



UserPlane Location Protocol

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1. Scope

This document describes the UserPlane Location Protocol (ULP). ULP is a protocol-level instantiation of the Lup reference point described in [SUPLAD]. The protocol is used between the SLP (SUPL Location Platform) and a SET (SUPL Enabled Terminal). For more details about SUPL Requirements refer to [SUPLRD]. For more details about SUPL architecture and call-flows, refer to [SUPLAD]

2. References

2.1 Normative References

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- [RFC2234] “Augmented BNF for Syntax Specifications: ABNF”. D. Crocker, Ed., P. Overell. November 1997, [URL:http://www.ietf.org/rfc/rfc2234.txt](http://www.ietf.org/rfc/rfc2234.txt)
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- [SUPLAD] “Secure User Plane Location Architecture”, Open Mobile Alliance™, OMA-AD-SUPL-AD-V1_0, [URL:http://www.openmobilealliance.org/](http://www.openmobilealliance.org/)
- [WAP] “Wireless Application Protocol”, Version 2.0, Open Mobile Alliance™, URL: <http://www.openmobilealliance.org/>
- [WAP PAP] “WAP Push Access Protocol”, Open Mobile Alliance™, URL: <http://www.openmobilealliance.org/>
- [WAP POTAP] “WAP Push Over The Air Protocol”, Open Mobile Alliance™, URL: <http://www.openmobilealliance.org/>
- [WAP PUSH] “WAP Push Message”, Open Mobile Alliance. URL: <http://www.openmobilealliance.org/>
- [WAP WDP] “WAP Wireless Datagram Protocol”, Open Mobile Alliance™, URL: <http://www.openmobilealliance.org/>
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- [3GPP GAD] 3GPP TS 23.032, “Universal Geographical Area Description (GAD)”, <http://www.3GPP.org>
- [3GPP LCS] 3GPP TS 22.071, “Location Services (LCS); Service description; Stage 1”, <http://www.3GPP.org>
- [3GPP RRC] 3GPP TS 25.331, “Radio Resource Control (RRC) Protocol Specification”, V 5.11.0, URL: <http://www.3GPP.org/>
- [ASN.1] ITU-T Recommendation X.680: "Information technology - Abstract Syntax Notation One (ASN.1): Specification of basic notation", <http://www.itu.int/ITU-T/>
- [PER] ITU-T Recommendation X.691: "Information technology - ASN.1 encoding rules: Specification of Packed Encoding Rules (PER)", <http://www.itu.int/ITU-T/>
- [TIA-637] 3GPP2 C.S0015-B v1.0, "Short Message Service (SMS) For Wideband Spread Spectrum Systems - Release B" June 2004, URL: http://www.3gpp2.org/Public_html/specs/
- [TIA-41] 3GPP2 X.S0004-E v1.0, "Wireless Radiotelecommunications Intersystem Operations", March 2004, URL: http://www.3gpp2.org/Public_html/specs/
- [OMAOPS] “OMA Organization and Process”, Version 1.2, Open Mobile Alliance™, January 2005, <http://www.openmobilealliance.org/>

2.2 Informative References

- [SUPL CP] "OMA SUPL Client Provisioning", Open Mobile Alliance(tm), OMA-TS-SUPL-Client-Provisioning-V1_0, [URL:http://www.openmobilealliance.org/](http://www.openmobilealliance.org/)
- [SUPL MO] "OMA Management Object for SUPL", Open MobileAlliance(tm), OMA-TS-SUPL-MO-V1_0, [URL:http://www.openmobilealliance.org/](http://www.openmobilealliance.org/)

3. Terminology and Conventions

3.1 Conventions

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in [RFC2119].

All sections and appendixes, except “Scope” and “Introduction”, are normative, unless they are explicitly indicated to be informative.

3.2 Definitions

Quality of Position	A set of attributes associated with a request for the geographic position of SET. The attributes include the required horizontal accuracy, vertical accuracy, max location age, and response time of the SET position.
Major Version	Major versions are likely to contain major feature additions; MAY contain incompatibilities with previous specification revisions; and though unlikely, could change, drop, or replace standard or existing interfaces. Initial releases are “1_0”. [OMAOPS]
Minor Version	Minor versions are likely to contain minor feature additions, be compatible with the preceding Major version. Minor specification revision include existing interfaces, although it MAY provide evolving interfaces. The initial minor release for any major release is “0”, i.e. 1_0 [OMAOPS]
Service Indicator	Service indicators are intended to be compatible with the Major_Minor release they relate to but add bug fixes. No new functions will be added through the release of Service Indicators. [OMAOPS]

3.3 Abbreviations

CI	Cell Identity (3GPP)
FQDN	Fully Qualified Domain Name
LAC	Location Area Code (3GPP)
MCC	Mobile Country Code (3GPP)
MNC	Mobile Network Code (3GPP)
NID	Network ID (C.S0022-A V1.0)
OMA	Open Mobile Alliance
PAP	WAP Push Access Protocol
POTAP	WAP Push Over The Air Protocol
QoP	Quality of Position
RNC	Radio Network Controller
SET	SUPL Enabled Terminal
SID	System ID (C.S0022-A V1.0)
SLC	SUPL Location Center
SLP	SUPL Location Platform
SM	Short Message
SMS	Short Message Service
TCP	Transmission Control Protocol
ULP	Userplane Location Protocol
WAP	Wireless Application Protocol

4. Introduction

Location services based on the location of mobile devices are becoming increasingly widespread. SUPL (Secure User Plane Location) employs user plane data bearers for transferring location information (e.g. GPS assistance) and for carrying positioning technology-related protocols between a SUPL Enabled Terminal (SET) and the network. SUPL is considered to be an effective way of transferring location information required for computing the target SET's location.

To serve a location service to a client, considerable signalling and position information are transferred between actors such as a SET and a location server. Currently, assisted-GPS (A-GPS) provides more accurate position of a SET than other available standardized positioning technologies. However, A-GPS over control plane requires modifications to existing network elements, and interfaces (for signalling procedures between the terminal and the network). SUPL needs only an IP capable network and requires minimum modification to the network, and this is an efficient solution that can be deployed rapidly.

SUPL utilises existing standards where available and possible, and SUPL should be extensible to enabling more positioning technologies as the need arises so that they utilise the same mechanism. In the initial phase, SUPL will provide full functionality of A-GPS with minimum changes of current network elements.

This protocol specification can be used to implement SUPL both in the SET and in the SLP

The target audience for this specification is developers and systems engineers implementing SUPL in SETs or SLPs.

5. Protocol Interface

The encoding for the ULP protocol SHALL be ASN.1 [ASN.1]. The encoding is BASIC-PER, unaligned encoding [PER].

5.1 Transport

The transport protocol between SET and SLP (SET and SLC/SPC for non-proxy mode) SHALL be TCP/IP with the following exception: the SUPL INIT message SHALL be transported over WAP Push or Mobile Terminated SMS. In case of WAP Push, the Push message from the PPG to SET SHALL follow the WAP Push specifications as per [WAP POTAP].

5.1.1 TCP/IP

A port number out of the range of Dynamic and/or Private IANA Ports range has been selected as standard port for ULP messages transported over TCP. This port number may later be replaced by a port number registered with IANA (Internet Assigned Numbers Authority). The port numbers is:

oma-ulp	59910/tcp	OMA UserPlane Location Protocol
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5.1.2 WAP Push

The WAP Push message from an SLP (SLC for non-proxy mode) to a PPG SHALL contain the SUPL INIT message and SHALL follow [WAP PAP]. WAP Push over HTTP SHALL be used and SHALL contain the PAP control entity and the PER encoded SUPL INIT message. An example (informative only) is shown in Annex 1. The PPG communicates with the SET over POTAP [WAP POTAP].

The content type SHALL be as registered with IANA (content type: application/oma-supl-ulp)

Note: at the time of writing, the content type has not been registered with IANA.

The WAP application id SHALL be as registered with OMNA (URN: x-oma-application:ulp.ua) and the assigned code value is (0x10).

5.1.3 MT SMS

For GSM/WCDMA, the WDP [WAP WDP] framing SHALL be used for MT SMS. The port number SHALL be as registered with IANA.

This port number may later be replaced by a port number registered with IANA (Internet Assigned Numbers Authority). The temporary port numbers is:

oma-ulp	59910/tcp	OMA User Plane Location Protocol
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For CDMA, the SUPL INIT message shall be sent as an MT SMS [TIA-637] using a dedicated Teleservice Identifier [TIA-41]. The dedicated Teleservice Identifier is: 4115.

5.1.4 SET Provisioning

The SET SHALL be provisioned with the address of the Home SLP in the form of FQDN.

The provisioning of the Home SLP address in the SET MAY use OMA enablers to provision the SET, e.g. as described in [SUPL CP] and [SUPL MO].

6. ULP Message Definitions (Normative)

This section contains a normative description of the ULP messages. All messages defined in ULP contain a common part and a message specific part.

6.1 Common Part

The common part contains parameters that are present in all ULP messages.

Parameter	Presence	Description
Message Length	M	The length of the entire ULP Message in octets. Note: The first two octets of a PER encoded ULP message contains the length of the entire message. These octets are set to the Message Length when the PER encoding is complete and the entire message length is known.
Version	M	Version of the ULP protocol, in the form major, minor, service indicator
Session ID	M	The unique Session ID
Message Payload	M	This parameter contains one of the messages defined in ULP. Defined messages are: <ul style="list-style-type: none"> • SUPL INIT • SUPL START • SUPL RESPONSE • SUPL POS INIT • SUPL POS • SUPL END • SUPL AUTH REQ • SUPL AUTH RESP

Table 1: Common Part for all ULP Messages

6.2 Message Specific Part

The message specific part contains further parameters that are unique for each ULP message. The following sub-sections describe the message specific part of ULP messages.

6.2.1 SUPL INIT

SUPL INIT is the initial message from the SLP to the SET in Network initiated cases

Parameter	Presence	Description
Positioning Method	M	Defines the positioning technology desired by the SLP, which can be AGPS SET assisted, AGPS SET Based, Autonomous GPS, EOTD, OTDOA, AFLT or Enhanced Cell ID.
Notification	O	The purpose of this field is to provide instructions to the SET with respect to LCS notification and privacy
SLP Address	CV	This parameter contains an SLP address (SPC address for non-proxy mode). For proxy mode this parameter is OPTIONAL. For non-proxy mode this parameter is REQUIRED. This address is used by the SET when establishing a secure IP connection to the SLP or SPC
QoP	O	Desired Quality of Position.
SLP Mode	M	This parameter indicates if the SLP uses proxy or non-proxy mode.
MAC	O	This parameter contains a Message Authentication Code (MAC), which MAY be used as integrity protection of the SUPL INIT message.
Key Identity	CV	This parameter contains a key identity, which identifies the key to be used to verify the MAC. It is required when MAC is present.

Table 2: SUPL INIT Message

6.2.2 SUPL START

SUPL START is the initial message from the SET to the SLP.

Parameter	Presence	Description
SET capabilities	M	Defines the capabilities of the SET
Location ID	M	Defines the cell information of the SET.

QoS	O	Desired Quality of Position
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Table 3: SUPL START Message

6.2.3 SUPL RESPONSE

SUPL RESPONSE is the response to a SUPL START message.

Parameter	Presence	Description
Positioning Method	M	The positioning method desired for the SUPL POS session.
SLP Address	CV	This parameter is only required for non-proxy mode and contains an SPC address. A SET uses this address to establish a data connection to the SPC.
SET Auth key	CV	This parameter is only required for non-proxy mode and contains the authentication key that a SET SHALL use for SPC authentication.
Key Identity 4	CV	This parameter is only required for non-proxy mode and contains a key identity.

Table 4 SUPL RESPONSE Message

6.2.4 SUPL POS INIT

SUPL POS INIT is the message following the SUPL INIT message in Network initiated cases or the SUPL RESPONSE message in SET initiated cases

Parameter	Presence	Description
SET Capabilities	M	Defines the capabilities of the SET.
Requested Assistance Data	O	Defines the requested GPS assistance data. The presence of this element indicates that the SET wants to obtain assistance data from the SLP. In the case of RRLP and SET based location determination in the SET initiated case, the SLP SHALL send the RRLP Assistance Data message. The SET SHALL acknowledge the reception of assistance data with an RRLP Assistance Data ACK. In the case of RRC and SET based location determination in the SET initiated case, the SLP SHALL send the RRC Assistance Data Delivery

		message. The Requested Assistance Data parameter is not applicable to TIA-801 [C.S0022-A v1.0].
Location ID	M	Defines the cell information of the SET.
Position	O	Defines the position of the SET.
SUPLPOS	O	Contains the SUPLPOS message. Note: is only used if positioning protocol allows SET to send first message
Ver	CV	This parameter contains a hash of the SUPL INIT message. In Network initiated proxy mode a SET SHALL calculate a hash of a received SUPL INIT and include the result of the hash in this parameter.

Table 5 SUPL POS INIT Message

6.2.5 SUPL POS

SUPL POS is the message that wraps the underlying TIA-801, RRLP or RRC element.

Parameter	Presence	Description
Positioning Payload	M	The underlying TIA-801, RRLP or RRC element.
Velocity	O	Velocity of the SET, needed to overcome the lack of this information in RRLP and RRC. Defined in [3GPP GAD]

Table 6: SUPL POS Message

6.2.6 SUPL END

SUPL END is the message that ends the SUPL procedure, normally or abnormally.

Parameter	Presence	Description
Position	O	Defines the position result of the SET.
Status Code	O	Defines the Status of the message as either an error indication or an information indication. Error indications have values between 0 and 99, information indications have values between 100 and 199.

Ver	CV	This parameter contains a hash of the SUPL INIT message and is calculated by the SET. This parameter MUST be present in situations where the SUPL END message is sent as a direct response to SUPL INIT (both proxy and non-proxy mode).
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Table 7 SUPL END Message

6.2.7 SUPL AUTH REQ

SUPL AUTH REQ message is used in Network initiated cases (non-proxy mode). The message is sent from the SET to the Home SLP. The purpose of the message is to transfer key information to the Home SLC.

Parameter	Presence	Description
SET Nonce	M	This parameter is used by SLC to derive keys.
Key Identity 2	M	This parameter contains a key identity.

Table 8 SUPL AUTH REQ Message

6.2.8 SUPL AUTH RESP

SUPL AUTH RESP message is used in Network initiated cases (non-proxy mode). The message is sent from the Home SLC to the SET. The purpose of the message is to inform the SET that it is allowed to continue with the SUPL procedure.

This message may also be tunneled to a V-SLC in an RLP message and SHALL then include the authentication key and key identity to be used by the V-SPC.

Parameter	Presence	Description
SPC Auth key	O	This parameter defines the authentication key that a SET SHALL use for SPC authentication.
Key Identity 3	CV	This parameter contains a key identity. It is required if SPC Auth Key is present.
Status Code	O	Defines the Status of the message as either an error indication or an information indication. Error indications have values between 0 and 99, information indications have values between 100 and 199. SUPL AUTH RESP uses the Status

		Code parameter to indicate authentication failure (authNetFailure). If the SLC sends authNetFailure back to the SET, the session is considered closed and will be terminated by both sides.
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Table 9 SUPL AUTH RESP Message

7. Parameter Definitions (Normative)

This section contains descriptions of the parameters used in ULP messages.

7.1 NMR

Parameter	Presence	Values/description
NMR	-	Describes Contents of the Current Network Measurement Reports. Contains 1 to 15 NMR elements
> NMR element		The following fields shall be repeated for each channel for which measurements are available. The measurements shall be ordered by decreasing channel numbers.
>> ARFCN	M	ARFCN of the channel. This is an integer (0..1023)
>> BSIC	M	BSIC of the channel. This is an integer (0..63)
>> RxLEV	M	Measured power of the channel. Integer (0..63). The actual measured power X in dBm is derived from this value N by using the formula $X = N - 110$.

Table 10 NMR Parameter

7.2 Positioning Payload

Parameter	Presence	Values/description
Positioning payload	-	Describes the positioning payload for TIA-801 [C.S0022-A V1.0], RRLP [3GPP RRLP] and RRC [3GPP RRC]. The restrictions of maximum PDU size as specified in Section 2.1 of [3GPP RRLP] (242 octets) does not apply. If the size of "rrlpPayload" exceeds 65535 bits, pseudo segmentation according to [3GPP RRLP] SHALL be used.

Table 11 Positioning Payload Parameter

7.3 SLP Address

Parameter	Presence	Values/description
SLP address	-	<p>The SLP address (SLC or SPC address for non-proxy mode) can be of type</p> <ul style="list-style-type: none"> • IPAddress <ul style="list-style-type: none"> ○ IPv4 ○ IPv6 • FQDN.

Table 12 SLP Address Parameter

7.4 Velocity

Parameter	Presence	Values/description
Velocity	-	<p>Describes the velocity of the SET as per [3GPP GAD]. One of the following four formats are supported:</p> <ul style="list-style-type: none"> • Horizontal Velocity <ul style="list-style-type: none"> ○ Bearing ○ Horizontal speed • Horizontal and Vertical Velocity <ul style="list-style-type: none"> ○ Vertical Direction ○ Bearing ○ Horizontal speed ○ Vertical speed • Horizontal Velocity Uncertainty <ul style="list-style-type: none"> ○ Bearing ○ Horizontal speed ○ Horizontal speed uncertainty • Horizontal and Vertical Velocity Uncertainty <ul style="list-style-type: none"> ○ Vertical direction ○ Bearing ○ Horizontal speed ○ Vertical speed ○ Horizontal speed

		uncertainty ○ Vertical speed uncertainty
--	--	---

Table 13 Velocity Parameter

7.5 Version

Parameter	Presence	Values/description
Version	-	Describes the protocol version of ULP When a SUPL message is received, the receiving entity SHALL determine if the major version part specified in the message is supported by the receiving entity. If the major version part is supported the message SHALL be processed by the receiving entity. If the major version part is not supported the exception procedure for SUPL protocol error SHALL be performed. If the minor version part or service indicator part is not supported by the receiving entity the exception procedure for SUPL protocol error SHALL NOT be performed.
>Maj	M	major version, range: (0..255), MUST be 1 for the version described in this document
>Min	M	minor version, range: (0..255), MUST be 0 for the version described in this document.
>Serv_ind	M	service indicator, range: (0..255), MUST be 0 for the version described in this document.

Table 14 Version

7.6 Status Code

Parameter	Presence	Values/description
Status Code	-	The different status codes, either error or information indicators, as described in the table below

Table 15 Status Code

Status Code	Description
Error Indicator	Indicates Errors
unspecified	The error is unknown

systemFailure	System Failure
protocolError	Protocol parsing error
dataMissing	Needed data value is missing
unexpectedDataValue	A datavalue takes a value that cannot be used
posMethodFailure	The underlying positioning method returned a failure
posMethodMismatch	No positioning method could be found matching requested QoP, SET capabilities and positioning method specified by SLP
posProtocolMismatch	No positioning protocol could be found being available at SET and SLP
targetSETnotReachable	The SET was not responding
versionNotSupported	Wrong ULP version
resourceShortage	There were not enough resources available to serve the SET
invalidSessionId	Invalid session identity
unexpectedMessage	Unexpected message received
nonProxyModeNotSupported	The SET does not support “Non-Proxy” mode of operation.
proxyModeNotSupported	The SET does not support “Proxy” mode of operation.
positioningNotPermitted	The SET is not authorized by the SLP to obtain a position or assistance data.
authNetFailure	The network does not authenticate the SET. Only used in SUPL AUTH_RESP
Information Indicator	Indicates Information
consentDeniedByUser	User denied consent for location determination session.
consentGrantedByUser	User granted consent for location determination session.

Table 16: Status Codes

7.7 Position

Parameter	Presence	Values/description
Position	-	This parameter describes the position of the SET. The parameter also contains a timestamp and optionally the velocity.
> Timestamp	M	Time when position fix was calculated.
> Position Estimate	M	
>> Sign of latitude	M	Indicates North or South.
>> Latitude	M	Integer (0..2 ²³ -1). The latitude encoded value (<i>N</i>) is derived from the actual latitude <i>X</i> in degrees (0°..90°) by this formula: $N \leq 2^{23} X / 90 < N+1$
>> Longitude	M	Integer (-2 ²³ .. 2 ²³ -1). The longitude encoded value (<i>N</i>) is derived from the actual longitude <i>X</i> in degrees (-180°..+180°) by this formula: $N \leq 2^{24} X / 360 < N+1$
>> Uncertainty ellipse (semi major, semi minor, major axis)	O	Contains the latitude/longitude uncertainty code associated with the major axis, and the uncertainty code associated with the minor axis and the orientation, in degrees, of the major axis with respect to the North. For the correspondence between the latitude/longitude uncertainty code and meters refer to [3GPP GAD] for details.
>> Confidence	O	Represents the confidence by which the position of a target entity is known to be within the shape description (i.e., uncertainty ellipse for 2D-description, uncertainty ellipsoid for 3D-description) and is expressed as a percentage. This is an integer (0..100).
>> Altitude information	O	Shall be present for a 3D position information; it shall remain absent for 2D position information.
>>> Altitude direction	M	Indicates height (above the WGS84 ellipsoid) or depth (below the WGS84 ellipsoid).
>>> Altitude	M	Provides altitude information in meters. Integer (0..2 ¹⁵ -1). Refer to [3GPP GAD] for details
>>> Altitude uncertainty	M	Contains the altitude uncertainty code. Refer

		to [3GPP GAD] for details
>Velocity	O	Speed and bearing values as defined by the Velocity type and as defined in [3GPP GAD]

Table 17 Position Parameter

The definition and coding of the position estimate parameter (ellipsoid point with altitude, uncertainty ellipse and altitude uncertainty) is based on [3GPP GAD]. The Datum used for all positions are WGS-84

7.8 Positioning Method

Parameter	Presence	Values/description
Positioning Method	-	<p>Describes the positioning method:</p> <ul style="list-style-type: none"> • A-GPS SET assisted only • A-GPS SET based only • A-GPS SET assisted preferred (A-GPS SET based is the fallback mode) • A-GPS SET based preferred (A-GPS SET assisted is the fallback mode) • Autonomous GPS • AFLT • Enhanced Cell/sector • EOTD • OTDOA • No position <p>During a particular SUPL session, if a particular Positioning Method has been specified by an SLP, and if the immediately preceding or immediately following SET message shows support of that same Positioning Method, then it SHALL be considered that agreement on Positioning Method has been reached for that session. This agreed Positioning Method cannot then be changed for the remainder of that SUPL session.</p> <p>The positioning method “no position” is used when no SUPL POS session is to be conducted and the SUPL INIT message was sent for notification and verification purposes only. The SET will then respond with a SUPL END message including the appropriate status code (“consentDeniedByUser” or “consentGrantedByUser”). In case no verification was required (“notification</p>

		only”), the SET will respond with an empty SUPL END message.
--	--	--

Table 18 Positioning Method Parameter

7.9 Requested Assistance Data

Parameter	Presence	Values/description
Requested assistance data	-	<p>This parameter is applicable for A-GPS positioning methods only. It describes the requested A-GPS assistance data in form of a bitmap:</p> <ul style="list-style-type: none"> • Almanac indicator • UTC model • Ionospheric model • DGPS corrections • Reference location • Reference time • Acquisition assistance • Real-time integrity • Navigation model
>Navigation Related Data Subfield	CV	When the navigation model indicator is set, this field is present.
>>GPS week	M	Contains the GPS week of the assistance data currently held in the SET; range is 0 to 1023
>>GPS Toe	M	Contains the GPS time of Ephemeris in hours of the newest set of Ephemeris contained in the SET; range is 0 to 167
>>NSAT	M	Contains the number of satellites to be considered for the current GPS assistance data request (number of satellites for which ephemeris data is available in the SET); range is 0 to 31. If the SET has no ephemeris data, this field SHALL be set to zero. If the SET has ephemeris data whose age exceeds the T-Toe limit, this field may be set to zero. If the network receives a zero value for this field, it shall ignore the GPS week and GPS Toe fields and assume that the SET has no ephemeris data
>>T-Toe limit	M	Contains the Ephemeris age tolerance of the SET to the network in hours; range is 0 to 10

>>Satellite information	CV	Present if NSAT > 0, repeated NSAT times
>>>SatId	M	Identifies the satellite and is equal to (SV ID No-1) where SV ID No is defined in ICD-GPS-200C. Range is 0 to 63
>>>IODE	M	Represents the satellite sequence number, range is 0 to 255

Table 19 Requested Assistance Data Parameter

7.10 SET capabilities

Parameter	Presence	Values/description
SET capabilities	-	<p>SET capabilities (not mutually exclusive) in terms of supported positioning technologies and positioning protocols.</p> <p>During a particular SUPL session, a SET may send its capabilities more than once – specifically, in SET initiated cases, the SET capabilities are sent in SUPL START and in SUPL POS INIT. In such cases, the SET capabilities MUST NOT change during this particular session.</p>
>Pos Technology	M	<p>Defines the positioning technology.</p> <p>Zero or more of the following positioning technologies (bitmap):</p> <ul style="list-style-type: none"> • SET-assisted A-GPS • SET-based A-GPS • Autonomous GPS • AFLT • E-CID • E-OTD • OTDOA
>Pref Method	M	<p>One of the following preferred modes:</p> <ul style="list-style-type: none"> • SET-assisted preferred • SET-based preferred • No preferred mode
>Pos Protocol	M	<p>Zero or more of the following positioning protocols (bitmap):</p>

		<ul style="list-style-type: none"> • RRLP • RRC • TIA-801
--	--	--

Table 20 SET capabilities Parameter

7.11 Location ID

Parameter	Presence	Values/description
Location ID	-	Describes the globally unique cell identification of the most current serving cell.
>Cell Info	M	The following cell IDs are supported: <ul style="list-style-type: none"> • GSM Cell Info • WCDMA Cell Info • CDMA Cell Info
>Status	M	Describes whether or not the cell info is: <ul style="list-style-type: none"> • Not Current, last known cell info • Current, the present cell info • Unknown (i.e. not known whether the cell id is current or not current) Note: The Status parameter does NOT apply to WCDMA optional parameters (Frequency Info, Primary Scrambling Code and Measured Results List). Frequency Info, Primary Scrambling Code and Measured Results List, if present, are always considered to be correct for the current cell., if present, is also always considered to be correct and current.

Table 21 Location ID Parameter

7.11.1 GSM Cell Info

The gsmCell parameter defines the parameter of a GSM radio cell.

Parameter	Presence	Values/description
Gsm Cell Info	-	GSM Cell ID
>MCC	M	Mobile Country Code, range: (0..999)
>MNC	M	Mobile Network Code, range: (0..999)

>LAC	M	Location Area Code, range: (0..65535)
>CI	M	Cell Identity, range: (0..65535)
>NMR	O	Network Measurement Report – can be present for 1 to 15 cells.
>>ARFCN	M	ARFCN, range: (0..1023)
>>BSIC	M	BSIC, range: (0..63)
>>RXLev	M	RXLEV, range: (0..63)
>TA	O	Timing Advance, range: (0..255)

Table 22 GSM Cell Info Parameter

7.11.2 WCDMA Cell Info

The wcdmaCell parameter defines the parameter of a WCDMA radio cell.

Parameter	Presence	Values/description
Wcdma Cell Info	-	WCDMA Cell ID
>MCC	M	Mobile Country Code, range: (0..999)
>MNC	M	Mobile Network Code, range: (0..999)
>UC-ID	M	Cell Identity, range: (0..268435455). UC-ID is composed of RNC-ID and C-ID.
>Frequency Info	O	<p>Frequency info can be:</p> <p>fdd:</p> <p>uarfcn-UL, range: (0..16383)</p> <p>uarfcn-DL, range: (0..16383)</p> <p>In case of fdd, uarfcn-UL is optional while uarfcn-DL is mandatory. If uarfcn-UL is not present, the default duplex distance defined for the operating frequency band shall be used [3GPP RRC].</p> <p>tdd</p> <p>uarfcn-Nt, range: (0..16383)</p> <p>Note: Frequency Info and Primary Scrambling Code are always those of the current cell.</p>
>Primary Scrambling Code	O	<p>Primary Scrambling Code, range: (0..511)</p> <p>Note: Frequency Info and Primary Scrambling Code are always those of the current cell.</p>

>Measured Results List	O	Network Measurement Report for WCDMA comprising both intra- and/or inter-frequency cell measurements (as per 3GPP TS 25.331).
------------------------	---	---

Table 23 WCDMA Cell Info Parameter

7.11.3 CDMA Cell Info

The cdmaCell parameter defines the parameter of a CDMA radio cell.

Parameter	Presence	Values/description
Cdma Cell Info	-	CDMA Cell ID
>NID	M	Network ID, range: (0..65535)
>SID	M	System ID, range: (0..32767)
>BASEID	M	Base Station ID, range: (0..65535)
>BASELAT	M	Base Station Latitude, range: (0..4194303)
>BASELONG	M	Base Station Longitude, range: (0..8388607)
>REFPN	M	Base Station PN Number, range: (0..511)
>WeekNumber	M	GPS Week number, range: (0..65535)
>Seconds	M	GPS Seconds, range: (0..4194303)

Table 24 CDMA Cell Info

7.12 Notification

Parameter	Presence	Values/description
Notification	-	Describes the notification/verification mechanism to be applied.
>Notification type	M	Type of notification: <ul style="list-style-type: none"> • No notification & no verification • Notification only • Notification and verification <ul style="list-style-type: none"> ○ Allowed on no answer (if no answer is received from the SET User, the SET will assume that user consent has been granted and will

		<p>proceed)</p> <ul style="list-style-type: none"> ○ Denied on no answer (if no answer is received from the SET User, the SET will assume that user consent has been denied and will abort) • Privacy override (is used for preventing notification and verification without leaving any traces of a performed position fix or position fix attempt in terms of log files etc. on the SET).
>Encoding type	CV	<p>Encoding type is required when Notification type is set to Notification only or Notification and verification and when RequestorID or ClientIDClientName is used.</p> <ul style="list-style-type: none"> • ucs2 • gsm-default • UTF-8
>RequestorID	O	Identity of the Requestor
>RequestorType	CV	<p>Indication what is the type of the client name. It is required if RequestorID is present. The type of the client name can be one of the following:</p> <ul style="list-style-type: none"> - Logical name - MSISDN - E-mail address - URL - SIP URL - IMS public identity - MIN - MDN
>ClientName	O	The name of the Location Application.
>ClientNameType	CV	<p>Indication what is the type of the client name. It is required if ClientName is present. The type of the client name can be one of the following:</p> <ul style="list-style-type: none"> - Logical name

		<ul style="list-style-type: none"> - MSISDN - E-mail address - URL - SIP URL - IMS public identity - MIN - MDN
--	--	---

Table 25 Notification Parameter

7.13 QoP

Parameter	Presence	Values/description
QoP	-	Describes the desired Quality of Position
>Horizontal accuracy	M	Horizontal accuracy as defined in [3GPP GAD] (section 6.2 Uncertainty)
>Vertical accuracy	O	Vertical accuracy as defined in [3GPP GAD] (section 6.4 Uncertainty Altitude)
> Maximum Location Age	O	Maximum tolerable age of position estimates used for cached position fixes. Units in seconds from 0 to 65535.
>Delay	O	Values as defined for element Response Time in 3GPP TS 44.031 [3GPP RRLP]: 2^N , N from (0..7), unit is seconds

Table 26 QoP

7.14 Session ID

The Session ID SHALL be a unique value, consisting of two parts, a SET value (SET Session ID) (see section 7.14.1) concatenated with an SLP value (SLP Session ID) (7.14.2).

Parameter	Presence	Values/description
SET Session ID	M	Part of Session ID pertaining to the SET
SLP Session ID	M	Part of Session ID pertaining to the SLP

Table 27 Session ID Parameter

For Network-Initiated flows, when sending a SUPL INIT to the SET, the SLP SHALL assign a value to the SLP Session ID, but to save bandwidth, the SLP SHALL not include the SET Session ID in the message. The SET SHALL then assign a value to the SET Session ID when it receives the message. Any further messages SHALL contain the resultant combined Session ID for the remainder of the session.

For SET-Initiated flows, when sending a SUPL START to the SLP, the SET SHALL assign a value to the SET Session ID, but to save bandwidth, the SET SHALL not include the SLP Session ID in the message. The SLP SHALL assign a value to the SLP Session ID when it receives the message. Any further messages SHALL contain the resultant combined Session ID for the remainder of the session.

The Session ID SHALL allow for multiple simultaneous sessions on both the SLP and the SET.

7.14.1 SET Session ID

This section describes the construct of the SET Session ID.

Parameter	Presence	Values/description
Session ID	M	Session identifier, unique from SET perspective. This value SHALL be unique over all concurrently active ULP sessions on that particular SET. This value may be reused by the SET after the ULP session for which it is being used has ended.
SET ID	M	SET identity value This parameter can be of type <ul style="list-style-type: none"> • MSISDN • MDN • MIN • IMSI • NAI • IPAddress <ul style="list-style-type: none"> ○ IPv4 ○ IPv6

Table 28 SET Session ID Parameter

7.14.2 SLP Session ID

This section describes the construct of the SLP Session ID.

Parameter	Presence	Values/description
Session ID	M	Session identifier, unique from SLP perspective. This value SHALL be unique over all concurrently active ULP sessions on that particular SLP. This value may be reused by the SLP after the ULP session for

		<p>which it is being used has ended.</p> <p>This parameter is written into a 4-octet-string.</p>
SLP ID	M	<p>The identity of the SLP.</p> <p>This parameter can be of type</p> <ul style="list-style-type: none"> • IPAddress <ul style="list-style-type: none"> ○ IPv4 ○ IPv6 • FQDN. <p>Note: SLP ID MAY be of different type and different value compared to the parameter SLP address in the messages SUPL INIT and SUPL RESPONSE.</p>

Table 29 SLP Session ID Parameter

7.15 SLP Mode

Parameter	Presence	Values/description
SLP Mode	-	<p>Describes the mode that the SLP (SPC for non-proxy mode) uses.</p> <p>This parameter can be of type</p> <ul style="list-style-type: none"> • Proxy mode • Non-proxy mode

Table 30 SLP Mode Parameter

7.16 MAC

Parameter	Presence	Values/description
MAC	-	<p>Describes the Message Authentication Code (MAC). For further details of the encoding of this parameter, see section 7.1 in SUPL AD [SUPLAD].</p>

Table 31 MAC Parameter

7.17 Key Identity

Parameter	Presence	Values/description
Key Identity	-	Describes the key identity, which identifies the key to be used to verify the MAC. For further details of the encoding of this parameter, see section 7.1 in SUPL AD [SUPLAD].

Table 32 Key Identity Parameter

7.18 Key Identity 2

Parameter	Presence	Values/description
Key Identity 2	-	Describes a key identity, which is used by SLC to derive the key to be used for SPC to SET communication. For further details of the encoding of this parameter, see section 7.1 in SUPL AD [SUPLAD].

Table 33 Key Identity 2 Parameter

7.19 Key Identity 3

Parameter	Presence	Values/description
Key Identity 3	-	Describes a key identity, which is used by V-SPC. For further details of the encoding of this parameter, see section 7.1 in SUPL AD [SUPLAD].

Table 34 Key Identity 3 Parameter

7.20 Key Identity 4

Parameter	Presence	Values/description
Key Identity 4	-	Describes a key identity, which is used by SET. For further details of the encoding of this parameter, see section 7.1 in SUPL AD [SUPLAD].

Table 35 Key Identity 4 Parameter

7.21 SPC Auth Key

Parameter	Presence	Values/description
SPC Auth key	-	Describes the authentication key that a SPC SHALL use for SET authentication. For further details of the encoding of this parameter, see section 7.1 in SUPL AD [SUPLAD].

Table 36 SPC Auth Key Parameter

7.22 SET Auth Key

Parameter	Presence	Values/description
SET Auth key	-	Describes the authentication key that a SET SHALL use for SPC authentication. For further details of the encoding of this parameter, see section 7.1 in SUPL AD [SUPLAD].

Table 37 SET Auth Key Parameter

7.23 Ver

Parameter	Presence	Values/description
Ver	-	Describes the hash of the SUPL INIT message. For further details of the encoding of this parameter, see section 7.1 in SUPL AD [SUPLAD].

Table 38 Ver Parameter

7.24 SET Nonce

Parameter	Presence	Values/description
SET Nonce	-	This parameter is used by SLC to derive keys. For further details of the encoding of this parameter, see section 7.1 in SUPL AD [SUPLAD].

Table 39 SET Nonce Parameter

8. ASN.1 Encoding of ULP messages (Normative)

This section defines the ULP messages and common elements with ASN.1 (Normative).

8.1 Common Part

```
ULP DEFINITIONS AUTOMATIC TAGS ::=
BEGIN
```

```
IMPORTS
```

```
  Version, SessionID
  FROM ULP-Components
  SUPLINIT
  FROM SUPL-INIT
  SUPLSTART
  FROM SUPL-START
  SUPLRESPONSE
  FROM SUPL-RESPONSE
  SUPLPOSINIT
  FROM SUPL-POS-INIT
  SUPLPOS
  FROM SUPL-POS
  SUPLEND
  FROM SUPL-END
  SUPLAUTHREQ
  FROM SUPL-AUTH-REQ
  SUPLAUTHRESP
  FROM SUPL-AUTH-RESP;
```

```
-- general ULP PDU layout;
```

```
ULP-PDU ::= SEQUENCE {
  length      INTEGER(0..65535),
  version     Version,
  sessionID   SessionID,
  message     UlpMessage}
```

```
UlpMessage ::= CHOICE {
  msSUPLINIT      SUPLINIT,
  msSUPLSTART     SUPLSTART,
  msSUPLRESPONSE  SUPLRESPONSE,
  msSUPLPOSINIT   SUPLPOSINIT,
  msSUPLPOS       SUPLPOS,
  msSUPLEND       SUPLEND,
  msSUPLAUTHREQ   SUPLAUTHREQ,
  msSUPLAUTHRESP  SUPLAUTHRESP,
  ...}
```

```
END
```

8.2 Message Specific Part

8.2.1 SUPL INIT

```
SUPL-INIT DEFINITIONS AUTOMATIC TAGS ::=
BEGIN
```

```
EXPORTS SUPLINIT;
```

```
IMPORTS SLPAddress, QoS, PosMethod
  FROM ULP-Components;
```

```
SUPLINIT ::= SEQUENCE {
  posMethod      PosMethod,
  notification   Notification OPTIONAL,
```

```

SLPAddress      SLPAddress OPTIONAL,
qoP             QoP OPTIONAL,
SLPMode        SLPMode,
mAC            MAC OPTIONAL,
keyIdentity     KeyIdentity OPTIONAL,
...}

Notification ::= SEQUENCE {
  notificationType NotificationType,
  encodingType     EncodingType OPTIONAL,
  requestorId     OCTET STRING(SIZE (1..maxReqLength)) OPTIONAL,
  requestorIdType FormatIndicator OPTIONAL,
  clientName      OCTET STRING(SIZE (1..maxClientLength)) OPTIONAL,
  clientNameType  FormatIndicator OPTIONAL,
  ...}

NotificationType ::= ENUMERATED {
  noNotificationNoVerification(0), notificationOnly(1),
  notificationAndVerificationAllowedNA(2),
  notificationAndVerificationDeniedNA(3), privacyOverride(4), ...
}

EncodingType ::= ENUMERATED {ucs2(0), gsmDefault(1), utf8(2), ...
}

maxReqLength INTEGER ::= 50

maxClientLength INTEGER ::= 50

FormatIndicator ::= ENUMERATED {
  logicalName(0), e-mailAddress(1), msisdN(2), url(3), sipUrl(4), min(5),
  mdn(6), ...
}

SLPMode ::= ENUMERATED {proxy(0), nonProxy(1)}

MAC ::= BIT STRING(SIZE (64))

KeyIdentity ::= BIT STRING(SIZE (128))

END

```

8.2.2 SUPL START

```

SUPL-START DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS SUPLSTART, SETCapabilities;

IMPORTS LocationId, QoP
      FROM ULP-Components;

SUPLSTART ::= SEQUENCE {
  SETCapabilities SETCapabilities,
  locationId      LocationId,
  qoP             QoP OPTIONAL,
  ...}

SETCapabilities ::= SEQUENCE {
  posTechnology  PosTechnology,
  prefMethod     PrefMethod,
  posProtocol    PosProtocol,
  ...}

PosTechnology ::= SEQUENCE {
  agpsSETAssisted  BOOLEAN,
  agpsSETBased     BOOLEAN,
  autonomousGPS   BOOLEAN,
  aFLT             BOOLEAN,

```

```

eCID          BOOLEAN,
eOTD          BOOLEAN,
oTDOA         BOOLEAN,
...}

PrefMethod ::= ENUMERATED {
  agpsSETassistedPreferred, agpsSETBasedPreferred, noPreference}

PosProtocol ::= SEQUENCE {
  tia801  BOOLEAN,
  rrlp    BOOLEAN,
  rrc     BOOLEAN,
  ...}

END

```

8.2.3 SUPL RESPONSE

```

SUPL-RESPONSE DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS SUPLRESPONSE;

IMPORTS PosMethod, SLPAddress
  FROM ULP-Components;

SUPLRESPONSE ::= SEQUENCE {
  posMethod      PosMethod,
  sLPAddress     SLPAddress OPTIONAL,
  sETAuthKey     SETAuthKey OPTIONAL,
  keyIdentity4   KeyIdentity4 OPTIONAL,
  ...}

SETAuthKey ::= CHOICE {
  shortKey  BIT STRING(SIZE (128)),
  longKey   BIT STRING(SIZE (256)),
  ...}

KeyIdentity4 ::= BIT STRING(SIZE (128))

END

```

8.2.4 SUPL POS INIT

```

SUPL-POS-INIT DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS SUPLPOSINIT;

IMPORTS
  SUPLPOS
  FROM SUPL-POS
  SETCapabilities
  FROM SUPL-START
  LocationId, Position, Ver
  FROM ULP-Components;

SUPLPOSINIT ::= SEQUENCE {
  sETCapabilities  SETCapabilities,
  requestedAssistData  RequestedAssistData OPTIONAL,
  locationId        LocationId,
  position          Position OPTIONAL,
  sUPLPOS           SUPLPOS OPTIONAL,
  ver               Ver OPTIONAL,
  ...}

```

```

RequestedAssistData ::= SEQUENCE {
    almanacRequested      BOOLEAN,
    utcModelRequested     BOOLEAN,
    ionosphericModelRequested  BOOLEAN,
    dgpsCorrectionsRequested  BOOLEAN,
    referenceLocationRequested  BOOLEAN,
    referenceTimeRequested    BOOLEAN,
    acquisitionAssistanceRequested  BOOLEAN,
    realTimeIntegrityRequested  BOOLEAN,
    navigationModelRequested  BOOLEAN,
    navigationModelData     NavigationModel OPTIONAL,
    ...}

NavigationModel ::= SEQUENCE {
    gpsWeek    INTEGER(0..1023),
    gpsToe     INTEGER(0..167),
    nSAT       INTEGER(0..31),
    toeLimit   INTEGER(0..10),
    satInfo    SatelliteInfo OPTIONAL,
    ...}

-- Further information on this fields can be found
-- in 3GPP TS 44.031 and 49.031
SatelliteInfo ::= SEQUENCE (SIZE (1..31)) OF SatelliteInfoElement

SatelliteInfoElement ::= SEQUENCE {
    satId  INTEGER(0..63),
    iODE   INTEGER(0..255),
    ...}

END

```

8.2.5 SUPL POS

```

SUPL-POS DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS SUPLPOS;

IMPORTS Velocity
    FROM ULP-Components;

SUPLPOS ::= SEQUENCE {
    posPayload  PosPayload,
    velocity    Velocity OPTIONAL,
    ...}

PosPayload ::= CHOICE {
    tia801payload  OCTET STRING(SIZE (1..8192)),
    rrcPayload     OCTET STRING(SIZE (1..8192)),
    rrlpPayload    OCTET STRING(SIZE (1..8192)),
    ...}

END

```

8.2.6 SUPL END

```

SUPL-END DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS SUPLEND;

IMPORTS StatusCode, Position, Ver
    FROM ULP-Components;

```

```

SUPLEND ::= SEQUENCE {
    position      Position OPTIONAL,
    statusCode    StatusCode OPTIONAL,
    ver           Ver OPTIONAL,
    ...}

END

```

8.2.7 SUPL AUTH REQ

```

SUPL-AUTH-REQ DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS SUPLAUTHREQ;

SUPLAUTHREQ ::= SEQUENCE {
    sETNonce      SETNonce,
    keyIdentity2  KeyIdentity2,
    ...}

SETNonce ::= BIT STRING(SIZE (128))

KeyIdentity2 ::= BIT STRING(SIZE (128))

END

```

8.2.8 SUPL AUTH RESP

```

SUPL-AUTH-RESP DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS SUPLAUTHRESP;

IMPORTS StatusCode
        FROM ULP-Components;

SUPLAUTHRESP ::= SEQUENCE {
    sPCAuthKey    SPCAuthKey OPTIONAL,
    keyIdentity3  KeyIdentity3 OPTIONAL,
    statusCode    StatusCode OPTIONAL,
    ...}

SPCAuthKey ::= CHOICE {
    shortKey  BIT STRING(SIZE (128)),
    longKey   BIT STRING(SIZE (256)),
    ...}

KeyIdentity3 ::= BIT STRING(SIZE (128))

END

```

8.3 Common elements

```

ULP-Components DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS
    Version, SessionID, IPAddress, SLPAddress, LocationId, Position, StatusCode,
    Velocity, QoP, PosMethod, Ver;

```



```

-- protocol version expressed as x.y.z (e.g., 5.1.0)
Version ::= SEQUENCE {
    maj     INTEGER(0..255),
    min     INTEGER(0..255),
    servind INTEGER(0..255)}

SessionID ::= SEQUENCE {
    setSessionID SetSessionID OPTIONAL, -- the semantics of OPTIONAL applies to the encoding only. The
parameter itself is MANDATORY. This is introduced only to minimize bandwidth for the SUPL INIT message.
Since the setSessionID is allocated by the SET, there is no setSessionID to be transmitted in the SUPL
INIT message.
    slpSessionID SlpSessionID OPTIONAL -- the semantics of OPTIONAL applies to the encoding only. The
parameter itself is MANDATORY. This is introduced only to minimize bandwidth for the SUPL START message.
Since the slpSessionID is allocated by the SLP, there is no slpSessionID to be transmitted in the SUPL
START message.--}

SetSessionID ::= SEQUENCE {sessionId INTEGER(0..65535),
                             setId     SETId}

SETId ::= CHOICE {
    msisdn  OCTET STRING(SIZE (8)),
    mdn     OCTET STRING(SIZE (8)),
    min     BIT STRING(SIZE (34)), -- coded according to TIA-553
    imsi    OCTET STRING(SIZE (8)),
    nai     IA5String(SIZE (1..1000)),
    ipAddress IPAddress,
    ...}

-- msisdn, mdn and imsi are a BCD (Binary Coded Decimal) string
-- represent digits from 0 through 9,
-- two digits per octet, each digit encoded 0000 to 1001 (0 to 9)
-- bits 8765 of octet n encoding digit 2n
-- bits 4321 of octet n encoding digit 2(n-1) +1
-- not used digits in the string shall be filled with 1111
SlpSessionID ::= SEQUENCE {
    sessionID OCTET STRING(SIZE (4)),
    slpId     SLPAddress}

IPAddress ::= CHOICE {
    ipv4Address OCTET STRING(SIZE (4)),
    ipv6Address OCTET STRING(SIZE (16))}

SLPAddress ::= CHOICE {ipAddress IPAddress,
                       fqDN      FQDN,
                       ...}

FQDN ::=
    VisibleString(FROM ("a".."z" | "A".."Z" | "0".."9" | ".-"))(SIZE (1..255))

Ver ::= BIT STRING(SIZE (64))

LocationId ::= SEQUENCE {cellInfo CellInfo,
                        status     Status,
                        ...}

Status ::= ENUMERATED {stale(0), current(1), unknown(2), ...
}

CellInfo ::= CHOICE {
    gsmCell      GsmCellInformation,
    wcdmaCell    WcdmaCellInformation,
    cdmaCell     CdmaCellInformation,
    ...}

Position ::= SEQUENCE {
    timestamp      UTCTime, -- shall include seconds and shall use UTC time.
    positionEstimate PositionEstimate,
    velocity       Velocity OPTIONAL,
    ...}

PositionEstimate ::= SEQUENCE {
    latitudeSign ENUMERATED {north, south},

```

```

latitude      INTEGER(0..8388607),
longitude     INTEGER(-8388608..8388607),
uncertainty
  SEQUENCE {uncertaintySemiMajor  INTEGER(0..127),
            uncertaintySemiMinor  INTEGER(0..127),
            orientationMajorAxis  INTEGER(0..180)} OPTIONAL,
-- angle in degree between major axis and North
confidence    INTEGER(0..100) OPTIONAL,
altitudeInfo  AltitudeInfo OPTIONAL,
...}

AltitudeInfo ::= SEQUENCE {
  altitudeDirection  ENUMERATED {height, depth},
  altitude           INTEGER(0..32767),
  altUncertainty     INTEGER(0..127),
  ...} -- based on 3GPP TS 23.032

CdmaCellInformation ::= SEQUENCE {
  refNID           INTEGER(0..65535), -- Network Id
  refSID           INTEGER(0..32767), -- System Id
  refBASEID       INTEGER(0..65535), -- Base Station Id
  refBASELAT      INTEGER(0..4194303), -- Base Station Latitude
  reBASELONG      INTEGER(0..8388607), -- Base Station Longitude
  refREFPN        INTEGER(0..511), -- Base Station PN Code
  refWeekNumber   INTEGER(0..65535), -- GPS Week Number
  refSeconds      INTEGER(0..4194303)-- GPS Seconds -- ,
  ...}

GsmCellInformation ::= SEQUENCE {
  refMCC  INTEGER(0..999), -- Mobile Country Code
  refMNC  INTEGER(0..999), -- Mobile Network Code
  refLAC  INTEGER(0..65535), -- Location area code
  refCI   INTEGER(0..65535), -- Cell identity
  nMR     NMR OPTIONAL,
  tA      INTEGER(0..255) OPTIONAL, --Timing Advance
  ...}

WcdmaCellInformation ::= SEQUENCE {
  refMCC           INTEGER(0..999), -- Mobile Country Code
  refMNC           INTEGER(0..999), -- Mobile Network Code
  refUC            INTEGER(0..268435455), -- Cell identity
  frequencyInfo    FrequencyInfo OPTIONAL,
  primaryScramblingCode  INTEGER(0..511) OPTIONAL,
  measuredResultsList  MeasuredResultsList OPTIONAL,
  ...}

FrequencyInfo ::= SEQUENCE {
  modeSpecificInfo  CHOICE {fdd  FrequencyInfoFDD,
                            tdd  FrequencyInfoTDD,
                            ...},
  ...}

FrequencyInfoFDD ::= SEQUENCE {
  uarfcn-UL  UARFCN OPTIONAL,
  uarfcn-DL  UARFCN,
  ...}

FrequencyInfoTDD ::= SEQUENCE {uarfcn-Nt  UARFCN,
  ...}

UARFCN ::= INTEGER(0..16383)

NMR ::= SEQUENCE (SIZE (1..15)) OF NMRelement

NMRelement ::= SEQUENCE {
  aRFCN  INTEGER(0..1023),
  bSIC   INTEGER(0..63),
  rxLev  INTEGER(0..63),
  ...}

MeasuredResultsList ::= SEQUENCE (SIZE (1..maxFreq)) OF MeasuredResults

MeasuredResults ::= SEQUENCE {

```

```

frequencyInfo          FrequencyInfo OPTIONAL,
ultra-CarrierRSSI      UTRA-CarrierRSSI OPTIONAL,
cellMeasuredResultsList CellMeasuredResultsList OPTIONAL}

CellMeasuredResultsList ::=
  SEQUENCE (SIZE (1..maxCellMeas)) OF CellMeasuredResults

-- SPARE: UTRA-CarrierRSSI, Max = 76
-- Values above Max are spare
UTRA-CarrierRSSI ::= INTEGER(0..127)

CellMeasuredResults ::= SEQUENCE {
  cellIdentity          INTEGER(0..268435455) OPTIONAL,
  modeSpecificInfo     CHOICE {fdd
    SEQUENCE {primaryCPICH-Info PrimaryCPICH-Info,
               cpich-Ec-N0      CPICH-Ec-N0 OPTIONAL,
               cpich-RSCP       CPICH-RSCP OPTIONAL,
               pathloss         Pathloss OPTIONAL},
    tdd
    SEQUENCE {cellParametersID CellParametersID,
               proposedTGSN    TGSN OPTIONAL,
               primaryCCPCH-RSCP PrimaryCCPCH-RSCP OPTIONAL,
               pathloss         Pathloss OPTIONAL,
               timeslotISCP-List TimeslotISCP-List OPTIONAL}}}

CellParametersID ::= INTEGER(0..127)

TGSN ::= INTEGER(0..14)

PrimaryCCPCH-RSCP ::= INTEGER(0..127)

-- SPARE: TimeslotISCP, Max = 91
-- Values above Max are spare
TimeslotISCP ::= INTEGER(0..127)

TimeslotISCP-List ::= SEQUENCE (SIZE (1..maxTS)) OF TimeslotISCP

PrimaryCPICH-Info ::= SEQUENCE {primaryScramblingCode INTEGER(0..511)}

-- SPARE: CPICH-Ec-No, Max = 49
-- Values above Max are spare
CPICH-Ec-N0 ::= INTEGER(0..63)

-- SPARE: CPICH- RSCP, Max = 91
-- Values above Max are spare
CPICH-RSCP ::= INTEGER(0..127)

-- SPARE: Pathloss, Max = 158
-- Values above Max are spare
Pathloss ::= INTEGER(46..173)

maxCellMeas INTEGER ::= 32

maxFreq INTEGER ::= 8

maxTS INTEGER ::= 14

StatusCode ::= ENUMERATED {
  unspecified(0), systemFailure(1), unexpectedMessage(2), protocolError(3),
  dataMissing(4), unexpectedDataValue(5), posMethodFailure(6),
  posMethodMismatch(7), posProtocolMismatch(8), targetSETnotReachable(9),
  versionNotSupported(10), resourceShortage(11), invalidSessionId(12),
  nonProxyModeNotSupported(13), proxyModeNotSupported(14),
  positioningNotPermitted(15), authNetFailure(16), consentDeniedByUser(100),
  consentGrantedByUser(101), ...
}

QoP ::= SEQUENCE {
  horacc          INTEGER(0..127),
  veracc          INTEGER(0..127) OPTIONAL, -- as defined in 3GPP TS 23.032 "uncertainty altitude"-
  maxLocAge       INTEGER(0..65535) OPTIONAL,
  delay           INTEGER(0..7) OPTIONAL, -- as defined in 3GPP TS 44.031

```

```
...}

Velocity ::= CHOICE { -- velocity definition as per 23.032
    horvel          Horvel,
    horandvervel   Horandvervel,
    horveluncert   Horveluncert,
    horandveruncert Horandveruncert,
    ...}

Horvel ::= SEQUENCE {
    bearing  BIT STRING(SIZE (9)),
    horspeed BIT STRING(SIZE (16)),
    ...}

Horandvervel ::= SEQUENCE {
    verdirect BIT STRING(SIZE (1)),
    bearing   BIT STRING(SIZE (9)),
    horspeed  BIT STRING(SIZE (16)),
    verspeed  BIT STRING(SIZE (8)),
    ...}

Horveluncert ::= SEQUENCE {
    bearing      BIT STRING(SIZE (9)),
    horspeed     BIT STRING(SIZE (16)),
    uncertspeed  BIT STRING(SIZE (8)),
    ...}

Horandveruncert ::= SEQUENCE {
    verdirect    BIT STRING(SIZE (1)),
    bearing      BIT STRING(SIZE (9)),
    horspeed     BIT STRING(SIZE (16)),
    verspeed     BIT STRING(SIZE (8)),
    horuncertspeed BIT STRING(SIZE (8)),
    veruncertspeed BIT STRING(SIZE (8)),
    ...}

PosMethod ::= ENUMERATED {
    agpsSETassisted(0), agpsSETbased(1), agpsSETassistedpref(2),
    agpsSETbasedpref(3), autonomousGPS(4), aFLT(5), eCID(6), eOTD(7), oTDOA(8),
    noPosition(9), ...
}

END
```

Appendix A. Change History

(Informative)

A.1 Approved Version History

Reference	Date	Description
n/a	n/a	No prior version

A.2 Draft/Candidate Version <current version> History

Document Identifier	Date	Sections	Description
Draft Versions OMA-LOC_SUPL_PS-V1_0	6 May 2004	All	Initial baseline version
	18 Aug 2004	3, 5, 6, 7	Incorporated: <ul style="list-style-type: none"> OMA-LOC-2004-232R02-CR_SUPL_Lup_Encoding.doc OMA-LOC-2004-0246R02-SUPL-PS-Protocol-Elements.doc OMA-LOC-2004-0247R01-SUPL-PS-Protocol-Elements-ASN1-encoding.doc Various minor editorial changes, header, history etc.
		5, 6, 7	Incorporated: <ul style="list-style-type: none"> OMA-LOC-2004-0329-CR_SUPL_Lup_Encoding.doc OMA-LOC-2004-0269R02-CR_PS-Changes Various minor editorial changes, header, history etc.
Draft Versions OMA-LOC_SUPL_TS-V1_0	23 Nov 2004	5, 6, new section 7, 8 (old 7)	Incorporated: <ul style="list-style-type: none"> OMA-LOC-2004-0388R01-CR-SUPL-END.doc OMA-LOC-2004-0392-CR-SUPL-NMR-Parameter.doc OMA-LOC-2004-0394-CR-SUPL-Parameters.doc OMA-LOC-2004-0396R01-CR-SUPL-POS-INIT.doc OMA-LOC-2004-0399R01-CR-SUPL-Positioning-Payload-Parameter.doc OMA-LOC-2004-0406R01-CR-SUPL-SLP-Address-Parameter.doc OMA-LOC-2004-0407R01-CR-SUPL-START.doc OMA-LOC-2004-0408R01-CR-SUPL-Velocity-Parameter.doc OMA-LOC-2004-0409-CR-SUPL-Version-Parameter.doc New document template Various minor editorial changes, header, history etc.

Document Identifier	Date	Sections	Description
	30 Nov 2004	QoP in section 6.2 and 8.2	Incorporated <ul style="list-style-type: none"> OMA-LOC-2004-0386R01-CR-QOP_parameter_in_SUPL_INIT.doc
	3 Dec 2004	3, 6, 7 8	Incorporated: <ul style="list-style-type: none"> Various minor editorial changes, header, history etc. OMA-LOC-2004-0352R01-CR-TCP-transport-for-SUPL.doc OMA-LOC-2004-0385R02-CR-posmethod-parameter-in-SUPL-RESPONSE.doc OMA-LOC-2004-0387R02-CR-Req-Assist-Data-parameter-in-SUPL-POS-INIT.doc OMA-LOC-2004-0389R02-CR-SUPL-Error-Cause-Parameter.doc OMA-LOC-2004-0390R02-CR-SUPL-INIT.doc OMA-LOC-2004-0395R02-CR-SUPL-POS.doc OMA-LOC-2004-0397R02-CR-SUPL-Position-Parameter.doc OMA-LOC-2004-0398R02-CR-SUPL-Positioning-Method-Parameter.doc OMA-LOC-2004-0401R02-CR-SUPL-Requested-Assistance-Data-Parameter.doc OMA-LOC-2004-0402R02-CR-SUPL-Requestor-Id-Parameter.doc OMA-LOC-2004-0403R02-CR-SUPL-RESPONSE.doc OMA-LOC-2004-0405R02-CR-SUPL-SET-Capabilities-Parameter.doc
Draft Versions OMA-TS-SUPL-V1_0	7 Dec 2004	All	Editorial inconsistencies between two previous versions. Some editorial changes.
	21 Dec 2004	6,7, 8	Incorporated: <ul style="list-style-type: none"> Various minor editorial changes, header, history etc. OMA-LOC-2004-0391R05-LATE-CR-SUPL-Location-Id-Parameter.doc OMA-LOC-2004-0393R05-LATE-CR-SUPL-Notification-Parameter.doc OMA-LOC-2004-0434-TS-Extension-Fields.doc OMA-LOC-2004-0453R01-CR_SUPL_TS_Adding_GSM_NMR_Definition.doc OMA-LOC-2004-0454-CR-SUPL-TS-Adding-GSM-TA-Definition.doc OMA-LOC-2004-0478-CR_SUPL_TS_SLPAdress_MandatoryInSUPLINIT.doc

Document Identifier	Date	Sections	Description
	12 Jan 2005	2, 3 5, 6, 7, 8	Incorporated: <ul style="list-style-type: none"> • OMA-LOC-2004-0400R03-LATE-CR-SUPL-QOP-Parameter.doc • OMA-LOC-2004-0449R01-CR_SUPL_TS_ReqAssData_Definition.doc • OMA-LOC-2004-0456R01-CR_SUPL_TS_Velocity.doc • OMA-LOC-2004-0458R01-CR_SUPL_TS_MessageDescriptions.doc • OMA-LOC-2004-0477R01-LATE-CR-SUPL-TS-Annex-1-PAP-example.doc • OMA-LOC-2004-0486-SUPL-TS-WAP-Protocol.doc
Draft Version OMA-TS-SUPL-V1_0-20050124-D_cb_ASN1	24 Jan 2005	8	Intermediate version to only make a major rework of ASN.1, both style, syntas and semantics. Based on Editorial changes and also OMA-LOC-2005-0009-CR_SUPL_TS_correctingASN1Syntax.doc
Draft Versions OMA-TS-SUPL-V1_0	24 Jan 2005	5 , 7, 8	Incorporated: <p>OMA-LOC-2004-0476R01-LATE-CR-SUPL-TS-Annex-2-POTAP-example.doc</p> <p>OMA-LOC-2004-0487R02-LATE-CR-SUPL-TS-Cached-Position.doc</p> <p>OMA-LOC-2005-0004-CR-TS-SUPL-Velocity-Parameter.doc</p> <p>OMA-LOC-2005-0009-CR_SUPL_TS_correctingASN1Syntax.doc</p> <p>OMA-LOC-2005-0014-LATE-CR-SUPL-TS-remove-requestor-id-parameter.doc</p> <p>OMA-LOC-2005-0028-Renaming-Lup-to-ULP.doc</p>

Document Identifier	Date	Sections	Description
	02 Feb 2005	2, 6, 7, 8 9, appendix.	<p>Incorporated:</p> <p>OMA-LOC-2004-0432R03-CR-revised-two-part-SUPL-session-id</p> <p>OMA-LOC-2004-0475R07-LATE-CR-SUPL-TS-Transport</p> <p>OMA-LOC-2004-0489R02-CR_SUPL_TS_NoSegmentationOfRRLP</p> <p>OMA-LOC-2005-0007-CR_SUPL_TS_messageLength</p> <p>OMA-LOC-2005-0010R01-CR-SUPL-TS-Location-ID-Corrections</p> <p>OMA-LOC-2005-0038R01-CR-SUPL-TS-Max-Loc-Age-in-QoP-Parameter</p> <p>OMA-LOC-2005-0062-CR_SUPL_TS_ASN_Corrections</p> <p>OMA-LOC-2005-0063-CR_SUPL_TS_MoveNMR_TA_to_GSMCell</p> <p>OMA-LOC-2005-0064R02-CR-SUPL-TS-POPULATE-SCR</p> <p>OMA-LOC-2005-0069-CR_SUPL_TS_Add_ErrorCauseInvalidSessionId</p> <p>OMA-LOC-2005-0070-CR_SUPL_TS_Removal_of_mandatory_and_optional_se c7</p> <p>OMA-LOC-2005-0072-CR_SUPL_TS_Add_extension_markers</p> <p>OMA-LOC-2005-0076-LATE-CR-SUPL-TS-Status-Code-Parameter</p> <p>OMA-LOC-2005-0078R01-LATE-CR-SUPL-TS-Common-Elements-Clean-Up</p> <p>OMA-LOC-2005-0085-LATE-CR-SUPL-TS-PosProtocol-Parameter</p> <p>OMA-LOC-2005-0099R01-LATE-SUPL-TS-QoP-Information</p> <p>Editorial changes:</p> <p>Several changes to the common elements section made the statuscode table stick out. This table (previously error cause) was moved to the status code section.</p> <p>Contribution 76 did not change the error cause section. This was clearly a mistake and was done as editorial 10 (Motorola) and 78 (Qualcomm) addressed Location ID. Editor has done his best to merge these without inconsistencies</p>
	10 Feb 2005		Editorial changes only

Document Identifier	Date	Sections	Description
	23 Feb 2005	2,5, 6, 7, 8, 9	Incorporated: OMA-LOC-2005-0105- CR_SUPL_TS_PosPayloadAsOctetString.doc OMA-LOC-2005-0108- CR_SUPL_TS_AddRef_ASN1_PER_WDP.doc OMA-LOC-2005-0110- CR_SUPL_TS_NoSetSessionIdInSUPL_INIT.doc OMA-LOC-2005-0111- CR_SUPL_TS_MinorCorrections_62_72.doc OMA-LOC-2005-0112- CR_SUPL_TS_SETId_encoding.doc OMA-LOC-2005-0113- CR_SUPL_TS_EncodingOfMessageLengthInSUPLMessages.doc OMA-LOC-2005-0114- CR_SUPL_TS_ClarifyTheContentOfTheSLPAddressParameter.doc OMA-LOC-2005-0115- CR_SUPL_TS_ClarificationTimestamp.doc OMA-LOC-2005-0121- CR_SUPL_TS_MessageLengthParameterInSection7_1.doc OMA-LOC-2005-0122- CR_SUPL_TS_AssignmentAuthority_WDP.doc Various editorial changes
	15 Mar 2005	All	Incorporated OMA-LOC-2005-0109R02- CR_SUPL_TS_Rename_SUPL_TS.doc OMA-LOC-2005-0123R02- CR_SUPL_TS_HandlingOfTheVersionParameter.doc OMA-LOC-2005-0132R01-Clarification-for-Requested-Assistance-Data.doc OMA-LOC-2005-0137-LATE-CR-SUPL-TS-Session-id-Clarification.doc Various editorial changes

Document Identifier	Date	Sections	Description
	14 Mar 2005	6,7, 8, 9	Incorporated : OMA-LOC-2005-0160-LATE-SUPL-Support-for-UTF-8-encoding-type.doc OMA-LOC-2005-0181R01-CR_SUPL_TS_notification_parameter.doc OMA-LOC-2005-0188R01-CR_SUPL_TS_determining_posmethod.doc OMA-LOC-2005-0189-CR_SUPL_TS_posmethod_mandatory_in_SUPL_RESPONSE.doc OMA-LOC-2005-0190R02-CR_SUPL_TS_consistent_SET_capabilities.doc OMA-LOC-2005-0192R02-CR_SUPL_TS_Bugfixes_Error_Indicators.doc OMA-LOC-2005-0202R01-CR_ULP_security.doc OMA-LOC-2005-0211R03-LATE-Extend-SET-Capabilities-with-preferred-A-GPS-modes.doc OMA-LOC-2005-0213-LATE-New-Status-Codes-for-mode-support.doc Various editorial changes
Draft Versions: OMA-TS-ULP-V1_0	23 Jun 2005	All	Changes during Consistency review, according to Consistency Review Report (CONRR)
	27 Jun 2005	All	Editorial changes and some corrections from previous consistency review version
Candidate Versions OMA-TS-ULP-V1_0	19 Jul 2005	All	Status changed to Candidate by TP TP ref # OMA-TP-2005-0220-SUPL-V1_0-for-Candidate-Approval

Appendix B. Static Conformance Requirements

(Normative)

B.1 SCR for SUPL Server

The notation used in this appendix is specified in [IOPPROC].

B.1.1 Home SLP Procedures

Item	Function	Reference	Status	Requirement
ULP-A-S-001	Home SLP supporting GSM/WCDMA mode PSK-TLS authentication		O	ULP-A-S-004 AND ULP-A-S-007 AND ULP-A-S-009 AND ULP-A-S-019
ULP-A-S-002	Home SLP supporting GSM/WCDMA mode alternative authentication		O	ULP-A-S-005 AND ULP-A-S-007 AND ULP-A-S-009 AND ULP-A-S-019
ULP-A-S-003	Home SLP supporting CDMA mode		O	ULP-A-S-006 AND (ULP-A-S-007 OR ULP-A-S-008) AND (ULP-A-S-009 OR ULP-A-S-010) AND ULP-A-S-021
ULP-A-S-004	Security function for GSM/WCDMA, PSK-TLS authentication	AD 7	O	
ULP-A-S-005	Security function for GSM/WCDMA, alternative authentication model	AD 7	O	
ULP-A-S-006	Security function for CDMA	AD 7	O	
ULP-A-S-007	Support of network initiated procedures in Proxy mode	AD 6.8.1, 6.8.3, 6.8.5, 6.8.7	O	ULP-E-S-001 AND ULP-E-S-004 AND ULP-E-S-006
ULP-A-S-008	Support of network	AD 6.8.2,	O	ULP-E-S-001

Item	Function	Reference	Status	Requirement
	initiated procedures in Non-Proxy mode	6.8.4, 6.8.6, 6.8.7		AND ULP-E-S-006 AND ULP-E-S-007 AND ULP-E-S-008
ULP-A-S-009	Support of SET initiated procedures in Proxy mode	AD 6.9.1, 6.9.3, 6.9.5, 6.9.7	O	ULP-E-S-002 AND ULP-E-S-003 AND ULP-E-S-004 AND ULP-E-S-006
ULP-A-S-010	Support of SET initiated procedures in Non-Proxy mode	AD 6.9.2, 6.9.4, 6.9.6, 6.9.7	O	ULP-E-S-002 AND ULP-E-S-003 AND ULP-E-S-006
ULP-A-S-011	Support of Cell ID positioning method	AD 6.3.3	M	
ULP-A-S-012	Support of SET-assisted A-GPS positioning method	AD 6.3.3	O	ULP-E-S-005
ULP-A-S-013	Support of SET-Based A-GPS positioning method	AD 6.3.3	O	ULP-E-S-005
ULP-A-S-014	Support of Autonomous GPS positioning method	AD 6.3.3	O	
ULP-A-S-015	Support of AFLT positioning method	AD 6.3.3	O	ULP-E-S-005
ULP-A-S-016	Support of Enhanced Cell ID positioning method	AD 6.3.3	O	
ULP-A-S-017	Support of E-OTD positioning method	AD 6.3.3	O	ULP-E-S-005
ULP-A-S-018	Support of OTDOA positioning method	AD 6.3.3	O	ULP-E-S-005
ULP-A-S-019	Support of RRLP positioning protocol	AD 6.7.1.2	O	
ULP-A-S-020	Support of RRC positioning protocol	AD 6.7.1.2	O	
ULP-A-S-021	Support of TIA-801 positioning protocol	AD 6.7.1.2	O	

B.1.2 Visited SLP Procedures for Roaming

Item	Function	Reference	Status	Requirement
ULP-B-S-001	Support in Visited SLP	AD 6.8.5, 6.9.5	O	RPL 1.0: MSF

Item	Function	Reference	Status	Requirement
	for roaming with calculation in Home-SLP, Proxy mode			AND NOT (RLP-D-S-002 AND RLP-D-S-003 AND RLP-D-S-005 AND RLP-V-S-001 AND RLP-V-S-006 AND RLP-V-S-009 AND RLP-V-S-010 AND RLP-V-S-011 AND RLP-V-S-012)
ULP-B-S-002	Support in Visited SLP for roaming with calculation in Home-SLP, non-Proxy mode	AD 6.8.6, 6.9.6	O	RLP 1.0: MSF AND NOT (RLP-D-S-002 AND RLP-D-S-003 AND RLP-D-S-005 AND RLP-V-S-001 AND RLP-V-S-006 AND RLP-V-S-009 AND RLP-V-S-010 AND RLP-V-S-011 AND RLP-V-S-012)
ULP-B-S-003	Support in Visited SLP for roaming with calculation in Visited-SLP, Proxy mode	AD 6.8.3, 6.9.3	O	RLP 1.0: MSF AND (RLP-B-S-007 AND RLP-B-S-008 AND RLP-C-S-011 AND RLP-C-S-012) AND NOT (RLP-D-S-002 AND RLP-D-S-003 AND RLP-D-S-005 AND RLP-V-S-001 AND RLP-V-S-006 AND RLP-V-S-009 AND RLP-V-S-010 AND RLP-V-S-011 AND RLP-V-S-012)
ULP-B-S-004	Support in Visited SLP for roaming with calculation in Visited-SLP, Non-Proxy mode	AD 6.8.4, 6.9.4	O	ULP-B-S-005 AND ULP-E-S-004 AND ULP-E-S-005 AND RLP 1.0: MSF AND (RLP-B-S-007 AND RLP-B-S-008 AND RLP-C-S-011 AND RLP-C-S-012)

Item	Function	Reference	Status	Requirement
				AND NOT (RLP-D-S-002 AND RLP-D-S-003 AND RLP-D-S-005 AND RLP-V-S-001 AND RLP-V-S-006 AND RLP-V-S-009 AND RLP-V-S-010 AND RLP-V-S-011 AND RLP-V-S-012)
ULP-B-S-005	Security function for CDMA	AD 7	O	

B.1.3 Home SLP Procedures for Roaming

Item	Function	Reference	Status	Requirement
ULP-C-S-001	Support in Home SLP for roaming with calculation in Home- SLP, Proxy mode	AD 6.8.5, 6.9.5	O	RLP 1.0: MCF AND NOT (RLP-D-C-003 AND RLP-D-C-005 AND RLP-V-C-001 AND RLP-V-C-006 AND RLP-V-C-009 AND RLP-V-C-010 AND RLP-V-C-011 AND RLP-V-C-012)
ULP-C-S-002	Support in Home SLP for roaming with calculation in Home- SLP, Non-Proxy mode	AD 6.8.6, 6.9.6	O	RLP 1.0: MCF AND NOT (RLP-D-C-003 AND RLP-D-C-005 AND RLP-V-C-001 AND RLP-V-C-006 AND RLP-V-C-009 AND RLP-V-C-010 AND RLP-V-C-011 AND RLP-V-C-012)
ULP-C-S-003	Support in Home SLP for roaming with calculation in Visited- SLP, Proxy mode	AD 6.8.3, 6.9.3	O	RLP 1.0: MCF AND (RLP-B-C-007 AND RLP-B-C-008 AND RLP-C-C-011 AND RLP-C-C-012) AND NOT (RLP-D-C-003 AND

Item	Function	Reference	Status	Requirement
				RLP-D-C-005 AND RLP-V-C-001 AND RLP-V-C-006 AND RLP-V-C-009 AND RLP-V-C-010 AND RLP-V-C-011 AND RLP-V-C-012)
ULP-C-S-004	Support in Home SLP for roaming with calculation in Visited-SLP, Non-Proxy mode	AD 6.8.4, 6,9,4	O	ULP-C-S-005 AND RLP 1.0: MCF AND (RLP-B-C-007 AND RLP-B-C-008 AND RLP-C-C-011 AND RLP-C-C-012) AND NOT (RLP-D-C-003 AND RLP-D-C-005 AND RLP-V-C-001 AND RLP-V-C-006 AND RLP-V-C-009 AND RLP-V-C-010 AND RLP-V-C-011 AND RLP-V-C-012)
ULP-C-S-005	Security function for CDMA	AD 7	O	

B.1.4 ULP Protocol Interface

Item	Function	Reference	Status	Requirement
ULP-D-S-001	ULP encoding	ULP 5	M	
ULP-D-S-002	ULP transport	ULP 6	M	ULP-D-S-003 AND (ULP-D-S-004 OR ULP-D-S-005)
ULP-D-S-003	Support of TCP/IP port number	ULP 6.1	M	
ULP-D-S-004	Support of WAP Push	ULP 6.2	O	
ULP-D-S-005	Support of MT SMS	ULP 6.3	O	

B.1.5 ULP Messages

Item	Function	Reference	Status	Requirement
ULP-E-S-001	Support of SUPL INIT	ULP 6, 7, 8	O	
ULP-E-S-002	Support of SUPL START	ULP 6, 7, 8	O	
ULP-E-S-003	Support of SUPL RESPONSE	ULP 6, 7, 8	O	
ULP-E-S-004	Support of SUPL POS INIT	ULP 6, 7, 8	O	
ULP-E-S-005	Support of SUPL POS	ULP 6, 7, 8	O	
ULP-E-S-006	Support of SUPL END	ULP 6, 7, 8	M	
ULP-E-S-007	Support of SUPL AUTH REQ	ULP 6, 7, 8	O	
ULP-E-S-008	Support of SUPL AUTH RESP	ULP 6, 7, 8	O	

B.1.6 Support of Parameters for Optional Functions in Home SLP

Item	Function	Reference	Status	Requirement
ULP-F-S-001	Support of qoP in SUPL INIT	ULP 6, 7, 8	O	
ULP-F-S-002	Support of qoP in SUPL START	ULP 6, 7, 8	O	
ULP-F-S-003	Support of position in SUPL POS INIT	ULP 6, 7, 8	O	
ULP-F-S-004	Support of requestedAssistData in SUPL POS INIT	ULP 6, 7, 8	O	
ULP-F-S-005	Support of reception of velocity	ULP 6, 7, 8	O	
ULP-F-S-006	Support of sending of velocity	ULP 6, 7, 8	O	
ULP-F-S-007	Support of notification in SUPL INIT	ULP 6,7,8	O	

B.2 SCR for SUPL CLIENT

B.2.1 SET Procedures

Item	Function	Reference	Status	Requirement
ULP-A-C-001	SET supporting GSM/WCDMA mode PSK-TLS authentication		O	ULP-A-C-004 AND ULP-A-C-007 AND ULP-A-C-009 AND ULP-A-C-019
ULP-A-C-002	SET supporting		O	ULP-A-C-005

Item	Function	Reference	Status	Requirement
	GSM/WCDMA mode alternative authentication			AND ULP-A-C-007 AND ULP-A-C-009 AND ULP-A-C-019
ULP-A-C-003	SET supporting CDMA mode		O	ULP-A-C-006 AND ULP-A-C-007 AND ULP-A-C-008 AND ULP-A-C-009 AND ULP-A-C-010 AND ULP-A-C-021
ULP-A-C-004	Security function for GSM/WCDMA, PSK-TLS authentication	AD 7	O	
ULP-A-C-005	Security function for GSM/WCDMA, alternative authentication model	AD 7	O	
ULP-A-C-006	Security function for CDMA	AD 7	O	
ULP-A-C-007	Support of network initiated procedures in Proxy mode	AD 6.8.1, 6.8.3, 6.8.5, 6.8.7	O	
ULP-A-C-008	Support of network initiated procedures in Non-Proxy mode	AD 6.8.2, 6.8.4, 6.8.6, 6.8.7	O	ULP-C-C-007 AND ULP-C-C-008
ULP-A-C-009	Support of SET initiated procedures in Proxy mode	AD 6.9.1, 6.9.3, 6.9.5, 6.9.7	O	
ULP-A-C-010	Support of SET initiated procedures in Non-Proxy mode	AD 6.9.2, 6.9.4, 6.9.6, 6.9.7	O	
ULP-A-C-011	Support of Cell ID positioning method	AD 6.3.3	M	
ULP-A-C-012	Support of SET-assisted A-GPS positioning method	AD 6.3.3	O	ULP-C-C-005
ULP-A-C-013	Support of SET-Based A-GPS positioning method	AD 6.3.3	O	ULP-C-C-005
ULP-A-C-014	Support of Autonomous GPS positioning method	AD 6.3.3	O	ULP-C-C-005
ULP-A-C-015	Support of AFLT positioning method	AD 6.3.3	O	ULP-C-C-005

Item	Function	Reference	Status	Requirement
ULP-A-C-016	Support of Enhanced Cell ID positioning method	AD 6.3.3	O	
ULP-A-C-017	Support of E-OTD positioning method	AD 6.3.3	O	ULP-C-C-005
ULP-A-C-018	Support of OTDOA positioning method	AD 6.3.3	O	ULP-C-C-005
ULP-A-C-019	Support of RRLP positioning protocol	AD 6.7.1.2	O	
ULP-A-C-020	Support of RRC positioning protocol	AD 6.7.1.2	O	
ULP-A-C-021	Support of TIA-801 positioning protocol	AD 6.7.1.2	O	

B.2.2 ULP Protocol Interface

Item	Function	Reference	Status	Requirement
ULP-B-C-001	ULP encoding	ULP 5	M	
ULP-B-C-002	ULP transport	ULP 6	M	
ULP-B-C-003	Support of TCP/IP port number	ULP 6.1	M	
ULP-B-C-004	Support of WAP Push	ULP 6.2	M	
ULP-B-C-005	Support of MT SMS	ULP 6.3	M	

B.2.3 ULP Messages

Item	Function	Reference	Status	Requirement
ULP-C-C-001	Support of SUPL INIT	ULP 6, 7, 8	M	
ULP-C-C-002	Support of SUPL START	ULP 6, 7, 8	M	
ULP-C-C-003	Support of SUPL RESPONSE	ULP 6, 7, 8	M	
ULP-C-C-004	Support of SUPL POS INIT	ULP 6, 7, 8	M	
ULP-C-C-005	Support of SUPL POS	ULP 6, 7, 8	O	
ULP-C-C-006	Support of SUPL END	ULP 6, 7, 8	M	
ULP-C-C-007	Support of SUPL AUTH REQ	ULP 6, 7, 8	O	
ULP-C-C-008	Support of SUPL AUTH RESP	ULP 6, 7, 8	O	

B.2.4 Support of Parameters for Optional Functions in SET

Item	Function	Reference	Status	Requirement
ULP-D-C-001	Support of qoP in SUPL INIT	ULP 6, 7, 8	O	
ULP-D-C-002	Support of qoP in SUPL START	ULP 6, 7, 8	O	

Item	Function	Reference	Status	Requirement
ULP-D-C-003	Support of position in SUPL POS INIT	ULP 6, 7, 8	O	
ULP-D-C-004	Support of requestedAssistData in SUPL POS INIT	ULP 6, 7, 8	O	
ULP-D-C-005	Support of reception of velocity	ULP 6, 7, 8	O	
ULP-D-C-006	Support of sending of velocity	ULP 6, 7, 8	O	
ULP-D-C-007	Support of notification in SUPL INIT	ULP 6,7,8	O	

Appendix C. Additional Information

C.1 Push Message Example (informative)

The Push message from the SLP (SLC for non-proxy mode) to the PPG contains the SUPL INIT message and follows [WAP PAP]. An example (informative only) is shown below:

```
POST / HTTP/1.1
Host: supl.provider.a.com
Date: Thu, 2 December 2004 03:45:31 GMT
Content-Type: multipart/related; boundary=asdfghijkl; type="application/xml"
Content-Length: XXX

--asdfghijkl

Content-Type: application/xml

<?xml version="1.0"?><!DOCTYPE pap PUBLIC "-//WAPFORUM//DTD PAP 2.0//EN"
"http://www.wapforum.org/DTD/pap2.0.dtd" >

<pap>
    <push-message push-id="faf34bcc3ca0f82cc0a8fd0c@supl.provider.a.com">
        <address address-
value="wappush=2063531234/TYPE=USER@supl.provider.a.com"/ >
        <quality-of-service priority="medium"/>
    </push-message>
</pap>

--asdfghijkl
Date: Fri, 1 March 2002 11:45:30 GMT
Content-Language: en
Content-Length: 24
Content-Type: application/oma-supl-ulp
X-OMA-Application-Id: ulp.ua

00180A00000000FAF34BCC3CA0F82CC0A8FD0CCAC1F8C010

--asdfghijkl--
```

The PAP elements used are:

- Push ID: the push ID is a unique value.
- Address Value: the subscriber is identified by a MSID. The full address value should be "wappush=<msid>/TYPE=USER@<appropriate domain>".
- Priority: set to the priority of this Location Service. This may be set to high for Emergency services and medium for other location services.
- Message Parameters:
 - Header:
 - Content length should be set to the number of bytes in the SUPL INIT ASN.1 encoded body.
 - Content type should be set to the value "application/oma-supl-ulp"

- Application ID should be set to “ulp.ua”.
- Body: the Body consists of the ASN.1 encoded SUPL INIT message

C.2 POTAP Example (informative)

The detailed specification of the WAP Push message is described in Table 40.

Table 40: WAP Push user data

Field	Reference	Size	Type	Value	Comment
<i>WSP PDU Header</i>					
TID		1	Octet	—	Push ID (unique value)
PDU Type		1	Octet	0x06	Push
Push Header Length		1	Octet	—	Length
content type		—	Octet	—	application/oma-supl-ulp
Push Header					
x-application-id-field		—	Octet	—	ulp.ua
Push Content					
SUPL INIT Message		N	Octet	—	Message as specified in Chapter 8