following the "[TDD - " applies only to TDD, including 7.68 Mcps TDD, 3.84Mcps TDD, 7.68Mcps TDD and 1.28Mcps TDD. Multiple sequential paragraphs applying only to TDD are enclosed separately to enable insertion of FDD specific (or common) paragraphs between the TDD specific paragraphs.
[3.84Mcps TDD]	This tagging indicates that the enclosed text following the "[3.84Mcps TDD - " applies only to 3.84Mcps TDD. Multiple sequential paragraphs applying only to 3.84Mcps TDD are enclosed separately to enable insertion of FDD and TDD specific (or common) paragraphs between the 3.84Mcps TDD specific paragraphs.
[1.28Mcps TDD]	This tagging indicates that the enclosed text following the "[1.28Mcps TDD - " applies only to 1.28Mcps TDD. Multiple sequential paragraphs applying only to 1.28Mcps TDD are enclosed separately to enable insertion of FDD and TDD specific (or common) paragraphs between the 1.28Mcps TDD specific paragraphs.
[7.68Mcps TDD]	This tagging indicates that the enclosed text following the "[7.68Mcps TDD - " applies only to 7.68Mcps TDD. Multiple sequential paragraphs applying only to 7.68Mcps TDD are enclosed separately to enable insertion of FDD and TDD specific (or common) paragraphs between the 7.68Mcps TDD specific paragraphs.
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. Position Calculation 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. POSITION CALCULATION REQUEST 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>Request Type</i> IE.
Value of an IE	When referring to the value of an information element (IE) in the specification the "Value"

5 PCAP Services

PCAP provides the signalling services between RNC and SAS that are required to fulfill the PCAP functions described in clause 7. PCAP services are categorized as follows:

Error (Reject)" or "Geographical Coordinates".

is written as it is specified in clause 9.2 enclosed by quotation marks, e.g. "Abstract Syntax

- 1. Position Calculation Service: They are related to a single UE and involve the transfer of UE Positioning measurement data and UE position estimate data over the Iupc interface between the SRNC and the SAS. They utilise connectionless signalling transport provided by the Iupc signalling bearer.
- 2. Information Exchange Service: They involve the transfer of GPS or GANSS related data over the Iupc interface between the RNC and the SAS on demand, on modification, or at regular intervals. They utilise connection-oriented signalling transport provided by the Iupc signalling bearer.
- 3. SAS Centric Position Service: They are related to the capability of the SAS to determine the positioning method used for individual positioning events. In this case the SRNC may allow A-GPS, A-GANSS, OTDOA, Cell ID

and U-TDOA positioning events for a single UE to be originated by the SAS via PCAP messages. They utilise connection-oriented signalling transport provided by the Iupc signalling bearer.

6 Services Expected from Signalling Transport

Signalling transport (TS 25.452 [3]) shall provide the following service for the PCAP.

- 1. Connection oriented data transfer service. This service is supported by a signalling connection between the RNC and the SAS. It shall be possible to dynamically establish and release signalling connections based on the need. Each point-to-point operation shall have its own signalling connection. The signalling connection shall provide in sequence delivery of PCAP messages. PCAP shall be notified if the signalling connection breaks.
- 2. Connectionless data transfer service. PCAP shall be notified in case a PCAP message did not reach the intended peer PCAP entity.

7 Functions of PCAP

PCAP has the following functions:

- Position Calculation. This function enables the SRNC to interact with an SAS in the process of performing a position estimate of a UE.
- Information Exchange. This function enables the RNC to obtain GPS or GANSS related data from an SAS.
- Reporting of General Error Situations. This function allows reporting of general error situations for which function specific error messages have not been defined.
- SAS Centric Position. This function enables the SRNC to interact with an SAS in the process of performing a position estimate of a UE.

The mapping between the above functions and PCAP elementary procedures is shown in the table 1.

Table 1: Mapping between functions and PCAP elementary procedures

Function	Elementary Procedure(s)	•
Position Calculation	a) Position Calculation	
	b) Position Parameter Modification	
	c) Abort	
Information Exchange	a) Information Exchange Initiation	
	b) Information Reporting	
	c) Information Exchange Termination	า
	d) Information Exchange Failure	
Reporting of General Error Situations	a) Error Indication	
SAS Centric Position	a) Position Initiation	
	b) Position Activation	
	c) Position Parameter Modification	
	d) Abort	
	e) Position Periodic Report	
	f) Position Periodic Result	
	g) Position Periodic Termination	

8 PCAP Procedures

8.1 Elementary Procedures

In the following tables, all EPs are divided into class 1 and class 2 EPs (see clause 3.1 for explanation of the different classes).

Table 2: Class 1

Elementary	Initiating	Successful Outcome	Unsuccessful Outcome
Procedure	Message	Response message	Response message
Position	POSITION	POSITION CALCULATION	POSITION CALCULATION
Calculation	CALCULATION REQUEST	RESPONSE	FAILURE
Information	IINFORMATION	INFORMATION	INFORMATION EXCHANGE
Exchange	EXCHANGE	EXCHANGE INITIATION	INITIATION FAILURE
Initiation	INITIATION	RESPONSE	
	REQUEST		
Position Initiation	POSITION	POSITION INITIATION	POSITION INITIATION
	INITIATION	RESPONSE	FAILURE
	REQUEST		
Position	POSITION	POSITION ACTIVATION	POSITION ACTIVATION
Activation	ACTIVATION	RESPONSE	FAILURE
	REQUEST		

Table 3: Class 2

Elementary Procedure	Message
Information Reporting	INFORMATION REPORT
Information Exchange Termination	INFORMATION EXCHANGE
	TERMINATION REQUEST
Information Exchange Failure	INFORMATION EXCHANGE
-	FAILURE INDICATION
Error Indication	ERROR INDICATION
Position Parameter Modification	POSITION PARAMETER
	MODIFICATION
Abort	ABORT
Position Periodic Report	POSITION PERIODIC REPORT
Position Periodic Result	POSITION PERIODIC RESULT
Position Periodic Termination	POSITION PERIODIC
	TERMINATION

8.2 Position Calculation

8.2.1 General

The purpose of the Position Calculation procedure is to enable an SRNC to query an SAS for a position estimate of a UE. The procedure uses connectionless signalling.

8.2.2 Successful Operation

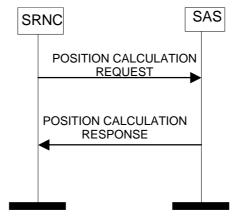


Figure 1: Position Calculation procedure, Successful Operation

The procedure is initiated with a POSITION CALCULATION REQUEST message sent from the SRNC to the SAS. When the SAS receives the POSITION CALCULATION REQUEST message, it shall calculate the UE position and, if supported and requested, velocity based on the provided measurement data. This procedure may be repeated by the SRNC as needed for periodic location. If the POSITION CALCULATION REQUEST message is part of periodic location, this message may include the *Periodic Position Calculation Info* IE to enable the SAS to better fulfill future such requests.

If the *Initial UE Position Estimate* IE is included in the POSITION CALCULATION REQUEST message, the SAS shall use this value for the calculation of the UE Position Estimate in case of A-GPS or A-GANSS positioning methods are used. The SAS may use this value for the calculation of the UE Position when any other methods are used.

If the *Cell-ID Measured Results Sets* IE is included in the POSITION CALCULATION REQUEST message and both of the *Round Trip Time Info* IE and the *Round Trip Time Info With Type 1* IE are included in the *Cell-ID Measured Results Info List* IE, the SAS shall use the *Round Trip Time Info* IE.

If the *Horizontal Accuracy Code* IE and possibly the *Vertical Accuracy Code* IE are included in the POSITION CALCULATION REQUEST message, the SAS shall use these values in order to assess whether the resulting position estimation fulfills the requested accuracy.

If the *SAS Response Time* IE is included in the POSITION CALCULATION REQUEST message, the SAS shall send a POSITION CALCULATION RESPONSE message within the indicated time after reception of the POSITION CALCULATION REQUEST message.

If the *Include Velocity* IE is set to "requested" in the POSITION CALCULATION REQUEST message, the SAS shall include the *Velocity Estimate* IE, if available, in the POSITION CALCULATION RESPONSE message.

If a *GANSS Measured Results* IE is included in the POSITION CALCULATION REQUEST message and does not contain the *GANSS Time ID* IE, the SAS shall assume that the corresponding GANSS timing refers to the "Galileo" timing.

The GANSS Measured Results IE contains one or several GANSS Generic Measurement Information IEs, each of them associated with a given GANSS:

- If a *GANSS Generic Measurement Information* IE does not contain the *GANSS ID* IE, the SAS shall assume that the associated GANSS is "Galileo".
- If a *GANSS Generic Measurement Information* IE associated with a particular GANSS does not contain the *GANSS Signal ID* IE, the SAS shall assume the default value as defined in TS 25.331 [4].
- If a *GANSS Generic Measurement Information* IE does not contain the *GANSS Code Phase Ambiguity* IE and the *GANSS Code Phase Ambiguity Extension* IE, the SAS shall assume the value "1" (ms).
- If the GANSS Integer Code Phase IE and the GANSS Integer Code Phase Extension IE associated to a given satellite (identified by the Sat ID IE value) is not present within the GANSS Measurement Parameters IE, the SAS shall use the default "1" (ms) for the GANSS Code Phase Ambiguity value in order to compute the value of the Total Code Phase (as defined in TS 25.331 [4]) for the related satellite, whatever the value of the GANSS Code Phase Ambiguity IE.

If an optional *Cell-ID IRAT Measured Results Sets* IE is included in the POSITION CALCULATION REQUEST message, the SAS shall, if supported, use this value for the calculation of the UE Position Estimate in case of RFPM positioning method is used. The SAS may use this value for the calculation of the UE Position when any other methods are used.

If the *IMSI* IE, or *IMEI* IE is included in the POSITION CALCULATION REQUEST message, the SAS may save these IEs for use in location session correlation.

Response Message:

If the SAS was able to calculate the position estimate, it shall respond with a POSITION CALCULATION RESPONSE message.

Whenever one of the geographic area shapes *Ellipsoid point with uncertainty Ellipse* IE, *Ellipsoid point with altitude* and uncertainty *Ellipsoid* IE or *Ellipsoid Arc* IE is reported, the *Confidence* IE shall indicate the probability that the UE is located within the uncertainty region of the shape. The value of the *Confidence* IE shall be in the interval of "1" to "100".

If at least the *Horizontal Accuracy Code* IE was included in the POSITION CALCULATION REQUEST message and the calculated position estimate fulfils the requested accuracy, the *Accuracy Fulfilment Indicator* IE with the value "requested accuracy fulfilled" shall be included in the POSITION CALCULATION RESPONSE message. If the calculated position estimate does not fulfil the requested accuracy, the *Accuracy Fulfilment Indicator* IE with the value "requested accuracy not fulfilled" shall be included in the POSITION CALCULATION RESPONSE message.

8.2.3 Unsuccessful Operation

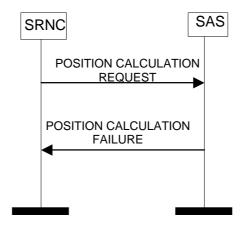


Figure 2: Position Calculation procedure, Unsuccessful Operation

If the SAS is unable to perform the position estimate for any reason, it shall return a POSITION CALCULATION FAILURE message to the SRNC.

Typical cause values are:

- Invalid reference information;
- Position calculation error: invalid GPS, Galileo, GLONASS or GANSS measured results;
- Initial UE Position Estimate missing;
- Processing Overload;
- Hardware Failure;
- O&M Intervention;
- Invalid U-TDOA measured results;
- U-TDOA positioning method not supported;
- U-TDOA positioning method not supported in specified UTRAN cell;
- SAS unable to perform U-TDOA positioning within Response Time.

8.2.4 Abnormal Conditions

If the *Vertical Accuracy Code* IE is included and the *Horizontal Accuracy Code* IE is not included in the POSITION CALCULATION REQUEST message, the SAS shall reject the procedure.

If the *RRC State* included in the *UTDOA Group* IE is indicated as being *CELL_DCH* in the POSITION CALCULATION REQUEST message and [FDD - neither the *DCH Information* IE nor the *E-DPCH Information* IE][TDD – no *DCH Information* IE] is included, the SAS shall reject the procedure using the POSITION CALCULATION FAILURE message.

If the *GPS Measured Results* IE is included in the POSITION CALCULATION REQUEST message but the *Initial UE Position Estimate* IE is not, the SAS shall return the POSITION CALCULATION FAILURE message to the SRNC.

If the *GANSS Measured Results* IE is included in the POSITION CALCULATION REQUEST message but the *Initial UE Position Estimate* IE is not, the SAS shall return the POSITION CALCULATION FAILURE message to the SRNC.

If neither of the GPS Measurement Results IE, the Cell-ID Measured Results Sets IE, the OTDOA Measurement Group IE nor the GANSS Measured Results IE is included in the POSITION CALCULATION REQUEST message, the SAS shall return the POSITION CALCULATION FAILURE message to the SRNC.

8.3 Information Exchange Initiation

8.3.1 General

This procedure is used by a RNC to request the initiation of an information exchange with a SAS.

This procedure uses the signalling bearer connection for the Information Exchange Context.

8.3.2 Successful Operation

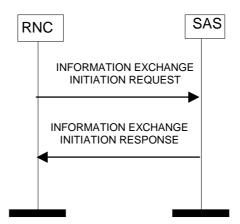


Figure 3: Information Exchange Initiation procedure, Successful Operation

The procedure is initiated with an INFORMATION EXCHANGE INITIATION REQUEST message sent from RNC to SAS.

If the Information Type IE is set to "Implicit", the SAS is responsible for selecting the type of assistance data.

Upon reception, the SAS shall provide the requested information according to the parameters given in the request. Unless specified below, the meaning of the parameters are given in other specifications.

If the *Information Exchange Object Type* IE is set to "Cell-ID Measured Results Sets" the SAS shall use the "Cell-ID Measured Results Info List" for obtaining an initial UE position estimate.

If the *GANSS-UTRAN Time Relationship Uncertainty* IE included in the INFORMATION EXCHANGE INITIATION REQUEST message does not contain the *GANSS ID* IE, the SAS shall assume that the *GANSS-UTRAN Time Relationship Uncertainty* IE is associated with "Galileo".

If the *Information Type* IE is set to "Explicit" and an *Explicit Information Item* IE is set to "GANSS Common Data", at least one of the GANSS Reference Time, GANSS Ionosphere Model, GANSS Reference Location, GANSS Additional Ionospheric Model, or GANSS Earth Orientation Parameters types shall be requested.

If the Information Type IE is set to "Explicit" and an Explicit Information Item IE is set to "GANSS Generic Data", at least one of the GANSS Real Time Integrity, GANSS Data Bit Assistance, DGANSS Corrections, GANSS Almanac and Satellite Health, GANSS Reference Measurement Information, GANSS UTC Model, GANSS Time Model GNSS-GNSS, GANSS Navigation Model, GANSS Additional Navigation Models, GANSS Additional UTC Models, or GANSS Auxiliary Information IEs shall be present in each GANSS Generic Data Item IE associated with a given GANSS.

- If the *GANSS Generic Data Item* IE does not contain the *GANSS ID* IE, the SAS shall assume that the corresponding GANSS is "Galileo".

Information Report Characteristics:

The Information Report Characteristics IE indicates how the reporting of the information shall be performed.

If the *Information Report Characteristics* IE is set to "On-Demand", the SAS shall report the requested information immediately.

If the *Information Report Characteristics* IE is set to "Periodic", the SAS shall report the requested information immediately and then shall periodically initiate the Information Reporting procedure for all the requested information, with the requested report frequency.

If the *Information Report Characteristics* IE is set to "On-Modification", the SAS shall report the requested information immediately if available. If the requested information is not available at the moment of receiving the INFORMATION EXCHANGE INITIATION REQUEST message, but expected to become available after some acquisition time, the SAS shall initiate the Information Reporting procedure when the requested information becomes available. The SAS shall then initiate the Information Reporting procedure in accordance to the following conditions:

- If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE includes "Almanac and Satellite Health", the SAS shall initiate the Information Reporting procedure for this specific Explicit Information Type when a change in the t_{oa} or WN_a parameter has occurred in almanac/health information for at least one visible satellite.
- If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE includes "UTC Model", the SAS shall initiate the Information Reporting procedure for this specific Explicit Information Type when a change in the t_{ot} or WN_t parameter has occurred in the GPS UTC model.
 - If the *Transmission TOW Indicator* IE is set to "requested", then the SAS shall include the *GPS Transmission TOW* IE in the INFORMATION REPORT message.
- If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE includes "Ionospheric Model", the SAS shall initiate the Information Reporting procedure for this specific Explicit Information Type when a change has occurred in the GPS ionospheric model.
 - If the *Transmission TOW Indicator* IE is set to "requested", then the SAS shall include the *GPS Transmission TOW* IE in the INFORMATION REPORT message.
- If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE includes "Navigation Model", the SAS shall initiate the Information Reporting procedure for this specific Explicit Information Type when a change has occurred in the clock/ephemeris information for at least one visible satellite or in the list of visible satellites.
 - If the *Transmission TOW Indicator* IE is set to "requested", then the SAS shall include the *GPS Transmission TOW* IE in the INFORMATION REPORT message.
- If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE includes "DGPS Corrections", the SAS shall initiate the Information Reporting procedure for this specific Explicit Information Type when a change has occurred in the quality of the DGPS corrections information for at least one visible satellite or in the list of visible satellites.
- If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE includes "Reference Time", the SAS shall initiate the Information Reporting procedure for this specific Explicit Information Type when a change has occurred in the time-of-week assistance information for at least one visible satellite or in the list of visible satellites.
- If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE includes "Acquisition Assistance", the SAS shall initiate the Information Reporting procedure for this specific Explicit Information Type when a change has occurred in acquisition assistance information for at least one visible satellite or in the list of visible satellites.
- If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE includes "Real Time Integrity", the SAS shall initiate the Information Reporting procedure for this specific Explicit Information Type when a change has occurred in the real-time integrity status of at least one visible satellite.

- If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE includes "Almanac and Satellite Health SIB", the SAS shall initiate the Information Reporting procedure for this specific Explicit Information Type when a change has occurred in almanac/health information for at least one visible satellite.
 - If the *Transmission TOW Indicator* IE is set to "requested", then the SAS shall include the *GPS Transmission TOW* IE in the INFORMATION REPORT message.
- If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE is set to "GANSS Generic Data" and includes the *GANSS Almanac and Satellite Health* IE, the SAS shall initiate the Information Reporting procedure for this specific Explicit Information Type when a change in the T_{oa}, IOD_a, or Week Number parameter has occurred in almanac/health information for at least one visible satellite.
 - If the *GANSS Time Indicator* IE is set to "requested", then the SAS shall include the *GANSS Reference Time* IE in the INFORMATION REPORT message.
- If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE is set to "GANSS Generic Data" and includes the *GANSS UTC Model* IE, the SAS shall initiate the Information Reporting procedure for this specific Explicit Information Type when a change in the t_{ot} or WN_t parameter has occurred in the GANSS UTC model.
 - If the *GANSS Time Indicator* IE is set to "requested", then the SAS shall include the *GANSS Reference Time* IE in the INFORMATION REPORT message.
- If the Information Type IE is set to "Explicit" and the Explicit Information Item IE is set to "GANSS Generic Data" and includes the GANSS Additional UTC Models IE, the SAS shall initiate the Information Reporting procedure for this specific Explicit Information Type when a change in the t_{ot}, WN_{ot}, WN_t, or N^A parameter has occurred in the GANSS Additional UTC model.
 - If the *GANSS Time Indicator* IE is set to "requested", then the SAS shall include the *GANSS Reference Time* IE in the INFORMATION REPORT message.
- If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE is set to "GANSS Common Data" and includes the *GANSS Ionosphere Model* IE, the SAS shall initiate the Information Reporting procedure for this specific Explicit Information Type when a change has occurred in the GANSS ionospheric model.
- If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE is set to "GANSS Common Data" and includes the *GANSS Additional Ionospheric Model* IE, the SAS shall initiate the Information Reporting procedure for this specific Explicit Information Type when a change has occurred in the GANSS additional ionospheric model.
 - If the *Data ID* IE is set to value "11", then the SAS shall include the *GANSS Additional Ionospheric Model* IE for the area as defined in IS-QZSS [27]. If the *Data ID* IE is set to value "00", then the SAS shall include the *GANSS Additional Ionospheric Model* IE applicable worldwide as defined in IS-QZSS [27].
- If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE is set to "GANSS Common Data" and includes the *GANSS Earth Orientation Parameters* IE, the SAS shall initiate the Information Reporting procedure for this specific Explicit Information Type when a change in the t_{EOP} parameter has occurred in the GANSS Earth Orientation Parameters.
- If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE is set to "GANSS Generic Data" and includes the *GANSS Navigation Model* IE, the SAS shall initiate the Information Reporting procedure for this specific Explicit Information Type when a change has occurred in the ephemeris information for at least one visible satellite or in the list of visible satellites.
- If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE is set to "GANSS Generic Data" and includes the *GANSS Additional Navigation Models* IE, the SAS shall initiate the Information Reporting procedure for this specific Explicit Information Type when a change has occurred in the ephemeris information for at least one visible satellite or in the list of visible satellites.
- If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE is set to "GANSS Generic Data" and includes the *GANSS Time Model GNSS-GNSS* IE, the SAS shall initiate the Information Reporting procedure for this specific Explicit Information Type when a change has occurred in the time information.
 - If the *GANSS Time Indicator* IE is set to "requested", then the SAS shall include the *GANSS Reference Time* IE in the INFORMATION REPORT message.

- If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE is set to "GANSS Generic Data" and includes the *DGANSS Corrections* IE, the SAS shall initiate the Information Reporting procedure for this specific Explicit Information Type when a change has occurred in the quality of the DGANSS corrections information for at least one visible satellite or in the list of visible satellites.
 - If the *GANSS Time Indicator* IE is set to "requested", then the SAS shall include the *GANSS Reference Time* IE in the INFORMATION REPORT message.
- If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE is set to "GANSS Common Data" and includes the *GANSS Reference Time* IE, the SAS shall initiate the Information Reporting procedure for this specific Explicit Information Type when a change has occurred in the time-of-week assistance information for at least one visible satellite or in the list of visible satellites.
- If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE is set to "GANSS Generic Data" and includes the *GANSS Reference Measurement Information* IE, the SAS shall initiate the Information Reporting procedure for this specific Explicit Information Type when a change has occurred in acquisition assistance information for at least one visible satellite or in the list of visible satellites.
 - If the *GANSS Time Indicator* IE is set to "requested", then the SAS shall include the *GANSS Reference Time* IE in the INFORMATION REPORT message.
- If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE is set to "GANSS Generic Data" and includes the *GANSS Real Time Integrity* IE, the SAS shall initiate the Information Reporting procedure for this specific Explicit Information Type when a change has occurred in the real-time integrity status of at least one visible satellite.
 - If the *GANSS Time Indicator* IE is set to "requested", then the SAS shall include the *GANSS Reference Time* IE in the INFORMATION REPORT message.
- If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE is set to "GANSS Generic Data" and includes the *GANSS Auxiliary Information* IE, the SAS shall initiate the Information Reporting procedure for this specific Explicit Information Type when a change in the *Signals Available* or *Channel Number* IEs has occurred in the GANSS Auxiliary Information.
 - If the *GANSS Time Indicator* IE is set to "requested", then the SAS shall include the *GANSS Reference Time* IE in the INFORMATION REPORT message.
- If any of the above *Information Type* IEs becomes temporarily unavailable, the SAS shall initiate the Information Reporting procedure for this specific Information Item by indicating "Information Not Available" in the *Requested Data Value Information* IE. If the Information becomes available again, the SAS shall initiate the Information Reporting procedure for this specific Information.

If the *IMSI* IE, or *IMEI* IE is included in the INFORMATION EXCHANGE INITIATION REQUEST message, the SAS may save these IEs for use in location session correlation.

Response message:

If the SAS is able to determine the information requested by the RNC, it shall respond with the INFORMATION EXCHANGE INITIATION RESPONSE message. The message shall include the same Information Exchange ID that was included in the INFORMATION EXCHANGE INITIATION REQUEST message. When the *Report Characteristics* IE is set to "On Modification" or "Periodic", the INFORMATION EXCHANGE INITIATION RESPONSE message shall contain the *Requested Data Value* IE if the data are available. When the *Report Characteristics* IE is set to "On Demand", the INFORMATION EXCHANGE INITIATION RESPONSE message shall contain the *Requested Data Value* IE.

When the response message includes data to be reported (see above), the SAS shall include at least one IE in the *Requested Data Value* IE.

If the Requested Data Value IE contains the GANSS Common Assistance Data IE, at least one of the GANSS Reference Time, GANSS Ionospheric Model, GANSS Reference Location, GANSS Additional Ionospheric Model, or GANSS Earth Orientation Parameters IEs shall be present.

- If the *GANSS Reference Time* IE does not contain the *GANSS Time ID* IE, the corresponding GANSS timing refers to the "Galileo" timing.

Any GANSS Generic Assistance Data IE associated with a given GANSS included in the Requested Data Value IE shall contain at least one of the GANSS Real Time Integrity, GANSS Data Bit Assistance, DGANSS Corrections, GANSS Almanac and Satellite Health, GANSS Reference Measurement Information, GANSS UTC Model, GANSS Time Model, GANSS Navigation Model, GANSS Additional Time Models, GANSS Additional Navigation Models, GANSS Additional UTC Models, or GANSS Auxiliary Information IEs.

- If the GANSS Generic Assistance Data IE does not contain the GANSS ID IE, the corresponding GANSS is "Galileo".
- The *DGANSS Corrections* IE contains one or several *DGANSS Information* IE(s), each of them associated with a GANSS Signal. A *DGANSS Information* IE for a particular GANSS that does not contain the *GANSS Signal ID* IE is by default associated with the default signal defined in TS 25.331 [4].
- The *GANSS Real Time Integrity* IE contains one or several *Satellite Information* IEs, each of them associated with a satellite and a GANSS Signal. A *Satellite Information* IE for a particular GANSS that does not contain the *Bad GANSS Signal ID* IE is by default associated with all the signals of the corresponding satellite (see OS SIS ICD [22], IS-GPS-200 [23], IS-GPS-705 [24], IS-GPS-800 [25], DTFA01-96-C-00025 [26], IS-QZSS [27], [28]).
- The GANSS Reference Measurement Information IE is associated with a GANSS Signal. A GANSS Reference Measurement Information IE for a particular GANSS that does not contain the GANSS Signal ID IE is by default associated with the default signal defined in TS 25.331 [4].

If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE is set to "GANSS Generic Data" and includes the *GANSS Time Model GNSS-GNSS* IE with exactly one bit set to value "1" in the *GNSS-GNSS Time ext* IE, the SAS shall include the *GANSS Time Model* IE in the *Requested Data Value* IE with the requested time information.

If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE is set to "GANSS Generic Data" and includes the *GANSS Time Model GNSS-GNSS* IE with more than one bit set to value "1" in the *GNSS-GNSS Time ext* IE, the SAS shall include the *GANSS Additional Time Models* IE in *Requested Data Value* IE with the requested time information for each GANSS.

If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE is set to "DGPS Corrections", the SAS shall include the *DGPS Corrections* IE in *Requested Data Value* IE with the *DGNSS Validity Period* IE included, if available.

If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE is set to "DGANSS Corrections", the SAS shall include the *DGANSS Corrections* IE in *Requested Data Value* IE with the *DGNSS Validity Period* IE included, if available.

If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE is set to "Acquisition Assistance", the SAS shall include the *GPS Acquisition Assistance* IE in *Requested Data Value* IE with the *Azimuth and Elevation* and *Azimuth and Elevation LSB* IEs included, if available.

If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE is set to "Almanac and Satellite Health", the SAS shall include the *GPS Almanac and Satellite Health* IE in *Requested Data Value* IE with the *Complete Almanac Provided* IE included, if available.

If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE is set to "Reference Time", the SAS shall include the *GPS Reference Time* IE in *Requested Data Value* IE with the *GPS Week Cycle Number* IE included, if available.

If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE is set to "GANSS Almanac and Satellite Health", the SAS shall include the *GANSS Almanac and Satellite Health* IE in *Requested Data Value* IE with the *Complete Almanac Provided* IE included, if available.

If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE is set to "GANSS Reference Measurement Information", the SAS shall include the *GANSS Reference Measurement Information* IE in *Requested Data Value* IE with the *Azimuth and Elevation* and *Azimuth and Elevation LSB* IEs included, if available.

If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE is set to "GANSS Reference Time", the SAS shall include the *GANSS Reference Time* IE in *Requested Data Value* IE with the *GANSS Day Cycle Number* IE included, if available.

If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE is set to "GANSS Time Model GNSS-GNSS", the SAS shall include the *GANSS Time Model* IE in *Requested Data Value* IE with the *Delta_T* IE included, if available.

8.3.3 Unsuccessful Operation

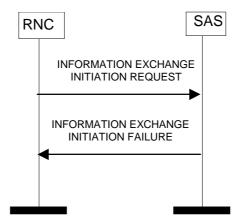


Figure 4: Information Exchange Initiation procedure, Unsuccessful Operation

If the requested Information Type received in the *Information Type* IE indicates a type of information that SAS cannot provide, the SAS shall regard the Information Exchange Initiation procedure as failed.

If the requested information provision cannot be carried out, the SAS shall send the INFORMATION EXCHANGE INITIATION FAILURE message. The message shall include the same Information Exchange ID that was used in the INFORMATION EXCHANGE INITIATION REQUEST message and the *Cause* IE set to an appropriate value.

Typical cause values are as follows:

- Information temporarily not available;
- Information Provision not supported for the object;
- Processing Overload;
- Hardware Failure;
- O&M Intervention.

8.3.4 Abnormal Conditions

If the *Information Exchange Object Type* IE is set to "Reference Position" and the *Information Type* IE set to "Explicit" and the *Explicit Information Item* IE is set to "Reference Location" or "GANSS Reference Location" the SAS shall reject the Information Exchange Initiation procedure and shall send the INFORMATION EXCHANGE INITIATION FAILURE message.

The allowed combinations of the Information Type and Information Report Characteristics are shown in the table below marked with "X". For not allowed combinations, the SAS shall reject the Information Exchange Initiation procedure using the INFORMATION EXCHANGE INITIATION FAILURE message.

Table 3a: Allowed Information Type and Information Report Characteristics combinations

Туре	Information Report Characteristics Type		
	On Demand	Periodic	On Modification
Almanac and Satellite Health	X	X	X
UTC Model	X	X	X
Ionospheric Model	X	X	X
Navigation Model	X	X	X
DGPS	X	X	X
Corrections			
Reference Time	X	X	X
Acquisition Assistance	X	X	X
Real Time Integrity	X	X	X
Almanac and Satellite Health SIB	X	X	X
Reference Location	X		
GANSS Reference Time	X	X	X
GANSS Ionosphere Model	X	X	X
GANSS Reference Location	X		
GANSS Additional Ionospheric Model	X	X	X
GANSS Earth Orientation Parameters	X	X	X
GANSS Real Time Integrity	X	X	X
GANSS Data Bit Assistance	X	X	
DGANSS Corrections	X	X	X
GANSS Almanac and Satellite Health	X	X	X
GANSS Reference Measurement Information	X	X	X
GANSS UTC Model	X	X	X
GANSS Time Model GNSS-GNSS	X	X	X
GANSS Navigation Model	X	X	X
GANSS Additional Navigation Models	X	X	X
GANSS Additional UTC Models	X	X	X
GANSS Auxiliary Information	X	X	X

8.4 Information Reporting

8.4.1 General

This procedure is used by a SAS to report the result of information requested by a RNC using the Information Exchange Initiation.

This procedure uses the signalling bearer connection for the Information Exchange Context.

8.4.2 Successful Operation



Figure 5: Information Reporting procedure, Successful Operation

If the requested information reporting criteria are met, the SAS shall initiate an Information Reporting procedure. Unless specified below, the meaning of the parameters are given in other specifications.

The *Information Exchange ID* IE shall be set to the Information Exchange ID provided by the RNC when initiating the information exchange with the Information Exchange Initiation procedure.

The Requested Data Value IE shall include at least one IE containing the data to be reported.

If the Requested Data Value IE contains the GANSS Common Assistance Data IE, at least one of the GANSS Reference Time, GANSS Ionospheric Model, GANSS Reference Location, GANSS Additional Ionospheric Model, or GANSS Earth Orientation Parameters IEs shall be present.

Any GANSS Generic Assistance Data IE associated with a given GANSS included in the Requested Data Value IE shall contain at least one of the GANSS Real Time Integrity, GANSS Data Bit Assistance, DGANSS Corrections, GANSS Almanac and Satellite Health, GANSS Reference Measurement Information, GANSS UTC Model, GANSS Time Model, GANSS Navigation Model, GANSS Additional Time Models, GANSS Additional Navigation Models, GANSS Additional UTC Models, or GANSS Auxiliary Information IEs.

- If the GANSS Generic Assistance Data IE does not contain the GANSS ID IE, the corresponding GANSS is "Galileo".
- The *DGANSS Corrections* IE contains one or several *DGANSS Information* IE(s), each of them associated with a GANSS Signal. A *DGANSS Information* IE for a particular GANSS that does not contain the *GANSS Signal ID* IE is by default associated with the default signal defined in TS 25.331 [4].
- The *GANSS Real Time Integrity* IE contains one or several *Satellite Information* IEs, each of them associated with a satellite and a GANSS Signal. A *Satellite Information* IE for a particular GANSS that does not contain the *Bad GANSS Signal ID* IE is by default associated with all the signals of the corresponding satellite (see OS SIS ICD [22], IS-GPS-200 [23], IS-GPS-705 [24], IS-GPS-800 [25], DTFA01-96-C-00025 [26], IS-QZSS [27], [28]).
- The GANSS Reference Measurement Information IE is associated with a GANSS Signal. A GANSS Reference Measurement Information IE for a particular GANSS that does not contain the GANSS Signal ID IE is by default associated with the default signal defined in TS 25.331 [4].

If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE is set to "GANSS Generic Data" and includes the *GANSS Time Model GNSS-GNSS* IE with exactly one bit set to value "1" in the *GNSS-GNSS Time ext* IE, the SAS shall include the *GANSS Time Model* IE in the *Requested Data Value* IE with the requested time information.

If the *Information Type* IE is set to "Explicit" and the *Explicit Information Item* IE is set to "GANSS Generic Data" and includes the *GANSS Time Model GNSS-GNSS* IE with more than one bit set to value "1" in the *GNSS-GNSS Time ext* IE, the SAS shall include the *GANSS Additional Time Models* IE in *Requested Data Value* IE with the requested time information for each GANSS.

8.4.3 Abnormal Conditions

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8.5 Information Exchange Termination

8.5.1 General

This procedure is used by a RNC to terminate the information exchange requested using the Information Exchange Initiation.

This procedure uses the signalling bearer connection for the Information Exchange Context.

8.5.2 Successful Operation

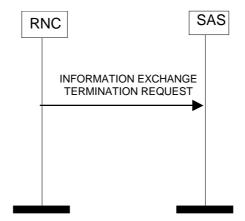


Figure 6: Information Exchange Termination procedure, Successful Operation

This procedure is initiated with an INFORMATION EXCHANGE TERMINATION REQUEST message.

Upon reception, the SAS shall terminate the information exchange corresponding to the Information Exchange ID.

8.5.3 Abnormal Conditions

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8.6 Information Exchange Failure

8.6.1 General

This procedure is used by a SAS to notify a RNC that the information exchange it previously requested using the Information Exchange Initiation can no longer be reported.

This procedure uses the signalling bearer connection for the Information Exchange Context.

8.6.2 Successful Operation

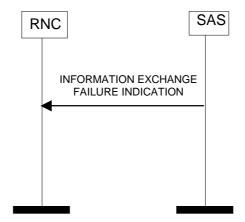


Figure 7: Information Exchange Failure procedure, Successful Operation

This procedure is initiated with a INFORMATION EXCHANGE FAILURE INDICATION message, sent from the SAS to the RNC, to inform the RNC that information previously requested by the Information Exchange Initiation procedure can no longer be reported. The message shall include the same Information Exchange ID that was used in the INFORMATION EXCHANGE INITIATION REQUEST message and the *Cause* IE set to an appropriate value.

Typical cause values are as follows:

- Information temporarily not available.

8.7 Error Indication

8.7.1 General

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

8.7.2 Successful Operation

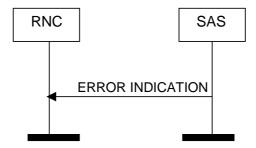


Figure 8: Error Indication procedure, SAS Originated, Successful Operation

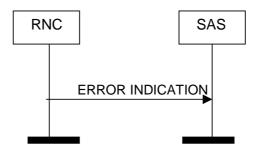


Figure 9: Error Indication procedure, RNC Originated, Successful Operation

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. This message shall use the same mode of the signalling bearer and the same signalling bearer connection (if connection oriented) as the message that triggers the procedure.

The ERROR INDICATION message shall include either the *Cause* IE, or the *Criticality Diagnostics* IE, or both the *Cause* IE and the *Criticality Diagnostics* IE.

Typical cause values are as follows:

- Transfer Syntax Error;
- Abstract Syntax Error (Reject);
- Abstract Syntax Error (Ignore and Notify);
- Message not Compatible with Receiver State;
- Unspecified.

8.7.3 Abnormal Conditions

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8.8 Position Initiation

8.8.1 General

This procedure is used by an SRNC to request from an SAS the position (non-periodic or periodic) of a UE using the SAS centric mode of operation.

The connection-oriented service of the signalling bearer shall be established in conjunction with this procedure.

8.8.2 Successful Operation

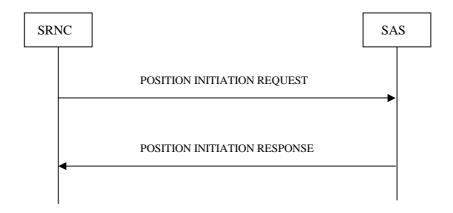


Figure 9a: Position Initiation procedure, Successful Operation

This procedure is initiated with a POSITION INITIATION REQUEST message sent from the SRNC to the SAS and ends with a POSITION INITIATION RESPONSE message from the SAS to the SRNC.

The POSITION INITIATION REQUEST message may contain one or several *Network Assisted GANSS Support* IE(s), each of them indicating the UE position capability with regard to GANSS.

- If a *Network Assisted GANSS Support* IE does not contain the *GANSS ID* IE, the SAS shall assume that the corresponding GANSS is "Galileo".
- If a *Network Assisted GANSS Support* IE corresponding to a particular GANSS does not contain the *GANSS Signal ID* IE and the *GANSS Signal IDs* IE, the SAS shall assume that the corresponding GANSS Signal is the default signal defined in TS 25.331 [4].

If the *IMSI* IE, or *IMEI* IE is included in the in POSITION INITIATION REQUEST message, the SAS may save these IEs for use in location session correlation.

Response Message:

If the POSITION INITIATION REQUEST message contains a request for direct reporting, and following completion of one or more positioning attempts, possibly using multiple positioning methods, the SAS shall pass the UE position to the SRNC in a POSITION INITIATION RESPONSE message.

If the POSITION INITIATION REQUEST message contains a request for periodic reporting, the SAS shall pass the final UE position to the SRNC in a POSITION INITIATION RESPONSE message.

Whenever one of the geographic area shapes *Ellipsoid point with uncertainty Ellipse* IE, *Ellipsoid point with altitude and uncertainty Ellipsoid* IE or *Ellipsoid Arc* IE is reported, the *Confidence* IE shall indicate the probability that the UE is located within the uncertainty region of the shape. The value of the *Confidence* IE shall be in the interval of "1" to "100".

If at least the *Horizontal Accuracy Code* IE was included in the POSITION INITIATION REQUEST message and the calculated position estimate fulfils the requested accuracy, the *Accuracy Fulfilment Indicator* IE with the value "requested accuracy fulfilled" shall be included in the POSITION INITIATION RESPONSE message. If the calculated

position estimate does not fulfil the requested accuracy, the *Accuracy Fulfilment Indicator* IE with the value "requested accuracy not fulfilled" shall be included in the POSITION INITIATION RESPONSE message.

8.8.3 Unsuccessful Operation

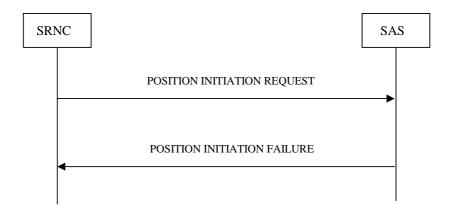


Figure 9b: Position Initiation procedure, Unsuccessful Operation

When the SAS is unable to accept a POSITION INITIATION REQUEST message or the SAS cannot provide a position estimate in case of direct reporting, the POSITION INITIATION FAILURE message shall be sent to the SRNC.

Typical cause values are:

- Processing Overload;
- Hardware Failure;
- O&M Intervention;
- Information temporarily not available.

8.8.4 Abnormal Conditions

If the *Vertical Accuracy Code* IE is included and the *Horizontal Accuracy Code* IE is not included in the POSITION INITIATION REQUEST message, the SAS shall reject the procedure.

8.9 Position Activation

8.9.1 General

The purpose of the Position Activation procedure is to enable the SAS to initiate a particular positioning method used for an individual positioning event. This procedure uses connection-oriented signalling.

8.9.2 Successful Operation

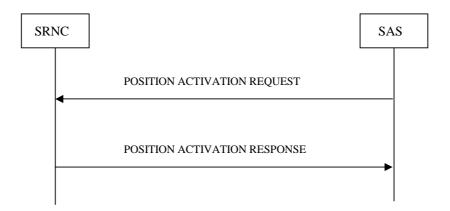


Figure 9c: Position Activation procedure, Successful Operation

The SAS initiates this procedure by sending a POSITION ACTIVATION REQUEST message to the SRNC containing the required positioning method and any assistance data and instructions associated with that positioning method. The SRNC then sends a POSITION ACTIVATION RESPONSE message to the SAS confirming the requested action and providing any information required by the requested positioning method; e.g. UE channel information for the U-TDOA positioning method or A-GPS measurements for UE assisted A-GPS. In the POSITION ACTIVATION RESPONSE message, the SRNC should include either the UE Position Estimate Info IE, GPS Measurement Results IE, Cell-ID Measured Results Sets IE, OTDOA Measured Results Sets IE, UTDOA Group IE, GANSS Measurement Results IE, Required GPS Assistance Data IE or Required GANSS Assistance Data IE.

If the *Positioning Method* IE in a POSITION ACTIVATION REQUEST message includes the *GNSS Positioning Method* IE indicating allowance of "GPS" and any other GNSS ("Galileo", "SBAS", "Modernized GPS", "QZSS", "GLONASS"), the SRNC may include both, the *GPS Measurement Results* IE and the *GANSS Measurement Results* IE, or both, the *Required GPS Assistance Data* IE or *Required GANSS Assistance Data* IE in the POSITION ACTIVATION RESPONSE message.

If the POSITION ACTIVATION REQUEST message contains periodic reporting information to start a periodic RNC positioning procedure (i.e., *Amount of Reporting* IE is included), the POSITION ACTIVATION RESPONSE message may be returned confirming the requested action and not including any measurements. In that case, all periodic measurement reports are conveyed using POSITION PERIODIC REPORT messages.

If the GPS Positioning Instructions IE or the GANSS Positioning Instructions IE is included in a POSITION ACTIVATION REQUEST message containing the Measurement Validity IE, the SRNC should include the Measurement Instructions Used IE in a POSITION ACTIVATION RESPONSE message if the Measurement Validity used by the SRNC is different from the Measurement Validity requested by the SAS.

If the *GERAN* IE is included in the *Requested Cell-ID Measurements* IE in the *Cell-ID Positioning* IE, the SRNC shall use it to determine the requested inter-RAT measurements.

If the POSITION ACTIVATION REQUEST message contains the *Position Method* IE with value "Cell ID", the *Amount of Reporting* IE shall not be included. If the POSITION ACTIVATION REQUEST message contains the *Position Method* IE with value 'Cell ID' the *Amount of Reporting* IE shall not be included.

If the POSITION ACTIVATION REQUEST message contains the *Position Method* IE with value "Cell ID", the RNC may include the measurements requested in the *Requested Cell-ID Measurements* IE in the POSITION ACTIVATION RESPONSE message. If the RNC includes the measurements in the *Requested Cell-ID Measurements* IE it shall, if supported, do so for all cells (i.e. those in the active, monitored and detected sets) for which measurements are available from the UE. If both of the *Round Trip Time Info* IE and the *Round Trip Time Info With Type 1* IE are included in the POSITION ACTIVATION RESPONSE message, the SAS shall use the *Round Trip Time Info* IE.

If the SRNC receives a new POSITION ACTIVATION REQUEST message before it has responded to a previous non-periodic request, the SRNC should terminate all activity for the previous request, without sending any response to the initial request, and process the new request.

If the SRNC receives a new POSITION ACTIVATION REQUEST message for UE position measurement reporting using A-GPS or A-GANSS or OTDOA (periodic or non-periodic) while it is still performing activity for a previous A-GPS or A-GANSS or OTDOA periodic request, the SRNC should terminate all activity for the previous request, including terminating the periodic measurement reporting in the UE, and should process the new request.

If the SRNC receives a new POSITION ACTIVATION REQUEST message for Cell-ID or U-TDOA positioning while it is still performing activity for a previous A-GPS or A-GANSS or OTDOA periodic request (but after returning any POSITION ACTIVATION RESPONSE for this request), the SRNC may both continue with the previous request and process the new request.

If the GANSS Positioning IE is included in the POSITION ACTIVATION REQUEST message and contains the Requested Data Value IE:

- If the GANSS Generic Assistance Data IE, associated with a given GANSS, is included in the Requested Data Value IE, it shall contain a GANSS Real Time Integrity, GANSS Data Bit Assistance, DGANSS Corrections, GANSS Almanac and Satellite Health, GANSS Reference Measurement Information, GANSS UTC Model, GANSS Time Model, GANSS Navigation Model, GANSS Additional Time Models, GANSS Additional Navigation Models, GANSS Additional UTC Models, or GANSS Auxiliary Information IE.
 - If the GANSS Generic Assistance Data IE does not contain the GANSS ID IE, the corresponding GANSS is "Galileo".
 - The *DGANSS Corrections* IE contains one or several *DGANSS Information* IE(s), each of them associated with a GANSS Signal. A *DGANSS Information* IE for a particular GANSS that does not contain the *GANSS Signal ID* IE is by default associated with the default signal defined in TS 25.331 [4].
 - The *GANSS Real Time Integrity* IE contains one or several *Satellite Information* IEs, each of them associated with a satellite and a GANSS Signal. A *Satellite Information* IE for a particular GANSS that does not contain the *Bad GANSS Signal ID* IE is by default associated with all the signals of the corresponding satellite (see OS SIS ICD [22], IS-GPS-200 [23], IS-GPS-705 [24], IS-GPS-800 [25], DTFA01-96-C-00025 [26], IS-QZSS [27], [28]).
 - The *GANSS Reference Measurement Information* IE is associated with a GANSS Signal. A *GANSS Reference Measurement Information* IE for a particular GANSS that does not contain the *GANSS Signal ID* IE is by default associated with the default signal defined in TS 25.331 [4].

If the RRC State included in the *UTDOA Group* IE is indicated as being *CELL_DCH* in the POSITION ACTIVATION RESPONSE message, [FDD - either the *DCH Information* IE or the *E-DPCH Information* IE][TDD - the *DCH Information* IE] should be included.

If the *GANSS Measured Results* IE is included in the POSITION ACTIVATION RESPONSE message and does not contain the *GANSS Time ID* IE, the SAS shall assume that the corresponding GANSS timing refers to the "Galileo" timing.

The GANSS Measured Results IE contains one or several GANSS Generic Measurement Information IEs, each of them associated with a given GANSS:

- If a *GANSS Generic Measurement Information* IE does not contain the *GANSS ID* IE, the SAS shall assume that the associated GANSS is "Galileo".
- If a *GANSS Generic Measurement Information* IE associated with a particular GANSS does not contain the *GANSS Signal ID* IE, the SAS shall assume the default value as defined in TS 25.331 [4].
- If a *GANSS Generic Measurement Information* IE does not contain the *GANSS Code Phase Ambiguity* IE and the *GANSS Code Phase Ambiguity Extension* IE, the SAS shall assume the value "1" (ms).
- If the GANSS Integer Code Phase IE and the GANSS Integer Code Phase Extension IE associated to a given satellite (identified by the Sat ID IE value) is not present within the GANSS Measurement Parameters IE, the SAS shall use the default "1" (ms) for the GANSS Code Phase Ambiguity value in order to compute the value of the Total Code Phase (as defined in TS 25.331 [4]) for the related satellite, whatever the value of the GANSS Code Phase Ambiguity IE.

If the *OTDOA Measured Results Sets* IE is included in the POSITION ACTIVATION RESPONSE message the SRNC should also include the *OTDOA Reference Cell Info*. The SAS shall use the cell identified in the *OTDOA Reference Cell Info* IE as reference cell for the measurements provided in the *OTDOA Measured Results Info List* IE.

If an optional *Cell-ID IRAT Measured Results Sets* IE is included in the POSITION ACTIVATION RESPONSE message, the SAS shall, if supported, use this value for the calculation of the UE Position Estimate in case of RFPM positioning method is used. The SAS may use this value for the calculation of the UE Position when any other methods are used.

8.9.3 Unsuccessful Operation

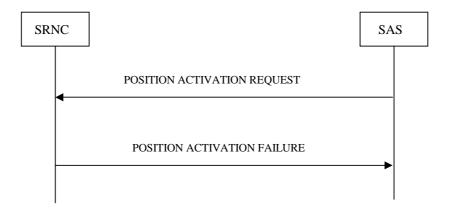


Figure 9d: Position Activation procedure, Unsuccessful Operation

When the SRNC is unable to accept a POSITION ACTIVATION REQUEST message, the POSITION ACTIVATION FAILURE message should be sent to the SAS.

Typical cause values are:

- Processing Overload;
- Hardware Failure:
- O&M Intervention;
- Positioning Method Not Supported;
- Location Measurement Failure.

8.9.4 Abnormal Conditions

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8.10 Position Parameter Modification

8.10.1 General

The purpose of the Position Parameter Modification procedure is to inform the SAS of any relevant changes to the RF connection or other changes during a positioning event. This procedure uses connectionless signalling when invoked in RNC centric mode and connection-oriented signalling when invoked in SAS centric mode.

8.10.2 Successful Operation



Figure 9e: Position Parameter Modification procedure, Successful Operation

If the SAS receives a POSITION PARAMETER MODIFICATION message, the SAS shall apply the information to the ongoing position estimate (e.g. reconfigure LMUs for U-TDOA) or to a new positioning attempt (e.g. use new serving cell to provide A-GPS assistance data). If there is more than one signalling connection for a UE, the SRNC should send the POSITION PARAMETER MODIFICATION message on each connection. When operating in the RNC centric mode the *Transaction ID* IE should be used to associate the POSITION PARAMETER MODIFICATION message to the correct positioning event.

In the POSITION PARAMETER MODIFICATION message, only one of the *UTRAN Cell Identifier* IE or the *UTDOA GROUP* IE should be included.

The SRNC should send a POSITION PARAMETER MODIFICATION message if an RRC measurement procedure for periodic UE positioning measurement reporting in the UE has been activated by the SRNC upon reception of a POSITION ACTIVATION REQUEST message, and if there is a RRC state transition during the RRC measurement procedure, which does not result in a termination of the UE measurement reporting. The SRNC should continue to notify the SAS of such RRC state changes until the periodic position measurement reporting has been completed or terminated.

8.10.3 Abnormal Conditions

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8.11 Abort

8.11.1 General

The purpose of the Abort procedure is to inform the SAS that the RNC is unable to continue the current positioning activity for a particular UE. This procedure uses connectionless signalling when invoked in RNC centric mode and connection-oriented signalling when invoked in SAS centric mode.

8.11.2 Successful Operation

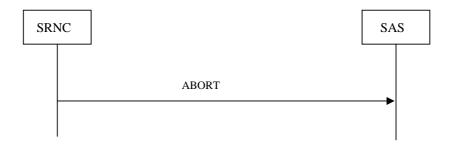


Figure 9f: Abort procedure, Successful Operation

The SRNC should send an ABORT message when the SRNC is unable to continue positioning activity due to cell reselection that results in a different SRNC, loss of contact with the UE or any other reason. When operating in the RNC centric mode the *Transaction ID* IE should be used to associate the ABORT message to the correct positioning event.

If the SAS receives an ABORT message while in the SAS centric mode it should immediately cease positioning attempts and return a POSITION INITIATION RESPONSE message to the SRNC carrying any location estimate already obtained or a POSITION INITIATION FAILURE message if no location estimate was obtained.

If the SAS receives an ABORT message while in the RNC centric mode it should immediately cease positioning attempts and return a POSITION CALCULATION RESPONSE message to the SRNC carrying any location estimate already obtained or a POSITION CALCULATION FAILURE message if no location estimate was obtained. After sending an ABORT message the SRNC should cease positioning activity, if any.

Typical cause values are:

- Processing Overload;
- Hardware Failure;
- O&M Intervention;
- Loss of contact with the UE.

8.11.3 Abnormal Conditions

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8.12 Position Periodic Report

8.12.1 General

The purpose of the Position Periodic Report procedure is to send measurement information or UE position estimate from the SRNC to the SAS for periodic location in SAS-centric mode. This procedure uses connection-oriented signalling.

8.12.2 Successful Operation



Figure 9g: Position Periodic Report procedure, Successful Operation

This procedure is initiated with a POSITION PERIODIC REPORT message sent from the SRNC to the SAS. The POSITION PERIODIC REPORT message provides the SAS measurement information such as GPS or OTDOA measurements, or an indication of measurement failure.

The SRNC should send the first POSITION PERIODIC REPORT message one reporting interval after the POSITION ACTIVATION RESPONSE message, and should continue to send further POSITION PERIODIC REPORT messages one reporting interval after the previous POSITION PERIODIC REPORT message based on the available measurements. If the RNC can not deliver measurement information when a POSITION PERIODIC REPORT is triggered, the *Cause* IE should be included in the POSITION PERIODIC REPORT message, indicating the reason for measurement failure, e.g. "UE Positioning Error: Not enough OTDOA cells", "UE Positioning Error: Not enough GPS

Satellites", "UE Positioning Error: Not Accomplished GPS Timing of Cell Frames" or "UE Positioning Error: Undefined Error". If the *Cause* IE is included in a POSITION PERIODIC REPORT message, the *UE Position Estimate Info* IE, *Velocity Estimate* IE, *GPS Measurement Results* IE, *GANSS Measurement Results* IE, *Cell-ID Measured Results Sets* IE, and *OTDOA Measured Results Sets* IE should not be included. If and only if the *Cause* IE indicates the error reason "UE Positioning Error: Assistance Data Missing" the SRNC may include the *Required GPS Assistance Data* IE and/or the *Required GANSS Assistance Data* IE in the POSITION PERIODIC REPORT message.

If the *Cell-ID Measured Results Sets* IE is included in the POSITION PERIODIC REPORT message and both of the *Round Trip Time Info* IE and the *Round Trip Time Info With Type 1* IE are included in the *Cell-ID Measured Results Info List* IE, the SAS shall use the *Round Trip Time Info* IE.

If the *GANSS Measured Results* IE is included in the POSITION PERIODIC REPORT message and does not contain the *GANSS Time ID* IE, the SAS shall assume that the corresponding GANSS timing refers to the "Galileo" timing.

The GANSS Measured Results IE contains one or several GANSS Generic Measurement Information IEs, each of them associated with a given GANSS:

- If a *GANSS Generic Measurement Information* IE does not contain the *GANSS ID* IE, the SAS shall assume that the associated GANSS is "Galileo".
- If a *GANSS Generic Measurement Information* IE associated with a particular GANSS does not contain the *GANSS Signal ID* IE, the SAS shall assume the default value as defined in TS 25.331 [4].
- If a *GANSS Generic Measurement Information* IE does not contain the *GANSS Code Phase Ambiguity* IE and the *GANSS Code Phase Ambiguity Extension* IE, the SAS shall assume the value "1" (ms).
- If the GANSS Integer Code Phase IE and the GANSS Integer Code Phase Extension IE associated to a given satellite (identified by the Sat ID IE value) is not present within the GANSS Measurement Parameters IE, the SAS shall use the default "1" (ms) for the GANSS Code Phase Ambiguity value in order to compute the value of the Total Code Phase (as defined in TS 25.331 [4]) for the related satellite, whatever the value of the GANSS Code Phase Ambiguity IE.

If the *OTDOA Measured Results Sets* IE is included in the POSITION PERIODIC REPORT message the SRNC should also include the *OTDOA Reference Cell Info*. The SAS shall use the cell identified in the *OTDOA Reference Cell Info* IE as reference cell for the measurements provided in the *OTDOA Measured Results Info List* IE.

If an optional *Cell-ID IRAT Measured Results Sets* IE is included in the POSITION PERIODIC REPORT message, the SAS shall, if supported, use this value for the calculation of the UE Position Estimate in case of RFPM positioning method is used. The SAS may use this value for the calculation of the UE Position when any other methods are used.

8.12.3 Abnormal Conditions

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8.13 Position Periodic Result

8.13.1 General

The purpose of the Position Periodic Result procedure is to provide UE position estimates from the SAS to the SRNC for periodic location in SAS-centric mode. This procedure uses connection-oriented signalling.

8.13.2 Successful Operation

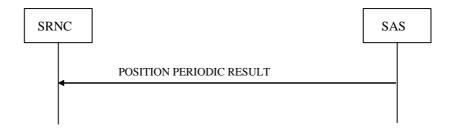


Figure 9h: Position Periodic Result procedure, Successful Operation

This procedure is initiated with a POSITION PERIODIC RESULT message sent from the SAS to the SRNC. The POSITION PERIODIC RESULT message conveys the UE position estimate (or an indication of positioning failure) from the SAS to the SRNC.

The SAS shall send a POSITION PERIODIC RESULT message one reporting interval after the previous POSITION PERIODIC RESULT message. If the SAS can not deliver measurement information when a POSITION PERIODIC RESULT is triggered, the *Cause* IE shall be included in the POSITION PERIODIC RESULT message, indicating the reason for measurement failure, e.g. 'Position Calculation error: invalid GPS measured results', 'Position Calculation error: invalid OTDOA measured results' or 'Position Calculation error: invalid Cell-ID measured results', 'Position Calculation error: invalid U-TDOA measured results'. If the *Cause* IE is included in a POSITION PERIODIC RESULT message, the *UE Position Estimate* IE, *Velocity Estimate* IE, *Position Data* IE, and *Accuracy Fulfilment Indicator* IE shall not be included.

If the *UE Position Estimate* IE is included in a POSITION PERIODIC RESULT message, the *Position Data* IE shall also be included.

Whenever one of the geographic area shapes *Ellipsoid point with uncertainty Ellipse* IE, *Ellipsoid point with altitude* and uncertainty *Ellipsoid* IE or *Ellipsoid Arc* IE is reported, the *Confidence* IE shall indicate the probability that the UE is located within the uncertainty region of the shape. The value of the *Confidence* IE shall be in the interval of "1" to "100".

If at least the *Horizontal Accuracy Code* IE was included in a POSITION INITIATION REQUEST message which initiates periodic position reporting, and the periodic position estimate included in a POSITION PERIODIC RESULT messages fulfils the requested accuracy, the *Accuracy Fulfilment Indicator* IE with the value "requested accuracy fulfilled" shall be included. If the calculated position estimate does not fulfil the requested accuracy, the *Accuracy Fulfilment Indicator* IE with the value "requested accuracy not fulfilled" shall be included in the POSITION PERIODIC RESULT message.

8.13.3 Abnormal Conditions

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8.14 Position Periodic Termination

8.14.1 General

The Position Periodic Termination procedure is used by a node to request termination of an ongoing periodic location, or to inform a node about termination of periodic location in SAS-centric mode. This procedure uses connection-oriented signalling.

8.14.2 Successful Operation

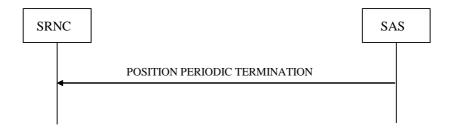


Figure 9i: Position Periodic Termination procedure, SAS Originated, Successful Operation

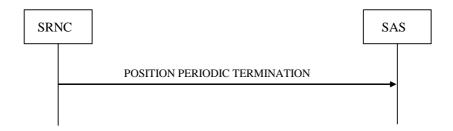


Figure 9k: Position Periodic Termination procedure, RNC Originated, Successful Operation

When the SAS or SRNC needs to terminate ongoing periodic location, a POSITION PERIODIC TERMINATION message is sent to the receiving node.

If an RRC measurement procedure for periodic UE positioning measurement reporting in the UE has been activated by the SRNC upon reception of a POSITION ACTIVATION REQUEST message, and if the SRNC receives a POSITION PERIODIC TERMINATION message, the SRNC should terminate the periodic UE positioning measurement reporting in the UE.

The SRNC should send a POSITION PERIODIC TERMINATION message if an RRC measurement procedure for periodic UE positioning measurement reporting in the UE has been activated by the SRNC upon reception of a POSITION ACTIVATION REQUEST message, and if the SRNC or UE terminates the measurement reporting (e.g., after RRC state transition).

8.14.3 Abnormal Conditions

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9 Elements for PCAP Communication

9.1 Message Functional Definition and Content

9.1.1 General

Clause 9.1 presents the contents of PCAP messages in tabular format. The corresponding ASN.1 definitions are presented in clause 9.3. In case there is contradiction between the tabular format in clause 9.1 and the ASN.1 definition, the ASN.1 shall take precedence, except for the definition of conditions for the presence of conditional IEs, where the tabular format shall take precedence.

NOTE: The messages have been defined in accordance to the guidelines specified in TS 25.921 [12].

9.1.2 Message Contents

9.1.2.1 Presence

All information elements in the message descriptions below are marked mandatory, optional or conditional according to table 4.

Table 4: Meaning of abbreviations used in PCAP messages

Abbreviation	Meaning
M	IEs marked as Mandatory (M) shall always be included in the
	message.
0	IEs marked as Optional (O) may or may not be included in the
	message.
С	IEs marked as Conditional (C) shall be included in a message only if
	the condition is satisfied. Otherwise the IE shall not be included.

9.1.2.2 Criticality

Each Information Element or Group of Information Elements may have a criticality information applied to it. Following cases are possible.

Table 5: Meaning of content within "Criticality" column

Abbreviation	Meaning
_	No criticality information is applied explicitly.
YES	Criticality information is applied. This is usable only for non- repeatable IEs
GLOBAL	The IE and all its repetitions together have one common criticality information. This is usable only for repeatable IEs.
EACH	Each repetition of the IE has its own criticality information. It is not allowed to assign different criticality values to the repetitions. This is usable only for repeatable IEs.

9.1.2.3 Range

The Range column indicates the allowed number of copies of repetitive IEs/IE groups.

9.1.2.4 Assigned Criticality

This column provides the actual criticality information as defined in clause 10.3.2, if applicable.

9.1.3 Position Calculation Request

Table 6

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	М		9.2.2.24	-	YES	reject
Transaction ID	M		9.2.2.28		_	•
Initial UE Position	0		Geographical		YES	reject
Estimate			Ārea			,
			9.2.2.6			
GPS Measured Results		0 <maxnoofsets< td=""><td></td><td></td><td>GLOBAL</td><td>reject</td></maxnoofsets<>			GLOBAL	reject
		>				_
>GPS Measured	M		9.2.2.12		_	
Results						
Cell-ID Measured		0 <maxnoofmea< td=""><td></td><td></td><td>GLOBAL</td><td>reject</td></maxnoofmea<>			GLOBAL	reject
Results Sets		surements>				-
>Cell-ID Measured	M		9.2.2.31		_	
Results Info List						
OTDOA Measurement		01			YES	reject
Group						,
>OTDOA Reference	М		9.2.2.34		_	
Cell Info						
>OTDOA Neighbour		1 <maxnoofmea< td=""><td></td><td></td><td>_</td><td></td></maxnoofmea<>			_	
Cell Info List		sNCell>				
>>OTDOA Neighbour	М		9.2.2.33		_	
Cell Info			0.2.2.00			
>OTDOA Measured		1 <maxnoofmea< td=""><td></td><td></td><td>_</td><td></td></maxnoofmea<>			_	
Results Sets		surements>				
>>OTDOA Measured	М	- Can Cirio in Cir	9.2.2.32		_	
Results Info List	141		0.2.2.02			
Horizontal Accuracy	0		9.2.2.38		YES	ignore
Code			0.2.2.00		120	ignoro
Vertical Accuracy Code	0		9.2.2.39		YES	ignore
UTDOA Group	0		9.2.2.74		YES	reject
SAS Response Time	0		Positioning	Indicates the	YES	ignore
OAO Nesponse Time			Response	interval	120	ignore
			Time	allowed for a		
			9.2.2.69	SAS		
			9.2.2.09	response for		
				U-TDOA		
				positioning.		
Include Velocity	0		9.2.2.97	positioning.	YES	ignoro
Include Velocity Periodic Position	0		9.2.2.97		YES	ignore
Calculation Info			9.2.2.100		150	ignore
		O amountoOfCata			CLOBAL	roicat
GANSS Measured		0 <maxnoofsets< td=""><td></td><td></td><td>GLOBAL</td><td>reject</td></maxnoofsets<>			GLOBAL	reject
Results Management	M	>	0.00447			
>GANSS Measured	IVI		9.2.2.117		_	
Results	-	0			OL ODA!	
Cell-ID IRAT Measured		0 <maxnoofira< td=""><td></td><td></td><td>GLOBAL</td><td>ignore</td></maxnoofira<>			GLOBAL	ignore
Results Sets		TMeasurements>	0.00.155			
>IRAT Measured	M		9.2.2.155		_	
Results Info List			0.05.175		\/==	
IMSI	0		9.2.2.158		YES	ignore
IMEI	0		9.2.2.159		YES	ignore

Range bound	Explanation
maxNoOfMeasNCell	Maximum number of neighbouring cells on which information can be reported. The value of maxNoOfMeasCell is 32.
maxNoOfSets	Maximum number of sets of Measured Results included in the Position Calculation Request message. The value for maxNoOfSets is 3.
maxNoOfMeasurements	Maximum number of Measurements of Cell-ID Measured Results Info List and OTDOA Measured Results Info List included in the Position Calculation Request message. The value for maxNoOfMeasurements is 16.
maxNoOfIRATMeasurements	Maximum number of IRATs for which Measurements of Cell-ID IRATMeasured Results Info List may be included in the Position Calculation Request message. The value for maxNoOfIRATMeasurements is 16.

9.1.4 Position Calculation Response

Table 8

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.2.24		YES	reject
Transaction ID	M		9.2.2.28		_	
UE Position Estimate	M		Geographical Area 9.2.2.6		YES	ignore
Criticality Diagnostics	0		9.2.2.4		YES	ignore
Accuracy Fulfilment Indicator	0		9.2.2.40		YES	ignore
Velocity Estimate	0		9.2.2.98		YES	ignore

9.1.5 POSITION CALCULATION FAILURE

Table 9

IE/Group Name	Presence	Range	IE type and	Semantics	Criticality	Assigned
			reference	description		Criticality
Message Type	M		9.2.2.24		YES	reject
Transaction ID	M		9.2.2.28		_	
Cause	M		9.2.2.3		YES	ignore
Criticality Diagnostics	0		9.2.2.4		YES	ignore

9.1.6 Information Exchange Initiation Request

Table 10

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
Message Type	M		9.2.2.24		YES	reject
Transaction ID	M		9.2.2.28		_	
Information Exchange ID	M		9.2.2.19		YES	reject
CHOICE Information Exchange Object Type	М				YES	reject
>Reference Position		1			_	
>>Reference Position Estimate/UE Initial Position >Additional Information	M		Geographi cal Area 9.2.2.6	For RNC- centric mode.	_	
Exchange Object Types						
>>Reference Position UC-ID						
>>>UTRAN Cell Identifier/UE Initial Position	M		UTRAN Cell Identifier 9.2.2.37	For SAS- centric mode.	YES	reject
>>Cell-ID Measured Results Sets						
>>>Cell-ID Measured Results Sets	М		9.2.2.152		YES	ignore
Information Type	M		9.2.2.22		YES	reject
Information Report Characteristics	М		9.2.2.21		YES	reject
GPS-UTRAN Time Relationship Uncertainty	C-GPS		9.2.2.18		YES	reject
GANSS-UTRAN Time Relationship Uncertainty	C-GANSS		9.2.2.121		YES	reject
IMSI	0		9.2.2.158		YES	ignore
IMEI	0		9.2.2.159		YES	ignore

Table 11

Condition	Explanation
GPS	The IE shall be present if the information requested in
	the Information Type IE contains GPS-related data
GANSS	The IE shall be present if the information requested in
	the Information Type IE contains GANSS-related data

Table 11a

Range bound	Explanation
maxNoOfMeasurements	Maximum number of Measurements of Cell-ID Measured
	Results Sets. The value for maxNoOfMeasurements is 16.

9.1.7 Information Exchange Initiation Response

Table 12

IE/Group Name	Presence	Range	IE Type and	Semantics Description	Criticality	Assigned Criticality
			Reference			
Message Type	M		9.2.2.24		YES	reject
Transaction ID	M		9.2.2.28		_	
Information Exchange ID	M		9.2.2.19		YES	ignore
CHOICE Information	0				YES	ignore
Exchange Object Type						
>Reference Position					_	
>>Requested Data Value	M		9.2.2.26		-	
Criticality Diagnostics	0		9.2.2.4		YES	ignore
Onticality Diagnostics			3.2.2.4		120	ignore

9.1.8 Information Exchange Initiation Failure

Table 13

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
Message Type	M		9.2.2.24		YES	reject
Transaction ID	M		9.2.2.28		_	
Information Exchange ID	М		9.2.2.19		YES	ignore
Cause	M		9.2.2.3		YES	ignore
Criticality Diagnostics	0		9.2.2.4		YES	ignore

9.1.9 Information Report

Table 14

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
Message Type	M		9.2.2.24		YES	ignore
Transaction ID	M		9.2.2.28		-	
Information Exchange ID	M		9.2.2.19		YES	ignore
CHOICE Information Exchange Object Type	М				YES	ignore
>Reference Position					-	
>>Requested Data Value Information	М		9.2.2.27		_	

9.1.10 Information Exchange Termination Request

Table 15

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
Message Type	M		9.2.2.24		YES	ignore
Transaction ID	M		9.2.2.28		_	
Information Exchange ID	M		9.2.2.19		YES	ignore

9.1.11 Information Exchange Failure Indication

Table 16

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
Message Type	M		9.2.2.24		YES	ignore
Transaction ID	M		9.2.2.28		_	
Information Exchange ID	M		9.2.2.19		YES	ignore
Cause	M		9.2.2.3		YES	ignore

9.1.12 Error Indication

Table 17

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.2.24		YES	ignore
Transaction ID	M		9.2.2.28		_	
Cause	0		9.2.2.3		YES	ignore
Criticality Diagnostics	0		9.2.2.4		YES	ignore

9.1.13 POSITION INITIATION REQUEST

Table 17a

IE/Group Name	Presence	Range	IE type	Semantics	Criticality	Assigned
			and	description		Criticality
			reference			
Message Type	M		9.2.2.24		YES	reject
Transaction ID	M		9.2.2.28		_	
Request Type	M		9.2.2.50		YES	reject
UE Positioning Capability	M		9.2.2.51		YES	reject
UTRAN Cell Identifier	M		9.2.2.37		YES	reject
Vertical Accuracy Code	0		9.2.2.39		YES	ignore
Response Time	0		9.2.2.52		YES	ignore
Positioning Priority	0		9.2.2.53		YES	ignore
Client Type	0		9.2.2.54		YES	ignore
Include Velocity	0		9.2.2.97		YES	ignore
Periodic Location Info	0		9.2.2.107		YES	ignore
IMSI	0		9.2.2.158		YES	ignore
IMEI	0		9.2.2.159		YES	ignore

9.1.14 position INITIATION response

Table 17b

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.2.24		YES	reject
Transaction ID	M		9.2.2.28		_	
UE Position Estimate	M		Geographi cal Area 9.2.2.6		YES	reject
Position Data	M		9.2.2.65		YES	ignore
Accuracy Fulfilment Indicator	0		9.2.2.40		YES	ignore
Velocity Estimate	0		9.2.2.98		YES	ignore

9.1.15 position INITIATION Failure

Table 17c

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.2.24		YES	reject
Transaction ID	M		9.2.2.28		_	
Cause	M		9.2.2.3		YES	ignore
Criticality Diagnostics	0		9.2.2.4		YES	ignore

9.1.16 position activation request

Table 17d

IE/Group Name	Presence	Range	IE type and	Semantics description	Criticality	Assigned Criticality
Managara Torra	D.4		reference		VEO	!
Message Type Transaction ID	M		9.2.2.24 9.2.2.28		YES	reject
Positioning Method	M		9.2.2.55		YES	reject
RNC Response Time	M		Positioning Response Time 9.2.2.69	Indicates the interval allowed for a RNC response, or the periodic reporting interval if Amount of Reporting IE is present.	YES	ignore
Positioning Priority	0		9.2.2.53	io procent.	YES	ignore
Environment Characterisation	0		9.2.2.62		YES	ignore
U-TDOA Positioning		01		Only present if Positioning Method is U- TDOA	YES	reject
>U-TDOA Bit Count	М		9.2.2.56	Used if UE is in CELL_FACH mode	-	
>U-TDOA Time Interval	M		9.2.2.57	Used if UE is in CELL_FACH mode	-	
GPS Positioning		01		Only present if Positioning Method is A- GPS	YES	reject
>GPS Positioning Instructions	М		9.2.2.101		_	
>Requested Data Value	0		9.2.2.26		_	
OTDOA Assistance Data		01		Only present if Positioning Method is OTDOA	YES	reject
>UE Positioning OTDOA Assistance data	M		9.2.2.59		-	
Include Velocity	0		9.2.2.97		YES	ignore
Amount of Reporting	0		9.2.2.108	Amount of reports for periodic reporting.	YES	ignore
Cell-ID Positioning		01		Only present if Positioning Method is Cell-ID	YES	ignore
>Requested Cell-ID Measurements	М		9.2.2.112		_	
GANSS Positioning		01		Only present if Positioning Method is GNSS	YES	reject
>GANSS Positioning Instructions	М		9.2.2.120		_	

47

>Requested Data Value	0	9.2.2.26	_	

9.1.17 position activation response

Table 17e

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	М		9.2.2.24		YES	reject
Transaction ID	M	†	9.2.2.28		-	.0,000
UE Position Estimate Info	Ö		9.2.2.102	Position information for UE based positioning methods	YES	ignore
GPS Measured Results		0 <ma xNoOfS ets></ma 			GLOBAL	reject
>GPS Measured Results	М		9.2.2.12		_	
Cell-ID Measured Results Sets		0 <ma xNoOf Measur ements ></ma 			GLOBAL	reject
>Cell-ID Measured Results Info List	M		9.2.2.31		-	
OTDOA Measured Results Sets		0 <ma xNoOf Measur ements ></ma 			GLOBAL	reject
>OTDOA Measured Results Info List	М		9.2.2.32		-	
UTDOA Group	0		9.2.2.74		YES	reject
Velocity Estimate	0		9.2.2.98		YES	ignore
Measurement Instructions Used	0		9.2.2.109		YES	ignore
GANSS Measured Results		0 <ma xNoOfS ets></ma 			GLOBAL	reject
>GANSS Measured Results	М		9.2.2.117		_	
Required GPS Assistance Data	0		Additional GPS Assistance Data Required 9.2.2.128		YES	ignore
Required GANSS Assistance Data	0		Additional GANSS Assistance Data Required 9.2.2.129		YES	ignore
OTDOA Reference Cell Info	0		OTDOA Reference Cell Info SAS- centric mode 9.2.2.153		YES	reject
Cell-ID IRAT Measured Results Sets		0 <ma xNoOfl RATMe asurem ents></ma 			GLOBAL	ignore
>IRAT Measured Results Info List	М		9.2.2.155		-	

Table 17f

Range bound	Explanation
maxNoOfSets	Maximum number of sets of Measured Results included in the
	Position Activation Response message. The value for maxNoOfSets
	is 3.
maxNoOfMeasurements	Maximum number of Measurements of Cell-ID Measured Results
	Info List and OTDOA Measured Results Info List included in the
	Position Activation Response message. The value for
	maxNoOfMeasurements is 16.
maxNoOfIRATMeasurements	Maximum number of IRATs for which Measurements of Cell-ID
	IRATMeasured Results Info List may be included in the Position
	Activation Response message. The value for
	maxNoOfIRATMeasurements is 16.

9.1.18 position ACTIVATION Failure

Table 17g

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.2.24		YES	reject
Transaction ID	M		9.2.2.28		-	
Cause	M		9.2.2.3		YES	ignore
Criticality Diagnostics	0		9.2.2.4		YES	ignore

9.1.19 Position Parameter modification

Table 17h

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.2.24		YES	ignore
Transaction ID	M		9.2.2.28		_	
UTRAN Cell Identifier	0		9.2.2.37		YES	reject
UTDOA Group	0		9.2.2.74		YES	reject
RRC State Change	0		9.2.2.110		YES	ignore

9.1.20 ABORT

Table 17i

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.2.24		YES	ignore
Transaction ID	M		9.2.2.28		_	
Cause	M		9.2.2.3		YES	ignore

9.1.21 position Periodic Report

Table 17.k

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	М		9.2.2.24		YES	ignore
Transaction ID	М		9.2.2.28		_	
UE Position Estimate Info	0		9.2.2.102		YES	ignore
Velocity Estimate	0		9.2.2.98		YES	ignore
GPS Measured Results		0 <ma xNoOfS ets></ma 			GLOBAL	ignore
>GPS Measured Results	M		9.2.2.12		_	
Cell-ID Measured Results Sets		0 <ma xNoOf Measur ements ></ma 			GLOBAL	ignore
>Cell-ID Measured Results Info List	М		9.2.2.31		_	
OTDOA Measured Results Sets		0 <ma xNoOf Measur ements ></ma 			GLOBAL	ignore
>OTDOA Measured Results Info List	М		9.2.2.32		_	
Cause	0		9.2.2.3		YES	ignore
GANSS Measured Results		0 <ma xNoOfS ets></ma 			GLOBAL	ignore
>GANSS Measured Results	М		9.2.2.117		_	
Required GPS Assistance Data	0		Additional GPS Assistance Data Required 9.2.2.128		YES	ignore
Required GANSS Assistance Data	0		Additional GANSS Assistance Data Required 9.2.2.129		YES	ignore
OTDOA Reference Cell Info	0		OTDOA Reference Cell Info SAS- centric mode 9.2.2.153		YES	reject
Cell-ID IRAT Measured Results Sets		0 <ma xNoOfl RATMe asurem ents></ma 			GLOBAL	ignore
>IRAT Measured Results Info List	М		9.2.2.155		_	

Table 17.I

Range bound	Explanation
maxNoOfSets	Maximum number of sets of Measured Results included in the
	Position Periodic Report message. The value for maxNoOfSets is 3.
maxNoOfMeasurements	Maximum number of Measurements of Cell-ID Measured Results
	Info List and OTDOA Measured Results Info List included in the
	Position Periodic Report message. The value for
	maxNoOfMeasurements is 16.
maxNoOfIRATMeasurements	Maximum number of IRATs for which Measurements of Cell-ID
	IRATMeasured Results Info List may be included in the Position
	Periodic Report message. The value for
	maxNoOfIRATMeasurements is 16.

9.1.22 position Periodic Result

Table 17.m

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.2.24		YES	ignore
Transaction ID	M		9.2.2.28		_	
UE Position Estimate	0		Geographi cal Area 9.2.2.6		YES	ignore
Velocity Estimate	0		9.2.2.98		YES	ignore
Position Data	0		9.2.2.65		YES	ignore
Accuracy Fulfilment Indicator	0		9.2.2.40		YES	ignore
Cause	0		9.2.2.3		YES	ignore

9.1.23 Position Periodic Termination

Table 17.n

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.2.24		YES	ignore
Transaction ID	M		9.2.2.28		_	
Periodic Position Termination Cause	0		9.2.2.111		YES	ignore

9.2 Information Element Functional Definitions and Contents

9.2.1 General

Clause 9.2 presents the PCAP IE definitions in tabular format. The corresponding ASN.1 definitions are presented in clause 9.3. In case there is contradiction between the tabular format in clause 9.2 and the ASN.1 definition, the ASN.1 shall take precedence, except for the definition of conditions for the presence of conditional elements, where the tabular format shall take precedence.

When specifying information elements which are to be represented by bitstrings, 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 bitstrings from other specifications, the first bit of the bitstring contains the first bit of the concerned information;

9.2.2 Radio Network Layer Related IEs

9.2.2.1 Almanac and Satellite Health SIB

Table 18

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
GPS Almanac and Satellite Health	М		9.2.2.9	
SatMask	M		BIT STRING(132)	indicates the satellites that contain the pages being broadcast in this data set
LSB TOW	M		BIT STRING (8)	

9.2.2.2 Altitude and direction

Table 19

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Direction of Altitude	M		ENUMERATED (Height, Depth)	
Altitude	М		INTEGER (02 ¹⁵ -1)	The relation between the value (N) and the altitude (a) in meters it describes is $N \le a < N+1$, except for $N=2^{15}-1$ for which the range is extended to include all greater values of (a).

9.2.2.3 Cause

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

Table 20

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
CHOICE Cause Group				Description
,				
>Radio Network Layer >>Radio Network Layer Cause	M		ENUMERATED (invalid reference information, information temporarily not available, information provision not supported for the object, position calculation error: invalid GPS measured results,, position calculation error: invalid Cell-ID measured results, position calculation error: invalid OTDOA measured results, position calculation error: A-GPS positioning method not supported, position calculation error: Cell-ID positioning method not supported, position calculation error: OTDOA positioning method not supported, Initial UE Position Estimate missing, position calculation error: U-TDOA position calculation error: U-TDOA position calculation error: U-TDOA positioning method not supported, position calculation error: U-TDOA positioning method not supported in specified UTRAN cell, positioning method not supported in specified UTRAN cell, positioning method not supported, loss of contact with UE, SAS unable to perform U-TDOA positioning within Response Time, Location measurement failure, UE Positioning Error: Not enough GPS Satellites, UE Positioning Error: Not enough GPS Satellites, UE Positioning Error: Not enough GPS Satellites, UE Positioning Error: Undefined Error, position calculation error: invalid Galileo measured results, position calculation error: Not enough Galileo Satellites, UE Positioning Error: Not enough GANSS measured results, position calculation error: invalid GLONASS measured results, position calculation error: Not enough GANSS measured results, position calculation error: Not enough GANSS satellites, UE Positioning Error: Not enough GANSS Satellites, UE Positioning Error: Not enough GANSS Satellites, UE Positioning Error:	
			Accomplished GANSS Timing of Cell Frames	
)	
>Transport Layer				
>>Transport Layer Cause	M		ENUMERATED (Transport Resource Unavailable, Unspecified,)	
>Protocol				<u> </u>

>>Protocol Cause	M	ENUMERATED (Transfer Syntax Error, Abstract Syntax Error (Reject), Abstract Syntax Error (Ignore and Notify), Message not Compatible with Receiver State, Semantic Error, Unspecified, Abstract Syntax Error (Falsely Constructed Message),)
>Misc		
>>Misc Cause	М	ENUMERATED (Processing Overload, Hardware Failure, O&M Intervention, Unspecified,)

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

Table 21

Radio Network Layer cause	Meaning
Invalid reference information	The reference information (GPS-UTRAN Time Relationship
mvana reference information	Uncertainty and/or Initial UE Position Estimate) provided by the
	RNC are invalid
Information temporarily not	The information requested by RNC is temporarily not available
available	The information requested by title to temperating her available
Information Provision not supported	The SAS does not support provision of the requested information
for the object	for the concerned object types
Position calculation error: invalid	The SAS cannot calculate position due to invalid GPS measured
GPS measured results	results
Position calculation error: invalid	The SAS cannot calculate position due to invalid Cell-ID measured
Cell-ID measured results	results
Position calculation error: invalid	The SAS cannot calculate position due to invalid OTDOA
OTDOA measured results	measured results
Position calculation error: A-GPS	The SAS cannot calculate position because it does not support the
positioning method not supported	A-GPS positioning method
Position calculation error: Cell-ID	The SAS cannot calculate position because it does not support the
positioning method not supported	Cell-ID positioning method
Position calculation error: OTDOA	The SAS cannot calculate position because it does not support the
positioning method not supported	OTDOA positioning method
Position calculation error: invalid U-	The SAS cannot calculate position due to invalid U-TDOA
TDOA measured results	measured results
Position calculation error: U-TDOA	The SAS cannot calculate position because it does not support the
positioning method not supported	U-TDOA positioning method
Position calculation error: U-TDOA	The SAS cannot calculate position because it does not support the
positioning method not supported	U-TDOA positioning method in the specified UTRAN cell
in specified UTRAN cell	
Positioning method not supported	The RNC does not support the requested positioning method
Loss of contact with UE	The RNC reports that it has lost contact with the UE
SAS unable to perform U-TDOA	The SAS did not send a U-TDOA position estimate within the
positioning within Response Time	interval defined by the Response Time IE
Location measurement failure	The SRNC cannot deliver the requested positioning measurement
	due to measurement failure.
UE Positioning Error: Not enough	The SRNC cannot deliver the requested positioning measurement
OTDOA cells	due to UE positioning error reported by the UE with error reason
	'Not enough OTDOA cells'.
UE Positioning Error: Not enough	The SRNC cannot deliver the requested positioning measurement
GPS Satellites	due to UE positioning error reported by the UE with error reason
	'Not enough GPS Satellites'.
UE Positioning Error: Reference	The SRNC cannot deliver the requested positioning measurement
Cell not serving cell	due to UE positioning error reported by the UE with error reason
	'Reference Cell not serving cell'
UE Positioning Error: Not	The SRNC cannot deliver the requested positioning measurement
Accomplished GPS Timing of Cell	due to UE positioning error reported by the UE with error reason
Frames	'Not Accomplished GPS Timing of Cell Frames'
UE Positioning Error: Undefined Error	The SRNC cannot deliver the requested positioning measurement due to UE positioning error reported by the UE with error reason
LIIU	due to the positioning error reported by the the with error reason 'Undefined Error'
Position calculation error: invalid	The SAS cannot calculate position due to invalid Galileo measured
Galileo measured results	results
Position calculation error: A-Galileo	The SAS cannot calculate position because it does not support the
positioning method not supported	A-Galileo positioning method
UE Positioning Error: Not enough	The SRNC cannot deliver the requested positioning measurement
Galileo Satellites	due to UE positioning error reported by the UE with error reason
James Gatomes	'Not enough Galileo Satellites'.
UE Positioning Error: Not	The SRNC cannot deliver the requested positioning measurement
Accomplished Galileo Timing of	due to UE positioning error reported by the UE with error reason
Cell Frames	'Not Accomplished Galileo Timing of Cell Frames'
UE Positioning Error: Assistance	The SRNC cannot deliver the requested positioning measurement
Data Missing	due to UE positioning error reported by the UE with error reason
	'Assistance Data Missing'
Position calculation error: invalid	The SAS cannot calculate position due to invalid GLONASS
GLONASS measured results	measured results
Position calculation error: invalid	The SAS cannot calculate position due to invalid GANSS
GANSS measured results	measured results

Position calculation error: A- GANSS positioning method not supported	The SAS cannot calculate position because it does not support any A-GANSS positioning method
UE Positioning Error: Not enough GANSS Satellites	The SRNC cannot deliver the requested positioning measurement due to UE positioning error reported by the UE with error reason 'Not Enough GANSS Satellites'.
UE Positioning Error: Not Accomplished GANSS Timing of Cell Frames	The SRNC cannot deliver the requested positioning measurement due to UE positioning error reported by the UE with error reason 'Not Accomplished GANSS Timing of Cell Frames'

Transport Network Layer cause	Meaning
Transport resource unavailable	The required transport resources are not available
Unspecified	Sent when none of the above cause values applies but still the
	cause is Transport Network Layer related

Table 23

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

Table 24

Miscellaneous cause	Meaning
Processing Overload	RNC/SAS processing overload
Hardware Failure	RNC/SAS hardware failure
O&M Intervention	Operation and Maintenance intervention related to RNC/SAS equipment
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

9.2.2.4 Criticality Diagnostics

The *Criticality Diagnostics* IE is sent by the RNC or the SAS when parts of a received message have not been comprehended or are missing. It contains information about which IE was not comprehended or is missing.

For further details on how to use the *Criticality Diagnostics* IE, see annex A.

Table 25

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Procedure Code	0		INTEGER (0255)	
Triggering Message	0		ENUMERAT ED (initiating message, successful outcome, unsuccessful outcome, outcome,	The Triggering Message is used only if the Criticality Diagnostics is part of Error Indication.
Procedure Criticality	0		ENUMERAT ED (reject, ignore, notify)	This Procedure Criticality is used for reporting the Criticality of the Triggering message (Procedure).
Transaction ID Information Element	0	O manufact	9.2.2.28	
Criticality Diagnostics		0 <maxnoof errors=""></maxnoof>		
>IE Criticality	М		ENUMERAT ED (reject, ignore, notify)	The IE Criticality is used for reporting the criticality of the triggering IE. The value 'Ignore" shall never be used.
>IE ld	M		INTEGER (065535)	The IE Id of the not understood or missing IE as defined in the ASN.1 part of the specification.
>Repetition Number	O		INTEGER (0255)	The Repetition Number IE gives - in case of a not understood IE: The number of occurrences of the reported IE up to and including the not understood occurrence - in case of a missing IE: The number of occurrences up to but not including the missing occurrence. Note: All the counted occurrences of the reported IE must have the same top-down hierarchical message structure of IEs with assigned criticality above them.
>Message Structure	0		9.2.2.23	The Message Structure IE describes the structure where the not understood or missing IE was detected. This IE is included if the not understood IE is not the top level of the message.
>Type of Error	M		ENUMERAT ED(not understood, missing,)	

Range bound	Explanation
maxnooferrors	Maximum number of IE errors allowed to be reported with a single
	message. The value for maxnooferrors is 256.

9.2.2.5 DGPS Corrections

This IE contains DGPS corrections, which may be employed to compensate for ranging errors due to atmospheric delay, orbital modelling, and satellite clock drift.

Table 27

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
GPS TOW sec	М		INTEGER (0604799)	In seconds GPS time-of-week when the DGPS corrections were calculated	-	
Status/Health	M		ENUMERATED (UDRE scale 1.0, UDRE scale 0.75, UDRE scale 0.5, UDRE scale 0.3, UDRE scale 0.2, UDRE scale 0.1, no data, invalid data)		-	
DPGS information	C- Status/Hea Ith	1 <maxs at></maxs 			-	
>SatID	М		INTEGER (063)	Identifies the satellite and is equal to (SV ID No - 1) where SV ID No is defined in ICD- GPS-200 [10].	-	
>IODE	M		INTEGER (0255)		_	
>UDRE	М		ENUMERATED (UDRE ≤ 1.0 m, 1.0m < UDRE ≤ 4.0m, 4.0m < UDRE ≤ 8.0m, 8.0m < UDRE)	The value in this field shall be multiplied by the UDRE Scale Factor in the IE Status/Health to determine the final UDRE estimate for the particular satellite.	-	
>PRC	М		INTEGER (- 20472047.)	Scaling factor 0.32 Meters	_	
>Range Rate Correction	М		INTEGER (- 127127)	Scaling factor 0.032 meters/sec	_	
>DGNSS Validity Period	0		9.2.2.154		YES	ignore

Table 28

Condition	Explanation		
Status/Health	This IE shall be present if the Status/Health IE is not		
	equal to "no data" or "invalid data"		

Range bound	Explanation
maxSat	Maximum number of satellites for which data is included in this IE.
	The value of maxSat is 16.

9.2.2.6 Geographical Area

Geographical Area IE is used to identify an area using geographical coordinates. The reference system is the same as the one used in TS 23.032 [11].

Table 30

IE/Group Name	Presence	Range	IE type and reference	Semantics description
CHOICE Geographical Area				
>Point				Ellipsoid point
>>Geographical	M		9.2.2.7	
Coordinates				
>Point With Uncertainty				Ellipsoid point with uncertainty circle
>>Geographical Coordinates	М		9.2.2.7	
>>Uncertainty Code	M		INTEGER (0127)	The uncertainty "r" expressed in meters is derived from the "Uncertainty Code" k by r = 10x(1.1 ^k -1)
>Polygon				List of Ellipsoid points
>>Polygon		1 <maxnoofpoints></maxnoofpoints>		
>>>Geographical Coordinates	М		9.2.2.7	
>Ellipsoid point with uncertainty Ellipse				
>>Geographical Coordinates	М		9.2.2.7	
>>Uncertainty Ellipse	М		9.2.2.30	
>>Confidence	M		INTEGER (0100)	In percentage
>Ellipsoid point with altitude			0100)	
>>Geographical Coordinates	М		9.2.2.7	
>>Altitude and direction	М		9.2.2.2	
>Ellipsoid point with altitude and uncertainty Ellipsoid				
>>Geographical Coordinates	М		9.2.2.7	
>>Altitude and direction	М		9.2.2.2	
>>Uncertainty Ellipse	M		9.2.2.30	
>>Uncertainty Altitude	M		INTEGER (0127)	The uncertainty altitude 'h' expressed in metres is derived from the 'Uncertainty Altitude' <i>k</i> , by: h=45x(1.025 ^k -1)
>>Confidence	М		INTEGER (0100)	In percentage
>Ellipsoid Arc				
>>Geographical Coordinates	М		9.2.2.7	
>>Inner radius	M		INTEGER (02 ¹⁶ -1)	The relation between the value (N) and the radius (r) in meters it describes is 5N≤ r <5(N+1), except for N=2 ¹⁶ -1 for which the range is extended to include all grater values of (r).
>>Uncertainty radius	M		INTEGER (0127)	The uncertainty "r" is derived from the "Uncertainty radius" k by $r = 10x(1.1^k-1)$

IE/Group Name	Presence	Range	IE type and reference	Semantics description
>>Offset angle	M		INTEGER (0179)	The relation between the value (N) and the angle (a) in degrees it describes is 2N≤ a <2(N+1)
>>Included angle	M		INTEGER (0179)	The relation between the value (N) and the angle (a) in degrees it describes is $2N < a \le 2(N+1)$
>>Confidence	М		INTEGER (0100)	

Table 31

Range bound	Explanation	
maxnoofPoints	Maximum no. of points in polygon. Value is 15.	

9.2.2.7 Geographical Coordinates

This IE contains the geographical coordinates.

Table 32

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Latitude Sign	М		ENUMERATED (North, South)	
Degrees Of Latitude	М		INTEGER (02 ²³ -1)	The IE value (N) is derived by this formula: N≤2 ²³ X /90 < N+1 X being the latitude in degree (0° 90°)
Degrees Of Longitude	M		INTEGER (-2 ²³ 2 ²³ -1)	The IE value (N) is derived by this formula: N≤2 ²⁴ X /360 < N+1 X being the longitude in degree (-180°+180°)

9.2.2.8 GPS Acquisition Assistance

This IE contains parameters that enable fast acquisition of the GPS signals in UE-assisted GPS positioning.

Table 33

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
GPS TOW msec	M		INTEGER (06.048*10 ⁸ -1)	GPS Time of Week in milliseconds (rounded down to the nearest millisecond unit).	-	
Satellite information		1 <ma xSat></ma 			_	
>SatID	M		INTEGER (063)	Identifies the satellite and is equal to (SV ID No - 1) where SV ID No is defined in ICD-GPS-200 [10].	_	
>Doppler (0 th order term)	М		INTEGER (- 20482047)	Scaling factor 2.5Hz	_	
>Extra Doppler		01			_	
>>Doppler (1 st order term)	М		INTEGER (- 4221)	Scaling factor 1/42	-	
>>Doppler Uncertainty	M		ENUMERAT ED (12.5,25,50, 100,200,)	In Hz	-	
>Code Phase	M		INTEGER (01022)	In Chips, specifies the centre of the search window	-	
>Integer Code Phase	М		INTEGER (019)	Number of 1023 chip segments	_	
>GPS Bit number	M		INTEGER (03)	Specifies GPS bit number (20 1023 chip segments)	-	
>Code Phase Search Window	M		ENUMRATE D (1023,1,2,3, 4,6,8,12,16,2 4,32,48,64,9 6,128,192)	Specifies the width of the search window.	-	
>Azimuth and Elevation		01			_	
>>Azimuth	М		INTEGER (031)	Scaling factor 11.25 Degrees	1	
>>Elevation	М		INTEGER (07)	Scaling factor 11.25 Degrees	_	
>>Azimuth and Elevation LSB		01			YES	ignore
>>>Azimuth LSB	M		INTEGER (015)	Scale factor 0.703125. The full satellite azimuth is constructed as 'Azimuth' × 11.25 + 'Azimuth LSB' × 0.703125 degrees.	-	
>>>Elevation LSB	M		INTEGER (015)	Scale factor 0.703125.	_	

			The full satellite elevation is constructed as 'Elevation' × 11.25 + 'Elevation LSB' × 0.703125 degrees.		
UTRAN GPS Reference Time	0	9.2.2.103	This IE may only be present if SAS operates in SAS-centric mode.	YES	ignore
GPS Reference Time Uncertainty	0	9.2.2.132	This IE may only be present if SAS operates in SAS-centric mode.	YES	ignore

Table 34

Range bound	Explanation
mMaxSat	Maximum number of satellites for which data is included in this IE.
	The value of maxSat is 16.

9.2.2.9 GPS Almanac and Satellite Health

This IE contains a reduced-precision subset of the clock and ephemeris parameters.

Table 35

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
WNa	М		BIT STRING (8)	•	_	_
Satellite information		1 <maxs atAlmana c></maxs 			_	
>DataID	М		BIT STRING (2)	See ICD-GPS-200 [10]	_	
>SatID	M		INTEGER (063)	Identifies the satellite and is equal to (SV ID No - 1) where SV ID No is defined in ICD-GPS- 200 [10].	-	
>e	M		BIT STRING (16)	Eccentricity (ICD-GPS- 200 [10])	_	
>t _{oa}	М		BIT STRING (8)	Reference Time of Almanac (ICD-GPS- 200 [10])	_	
>δi	М		BIT STRING (16)	Correction to Inclination (semi-circles) (ICD- GPS-200 [10])	_	
>OMEGADOT	M		BIT STRING (16)	Rate of Right Ascension (semi- circles/sec) (ICD-GPS- 200 [10])	_	
>SV Health	M		BIT STRING (8)	ICD-GPS-200 [10]	_	
>A ^{1/2}	M		BIT STRING (24)	Semi-Major Axis (meters) ^{1/2} (ICD-GPS- 200 [10])	_	
>OMEGA ₀	M		BIT STRING (24)	Longitude of Ascending Node of Orbit Plane at Weekly Epoch (semi- circles) (ICD-GPS-200 [10])	_	
>M ₀	M		BIT STRING (24)	Mean Anomaly at Reference Time (semi- circles) (ICD-GPS-200 [10])	-	
>00	М		BIT STRING (24)	Argument of Perigee (semi-circles) (ICD- GPS-200 [10])	_	
>af ₀	М		BIT STRING (11)	apparent clock correction (ICD-GPS- 200 [10])	-	
>af ₁	M		BIT STRING (11)	apparent clock correction (ICD-GPS- 200 [10])	-	
SV Global Health	0		BIT STRING (364)	This enables GPS time recovery and possibly extended GPS correlation intervals	-	
Complete Almanac Provided	0		BOOLEAN	This field indicates whether the SAS provided almanac for the full GPS constellation or not. TRUE means complete GPS almanac is provided.	YES	ignore

Range bound	Explanation
maxSatAlmanac	Maximum number of satellites for which data is included in this IE.
	The value of maxSatAlmanac is 32.

9.2.2.10 GPS Clock and Ephemeris Parameters

The IE contains the GPS clock information and GPS Ephemeris.

Table 37

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
C/A or P on L2	М		BIT STRING (2)	Code(s) on L2 Channel (ICD-GPS-200 [10])
URA Index	М		BIT STRING (4)	User Range Accuracy (ICD- GPS-200 [10])
SV Health	М		BIT STRING (6)	ICD-GPS-200 [10]
IODC	М		BIT STRING (10)	Issue of Data, Clock (ICD-GPS-200 [10])
L2 P Data Flag	М		BIT STRING (1)	ICD-GPS-200 [10]
SF 1 Reserved	М		BIT STRING (87)	ICD-GPS-200 [10]
T_GD	М		BIT STRING (8)	Estimated group delay differential (ICD-GPS-200 [10])
t _{oc}	М		BIT STRING (16)	apparent clock correction (ICD-GPS-200 [10])
af ₂	М		BIT STRING (8)	apparent clock correction (ICD-GPS-200 [10])
af ₁	М		BIT STRING (16)	apparent clock correction (ICD-GPS-200 [10])
af ₀	М		BIT STRING (22)	apparent clock correction (ICD-GPS-200 [10])
C _{rs}	M		BIT STRING (16)	Amplitude of the Sine Harmonic Correction Term to the Orbit Radius (meters) (ICD-GPS-200 [10])
Δη	М		BIT STRING (16)	Mean Motion Difference From Computed Value (semi- circles/sec) (ICD-GPS-200 [10])
M ₀	М		BIT STRING (32)	Mean Anomaly at Reference Time (semi-circles) (ICD-GPS- 200 [10])
Cuc	М		BIT STRING (16)	Amplitude of the Cosine Harmonic Correction Term To The Argument Of Latitude (radians) (ICD-GPS-200 [10])
е	М		BIT STRING (32)	Eccentricity (ICD-GPS-200 [10])
C _{us}	М		BIT STRING (16)	Amplitude of the Sine Harmonic Correction Term To The Argument Of Latitude (radians) (ICD-GPS-200 [10])
(A) ^{1/2}	М		BIT STRING (32)	Semi-Major Axis (meters) ^{1/2} (ICD-GPS-200 [10])
t _{oe}	М		BIT STRING (16)	Reference Time Ephemeris (ICD-GPS-200 [10])
Fit Interval Flag	М		BIT STRING (1)	ICD-GPS-200 [10]
AODO	М		BIT STRING (5)	Age Of Data Offset (ICD-GPS- 200 [10])
C _{ic}	М		BIT STRING (16)	Amplitude of the Cosine Harmonic Correction Term To The Angle Of Inclination (radians) (ICD-GPS-200 [10])
OMEGA ₀	М		BIT STRING (32)	Longitude of Ascending Node of Orbit Plane at Weekly Epoch (semi-circles) (ICD-GPS-200 [10])
Cis	M		BIT STRING (16)	Amplitude of the Sine Harmonic Correction Term To The Angle Of Inclination (radians) (ICD- GPS-200 [10])
i ₀	M		BIT STRING	Inclination Angle at Reference

		(32)	Time (semi-circles) (ICD-GPS-200 [10])
C _{rc}	М	BIT STRING (16)	Amplitude of the Cosine Harmonic Correction Term to the Orbit Radius (meters) (ICD- GPS-200 [10])
ω	M	BIT STRING (32)	Argument of Perigee (semi- circles) (ICD-GPS-200 [10])
OMEGAdot	M	BIT STRING (24)	Rate of Right Ascension (semi- circles/sec) (ICD-GPS-200 [10])
Idot	M	BIT STRING (14)	Rate of Inclination Angle (semi- circles/sec) (ICD-GPS-200 [10])

9.2.2.11 GPS Ionospheric Model

The IE contains fields needed to model the propagation delays of the GPS signals through the ionosphere.

Table 38

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
α_0	M		BIT STRING (8)	NOTE 1
α_1	M		BIT STRING (8)	NOTE 1
0.2	M		BIT STRING (8)	NOTE 1
0(3	M		BIT STRING (8)	NOTE 1
βο	M		BIT STRING (8)	NOTE 2
β ₁	M		BIT STRING (8)	NOTE 2
β_2	M		BIT STRING (8)	NOTE 2
β ₃	M		BIT STRING (8)	NOTE 2

NOTE 1: The parameters α_n are the coefficients of a cubic equation representing the amplitude of the vertical delay (ICD-GPS-200 [10]).

NOTE 2: The parameters β_n are the coefficients of a cubic equation representing the period of the ionospheric model (ICD-GPS-200 [10]).

9.2.2.12 GPS Measured Results

The purpose of this information element is to provide reported GPS measurement information from the SRNC to the SAS.

Table 39

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
GPS TOW msec	М		INTEGER (06.048*1 0 ⁸ -1)	GPS Time of Week in milliseconds (rounded down to the nearest millisecond unit).	-	
				If the UTRAN GPS reference time Result is present, this IE shall be set to 0 by the transmitter and ignored by the receiver.		
Measurement		1 <ma< td=""><td></td><td></td><td>_</td><td></td></ma<>			_	
>Satellite ID	М	xSat>	INTEGER (063)	Identifies the satellite and is equal to (SV ID No - 1) where SV ID No is defined in ICD-GPS-200 [10].	-	
>C/N _o	М		INTEGER (063)	The estimate of the carrier-to-noise ratio of the received signal from the particular satellite used in the measurement. It is given in units of dB-Hz (Typical levels will be in the range of 20 – 50 dB-Hz).	-	
>Doppler	М		INTEGER (-32768 32768)	Hz, scale factor 0.2.	_	
>Whole GPS Chips	М		INTEGER (01022)	Unit in GPS chips	_	
>Fractional GPS Chips	М		INTEGER (0(2 ¹⁰ -1))	Scale factor 2 ⁻¹⁰	-	
>Multipath Indicator	M		ENUMERA TED (NM, low, medium, high)	See NOTE 1	-	
>Pseudorange RMS Error	М		INTEGER (063)	See NOTE 2	_	
UTRAN GPS Reference Time Result	0		9.2.2.104	This IE may only be present if SAS operates in SAS- centric mode.	YES	ignore
GPS Reference Time Uncertainty NOTE 1: Table 41 gives	0		9.2.2.132		YES	ignore

NOTE 2: Table 42 gives the bitmapping of the Pseudorange RMS Error field.

Table 40

Range bound	Explanation
maxSat	Maximum number of satellites for which data is included in this IE.
	The value of maxSat is 16.

Table 41

Value	Multipath Indication		
NM	Not measured		
Low	MP error < 5m		
Medium	5m < MP error < 43m		
High	MP error > 43m		

Table 42

Value	Mantissa	Exponent	Floating-Point value, x _i	Pseudorange value, P
0	000	000	0.5	P < 0.5
1	001	000	0.5625	0.5 <= P < 0.5625
i	Χ	Υ	0.5 * (1 + x/8) * 2y	xi-1 <= P < xi
62	110	111	112	104 <= P < 112
63	111	111		112 <= P

9.2.2.13 GPS Navigation Model

This IE contain information required to manage the transfer of precise navigation data to the GPS-capable UE.

Table 43

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Satellite information		1 <maxs< td=""><td></td><td></td></maxs<>		
		at>		
>SatID	М		INTEGER (063)	Identifies the satellite and is equal to (SV ID No - 1) where SV ID No is defined in ICD-GPS-200 [10].
>Satellite Status	М		ENUMERAT ED (NS_NN, ES_SN, ES_NN, REVD)	See NOTE
>GPS Clock and Ephemeris parameters	C-Satellite status		9.2.2.10	

Table 44

Value	Indication
NS_NN	New satellite, new Navigation Model
ES_SN	Existing satellite, same Navigation Model
ES_NN	Existing satellite, new Navigation Model
REVD	Reserved

Condition	Explanation			
Satellite status	The IE shall be present if the Satellite Status IE is not			
	set to ES_SN			

Table 46

Range bound	Explanation
maxSat	Maximum number of satellites for which data is included in this IE.
	The value of maxSat is 16.

9.2.2.14 GPS Real Time Integrity

Table 47

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
CHOICE Bad Satellites Presence				
>Bad Satellites				
>>Satellite information		1 <maxsat< td=""><td></td><td></td></maxsat<>		
>>>BadSatID	M	>	INTEGER (063)	Identifies the satellite and is equal to (SV ID No - 1) where SV ID No is defined in ICD-GPS-200 [10].
>No Bad Satellites			NULL	

Table 48

Range bound	Explanation			
maxSat	Maximum number of satellites for which data is included in this IE.			
	The value of maxSat is 16.			

9.2.2.15 GPS Reference Time

Table 49

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
GPS Week	М		INTEGER (01023)		_	
GPS TOW msec	M		INTEGER (06.048*10 ⁸ -1)	GPS Time of Week in milliseconds (rounded down to the nearest millisecond unit).	-	
GPS TOW Assist		0 <maxs at></maxs 			_	
>SatID	M		INTEGER (063)	Identifies the satellite and is equal to (SV ID No - 1) where SV ID No is defined in ICD-GPS-200 [10].	-	
>TLM Message	М		BIT STRING (14)		_	
>Anti-Spoof	М		BOOLEAN		_	
>Alert	М		BOOLEAN		_	
>TLM Reserved	М		BIT STRING (2)		_	
UTRAN GPS Reference Time	0		9.2.2.103	This IE may only be present if SAS operates in SAS-centric mode.	YES	ignore
SFN-TOW Uncertainty	0		GPS- UTRAN Time Relationship Uncertainty 9.2.2.18	This IE may only be present if SAS operates in SAS-centric mode.	YES	ignore
T _{UTRAN-GPS} Drift Rate	0		9.2.2.105	This IE may only be present if SAS operates in SAS-centric mode.	YES	ignore
GPS Reference Time Uncertainty	0		9.2.2.132	This IE may only be present if SAS operates in SAS-centric mode.	YES	ignore
GPS Week Cycle Number	0		INTEGER (07)	Number of 1024 GPS week cycles occurred since the GPS zero time-point (midnight of the night of January 5, 1980/morning of January 6, 1980). The first 1024 GPS weeks since the zero time-point is GPS Week Cycle Number 0.	YES	ignore

Range bound	Explanation
maxSat	Maximum number of satellites for which data is included in this IE.
	The value of maxSat is 16.

9.2.2.16 GPS Transmission TOW

Table 51

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
GPS Transmission TOW			INTEGER (0604799)	The GPS time-of-week in seconds

9.2.2.17 GPS UTC Model

The UTC Model field contains a set of parameters needed to relate GPS time to Universal Time Coordinate (UTC).

Table 52

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
A ₁	М		BIT STRING (24)	sec/sec (ICD-GPS-200 [10])
A ₀	М		BIT STRING (32)	seconds (ICD-GPS-200 [10])
t _{ot}	М		BIT STRING (8)	seconds (ICD-GPS-200 [10])
Δt_{LS}	М		BIT STRING (8)	seconds (ICD-GPS-200 [10])
WNt	М		BIT STRING (8)	weeks (ICD-GPS-200 [10])
WN _{LSF}	М		BIT STRING (8)	weeks (ICD-GPS-200 [10])
DN	М		BIT STRING (8)	days (ICD-GPS-200 [10])
Δt_{LSF}	М		BIT STRING (8)	seconds (ICD-GPS-200 [10])

9.2.2.18 GPS-UTRAN Time Relationship Uncertainty

This IE contains the uncertainty of the GPS and UTRAN time relationship.

Table 53

IE/Group Name	Presence	Range	IE Type and Reference	Semantics
				Description
GPS-UTRAN Time			ENUMERATED	RNC or SAS estimate
Relationship Uncertainty			(50ns, 500ns, 1us, 10us,	of uncertainty in
·			1ms, 10ms, 100ms,	GPS-UTRAN time
			unreliable,)	relationship

9.2.2.19 Information Exchange ID

The Information Exchange ID uniquely identifies any requested information per RNC-SAS pair.

Table 54

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Information Exchange ID			INTEGER (0 2^20-1)	

9.2.2.20 Void

9.2.2.21 Information Report Characteristics

The information report characteristics define how the reporting shall be performed.

Table 56

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Information Report Characteristics Type	М		ENUMERAT ED(On Demand, Periodic, On Modification,)	
CHOICE Information Report Periodicity	C-Periodic			Indicates the frequency with which the SAS shall send broadcast data reports.
>Min				
>>Minutes	M		INTEGER (160,)	
>Hour				
>>Hours	M		INTEGER (124,)	

Table 57

Condition	Explanation
Periodic	This IE shall be present if the Information Report
	Characteristics Type IE indicates 'periodic'

9.2.2.22 Information Type

The Information Type indicates which kind of information the SAS shall provide.

Table 58

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
CHOICE Information Type				_	_	_
>Implicit					_	
>>Method Type	M		9.2.2.25		_	
>Explicit					_	
>>Explicit Information		1 <max noofExp Info></max 			_	
>>>CHOICE Explicit Information Item	М				_	
>>>Almanac and Satellite Health			NULL		-	
>>>UTC Model					_	
>>>>Transmission TOW Indicator	М		9.2.2.29		_	
>>>Ionospheric Model					_	
>>>>Transmission TOW Indicator	М		9.2.2.29		_	
>>>Navigation Model					_	
>>>>Transmission TOW Indicator	М		9.2.2.29		_	
>>>>Nav. Model Additional Data		01			_	
>>>>GPS Week	М		INTEGER (01023)		_	
>>>>GPS_Toe	M		INTEGER (0167)	GPS time of ephemeris in hours of the latest ephemeris set	_	
>>>>T-Toe limit	М		Integer (010)	ephemeris age tolerance in hours	_	
>>>>Satellite related data		0 <max Sat></max 			_	
>>>>SatID	M		INTEGER (063)	Identifies the satellite and is equal to (SV ID No - 1) where SV ID No is defined in ICD-GPS-200 [10].	-	
>>>>>IODE	M		INTEGER (0255)	Issue of Data Ephemeris for SatID	_	
>>>DGPS Corrections			NULL		-	
>>>Reference Time			NULL			
>>>Acquisition Assistance			NULL		_	
>>>Real Time Integrity			NULL		_	
>>>Almanac and Satellite Health SIB					_	
>>>>Transmission TOW Indicator	М		9.2.2.29		_	
>>>Reference Location			NULL	This IE may only be present if SAS	_	

	1	_	1	T	•	
				operates in		
				SAS-centric		
				mode.		
>>>> GANSS					_	
Common Data						
>>>>GANSS	0		ENUMERAT		_	
Reference Time			ED(Request			
Reference fillie						
			ed, Not-			
			Requested)			
>>>>GANSS	0		ENUMERAT		_	
Ionosphere Model			ED(Request			
·			ed, Not-			
			Requested)			
>>>>GANSS	0		ENUMERAT	This IF may	_	
	0			This IE may	_	
Reference Location			ED(Request	only be		
			ed, Not-	present if SAS		
			Requested)	operates in		
			, ,	SAS-centric		
				mode.		
DANIOO		-	CANCO		VEC	ia:
>>>> GANSS	0		GANSS	Presence	YES	ignore
Additional			Additional	means		
Ionospheric Model			Ionospheric	requested.		
·			Model			
			Request			
			9.2.2.137			
041100 5		 			\/=0	:-
>>>>GANSS Earth	0		GANSS		YES	ignore
Orientation			Earth			
Parameters			Orientation			
			Parameters			
			Request			
			9.2.2.138			
>>>GANSS Generic					_	
Data						
>>>>GANSS		1 <max< td=""><td></td><td></td><td>_</td><td></td></max<>			_	
Generic Data Item		GANSS				
		>				
>>>>GANSS ID	0		9.2.2.130	Absence of	_	
>>>>>OANOO ID	~		3.2.2.130	this IE means	_	
				Galileo.		
>>>>GANSS		01			_	
Real Time						
Integrity						
>>>>GANSS	0		9.2.2.127		_	
Time Indicator			0.2.2.			
>>>>GANSS		01			_	
		0 1			_	
Data Bits		1		T. 0		
>>>>GANSS	M		INTEGER	The GANSS	_	
TOD	1		(086399)	TOD for which		
			·	the data bits		
				are requested.		
>>>>Data Bit		1		a.o.roquodicu.	_	
Assistance		'				
	N 4	 	DIT	Coded -		
>>>>>GAN	М		BIT	Coded as	_	
SS Signal ID			STRING(8)	defined in TS		
				25.331 [4]		
>>>>GAN	М		INTEGER(0	This field	_	
SS Data Bit	1		15)	represents the		
Interval	1		10)			
interval				time length for		
				which the Data		
				Bit Assistance		
				is requested.		
				The Data Bit		
	1					
				Assistance		
				shall be		
				relative to the		
				time interval		
	1			(GANSS TOD,		
				GANSS TOD,		
			i e	・ ハマスシン コノコノ		

			1	1	
			+ Data Bit Interval). The Data Bit Interval r, expressed in seconds, is mapped to a binary number K with the following formula: r =0.1* 2 K Value K=15 means that the time interval is not specified.		
	0 <max GANSS Sat></max 			_	
M		INTEGER (063)	Defined in TS 25.331 [4].	_	
	01	• • • • • • • • • • • • • • • • • • • •		_	
0		9.2.2.127		_	
М		BIT STRING(8)	Coded as defined in TS 25.331 [4]	-	_
	01			_	
0		9.2.2.127		_	
	01			-	
0		9.2.2.127		_	
	01			_	
0		9.2.2.127		_	
	01			-	
IVI		STRING(9)	time model required. Bit 1 is the MSB and bit 9 is the LSB (see clause 9.2.1). Bit 1 stands for GPS, Bit 2 stands for Galileo, Bit 3 stands for QZSS Bit 4 stands for GLONASS. Other bits are		
	O M O O	Sat> M O1 O M O1 O O1 O O1 O O1	GANSS Sat> M INTEGER (063) 01 9.2.2.127 M BIT STRING(8) 01 9.2.2.127 0 9.2.2.127 0 9.2.2.127 0 9.2.2.127 0 9.2.2.127 0 9.2.2.127 0 9.1 0 9.2.2.127 0 9.2.2.127 0 9.2.2.127	The Data Bit Interval r, expressed in seconds, is mapped to a binary number K with the following formula:	Interval), The Data Bit Interval r, expressed in seconds, is mapped to a binary number K with the following formula:

						,
>>>>GANSS Time Indicator	0		9.2.2.127		_	
>>>>GANSS Navigation Model		01			_	
>>>>>GANSS Week	М		INTEGER(0 4095)	Defined in TS 25.331 [4].	-	
>>>>GANSS Toe	М		INTEGER(0 167)	Defined in TS 25.331 [4].	-	
>>>>>GANSS T-Toe Limit	М		INTEGÉR(0 10)	Defined in TS 25.331 [4].	-	
>>>>>Satellit e Related Data		0 <max GANSS Sat></max 			_	
>>>>>Sat ID	M		INTEGER(0 63)	Defined in TS 25.331 [4].	_	
>>>>>IOD	M		BIT STRING(10)	Defined in TS 25.331 [4].	_	
>>>>GANSS Additional Navigation Models		01			_	
>>>>GANSS Week	М		INTEGER(0 4095)	Defined in TS 25.331 [4].	_	
>>>>GANSS Toe	M		INTEGER(0 167)	Defined in TS 25.331 [4].	_	
>>>>>GANSS T-Toe Limit	М		INTEGER(0 10)	Defined in TS 25.331 [4].	_	
>>>>>Satellite Related Data		0 <max GANSS Sat></max 			_	
>>>>Sat ID	M		INTEGER(0 63)	Defined in TS 25.331 [4].	_	
>>>>>IOD	М		BIT STRING(10)	Defined in TS 25.331 [4].	_	
>>>>>GANSS Additional UTC Models		01			-	
>>>>>GANSS Time Indicator	0		9.2.2.127		_	
>>>>>GANSS Auxiliary Information		01			-	
>>>>>GANSS Time Indicator	0		9.2.2.127		_	
>>>>SBAS ID	C-GANSS- ID		9.2.2.134		_	

Range Bound	Explanation
maxnoofExpInfo	Maximum number of Explicit Information supported in one
	Information Exchange. The value of maxnoofExpInfo is 32.
maxSat	Maximum number of satellites for which data is included in this IE.
	The value of maxSat is 16.
maxGANSS	Maximum number of GANSS systems for which data is included in
	this IE. The value of maxGANSS is 8.
maxGANSSSat	Maximum number of satellites for which data is included in this IE.
	The value of maxGANSSSat is 64

Table 59A

Condition	Explanation		
GANSS-ID	This IE shall be present if the GANSS ID IE indicates 'SBAS'.		

9.2.2.23 Message Structure

The *Message Structure* IE gives information for each level with assigned criticality in an hierarchical message structure from top level down to the lowest level above the reported level for the occurred error (reported in the *Information Element Criticality Diagnostics* IE).

Table 60

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Message structure		1 <maxnoo flevels></maxnoo 		The first repetition of the Message Structure IE corresponds to the top level of the message. The last repetition of the Message Structure IE corresponds to the level above the reported level for the occurred error of the message.
>IE ID	М		INTEGER (065535)	The IE ID of this level's IE containing the not understood or missing IE.
>Repetition Number	0		INTEGER (1256)	The Repetition Number IE gives, if applicable, the number of occurrences of this level's reported IE up to and including the occurrence containing the not understood or missing IE. Note: All the counted occurrences of the reported IE must have the same top-down hierarchical message structure of IEs with assigned criticality above them.

Table 61

Range bound	Explanation
maxnooflevels	Maximum no. of message levels to report. The value for
	maxnooflevels is 256.

9.2.2.24 Message Type

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

Table 62

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Procedure Code	M		INTEGER(0255)	'1' = Position Calculation '2' = Information Exchange Initiation '3' = Information Reporting '4' = Information Exchange Termination, '5' = Information Exchange Failure '6' = Error Indication '7' = Private Message '8' = Position Parameter Modification '9' = Position Initiation '10' = Position Activation '11' = Abort '12' = Position Periodic Report '13' = Position Periodic Result '14' = Position Periodic Termination
Type of Message	M		ENUMERATED (Initiating Message, Successful Outcome, Unsuccessful Outcome, Outcome)	

9.2.2.25 Method Type

Table 63

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Method Type			ENUMERATED	
			(UE_Assisted,	
			UE_Based)	

9.2.2.26 Requested Data Value

The Requested Data Value contains the relevant data concerning the ongoing information exchange, or positioning event.

Table 64

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
GPS Almanac and	0		9.2.2.9	l l	_	,
Satellite Health						
GPS UTC Model	0		9.2.2.17		_	
GPS Ionospheric Model	0		9.2.2.11		_	
GPS Navigation Model	0		9.2.2.13		_	
DGPS Corrections	0		9.2.2.5		_	
GPS Reference Time	0		9.2.2.15		_	
GPS Acquisition	0		9.2.2.8		-	
Assistance						
GPS Real Time Integrity	0		9.2.2.14		-	
Almanac and Satellite	0		9.2.2.1		_	
Health SIB						
GPS Transmission TOW	0		9.2.2.16		_	
GPS Reference Location	0		Geo- graphical Area 9.2.2.6	This IE may only be present if SAS operates in SAS-centric mode.	YES	ignore
GANSS Common Assistance Data		01			YES	ignore
>GANSS Reference	0		9.2.2.124		_	
Time			0.2.2			
>GANSS Ionospheric	0		9.2.2.116		_	
Model						
>GANSS Reference Location	0		Geo- graphical Area 9.2.2.6	This IE may only be present if SAS operates in SAS-centric mode.	I	
>GANSS Additional Ionospheric Model	0		9.2.2.116A		YES	ignore
>GANSS Earth Orientation Parameters	0		9.2.2.133		YES	ignore
GANSS Generic Assistance Data		0 <max GANSS</max 			GLOBAL	ignore
Assistance Data		>				
>GANSS ID	0		9.2.2.130	Absence of this IE means Galileo.	-	
>GANSS Real Time Integrity	0		9.2.2.122		_	
>GANSS Data Bit Assistance	0		9.2.2.127A		_	
>DGANSS Corrections	0		9.2.2.113		_	
>GANSS Almanac and Satellite Health	0		9.2.2.114		-	
>GANSS Reference Measurement Information	0		9.2.2.123		_	
>GANSS UTC Model	0		9.2.2.126		_	
>GANSS Time Model	0		9.2.2.125		_	
>GANSS Navigation Model	Ō		9.2.2.118		-	
>GANSS Additional Time Models	0		9.2.2.125A		YES	ignore

>GANSS Additional Navigation Models	0	9.2.2.118A	YES	ignore
>GANSS Additional UTC Models	0	9.2.2.126A	YES	ignore
>GANSS Auxiliary Information	0	9.2.2.135	YES	ignore
>SBAS ID	C-GANSS- ID	9.2.2.134	YES	ignore

Table 64A

Range Bound	Explanation
maxGANSS	Maximum number of GANSS systems for which data is included in
	this IE. The value of maxGANSS is 8.

Table 64B

Condition	Explanation		
GANSS-ID	This IE shall be present if the GANSS ID IE indicates 'SBAS'.		

9.2.2.27 Requested Data Value Information

The *Requested Data Value Information* IE provides information on whether or not the Requested Data Value is available in the message and also the Requested Data Value itself if available.

In case of "Periodic" and "On Modification" reporting, "Information Not Available" shall be used when at least one part of the requested information was not available at the moment of initiating the Information Reporting procedure.

Table 65

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
CHOICE Information Availability Indicator	M				_	
>Information Available					_	
>>Requested Data Value	М		9.2.2.26		_	
>Information not Available			NULL		_	

9.2.2.28 Transaction ID

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

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

The 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
CHOICE Transaction ID Length				The Transaction ID shall be interpreted for its integer value, not for the type of encoding ("short' or "long').
>Short				
>>Transaction ID Value	M		INTEGER (0127)	
>Long				
>>Transaction ID Value	M		INTEGER (032767)	

9.2.2.29 Transmission TOW Indicator

Table 67

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Transmission TOW			ENUMERATE	
Indicator			D (requested,	
			not	
			requested)	

9.2.2.30 Uncertainty Ellipse

This IE contains the uncertainty ellipse of a geographical area.

Table 68

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Uncertainty semi-major	M		INTEGER (0127)	The uncertainty "r" is derived from the "uncertainty code" k by $r = 10x(1.1^k-1)$
Uncertainty semi-minor	M		INTEGER (0127)	The uncertainty "r" is derived from the "uncertainty code" k by $r = 10x(1.1^k-1)$
Orientation of major axis	M		INTEGER (089)	The relation between the IE value (N) and the angle (a) in degrees it describes is 2N≤ a <2(N+1)

9.2.2.31 Cell-ID Measured Results Info List

This IE contains the Cell-ID measurements of signals associated with one or more cells.

Table 69

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
Cell-ID Measured Results Info		1 <maxn oOfMeas NCell></maxn 			1	
>UC-ID	M		9.2.2.37	The identifier of the measured cell.	-	
>UTRAN Access Point Position with Altitude	M		9.2.2.36	Exact geographical position of the base station antenna.	ľ	
				If the SAS operates in SAS-centric mode, the values of this IE shall be set to 0 by the transmitter and shall be ignored by the receiver.		
>Geographical Area	0		9.2.2.6	May only be present if the SAS operates in RNC-centric mode.	-	
>Round Trip Time Info		01		FDD only	_	
>>UE Rx-Tx Time Difference Type 2	М		INTEGER (08191)	According to mapping in TS 25.133 [13].	-	
>>UE Positioning Measurement Quality	M		9.2.2.35	Quality of the UE Rx-Tx time difference measurement.	-	
>>Round Trip Time	M		INTEGER (032766)	According to mapping in TS 25.133 [13].	-	
>>Extended Round Trip Time	0		INTEGER (3276710 3041)	Continuation of intervals as mapped in TS 25.133 [13]. Included only if the Round Trip Time IE above is included with its maximum value and if the actual value is outside the possible range for the Round Trip Time IE	YES	ignore
>Rx Timing Deviation Info		01		3.84Mcps TDD only	-	
>>Rx Timing Deviation	М		INTEGER (08191)	According to mapping in TS 25.123 [14].	-	
>>Timing Advance	М		INTEGER (063)	According to TS 25.331 [4].	_	
>Rx Timing Deviation LCR Info		01		1.28Mcps TDD only	-	

>>Rx Timing Deviation LCR	М		INTEGER (0511)	According to mapping in TS 25.123 [14].	-	
>>Timing Advance LCR	М		INTEGER (02047)	According to TS 25.331 [4]. The content of this IE shall be ignored if the Extended Timing Advance LCR IE is present	1	
>>Extended Timing Advance LCR	0		INTEGER (2048819 1)	According to TS 25.331 [4].	YES	ignore
>Pathloss	0		INTEGER (46158)	Unit: dB downlink pathloss as defined in the Cell measured results IE in TS 25.331 [4].	-	
>Rx Timing Deviation 768Info		01		7.68Mcps TDD only	YES	reject
>>Rx Timing Deviation 7.68Mcps	M		INTEGER (0 65535)	According to mapping in TS 25.123 [14].	-	
>>Timing Advance 7.68Mcps	М		INTEGER (0 511)	According to TS 25.331 [4].	_	
>Rx Timing Deviation 384ext Info		01		3.84Mcps TDD only	YES	reject
>>Rx Timing Deviation	М		INTEGER (0 32767)	According to mapping in TS 25.123 [14].	П	
>>Timing Advance	М		INTEGER (0 255)	According to TS 25.331 [4].	-	
>Round Trip Time Info With Type 1		01		FDD only	YES	ignore
>>UE Rx-Tx Time Difference Type 1	M		INTEGER (7681280)	According to mapping in TS 25.133 [13].	_	
>>Round Trip Time	M		INTEGER (032766)	According to mapping in TS 25.133 [13].	-	
>>Extended Round Trip Time	0		INTEGER (3276710 3041)	Continuation of intervals as mapped in TS 25.133 [13]. Included only if the Round Trip Time IE above is included with its maximum value and if the actual value is outside the possible range for the Round Trip Time IE	_	
>Additional UE Measurement Info		01		FDD only	YES	ignore
>>CPICH RSCP	0		INTEGER (-591)	According to CPICH_RSCP in TS 25.133 [13].	-	

>>CPICH Ec/N0	0		INTEGER (049)	According to CPICH_Ec/No in TS 25.133 [13].	-	
>Angle Of Arrival LCR		01		1.28Mcps TDD only	YES	ignore
>>AOA LCR	М		INTEGER (0719)	According to mapping in TS 25.123 [14]	ı	
>>AOA LCR Accuracy Class	M		ENUMERA TED (A, B, C, D, E, F, G, H,)	According to mapping in TS 25.123 [14]	_	

Range bound	Explanation
maxNoOfMeasNCell	Maximum number of neighbour cells on which information can be
	reported. The value of maxNoOfMeasNCell is 32.

9.2.2.32 OTDOA Measured Results Info List

This IE contains the OTDOA measurements of signals sent from the reference and neighbour cells.

Table 71

IE/Group Name	Presenc e	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
OTDOA Measured Results Info		1 <maxno ofMeasNC ell></maxno 			ŀ	
>UC-ID	М		9.2.2.37	The identifier of the neighbour cell.	1	
>UE SFN-SFN Observed Time Difference Type 2 Info		1			ı	
>>SFN-SFN Observed Time Difference Type 2	М		INTEGER (040961)	Gives the observed timing of the neighbour cell relative to the reference cell.	1	
>>UE Positioning Measurement Quality	М		9.2.2.35	Quality of the observed time difference measurement.	-	
>>Measurement Delay	М		INTEGER (065535)	The interval of time, in units of 10ms frames, spanning the following two events:	-	
				1) Time of applicability of the SFN-SFN Value or TUTRAN-GPS/SFN relationship provided for the corresponding neighbour cell in 9.2.2.33 or TUTRAN-GANSS/SFN relationship provided for the corresponding neighbour cell in 9.2.2.33.		
				2) The point in time when this corresponding SFN-SFN observed time difference measurement was captured by the UE.		
				If the SAS operates in SAS-centric mode, 1) above shall be set to zero. I.e., in SAS-centric mode this IE		

			indicates the SFN during which the corresponding SFN-SFN observed time difference measurement was captured by the UE.		
>Additional OTDOA Measured Results	0		This IE may only be present if SAS operates in SAS-centric mode.	YES	ignore
>>Primary CPICH Info	M	Primary Scrambling Code 9.2.2.46	The identifier of the neighbour cell.	-	

Range bound	Explanation
MaxNoOfMeasNCell	Maximum number of neighbouring cells on which information can be
	reported. The value of MaxNoOfMeasNCell is 32.

9.2.2.33 OTDOA Neighbour Cell Info

Table 73

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
UC-ID	М		9.2.2.37	The identifier of the neighbour cell.
UTRAN Access Point Position with Altitude	М		9.2.2.36	Exact geographical position of the base station antenna.
CHOICE Relative Timing Difference Info	М			
>SFN-SFN Measurement				
Value Information				
>>SFN-SFN Value	М		INTEGER (0614399)	
>>SFN-SFN Quality	0		INTEGER (0255)	Indicates the standard deviation (std) of the SFN-SFN otd (observed time difference) measurements in 1/16 chip. SFN-SFN Quality = $\sqrt{E[(x-\mu)^2]}$ = std of reported SFN-SFN Value, where x is the reported SFN-SFN Value and $\mu = E[x]$ is the expectation value of x.
>>SFN-SFN Drift Rate	M		INTEGER (-100+100)	Indicates the SFN-SFN drift rate in 1/256 chip per second. A positive value indicates that the Reference cell clock is running at a greater frequency than the measured neighbouring cell.
>>SFN-SFN Drift Rate Quality	0		INTEGER (0100)	Indicates the standard deviation (std) of the SFN-SFN drift rate measurements in 1/256 chip per second. SFN-SFN Drift Rate Quality = $\sqrt{E[(x-\mu)^2]}$ = std of reported SFN-SFN Drift Rate, where x is the reported SFN-SFN Drift Rate and $\mu = E[x]$ is the expectation value of x.
>T _{UTRAN-GPS} Measurement Value Information				
>>SFN	М		INTEGER (04095)	SFN during which the T _{UTRAN-GPS} measurement was performed
>>T _{UTRAN-GPS}		1		Indicates the UTRAN GPS Timing of Cell Frame for LCS.
>>>MS	М		INTEGER (016383)	Most significant part
>>>LS	М		INTEGER (04294967295)	Least significant part
>>T _{UTRAN-GPS} Quality	0		ÎNTEGER (0255)	Indicates the standard deviation (std) of the $T_{UTRAN-GPS}$ measurements in 1/16 chip. $T_{UTRAN-GPS}$ Quality = $\sqrt{E[(x-\mu)^2]}$ = std of reported $T_{UTRAN-GPS}$ Value, where x is the reported $T_{UTRAN-GPS}$ Value and $\mu = E[x]$ is the expectation value of x.
>>T _{UTRAN-GPS} Drift Rate	М		INTEGER (-50+50)	Indicates the T _{UTRAN-GPS} drift rate in 1/256 chip per second. A positive value indicates that the UTRAN clock is running

				at a lower frequency than GPS clock.
>>T _{UTRAN-GPS} Drift Rate Quality	O		INTEGER (050)	Indicates the standard deviation (std) of the $T_{UTRAN-GPS}$ drift rate measurements in 1/256 chip per second. $T_{UTRAN-GPS}$ Drift Rate Quality = $\sqrt{E[(x-\mu)^2]}$ = std of reported $T_{UTRAN-GPS}$ Drift Rate, where x is the reported $T_{UTRAN-GPS}$ Drift Rate and $\mu = E[x]$ is the expectation value of x.
>T _{UTRAN-GANSS} Measurement Value Information				
>>GANSS ID	0		9.2.2.130	Absence of this IE means Galileo.
>>SFN	М		INTEGER (04095)	SFN during which the T _{UTRAN} - GANSS measurement was performed
>>T _{UTRAN-GANSS}		1		Indicates the UTRAN GANSS Timing of Cell Frame for LCS.
>>>MS	М		INTEGER (016383)	Most significant part
>>>LS	М		INTEGER (04294967295)	Least significant part
>>T _{utran-ganss} Quality	0		INTEGER (0255)	Indicates the standard deviation (std) of the $T_{UTRAN-GANSS}$ measurements in 1/16 chip. $T_{UTRAN-GANSS}$ Quality = $\sqrt{E[(x-\mu)^2]}$ = std of reported $T_{UTRAN-GANSS}$ Value, where x is the reported $T_{UTRAN-GANSS}$ Value and $\mu = E[x]$ is the expectation value of x.
>>Tutran-ganss Drift Rate	М		INTEGER (-5050)	Indicates the Tutran-Ganss drift rate in 1/256 chip per second. A positive value indicates that the UTRAN clock is running at a lower frequency than GANSS clock.
>>T _{UTRAN-GANSS} Drift Rate Quality	0		INTEGER (050)	Indicates the standard deviation (std) of the $T_{UTRAN-GANSS}$ drift rate measurements in 1/256 chip per second. $T_{UTRAN-GANSS}$ Drift Rate Quality = $\sqrt{E[(x-\mu)^2]}$ = std of reported $T_{UTRAN-GANSS}$ Drift Rate, where x is the reported $T_{UTRAN-GANSS}$ Drift Rate and μ = $E[x]$ is the expectation value of x.

9.2.2.34 OTDOA Reference Cell Info

Table 74

IE/Group Name	Presen ce	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
UC-ID	M		9.2.2.37	The identifier of the reference cell.	_	
UTRAN Access Point Position with Altitude	M		9.2.2.36	Exact geographical position of the base station antenna.	-	
T _{UTRAN-GPS} Measurement Value Information		01			_	
>SFN	М		INTEGER (04095)	SFN during which the T _{UTRAN-GPS} measurement was performed	-	
>T _{UTRAN-GPS}		1		Indicates the UTRAN GPS Timing of Cell Frame for LCS.	-	
>>MS	M		INTEGER (016383)	Most significant part	_	
>>LS	М		INTEGER (0429496 7295)	Least significant part	_	
>T _{UTRAN-GPS} Quality	0		INTEGER (0255)	Indicates the standard deviation (std) of the $T_{UTRAN-GPS}$ measurements in 1/16 chip. $T_{UTRAN-GPS}$ Quality = $\sqrt{E[(x-\mu)^2]}$ = std of reported $T_{UTRAN-GPS}$ Value, where x is the reported $T_{UTRAN-GPS}$ Value and μ = $E[x]$ is the expectation value of x.	_	
>T _{UTRAN-GPS} Drift Rate	M		INTEGER (-50+50)	Indicates the T _{UTRAN-GPS} drift rate in 1/256 chip per second. A positive value indicates that the UTRAN clock is running at a lower frequency than GPS clock.	-	
>T _{UTRAN-GPS} Drift Rate Quality	0		INTEGER (050)	Indicates the standard deviation (std) of the T _{UTRAN-GPS} drift rate measurements in 1/256 chip per second. T _{UTRAN-GPS} Drift Rate Quality = $\sqrt{E[(x-\mu)^2]}$ = std of reported T _{UTRAN-GPS} Drift Rate, where x is the reported T _{UTRAN-GPS} Drift Rate and μ = $E[x]$ is the expectation value of	_	

T	+	0.1		X.	CLOBAL	iances
T _{UTRAN-GANSS} Measurement Value Information		01			GLOBAL	ignore
>GANSS ID	0		9.2.2.130	Absence of this IE means Galileo.	_	
>SFN	М		INTEGER (04095)	SFN during which the T _{UTRAN-GANSS} measurement was performed	-	
>Tutran-ganss		1		Indicates the UTRAN GANSS Timing of Cell Frame for LCS.	-	
>>MS	М		INTEGER(016383)	Most significant part	-	
>>LS	М		INTEGER(04294967 295)	Least significant part	-	
>Tutran-ganss Quality	0		INTEGER(0255)	Indicates the standard deviation (std) of the T_{UTRAN} - GANSS measurements in 1/16 chip. T_{UTRAN} - GANSS Quality = $\sqrt{E[(x-\mu)^2]}$ = std of reported T_{UTRAN} - GANSS Value, where x is the reported T_{UTRAN} - SANSS Value and $\mu = E[x]$ is the expectation value of x.	-	
>T _{UTRAN-GANSS} Drift Rate	M		INTEGER(-5050)	Indicates the T _{UTRAN-GANSS} drift rate in 1/256 chip per second. A positive value indicates that the UTRAN clock is running at a lower frequency than GANSS clock.	_	
>T _{UTRAN-GANSS} Drift Rate Quality	0		INTEGER(050)	Indicates the standard deviation (std) of the Tutran-Ganss drift rate measurements in 1/256 chip per second. Tutran-Ganss Drift Rate Quality = $\sqrt{E[(x-\mu)^2]}$ = std of reported Tutran-Ganss Drift Rate, where x is the reported Tutran-Ganss Drift Rate and $\mu = E[x]$ is the expectation value of x.	_	
Additional Measurement Information LCR		01		1.28Mcps TDD only	YES	ignore
>Timing Advance LCR R7	М		INTEGER (08191)	According to TS 25.331 [4].	-	
>Rx Timing Deviation LCR	М		INTEGER (0511)	According to mapping in TS	-	

				25.123 [14].		
>Angle Of Arrival LCR		01		1.28Mcps TDD only	_	
>>AOA LCR	М		INTEGER	According to mapping in TS	_	
			(0719)	25.123 [14]		
>>AOA LCR Accuracy Class	M		ENUMERA TED (A, B, C, D, E, F, G, H,)	According to mapping in TS 25.123 [14]	-	

9.2.2.35 UE Positioning Measurement Quality

Table 75

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Std Resolution	M		BIT STRING (2)	Std Resolution field includes the resolution used in Std of Measurements field. Encoding on two bits as follows: '00' 10 meters '01' 20 meters '10' 30 meters '11' Reserved
Number of Measurements	M		BIT STRING (3)	The 'Number of Measurements' field indicates how many measurements have been used in the UE to determine the sample standard deviation of the measurements. Following 3 bit encoding is used: '001' 5-9 '010' 10-14 '011' 15-24 '100' 25-34 '101' 35-44 '110' 45-54 '111' 55 or more Special case: '000':In this case the field 'Std of Measurements' contains the std of the reported measurement value = $\sqrt{E[(x-\mu)^2]}$, where x is the reported value and $\mu = E[x]$ is the expectation value (i.e. the true value) of x. This std can be used irrespective of the number of measurements and reporting of the number of measurements such as Ec/No or Rx levels can be utilised in this case to evaluate the 'Std of Measurements' reported in this IE.

Std of Measurements	М	BIT STRING	Std of Measurements field
		(5)	includes sample standard
		(0)	deviation of measurements
			(when number of
			measurements is reported in
			'Number of Measurements"
			field) or standard deviation of
			the reported measurement
			value = $\sqrt{E[(x-\mu)^2]}$, where x is
			the reported value and μ =
			E[x] is the expectation value
			(i.e. the true value) of x (when
			'000' is given in 'Number of
			Measurements' field).
			Following linear 5 bit encoding
			is used:
			'00000' 0 - (R*1-1) meters
			'00001' R*1 – (R*2-1) meters
			'00010' R*2 – (R*3-1) meters
			·
			'11111' R*31 meters or more
			where R is the resolution
			defined by Std Resolution
			field. E.g. R=20 m
			corresponds to 0-19 m, 20-39
			m,,620+ m.
	1		,,0201 111.

9.2.2.36 UTRAN Access Point Position with Altitude

The UTRAN Access Point Position with Altitude indicates the exact geographical position of the base station antenna. The altitude shall be included when available.

Table 76

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Geographical Coordinates	M		9.2.2.7	
Altitude and direction	0		9.2.2.2	

9.2.2.37 UTRAN Cell Identifier (UC-ID)

The UC-ID (UTRAN Cell identifier) is the identifier of a cell in one UTRAN.

Table 77

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
RNC-ID	М		INTEGER (04095)	The identifier of one RNC in UTRAN. If the Extended RNC-ID IE is included in the UC-ID IE, the RNC-ID IE shall be ignored.	-	-
C-ID	M		INTEGER (065535)	The identifier of a cell in one RNS.	_	_
Extended RNC-ID	0		9.2.2.37A	The Extended RNC-ID IE shall be used if the RNC identity has a value larger than 4095.	YES	reject

9.2.2.37A Extended RNC-ID

This is the identifier of one RNC in UTRAN.

Table 77A

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Extended RNC-ID			INTEGER (409665535)	Note: Application of the Extended RNC-ID IE to very
				large networks is FFS.

9.2.2.38 Horizontal Accuracy Code

Table 78

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Horizontal Accuracy Code	М		INTEGER(0127)	The requested accuracy "r" is derived from the "Horizontal Accuracy Code" k by $r = 10x(1.1^k-1)$

9.2.2.39 Vertical Accuracy Code

Table 79

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Vertical Accuracy Code	M		INTEGER (0127)	The requested accuracy "v" is derived from the "Vertical Accuracy Code" k by $v = 45x(1.025^k-1)$.

9.2.2.40 Accuracy Fulfilment Indicator

This IE indicates whether the returned position estimate satisfies the requested accuracy or not.

Table 80

IE/Group Name	Presence	Range	IE Type and	Semantics Description
			Reference	
Accuracy Fulfilment Indicator	M		ENUMERATED (requested	
			` ·	
			accuracy	
			fulfilled,	
			requested	
			accuracy not	
			fulfilled,	
)	

9.2.2.41 Uplink DPCH information

This IE indicates the Uplink DPCH information used in the U-TDOA positioning method.

Table 81

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Choice mode	M			
>FDD				
>>Scrambling code type	M		ENUMERATED	
			(short, long)	
>>Scrambling code number	M		INTEGER(016	
			777215)	
>>TFCI existence	M		BOOLEAN	TRUE means existence.
>>Number of FBI bits	M		INTEGER(02)	In bits.
>TDD				
>>Cell Parameter ID	М		9.2.2.81	
>>TFCI Coding	М		9.2.2.82	
>>Puncture Limit	M		9.2.2.76	
>>Repetition Period	M		9.2.2.84	
>>Repetition Length	M		9.2.2.83	
>>TDD DPCH Offset	M		9.2.2.85	
>>UL Timeslot Information	M		9.2.2.86	
>>Frame Offset	M		9.2.2.64	
>>Special Burst Scheduling	M		9.2.2.92	

9.2.2.42 Frequency information

This IE indicates the Frequency information used for the U-TDOA positioning method.

Table 82

IE/Group name	Presence	Range	IE Type and Reference	Semantics description
CHOICE mode	M			
>FDD				
>>UARFCN uplink (Nu)	0		INTEGER (016383)	If this IE is not present, the default duplex distance defined for the operating frequency band shall be used (TS 25.101 [20])
>>UARFCN downlink (Nd)	М		INTEGER (0 16383)	TS 25.101 [20]
>TDD				
>>UARFCN	М		INTEGER (0 16383)	TS 25.102 [21]

9.2.2.43 PRACH parameters

This IE indicates the PRACH parameter used for the U-TDOA positioning method.

Table 83

IE/Group name	Presence	Range	IE Type and Reference	Semantics description
PRACH parameters		1		
		<maxp< td=""><td></td><td></td></maxp<>		
		RACH>		
>PRACH information	M		9.2.2.47	
>TFS	M		9.2.2.48	
>TFCS		1 <max TFC></max 		
>>CTFC	М		9.2.2.49	

Table 84

Range bound	Explanation			
maxPRACH	Maximum number of PRACHs in a cell. The value is 16.			
maxTFC	Maximum number of TFC. Value is 1024.			

9.2.2.44 Compressed Mode Assistance Data

This IE provides the assistance data used for the U-TDOA positioning method when the UE is operating in the compressed mode.

Table 85

IE/Group name	Presence	Range	IE Type and Reference	Semantics description
Downlink information		1		
>Primary Scrambling Code	M		9.2.2.46	
>Chip Offset	M		9.2.2.63	
>Frame Offset	M		9.2.2.64	
Uplink information		1		
>Transmisson Gap Pattern Sequence Information	М		9.2.2.66	
>Active Pattern Sequence Information	М		9.2.2.67	
>CFN	M		9.2.2.68	

9.2.2.45 C-RNTI

The cell RNTI (C-RNTI) identifies a UE having a RRC connection within a cell that is used for the U-TDOA positioning method.

Table 86

IE/Group name	Presence	Range	IE Type and Reference	Semantics description
C-RNTI			BIT	
			STRING(16)	

9.2.2.46 Primary Scrambling Code

This IE gives the DL scrambling code of a cell.

Table 87

IE/Group name	Presence	Range	IE Type and Reference	Semantics description
Primary Scrambling Code			INTEGER (0511)	

9.2.2.47 PRACH information

This IE contains the PRACH information used for the U-TDOA positioning method.

Table 88

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
CHOICE mode	M			
>FDD				
>>Available Signature	М		BIT STRING (16)	Each bit indicates availability for a signature, where the signatures are numbered "signature 0" up to "signature 15". The value 1 of a bit indicates that the corresponding signature is available and the value 0 that it is not available.
>>Available SF	М		ENUMERATED (32,64,128,256,)	In chips per symbol Defines the minimum allowed SF (i.e. the maximum rate)
>>Preamble scrambling code number	М		INTEGER (015)	Identification of scrambling code see TS 25.213 [17]
>>Puncturing Limit	М		9.2.2.76	
>>Available Sub Channel Number	M		BIT STRING (12)	Each bit indicates availability for a subchannel, where the subchannels are numbered "subchannel 0" to "subchannel 11". The value 1 of a bit indicates that the corresponding subchannel is available and the value 0 indicates that it is not available.
>TDD				

>>Time Slot	M	9.2.2.87	
>>TDD Channelisation Code	M	9.2.2.91	
>>Max PRACH Midamble Shifts	M	9.2.2.93	
>>PRACH Midamble	M	9.2.2.94	

9.2.2.48 TFS

This IE contains the TFS parameters used for the U-TDOA positioning method.

Table 89

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Dynamic Transport Format Information		1 <maxt F></maxt 		
>RLC Size	М		INTEGER (1295055)	Unit is bits
>Number of TBs and TTI List		1 <maxt F></maxt 		Present for every valid number of TB's (and TTI) for this RLC Size.
>>Transmission time interval	C- dynamicTT I		ENUMERATED(1 0, 20, 40, 80, dynamic,)	In ms. The value dynamic is only used in TDD mode.
>>Number of Transport blocks	М		INTEGER (0512)	
Semi-static Transport Format Information	M		9.2.2.61	

Table 90

	Range bound	Explanation	
ma	axTF	Maximum number of Transport Formats. The value is 32.	

Table 91

Condition	Explanation
dynamicTTI	This IE shall be present if TTI IE in Semi-static Transport Format
	Information IE is set to dynamic.

9.2.2.49 CTFC

This IE identifies the TFC used for the U-TDOA positioning method.

Table 92

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
CHOICE CTFC Size				
>2 bit CTFC				
>>CTFC information-2		1 <max TFC></max 		
>>>ctfc2Bit	M		INTEGER (03)	
>4 bit CTFC				
>>CTFC information-4		1 <max TFC></max 		
>>>ctfc4Bit	M		INTEGER (015)	
>6 bit CTFC				
>>CTFC information-6		1 <max TFC></max 		
>>>ctfc6Bit	M		INTEGER (063)	
>8 bit CTFC				
>>CTFC information-8		1 <max TFC></max 		
>>>ctfc8Bit	M		INTEGER (0255)	
>12 bit CTFC				
>>CTFC information-12		1 <max TFC></max 		
>>>ctfc12Bit	M		INTEGER (04095)	
>16 bit CTFC				
>>CTFC information-16		1 <max TFC></max 		
>>>ctfc16Bit	M		INTEGER (065535)	
>24 bit CTFC				
>>CTFC information-24		1 <max TFC></max 		
>>>ctfc22Bit	М		INTEGER (0 16777215)	

Table 92A

Range bound	Explanation
maxTFC	Maximum number of TFC. Value is 1024.

9.2.2.50 Request Type

This IE contains the Request Type parameters used for SAS centric positioning method selection.

Table 93

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Event	M		ENUMERATED(S top Change of service area, Direct, Change of service area, Stop Direct,,Periodic, Stop Periodic)	Requests related to service area reporting are not supported in the current version of this specification.
Report Area	М		ENUMERATED(S ervice Area, Geographical Area,)	
Horizontal Accuracy Code	0		INTEGER(0127)	The requested accuracy "r" is derived from the "accuracy code" k by $r = 10x(1.1^k-1)$.

9.2.2.51 UE Positioning Capability

This IE contains the UE Positioning Capability information used for SAS centric positioning method selection.

Table 94

IE/Group Name	Presenc e	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
Standalone location method(s) supported	M		BOOLEAN	Defines if a UE can measure its location by some means unrelated to UTRAN. TRUE means supported	-	
UE based OTDOA supported	М		BOOLEAN	TRUE means supported	_	
Network Assisted GPS support	M		ENUMERA TED (Network based, UE based, Both, None,)	Defines if the UE supports network based or UE based GPS methods.	-	
Support for GPS timing of cell frames measurement	М		BOOLEAN	Defines if a UE has the capability to perform the UE GPS timing of cell frames measurement (TS 25.331 [4]). TRUE means capable	_	
Support for IPDL	М		BOOLEAN	Defines if a UE has the capability to use IPDL to enhance its 'SFN-SFN observed time difference –type 2' measurement. TRUE means supported	-	
Support for Rx-Tx time difference type2 measurement	М		BOOLEAN	TRUE means supported	-	
Support for UE assisted GPS measurement validity in CELL_PCH and URA_PCH states	M		BOOLEAN	TRUE means supported	-	
Support for SFN-SFN observed time difference type 2 measurement	М		BOOLEAN	TRUE means supported	_	
Network Assisted GANSS Support		0 <max GANSS></max 			GLOBAL	ignore
>GANSS ID	0		9.2.2.130	Absence of this IE means Galileo.	-	
>GANSS mode	M		ENUMERA TED ('Network based', 'UE based', 'Both', 'None')	Defines if the UE supports network based or UE based GANSS methods	-	
>GANSS Signal ID	0		9.2.2.131	Absence of this field means the default value for the GANSS	-	

>Support for GANSS timing of cell frames measurement	M	BOOLEAN	identified by 'GANSS ID' (TS 25.331 [4]). Defines if a UE has the capability to perform the UE GANSS timing of cell frames measurement (TS 25.331 [4]). TRUE means capable Defines if a UE	-	
>Support for GANSS Carrier-Phase Measurement	IVI	BOOLEAN	has the capability to perform the UE GANSS Carrier-Phase Measurement. TRUE means capable		
>SBAS IDs	C- GANSS- ID	9.2.2.150		YES	ignore
>GANSS Signal IDs	0	 9.2.2.131a		YES	ignore
>Support for non-native assistance choices	0	Support for Non-Native Assistance Choices Indication 9.2.2.139		YES	ignore

Table 94A

Range Bound	Explanation
maxGANSS	Maximum number of GANSS systems for which data is included in
	this IE. The value of maxGANSS is 8.

Table 94B

Condition	Explanation				
GANSS-ID	This IE shall be present if the GANSS ID IE indicates 'SBAS'.				

9.2.2.52 Response Time

This IE contains the Response Time used for SAS centric mode.

Table 95

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Response Time			ENUMERATED(Low Delay, Delay	The value refers to TS 22.071 [15].
			Tolerant,)	

9.2.2.53 Positioning Priority

This IE contains the Positioning Priority used for SAS centric mode.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Positioning Priority			ENUMERATED(High Priority, Normal Priority,)	The value refers to TS 22.071 [15]

9.2.2.54 Client Type

This IE contains the Client Type used for SAS centric mode.

Table 97

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Client Type			ENUMERATED(Emergency Services, Value Added Services, PLMN Operator Services, Lawful Intercept Services, PLMN Operator - broadcast services, PLMN Operator - O&M, PLMN Operator - anonymous statistics, PLMN Operator - Target MS service support,)	Identifies the type of client.

9.2.2.55 Positioning Method

This IE contains the Positioning Method used for SAS centric positioning method selection.

Table 98

IE/Group Name	Presenc	Range	IE Type and	Semantics	Criticality	Assigned
Additional Method Type	M e		Reference 9.2.2.58	Description	_	Criticality
Selected Position Method	M		ENUMERATE D(OTDOA, GPS, OTDOA or GPS, Cell ID, UTDOA, , GNSS, OTDOA or GNSS)		I	
GNSS Positioning Method	C-GNSS		BIT STRING(9)	For each bit, if set to "1", indicates that respective GNSS is allowed. Bit 1 is the MSB and bit 9 is the LSB (see clause 9.2.1). bit 1: GPS bit 2: Galileo bit 3: SBAS(WAAS, EGNOS, MSAS, GAGAN) bit 4: Modernized GPS (L1C, L2C, L5) bit 5: QZSS bit 6: GLONASS bits 7-9: reserved for future GNSSes Note: Bit 1 cannot be the only one set to 1.	YES	ignore

Table 98A

Condition	Explanation
GNSS	This IE shall be present if the Selected Position Method IE value is
	set to "GNSS" or 'OTDOA or GNSS'

9.2.2.56 U-TDOA Bit Count

This IE contains the recommended number of pre-coded bits to be transmitted by the UE when the U-TDOA positioning method is selected.

Table 99

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
U-TDOA Bit Count			INTEGER (05000)	Number of bits to be transmitted by the target UE

9.2.2.57 U-TDOA Time Interval

This IE contains the recommended maximum time interval for transmission of the U-TDOA Bit Count number of bits for U-TDOA positioning.

IE/Group Name	Presence	Range	IE Type and	Semantics Description
			Reference	
U-TDOA Time Interval			INTEGER	Time in ms in which the U-
			(03000)	TDOA Bit Count is to be
				transmitted by the UE

9.2.2.58 Additional Method Type

This IE contains the selected positioning method type for SAS-centric mode.

Table 101

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Additional Method Type			ENUMERATED (UE_Assisted, UE_Based, UE_Based is preferred but UE_assisted is allowed, UE_Assisted is preferred but UE_Assisted is preferred but UE_Based is allowed,)	

9.2.2.59 UE Positioning OTDOA Assistance Data

This IE contains the UE Positioning OTDOA Assistance Data used in the SAS centric mode.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
UE Positioning OTDOA Reference Cell Info	0				_	•
>SFN	0		INTEGER (04095)	Time stamp (SFN of Reference Cell) of the SFN-SFN relative time differences and SFN-SFN drift rates. Included if any SFN-SFN drift value is included in IE UE positioning OTDOA neighbour cell info.	-	
>CHOICE mode >>Fdd					_	
>>>Primary CPICH Information	M		Primary scrambling code 9.2.2.46		-	
>>Tdd					_	
>>>Cell Parameter ID	M		9.2.2.81		_	
>Frequency Info	0		9.2.2.42	Default value is the existing value of frequency information. This IE shall always be set to default value	-	
>CHOICE positioning mode					_	
>>UE Based					_	
>>> Cell position	0		Reference Cell Position 9.2.2.70	The position of the antenna that defines the cell.	_	
>>> Round Trip Time	0		INTEGER (032766)	According to mapping in TS 25.133 [13].	_	
>>UE Assisted	_				_	
>UE positioning IPDL parameters	0		9.2.2.71	If this element is not included there are no idle periods present	_	
>Extended Round Trip Time	0		INTEGER (3276710304 1)	According to mapping in TS 25.133 [13]. Included only if the Round Trip Time IE above is included with its maximum value and if the actual value is outside the possible range for the Round Trip Time IE.	YES	ignore
>Timing Advance LCR R7	0		INTEGER (08191)	1.28Mcps TDD only. According to TS 25.331 [4].	_	
>Rx Timing Deviation LCR	0		INTEGER (0511)	1.28Mcps TDD only . According to mapping in TS 25.123 [14].	-	
>Angle Of Arrival LCR		01		1.28Mcps TDD only	_	
>>AOA LCR	М		INTEGER (0719)	According to mapping in TS 25.123 [14]	_	
>>AOA LCR Accuracy Class	M		ENUMERATE D (A, B, C, D, E,	According to mapping in TS 25.123 [14]	-	

			F, G, H,)		1	
UE Positioning OTDOA Neighbour Cell List	0		1 , 0, 11,)		_	
>UE positioing OTDOA Neighbour cell info		1 <ma xCellM</ma 			-	
>>CHOICE mode		eas>				
>>CHOICE Mode					_	
>>>Primary CPICH Information	М		Primary scrambling code 9.2.2.46		-	
>>>TDD					_	
>>>Cell Parameter ID	M		9.2.2.81		_	
>>Frequency Info	0		9.2.2.42	Default value is the existing value of frequency information	_	
>>UE positioning IPDL parameters	0		9.2.2.71		-	
>>SFN-SFN Relative Time difference	M		9.2.2.73		_	
>>SFN Offset Validity	0		ENUMERATE D (false)	Absence of this element means SFN offset is valid. False means SFN offset is not valid.	_	
>>SFN-SFN Drift	0		ENUMERATE D (0,1,2,3,4,5,8, 10,15,25,35,50,65,80,100,-1,- 2,-3,-4,-5,-8, - 10,-15,-25,- 35,-50,-65,- 80,-100,)	Indicates the SFN- SFN drift rate in 1/256 chip per second.	_	
>>Search Window Size	M		ENUMERATE D (c20, c40, c80, c160, c320, c640, c1280, moreThan128 0,)	In chips. If the value is X then the expected SFN-SFN observed time difference is in the range [RTD-X, RTD+X] where RTD is the value of the field SFN-SFN relative time difference.	_	
>>CHOICE					_	
positioning mode >>>UE Based		1				
>>>VE Based >>>>Relative North	0		INTEGER (- 2000020000)	Seconds of angle, scale factor 0.03. Relative position compared to reference cell.	-	
>>>Relative East	0		INTEGER (- 2000020000)	Seconds of angle, scale factor 0.03. Relative position compared to reference cell.	-	
>>>>Relative Altitude	0		INTEGER (- 40004000)	Relative altitude in meters compared to ref. cell.	-	
>>>>Fine SFN- SFN	0		INTEGER (015)	Gives finer resolution	_	
>>>>Round Trip Time	0		INTEGER (032766)	In chips. Included if cell is in active set	_	

>>> UE assisted				-	
>>Extended Round Trip Time	0	INTEGER (3276710304 1)	In chips. Included if cell is in active set. Included only if the Round Trip Time IE above is included with its maximum value and if the actual value is outside the possible range for the Round Trip Time IE.	YES	ignore

Range bound	Explanation			
maxCellMeas	Maximum number of cells to measure. The value is 32.			

9.2.2.60 UL TrCH information

This IE contains the UL TrCH information used for the U-TDOA positioning method.

Table 104

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Uplink transport channel type	М		ENUMERATED (DCH,USCH,)	USCH is TDD only
TFS	М		9.2.2.48	

9.2.2.61 Semi-static Transport Format Information

This IE contains the Semi-static Transport Format information used for the U-TDOA positioning method.

Table 105

IE/Group Name	Presence	Range	IE Type and Reference	Semantics description
Transmission time interval	М		ENUMERATED(5, 10, 20, 40, 80, dynamic,)	In ms. The value dynamic is only used in TDD mode
Type of channel coding	М		ENUMERATED(N o coding, Convolutional, Turbo,)	The option "No coding" is only valid for TDD.
Coding Rate	C-Coding		ENUMERATED(1/ 2, 1/3,)	
Rate matching attribute	M		INTEGER(1hiRM)	
CRC size	M		ENUMERATED(0, 8, 12, 16, 24,)	In bits

Table 106

Condition	Explanation
Coding	This IE shall be present if Type of channel coding IE is
	'Convolutional' or 'Turbo'.

Table 107

Constant	Explanation	Value

Constant	Explanation	Value
hiRM	Maximum number that could be set as rate	256
	matching attribute for a transport channel	

9.2.2.62 Environment Characterisation

This IE contains the Environment Characterisation information used for the SAS centric mode.

Table 108

IE/Group Name	Presence	Range	IE Type and Reference	Semantics description
Environment Characterisation			ENUMERATED(hea vy multipath and NLOS conditions, no or light multipath and usually LOS conditions, not defined or mixed environment,)	

9.2.2.63 Chip Offset

This IE contains the Chip Offset information used for the U-TDOA positioning method.

The Chip Offset is defined as the radio timing offset inside a radio frame. The Chip offset is used as offset relative to the Primary CPICH timing for the DL DPCH or for the F-DPCH.

Table 109

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Chip Offset			INTEGER(038399)	Unit: chips

9.2.2.64 Frame Offset

This IE contains the Frame Offset information used for the U-TDOA positioning method.

The Frame Offset is the required offset between the dedicated channel downlink transmission frames (CFN, Connection Frame Number) and the broadcast channel frame offset (Cell Frame Number). The Frame Offset is used in the translation between Connection Frame Number (CFN) on Iub/Iur and the least significant 8 bits of SFN (System Frame Number) on Uu. The Frame Offset is UE and cell specific

Table 110

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Frame Offset			INTEGER(0255)	Unit: Frames

9.2.2.65 Position Data

This IE provides data related to the positioning methods used and reported in the SAS centric mode.

Table 111

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Position Data	M				_	•
>Positioning Data Discriminator	M		BIT STRING (4)	The positioning data discriminator defines the type of data provided for each positioning method: 0000 indicates the presence of the <i>Positioning Data Set</i> IE (that reports the usage of each non-GANSS method that was successfully used to obtain the location estimate) 0001 indicates the presence of the GANSS Positioning Data Set IE (that reports the usage of each GANSS method that was successfully used to obtain the location estimate) and the absence of the <i>Positioning Data Set</i> IE 1 octet of data is provided for each positioning method included. All other values are reserved.		
>Positioning Data Set	C- ifDiscrimin				_	
	ator=0					

>>Positioning Method and Usage	1 <ma xSet></ma 	OCTET STRING (1)	Coding of positioning method (bits 8-4): 00000 Reserved 00001 Reserved 00010 Reserved 00010 Reserved 00100 Reserved 00101 Mobile Assisted GPS 00110 Mobile Based GPS 00111 Conventional GPS 01000 U-TDOA 01001 OTDOA 01010 IPDL 01011 RTT 01100 Cell ID 01101 to 01111 reserved	_	
>GANSS		0.1	10000 to 11111 reserved for network specific positioning methods Coding of usage (bits 3-1): 000 Attempted unsuccessfully due to failure or interruption - not used. 001 Attempted successfully: results not used to generate location - not used. 010 Attempted successfully: results used to verify but not generate location - not used. 011 Attempted successfully: results used to generate location 100 Attempted successfully: results used to generate location 100 Attempted successfully: case where MS supports multiple mobile based positioning methods and the actual method or methods used by the MS cannot be determined.	YES	ignore
>GANSS Positioning Data Set		01		YES	ignore

>>GANSS	1 <ma< th=""><th>OCTET</th><th>Coding of Method (Bits 8-</th><th>_</th><th></th></ma<>	OCTET	Coding of Method (Bits 8-	_	
Positioning	xGANS	STRING (1)	7):		
Method and	SSet>	, ,	00 : UE-Based		
Usage			01 : UE-Assisted		
			10 : Conventional		
			11 : Reserved		
			Coding of GANSS ID (Bits		
			6-4):		
			000 : Galileo		
			001 : SBAS		
			010 : Modernized GPS		
			011 : QZSS		
			100 : GLONASS		
			other values reserved		
			Girlor values reserved		
			Coding of usage (bits 3-1):		
			County of dodge (She o 1).		
			011 Attempted		
			successfully: results used		
			to generate location		
			100 Attempted		
			successfully: case where		
			UE supports multiple		
			mobile based positioning		
			methods and the actual		
			method or methods used		
			by the UE cannot be		
			determined.		

Condition	Explanation
ifDiscriminator=0	This IE is present if the Positioning Data Discriminator IE is set to
	"0000"

Table 113

Range bound	Explanation
maxSet	Maximum size of the data set. Value is 9.
maxGANSSSet	Maximum size of the data. Value is 9.

9.2.2.66 Transmission Gap Pattern Sequence Information

This IE contains the Transmission Gap Pattern Sequence information used for the U-TDOA positioning method when the UE is operating in the compressed mode.

Table 114

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Transmission Gap Pattern Sequence Information		1 <maxtgps></maxtgps>		
>TGPS Identifier	М		INTEGER (1maxTGPS)	Transmission Gap Pattern Sequence Identifier: Establish a reference to the compressed mode pattern sequence. Up to <maxtgps> simultaneous compressed mode pattern sequences can be used.</maxtgps>
>TGSN	M		INTEGER (014)	Transmission Gap Starting Slot Number: The slot number of the first transmission gap slot within the TGCFN.
>TGL1	M		INTEGER (114)	The length of the first Transmission Gap within the transmission gap pattern expressed in number of slots.
>TGL2	0		INTEGER (114)	The length of the second Transmission Gap within the transmission gap pattern. If omitted, then TGL2=TGL1.
>TGD	М		INTEGER (0,15269)	Transmission Gap Distance: indicates the number of slots between the starting slots of two consecutive transmission gaps within a transmission gap pattern. If there is only one transmission gap in the transmission gap pattern, this parameter shall be set to "0" ("0" =undefined).
>TGPL1	М		INTEGER (1144,)	The duration of transmission gap pattern 1 in frames.
>Uplink Compressed Mode Method	M		ENUMERATED(SF/2, Higher Layer Scheduling,)	Method for generating uplink compressed mode gap.

Table 115

Range bound	Explanation		
maxTGPS	Maximum number of transmission gap pattern sequences. The		
	value is 6.		

9.2.2.67 Active Pattern Sequence Information

This IE contains the Active Pattern Sequence information used for the U-TDOA positioning method when the UE is operating in the compressed mode.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
CM Configuration Change CFN	М		CFN 9.2.2.68	
Transmission Gap Pattern Sequence Status		0 <maxtgps></maxtgps>		
>TGPS Identifier	M		INTEGER (1maxTGPS)	If the group is not present, none of the pattern sequences are activated. References an already defined sequence.
>TGPRC	M		INTEGER (0511)	The number of transmission gap patterns within the Transmission Gap Pattern Sequence. "0"=Infinity
>TGCFN	M		CFN 9.2.2.68	Connection Frame Number of the first frame of the first pattern 1 within the Transmission Gap Pattern Sequence.

Table 117

Range bound	Explanation		
	Maximum number of transmission gap pattern sequences. The value is 6.		

9.2.2.68 CFN

This IE contains the CFN used for the U-TDOA positioning method when the UE is operating in the compressed mode.

Table 118

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
CFN			INTEGER(0255)	

9.2.2.69 Positioning Response Time

This IE contains the Positioning Response Time information used for SAS centric mode.

Table 119

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Positioning Response Time			ENUMERATED(250, 500, 1000, 2000, 3000, 4000, 6000, 8000, 12000, 16000, 20000, 24000, 28000, 32000, 64000,)	Unit: millisecond

9.2.2.70 Reference Cell Position

Reference Cell Position IE is used to identify the position of the reference cell using geographical coordinates. The reference system is the same as the one used in TS 23.032 [11].

Table 120

IE/Group Name	Presence	Range	IE type and reference	Semantics description
CHOICE Geographical Area			10.0.0.00	
>Point				Ellipsoid point
>>Geographical Coordinates	M		9.2.2.7	
>Ellipsoid point with altitude				
>>Geographical Coordinates	М		9.2.2.7	
>>Altitude and direction	M		9.2.2.2	

9.2.2.71 UE Positioning IPDL Parameters

The UE Positioning IPDL Parameters IE is used for OTDOA in the SAS centric mode.

Table 121

IE/Group Name	Presence	Range	IE type and reference	Semantics description
CHOICE mode				
>FDD				
>>IP Spacing	M		ENUMERATED(See TS 25.331 [4]
			5,7,10,15,20,30,	
			40,50,)	
>>IP Length	M		ENUMERATED(See TS 25.331 [4]
			5,10,)	
>>IP Offset	M		INTEGER(09)	See TS 25.331 [4]
>>Seed	M		INTEGER(063)	See TS 25.331 [4]
>TDD				_
Burst Mode Parameters	0	·	9.2.2.72	

9.2.2.72 Burst Mode Parameters

Burst Mode Parameters IE is used for OTDOA in the SAS centric mode.

Table 122

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Burst Start	M		INTEGER(015)	
Burst Length	M		INTEGER(102	
_			5)	
Burst Frequency	M		INTEGER(116)	

9.2.2.73 SFN-SFN Relative Time Difference

SFN-SFN Relative Time Difference IE is used for OTDOA in the SAS centric mode

Table 123

IE/Group Name	Presence	Range	IE type and reference	Semantics description
			reference	
SFN Offset	M		INTEGER	
			(04095)	
SFN-SFN-Relative Time	M		INTEGER	
Difference			(038399)	

9.2.2.74 UTDOA Group

This IE contains information used for the U-TDOA positioning method.

Table 124

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
UTRAN Cell Identifier	M		9.2.2.37	
Frequency Information	M		9.2.2.42	
Choice RRC State	M			
>CELL_DCH				
>>Uplink DPCH Information	М		9.2.2.41	
>>Compressed Mode Assistance Data	0		9.2.2.44	FDD only
>>DCH Information		01		
>>>TFCS		1 <maxtfc></maxtfc>		
>>>>CTFC	M		9.2.2.49	
>>>TrCH Information		1 <maxtrch></maxtrch>		
List				
>>>>UL TrCH	M		9.2.2.60	
Information				
>>E-DPCH Information		01		FDD only
>>>Maximum Set of E- DPDCHs	M		9.2.2.75	
>>>Puncture Limit	M		9.2.2.76	
>>>E-TFCS Information	M		9.2.2.77	
>>>E-TTI	M		9.2.2.79	
>>>E-DPCCH Power Offset	0		9.2.2.80	
>CELL_FACH				
>>PRACH Parameters	М		9.2.2.43	
>>C-RNTI	М		9.2.2.45	
>>USCH parameters	0		9.2.2.95	TDD only

Table 125

Range bound Explanation		
maxTFC	Maximum number of TFC. The value is 1024.	
maxTrCH	Maximum number of Transport Channels. The value is 32.	

9.2.2.75 Maximum Set of E-DPDCHs

The Maximum Set of E-DPDCHs parameter, as defined in TS 25.212 [16], is used in UTDOA positioning method.

IE/Group Name	Presence	Range	IE Type and	Semantics Description
			Reference	
Maximum Set of E-DPDCHs			ENUMERATED	
			(vN64, vN32,	
			vN16, vN8, vN4,	
			v2xN4, v2xN2,	
			v2xN2plus2xN4,	
)	

9.2.2.76 Puncture Limit

The Puncture Limit parameter is used in UTDOA positioning method indicating the limit in the amount of puncturing that can be applied in order to minimise the number of dedicated physical channels.

Table 127

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Puncture Limit			INTEGER (015)	Unit: % Range: 40100 % Step: 4 % 100% means no puncturing

9.2.2.77 E-DCH Transport Format Combination Set Information (E-TFCS Information)

This IE is used in UTDOA positioning method. Whereas the related Transport Block sizes are standardised in [ref is FFS] this IE gives details on the referenced Transport Block Size Table and the Reference E-TFCIs.

Table 128

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
E-DCH Transport Format Combination Set Index	M		INTEGER (14,)	Indicates which standardised E-TFCS Transport Block Size Table shall be used. The related tables are specified in [ref FFS].
Reference E-TFCI Information		0 <maxnoofrefetf Cls></maxnoofrefetf 		
>Reference E-TFCI	М		INTEGER (0127)	
>Reference E-TFCI Power Offset	М		9.2.2.78	

Table 129

Range Bound	Explanation
maxnoofRefETFCIs	Maximum number of signalled reference E-TFCIs

9.2.2.78 Reference E-TFCI Power Offset

The Reference E-TFCI Power Offset is used in UTDOA positioning method indicating how to calculate the reference E-TFC gain factor.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Reference E-TFCI Power Offset			INTEGER (08)	According to mapping in ref. TS 25.213 [17].

9.2.2.79 E-TTI

The E-TTI parameter is used in UTDOA positioning method indicating the Transmission Time Interval for E-DPCH operation.

Table 131

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
E-TTI			ENUMERATED (2ms, 10ms,)	

9.2.2.80 E-DPCCH Power Offset

The E-DPCCH Power Offset is used in UTDOA positioning method indicating how to calculate the E-DPCCH gain factor.

Table 132

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
E-DPCCH Power Offset			INTEGER (08)	According to mapping in ref. TS 25.213 [17].

9.2.2.81 Cell Parameter ID

The Cell Parameter ID identifies unambiguously the Code Groups, Scrambling Codes, Midambles and Toffset (see ref. TS 25.223 [18]).

Table 133

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Cell Parameter ID			INTEGER	
			(0127,)	

9.2.2.82 TFCI Coding

The TFCI Coding describes the way how the TFCI bits are coded. By default 1 TFCI bit is coded with 4 bits, 2 TFCI bits are coded with 8 bits, 3-5 TFCI bits are coded with 16 bits and 6-10 TFCI bits are coded with 32 bits.

Table 134

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
TFCI Coding			ENUMERATED	
-			(4, 8, 16, 32,)	

9.2.2.83 Repetition Length

The Repetition Length represents the number of consecutive Radio Frames inside a Repetition Period in which the same Time Slot is assigned to the same Physical Channel see ref. TS 25.331 [4].

Table 135

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Repetition Length			INTEGER (163)	

9.2.2.84 Repetition Period

The Repetition Period represents the number of consecutive Radio Frames after which the same assignment scheme of Time Slots to a Physical Channel is repeated. This means that if the Time Slot K is assigned to a physical channel in the Radio Frame J, it is assigned to the same physical channel also in all the Radio Frames J+n*Repetition Period (where n is an integer) see ref. TS 25.331 [4].

Table 136

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Repetition Period			ENUMERATED	
			(1, 2, 4, 8, 16, 32,	
			64,)	

9.2.2.85 TDD DPCH Offset

The Offset represents the phase information for the allocation of a group of dedicated physical channels. The first range is used when a starting offset is not required and the TDD Physical channel offset for each DPCH in the CCTrCH shall be directly determined from the TDD DPCH Offset. The second range is used when a starting offset is required. The TDD DPCH Offset shall map to the CFN and the TDD Physical Channel Offet for each DPCH in this CCTrCH shall calculated by TDD DPCH Offset *mod* Repetition period, see ref. TS 25.331 [4].

Table 137

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
CHOICE Offset Type				
>Initial Offset				
>>TDD DPCH Offset Value	M		INTEGER (0255)	
>No Initial Offset				
>>TDD DPCH Offset Value	M		INTEGER (063)	

9.2.2.86 UL Timeslot Information

The UL Timeslot Information IE provides information on the time slot allocation for an UL DPCH.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
UL Timeslot Information		1 <maxno ofULts></maxno 		
>Time Slot	M		9.2.2.87	
>Midamble Shift And Burst Type	М		9.2.2.88	
>TFCI Presence	M		9.2.2.89	
>UL Code Information	M		9.2.2.90	

Table 138A

Range Bound	Explanation
maxnoofULts	Maximum number of allocated time slots for an UL DPCH. The value
	of maxnoofULts is 15.

9.2.2.87 Time Slot

The Time Slot represents the minimum time interval inside a Radio Frame that can be assigned to a Physical Channel.

Table 139

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Time Slot			INTEGER (014)	

9.2.2.88 Midamble Shift And Burst Type

This information element indicates burst type and midamble allocation.

The 256 chip midamble supports 3 different time shifts, the 512 chips midamble may support 8 or even 16 time shifts.

Three different midamble allocation schemes exist:

Default midamble: the midamble shift is selected by layer 1 depending on the associated channelisation code (DL and UL)

Common midamble: the midamble shift is chosen by layer 1 depending on the number of channelisation codes (possible in DL only)

UE specific midamble: a UE specific midamble is explicitly assigned (DL and UL)

Table 140

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
CHOICE Burst Type				
>Type1				
>>Midamble Configuration	M		INTEGER (4, 8, 16)	As defined in TS 25.221 [19].
Burst Type 1 And 3				
>>CHOICE Midamble	M			
Allocation Mode				
>>>Default Midamble			NULL	
>>>Common Midamble			NULL	
>>>UE Specific				
Midamble				
>>Midamble Shift Long	M		INTEGER (015)	
>Type2				
>>Midamble Configuration	M		INTEGER (3,6)	As defined in TS 25.221 [19].
Burst Type 2				
>>CHOICE Midamble	M			
Allocation Mode				
>>>Default Midamble			NULL	
>>>Common Midamble			NULL	
>>>UE Specific				
Midamble				
>>Midamble Shift Short	M		INTEGER (05)	
>Type3				UL only
>>Midamble Configuration	M		INTEGER (4, 8, 16)	As defined in TS 25.221 [19].
Burst Type 1 And 3				
>>CHOICE Midamble	M			
Allocation Mode				
>>>Default Midamble			NULL	
>>>UE Specific				
Midamble				
>>Midamble Shift Long	M		INTEGER (015)	

9.2.2.89 TFCI Presence

The TFCI Presence parameter indicates whether the TFCI shall be included. [TDD - If it is present in the timeslot, it will be mapped to the channelisation code defined by TS 25.221 [19].]

Table 141

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
TFCI presence			ENUMERATED (
			Present,	
			Not Present)	

9.2.2.90 TDD UL Code Information

The TDD UL Code Information IE provides information for UL Codes that have been established.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
TDD UL Code Information		1 <maxno ofDPCHs></maxno 		
>TDD Channelisation Code	М		9.2.2.91	

Table 143

Range Bound	Explanation
maxnoofDPCHs	Maximum number of DPCHs in one CCTrCH

9.2.2.91 TDD Channelisation Code

The Channelisation Code Number indicates which Channelisation Code is used for a given Physical Channel. In TDD the Channelisation Code is an Orthogonal Variable Spreading Factor code, that can have a spreading factor of 1, 2, 4, 8 or 16.

Table 144

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
TDD Channelisation Code			ENUMERATED ((1/1), (2/1), (2/2), (4/1), (4/4), (8/1), (8/8), (16/1), (16/16),)	

9.2.2.92 Special Burst Scheduling

This information element expresses the number of frames between special burst transmissions during DTX.

Table 145

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Special Burst Scheduling			INTEGER (1256)	Number of frames between special burst transmission during DTX

9.2.2.93 Max PRACH Midamble Shift

Indicates the maximum number of Midamble shifts to be used in a cell.

Table 146

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Max PRACH Midamble Shift			ENUMERATED (4, 8,)	

9.2.2.94 PRACH Midamble

The PRACH Midamble indicates if only the Basic Midamble Sequence or also the time-inverted Midamble Sequence is used.

Table 147

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
PRACH Midamble			ENUMERATED (Inverted, Direct,)	

9.2.2.95 USCH Parameters

In Cell-FACH state, when the UE supports the USCH, and the CRNC is equal to the SRNC, the UE may be given periodic allocations on the uplink shared channel. Furthermore, the UE may also be configured to generate special bursts instead of uplink shared channel transmissions. This information element defines the uplink shared channel transmissions.

Table 148

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Cell Parameter ID	M		9.2.2.81	
TFCI Coding	M		9.2.2.82	
Puncture Limit	M		9.2.2.76	
Repetition Period	M		9.2.2.84	This is the scheduling interval on the USCH.
USCH Scheduling Offset	M		9.2.2.96	
UL Timeslot Information	M		9.2.2.86	
TFCS		1 <maxtf C></maxtf 		
>CTFC	M		9.2.2.49	
TrCH Information List		1 <maxtr CH></maxtr 		
>UL TrCH Information	M		9.2.2.60	

Table 149

Range bound	Explanation
maxTFC	Maximum number of TFC. The value is 1024.
maxTrCH	Maximum number of Transport Channels. The value is 32.

9.2.2.96 USCH Scheduling Offset

This information element indicates the offset relative to CFN=0 that the transmission on the uplink shared channel shall take place.

Table 150

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
USCH scheduling offset			INTEGER(0255)	

9.2.2.97 Include Velocity

This element indicates that the UE"s velocity is requested.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Include Velocity	М		ENUMERATED (requested)	

9.2.2.98 Velocity Estimate

The *Velocity Estimate* IE is used to describe the UE's velocity. The reference system is the same as used in TS 23.032 [11].

Table 152

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Choice Velocity Estimate				
>Horizontal Velocity				Horizontal speed and bearing (the direction of travel).
>>Horizontal Speed and Bearing	M		9.2.2.99	
>Horizontal with Vertical Velocity				Horizontal speed and bearing (the direction of travel) as well as vertical speed and the direction (upward or downward)
>>Horizontal Speed and Bearing	M		9.2.2.99	
>>Vertical Velocity	M		9.2.2.100	
>Horizontal Velocity with Uncertainty				Horizontal speed, bearing (the direction of travel), and the uncertainty of the reported speed.
>>Horizontal Speed and Bearing	M		9.2.2.99	
>>Uncertainty Speed	M		INTEGER (0255)	Uncertainty speed is encoded in increments of 1 kilometer per hour using an 8 bit binary coded number (N). The value of N gives the uncertainty speed except for N=255 which indicates that the uncertainty is not specified
>Horizontal with Vertical Velocity and Uncertainty				Horizontal speed and bearing (the direction of travel) as well as vertical speed and the direction (upward or downward) and the uncertainty of the reported speed.
>>Horizontal Speed and Bearing	M		9.2.2.99	
>>Vertical Velocity	М		9.2.2.100	
>>Horizontal Uncertainty Speed	M		INTEGER (0255)	Horizontal Uncertainty Speed is encoded in increments of 1 kilometer per hour using an 8 bit binary coded number (N). The value of N gives the uncertainty speed except for N=255 which indicates that the uncertainty is not specified
>>Vertical Uncertainty Speed	М		INTEGER (0255)	Vertical Uncertainty Speed is encoded in increments of 1 kilometer per hour using an 8 bit binary coded number (N). The value of N gives the uncertainty speed except for N=255 which indicates that the uncertainty is not specified

9.2.2.99 Horizontal Speed and Bearing

This IE contains the two components of horizontal velocity: speed and bearing

Table 153

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Bearing	M		INTEGER (0359)	The direction of movement is given in degrees where "0" represents North, "90" represents East, etc.
Horizontal Speed	M		INTEGER (0< 2 ¹¹ -1)	The relationship between (N) and the horizontal speed (h) in kilometers per hour it describes is: $N \le h < N + 0.5$ $(N=0)$ $N - 0.5 \le h < N + 0.5$ $(0 < N < 2^{11} - 1)$ $N - 0.5 \le h$ $(N < N < 1)$

9.2.2.100 Vertical Velocity

This IE contains the two components of vertical velocity: speed and direction

Table 154

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Vertical Speed	М		INTEGER (02 ⁸ -1)	The relationship between (N) and the vertical speed (v) in kilometers per hour it describes is: $N \le v < N + 0.5$ (N = 0) $N - 0.5 \le v < N + 0.5$ (0 < N < 2^8 -1) $N - 0.5 \le v$ (N = 2^8 -1)
Vertical Speed Direction			ENUMERATED	
			(upward,	
			downward)	

9.2.2.101 GPS Positioning Instructions

This information element contains positioning instructions for GPS positioning method in SAS-centric mode.

Table 155

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
Horizontal Accuracy Code	0		9.2.2.38		_	-
Vertical Accuracy Code	0		9.2.2.39		_	
GPS Timing of Cell Wanted	M		BOOLEAN	This IE is set to TRUE if the UE is requested to report SFN-GPS timing of the reference cell.	-	
Additional Assistance Data Request	М		BOOLEAN	TRUE indicates that the UE is requested to send an additional assistance data request if the provided assistance data are not sufficient.	_	
Measurement Validity	0		ENUMERATED(CELL_DCH, all states except CELL_DCH, all states,)		YES	ignore

9.2.2.102 UE Position Estimate Info

The UE Position Estimate Info is used in UE-based positioning methods providing the UE position estimate from the RNC to the SAS in SAS-centric mode.

Table 156

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
CHOICE Reference Time	М			•	-	
>UTRAN GPS reference time Result			9.2.2.104		_	
>GPS reference time					_	
>>GPS TOW msec	М		INTEGER (06.048*10 ⁸ -1,)	GPS Time of Week in milliseconds.	_	
>Cell timing					_	
>>SFN	М		INTEGER (04095)	SFN during which the position was calculated.	_	
>>UC-ID	М		UTRAN Cell Identifier 9.2.2.37	Identifies the reference cell for SFN.	_	
>UTRAN GANSS reference time result					_	
>>UTRAN-GANSS Reference Time Result	М		9.2.2.136		YES	ignore
>GANSS reference time only					-	
>>GANSS reference time only	М				YES	ignore
>>>GANSS TOD msec	М		INTEGER(035 99999)	GANSS Time of Day in milliseconds.	-	
>>>GANSS time ID	0		GANSS ID 9.2.2.130	Absence of this IE means Galileo system time. The value "0" ("SBAS") shall not be used for GANSS Time ID.	-	
UE Position Estimate	M		Geographical Area 9.2.2.6		_	
GPS Reference Time Uncertainty	0		9.2.2.132		YES	ignore
Position Data	0		Position Data UE-Based 9.2.2.140		YES	ignore

9.2.2.103 UTRAN-GPS Reference Time

Table 157

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
UTRAN GPS timing of cell frames	M		INTEGER (0 2322431999999,)	GPS timing of cell frames in steps of 1 chip.
UC-ID	0		UTRAN Cell Identifier 9.2.2.37	Identifies the reference cell for the GPS TOW-SFN relationship.
SFN	М		INTEGER (04095)	The SFN which the UTRAN GPS timing of cell frames time stamps.

9.2.2.104 UTRAN-GPS Reference Time Result

Table 158

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
UE GPS timing of cell frames	M		INTEGER(0 37158911999999,)	GPS Time of Week in units of 1/16 th UMTS chips according to TS 25.133 [13].
UC-ID	M		UTRAN Cell Identifier 9.2.2.37	Identifies the reference cell for the GPS TOW-SFN relationship
SFN	М		INTEGER(04095)	This IE indicates the SFN at which the UE timing of cell frame is captured.

9.2.2.105 T_{UTRAN-GPS} Drift Rate

Table 159

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
T _{UTRAN-GPS} Drift Rate	0		ENUMERATED (0, 1, 2, 5, 10, 15, 25, 50, -1, -2, -5, -10, -15, -25, -50,)	In 1/256 chips per sec.

9.2.2.106 Periodic Position Calculation Info

The Periodic Position Calculation Info contains information required for periodic location in RNC-centric mode.

Table 160

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Reference Number	M		INTEGER (032767,)	This IE is used to uniquely associate all periodic Position Calculation procedures belonging to the location of the same target UE for periodic location. Position Calculation procedures belonging to the same target UE for periodic location shall use the same Reference Number.
Amount of Outstanding Requests	M		INTEGER (1 8639999,)	This IE indicates the amount of outstanding periodic requests. This IE shall be set to the total number of periodic requests in the first Position Calculation Request message, and decrement by 1 for each new Position Calculation Request for periodic location. When the number reaches 1, the SAS will know that the periodic location is complete.
Reporting Interval	M		INTEGER (1 8639999,)	This IE indicates the reporting interval in seconds when the SAS can expect a next Position Calculation Request associated to the same target UE in periodic location.

9.2.2.107 Periodic Location Info

The Periodic Location Info contains the periodic reporting interval and reporting amount for periodic location.

Table 161

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Reporting Amount	М		INTEGER (1 8639999,)	This IE indicates the amount of periodic reports.
Reporting Interval	М		INTEGER (1 8639999,)	This IE indicates the reporting interval in seconds.

9.2.2.108 Amount of Reporting

The Amount of Reporting together with the *RNC Response Time IE* in a POSITION ACTIVATION REQUEST message defines the periodical reporting criteria.

Table 162

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Amount of Reporting	M		ENUMERATED(2,	Amount of reporting for a
			4, 8, 16, 32, 64,	periodic location procedure.
			Infinity,)	

9.2.2.109 Measurement Instructions Used

This information element contains measurement instructions used by the SRNC upon reception of a POSITION ACTIVATION REQUEST message.

Table 163

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Measurement Validity	М		ENUMERATED(CELL_DCH, all states except CELL_DCH, all states,)	

9.2.2.110 RRC State Change

Table 164

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
New RRC State	M		ENUMERATED(CELL_DCH,	
			CELL_FACH, CELL_PCH,	
			URA_PCH,)	

9.2.2.111 Periodic Position Termination Cause

The Position Periodic Termination Cause element indicates the reason for termination of a periodic reporting procedure in SAS-centric mode.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Periodic Position	M		ENUMERATED(
Termination Cause			RRC State Transition,	
			Cancelled by SRNC,	
			Cancelled by SAS,	
			Undefined,	
)	

9.2.2.112 Requested Cell-ID Measurements

This information element contains a list of requested measurements for Cell-ID positioning method in SAS-centric mode.

Table 166

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
Choice mode	М					•
>FDD					-	
>>Round Trip Time Info	M		BOOLEAN	If set to TRUE, the RNC is requested to include the Round Trip Time Info IE in the Cell-ID Measured Results Info List.	-	
>>Pathloss	М		BOOLEAN	If set to TRUE, the RNC is requested to include the Pathloss IE in the Cell-ID Measured Results Info List.	-	
>>Round Trip Time Info With Type 1	M		BOOLEAN	If set to TRUE, the RNC is requested to include the Round Trip Time Info With Type 1 IE in the Cell-ID Measured Results Info List.	-	
>>CPICH RSCP	М		BOOLEAN	If set to TRUE, the RNC is requested to include the CPICH RSCP IE in the Cell-ID Measured Results Info List.	-	
>>CPICH Ec/N0	M		BOOLEAN	If set to TRUE, the RNC is requested to include the CPICH Ec/N0 IE in the Cell-ID Measured Results Info List.	-	
>TDD >>Rx Timing Deviation Info	M		BOOLEAN	If set to TRUE, the RNC is requested to include the Rx Timing Deviation Info IE in the Cell-ID Measured Results Info List.	-	
>>Pathloss	М		BOOLEAN	If set to TRUE, the RNC is requested to include the Pathloss IE in the Cell-ID Measured Results Info List.	-	
>>Rx Timing Deviation LCR Info	M		BOOLEAN	If set to TRUE, the RNC is requested to include the Rx Timing Deviation LCR Info IE in the Cell-ID Measured Results Info List.	-	
>>Rx Timing Deviation 768Info	M		BOOLEAN	If set to TRUE, the RNC is requested to include the Rx Timing Deviation 768Info IE in the Cell-ID Measured Results Info List.	-	
>>Rx Timing Deviation 384ext Info	M		BOOLEAN	If set to TRUE, the RNC is requested to include the Rx Timing Deviation 384ext Info IE in the Cell-ID Measured Results Info List.	-	
>>Angle Of Arrival LCR	М		BOOLEAN	If set to TRUE, the RNC is requested to include the <i>Angle Of Arrival LCR</i> IE in the Cell-ID Measured Results Info List.	-	
>>Timing Advance LCR	М		BOOLEAN	If set to TRUE, the RNC is requested to include the Timing Advance LCR IE (or the Extended Timing Advance LCR IE) in the Cell-ID Measured Results Info List.	-	
GERAN	0		500: 5:::		YES	reject
>GSM RSSI	M		BOOLEAN	If set to TRUE, the RNC is requested to include the GSM RSSI measurement as part of the IRAT Measured Result Info		

		List	

9.2.2.113 DGANSS Corrections

This IE contains DGANSS corrections to be used by the UE.

Table 167

IE/Group name	Presence	Range	IE Type and Reference	Semantics description	Criticality	Assigned Criticality
DGANSS Reference Time	M		INTEGER (03570 by step of 30)	Seconds. Time in GNSS system time (modulo 3600 s) when the DGANSS corrections were calculated	_	
DGANSS Information		1 <maxsg nType></maxsg 			_	
>GANSS Signal ID	0	TTYPE>	9.2.2.131	Absence of this field means the default value for the GANSS identified by 'GANSS ID' (TS 25.331 [4]).	_	
>Status/Health	M		ENUMERATED(UDRE scale 1.0, UDRE scale 0.75, UDRE scale 0.5, UDRE scale 0.3, UDRE scale 0.2, UDRE scale 0.1, no data, invalid data)		_	
>DGANSS Signal Information	C- Status/Hea Ith	1 <maxgan SSSat></maxgan 			_	
>>Sat ID	М		INTEGER(063)	Defined in TS 25.331 [4].	_	
>>IOD	М		BIT STRING(10)		_	
>>UDRE	M		ENUMERATED(UDRE ≤ 1.0 m, 1.0m < UDRE ≤ 4.0m, 4.0m < UDRE ≤ 8.0m, 8.0m < UDRE)	The value in this field shall be multiplied by the UDRE Scale Factor in the IE Status/Health to determine the final UDRE estimate for the particular satellite.	_	
>>PRC	М		INTEGER (-20472047)	Scaling factor 0.32 meters	_	
>>RRC	М		INTEGER (-127127)	Scaling factor 0.032 meters/sec	_	
>>DGNSS Validity Period	0		9.2.2.154		YES	ignore

Table 167A

Range bound	Explanation
maxSgnType	Maximum number of signals for which data is included in this IE. The value of maxSgnType is 8
maxGANSSSat	Maximum number of satellites for which data is included in this IE. The value of maxGANSSSat is 64

Table 167B

Condition	Explanation
Status/Health	This IE shall be present if the Status/Health IE value
	is not equal to "no data" or "invalid data".

9.2.2.114 GANSS Almanac and Satellite Health

This IE contains a reduced-precision subset of the ephemeris and clock correction parameters.

Table 168

IE/Group name	Presence	Range	IE Type and Reference	Semantics description	Criticality	Assigned Criticality
Week Number	М		INTEGER(0255)	Almanac reference week, number of weeks since the beginning of GANSS specific system time (mod 256)	-	,
CHOICE Almanac Model	М				_	
>Keplerian Parameters				Model 1	-	
>>T _{oa}	М		INTEGER(0255)	Scaling factor 2 ¹² s Reference time of almanac within week in GANSS TOD time base	-	
>>IODa	М		INTEGER(03)	Issue-Of –Data, common to all satellites	_	
>>Satellite Information KP		1 <maxg ANSSS atAlman ac></maxg 		Almanacs are in the order of the SV IDs, the smallest ID first.	_	
>>>Sat ID	М	407	INTEGER(063)	Defined in TS 25.331 [4].	-	
>>>e	М		BIT STRING(11)	Eccentricity, –		
>>>δi	М		BIT STRING(11)	semi-circles (OS SIS ICD [22])	_	
>>>OMEGADOT	М		BIT STRING(11)	Longitude of Ascending –		
>>>SV Health KP	М		BIT STRING(4)	dimensionless	_	
>>>delta A ^{1/2}	М		BIT STRING(17)	Semi-Major Axis delta (meters) ^{1/2} (OS SIS ICD [22])	-	
>>>OMEGA ₀	M		BIT STRING(16)	Longitude of Ascending (16) Node of Orbit Plane at Weekly Epoch (semi- circles) (OS SIS ICD [22])		
>>>M ₀	M		BIT STRING(16)	Mean Anomaly at Reference Time (semi- circles) (OS SIS ICD [22])	I	
>>>0	М		BIT STRING(16)	Argument of Perigee (semi-circles) (OS SIS ICD [22])	ı	
>>>af ₀	М		BIT STRING(14)	Seconds (OS SIS ICD [22])	_	
>>>af ₁	М		BIT STRING(11)	sec/sec (OS SIS ICD [22])	_	
>NAV Keplerian Parameters	1			Model 2	\	
>>Keplerian NAV Almanac	M		INTEGER/S	0 1: 4 4 0.12	YES	ignore
>>>T _{oa}	M		INTEGER(0255)	Scaling factor 2 ¹² s Reference time of almanac within week in GANSS TOD time base	_	
>>>Satellite information		1			_	

IE/Group name	Presence	Range	IE Type and Reference	Semantics description	Criticality	Assigned Criticality
NAV-KP		<maxg ANSSS atAlman ac></maxg 				
>>>Sat ID	М		INTEGER (063)	Defined in TS 25.331 [4].	_	
>>>e	М		BIT STRING(16)	Eccentricity, dimensionless (IS- QZSS [27])	_	
>>>δi	М		BIT STRING (16)	Correction to inclination, semi-circles (IS-QZSS [27])	_	
>>>OMEGADOT	М		BIT STRING (16)	Rate of right ascension, semi-circles/sec (IS- QZSS [27])	_	
>>>SV Health	М		BIT STRING (8)	Satellite health (IS- QZSS [27])	_	
>>>A ^{1/2}	М		BIT STRING (24)	Square root of the semi- major axis, meters ^{1/2} (IS-QZSS [27])	_	
>>>OMEGA ₀	М		BIT STRING (24)	Longitude of ascending node of orbit plane at weekly epoch, semi-circles (IS-QZSS [27])	_	
>>>:0	М		BIT STRING (24)	Argument of perigee semi-circles (IS-QZSS [27])	_	
>>>M ₀	M		BIT STRING (24)	RING Mean anomaly at reference time semi-circles (IS-QZSS [27])		
>>>af ₀	M		BIT STRING (11)	Apparent satellite clock correction seconds (IS-QZSS [27])	_	
>>>af ₁	М		BIT STRING (11)	Apparent satellite clock correction sec/sec (IS-QZSS [27])	-	
>Reduced Keplerian Parameters				Model 3		
>>Keplerian Reduced Almanac	М				YES	ignore
>>>T _{oa}	M		INTEGER(0255)	Scaling factor 2 ¹² s Reference time of almanac within week in GANSS TOD time base	_	
>>>Satellite information RED-KP		1 <maxg ANSSS atAlman ac></maxg 			_	
>>>Sat ID	М		INTEGER (063)	Defined in TS 25.331 – [4].		
>>>>δ _A	M		BIT STRING(8)	meters (IS-GPS-200 – [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])		
$>>>>\Omega_0$	M		BIT STRING (7)			
>>>>Φ ₀	М		BIT STRING (7)	semi-circles (IS-GPS- 200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])	_	

IE/Group name	Presence	Range	IE Type and Reference	Semantics description	Criticality	Assigned Criticality
>>>L1 Health	М		BIT STRING (1)	dimensionless (IS-GPS- 200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])	-	,
>>>L2 Health	M		BIT STRING (1)	dimensionless (IS-GPS- 200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])	_	
>>>L5 Health	M		BIT STRING (1)	dimensionless (IS-GPS- 200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])	_	
>Midi Keplerian Parameters				Model 4		
>>Keplerian Midi Almanac	M			42	YES	ignore
>>>T _{oa}	M		INTEGER(0255)	Scaling factor 2 ¹² s Reference time of almanac within week in GANSS TOD time base	_	
>>>Satellite information MIDI-KP		1 <maxg ANSSS atAlman ac></maxg 			_	
>>>Sat ID	М		INTEGER (063)	Defined in TS 25.331 [4].	_	
>>>e	M		BIT STRING(11)	dimensionless (IS-GPS- 200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])		
>>>>δ _i	M		BIT STRING (11)			
>>>Ω_dot	М		BIT STRING (11)	semi-circles/sec (IS- GPS-200 [23], IS-GPS- 705 [24], IS-GPS-800 [25], IS-QZSS [27])	_	
>>>sqrtA	M		BIT STRING (17)	RING meters ^{1/2} (IS-GPS-200 – [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])		
>>>\Omega_0	M		BIT STRING (16)	NG semi-circles (IS-GPS- 200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])		
>>>()	M		BIT STRING (16)			
>>>M ₀	M		BIT STRING (16)	200 [23], IS-ĠPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])		
>>>afo	M		BIT STRING (11)	[23], IS-GPS-705 [24], IS-GPS-800 [25], IS- QZSS [27])		
>>>a _{f1}	M		BIT STRING (10)			
>>>>L1 Health	M		BIT STRING (1)	Dimensionless (IS- GPS-200 [23], IS-GPS- 705 [24], IS-GPS-800 [25], IS-QZSS [27])	_	

IE/Group name	Presence	Range	IE Type and	Semantics description	Criticality	Assigned
-			Reference		-	Criticality
>>>L2 Health	M		BIT STRING (1)	dimensionless (IS-GPS- 200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])	-	
>>>L5 Health	M		BIT STRING (1)	dimensionless (IS-GPS- 200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])	-	
>GLONASS Keplerian Parameters				Model 5		
>>Keplerian GLONASS	M				YES	ignore
>>>Satellite information GLO-KP		1 <maxg ANSSS atAlman ac></maxg 			_	
>>>N ^A	М		BIT STRING(11)	days [28]	ı	
>>>n ^A	М		BIT STRING (5)	dimensionless [28]	_	
>>>>H _n ^A	М		BIT STRING (5)	dimensionless [28]	_	
>>>>\lambda_n^A	М		BIT STRING (21)	semi-circles [28]	_	
>>>t _{\lambda n}	М		BIT STRING (21)	seconds [28]	_	
>>>>∆i _n ^A	М		BIT STRING (18)	semi-circles [28]	_	
>>>>\DT_n^A	М		BIT STRING (22)	sec/orbit period [28]	_	
>>>>ΔT_DOT _n A	М		BIT STRING (7)	sec/orbit period ² [28]	_	
>>>> £ _n A	М		BIT STRING (15)	dimensionless [28]	_	
>>>∞ _n ^A	М		BIT STRING (16)	semi-circles [28]	_	
>>>>\tau_{n}^{A}	М		BIT STRING (10)	seconds [28]	_	
>>>C _n ^A	М		BIT STRING (1)	dimensionless [28]	-	
>>>M _n ^A	0		BIT STRING (2)	dimensionless [28]	_	
>SBAS ECEF Parameters				Model 6		
>>ECEF SBAS Almanac	М				YES	ignore
>>>Satellite information SBAS-ECEF		1 <maxg ANSSS atAlman ac></maxg 			-	
>>>Data ID	М		BIT STRING(2)	Dimensionless (DTFA01-96-C-00025 [26])	I	
>>>SV ID	М		INTEGER (063)	Defined in TS 25.331 [4].	_	
>>>Health	М		BIT STRING (8)	Dimensionless (DTFA01-96-C-00025 [26])	-	
>>>X _G	М		BIT STRING (15)	meters (DTFA01-96-C		
>>>Y _G	М		BIT STRING (15)	meters (DTFA01-96-C- – 00025 [26])		
>>>Z _G	М		BIT STRING (9)	meters (DTFA01-96-C- 00025 [26])		
>>>X _G Rate-of-	М		BIT STRING	meters/sec (DTFA01-	_	
Change			(3)	96-C-00025 [26])		

IE/Group name	Presence	Range	IE Type and	Semantics description	Criticality	Assigned
			Reference			Criticality
>>>>Y _G Rate-of-	M		BIT STRING	meters/sec (DTFA01-	_	
Change			(3)	96-C-00025 [26])		
>>>>Z _G Rate-of-Change	M		BIT STRING	meters/sec (DTFA01-	_	
_			(4)	96-C-00025 [26])		
>>>t ₀	M		BIT STRING	seconds (DTFA01-96-	_	
			(11)	C-00025 [26])		
Complete Almanac Provided	0		BOOLEAN	This field indicates	YES	ignore
				whether the SAS		
				provided almanac for		
				the full GANSS		
				constellation or not.		
				TRUE means complete		
				GANSS almanac is		
				provided.		

Table 168A

Range bound	Explanation
maxGANSSSatAlmanac	Maximum number of satellites for which data is included in this IE.
	The value of maxGANSSSat is 36

9.2.2.115 GANSS Clock Model

The IE contains fields needed to model the GANSS clock parameters.

Table 169

IE/Group name	Presence	Range	IE Type and	Semantics description
Satellite Clock Model		1 <maxga NSSClock Mod></maxga 	Reference	Model-1. There may be more than one clock model included if defined in SIS ICD (e.g. two for Galileo)
>t _{oc}	М		BIT STRING(14)	defined in OS SIS ICD [22]
>a _{i2}	M		BIT STRING(12)	defined in OS SIS ICD [22]
>a _{i1}	M		BIT STRING(18)	defined in OS SIS ICD [22]
>a _{i0}	М		BIT STRING(28)	defined in OS SIS ICD [22]
>T _{GD}	0		BIT STRING(10)	defined in OS SIS ICD [22]
>Model ID	0		INTEGER(03)	Coded as defined in Table 169B.

Table 169A

Range bound	Explanation
maxGANSSClockMod	Maximum number of satellite clock models for which data is
	included in this IE. The value of maxGANSSClockMod is 4

Table 169B

GANSS Id	Model ID Value	Explanation
Galileo	0	I/NAV
Gailleo	1	F/NAV

2	Reserved
3	Reserved

9.2.2.115A GANSS Additional Clock Models

The IE contains fields needed to model the GANSS clock parameters.

Table 169C

IE/Group name	Presence	Range	IE Type and	Semantics description
			Reference	

IE/Group name	Presence	Range	IE Type and Reference	Semantics description
CHOICE Additional Clock Models				
>NAV-Clock Model				Model-2
>>t _{oc}	М		BIT STRING(16)	Time of clock (seconds) (IS-QZSS [27])
>>af ₂	М		BIT STRING (8)	Clock correction polynomial coefficient (sec/sec²) (IS-QZSS [27])
>>af ₁	М		BIT STRING (16)	Clock correction polynomial coefficient (sec/sec) (IS-QZSS [27])
>>af ₀	М		BIT STRING (22)	Clock correction polynomial coefficient (seconds) (IS-QZSS [27])
>>T _{GD}	М		BIT STRING (8)	Group delay (seconds) (IS-QZSS [27])
>CNAV/CNAV-2 Clock Model				Model-3
>>t _{oc}	M		BIT STRING (11)	Clock data reference time of week (seconds) (IS-GPS-200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])
>>t _{op}	M		BIT STRING (11)	Clock data predict time of week (seconds) (IS-GPS-200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])
>>URA _{oc} Index	М		BIT STRING (5)	SV clock accuracy index (dimensionless) (IS-GPS-200 [23], IS-GPS-705 [24], IS- GPS-800 [25], IS-QZSS [27])
>>URA _{oc1} Index	M		BIT STRING (3)	SV clock accuracy change index (dimensionless) (IS-GPS-200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])
>>URA _{oc2} Index	M		BIT STRING (3)	SV clock accuracy change rate index (dimensionless) (IS-GPS-200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])
>>a _{f2-n}	M		BIT STRING (10)	SV clock drift rate correction coefficient (sec/sec ²) (IS-GPS-200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])
>>a _{f1-n}	М		BIT STRING (20)	SV clock drift correction coefficient (sec/sec) (IS-GPS-200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])
>>a _{f0-n}	M		BIT STRING (26)	SV clock bias correction coefficient (seconds) (IS-GPS-200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])
>>T _{GD}	М		BIT STRING (13)	Group delay correction (seconds) (IS-GPS-200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])
>>ISC _{L1CP}	0		BIT STRING (13)	Inter signal group delay correction (seconds) (IS-GPS-800 [25], IS-QZSS [27])
>>ISC _{L1CD}	0		BIT STRING (13)	Inter signal group delay correction

IE/Group name	Presence	Range	IE Type and Reference	Semantics description
				(seconds) (IS-GPS-800 [25], IS-QZSS [27])
>>ISC _{L1C/A}	0		BIT STRING (13)	Inter signal group delay correction (seconds) (IS-GPS-200 [23], IS-GPS-705 [24], IS-QZSS [27])
>>ISC _{L2C}	0		BIT STRING (13)	Inter signal group delay correction (seconds) (IS-GPS-200 [23], IS-GPS-705 [24], IS-QZSS [27])
>>ISC _{L515}	0		BIT STRING (13)	Inter signal group delay correction (seconds) (IS-GPS-705 [24], IS-QZSS [27])
>>ISC _{L5Q5}	0		BIT STRING (13)	Inter signal group delay correction (seconds) (IS-GPS-705 [24], IS-QZSS [27])
>GLONASS Satellite Clock Model				Model-4
$>\tau_{n}(t_{b})$	М		BIT STRING (22)	Satellite clock offset (seconds) [28]
$>\gamma_{n}(t_{b})$	М		BIT STRING (11)	Relative frequency offset from nominal value (dimensionless) [28]
$>\Delta au_n$	0		BIT STRING (5)	Time difference between transmission in G2 and G1 (seconds) [28]
>SBAS Satellite Clock Model				Model-5
>t ₀	М		BIT STRING (13)	(seconds) (DTFA01-96-C- 00025 [26])
>a _{Gfo}	М		BIT STRING (12)	(seconds) (DTFA01-96-C- 00025 [26])
>a _{Gf1}	М		BIT STRING (8)	(sec/sec) (DTFA01-96-C- 00025 [26])

9.2.2.116 GANSS Ionospheric Model

The IE contains fields needed to model the propagation delays of the GANSS signals through the ionosphere.

Table 170

IE/Group name	Presence	Range	IE Type and	Semantics description
			Reference	

IE/Group name	Presence	Range	IE Type and Reference	Semantics description
a_{i0}	M		BIT STRING(12)	This parameter is used as defined in OS SIS ICD [22]
a _{i1}	M		BIT STRING(12)	This parameter is used as defined in OS SIS ICD [22]
a _{i2}	М		BIT STRING(12)	This parameter is used as defined in OS SIS ICD [22]
GANSS Ionosphere Regional Storm Flags		01		
>Storm Flag 1	M		BOOLEAN	This parameter is used as defined in OS SIS ICD [22]
>Storm Flag 2	M		BOOLEAN	This parameter is used as defined in OS SIS ICD [22]
>Storm Flag 3	M		BOOLEAN	This parameter is used as defined in OS SIS ICD [22]
>Storm Flag 4	М		BOOLEAN	This parameter is used as defined in OS SIS ICD [22]
>Storm Flag 5	M		BOOLEAN	This parameter is used as defined in OS SIS ICD [22]

9.2.2.116A GANSS Additional Ionospheric Model

The IE contains fields needed to model the propagation delays of the GANSS signals through the ionosphere.

Table 170A

IE/Group name	Presence	Range	IE Type and Reference	Semantics description
Data ID	M		BIT STRING(2)	Coded as defined in TS 25.331 [4]
α_0	M		BIT STRING (8)	seconds (IS-QZSS [27])
α_1	M		BIT STRING (8)	sec/semi-circle (IS-QZSS [27])
α_2	M		BIT STRING (8)	sec/(semi-circle) ² (IS-QZSS [27])
α ₃	M		BIT STRING (8)	sec/(semi-circle) ³ (IS-QZSS [27])
β_0	M		BIT STRING (8)	seconds (IS-QZSS [27])
β1	M		BIT STRING (8)	sec/semi-circle (IS-QZSS [27])
β_2	M		BIT STRING (8)	sec/(semi-circle) ² (IS-QZSS [27])
β_3	M		BIT STRING (8)	sec/(semi-circle) ³ (IS-QZSS [27])

9.2.2.117 GANSS Measured Results

Table 171

IE/Group name	Presence	Range	IE Type and Reference	Semantics description	Criticality	Assigned Criticality
CHOICE Reference Time	M		Reference	description	_	Officiality
>UTRAN Reference Time				This choice may only be present if SAS operates in SAS-centric mode.	-	
>>UE GANSS Timing of Cell Frames	M		INTEGER(0. .863999999 99750 by step of 250)	GANSS Time of Day (TOD) in ns	-	
>>GANSS Time ID	0		GANSS ID 9.2.2.130	Absence of this IE means Galileo system time. The value "0" ("SBAS") shall not be used for GANS Time ID.	-	
>>GANSS TOD Uncertainty	0		INTEGER(0. .127)	Provides the accuracy of the relation between GANSS TOD and UTRAN time. Its coding is defined in TS 25.331 [4].	_	
>>UC-ID	М		UTRAN Cell Identifier 9.2.2.37	Identifies the reference cell for the GANSS TOD-SFN relationship.	-	
>>Reference SFN	M		INTEGER(0. .4095)	The SFN for which the location is valid. This IE indicates the SFN at which the UE timing of cell frames is captured.	_	
>GANSS Reference Time Only					_	
>>GANSS TOD msec	М		INTEGER(0. .3599999)	GANSS Time of Day (modulo 1 hour) in milliseconds (rounded down to the nearest millisecond unit).	_	
>>GANSS Time ID	0		GANSS ID 9.2.2.130	Absence of this IE means Galileo system time. The value "0" ("SBAS") shall not be used for GANSS Time ID.	-	
>>GANSS TOD Uncertainty	0		INTEGER(0127)	Provides the accuracy of the GANSS TOD. Its coding is defined in TS 25.331 [4].	_	
GANSS Generic Measurement Information		1 <max GANSS</max 			_	

IE/Group name	Presence	Range	IE Type and Reference	Semantics description	Criticality	Assigned Criticality
>GANSS ID	0	>	9.2.2.130	Absence of this IE means Galileo.	_	
>GANSS Signal Measurement Information	М	1 <max SgnTyp e></max 			_	
>>GANSS Signal ID	0		9.2.2.131	Absence of this field means the default value for the GANSS identified by 'GANSS ID' TS 25.331 [4].	-	
>>GANSS Code Phase Ambiguity	0		INTEGER(031)	In milliseconds. Defined in TS 25.331 [4].	_	
>>GANSS Code Phase Ambiguity Extension	0		9.2.2.141		YES	ignore
>>GANSS Measurement Parameters	M	1 <maxg ANSSS at></maxg 			_	
>>>Sat ID	М		INTEGER(063)	Defined in TS 25.331 [4].	_	
>>>C/N _o	M		INTEGER(063)	the estimate of the carrier-to-noise ratio of the received signal from the particular satellite used in the measurement. It is given in units of dB-Hz (typical levels will be in the range of 20 – 50 dB-Hz).	_	
>>>Multipath Indicator	M		ENUMERAT ED(NM, low, medium, high)	Coding as in 9.2.2.12	-	
>>>Carrier Quality Indicaton	0		BIT STRING(2)	Coded as defined in TS 25.331 [4].	-	
>>>GANSS Code Phase	М		INTEGER(02 ²¹ -1)	Defined in TS 25.331 [4].	_	
>>>GANSS Integer Code Phase	0		INTEGER(063)	Defined in TS 25.331 [4].	-	
>>>GANSS Integer Code Phase Extension	0		9.2.2.142		YES	ignore
>>>Code Phase RMS Error	M		INTEGER (063)	Coding as Pseudorange RMS Error in section 9.2.2.12	_	
>>>Doppler	M		INTEGER(- 327683276 7)	m/s, scale factor 0.04. Doppler measured by the UE for the particular satellite signal	-	
>>>ADR	0		INTEGER(033554431)	Meters, scale factor 2 ⁻¹⁰ ADR measurement measured by the	-	

IE/Group name	Presence	Range	IE Type and Reference	Semantics description	Criticality	Assigned Criticality
				UE for the		
				particular satellite		
				signal.		

Table 171A

Range bound	Explanation
maxGANSS	Maximum number of GANSS. The value of maxGANSS is 8.
maxSgnType	Maximum number of signals for which data is included in this IE. The value of maxSgnType is 8.
maxGANSSSat	Maximum number of satellites for which data is included in this IE. The value of maxGANSSSat is 64

9.2.2.118 GANSS Navigation Model

This IE contains information required to manage the transfer of precise navigation data to the GANSS-capable UE.

Table 172

IE/Group name	Presence	Range	IE Type and Reference	Semantics description
Non-Broadcast Indication	0		ENUMERAT ED(true)	If this IE is present, GANSS navigation model is not derived from satellite broadcast. See NOTE 1
Satellite Information		1 <maxga NSSSat></maxga 		
>Sat ID	M		INTEGER(063)	Defined in TS 25.331 [4]
>SV Health	M		BIT STRING(5)	Coded as defined in TS 25.331 [4].
>IOD	M		BIT STRING(10)	
>GANSS Clock Model	М		GANSS clock model 9.2.2.115	
>GANSS Orbit Model	М		GANSS orbit model 9.2.2.119	

Table 172A

Range bound	Explanation
maxGANSSSat	Maximum number of satellites for which data is included in this IE.
	The value of maxGANSSSat is 64

NOTE 1: The Non-Broadcast Indication allows to inform that the navigation model is not bit-to-bit the one broadcast by the satellite. If it is set to 1, the UE is informed that techniques such as data wiping off applied to the navigation model may not work for instance.

9.2.2.118A GANSS Additional Navigation Models

This IE contains information required to manage the transfer of precise navigation data to the GANSS-capable UE.

Table 172B

IE/Group name	Presence	Range	IE Type and Reference	Semantics description
Non-Broadcast Indication	0		ENUMERAT ED(true)	If this IE is present, GANSS navigation model is not derived from satellite broadcast. See NOTE 1 in 9.2.2.118.
Satellite Information		1 <maxga NSSSat></maxga 		
>Sat ID	М		INTEGER(063)	Defined in TS 25.331 [4].
>SV Health	М		BIT STRING(6)	Coded as defined in TS 25.331 [4].
>IOD	М		BIT STRING(11)	Coded as defined in TS 25.331 [4].
>GANSS Additional Clock Models	М		GANSS addtional clock models 9.2.2.115A	
>GANSS Additional Orbit Models	М		GANSS additional orbit models 9.2.2.119A	

Table 172C

Range bound	Explanation
maxGANSSSat	Maximum number of satellites for which data is included in this IE.
	The value of maxGANSSSat is 64

9.2.2.119 GANSS Orbit Model

This IE contains information for GANSS orbit model parameters.

Table 173

IE/Group name	Presence	Range	IE Type and Reference	Semantics description
CHOICE Orbit Model	M			
>Keplerian Parameters				Model-1
>>t _{oe}	M		BIT STRING(14)	Time-of-Ephemeris in seconds, scale factor 60 (OS SIS ICD [22])
>>ω	М		BIT STRING(32)	Argument of Perigee (semi- circles) (OS SIS ICD [22])
>>∆n	M		BIT STRING(16)	Mean Motion Difference From Computed Value (semi- circles/sec) (OS SIS ICD [22])
>>M ₀	M		BIT STRING(32)	Mean Anomaly at Reference Time (semi-circles) (OS SIS ICD [22])
>>OMEGAdot	М		BIT STRING(24)	Longitude of Ascending Node of Orbit Plane at Weekly Epoch (semi-circles/sec) (OS SIS ICD [22])
>>e	М		BIT STRING(32)	Eccentricity, scale factor 2 ⁻³³ (OS SIS ICD [22])
>>ldot	M		BIT STRING(14)	Rate of Inclination Angle (semi-circles/sec) (OS SIS ICD [22])

IE/Group name	Presence	Range	IE Type and Reference	Semantics description
>>sqrtA	M		BIT STRING(32)	Semi-Major Axis in (meters) ^{1/2} , scale factor 2 ⁻¹⁹ (OS SIS ICD [22])
>>i ₀	М		BIT STRING(32)	Inclination Angle at Reference Time (semi-circles) (OS SIS ICD [22])
>>OMEGA ₀	M		BIT STRING(32)	Longitude of Ascending Node of Orbit Plane at Weekly Epoch (semi-circles) (OS SIS ICD [22])
>>C _{rs}	M		BIT STRING(16)	Amplitude of the Sine Harmonic Correction Term to the Orbit Radius (meters) (OS SIS ICD [22])
>>Cis	М		BIT STRING(16)	Amplitude of the Sine Harmonic Correction Term To The Angle Of Inclination (radians) (OS SIS ICD [22])
>>C _{us}	M		BIT STRING(16)	Amplitude of the Sine Harmonic Correction Term To The Argument Of Latitude (radians) (OS SIS ICD [22])
>>C _{rc}	М		BIT STRING(16)	Amplitude of the Cosine Harmonic Correction Term to the Orbit Radius (meters) (OS SIS ICD [22])
>>C _{ic}	М		BIT STRING(16)	Amplitude of the Cosine Harmonic Correction Term To The Angle Of Inclination (radians) (OS SIS ICD [22])
>>C _{uc}	М		BIT STRING(16)	Amplitude of the Cosine Harmonic Correction Term To The Argument Of Latitude (radians) (OS SIS ICD [22])

9.2.2.119A GANSS Additional Orbit Models

This IE contains information for GANSS orbit model parameters.

Table 173A

IE/Group name	Presence	Range	IE Type and Reference	Semantics description
CHOICE Additional Orbit Models				
>NAV-Keplerian Parameters				Model-2
>>URA Index	M		BIT STRING(4)	SV accuracy (dimensionless) (IS-QZSS [27])
>>Fit Interval Flag	M		BIT STRING (1)	Fit interval indication (dimensionless) (IS-QZSS [27])
>>t _{oe}	М		BIT STRING(16)	Time of ephemeris (seconds) (IS-QZSS [27])
>>0	М		BIT STRING (32)	Argument of perigee (semi-circles) (IS-QZSS [27])
>>∆n	M		BIT STRING (16)	Mean motion difference from computed value (semi-circles/sec) (IS-QZSS [27])
>>M ₀	М		BIT STRING (32)	Mean anomaly at reference time (semi-circles) (IS-QZSS [27])

IE/Group name	Presence	Range	IE Type and Reference	Semantics description
>>OMEGAdot	М		BIT STRING (24)	Rate of right ascension (semi-circles/sec) (IS-QZSS [27])
>>e	М		BIT STRING (32)	Eccentricity (dimensionless) (IS-QZSS [27])
>>ldot	M		BIT STRING (14)	Rate of inclination angle (semi-circles/sec) (IS-QZSS [27])
>>sqrtA	М		BIT STRING (32)	Square root of semi-major axis (meters ^{1/2}) (IS-QZSS [27])
>>i ₀	М		BIT STRING (32)	Inclination angle at reference time (semi-circles) (IS-QZSS [27])
>>OMEGA ₀	М		BIT STRING (32)	Longitude of ascending node of orbit plane at weekly epoch (semi-circles) (IS-QZSS [27])
>>C _{rs}	М		BIT STRING (16)	Amplitude of sine harmonic correction term to the orbit radius (meters) (IS-QZSS [27])
>>C _{is}	М		BIT STRING (16)	Amplitude of sine harmonic correction term to the angle of inclination (radians) (IS-QZSS [27])
>>C _{us}	М		BIT STRING (16)	Amplitude of sine harmonic correction term to the argument of latitude (radians) (IS-QZSS [27])
>>C _{rc}	М		BIT STRING (16)	Amplitude of cosine harmonic correction term to the orbit radius (meters) (IS-QZSS [27])
>>C _{ic}	М		BIT STRING (16)	Amplitude of cosine harmonic correction term to the angle of inclination (radians) (IS-QZSS [27])
>>C _{uc}	М		BIT STRING (16)	Amplitude of cosine harmonic correction term to the argument of latitude (radians) (IS-QZSS [27])

IE/Group name	Presence	Range	IE Type and Reference	Semantics description
>CNAV/CNAV-2 Keplerian Parameters				Model-3
>>t _{op}	M		BIT STRING (11)	Data predict time of week (seconds) (IS-GPS-200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])
>>URA _{oe} Index	M		BIT STRING (5)	SV accuracy (dimensionless) (IS-GPS-200 [23], IS-GPS-705 [24], IS- GPS-800 [25], IS-QZSS [27])
>>∆A	M		BIT STRING (26)	Semi-major axis difference at reference time (meters) (IS-GPS-200 [23], IS- GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])
>>A_dot	М		BIT STRING (25)	Chane rate in semi-major axis (meters/sec) (IS-GPS-200 [23], IS-GPS-705 [24], IS- GPS-800 [25], IS-QZSS [27])
>>∆n ₀	M		BIT STRING (17)	Mean motion difference from computed value at reference time (semi-circles/sec) (IS-GPS- 200 [23], IS-GPS-705 [24], IS- GPS-800 [25], IS-QZSS [27])
>>∆n ₀ _dot	M		BIT STRING (23)	Rate of mean motion difference from computed value (semi-circles/sec ²) (IS-GPS- 200 [23], IS-GPS-705 [24], IS- GPS-800 [25], IS-QZSS [27])
>>M _{0-n}	М		Bit String(33)	Mean anomaly at reference time (semi-circles) (IS-GPS-200 [23], IS-GPS-705 [24], IS- GPS-800 [25], IS-QZSS [27])
>>en	М		BIT STRING (33)	Eccentricity (dimensionless) (IS-GPS-200 [23], IS-GPS-705 [24], IS- GPS-800 [25], IS-QZSS [27])
>>\omega_n	M		Bit String(33)	Argument of perigee (semi-circles) (IS-GPS-200 [23], IS-GPS-705 [24], IS- GPS-800 [25], IS-QZSS [27])
>>Ω _{0-n}	M		BIT STRING (33)	Reference right ascension angle (semi-circles) (IS-GPS-200 [23], IS-GPS-705 [24], IS- GPS-800 [25], IS-QZSS [27])
>>ΔΩ_dot	М		BIT STRING (17)	Rate of right ascension difference (semi-circles/sec) (IS-GPS- 200 [23], IS-GPS-705 [24], IS- GPS-800 [25], IS-QZSS [27])
>>i _{o-n}	М		BIT STRING (33)	Inclination angle at reference time (semi-circles) (IS-GPS-200 [23], IS-GPS-705 [24], IS- GPS-800 [25], IS-QZSS [27])
>>l _{0-n} _dot	M		BIT STRING (15)	Rate of inclination angle (semi-circles/sec) (IS-GPS- 200 [23], IS-GPS-705 [24], IS- GPS-800 [25], IS-QZSS [27])

IE/Group name	Presence	Range	IE Type and Reference	Semantics description
>>C _{is-n}	M		BIT STRING (16)	Amplitude of sine harmonic correction term to the angle of inclination (radians) (IS-GPS-200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])
>>C _{ic-n}	M		BIT STRING (16)	Amplitude of cosine harmonic correction term to the angle of inclination (radians) (IS-GPS-200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])
>>C _{rs-n}	M		BIT STRING (24)	Amplitude of sine harmonic correction term to the orbit radius (meters) (IS-GPS-200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])
>>C _{rc-n}	М		BIT STRING (24)	Amplitude of cosine harmonic correction term to the orbit radius (meters) (IS-GPS-200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])
>>C _{us-n}	M		BIT STRING (21)	Amplitude of sine harmonic correction term to the argument of latitude (radians) (IS-GPS-200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])
>>C _{uc-n}	М		BIT STRING (21)	Amplitude of cosine harmonic correction term to the argument of latitude (radians) (IS-GPS-200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])
>GLONASS Earth-Centered, Earth-fixed Parameters				Model-4
>>E _n	M		BIT STRING (5)	Age of data (days) [28]
>>P1	M		BIT STRING (2)	Time interval between two adjacent values of t₀ (minutes) [28]
>>P2	М		BIT STRING (1)	Change of t _b flag (dimensionless) [28]
>>M	0		BIT STRING (2)	Type of satellite (dimensionless) [28]
$\Rightarrow x_n(t_b)$	М		BIT STRING (27)	x-coordinate of satellite at time t _b (kilometers) [28]
$\Rightarrow \dot{x}_n(t_b)$	М		BIT STRING (24)	x-coordinate of satellite velocity at time t _b (kilometers/sec) [28]
$\Rightarrow \ddot{x}_n(t_b)$	М		BIT STRING (5)	x-coordinate of satellite acceleration at time t _b (kilometers/sec ²) [28]
$\Rightarrow y_n(t_b)$	М		BIT STRING (27)	y-coordinate of satellite at time t _b (kilometers) [28]
$\Rightarrow \dot{y}_n(t_b)$	М		BIT STRING (24)	y-coordinate of satellite velocity at time t _b (kilometers/sec) [28]
$\Rightarrow \ddot{y}_n(t_b)$	М		BIT STRING (5)	y-coordinate of satellite acceleration at time t _b (kilometers/sec ²) [28]

IE/Group name	Presence	Range	IE Type and Reference	Semantics description
$\Rightarrow z_n(t_b)$	M		BIT STRING (27)	z-coordinate of satellite at time t_b (kilometers) [28]
$\Rightarrow \dot{z}_n(t_b)$	M		BIT STRING (24)	z-coordinate of satellite velocity at time t _b (kilometers/sec) [28]
$\Rightarrow \ddot{z}_n(t_b)$	M		BIT STRING (5)	z-coordinate of satellite acceleration at time t _b (kilometers/sec ²) [28]
>SBAS Earth-Centered, Earth- fixed Parameters				Model-5
>>t ₀	C-ClockMo del		BIT STRING (13)	Time of applicability (seconds) (DTFA01-96-C- 00025 [26])
>>Accuracy	М		BIT STRING (4)	(dimensionless) (DTFA01-96- C-00025 [26])
>>X _G	М		BIT STRING (30)	(meters) (DTFA01-96-C-00025 [26])
>>Y _G	М		BIT STRING (30)	(meters) (DTFA01-96-C-00025 [26])
>>Z _G	М		BIT STRING (25)	(meters) (DTFA01-96-C-00025 [26])
>>X _G Rate-of-Change	М		BIT STRING (17)	(meters/sec) (DTFA01-96-C- 00025 [26])
>>Y _G Rate-of-Change	М		BIT STRING (17)	(meters/sec) (DTFA01-96-C- 00025 [26])
>>Z _G Rate-of-Change	М		BIT STRING (18)	(meters/sec) (DTFA01-96-C- 00025 [26])
>>X _G Acceleration	М		BIT STRING (10)	(meters/sec ²) (DTFA01-96-C- 00025 [26])
>>Y _G Acceleration	М		BIT STRING (10)	meters/sec ²) (DTFA01-96-C- 00025 [26])
>>Z _G Acceleration	М		BIT STRING (10)	meters/sec ²) (DTFA01-96-C- 00025 [26])

Table 173B

Condition	Explanation
ClockModel	This IE shall be present if 'SBAS Satellite Clock Model' (Model-5) in IE GANSS Additional Clock Models is not included in GANSS Additional Navigation Models IE.

9.2.2.120 GANSS Positioning Instructions

This information element contains positioning instructions for GANSS positioning method in SAS-centric mode.

Table 174

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
Horizontal Accuracy Code	0		9.2.2.38	•	_	
Vertical Accuracy Code	0		9.2.2.39		_	
GANSS Timing of Cell Wanted	M		BIT STRING(8)	For each bit, if set to "1", indicates that for respective GANSS the GANSS Timing of Cell is wanted. Bit 1 is the MSB and bit 8 is the LSB (see clause 9.2.1). bit 1: Galileo bit 2: Modernized GPS bit 3: QZSS bit 4: GLONASS bits 5-8: reserved for future GANSS.	-	
Additional Assistance Data Request	M		BIT STRING(8)	For each bit, if set to "1", indicates that the UE is requested to send an additional assistance data request for the respective GANSS. Bit 1 is the MSB and bit 8 is the LSB (see clause 9.2.1). bit 1: Galileo bit 2: SBAS bit 3: Modernized GPS bit 4: QZSS bit 5: GLONASS bits 6-8: reserved for future GANSS.	-	
Measurement Validity	0		ENUMERATED (CELL_DCH, all states except CELL_DCH, all states,)	luture GANGO.	-	
GANSS Carrier-Phase Measurement Requested	0		9.2.2.143		YES	ignore
GANSS Multi-frequency Measurement Requested	0		9.2.2.144		YES	ignore

9.2.2.121 GANSS-UTRAN Time Relationship Uncertainty

This IE contains the uncertainty of the GANSS and UTRAN time relationship.

Table 175

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
GANSS-UTRAN Time Relationship Uncertainty	M		ENUMERATED (50ns, 500ns, 1us, 10us, 1ms, 10ms, 100ms, unreliable,)	RNC estimate of uncertainty in GANSS-UTRAN time relationship
GANSS ID	0		9.2.2.130	Absence of this IE means Galileo.

9.2.2.122 GANSS Real Time Integrity

This IE contains parameters that describe the real-time status of the GANSS constellation.

Table 176

IE/Group name	Presence	Range	IE Type and Reference	Semantics description
Satellite Information		1 <maxga< td=""><td></td><td></td></maxga<>		
		NSSSat>		
>Bad GANSS Sat ID	M		INTEGER(0.	Defined in TS 25.331 [4].
			.63)	
>Bad GANSS Signal ID	0		BIT	Coded as defined in TS
_			STRING(8)	25.331 [4].

Table 176A

Range bound	Explanation
maxGANSSSat	Maximum number of satellites for which data is included in this IE.
	The value of maxGANSSSat is 64

9.2.2.123 GANSS Reference Measurement Information

This IE contains parameters that enable fast acquisition of the GANSS signals in UE-assisted GANSS positioning.

Table 177

IE/Group name	Presence	Range	IE Type and Reference	Semantics description	Criticality	Assigned Criticality
GANSS Signal ID	0		9.2.2.131	Absence of this field means the default value for the GANSS identified by 'GANSS ID' TS 25.331 [4].	-	
Satellite Information		1 <ma xGANS SSat></ma 		15 16 25:50 : [1]:	_	
>Sat ID	М		INTEGER (063)	Defined in TS 25.331 [4].	_	
>Doppler (0 th order term)	M		INTEGER(- 20482047)	Scaling factor 0.5 m/s Conversion between m/s and Hz shall be made by using the nominal wavelength of the assisted signal.	-	
>Extra Doppler		01			_	
>>Doppler (1 st order term)	M		INTEGER (- 4221)	Scaling factor 1/210 m/s ²	_	
>>Doppler Uncertainty	M		ENUMERAT ED (40,20,10,5, 2.5)	m/s. The Doppler experienced by a stationary UE is in the range 'Doppler – Doppler Uncertainty' to 'Doppler + Doppler Uncertainty'.	_	
>Code Phase	M		INTEGER(01023)	ms, scaling factor 2 ⁻¹⁰ Nominal chipping rate of the GNSS signal shall be used in conversion. Increasing binary values of the field signify increasing predicted pseudoranges.	_	
>Integer Code Phase	M		INTEGER(0127)	ms. Integer code phase (expressed modulo 128 ms) currently being transmitted at the GANSS Reference Time, as seen by a receiver at the Reference Location	-	
>Code Phase Search Window	M		INTEGER(031)	Expected code-phase is in the range 'Code Phase – Code Phase Search Window' to 'Code Phase + Code Phase Search Window'. Coded as defined in TS 25.331 [4].	-	
>Azimuth and Elevation		01			_	
>>Azimuth	М		INTEGER(031)	Scaling factor 11.25 Degrees.	_	

IE/Group name	Presence	Range	IE Type and Reference	Semantics description	Criticality	Assigned Criticality
>>Elevation	М		INTEGER(07)	Scaling factor 11.25 Degrees.	_	
>>Azimuth and Elevation LSB		01			YES	ignore
>>>Azimuth LSB	M		INTEGER(0. .15)	The full satellite azimuth is constructed as 'Azimuth' × 11.25 + 'Azimuth LSB' × 0.703125 degrees. An angle of x degrees means the satellite azimuth a is in the range x ≤ a < x+0.703125 degrees.	-	
>>>Elevation LSB	M		INTEGER(0. .15)	The full satellite elevation is constructed as 'Elevation' × 11.25 + 'Elevation LSB' × 0.703125 degrees. An angle of y degrees means the satellite elevation e is in the range y ≤ e < y+0.703125 degrees.	-	

Table 177A

Range bound	Explanation
maxGANSSSat	Maximum number of satellites for which data is included in this IE.
	The value of maxGANSSSat is 64

9.2.2.124 GANSS Reference Time

Table 178

IE/Group name	Presence	Range	IE Type and Reference	Semantics description	Criticality	Assigned Criticality
GANSS Day	0		INTEGER(081 91)	The number of days from the beginning of GNSS system time (mod 8192)	_	
GANSS TOD	М		INTEGER(086 399)	GANSS Time of Day in seconds	_	
GANSS TOD Uncertainty	0		INTÉGER(012 7)	Provides the accuracy of the relation between GANSS TOD and UTRAN time if UTRAN GANSS timing of cell frames is provided. Its coding is defined in TS 25.331 [4]. This IE may only be present if SAS	-	
				operates in SAS- centric mode.		
GANSS Time ID	0		GANSS ID 9.2.2.130	Absence of this IE means Galileo system time. The value "0" ("SBAS") shall not be used for GANSS Time ID.	-	
UTRAN GANSS Reference Time		01		This IE may only be present if SAS operates in SAS-centric mode.	_	
>UTRAN GANSS Timing of Cell Frames	М		INTEGER(0 999999750 by step of 250)	UTRAN GANSS timing of cell frames in steps of 250 ns. Indicates sub- second part of <i>GANSS TOD IE</i> . See TS 25.331 [4].	-	
>UC-ID	0		UTRAN Cell Identifier 9.2.2.37	Identifies the reference cell for the GANSS TOD-SFN relationship.	_	
>SFN	M		Integer(04095)	The SFN which the UTRAN GANSS timing of cell frames time stamps.	_	
T _{UTRAN-GANSS} Drift Rate	0		ENUMERATED (0, 1, 2, 5, 10, 15, 25, 50, -1, -2, -5, -10, -15, -25, -50,)	in 1/256 chips per sec.	_	
GANSS Day Cycle Number	0		INTEGER (07)	Number of 8192 day cycles occurred since the GANSS zero time-point defined in TS 25.331 [4]. The first 8192 GANSS days since the zero time- point is GANSS Day Cycle Number 0.	YES	ignore

9.2.2.125 GANSS Time Model

The *GANSS Time Model* IE contains a set of parameters needed to relate GANSS time to selected time reference indicated by GNSS_TO_ID.

Table 179

IE/Group name	Presence	Range	IE Type and Reference	Semantics description	Criticality	Assigned Criticality
GANSS Time Model	M		INTEGER	GANSS reference	-	,
Reference Time			(037799)	time (modulo 1		
				week) in seconds.		
				Scale Factor 24		
T _{A0}	M		INTEGER(-	Seconds, scale	_	
			214748364821474	factor 2 ⁻³⁵		
			83647)			
T _{A1}	0		INTEGER(-	sec/sec, scale	_	
			83886088388607)	factor 2 ⁻⁵¹		
T _{A2}	0		INTEGER	sec/sec ² , scale	_	
			(-6463)	factor 2 ⁻⁶⁸		
GNSS_TO_ID	M		ENUMERATED(GP		_	
			S,, Galileo,			
			QZSS, GLONASS)			
Week Number	0		INTEGER	Reference week of	_	
			(08191)	GANSS Time Model		
Delta_T	0		INTEGER	This field specifies	YES	ignore
			(-128127)	the integer seconds		
				of the GNSS-GNSS		
				Time Offset.		
				Scale factor 1		
				second.		

9.2.2.125A GANSS Additional Time Models

The GANSS Additional Time Models IE contains a set of parameters needed to relate GANSS time to selected time references.

Table 179A

IE/Group name	Presence	Range	IE Type and Reference	Semantics description
GNSS-GNSS Time Model		1 <maxga NSS-1></maxga 		
>GANSS Time Model			9.2.2.125	

Table 179B

Range Bound	Explanation
maxGANSS-1	Maximum number of GANSS systems for which data is included in
	this IE. The value of maxGANSS-1 is 7.

9.2.2.126 GANSS UTC Model

The *GANSS UTC Model* IE contains a set of parameters needed to relate GANSS time to Universal Time Coordinate (UTC).

Table 180

IE/Group name	Presence	Range	IE Type and Reference	Semantics description
A ₁	М		BIT STRING(24)	sec/sec (OS SIS ICD [22])
A ₀	М		BIT STRING(32)	seconds (OS SIS ICD [22])
t _{ot}	М		BIT STRING(8)	seconds (OS SIS ICD [22])
WNt	М		BIT STRING(8)	weeks (OS SIS ICD [22])
Δt_{LS}	М		BIT STRING(8)	seconds (OS SIS ICD [22])
WN _{LSF}	М		BIT STRING(8)	weeks (OS SIS ICD [22])
DN	М		BIT STRING(8)	days (OS SIS ICD [22])
Δt_{LSF}	M		BIT STRING(8)	seconds (OS SIS ICD [22])

9.2.2.126A GANSS Additional UTC Models

The *GANSS Additional UTC Models* IE contains several sets of parameters needed to relate GANSS time to Universal Time Coordinate (UTC), as defined in [23,24,25,26,27,28].

Table 180A

IE/Group name	Presence	Range	IE Type and	Semantics description
			Reference	

IE/Group name	Presence	Range	IE Type and Reference	Semantics description
CHOICE Additional UTC Models				
>Model Set 1			DIT	D: (5: 1 (ONOO (
>A _{0-n}	M		BIT STRING(16)	Bias coefficient of GNSS time scale relative to UTC time scale (seconds) (IS-GPS-200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])
>A _{1-n}	M		BIT STRING (13)	Drift coefficient of GNSS time scale relative to UTC time scale (sec/sec) (IS-GPS-200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])
>A _{2-n}	M		BIT STRING (7)	Drift rate correction coefficient of GNSS time scale relative to UTC time scale (sec/sec ²) (IS-GPS-200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])
$>\!\!\Delta t_{LS}$	М		BIT STRING (8)	Current or past leap second count (seconds) (IS-GPS-200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])
>t _{ot}	М		BIT STRING (16)	Time data reference time of week (seconds) (IS-GPS-200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])
>WN _{ot}	М		BIT STRING (13)	Time data reference week number (weeks) (IS-GPS-200 [23], IS- GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])
>WN _{LSF}	M		BIT STRING (8)	Leap second reference week number (weeks) (IS-GPS-200 [23], IS- GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])
>DN	М		BIT STRING (4)	Leap second reference day number (days) (IS-GPS-200 [23], IS- GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])
>∆t _{LSF}	М		BIT STRING (8)	Current or future leap second count (seconds) (IS-GPS-200 [23], IS-GPS-705 [24], IS-GPS-800 [25], IS-QZSS [27])
>Model Set 2		_		
>N ^A	M		BIT STRING (11)	Callendar day number within four-year period beginning since the leap year (days) [28]
>T _c	М		BIT STRING (32)	GLONASS time scale correction to UTC(SU) (seconds) [28]
>Delta UT1	0		DIT OTONIC	0 (" :
>>B1	М		BIT STRING (11)	Coefficient to determine ΔUT1 (seconds) [28]
>>B2	М		BIT STRING (10)	Coefficient to determine ΔUT1 (seconds/msd) [28]
>KP	0		BIT STRING (2)	Notification of expected leap second correction

IE/Group name	Presence	Range	IE Type and Reference	Semantics description
				(dimensionless) [28]
>Model Set 3				
>A _{1WNT}	M		BIT STRING (24)	sec/sec (DTFA01-96-C-00025 [26], Message Type 12)
>A _{0WNT}	М		BIT STRING (32)	seconds (DTFA01-96-C-00025 [26], Message Type 12)
>t _{ot}	М		BIT STRING (8)	seconds (DTFA01-96-C-00025 [26], Message Type 12)
>WN _t	М		BIT STRING (8)	weeks (DTFA01-96-C-00025 [26], Message Type 12)
$>\Delta t_{LS}$	М		BIT STRING (8)	seconds (DTFA01-96-C-00025 [26], Message Type 12)
>WN _{LSF}	М		BIT STRING (8)	weeks (DTFA01-96-C-00025 [26], Message Type 12)
>DN	М		BIT STRING (8)	days (DTFA01-96-C-00025 [26], Message Type 12)
$>\Delta t_{LSF}$	М		BIT STRING (8)	seconds (DTFA01-96-C-00025 [26], Message Type 12)
>UTC Standard ID	M		BIT STRING (3)	dimensionless Coded as defined in TS 25.331 [4].

9.2.2.127 GANSS Time Indicator

Table 181

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
GANSS Time Indicator			ENUMERATE	
			D (requested,	
			not	
			requested)	

9.2.2.127A GANSS Data Bit Assistance

Table 181A

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
GANSS TOD	M		INTEGER(059,)	Reference time (modulo 1 minute) of the first bit of the data in <i>Data Bits</i> IE, in seconds.
Data Bit Assistance		1 <maxgans< td=""><td></td><td></td></maxgans<>		
List		SSat>		
>Sat ID	M		INTEGER(063)	Defined in TS 25.331 [4].
>Data Bit Assistance		1 <maxsgnty< td=""><td></td><td></td></maxsgnty<>		
Sgn List		pe>		
>>GANSS Signal ID	M		9.2.2.131	
>>Data Bits	М		BIT STRING(11024)	Raw data bits as transmitted from a specific satellite at the time indicated by GANSS_TOD. See TS 25.331 [4].

Table 181B

Range bound	Explanation
maxSgnType	Maximum number of signals for which data is included in this IE.
	The value of maxSgnType is 8
maxGANSSSat	Maximum number of GANSS satellites for which data is included in
	the IE. The value of maxGANSSSat is 64.

9.2.2.128 Additional GPS Assistance Data Required

This IE lists the GPS assistance data types required by the UE.

Table 182

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Almanac	M		BOOLEAN	TRUE means requested
UTC Model	M		BOOLEAN	TRUE means requested
Ionospheric Model	M		BOOLEAN	TRUE means requested
Navigation Model	M		BOOLEAN	TRUE means requested
DGPS Corrections	M		BOOLEAN	TRUE means requested
Reference Location	M		BOOLEAN	TRUE means requested
Reference Time	M		BOOLEAN	TRUE means requested
Acquisition Assistance	M		BOOLEAN	TRUE means requested
Real-Time Integrity	M		BOOLEAN	TRUE means requested
Nav. Model Additional Data		01		·
>GPS Week	M		INTEGER	GPS week number
			(01023)	
>GPS_Toe	M		INTEGER	GPS time of ephemeris in
			(0167)	hours of the latest ephemeris
				set
>T-Toe limit	M		Integer	ephemeris age tolerance in
			(010)	hours
>Satellites related data		0 <maxsat></maxsat>		
>>SatID	M		INTEGER	Identifies the satellite and is
			(063)	equal to (SV ID No - 1) where
				SV ID No is defined in ICD-
				GPS-200 [10].
>>IODE	M		INTEGER	Issue of Data Ephemeris for
			(0255)	SatID

Table 183

Range Bound	Explanation
maxSat	Maximum number of satellites for which data is included in this IE.
	The value of maxSat is 16.

9.2.2.129 Additional GANSS Assistance Data Required

This IE lists the GANSS assistance data types required by the UE.

Table 184

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
GANSS Reference Time	М		BOOLEAN	TRUE means requested	-	
GANSS Reference Location	М		BOOLEAN	TRUE means requested	_	
GANSS Ionospheric model	М		BOOLEAN	TRUE means requested	_	
GANSS Additional Ionospheric Model	0		GANSS Additional Ionospheric Model Required 9.2.2.145	Presence means required.	YES	ignore
GANSS Earth Orientation Parameters	0		GANSS Earth Orientation Parameters Required 9.2.2.146		YES	ignore
GANSS Requested Generic Assistance Data		1 <ma xGANS S></ma 			-	
>GANSS ID	0	<u> </u>	9.2.2.130	Absence of this IE means Galileo	-	
>GANSS Real-Time Integrity	0		BOOLEAN	TRUE means requested	-	
>GANSS Differential Corrections		01			_	
>>DGANSS Signal	М		BIT STRING (8)	Coded as defined in TS 25.331 [4].	-	
>GANSS Almanac	0		BOOLEAN	TRUE means requested	_	
>GANSS Navigation Model	0		BOOLEAN	TRUE means requested	_	
>GANSS Time Model GNSS-GNSS	0		BIT STRING (9)	Defines the time model. Bit 1 is the MSB and bit 9 is the LSB (see clause 9.2.1). Bit 1 is set for GPS, Bit 2 is set for Galileo. Bit 3 is set for QZSS Bit 4 is set for GLONASS Other bits are reserved.	_	
>GANSS Reference Measurement Information	0		BOOLEAN	TRUE means requested	_	
>GANSS Data Bits		01			_	
>>GANSS TOD	M		INTEGER (086399)	The GANSS TOD for which the data bits are requested.	-	

>>Data Bit Assistance		1			_	
>>>GANSS Signal ID	М		BIT	Coded as	_	
			STRING(8)	defined in TS		
CANICO D. (D.)			INITEOED/	25.331 [4].		
>>>GANSS Data Bit Interval	M		INTEGER(This field	_	
interval			015)	represents the time length for		
				which the Data		
				Bit Assistance is		
				requested. The		
				Data Bit		
				Assistance shall		
				be relative to		
				the time interval		
				(GANSS TOD,		
				GANSS TOD +		
				Data Bit		
				Interval).		
				The Data Bit		
				Interval <i>r</i> , expressed in		
				seconds, is		
			1	mapped to a		
				binary number K		
				with the		
				following		
				formula:		
				r=0.1*		
				2 ^K		
				Value K=15		
				means that the		
				time interval is		
>>>Satellite Information		0 <ma< td=""><td></td><td>not specified.</td><td></td><td></td></ma<>		not specified.		
		xGANS			_	
		SSat>				
>>>Satellite ID	М		INTEGER(Defined in TS	_	
			063)	25.331 [4].		
>GANSS UTC model	0		BOOLEAN	TRUE means	_	
				requested		
>GANSS Navigation Model		01			_	
Additional data >>GANSS Week/Day	M		INTEGER	Defined in TS		
>>GAINGS WEEK/Day	IVI		(04095)	25.331 [4].	_	
>>GANSS_Toe	M		INTEGER	Defined in TS	_	
770,1100_100	'''		(0167)	25.331 [4].		
>>T-Toe limit	М		INTEGER	Defined in TS	_	
			(010)	25.331 [4].		
>>Satellites list related	М	0			_	
data		<maxg< td=""><td></td><td></td><td></td><td></td></maxg<>				
		ANSSS				
015	N4	at>	INITEGES	D-6- 1: TO		
>>>Sat ID	M		INTEGER	Defined in TS	_	
>>>IOD	M		(063) BIT	25.331 [4]. Defined in TS	_	
>>>IOD	IVI		STRING	25.331 [4].	_	
			(10)	20.001 [4].		
>GANSS Additional	0		GANSS		YES	ignore
Navigation Models			Additional			.3.10.0
			Navigation			
			Models			
			Required			
			9.2.2.147			
>GANSS Additional UTC	0		GANSS		YES	ignore
Models			Additional			
			UTC			
			Models			
			Required	<u> </u>		

		9.2.2.148		
>GANSS Auxiliary	0	GANSS	YES	ignore
Information		Auxiliary		
		Information		
		Required		
		9.2.2.149		
>SBAS ID	0	9.2.2.134	YES	ignore
>GANSS Additional	0	9.2.2.151	YES	ignore
Assistance Data Choices				

Table 185

Range Bound	Explanation
maxGANSS	Maximum number of GANSS for which data is included in this IE.
	The value of maxGANSS is 8.
maxGANSSSat	Maximum number of GANSS satellites for which data is included in
	this IE. The value of maxGANSSSat is 64.

9.2.2.130 GANSS ID

This IE defines a particular GANSS.

Table 186

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
GANSS ID	М		INTEGER(07)	Defines the GANSS and is coded as defined in the UE positioning GANSS additional assistance data request IE in TS 25.331 [4].

9.2.2.131 GANSS Signal ID

This IE defines a specific signal within a particular GANSS.

Table 187

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
GANSS Signal ID	M		INTEGER	Defines the GANSS signal
			(03,,47)	and is coded as defined in TS 25.331 [4].

9.2.2.131a GANSS Signal IDs

This IE defines multiple signals within a particular GANSS.

Table 187A

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
GANSS Signal IDs	M		BIT STRING(8)	Each bit represents one signal as defined in TS 25.331 [4].

9.2.2.132 GPS Reference Time Uncertainty

Table 188

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
GPS Reference Time Uncertainty	M		Integer (0127)	This element provides the accuracy of the provided GPS time, or alternatively the accuracy of the provided relation between GPS and UTRAN time. If "GPS TOW" is the provided GPS time, or alternatively the GPS time corresponding to the UTRAN time provided, then the true GPS time lies in the interval ["GPS TOW" - "GPS Reference Time Uncertainty", "GPS TOW" + "GPS Reference Time Uncertainty"]. The uncertainty r, expressed in microseconds, is mapped to a number K with the following formula: $r = C^*(((1+x)K)-1)$ with $C = 0.0022$ and $x = 0.18$. To encode any higher value of the uncertainty than that corresponding to K=127 in the formula above, or to indicate an undefined value of the "GPS TOW", the same value, K=127, shall be used.

9.2.2.133 GANSS Earth Orientation Parameters

Table 189

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
t _{EOP}	M		BIT STRING(16)	EOP data reference time (seconds) (IS-GPS-200 [23])
PM_X	M		BIT STRING (21)	X-axis polar motion value at reference time (arc-seconds) (IS-GPS-200 [23])
PM_X_dot	M		BIT STRING (15)	X-axis polar motion drift at reference time (arc-seconds/day) (IS-GPS- 200 [23])
PM_Y	M		BIT STRING (21)	Y-axis polar motion value at reference time (arc-seconds) (IS-GPS-200 [23])
PM_Y_dot	М		BIT STRING (15)	Y-axis polar motion drift at reference time (arc-seconds/day) (IS-GPS- 200 [23])
ΔUT1	M		BIT STRING (31)	UT1-UTC difference at reference time (seconds) (IS-GPS-200 [23])
ΔUT1_dot	M		BIT STRING (19)	Rate of UT1-UTC difference at reference time (seconds/day) (IS-GPS-200 [23])

9.2.2.134 SBAS ID

This IE defines a specific SBAS.

Table 190

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
SBAS ID	M		ENUMERATED(WAAS, EGNOS, MSAS, GAGAN,)	

9.2.2.135 GANSS Auxiliary Information

Table 191

IE/Group name	Presence	Range	IE Type and Reference	Semantics description
CHOICE GANSS-ID				
>GANSS-ID-1				This choice may only be present if GANSS ID indicated 'Modernized GPS'
>>Aux Info List		1 <maxgan SSSat></maxgan 		
>>>Sat ID	M		INTEGER(063)	Defined in TS 25.331 [4].
>>>Signals Available	М		BIT STRING(8)	Coded as defined in TS 25.331 [4].
>GANSS-ID-3				This choice may be present if GANSS ID indicated 'GLONASS'
>>Aux Info List		1 <maxgan SSSat></maxgan 		
>>>Sat ID	М		INTEGER(063)	Defined in TS 25.331 [4].
>>>Signals Available	М		BIT STRING(8)	Coded as defined in TS 25.331 [4].
>>>Channel Number	М		INTEGER (-713)	This field indicates the GLONASS carrier frequency number of the satellite identified by <i>Sat ID</i> , as defined in [28].

Range Bound	Explanation
maxGANSSSat	Maximum number of GANSS satellites for which data is included in
	this IE. The value of maxGANSSSat is 64.

9.2.2.136 UTRAN-GANSS Reference Time Result

Table 193

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
UE GANSS timing of cell frames	M		INTEGER(034559 9999999,)	GANSS Time of Day in steps of 250 ns TS 25.331 [4].
GANSS time ID	0		GANSS ID 9.2.2.130	Absence of this IE means Galileo system time. The value "0" ("SBAS") shall not be used for GANSS Time ID.
GANSS TOD Uncertainty	0		INTEGER(0127)	Coded as defined in TS 25.331 [4].
UC-ID	M		UTRAN Cell Identifier 9.2.2.37	Identifies the reference cell for the GANSS TOD-SFN relationship.
SFN	M		INTEGER (04095)	This IE indicates the SFN at which the UE timing of cell frame is captured.

9.2.2.137 GANSS Additional Ionospheric Model Request

Table 194

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Data ID	M		BIT STRING(2)	Data ID for GANSS Additional lonospheric Model as defined in TS 25.331 [4].

9.2.2.138 GANSS Earth Orientation Parameters Request

Table 195

IE/Group Name	Presence	Range	IE Type and	Semantics Description
			Reference	
GANSS Earth Orientation	M		ENUMERAT	
Parameters Request			ED(Request	
			ed, Not-	
			Requested)	

9.2.2.139 Support for Non-Native Assistance Choices Indication

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Support for Non-Native Assistance Choices Indication	M		BOOLEAN	TRUE means supported.

9.2.2.140 Position Data UE-Based

Table 197

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Position Data UE-Based	М		Bit String(16)	For each bit, if set to "1" indicates that respective GNSS or position system was used by the UE for position calculation. Coded as defined in TS 25.331 [4].

9.2.2.141 GANSS Code Phase Ambiguity Extension

Table 198

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
GANSS Code Phase	М		INTEGER(32127)	In milliseconds.
Ambiguity Extension				Defined in TS 25.331 [4].

9.2.2.142 GANSS Integer Code Phase Extension

Table 199

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
GANSS Integer Code Phase	М		INTEGER(64127)	In milliseconds.
Extension				Defined in TS 25.331 [4].

9.2.2.143 GANSS Carrier-Phase Measurement Requested

Presence	Range	IE Type and Reference	Semantics Description
M		BIT STRING(8)	For each bit, if set to "1", indicates that the UE is requested to report carrier phase measurements for the respective GANSS. Bit 1 is the MSB and bit 8 is the LSB (see clause 9.2.1). bit 1: Galileo bit 2: SBAS bit 3: Modernized GPS bit 4: QZSS bit 5: GLONASS bits 6-8: reserved for future GANSS.
		g -	Reference

9.2.2.144 GANSS Multi-frequency Measurement Requested

Table 201

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
GANSS Multi-frequency Measurement Requested	M		BIT STRING(8)	For each bit, if set to "1", indicates that the UE is requested to report measurements for multiple GANSS signals for the respective GANSS. Bit 1 is the MSB and bit 8 is the LSB (see clause 9.2.1). bit 1: Galileo bit 2: SBAS bit 3: Modernized GPS bit 4: QZSS bit 5: GLONASS bits 6-8: reserved for future GANSS.

9.2.2.145 GANSS Additional Ionospheric Model Required

Table 202

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Data ID	М		BIT STRING(2)	Data ID for GANSS Additional lonospheric Model as defined in the UE positioning GANSS additional assistance data request IE of TS 25.331 [4].

9.2.2.146 GANSS Earth Orientation Parameters Required

Table 203

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
GANSS Earth Orientation Parameters Required	М		BOOLEAN	TRUE means required.

9.2.2.147 GANSS Additional Navigation Models Required

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
GANSS Additional	M		BOOLEAN	TRUE means required.
Navigation Models Required				

9.2.2.148 GANSS Additional UTC Models Required

Table 205

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
GANSS Additional UTC Models Required	M		BOOLEAN	TRUE means required.

9.2.2.149 GANSS Auxiliary Information Required

Table 206

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
GANSS Auxiliary Information Required	M		BOOLEAN	TRUE means required.

9.2.2.150 SBAS IDs

This IE defines multiple SBASs.

Table 207

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
SBAS IDs	M		BIT STRING(8)	Each bit represents one SBAS as defined in TS 25.331 [4], subclause 10.3.3.45.

9.2.2.151 GANSS Additional Assistance Data Choices

Table 208

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
GANSS Additional Assistance Data Choices		1		
>Orbit Model ID	0		INTEGER(07)	Coded as defined in the UE positioning GANSS additional assistance data request IE of TS 25.331 [4].
>Clock Model ID	0		INTEGER(07)	Coded as defined in the UE positioning GANSS additional assistance data request IE of TS 25.331 [4].
>UTC Model ID	0		INTEGER(07)	Coded as defined in the <i>UE</i> positioning GANSS additional assistance data request IE of TS 25.331 [4].
>Almanac Model ID	0		INTEGER(07)	Coded as defined in the <i>UE</i> positioning GANSS additional assistance data request IE of TS 25.331 [4].

9.2.2.152 Cell-ID Measured Results Sets

This IE contains the list of Cell-ID measurements of signals associated with one or more cells.

Table 209

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Cell-ID Measured Results Sets		1 <maxnoofmeas urements></maxnoofmeas 		
>Cell-ID Measured Results Info List	М		9.2.2.31	For SAS-centric mode.

Table 209A

Range Bound	Explanation
maxNoOfMeasurements	Maximum number of Measurements of Cell-ID Measured Results Info List and OTDOA Measured Results Info List included in the
	Position Calculation Request message. The value for maxNoOfMeasurements is 16.

9.2.2.153 OTDOA Reference Cell Info SAS-centric mode

Table 210

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
UC-ID	M		9.2.2.37	The identifier of the reference cell for the SFN-SFN Observed Time Difference Type 2 measurements.

9.2.2.154 DGNSS Validity Period

This IE defines the validity period of the GNSS differential corrections provided in *DGPS corrections* and *DGANSS corrections* IEs

Table 211

IE/Group Name	Presence	Range	IE Type and	Semantics Description
			Reference	
UDRE Growth Rate	М		Enumerated(UDRE growth 1.5, UDRE growth 2, UDRE growth 4, UDRE growth 6, UDRE growth 8, UDRE growth 10, UDRE growth 12, UDRE growth 16)	This field provides an estimate of the growth rate of uncertainty (1-σ) in the corrections. The UDRE at time value specified in the <i>Time of Validity for UDRE Growth Rate</i> field is the value of this field times the value of UDRE provided in <i>DGPS Corrections</i> or <i>DGANSS corrections</i> IE (TS 25.331 [4]).
Time of Validity for UDRE Growth Rate	M		Enumerated(val20sec, val40sec, val80sec, val160sec, val320sec, val640sec, val1280sec, val2560sec)	This field specifies the time when the <i>UDRE Growth Rate</i> field applies (TS 25.331 [4]).

9.2.2.155 IRAT Measured Results Info List

This IE contains the Cell-ID measurements of signals associated with one or more Inter-RAT cells.

Table 212

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Cell-ID IRAT Measured				
Results Info				
>GERAN Measured	0			
Results Info				
>>GERAN Measured	M	1 to		
Results		<maxreportedge< td=""><td></td><td></td></maxreportedge<>		
		RANCells>		
>>GERAN Cell Global	0		9.2.2.156	
Identity				
>>>GERAN PCI		1		
>>>bsic	M		9.2.2.157	
>>>arfcn	M		INTEGER	TS 45.005 [29]
			(01023)	
>>>GSM RSSI	M		INTEGER	RXLEV is mapped to a value
			(063)	between 0 and 63, TS
				45.008 [30].

Table 212A

Range bound	Explanation
maxReportedGERANCells	Maximum number of GERAN neighbour cells. The value of
	maxReportedGERANCells is 6.

9.2.2.156 GERAN Cell Global Identity

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
PLMN Identity	M		OCTET STRING (SIZE (3))	- digits 0 to 9, encoded 0000 to 1001, - 1111 used as filler digit, two digits per octet, - bits 4 to 1 of octet n encoding digit 2n-1 - bits 8 to 5 of octet n encoding digit 2n
				-The 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 a 3 digit MNC).
LAC	M		INTEGER(065 535)	Location Area Code
CI	М		INTEGER(065 535)	Cell Identifiier

9.2.2.157 GSM BSIC

Table 214

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Network Colour Code (NCC)	M		BIT STRING (3)	The first/leftmost bit of the bit string contains the most significant bit of the NCC.
Base Station Colour Code (BCC)	M		BIT STRING (3)	The first/leftmost bit of the bit string contains the most significant bit of the BCC.

9.2.2.158 IMSI

This information element identifies the International Mobile Subscriber Identity of the target UE (see TS 25.413 [32]).

Table 215

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
IMSI	M		OCTET STRING (SIZE (38))	- digits 0 to 9, encoded 0000 to 1001, - 1111 used as filler digit, two digits per octet, - bit 4 to 1 of octet n encoding digit 2n-1 - bit 8 to 5 of octet n encoding digit 2n -Number of decimal digits shall be from 6 to 15 starting with the digits from the PLMN identity. When the IMSI is made of an odd number of digits, the filler digit shall be added at the end to make an even number of digits of length 2N. The filler digit shall then be consequently encoded as bit 8 to 5 of octet N.

9.2.2.159 IMEI

This information element identifies the International Mobile Station Equipment Identity of the target UE (see TS 25.413 [32])

Table 216

IE/Group Name	Presence	Range	IE Type and	Semantics Description
			Reference	
IMEI	M		OCTET STRING (SIZE (8))	- hexadecimal digits 0 to F, two hexadecimal digits per octet, - each hexadecimal digit encoded 0000 to 1111, - 1111 used as filler for bits 8 to 5 of last octet - bit 4 to 1 of octet n encoding digit 2n-1 bit 8 to 5 of octet n encoding digit 2n Number of hexadecimal digits shall be 15.

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

9.3.0 General

PCAP ASN.1 definition conforms with ITU-T Rec. X.680 [7], ITU-T Rec. X.681 [8], and ITU-T Rec. X.691 [9].

The ASN.1 definition specifies the structure and content of PCAP messages. PCAP 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 a PCAP 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 needed 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 where 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 a PCAP 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 10.3.6.

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

9.3.1 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 interoperability;
- 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.

9.3.2 Elementary Procedure Definitions

id-ErrorIndication,

```
PCAP-PDU-Descriptions {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
umts-Access (20) modules (3) pcap(4) version1 (1) pcap-PDU-Descriptions (0)}
DEFINITIONS AUTOMATIC TAGS ::=
BEGIN
__ *********************
-- IE parameter types from other modules.
     *****************
IMPORTS
   Criticality,
   ProcedureCode,
   TransactionID
FROM PCAP-CommonDataTypes
    PositionCalculationRequest,
   PositionCalculationResponse,
    PositionCalculationFailure,
   InformationExchangeInitiationRequest,
    InformationExchangeInitiationResponse,
   InformationExchangeInitiationFailure,
    InformationReport,
    InformationExchangeTerminationRequest,
   InformationExchangeFailureIndication,
   ErrorIndication,
   PrivateMessage,
   PositionInitiationRequest,
   PositionInitiationResponse,
    PositionInitiationFailure,
    PositionActivationRequest,
    PositionActivationResponse,
    PositionActivationFailure,
   PositionParameterModification,
   Abort,
   PositionPeriodicReport,
   PositionPeriodicResult,
   PositionPeriodicTermination
FROM PCAP-PDU-Contents
   id-PositionCalculation.
   id-InformationExchangeInitiation,
   id-InformationReporting,
   id-InformationExchangeTermination,
   id-InformationExchangeFailure,
```

```
id-privateMessage,
   id-PositionInitiation,
   id-PositionActivation.
   id-PositionParameterModification,
   id-Abort,
   id-PositionPeriodicReport,
   id-PositionPeriodicResult,
   id-PositionPeriodicTermination
FROM PCAP-Constants:
-- Interface Elementary Procedure Class
PCAP-ELEMENTARY-PROCEDURE ::= CLASS {
   &InitiatingMessage
    &SuccessfulOutcome
                              OPTIONAL,
    &UnsuccessfulOutcome
                              OPTIONAL,
   &Outcome
                              OPTIONAL,
                              ProcedureCode
                                             UNIQUE,
   &procedureCode
                                             DEFAULT ignore
    &criticality
                              Criticality
WITH SYNTAX {
                              &InitiatingMessage
    INITIATING MESSAGE
                              &SuccessfulOutcome]
    [SUCCESSFUL OUTCOME
                              &UnsuccessfulOutcome]
    [UNSUCCESSFUL OUTCOME
                              &Out.comel
    [OUTCOME
   PROCEDURE CODE
                              &procedureCode
    [CRITICALITY
                              &criticality]
    *******************
  Interface PDU definitions
  *****************
PCAP-PDU ::= CHOICE {
   initiatingMessage
                          InitiatingMessage,
   successfulOutcome
                          SuccessfulOutcome,
   unsuccessfulOutcome
                          UnsuccessfulOutcome,
   outcome
                          Outcome,
    . . .
InitiatingMessage ::= SEQUENCE {
   procedureCode PCAP-ELEMENTARY-PROCEDURE.&procedureCode
                                                                 ({PCAP-ELEMENTARY-PROCEDURES}),
   criticality
                   PCAP-ELEMENTARY-PROCEDURE.&criticality
                                                                 ({PCAP-ELEMENTARY-PROCEDURES}{@procedureCode}),
    transactionID TransactionID,
```

```
({PCAP-ELEMENTARY-PROCEDURES}{@procedureCode})
    value
                   PCAP-ELEMENTARY-PROCEDURE.&InitiatingMessage
SuccessfulOutcome ::= SEQUENCE
   procedureCode PCAP-ELEMENTARY-PROCEDURE.&procedureCode
                                                                 ({PCAP-ELEMENTARY-PROCEDURES}),
   criticality
                                                                 ({PCAP-ELEMENTARY-PROCEDURES}{@procedureCode}),
                   PCAP-ELEMENTARY-PROCEDURE.&criticality
    transactionID TransactionID,
                                                                 ({PCAP-ELEMENTARY-PROCEDURES}{@procedureCode})
   value
                   PCAP-ELEMENTARY-PROCEDURE. & Successful Outcome
UnsuccessfulOutcome ::= SEQUENCE {
                                                                 ({PCAP-ELEMENTARY-PROCEDURES}),
   procedureCode PCAP-ELEMENTARY-PROCEDURE.&procedureCode
                                                                 ({PCAP-ELEMENTARY-PROCEDURES}{@procedureCode}),
   criticality
                   PCAP-ELEMENTARY-PROCEDURE.&criticality
   transactionID TransactionID,
                                                                 ({PCAP-ELEMENTARY-PROCEDURES} { @procedureCode } )
   value
                   PCAP-ELEMENTARY-PROCEDURE. &UnsuccessfulOutcome
Outcome ::= SEQUENCE {
                                                                 ({PCAP-ELEMENTARY-PROCEDURES}),
   procedureCode PCAP-ELEMENTARY-PROCEDURE.&procedureCode
                   PCAP-ELEMENTARY-PROCEDURE.&criticality
                                                                 ({PCAP-ELEMENTARY-PROCEDURES}{@procedureCode}),
   criticality
   transactionID TransactionID.
                                                                 ({PCAP-ELEMENTARY-PROCEDURES}{@procedureCode})
   value
                   PCAP-ELEMENTARY-PROCEDURE. &Outcome
     ****************
-- Interface Elementary Procedure List
  *****************
PCAP-ELEMENTARY-PROCEDURES PCAP-ELEMENTARY-PROCEDURE ::= {
   PCAP-ELEMENTARY-PROCEDURES-CLASS-1
   PCAP-ELEMENTARY-PROCEDURES-CLASS-2
    . . .
PCAP-ELEMENTARY-PROCEDURES-CLASS-1 PCAP-ELEMENTARY-PROCEDURE ::= {
    positionCalculation
    informationExchangeInitiation,
   positionInitiation |
   positionActivation
PCAP-ELEMENTARY-PROCEDURES-CLASS-2 PCAP-ELEMENTARY-PROCEDURE ::=
    informationReporting
    informationExchangeTermination
    informationExchangeFailure
    errorIndication
   privateMessage,
    positionParameterModification
```

```
abort
   positionPeriodicReport
   positionPeriodicResult
    positionPeriodicTermination
     ***************
  Interface Elementary Procedures
positionCalculation PCAP-ELEMENTARY-PROCEDURE ::= {
   INITIATING MESSAGE
                           PositionCalculationRequest
   SUCCESSFUL OUTCOME
                           PositionCalculationResponse
                           PositionCalculationFailure
   UNSUCCESSFUL OUTCOME
                           id-PositionCalculation
   PROCEDURE CODE
                           reject
    CRITICALITY
informationExchangeInitiation PCAP-ELEMENTARY-PROCEDURE ::= {
   INITIATING MESSAGE
                           InformationExchangeInitiationRequest
                           InformationExchangeInitiationResponse
   SUCCESSFUL OUTCOME
   UNSUCCESSFUL OUTCOME
                           InformationExchangeInitiationFailure
                           id-InformationExchangeInitiation
    PROCEDURE CODE
   CRITICALITY
                           reject
positionInitiation PCAP-ELEMENTARY-PROCEDURE ::= {
   INITIATING MESSAGE
                           PositionInitiationRequest
   SUCCESSFUL OUTCOME
                           PositionInitiationResponse
   UNSUCCESSFUL OUTCOME
                           PositionInitiationFailure
                           id-PositionInitiation
   PROCEDURE CODE
   CRITICALITY
                           reject
positionActivation PCAP-ELEMENTARY-PROCEDURE ::= {
   INITIATING MESSAGE
                           PositionActivationRequest
                           PositionActivationResponse
    SUCCESSFUL OUTCOME
                           PositionActivationFailure
   UNSUCCESSFUL OUTCOME
                           id-PositionActivation
   PROCEDURE CODE
    CRITICALITY
                           reject
informationReporting PCAP-ELEMENTARY-PROCEDURE ::= {
   INITIATING MESSAGE
                           InformationReport
                           id-InformationReporting
    PROCEDURE CODE
    CRITICALITY
                           ignore
```

```
informationExchangeTermination PCAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE
                            InformationExchangeTerminationRequest
    PROCEDURE CODE
                            id-InformationExchangeTermination
    CRITICALITY
informationExchangeFailure PCAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE
                            InformationExchangeFailureIndication
    PROCEDURE CODE
                            id-InformationExchangeFailure
    CRITICALITY
                            ignore
errorIndication PCAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE
                            ErrorIndication
                            id-ErrorIndication
    PROCEDURE CODE
    CRITICALITY
                            ignore
privateMessage PCAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE
                            PrivateMessage
    PROCEDURE CODE
                            id-privateMessage
    CRITICALITY
                            ignore
positionParameterModification PCAP-ELEMENTARY-PROCEDURE ::= {
                            PositionParameterModification
    INITIATING MESSAGE
    PROCEDURE CODE
                            id-PositionParameterModification
    CRITICALITY
                            ignore
abort PCAP-ELEMENTARY-PROCEDURE ::= {
                            Abort
    INITIATING MESSAGE
    PROCEDURE CODE
                            id-Abort
    CRITICALITY
                            ignore
positionPeriodicReport PCAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE
                            PositionPeriodicReport
    PROCEDURE CODE
                            id-PositionPeriodicReport
    CRITICALITY
                            ignore
positionPeriodicResult PCAP-ELEMENTARY-PROCEDURE ::= {
                            PositionPeriodicResult
    INITIATING MESSAGE
    PROCEDURE CODE
                            id-PositionPeriodicResult
    CRITICALITY
                            ignore
positionPeriodicTermination PCAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE
                            PositionPeriodicTermination
    PROCEDURE CODE
                            id-PositionPeriodicTermination
```

```
CRITICALITY ignore }
END
```

9.3.3 PDU Definitions

```
__ *********************
-- PDU definitions for PCAP.
PCAP-PDU-Contents {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
umts-Access (20) modules (3) pcap(4) version1 (1) pcap-PDU-Contents (1) }
DEFINITIONS AUTOMATIC TAGS ::=
BEGIN
     *****************
-- IE parameter types from other modules.
IMPORTS
   Cause,
   CriticalityDiagnostics,
   GPS-UTRAN-TRU,
   InformationExchangeID,
   InformationReportCharacteristics,
   InformationType,
   MeasuredResultsList,
   RequestedDataValue,
   RequestedDataValueInformation,
   UE-PositionEstimate,
   CellId-MeasuredResultsSets,
   OTDOA-MeasurementGroup,
   AccuracyFulfilmentIndicator,
   HorizontalAccuracyCode,
   VerticalAccuracyCode,
   RequestType,
   UE-PositioningCapability,
   UC-ID,
   ResponseTime,
   PositioningPriority,
   ClientType,
   PositioningMethod,
   UTDOAPositioning,
   GPSPositioning,
   OTDOAAssistanceData,
```

```
UTDOA-Group,
    Positioning-ResponseTime,
    EnvironmentCharacterisation.
    PositionData.
    IncludeVelocity,
    VelocityEstimate,
    UE-PositionEstimateInfo,
    OTDOA-MeasuredResultsSets.
    PeriodicPosCalcInfo.
    PeriodicLocationInfo,
    AmountOfReporting,
   MeasInstructionsUsed,
    RRCstateChange,
    PeriodicTerminationCause,
    CellIDPositioning,
    GANSS-MeasuredResultsList,
    GANSSPositioning,
    GANSS-UTRAN-TRU,
    AdditionalGPSAssistDataRequired,
    AdditionalGanssAssistDataRequired,
    OTDOA-ReferenceCellInfoSAS-centric,
    CellId-IRATMeasuredResultsSets,
    IMSI,
    IMEI
FROM PCAP-IES
    TransactionID
FROM PCAP-CommonDataTypes
    ProtocolExtensionContainer{},
    ProtocolIE-ContainerList(),
    ProtocolIE-Container{},
    ProtocolIE-Single-Container{},
    PrivateIE-Container{},
    PCAP-PRIVATE-IES,
    PCAP-PROTOCOL-EXTENSION,
    PCAP-PROTOCOL-IES
FROM PCAP-Containers
    id-Cause,
    id-CriticalityDiagnostics,
    id-GPS-UTRAN-TRU,
    id-InformationExchangeID,
    id-InformationExchangeObjectType-InfEx-Rprt,
    id-InformationExchangeObjectType-InfEx-Rqst,
    id-InformationExchangeObjectType-InfEx-Rsp,
    id-InformationReportCharacteristics,
    id-InformationType,
    id-GPS-MeasuredResultsList,
    id-RequestedDataValue,
    id-RequestedDataValueInformation,
```

```
id-TransactionID,
    id-UE-PositionEstimate.
    id-CellId-MeasuredResultsSets.
    id-OTDOA-MeasurementGroup,
    id-AccuracyFulfilmentIndicator,
    id-HorizontalAccuracyCode,
    id-VerticalAccuracyCode,
    id-RequestType,
    id-UE-PositioningCapability,
    id-UC-id,
    id-ResponseTime,
    id-PositioningPriority,
    id-ClientType,
    id-PositioningMethod,
    id-UTDOAPositioning,
    id-GPSPositioning,
    id-OTDOAAssistanceData,
    id-UTDOA-Group,
    id-Positioning-ResponseTime,
    id-EnvironmentCharacterisation,
    id-PositionData,
    id-IncludeVelocity,
    id-VelocityEstimate,
    id-UE-PositionEstimateInfo,
    id-UC-ID-InfEx-Rqst,
    id-OTDOA-MeasuredResultsSets,
    id-PeriodicPosCalcInfo,
    id-PeriodicLocationInfo,
    id-AmountOfReporting,
    id-MeasInstructionsUsed,
    id-RRCstateChange,
    id-PeriodicTerminationCause,
    id-CellIDPositioning,
    id-GANSS-MeasuredResultsList,
    id-GANSSPositioning,
    id-GANSS-UTRAN-TRU,
    id-AdditionalGPSAssistDataRequired,
    id-AdditionalGanssAssistDataRequired,
    id-OTDOA-ReferenceCellInfo,
    id-CellId-IRATMeasuredResultsSets,
    id-IMSI,
    id-IMEI
FROM PCAP-Constants:
-- POSITION CALCULATION REQUEST
         ***************
PositionCalculationRequest ::= SEQUENCE {
    protocolIEs
                       ProtocolIE-Container
                                                   { {PositionCalculationRequestIEs} },
```

```
protocolExtensions ProtocolExtensionContainer { {PositionCalculationRequestExtensions} } OPTIONAL,
PositionCalculationRequestIEs PCAP-PROTOCOL-IES ::= {
     ID id-UE-PositionEstimate
                                                                                                       PRESENCE optional } |
                                         CRITICALITY reject TYPE UE-PositionEstimate
    ID id-GPS-MeasuredResultsList
                                         CRITICALITY reject TYPE MeasuredResultsList
                                                                                                       PRESENCE optional }.
PositionCalculationRequestExtensions PCAP-PROTOCOL-EXTENSION ::= {
     ID id-CellId-MeasuredResultsSets
                                                                                                       PRESENCE optional
                                     CRITICALITY reject EXTENSION CellId-MeasuredResultsSets
     ID id-OTDOA-MeasurementGroup
                                     CRITICALITY reject EXTENSION OTDOA-MeasurementGroup
                                                                                                       PRESENCE optional
     ID id-HorizontalAccuracyCode
                                     CRITICALITY ignore EXTENSION HorizontalAccuracyCode
                                                                                                       PRESENCE optional
     ID id-VerticalAccuracyCode
                                     CRITICALITY ignore EXTENSION VerticalAccuracyCode
                                                                                                       PRESENCE optional
     ID id-UTDOA-Group
                                     CRITICALITY reject EXTENSION UTDOA-Group
                                                                                                       PRESENCE optional
     ID id-Positioning-ResponseTime
                                     CRITICALITY ignore EXTENSION Positioning-ResponseTime
                                                                                                       PRESENCE optional
     ID id-IncludeVelocity
                                     CRITICALITY ignore EXTENSION IncludeVelocity
                                                                                                       PRESENCE optional
     ID id-PeriodicPosCalcInfo
                                     CRITICALITY ignore EXTENSION PeriodicPosCalcInfo
                                                                                                       PRESENCE optional
     ID id-GANSS-MeasuredResultsList
                                     CRITICALITY reject EXTENSION GANSS-MeasuredResultsList
                                                                                                       PRESENCE optional
     ID id-IMSI
                                     CRITICALITY ignore EXTENSION IMSI
                                                                                                       PRESENCE optional }
    ID id-IMEI
                                     CRITICALITY ignore EXTENSION IMEI
                                                                                                       PRESENCE optional },
  *****************
-- POSITION CALCULATION RESPONSE
  *****************
PositionCalculationResponse ::= SEQUENCE {
                   ProtocolIE-Container
   protocolIEs
                                              {PositionCalculationResponseIEs} },
   protocolExtensions ProtocolExtensionContainer { {PositionCalculationResponseExtensions} }
                                                                                   OPTIONAL,
PositionCalculationResponseIEs PCAP-PROTOCOL-IES ::= {
     ID id-UE-PositionEstimate
                                  CRITICALITY ignore TYPE UE-PositionEstimate
                                                                               PRESENCE mandatory }
                                                                               PRESENCE optional },
   { ID id-CriticalityDiagnostics
                                  CRITICALITY ignore TYPE CriticalityDiagnostics
PositionCalculationResponseExtensions PCAP-PROTOCOL-EXTENSION ::= {
     ID id-AccuracyFulfilmentIndicator CRITICALITY ignore EXTENSION AccuracyFulfilmentIndicator
                                                                                          PRESENCE optional }
   PRESENCE optional },
    ****************
-- POSITION CALCULATION FAILURE
```

```
__ *******************
PositionCalculationFailure ::= SEOUENCE {
   protocolIEs ProtocolIE-Container
                                              { {PositionCalculationFailureIEs} },
   protocolExtensions ProtocolExtensionContainer { {PositionCalculationFailureExtensions} } OPTIONAL,
PositionCalculationFailureIEs PCAP-PROTOCOL-IES ::= {
                                  CRITICALITY ignore TYPE Cause
     ID id-Cause
                                                                                 PRESENCE mandatory }
   ID id-CriticalityDiagnostics
                                   CRITICALITY ignore TYPE CriticalityDiagnostics
                                                                                 PRESENCE optional },
   . . .
PositionCalculationFailureExtensions PCAP-PROTOCOL-EXTENSION ::= {
-- INFORMATION EXCHANGE INITIATION REQUEST
  ***********************
InformationExchangeInitiationRequest ::= SEQUENCE {
                ProtocolIE-Container
                                                  {{InformationExchangeInitiationRequest-IEs}},
   protocolIEs
   protocolExtensions
                      ProtocolExtensionContainer {{InformationExchangeInitiationRequest-Extensions}}
                                                                                                          OPTIONAL,
InformationExchangeInitiationRequest-IES PCAP-PROTOCOL-IES ::= {
   { ID id-InformationExchangeID
                               CRITICALITY reject TYPE InformationExchangeID
       PRESENCE mandatory } |
   PRESENCE
mandatory }|
   -- This IE represents both the Information Exchange Object Type IE and the choice based on the Information Exchange Object Type
   -- as described in the tabular message format in clause 9.1.
   { ID id-InformationType
                                                 CRITICALITY reject TYPE InformationType
          PRESENCE
                    mandatory }|
   { ID id-InformationReportCharacteristics
                                                 CRITICALITY reject TYPE InformationReportCharacteristics
   PRESENCE mandatory }
   { ID id-GPS-UTRAN-TRU
                                                 CRITICALITY reject TYPE GPS-UTRAN-TRU
          PRESENCE conditional },
   -- This IE shall be present if the information requested in the Information Type IE contains GPS-related data
InformationExchangeInitiationRequest-Extensions PCAP-PROTOCOL-EXTENSION ::= {
   { ID id-GANSS-UTRAN-TRU
                                          CRITICALITY reject EXTENSION GANSS-UTRAN-TRU
      PRESENCE conditional } |
   -- This IE shall be present if the information requested in the Information Type IE contains GANSS-related data
   { ID id-IMSI
                                          CRITICALITY ignore EXTENSION IMSI
      PRESENCE optional } |
```

```
{ ID id-IMEI
                                           CRITICALITY ignore EXTENSION IMEI
       PRESENCE optional },
InformationExchangeObjectType-InfEx-Rgst ::= CHOICE {
   referencePosition
                                                     RefPosition-InfEx-Rqst,
   extension-InformationExchangeObjectType-InfEx-Rgst
                                                     Extension-InformationExchangeObjectType-InfEx-Rgst
RefPosition-InfEx-Rqst ::= SEQUENCE {
   referencePositionEstimate
                                UE-PositionEstimate,
   iE-Extensions
                                ProtocolExtensionContainer { { RefPositionItem-InfEx-Rgst-ExtIEs} }
                                                                                                    OPTIONAL.
RefPositionItem-InfEx-Rqst-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
Extension-InformationExchangeObjectType-InfEx-Rgst ::= ProtocolIE-Single-Container {{ Extension-InformationExchangeObjectType-InfEx-RgstIE }}
Extension-InformationExchangeObjectType-InfEx-RqstIE PCAP-PROTOCOL-IES ::= {
     ID id-UC-ID-InfEx-Rqst
                                   CRITICALITY reject TYPE UC-ID-InfEx-Rqst
                                                                                  PRESENCE mandatory }
     UC-ID-InfEx-Rgst ::= SEQUENCE {
   referenceUC-ID
                                UC-ID,
                                ProtocolExtensionContainer { { UCIDItem-InfEx-Rqst-ExtIEs} }
   iE-Extensions
                                                                                              OPTIONAL,
UCIDItem-InfEx-Rqst-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
  -- INFORMATION EXCHANGE INITIATION RESPONSE
InformationExchangeInitiationResponse ::= SEQUENCE
   protocolIEs
                        ProtocolIE-Container
                                                  {{InformationExchangeInitiationResponse-IEs}},
   protocolExtensions
                        ProtocolExtensionContainer
                                                 {{InformationExchangeInitiationResponse-Extensions}}
                                                                                                           OPTIONAL,
InformationExchangeInitiationResponse-IEs PCAP-PROTOCOL-IES ::= {
   { ID id-InformationExchangeID
                                                  CRITICALITY ignore TYPE InformationExchangeID
               mandatory }|
       PRESENCE
```

```
id-InformationExchangeObjectType-InfEx-Rsp CRITICALITY ignore TYPE InformationExchangeObjectType-InfEx-Rsp
                                                                                                                           PRESENCE
   optional }|
   { ID id-CriticalityDiagnostics
                                                   CRITICALITY ignore TYPE CriticalityDiagnostics
       PRESENCE optional },
InformationExchangeInitiationResponse-Extensions PCAP-PROTOCOL-EXTENSION ::= {
InformationExchangeObjectType-InfEx-Rsp ::= CHOICE {
   referencePosition
                                RefPosition-InfEx-Rsp,
RefPosition-InfEx-Rsp ::= SEQUENCE {
   requestedDataValue
                                RequestedDataValue,
   iE-Extensions
                                ProtocolExtensionContainer { { RefPositionItem-InfEx-Rsp-ExtIEs} }
                                                                                                      OPTIONAL,
RefPositionItem-InfEx-Rsp-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
     *****************
-- INFORMATION EXCHANGE INITIATION FAILURE
__ *********************
InformationExchangeInitiationFailure ::= SEQUENCE {
                                                   {{InformationExchangeInitiationFailure-IEs}},
   protocolIEs
                         ProtocolIE-Container
                         ProtocolExtensionContainer {{InformationExchangeInitiationFailure-Extensions}}
   protocolExtensions
                                                                                                             OPTIONAL,
InformationExchangeInitiationFailure-IEs PCAP-PROTOCOL-IES ::= {
          id-InformationExchangeID
                                        CRITICALITY ignore TYPE InformationExchangeID
                                                                                       PRESENCE mandatory }
     ID
          id-Cause
                                        CRITICALITY ignore TYPE Cause
                                                                                       PRESENCE mandatory } |
    ID
          id-CriticalityDiagnostics
                                        CRITICALITY ignore TYPE CriticalityDiagnostics
                                                                                       PRESENCE optional
InformationExchangeInitiationFailure-Extensions PCAP-PROTOCOL-EXTENSION ::= {
     *****************
-- POSITION INITIATION REQUEST
```

```
__ *******************
PositionInitiationRequest ::= SEQUENCE {
   protocolIEs ProtocolIE-Container
                                               {PositionInitiationRequestIEs} },
   protocolExtensions ProtocolExtensionContainer { {PositionInitiationRequestExtensions} }
                                                                                      OPTIONAL.
PositionInitiationRequestIEs PCAP-PROTOCOL-IES ::= {
     ID id-RequestType
                                   CRITICALITY reject TYPE RequestType
                                                                                  PRESENCE mandatory
     ID id-UE-PositioningCapability
                                   CRITICALITY reject TYPE UE-PositioningCapability PRESENCE mandatory
                                   CRITICALITY reject TYPE UC-ID
     ID id-UC-id
                                                                                  PRESENCE mandatory
                                                                                  PRESENCE optional }
     ID id-VerticalAccuracyCode
                                   CRITICALITY ignore TYPE VerticalAccuracyCode
     ID id-ResponseTime
                                   CRITICALITY ignore TYPE ResponseTime
                                                                                  PRESENCE optional
     ID id-PositioningPriority
                                   CRITICALITY ignore TYPE PositioningPriority
                                                                                  PRESENCE optional }
   { ID id-ClientType
                                   CRITICALITY ignore TYPE ClientType
                                                                                   PRESENCE optional },
   . . .
PositionInitiationRequestExtensions PCAP-PROTOCOL-EXTENSION ::= {
     ID id-IncludeVelocity
                                   CRITICALITY ignore EXTENSION IncludeVelocity
                                                                                      PRESENCE optional }
     ID id-PeriodicLocationInfo
                                   CRITICALITY ignore EXTENSION PeriodicLocationInfo
                                                                                      PRESENCE optional
     ID id-IMSI
                                   CRITICALITY ignore EXTENSION IMSI
                                                                                      PRESENCE optional
                                   CRITICALITY ignore EXTENSION IMEI
                                                                                      PRESENCE optional }.
    ID id-IMEI
  *****************
-- POSITION INITIATION RESPONSE
        ***************
PositionInitiationResponse ::= SEQUENCE {
   protocolIEs
                     ProtocolIE-Container
                                                {PositionInitiationResponseIEs} },
   protocolExtensions ProtocolExtensionContainer { {PositionInitiationResponseExtensions} } OPTIONAL,
PositionInitiationResponseIEs PCAP-PROTOCOL-IES ::= {
     ID id-UE-PositionEstimate
                                       CRITICALITY reject TYPE UE-PositionEstimate
                                                                                              PRESENCE mandatory
     ID id-PositionData
                                       CRITICALITY ignore TYPE PositionData
                                                                                              PRESENCE mandatory }
   { ID id-AccuracyFulfilmentIndicator
                                       CRITICALITY ignore TYPE AccuracyFulfilmentIndicator
                                                                                              PRESENCE optional },
   . . .
PositionInitiationResponseExtensions PCAP-PROTOCOL-EXTENSION ::= {
   { ID id-VelocityEstimate
                                       CRITICALITY ignore EXTENSION VelocityEstimate PRESENCE optional },
   . . .
__ **********************
```

```
-- POSITION INITIATION FAILURE
__ *********************
PositionInitiationFailure ::= SEQUENCE {
                     ProtocolIE-Container
                                                  {PositionInitiationFailureIEs} },
   protocolIEs
   protocolExtensions ProtocolExtensionContainer { {PositionInitiationFailureExtensions} }
PositionInitiationFailureIEs PCAP-PROTOCOL-IES ::= {
     ID id-Cause
                                 CRITICALITY ignore TYPE Cause
                                                                                   PRESENCE mandatory } |
    { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics
                                                                                  PRESENCE optional },
PositionInitiationFailureExtensions PCAP-PROTOCOL-EXTENSION ::= {
-- POSITION ACTIVATION REQUEST
__ **********************
PositionActivationRequest ::= SEQUENCE {
                     ProtocolIE-Container
                                                 {PositionActivationRequestIEs} },
   protocolIEs
   protocolExtensions ProtocolExtensionContainer { {PositionActivationRequestExtensions} } OPTIONAL,
PositionActivationRequestIEs PCAP-PROTOCOL-IES ::= {
     ID id-PositioningMethod
                                     CRITICALITY reject TYPE PositioningMethod
                                                                                          PRESENCE mandatory
     ID id-Positioning-ResponseTime
                                     CRITICALITY ignore TYPE Positioning-ResponseTime
                                                                                          PRESENCE mandatory }
     ID id-PositioningPriority
                                     CRITICALITY ignore TYPE PositioningPriority
                                                                                          PRESENCE optional
     ID id-EnvironmentCharacterisation CRITICALITY ignore TYPE EnvironmentCharacterisation
                                                                                          PRESENCE optional
     ID id-UTDOAPositioning
                                     CRITICALITY reject TYPE UTDOAPositioning
                                                                                          PRESENCE optional
     ID id-GPSPositioning
                                     CRITICALITY reject TYPE GPSPositioning
                                                                                          PRESENCE optional
    ID id-OTDOAAssistanceData
                                     CRITICALITY reject TYPE OTDOAAssistanceData
                                                                                          PRESENCE optional },
PositionActivationRequestExtensions PCAP-PROTOCOL-EXTENSION ::= {
     ID id-IncludeVelocity
                                     CRITICALITY ignore EXTENSION IncludeVelocity
                                                                                           PRESENCE optional
                                     CRITICALITY ignore EXTENSION AmountOfReporting
     ID id-AmountOfReporting
                                                                                           PRESENCE optional
     ID id-CellIDPositioning
                                     CRITICALITY ignore EXTENSION CellIDPositioning
                                                                                           PRESENCE optional }
    { ID id-GANSSPositioning
                                     CRITICALITY reject EXTENSION GANSSPositioning
                                                                                           PRESENCE optional },
```

```
__ ******************
  POSITION ACTIVATION RESPONSE
      PositionActivationResponse ::= SEQUENCE {
   protocolIEs
                      ProtocolIE-Container
                                                 {PositionActivationResponseIEs} },
   protocolExtensions ProtocolExtensionContainer { {PositionActivationResponseExtensions} }
                                                                                        OPTIONAL,
PositionActivationResponseIEs PCAP-PROTOCOL-IES ::= {
     ID id-UE-PositionEstimateInfo
                                        CRITICALITY ignore TYPE UE-PositionEstimateInfo
                                                                                          PRESENCE optional
     ID id-GPS-MeasuredResultsList
                                        CRITICALITY reject TYPE MeasuredResultsList
                                                                                          PRESENCE optional
     ID id-CellId-MeasuredResultsSets
                                        CRITICALITY reject TYPE CellId-MeasuredResultsSets
                                                                                         PRESENCE optional
     ID id-OTDOA-MeasuredResultsSets
                                        CRITICALITY reject TYPE OTDOA-MeasuredResultsSets
                                                                                          PRESENCE optional
     ID id-UTDOA-Group
                                        CRITICALITY reject TYPE UTDOA-Group
                                                                                          PRESENCE optional },
   . . .
PositionActivationResponseExtensions PCAP-PROTOCOL-EXTENSION ::= {
    { ID id-VelocityEstimate
                                               CRITICALITY ignore EXTENSION VelocityEstimate
   PRESENCE optional } |
   { ID id-MeasInstructionsUsed
                                               CRITICALITY ignore EXTENSION MeasInstructionsUsed
   PRESENCE optional } |
    { ID id-GANSS-MeasuredResultsList
                                                CRITICALITY reject EXTENSION GANSS-MeasuredResultsList
                                                                                                                            PRESENCE
optional } |
    { ID id-AdditionalGPSAssistDataRequired
                                                CRITICALITY ignore EXTENSION AdditionalGPSAssistDataRequired
                                                                                                                     PRESENCE optional }
     ID id-AdditionalGanssAssistDataRequired
                                                CRITICALITY ignore EXTENSION AdditionalGanssAssistDataRequired
                                                                                                                     PRESENCE optional }
     ID id-OTDOA-ReferenceCellInfo
                                                CRITICALITY reject EXTENSION OTDOA-ReferenceCellInfoSAS-centric
                                                                                                              PRESENCE optional } |
    ID id-CellId-IRATMeasuredResultsSets
                                                CRITICALITY ignore EXTENSION CellId-IRATMeasuredResultsSets
                                                                                                                     PRESENCE optional },
    *****************
-- POSITION ACTIVATION FAILURE
  *****************
PositionActivationFailure ::= SEOUENCE {
   protocolIEs
                     ProtocolIE-Container
                                                {PositionActivationFailureIEs} },
   protocolExtensions ProtocolExtensionContainer { {PositionActivationFailureExtensions} }
PositionActivationFailureIEs PCAP-PROTOCOL-IES ::= {
     ID id-Cause
                                 CRITICALITY ignore TYPE Cause
                                                                                 PRESENCE mandatory }
    { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics
                                                                                 PRESENCE optional },
```

```
PositionActivationFailureExtensions PCAP-PROTOCOL-EXTENSION ::= {
__ ******************
-- INFORMATION REPORT
  ********************
InformationReport ::= SEQUENCE {
   protocolIEs
                        ProtocolIE-Container
                                                  {{InformationReport-IEs}},
   protocolExtensions
                        ProtocolExtensionContainer {{InformationReport-Extensions}}
                                                                                     OPTIONAL,
InformationReport-IEs PCAP-PROTOCOL-IES ::= {
   { ID id-InformationExchangeID
                                                     CRITICALITY ignore TYPE InformationExchangeID
          PRESENCE mandatory } |
   { ID id-InformationExchangeObjectType-InfEx-Rprt
                                                     CRITICALITY ignore TYPE InformationExchangeObjectType-InfEx-Rprt PRESENCE
   mandatory },
InformationReport-Extensions PCAP-PROTOCOL-EXTENSION ::= {
InformationExchangeObjectType-InfEx-Rprt ::= CHOICE {
   referencePosition
                               RefPosition-InfEx-Rprt,
RefPosition-InfEx-Rprt ::= SEQUENCE {
   requestedDataValueInformation RequestedDataValueInformation,
                               ProtocolExtensionContainer {{ RefPositionItem-InfEx-Rprt-ExtIEs }}
   iE-Extensions
                                                                                                   OPTIONAL,
   . . .
RefPositionItem-InfEx-Rprt-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
-- INFORMATION EXCHANGE TERMINATION REQUEST
  ******************
```

```
InformationExchangeTerminationRequest ::= SEQUENCE {
   protocolIEs
                        ProtocolIE-Container
                                                 {{InformationExchangeTerminationRequest-IEs}},
   protocolExtensions
                        ProtocolExtensionContainer
                                                 {{InformationExchangeTerminationRequest-Extensions}}
                                                                                                  OPTIONAL.
InformationExchangeTerminationRequest-IEs PCAP-PROTOCOL-IES ::= {
          id-InformationExchangeID
                                          CRITICALITY
                                                        ignore TYPE InformationExchangeID
                                                                                                         PRESENCE
                                                                                                                      mandatory },
InformationExchangeTerminationRequest-Extensions PCAP-PROTOCOL-EXTENSION ::= {
  INFORMATION EXCHANGE FAILURE INDICATION
     *****************
InformationExchangeFailureIndication ::= SEQUENCE {
   protocolIEs
                        ProtocolIE-Container
                                                 {{InformationExchangeFailureIndication-IEs}},
                                                {{InformationExchangeFailureIndication-Extensions}}
   protocolExtensions
                        ProtocolExtensionContainer
                                                                                                  OPTIONAL,
InformationExchangeFailureIndication-IES PCAP-PROTOCOL-IES ::= {
          id-InformationExchangeID
                                          CRITICALITY ignore
                                                                  TYPE InformationExchangeID
                                                                                                         PRESENCE
                                                                                                                      mandatory
                                                                  TYPE Cause
                                                                                                                PRESENCE
   { ID
          id-Cause
                                          CRITICALITY ignore
   mandatory },
   . . .
InformationExchangeFailureIndication-Extensions PCAP-PROTOCOL-EXTENSION ::= {
    -- ERROR INDICATION
__ **********************
ErrorIndication ::= SEQUENCE {
   protocolIEs
                     ProtocolIE-Container
                                              {ErrorIndicationIEs} },
   protocolExtensions ProtocolExtensionContainer { {ErrorIndicationExtensions} } OPTIONAL,
ErrorIndicationIEs PCAP-PROTOCOL-IES ::= {
```

```
ID id-Cause
                                 CRITICALITY ignore TYPE Cause
                                                                            PRESENCE optional } |
   { ID id-CriticalityDiagnostics
                                 CRITICALITY ignore TYPE CriticalityDiagnostics
                                                                            PRESENCE optional },
ErrorIndicationExtensions PCAP-PROTOCOL-EXTENSION ::= {
  *****************
-- POSITION PARAMETER MODIFICATION
  ****************
PositionParameterModification ::= SEQUENCE {
              ProtocolIE-Container
                                          { {PositionParameterModificationIEs} },
   protocolIEs
   protocolExtensions ProtocolExtensionContainer { {PositionParameterModificationExtensions} } OPTIONAL,
PositionParameterModificationIEs PCAP-PROTOCOL-IES ::= {
                CRITICALITY reject TYPE UC-ID
    ID id-UC-id
                                                                            PRESENCE optional } |
   { ID id-UTDOA-Group
                                 CRITICALITY reject TYPE UTDOA-Group
                                                                            PRESENCE optional },
PositionParameterModificationExtensions PCAP-PROTOCOL-EXTENSION ::= {
   { ID id-RRCstateChange
                        CRITICALITY ignore EXTENSION RRCstateChange
                                                                    PRESENCE optional },
__ *********************
-- PRIVATE MESSAGE
PrivateMessage ::= SEQUENCE {
   privateIEs
             PrivateIE-Container {{PrivateMessage-IEs}},
PrivateMessage-IEs PCAP-PRIVATE-IES ::= {
-- ABORT
__ ********************
Abort ::= SEQUENCE {
```

```
{AbortIEs} },
   protocolIEs
                       ProtocolIE-Container
   protocolExtensions ProtocolExtensionContainer { {AbortExtensions} }
                                                                        OPTIONAL.
AbortIEs PCAP-PROTOCOL-IES ::= {
                      CRITICALITY ignore TYPE Cause
                                                         PRESENCE mandatory },
    { ID id-Cause
    . . .
AbortExtensions PCAP-PROTOCOL-EXTENSION ::= {
  POSITION PERIODIC REPORT
        ********************
PositionPeriodicReport ::= SEQUENCE {
   protocolIEs
                          ProtocolIE-Container
                                                      {{PositionPeriodicReport-IEs}},
                                                    {{PositionPeriodicReport-Extensions}}
   protocolExtensions
                          ProtocolExtensionContainer
                                                                                             OPTIONAL,
PositionPeriodicReport-IEs PCAP-PROTOCOL-IES ::= {
     ID id-UE-PositionEstimateInfo
                                          CRITICALITY ignore TYPE UE-PositionEstimateInfo
                                                                                             PRESENCE optional
                                          CRITICALITY ignore TYPE VelocityEstimate
                                                                                             PRESENCE optional
     ID id-VelocityEstimate
                                          CRITICALITY ignore TYPE MeasuredResultsList
     ID id-GPS-MeasuredResultsList
                                                                                             PRESENCE optional
     ID id-CellId-MeasuredResultsSets
                                          CRITICALITY ignore TYPE CellId-MeasuredResultsSets
                                                                                             PRESENCE optional
     ID id-OTDOA-MeasuredResultsSets
                                          CRITICALITY ignore TYPE OTDOA-MeasuredResultsSets
                                                                                             PRESENCE optional
     ID id-Cause
                                          CRITICALITY ignore TYPE Cause
                                                                                             PRESENCE optional
    . . .
PositionPeriodicReport-Extensions PCAP-PROTOCOL-EXTENSION ::= {
    { ID id-GANSS-MeasuredResultsList
                                                 CRITICALITY ignore EXTENSION GANSS-MeasuredResultsList
                                                                                                                                 PRESENCE
optional } |
    { ID id-AdditionalGPSAssistDataRequired
                                                 CRITICALITY ignore EXTENSION Additional GPSAssist Data Required
                                                                                                                          PRESENCE optional }
                                                                                                                          PRESENCE optional }
     ID id-AdditionalGanssAssistDataRequired
                                                 CRITICALITY ignore EXTENSION AdditionalGanssAssistDataRequired
     ID id-OTDOA-ReferenceCellInfo
                                                 CRITICALITY reject EXTENSION OTDOA-ReferenceCellInfoSAS-centric
                                                                                                                   PRESENCE optional } |
                                                                                                                          PRESENCE optional },
    { ID id-CellId-IRATMeasuredResultsSets
                                                 CRITICALITY ignore EXTENSION CellId-IRATMeasuredResultsSets
-- POSITION PERIODIC RESULT
```

```
__ ******************
PositionPeriodicResult ::= SEQUENCE {
   protocolIEs ProtocolIE-Container
                                           {{PositionPeriodicResult-IEs}},
   protocolExtensions ProtocolExtensionContainer {{PositionPeriodicResult-Extensions}}
                                                                              OPTIONAL.
PositionPeriodicResult-IEs PCAP-PROTOCOL-IES ::= {
                                     CRITICALITY ignore TYPE UE-PositionEstimate
    ID id-UE-PositionEstimate
                                                                                         PRESENCE optional
    ID id-VelocityEstimate
                                     CRITICALITY ignore TYPE VelocityEstimate
                                                                                         PRESENCE optional
    ID id-PositionData
                                     CRITICALITY ignore TYPE PositionData
                                                                                         PRESENCE optional
    ID id-AccuracyFulfilmentIndicator
                                     CRITICALITY ignore TYPE AccuracyFulfilmentIndicator
                                                                                         PRESENCE optional }
   { ID id-Cause
                                     CRITICALITY ignore TYPE Cause
                                                                                         PRESENCE optional },
PositionPeriodicResult-Extensions PCAP-PROTOCOL-EXTENSION ::= {
   -- POSITION PERIODIC TERMINATION
     ----
PositionPeriodicTermination ::= SEQUENCE {
               ProtocolIE-Container
                                            {{PositionPeriodicTermination-IEs}},
   protocolExtensions ProtocolExtensionContainer {{PositionPeriodicTermination-Extensions}} OPTIONAL,
PositionPeriodicTermination-IEs PCAP-PROTOCOL-IES ::= {
                                CRITICALITY ignore TYPE PeriodicTerminationCause
   { ID id-PeriodicTerminationCause
                                                                                         PRESENCE optional },
   . . .
PositionPeriodicTermination-Extensions PCAP-PROTOCOL-EXTENSION ::= {
END
```

9.3.4 Information Element Definitions

```
PCAP-IEs {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
umts-Access (20) modules (3) pcap(4) version1 (1) pcap-IEs (2) }
DEFINITIONS AUTOMATIC TAGS ::=
BEGIN
IMPORTS
    maxNrOfErrors,
    maxSat,
    maxSatAlmanac,
    maxNrOfLevels,
    maxNrOfMeasNCell,
    maxNrOfMeasurements,
    maxNrOfPoints,
    maxNrOfExpInfo,
    maxNrOfSets,
    maxRateMatching,
    maxNrOfTFs,
    maxTTI-count,
    maxTS-1,
    maxCCTrCH,
    maxTF,
    maxTFC,
    maxPRACH,
    maxTrCH,
    maxTGPS,
    maxNoOfMeasurements,
    maxCellMeas,
    maxNrOfEDPCCH-PO-QUANTSTEPs,
    maxNrOfRefETFCI-PO-QUANTSTEPs,
    maxNrOfRefETFCIs,
    maxSet,
    maxGANSS,
    maxGANSSSat,
    maxGANSSSet,
    maxSgnType,
    maxGANSSSatAlmanac,
    maxGANSSClockMod,
    maxGANSS-1,
    maxNrOfIRATMeasurements,
    maxReportedGERANCells,
    id-UTRAN-GPSReferenceTime,
    id-UTRAN-GPSReferenceTimeResult,
    id-GPS-UTRAN-TRU,
    id-UTRAN-GPS-DriftRate,
    id-OTDOA-AddMeasuredResultsInfo,
    id-GPS-ReferenceLocation,
    id-rxTimingDeviation768Info,
    id-rxTimingDeviation384extInfo,
```

```
id-MeasurementValidity,
id-ExtendedRoundTripTime,
id-roundTripTimeInfoWithType1,
id-AddMeasurementInfo,
id-Extended-RNC-ID.
id-GANSS-CommonAssistanceData,
id-GANSS-GenericAssistanceDataList.
id-GANSS-PositioningDataSet,
id-GNSS-PositioningMethod,
id-NetworkAssistedGANSSSuport,
id-TUTRANGANSSMeasurementValueInfo,
id-angleOfArrivalLCR,
id-extendedTimingAdvanceLCR,
id-additionalMeasurementInforLCR,
id-timingAdvanceLCR-R7,
id-rxTimingDeviationLCR,
id-GPSReferenceTimeUncertainty,
id-GANSS-AddIonoModelReg,
id-GANSS-EarthOrientParaReg,
id-GANSS-Additional-Ionospheric-Model,
id-GANSS-Earth-Orientation-Parameters.
id-GANSS-Additional-Time-Models,
id-GANSS-Additional-Navigation-Models,
id-GANSS-Additional-UTC-Models,
id-GANSS-Auxiliary-Information,
id-GANSS-SBAS-ID,
id-GANSS-SBAS-IDs,
id-GANSS-Signal-IDs,
id-GANSS-alm-keplerianNAVAlmanac,
id-GANSS-alm-keplerianReducedAlmanac,
id-GANSS-alm-keplerianMidiAlmanac,
id-GANSS-alm-keplerianGLONASS,
id-GANSS-alm-ecefSBASAlmanac,
id-UTRAN-GANSSReferenceTimeResult,
id-GANSS-Reference-Time-Only,
id-GANSS-AddADchoices,
id-supportGANSSNonNativeADchoices,
id-PositionDataUEbased,
id-ganssCodePhaseAmbiguityExt,
id-ganssIntegerCodePhaseExt,
id-GANSScarrierPhaseRequested,
id-GANSSMultiFreqMeasRequested,
id-ganssReq-AddIonosphericModel,
id-ganssReg-EarthOrientPara,
id-ganssAddNavigationModel-reg.
id-ganssAddUTCModel-reg,
id-ganssAuxInfo-reg,
id-GANSS-AlmanacModelChoice,
id-DGNSS-ValidityPeriod,
id-AzimuthAndElevationLSB,
id-completeAlmanacProvided,
id-GPS-Week-Cycle,
id-GANSS-Day-Cycle,
id-ganss-Delta-T,
```

id-requestedCellIDGERANMeasurements

```
FROM PCAP-Constants
   Criticality,
   ProcedureCode,
   ProtocolIE-ID,
   TransactionID,
   TriggeringMessage
FROM PCAP-CommonDataTypes
   ProtocolExtensionContainer{},
   ProtocolIE-Single-Container{},
   PCAP-PROTOCOL-EXTENSION,
   PCAP-PROTOCOL-IES
FROM PCAP-Containers;
__ *********************
-- Accuracy Fulfilment Indicator
__ ********************
AccuracyFulfilmentIndicator ::= ENUMERATED{
   requested-Accuracy-Fulfilled,
   requested-Accuracy-Not-Fulfilled,
    *************
-- Additional Method Type
__ *********************
AdditionalMethodType ::= ENUMERATED {
   ue-assisted,
   ue-based,
   ue-based-preferred-but-ue-assisted-allowed,
   ue-assisted-preferred-but-ue-based-allowed,
-- Almanac and Satellite Health SIB
__ ********************
```

```
AlmanacAndSatelliteHealthSIB ::=
                                   SEQUENCE
   gpsAlmanacAndSatelliteHealth
                                      GPS-AlmanacAndSatelliteHealth.
   satMask
                                      BIT STRING (SIZE (1..32)),
   lshTOW
                                      BIT STRING (SIZE (8)),
                                      ProtocolExtensionContainer { { AlmanacAndSatelliteHealthSIB-ExtIEs } } OPTIONAL,
   iE-Extensions
AlmanacAndSatelliteHealthSIB-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
  *****************
-- Cause IE
__ **********************
Cause ::= CHOICE {
   radioNetwork
                           CauseRadioNetwork,
                           CauseTransport,
   transport
                           CauseProtocol,
   protocol
   misc
                           CauseMisc,
    . . .
CauseRadioNetwork ::= ENUMERATED {
   invalid-reference-information,
    information-temporarily-not-available,
    information-provision-not-supported-for-the-object,
    position-calculation-error-invalid-GPS-measured-results,
    . . . ,
   position-calculation-error-invalid-CellID-measured-results,
   position-calculation-error-invalid-OTDOA-measured-results,
   position-calculation-error-AGPS-positioning-method-not-supported,
   position-calculation-error-CellID-positioning-method-not-supported,
    position-calculation-error-OTDOA-positioning-method-not-supported,
    initial-UE-position-estimate-missing,
    position-caclulation-error-invalid-UTDOA-measured-results,
    position-calculation-error-UTDOA-positioning-method-not-supported,
    position-calculation-error-UTDOA-not-supported-UTRAN-cell,
    positioning-method-not-supported,
    loss-of-contact-with-UE,
    sAS-unable-to-perform-UTDOA-positioning-within-response-time,
    location-measurement-failure,
    ue-positioning-error-Not-enough-OTDOA-cells,
    ue-positioning-error-Not-enough-GPS-Satellites,
    ue-positioning-error-Reference-Cell-not-serving-cell,
    ue-positioning-error-Not-Accomplished-GPS-Timing-of-Cell-Frames,
    ue-positioning-error-Undefined-Error,
    position-calculation-error-invalid-Galileo-measured-results,
    position-calculation-error-AGalileo-positioning-method-not-supported,
    ue-positioning-error-Not-enough-Galileo-Satellites,
```

```
ue-positioning-error-Not-Accomplished-Galileo-Timing-of-Cell-Frames,
    ue-positioning-error-Assistance-Data-missing,
    position-calculation-error-invalid-GLONASS-measured-results,
    position-calculation-error-invalid-GANSS-measured-results,
    position-calculation-error-AGANSS-positioning-method-not-supported,
   ue-positioning-error-Not-enough-GANSS-Satellites,
    ue-positioning-error-Not-Accomplished-GANSS-Timing-of-Cell-Frames
CauseTransport ::= ENUMERATED {
    transport-resource-unavailable,
    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,
CauseMisc ::= ENUMERATED {
   processing-overload,
   hardware-failure,
   o-and-m-intervention,
   unspecified,
    . . .
    *************
  Cell Id Measured Results Sets
         ****************
CellId-MeasuredResultsSets ::=
                                      SEQUENCE (SIZE (1..maxNrOfMeasurements)) OF
    CellId-MeasuredResultsInfoList
CellId-MeasuredResultsInfoList ::=
                                      SEOUENCE (SIZE (1..maxNrOfMeasNCell)) OF
    CellId-MeasuredResultsInfo
CellId-MeasuredResultsInfo ::=
                                      SEQUENCE {
   11C-TD
                                      UC-ID,
   uTRANAccessPointPositionAltitude
                                      UTRANAccessPointPositionAltitude,
   ue-PositionEstimate
                                      UE-PositionEstimate
                                                                 OPTIONAL,
    roundTripTimeInfo
                                      RoundTripTimeInfo
                                                                 OPTIONAL, -- FDD only
    rxTimingDeviationInfo
                                      RxTimingDeviationInfo
                                                                 OPTIONAL, -- 3.84Mcps TDD only
    rxTimingDeviationLCRInfo
                                      RxTimingDeviationLCRInfo
                                                                 OPTIONAL, -- 1.28Mcps TDD only
```

```
pathloss
                                                            OPTIONAL,
   iE-Extensions
                                   OPTIONAL,
CellId-MeasuredResultsInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    { ID id-rxTimingDeviation768Info
                                                                                                    PRESENCE optional } | -- 7.68Mcps
                                 CRITICALITY reject EXTENSION RxTimingDeviation768Info
TDD only
    ID id-rxTimingDeviation384extInfo CRITICALITY reject EXTENSION RxTimingDeviation384extInfo
                                                                                                    PRESENCE optional } | -- 3.84Mcps
TDD only
     ID id-roundTripTimeInfoWithType1 CRITICALITY ignore EXTENSION RoundTripTimeInfoWithType1
                                                                                                    PRESENCE optional } | -- FDD only
     ID id-AddMeasurementInfo
                                   CRITICALITY ignore EXTENSION AddMeasurementInfo
                                                                                                    PRESENCE optional } |
    ID id-angleOfArrivalLCR
                                   CRITICALITY ignore EXTENSION AngleOfArrivalLCR
                                                                                                    PRESENCE optional },
RoundTripTimeInfo ::=
                                   SEQUENCE {
   ue-RxTxTimeDifferenceType2
                                   UE-RxTxTimeDifferenceType2,
   ue-PositioningMeasQuality
                                   UE-PositioningMeasOuality,
   roundTripTime
                                   RoundTripTime,
   iE-Extensions
                                   ProtocolExtensionContainer { { RoundTripTimeInfo-ExtIEs } }
                                                                                                    OPTIONAL,
RoundTripTimeInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
   PRESENCE optional }, -- FDD only
   . . .
                                   SEQUENCE {
RoundTripTimeInfoWithType1 ::=
   ue-RxTxTimeDifferenceType1
                                   UE-RxTxTimeDifferenceType1,
   roundTripTime
                                   RoundTripTime,
   extendedRoundTripTime
                                   ExtendedRoundTripTime
                                                            OPTIONAL, -- FDD only
                                   iE-Extensions
                                                                                                           OPTIONAL,
RoundTripTimeInfoWithType1-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
UE-RxTxTimeDifferenceType2 ::=
                                   INTEGER (0..8191)
UE-RxTxTimeDifferenceType1 ::=
                                   INTEGER (768..1280)
UE-PositioningMeasQuality ::=
                                   SEQUENCE {
   stdResolution
                                   BIT STRING (SIZE (2)),
   numberOfMeasurements
                                   BIT STRING (SIZE (3)),
   stdOfMeasurements
                                   BIT STRING (SIZE (5)),
                                   ProtocolExtensionContainer { { UE-PositioningMeasQuality-ExtIEs } }
   iE-Extensions
                                                                                                           OPTIONAL,
UE-PositioningMeasQuality-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
```

```
RoundTripTime ::=
                               INTEGER (0..32766)
-- Actual value RoundTripTime = IE value * 0.0625 + 876
ExtendedRoundTripTime ::=
                                       INTEGER (32767..103041)
-- Actual value RoundTripTime = IE value * 0.0625 + 876
UTRANAccessPointPositionAltitude ::= SEQUENCE {
   geographicalCoordinates
                                 GeographicalCoordinates,
   ga-AltitudeAndDirection
                                 GA-AltitudeAndDirection
   OPTIONAL,
   iE-Extensions
                                 ProtocolExtensionContainer { { UTRANAccessPointPositionAltitude-ExtIEs } }
                                                                                                          OPTIONAL,
UTRANAccessPointPositionAltitude-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
                                 SEQUENCE {
RxTimingDeviationInfo ::=
   rxTimingDeviation
                                 RxTimingDeviation,
   timingAdvance
                                 TimingAdvance,
   iE-Extensions
                                 ProtocolExtensionContainer { { RxTimingDeviationInfo-ExtIEs } }
                                                                                             OPTIONAL,
RxTimingDeviationInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
RxTimingDeviationLCRInfo ::=
                                 SEQUENCE {
   rxTimingDeviationLCR
                                 RxTimingDeviationLCR,
   timingAdvanceLCR
                                 TimingAdvanceLCR,
   -- The content of this IE shall be ignored if the id-extendedTiminqAdvanceLCR IE is present.
                                 OPTIONAL,
RxTimingDeviationLCRInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
PRESENCE optional }, -- 1.28Mcps
TDD only
ExtendedTimingAdvanceLCR ::=
                                 INTEGER (2048..8191)
RxTimingDeviation768Info ::=
                                 SEQUENCE {
   rxTimingDeviation768
                                 RxTimingDeviation768,
   timingAdvance768
                                 TimingAdvance768,
   iE-Extensions
                                 OPTIONAL,
```

```
RxTimingDeviation768Info-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
RxTimingDeviation384extInfo ::=
                                        SEQUENCE {
    rxTimingDeviation384ext
                                        RxTimingDeviation384ext,
    timingAdvance384ext
                                        TimingAdvance384ext,
    iE-Extensions
                                        ProtocolExtensionContainer { { RxTimingDeviation384extInfo-ExtIEs } }
                                                                                                                         OPTIONAL,
RxTimingDeviation384extInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
AddMeasurementInfo ::=
                                        SEQUENCE +
    cpich-RSCP
                    CPICH-RSCP
                                                                                         OPTIONAL,
                                                                                         OPTIONAL,
    cpich-EcNo
                    CPICH-EcNo
    iE-Extensions ProtocolExtensionContainer { { AddMeasurementInfo-ExtIEs } }
                                                                                         OPTIONAL,
AddMeasurementInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
                                        SEQUENCE {
AngleOfArrivalLCR ::=
    aOA-LCR
                                        AOA-LCR,
    aOA-LCR-Accuracy-Class
                                        AOA-LCR-Accuracy-Class,
    iE-Extensions
                                        ProtocolExtensionContainer { { AngleOfArrivalLCR-ExtIEs } }
                                                                                                                  OPTIONAL,
    . . .
AngleOfArrivalLCR-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
RxTimingDeviation ::=
                                        INTEGER (0..8191)
RxTimingDeviationLCR ::=
                                        INTEGER (0..511)
RxTimingDeviation768 ::=
                                        INTEGER (0..65535)
RxTimingDeviation384ext ::=
                                        INTEGER (0..32767)
TimingAdvance ::=
                                        INTEGER (0..63)
TimingAdvanceLCR ::=
                                        INTEGER (0..2047)
TimingAdvance768 ::=
                                        INTEGER (0..511)
TimingAdvance384ext ::=
                                        INTEGER (0..255)
```

```
Pathloss ::=
                                       INTEGER (46..158)
-- Unit: dB; as defined in the Cell measured results IE of TS 25.331 [4]
CPICH-EcNo ::=
                                       INTEGER (0..49)
-- According to CPICH Ec/No in TS 25.133 [13]
                                       INTEGER (-5..91)
-- According to CPICH RSCP in TS 25.133 [13]
AOA-LCR ::=
                                       INTEGER (0..719) -- According to mapping in TS 25.123 [14]
AOA-LCR-Accuracy-Class ::=
                                       ENUMERATED {
                                           a,b,c,d,e,f,g,h, ...}
__ ********************
-- Cell Id IRAT Measured Results Sets
CellId-IRATMeasuredResultsSets ::=
                                       SEQUENCE (SIZE (1..maxNrOfIRATMeasurements)) OF
    CellId-IRATMeasuredResultsInfoList
CellId-IRATMeasuredResultsInfoList ::= SEQUENCE {
    gERAN-MeasuredResultsInfoList
                                       GERAN-MeasuredResultsInfoList
   OPTIONAL,
   iE-Extenstions
                                       ProtocolExtensionContainer { { CellId-IRATMeasuredResultsInfoListExtIEs }}
                                                                                                                      OPTIONAL,
CellId-IRATMeasuredResultsInfoListExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GERAN-MeasuredResultsInfoList ::=
                                       SEQUENCE (SIZE (1..maxReportedGERANCells)) OF
    GERAN-MeasuredResultsInfo
GERAN-MeasuredResultsInfo ::=
                                       SEQUENCE {
    gERANCellID
                                       GERANCellGlobalID
                                                                                                                      OPTIONAL,
                                       GERANPhysicalCellID,
    gERANPhysicalCellID
    qSM-RSSI
                                       GSM-RSSI,
    iE-Extenstions
                                       ProtocolExtensionContainer { GERAN-MeasuredResultsInfo-ExtIEs }} OPTIONAL,
GERAN-MeasuredResultsInfo-ExtIEs
                                       PCAP-PROTOCOL-EXTENSION ::= {
GERANCellGlobalID ::=
                                       SEQUENCE {
    plmn-Identity
                                       PLMN-Identity,
                                                              --As defined in TS 23.003
    locationAreaCode
                                       BIT STRING (SIZE (16)),
    cellIdentity
                                       BIT STRING (SIZE (16)),
```

```
iE-Extenstions
                                                                                       OPTIONAL,
GERANCellGlobalID-ExtIEs
                             PCAP-PROTOCOL-EXTENSION ::= {
PLMN-Identity ::=
                             OCTET STRING (SIZE (3))
GSM-RSSI ::=
                             INTEGER (0..63)
GERANPhysicalCellID ::=
                             SEQUENCE {
  bsic
                             GSM-BSIC,
  arfcn
                             GSM-BCCH-ARFCN
GSM-BSIC ::=
                             SEQUENCE {
                            BIT STRING (SIZE (3)),
  networkColourCode
  baseStationColourCode
                            BIT STRING (SIZE (3))
GSM-BCCH-ARFCN ::=
                             INTEGER (0..1023)
__ ********************
-- Cell-ID Positioning (Position Activation Request Message)
  CellIDPositioning ::= SEQUENCE {
  requestedCellIDMeasurements
                          RequestedCellIDMeasurements,
  iE-Extensions
                          ProtocolExtensionContainer { { CellIDPositioning-ExtIEs } } OPTIONAL,
CellIDPositioning-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
   . . .
RequestedCellIDMeasurements ::= CHOICE {
  fdd
        SEQUENCE {
           roundTripTimeInfoWanted
                                     BOOLEAN,
           pathlossWanted
                                     BOOLEAN,
           roundTripTimeInfoWithType1Wanted
                                     BOOLEAN,
           cpichRSCPWanted
                                     BOOLEAN,
           cpicEcNoWanted
                                     BOOLEAN,
           iE-Extensions
                                     tdd
        SEQUENCE
           rxTimingDeviationInfoWanted
                                      BOOLEAN,
```

```
pathlossWanted
                                             BOOLEAN,
              rxTimingDeviationLCRInfoWanted
                                             BOOLEAN,
              rxTimingDeviation768InfoWanted
                                             BOOLEAN.
              rxTimingDeviation384extInfoWanted
                                             BOOLEAN,
              angleOfArrivalLCRWanted
                                             BOOLEAN,
              timingAdvanceLCRWanted
                                             BOOLEAN,
              iE-Extensions
                                             ProtocolExtensionContainer { { RequestedCellIDMeasurementsTDD-ExtIEs } } OPTIONAL,
              },
   . . .
RequestedCellIDMeasurementsFDD-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
RequestedCellIDMeasurementsTDD-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
RequestedCellIDGERANMeasurements ::= SEQUENCE {
   rSSIMeasurementsWanted BOOLEAN,
                        ProtocolExtensionContainer { { RequestedCellIDGERANMeasurements-ExtIEs} }
   iE-Extensions
                                                                                            OPTIONAL,
   . . .
RequestedCellIDGERANMeasurements-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
  *****************
-- Client Type
  *****************
ClientType ::= ENUMERATED {
   emergency-services,
   value-added-services,
   plmn-operator-services,
   lawful-intercept-services,
   plmn-operator-broadcast-services,
   plmn-operator-oam,
   plmn-operator-anonymous-statistics,
   plmn-operator-target-ms-service-support,
    ****************
-- CriticalityDiagnostics
__ **********************
```

```
CriticalityDiagnostics ::= SEQUENCE {
   procedureCode
                              ProcedureCode
                                                                                          OPTIONAL.
   triggeringMessage
                              TriggeringMessage
                                                                                          OPTIONAL,
   procedureCriticality
                              Criticality
                                                                                          OPTIONAL,
   transactionID
                              TransactionID
                                                                                          OPTIONAL,
   iEsCriticalityDiagnostics
                             CriticalityDiagnostics-IE-List
                                                                                          OPTIONAL,
                              ProtocolExtensionContainer { (CriticalityDiagnostics-ExtIEs) }
   iE-Extensions
                                                                                          OPTIONAL,
CriticalityDiagnostics-IE-List ::= SEQUENCE (SIZE (1..maxNrOfErrors)) OF
   SEQUENCE {
       iECriticality
                              Criticality,
       iE-ID
                              ProtocolIE-ID,
       repetitionNumber
                              CriticalityDiagnosticsRepetition
                                                                                                         OPTIONAL,
                              MessageStructure
       messageStructure
                                                                                                         OPTIONAL,
       typeOfError
                              TypeOfError,
                              ProtocolExtensionContainer { {CriticalityDiagnostics-IE-List-ExtIEs} }
       iE-Extensions
CriticalityDiagnostics-IE-List-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
CriticalityDiagnostics-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
CriticalityDiagnosticsRepetition ::= INTEGER (0..255)
TypeOfError ::= ENUMERATED {
   not-understood,
   missing,
    ******************
-- DGPSCorrections
DGPSCorrections ::=
                                  SEOUENCE ·
   qps-TOW-sec
                                     INTEGER (0..604799),
   statusHealth
                                     DiffCorrectionStatus,
                                     DGPS-CorrectionSatInfoList
   dgps-CorrectionSatInfoList
                                                                                                  OPTIONAL,
   -- not included if satelliteHealth is equal to noData or invalidData
   iE-Extensions
                                     OPTIONAL,
```

```
DGPSCorrections-ExtlEs PCAP-PROTOCOL-EXTENSION ::= {
DiffCorrectionStatus ::=
                                  ENUMERATED {
                                     udre-1-0, udre-0-75, udre-0-5, udre-0-3,
                                     udre-0-2, udre-0-1, noData, invalidData }
DGPS-CorrectionSatInfoList ::=
                                  SEQUENCE (SIZE (1..maxSat)) OF
                                     DGPS-CorrectionSatInfo
DGPS-CorrectionSatInfo ::=
                                  SEQUENCE {
    satID
                                     INTEGER (0..63),
    iode
                                     INTEGER (0..255),
   udre
                                     UDRE,
   prc
                                     PRC,
                                     RRC,
   rrc
    iE-Extensions
                                     ProtocolExtensionContainer { { DGPS-CorrectionSatInfo-ExtIEs } }
                                                                                                          OPTIONAL,
DGPS-CorrectionSatInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    {ID id-DGNSS-ValidityPeriod CRITICALITY ignore EXTENSION DGNSS-ValidityPeriod PRESENCE optional},
DGNSS-ValidityPeriod ::=
                                  SEQUENCE {
   udreGrowthRate
                                     UDREGrowthRate,
   udreValidityTime
                                     UDREValidityTime,
   iE-Extensions
                                     OPTIONAL,
DGNSS-ValidityPeriod-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
UDRE ::=
                                  ENUMERATED {
                                     lessThan1,
                                     between1-and-4,
                                     between4-and-8,
                                     over8 }
                                  ENUMERATED {
UDREGrowthRate ::=
                                     growth-1-point-5,
                                     growth-2,
                                     growth-4,
                                     growth-6,
                                     growth-8,
                                     growth-10,
                                     growth-12,
```

```
growth-16
UDREValidityTime
                                    ENUMERATED {
                                       val-20sec,
                                       val-40sec,
                                       val-80sec,
                                       val-160sec,
                                       val-320sec,
                                       val-640sec,
                                       val-1280sec,
                                       val-2560sec
PRC ::=
                                INTEGER (-2047..2047)
RRC ::=
                                INTEGER (-127..127)
  *****************
-- IMEI, IMSI
-- IMEI
IMEI ::=
          OCTET STRING (SIZE (3..8))
-- IMSI
IMSI ::=
          OCTET STRING (SIZE (8))
    ******************
-- UE-PositionEstimate (i.e., Geographical Area)
__ *********************
-- UE-PositionEstimate is based on Geographical Area Description in 23.032
UE-PositionEstimate ::= CHOICE {
   point
                                              GA-Point,
   pointWithUnCertainty
                                              GA-PointWithUnCertainty,
   polygon
                                              GA-Polygon,
   pointWithUncertaintyEllipse
                                              GA-PointWithUnCertaintyEllipse,
   pointWithAltitude
                                              GA-PointWithAltitude,
   pointWithAltitudeAndUncertaintyEllipsoid
                                              GA-PointWithAltitudeAndUncertaintyEllipsoid,
   ellipsoidArc
                                              GA-EllipsoidArc,
GeographicalCoordinates ::= SEQUENCE {
   latitudeSign
                        ENUMERATED {north, south},
   latitude
                        INTEGER (0..8388607),
   longitude
                        INTEGER (-8388608..8388607),
```

```
ProtocolExtensionContainer { {GeographicalCoordinates-ExtIEs} } OPTIONAL,
    iE-Extensions
GeographicalCoordinates-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GA-AltitudeAndDirection ::= SEQUENCE {
    directionOfAltitude
                           ENUMERATED {height, depth},
    altitude
                           INTEGER (0..32767),
    . . .
GA-EllipsoidArc ::= SEQUENCE {
    geographicalCoordinates
                                GeographicalCoordinates,
    innerRadius
                                INTEGER (0..65535),
    uncertaintyRadius
                                INTEGER (0..127),
    offsetAngle
                                INTEGER (0..179),
    includedAngle
                                INTEGER (0..179),
    confidence
                                INTEGER (0..100),
                                ProtocolExtensionContainer { GA-EllipsoidArc-ExtIEs} } OPTIONAL,
    iE-Extensions
GA-EllipsoidArc-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GA-Point ::= SEQUENCE {
    geographicalCoordinates
                                GeographicalCoordinates,
                                ProtocolExtensionContainer { GA-Point-ExtIEs} } OPTIONAL,
    iE-Extensions
    . . .
GA-Point-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GA-PointWithAltitude ::= SEQUENCE {
    geographicalCoordinates
                                GeographicalCoordinates,
    altitudeAndDirection
                                GA-AltitudeAndDirection,
    iE-Extensions
                                ProtocolExtensionContainer { GA-PointWithAltitude-ExtIEs} } OPTIONAL,
GA-PointWithAltitude-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GA-PointWithAltitudeAndUncertaintyEllipsoid ::= SEQUENCE {
                                GeographicalCoordinates,
    geographicalCoordinates
    altitudeAndDirection
                                GA-AltitudeAndDirection,
    uncertaintyEllipse
                                GA-UncertaintyEllipse,
```

```
uncertaintyAltitude
                               INTEGER (0..127),
   confidence
                               INTEGER (0..100),
   iE-Extensions
                               ProtocolExtensionContainer { GA-PointWithAltitudeAndUncertaintyEllipsoid-ExtIEs} } OPTIONAL,
GA-PointWithAltitudeAndUncertaintyEllipsoid-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GA-PointWithUnCertainty ::=SEQUENCE {
                               GeographicalCoordinates,
   geographicalCoordinates
   uncertaintyCode
                               INTEGER (0..127),
   iE-Extensions
                               ProtocolExtensionContainer { {GA-PointWithUnCertainty-ExtIEs} } OPTIONAL,
   . . . }
GA-PointWithUnCertainty-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GA-PointWithUnCertaintyEllipse ::= SEQUENCE
   geographicalCoordinates
                              GeographicalCoordinates,
   uncertaintyEllipse
                               GA-UncertaintyEllipse,
                               INTEGER (0..100),
   confidence
                               ProtocolExtensionContainer { GA-PointWithUnCertaintyEllipse-ExtIEs} } OPTIONAL,
   iE-Extensions
GA-PointWithUnCertaintyEllipse-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GA-Polygon ::= SEQUENCE (SIZE (1..maxNrOfPoints)) OF
   SEQUENCE {
                                   GeographicalCoordinates,
       geographicalCoordinates
                                   ProtocolExtensionContainer { {GA-Polygon-ExtIEs} } OPTIONAL,
       iE-Extensions
GA-Polygon-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GA-UncertaintyEllipse ::= SEQUENCE {
   uncertaintySemi-major
                               INTEGER (0..127),
   uncertaintySemi-minor
                               INTEGER (0..127),
   orientationOfMajorAxis
                              INTEGER (0..89),
     ****************
-- UE-PositionEstimateInfo
```

__ *******************

```
UE-PositionEstimateInfo ::= SEOUENCE {
   referenceTimeChoice
                             ReferenceTimeChoice,
   ue-positionEstimate
                             UE-PositionEstimate,
                             ProtocolExtensionContainer { { UE-PositionEstimateInfo-ExtIEs } } OPTIONAL,
   iE-Extensions
UE-PositionEstimateInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    PRESENCE optional } |
                                     CRITICALITY ignore EXTENSION PositionDataUEbased
                                                                                                   PRESENCE optional },
   {ID id-PositionDataUEbased
   . . .
ReferenceTimeChoice ::= CHOICE {
   utran-GPSReferenceTimeResult
                                     UTRAN-GPSReferenceTimeResult,
   gps-ReferenceTimeOnly
                                     INTEGER (0..604799999, ...),
   cell-Timing
                                     Cell-Timing,
   extension-ReferenceTimeChoice
                                     Extension-ReferenceTimeChoice
Extension-ReferenceTimeChoice ::= ProtocolIE-Single-Container {{ Extension-ReferenceTimeChoice-IE }}
Extension-ReferenceTimeChoice-IE PCAP-PROTOCOL-IES ::= {
    { ID id-UTRAN-GANSSReferenceTimeResult
                                                CRITICALITY
                                                                                  UTRAN-GANSSReferenceTimeResult
                                                                ignore
                                                                           TYPE
                                                                                                                        PRESENCE
   mandatory}|
   { ID id-GANSS-Reference-Time-Only
                                                                                  GANSS-Reference-Time-Only
                                                 CRITICALITY
                                                                ignore
                                                                           TYPE
                                                                                                                               PRESENCE
   mandatory}
Cell-Timing ::= SEQUENCE {
   sfn
                      INTEGER (0..4095),
   iE-Extensions ProtocolExtensionContainer { { Cell-Timing-ExtIEs } } OPTIONAL,
Cell-Timing-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-Reference-Time-Only ::= SEQUENCE {
   ganssTODmsec
                  INTEGER (0..3599999),
   qanssTimeID
                  GANSSID
                                                                                   OPTIONAL,
   iE-Extensions ProtocolExtensionContainer { { GANSS-Reference-Time-Only-ExtIEs } } OPTIONAL,
GANSS-Reference-Time-Only-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
```

```
PositionDataUEbased ::= SEQUENCE {
   positionData BIT STRING (SIZE(16)),
   iE-Extensions ProtocolExtensionContainer { { PositionDataUEbased-ExtIEs } }
PositionDataUEbased-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
  ***************
-- Position Data
__ *******************
PositionData ::= SEQUENCE {
   positioningDataDiscriminator
                                    PositioningDataDiscriminator,
   positioningDataSet
                                    PositioningDataSet
                                                                                        OPTIONAL,
-- This IE shall be present if the PositioningDataDiscriminator IE is set to the value "0000" --
                                   ProtocolExtensionContainer { {PositionData-ExtIEs} }
   iE-Extensions
                                                                                        OPTIONAL,
PositionData-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
   { ID id-GANSS-PositioningDataSet
                                           CRITICALITY ignore EXTENSION GANSS-PositioningDataSet
                                                                                                                   PRESENCE optional },
GANSS-PositioningDataSet ::= SEQUENCE(SIZE(1..maxGANSSSet)) OF GANSS-PositioningMethodAndUsage
GANSS-PositioningMethodAndUsage ::= OCTET STRING (SIZE(1))
PositioningDataDiscriminator ::= BIT STRING (SIZE(4))
PositioningDataSet ::= SEQUENCE(SIZE(1..maxSet)) OF PositioningMethodAndUsage
PositioningMethodAndUsage ::= OCTET STRING (SIZE(1))
__ ********************
-- GPS-AcquisitionAssistance:
  ******************
GPS-AcquisitionAssistance ::= SEQUENCE {
   qps-TOW-1msec
                                   INTEGER (0..604799999),
   satelliteInformationList
                                   AcquisitionSatInfoList,
   iE-Extensions
                                    ProtocolExtensionContainer { GPS-AcquisitionAssistance-ExtIEs } }
                                                                                                     OPTIONAL,
```

```
GPS-AcquisitionAssistance-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    {ID id-UTRAN-GPSReferenceTime
                                                                                                           PRESENCE optional}
                                        CRITICALITY ignore EXTENSION
                                                                         UTRAN-GPSReferenceTime
    {ID id-GPSReferenceTimeUncertainty CRITICALITY ignore EXTENSION
                                                                         GPSReferenceTimeUncertainty
                                                                                                           PRESENCE optional } ,
    . . .
AcquisitionSatInfoList ::=
                                    SEQUENCE (SIZE (1..maxSat)) OF
                                        AcquisitionSatInfo
AcquisitionSatInfo ::=
                                    SEOUENCE {
    satID
                                        INTEGER (0..63),
    doppler0thOrder
                                        INTEGER (-2048..2047),
    extraDopplerInfo
                                        ExtraDopplerInfo
                                                                                                                  OPTIONAL,
    codePhase
                                        INTEGER (0..1022),
    integerCodePhase
                                        INTEGER (0..19),
    gps-BitNumber
                                        INTEGER (0..3),
    codePhaseSearchWindow
                                        CodePhaseSearchWindow,
    azimuthAndElevation
                                        AzimuthAndElevation
                                                                                                                  OPTIONAL,
    iE-Extensions
                                        ProtocolExtensionContainer { { AcquisitionSatInfo-ExtIEs } }
                                                                                                                  OPTIONAL,
AcquisitionSatInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    . . .
ExtraDopplerInfo ::=
                                    SEOUENCE {
    doppler1stOrder
                                        INTEGER (-42..21),
    dopplerUncertainty
                                        DopplerUncertainty,
    iE-Extensions
                                        ProtocolExtensionContainer { { ExtraDopplerInfo-ExtIEs } }
                                                                                                           OPTIONAL,
ExtraDopplerInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    . . .
DopplerUncertainty ::=
                                     ENUMERATED {
                                        hz12-5, hz25, hz50, hz100, hz200, ...}
CodePhaseSearchWindow ::=
                                    ENUMERATED {
                                        w1023, w1, w2, w3, w4, w6, w8,
                                        w12, w16, w24, w32, w48, w64,
                                        w96, w128, w192 }
AzimuthAndElevation ::=
                                    SEQUENCE {
    azimuth
                                        INTEGER (0..31),
    elevation
                                        INTEGER (0..7),
```

```
ProtocolExtensionContainer { { AzimuthAndElevation-ExtIEs } }
   iE-Extensions
                                                                                                 OPTIONAL,
AzimuthAndElevation-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    {ID id-AzimuthAndElevationLSB
                                    CRITICALITY ignore EXTENSION AzimuthAndElevationLSB PRESENCE optional },
AzimuthAndElevationLSB ::=
                                 SEQUENCE {
   azimuthLSB
                                    INTEGER (0..15),
   elevationLSB
                                     INTEGER (0..15),
                                     ProtocolExtensionContainer { { AzimuthAndElevationLSB-ExtIEs } } OPTIONAL,
   iE-Extensions
AzimuthAndElevationLSB-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
__ ********************
-- GANSS Elements
__ **********************
AuxInfoGANSS-ID1 ::= SEQUENCE (SIZE(1.. maxGANSSSat)) OF AuxInfoGANSS-ID1-element
AuxInfoGANSS-ID1-element ::= SEQUENCE {
                     INTEGER (0..63),
    signalsAvailable BIT STRING (SIZE(8)),
                     ProtocolExtensionContainer { { AuxInfoGANSS-ID1-element-ExtIEs } } OPTIONAL,
   ie-Extensions
AuxInfoGANSS-ID1-element-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
AuxInfoGANSS-ID3 ::= SEOUENCE (SIZE(1.. maxGANSSSat)) OF AuxInfoGANSS-ID3-element
AuxInfoGANSS-ID3-element ::= SEQUENCE {
   svID
                     INTEGER(0..63),
   signalsAvailable BIT STRING (SIZE(8)),
   channelNumber INTEGER (-7..13),
   ie-Extensions ProtocolExtensionContainer { { AuxInfoGANSS-ID3-element-ExtIEs } } OPTIONAL,
AuxInfoGANSS-ID3-element-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
```

```
CNAVclockModel ::= SEQUENCE
    cnavToc
                     BIT STRING (SIZE (11)),
   cnavTop
                      BIT STRING (SIZE (11)),
   cnavURA0
                   BIT STRING (SIZE (5)),
   cnavURA1
                    BIT STRING (SIZE (3)),
   cnavURA2
                   BIT STRING (SIZE (3)),
   cnavAf2
                     BIT STRING (SIZE (10)),
   cnavAf1
                      BIT STRING (SIZE (20)),
    cnavAf0
                      BIT STRING (SIZE (26)),
   cnavTqd
                      BIT STRING (SIZE (13)),
   cnavISCl1cp
                      BIT STRING (SIZE (13))
                                                                                OPTIONAL,
   cnavISCl1cd
                      BIT STRING (SIZE (13))
                                                                                OPTIONAL,
   cnavISCl1ca
                   BIT STRING (SIZE (13))
                                                                                OPTIONAL,
   cnavISC12c
                   BIT STRING (SIZE (13))
                                                                                OPTIONAL,
   cnavISCl5i5
                   BIT STRING (SIZE (13))
                                                                                OPTIONAL,
    cnavISC15q5
                      BIT STRING (SIZE (13))
                                                                                OPTIONAL,
   ie-Extensions
                      ProtocolExtensionContainer { { CNAVclockModel-ExtIEs } }
                                                                                OPTIONAL,
CNAVclockModel-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
DeltaUT1 ::= SEQUENCE {
   b1
                      BIT STRING (SIZE(11)),
   b2
                      BIT STRING (SIZE(10)),
                      ProtocolExtensionContainer { { DeltaUT1-ExtIEs } } OPTIONAL,
   ie-Extensions
DeltaUT1-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
DGANSS-Corrections ::= SEQUENCE {
   dGANSS-ReferenceTime
                                  INTEGER (0..119),
   dGANSS-Information
                                  DGANSS-Information,
   ie-Extensions
                                  OPTIONAL,
DGANSS-Corrections-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    . . .
DGANSS-Information ::= SEQUENCE (SIZE (1..maxSgnType)) OF DGANSS-InformationItem
DGANSS-InformationItem ::= SEQUENCE {
   gANSS-SignalId
                                      GANSS-SignalID
                                                                                                                  OPTIONAL,
   gANSS-StatusHealth
                                      GANSS-StatusHealth,
    -- The following IE shall be present if the Status/Health IE value is not equal to "no data" or "invalid data"
    dGANSS-SignalInformation
                                      DGANSS-SignalInformation
                                                                                                                  OPTIONAL,
```

```
ProtocolExtensionContainer { { DGANSS-InformationItem-ExtIEs } } OPTIONAL,
   ie-Extensions
DGANSS-InformationItem-ExtIEs PCAP-PROTOCOL-EXTENSION ::=
DGANSS-SignalInformation ::= SEQUENCE (SIZE (1..maxGANSSSat)) OF DGANSS-SignalInformationItem
DGANSS-SignalInformationItem ::= SEQUENCE
    satId
                                      INTEGER(0..63),
   qANSS-iod
                                      BIT STRING (SIZE (10)),
   udre
                                      UDRE,
                                      INTEGER (-2047..2047),
   ganss-prc
   ganss-rrc
                                      INTEGER (-127..127),
   ie-Extensions
                                      OPTIONAL,
DGANSS-SignalInformationItem-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    {ID id-DGNSS-ValidityPeriod CRITICALITY ignore EXTENSION DGNSS-ValidityPeriod
                                                                                    PRESENCE
                                                                                                               optional },
    . . .
GANSS-AddClockModels ::= CHOICE {
   navClockModel
                                  NAVclockModel,
   cnavClockModel
                                  CNAVclockModel,
   glonassClockModel
                                  GLONASSclockModel,
   sbasClockModel
                                  SBASclockModel,
GANSS-AddOrbitModels ::= CHOICE {
   navKeplerianSet
                                  NavModel-NAVKeplerianSet,
   cnavKeplerianSet
                                  NavModel-CNAVKeplerianSet,
   glonassECEF
                                  NavModel-GLONASSecef,
   sbasECEF
                                  NavModel-SBASecef,
GANSS-Additional-Ionospheric-Model ::= SEQUENCE {
                                      BIT STRING (SIZE(2)),
    alpha-beta-parameters
                                      GPS-Ionospheric-Model,
                                      ProtocolExtensionContainer { { GANSS-Additional-Ionospheric-Model-ExtIEs } }
   ie-Extensions
                                                                                                                   OPTIONAL,
```

```
GANSS-Additional-Ionospheric-Model-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-Additional-Navigation-Models ::= SEQUENCE {
   OPTIONAL,
   ganssSatInfoNavList
                      Ganss-Sat-Info-AddNavList,
   ie-Extensions
                          ProtocolExtensionContainer { { GANSS-Additional-Navigation-Models-ExtIEs } } OPTIONAL,
GANSS-Additional-Navigation-Models-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-Additional-Time-Models ::= SEQUENCE (SIZE (1..maxGANSS-1)) OF GANSS-Time-Model
GANSS-Additional-UTC-Models ::= CHOICE {
   ut.cModel1
                     UTCmodelSet1,
   utcModel2
                     UTCmodelSet2,
   utcModel3
                     UTCmodelSet3,
GANSS-ALM-ECEFsbasAlmanacSet ::= SEQUENCE {
   sat-info-SBASecefList
                        GANSS-SAT-Info-Almanac-SBASecefList,
   ie-Extensions
                            ProtocolExtensionContainer { GANSS-ALM-ECEFsbasAlmanacSet-ExtIEs } }
                                                                                                           OPTIONAL,
   . . .
GANSS-ALM-ECEFsbasAlmanacSet-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-ALM-GlonassAlmanacSet ::= SEQUENCE {
   sat-info-GLOkpList
                         GANSS-SAT-Info-Almanac-GLOkpList,
   ie-Extensions
                            OPTIONAL,
GANSS-ALM-GlonassAlmanacSet-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
   . . .
GANSS-ALM-MidiAlmanacSet ::= SEQUENCE {
   t-oa
                            INTEGER (0..255),
```

```
sat-info-MIDIkpList
                            GANSS-SAT-Info-Almanac-MIDIkpList,
   ie-Extensions
                            OPTIONAL.
GANSS-ALM-MidiAlmanacSet-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-ALM-NAVKeplerianSet ::= SEQUENCE {
                           INTEGER (0..255),
   sat-info-NAVkpList
                           GANSS-SAT-Info-Almanac-NAVkpList,
                            ie-Extensions
                                                                                                          OPTIONAL,
GANSS-ALM-NAVKeplerianSet-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-ALM-ReducedKeplerianSet ::= SEQUENCE {
                            INTEGER (0..255),
   sat-info-REDkpList
                           GANSS-SAT-Info-Almanac-REDkpList,
   ie-Extensions
                            ProtocolExtensionContainer { { GANSS-ALM-ReducedKeplerianSet-ExtIEs } }
                                                                                                          OPTIONAL,
GANSS-ALM-ReducedKeplerianSet-ExtIEs PCAP-PROTOCOL-EXTENSION ::=
GANSS-AlmanacAndSatelliteHealth ::= SEQUENCE {
   weekNumber
               INTEGER(0..255),
   gANSS-AlmanacModel
                        GANSS-AlmanacModel,
                  ProtocolExtensionContainer { { GANSS-AlmanacAndSatelliteHealth-ExtIEs } }
   ie-Extensions
                                                                                                          OPTIONAL,
GANSS-AlmanacAndSatelliteHealth-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
   {ID id-completeAlmanacProvided
                                  CRITICALITY ignore EXTENSION CompleteAlmanacProvided PRESENCE optional },
GANSS-AlmanacModel ::= CHOICE {
   gANSS-keplerianParameters
                                   GANSS-KeplerianParametersAlm,
   . . . ,
```

```
extension-GANSS-AlmanacModel
                                        Extension-GANSS-AlmanacModel
Extension-GANSS-AlmanacModel ::= ProtocolIE-Single-Container {{ Extension-GANSS-AlmanacModel-IE }}
Extension-GANSS-AlmanacModel-IE PCAP-PROTOCOL-IES ::= {
    { ID id-GANSS-alm-keplerianNAVAlmanac
                                                     CRITICALITY
                                                                     ignore
                                                                                 TYPE
                                                                                          GANSS-ALM-NAVKeplerianSet
                                                                                                                                         PRESENCE
    mandatory}|
    { ID id-GANSS-alm-keplerianReducedAlmanac
                                                     CRITICALITY
                                                                     ignore
                                                                                 TYPE
                                                                                         GANSS-ALM-ReducedKeplerianSet
                                                                                                                                  PRESENCE
    mandatory}|
    { ID id-GANSS-alm-keplerianMidiAlmanac
                                                     CRITICALITY
                                                                     ignore
                                                                                 TYPE
                                                                                         GANSS-ALM-MidiAlmanacSet
                                                                                                                                         PRESENCE
    mandatory} |
    { ID id-GANSS-alm-keplerianGLONASS
                                                     CRITICALITY
                                                                     ignore
                                                                                 TYPE
                                                                                         GANSS-ALM-GlonassAlmanacSet
                                                                                                                                         PRESENCE
    mandatory}
    { ID id-GANSS-alm-ecefSBASAlmanac
                                                     CRITICALITY
                                                                     ignore
                                                                                 TYPE
                                                                                         GANSS-ALM-ECEFsbasAlmanacSet
                                                                                                                                  PRESENCE
    mandatory }
GANSS-Auxiliary-Information ::= CHOICE {
    ganssID1
                AuxInfoGANSS-ID1, -- This choice may only be present if GANSS ID indicates Modernized GPS
                AuxInfoGANSS-ID3, -- This choice may only be present if GANSS ID indicates GLONASS
    qanssID3
    . . .
GANSS-AzimuthAndElevation ::= SEQUENCE {
                                INTEGER (0..31),
    -- applicable range of elevation is 0..7. Values 8-75 shall not be used.
    elevation
                                INTEGER (0..75),
    ie-Extensions
                                ProtocolExtensionContainer { GANSS-AzimuthAndElevation-ExtIEs } }
                                                                                                                      OPTIONAL,
GANSS-AzimuthAndElevation-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    {ID id-AzimuthAndElevationLSB
                                        CRITICALITY ignore EXTENSION AzimuthAndElevationLSB PRESENCE
                                                                                                                      optional },
    . . .
GANSS-Clock-Model ::= SEQUENCE (SIZE (1..maxGANSSClockMod)) OF GANSS-SatelliteClockModelItem
GANSS-CommonAssistanceData ::= SEOUENCE
    ganss-Reference-Time
                                        GANSS-Reference-Time
                                                                                                                      OPTIONAL,
    ganss-Ionospheric-Model
                                        GANSS-Ionospheric-Model
                                                                                                                      OPTIONAL,
    ganss-Reference-Location
                                        GANSS-Reference-Location
                                                                                                                      OPTIONAL,
    ie-Extensions
                                        ProtocolExtensionContainer { GANSS-CommonAssistanceData-ExtIEs } }
                                                                                                                      OPTIONAL,
```

```
GANSS-CommonAssistanceData-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    { ID id-GANSS-Additional-Ionospheric-Model
                                                 CRITICALITY ignore EXTENSION GANSS-Additional-Ionospheric-Model
                                                                                                                   PRESENCE optional } |
    { ID id-GANSS-Earth-Orientation-Parameters
                                                  CRITICALITY ignore EXTENSION GANSS-Earth-Orientation-Parameters
                                                                                                                   PRESENCE optional },
GANSS-Data-Bit-Assistance ::= SEQUENCE {
   ganssTod
                                      INTEGER (0..59,...),
   dataBitAssistancelist
                                      GANSS-DataBitAssistanceList,
   ie-Extensions
                                      ProtocolExtensionContainer { GANSS-Data-Bit-Assistance-ExtIEs } }
                                                                                                               OPTIONAL,
GANSS-Data-Bit-Assistance-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-DataBitAssistanceList ::= SEQUENCE (SIZE (1..maxGANSSSat)) OF GANSS-DataBitAssistanceItem
GANSS-DataBitAssistanceItem ::= SEQUENCE {
   sat.Id
                                  INTEGER (0..63),
   dataBitAssistanceSqnList
                                  GANSS-DataBitAssistanceSqnList,
   ie-Extensions
                                  ProtocolExtensionContainer { GANSS-DataBitAssistanceItem-ExtIEs } }
                                                                                                               OPTIONAL,
GANSS-DataBitAssistanceItem-ExtIEs PCAP-PROTOCOL-EXTENSION ::=
GANSS-DataBitAssistanceSgnList ::= SEQUENCE (SIZE (1..maxSgnType)) OF GANSS-DataBitAssistanceSgnItem
GANSS-DataBitAssistanceSgnItem ::= SEQUENCE
   ganss-SignalId
                          GANSS-SignalID,
                          BIT STRING (SIZE (1..1024)),
   ganssDataBits
                          ie-Extensions
                                                                                                               OPTIONAL,
GANSS-DataBitAssistanceSqnItem-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-Earth-Orientation-Parameters ::= SEQUENCE {
                      BIT STRING (SIZE (16)),
   teop
   pmX
                       BIT STRING (SIZE (21)),
   pmXdot
                      BIT STRING (SIZE (15)),
   pmY
                      BIT STRING (SIZE (21)),
                      BIT STRING (SIZE (15)),
   pmYdot
```

```
deltaUT1
                        BIT STRING (SIZE (31)),
    deltaUT1dot
                        BIT STRING (SIZE (19)),
    ie-Extensions
                        ProtocolExtensionContainer { GANSS-Earth-Orientation-Parameters-ExtIEs } }
                                                                                                                     OPTIONAL,
GANSS-Earth-Orientation-Parameters-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-ExtraDoppler ::= SEQUENCE {
    dopplerFirstOrder
                                INTEGER (-42..21),
    dopplerUncertainty
                                ENUMERATED { dH40, dH20, dH10, dH5, dH2-5 },
    ie-Extensions
                                ProtocolExtensionContainer { GANSS-ExtraDoppler-ExtIEs } }
                                                                                                 OPTIONAL,
GANSS-ExtraDoppler-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-GenericAssistanceDataList ::= SEQUENCE (SIZE (1..maxGANSS)) OF GANSSGenericAssistanceData
GANSSGenericAssistanceData ::= SEQUENCE{
                                        GANSSID
                                                                                                             OPTIONAL,
    qanssId
    ganss-Real-Time-Integrity
                                        GANSS-Real-Time-Integrity
                                                                                                             OPTIONAL,
                                        GANSS-Data-Bit-Assistance
    ganss-DataBitAssistance
                                                                                                             OPTIONAL,
    dganss-Corrections
                                        DGANSS-Corrections
                                                                                                             OPTIONAL,
                                        GANSS-AlmanacAndSatelliteHealth
    ganss-AlmanacAndSatelliteHealth
                                                                                                             OPTIONAL,
    ganss-ReferenceMeasurementInfo
                                        GANSS-ReferenceMeasurementInfo
                                                                                                             OPTIONAL,
                                        GANSS-UTC-Model
    ganss-UTC-Model
                                                                                                             OPTIONAL,
    ganss-Time-Model
                                        GANSS-Time-Model
                                                                                                             OPTIONAL,
    ganss-Navigation-Model
                                        GANSS-Navigation-Model
                                                                                                             OPTIONAL,
                                        ProtocolExtensionContainer { { GANSSGenericAssistance-ExtIEs } }
    ie-Extensions
                                                                                                             OPTIONAL,
GANSSGenericAssistance-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
      ID id-GANSS-Additional-Time-Models
                                                    CRITICALITY ignore EXTENSION GANSS-Additional-Time-Models
                                                                                                                                 PRESENCE optional } |
      ID id-GANSS-Additional-Navigation-Models
                                                    CRITICALITY ignore EXTENSION GANSS-Additional-Navigation-Models
                                                                                                                         PRESENCE optional }
     ID id-GANSS-Additional-UTC-Models
                                                    CRITICALITY ignore EXTENSION GANSS-Additional-UTC-Models
                                                                                                                                         PRESENCE
optional }
    { ID id-GANSS-Auxiliary-Information
                                                    CRITICALITY ignore EXTENSION GANSS-Auxiliary-Information
                                                                                                                                         PRESENCE
optional }
    -- the following IE shall be present if "GANSSID" in "GANSSGenericAssistanceData" is "0" (SBAS)
    { ID id-GANSS-SBAS-ID
                                                     CRITICALITY ignore EXTENSION GANSS-SBAS-ID
                                                                                                                         PRESENCE optional },
    . . .
GANSS-GenericMeasurementInfo ::= SEQUENCE(SIZE(1..maxGANSS)) OF SEQUENCE {
```

```
qanssId
                             GANSSID
                                                                                                        OPTIONAL,
   ganssMeasurementSignalList GANSSMeasurementSignalList,
   ie-Extensions
                             ProtocolExtensionContainer { GANSS-GenericMeasurementInfo-ExtIEs } }
GANSS-GenericMeasurementInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSSID ::= SEQUENCE {
   qanss-ID
                      INTEGER (0..7),
                      ProtocolExtensionContainer { { GANSSID-ExtIEs } } OPTIONAL,
   ie-Extensions
GANSSID-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSSMeasurementSignalList ::= SEQUENCE (SIZE (1..maxSqnType)) OF SEQUENCE {
   ganssSignalId
                                     GANSS-SignalID
                                                                      OPTIONAL,
   ganssCodePhaseAmbiguity
                                     INTEGER (0..31)
                                                                      OPTIONAL,
   ganssMeasurementParameters
                                     GANSS-MeasurementParameters,
   ie-Extensions
                                     ProtocolExtensionContainer { GANSSMeasurementSignalList-ExtIEs } }
                                                                                                        OPTIONAL,
GANSSMeasurementSignalList-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    optional },
    . . .
GanssCodePhaseAmbiguityExt ::= SEQUENCE {
   ganssCodePhaseAmbiguity-ext
                                     INTEGER (32..127),
   ie-Extensions
                                     ProtocolExtensionContainer { GanssCodePhaseAmbiquityExt-ExtIEs } }
                                                                                                                      OPTIONAL,
    . . .
GanssCodePhaseAmbiquityExt-ExtlEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-Ionospheric-Model ::= SEQUENCE {
    alpha-zero-ionos
                                     BIT STRING (SIZE (12)),
```

```
alpha-one-ionos
                                        BIT STRING (SIZE (12)),
    alpha-two-ionos
                                        BIT STRING (SIZE (12)),
    gANSS-IonosphereRegionalStormFlags GANSS-IonosphereRegionalStormFlags
                                                                                                 OPTIONAL,
    ie-Extensions
                                        ProtocolExtensionContainer { { GANSS-Ionospheric-Model-ExtIEs } }
                                                                                                                     OPTIONAL,
GANSS-Ionospheric-Model-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-IonosphereRegionalStormFlags ::= SEQUENCE {
    storm-flag-one
                                        BOOLEAN,
    storm-flag-two
                                        BOOLEAN.
    storm-flag-three
                                        BOOLEAN,
    storm-flag-four
                                        BOOLEAN,
    storm-flag-five
                                        BOOLEAN,
                                        ProtocolExtensionContainer { GANSS-IonosphereRegionalStormFlags-ExtIEs } } OPTIONAL,
    ie-Extensions
GANSS-IonosphereRegionalStormFlags-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-KeplerianParametersAlm ::= SEQUENCE {
    t-oa
                                        INTEGER (0..255),
    iod-a
                                        INTEGER(0..3),
    gANSS-SatelliteInformationKP
                                        GANSS-SatelliteInformationKP,
                                        ProtocolExtensionContainer { { GANSS-KeplerianParametersAlm-ExtIEs } }
    ie-Extensions
                                                                                                                          OPTIONAL,
GANSS-KeplerianParametersAlm-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    . . .
GANSS-KeplerianParametersOrb ::= SEQUENCE {
   toe-nav
                                        BIT STRING (SIZE (14)),
    ganss-omega-nav
                                        BIT STRING (SIZE (32)),
    delta-n-nav
                                        BIT STRING (SIZE (16)),
    m-zero-nav
                                        BIT STRING (SIZE (32)),
    omegadot-nav
                                        BIT STRING (SIZE (24)),
    ganss-e-nav
                                        BIT STRING (SIZE (32)),
    idot-nav
                                        BIT STRING (SIZE (14)),
    a-sgrt-nav
                                        BIT STRING (SIZE (32)),
                                        BIT STRING (SIZE (32)),
    i-zero-nav
    omega-zero-nav
                                        BIT STRING (SIZE (32)),
                                        BIT STRING (SIZE (16)),
    c-rs-nav
```

```
c-is-nav
                                        BIT STRING (SIZE (16)),
    c-us-nav
                                        BIT STRING (SIZE (16)),
    c-rc-nav
                                        BIT STRING (SIZE (16)),
    c-ic-nav
                                        BIT STRING (SIZE (16)),
    c-uc-nav
                                        BIT STRING (SIZE (16)),
    ie-Extensions
                                        ProtocolExtensionContainer { GANSS-KeplerianParametersOrb-ExtIEs } }
                                                                                                                          OPTIONAL,
    . . .
GANSS-KeplerianParametersOrb-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    . . .
GANSS-MeasurementParameters ::= SEQUENCE(SIZE(1..maxGANSSSat)) OF GANSS-MeasurementParametersItem
GANSS-MeasurementParametersItem ::= SEQUENCE
                                INTEGER (0..63),
    satId
    cToNzero
                                INTEGER (0..63),
    multipathIndicator
                                ENUMERATED{nM, low, medium, high},
    carrierQualityIndication
                                BIT STRING(SIZE(2))
                                                                                                                          OPTIONAL,
    ganssCodePhase
                                INTEGER (0..2097151),
    ganssIntegerCodePhase
                                INTEGER (0..63)
                                                                                                                          OPTIONAL,
    codePhaseRmsError
                                INTEGER (0..63),
    doppler
                                INTEGER (-32768..32767),
    adr
                                INTEGER (0..33554431)
                                                                                                                          OPTIONAL,
                                ProtocolExtensionContainer { { GANSS-MeasurementParametersItem-ExtIEs } }
    ie-Extensions
                                                                                                                  OPTIONAL,
GANSS-MeasurementParametersItem-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    {ID id-ganssIntegerCodePhaseExt CRITICALITY ignore EXTENSION GanssIntegerCodePhaseExt PRESENCE
                                                                                                                      optional },
    . . .
GanssIntegerCodePhaseExt ::= SEQUENCE {
    ganssIntegerCodePhase-ext
                                        INTEGER (64..127),
                                        ProtocolExtensionContainer { { GanssIntegerCodePhaseExt-ExtIEs } }
    ie-Extensions
                                                                                                                                  OPTIONAL,
    . . .
GanssIntegerCodePhaseExt-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-MeasuredResultsList ::= SEQUENCE (SIZE (1..maxNrOfSets)) OF GANSS-MeasuredResults
GANSS-MeasuredResults ::= SEQUENCE {
    referenceTime CHOICE {
       utranReferenceTime
                                UTRAN-GANSSReferenceTimeUL,
       ganssReferenceTimeOnly GANSS-ReferenceTimeOnly,
```

```
ganssGenericMeasurementInfo GANSS-GenericMeasurementInfo,
                                ProtocolExtensionContainer { { GANSS-MeasuredResults-ExtIEs } } OPTIONAL,
GANSS-MeasuredResults-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-Navigation-Model ::= SEQUENCE {
    non-broadcastIndication
                                ENUMERATED{true}
                                                        OPTIONAL,
    ganssSatInfoNav
                                GANSS-Sat-Info-Nav,
                               ProtocolExtensionContainer { { GANSS-Navigation-Model-ExtIEs } } OPTIONAL,
    ie-Extensions
GANSS-Navigation-Model-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-Orbit-Model ::= CHOICE {
    gANSS-keplerianParameters
                                        GANSS-KeplerianParametersOrb,
GANSS-Real-Time-Integrity ::= SEQUENCE (SIZE (1..maxGANSSSat)) OF GANSS-RealTimeInformationItem
GANSS-RealTimeInformationItem ::= SEQUENCE {
    bad-ganss-satId
                                        INTEGER (0..63),
    bad-ganss-signalId
                                                                                                OPTIONAL,
                                        BIT STRING(SIZE(8))
    ie-Extensions
                                        ProtocolExtensionContainer { { GANSS-RealTimeInformationItem-ExtIEs } }
                                                                                                                    OPTIONAL,
GANSS-RealTimeInformationItem-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-Reference-Location ::=
                                        SEOUENCE {
    ue-PositionEstimate
                                        UE-PositionEstimate,
                                        ProtocolExtensionContainer { { GANSS-Reference-Location-ExtIEs } }
    iE-Extensions
                                                                                                                 OPTIONAL,
GANSS-Reference-Location-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
```

```
GANSS-ReferenceMeasurementInfo ::= SEQUENCE {
    ganssSignalId
                               GANSS-SignalID
                                                                                                                    OPTIONAL,
    satelliteInformation
                                GANSS-SatelliteInformation,
    ie-Extensions
                                ProtocolExtensionContainer { GANSS-ReferenceMeasurementInfo-ExtIEs } }
                                                                                                                    OPTIONAL,
GANSS-ReferenceMeasurementInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-Reference-Time ::= SEQUENCE {
    qanssDay
                                INTEGER (0..8191)
                                                                                                  OPTIONAL,
   qanssTod
                                INTEGER (0..86399),
    ganssTodUncertainty
                                INTEGER (0..127)
                                                                                                  OPTIONAL,
    ganssTimeId
                                GANSSID
                                                                                                  OPTIONAL,
    utran-ganssreferenceTime
                                UTRAN-GANSSReferenceTimeDL
                                                                                                  OPTIONAL,
                                TUTRAN-GANSS-DriftRate
    tutran-ganss-driftRate
                                                                                                  OPTIONAL,
                                ProtocolExtensionContainer { GANSS-Reference-Time-ExtIEs } }
    ie-Extensions
                                                                                                 OPTIONAL,
    . . .
GANSS-Reference-Time-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    {ID id-GANSS-Day-Cycle
                                                                                         PRESENCE optional },
                                CRITICALITY
                                                ignore EXTENSION
                                                                     GANSS-Day-Cycle
    . . .
GANSS-Day-Cycle
                        ::= INTEGER (0..7)
GANSS-ReferenceTimeOnly ::= SEQUENCE {
   qANSS-tod
                                INTEGER (0..3599999),
    gANSS-timeId
                                GANSSID
                                                OPTIONAL,
    gANSS-TimeUncertainty
                                INTEGER (0..127) OPTIONAL,
    ie-Extensions
                                ProtocolExtensionContainer { GANSS-ReferenceTimeOnly-ExtIEs } } OPTIONAL,
GANSS-ReferenceTimeOnly-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    . . .
GANSS-SatelliteClockModelItem ::= SEQUENCE {
                                        BIT STRING (SIZE(14)),
    t-oc
```

```
BIT STRING (SIZE(12)),
   a-i2
   a-i1
                                      BIT STRING (SIZE(18)),
   a-i0
                                      BIT STRING (SIZE(28)),
   t.-ad
                                      BIT STRING (SIZE(10))
                                                                      OPTIONAL.
   model-id
                                      INTEGER (0..3)
                                                                      OPTIONAL,
                                      ProtocolExtensionContainer { { GANSS-SatelliteClockModelItem-ExtIEs } }
   ie-Extensions
                                                                                                                OPTIONAL,
GANSS-SatelliteClockModelItem-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
   . . .
GANSS-SatelliteInformation ::= SEQUENCE(SIZE(1..maxGANSSSat)) OF GANSS-SatelliteInformationItem
GANSS-SatelliteInformationItem ::= SEQUENCE {
   qanssSatId
                               INTEGER (0..63),
   dopplerZeroOrder
                               INTEGER (-2048..2047),
    extraDoppler
                               GANSS-ExtraDoppler
                                                              OPTIONAL,
    codePhase
                               INTEGER(0..1023),
   integerCodePhase
                               INTEGER(0..127),
    codePhaseSearchWindow
                               INTEGER (0..31),
    azimuthAndElevation
                               GANSS-AzimuthAndElevation
                                                              OPTIONAL,
    ie-Extensions
                               OPTIONAL,
GANSS-SatelliteInformationItem-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-SatelliteInformationKP ::= SEQUENCE (SIZE (1..maxGANSSSatAlmanac)) OF GANSS-SatelliteInformationKPItem
GANSS-SatelliteInformationKPItem ::= SEOUENCE {
   satId
                                      INTEGER (0..63),
   ganss-e-alm
                                      BIT STRING (SIZE (11)),
   ganss-delta-I-alm
                                      BIT STRING (SIZE (11)),
   ganss-omegadot-alm
                                      BIT STRING (SIZE (11)),
   ganss-svhealth-alm
                                      BIT STRING (SIZE (4)),
    ganss-delta-a-sqrt-alm
                                      BIT STRING (SIZE (17)),
    ganss-omegazero-alm
                                      BIT STRING (SIZE (16)),
   ganss-m-zero-alm
                                      BIT STRING (SIZE (16)),
    ganss-omega-alm
                                      BIT STRING (SIZE (16)),
    ganss-af-zero-alm
                                      BIT STRING (SIZE (14)),
   ganss-af-one-alm
                                      BIT STRING (SIZE (11)),
    ie-Extensions
                                       ProtocolExtensionContainer { GANSS-SatelliteInformationKPItem-ExtIEs } } OPTIONAL,
```

```
GANSS-SatelliteInformationKPItem-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-SAT-Info-Almanac-GLOkpList ::= SEQUENCE (SIZE (1.. maxGANSSSatAlmanac)) OF GANSS-SAT-Info-Almanac-GLOkp
GANSS-SAT-Info-Almanac-GLOkp ::= SEQUENCE {
           gloAlmNA BIT STRING (SIZE(11)),
           qloAlmnA
                                                                        BIT STRING (SIZE(5)),
         gloAlmmA BIT STRING (SIZE(5)),
gloAlmHA BIT STRING (SIZE(5)),
gloAlmLambdaA BIT STRING (SIZE(21)),
gloAlmTlambdaA BIT STRING (SIZE(21)),
gloAlmDeltaTA BIT STRING (SIZE(21)),
gloAlmDeltaTA BIT STRING (SIZE(22)),
gloAlmDeltaTdotA BIT STRING (SIZE(22)),
gloAlmEpsilonA BIT STRING (SIZE(15)),
gloAlmOmegaA BIT STRING (SIZE(16)),
gloAlmTauA BIT STRING (SIZE(10)),
           qloAlmTauA
                                                                        BIT STRING (SIZE(10)),
           qloAlmCA
                                                                       BIT STRING (SIZE(1)),
           qloAlmMA
                                                                        BIT STRING (SIZE(2))
           OPTIONAL,
                                                          ProtocolExtensionContainer { { GANSS-SAT-Info-Almanac-GLOkp-ExtIEs } }
            ie-Extensions
                                                                                                                                                                                                                                                                                                                                               OPTIONAL,
GANSS-SAT-Info-Almanac-GLOkp-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-SAT-Info-Almanac-MIDIkpList ::= SEQUENCE (SIZE (1.. maxGANSSSatAlmanac)) OF GANSS-SAT-Info-Almanac-MIDIkp
GANSS-SAT-Info-Almanac-MIDIkp ::= SEQUENCE {
           svID
                                       INTEGER (0..63),
           midiAlmE
                                                                         BIT STRING (SIZE (11)),
          midiAlmDeltaI BIT STRING (SIZE (11)),
midiAlmOmegaDot BIT STRING (SIZE (11)),
midiAlmSqrtA BIT STRING (SIZE (17)),
           midiAlmOmega0
                                                                               BIT STRING (SIZE (16)),
           midiAlmOmega
                                                                               BIT STRING (SIZE (16)),
           midiAlmMo
                                                                              BIT STRING (SIZE (16)),
         midiAlmaf0
midiAlmaf0
midiAlmaf1
midiAlmaf1
midiAlmL1Health
midiAlmL2Health
midiAlmL2Health
midiAlmL5Health
midiAlmaf0
midiAlmaf0
midiAlmaf0
midiAlmaf1
midi
                                                                               ProtocolExtensionContainer { GANSS-SAT-Info-Almanac-MIDIkp-ExtIEs } }
            ie-Extensions
                                                                                                                                                                                                                                                                                                                                               OPTIONAL,
GANSS-SAT-Info-Almanac-MIDIkp-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
```

```
GANSS-SAT-Info-Almanac-NAVkpList ::= SEQUENCE (SIZE (1.. maxGANSSSatAlmanac)) OF GANSS-SAT-Info-Almanac-NAVkp
GANSS-SAT-Info-Almanac-NAVkp ::= SEQUENCE {
     svID
                                INTEGER (0..63),
     navAlmE
                                 BIT STRING (SIZE (16)),
    navAlmDeltaI BIT STRING (SIZE (16)),
navAlmOMEGADOT BIT STRING (SIZE (16)),
navAlmSVHealth BIT STRING (SIZE (8)),
navAlmSQrtA BIT STRING (SIZE (24)),
navAlmOMEGAO BIT STRING (SIZE (24)),
navAlmOMega BIT STRING (SIZE (24)),
navAlmMo BIT STRING (SIZE (24)),
                               BIT STRING (SIZE (24)),
BIT STRING (SIZE (11)),
     navAlmMo
     navAlmaf0
     navAlmaf1
                                 BIT STRING (SIZE (11)),
     ie-Extensions
                                ProtocolExtensionContainer { { GANSS-SAT-Info-Almanac-NAVkp-ExtIEs } }
                                                                                                                                                       OPTIONAL,
GANSS-SAT-Info-Almanac-NAVkp-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-SAT-Info-Almanac-REDkpList ::= SEQUENCE (SIZE (1.. maxGANSSSatAlmanac)) OF GANSS-SAT-Info-Almanac-REDkp
GANSS-SAT-Info-Almanac-REDkp ::= SEQUENCE {
     svID
                INTEGER(0..63),
    redAlmDeltaA BIT STRING (SIZE (8)),
redAlmOmegaO BIT STRING (SIZE (7)),
redAlmPhiO BIT STRING (SIZE (7)),
redAlmL1Health BIT STRING (SIZE (1)),
redAlmL2Health BIT STRING (SIZE (1)),
redAlmL5Health BIT STRING (SIZE (1)),
                                   ProtocolExtensionContainer { GANSS-SAT-Info-Almanac-REDkp-ExtIEs } }
     ie-Extensions
                                                                                                                                                       OPTIONAL,
GANSS-SAT-Info-Almanac-REDkp-ExtIES PCAP-PROTOCOL-EXTENSION ::= {
     . . .
GANSS-SAT-Info-Almanac-SBASecefList ::= SEQUENCE (SIZE (1.. maxGANSSSatAlmanac)) OF GANSS-SAT-Info-Almanac-SBASecef
GANSS-SAT-Info-Almanac-SBASecef ::= SEQUENCE {
     sbasAlmDataID
                          BIT STRING (SIZE(2)),
     svID
                                  INTEGER(0..63),
     sbasAlmHealth
                                BIT STRING (SIZE(8)),
     sbasAlmXg
                                   BIT STRING (SIZE(15)),
```

```
sbasAlmYq
                            BIT STRING (SIZE(15)),
    sbasAlmZq
                          BIT STRING (SIZE(9)),
    sbasAlmXqdot
                          BIT STRING (SIZE(3)),
    sbasAlmYqDot
                         BIT STRING (SIZE(3)),
    sbasAlmZqDot
                         BIT STRING (SIZE(4)),
    sbasAlmTo
                           BIT STRING (SIZE(11)),
    ie-Extensions
                            ProtocolExtensionContainer { GANSS-SAT-Info-Almanac-SBASecef-ExtIEs } }
                                                                                                                      OPTIONAL,
GANSS-SAT-Info-Almanac-SBASecef-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
Ganss-Sat-Info-AddNavList ::= SEQUENCE (SIZE (1..maxGANSSSat)) OF SEQUENCE {
                           INTEGER (0..63),
    satId
                          BIT STRING (SIZE (6)),
BIT STRING (SIZE (11)),
    svHealth
    iod
                         GANSS-AddClockModels,
GANSS-AddOrbitModels,
    ganssAddClockModels
    qanssAddOrbitModels
                                ProtocolExtensionContainer { { Ganss-Sat-Info-AddNavList-ExtIEs } } OPTIONAL,
    ie-Extensions
Ganss-Sat-Info-AddNavList-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-Sat-Info-Nav ::= SEQUENCE (SIZE(1..maxGANSSSat)) OF SEQUENCE {
                                INTEGER (0..63),
    svHealth
                                BIT STRING (SIZE(5)),
    boi
                                BIT STRING (SIZE(10)),
    ganssClockModel
                                GANSS-Clock-Model,
    ganssOrbitModel
                                GANSS-Orbit-Model,
                                ProtocolExtensionContainer { GANSS-Sat-Info-Nav-ExtIEs } } OPTIONAL,
    ie-Extensions
GANSS-Sat-Info-Nav-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    . . .
GANSS-SignalID ::= SEQUENCE {
    ganssSignalID
                        INTEGER (0..3,...,4..7),
    ie-Extensions
                        ProtocolExtensionContainer { { GANSS-SignalID-ExtIEs } } OPTIONAL,
GANSS-SignalID-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
```

```
GANSS-StatusHealth ::= ENUMERATED {
   udre-scale-1dot0,
  udre-scale-0dot75,
  udre-scale-0dot5,
  udre-scale-0dot3,
  udre-scale-Odot2,
   udre-scale-0dot1,
  no-data,
   invalid-data
GANSS-Time-Model ::= SEQUENCE {
    ganss-time-model-refTime
                                         INTEGER (0..37799),
    ganss-t-a0
                                         INTEGER (-2147483648..2147483647),
    ganss-t-a1
                                         INTEGER (-8388608..8388607)
                                                                                                                       OPTIONAL,
    ganss-t-a2
                                         INTEGER (-64..63)
                                                                                                                       OPTIONAL,
                                         ENUMERATED{gps,...,galileo,qzss,glonass},
    gnss-to-id
    ganss-wk-number
                                         INTEGER (0..8191)
                                                                                                                       OPTIONAL,
    ie-Extensions
                                         ProtocolExtensionContainer { GANSS-Time-Model-ExtIEs } }
                                                                                                                       OPTIONAL,
GANSS-Time-Model-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    {ID id-ganss-Delta-T
                                 CRITICALITY
                                                 ignore EXTENSION
                                                                     GANSS-Delta-T
                                                                                           PRESENCE
                                                                                                                       optional},
    . . .
GANSS-Delta-T ::= INTEGER(-128..127)
GANSS-UTRAN-TimeRelationshipUncertainty ::= ENUMERATED {
    qANSS-UTRAN-TRU-50nano,
    qANSS-UTRAN-TRU-500nano,
    qANSS-UTRAN-TRU-1micro,
    qANSS-UTRAN-TRU-10micro,
    qANSS-UTRAN-TRU-1milli,
    gANSS-UTRAN-TRU-10milli,
    gANSS-UTRAN-TRU-100milli,
    gANSS-UTRAN-TRU-unreliable,
GANSS-UTRAN-TRU ::= SEQUENCE {
    gANSS-UTRAN-TimeRelationshipUncertainty
                                                 GANSS-UTRAN-TimeRelationshipUncertainty,
```

```
GANSSID
    qanssId
    OPTIONAL,
                                                ProtocolExtensionContainer { { GANSS-UTRAN-TRU-ExtIEs } }
    ie-Extensions
                                                                                                                    OPTIONAL,
GANSS-UTRAN-TRU-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-UTC-Model ::= SEQUENCE {
    a-one-utc
                                        BIT STRING (SIZE (24)),
                                        BIT STRING (SIZE (32)),
    a-zero-utc
    t-ot-utc
                                        BIT STRING (SIZE (8)),
                                        BIT STRING (SIZE (8)),
    w-n-t-utc
                                        BIT STRING (SIZE (8)),
    delta-t-ls-utc
    w-n-lsf-utc
                                        BIT STRING (SIZE (8)),
    dn-utc
                                        BIT STRING (SIZE (8)),
    delta-t-lsf-utc
                                        BIT STRING (SIZE (8)),
    ie-Extensions
                                        ProtocolExtensionContainer { { GANSS-UTC-Model-ExtIEs } }
                                                                                                                    OPTIONAL,
GANSS-UTC-Model-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
TUTRAN-GANSS-DriftRate ::= ENUMERATED {
    uTRAN-GANSSDrift0,
                                                   uTRAN-GANSSDrift2,
                           uTRAN-GANSSDrift1,
    uTRAN-GANSSDrift5,
                           uTRAN-GANSSDrift10,
                                                   uTRAN-GANSSDrift15,
    uTRAN-GANSSDrift25,
                         uTRAN-GANSSDrift50,
                                                   uTRAN-GANSSDrift-1,
   uTRAN-GANSSDrift-2,
                         uTRAN-GANSSDrift-5,
                                                   uTRAN-GANSSDrift-10,
    uTRAN-GANSSDrift-15,
                         uTRAN-GANSSDrift-25,
                                                   uTRAN-GANSSDrift-50,
GLONASSclockModel ::= SEQUENCE {
    qloTau
                           BIT STRING (SIZE (22)),
    gloGamma
                           BIT STRING (SIZE (11)),
    qloDeltaTau
                          BIT STRING (SIZE (5))
                                                                                        OPTIONAL,
    ie-Extensions
                          ProtocolExtensionContainer { { GLONASSclockModel-ExtIEs } } OPTIONAL,
GLONASSclockModel-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
NAVclockModel ::= SEQUENCE {
```

```
navToc
                           BIT STRING (SIZE (16)),
   navaf2
                           BIT STRING (SIZE (8)),
    navaf1
                         BIT STRING (SIZE (16)),
    navaf0
                         BIT STRING (SIZE (22)),
    navTqd
                          BIT STRING (SIZE (8)),
    ie-Extensions
                           ProtocolExtensionContainer { { NAVclockModel-ExtIEs } } OPTIONAL,
NAVclockModel-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
NavModel-CNAVKeplerianSet ::= SEQUENCE {
                 BIT STRING (SIZE (11)),
    cnavTop
    cnavURAindex
                       BIT STRING (SIZE (5)),
    cnavDeltaA
                         BIT STRING (SIZE (26)),
    cnavAdot
                         BIT STRING (SIZE (25)),
   cnavDeltaNo BIT STRING (SIZE (17)), cnavDeltaNoDot BIT STRING (SIZE (23)),
    cnavMo
                         BIT STRING (SIZE (33)),
                         BIT STRING (SIZE (33)),
    cnavE
    cnav0meqa
                         BIT STRING (SIZE (33)),
   cnavOMEGA0
                           BIT STRING (SIZE (33)),
    cnavDeltaOmegaDot
                           BIT STRING (SIZE (17)),
    cnavIo
                           BIT STRING (SIZE (33)),
    cnavIoDot
                           BIT STRING (SIZE (15)),
    cnavCis
                           BIT STRING (SIZE (16)),
                      BIT STRING (SIZE (16)),
BIT STRING (SIZE (24)),
    cnavCic
    cnavCrs
                         BIT STRING (SIZE (24)),
    cnavCrc
    cnavCus
                           BIT STRING (SIZE (21)),
                           BIT STRING (SIZE (21)),
    cnavCuc
                           ProtocolExtensionContainer { { NavModel-CNAVKeplerianSet-ExtIEs } } OPTIONAL,
    ie-Extensions
NavModel-CNAVKeplerianSet-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
NavModel-GLONASSecef ::= SEQUENCE {
    gloEn
                           BIT STRING (SIZE (5)),
    gloP1
                           BIT STRING (SIZE (2)),
    qloP2
                           BIT STRING (SIZE (1)),
    qloM
                           BIT STRING (SIZE (2))
                                                                                           OPTIONAL,
    qloX
                           BIT STRING (SIZE (27)),
    gloXdot
                           BIT STRING (SIZE (24)),
    qloXdotdot
                           BIT STRING (SIZE (5)),
    gloY
                           BIT STRING (SIZE (27)),
    aloYdot
                           BIT STRING (SIZE (24)),
    gloYdotdot
                           BIT STRING (SIZE (5)),
   qloZ
                           BIT STRING (SIZE (27)),
```

```
qloZdot
                           BIT STRING (SIZE (24)),
    qloZdotdot
                           BIT STRING (SIZE (5)),
                            ProtocolExtensionContainer { { NavModel-GLONASSecef-ExtIEs } } OPTIONAL,
    ie-Extensions
NavModel-GLONASSecef-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
NavModel-NAVKeplerianSet ::= SEQUENCE {
                           BIT STRING (SIZE (4)),
    navFitFlaq
                           BIT STRING (SIZE (1)),
   navToe
                         BIT STRING (SIZE (16)),
                         BIT STRING (SIZE (32)),
    nav0mega
    navDeltaN
                         BIT STRING (SIZE (16)),
                           BIT STRING (SIZE (32)),
    navOmegaADot
                           BIT STRING (SIZE (24)),
    navE
                           BIT STRING (SIZE (32)),
    navIDot
                           BIT STRING (SIZE (14)),
    navAPowerHalf
                           BIT STRING (SIZE (32)),
                           BIT STRING (SIZE (32)),
    navI0
    navOmegaA0
                           BIT STRING (SIZE (32)),
    navCrs
                           BIT STRING (SIZE (16)),
    navCis
                           BIT STRING (SIZE (16)),
    navCus
                           BIT STRING (SIZE (16)),
    navCrc
                         BIT STRING (SIZE (16)),
    navCic
                         BIT STRING (SIZE (16)),
    navCuc
                           BIT STRING (SIZE (16)),
                           ProtocolExtensionContainer { { NavModel-NAVKeplerianSet-ExtIEs } } OPTIONAL,
    ie-Extensions
NavModel-NAVKeplerianSet-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
NavModel-SBASecef ::= SEQUENCE {
    -- the following IE shall be present if "SBASclockModel" in "GANSS-AddClockModels" is not included in "Ganss-Sat-Info-AddNavList"
    sbasTo
                           BIT STRING (SIZE (13))
                                                                                       OPTIONAL,
    sbasAccuracy
                           BIT STRING (SIZE (4)),
    sbasXq
                           BIT STRING (SIZE (30)),
    sbasYg
                           BIT STRING (SIZE (30)),
    sbasZg
                           BIT STRING (SIZE (25)),
    sbasXqDot
                           BIT STRING (SIZE (17)),
    sbasYgDot
                           BIT STRING (SIZE (17)),
    sbasZgDot
                           BIT STRING (SIZE (18)),
    sbasXqDotDot
                           BIT STRING (SIZE (10)),
    sbaqYqDotDot
                           BIT STRING (SIZE (10)),
    sbasZqDotDot
                           BIT STRING (SIZE (10)),
                           ProtocolExtensionContainer { { NavModel-SBASecef-ExtIEs } } OPTIONAL,
    ie-Extensions
```

```
NavModel-SBASecef-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
SBASclockModel ::= SEQUENCE {
    sbasTo
                          BIT STRING (SIZE (13)),
    sbasAqfo
                          BIT STRING (SIZE (12)),
    sbasAqf1
                          BIT STRING (SIZE (8)),
   ie-Extensions
                         ProtocolExtensionContainer { { SBASclockModel-ExtIEs } }
                                                                                    OPTIONAL,
SBASclockModel-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
UTCmodelSet1 ::= SEQUENCE {
    ut.cA0
                       BIT STRING (SIZE(16)),
   ut.cA1
                       BIT STRING (SIZE(13)),
   utcA2
                      BIT STRING (SIZE(7)),
   utcDeltaTls
                    BIT STRING (SIZE(8)),
   utcTot
                       BIT STRING (SIZE(16)).
   utcWNot
                      BIT STRING (SIZE(13)),
   utcWNlsf
                      BIT STRING (SIZE(8)),
   utcDN
                      BIT STRING (SIZE(4)),
    utcDeltaTlsf
                    BIT STRING (SIZE(8)),
                    ProtocolExtensionContainer { { UTCmodelSet1-ExtIEs } } OPTIONAL,
   ie-Extensions
UTCmodelSet1-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
UTCmodelSet2 ::= SEQUENCE {
                      BIT STRING (SIZE(11)),
    tauC
                      BIT STRING (SIZE(32)),
    deltaUT1
                      DeltaUT1
                                                                              OPTIONAL,
                      BIT STRING (SIZE(2))
                                                                              OPTIONAL,
   ie-Extensions
                   ProtocolExtensionContainer { { UTCmodelSet2-ExtIEs } } OPTIONAL,
UTCmodelSet2-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
UTCmodelSet3 ::= SEQUENCE {
   utcA1wnt
                      BIT STRING (SIZE(24)),
   utcA0wnt
                      BIT STRING (SIZE(32)),
   utcTot
                      BIT STRING (SIZE(8)),
```

```
utcWNt
                   BIT STRING (SIZE(8)),
   utcDeltaTls
                   BIT STRING (SIZE(8)),
   utcWNlsf
                   BIT STRING (SIZE(8)),
   ut.cDN
                   BIT STRING (SIZE(8)),
   utcDeltaTlsf
                   BIT STRING (SIZE(8)),
   utcStandardID
                   BIT STRING (SIZE(3)),
   ie-Extensions
                    ProtocolExtensionContainer { { UTCmodelSet3-ExtIEs } } OPTIONAL,
UTCmodelSet3-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
UTRAN-GANSSReferenceTimeDL ::= SEQUENCE {
   utran-GANSSTimingOfCellFrames INTEGER(0..3999999),
   uC-ID
                              UC-ID
   OPTIONAL,
   referenceSfn
                              INTEGER (0..4095),
   ie-Extensions
                              OPTIONAL,
UTRAN-GANSSReferenceTimeDL-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
UTRAN-GANSSReferenceTimeUL ::= SEQUENCE {
   ue-GANSSTimingOfCellFrames INTEGER(0..345599999999),
   gANSS-TimeId
                          GANSSID
                                                  OPTIONAL,
   gANSS-TimeUncertainty
                          INTEGER (0..127)
                                                  OPTIONAL,
   uC-ID
                          UC-ID,
   referenceSfn
                          INTEGER (0..4095),
                          ie-Extensions
                                                                                                 OPTIONAL,
   . . .
UTRAN-GANSSReferenceTimeUL-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
__ ********************
-- GPS Almanac and Satellite Health
__ **********************
GPS-AlmanacAndSatelliteHealth ::= SEQUENCE {
                                 BIT STRING (SIZE (8)),
   almanacSatInfoList
                                 AlmanacSatInfoList,
```

```
svGlobalHealth
                                      BIT STRING (SIZE (364)) OPTIONAL,
   iE-Extensions
                                      ProtocolExtensionContainer { { GPS-AlmanacAndSatelliteHealth-ExtIEs } }
                                                                                                                  OPTIONAL,
GPS-AlmanacAndSatelliteHealth-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    {ID id-completeAlmanacProvided
                                     CRITICALITY ignore EXTENSION CompleteAlmanacProvided PRESENCE optional },
CompleteAlmanacProvided ::=
                              BOOLEAN
AlmanacSatInfoList ::=
                                  SEQUENCE (SIZE (1..maxSatAlmanac)) OF
                                      AlmanacSatInfo
AlmanacSatInfo ::=
                                  SEQUENCE {
   dataID
                                      BIT STRING (SIZE (2)),
   satID
                                      INTEGER (0..63),
                                     BIT STRING (SIZE (16)),
   t-oa
                                     BIT STRING (SIZE (8)),
   deltaI
                                     BIT STRING (SIZE (16)),
   omegaDot
                                     BIT STRING (SIZE (16)),
   satHealth
                                      BIT STRING (SIZE (8)),
   a-Sgrt
                                      BIT STRING (SIZE (24)),
   omega0
                                     BIT STRING (SIZE (24)),
                                      BIT STRING (SIZE (24)),
                                      BIT STRING (SIZE (24)),
   omega
   af0
                                     BIT STRING (SIZE (11)),
   af1
                                     BIT STRING (SIZE (11)),
   iE-Extensions
                                      ProtocolExtensionContainer { { AlmanacSatInfo-ExtIEs } } OPTIONAL,
AlmanacSatInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
  ****************
-- GPS Clock And Ephemeris Parameters
__ *******************************
GPS-ClockAndEphemerisParameters ::= SEQUENCE
   codeOnL2
                                      BIT STRING (SIZE (2)),
   uraIndex
                                      BIT STRING (SIZE (4)),
   satHealth
                                     BIT STRING (SIZE (6)),
   iodc
                                     BIT STRING (SIZE (10)),
   12Pflag
                                     BIT STRING (SIZE (1)),
   sf1Revd
                                     SubFrame1Reserved,
   t-GD
                                     BIT STRING (SIZE (8)),
```

OPTIONAL,

```
t-oc
                                     BIT STRING (SIZE (16)),
    af2
                                     BIT STRING (SIZE (8)),
    af1
                                     BIT STRING (SIZE (16)),
    af0
                                     BIT STRING (SIZE (22)),
    c-rs
                                     BIT STRING (SIZE (16)),
    delta-n
                                     BIT STRING (SIZE (16)),
    m0
                                     BIT STRING (SIZE (32)),
                                     BIT STRING (SIZE (16)),
                                     BIT STRING (SIZE (32)),
    е
    c-us
                                     BIT STRING (SIZE (16)),
                                     BIT STRING (SIZE (32)),
    a-Sgrt
                                     BIT STRING (SIZE (16)),
    t-oe
    fitInterval
                                     BIT STRING (SIZE (1)),
    aodo
                                     BIT STRING (SIZE (5)),
    c-ic
                                     BIT STRING (SIZE (16)),
   omega0
                                     BIT STRING (SIZE (32)),
    c-is
                                     BIT STRING (SIZE (16)),
    i0
                                     BIT STRING (SIZE (32)),
    c-rc
                                     BIT STRING (SIZE (16)),
    omega
                                     BIT STRING (SIZE (32)),
    omegaDot
                                     BIT STRING (SIZE (24)),
    iDot
                                     BIT STRING (SIZE (14)),
                                     ProtocolExtensionContainer { { GPS-ClockAndEphemerisParameters-ExtIEs } }
    iE-Extensions
    . . .
GPS-ClockAndEphemerisParameters-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
SubFrame1Reserved ::=
                                SEQUENCE {
   reserved1
                                     BIT STRING (SIZE (23)),
   reserved2
                                     BIT STRING (SIZE (24)),
   reserved3
                                    BIT STRING (SIZE (24)),
    reserved4
                                     BIT STRING (SIZE (16))
    ****************
-- GPS Ionospheric Model
__ *******************
GPS-Ionospheric-Model ::=
                                  SEQUENCE {
    alfa0
                                     BIT STRING (SIZE (8)),
    alfa1
                                     BIT STRING (SIZE (8)),
    alfa2
                                     BIT STRING (SIZE (8)),
    alfa3
                                     BIT STRING (SIZE (8)),
   beta0
                                     BIT STRING (SIZE (8)),
    beta1
                                     BIT STRING (SIZE (8)),
    beta2
                                     BIT STRING (SIZE (8)),
```

```
beta3
                                     BIT STRING (SIZE (8)),
   iE-Extensions
                                     ProtocolExtensionContainer { GPS-Ionospheric-Model-ExtIEs } }
                                                                                                           OPTIONAL,
GPS-Ionospheric-Model-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
  *****************
-- GPS Measured Results
__ *********************
MeasuredResultsList ::=
                                  SEQUENCE (SIZE (1..maxNrOfSets)) OF
   GPS-MeasuredResults
GPS-MeasuredResults ::=
                                  SEQUENCE {
   qps-TOW-1msec
                                     INTEGER (0..604799999),
   gps-MeasurementParamList
                                     GPS-MeasurementParamList,
                                     ProtocolExtensionContainer { GPS-MeasuredResults-ExtIEs } }
   iE-Extensions
                                                                                                   OPTIONAL,
    . . .
GPS-MeasuredResults-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    {ID id-UTRAN-GPSReferenceTimeResult CRITICALITY ignore EXTENSION
                                                                                                                  optional}
                                                                    UTRAN-GPSReferenceTimeResult
                                                                                                    PRESENCE
    {ID id-GPSReferenceTimeUncertainty CRITICALITY ignore EXTENSION
                                                                                                                  optional },
                                                                    GPSReferenceTimeUncertainty
                                                                                                    PRESENCE
    . . .
GPS-MeasurementParamList ::=
                                  SEQUENCE (SIZE (1..maxSat)) OF
                                     GPS-MeasurementParam
GPS-MeasurementParam ::=
                                  SEQUENCE {
   satelliteID
                                      INTEGER (0..63),
   c-N0
                                      INTEGER (0..63),
                                      INTEGER (-32768..32768),
   doppler
   wholeGPS-Chips
                                     INTEGER (0..1022),
                                      INTEGER (0..1023),
   fractionalGPS-Chips
   multipathIndicator
                                     MultipathIndicator,
   pseudorangeRMS-Error
                                     INTEGER (0..63),
   iE-Extensions
                                      ProtocolExtensionContainer { GPS-MeasurementParam-ExtIEs } }
                                                                                                   OPTIONAL,
MultipathIndicator ::=
                                  ENUMERATED {
                                     nm,
                                     low,
                                     medium,
                                     high }
```

```
GPS-MeasurementParam-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
  -- GPS Navigation Model
__ *********************
GPS-NavigationModel ::=
                       SEQUENCE (SIZE (1..maxSat)) OF
                                 NavigationModelSatInfo
NavigationModelSatInfo ::=
                             SEQUENCE {
   satID
                                 INTEGER (0..63),
   satelliteStatus
                                 SatelliteStatus,
   gps-clockAndEphemerisParms
                                 GPS-ClockAndEphemerisParameters
                                                                                                    OPTIONAL,
   -- This IE is not present if satelliteStatus is es-SN
   iE-Extensions
                                 ProtocolExtensionContainer { { NavigationModelSatInfo-ExtIEs } } OPTIONAL,
NavigationModelSatInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
SatelliteStatus ::=
                              ENUMERATED {
                                 ns-NN,
                                 es-SN,
                                 es-NN,
                                 rev2,
                                 rev }
__ *********************
-- GPS Real Time Integrity
__ ********************
GPS-RealTimeIntegrity ::= CHOICE {
   badSatellites
                    BadSatList,
                   NoBadSatellites,
   noBadSatellites
   . . .
                              SEQUENCE (SIZE (1..maxSat)) OF
BadSatList ::=
                                 INTEGER (0..63)
```

```
NoBadSatellites ::= NULL
__ ***********************
-- GPS Reference Location
  **********************
GPS-ReferenceLocation ::=
                                SEQUENCE {
   ue-PositionEstimate
                                    UE-PositionEstimate,
   iE-Extensions
                                    ProtocolExtensionContainer { { GPS-ReferenceLocation-ExtIEs } } OPTIONAL,
   . . .
GPS-ReferenceLocation-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
  ******************
-- GPS Reference Time
__ ********************
GPS-ReferenceTime ::=
                                SEQUENCE {
   qps-Week
                                    INTEGER (0..1023),
   qps-TOW-1msec
                                    INTEGER (0..604799999),
   gps-TOW-AssistList
                                    GPS-TOW-AssistList
                                                                                               OPTIONAL,
                                    ProtocolExtensionContainer { { GPS-ReferenceTime-ExtIEs } }
   iE-Extensions
                                                                                               OPTIONAL,
GPS-ReferenceTime-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
   {ID id-UTRAN-GPSReferenceTime
                                    CRITICALITY ignore EXTENSION
                                                                 UTRAN-GPSReferenceTime
                                                                                                             optional } |
                                                                                               PRESENCE
   {ID id-GPS-UTRAN-TRU
                                    CRITICALITY ignore EXTENSION
                                                                                                             optional } |
                                                                 GPS-UTRAN-TRU
                                                                                               PRESENCE
   {ID id-UTRAN-GPS-DriftRate
                                    CRITICALITY ignore EXTENSION
                                                                 UTRAN-GPS-DriftRate
                                                                                               PRESENCE
                                                                                                             optional}
   {ID id-GPSReferenceTimeUncertainty CRITICALITY ignore EXTENSION
                                                                                                             optional } |
                                                                 GPSReferenceTimeUncertainty
                                                                                               PRESENCE
   {ID id-GPS-Week-Cycle
                                    CRITICALITY ignore EXTENSION
                                                                 GPS-Week-Cycle
                                                                                               PRESENCE
                                                                                                             optional},
   . . .
GPS-Week-Cycle
                                INTEGER (0..7)
GPS-TOW-AssistList ::=
                                SEQUENCE (SIZE (1..maxSat)) OF
                                    GPS-TOW-Assist
GPS-TOW-Assist ::=
                                SEQUENCE {
   satID
                                    INTEGER (0..63),
   tlm-Message
                                    BIT STRING (SIZE (14)),
   antiSpoof
                                    BOOLEAN,
```

```
alert
                                BOOLEAN,
   tlm-Reserved
                                BIT STRING (SIZE (2)),
   iE-Extensions
                                ProtocolExtensionContainer { { GPS-TOW-Assist-ExtIEs } } OPTIONAL,
GPS-TOW-Assist-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
                             ENUMERATED {
UTRAN-GPS-DriftRate ::=
                            utran-GPSDrift0, utran-GPSDrift1, utran-GPSDrift2,
                            utran-GPSDrift5, utran-GPSDrift10, utran-GPSDrift15,
                            utran-GPSDrift25, utran-GPSDrift50, utran-GPSDrift-1,
                             utran-GPSDrift-2, utran-GPSDrift-5, utran-GPSDrift-10,
                             utran-GPSDrift-15, utran-GPSDrift-25, utran-GPSDrift-50,
  ******************
-- GPS Reference Time Uncertainty
__ **********************
GPSReferenceTimeUncertainty ::= SEQUENCE {
   iE-Extensions
                  ProtocolExtensionContainer { { GPSReferenceTimeUncertainty-ExtIEs } } OPTIONAL,
GPSReferenceTimeUncertainty-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    *****************
-- GPS Transmission TOW
__ *******************************
GPS-Transmission-TOW ::= INTEGER (0..604799)
__ ********************
-- GPS UTC Model
__ *******************************
GPS-UTC-Model ::=
                            SEOUENCE {
   a1
                                BIT STRING (SIZE (24)),
   a0
                                BIT STRING (SIZE (32)),
```

```
t-ot
                                   BIT STRING (SIZE (8)),
   delta-t-LS
                                   BIT STRING (SIZE (8)),
   wn - t.
                                   BIT STRING (SIZE (8)),
   wn-lsf
                                   BIT STRING (SIZE (8)),
                                   BIT STRING (SIZE (8)),
   delta-t-LSF
                                   BIT STRING (SIZE (8)),
   iE-Extensions
                                   ProtocolExtensionContainer { { GPS-UTCmodel-ExtIEs } } OPTIONAL,
GPS-UTCmodel-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
  *****************
-- GPS UTRAN Time Relationship Uncertainty
-- nsec=nanosecond, usec=microsecond, msec=millisecond, sec=second
__ ********************
GPS-UTRAN-TRU ::= ENUMERATED {
                     nsec-50,
                     nsec-500,
                     usec-1,
                     usec-10,
                     msec-1,
                     msec-10,
                     msec-100,
                     unreliable,
                     . . . }
  ****************
-- Additional GPS Assistance Data Required
  *****************
AdditionalGPSAssistDataRequired ::=
                                   SEQUENCE {
   almanacRequest
                                   BOOLEAN
   utcModelRequest
                                   BOOLEAN,
   {\tt ionosphericModelRequest}
                                   BOOLEAN,
   navigationModelRequest
                                   BOOLEAN,
   dgpsCorrectionsRequest
                                   BOOLEAN,
   referenceLocationRequest
                                   BOOLEAN,
   referenceTimeRequest
                                   BOOLEAN,
   aquisitionAssistanceRequest
                                   BOOLEAN,
   realTimeIntegrityRequest
                                   BOOLEAN,
   navModelAddDataRequest
                                   NavModelAdditionalData
                                                            OPTIONAL,
   iE-Extensions
                                   ProtocolExtensionContainer { { AdditionalGPSAssistDataRequired-ExtIEs } } OPTIONAL,
   . . .
```

```
AdditionalGPSAssistDataRequired-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
-- Additional GANSS Assistance Data Required
  ****************
AdditionalGanssAssistDataRequired::= SEQUENCE {
    ganssReferenceTime
                                       BOOLEAN
    ganssreferenceLocation
                                       BOOLEAN
    ganssIonosphericModel
                                       BOOLEAN,
    ganssRequestedGenericAssistanceDataList GanssRequestedGenericAssistanceDataList,
                                       ProtocolExtensionContainer { { AdditionalGanssAssistDataRequired-ExtIEs } } OPTIONAL,
    iE-Extensions
    . . .
AdditionalGanssAssistDataRequired-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    {ID id-ganssReq-AddIonosphericModel
                                           CRITICALITY ignore EXTENSION
                                                                          GANSSReq-AddIonosphericModel
                                                                                                              PRESENCE
                                                                                                                             optional}|
    {ID id-ganssReq-EarthOrientPara
                                           CRITICALITY ignore EXTENSION
                                                                          GANSSReq-EarthOrientPara
                                                                                                               PRESENCE
                                                                                                                             optional},
GANSSReg-AddIonosphericModel ::= SEQUENCE {
    ganss-add-iono-mode-req
                               BIT STRING (SIZE(2)),
    iE-Extensions
                               ProtocolExtensionContainer { GANSSReq-AddIonosphericModel-ExtIEs } }
GANSSReq-AddIonosphericModel-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSSReq-EarthOrientPara ::= BOOLEAN
GanssRequestedGenericAssistanceDataList ::= SEQUENCE (SIZE (1..maxGANSS)) OF
                                       GanssReqGenericData
                                   SEQUENCE {
GanssReqGenericData ::=
    qanssId
                                       GANSSID
                                                                                                              OPTIONAL,
                                                                                                              OPTIONAL,
    ganssRealTimeIntegrity
                                       BOOLEAN
    ganssDifferentialCorrection
                                       DGANSS-Sig-Id-Reg
                                                                                                              OPTIONAL,
    ganssAlmanac
                                       BOOLEAN
                                                                                                              OPTIONAL,
    ganssNavigationModel
                                       BOOLEAN
                                                                                                              OPTIONAL,
    ganssTimeModelGnssGnss
                                       BIT STRING (SIZE (9))
                                                                                                              OPTIONAL,
    ganssReferenceMeasurementInfo
                                       BOOLEAN
                                                                                                              OPTIONAL,
    ganssDataBits
                                       GanssDataBits
                                                                                                              OPTIONAL,
    ganssUTCModel
                                       BOOLEAN
                                                                                                              OPTIONAL,
    ganssNavigationModelAdditionalData NavigationModelGANSS
                                                                                                              OPTIONAL,
    iE-Extensions
                                       ProtocolExtensionContainer { GanssReqGenericData-ExtIEs } }
                                                                                                       OPTIONAL,
```

optional } |

optional }

optional}

optional},

optional } |

PRESENCE

PRESENCE

PRESENCE

PRESENCE

```
...}
GanssRegGenericData-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    {ID id-ganssAddNavigationModel-req
                                          CRITICALITY ignore EXTENSION
                                                                         GANSS-AddNavigationModel-Reg PRESENCE
    ID id-ganssAddUTCModel-req
                                          CRITICALITY ignore EXTENSION
                                                                         GANSS-AddUTCModel-Req
    ID id-ganssAuxInfo-reg
                                          CRITICALITY ignore EXTENSION
                                                                         GANSS-AuxInfo-req
    {ID id-GANSS-SBAS-ID
                                          CRITICALITY ignore EXTENSION
                                                                         GANSS-SBAS-ID
    {ID id-GANSS-AddADchoices
                                          CRITICALITY ignore EXTENSION
                                                                         GANSS-AddADchoices
GANSS-AddNavigationModel-Reg ::= BOOLEAN
GANSS-AddUTCModel-Reg ::= BOOLEAN
GANSS-AuxInfo-reg ::= BOOLEAN
GANSS-AddADchoices ::= SEQUENCE {
   orbitModelID
                          INTEGER (0..7)
                                                                                         OPTIONAL,
   clockModelID
                          INTEGER (0..7)
                                                                                         OPTIONAL,
   utcModelID
                          INTEGER (0..7)
                                                                                         OPTIONAL,
   almanacModelID
                          INTEGER (0..7)
                                                                                         OPTIONAL,
   iE-Extensions
                          OPTIONAL,
    . . . }
GANSS-AddADchoices-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
DGANSS-Sig-Id-Req ::= BIT STRING (SIZE (8))
GanssDataBits ::=
                               SEQUENCE {
   ganssTod
                              INTEGER (0..86399),
                              ReqDataBitAssistanceList,
   dataBitAssistancelist
                               ProtocolExtensionContainer { { GanssDataBits-ExtIEs } } OPTIONAL.
   iE-Extensions
GanssDataBits-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
ReqDataBitAssistanceList ::=
                              SEQUENCE {
   ganssSignalID
                              BIT STRING (SIZE (8)),
   ganssDataBitInterval
                              INTEGER (0..15),
   ganssSatelliteInfo
                              SEQUENCE (SIZE (1..maxGANSSSat)) OF INTEGER (0..63)
                                                                                                     OPTIONAL,
                              ProtocolExtensionContainer { { ReqDataBitAssistanceList-ExtIEs } }
   iE-Extensions
                                                                                                     OPTIONAL,
ReqDataBitAssistanceList-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
   . . .
```

```
-- Information Exchange ID
__ *********************
InformationExchangeID ::= INTEGER (0..1048575)
__ **********************
-- Information Report Characteristics
__ ********************
InformationReportCharacteristics ::= SEQUENCE {
                      InformationReportCharacteristicsType,
   periodicity
                      InformationReportPeriodicity
                                                  OPTIONAL,
   -- present if type indicates periodic
InformationReportCharacteristicsType ::= ENUMERATED {
   onDemand,
   periodic,
   onModification,
InformationReportPeriodicity ::= CHOICE {
   min
               INTEGER (1..60, ...),
-- Unit min, Step 1min
   hour
               INTEGER (1..24, ...),
-- Unit hour, Step 1hour
-- Information Type
__ *******************************
InformationType ::= CHOICE {
   implicitInformation
                         MethodType,
   explicitInformation
                         ExplicitInformationList,
   . . .
```

```
ExplicitInformationList ::= SEOUENCE (SIZE (1..maxNrOfExpInfo)) OF ExplicitInformation
ExplicitInformation ::= CHOICE {
    almanacAndSatelliteHealth
                                       AlmanacAndSatelliteHealth,
    utcModel
                                       UtcModel,
                                       IonosphericModel,
    ionosphericModel
    navigationModel
                                       NavigationModel,
    dgpsCorrections
                                       DqpsCorrections,
                                       ReferenceTime,
    referenceTime
    acquisitionAssistance
                                       AcquisitionAssistance,
    realTimeIntegrity
                                       RealTimeIntegrity,
    almanacAndSatelliteHealthSIB
                                       AlmanacAndSatelliteHealthSIB-InfoType,
    . . . ,
    referenceLocation
                                       ReferenceLocation,
    ganss-Common-DataReg
                                       GANSSCommonDataReg,
                                       GANSSGenericDataList
    ganss-Generic-DataList
DganssCorrectionsReg ::= SEQUENCE {
    transmissionGanssTimeIndicator TransmissionGanssTimeIndicator
                                                                                                OPTIONAL,
    dganss-sig-id-reg
                                   DGANSS-Sig-Id-Reg,
    iE-Extensions
                                   ProtocolExtensionContainer { { DqanssCorrectionsReq-ExtIEs} } OPTIONAL,
DganssCorrectionsReg-ExtIEs PCAP-PROTOCOL-EXTENSION ::=
Ganss-almanacAndSatelliteHealthReq ::= SEQUENCE {
    transmissionGanssTimeIndicator TransmissionGanssTimeIndicator OPTIONAL,
                               ProtocolExtensionContainer { { Ganss-almanacAndSatelliteHealthReq-ExtIEs} } OPTIONAL,
    iE-Extensions
    . . .
Ganss-almanacAndSatelliteHealthReq-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSSCommonDataReq ::= SEQUENCE{
    ganss-ReferenceTime
                                   ENUMERATED {requested, not-requested}
                                                                          OPTIONAL,
                                   ENUMERATED {requested, not-requested}
    ganss-IonosphericModel
                                                                          OPTIONAL,
    ganss-ReferenceLocation
                                   ENUMERATED {requested, not-requested}
                                                                          OPTIONAL,
                                   ie-Extensions
                                                                                                                  OPTIONAL.
GANSSCommonDataReg-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    {ID id-GANSS-AddIonoModelReg
                                       CRITICALITY ignore EXTENSION
                                                                       GANSS-AddIonoModelReg
                                                                                                       PRESENCE
                                                                                                                      optional |
    {ID id-GANSS-EarthOrientParaReg
                                       CRITICALITY ignore EXTENSION
                                                                      GANSS-EarthOrientParaReq
                                                                                                       PRESENCE
                                                                                                                      optional } ,
```

```
GANSS-AddIonoModelReg ::= SEQUENCE
    dataID
                    BIT STRING (SIZE(2)),
    iE-Extensions ProtocolExtensionContainer { { GANSS-AddIonoModelReg-ExtIEs} } OPTIONAL,
GANSS-AddIonoModelReq-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-EarthOrientParaReg ::= SEQUENCE {
                    ENUMERATED {requested, not-requested},
    iE-Extensions ProtocolExtensionContainer { GANSS-EarthOrientParaReq-ExtIEs} }
GANSS-EarthOrientParaReq-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSSGenericDataList ::= SEQUENCE (SIZE(1..maxGANSS)) OF GANSSGenericDataReq
GANSSGenericDataReq ::= SEQUENCE {
                                                                                 OPTIONAL,
    ganssID
                                        GANSSID
    ganss-realTimeIntegrity
                                        Ganss-realTimeIntegrityReg
                                                                                 OPTIONAL,
    ganss-dataBitAssistance
                                        GanssDataBits
                                                                                 OPTIONAL,
    dganssCorrections
                                        DganssCorrectionsReg
                                                                                 OPTIONAL,
                                        Ganss-almanacAndSatelliteHealthReq
    ganss-almanacAndSatelliteHealth
                                                                                 OPTIONAL,
    ganss-referenceMeasurementInfo
                                        Ganss-referenceMeasurementInfoReq
                                                                                 OPTIONAL,
    ganss-utcModel
                                        Ganss-utcModelReq
                                                                                 OPTIONAL,
    ganss-TimeModel-Gnss-Gnss
                                        Ganss-TimeModel-Gnss-Gnss
                                                                                 OPTIONAL,
    navigationModel
                                        NavigationModelGANSS
                                                                                 OPTIONAL,
    . . . ,
    ganss-AddNavModelsReg
                                        AddNavigationModelsGANSS
                                                                                 OPTIONAL,
    ganss-AddUtcModelsReq
                                        GANSS-AddUtcModelsReq
                                                                                 OPTIONAL,
    ganss-AuxInfoReq
                                        GANSS-AuxInfoReq
                                                                                 OPTIONAL,
    -- the following IE shall be present if GANSSID is "0" (SBAS)
    qanss-SBAS-ID
                                        GANSS-SBAS-ID
                                                                                 OPTIONAL
AddNavigationModelsGANSS ::= SEQUENCE
    ganssWeek
                                INTEGER (0..4095),
    qanssT0E
                                INTEGER (0..167),
    t-toe-limit
                                INTEGER (0..10),
    addSatRelatedDataListGANSS AddSatelliteRelatedDataListGANSS,
    iE-Extensions
                                ProtocolExtensionContainer { { AddNavigationModelsGANSS-ExtIEs } }
                                                                                                           OPTIONAL,
    . . .
AddNavigationModelsGANSS-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
```

```
AddSatelliteRelatedDataListGANSS ::= SEOUENCE (SIZE (0..maxGANSSSat)) OF AddSatelliteRelatedDataGANSS
AddSatelliteRelatedDataGANSS ::= SEQUENCE {
    satID
                              INTEGER (0..63),
   iod
                              BIT STRING (SIZE(10)),
                              ProtocolExtensionContainer { { AddSatelliteRelatedDataGANSS-ExtIEs } } OPTIONAL,
   iE-Extensions
AddSatelliteRelatedDataGANSS-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-AddUtcModelsReq ::= SEQUENCE {
    transmissionGanssTimeIndicator TransmissionGanssTimeIndicator
                                                                                                    OPTIONAL,
                                  iE-Extensions
                                                                                                    OPTIONAL,
    . . .
GANSS-AddUtcModelsReq-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-AuxInfoReq ::= SEQUENCE {
    transmissionGanssTimeIndicator TransmissionGanssTimeIndicator
                                                                                                    OPTIONAL,
                                  ProtocolExtensionContainer { { GANSS-AuxInfoReq-ExtIEs} }
   iE-Extensions
                                                                                                    OPTIONAL,
GANSS-AuxInfoReg-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-SBAS-ID ::= ENUMERATED
                              waas,
                              egnos,
                              msas,
                              gagan,
Ganss-utcModelReq ::= SEQUENCE {
    transmissionGanssTimeIndicator TransmissionGanssTimeIndicator OPTIONAL,
                              ProtocolExtensionContainer { { Ganss-utcModelReq-ExtIEs} } OPTIONAL,
    iE-Extensions
    . . .
Ganss-utcModelReg-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
```

```
Ganss-realTimeIntegrityReq ::= SEQUENCE {
    transmissionGanssTimeIndicator TransmissionGanssTimeIndicator OPTIONAL,
                                ProtocolExtensionContainer { { Ganss-realTimeIntegrityReq-ExtIEs} } OPTIONAL,
Ganss-realTimeIntegrityReq-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
Ganss-referenceMeasurementInfoReq ::= SEQUENCE {
    transmissionGanssTimeIndicator TransmissionGanssTimeIndicator OPTIONAL,
                                ProtocolExtensionContainer { { Ganss-referenceMeasurementInfoReg-ExtIEs} } OPTIONAL,
    . . .
Ganss-referenceMeasurementInfoReq-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
Ganss-TimeModel-Gnss-Gnss ::= SEQUENCE{
    ganssTimeModelGnssGnssExt
                                    BIT STRING (SIZE(9)),
    transmissionGanssTimeIndicator TransmissionGanssTimeIndicator OPTIONAL,
                                    ProtocolExtensionContainer { { Ganss-TimeModel-Gnss-Gnss-ExtIEs} } OPTIONAL,
    iE-Extensions
Ganss-TimeModel-Gnss-Gnss-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
TransmissionGanssTimeIndicator ::= ENUMERATED {
    requested,
    not-Requested
AlmanacAndSatelliteHealth ::= NULL
UtcModel ::= SEQUENCE {
    transmissionTOWIndicator
                                TransmissionTOWIndicator,
                                ProtocolExtensionContainer { { UtcModel-ExtIEs } } OPTIONAL,
    iE-Extensions
    . . .
UtcModel-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
IonosphericModel ::= SEQUENCE {
```

```
transmissionTOWIndicator
                                TransmissionTOWIndicator,
    iE-Extensions
                                ProtocolExtensionContainer { { IonosphericModel-ExtIEs } } OPTIONAL,
IonosphericModel-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
NavigationModel ::= SEQUENCE {
    transmissionTOWIndicator
                                    TransmissionTOWIndicator,
    navModelAdditionalData
                                        NavModelAdditionalData
                                                                         OPTIONAL,
                                ProtocolExtensionContainer { { NavigationModel-ExtIEs } }
   iE-Extensions
NavigationModel-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
NavModelAdditionalData ::= SEQUENCE {
    qps-Week
                                INTEGER (0..1023),
   qps-TOE
                                INTEGER (0..167),
   t-TOE-limit
                                INTEGER (0..10),
    satRelatedDataList
                                SatelliteRelatedDataList,
                                ProtocolExtensionContainer { { NavModelAdditionalData-ExtIEs } } OPTIONAL,
    iE-Extensions
NavModelAdditionalData-ExtIEs PCAP-PROTOCOL-EXTENSION ::=
SatelliteRelatedDataList ::= SEOUENCE (SIZE (0..maxSat)) OF SatelliteRelatedData
SatelliteRelatedData ::= SEQUENCE {
    satID
                                INTEGER (0..63),
    iode
                                INTEGER (0..255),
    iE-Extensions
                                ProtocolExtensionContainer { { SatelliteRelatedData-ExtIEs } } OPTIONAL,
SatelliteRelatedData-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    . . .
NavigationModelGANSS ::= SEQUENCE {
    qanssWeek
                                INTEGER (0..4095),
    qanssT0E
                                INTEGER (0..167),
    t-toe-limit
                                INTEGER (0..10),
    satRelatedDataListGANSS
                                SatelliteRelatedDataListGANSS
    iE-Extensions
                                ProtocolExtensionContainer { { NavigationModelGANSS-ExtIEs } } OPTIONAL,
    . . .
```

```
NavigationModelGANSS-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
SatelliteRelatedDataListGANSS ::= SEQUENCE (SIZE (0..maxGANSSSat)) OF SatelliteRelatedDataGANSS
SatelliteRelatedDataGANSS ::= SEQUENCE {
                             INTEGER (0..63),
   iod
                             BIT STRING (SIZE(10)),
                             ProtocolExtensionContainer { { SatelliteRelatedDataGANSS-ExtIEs } } OPTIONAL,
   iE-Extensions
SatelliteRelatedDataGANSS-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
DgpsCorrections ::= NULL
ReferenceTime ::= NULL
AcquisitionAssistance ::= NULL
RealTimeIntegrity ::= NULL
AlmanacAndSatelliteHealthSIB-InfoType ::= SEQUENCE {
   transmissionTOWIndicator
                                 TransmissionTOWIndicator,
   iE-Extensions
                              ProtocolExtensionContainer { { AlmanacAndSatelliteHealthSIB-InfoType-ExtIEs } } OPTIONAL,
    . . .
AlmanacAndSatelliteHealthSIB-InfoType-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
ReferenceLocation ::= NULL
TransmissionTOWIndicator ::= ENUMERATED {
   requested,
   not-Requested
    *************
-- Message Structure
  ************************
MessageStructure ::= SEQUENCE (SIZE (1..maxNrOfLevels)) OF
   SEQUENCE {
       iE-ID
                              ProtocolIE-ID,
                             MessageStructureRepetition
       repetitionNumber
                                                                                      OPTIONAL,
```

```
ProtocolExtensionContainer { {MessageStructure-ExtIEs} }
      iE-Extensions
                                                                      OPTIONAL,
MessageStructureRepetition ::= INTEGER (1..256)
MessageStructure-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
  *****************
-- Measurement Instructions Used
__ **********************
MeasInstructionsUsed ::= SEQUENCE {
   measurementValidity
                        MeasurementValidity,
                        ProtocolExtensionContainer { { MeasInstructionsUsed-ExtIEs } } OPTIONAL,
   iE-Extensions
MeasInstructionsUsed-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    -- Measurement Validity
__ *********************
MeasurementValidity ::= SEQUENCE {
                  ENUMERATED { cell-DCH, all-States-Except-Cell-DCH, all-States, ... },
                 ProtocolExtensionContainer { { MeasurementValidity-ExtIEs } } OPTIONAL,
  iE-Extensions
MeasurementValidity-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
  *****************
-- Method Type
__ ******************
MethodType ::= ENUMERATED {
   ue-assisted,
   ue-based
```

```
__ ********************
-- OTDOA Measurement Group
  OTDOA-MeasurementGroup ::=
                                  SEQUENCE {
   otdoa-ReferenceCellInfo
                                      OTDOA-ReferenceCellInfo,
   otdoa-NeighbourCellInfoList
                                      OTDOA-NeighbourCellInfoList,
                                      OTDOA-MeasuredResultsSets,
   otdoa-MeasuredResultsSets
   iE-Extensions
                                      ProtocolExtensionContainer { { OTDOA-MeasurementGroup-ExtIEs } }
                                                                                                           OPTIONAL,
    . . .
OTDOA-MeasurementGroup-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
OTDOA-ReferenceCellInfo ::=
                                      SEQUENCE {
   uC-ID
                                      UC-ID,
   uTRANAccessPointPositionAltitude
                                      UTRANAccessPointPositionAltitude.
   tUTRANGPSMeasurementValueInfo
                                      TUTRANGPSMeasurementValueInfo
                                                                                                                          OPTIONAL,
                                      ProtocolExtensionContainer { { OTDOA-ReferenceCellInfo-ExtIEs } }
   iE-Extensions
                                                                                                                  OPTIONAL,
    . . .
OTDOA-ReferenceCellInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    { ID id-TUTRANGANSSMeasurementValueInfo
                                             CRITICALITY ignore EXTENSION TUTRANGANSSMeasurementValueInfo
                                                                                                                                 PRESENCE
optional }|
    { ID id-additionalMeasurementInforLCR
                                             CRITICALITY ignore EXTENSION AdditionalMeasurementInforLCR
                                                                                                                                 PRESENCE
optional },
    -- 1.28Mcps TDD only
    . . .
OTDOA-ReferenceCellInfoSAS-centric ::=
                                             SEOUENCE {
                                      UC-ID,
                                      ProtocolExtensionContainer { { OTDOA-ReferenceCellInfoSAS-centric-ExtIEs } }
   iE-Extensions
                                                                                                                          OPTIONAL,
OTDOA-ReferenceCellInfoSAS-centric-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
OTDOA-NeighbourCellInfoList ::=
                                      SEQUENCE (SIZE (1..maxNrOfMeasNCell)) OF
   OTDOA-NeighbourCellInfo
OTDOA-NeighbourCellInfo ::=
                                      SEQUENCE {
   uC-ID
                                      UC-ID,
                                      UTRANAccessPointPositionAltitude,
   uTRANAccessPointPositionAltitude
   relativeTimingDifferenceInfo
                                      RelativeTimingDifferenceInfo,
   iE-Extensions
                                      ProtocolExtensionContainer { { OTDOA-NeighbourCellInfo-ExtIEs } }
                                                                                                                  OPTIONAL,
    . . .
```

```
OTDOA-NeighbourCellInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
OTDOA-MeasuredResultsSets ::=
                                        SEQUENCE (SIZE (1..maxNrOfMeasurements)) OF
    OTDOA-MeasuredResultsInfoList
OTDOA-MeasuredResultsInfoList ::=
                                        SEQUENCE (SIZE (1..maxNrOfMeasNCell)) OF
    OTDOA-MeasuredResultsInfo
OTDOA-MeasuredResultsInfo ::=
                                        SEQUENCE {
    uC-ID
                                        UC-ID,
    ue-SFNSFNTimeDifferenceType2Info
                                        UE-SFNSFNTimeDifferenceType2Info,
    iE-Extensions
                                        ProtocolExtensionContainer { { OTDOA-MeasuredResultsInfo-ExtIEs } }
                                                                                                                          OPTIONAL,
OTDOA-MeasuredResultsInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    {ID id-OTDOA-AddMeasuredResultsInfo CRITICALITY ignore EXTENSION OTDOA-AddMeasuredResultsInfo
                                                                                                          PRESENCE
                                                                                                                          optional},
    . . .
OTDOA-AddMeasuredResultsInfo ::= SEQUENCE
    primaryCPICH-Info
                            PrimaryScramblingCode,
                            ProtocolExtensionContainer { { OTDOA-AddMeasuredResultsInfo-ExtIEs } }
    iE-Extensions
                                                                                                                  OPTIONAL,
OTDOA-AddMeasuredResultsInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
UE-SFNSFNTimeDifferenceType2Info ::=
                                        SEOUENCE {
    ue-SFNSFNTimeDifferenceType2
                                        INTEGER (0..40961),
    ue-PositioningMeasQuality
                                        UE-PositioningMeasQuality,
    measurementDelay
                                        INTEGER (0..65535),
    iE-Extensions
                                        ProtocolExtensionContainer { { UE-SFNSFNTimeDifferenceInfo-ExtIEs } }
                                                                                                                          OPTIONAL,
    . . .
UE-SFNSFNTimeDifferenceInfo-ExtlEs PCAP-PROTOCOL-EXTENSION ::= {
UC-ID ::=
                                        SEOUENCE ·
    rNC-ID
                                        INTEGER (0..4095),
    c-ID
                                        INTEGER (0..65535),
    iE-Extensions
                                        ProtocolExtensionContainer { { UC-ID-ExtIEs } }
                                                                                             OPTIONAL,
UC-ID-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
```

259

```
CRITICALITY reject
    { ID id-Extended-RNC-ID
                                                        EXTENSION
                                                                     Extended-RNC-ID PRESENCE
                                                                                                 optional},
Extended-RNC-ID ::= INTEGER (4096..65535)
RelativeTimingDifferenceInfo ::= CHOICE {
    sFNSFNMeasurementValueInfo
                                        SFNSFNMeasurementValueInfo,
    tUTRANGPSMeasurementValueInfo
                                        TUTRANGPSMeasurementValueInfo,
    tUTRANGANSSMeasurementValueInfo
                                        TUTRANGANSSMeasurementValueInfo
SFNSFNMeasurementValueInfo ::= SEQUENCE {
    sFNSFNValue
                                        SFNSFNValue,
    sFNSFNOuality
                                        SFNSFNOuality
                                                                                                                                 OPTIONAL,
                                        SFNSFNDriftRate,
    sFNSFNDriftRate
                                        SFNSFNDriftRateQuality
    sFNSFNDriftRateOuality
                                                                                                                                 OPTIONAL,
                                        ProtocolExtensionContainer { { SFNSFNMeasurementValueInfo-ExtIEs } }
                                                                                                                  OPTIONAL,
    iE-Extensions
    . . .
SFNSFNMeasurementValueInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
SFNSFNValue ::=
                                        INTEGER (0..614399)
SFNSFNOuality ::=
                                        INTEGER (0..255)
-- Unit chip, Step 1/16 chip, Range 0.. 255/16 chip
SFNSFNDriftRate ::=
                                        INTEGER (-100..100)
-- Unit chip/s, Step 1/256 chip/s, Range -100/256..+100/256 chip/s
SFNSFNDriftRateQuality ::=
                                        INTEGER (0..100)
-- Unit chip/s, Step 1/256 chip/s, Range 0..100/256 chip/s
TUTRANGPSMeasurementValueInfo ::= SEQUENCE {
    sFN
                                        SFN,
    tUTRANGPS
                                        TUTRANGPS,
    tUTRANGPSQuality
                                        TUTRANGPSQuality
                                                                                                                                         OPTIONAL,
                                        TUTRANGPSDriftRate,
    tUTRANGPSDriftRate
    tUTRANGPSDriftRateQuality
                                        TUTRANGPSDriftRateQuality
                                                                                                                                         OPTIONAL,
                                        ProtocolExtensionContainer { { TUTRANGPSMeasurementValueInfo-ExtIEs } } OPTIONAL,
    iE-Extensions
TUTRANGPSMeasurementValueInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
SFN ::=
                                        INTEGER (0..4095)
```

```
TUTRANGPS ::=
                                      SEQUENCE {
   ms-part
                                     INTEGER (0..16383),
                                      INTEGER (0..4294967295)
   ls-part
TUTRANGPSQuality ::=
                                     INTEGER (0..255)
-- Unit chip, Step 1/16 chip, Range 0.. 255/16 chip
TUTRANGPSDriftRate ::=
                                     INTEGER (-50..50)
-- Unit chip/s, Step 1/256 chip/s, Range -50/256..+50/256 chip/s
TUTRANGPSDriftRateQuality ::=
                                     INTEGER (0..50)
-- Unit chip/s, Step 1/256 chip/s, Range 0..50/256 chip/s
TUTRANGANSSMeasurementValueInfo ::= SEQUENCE {
   ganssID
                                      GANSSID
                                                            OPTIONAL,
   sFN
                                     SFN,
   tUTRANGANSS
                                     TUTRANGANSS,
   tUTRANGANSSOuality
                                      INTEGER (0..255)
                                                            OPTIONAL,
   tUTRANGANSSDriftRate
                                     INTEGER (-50..50),
   tUTRANGANSSDriftRateQuality
                                     INTEGER (0..50)
                                                            OPTIONAL,
                                     ProtocolExtensionContainer { { TUTRANGANSSMeasurementValueInfo-ExtIEs } }
   iE-Extensions
                                                                                                                  OPTIONAL,
TUTRANGANSSMeasurementValueInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
TUTRANGANSS ::=
                                         SEQUENCE {
   ms-part
                                      INTEGER (0..16383),
   ls-part
                                     INTEGER (0..4294967295)
AdditionalMeasurementInforLCR ::= SEOUENCE
   timingAdvanceLCR-R7
                         TimingAdvanceLCR-R7,
   rxTimingDeviationLCR
                              RxTimingDeviationLCR,
   angleOfArrivalLCR
                              AngleOfArrivalLCR
                                                         OPTIONAL,
                              ProtocolExtensionContainer { { AdditionalMeasurementInforLCR-ExtIEs } } OPTIONAL,
   iE-Extensions
    . . .
AdditionalMeasurementInforLCR-ExtIEs PCAP-PROTOCOL-EXTENSION ::=
TimingAdvanceLCR-R7 ::=
                          INTEGER (0..8191)
  *******************
-- Periodic Position Calculation Info
__ **********************
```

```
PeriodicPosCalcInfo ::= SEQUENCE {
   referenceNumber
                           INTEGER (0..32767, ...),
   amountOutstandingRequests INTEGER (1..8639999, ...),
   reportingInterval
                           INTEGER (1..8639999, ...),
   iE-Extensions
                           ProtocolExtensionContainer { { PeriodicPosCalcInfo-ExtIEs } }
PeriodicPosCalcInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
-- Periodic Location Info
__ ********************
PeriodicLocationInfo ::= SEQUENCE {
   reportingAmount
                           INTEGER (1..8639999, ...),
   reportingInterval
                           INTEGER (1..8639999, ...),
   iE-Extensions
                           ProtocolExtensionContainer { { PeriodicLocationInfo-ExtIEs } } OPTIONAL,
   . . .
PeriodicLocationInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
-- Periodic Termination Cause
  ************************
PeriodicTerminationCause ::= ENUMERATED {
                 rrc-state-transition,
                 cancelled-by-srnc,
                 cancelled-by-sas,
                 undefined,
    -- Positioning Method
  ******************
PositioningMethod ::= SEQUENCE {
   additional Method Type
                              AdditionalMethodType,
   selectedPositionMethod
                              SelectedPositionMethod,
   iE-Extensions
                               ProtocolExtensionContainer { { PositioningMethod-ExtIEs } } OPTIONAL,
```

```
PositioningMethod-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
-- The following IE shall be present if the Selected Position Method IE value is set to "GNSS" or 'OTDOA or GNSS'
   { ID id-GNSS-PositioningMethod CRITICALITY ignore EXTENSION GNSS-PositioningMethod
GNSS-PositioningMethod ::= BIT STRING (SIZE(9))
SelectedPositionMethod ::= ENUMERATED {
   oTDOA,
   qPS,
   oTDOA-or-GPS,
   cell-id,
   uTDOA,
   . . . ,
   qNSS,
   oTDOA-or-GNSS
  *****************
-- Positioning Priority
__ ********************
PositioningPriority ::= ENUMERATED
   high-priority,
   normal-priority,
  *****************
-- RRC State Change
__ *******************
RRCstateChange ::= SEQUENCE {
   new-ue-State
                   ENUMERATED { cell-DCH, cell-FACH, cell-PCH, ura-PCH, ... },
   iE-Extensions
                   ProtocolExtensionContainer { { RRCstateChange-ExtIEs } }
   . . .
RRCstateChange-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
  *****************
-- Requested Data Value
```

```
RequestedDataValue ::= SEQUENCE {
   qpsAlmanacAndSatelliteHealth
                                     GPS-AlmanacAndSatelliteHealth
                                                                                                 OPTIONAL,
                                     GPS-UTC-Model
   qps-UTC-Model
                                                                                                 OPTIONAL,
   qps-Ionospheric-Model
                                     GPS-Ionospheric-Model
                                                                                                 OPTIONAL,
                                     GPS-NavigationModel
   qps-NavigationModel
                                                                                                 OPTIONAL,
   dgpsCorrections
                                     DGPSCorrections
                                                                                                 OPTIONAL,
   referenceTime
                                     GPS-ReferenceTime
                                                                                                 OPTIONAL,
   gps-AcquisitionAssistance
                                     GPS-AcquisitionAssistance
                                                                                                 OPTIONAL,
   gps-RealTime-Integrity
                                     GPS-RealTimeIntegrity
                                                                                                 OPTIONAL,
   almanacAndSatelliteHealthSIB
                                     AlmanacAndSatelliteHealthSIB
                                                                                                 OPTIONAL,
   qps-Transmission-TOW
                                     GPS-Transmission-TOW
                                                                                                 OPTIONAL,
   iE-Extensions
                                     ProtocolExtensionContainer { { RequestedDataValue-ExtIEs} }
                                                                                                 OPTIONAL,
--at least one of the above IEs shall be present in the requested data value
RequestedDataValue-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
     ID id-GPS-ReferenceLocation
                                        CRITICALITY ignore EXTENSION GPS-ReferenceLocation
                                                                                                               PRESENCE optional }
     ID id-GANSS-CommonAssistanceData
                                        CRITICALITY ignore EXTENSION GANSS-CommonAssistanceData
                                                                                                               PRESENCE optional }
     ID id-GANSS-GenericAssistanceDataList CRITICALITY iqnore EXTENSION GANSS-GenericAssistanceDataList
                                                                                                        PRESENCE optional }.
     -- Requested Data Value Information
__ *********************
RequestedDataValueInformation ::= CHOICE {
                             InformationAvailable,
   informationAvailable
   informationNotAvailable
                             InformationNotAvailable
InformationAvailable::= SEQUENCE {
   requestedDataValue
                         RequestedDataValue,
                         ProtocolExtensionContainer { { InformationAvailable-ExtIEs} }
   iE-Extensions
InformationAvailable-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
InformationNotAvailable ::= NULL
__ *******************
-- Request Type
```

```
__ ********************
RequestType ::= SEQUENCE {
   event.
               RequestTypeEvent,
   reportArea
               RequestTypeReportArea,
   horizontalaccuracyCode RequestTypeAccuracyCode
                                            OPTIONAL,
   iE-Extensions ProtocolExtensionContainer { { RequestType-ExtIEs} }
                                                           OPTIONAL,
RequestType-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
RequestTypeEvent ::= ENUMERATED {
   stop-change-of-service-area,
   direct,
   change-of-service-area,
   stop-direct,
   . . . ,
   periodic,
   stop-periodic
RequestTypeReportArea ::= ENUMERATED {
   service-area,
   geographical-area,
   . . .
RequestTypeAccuracyCode ::= INTEGER (0..127)
__ *********************
-- Response Time
__ ********************
ResponseTime ::= ENUMERATED {
   low-delay,
   delay-tolerant,
   . . .
  *****************
-- Horizontal Accuracy Code
__ ********************
HorizontalAccuracyCode
                         ::= INTEGER (0..127)
__ ********************
-- UE Positioning Capability
```

```
__ *********************
UE-PositioningCapability ::= SEQUENCE
    standAloneLocationMethodsSupported BOOLEAN,
    ueBasedOTDOASupported
                                       BOOLEAN,
    networkAssistedGPSSupport
                                       NetworkAssistedGPSSuport,
    supportGPSTimingOfCellFrame
                                       BOOLEAN,
    supportForIPDL
                                       BOOLEAN.
    supportForRxTxTimeDiff
                                       BOOLEAN.
    supportForUEAGPSinCellPCH
                                       BOOLEAN,
    supportForSFNSFNTimeDiff
                                       BOOLEAN.
    iE-Extensions
                                       ProtocolExtensionContainer { {UE-PositioningCapability-ExtIEs} } OPTIONAL,
    . . .
UE-PositioningCapability-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    { ID id-NetworkAssistedGANSSSuport
                                               CRITICALITY ignore EXTENSION NetworkAssistedGANSSSupport
                                                                                                                                      PRESENCE
optional },
NetworkAssistedGANSSSupport ::= SEQUENCE (SIZE (1..maxGANSS)) OF SEQUENCE {
                                       GANSSID
                                                                                       OPTIONAL,
    qanssID
                                       ENUMERATED {
    ganssMode
                                               networkBased.
                                               ue-Based,
                                               both,
                                               none
    ganssSignalID
                                       GANSS-SignalID
                                                                                       OPTIONAL,
    supportGANSSTimingOfCellFrame
                                       BOOLEAN,
    supportGANSSCarrierPhaseMeasurement BOOLEAN,
    iE-Extensions ProtocolExtensionContainer { { NetworkAssistedGANSSSuport-ExtIEs} } OPTIONAL,
    . . .
NetworkAssistedGANSSSuport-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    -- the following IE shall be present if "GANSSID" in "NetworkAssistedGANSSSupport" is "0" (SBAS)
     ID id-GANSS-SBAS-IDs
                                           CRITICALITY ignore EXTENSION GANSS-SBAS-IDs
                                                                                                                       PRESENCE optional }
     ID id-GANSS-Signal-IDs
                                           CRITICALITY ignore EXTENSION GANSS-Signal-IDs
                                                                                                                       PRESENCE optional }
    { ID id-supportGANSSNonNativeADchoices CRITICALITY ignore EXTENSION SupportGANSSNonNativeADchoices PRESENCE optional },
    . . .
NetworkAssistedGPSSuport ::= ENUMERATED {
    network-based,
   ue-based,
   both.
    none,
GANSS-SBAS-IDs ::= SEQUENCE
    ganss-sbas-ids
                       BIT STRING (SIZE(8)),
    iE-Extensions
                       ProtocolExtensionContainer { { GANSS-SBAS-IDs-ExtIEs} } OPTIONAL,
```

266

```
GANSS-SBAS-IDs-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-Signal-IDs ::= SEQUENCE {
   ganss-signal-ids BIT STRING (SIZE(8)),
   iE-Extensions
                   ProtocolExtensionContainer { GANSS-Signal-IDs-ExtIEs} }
                                                                       OPTIONAL,
   . . .
GANSS-Signal-IDs-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
SupportGANSSNonNativeADchoices ::= BOOLEAN
__ ********************
-- UTDOA Positioning (Position Activation Request Message)
  *****************
UTDOAPositioning ::= SEQUENCE {
   utdoa-BitCount UTDOA-BitCount,
                       UTDOA-TimeInterval,
   utdoa-timeInterval
   iE-Extensions ProtocolExtensionContainer { { UTDOAPositioning-ExtIEs } } OPTIONAL,
UTDOAPositioning-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
UTDOA-BitCount ::= INTEGER (0..5000)
UTDOA-TimeInterval ::= INTEGER (0..3000)
EnvironmentCharacterisation ::= ENUMERATED { heavyMultipathandNLOSconditions,
             noOrLightMultipathAndUsuallyLOSconditions,
             notDefinedOrMixedEnvironment,
__ ********************
-- GPS and GANSS Positioning (Position Activation Request Message)
```

```
GPSPositioning ::= SEOUENCE {
   gpsPositioningInstructions
                                   GPSPositioningInstructions,
    requestedDataValue
                                   RequestedDataValue
                                                              OPTIONAL.
   iE-Extensions
                                   ProtocolExtensionContainer { { GPSPositioning-ExtIEs } } OPTIONAL,
GPSPositioning-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GPSPositioningInstructions ::= SEQUENCE {
   horizontalAccuracyCode
                                      HorizontalAccuracyCode
                                                                                                                                   OPTIONAL,
   verticalAccuracyCode
                                       VerticalAccuracyCode
                                                                                                                                   OPTIONAL,
    qpsTimingOfCellWanted
                                      BOOLEAN,
    additionalAssistanceDataRequest
                                      BOOLEAN,
                                       iE-Extensions
                                                                                                             OPTIONAL,
GPSPositioningInstructions-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    {ID id-MeasurementValidity
                                   CRITICALITY
                                                  ignore
                                                              EXTENSION
                                                                              MeasurementValidity
                                                                                                             PRESENCE optional },
GANSSPositioning ::= SEQUENCE {
   ganssPositioningInstructions
                                   GANSS-PositioningInstructions,
   requestedDataValue
                                   RequestedDataValue
                                                                  OPTIONAL,
   iE-Extensions
                                   ProtocolExtensionContainer { GANSSPositioning-ExtIEs } } OPTIONAL,
GANSSPositioning-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
GANSS-PositioningInstructions ::= SEQUENCE {
   horizontalAccuracyCode
                                      HorizontalAccuracyCode
                                                                                                                                   OPTIONAL,
    verticalAccuracyCode
                                       VerticalAccuracyCode
                                                                                                                                   OPTIONAL,
    ganssTimingOfCellWanted
                                      BIT STRING (SIZE (8)),
    additionalAssistanceDataRequest
                                      BIT STRING (SIZE (8)),
   measurement Validity
                                      MeasurementValidity
                                                                                                                                   OPTIONAL,
                                       ProtocolExtensionContainer { { GANSS-PositioningInstructions-ExtIEs } } OPTIONAL,
   iE-Extensions
GANSS-PositioningInstructions-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    {ID id-GANSScarrierPhaseRequested CRITICALITY ignore EXTENSION
                                                                      GANSScarrierPhaseRequested
                                                                                                      PRESENCE optional |
    {ID id-GANSSMultiFreqMeasRequested CRITICALITY ignore EXTENSION
                                                                      GANSSMultiFreqMeasRequested
                                                                                                      PRESENCE optional },
    . . .
```

```
GANSScarrierPhaseRequested ::= BIT STRING (SIZE (8))
GANSSMultiFreqMeasRequested ::= BIT STRING (SIZE (8))
__ ********************
-- OTDOA Assistance Data
__ *********************
OTDOAAssistanceData ::= SEQUENCE {
   uE-Positioning-OTDOA-AssistanceData
                                            UE-Positioning-OTDOA-AssistanceData,
   iE-Extensions
                                            ProtocolExtensionContainer { { OTDOAAssistanceData-ExtIEs } } OPTIONAL,
   . . .
OTDOAAssistanceData-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
   **********
-- UE Positioning OTDOA Assistance Data
__ ******************
UE-Positioning-OTDOA-AssistanceData ::=
                                        SEQUENCE {
   ue-positioning-OTDOA-ReferenceCellInfo
                                                UE-Positioning-OTDOA-ReferenceCellInfo
                                                                                                 OPTIONAL,
   ue-positioning-OTDOA-NeighbourCellList
                                                UE-Positioning-OTDOA-NeighbourCellList
                                                                                                 OPTIONAL,
   iE-Extensions
                                                ProtocolExtensionContainer { { UE-Positioning-OTDOAAssistanceData-ExtIEs } } OPTIONAL,
   . . .
UE-Positioning-OTDOAAssistanceData-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
UE-Positioning-OTDOA-ReferenceCellInfo ::= SEQUENCE {
                                                                      OPTIONAL,
   modeSpecificInfo CHOICE {
       fdd
                                            SEQUENCE {
          primaryCPICH-Info
                                            PrimaryScramblingCode,
                                            SEQUENCE {
       tdd
          cellParameterID
                                            CellParameterID,
       --- coding is FFS
       . . .
   frequencyInfo
                                    FrequencyInfo
                                                                      OPTIONAL,
   positioningMode CHOICE {
       ueBased
                                            SEQUENCE {
```

268

```
cellPosition
                                                        ReferenceCellPosition
                                                                                OPTIONAL,
            -- actual value roundTripTime = (IE value * 0.0625) + 876
           roundTripTime
                                                INTEGER (0..32766)
                                                                                OPTIONAL.
                                                SEQUENCE {
       ueAssisted
    ue-positioning-IPDL-Paremeters
                                                UE-Positioning-IPDL-Parameters OPTIONAL,
    iE-Extensions
                                        ProtocolExtensionContainer { { UE-Positioning-OTDOAReferenceCellInfo-ExtIEs } } OPTIONAL,
UE-Positioning-OTDOAReferenceCellInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
     ID id-ExtendedRoundTripTime CRITICALITY ignore EXTENSION ExtendedRoundTripTime
                                                                                                PRESENCE optional } |
                                                                                                                     -- FDD only
     ID id-timingAdvanceLCR-R7
                                    CRITICALITY ignore EXTENSION TimingAdvanceLCR-R7
                                                                                                PRESENCE optional | -- 1.28Mcps TDD only
     ID id-rxTimingDeviationLCR
                                    CRITICALITY ignore EXTENSION RXTimingDeviationLCR
                                                                                                PRESENCE optional } -- 1.28Mcps TDD only
     ID id-angleOfArrivalLCR
                                    CRITICALITY ignore EXTENSION AngleOfArrivalLCR
                                                                                                PRESENCE optional }, -- 1.28Mcps TDD only
ReferenceCellPosition ::=
                                    CHOICE {
    ellipsoidPoint
                                        GeographicalCoordinates,
    ellipsoidPointWithAltitude
                                        GA-PointWithAltitude,
UE-Positioning-IPDL-Parameters ::=
                                            SEQUENCE {
    modeSpecificInfo
                                        CHOICE {
        fdd
                                            SEQUENCE {
           ip-Spacing
                                                IP-Spacing,
           ip-Length
                                                IP-Length,
           ip-Offset
                                                INTEGER (0..9),
           seed
                                                INTEGER (0..63),
       tdd
                                            SEQUENCE {
            -- coding is FFS
    burstModeParameters
                                        BurstModeParameters
                                                                        OPTIONAL,
                                        ProtocolExtensionContainer { { UE-Positioning-IPDL-Parameters-ExtIEs } } OPTIONAL,
    iE-Extensions
UE-Positioning-IPDL-Parameters-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
```

```
IP-Spacing ::=
                                     ENUMERATED {
                                        e5, e7, e10, e15, e20,
                                        e30, e40, e50, ... }
                                     ENUMERATED {
IP-Length ::=
                                        ipl5, ipl10, ... }
BurstModeParameters ::=
                                    SEQUENCE {
                                        INTEGER (0..15),
   burstStart
   burstLength
                                        INTEGER (10..25),
   burstFreq
                                        INTEGER (1..16),
                                        ProtocolExtensionContainer { { BurstModeParameters-ExtIEs } } OPTIONAL,
    iE-Extensions
BurstModeParameters-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
UE-Positioning-OTDOA-NeighbourCellList ::= SEQUENCE (SIZE (1..maxCellMeas)) OF
                                            UE-Positioning-OTDOA-NeighbourCellInfo
UE-Positioning-OTDOA-NeighbourCellInfo ::= SEQUENCE {
    modeSpecificInfo
                      CHOICE {
        fdd
                                        SEQUENCE {
            primaryCPICH-Info
                                                PrimaryScramblingCode,
       tdd
                                        SEQUENCE {
           cellParameterID
                                                CellParameterID,
           -- coding is FFS
    frequencyInfo
                                        FrequencyInfo
                                                                             OPTIONAL,
    ue-positioning-IPDL-Paremeters
                                        UE-Positioning-IPDL-Parameters
                                                                             OPTIONAL,
    sfn-SFN-RelTimeDifference
                                        SFN-SFN-RelTimeDifference1,
    sfn-Offset-Validity
                                        SFN-Offset-Validity
                                                                             OPTIONAL,
    sfn-SFN-Drift
                                        SFN-SFN-Drift
                                                                             OPTIONAL,
    searchWindowSize
                                        OTDOA-SearchWindowSize,
    positioningMode
                        CHOICE {
       ueBased
                                                SEQUENCE {
           relativeNorth
                                                INTEGER (-20000..20000)
                                                                                     OPTIONAL,
           relativeEast
                                                                                     OPTIONAL,
                                                INTEGER (-20000..20000)
                                                INTEGER (-4000..4000)
           relativeAltitude
                                                                                     OPTIONAL,
            fineSFN-SFN
                                                FineSFNSFN
                                                                                     OPTIONAL,
            -- actual value roundTripTime = (IE value * 0.0625) + 876
            roundTripTime
                                                INTEGER (0.. 32766)
                                                                                     OPTIONAL,
```

```
ueAssisted
                                           SEQUENCE {
       },
                                    ProtocolExtensionContainer { { UE-Positioning-OTDOANeighbourCellInfo-ExtIEs } } OPTIONAL,
   iE-Extensions
UE-Positioning-OTDOANeighbourCellInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
   PRESENCE optional }, -- FDD only
SFN-SFN-RelTimeDifference1 ::=
                                SEQUENCE {
                                    INTEGER (0 .. 4095),
   sfn-Offset
   sfn-sfn-Reltimedifference
                                    INTEGER (0.. 38399),
                                    ProtocolExtensionContainer { { SFN-SFN-RelTimeDifference1-ExtIEs } } OPTIONAL,
   iE-Extensions
SFN-SFN-RelTimeDifference1-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
                            ENUMERATED { false }
SFN-Offset-Validity ::=
OTDOA-SearchWindowSize ::=
                                 ENUMERATED {
                                    c20, c40, c80, c160, c320,
                                    c640, c1280, moreThan1280, ... }
SFN-SFN-Drift ::=
                                 ENUMERATED {
                                    sfnsfndrift0, sfnsfndrift1, sfnsfndrift2,
                                    sfnsfndrift3, sfnsfndrift4, sfnsfndrift5,
                                    sfnsfndrift8, sfnsfndrift10, sfnsfndrift15,
                                    sfnsfndrift25, sfnsfndrift35, sfnsfndrift50,
                                    sfnsfndrift65, sfnsfndrift80, sfnsfndrift100,
                                    sfnsfndrift-1, sfnsfndrift-2, sfnsfndrift-3,
                                    sfnsfndrift-4, sfnsfndrift-5, sfnsfndrift-8,
                                    sfnsfndrift-10, sfnsfndrift-15, sfnsfndrift-25,
                                    sfnsfndrift-35, sfnsfndrift-50, sfnsfndrift-65,
                                    sfnsfndrift-80, sfnsfndrift-100, ...}
FineSFNSFN
            ::= INTEGER (0..15)
-- Range 0..0.9375 step size 0.0625
__ *********************
-- Vertical Accuracy Code
```

```
VerticalAccuracyCode
                               ::= INTEGER (0..127)
-- UTDOA Group
__ *********************
UTDOA-Group ::=
                       SEQUENCE {
   uC-ID
                                      UC-ID,
    frequencyInfo
                                      FrequencyInfo,
    uTDOA-ChannelSettings
                                      UTDOA-RRCState,
                                      ProtocolExtensionContainer { { UTDOA-Group-ExtIEs } }
   iE-Extensions
                                                                                               OPTIONAL,
UTDOA-Group-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
FrequencyInfo ::=
                                   SEQUENCE {
   modeSpecificInfo
                                      CHOICE {
       fdd
                                          FrequencyInfoFDD,
       tdd
                                          FrequencyInfoTDD,
                               ProtocolExtensionContainer { { FrequencyInfo-ExtIEs } }
                                                                                         OPTIONAL,
    iE-Extensions
FrequencyInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
FrequencyInfoFDD ::=
                                   SEQUENCE {
   uarfcn-UL
                                      UARFCN
                                                          OPTIONAL,
    uarfcn-DL
                                      UARFCN,
   iE-Extensions
                               ProtocolExtensionContainer { { FrequencyInfoFDD-ExtIEs } }
                                                                                             OPTIONAL,
FrequencyInfoFDD-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
FrequencyInfoTDD ::=
                                   SEQUENCE {
   uarfcn
                                      UARFCN,
   iE-Extensions
                       ProtocolExtensionContainer { {FrequencyInfoTDD-ExtIEs} }
                                                                                             OPTIONAL,
```

```
FrequencyInfoTDD-ExtlEs PCAP-PROTOCOL-EXTENSION ::= {
UTDOA-RRCState ::= CHOICE {
   uTDOA-CELLDCH UTDOA-CELLDCH,
   uTDOA-CELLFACH UTDOA-CELLFACH,
  ********
-- UTDOA Cell DCH Information
__ ***************
                       SEQUENCE {
UTDOA-CELLDCH ::=
   uL-DPCHInfo
                                              UL-DPCHInfo,
   compressedModeAssistanceData
                                              Compressed-Mode-Assistance-Data
                                                                                  OPTIONAL,
   dCH-Information
                                              DCH-Information
                                                                  OPTIONAL,
   e-DPCH-Information
                                              E-DPCH-Information OPTIONAL,
                                   ProtocolExtensionContainer { { UTDOA-CELLDCH-ExtIEs} } OPTIONAL,
   iE-Extensions
                           PCAP-PROTOCOL-EXTENSION ::= {
UTDOA-CELLDCH-ExtIEs
UL-DPCHInfo ::=
                                   CHOICE {
       fdd
                                          SEQUENCE {
           scramblingCodeType
                                              ScramblingCodeType,
           scramblingCode
                                              UL-ScramblingCode,
           tfci-Existence
                                              BOOLEAN,
           numberOfFBI-Bits
                                              NumberOfFBI-Bits,
                                              ProtocolExtensionContainer { { UL-DPCHInfoFDD-ExtIEs} } OPTIONAL,
           iE-Extensions
           . . .
       t.dd
                                          SEQUENCE {
           cellParameterID
                                              CellParameterID,
           tFCI-Coding
                                              TFCI-Coding,
           punctureLimit
                                              PuncturingLimit,
           repetitionPeriod
                                              RepetitionPeriod,
                                              RepetitionLength,
           repetitionLength
           tdd-DPCHOffset
                                              TDD-DPCHOffset,
           uL-Timeslot-Information
                                              UL-Timeslot-Information,
           frameOffset
                                              FrameOffset,
           specialBurstScheduling
                                              SpecialBurstScheduling,
           iE-Extensions
                                              ProtocolExtensionContainer { { UL-DPCHInfoTDD-ExtIEs} } OPTIONAL,
```

```
UL-DPCHInfoFDD-ExtIEs
                            PCAP-PROTOCOL-EXTENSION ::= {
                            PCAP-PROTOCOL-EXTENSION ::= {
UL-DPCHInfoTDD-ExtIEs
Compressed-Mode-Assistance-Data ::=
                                        SEQUENCE {
            dl-information
                                            DL-InformationFDD,
            ul-information
                                            UL-InformationFDD,
                                            ProtocolExtensionContainer { { Compressed-Mode-Assistance-DataFDD-ExtIEs} } OPTIONAL,
            iE-Extensions
                                                PCAP-PROTOCOL-EXTENSION ::= {
Compressed-Mode-Assistance-DataFDD-ExtIEs
DL-InformationFDD ::=
                                    SEQUENCE {
            primaryScramblingCode
                                            PrimaryScramblingCode,
                                            ChipOffset,
            chipOffset
            frameOffset
                                            FrameOffset,
            iE-Extensions
                                            ProtocolExtensionContainer { DL-InformationFDD-ExtIEs} } OPTIONAL,
DL-InformationFDD-ExtIEs
                                PCAP-PROTOCOL-EXTENSION ::= {
UL-InformationFDD ::=
            transmissionGapPatternSequenceInfo
                                                        Transmission-Gap-Pattern-Sequence-Information,
            activePatternSequenceInfo
                                                        Active-Pattern-Sequence-Information,
            cFN
                                                        ProtocolExtensionContainer { { UL-InformationFDD-ExtIEs} } OPTIONAL,
            iE-Extensions
UL-InformationFDD-ExtIEs
                                PCAP-PROTOCOL-EXTENSION ::= {
Transmission-Gap-Pattern-Sequence-Information ::= SEQUENCE (SIZE (1..maxTGPS)) OF
    SEQUENCE {
        tGPSID
                                            TGPSID,
        tGSN
                                            TGSN,
        tGL1
                                            GapLength,
```

```
tGL2
                                            GapLength OPTIONAL,
        t.GD
                                            TGD,
        t.GPL1
                                            GapDuration,
        uplink-Compressed-Mode-Method
                                            Uplink-Compressed-Mode-Method,
        iE-Extensions
                                            ProtocolExtensionContainer { {Transmission-Gap-Pattern-Sequence-Information-ExtIEs} } OPTIONAL,
Transmission-Gap-Pattern-Sequence-Information-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
                    ::= INTEGER (0|15..269)
-- 0 = Undefined, only one transmission gap in the transmission gap pattern sequence
TGPRC
                    ::= INTEGER (0..511)
-- 0 = infinity
TGPSID
                    ::= INTEGER (1.. maxTGPS)
TGSN
                    ::= INTEGER (0..14)
Uplink-Compressed-Mode-Method ::= ENUMERATED {
    sFdiv2,
    higher-layer-scheduling,
GapDuration
                       ::= INTEGER (1..144,...)
-- Unit frame
GapLength
                        ::= INTEGER (1..14)
-- Unit slot
Active-Pattern-Sequence-Information ::= SEQUENCE {
    cMConfigurationChangeCFN
    transmission-Gap-Pattern-Sequence-Status
                                                Transmission-Gap-Pattern-Sequence-Status-List OPTIONAL,
    iE-Extensions
                                                 ProtocolExtensionContainer { {Active-Pattern-Sequence-Information-ExtIEs} } OPTIONAL,
    . . .
Active-Pattern-Sequence-Information-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    . . .
Transmission-Gap-Pattern-Sequence-Status-List ::= SEQUENCE (SIZE (1..maxTGPS)) OF
    SEQUENCE {
        tGPSID
                            TGPSID,
        tGPRC
                            TGPRC,
        tGCFN
                            ProtocolExtensionContainer { { Transmission-Gap-Pattern-Sequence-Status-List-ExtIEs } } OPTIONAL,
        iE-Extensions
        . . .
```

```
Transmission-Gap-Pattern-Sequence-Status-List-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
DCH-Information ::=
                        SEOUENCE {
                                                TFCS,
    tFCS
    trChInfo
                                                TrChInfoList,
   iE-Extensions
                                                ProtocolExtensionContainer { { DCH-Information-ExtIEs} } OPTIONAL,
DCH-Information-ExtIEs
                         PCAP-PROTOCOL-EXTENSION ::= {
TrChInfoList ::= SEQUENCE (SIZE(1..maxTrCH)) OF
       UL-TrCHInfo
UL-TrCHInfo ::=
                    SEQUENCE {
   uL-TrCHtype
                                        UL-TrCHType,
    tfs
                                        TransportFormatSet,
    iE-Extensions
                                        ProtocolExtensionContainer { { UL-TrCHInfo-ExtIEs} } OPTIONAL,
                        PCAP-PROTOCOL-EXTENSION ::= {
UL-TrCHInfo-ExtIEs
UL-TrCHType ::=
                    ENUMERATED {dch, usch, ...}
E-DPCH-Information ::= SEQUENCE {
    maxSet-E-DPDCHs
                                                Max-Set-E-DPDCHs,
    ul-PunctureLimit
                                                PuncturingLimit,
                                                E-TFCS-Information,
    e-TFCS-Information
    e-TTI
                                                E-TTI,
                                                E-DPCCH-PO
    e-DPCCH-PO
                                                                    OPTIONAL,
                                                ProtocolExtensionContainer { { E-DPCH-Information-ExtIEs} }
    iE-Extensions
                                                                                                                         OPTIONAL,
E-DPCH-Information-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
Max-Set-E-DPDCHs ::= ENUMERATED {
    vN64, vN32, vN16, vN8, v2xN4, v2xN2, v2xN2plus2xN4,
```

```
-- Values related to TS 25.212 [16]
E-TFCS-Information ::= SEQUENCE {
    e-DCH-TFCS-Index
                                                    E-DCH-TFCS-Index,
    reference-E-TFCI-Information
                                                    Reference-E-TFCI-Information
                                                                                         OPTIONAL.
   iE-Extensions
                                                    ProtocolExtensionContainer { {E-TFCS-Information-ExtIEs} }
                                                                                                                         OPTIONAL,
E-TFCS-Information-ExtlEs PCAP-PROTOCOL-EXTENSION ::= {
E-DCH-TFCS-Index ::= INTEGER (1..4,...)
Reference-E-TFCI-Information ::= SEQUENCE (SIZE (1..maxNrOfRefETFCIs)) OF Reference-E-TFCI-Information-Item
Reference-E-TFCI-Information-Item ::= SEQUENCE {
    reference-E-TFCI
    reference-E-TFCI-PO
                                    Reference-E-TFCI-PO,
   iE-Extensions
                                    ProtocolExtensionContainer { { Reference-E-TFCI-Information-Item-ExtIEs} }
                                                                                                                         OPTIONAL,
Reference-E-TFCI-Information-Item-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
Reference-E-TFCI-PO ::= INTEGER (0.. maxNrOfRefETFCI-PO-OUANTSTEPs)
    -- FFS according to mapping in TS 25.213 [17]
E-TFCI ::= INTEGER (0..127)
E-TTI ::= ENUMERATED {
    e-TTI-2ms,
    e-TTI-10ms,
E-DPCCH-PO ::= INTEGER (0..maxNrOfEDPCCH-PO-QUANTSTEPs)
CellParameterID ::= INTEGER (0..127,...)
TFCI-Coding ::= ENUMERATED {
    v4,
    v8,
    v16,
    v32,
    . . .
RepetitionLength ::= INTEGER (1..63)
```

```
RepetitionPeriod ::= ENUMERATED {
    v1,
    v2.
    v4,
    v8,
    v16,
    v32,
    v64,
TDD-DPCHOffset ::= CHOICE {
    initialOffset
                        INTEGER (0..255),
    noinitialOffset
                        INTEGER (0..63)
UL-Timeslot-Information ::= SEQUENCE (SIZE (1..maxNrOfULTSs)) OF UL-Timeslot-InformationItem
maxNrOfULTSs
                            INTEGER ::= 15
UL-Timeslot-InformationItem ::= SEQUENCE {
    timeSlot
                                             TimeSlot,
    midambleShiftAndBurstType
                                            MidambleShiftAndBurstType,
    tFCI-Presence
                                             BOOLEAN,
    uL-Code-InformationList
                                             TDD-UL-Code-Information,
    iE-Extensions
                                             ProtocolExtensionContainer { { UL-Timeslot-InformationItem-ExtIEs} }
                                                                                                                           OPTIONAL,
UL-Timeslot-InformationItem-ExtIEs PCAP-PROTOCOL-EXTENSION ::=
TimeSlot ::= INTEGER (0..14)
MidambleShiftAndBurstType ::=
                                     CHOICE {
    type1
                                        SEQUENCE ·
        midambleConfigurationBurstType1And3 MidambleConfigurationBurstType1And3,
        midambleAllocationMode
                                             CHOICE
            defaultMidamble
                                                 NULL,
            commonMidamble
                                                 NULL,
                                                 MidambleShiftLong,
            ueSpecificMidamble
    . . .
    },
        midambleConfigurationBurstType2
                                            MidambleConfigurationBurstType2,
        midambleAllocationMode
                                             CHOICE {
            defaultMidamble
                                                 NULL,
            commonMidamble
                                                 NULL,
            ueSpecificMidamble
                                                 MidambleShiftShort,
```

```
type3
                                         SEQUENCE {
        midambleConfigurationBurstType1And3 MidambleConfigurationBurstType1And3,
        midambleAllocationMode
            defaultMidamble
                                                 NULL,
            ueSpecificMidamble
                                                 MidambleShiftLong,
        . . .
MidambleShiftLong ::=
                                    INTEGER (0..15)
MidambleShiftShort ::=
                                     INTEGER (0..5)
MidambleConfigurationBurstType1And3 ::=
                                             ENUMERATED {v4, v8, v16}
MidambleConfigurationBurstType2 ::=
                                         ENUMERATED {v3, v6}
TDD-UL-Code-Information ::= SEQUENCE (SIZE (1..maxNrOfDPCHs)) OF TDD-UL-Code-InformationItem
maxNrOfDPCHs
                            INTEGER ::= 240
TDD-UL-Code-InformationItem ::= SEQUENCE {
    tdd-ChannelisationCode
                                             TDD-ChannelisationCode,
                                             ProtocolExtensionContainer { { TDD-UL-Code-InformationItem-ExtIEs} }
    iE-Extensions
                                                                                                                           OPTIONAL,
TDD-UL-Code-InformationItem-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
TDD-ChannelisationCode ::= ENUMERATED {
    chCode1div1,
    chCode2div1,
    chCode2div2,
    chCode4div1,
    chCode4div2,
    chCode4div3,
    chCode4div4,
    chCode8div1.
    chCode8div2,
    chCode8div3,
    chCode8div4,
    chCode8div5,
    chCode8div6,
    chCode8div7,
    chCode8div8,
    chCode16div1,
    chCode16div2,
```

```
chCode16div3,
    chCode16div4,
    chCode16div5.
    chCode16div6,
    chCode16div7,
    chCode16div8,
    chCode16div9,
    chCode16div10,
    chCode16div11,
    chCode16div12,
    chCode16div13,
    chCode16div14,
    chCode16div15,
    chCode16div16,
SpecialBurstScheduling ::= INTEGER (1..256) -- Number of frames between special burst transmission during DTX
__ ****************
-- UTDOA Cell Fach Information
__ *****************
UTDOA-CELLFACH ::= SEQUENCE {
                                           PRACHparameters,
    pRACHparameters
    cRNTI
                                           C-RNTI,
                                           UschParameters
    uschParameters
                                                                   OPTIONAL,
    iE-Extensions
                                           ProtocolExtensionContainer { { UTDOA-CELLFACH-ExtIEs} } OPTIONAL,
    . . .
UTDOA-CELLFACH-ExtIEs
                           PCAP-PROTOCOL-EXTENSION ::= {
PRACHparameters ::= SEQUENCE (SIZE (1..maxPRACH)) OF
    PRACH-ChannelInfo
PRACH-ChannelInfo ::= SEQUENCE {
    pRACH-Info
                               PRACH-Info,
    tFS
                               TransportFormatSet,
    tFCS
                               ProtocolExtensionContainer { { PRACH-ChannelInfo-ExtIEs} } OPTIONAL,
    iE-Extensions
                               PCAP-PROTOCOL-EXTENSION ::= {
PRACH-ChannelInfo-ExtIEs
```

```
PRACH-Info ::=
                                     CHOICE {
        fdd
                                         SEQUENCE
            availableSignatures
                                                 AvailableSignatures,
            availableSF
                                                 SF-PRACH,
            preambleScramblingCodeWordNumber
                                                 PreambleScramblingCodeWordNumber,
            puncturingLimit
                                                 PuncturingLimit,
            availableSubChannelNumbers
                                                 AvailableSubChannelNumbers.
            iE-Extensions
                                                 ProtocolExtensionContainer { { PRACH-Info-FDD-ExtIEs} } OPTIONAL,
            . . .
        },
        tdd
                                         SEQUENCE {
            timeSlot
                                                     TimeSlot,
            tdd-ChannelisationCode
                                                     TDD-ChannelisationCode,
                                                     MaxPRACH-MidambleShifts,
            maxPRACH-MidambleShifts
            pRACH-Midamble
                                                     PRACH-Midamble,
            iE-Extensions
                                                     ProtocolExtensionContainer { { PRACH-Info-TDD-ExtIEs} } OPTIONAL,
        },
PRACH-Info-FDD-ExtIEs
                            PCAP-PROTOCOL-EXTENSION ::= {
                             PCAP-PROTOCOL-EXTENSION ::= {
PRACH-Info-TDD-ExtIEs
                                     ENUMERATED {
SF-PRACH ::=
                                         sfpr32, sfpr64, sfpr128, sfpr256, ... }
AvailableSignatures ::=
                                BIT STRING {
                                     signature15(0),
                                     signature14(1),
                                     signature13(2),
                                     signature12(3),
                                     signature11(4),
                                     signature10(5),
                                     signature9(6),
                                     signature8(7),
                                     signature7(8),
                                     signature6(9),
                                     signature5(10),
                                     signature4(11),
                                     signature3(12),
                                     signature2(13),
                                     signature1(14),
                                     signature0(15)
                                          (SIZE(16))
PreambleScramblingCodeWordNumber ::=
                                        INTEGER (0..15)
```

```
PuncturingLimit ::=
                        INTEGER (0..15)
-- 0: 40%; 1: 44%; ... 14: 96%; 15: 100%
AvailableSubChannelNumbers ::=
                                     BIT STRING {
                                         subCh11(0),
                                        subCh10(1),
                                        subCh9(2),
                                        subCh8(3),
                                        subCh7(4),
                                        subCh6(5),
                                         subCh5(6),
                                        subCh4(7),
                                        subCh3(8),
                                        subCh2(9),
                                        subCh1(10),
                                         subCh0(11)
                                              (SIZE(12))
ScramblingCodeType ::=
                                     ENUMERATED {
                                         shortSC,
                                        longSC
UL-ScramblingCode ::=
                                    INTEGER (0..16777215)
NumberOfFBI-Bits ::=
                                     INTEGER (0..2)
                                                     SEQUENCE {
TransportFormatSet ::=
    dynamicPart
                            TransportFormatSet-DynamicPartList,
    semi-staticPart
                            TransportFormatSet-Semi-staticPart,
    iE-Extensions
                            ProtocolExtensionContainer { { TransportFormatSet-ExtIEs} }
                                                                                              OPTIONAL,
    . . .
TransportFormatSet-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
TransportFormatSet-DynamicPartList ::= SEQUENCE (SIZE (1..maxNrOfTFs)) OF
    SEQUENCE {
        rlc-Size
                                    RLC-Size,
        numberOfTbsTTIList
                                    SEQUENCE (SIZE (1..maxNrOfTFs)) OF TbsTTIInfo,
                                     ProtocolExtensionContainer { { TransportFormatSet-DynamicPartList-ExtIEs} }
        iE-Extensions
                                                                                                                           OPTIONAL,
        . . .
TransportFormatSet-DynamicPartList-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
TbsTTIInfo ::= SEQUENCE {
    tTIInfo
                        TransportFormatSet-TransmissionTimeIntervalDynamic
                                                                                 OPTIONAL,
    numberOfTbs
                        TransportFormatSet-NrOfTransportBlocks,
```

3GPP TS 25.453 version 11.0.0 Release 11

```
ProtocolExtensionContainer { { TbsTTIInfo-ExtIEs} } OPTIONAL,
    iE-Extensions
TbsTTIInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
RLC-Size
           ::= INTEGER (129..5055)
TransportFormatSet-NrOfTransportBlocks ::= INTEGER (0..512)
TransportFormatSet-Semi-staticPart ::= SEQUENCE {
    transmissionTimeInterval
                                    TransportFormatSet-TransmissionTimeIntervalSemiStatic,
    channelCoding
                                    TransportFormatSet-ChannelCodingType,
                                                                                 OPTIONAL,
    codingRate
                                    TransportFormatSet-CodingRate
    -- This IE shall be present if the Type of channel coding IE is set to 'convolutional' or 'turbo'
    rateMatchingAttribute
                                    TransportFormatSet-RateMatchingAttribute,
    cRC-Size
                                    TransportFormatSet-CRC-Size,
    iE-Extensions
                                    ProtocolExtensionContainer { { TransportFormatSet-Semi-staticPart-ExtIEs} }
                                                                                                                          OPTIONAL,
TransportFormatSet-Semi-staticPart-ExtIEs PCAP-PROTOCOL-EXTENSION ::=
TransportFormatSet-TransmissionTimeIntervalSemiStatic ::= ENUMERATED {
   msec-5,
   msec-10,
   msec-20,
   msec-40,
   msec-80,
    dynamic,
TransportFormatSet-ChannelCodingType ::= ENUMERATED {
    no-codingTDD,
    convolutional-coding,
    turbo-coding,
TransportFormatSet-CodingRate ::= ENUMERATED {
   half,
    third.
    . . .
TransportFormatSet-RateMatchingAttribute ::= INTEGER (1..maxRateMatching)
```

```
TransportFormatSet-CRC-Size ::= ENUMERATED {
    v0.
    v8.
    v12,
    v16,
    v24,
TransportFormatSet-TransmissionTimeIntervalDynamic ::= ENUMERATED {
    msec-10,
   msec-20.
   msec-40,
    msec-80,
    dynamic,
TFCS ::=
                SEQUENCE (SIZE (1..maxTFC)) OF CTFC
CTFC ::=
                                CHOICE{
        ctfc2Bit
                                             SEQUENCE (SIZE (1..maxTFC)) OF INTEGER (0..3),
        ctfc4Bit
                                             SEQUENCE (SIZE (1..maxTFC)) OF INTEGER (0..15),
        ctfc6Bit
                                             SEQUENCE (SIZE (1..maxTFC)) OF INTEGER (0..63),
        ctfc8Bit
                                             SEQUENCE (SIZE (1..maxTFC)) OF INTEGER (0..255),
        ctfc12Bit
                                             SEQUENCE (SIZE (1..maxTFC)) OF INTEGER (0..4095),
        ctfc16Bit
                                             SEQUENCE (SIZE (1..maxTFC)) OF INTEGER (0..65535),
        ctfc24Bit
                                             SEQUENCE (SIZE (1..maxTFC)) OF INTEGER (0..16777215),
        . . .
C-RNTI ::=
                                BIT STRING (SIZE (16))
UARFCN ::=
                                INTEGER (0..16383)
CFN ::= INTEGER (0..255)
ChipOffset ::= INTEGER (0..38399)
-- Unit Chip
FrameOffset ::= INTEGER (0..255)
PrimaryScramblingCode ::= INTEGER (0..511)
UschParameters ::= SEQUENCE {
    cellParameterID
                                        CellParameterID,
    tFCI-Coding
                                        TFCI-Coding,
    punctureLimit
                                        PuncturingLimit,
    repetitionPeriod
                                        RepetitionPeriod,
    uSCH-SchedulingOffset
                                        USCH-SchedulingOffset,
```

```
uL-Timeslot-Information
                               UL-Timeslot-Information,
   t.FCS
                               TFCS,
   trChInfo
                               TrChInfoList,
   iE-Extensions ProtocolExtensionContainer { { UschParameters-ExtIEs} } OPTIONAL,
UschParameters-ExtIEs
                     PCAP-PROTOCOL-EXTENSION ::= {
USCH-SchedulingOffset ::= INTEGER (0..255)
MaxPRACH-MidambleShifts ::= ENUMERATED {
   shift4,
   shift8,
PRACH-Midamble ::= ENUMERATED {
   inverted,
   direct,
__************
-- Positioning Response Time
__************
Positioning-ResponseTime ::=
                                  ENUMERATED {
                                               ms250, ms500, s1, s2, s3, s4, s6,
                                               s8, s12, s16, s20, s24, s28, s32, s64,
__************
-- Amount of Reporting
__************
AmountOfReporting ::= ENUMERATED { ra2, ra4, ra8, ra16, ra32,
                             ra64, ra-Infinity, ... }
  *****************
-- Include Velocity
__ ********************
```

```
IncludeVelocity
                      ::= ENUMERATED {
   requested
__ *********************
-- VelocityEstimate
__ ********************
-- VelocityEstimate is based on Description of Velocity in 23.032
VelocityEstimate ::= CHOICE {
   horizontalVelocity
                                                 Horizontal Velocity,
   horizontalWithVerticalVelocity
                                                 HorizontalWithVerticalVelocity,
   horizontalVelocityWithUncertainty
                                                 Horizontal Velocity With Uncertainty,
   horizontalWithVerticalVelocityAndUncertainty
                                                HorizontalWithVerticalVelocityAndUncertainty,
Horizontal Velocity ::= SEQUENCE {
   horizontalSpeedAndBearing
                                 HorizontalSpeedAndBearing,
                      ProtocolExtensionContainer { { HorizontalVelocity-ExtIEs} } OPTIONAL,
   iE-Extensions
Horizontal Velocity-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
HorizontalWithVerticalVelocity ::= SEQUENCE {
   horizontalSpeedAndBearing
                                         HorizontalSpeedAndBearing,
   verticalVelocity
                                         Vertical Velocity,
                                         ProtocolExtensionContainer { { HorizontalWithVerticalVelocity-ExtIEs} } OPTIONAL,
   iE-Extensions
HorizontalWithVerticalVelocity-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
HorizontalVelocityWithUncertainty ::= SEQUENCE {
   horizontalSpeedAndBearing
                                HorizontalSpeedAndBearing,
   uncertaintySpeed
                                 INTEGER (0..255),
                                 ProtocolExtensionContainer { { HorizontalVelocityWithUncertainty-ExtIEs} } OPTIONAL,
   iE-Extensions
HorizontalVelocityWithUncertainty-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
```

__************

```
HorizontalWithVerticalVelocityAndUncertainty ::= SEQUENCE {
   horizontalSpeedAndBearing
                                 HorizontalSpeedAndBearing,
   verticalVelocity
                                 Vertical Velocity,
   horizontalUncertaintySpeed
                                 INTEGER (0..255),
   verticalUncertaintySpeed
                                 INTEGER (0..255),
   iE-Extensions
                                 ProtocolExtensionContainer { { HorizontalWithVerticalVelocityAndUncertainty-ExtIEs} } OPTIONAL,
HorizontalWithVerticalVelocityAndUncertainty-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
HorizontalSpeedAndBearing ::= SEQUENCE {
   bearing
                                                INTEGER (0..359),
   horizontalSpeed
                                                INTEGER (0..2047)
VerticalVelocity ::= SEQUENCE {
   verticalSpeed
                                                INTEGER (0..255),
   verticalSpeedDirection
                                                VerticalSpeedDirection
VerticalSpeedDirection ::= ENUMERATED {
   upward,
   downward
__*************
-- UTRAN-GPS Reference Time
__************
UTRAN-GPSReferenceTime ::= SEQUENCE {
   utran-GPSTimingOfCell
                              INTEGER (0..2322431999999, ...),
   uC-ID
                                                               OPTIONAL,
   sfn
                              INTEGER (0..4095),
                              ProtocolExtensionContainer { { UTRAN-GPSReferenceTime-ExtIEs } } OPTIONAL,
   iE-Extensions
UTRAN-GPSReferenceTime-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
__*************
-- UTRAN-GPS Reference Time Result
```

```
UTRAN-GPSReferenceTimeResult ::= SEQUENCE {
   ue-GPSTimingOfCell
                             INTEGER (0..37158911999999, ...),
   uC-ID
                             UC-ID,
                             INTEGER (0..4095),
                             ProtocolExtensionContainer { { UTRAN-GPSReferenceTimeResult-ExtIEs } }
   iE-Extensions
UTRAN-GPSReferenceTimeResult-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
__**************
-- UTRAN-GANSS Reference Time Result
__************
UTRAN-GANSSReferenceTimeResult ::= SEQUENCE {
   ue-GANSSTimingOfCell
                         INTEGER (0..345599999999, ...),
   ganss-Time-ID
                             GANSSID
                                                                                                               OPTIONAL,
                           INTEGER (0..127)
   ganssTodUncertainty
                                                                                                               OPTIONAL,
   uC-ID
                             UC-ID,
   sfn
                             INTEGER (0..4095),
   iE-Extensions
                             ProtocolExtensionContainer { { UTRAN-GANSSReferenceTimeResult-ExtIEs } } OPTIONAL,
    . . .
UTRAN-GANSSReferenceTimeResult-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
END
```

9.3.5 Common Definitions

```
BEGIN
-- Extension constants
__ *********************
maxPrivateIEs
                                       INTEGER ::= 65535
maxProtocolExtensions
                                       INTEGER ::= 65535
maxProtocolIEs
                                       INTEGER ::= 65535
    ********************
-- Common Data Types
__ *******************
             ::= ENUMERATED { reject, ignore, notify }
Criticality
Presence
            ::= ENUMERATED { optional, conditional, mandatory }
PrivateIE-ID ::= CHOICE {
   local
                  INTEGER (0..65535),
                   OBJECT IDENTIFIER
   qlobal
ProcedureCode
             ::= INTEGER (0..255)
ProtocolIE-ID
             ::= INTEGER (0..maxProtocolIEs)
TransactionID
            ::= CHOICE {
              INTEGER (0..127),
   shortTID
   longTID
                  INTEGER (0..32767)
TriggeringMessage ::= ENUMERATED { initiating-message, successful-outcome, unsuccessful-outcome, outcome }
END
```

9.3.6 Constant Definitions

```
umts-Access (20) modules (3) pcap(4) version1 (1) pcap-Constants (4) }
DEFINITIONS AUTOMATIC TAGS ::=
BEGIN
IMPORTS
   ProcedureCode,
   ProtocolIE-ID
FROM PCAP-CommonDataTypes;
__ ********************
-- Elementary Procedures
__ *******************
id-PositionCalculation
                                ProcedureCode ::= 1
id-InformationExchangeInitiation
                                ProcedureCode ::= 2
id-InformationReporting
                                ProcedureCode ::= 3
id-InformationExchangeTermination
                                ProcedureCode ::= 4
id-InformationExchangeFailure
                                ProcedureCode ::= 5
id-ErrorIndication
                                ProcedureCode ::= 6
                                ProcedureCode ::= 7
id-privateMessage
id-PositionParameterModification
                                ProcedureCode ::= 8
id-PositionInitiation
                                ProcedureCode ::= 9
                                ProcedureCode ::= 10
id-PositionActivation
                                ProcedureCode ::= 11
id-Abort
id-PositionPeriodicReport
                                ProcedureCode ::= 12
id-PositionPeriodicResult
                                ProcedureCode ::= 13
id-PositionPeriodicTermination
                                ProcedureCode ::= 14
  *****************
-- Lists
__ ********************
maxNrOfErrors
                                INTEGER ::= 256
maxSat.
                                INTEGER ::= 16
maxSatAlmanac
                                INTEGER ::= 32
maxNrOfLevels
                                INTEGER ::= 256
maxNrOfPoints
                                INTEGER ::= 15
                                INTEGER ::= 32
maxNrOfExpInfo
maxNrOfMeasNCell
                                INTEGER ::= 32
maxNrOfMeasurements
                                INTEGER ::= 16
maxNrOfSets
                                INTEGER ::= 3
maxRateMatching
                                INTEGER ::= 256
                                INTEGER ::= 32
maxNrOfTFs
maxTTI-count
                                INTEGER ::= 4
maxTS-1
                                INTEGER ::= 13
maxCCTrCH
                                INTEGER ::= 8
```

```
maxTF
                                  INTEGER ::= 32
maxTFC
                                  INTEGER ::= 1024
maxPRACH
                                   INTEGER ::= 16
maxTrCH
                                   INTEGER ::= 32
maxTGPS
                                   INTEGER ::= 6
                                  INTEGER ::= 16
maxNoOfMeasurements
maxCellMeas
                                  INTEGER ::= 32
maxNrOfEDPCCH-PO-OUANTSTEPs
                                  INTEGER ::= 8
                                                  -- FFS
maxNrOfRefETFCI-PO-QUANTSTEPs
                                  INTEGER ::= 8
                                                  -- FFS
                                   INTEGER ::= 8
maxNrOfRefETFCIs
maxSet
                                  INTEGER ::= 9
maxGANSSSat
                                  INTEGER ::= 64
maxSqnType
                                  INTEGER ::= 8
maxGANSS
                                  INTEGER ::= 8
maxGANSSSet.
                                  INTEGER ::= 9
maxGANSSSatAlmanac
                                  INTEGER ::= 36
                                   INTEGER ::= 4
maxGANSSClockMod
maxGANSS-1
                                   INTEGER ::= 7
maxNrOfIRATMeasurements
                                   INTEGER ::= 16
                                  INTEGER ::= 6
maxReportedGERANCells
  *****************
    id-Cause
                                              ProtocolIE-ID ::= 1
id-CriticalityDiagnostics
                                              ProtocolIE-ID ::= 2
id-GPS-UTRAN-TRU
                                              ProtocolIE-ID ::= 3
id-InformationExchangeID
                                              ProtocolIE-ID ::= 4
id-InformationExchangeObjectType-InfEx-Rprt
                                              ProtocolIE-ID ::= 5
id-InformationExchangeObjectType-InfEx-Rgst
                                              ProtocolIE-ID ::= 6
id-InformationExchangeObjectType-InfEx-Rsp
                                              ProtocolIE-ID ::= 7
id-InformationReportCharacteristics
                                              ProtocolIE-ID ::= 8
id-InformationType
                                              ProtocolIE-ID ::= 9
id-GPS-MeasuredResultsList
                                              ProtocolIE-ID ::= 10
id-MethodType
                                              ProtocolIE-ID ::= 11
id-RefPosition-InfEx-Rgst
                                              ProtocolIE-ID ::= 12
id-RefPosition-InfEx-Rsp
                                              ProtocolIE-ID ::= 13
id-RefPosition-Inf-Rprt
                                              ProtocolIE-ID ::= 14
id-RequestedDataValue
                                              ProtocolIE-ID ::= 15
id-RequestedDataValueInformation
                                              ProtocolIE-ID ::= 16
id-TransactionID
                                              ProtocolIE-ID ::= 17
id-UE-PositionEstimate
                                              ProtocolIE-ID ::= 18
id-CellId-MeasuredResultsSets
                                              ProtocolIE-ID ::= 20
id-OTDOA-MeasurementGroup
                                              ProtocolIE-ID ::= 22
id-AccuracyFulfilmentIndicator
                                              ProtocolIE-ID ::= 23
id-HorizontalAccuracyCode
                                              ProtocolIE-ID ::= 24
id-VerticalAccuracyCode
                                              ProtocolIE-ID ::= 25
id-UTDOA-Group
                                              ProtocolIE-ID ::= 26
id-RequestType
                                              ProtocolIE-ID ::= 28
id-UE-PositioningCapability
                                              ProtocolIE-ID ::= 29
                                              ProtocolIE-ID ::= 30
id-UC-id
```

id-ResponseTime	ProtocolIE-ID ::= 31
id-PositioningPriority	ProtocolIE-ID ::= 32
id-ClientType	ProtocolIE-ID ::= 33
id-PositioningMethod	ProtocolIE-ID ::= 34
id-UTDOAPositioning	ProtocolIE-ID ::= 35
id-GPSPositioning	ProtocolIE-ID ::= 36
id-OTDOAAssistanceData	ProtocolIE-ID ::= 37
id-Positioning-ResponseTime	ProtocolIE-ID ::= 38
id-EnvironmentCharacterisation	ProtocolIE-ID ::= 39
id-PositionData	ProtocolIE-ID ::= 40
id-IncludeVelocity	ProtocolIE-ID ::= 41
id-VelocityEstimate	ProtocolIE-ID ::= 42
id-rxTimingDeviation768Info	ProtocolIE-ID ::= 43
id-UC-ID-InfEx-Rqst	ProtocolIE-ID ::= 44
id-UE-PositionEstimateInfo	ProtocolIE-ID ::= 45
id-UTRAN-GPSReferenceTime	ProtocolIE-ID ::= 46
	ProtocolIE-ID ::= 47
	ProtocolIE-ID ::= 48
id-OTDOA-AddMeasuredResultsInfo	ProtocolIE-ID ::= 49
id-GPS-ReferenceLocation	ProtocolIE-ID ::= 50
id-OTDOA-MeasuredResultsSets	ProtocolIE-ID ::= 51
	ProtocolIE-ID ::= 55
id-ExtendedRoundTripTime	ProtocolIE-ID ::= 56
id-PeriodicPosCalcInfo	ProtocolIE-ID ::= 57
id-PeriodicLocationInfo	ProtocolIE-ID ::= 58
	ProtocolIE-ID ::= 59
id-MeasInstructionsUsed	ProtocolIE-ID ::= 60
id-RRCstateChange	ProtocolIE-ID ::= 61
	ProtocolIE-ID ::= 62
id-MeasurementValidity	ProtocolIE-ID ::= 63
_	ProtocolIE-ID ::= 64
id-CellIDPositioning	ProtocolIE-ID ::= 66
5	ProtocolIE-ID ::= 67
id-Extended-RNC-ID	ProtocolIE-ID ::= 68
id-GANSS-CommonAssistanceData	ProtocolIE-ID ::= 69
id-GANSS-GenericAssistanceDataList	ProtocolIE-ID ::= 70
id-GANSS-MeasuredResultsList	ProtocolIE-ID ::= 71
id-GANSS-UTRAN-TRU	ProtocolIE-ID ::= 72
id-GANSSPositioning	ProtocolIE-ID ::= 72 ProtocolIE-ID ::= 73
id-GANSS-PositioningDataSet	ProtocoliE-ID ::= 73 ProtocoliE-ID ::= 74
id-GNSS-PositioningMethod	ProtocoliE-ID ::= 74 ProtocolIE-ID ::= 75
id-NetworkAssistedGANSSSuport	ProtocoliE-ID ::= 75 ProtocolIE-ID ::= 76
<u>=</u>	ProtocoliE-ID ::= 76 ProtocolIE-ID ::= 77
id-TUTRANGANSSMeasurementValueInfo	
<u>-</u>	ProtocolIE-ID ::= 78
id-AdditionalGanssAssistDataRequired	ProtocolIE-ID ::= 79
id-angleOfArrivalLCR	ProtocolIE-ID ::= 80
id-extendedTimingAdvanceLCR	ProtocolIE-ID ::= 81
	ProtocolIE-ID ::= 82
5	ProtocolIE-ID ::= 83
id-rxTimingDeviationLCR	ProtocolIE-ID ::= 84
	ProtocolIE-ID ::= 85
id-GANSS-AddIonoModelReq	ProtocolIE-ID ::= 86
id-GANSS-EarthOrientParaReq	ProtocolIE-ID ::= 87
id-GANSS-Additional-Ionospheric-Model	ProtocolIE-ID ::= 88

```
id-GANSS-Earth-Orientation-Parameters
                                                ProtocolIE-ID ::= 89
id-GANSS-Additional-Time-Models
                                                ProtocolIE-ID ::= 90
id-GANSS-Additional-Navigation-Models
                                                ProtocolIE-ID ::= 91
id-GANSS-Additional-UTC-Models
                                                ProtocolIE-ID ::= 92
id-GANSS-Auxiliary-Information
                                                ProtocolIE-ID ::= 93
id-GANSS-SBAS-ID
                                                ProtocolIE-ID ::= 94
id-GANSS-SBAS-IDs
                                                ProtocolIE-ID ::= 95
id-GANSS-Signal-IDs
                                                ProtocolIE-ID ::= 96
id-supportGANSSNonNativeADchoices
                                                ProtocolIE-ID ::= 97
id-PositionDataUEbased
                                                ProtocolIE-ID ::= 98
id-ganssCodePhaseAmbiguityExt
                                                ProtocolIE-ID ::= 99
id-ganssIntegerCodePhaseExt
                                                ProtocolIE-ID ::= 100
id-GANSScarrierPhaseRequested
                                                ProtocolIE-ID ::= 101
id-GANSSMultiFreqMeasRequested
                                                ProtocolIE-ID ::= 102
id-ganssReg-AddIonosphericModel
                                                ProtocolIE-ID ::= 103
id-ganssReg-EarthOrientPara
                                                ProtocolIE-ID ::= 104
id-ganssAddNavigationModel-reg
                                                ProtocolIE-ID ::= 105
id-ganssAddUTCModel-reg
                                                ProtocolIE-ID ::= 106
id-ganssAuxInfo-reg
                                                ProtocolIE-ID ::= 107
id-GANSS-AlmanacModelChoice
                                                ProtocolIE-ID ::= 108
id-GANSS-alm-keplerianNAVAlmanac
                                                ProtocolIE-ID ::= 109
id-GANSS-alm-keplerianReducedAlmanac
                                                ProtocolIE-ID ::= 110
id-GANSS-alm-keplerianMidiAlmanac
                                                ProtocolIE-ID ::= 111
id-GANSS-alm-keplerianGLONASS
                                                ProtocolIE-ID ::= 112
id-GANSS-alm-ecefSBASAlmanac
                                                ProtocolIE-ID ::= 113
id-UTRAN-GANSSReferenceTimeResult
                                                ProtocolIE-ID ::= 114
id-GANSS-Reference-Time-Only
                                                ProtocolIE-ID ::= 115
id-GANSS-AddADchoices
                                                ProtocolIE-ID ::= 116
                                                ProtocolIE-ID ::= 117
id-OTDOA-ReferenceCellInfo
id-DGNSS-ValidityPeriod
                                                ProtocolIE-ID ::= 118
id-AzimuthAndElevationLSB
                                                ProtocolIE-ID ::= 119
id-completeAlmanacProvided
                                                ProtocolIE-ID ::= 120
id-GPS-Week-Cycle
                                                ProtocolIE-ID ::= 121
id-GANSS-Day-Cycle
                                                ProtocolIE-ID ::= 122
id-ganss-Delta-T
                                                ProtocolIE-ID ::= 123
id-requestedCellIDGERANMeasurements
                                                ProtocolIE-ID ::= 124
id-CellId-IRATMeasuredResultsSets
                                                ProtocolIE-ID ::= 125
id-IMSI
                                                ProtocolIE-ID ::= 126
id-IMEI
                                                ProtocolIE-ID ::= 127
END
```

9.3.7 Container Definitions

```
umts-Access (20) modules (3) pcap(4) version1 (1) pcap-Containers (5) }
DEFINITIONS AUTOMATIC TAGS ::=
BEGIN
  *****************
-- IE parameter types from other modules.
__ *********************
IMPORTS
   Criticality,
   Presence,
   PrivateIE-ID,
   ProtocolIE-ID,
   maxPrivateIEs,
   maxProtocolExtensions,
   maxProtocolIEs
FROM PCAP-CommonDataTypes;
    *****************
-- Class Definition for Protocol IEs
__ ********************
PCAP-PROTOCOL-IES ::= CLASS {
   &id
                  ProtocolIE-ID
                                  UNIQUE,
   &criticality
                  Criticality,
   &Value,
   &presence
                  Presence
WITH SYNTAX {
   ID
                  &id
   CRITICALITY
                  &criticality
                  &Value
   TYPE
   PRESENCE
                  &presence
  ******************
-- Class Definition for Protocol Extensions
__ *********************
PCAP-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
__ *********************
PCAP-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 {PCAP-PROTOCOL-IES : IEsSetParam} ::=
   SEQUENCE (SIZE (0..maxProtocolIEs)) OF
      ProtocolIE-Field {{IEsSetParam}}
ProtocolIE-Single-Container {PCAP-PROTOCOL-IES : IEsSetParam} ::=
   ProtocolIE-Field {{IEsSetParam}}
ProtocolIE-Field {PCAP-PROTOCOL-IES : IESSetParam} ::= SEQUENCE {
                   PCAP-PROTOCOL-IES.&id
                                                 ({IEsSetParam}),
                                                 ({IEsSetParam}{@id}),
   criticality
                   PCAP-PROTOCOL-IES.&criticality
                                                 ({IEsSetParam}{@id})
   value
                  PCAP-PROTOCOL-IES.&Value
     *****************
  Container Lists for Protocol IE Containers
  ************************
ProtocolIE-ContainerList {INTEGER : lowerBound, INTEGER : upperBound, PCAP-PROTOCOL-IES : IESSetParam} ::=
   SEQUENCE (SIZE (lowerBound..upperBound)) OF
      ProtocolIE-Container {{IEsSetParam}}
```

```
Container for Protocol Extensions
ProtocolExtensionContainer {PCAP-PROTOCOL-EXTENSION : ExtensionSetParam} ::=
   SEQUENCE (SIZE (1..maxProtocolExtensions)) OF
       ProtocolExtensionField {{ExtensionSetParam}}
ProtocolExtensionField {PCAP-PROTOCOL-EXTENSION : ExtensionSetParam} ::= SEQUENCE
                     PCAP-PROTOCOL-EXTENSION.&id
                                                           ({ExtensionSetParam}),
   criticality
                     PCAP-PROTOCOL-EXTENSION.&criticality
                                                           ({ExtensionSetParam}{@id}),
   extensionValue
                  PCAP-PROTOCOL-EXTENSION. &Extension
                                                           ({ExtensionSetParam}{@id})
     Container for Private IEs
PrivateIE-Container {PCAP-PRIVATE-IES : IEsSetParam } ::=
   SEQUENCE (SIZE (1.. maxPrivateIEs)) OF
       PrivateIE-Field {{IEsSetParam}}
PrivateIE-Field {PCAP-PRIVATE-IES : IESSetParam} ::= SEQUENCE {
                     PCAP-PRIVATE-IES.&id
                                                        ({IEsSetParam}),
                                                        ({IEsSetParam}{@id}),
   criticality
                   PCAP-PRIVATE-IES.&criticality
                                                        ({IEsSetParam}{@id})
   value
                     PCAP-PRIVATE-IES.&Value
END
```

9.4 Message Transfer Syntax

PCAP shall use the ASN.1 Basic Packed Encoding Rules (BASIC-PER) Aligned Variant as transfer syntax, as specified in ITU-T Rec. X.691 [9].

10 Handling of Unknown, Unforeseen and Erroneous Protocol Data

10.1 General

Protocol Error cases can be divided into three classes:

- Transfer Syntax Error.

- Abstract Syntax Error.
- Logical Error.

Protocol errors can occur in the following functions within a receiving node.

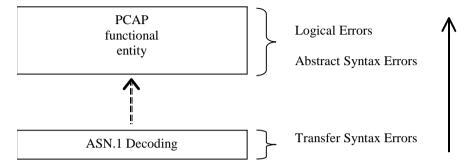


Figure 10: Protocol Errors in PCAP

The information stated in subclauses 10.2, 10.3 and 10.4, to be included in the message used when reporting an error, is what at minimum shall be included. Other optional information elements within the message may also be included, if available. This is also valid for the case when the reporting is done with a response message. The latter is an exception to what is stated in subclause 4.1.

10.2 Transfer Syntax Error

A Transfer Syntax Error occurs when the receiver is not able to decode the received physical message. Transfer syntax errors are always detected in the process of ASN.1 decoding. If a Transfer Syntax Error occurs, the receiver should initiate Error Indication procedure with appropriate cause value for the Transfer Syntax protocol error.

Examples for Transfer Syntax Errors are:

- Violation of value ranges in ASN.1 definition of messages. e.g.: If an IE has a defined value range of 0 to 10 (ASN.1: INTEGER (0..10)), and 12 will be received, then this will be treated as a transfer syntax error.
- Violation in list element constraints. e.g.: If a list is defined as containing 1 to 10 elements, and 12 elements will be received, than this case will be handled as a transfer syntax error.
- Missing mandatory elements in ASN.1 SEQUENCE definitions (as sent by the originator of the message).
- Wrong order of elements in ASN.1 SEQUENCE definitions (as sent by the originator of the message).

10.3 Abstract Syntax Error

10.3.1 General

An Abstract Syntax Error occurs when the receiving functional PCAP entity:

- 1) receives IEs or IE groups that cannot be understood (unknown IE id);
- 2) receives IEs for which the logical range is violated (e.g.: ASN.1 definition: 0 to 15, the logical range is 0 to 10 (values 11 to 15 are undefined), and 12 will be received; this case will be handled as an abstract syntax error using criticality information sent by the originator of the message);
- 3) does not receive IEs or IE groups but according to the specified presence of the concerning object, the IEs or IE groups should have been present in the received message;
- 4) receives IEs or IE groups that are defined to be part of that message in wrong order or with too many occurrences of the same IE or IE group;
- 5) receives IEs or IE groups but according to the conditional presence of the concerning object and the specified condition, the IEs or IE groups should not have been present in the received message.

Cases 1 and 2 (not comprehended IE/IE group) are handled based on received Criticality information. Case 3 (missing IE/IE group) is handled based on Criticality information and Presence information for the missing IE/IE group specified in the version of the specification used by the receiver. Case 4 (IEs or IE groups in wrong order or with too many occurrences) and Case 5 (erroneously present conditional IEs or IE groups) result in rejecting the procedure.

If an Abstract Syntax Error occurs, the receiver shall read the remaining message and shall then for each detected Abstract Syntax Error that belong to cases 1-3 act according to the Criticality Information and Presence Information for the IE/IE group due to which Abstract Syntax Error occurred in accordance with subclauses 10.3.4 and 10.3.5. The handling of cases 4 and 5 is specified in subclause 10.3.6.

10.3.2 Criticality Information

In the PCAP messages there is criticality information set for individual IEs and/or IE groups. This criticality information instructs the receiver how to act when receiving an IE or an IE group that is not comprehended, i.e. the entire item (IE or IE group) which is not (fully or partially) comprehended shall be treated in accordance with its own criticality information as specified in subclause 10.3.4.

In addition, the criticality information is used in case of the missing IE/IE group abstract syntax error (see subclause 10.3.5).

The receiving node shall take different actions depending on the value of the Criticality Information. The three possible values of the Criticality Information for an IE/IE group are:

- Reject IE.
- Ignore IE and Notify Sender.
- Ignore IE.

The following rules restrict when a receiving entity may consider an IE, an IE group, or an EP not comprehended (not implemented), and when action based on criticality information is applicable:

- 1. IE or IE group: When one new or modified IE or IE group is implemented for one EP from a standard version, then other new or modified IEs or IE groups specified for that EP in that standard version shall be considered comprehended by a receiving entity (some may still remain unsupported).
- 2. EP: The comprehension of different EPs within a standard version or between different standard versions is not mandated. Any EP that is not supported may be considered not comprehended, even if another EP from that standard version is comprehended, and action based on criticality shall be applied.

10.3.3 Presence Information

For many IEs/IE groups which are optional according to the ASN.1 transfer syntax, PCAP specifies separately if the presence of these IEs/IE groups is optional or mandatory with respect to RNS application by means of the presence field of the concerning object of class PCAP-PROTOCOL-IES, PCAP -PROTOCOL-IES-PAIR, PCAP -PROTOCOL-EXTENSION or PCAP -PRIVATE-IES.

The presence field of the indicated classes supports three values:

- 1. Optional;
- 2. Conditional;
- 3. Mandatory.

If an IE/IE group is not included in a received message and the presence of the IE/IE group is mandatory or the presence is conditional and the condition is true according to the version of the specification used by the receiver, an abstract syntax error occurs due to a missing IE/IE group.

If an IE/IE group is included in a received message and the presence of the IE/IE group is conditional and the condition is false according to the version of the specification used by the receiver, an abstract syntax error occurs due to this erroneously present conditional IE/IE group.

10.3.4 Not comprehended IE/IE group

10.3.4.1 Procedure Code

The receiving node shall treat the different types of received criticality information of the *Procedure Code* IE according to the following:

Reject IE:

- If a message is received with a *Procedure Code* IE marked with "*Reject IE*" which the receiving node does not comprehend, the receiving node shall reject the procedure using the Error Indication procedure.

Ignore IE and Notify Sender:

- If a message is received with a *Procedure Code* IE marked with "*Ignore IE and Notify Sender*" which the receiving node does not comprehend, the receiving node shall ignore the procedure and initiate the Error Indication procedure.

Ignore IE:

- If a message is received with a *Procedure Code* IE marked with "*Ignore IE*" which the receiving node does not comprehend, the receiving node shall ignore the procedure.

When using the Error Indication procedure to reject a procedure or to report an ignored procedure it shall include the *Procedure Code* IE, the *Triggering Message* IE, and the *Procedure Criticality* IE in the *Criticality Diagnostics* IE.

10.3.4.1A Type of Message

When the receiving node cannot decode the *Type of Message* IE, the Error Indication procedure shall be initiated with an appropriate cause value.

10.3.4.2 IEs other than the Procedure Code and Type of Message

The receiving node shall treat the different types of received criticality information of an IE/IE group other than the *Procedure Code* IE and *Type of Message* IE according to the following:

Reject IE:

- If a message *initiating* a procedure is received containing one or more IEs/IE groups marked with "*Reject IE*" which the receiving node does not comprehend; none of the functional requests of the message shall be executed. The receiving node shall reject the procedure and report the rejection of one or more IEs/IE groups using the message normally used to report unsuccessful outcome of the procedure. In case the information received in the initiating message was insufficient to determine a value for all IEs that are required to be present in the message used to report the unsuccessful outcome of the procedure, the receiving node shall instead terminate the procedure and initiate the Error Indication procedure.
- If a message *initiating* a procedure that does not have a message to report unsuccessful outcome is received containing one or more IEs/IE groups marked with "*Reject IE*" which the receiving node does not comprehend, the receiving node shall terminate the procedure and initiate the Error Indication procedure.
- If a *response* message is received containing one or more IEs/IE groups marked with "*Reject IE*", that the receiving node does not comprehend, the receiving node shall consider the procedure as unsuccessfully terminated and initiate local error handling.

Ignore IE and Notify Sender:

- If a message *initiating* a procedure is received containing one or more IEs/IE groups marked with "*Ignore IE and Notify Sender*" which the receiving node does not comprehend, the receiving node shall ignore the content of the not comprehended IEs/IE groups, continue with the procedure as if the not comprehended IEs/IE groups were not received (except for the reporting) using the understood IEs/IE groups, and report in the response message of the procedure that one or more IEs/IE groups have been ignored. In case the information received in the initiating message was insufficient to determine a value for all IEs that are required to be present in the response message, the receiving node shall instead terminate the procedure and initiate the Error Indication procedure.
- If a message *initiating* a procedure that does not have a message to report the outcome of the procedure is received containing one or more IEs/IE groups marked with "*Ignore IE and Notify Sender*" which the receiving node does not comprehend, the receiving node shall ignore the content of the not comprehended IEs/IE groups, continue with the procedure as if the not comprehended IEs/IE groups were not received (except for the reporting) using the understood IEs/IE groups, and initiate the Error Indication procedure to report that one or more IEs/IE groups have been ignored.

- If a *response* message is received containing one or more IEs/IE groups marked with "*Ignore IE and Notify Sender*" which the receiving node does not comprehend, the receiving node shall ignore the content of the not comprehended IEs/IE groups, continue with the procedure as if the not comprehended IEs/IE groups were not received (except for the reporting) using the understood IEs/IE groups and initiate the Error Indication procedure.

Ignore IE:

- If a message *initiating* a procedure is received containing one or more IEs/IE groups marked with "*Ignore IE*" which the receiving node does not comprehend, the receiving node shall ignore the content of the not comprehended IEs/IE groups and continue with the procedure as if the not comprehended IEs/IE groups were not received using the understood IEs/IE groups.
- If a *response* message is received containing one or more IEs/IE groups marked with "*Ignore IE*" which the receiving node does not comprehend, the receiving node shall ignore the content of the not comprehended IEs/IE groups.

When reporting not comprehended IEs/IE groups marked with "Reject IE" or "Ignore IE and Notify Sender" using a response message defined for the procedure, the Information Element Criticality Diagnostics IE shall be included in the Criticality Diagnostics IE for each reported IE/IE group. The Repetition Number IE shall be included in the Information Element Criticality Diagnostics IE if the reported IE/IE group was part of a "SEQUENCE OF" definition.

When reporting not comprehended IEs/IE groups marked with "Reject IE" or "Ignore IE and Notify Sender" using the Error Indication procedure, the Procedure Code IE, the Triggering Message IE, Procedure Criticality IE, the Transaction Id IE, and the Information Element Criticality Diagnostics IE shall be included in the Criticality Diagnostics IE for each reported IE/IE group. The Repetition Number IE shall be included in the Information Element Criticality Diagnostics IE if the reported IE/IE group was part of a "SEQUENCE OF" definition.

10.3.5 Missing IE or IE group

The receiving node shall treat the missing IE/IE group according to the criticality information for the missing IE/IE group in the received message specified in the version of the present document used by the receiver:

Reject IE:

- If a received message *initiating* a procedure is missing one or more IEs/IE groups with specified criticality "*Reject IE*"; none of the functional requests of the message shall be executed. The receiving node shall reject the procedure and report the missing IEs/IE groups using the message normally used to report unsuccessful outcome of the procedure. In case the information received in the initiating message was insufficient to determine a value for all IEs that are required to be present in the message used to report the unsuccessful outcome of the procedure, the receiving node shall instead terminate the procedure and initiate the Error Indication procedure.
- If a received message *initiating* a procedure that does not have a message to report unsuccessful outcome is missing one or more IEs/IE groups with specified criticality "*Reject IE*", the receiving node shall initiate the Error Indication procedure.
- If a received *response* message is missing one or more IEs/IE groups with specified criticality "*Reject IE*, the receiving node shall consider the procedure as unsuccessfully terminated and initiate local error handling.

Ignore IE and Notify Sender:

- If a received message *initiating* a procedure is missing one or more IEs/IE groups with specified criticality "*Ignore IE and Notify Sender*", the receiving node shall ignore that those IEs are missing and continue with the procedure based on the other IEs/IE groups present in the message and report in the response message of the procedure

that one or more IEs/IE groups were missing. In case the information received in the initiating message was insufficient to determine a value for all IEs that are required to be present in the response message, the receiving node shall instead terminate the procedure and initiate the Error Indication procedure.

- If a received message *initiating* a procedure that does not have a message to report the outcome of the procedure is missing one or more IEs/IE groups with specified criticality "*Ignore IE and Notify Sender*", the receiving node shall ignore that those IEs are missing and continue with the procedure based on the other IEs/IE groups present in the message and initiate the Error Indication procedure to report that one or more IEs/IE groups were missing.
- If a received *response* message is missing one or more IEs/IE groups with specified criticality "*Ignore IE and Notify Sender*", the receiving node shall ignore that those IEs are missing and continue with the procedure based on the other IEs/IE groups present in the message and initiate the Error Indication procedure to report that one or more IEs/IE groups were missing.

Ignore IE:

- If a received message *initiating* a procedure is missing one or more IEs/IE groups with specified criticality "*Ignore IE*", the receiving node shall ignore that those IEs are missing and continue with the procedure based on the other IEs/IE groups present in the message.
- If a received *response* message is missing one or more IEs/IE groups with specified criticality "*Ignore IE*", the receiving node shall ignore that those IEs/IE groups are missing.

When reporting missing IEs/IE groups with specified criticality "Reject IE" or "Ignore IE and Notify Sender" using a response message defined for the procedure, the Information Element Criticality Diagnostics IE shall be included in the Criticality Diagnostics IE for each reported IE/IE group.

When reporting missing IEs/IE groups with specified criticality "Reject IE" or "Ignore IE and Notify Sender" using the Error Indication procedure, the Procedure Code IE, the Triggering Message IE, Procedure Criticality IE, the Transaction Id IE, and the Information Element Criticality Diagnostics IE shall be included in the Criticality Diagnostics IE for each reported IE/IE group.

10.3.6 IEs or IE groups received in wrong order or with too many occurrences or erroneously present

If a message with IEs or IE groups in wrong order or with too many occurrences is received or if IEs or IE groups with a conditional presence are present when the condition is not met (i.e. erroneously present), the receiving node shall behave according to the following:

- If a message *initiating* a procedure is received containing IEs or IE groups in wrong order or with too many occurrences or erroneously present, none of the functional requests of the message shall be executed. The receiving node shall reject the procedure and report the cause value "Abstract Syntax Error (Falsely Constructed Message)" using the message normally used to report unsuccessful outcome of the procedure. In case the information received in the initiating message was insufficient to determine a value for all IEs that are required to be present in the message used to report the unsuccessful outcome of the procedure, the receiving node shall instead terminate the procedure and initiate the Error Indication.
- If a message *initiating* a procedure that does not have a message to report unsuccessful outcome is received containing IEs or IE groups in wrong order or with too many occurrences or erroneously present, the receiving node shall terminate the procedure and initiate the Error Indication procedure, and use cause value "Abstract Syntax Error (Falsely Constructed Message)".
- If a *response* message is received containing IEs or IE groups in wrong order or with too many occurrences or erroneously present, the receiving node shall consider the procedure as unsuccessfully terminated and initiate local error handling.

10.4 Logical Error

Logical error situations occur when a message is comprehended correctly, but the information contained within the message is not valid (i.e. semantic error), or describes a procedure which is not compatible with the state of the receiver. In these conditions, the following behaviour shall be performed (unless otherwise specified) as defined by the class of the elementary procedure, irrespective of the criticality of the IEs/IE groups containing the erroneous values.

Class 1:

Protocol Causes:

Where the logical error occurs in a request message of a class 1 procedure, and the procedure has a message to report this unsuccessful outcome, this message shall be sent with an appropriate cause value. Typical cause values are:

- 1. Semantic Error.
- 2. Message not compatible with receiver state.

Where the logical error is contained in a request message of a class 1 procedure, and the procedure does not have a message to report this unsuccessful outcome, the procedure shall be terminated and the Error Indication procedure shall be initiated with an appropriate cause value.

Where the logical error exists in a response message of a class 1 procedure, the procedure shall be considered as unsuccessfully terminated and local error handling shall be initiated.

Class 2:

Where the logical error occurs in a message of a class 2 procedure, the procedure shall be terminated and the Error Indication procedure shall be initiated with an appropriate cause value.

10.5 Exceptions

The error handling for all the cases described hereafter shall take precedence over any other error handling described in the other subclauses of clause 10.

- If any type of error (Transfer Syntax Error, Abstract Syntax Error or Logical Error) is detected in the ERROR INDICATION message, it shall not trigger the Error Indication procedure in the receiving Node but local error handling.
- In case a response message or Error Indication message needs to be returned, but the information necessary to determine the receiver of that message is missing, the procedure shall be considered as unsuccessfully terminated and local error handling shall be initiated.
- If an error that terminates a procedure occurs, the returned cause value shall reflect the error that caused the termination of the procedure even if one or more abstract syntax errors with criticality 'ignore and notify' have earlier occurred within the same procedure.

Annex A (informative): Guidelines for Usage of the Criticality Diagnostics IE

A.1 EXAMPLE MESSAGE Layout

Assume the following message format:

Table A.1

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M				YES	Reject
Transaction ID	M				_	
Α	M				YES	reject
В	M				YES	reject
>E		1 <maxe></maxe>			EACH	ignore
>>F		1 <maxf></maxf>			-	
>>>G		03,			EACH	ignore
>>H		1 <maxh></maxh>			EACH	ignore
>>>G		03,			EACH	ignore and notify
>>G	M				YES	reject
>>J		1 <maxj></maxj>			-	
>>>G		03,			EACH	reject
С	M				YES	reject
>K		1 <maxk></maxk>			EACH	ignore and notify
>>L		1 <maxl></maxl>			-	
>>>M	0				-	
D	M				YES	reject

NOTE: The IEs F, J, and L do not have assigned criticality. The IEs F, J, and L are consequently realised as the ASN.1 type SEQUENCE OF of "ordinary" ASN.1 type, e.g. INTEGER. On the other hand, the repeatable IEs with assigned criticality are realised as the ASN.1 type SEQUENCE OF of an IE object, e.g. ProtocolIE-Single-Container.

For the corresponding ASN.1 layout, see clause A.4.

A.2 Example on a Received EXAMPLE MESSAGE

Assume further more that a received message based on the above tabular format is according to figure A.1.

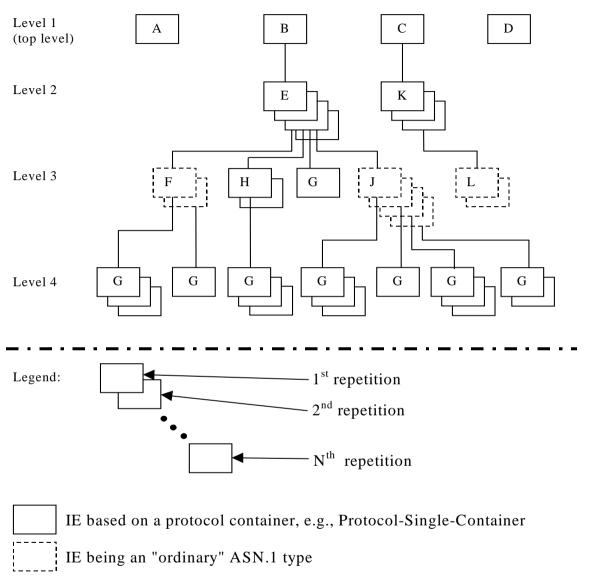
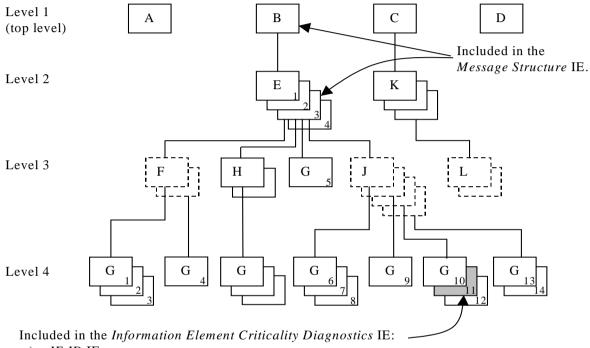


Figure A.1: Example of content of a received PCAP message based on the EXAMPLE MESSAGE

A.3 Content of Criticality Diagnostics

A.3.1 Example 1



- a) IE ID IE
- b) Repetition Number IE

Figure A.2: Example of a received PCAP message containing a not comprehended IE

If there is an error within the instance marked as grey in the IE G in the IE J shown in the figure A.2, this will be reported within the *Information Element Criticality Diagnostics* IE within the *Criticality Diagnostics* IE as in table A.2.

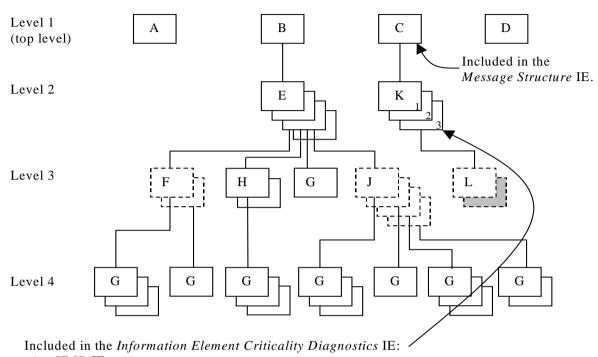
Table A.2

IE name	Value	Comment
IE Criticality	Reject	Criticality for IE on the reported level, i.e. level 4.
IE ID	id-G	IE ID from the reported level, i.e. level 4.
Repetition	11	Repetition number on the reported level, i.e. level 4.
Number		(Since the IE E (level 2) is the lowest level included in the <i>Message Structure</i> IE this is the eleventh occurrence of IE G within the IE E (level 2).
Type of Error	not	
	underst	
	ood	
Message Structur	e, first rep	etition
>IE ID	id-B	IE ID from level 1.
Message Structur	e, second	repetition
>IE ID	id-E	IE ID from the lowest level above the reported level, i.e. level 2.
>Repetition	3	Repetition number from the lowest level above the reported level, i.e. level 2.
Number		

NOTE 1: The IE J on level 3 cannot be included in the Message Structure IE since they have no criticality of their own.

NOTE 2: The repetition number of the reported IE indicates the number of repetitions of IE G received up to the detected erroneous repetition, counting all occurrences of the IE G below the same instance of the previous level with assigned criticality (instance 3 of IE E on level 2).

A.3.2 Example 2



- a) IE ID IE
- b) Repetition Number IE

Figure A.3: Example of a received PCAP message containing a not comprehended IE

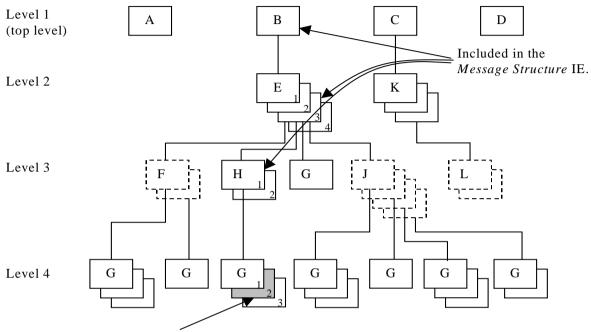
If there is an error within the second instance (marked as grey) in the sequence (IE L in the tabular format) on level 3 below IE K in the structure shown in the figure A.3, this will be reported within the *Information Element Criticality Diagnostics* IE within the *Criticality Diagnostics* IE as in table A.3.

Table A.3

IE name	Value	Comment	
IE Criticality	ignore	Criticality for IE on the reported level, i.e. level 2.	
	and		
	notify		
IE ID	id-K	IE ID from the reported level, i.e. level 2.	
Repetition	3	Repetition number on the reported level, i.e. level 2.	
Number			
Type of Error	not		
	underst		
	ood		
Message Structur	Message Structure, first repetition		
>IE ID	id-C	IE ID from the lowest level above the reported level, i.e. level 1.	

NOTE: The IE L on level 3 cannot be reported individually included in the *Message Structure* IE since it has no criticality of its own.

A.3.3 Example 3



Included in the Information Element Criticality Diagnostics IE:

- a) IE ID IE
- b) Repetition Number IE

Figure A.4: Example of a received PCAP message containing a not comprehended IE

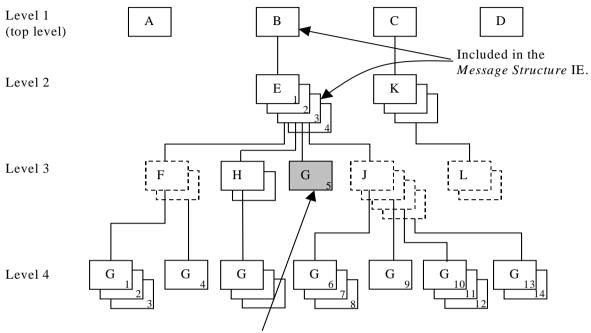
If there is an error within the instance marked as grey in the IE G in the IE H shown in the figure A.4, this will be reported within the *Information Element Criticality Diagnostics* IE within the *Criticality Diagnostics* IE as in table A.4.

Table A.4

IE name	Value	Comment	
IE Criticality	ignore and notify	Criticality for IE on the reported level, i.e. level 4.	
IE ID	id-G	IE ID from the reported level, i.e. level 4.	
Repetition Number	2	Repetition number on the reported level, i.e. level 4.	
Type of Error	not underst ood		
Message Structur	e, first rep	etition	
>IE ID	id-B	IE ID from level 1.	
Message Structur	e, second	repetition	
>IE ID	id-E	IE ID from level 2.	
>Repetition Number	3	Repetition number from level 2.	
Message Structure, third repetition			
>IE ID	id-H	IE ID from the lowest level above the reported level, i.e. level 3.	
>Repetition Number	1	Repetition number from the lowest level above the reported level, i.e. level 3.	

NOTE: The repetition number of level 4 indicates the number of repetitions of IE G received up to the detected erroneous repetition, counted below the same instance of the previous level with assigned criticality (instance 1 of IE H on level 3).

A.3.4 Example 4



Included in the Information Element Criticality Diagnostics IE:

- a) IE ID IE
- b) Repetition Number IE

Figure A.5: Example of a received PCAP message containing a not comprehended IE

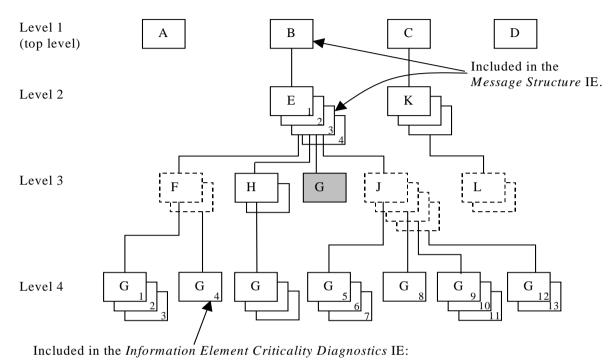
If there is an error within the instance marked as grey in the IE G in the IE E shown in the figure A.5, this will be reported within the *Information Element Criticality Diagnostics* IE within the *Criticality Diagnostics* IE, as in table A.5.

Table A.5

IE name	Value	Comment
IE Criticality	Reject	Criticality for IE on the reported level, i.e. level 3.
IE ID	id-G	IE ID from the reported level, i.e. level 3.
Repetition	5	Repetition number on the reported level, i.e. level 3.
Number		(Since the IE E (level 2) is the lowest level included in the <i>Message Structure</i> IE this is the fifth occurrence of IE G within the IE E (level 2).
Type of Error	not	
	underst	
	ood	
Message Structur	e, first rep	etition
>IE ID	id-B	IE ID from level 1.
Message Structur	e, second	repetition
>IE ID	id-E	IE ID from the lowest level above the reported level, i.e. level 2.
>Repetition	3	Repetition number from the lowest level above the reported level, i.e. level 2.
Number		

NOTE: The repetition number of the reported IE indicates the number of repetitions of IE G received up to the detected erroneous repetition, counting all occurrences of the IE G below the same instance of the previous level with assigned criticality (instance 3 of IE E on level 2).

A.3.5 Example 5



- a) IE ID IE
- b) Repetition Number IE

Figure A.6: Example of a received PCAP message with a missing IE

If the instance marked as grey in the IE G in the IE E shown in the figure A.6, is missing this will be reported within the *Information Element Criticality Diagnostics* IE, as in table A.6.

Table A.6

IE name	Value	Comment		
IE Criticality	reject	Criticality for IE on the reported level, i.e. level 3.		
IE ID	id-G	IE ID from the reported level, i.e. level 3.		
Repetition	4	Repetition number up to the missing IE on the reported level, i.e. level 3.		
Number		(Since the IE E (level 2) is the lowest level included in the Message Structure		
		IE there have been four occurrences of IE G within the IE E (level 2) up to		
		the missing occurrence.		
Type of Error	missing			
Message Structur	Message Structure, first repetition			
>IE ID	id-B	IE ID from level 1.		
Message Structur	e, second	repetition		
>IE ID	id-E	IE ID from the lowest level above the reported level, i.e. level 2.		
>Repetition	3	Repetition number from the lowest level above the reported level, i.e. level 2.		
Number				

NOTE: The repetition number of the reported IE indicates the number of repetitions of IE G received up to but not including the missing occurrence, counting all occurrences of the IE G below the same instance of the previous level with assigned criticality (instance 3 of IE E on level 2).

A.4 ASN.1 of EXAMPLE MESSAGE

```
E-List ::= SEQUENCE (SIZE (1..maxE)) OF ProtocolIE-Single-Container { {E-IEs} }
E-IEs PCAP-PROTOCOL-IES ::= {
    { ID id-E CRITICALITY ignore TYPE E PRESENCE mandatory }
E ::= SEQUENCE {
   f
                   F-List.
   h
                  H-List,
                  G-List1,
   q
                  J-List,
   iE-Extensions ProtocolExtensionContainer { {E-ExtIEs} } OPTIONAL,
E-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
F-List ::= SEQUENCE (SIZE (1..maxF)) OF F
F ::= SEQUENCE {
                  G-List2 OPTIONAL,
   iE-Extensions ProtocolExtensionContainer { {F-ExtIEs} } OPTIONAL,
F-ExtIEs
          PCAP-PROTOCOL-EXTENSION ::= {
G-List2 ::= SEQUENCE (SIZE (1..3, ...)) OF ProtocolIE-Single-Container { G2-IEs} }
G2-IES PCAP-PROTOCOL-IES ::= {
   { ID id-G CRITICALITY ignore TYPE G PRESENCE mandatory }
H-List ::= SEOUENCE (SIZE (1..maxH)) OF ProtocolIE-Single-Container { {H-IEs} }
H-IES PCAP-PROTOCOL-IES ::= {
    { ID id-H CRITICALITY ignore TYPE H PRESENCE mandatory }
H ::= SEQUENCE {
   q G-List3 OPTIONAL,
   iE-Extensions
                     ProtocolExtensionContainer { {H-ExtIEs} } OPTIONAL,
H-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
G-List3 ::= SEQUENCE (SIZE (1..3, ...)) OF ProtocolIE-Single-Container { {G3-IEs} }
```

```
G3-IES PCAP-PROTOCOL-IES ::= {
   G-List1 ::= ProtocolIE-Single-Container { {G1-IEs} }
G1-IES PCAP-PROTOCOL-IES ::= {
   { ID id-G CRITICALITY reject TYPE G PRESENCE mandatory }
J-List ::= SEQUENCE (SIZE (1..maxJ)) OF J
J ::= SEQUENCE {
                 G-List4 OPTIONAL,
   iE-Extensions ProtocolExtensionContainer { {J-ExtIEs} } OPTIONAL,
J-ExtIES PCAP-PROTOCOL-EXTENSION ::= {
G-List4 ::= SEQUENCE (SIZE (1..3, ...)) OF ProtocolIE-Single-Container { {G4-IEs} }
G4-IES PCAP-PROTOCOL-IES ::= {
   C ::= SEQUENCE {
                 K-List,
   iE-Extensions ProtocolExtensionContainer { {C-ExtIEs} } OPTIONAL,
C-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
K-List ::= SEOUENCE (SIZE (1..maxK)) OF ProtocolIE-Single-Container { K-IEs} }
K-IES PCAP-PROTOCOL-IES ::= {
   { ID id-K CRITICALITY notify TYPE K PRESENCE mandatory }
K ::= SEQUENCE {
                 L-List.
   iE-Extensions ProtocolExtensionContainer { {K-ExtIEs} } OPTIONAL,
K-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
```

Annex B (informative): Change History

TSG #	TSG Doc.	CR	Rev	Subject/Comment	New
12/2008	-	-	-	Creation of Rel-8 version based on v 7.11.0	8.0.0
42	RP-080852	0115	1	Support for additional navigation satellite systems in PCAP	8.0.0
43	RP-090076	0117		PCAP Review	8.1.0
43	RP-090076	0118		Correction to Additional GANSS Assistance Data Required IE	8.1.0
45	RP-090770	0119	1	Correction on Cell-ID Measured Results Sets in INFORMATION EXCHANGE INITIATION REQUEST	8.2.0
12/2009	-	-	-	Creation of Rel-9 version based on v 8.2.0	9.0.0
47	RP-100229	0120		Correction to OTDOA in SAS-centric mode	9.1.0
47	RP-100230	0121	1	Addition of DGNSS Validity Period in PCAP	9.1.0
49	RP-100907	0124	1	DGANSS ASN.1 correction	9.2.0
09/2010				Creation of Rel-10 version based on v 9.2.0	
49	RP-100910	0123	1	Small Technical Enhancements and Improvements for GNSS (PCAP)	10.0.0
50	RP-101276	0127	6	IRAT measurement for enhanced positioning capability	10.1.0
50	RP-101276	0128	1	Clarification of reporting of CellID measurements	10.1.0
SP-49	SP-100629			Clarification on the use of References (TS 21.801 CR#0030)	10.2.0
51	RP-110229	0129	2	PCAP ASN.1 Cleanup	10.2.0
51	RP-110226	0134	5	Adding of IMSI and IMEI to PERFORM LOCATION REQUEST message	10.2.0
52	RP-110686	0135	2	ASN.1 corrections and cleanup of 25.453	10.3.0
52	RP-110685	0136		References cleanup (25.453)	10.3.0
09/2012				Update to Rel-11 version (MCC)	11.0.0

History

Document history			
V11.0.0	October 2012	Publication	