



Internal Location Protocol

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1. Scope

This document describes the Internal Location Protocol (ILP) for SUPL 3.0. ILP is a protocol-level instantiation of the Llp reference point defined in [SUPL 3.0 AD]. ILP is used between a SLC (SUPL Location Center) and a SPC (SUPL Positioning Center). For more details about SUPL 3.0 Requirements refer to [SUPL 3.0 RD]. For more details about SUPL 3.0 architecture and message flows, refer to [SUPL 3.0 AD] and [SUPL 3.0 TS ULP].

Of all the service scenarios and message flows supported in SUPL 3.0, only those which involve ILP are discussed in this document. All other service scenarios and message flows are omitted i.e., are not repeated in this document. Please refer to [SUPL 3.0 TS ULP] for a complete description of all supported service scenarios and message flows.

The target audience for this specification is developers, systems or network engineers developing or deploying SUPL.

2. References

2.1 Normative References

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URL:<http://www.3gpp.org>
- [3GPP LPP] 3GPP TS 36.355 "Evolved Universal Terrestrial Radio Access (E-UTRA); LTE Positioning Protocol (LPP)"
URL:<http://www.3gpp.org/>
- [3GPP RRC] 3GPP TS 25.331, “Radio Resource Control (RRC) Protocol Specification”,
URL:<http://www.3GPP.org/>
- [3GPP RRLP] 3GPP TS 44.031, “Location Services (LCS); Mobile Station (MS) – Serving Mobile Location Centre (SMLC) Radio Resource LCS Protocol (RRLP)”,
URL:<http://www.3GPP.org/>
- [3GPP2 X.S0049-0] 3GPP2 X.S0049-0, “All-IP Network Emergency Call Support”, Version 1.0, February 2008,
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- [IOPPROC] “OMA Interoperability Policy and Process”, Version 1.11, Open Mobile Alliance™, OMA-IOP-Process-V1_11,
URL:<http://www.openmobilealliance.org/>
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URL:<http://www.openmobilealliance.org/>
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URL:<http://www.openmobilealliance.org/>
- [PER] ITU-T Recommendation X.691: “Information technology – ASN.1 encoding rules: Specification of Packed Encoding Rules (PER)”,
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- [RFC 2119] “Key words for use in RFCs to Indicate Requirement Levels”, S. Bradner, March 1997,
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- [SUPL 3.0 RD] “Secure User Plane Location Requirements”, Version 3.0, Open Mobile Alliance™, OMA-RD-SUPL-V3_0,
URL:<http://www.openmobilealliance.org/>
- [SUPL 3.0 TS ULP] “User Plane Location Protocol”, Version 3.0, Open Mobile Alliance™, OMA-TS-ULP-V3_0,
URL:<http://www.openmobilealliance.org/>
- [TIA-553] Mobile Station -Land Station Compatibility Specification (AMPS), September 1989
URL:<http://www.tiaonline.org/standards/>
- [TIA-801] C.S0022, Position Determination Service for cdma2000 Spread Spectrum Systems
URL:http://www.3gpp2.org/Public_html/specs/
- [TLS] “Transport Layer Security (TLS) Version 1.1”, IETF RFC 4346, April 2006
URL:<http://www.ietf.org/rfc/rfc4346.txt>

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 [RFC 2119].

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

3.2 Definitions

Area ID	Area ID is the identity of an area in a wireless network.
I-WLAN	The interworking WLAN refers to the system for interworking between 3GPP/3GPP2 systems and WLAN. The intent of 3GPP/3GPP2–WLAN Interworking is to extend 3GPP/3GPP2 services and functionality to the WLAN access environment. The 3GPP/3GPP2–WLAN Interworking System provides bearer services allowing a 3GPP/3GPP2 subscriber to use a WLAN to access 3GPP/3GPP2 PS based services.
Location ID	The Location ID defines the current serving cell, current serving WLAN AP or current serving WiMAX BS information of the SET.
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]
Multiple Location IDs	The Multiple Location IDs parameter may contain current non-serving cell, current non-serving WLAN AP or current non-serving WiMAX BS information for the SET and/or historic serving or non-serving cell, WLAN AP or WiMAX BS information for the SET.
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.
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]
SUPL Roaming	For positioning not associated with an emergency services call, SUPL roaming occurs when a SET leaves the service area of its H-SLP. For positioning associated with an emergency services call, SUPL roaming occurs when the SET is not within the service area of the E-SLP. The service area of an H-SLP or E-SLP includes the area within which the H-SLP or E-SLP can provide a position estimate for a SET or relevant assistance data to a SET without contacting other SLPs. It should be noted that an H-SLP or E-SLP service area is not necessarily associated with the service area(s) of the underlying wireless network(s). In the case of service from a D-SLP, the H-SLP will normally assign a geographic service area within which the SET may access the D-SLP. Service from a D-SLP where the SET is roaming outside the assigned service area of the D-SLP is not supported.
LPP	LPP implies use of LPP only
LPPe	LPPe implies use of LPP and LPPe

3.3 Abbreviations

AP	Access Point (WLAN)
BS	Base Station (WiMAX)
CI	Cell Identity (3GPP)

D-SLP	Discovered SLP
FQDN	Fully Qualified Domain Name
GANSS	Galileo and Additional Navigation Satellite Systems
GBA	Generic Bootstrapping Architecture
GLONASS	G LObal'naya N AVigatsionnaya S putnikovaya S istema (Engl.: Global Navigation Satellite System)
GNSS	Global Navigation Satellite System
H-SLP	Home SLP
LAC	Location Area Code (3GPP)
LPP	LTE Positioning Protocol
LPPe	LPP Extensions
LTE	Long Term Evolution
MCC	Mobile Country Code (3GPP)
MLP	Mobile Location Protocol
MNC	Mobile Network Code (3GPP)
NID	Network ID (C.S0022-A V1.0)
OMA	Open Mobile Alliance
QoP	Quality of Position
QZSS	Quasi-Zenith Satellite System
RLP	Roaming Location Protocol
SBAS	Satellite Based Augmentation System
SET	SUPL Enabled Terminal
SLC	SUPL Location Center
SLP	SUPL Location Platform
SMS	Short Message Service
SPC	SUPL Positioning Center
TCP	Transmission Control Protocol
TLS	Transport Layer Security
TD-SCDMA	Time Division-Synchronous Code Division Multiple Access
ULP	Userplane Location Protocol
WCDMA	Wideband Code Division Multiple Access
WiMAX	Worldwide Interoperability for Microwave Access
WLAN	Wireless Local Area Network

4. Introduction

This specification describes the ILP protocol release 3.0, a protocol-level instantiation of the Llp reference point. The Llp reference point was introduced in SUPL in release 2.0. Use of ILP allows SUPL operators to use an open interface (Llp) between the SLC and the SPC. Whether or not Llp is present in a particular implementation is optional. The presence (or absence) of Llp in a particular implementation is transparent to SUPL. The presence of Llp in an implementation does not in itself imply that SLC and SPC are deployed as physically separate network elements.

NOTE: Some parameters and messages from SUPL 2.0 TS ILP are no longer applicable in SUPL 3.0. However, due to code backwards compatibility, these parameters and messages are still listed in this document and are present in the ILP ASN.1 encoding. Parameters and messages no longer applicable in SUPL 3.0 are marked as such.

5. Message Flows

Of all the message flows supported in SUPL 3.0, only those which involve ILP are shown in this section. All other message flows are omitted. Please refer to [SUPL 3.0 TS ULP] for a complete description of all SUPL 3.0 message flows. Please also note that message flows shown in this section are limited to non roaming scenarios since roaming has no impact on ILP (and ULP) message flows¹. Please refer to [SUPL 3.0 TS ULP] for a detailed description of roaming scenarios.

The message flow descriptions presented in this section are focused on ILP. A more general description of the message flows and services involved (immediate service, deferred service, etc.) can be found in [SUPL 3.0 TS ULP] and is not repeated here.

NOTE: In SUPL 3.0 it is possible to use LPP (by itself), LPP+LPPe or TIA-801 as positioning protocol. Therefore the following convention applies: *LPP* implies use of *LPP only* (i.e. without LPPe), *LPPe* implies use of *LPP and LPPe* and *TIA-801* implies use of *TIA-801 only*. A SUPL POS (LPP/LPPe/TIA-801) message means a SUPL POS message carrying either LPP, LPP+LPPe or TIA-801 positioning payload.

NOTE: To simplify the message flows, the mandatory ILP header parameter sessionID2 and the mandatory ULP header parameter sessionID are not shown in the message flow diagrams.

NOTE: ILP message flows described in this section are limited to the H-SLP and E-SLP, respectively. D-SLP ILP message flow scenarios (i.e., message flows between the D-SLC and the D-SPC) are not shown since they are identical to H-SLP ILP message flows.

NOTE: Optional parameters in the call flow diagrams of this chapter are shown in gray.

¹ In roaming scenarios, the V-SLP is invoked whenever the H-SLP requires translation of enhanced cell/sector/AP information into a position estimate due to SUPL roaming.

5.1 Immediate Service

5.1.1 Network Initiated Single Fix

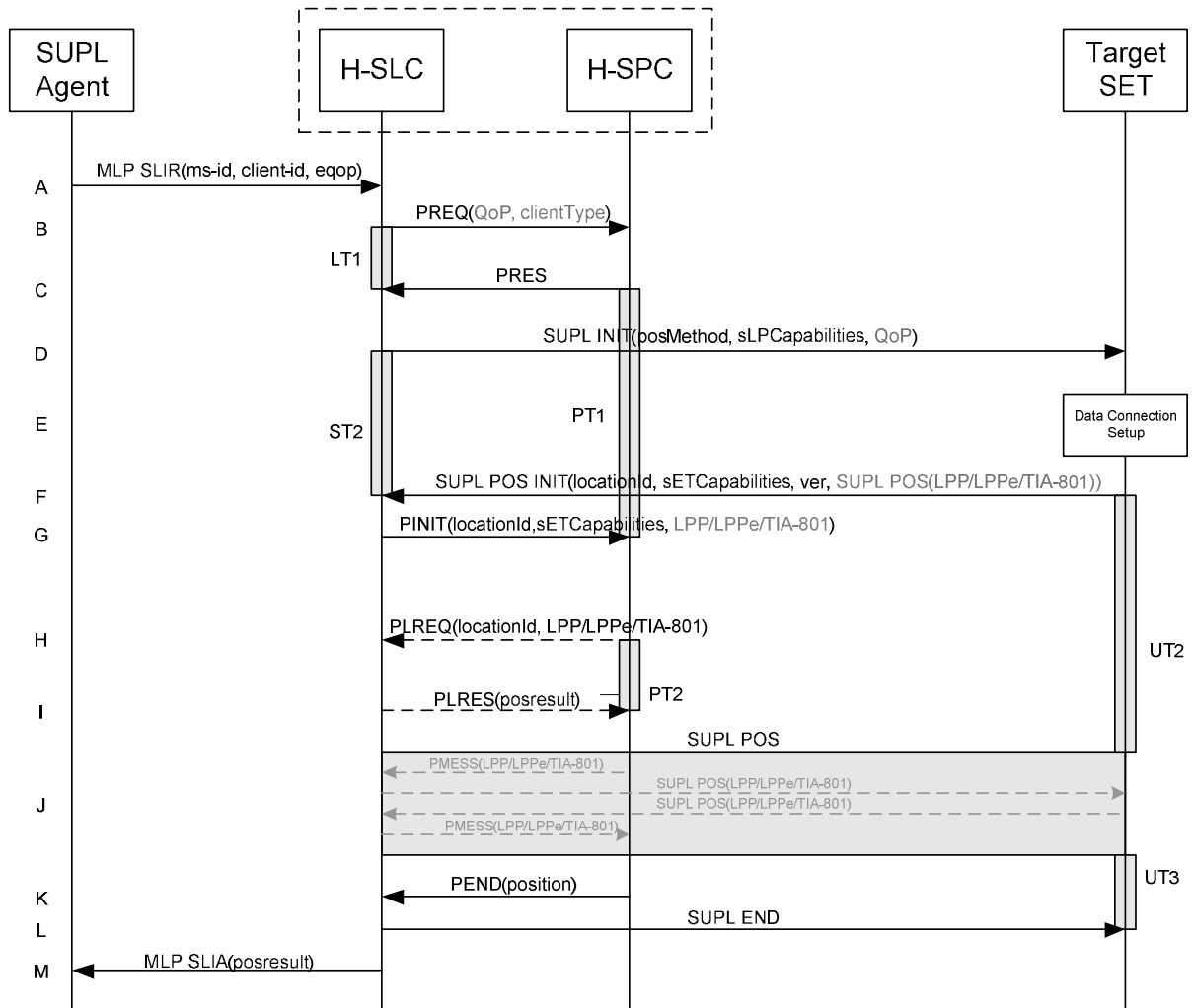


Figure 1: Network Initiated Single Fix

NOTE: See Appendix C for timer descriptions.

- A. The SUPL Agent issues an MLP SLIR message to the H-SLC, with which the SUPL Agent is associated. If a previously computed position which meets the requested QoP is available at the H-SLC and no notification or verification is required, the H-SLC SHALL directly proceed to step M. If notification and verification or notification only is required, the H-SLC SHALL proceed to step D.
- B. The H-SLC requests service from the H-SPC for a SUPL session by sending a PREQ message optionally containing the QoP and/or the client Type. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods are approved.
- C. The H-SPC accepts the service request by sending a PRES message to the H-SLC. The H-SPC MAY include a preferred positioning method in PRES and MAY also include its supported positioning methods.

- D. The H-SLC initiates the location session with the SET by sending a SUPL INIT message to the SET. The SUPL INIT message contains the intended positioning method (*posMethod*), the SLP Capabilities (*sLPCapabilities*) and optionally the *QoP*. If the result of the privacy check in step A indicates that notification and/or verification of the target subscriber is needed, the H-SLC SHALL also include the Notification parameter in the SUPL INIT message. Before the SUPL INIT message is sent, the H-SLC also computes and stores the hash of the SUPL INIT message. If in step A the H-SLC decided to use a previously computed position, the SUPL INIT message SHALL indicate this in a 'no position' *posMethod* parameter value and the SET SHALL respond with a SUPL END message carrying the results of the verification process (access granted, or access denied). If no explicit verification is required (notification only) the SET SHALL respond with a SUPL END message. The H-SLC SHALL then directly proceed to step M.
- E. The SET analyses the received SUPL INIT message. If found not to be authentic, the SET takes no further action. Otherwise, the SET takes required action to prepare for the establishment of a TLS connection with the H-SLC. The SET also calculates the hash of the received SUPL INIT message.
- F. The SET evaluates the Notification rules and takes the appropriate action. The SET SHALL establish a TLS connection to the H-SLC using the H-SLP address provisioned by the Home Network. The SET then sends a SUPL POS INIT message to start a positioning session with the H-SLP. The SET SHALL send the SUPL POS INIT message even if the SET does not support the intended positioning method indicated in SUPL INIT. The SUPL POS INIT message contains the Location ID (*locationId*), SET capabilities (*sETCapabilities*) and the hash (*ver*) of the received SUPL INIT message calculated in step E. The SUPL POS INIT message MAY also include a SUPL POS message carrying LPP/LPPE and/or TIA-801 positioning protocol messages in line with the H-SLP's positioning protocol capabilities (indicated in step B in *sLPCapabilities*). The SET MAY also provide its position, if this is supported. If the SUPL POS INIT message contains a position which meets the requested QoP, the H-SLC MAY directly proceed to step L and not engage in a SUPL POS session. The H-SLC then also sends a PEND message to the SPC to end the session.
- G. The H-SLC sends a PINIT message to the H-SPC including the Location ID (*locationId*), SET capabilities (*sETCapabilities*) and any LPP/LPPE/TIA-801 payload received in step F. The H-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the H-SPC in step C, or a different posmethod of the H-SLC's choosing, as long as it is one supported by the H-SPC. If a posmethod was included in the PINIT message, the H-SPC SHALL use that posmethod. If no posmethod parameter was included in PINIT, the H-SPC shall choose any posmethod in line with the SET capabilities and which was approved by the H-SLC in step B. If required for the posmethod the H-SPC SHALL use the appropriate positioning protocol (e.g. LPP, LPPE or TIA-801) from the PINIT message. If a position received from or calculated based on information received in the PINIT message is available that meets the required QoP, the H-SPC MAY directly proceed to step K and not engage in a SUPL POS session.
- H. This step is optional and only executed if the H-SPC cannot translate information received in the *locationId* or LPP/LPPE/TIA-801 payload received in step G into a position estimate. In this case the H-SPC sends a PLREQ message containing the Location ID (*locationId*) and LPP/LPPE/TIA-801 payload to the H-SLC.
- I. This step is conditional and only occurs if step H was performed. The H-SLC reports the position result back to the H-SPC in a PLRES message. If the position result meets the required QoP, the H-SPC MAY directly proceed to step K and not engage in a SUPL POS session.
- J. The H-SLC SHALL verify that the value of the *ver* parameter received in SUPL POS INIT in step F matches the one calculated and stored by the H-SLC in step D. If the values do not match, the H-SLC SHALL directly move to step L and send a SUPL END message with status code '*authSuplinitFailure*'. The H-SLC then also sends a PEND message to the SPC to end the session.
SET and H-SPC MAY exchange several successive positioning procedure messages. Thereby the positioning procedure payload (LPP/LPPE/TIA-801) is transferred between the H-SPC and the H-SLC using PMESS messages. The positioning protocol payload (LPP/LPPE/TIA-801) is transferred between the H-SLC and the SET using SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is shown conceptually in dotted lines but the actual message exchange may be different).
- K. Once the position calculation is complete the H-SPC sends a PEND message including the position result (*position*) to the H-SLC.

- L. The H-SLC sends a SUPL END message to the SET to end the session. The SET SHALL release the TLS connection to the H-SLC and release all resources related to this session.
- M. The H-SLC sends the position estimate back to the SUPL Agent in an MLP SLIA message and SHALL release all resources related to this session.

5.1.2 SET Initiated Single Fix

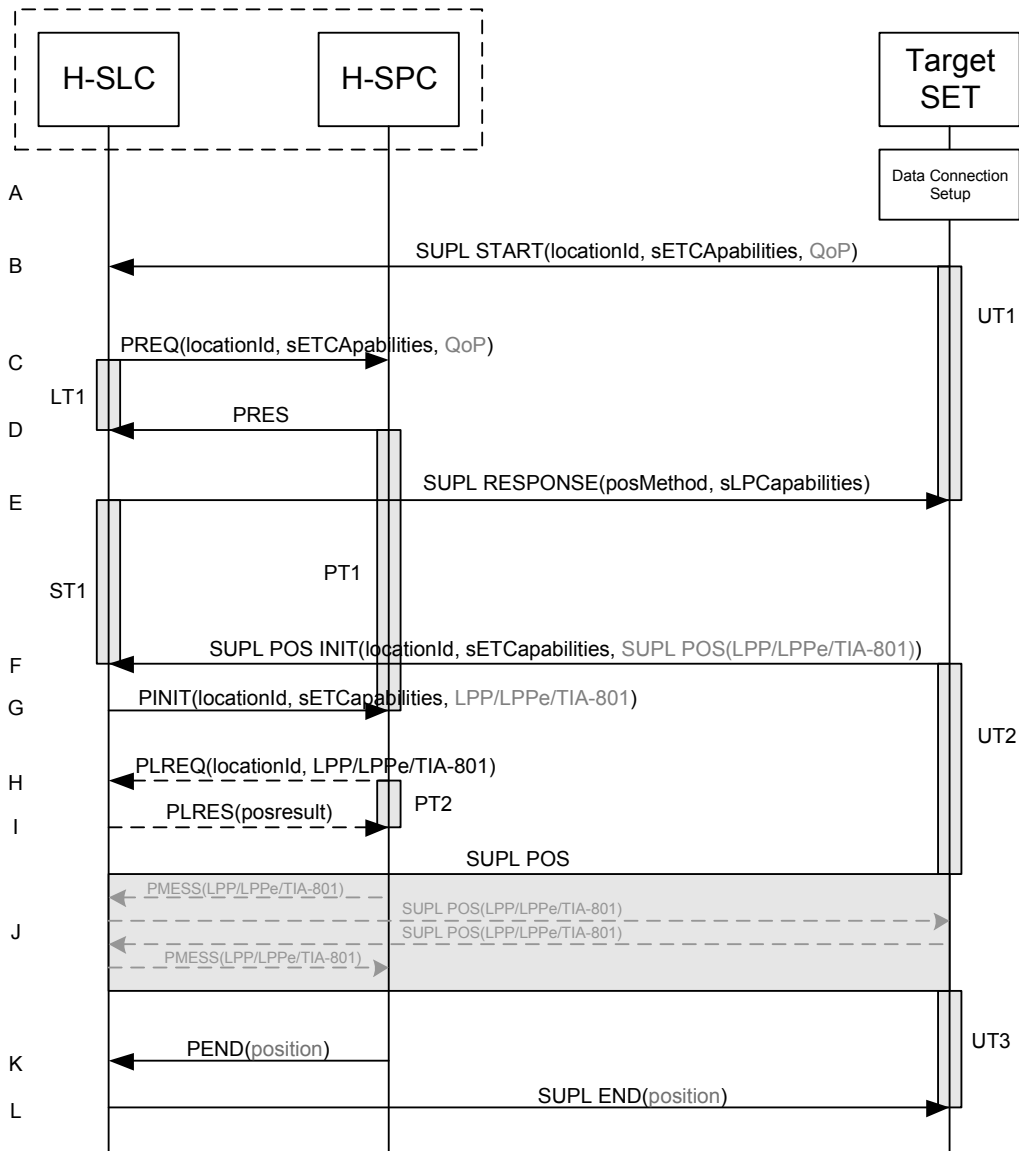


Figure 2: SET-Initiated Single Fix

NOTE: See Appendix C for timer descriptions.

- A. The SUPL Agent on the SET receives a request for position from an application running on the SET. The SET takes appropriate action to establish or resume a TLS connection to the H-SLC.
- B. The SET uses the default address provisioned by the Home Network to establish a TLS connection to the H-SLC and sends a SUPL START message to start a positioning session with the H-SLP. The SUPL START message contains the Location ID (*locationId*), SET capabilities (*sETCApabilities*)

- and optionally the desired QoP. If a previously computed position which meets the requested QoP is available at the H-SLC, the H-SLC SHALL directly proceed to step L i.e., send a SUPL END message to the SET including the position result (*position*).
- C. The H-SLC requests service from the H-SPC for a SUPL session by sending a PREQ message including the Location ID (*locationId*), SET Capabilities (*sETCapabilities*) and optionally the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods are approved.
- D. The H-SPC accepts the service request by sending a PRES message to the H-SLC. The H-SPC MAY include a preferred positioning method in PRES and MAY also include its supported positioning methods.
- E. The H-SLC SHALL respond with a SUPL RESPONSE message containing the intended positioning method (*posMethod*) and the SLP Capabilities (*sLPCapabilities*). If the H-SPC included a list of supported posmethods in step D, the chosen intended positioning method SHALL be aligned with the list of supported posmethods.
- F. The SET SHALL send a SUPL POS INIT message to the H-SLC. The SET SHALL send the SUPL POS INIT message even if the SET does not support the intended positioning method indicated in SUPL RESPONSE in step E. The SUPL POS INIT message contains the Location ID (*locationId*), SET capabilities (*sETCapabilities*) and optionally a SUPL POS message carrying LPP/LPPE/TIA-801 positioning protocol messages in line with the H-SLP's positioning protocol capabilities (indicated in step E in *sLPCapabilities*).
- G. The H-SLC sends a PINIT message to the H-SPC including the Location ID (*locationId*), SET capabilities (*sETCapabilities*) and any LPP/LPPE/TIA-801 payload received in step F. The H-SLC MAY include a posmethod in PINIT. This posmethod may either be the posmethod recommended by the H-SPC in step D, or a different posmethod of the H-SLC's choosing, as long as it is one supported by the H-SPC.
If a posmethod was included in PINIT, the H-SPC SHALL use that posmethod. If no posmethod parameter was included in the PINIT, the H-SPC shall choose any posmethod in line with the SET capabilities and which was approved by the H-SLC in step C. If required for the posmethod the H-SPC SHALL use the supported positioning protocol (e.g. LPP, LPPE or TIA-801) from the PINIT message. If a position calculated based on information received in the PINIT message is available that meets the required QoP, the H-SPC MAY directly proceed to step K and not engage in a SUPL POS session
- H. This step is optional and only executed if the H-SPC cannot translate information received in the *locationId* or LPP/LPPE/TIA-801 payload received in step G into a position. In this case the H-SPC sends a PLREQ message containing the Location ID (*locationId*) and LPP/LPPE/TIA-801 payload to the H-SLC.
- I. This step is conditional and only occurs if step H was performed. The H-SLC reports the position result back to the H-SPC in a PLRES message. If the position result meets the required QoP, the H-SPC MAY directly proceed to step K and not engage in a SUPL POS session.
- J. SET and H-SPC MAY exchange several successive positioning procedure messages. Thereby the positioning procedure payload (LPP/LPPE/TIA-801) is transferred between the H-SPC and the H-SLC using PMESS messages. The positioning protocol payload (LPP/LPPE/TIA-801) is transferred between the H-SLC and the SET using SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is shown conceptually in dotted lines but the actual message exchange may be different).
- K. Once the position calculation is complete the H-SPC sends a PEND message to the H-SLC including – if applicable – the position result.

- L. The H-SLC sends a SUPL END message to the SET including – if applicable – the position result and ends the session. The SET SHALL release the secure connection to the H-SLC and release all resources related to this session.

5.1.3 Exception Procedures

5.1.3.1 SET Does Not Allow Positioning

After receiving a SUPL INIT message the SET executes the notification/verification procedure. In this scenario, the subscriber rejects the location request.

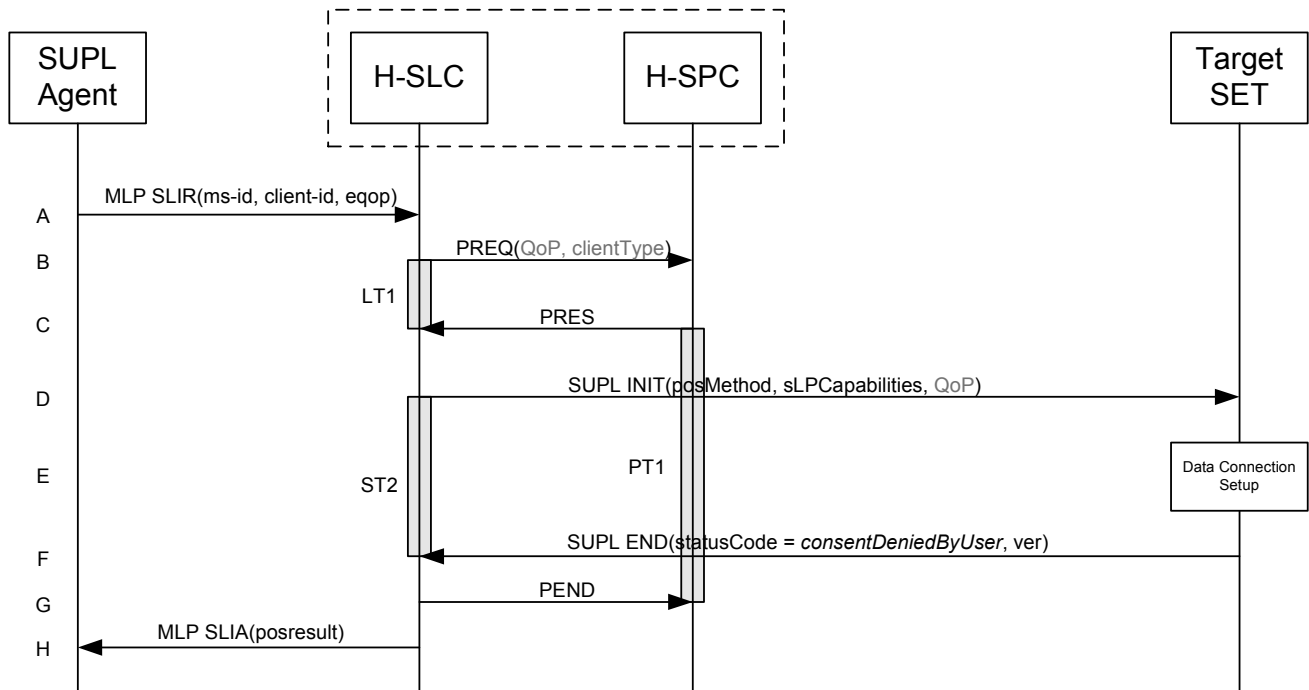


Figure 3: Network Initiated SET User Rejects Positioning

NOTE: See Appendix C for timer descriptions.

- A. The SUPL Agent sends an MLP SLIR message to the H-SLC, with which the SUPL Agent is associated.
- B. The H-SLC requests service from the H-SPC for a SUPL session by sending a PREQ message optionally containing the desired QoP and the client type (*clientType*). The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.
- C. The H-SPC accepts the service request by sending a PRES message to the H-SLC. The H-SPC MAY include a preferred positioning method in PRES and MAY also include its supported positioning methods.
- D. The H-SLP initiates the location session with the SET using the SUPL INIT message. In this case the result of the privacy check in Step A indicated that notification or verification to the target subscriber is required, and the H-SLC therefore includes the Notification element in the SUPL INIT message
- E. The SET analyses the received SUPL INIT. If found to be non authentic, the SET takes no further action. Otherwise the SET takes needed action preparing for establishment or resumption of a TLS connection.
- F. The SET evaluates the notification rules and alerts the subscriber of the position request. In this case the user rejects the location request, either explicitly or implicitly by not responding to the notification. The SET returns a SUPL

END message to the H-SLC containing a hash of the received SUPL INIT message (ver) and the status code *consentDeniedByUser*.

G. The H-SLC sends a PEND message to the H-SPC to terminate the SUPL session.

H. The H-SLC sends qn MLP SLIA message including the appropriate error-code to the SUPL Agent.

5.1.3.2 SUPL Protocol Error

When a SUPL protocol error occurs and as a result the SUPL session is terminated, a PEND message is sent by the SLC or SPC to its counterpart (i.e. SPC or SLC) and the SUPL session is ended.

5.1.3.3 Timer expiration

Timer expirations are defined in Appendix C.

5.1.4 Network Initiated Single Fix, Notification/Verification based on current location

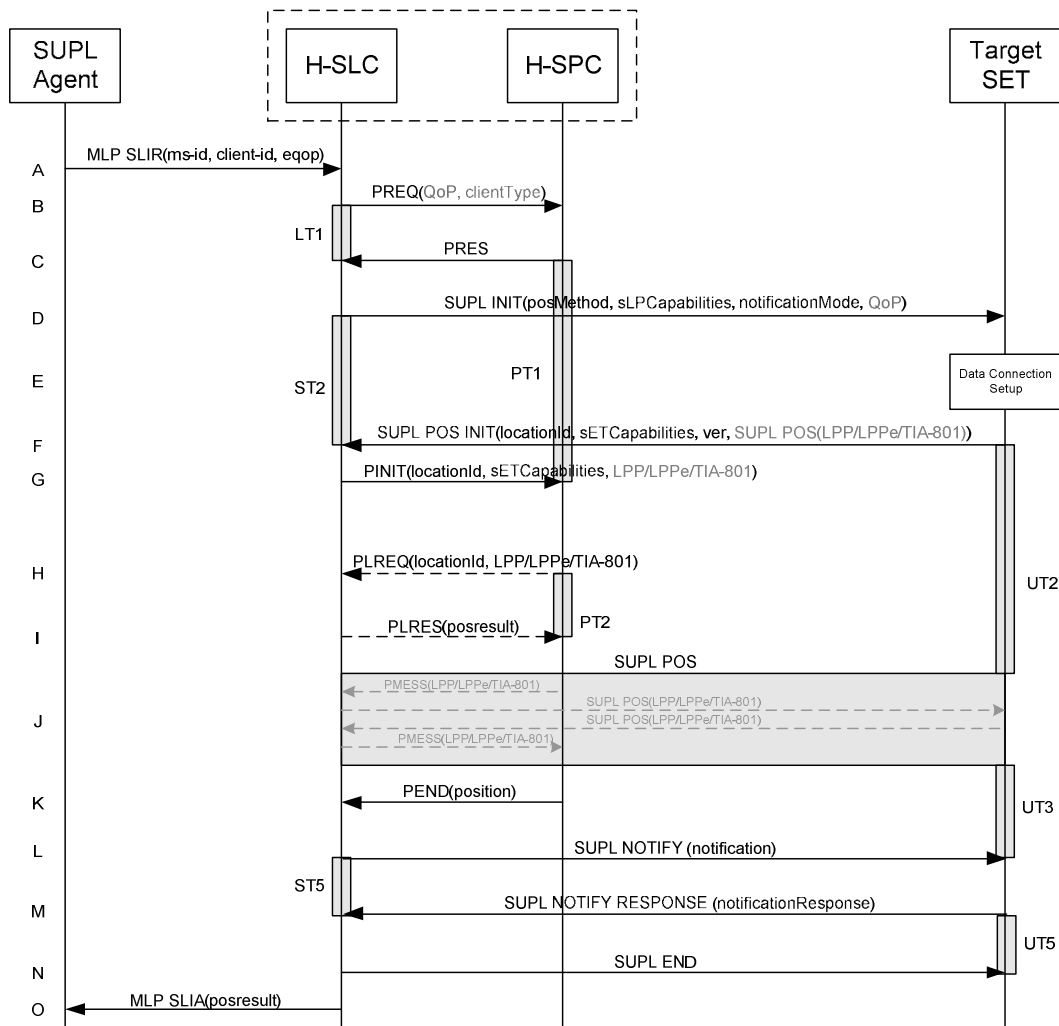


Figure 4: Network Initiated Single Fix, Notification/Verification based on current location

NOTE: See Appendix C for timer descriptions.

- A. The SUPL Agent issues an MLP SLIR message to the H-SLC, with which the SUPL Agent is associated. If a previously computed position which meets the requested QoP is available at the H-SLC and, based on that position, no notification or verification is required, the H-SLC SHALL directly proceed to step O. If, based on that position, notification and verification or notification only is required, the H-SLC SHALL proceed to step D.
- B. The H-SLC requests service from the H-SPC for a SUPL session by sending a PREQ message optionally containing the QoP and/or the client Type. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods are approved.
- C. The H-SPC accepts the service request by sending a PRES message to the H-SLC. The H-SPC MAY include a preferred positioning method in PRES and MAY also include its supported positioning methods.
- D. The H-SLC initiates the location session with the SET by sending a SUPL INIT message to the SET. The SUPL INIT message contains the intended positioning method (*posMethod*), the SLP Capabilities (*sLPCapabilities*) and optionally the *QoP*. As in this case the result of the privacy check in Step A indicates that subscriber privacy check based on current location is required, the H-SLP SHALL include the Notification Mode element (*notificationMode*) in the SUPL INIT message to indicate notification based on current location and SHALL NOT include the notification element in the SUPL INIT message. Before the SUPL INIT message is sent, the H-SLC also computes and stores the hash of the SUPL INIT message.
If in step A the H-SLC decided to use a previously computed position, the SUPL INIT message SHALL indicate this in a 'no position' *posMethod* parameter value and the SET SHALL respond with a SUPL END message carrying the results of the verification process (access granted, or access denied). If no explicit verification is required (notification only) the SET SHALL respond with a SUPL END message. The H-SLC SHALL then directly proceed to step O.
- E. The SET analyses the received SUPL INIT message. If found not to be authentic, the SET takes no further action. Otherwise, the SET takes required action to prepare for the establishment of a TLS connection with the H-SLC. The SET also calculates the hash of the received SUPL INIT message.
- F. The SET evaluates the Notification rules and takes the appropriate action. The SET checks the notification mode indicator and determines that in this case the notification is performed based on the location of the SET. The SET SHALL establish a TLS connection to the H-SLC using the H-SLP address provisioned by the Home Network. The SET then sends a SUPL POS INIT message to start a positioning session with the H-SLP. The SET SHALL send the SUPL POS INIT message even if the SET does not support the intended positioning method indicated in SUPL INIT message. The SUPL POS INIT message contains the Location ID (*locationId*), SET capabilities (*sETCapabilities*) and the hash (*ver*) of the received SUPL INIT message calculated in step E. The SUPL POS INIT message MAY also include a SUPL POS message carrying LPP/LPPE and/or TIA-801 positioning protocol messages in line with the H-SLP's positioning protocol capabilities (indicated in step D in *sLPCapabilities*). The SET MAY also provide its position, if this is supported. If the SUPL POS INIT message contains a position which meets the requested QoP, the H-SLC MAY directly proceed to step L and not engage in a SUPL POS session. The H-SLC then also sends a PEND message to the SPC to end the session.
- G. The H-SLC sends a PINIT message to the H-SPC including the Location ID (*locationId*), SET capabilities (*sETCapabilities*) and any LPP/LPPE/TIA-801 payload received in step F. The H-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the H-SPC in step C, or a different posmethod of the H-SLC's choosing, as long as it is one supported by the H-SPC.
If a posmethod was included in the PINIT message, the H-SPC SHALL use that posmethod. If no posmethod parameter was included in the PINIT message, the H-SPC shall choose any posmethod in line with the SET capabilities and which was approved by the H-SLC in step B. If required for the posmethod the H-SPC SHALL use the appropriate positioning protocol (e.g. LPP, LPPE or TIA-801) from the PINIT message. If a position received from or calculated based on information received in the PINIT message is available that meets the required QoP, the H-SPC MAY directly proceed to step K and not engage in a SUPL POS session.
- H. This step is optional and only executed if the H-SPC cannot translate information received in the *locationId* or LPP/LPPE/TIA-801 payload received in step G into a position estimate. In this case the H-SPC sends a PLREQ message containing the Location ID (*locationId*) and LPP/LPPE/TIA-801 payload to the H-SLC.

- I. This step is conditional and only occurs if step H was performed. The H-SLC reports the position result back to the H-SPC in a PLRES message. If the position result meets the required QoP, the H-SPC MAY directly proceed to step K and not engage in a SUPL POS session.
- J. The H-SLC SHALL verify that the value of the *ver* parameter received in SUPL POS INIT in step F matches the one calculated and stored by the H-SLC in step D. If the values do not match, the H-SLC SHALL directly move to step N and send a SUPL END message with status code '*authSuplinitFailure*'. The H-SLC then also sends a PEND message to the SPC to end the session.
SET and H-SPC MAY exchange several successive positioning procedure messages. Thereby the positioning procedure payload (LPP/LPPE/TIA-801) is transferred between the H-SPC and the H-SLC using PMESS messages. The positioning protocol payload (LPP/LPPE/TIA-801) is transferred between the H-SLC and the SET using SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is shown conceptually in dotted lines but the actual message exchange may be different).
- K. Once the position calculation is complete the H-SPC sends a PEND message including the position result (*position*) to the H-SLC.
- L. The H-SLC applies subscriber privacy against the SET position estimate determined in Step K. If, based on this position, notification and verification or notification only is required, the H-SLC SHALL send a SUPL NOTIFY message to the SET. The SUPL NOTIFY message contains the notification element (*notification*). If, based on this position, no notification or verification is required, the H-SLP SHALL directly proceed to Step N.
- M. The SET SHALL send a SUPL NOTIFY RESPONSE message to the H-SLC. If notification and verification was required in Step L then this will contain the containing the notification response from the user.
- N. The H-SLC sends a SUPL END message to the SET to end the session. The SET SHALL release the TLS connection to the H-SLC and release all resources related to this session.
- O. The H-SLC sends the position estimate back to the SUPL Agent in an MLP SLIA message and SHALL release all resources related to this session.

5.2 Emergency Services

This section describes the handling of Emergency Service Location Requests.

5.2.1 Network Initiated

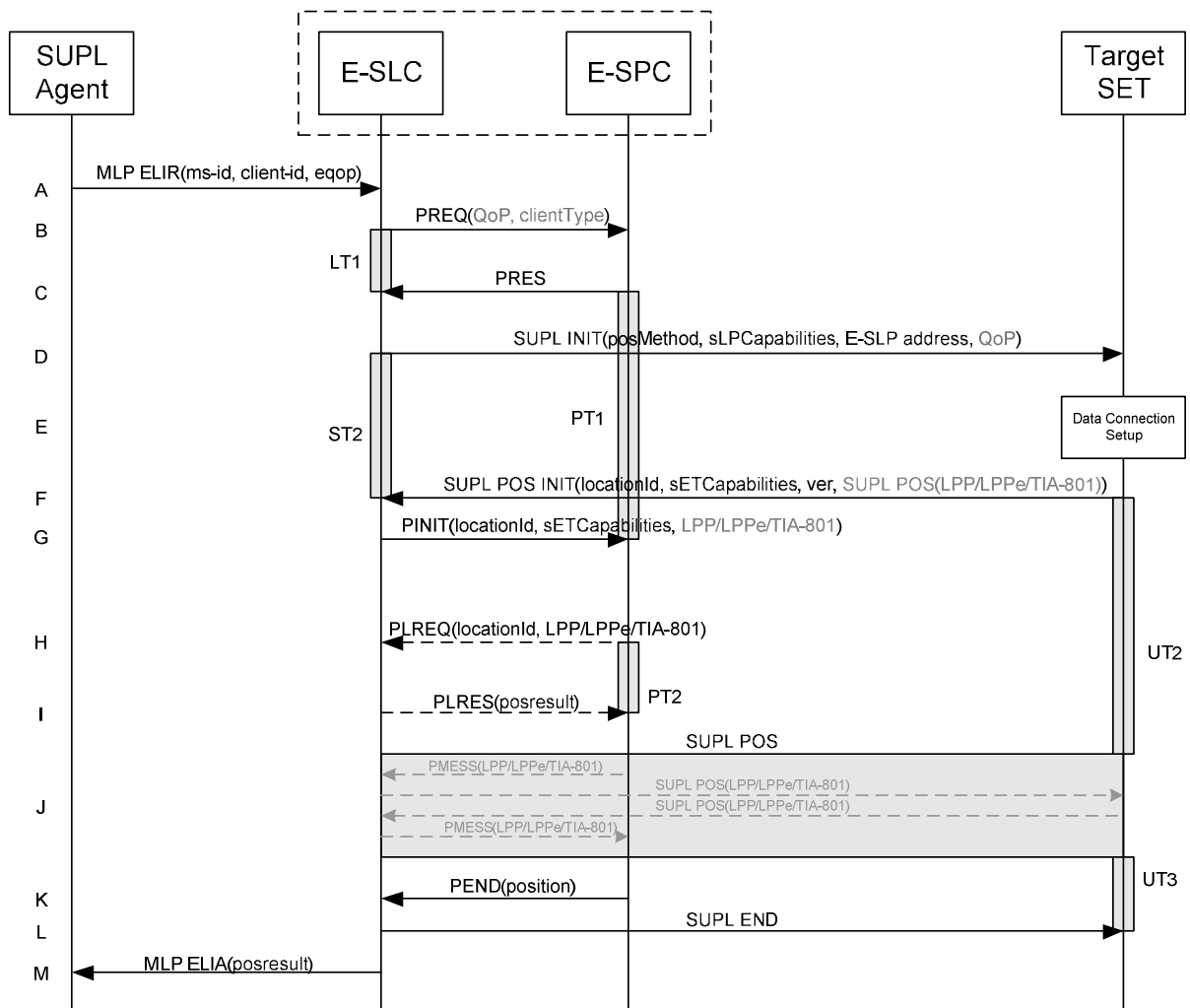


Figure 5: Network Initiated Emergency Service

NOTE: See Appendix C for timer descriptions.

The ILP/ULP message flow for Network Initiated Emergency Service is the same as for immediate single fix (see section 5.1.1). The only difference is that the H-SLP is replaced by an E-SLP² and in step B the PREQ message from the E-SLC to the E-SPC indicates the SUPL session request is for an emergency call in the appropriate client type (clientType=Emergency). The fact that the SUPL INIT message carries the address of the E-SLP has no impact on overall message flow.

² In certain scenarios the H-SLP may also serve as the E-SLP.

5.2.2 SET Initiated

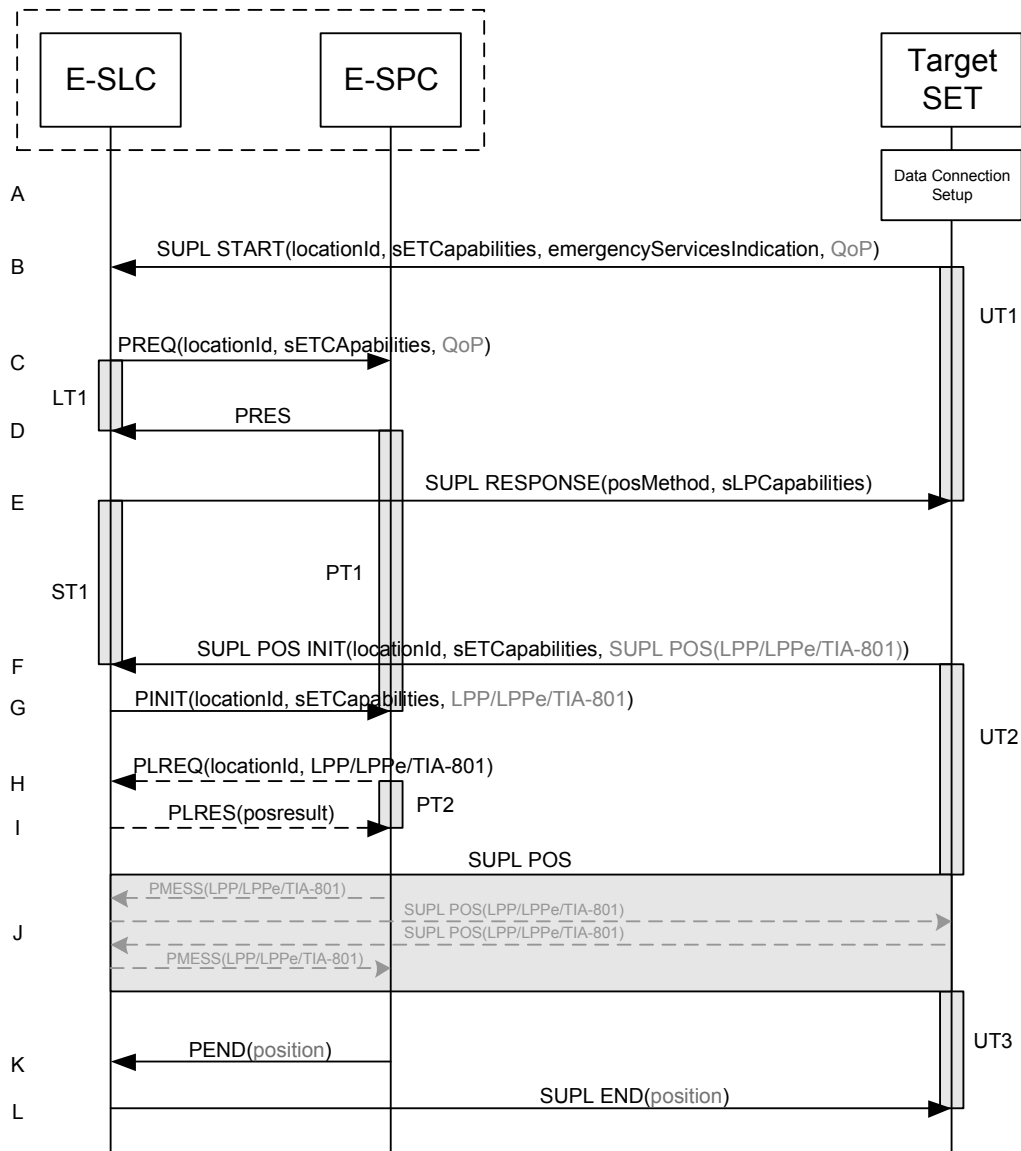


Figure 6: SET-Initiated Emergency Services

NOTE: See Appendix C for timer descriptions.

The ILP/ULP message flow for SET Initiated Emergency Service is the same as for immediate single fix (see section 5.1.2). The only difference is that the H-SLP is replaced by an E-SLP and in step C the PREQ message from the E-SLC to the E-SPC indicates the SUPL session request is for emergency services in the appropriate client type (clientType=Emergency). The fact that the SUPL START message carries the Emergency Services Indication parameter (*emergencyServicesIndication*) has no impact on overall message flow.

5.3 Deferred Services

5.3.1 Network Initiated Triggered Periodic

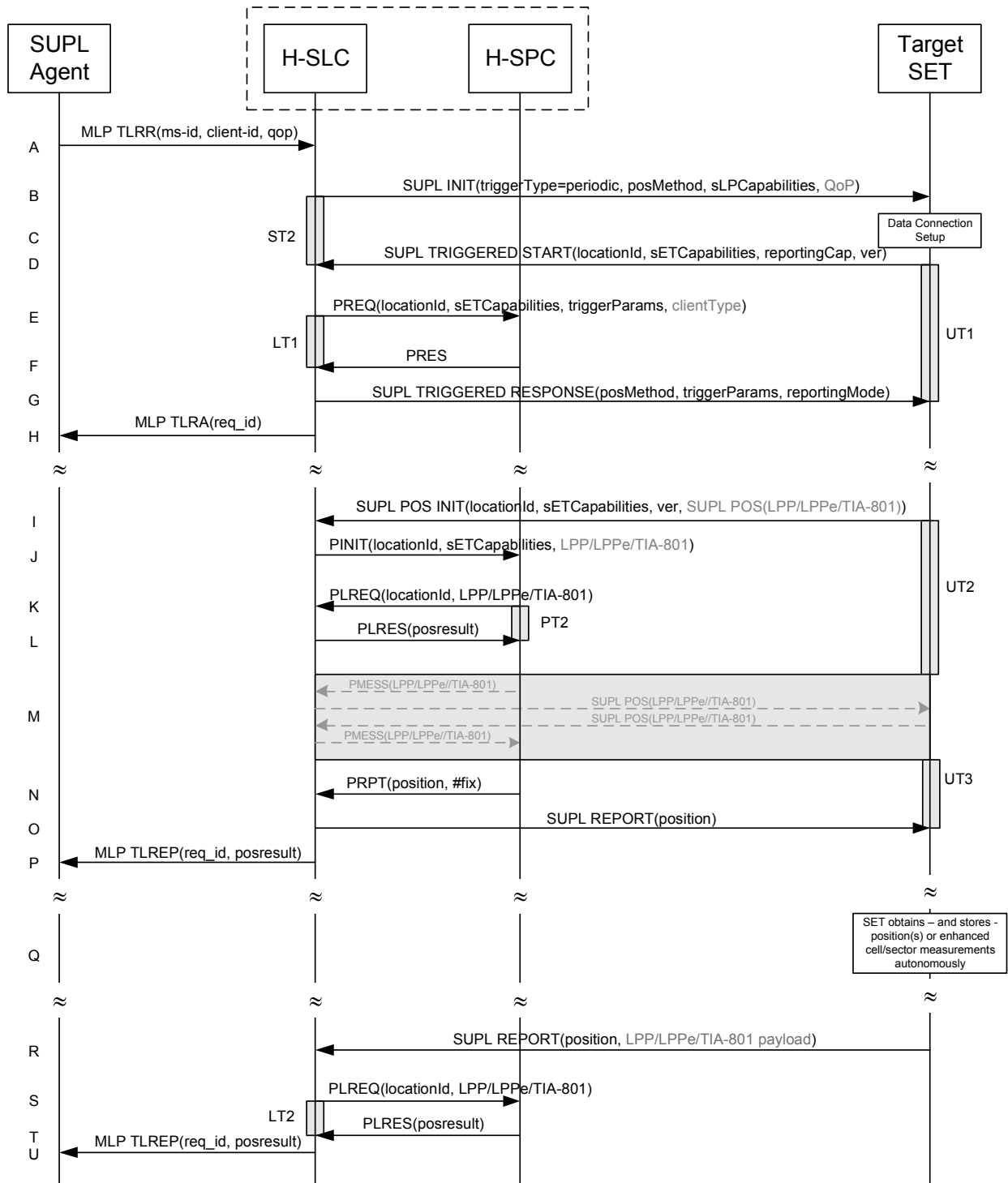


Figure 7: Network Initiated Periodic Trigger (Part I)

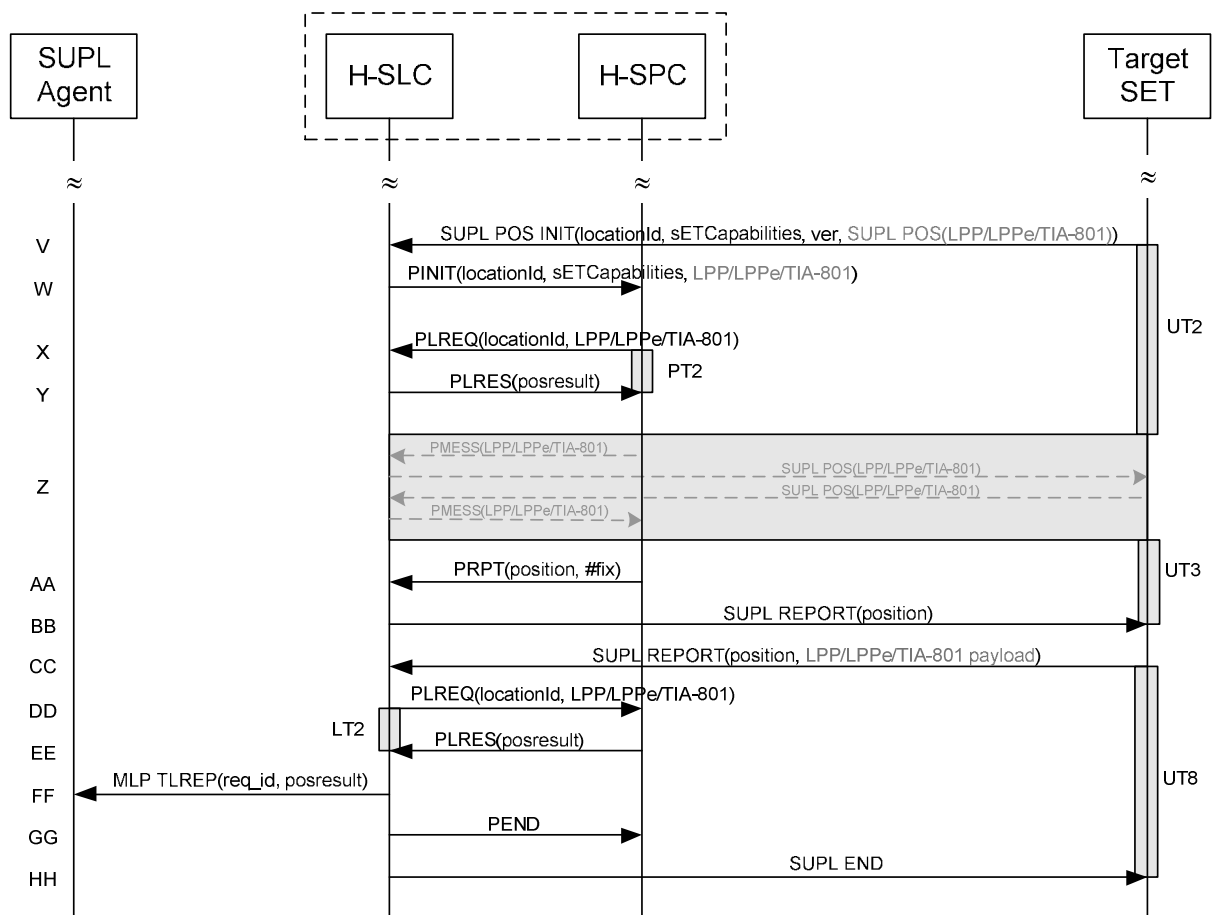


Figure 8: Network Initiated Periodic Trigger (Part II)

NOTE: See Appendix C for timer descriptions.

- A. The SUPL Agent issues an MLP TLRR message to the H-SLC, with which SUPL Agent is associated. The TLRR message may indicate that batch reporting or quasi-real time reporting is to be used instead of real time reporting.
- B. The H-SLC initiates a periodic trigger session with the SET by sending a SUPL INIT message to the SET. The SUPL INIT message contains the intended positioning method (*posMethod*), the SLP Capabilities (*sLPCapabilities*), trigger type indicator (*triggerType=periodic*) and optionally the desired QoP. If the result of the privacy check in Step A indicates that notification or verification to the target subscriber is needed, the H-SLC SHALL also include the Notification element in the SUPL INIT message. Before the SUPL INIT message is sent, the H-SLC also computes and stores a hash of the SUPL INIT message.
- C. The SET analyses the received SUPL INIT message. If found not to be authentic, the SET takes not further action. Otherwise the SET takes required action to prepare for the establishment of a TLS connection with the H-SLC. The SET also calculates the hash of the received SUPL INIT message.
- D. The SET evaluates the Notification rules and takes appropriate action. The SET SHALL establish a TLS connection to the H-SLC using the H-SLP address provisioned by the Home Network. The SET then sends a SUPL TRIGGERED START message to start a periodic triggered session with the H-SLP. The SET SHALL send the SUPL TRIGGERED START message even if the SET does not support the intended positioning method indicated in SUPL INIT (step B). The SUPL TRIGGERED START message contains the Location ID (*locationId*), SET capabilities (*sETCapabilities*), reporting capabilities (*reportingCap*) and the hash of the received SUPL INIT message (*ver*) calculated in step B. The *reportingCap* parameter indicates whether the SET is capable of batch reporting, real time reporting and/or quasi-real time reporting.

- E. The H-SLC requests service from the H-SPC for a SUPL session by sending a PREQ message containing the Location ID (*locationId*), SET capabilities the trigger parameters (*triggerParams*) and optionally the client type (*clientType*). The PREQ MAY also optionally contain the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.
- F. The H-SPC accepts the service request by sending a PRES message to the H-SLC. The H-SPC MAY include a preferred positioning method in PRES and MAY also include its supported positioning methods.
- G. The H-SLC SHALL verify that the value of the *ver* parameter received in SUPL TRIGGERED START in step D matches the one calculated and stored by the H-SLC in step B. If the values do not match, the H-SLC SHALL send a SUPL END message with status code '*authSuplinitFailure*'. The H-SLC SHALL send a SUPLTRIGGERED RESPONSE message to the SET. The SUPL TRIGGERED RESPONSE message contains the intended positioning method (*posMethod*) and the trigger parameters (*triggerParams*). If the H-SPC included a list of supported posmethods in step F, the chosen intended positioning method SHALL be aligned with the list of supported posmethods. Consistent with the reporting capabilities of the SET (sent in *reportingCap* in step D), the H-SLC also indicates the reporting mode (*reportingMode*) to be used by the SET: real time reporting, quasi-real time reporting or batch reporting. In the case of batch reporting, the SUPL TRIGGERED RESPONSE message indicates the conditions for sending batch reports to the H-SLC and any criteria, when the conditions for sending arise, for including or excluding particular stored position estimates and/or (if allowed) particular stored enhanced cell/sector/AP measurements. In the case of quasi-real time reporting, the SUPL TRIGGERED RESPONSE message indicates whether the SET is allowed to send enhanced cell/sector/AP measurements in lieu of or in addition to position estimates. If enhanced cell/sector/AP positioning was selected for batch or quasi-real time reporting, the SUPL TRIGGERED RESPONSE message indicates if the SET is permitted to send stored enhanced cell/sector/AP measurements. In this case, if batch reporting was selected, the SET MAY skip steps I to O.
- H. The H-SLC informs the SUPL Agent in an MLP TLRA message that the triggered location response request has been accepted and also includes a *req_id* parameter to be used as a transaction id for the entire duration of the periodic triggered session. SET and H-SLC MAY release the TLS connection.

NOTE: [The MLP TLRA may be sent earlier at any time after the H-SLC receives the MLP TLRR.](#)

- I. When the periodic trigger in the SET indicates that a position fix has to be performed or at any time the SET decides it requires assistance data, the SET establishes a TLS connection to the H-SLC. The SET sends a SUPL POS INIT message to the H-SLC. The SUPL POS INIT message contains the Location ID (*locationId*), SET capabilities (*sETCapabilities*) and optionally a SUPL POS message carrying LPP/LPPE and/or TIA-801 positioning protocol payload in line with the H-SLP's positioning protocol capabilities (indicated in step B in *sLPCapabilities*). The SET MAY also provide its position, if this is supported.
If a position calculated based on information received in the SUPL POS INIT message is available (e.g. a cell-id based position fix) that meets the required QoP, the H-SLC MAY directly proceed to step O and not engage in a SUPL POS session.
- J. The H-SLC sends a PINIT message to the H-SPC including the Location ID (*locationId*), SET capabilities (*sETCapabilities*) and any LPP/LPPE/TIA-801 payload received in step I. The H-SLC MAY include a posmethod in PINIT. This posmethod may either be the posmethod recommended by the H-SPC in step F, or a different posmethod of the H-SLC's choosing, as long as it is one supported by the H-SPC.
If a posmethod was included in PINIT, the H-SPC SHALL use that posmethod. If no posmethod parameter was included in PINIT, the H-SPC SHALL choose any posmethod in line with the SET capabilities and which was approved by the H-SLC in step E. If required for the posmethod the H-SPC SHALL use the supported positioning protocol (e.g. LPP, LPPE or TIA-801) from the PINIT message. If a position received from or calculated based on information received in the PINIT message is available that meets the required QoP, the H-SPC MAY directly proceed to step N and not engage in a SUPL POS session.
- K. This step is optional and only executed if the H-SPC cannot translate information received in the *locationId* or LPP/LPPE/TIA-801 payload received in step J into a position. In this case the H-SPC sends a PLREQ message containing the Location ID (*locationId*) and LPP/LPPE/TIA-801 payload to the H-SLC.

- L. This step is conditional and only occurs if step K was performed. The H-SLC reports the position result back to the H-SPC in a PLRES message. If the position result meets the required QoP, the H-SPC MAY directly proceed to step N and not engage in a SUPL POS session.
- M. SET and H-SPC MAY exchange several successive positioning procedure messages. Thereby the positioning procedure payload (LPP/LPPE/TIA-801) is transferred between the H-SPC and the H-SLC using PMESS messages. The positioning protocol payload (LPP/LPPE/TIA-801) is transferred between the H-SLC and the SET using SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is shown conceptually in dotted lines but the actual message exchange may be different).
- N. Once the position calculation is complete the H-SPC sends a PRPT message including the position result (*position*) to the H-SLC.
- O. Once the position calculation (or assistance data delivery) is complete, the H-SLC sends a SUPL REPORT message to the SET. If the reporting mode is batch reporting, the SET stores all calculated position estimates. In SET Assisted mode the position is calculated by the H-SLP and therefore is included in the SUPL REPORT message for batch reporting mode. The SET MAY release the TLS connection to the H-SLC.

If a SET Based positioning method was chosen which allows the SET to autonomously calculate a position estimate (e.g. autonomous GNSS or A-GNSS SET Based mode where the SET has current GNSS assistance data and does not require an assistance data update from the H-SLP) steps I to O are not performed. Instead, the SET autonomously calculates the position estimate and – for real time or quasi-real time reporting – sends the calculated position estimate to the H-SLC using a SUPL REPORT message containing the position estimate.

- P. This step is optional: Once the position calculation is complete and if real time or quasi-real time reporting is used, the H-SLC sends a MLP TLREP message including the position result (*posresult*) to the SUPL Agent. If the reporting mode is set to batch reporting, this message is not used.
- Q. This step is optional: If the SET cannot communicate with the H-SLC and quasi-real time reporting is used or if batch reporting is used, the SET MAY – if supported - perform SET Based position fixes (e.g. autonomous GNSS or SET Based A-GNSS where the SET has current assistance data) and/or, if allowed by the H-SLC, enhanced cell/sector/AP measurements. In the case of batch reporting, and if explicitly allowed by the H-SLC, enhanced cell/sector/AP measurements are permitted even when the SET can communicate with the H-SLC.
- R. This step is optional and is executed if batch reporting is used and if any of the conditions for sending batch reports have occurred. It is also executed, once the SET is able to re-establish communication with the H-SLC, if quasi-real time reporting is used if one or more previous reports have been missed. The SET sends the stored position estimates and/or, if allowed, the stored enhanced cell/sector/AP measurements (sent in LPP/LPPE/TIA-801 payload messages) in an unsolicited SUPL REPORT message to the H-SLC. The SUPL REPORT message contains the position result(s) including date and time information for each position result and optionally the position method used. In the case of batch reporting, the stored position estimates and/or enhanced cell/sector/AP measurements included in the SUPL REPORT message may be chosen according to criteria received in step G. If no criteria are received in step G, the SET shall include all stored position estimates and/or enhanced cell/sector/AP measurements not previously reported. If applicable, enhanced cell/sector/AP measurements are sent in LPP/LPPE/TIA-801 payload messages.
- S. This step is optional: if the SUPL REPORT message in step R contained enhanced cell/sector measurements (sent in LPP/LPPE/TIA-801 payload messages) and the H-SPC is required to translate the received enhanced cell/sector measurements into position estimates, the H-SLC sends a PLREQ message containing the Location ID (*locationId*) and enhanced cell/sector measurements sent in LPP/LPPE/TIA-801 payload messages to the H-SPC.
- T. This step is conditional and only used if step S occurred: the H-SPC returns the calculated position estimates to the H-SLC in a PLRES message.
- U. The H-SLC forwards the reported and/or calculated position estimate(s) to the SUPL Agent in an MLP TLREP message.

Steps I to U are repeated as applicable. When the last position estimate needs to be calculated i.e. the end of the periodic triggered session has been reached, steps V to BB may be performed (a repeat of steps I to O). Alternatively - and if applicable - step Q is repeated.

CC. This step is optional. When real-time reporting is used, it is executed after the last position estimate or, if allowed, last set of enhanced cell/sector measurements has been obtained or was due. When batch or quasi real-time reporting is used, step CC is executed if and as soon as the following conditions apply:

- i. The SET has stored historic location reports and/or stored historic enhanced cell/sector measurements that have not yet been sent to the H-SLC.
- ii. The SET is able to establish communication with the H-SLC.
- iii. In the case of batch reporting, the conditions for sending have arisen or the SET has obtained the last fix according to the number of fixes (in which case an incomplete batch of positions is sent).

The SUPL REPORT message is used to send all or a subset of stored position fixes and/or stored enhanced cell/sector measurements (sent in LPP/LPPE/TIA-801 payload messages) not previously reported to the H-SLC. In the case of batch reporting, the stored position estimates and/or stored enhanced cell/sector measurements included in the SUPL REPORT message may be chosen according to criteria received in step G. If no criteria are received in step G, the SET shall include all stored position estimates and/or stored enhanced cell/sector measurements not previously reported.

DD. This step is optional: if the SUPL REPORT message in step CC contained enhanced cell/sector measurements received in the LPP/LPPE/TIA-801 payload message and the H-SPC is required to translate the received enhanced cell/sector measurements into position estimates, the H-SLC sends a PLREQ message containing the Location ID (*locationId*) and LPP/LPPE/TIA-801 payload to the H-SLC.

EE. This step is conditional and only used if step DD occurred: the H-SPC returns the calculated position estimates to the H-SLC in a PLRES message.

FF. The H-SLC forwards the reported and/or calculated historical position estimate(s) to the SUPL Agent in an MLP TLREP message. As an option (e.g. if the SUPL Agent is not available), the H-SLC could retain the historic position fixes for later retrieval by the SUPL Agent.

GG. After the last position result has been reported to the SUPL Agent in step FF or following some timeout on not receiving stored position estimates in step CC, the H-SLC informs the H-SPC about the end of the periodic triggered session by sending a PEND message.

HH. The H-SLC ends the periodic triggered session by sending a SUPL END message to the SET.

5.3.2 Network Initiated Area and Velocity Event Triggers

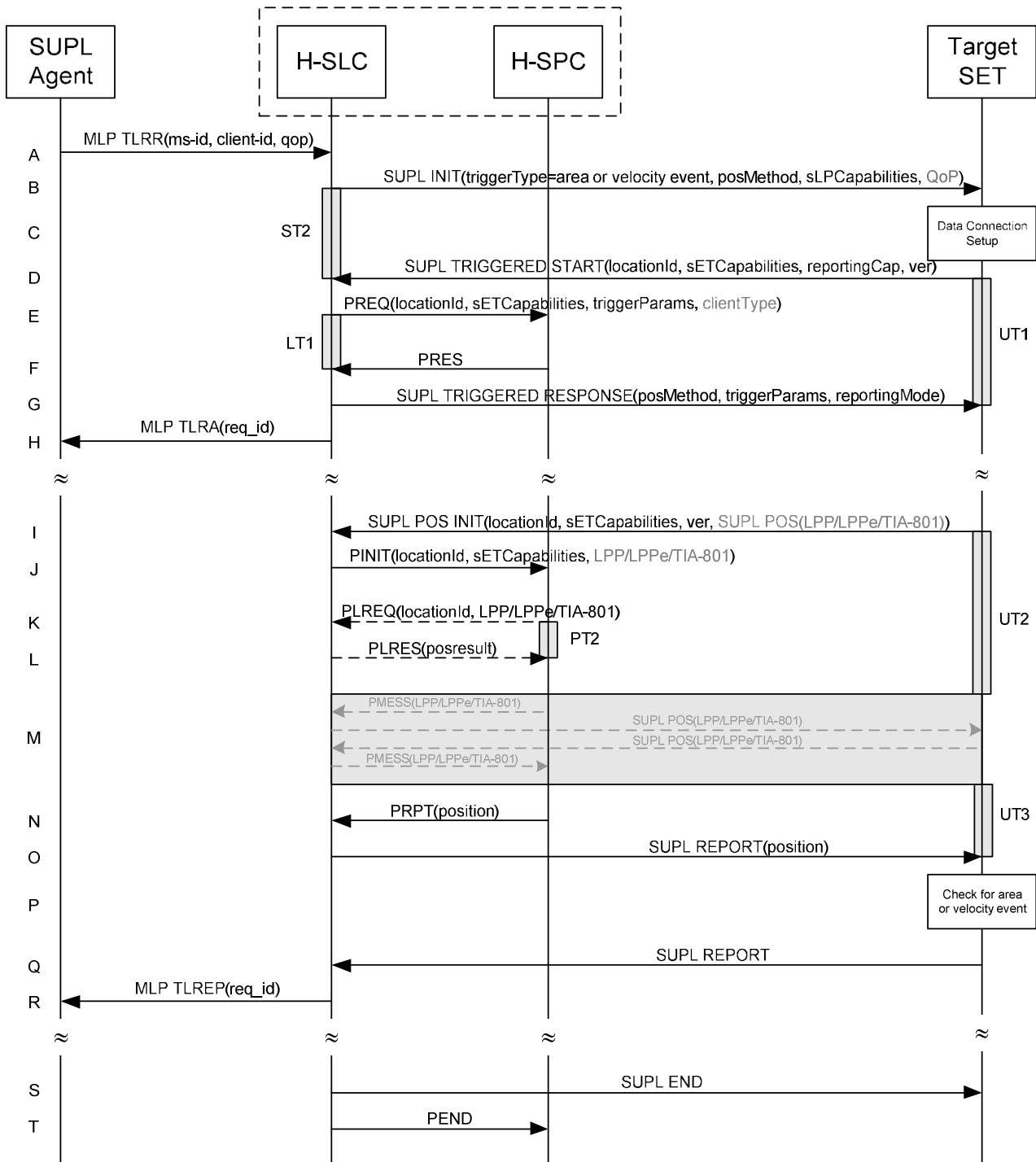


Figure 9: Network Initiated Area or Velocity Event Trigger

NOTE: See Appendix C for timer descriptions.

- A. The SUPL Agent sends an MLP TLRR message to the H-SLC, with which it is associated. In the case of an area event triggered session: The MLP TLRR message contains all parameters required for the area event trigger session (e.g., geographic target area, trigger criteria, etc.). In the case of a velocity event triggered session: The MLP TLRR message contains all parameters required for the velocity event trigger session (e.g., target velocity, start time, stop time, number of reports, etc.).

- B. The H-SLC initiates an area or velocity event trigger session with the SET by sending a SUPL INIT message to the SET. The SUPL INIT message contains the intended positioning method (*posMethod*), the SLP Capabilities (*sLPCapabilities*), trigger type indicator (*triggerType*=area event or velocity event) and optionally the desired QoP. If the result of the privacy check in Step A indicates that notification or verification to the target subscriber is needed, the H-SLC SHALL also include the Notification element in the SUPL INIT message. Before the SUPL INIT message is sent, the H-SLC also computes and stores a hash of the SUPL INIT message.
- C. The SET analyses the received SUPL INIT message. If found not to be authentic, the SET takes no further action. Otherwise the SET takes required action to prepare for the establishment of a TLS connection with the H-SLC. The SET also calculates the hash of the received SUPL INIT message.
- D. The SET evaluates the Notification rules and takes appropriate action. The SET SHALL establish a TLS connection to the H-SLC using the H-SLP address provisioned by the Home Network. The SET then sends a SUPL TRIGGERED START message to start a triggered area or velocity event session with the H-SLP. The SET SHALL send the SUPL TRIGGERED START message even if the SET does not support the intended positioning method indicated in SUPL INIT (step B). The SUPL TRIGGERED START message contains the Location ID (*locationId*), SET capabilities (*sETCapabilities*) and the hash of the received SUPL INIT message (*ver*) calculated in step B.
- E. The H-SLC requests service from the H-SPC for a SUPL session by sending a PREQ message containing the Location ID (*locationId*), SET capabilities the trigger parameters (*triggerParams*) and optionally the client type (*clientType*). The PREQ MAY also optionally contain the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.
- F. The H-SPC accepts the service request by sending a PRES message to the H-SLC. The H-SPC MAY include a preferred positioning method in PRES and MAY also include its supported positioning methods.
- G. The H-SLC SHALL verify that the value of the *ver* parameter received in SUPL TRIGGERED START in step D matches the one calculated and stored by the H-SLC in step B. If the values do not match, the H-SLC SHALL send a SUPL END message with status code '*authSuplinitFailure*'. The H-SLC SHALL send a SUPLTRIGGERED RESPONSE message to the SET. The SUPL TRIGGERED RESPONSE message contains the intended positioning method (*posMethod*) and the trigger parameters (*triggerParams*). If the H-SPC included a list of supported posmethods in step F, the chosen intended positioning method SHALL be aligned with the list of supported posmethods.

In the case of an area event triggered session the SUPL TRIGGERED RESPONSE message may also contain the area ids of the specified area (in *triggerParams*).

- H. The H-SLC informs the SUPL Agent in an MLP TLRA message that the triggered location response request has been accepted and also includes a *req_id* parameter to be used as a transaction id for the entire duration of the area or velocity event triggered session. SET and H-SLC MAY release the TLS connection.

NOTE: [The MLP TLRA may be sent earlier at any time after the H-SLC receives the MLP TLRR.](#)

- I. If the area ids are downloaded in step G, the SET SHALL compare the current area id to the downloaded area ids. When the area or velocity event trigger mechanism in the SET or the comparison of the current area id to the downloaded area ids indicates that a position fix is to be executed, the SET establishes a TLS connection with the H-SLC. A TLS connection with the H-SLC is also established by the SET, whenever the area or velocity event trigger in the SET indicates that a position fix has to be performed or at any time the SET decides it requires assistance data. The SET then sends a SUPL POS INIT message to the H-SLC. The SUPL POS INIT message contains the Location ID (*locationId*), SET capabilities (*sETCapabilities*) and optionally a SUPL POS message carrying LPP/LPPE and/or TIA-801 positioning protocol payload in line with the H-SLP's positioning protocol capabilities (indicated in step B in *sLPCapabilities*). The SET MAY also provide its position, if this is supported. If a position calculated based on information received in the SUPL POS INIT message is available (e.g. a cell-id based position fix) that meets the required QoP, the H-SLP MAY directly proceed to step O and not engage in a SUPL POS session.
- J. The H-SLC sends a PINIT message to the H-SPC including the Location ID (*locationId*), SET capabilities (*sETCapabilities*) and any LPP/LPPE/TIA-801 payload received in step I. The H-SLC MAY include a posmethod in

PINIT. This posmethod may either be the posmethod recommended by the H-SPC in step F, or a different posmethod of the H-SLC's choosing, as long as it is one supported by the H-SPC.

If a posmethod was included in PINIT by the H-SLC, the H-SPC SHALL use that posmethod. If no posmethod parameter was included in PINIT, the H-SPC SHALL choose any posmethod in line with the SET capabilities and which was approved by the H-SLC in step E. If required for the posmethod the H-SPC SHALL use the supported positioning protocol (e.g. LPP, LPPe or TIA-801) from the PINIT message. If a position received from or calculated based on information received in the PINIT message is available that meets the required QoP, the H-SPC MAY directly proceed to step N and not engage in a SUPL POS session.

- K. This step is optional and only executed if the H-SPC cannot translate information received in the *locationId* or LPP/LPPe/TIA-801 payload received in step J into a position. In this case the H-SPC sends a PLREQ message containing the Location ID (*locationId*) and LPP/LPPe/TIA-801 payload to the H-SLC.
- L. This step is conditional and only occurs if step K was performed. The H-SLC reports the position result back to the H-SPC in a PLRES message. If the position result meets the required QoP, the H-SPC MAY directly proceed to step N and not engage in a SUPL POS session.
- M. SET and H-SPC MAY exchange several successive positioning procedure messages. Thereby the positioning procedure payload (LPP/LPPe/TIA-801) is transferred between the H-SPC and the H-SLC using PMESS messages. The positioning protocol payload (LPP/LPPe/TIA-801) is transferred between the H-SLC and the SET using SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is shown conceptually in dotted lines but the actual message exchange may be different).
- N. Once the position calculation is complete the H-SPC sends a PRPT message including the position result (*position*) to the H-SLC.
- O. Once the position calculation (or assistance data delivery) is complete, the H-SLC sends a SUPL REPORT message to the SET. The SUPL REPORT message may include the position result (*position*) – which may include the velocity - if the result was calculated at the H-SLP. The SET MAY release the secure connection to the H-SLC.
- P. In the case of an area event triggered session: The SET compares the calculated position estimate with the target area to check if the event trigger condition has been met.

In the case of a velocity event triggered session: The SET compares the calculated velocity with the target velocity to check if the event trigger condition has been met.

If no area or velocity event is triggered, the SET SHALL return to step I. If an area or velocity event is triggered, the SET SHALL proceed to step Q.

- Q. In the case of an area event triggered session: The SET sends a SUPL REPORT message including the position estimate to the H-SLC unless the Location Estimate parameter is set to “false” in which case no position estimate is included.
- In the case of a velocity event triggered session: The SET sends a SUPL REPORT message including the velocity to the H-D-SLP unless the Velocity Estimate parameter is set to “false”. Since a velocity estimate is always sent as part of a position estimate, the position estimate is also included.

- R. The H-SLC sends a MLP TLREP message to the SUPL Agent which may include the position result.

If the SUPL Agent has requested several reports and more reports are to be sent, the SET repeats steps I to R or steps I to O depending on whether or not an area or velocity event has occurred. Note that in the latter case, step Q occurs only after the minimum time between reports has elapsed.

- S. When the maximum number of reports for the SUPL triggered session has been reached, the H-SLC sends a SUPL END message to the SET.
- T. The H-SLC informs the H-SPC about the end of the triggered session by sending a PEND message.

The message flow described in Figure 9 is applicable to all positioning methods; however, individual steps within the message flows are optional:

- Step M (SUPL POS) is not performed for cell-id based positioning methods.
- In SET Based mode where no assistance data is required from the network, no interaction with the H-SLC is required to calculate a position/velocity estimate. Interaction with the H-SLC is only required for assistance data update in which case steps I to O are performed.

When the stop time of the triggered area or velocity event session is reached, the SET initiates the ending of the session as shown in Figure 10.

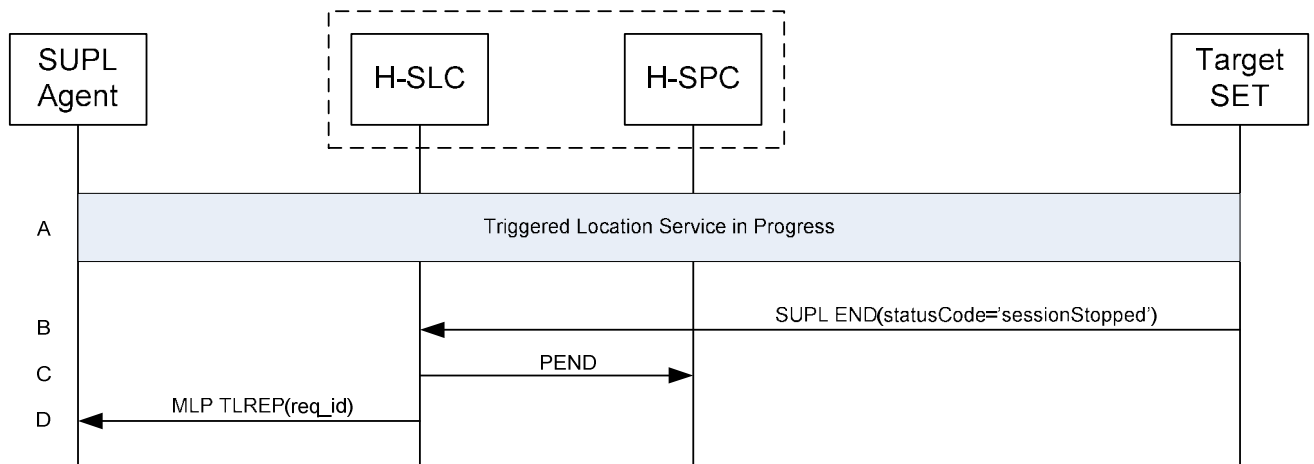


Figure 10: Ending of a triggered area or velocity event session when the stop time has been reached.

- The area or velocity event triggered session is in progress.
- When the StopTime of the event trigger session is reached, the SET sends a SUPL END message with status code “sessionStopped” to the H-SLC .
- The H-SLC informs the H-SPC about the end of the triggered session by sending a PEND message.
- The H-SLC MAY send an MLP TLREP message to the SUPL Agent to indicate the end of the triggered area or velocity event session.

NOTE: If the SET does not send a SUPL END message within a configured time interval after the Stop Time was reached (i.e. step B did not occur), the H-SLC MAY proceed directly to step C and discard all resources for the session.

5.3.3 SET Initiated Triggered Periodic

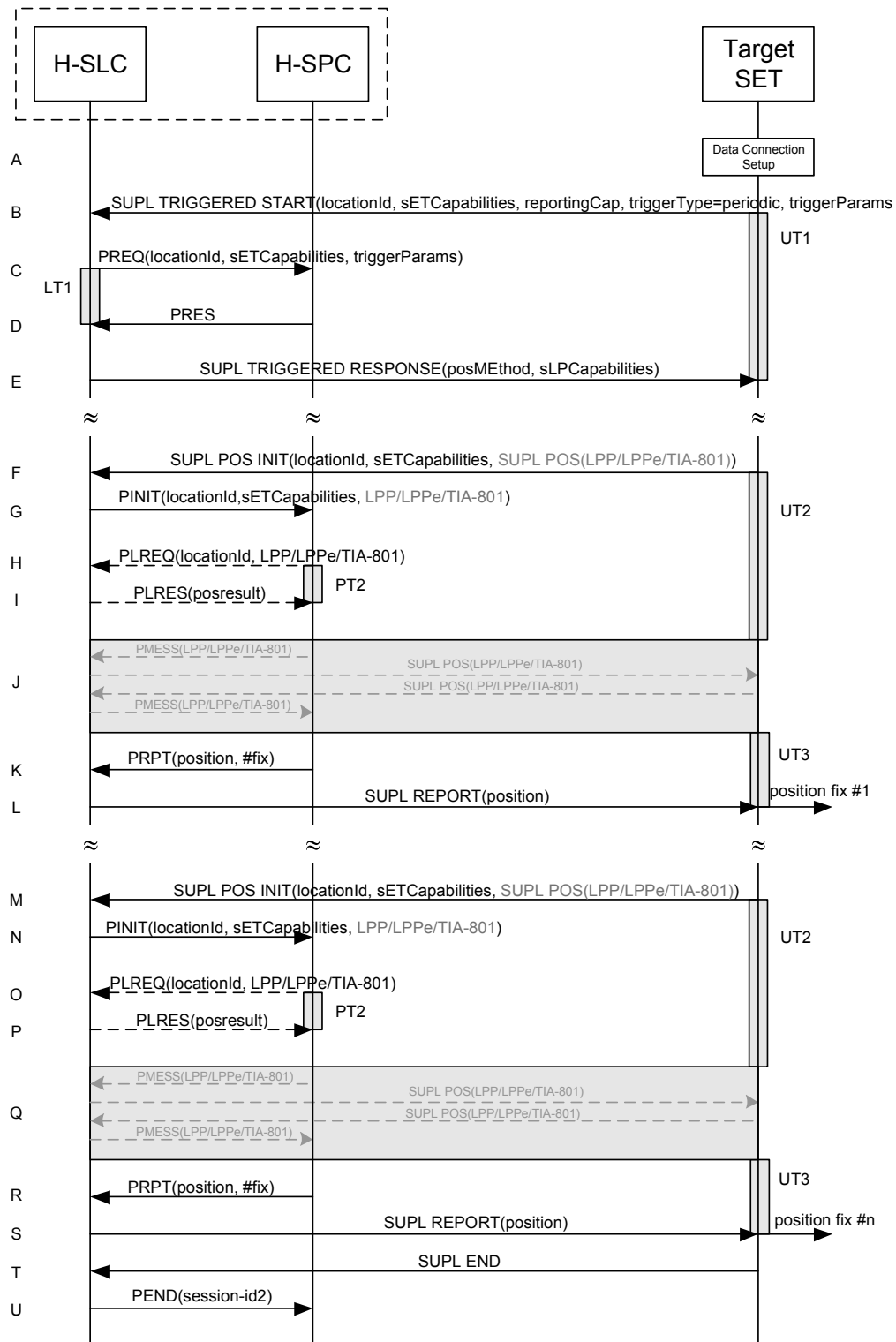


Figure 11: SET Initiated Periodic Trigger

NOTE: See Appendix C for timer descriptions.

- A. The SUPL Agent on the SET receives a position request from an application running on the SET. The SET takes appropriate action to establish a TLS connection to the H-SLC.
- B. The SUPL Agent on the SET uses the default address provisioned by the Home Network to establish a TLS connection to the H-SLC and sends a SUPL TRIGGERED START message to start a positioning session with the H-SLP. The SUPL TRIGGERED START message contains Location ID (*locationId*), SET capabilities (*sETCapabilities*), trigger type indicator (*triggerType=periodic*), periodic trigger parameters (*triggerParams*) and optionally the QoP.
- C. The H-SLC requests service from the H-SPC for a SUPL session by sending a PREQ message containing the Location ID (*locationId*), SET capabilities and the trigger parameters (*triggerParams*). The PREQ MAY also optionally contain the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.
- D. The H-SPC accepts the service request by sending a PRES message to the H-SLC. The H-SPC MAY include a preferred positioning method in PRES and MAY also include its supported positioning methods.
- E. The H-SLC sends a SUPLTRIGGERED RESPONSE message to the SET. The SUPL TRIGGERED RESPONSE message contains the intended positioning method (*posMethod*) and the SLP Capabilities (*sLPCapabilities*). If the H-SPC included a list of supported posmethods in step D, the chosen intended positioning method SHALL be aligned with the list of supported posmethods.
- F. When the periodic trigger in the SET indicates that a position fix has to be performed or at any time the SET decides it requires assistance data, the SET establishes a TLS connection to the H-SLC. The SET sends a SUPL POS INIT message to the H-SLC. The SUPL POS INIT message contains the Location ID (*locationId*), SET capabilities (*sETCapabilities*) and optionally a SUPL POS message carrying LPP/LPPE and/or TIA-801 positioning protocol payload in line with the H-SLP's positioning protocol capabilities (indicated in step E in *sLPCapabilities*). The SET MAY also provide its position, if this is supported.
If a position calculated based on information received in the SUPL POS INIT message is available (e.g. a cell-id based position fix) that meets the required QoP, the H-SLC MAY directly proceed to step L and not engage in a SUPL POS session.
- G. The H-SLC sends a PINIT message to the H-SPC including the Location ID (*locationId*), SET capabilities (*sETCapabilities*) and any LPP/LPPE/TIA-801 payload received in step F. The H-SLC MAY include a posmethod in PINIT. This posmethod may either be the posmethod recommended by the H-SPC in step D, or a different posmethod of the H-SLC's choosing, as long as it is one supported by the H-SPC.
If a posmethod was included in PINIT, the H-SPC SHALL use that posmethod. If no posmethod parameter was included in PINIT, the H-SPC SHALL choose any posmethod in line with the SET capabilities and which was approved by the H-SLC in step C. If required for the posmethod the H-SPC SHALL use the supported positioning protocol (e.g. LPP, LPPE or TIA-801) from the PINIT message. If a position received from or calculated based on information received in the PINIT message is available that meets the required QoP, the H-SPC MAY directly proceed to step K and not engage in a SUPL POS session.
- H. This step is optional and only executed if the H-SPC cannot translate information received in the *locationId* or LPP/LPPE/TIA-801 payload received in step G into a position. In this case the H-SPC sends a PLREQ message containing the Location ID (*locationId*) and LPP/LPPE/TIA-801 payload to the H-SLC.
- I. This step is conditional and only occurs if step H was performed. The H-SLC reports the position result back to the H-SPC in a PLRES message. If the position result meets the required QoP, the H-SPC MAY directly proceed to step K and not engage in a SUPL POS session.
- J. SET and H-SPC MAY exchange several successive positioning procedure messages. Thereby the positioning procedure payload (LPP/LPPE/TIA-801) is transferred between the H-SPC and the H-SLC using PMESS messages. The positioning protocol payload (LPP/LPPE/TIA-801) is transferred between the H-SLC and the SET using SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is shown conceptually in dotted lines but the actual message exchange may be different).

- K. Once the position calculation is complete the H-SPC sends a PRPT message including the position result (*position*) to the H-SLC.
- L. Once the position calculation (or assistance data delivery) is complete, the H-SLC sends a SUPL REPORT message to the SET. The SUPL REPORT message includes the position result if the position estimate is calculated in the H-SPC and therefore needs to be sent to the SET.

NOTE: Steps F to L are optional and not performed for SET Based mode in the case where no assistance data is required from the network. In this case the SET autonomously calculates a position fix based on the currently available assistance data stored in the SET.

Steps F to L are repeated if so required for calculating any of the remaining position estimates of the periodic triggered session. The last position estimate which – as shown in this case - requires the execution of steps F to L, is shown in steps M to S.

- S. After the last position result has been calculated, the SET ends the periodic triggered session by sending a SUPL END message to the H-SLC.
- T. The H-SLC ends the periodic triggered session with the H-SPC by sending a PEND message.

5.3.4 SET Initiated Area and Velocity Event Triggers

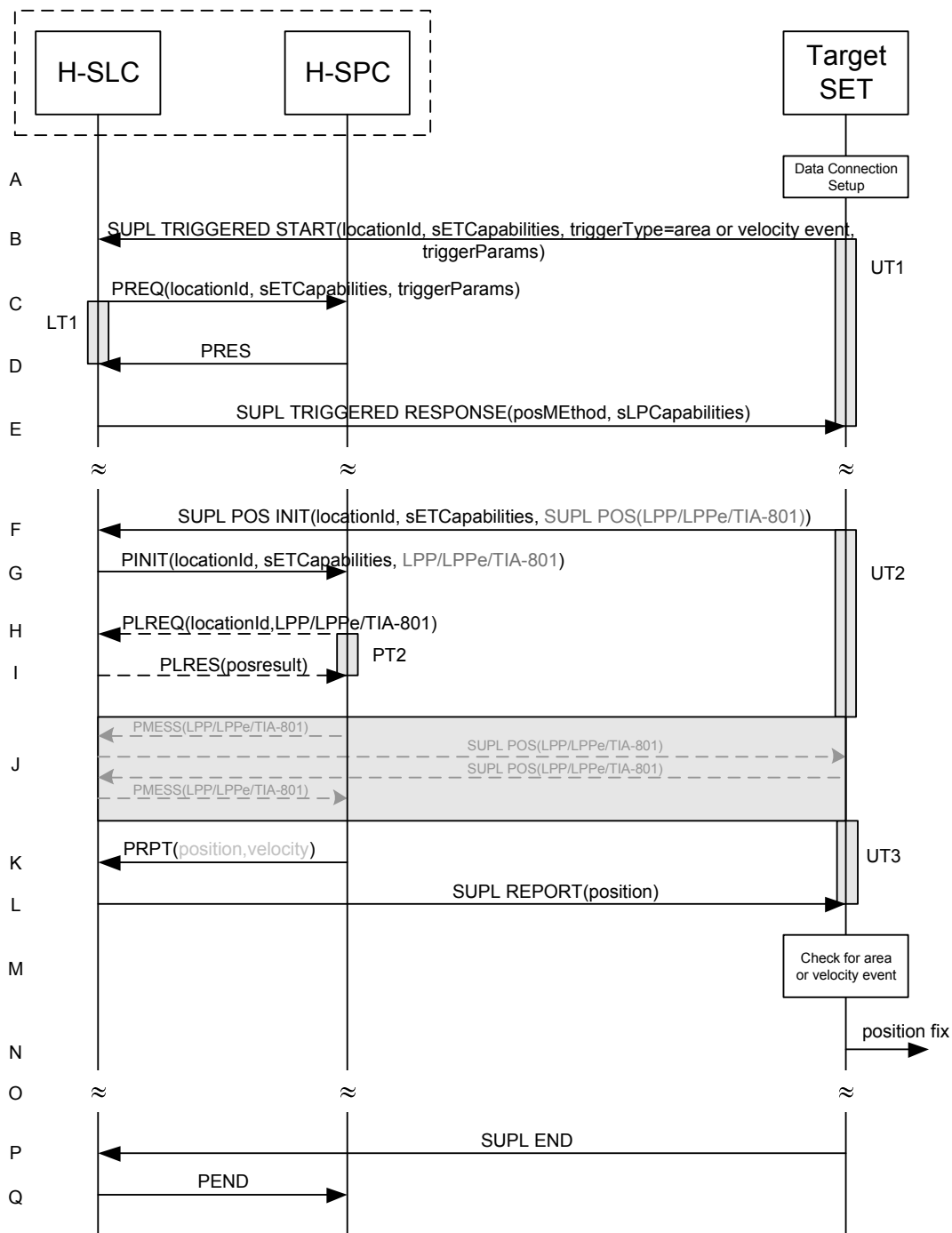


Figure 12: SET Initiated Area or Velocity Event Trigger

NOTE: See Appendix C for timer descriptions.

- A. The SUPL Agent on the SET receives a position request from an application running on the SET. The SET takes appropriate action to establish a TLS connection to the H-SLC.

- B. The SUPL Agent on the SET uses the default address provisioned by the Home Network to establish a TLS connection to the H-SLC and sends a SUPL TRIGGERED START message to start a positioning session with the H-SLP. The SUPL TRIGGERED START message contains Location ID (*locationId*), SET capabilities (*sETCapabilities*), trigger type indicator (*triggerType*=area event or velocity event), area or velocity event trigger parameters (*triggerParams*) and optionally the QoP.
- C. The H-SLC requests service from the H-SPC for a SUPL session by sending a PREQ message containing the Location ID (*locationId*), SET capabilities and the trigger parameters (*triggerParams*). The PREQ MAY also optionally contain the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.
- D. The H-SPC accepts the service request by sending a PRES message to the H-SLC. The H-SPC MAY include a preferred positioning method in PRES and MAY also include its supported positioning methods.
- E. The H-SLC sends a SUPLTRIGGERED RESPONSE message to the SET. The SUPL TRIGGERED RESPONSE message contains the intended positioning method (*posMethod*) and the SLP Capabilities (*sLPCapabilities*). If the H-SPC included a list of supported posmethods in step D, the chosen intended positioning method SHALL be aligned with the list of supported posmethods.
- F. When the area or velocity event trigger in the SET indicates that a position fix has to be performed or at any time the SET decides it requires assistance data, the SET establishes a TLS connection to the H-SLC. The SET sends a SUPL POS INIT message to the H-SLC. The SUPL POS INIT message contains the Location ID (*locationId*), SET capabilities (*sETCapabilities*) and optionally a SUPL POS message carrying LPP/LPPE and/or TIA-801 positioning protocol payload in line with the H-SLP's positioning protocol capabilities (indicated in step E in *sLPCapabilities*). The SET MAY also provide its position, if this is supported.
If a position calculated based on information received in the SUPL POS INIT message is available (e.g. a cell-id based position fix) that meets the required QoP, the H-SLC MAY directly proceed to step L and not engage in a SUPL POS session.
- G. The H-SLC sends a PINIT message to the H-SPC including the Location ID (*locationId*), SET capabilities (*sETCapabilities*) and any LPP/LPPE/TIA-801 payload received in step F. The H-SLC MAY include a posmethod in PINIT. This posmethod may either be the posmethod recommended by the H-SPC in step D, or a different posmethod of the H-SLC's choosing, as long as it is one supported by the H-SPC.
If a posmethod has been included in the PINIT by the H-SLC, the H-SPC SHALL use that posmethod. If no posmethod parameter was included in the PINIT, the H-SPC SHALL choose any posmethod in line with the SET capabilities and which was approved by the H-SLC in step C. If required for the posmethod the H-SPC SHALL use the supported positioning protocol (e.g. LPP, LPPE or TIA-801) from the PINIT message. If a position received from or calculated based on information received in the PINIT message is available that meets the required QoP, the H-SPC MAY directly proceed to step K and not engage in a SUPL POS session.
- H. This step is optional and only executed if the H-SPC cannot translate information received in the *locationId* or LPP/LPPE/TIA-801 payload received in step G into a position. In this case the H-SPC sends a PLREQ message containing the Location ID (*locationId*) and LPP/LPPE/TIA-801 payload to the H-SLC.
- I. This step is conditional and only occurs if step H was performed. The H-SLC reports the position result back to the H-SPC in a PLRES message. If the position result meets the required QoP, the H-SPC MAY directly proceed to step K and not engage in a SUPL POS session.
- J. SET and H-SPC MAY exchange several successive positioning procedure messages. Thereby the positioning procedure payload (LPP/LPPE/TIA-801) is transferred between the H-SPC and the H-SLC using PMESS messages. The positioning protocol payload (LPP/LPPE/TIA-801) is transferred between the H-SLC and the SET using SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is shown conceptually in dotted lines but the actual message exchange may be different).
- K. Once the position calculation – which may include the velocity - is complete the H-SPC sends a PRPT message including the position result (*position*) to the H-SLC.

- L. Once the position calculation (or assistance data delivery) is complete, the H-SLC sends a SUPL REPORT message to the SET. The SUPL REPORT message includes the position result – which may include the velocity - if the position estimate is calculated in the H-SPC and therefore needs to be sent to the SET.
- M. In the case of an area event triggered session: The SET compares the calculated position estimate with the target area to check if the event trigger condition has been met.

In the case of a velocity event triggered session: The SET compares the calculated velocity with the target velocity to check if the event trigger condition has been met.

If no area event or velocity is triggered, the SET SHALL return to step F.
- N. If an area or velocity event was triggered, the SET forwards the calculated position and/or velocity estimate to the internal SUPL Agent.
- O. If the SUPL Agent has requested several reports and more reports are to be sent, the SET repeats step F to M or step F to N depending on whether or not an area or velocity event occurred. Note that in the latter case, step N occurs only after the minimum time between reports has elapsed.
- P. When maximum number of reports for the SUPL triggered session has been reached, the SET sends a SUPL END message to the H-SLC.
- Q. The H-SLC informs the H-SPC about the end of the triggered session by sending a PEND message.

The flow described in Figure 12 is applicable to all positioning methods; however, individual steps within the flows are optional:

- Step J is not performed for cell-id based positioning methods.
- In SET Based mode where no assistance data is required from the network, no interaction with the H-SLC is required to calculate a position estimate. Interaction with the H-SLC is only required for assistance data update in which case steps F to L are performed.

When the stop time of the triggered area or velocity event session is reached, the SET initiates the ending of the session as shown in Figure 13.

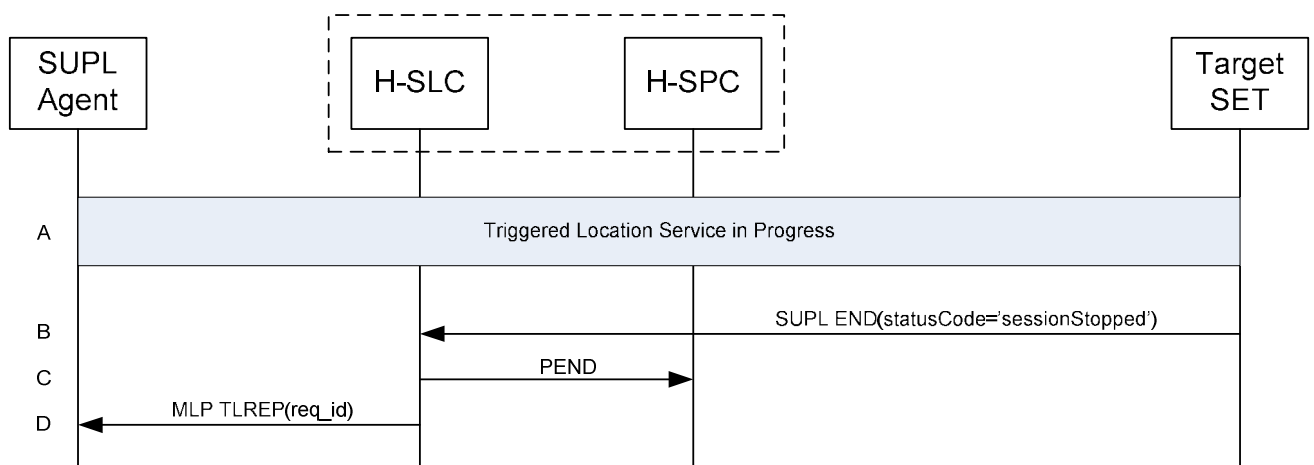


Figure 13: Ending of a triggered area or velocity event session when the stop time has been reached.

- A. The area or velocity event triggered session is in progress.
- B. When the StopTime of the event trigger session is reached, the SET sends a SUPL END message with status code “sessionStopped” to the H-SLC .

- C. The H-SLC informs the H-SPC about the end of the triggered session by sending a PEND message.
- D. The H-SLC MAY send an MLP TLREP message to the SUPL Agent to indicate the end of the triggered area or velocity event session.

NOTE: If the SET does not send a SUPL END message within a configured time interval after the Stop Time was reached (i.e. step B did not occur), the H-SLC MAY proceed directly to step C and discard all resources for the session.

5.3.5 Network Initiated Generic SUPL Session (GSS)

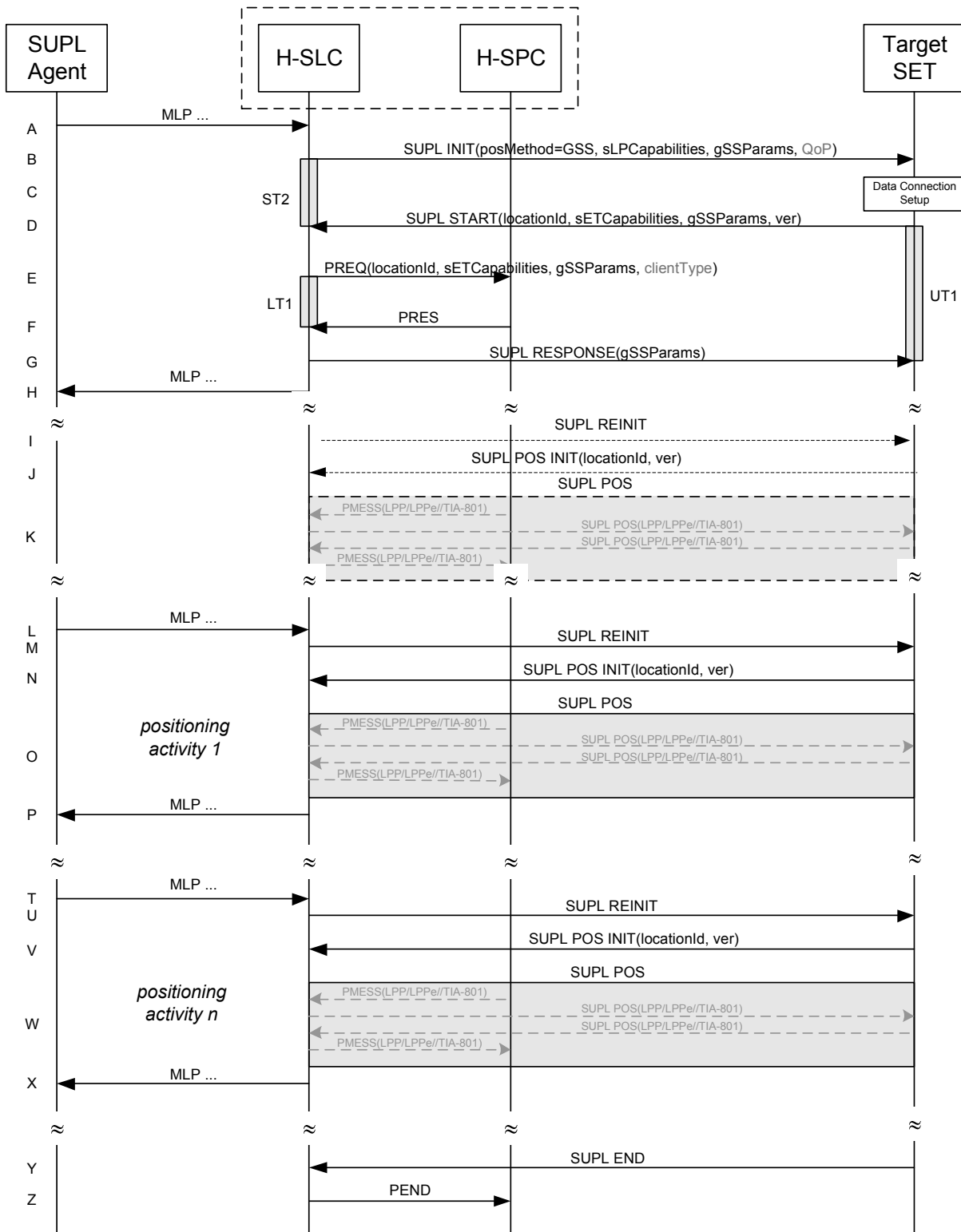


Figure 14: Network Initiated GSS

- A. This step is optional: the SUPL Agent may send an MLP request for location service to the H-SLC, with which it is associated. A GSS may also be established by the H-SLC based on some other event or condition and in the absence of any MLP location requests by the SUPL Agent.
- B. The H-SLC initiates a GSS with the SET by sending a SUPL INIT message. The SUPL INIT message contains a positioning method (*posMethod*) of “GSS”. The H-SLC also includes the SLP Capabilities (*sLPCapabilities*) which are used to indicate the supported positioning protocol (LPP/LPPE or TIA-801) and the GSS Parameter (*gSSParams*). The GSS Parameter defines the desired duration of the GSS. If the result of the privacy check in step A indicates that notification and/or verification of the target subscriber is needed, the H-SLC SHALL also include the Notification parameter in the SUPL INIT message otherwise, the Notification parameter SHALL be omitted. Before the SUPL INIT message is sent, the H-SLC also computes and stores the hash of the SUPL INIT message.
- C. The SET analyses the received SUPL INIT message. If found not to be authentic, the SET takes no further action. Otherwise, the SET takes required action to prepare for the establishment of a TLS connection with the H-SLC. The SET also calculates the hash of the received SUPL INIT message.
- D. The SET evaluates the Notification rules and takes the appropriate action. The SET SHALL establish a TLS connection to the H-SLC using the H-SLP address provisioned by the Home Network. The SET then sends a SUPL START message to the H-SLC. The SUPL START message includes the Location ID (*locationId*), SET Capabilities (*sETCapabilities*), GSS Parameter (*gSSParams*) and the hash (*ver*) of the received SUPL INIT message. The SET Capabilities are used to indicate to the H-SLC which positioning protocol(s) is/are supported by the SET. The GSS Parameter is used to indicate to the H-SLC which duration of GSS the SET is willing and able to support. The H-SLC SHALL verify that the value of the *ver* parameter received in SUPL START matches the one calculated and stored by the H-SLC in step B. If the values do not match, the H-SLC SHALL abort the GSS and send a SUPL END message to the SET with status code ‘*authSuplinitFailure*’.
- E. The H-SLC requests service from the H-SPC by sending a PREQ message containing the Location ID (*locationId*), SET capabilities the trigger parameters (*triggerParams*), the GSS parameters (*gSSParams*) and optionally the client type (*clientType*). The PREQ MAY also optionally contain the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.
- F. The H-SPC accepts the service request by sending a PRES message to the H-SLC. The H-SPC MAY include a preferred positioning method in PRES and MAY also include its supported positioning methods.
- G. The H-SLC sends a SUPL RESPONSE message to the SET including the GSS Parameter. In line with the GSS Parameter exchange in steps B and D, the GSS Parameter is used to determine the final duration of the GSS.
- H. This step is optional and may be performed by the H-SLC to acknowledge the MLP location request by the SUPL Agent in step A, if step A was performed.

The GSS is now established with a pre-defined lifetime (*duration*). The H-SLC may at any time request a position activity such as assistance data provisioning, measurement and/or position request, etc. based on some condition or event. This is shown in the remainder of the call flow.

Steps I, J and K are optional and should be performed by the SET and the SLP in order to exchange their positioning capabilities unless both entities already know each other’s positioning capabilities. The capabilities exchange may be initiated either by the D/H-SLP or the SET. In the case of the D/H-SLP, the D/H-SLP SHALL send a SUPL REINIT as in step I. In the case of the SET, the SET SHALL send a SUPL POS INIT as in step J and step I is omitted.

- I. The D/H-SLP SHALL send a SUPL REINIT message to the SET if the capabilities exchange is initiated by the D/H-SLP. The SUPL REINIT message SHALL contain the same session id as that of the GSS. Before the SUPL REINIT message is sent, the D/H-SLP computes and stores the hash of the SUPL REINIT message.
- J. The SET analyses the received SUPL REINIT message if received. If found not to be authentic, the SET takes no further action. Otherwise, the SET takes required action to prepare for the establishment of a TLS connection with the D/H-SLP if it is not already established. The SET also calculates the hash of the received SUPL REINIT message. The SET SHALL send a SUPL POS INIT message to the D/H-SLP including the Location ID (*locationId*) and hash of the SUPL REINIT message (*ver*).

- K. The positioning capabilities exchanged in this step are those which the SET and the H-SLP are willing and able to use for the GSS. The positioning protocol payload (LPP/LPPE/TIA-801) is transferred between the H-SPC and the H-SLC using PMESS messages and is transferred between the H-SLC and the SET using SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is shown conceptually in dotted lines but the actual message exchange may be different).

If the exchange of positioning capabilities reveals that no suitable match exists, the H-SLC ends the GSS by sending a SUPL END message to the SET with status code '*gssCapabilityMismatch*'. The SET and the D/H-SLP MAY release the secure connection after positioning capabilities exchange is complete.

- L. This step is optional: a SUPL Agent (which may or may not be the same as the SUPL Agent of step A) sends an MLP request for location service to the H-SLC. This step is only shown as an example to illustrate that an MLP location service request may lead to a positioning activity.
- M. When the H-SLC decides to initiate a positioning activity (which may be the result of step L or some other condition or event), the H-SLC SHALL send a SUPL REINIT message to the SET. Before the SUPL REINIT message is sent, the H-SLC computes and stores the hash of the SUPL REINIT message.
- N. The SET analyses the received SUPL REINIT message. If found not to be authentic, the SET takes no further action. Otherwise, the SET takes required action to prepare for the establishment of a TLS connection with the H-SLC if it is not already established. The SET also calculates the hash of the received SUPL REINIT message. The SET SHALL send a SUPL POS INIT message to the H-SLC including the Location ID (*locationId*) and hash of the SUPL REINIT message (*ver*).
- O. SET and H-SPC MAY exchange SUPL POS messages to execute the requested positioning activity. Initial SUPL POS messages may be used if needed to provide the H-SLC with the access network type for the SET which may then be used to select the most appropriate positioning protocol (LPP/LPPE or TIA-801) and positioning methods. The positioning protocol payload (LPP/LPPE/TIA-801) is transferred between the H-SPC and the H-SLC using PMESS messages. The positioning protocol payload (LPP/LPPE/TIA-801) is transferred between the H-SLC and the SET using SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is shown conceptually in dotted lines but the actual message exchange may be different). The SET and the D/H-SLP MAY release the secure connection after positioning activity is complete.
- P. This step is optional and may be performed by the H-SLC to provide a response to the SUPL Agent's request for location service and may include the results of the positioning activity in step L – if step L took place.

Steps L to P may be repeated as required and at any time during the lifetime of the GSS (this is illustrated in steps T to X).

- Y. When the end of the GSS is reached, the SET sends a SUPL END message to the H-SLC.
- Z. The H-SLC informs the H-SPC about the end of the session by sending a PEND message.

5.3.6 SET Initiated Generic SUPL Session (GSS)

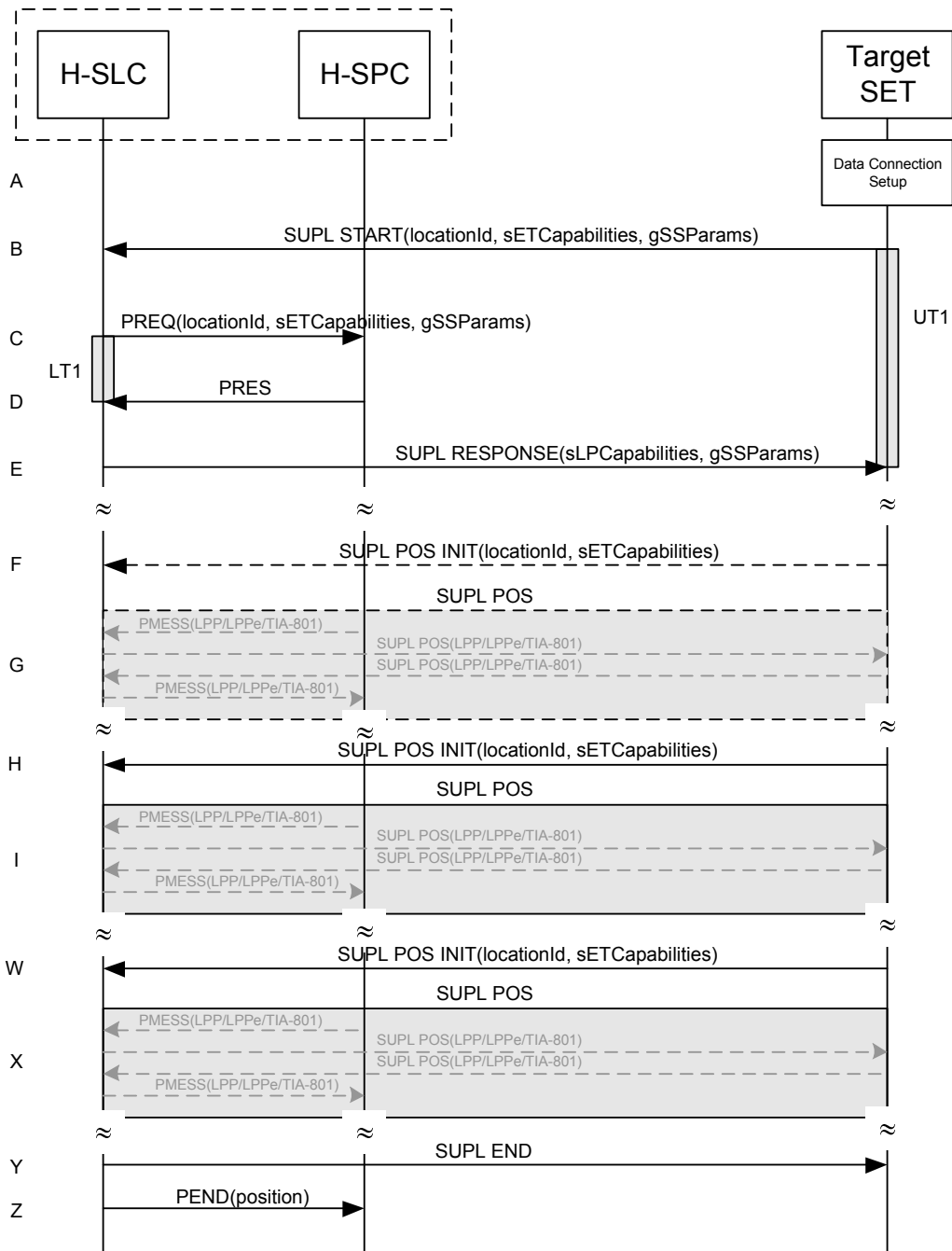


Figure 15: SET Initiated GSS

- A. The SUPL Agent on the SET requests the establishment of a GSS. The SET takes appropriate action to establish a TLS connection to the H-SLC.
- B. The SET uses the default address provisioned by the Home Network to establish a TLS connection to the H-SLC and sends a SUPL START message to start a GSS with the H-SLP. The SUPL START message contains the Location ID (*locationId*), SET capabilities (*sETCapabilities*) and GSS Parameters (*gSSParams*). The SET

Capabilities are used to indicate to the H-SLC which positioning protocols are supported by the SET (LPP/LPpE or TIA-801). The GSS Parameter is used to indicate the desired duration of the GSS.

- C. The H-SLC requests service from the H-SPC by sending a PREQ message containing the Location ID (*locationId*), SET capabilities the trigger parameters (*triggerParams*), the GSS parameters (*gSSParams*) and optionally the client type (*clientType*). The PREQ MAY also optionally contain the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.
- D. The H-SPC accepts the service request by sending a PRES message to the H-SLC. The H-SPC MAY include a preferred positioning method in PRES and MAY also include its supported positioning methods.
- E. The H-SLC sends a SUPL RESPONSE message to the SET including the SLP Capabilities and the GSS Parameter. In line with the GSS Parameter exchanged in step B, the GSS Parameter in this step is used to determine the final duration of the GSS.

The GSS is now established with a pre-defined lifetime (*duration*). The SUPL Agent which initiated the GSS may at any time request a position activity such as assistance data provisioning, measurement and/or position request, etc. This is shown in the remainder of the call flow.

Steps F and G are optional and should be performed by the SET and the SLP in order to exchange their positioning capabilities unless both entities already know each other's positioning capabilities. The D/H-SLP may also initiate the set capabilities exchange as shown in Figure 14 steps I, J, and K.

- F. The SET sends a SUPL POS INIT message to start a positioning session with the H-SLP to exchange their positioning capabilities.
 - G. The positioning capabilities exchanged in this step are those which the SET and the H-SLP are willing and able to use for the GSS. The positioning protocol payload (LPP/LPpE/TIA-801) is transferred between the H-SPC and the H-SLC using PMESS messages and is transferred between the H-SLC and the SET using SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is shown conceptually in dotted lines but the actual message exchange may be different).
- If the exchange of positioning capabilities reveals that no suitable match exists, the H-SLC ends the GSS by sending a SUPL END message to the SET with status code '*gssCapabilityMismatch*'. The SET and the D/H-SLP MAY release the secure connection after positioning capabilities exchange is complete.
- H. When the SET decides to initiate a positioning activity, the SET establishes a secure connection to the D/H-SLP if it is not already established and then sends a SUPL POS INIT message to start a positioning session with the D/H-SLP.
 - I. The SET and the H-SPC MAY exchange SUPL POS messages to execute a requested positioning activity. Initial SUPL POS messages may be used if needed to provide the H-SLC with the access network type for the SET which may then be used to select the most appropriate positioning protocol (LPP/LPpE or TIA-801) and positioning methods. The positioning protocol payload (LPP/LPpE/TIA-801) is transferred between the H-SPC and the H-SLC using PMESS messages. The positioning protocol payload (LPP/LPpE/TIA-801) is transferred between the H-SLC and the SET using SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is shown conceptually in dotted lines but the actual message exchange may be different).

Step H and I may be repeated as required and at any time during the lifetime of the GSS (this is illustrated in steps W and X).

- Y. When the end of the GSS is reached, the H-SLC sends a SUPL END message to the SET.
- Z. The H-SLC informs the H-SPC about the end of the session by sending a PEND message.

5.3.7 Exception Procedures

This section describes the exception procedures for triggered scenarios.

5.3.7.1 Network cancels the triggered location request

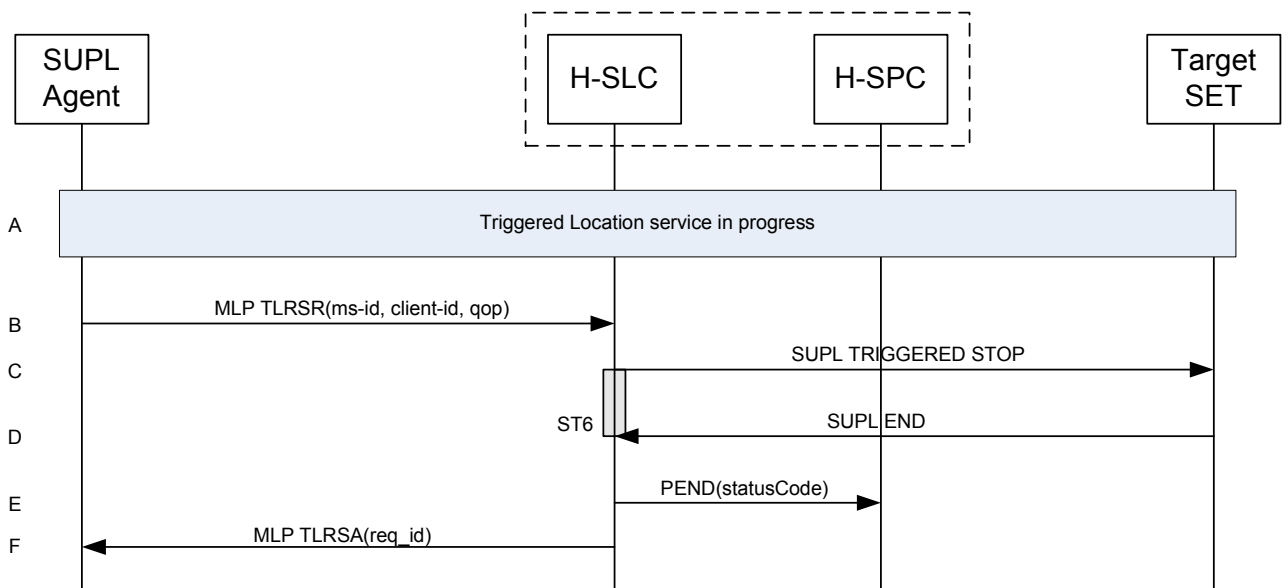


Figure 16: Network Initiated Triggered location, Network cancels the triggered location request

NOTE: See Appendix C for timer descriptions.

- A. A triggered location session is in progress.
- B. The SUPL Agent sends a MLP TLRSR message to cancel the ongoing triggered session.
 NOTE: The MLP TLRSR in this flow is only used to illustrate a possible triggered session cancellation initiated by the SUPL Agent. The triggered session could also be cancelled by the H-SLC i.e. without the SUPL Agent's involvement.
- C. The H-SLC sends a SUPL TRIGGERED STOP message to the target SET to request cancellation of the triggered session.
- D. The target SET acknowledges that it has cancelled the positioning procedure by sending a SUPL END message to the H-SLC.
- E. The H-SLC cancels the triggered session with the H-SPC by sending a PEND message including the appropriate Status Code.
- F. The H-SLC confirms cancellation of the triggered SUPL session by sending a MLP TLRSA message to the SUPL Agent.

5.3.7.2 SET cancels the triggered location request

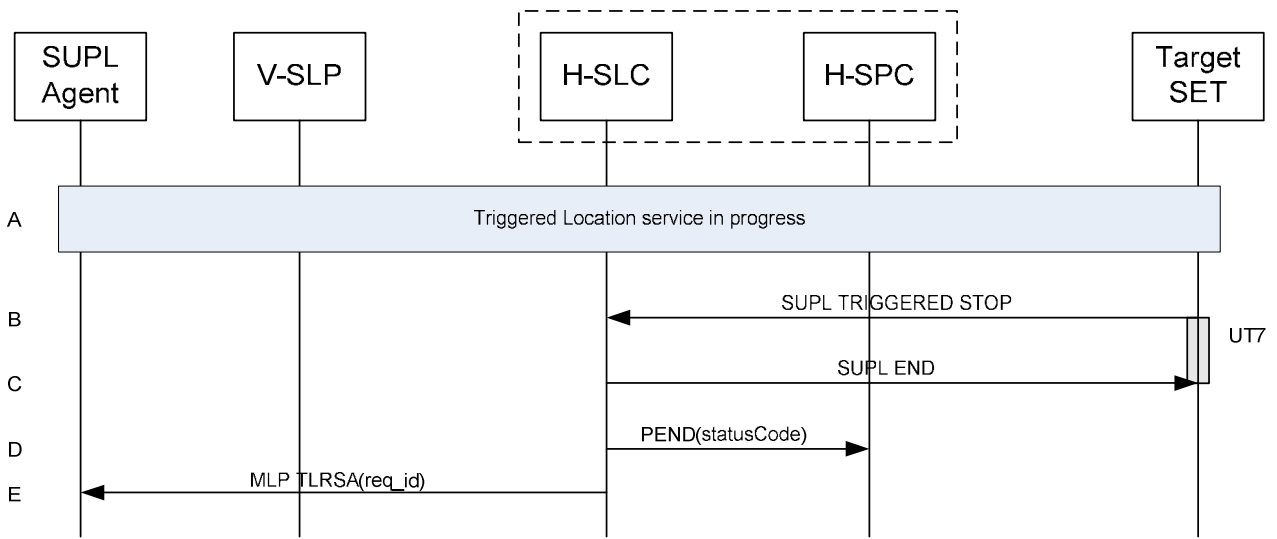


Figure 17: Network Initiated Triggered location, SET cancels the triggered location request

NOTE: See Appendix C for timer descriptions.

- A. A triggered location session is in progress.
- B. The SET sends a SUPL TRIGGERED STOP message including the session-id to the H-SLC to request cancellation of the triggered session.
- C. The H-SLC sends a SUPL END message to the SET to end the session.
- D. The H-SLC cancels the triggered session with the H-SPC by sending a PEND message including the appropriate Status Code.
- E. The H-SLC sends an MLP TLRSA message to the SUPL Agent to inform the SUPL Agent that the triggered session has been cancelled.

5.3.7.3 Triggered Session Pause/Resume Procedure – Network Initiated

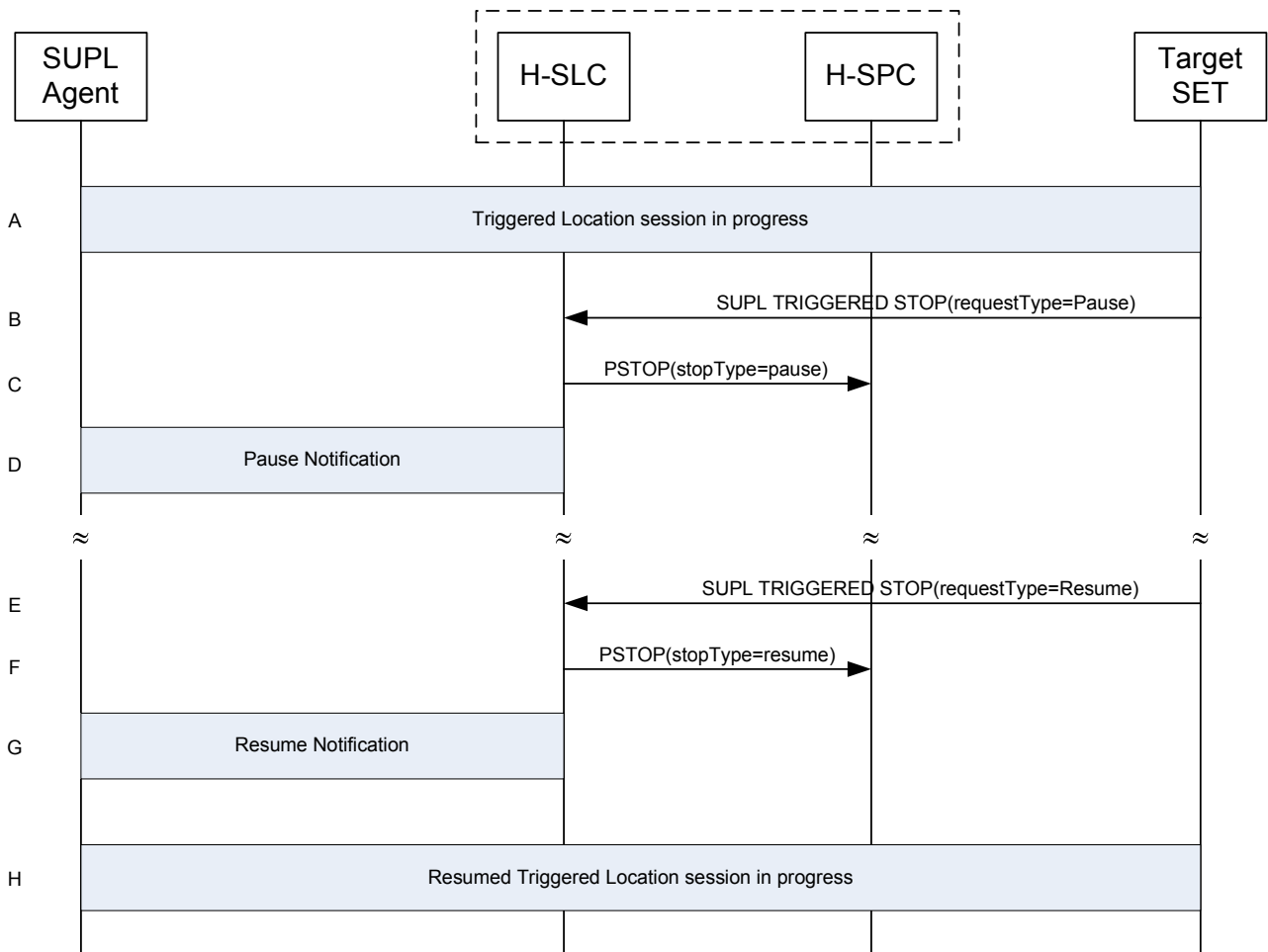


Figure 18: Network Initiated Triggered Session Pause/Resume Procedure Successful Case

- A. A triggered session is in progress.
- B. The SET decides to pause the triggered session and sends a SUPL TRIGGERED STOP message with request type “pause” to inform the H-SLP that the triggered session is to be paused. While the triggered session is paused, both triggered sessions in the H-SLP and the SET SHALL still be active, however, the SET SHALL not perform positioning and/or store enhanced cell/section measurements. In case of an area event triggered session, the SET SHALL also not perform Area ID comparisons.
- C. The H-SLC sends a PSTOP message to the H-SPC with stop type “pause” to inform the H-SPC that the triggered session has been paused.
- D. This step is optional. The H-SLC informs the SUPL Agent that the triggered session is paused.
- E. When the SET decides to resume the triggered session, it sends a SUPL TRIGGERED STOP message with request type “resume” to inform the H-SLP that the triggered session in the SET is resumed. SET and H-SLP resume the triggered session.
- F. The H-SLC sends a PSTOP message to the H-SPC with stop type “resume” to inform the H-SPC that the triggered session has been resumed.
- G. This step is optional. The H-SLC informs the SUPL Agent that the triggered session is resumed.

H. The triggered session continues.

5.3.7.4 Triggered Session Expires while the Triggered Session is Paused – Network Initiated

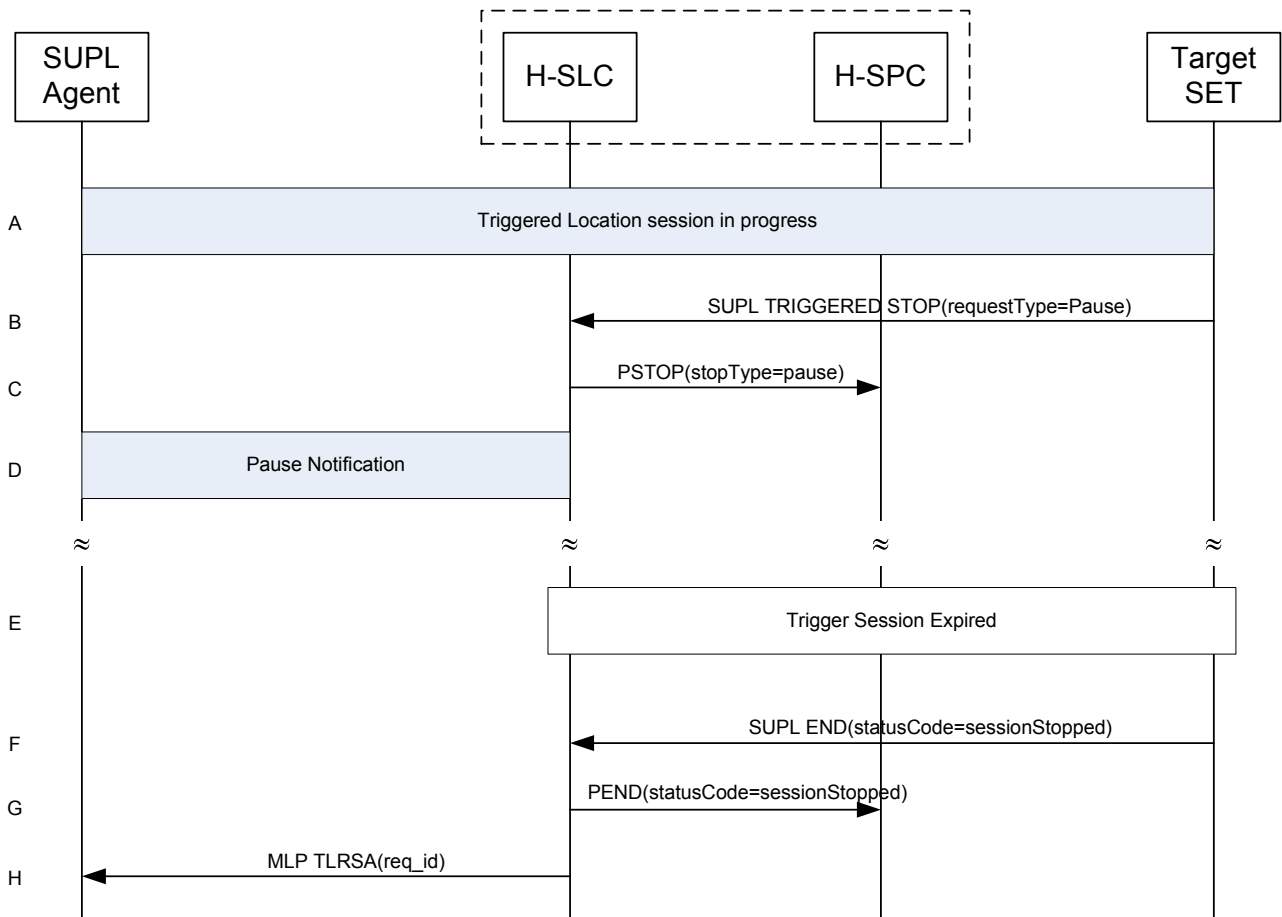


Figure 19: Network Initiated Triggered Session, triggered session expires while the triggered session is paused

- A. A triggered session is in progress.
- B. The SET decides to pause the triggered session and sends a SUPL TRIGGERED STOP message with request type “pause” to inform the H-SLP that the triggered session in the SET is paused. While the triggered session is paused, both triggered sessions in the H-SLP and the SET SHALL be still active, however the SET SHALL not perform positioning and/or store enhanced cell/section measurements. In case of an area event triggered service, the SET SHALL also not perform Area ID comparisons.
- C. The H-SLC sends a PSTOP message to the H-SPC with stop type “pause” to inform the H-SPC that the triggered session has been paused.
- D. This step is optional. The H-SLP informs the SUPL Agent that the triggered session is paused.
- E. While the triggered session is paused, the stop time of the triggered session is reached.

NOTE: In case of a periodic triggered service, the stop time is defined by the number of fixes, the interval between fixes and the start time.

- F. The target SET sends a SUPL END message to the H-SLP including the status code “sessionStopped”.

- G. The H-SLC sends a PEND message to the H-SPC with status code “sessionStopped” to inform the H-SPC that the triggered session has been stopped.
- H. The H-SLC sends an MLP TLRSA message to the SUPL Agent to report that the triggered session has been stopped.

5.3.7.5 Triggered Session Pause/Resume Procedure – SET Initiated

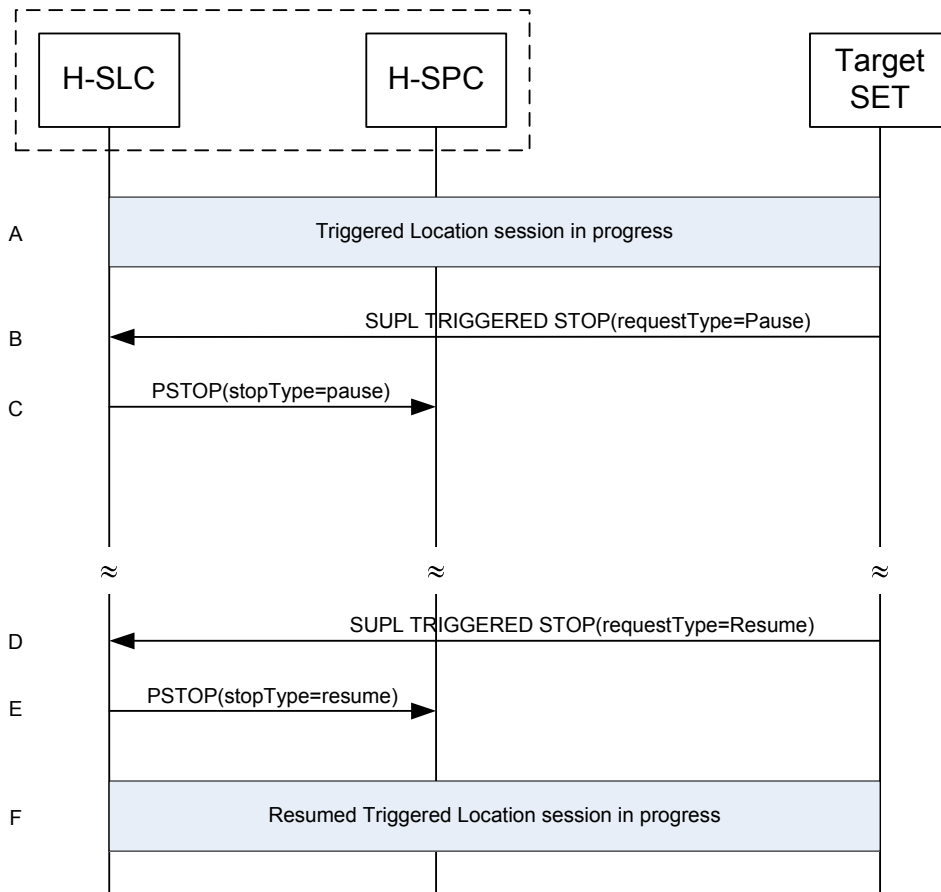


Figure 20: SET Initiated Triggered Session Pause/Resume Procedure Successful Case

- A. A triggered session is in progress.
- B. The SET decides to pause the triggered session and sends a SUPL TRIGGERED STOP message with request type “pause” to inform the H-SLP that the triggered session in the SET is paused. While the triggered session is paused, both triggered sessions in the H-SLP and the SET SHALL be still active, however the SET SHALL not perform positioning and/or store enhanced cell/section measurements. In case of an area event triggered service, the SET SHALL also not perform Area ID comparisons.
- C. The H-SLC sends a PSTOP message to the H-SPC with stop type “pause” to inform the H-SPC that the triggered session has been paused.
- D. When the SET decides to resume the triggered session, it sends a SUPL TRIGGERED STOP message with request type “resume” to inform the H-SLP that the triggered session in the SET is resumed. SET and H-SLP resume the triggered session.
- E. The H-SLC sends a PSTOP message to the H-SPC with stop type “resume” to inform the H-SPC that the triggered session has been resumed.

F. The triggered session continues.

5.3.7.6 Triggered Session Expires while the Triggered Session is Paused – SET Initiated

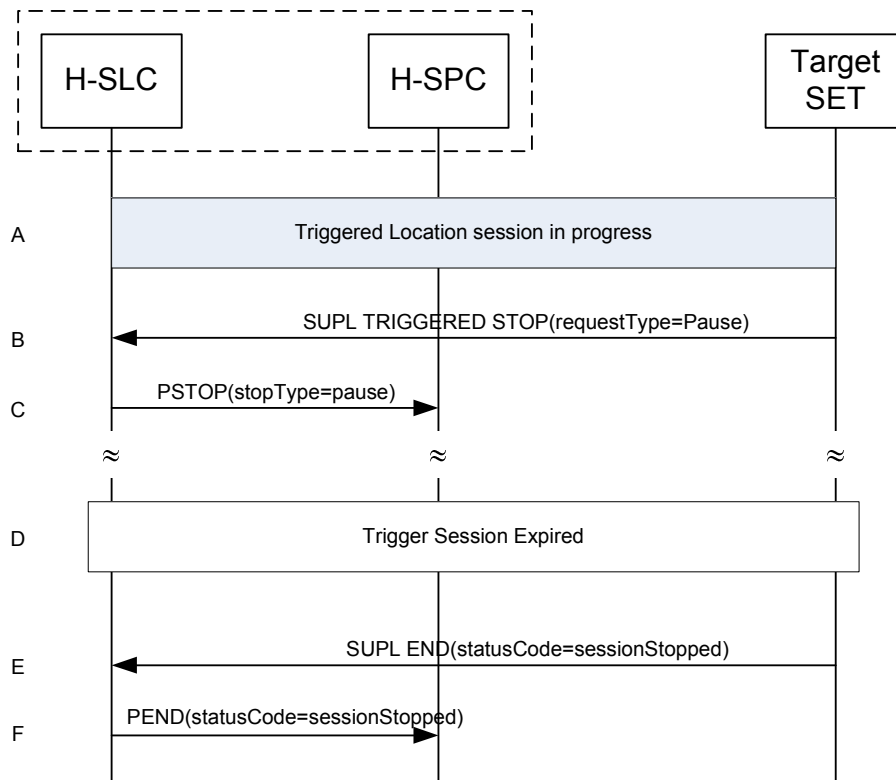


Figure 21: SET Initiated Triggered Session, triggered session expires while the triggered session is paused

- A. A triggered session is ongoing.
- B. The SET decides to pause the triggered session and sends a SUPL TRIGGERED STOP message with request type “pause” to inform the H-SLP that the triggered session in the SET is paused. While the triggered session is paused, both triggered sessions in the H-SLP and the SET SHALL be still active, however the SET SHALL not perform positioning and/or store enhanced cell/section measurements. In case of an area event triggered service, the SET SHALL also not perform Area ID comparisons.
- C. The H-SLC sends a PSTOP message to the H-SPC with stop type “pause” to inform the H-SPC that the triggered session has been paused.
- D. While the triggered session is paused, the stop time of the triggered session is reached.

NOTE: In case of a periodic triggered service, the stop time is defined by the number of fixes, the interval between fixes and the start time.

- E. The target SET sends a SUPL END message to the H-SLP including the status code “sessionStopped”.
- F. The H-SLC sends a PEND message to the H-SPC with status code “sessionStopped” to inform the H-SPC that the triggered session has been stopped.

5.3.8 Retrieval of Historical Positions and/or Enhanced Cell Sector Measurements

5.3.8.1 Retrieval of Historical Position Results

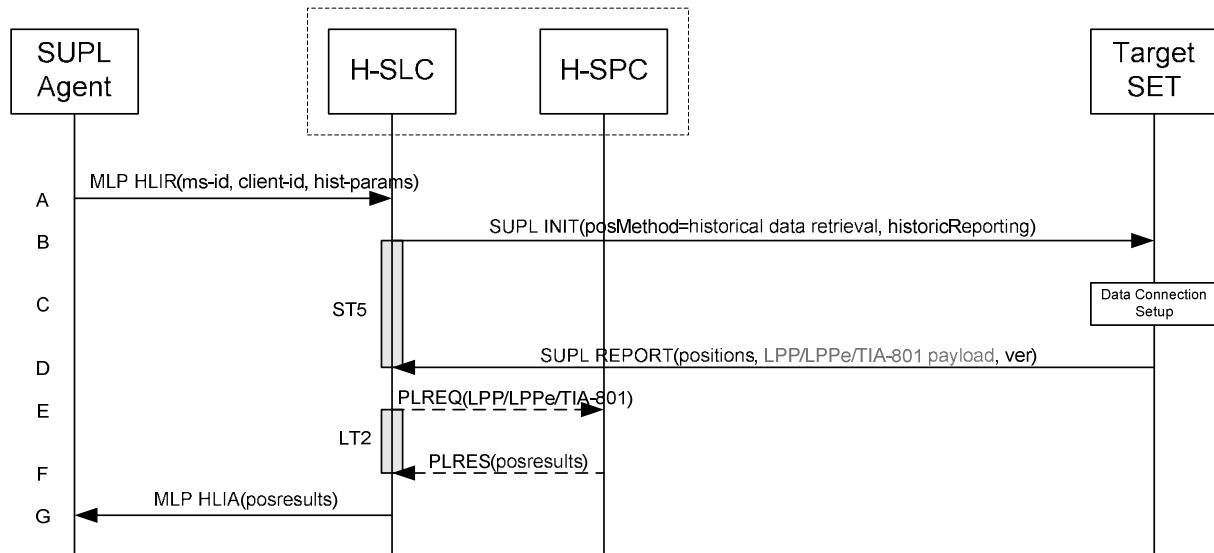


Figure 22: Retrieval of historical positions and/or enhanced cell/sector measurements

NOTE: See [Appendix C](#) for timer descriptions.

- A. The SUPL Agent issues an MLP HLIR message to the H-SLC, with which SUPL Agent is associated. The hist-params parameter in the HLIR message defines criteria to be applied by the SET when selecting historical position to be reported to the SUPL Agent (e.g. time window, QoP, positioning method, etc.).
- B. The H-SLC initiates the retrieval of historic positions with the SET by sending a SUPL INIT message. The SUPL INIT message contains the posMethod and criteria for selecting stored historic position estimates and/or stored enhanced cell/sector measurements (historicReporting). Historic data retrieval is indicated by a positioning method parameter of “*historical data retrieval*”. If the result of the privacy check in Step A indicates that notification or verification to the target subscriber is needed, the H-SLC SHALL also include the Notification element in the SUPL INIT message. Before the SUPL INIT message is sent, the H-SLC also computes and stores a hash of the message.
- C. The SET analyses the received SUPL INIT. If it is found to be non authentic, the SET takes no further action. Otherwise the SET takes needed action preparing for establishment or resumption of a TLS connection with the H-SLC.
- D. The SET evaluates the Notification rules and takes appropriate action. The SET then establishes a TLS connection to the H-SLC using an H-SLP address provisioned by the Home Network. The SET selects historic position estimates and/or historic enhanced cell/sector measurements (sent in LPP/LPPE/TIA-801 payload messages) based on the criteria received in step B and sends the positions and/or enhanced cell/sector measurements in a SUPL REPORT message to the H-SLC. The SUPL REPORT message also contains the hash of the received SUPL INIT message (*ver*).
- E. This step is optional and only executed if the H-SPC cannot translate information received in the LPP/LPPE/TIA-801 payload received in step D into a position. In this case the H-SPC sends a PLREQ message containing the LPP/LPPE/TIA-801 payload to the H-SLC.
- F. This step is conditional and only occurs if step E was performed. The H-SLC reports the position result back to the H-SPC in a PLRES message.
- G. The H-SLC reports the historical position estimates to the SUPL Agent in an MLP HLIA message.

5.4 Other

5.4.1 SLC/SPC Heartbeat

5.4.1.1 Successful PALIVE exchange

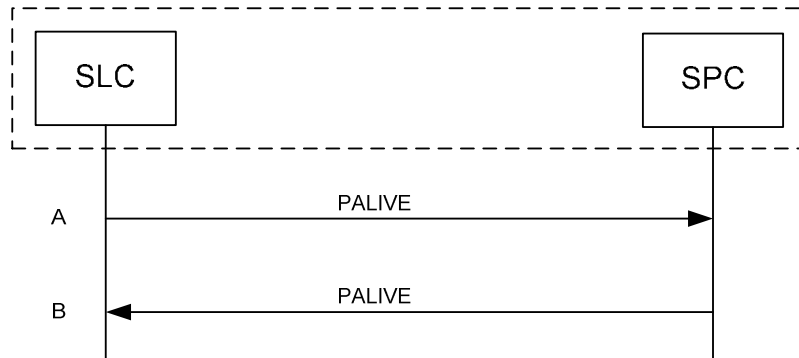


Figure 23: Successful PALIVE exchange

NOTE: This callflow applies both to PALIVE exchanges between the H-SLC and H-SPC and between the V-SLC and V-SPC.

NOTE: The use of guard timers for the PALIVE exchange is considered implementation dependent and out of scope for ILP.

- A. The SLC sends a PALIVE message to the SPC.
- B. The SPC SHALL respond with a PALIVE message.

5.4.1.2 PALIVE Error Handling

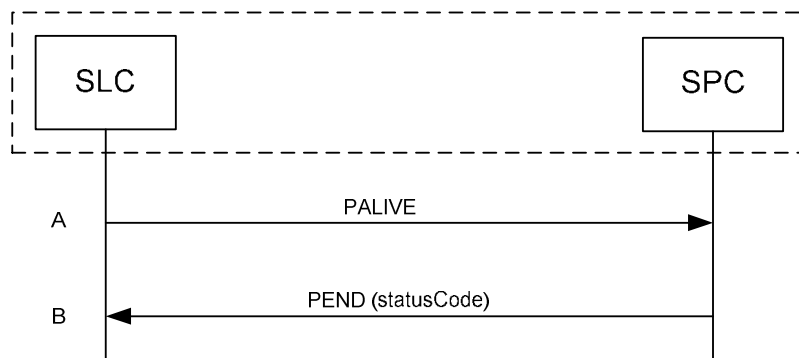


Figure 24: PALIVE Error handling

NOTE: This callflow applies both to PALIVE exchanges between the H-SLC and H-SPC and between the V-SLC and V-SPC.

NOTE: The use of guard timers for the PALIVE exchange is considered implementation dependent and out of scope for ILP.

- A. The SLC sends a PALIVE message to the SPC.

- B. If the SPC cannot decode the incoming PALIVE message, or if it contains a protocol error or is a version of ILP that the SPC does not support, the SPC SHALL respond with a PEND with an appropriate Status Code.

6. Security Considerations

This section describes the security considerations of ILP.

6.1 SLC-SPC Security

The connection between the SLC and SPC SHALL be secure. The specifics of which methods are used to secure the connection are beyond the scope of this document.

7. Protocols and Interfaces

The encoding for the ILP protocol SHALL be ASN.1 [ASN.1].

The encoding is BASIC-PER, unaligned encoding [PER].

The transport protocol between SLC and SPC SHALL be TCP/IP.

7.1 TCP/IP

An Llp reference point MAY provide two socket ports for operation, one for encryption with TLS 1.1 [TLS] and one without.

The port numbers for ILP messages transported over TCP SHALL be as registered with IANA (Internet Assigned Numbers Authority). The port numbers are:

oma-ilp	7276/tcp	OMA Internal Location Protocol
oma-ilp-s	7277/tcp	OMA Internal Location Secure Protocol

NOTE: An SLC or SPC MAY choose to introduce other technologies for secure transfer. Any such technology SHALL be provided over a different port than the two mentioned above.

7.2 Llp

The function of the Llp reference point is logically separated into Positioning Control and Positioning Data.

7.3 Positioning Control

The Positioning Control interface is used in the establishment, maintenance and clearing of sessions between the SLC and SPC. It enables the SLC and SPC to perform Position Calculation Function.

Table 1 shows the messages of the Llp Positioning Control interface.

Message Name	Description
PREQ	The PREQ message is used by the SLC to request a SUPL session of the SPC.
PRES	The PRES message is the response to a PREQ message and sent by the SPC to the SLC.
PRPT	The PRPT message is used by the SPC to report a position estimate or an error to the SLC.
PLREQ	The PLREQ message is used by the SLC (or SPC) to request a cell-id translation into coarse position estimate from the SPC (or SLC).
PLRES	The PLRES message is used by the SPC (or SLC) to report a coarse position estimate based on cell-id translation to the SLC (or SPC).
PALIVE	The PALIVE message is used by the SLC to verify the operational status of the SPC. The SLC may send the PALIVE message at any time. The SPC must then respond with a corresponding PALIVE message.
PEND	The PEND message is used by the SLC (or SPC) to inform the SPC (or SLC) about the end of a SUPL session.

Message Name	Description
PSTOP	The PSTOP message is used by an SLC to inform the SPC that a SUPL session has been paused or resumed.

Table 1: Llp Positioning Control

7.4 Positioning Data

The Positioning Data interface is used to transport information used for the position calculation. This interface is used in proxy mode only.

Table 2 shows the messages of the Positioning Data interface.

Message Name	Description
PMESS	The PMESS message is bidirectional and is used to carry LPP/LPPe/TIA-801 payload.
PINIT	The PINIT message may be used by the SLC to initiate the positioning protocol session (LPP/LPPe/TIA-801) with the SPC.

Table 2: Llp Positioning Data

For additional requirements concerning the use of positioning protocols and position determination messages, refer to [SUPL 3.0 TS ULP].

8. ILP Message Definitions (Normative)

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

8.1 Common Part

Parameter	Presence	Description
Message Length	M	The length of the entire ILP Message in octets. NOTE: The first two octets of a PER encoded ILP 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 ILP protocol, in the form Major, Minor, Service Indicator
Session ID2	M	The unique Session ID2
Message Payload	M	This parameter contains one of the messages defined in ILP. Defined messages are: <ul style="list-style-type: none"> • PREQ • PRES • PRPT • PLREQ • PLRES • PINIT • PALIVE • PEND • PMESS • PSTOP

Table 3: Common Part

8.2 Message Specific Part

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

8.3 PREQ

The PREQ message is used by the SLC to request a SUPL session from the SPC.

Parameter	Presence	Values/description
SLP Mode	M	This parameter indicates if the SLP uses proxy or non-proxy mode. This parameter is always set to proxy mode since non-proxy mode is not supported in SUPL 3.0.
Approved Positioning Method	O	<p>Defines the list of positioning technologies approved by the SLC, which can be:</p> <ul style="list-style-type: none"> • A-GNSS SET assisted • A-GNSS SET Based • Autonomous GNSS • EOTD • OTDOA³ • OTDOA - LTE • AFLT • Enhanced Cell ID • Other <p>If this list is not present, the H-SPC SHALL assume all available positioning technologies have been approved by the SLC.</p>
Location ID	O	Describes a globally unique cell, WLAN AP or WiMAX BS identification of the most current serving cell.
Multiple Location IDs	O	This parameter may contain current non-serving cell, current non-serving WLAN AP or current non-serving WiMAX BS information for the SET and/or historic serving or non-serving cell, or WLAN AP or WiMAX BS information for the SET.
Position	O	Defines the position estimate for the SET.
Trigger Parameters	CV	This parameter is only required for triggered SUPL sessions and defines the trigger parameters.
SPC_SET_Key	O	This parameter is not applicable in SUPL 3.0. This parameter SHALL NOT be used.
SPC-TID	O	This parameter is not applicable in SUPL 3.0. This parameter SHALL NOT be used.

³ OTDOA for WCDMA

SPC_SET_Key_lifetime	O	This parameter is not applicable in SUPL 3.0. This parameter SHALL NOT be used.
QoP	O	Desired Quality of Position. QoP and High Accuracy QoP are mutually exclusive.
SET Capabilities	O	Defines the capabilities of the SET. This parameter MUST not be used for Immediate Network Initiated scenarios but MUST be used for all other scenarios.
Notification Mode	O	This parameter is not applicable in SUPL 3.0. This parameter SHALL NOT be used.
GSS Parameter	CV	This parameter is only used for GSS in which case it is mandatory. The parameter defines the length of the Generic SUPL Session in terms of either duration or number of SUPL POS messages allowed within one GSS.
Client Type	O	This parameter is used to indicate to the SPC which type of client is requesting the service.
High Accuracy QoP	O	This parameter is used to specify the desired quality of position for high accuracy positioning. If this parameter is present, high accuracy positioning should be used if supported and applicable. QoP and High Accuracy QoP are mutually exclusive.
Reference Point Id	O	This parameter provides a Reference Point Id and is used to indicate that the requested position estimate should be expressed relative to a reference position (relative position). NOTE: The reference point is defined via its unique Id and not via coordinate points. The definition of Reference Point Id is as per [OMA-LPPE].

Table 4: PREQ Message

8.4 PRES

The PRES message is sent by the SPC in response to a PREQ message.

Parameter	Presence	Values/description
Preferred Positioning Method	O	Defines positioning method preferred by the SPC: <ul style="list-style-type: none"> A-GNSS SET assisted (not applicable in SUPL 3.0)

		<ul style="list-style-type: none"> • A-GNSS SET Based (not applicable in SUPL 3.0) • Autonomous GNSS (not applicable in SUPL 3.0) • EOTD (not applicable in SUPL 3.0) • OTDOA (not applicable in SUPL 3.0) • AFLT (not applicable in SUPL 3.0) • Enhanced Cell ID (not applicable in SUPL 3.0) • SET Assisted Generic (any SET Assisted method or combination of SET Assisted methods) • SET Based Generic (any SET Based method or combination of SET Based methods) • Other
GNSS Positioning Technology	O	This parameter is not applicable to SUPL 3.0 and SHALL NOT be used.
Supported Positioning Methods	O	Defines the list of positioning technologies supported by the SPC.
Position	O	Defines the position estimate for the SET. This parameter is used if PREQ contained a Location ID based on which the SPC calculated a position estimate.
SPC Status Code	O	Defines the status code for error handling.

Table 5: PRES Message

8.5 PRPT

The PRPT message is used by the SPC to report a position estimate. PRPT is only used for triggered services.

Parameter	Presence	Values/description
Position	O	Defines the position estimate for the SET. The position parameter may be omitted in error scenarios in which case the status code is present.
Number of fix	O	Defines the number of the fix.
Status Code	O	Defines the status code for error handling.
Relative Position	O	This parameter defines the position result relative to a reference point or another SET

		(relative position).
Civic Position	O	This parameter defines the position result according to civic address. This parameter is only applicable when sent from the SLP to the SET.

Table 6: PRPT Message

8.6 PLREQ

The PLREQ message is used by the SLC (or SPC) to request a cell-id translation into a coarse position.

Parameter	Presence	Values/description
Location ID	M	Describes a globally unique cell , WLAN AP or WiMAX BS identification of the most current serving cell.
Multiple Location IDs	O	This parameter may contain current non-serving cell, current non-serving WLAN AP or current non-serving WiMAX BS information for the SET and/or historic serving or non-serving cell, WLAN AP or WiMAX BS information for the SET.
Positioning Payload	M	This parameter carries the LPP/LPPE/TIA-801 positioning protocol payload required by the SPC to perform a cell/sector/AP information to position estimate translation.

Table 7: PLREQ Message

8.7 PLRES

The PLRES message is used by the SPC (or SLC) to return a coarse position based on cell-id translation request.

Parameter	Presence	Values/description
Position Results	O	Defines either a position estimate or - if no position could be calculated - a status code. Can be either one single Position Result or multiple Position Results.

Table 8: PLRES Message

8.8 PINIT

The PINIT message is sent by the SLC to the SPC before the start of the positioning procedure message exchange. PINIT may optionally contain the positioning payload if the positioning protocol allows the SET to send the first message.

Parameter	Presence	Values/description
SET Capabilities	M	Defines the capabilities of the SET.
Location ID	M	Describes a globally unique cell, WLAN AP or WiMAX BS identification of the most current serving cell. Defines the cell information of the SET.
Positioning Method	O	<p>Defines the positioning method that the SPC SHALL use. If this parameter is not present, the SPC MAY choose any positioning method that the SLC has previously approved.</p> <p>If the Positioning Method is AGNSS SET Assisted or AGNSS SET Based, the parameter GNSS Positioning Technology MUST be present to indicate the actual positioning technologies.</p> <p>If the Positioning Method is Autonomous GNSS, the parameter GNSS Positioning Technology MAY be present.</p>
Requested Assistance Data	O	This parameter is not applicable in SUPL 3.0. This parameter SHALL NOT be used.
Position	O	Defines the position of the SET.
Positioning Payload	O	<p>If a positioning protocol that allows the SET to send the first message is used, and the SUPL POS INIT contains a positioning protocol payload, the parameter also contains that payload.</p> <p>Any positioning protocol messages in this parameter that are not supported by the SPC SHALL be ignored by that SPC.</p>
Multiple Location IDs	O	This parameter may contain current non-serving cell, current non-serving WLAN AP or current non-serving WiMAX BS information for the SET and/or historic serving or non-serving cell, WLAN AP or WiMAX BS information for the SET.
UTRAN GPS Reference Time Result	O	This parameter is not applicable in SUPL 3.0. This parameter SHALL NOT be used.
UTRAN GANSS Reference Time Result	O	This parameter is not applicable in SUPL 3.0. This parameter SHALL NOT be used.

GNSS Positioning Technology	CV	<p>Defines the actual GNSSs allowed for AGNSS SET Assisted, AGNSS SET Based or Autonomous GNSS in the Positioning Method parameter.</p> <ul style="list-style-type: none"> • GPS • Galileo • SBAS • Modernized GPS • QZSS • GLONASS <p>NOTE: GPS MUST NOT be the only allowed GNSS in this parameter.</p>
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Table 9: PINIT Message

8.9 PALIVE

The PALIVE message is used by the SLC to verify the operational status of the SPC and by the SPC to respond to the SLC's query.

Parameter	Presence	Values/description
SPC Status Code	CV	This parameter is only required in the response of the SPC to the SLC and defines the operational status of the SPC.

Table 10: PALIVE Message

8.10 PEND

The PEND message is used by the SLC (or SPC) to inform the SPC (or SLC) about the end of a SUPL session.

Parameter	Presence	Values/description
Position	O	Defines the position estimate for the SET.
Status Code	O	Defines the status code for error handling.
Relative Position	O	This parameter defines the position result relative to a reference point or another SET (relative position). This parameter is only applicable when sent from the SPC to the SLC.
Civic Position	O	This parameter defines the position result according to civic address. This parameter is only applicable when sent from the SLP to the SET.

Table 11: PEND Message

8.11 PMESS

The PMESS message is used for LPP/LPPe/TIA-801 payload exchange between the SET and the SPC.

Parameter	Presence	Values/description
Positioning Payload	M	TIA-801, LPP or LPPe positioning protocol messages.
Velocity	O	This parameter is not applicable in SUPL 3.0. This parameter SHALL NOT be used.
UTRAN GPS Reference Time Assistance	O	This parameter is not applicable in SUPL 3.0. This parameter SHALL NOT be used.
UTRAN GPS Reference Time Result	O	This parameter is not applicable in SUPL 3.0. This parameter SHALL NOT be used.
UTRAN GANSS Reference Time Assistance	O	This parameter is not applicable in SUPL 3.0. This parameter SHALL NOT be used.
UTRAN GANSS Reference Time Result	O	This parameter is not applicable in SUPL 3.0. This parameter SHALL NOT be used.

Table 12: PMESS Message

8.12 PSTOP

The PSTOP message is used by an SLC to inform the SPC that a SUPL session has been paused or resumed.

Parameter	Presence	Values/description
Stop Type	O	Stop Type: (1) pause or (2) resume

Table 13: PSTOP Message

9. Parameter Definitions (Normative)

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

9.1 Version

Parameter	Presence	Value/Description
Version	-	<p>Describes the protocol version of ILP</p> <p>When an ILP message is received, the receiving entity SHALL determine if the Major and Minor Versions specified in the message are supported by the receiving entity.</p> <p>If the Major Version and Minor Versions are not supported, the exception procedure for ILP protocol error SHALL be performed.</p> <p>Note that there is no requirement for backwards compatibility in ILP, unlike the mechanism used in ULP.</p>
>Maj	M	Major Version, range: (0..255), MUST be 3 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 Parameter

9.2 Session ID2

The Session ID2 SHALL be a unique value, consisting of two mandatory parts, a SLC value (SLC Session ID, see section 9.2.1) concatenated with an SPC value (SPC Session ID, see section 9.2.2). An optional SET value (SET Session ID, see section 9.2.3) MAY be included. For the SLC Session ID, the SLC SHALL reuse the values from the SLP Session ID.

Parameter	Presence	Value/Description
SLC Session ID	M	Part of Session ID pertaining to the SLC
SET Session ID	O	Part of Session ID pertaining to the SET
SPC Session ID	M	Part of Session ID pertaining to the SPC

Table 15: Session ID2 Parameter

When sending a PREQ to the SPC, the SLC SHALL assign a value to the SLC Session ID, but the SLC SHALL not include the SPC Session ID in the message. The SPC SHALL then assign a value to the SPC Session ID when it receives the message. Any further messages SHALL contain the resultant combined Session ID for the remainder of the session.

The SLC MAY add the optional SET Session ID to the session ID2 at any time.

9.2.1 SLC Session ID

This section describes the construct of the SLP Session ID.

Parameter	Presence	Value/Description
Session ID	M	Session identifier, unique from SLC perspective. The SLC SHALL use the same value that it used in the SLP Session ID included in the ULP Session ID.
SLC ID	M	The identity of the SLC. This parameter can be of type <ul style="list-style-type: none"> • IPAddress <ul style="list-style-type: none"> ○ IPv4 ○ IPv6 • FQDN The SLC SHALL use the same value that it used in the SLP ID included in the ULP Session ID.

Table 16: SLC Session ID Parameter

9.2.2 SPC Session ID

This section describes the construct of the SLP Session ID.

Parameter	Presence	Value/Description
Session ID	M	Session identifier, unique from SPC perspective. This value SHALL be unique over all concurrently active ILP sessions for that particular SPC. This value may be reused by the SPC after the ILP session for which it is being used has ended. This parameter is written into a 4-octet-string.

SPC ID	M	<p>The identity of the SPC. This parameter can be of type</p> <ul style="list-style-type: none"> • IPAddress <ul style="list-style-type: none"> ○ IPv4 ○ IPv6 • FQDN
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Table 17: SPC Session ID Parameter

9.2.3 SET Session ID

This section describes the construct of the SET Session ID.

Parameter	Presence	Value/Description
Session ID	M	<p>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.</p>
SET ID	M	<p>SET identity value This parameter can be of type</p> <ul style="list-style-type: none"> • MSISDN • MDN • MIN (encoded as per [TIA-553]) • IMSI • NAI • IPAddress <ul style="list-style-type: none"> ○ IPv4 ○ IPv6

Table 18: SET Session ID Parameter

9.3 Positioning Method

Parameter	Presence	Description
Position Method	-	<p>Describes the positioning method:</p> <ul style="list-style-type: none"> • A-GPS SET assisted only (not applicable in SUPL 3.0) • A-GPS SET based only (not applicable in SUPL 3.0)

		<ul style="list-style-type: none"> • A-GPS SET assisted preferred (A-GPS SET based is the fallback mode) (not applicable in SUPL 3.0) • A-GPS SET based preferred (A-GPS SET assisted is the fallback mode) (not applicable in SUPL 3.0) • A-GNSS SET Assisted only (not applicable in SUPL 3.0) • A-GNSS SET Based only (not applicable in SUPL 3.0) • A-GNSS SET Assisted preferred (A-GNSS SET Based is the fallback mode) (not applicable in SUPL 3.0) • A-GNSS SET Based preferred (A-GNSS SET Assisted is the fallback mode) (not applicable in SUPL 3.0) • Autonomous GPS (not applicable in SUPL 3.0) • Autonomous GNSS (not applicable in SUPL 3.0) • AFLT (not applicable in SUPL 3.0) • Enhanced Cell/sector (not applicable in SUPL 3.0) • EOTD (not applicable in SUPL 3.0) • OTDOA (not applicable in SUPL 3.0) • SET Assisted Generic (any SET Assisted method or combination of SET Assisted methods) • SET Based Generic (any SET Assisted method or combination of SET Assisted methods) • Other
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Table 19: Positioning Method Parameter

9.4 SLP Mode

Parameter	Presence	Value/Description
SLP Mode	-	<p>Describes the mode that the SLP uses. This parameter can be of type</p> <ul style="list-style-type: none"> - Proxy mode - Non-proxy mode <p>In SUPL 3.0 only proxy mode is supported and therefore the value of this parameter SHALL be set to 'Proxy mode'</p>

Table 20: SLP Mode Parameter

9.5 Location ID

Parameter	Presence	Values/description
Location ID	-	Defines the current serving cell, current serving WLAN AP or current serving WiMAX BS information of the SET.
>Cell Info	M	<p>The following cell IDs are supported:</p> <ul style="list-style-type: none"> • GSM Cell Info • WCDMA/TD-SCDMA Cell Info • CDMA Cell Info • HRPD Cell Info • UMB Cell Info • LTE Cell Info • WLAN AP Info • WiMAX BS Info • No Cell Info - This is to be used for bearers where there is no applicable cell information e.g. Cable Modems
>Status	M	<p>Describes whether or not the cell, WLAN AP or WiMAX BS info is:</p> <ul style="list-style-type: none"> • Not Current, last known cell/AP/BS info • Current, the present cell/AP/BS info • Unknown (i.e. not known whether the cell/AP/BS id is current or not current)

Table 21: Location ID Parameter

9.5.1 GSM Cell Info

The GSM Cell Info parameter defines the parameters of a GSM radio cell.

Parameter	Presence	Value/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	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.
>>ARFCN	M	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.
>>BSIC	M	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.
>>RXLev	M	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.
>TA	O	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.

Table 22: GSM Cell Info Parameter

9.5.2 WCDMA/TD-SCDMA Cell Info

The WCDMA/TD-SCDMA Cell Info parameter defines the parameters of a WCDMA/TD-SCDMA radio cell.

Parameter	Presence	Value/Description
WCDMA/TD-SCDMA Cell Info	-	WCDMA/TD-SCDMA 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). NOTE: this information element contains the Cell Identity sent in SIB3 [3GPP RRC] .
>Frequency Info	O	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.
>Primary Scrambling Code	O	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.
>Measured Results List	O	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.
>Cell Parameters ID	O	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.
>Timing Advance	O	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.
>> TA	M	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.
>>TA Resolution	O	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.

>> Chip Rate	O	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.
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Table 23: WCDMA/TD-SCDMA Cell Info Parameter

9.5.3 LTE Cell Info

The LTE Cell Info parameter defines the parameters of a LTE radio cell.

Parameter	Presence	Value/Description
LTE Cell Info	-	LTE Cell ID. Parameter definitions in [3GPP LTE].
>CellGlobalIdEUTRA	M	
>>PLMN-Identity	M	
>>>MCC	M	Mobile Country Code, range: (0..999)
>>>MNC	M	Mobile Network Code, range: (0..999)
>>CI	M	Cell Identity, length 28 bits.
>PhysCellId	M	Physical Cell ID, range: (0..503)
>TrackingAreaCode	M	Tracking Area Code, length 16 bits
>RSRPResult	O	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.
>RSRQResult	O	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.
>TA	O	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.
>Measured Results List EUTRA	O	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.

Table 24: LTE Cell Info

9.5.4 CDMA Cell Info

The CDMA Cell Info parameter defines the parameters of a CDMA radio cell.

Parameter	Presence	Value/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) This parameter is conditional and only used for 1x in which case it is mandatory.
>WeekNumber	M	GPS Week number, range: (0..65535)
>Seconds	M	GPS Seconds, range: (0..4194303)

Table 25: CDMA Cell Info

9.5.5 HRPD Cell Info

The HRPD Cell Info parameter defines the parameters of a HRPD radio cell.

Parameter	Presence	Value/Description
Hrpd Cell Info	-	HRPD Cell ID
>SECTORID	M	Sector ID, length 128 bits
>BASELAT	M	Base Station Latitude, range: (0..4194303)
>BASELONG	M	Base Station Longitude, range: (0..8388607)
>WeekNumber	M	GPS Week number, range: (0..65535)
>Seconds	M	GPS Seconds, range: (0..4194303)

Table 26: HRPD Cell Info

9.5.6 WLAN AP Info

The WLAN AP Info parameter defines the parameters of a WLAN access point.

Parameter	Presence	Value/Description
WLAN AP Info	-	WLAN Access Point ID
>AP MAC Address	M	Access Point MAC Address
>AP Transmit Power	O	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.
>AP Antenna Gain	O	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.
>AP S/N	O	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.
> Device Type	O	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.

>AP Signal Strength	O	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.
>AP Channel/Frequency	O	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.
>Round Trip Delay	O	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.
>>RTD Value	M	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.
>>RTD Units	M	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.
>>RTD Accuracy	O	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.
>SET Transmit Power	O	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.
>SET Antenna Gain	O	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.
>SET S/N	O	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.
>SET Signal Strength	O	Not applicable in SUPL 3.0. This parameter SHALL NOT be used.
>AP Reported Location	O	Location of the Access Point as reported by the AP
>>Location Encoding	M	Location encoding description - LCI - ASN.1
>>Location Data	M	Location Data
>>>Location Accuracy	O	Location Accuracy in units of 0.1m
>>>Location Value	M	Location value in the format defined in Location Encoding

Table 27: WLAN AP Info

9.5.7 WiMAX BS Info

The WiMAX BS Info parameter defines the parameters of a WiMAX base station.

Parameter	Presence	Value/Description
WiMAX BS Info	-	WiMAX Base Station Info
>BS ID	M	Base Station Identifier Bit string of fix length of 48
>RTD measurement	O	Round Trip Delay (RTD) or relative RTD measurement between the SET and the serving BS
>>Round Trip Delay	M	Round Trip Delay (RTD) between the SET and the serving BS in units of 10 ns Range (0 .. 65535)
>>Round Trip Delay Uncertainty	O	Standard deviation of the Round Trip Delay measurement in units of 10 ns Range (0 .. 1023)
>WiMAX NMR List	O	WiMAX network measurements. Repeated 1-32 times.

>> BS ID	M	Base Station for the serving and neighboring cell measurement. Bit string of fixed length of 48
>> Relative Delay	O	Relative Delay between the SET and the neighboring BS in units of 10 ns. Not applicable for the serving BS. Range (-32768..32767)
>> Relative Delay uncertainty	O	Relative Delay uncertainty in units of 10 ns. Range (0 .. 1023)
>>BS Signal Strength	O	BS signal strength received at the SET in dBm Range (0 .. 255)
>>BS Signal Strength Uncertainty	O	Standard deviation of BS signal strength received at the SET in dB Range (0 .. 63)
>>BS Tx Power	O	BS equivalent isotropic transmit power Range (0 .. 255)
>>BS CINR	O	BS Carrier to Noise and Interference Ratio as received at the SET in dB Range (0 .. 255)
>>BS CINR Uncertainty	O	Standard deviation of BS Carrier to Noise and Interference Ratio as received at the SET in dB Range (0 .. 63)
>> BS Location	O	Location of the BS as reported by the BS
>>>>Location Encoding	M	Location encoding description - LCI as per [RFC 3825] - ASN.1 as per [X.694]
>>>>>Location Data	M	Location Data
>>>>>>Location Accuracy	O	Location Accuracy in units of 0.1m Integer (0..4294967295)
>>>>>>>Location Value	M	Location value in the format defined in Location Encoding Octet string of fix length of 128

Table 28: WiMAX BS Info

9.6 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 (N) is derived from the actual latitude X in degrees ($0^\circ..90^\circ$) by this formula: $N \leq 2^{23} X / 90 < N+1$
>> Longitude	M	Integer ($-2^{23}..2^{23}-1$). The longitude encoded value (N) is derived from the actual longitude X in degrees ($-180^\circ..+180^\circ$) 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
>> highAccuracy3Dposition	O	Defines the high accuracy 3D position as defined in [OMA-LPPE]
> Velocity	O	Speed and bearing values as defined by the Velocity type and as defined in.

Table 29: 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.

The definition and coding of the high accuracy 3D position is based on [OMA-LPPE]. If an LPPE version has been selected for the positioning session, then that same version SHALL be used. Otherwise version 1.0 of LPPE SHALL be used.

Since the low accuracy position estimate is mandatory, both low accuracy and high accuracy position estimate SHALL be sent in case of high accuracy position estimate reporting. When both are sent, they SHALL be consistent with each other.

9.7 Trigger Params

Parameter	Presence	Values/description
Trigger Type	M	This parameter can be of type <ul style="list-style-type: none"> • Periodic • Area Event • Velocity Event
Periodic Trigger Parameters	O	Periodic Trigger Parameters: <ul style="list-style-type: none"> • Number of fixes • Interval between fixes • Start time

Table 30: Trigger Parameter

9.8 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 31: QoP Parameter

9.9 SPC Status Code

Parameter	Presence	Values/description
SPC Status Code	-	This parameter is only required in the response of the SPC to the SLC and defines the operational status of the SPC.
>SPC Status Code values	M	The Status Code can assume the following values: operational(0), not_operational(1), reduced_availability(2)

Table 32: Status Code Parameter

9.10 Number of Fix

Parameter	Presence	Values/description
Number of Fix	-	Defines the fix number within a triggered session.

Table 33: Number of Fix Parameter

9.11 SET Capabilities

Parameter	Presence	Values/description
SET capabilities	-	SET capabilities (not mutually exclusive) in terms of supported positioning technologies and positioning protocols.
>Pos Technology	M	This parameter does not apply to SUPL 3.0. Since this parameter is mandatory, it may be set to any arbitrary value.
>Pref Method	M	This parameter is not applicable in SUPL 3.0. Since this parameter is mandatory, it may be set to any arbitrary value.
>Pos Protocol	M	Zero or more of the following positioning protocols (bitmap): <ul style="list-style-type: none"> TIA-801 LPP LPPe Flags for legacy positioning protocols (RRLP and RRC) SHALL be set to FALSE.
>>Pos Protocol Version TIA-801	CV	Describes the protocol version of TIA-801 Positioning Protocol. It is required if TIA-801 is identified in the Pos Protocol parameter.
>>>Supported Pos Protocol Version TIA-801	M	Specifies a list of up to 8 different supported 3GPP2 C.S0022 versions. This parameter is required (with at least one entry in the list) if TIA-801 is identified in the Pos Protocol

		parameter.
>>>>Revision Number	M	Revision part of document number for the specifications of C.S0022 Functioning Protocol. Value: [0,A-Z]
>>>>Point Release Number	M	Point Release number for C.S0022, range: (0..255).
>>>> Internal Edit Level	M	Internal Edit Level for C.S0022, range: (0..255).
>>Pos Protocol Version LPP	CV	Describes the protocol version of LPP Positioning Protocol. It is required if LPP is identified in the Pos Protocol parameter.
>>>Major Version Field	M	First (most significant) element of the version number for LPP Positioning Protocol, range: (0..255)
>>>Technical Version Field	M	Second element of the version number for LPP Positioning Protocol, range: (0..255)
>>>Editorial Version Field	M	Third (least significant) element of the version number for LPP Positioning Protocol, range: (0..255)
>>Pos Protocol Version LPPe	CV	Describes the protocol version of LPPe Positioning Protocol. It is required if LPPe is identified in the Pos Protocol parameter.
>>>Major Version Field	M	First (most significant) element of the version number for LPPe Positioning Protocol, range: (0..255)
>>>Minor Version Field	M	Second element of the version number for LPPe Positioning Protocol, range: (0..255)
> supported bearers	O	This parameter is not applicable in SUPL 3.0. This parameter SHALL NOT be used.
>QoPCapabilities	O	This parameter defines the ability of the SET for reporting and/or receiving high accuracy position and/or velocity results.
>Relative Position Capabilities	O	This parameter defines the ability of the SET to support relative positioning.
>Civic Position Capabilities	O	This parameter defines the ability of the SET to support absolute civic positioning.

Table 34: SET Capabilities Parameter

9.12 Multiple Location IDs

Parameter	Presence	Values/description
Multiple Location IDs	-	This parameter contains a set of up to MaxLidSize(64) Location ID/Relative Timestamp/Serving Cell Flag data. If Relative Timestamp is present, the associated Location ID represents historical data; if Relative Timestamp is absent, the Location

		ID represents current data.
>Location ID	M	Describes measured globally unique cell/WLAN AP/WiMAX BS identification of the serving cell/WLAN AP/WiMAX BS or cell/WLAN AP/WiMAX BS identification from any receivable radio network. If this information is historical, the Relative Timestamp parameter must be present. If this data is current, the Relative Timestamp parameter need not be present.
>Relative Timestamp	CV	Time stamp of measured location Id relative to “current Location ID” in units of 0.01 sec. Range from 0 to 65535*0.01 sec. Time stamp for current Location Id if present is 0.
>Serving Cell Flag	M	This flag indicates whether the Location ID data represents a serving cell, WLAN AP or WiMAX BS or idle (i.e. camped-on) cell or WLAN AP. If set, the Location ID information represents serving cell,WLAN AP or WiMAX BS information; if not set, the Location ID information represents idle mode information or neighbor cell ,WLAN AP or WiMAX BS information.

Table 35: Multiple Location Ids Parameter

9.13 Positioning Payload

Parameter	Presence	Values/description
Positioning payload	-	Describes the positioning payload for TIA-801[TIA-801], LPP [3GPP LPP] and LPPe [OMA-LPPe]. Up to three LPP/LPPe messages and/or up to three TIA801 messages are allowed to be sent in a single Positioning Payload IE.

Table 36: Positioning Payload Parameter

9.14 GNSS Positioning Technology

Parameter	Presence	Value/Description
GNSS Positioning Technology	-	Bitmap of GNSS Positioning Technology. This bitmap indicates the GNSS used or to be used for the positioning computation: <ul style="list-style-type: none"> • GPS • Galileo • SBAS • Modernized GPS • QZSS

		<ul style="list-style-type: none"> • GLONASS <p>When a Bit is set to FALSE: not used, when set to TRUE, used.</p> <p>NOTE: GPS SHALL not be the only bit set to TRUE.</p>
--	--	--

Table 37: GNSS Positioning Technology

9.15 Approved Positioning Methods

Parameter	Presence	Value/Description
Positioning Technology	-	<p>Defines the positioning technologies which the SLC has approved for the SPC.</p> <p>Zero or more of the following positioning technologies (bitmap and technologies listed in GANSS Position Methods structure):</p> <ul style="list-style-type: none"> • SET-assisted A-GPS • SET-based A-GPS • Autonomous GPS • AFLT • E-CID • E-OTD • OTDOA⁴ • OTDOA - LTE • Other
>>GANSS Position Methods	O	Defines the supported GANSS (i.e. other than A-GPS). If included, this parameter is repeated for each supported GANSS
>>>GANSS ID	M	<p>Defines the GANSS. Integer (0..15)</p> <p>0: Galileo 1: SBAS 2: Modernized GPS 3: QZSS 4: GLONASS</p> <p>5-15: Reserved for future use</p>
>>>GANSS Positioning	M	Bitmap defining the supported modes

⁴ OTDOA for WCDMA

Modes		for GNSS indicated by GANSS ID. Bit 0: SET Assisted Bit 1: SET Based Bit 2: Autonomous
>>>GANSS Signals	M	<p>Bitmap (length 8 bits) defining the supported signals for GNSS indicated by GANSS ID.</p> <p>For Galileo, the bits are interpreted as :</p> <p>Bit 0: E1 Bit 1: E5a Bit 2: E5b Bit 3: E5a+E5b Bit 4: E6 Bits 5-7: Spare</p> <p>For Modernized GPS, the bits are interpreted as:</p> <p>Bit 1: L1 C Bit 2: L2 C Bit 3: L5 Bits 0, 4-7: Spare</p> <p>For QZSS, the bits are interpreted as:</p> <p>Bit 0: L1 C/A Bit 1: L1 C Bit 2: L2 C Bit 3: L5 Bits 4-7: Spare</p> <p>For GLONASS, the bits are interpreted as:</p> <p>Bit 0: G1 Bit 1: G2 Bit 2: G3 Bits 3-7: Spare</p> <p>For SBAS, the bits are interpreted as:</p> <p>Bit 0: L1 Bits 1-7: Spare</p>

Table 38: Approved Positioning Methods

9.16 Supported Positioning Methods

Parameter	Presence	Value/Description
Positioning Technology	-	Defines the positioning technologies which the SPC supports. Zero or more of the following positioning technologies (bitmap and technologies listed in GANSS Position

		<p>Methods structure):</p> <ul style="list-style-type: none"> • SET-assisted A-GPS • SET-based A-GPS • Autonomous GPS • AFLT • E-CID • E-OTD • OTDOA⁵ • OTDOA-LTE • Other
>>GANSS Position Methods	O	Defines the supported GANSS (i.e. other than A-GPS). If included, this parameter is repeated for each supported GANSS
>>>GANSS ID	M	<p>Defines the GANSS. Integer (0..15)</p> <p>0: Galileo 1: SBAS 2: Modernized GPS 3: QZSS 4: GLONASS</p> <p>5-15: Reserved for future use</p>
>>>GANSS Positioning Modes	M	<p>Bitmap defining the supported modes for GNSS indicated by GANSS ID.</p> <p>Bit 0: SET Assisted Bit 1: SET Based Bit 2: Autonomous</p>
>>>GANSS Signals	M	<p>Bitmap (length 8 bits) defining the supported signals for GNSS indicated by GANSS ID.</p> <p>For Galileo, the bits are interpreted as :</p> <p>Bit 0: E1 Bit 1: E5a Bit 2: E5b Bit 3: E5a+E5b Bit 4: E6 Bits 5-7: Spare</p> <p>For Modernized GPS, the bits are interpreted as:</p>

⁵ OTDOA for WCDMA

		<p>Bit 1: L1 C Bit 2: L2 C Bit 3: L5 Bits 0, 4-7: Spare</p> <p>For QZSS, the bits are interpreted as: Bit 0: L1 C/A Bit 1: L1 C Bit 2: L2 C Bit 3: L5 Bits 4-7: Spare</p> <p>For GLONASS, the bits are interpreted as: Bit 0: G1 Bit 1: G2 Bit 2: G3 Bits 3-7: Spare</p> <p>For SBAS, the bits are interpreted as: Bit 0: L1 Bits 1-7: Spare</p>
--	--	--

Table 39: Supported Positioning Methods

9.17 Preferred Positioning Method

Parameter	Presence	Description
Position Method		<p>Describes the positioning method:</p> <ul style="list-style-type: none"> • A-GPS SET assisted only (not applicable in SUPL 3.0) • A-GPS SET based only (not applicable in SUPL 3.0) • A-GPS SET assisted preferred (A-GPS SET based is the fallback mode) (not applicable in SUPL 3.0) • A-GPS SET based preferred (A-GPS SET assisted is the fallback mode) (not applicable in SUPL 3.0) • A-GNSS SET Assisted only (not applicable in SUPL 3.0) • A-GNSS SET Based only (not applicable in SUPL 3.0) • A-GNSS SET Assisted

		<p>preferred (A-GNSS SET Based is the fallback mode) (not applicable in SUPL 3.0)</p> <ul style="list-style-type: none"> • A-GNSS SET Based preferred (A-GNSS SET Assisted is the fallback mode) (not applicable in SUPL 3.0) • Autonomous GPS (not applicable in SUPL 3.0) • Autonomous GNSS (not applicable in SUPL 3.0) • AFLT (not applicable in SUPL 3.0) • Enhanced Cell/sector (not applicable in SUPL 3.0) • EOTD (not applicable in SUPL 3.0) • OTDOA (not applicable in SUPL 3.0) • SET Assisted Generic (any SET Assisted method or combination of SET Assisted methods) • SET Based Generic (any SET Assisted method or combination of SET Assisted methods) • Other
--	--	--

Table 40: Preferred Positioning Method

9.18 Status Code

Parameter	Presence	Values/description
Status Code	-	This parameter is only required in the context of sending a position response or to terminate a SUPL session.
> Status Code values	O	<p>The Status Code can assume the following values:</p> <p>unspecified(0), systemFailure(1), unexpectedMessage(2), protocolError(3), dataMissing(4), unexpectedDataValue(5), posMethodFailure(6), posMethodMismatch(7), posProtocolMismatch(8),</p>

		targetSETnotReachable(9), versionNotSupported(10), resourceShortage(11), invalidSessionId(12), nonProxyModeNotSupported(13), proxyModeNotSupported(14), positioningNotPermitted(15), iLPTimeout(16)
--	--	--

Table 41: Status Code Parameter

9.19 GSS Parameter

Parameter	Presence	Value/Description
GSS Parameters	-	Defines the parameters to be used for GSS.
>Duration	M	Defines the duration of a GSS in terms of: (1) Time (2) Number of SUPL POS messages allowed within one GSS as one of the following options <ol style="list-style-type: none"> a. Uplink b. Downlink c. Uplink + Downlink The duration of a GSS can be defined in terms of (1) Time only, (2) Number of SUPL POS messages only or a combination of (1) and (2) (whichever is reached first).

Table 42: GSS Parameters

9.20 Velocity

Parameter	Presence	Value/Description
Velocity		Describes the velocity of the SET as per [3GPP GAD]. One of the following four formats are supported: <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

		<ul style="list-style-type: none"> • 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 • High accuracy 3D velocity as per [OMA-LPPE]
--	--	--

Table 43: Velocity Parameter

9.21 High Accuracy QoP

Parameter	Presence	Value/Description
High Accuracy QoP	-	Describes the desired High Quality of Position.
>Horizontal accuracy	M	Horizontal accuracy as defined in [OMA-LPPE] “ <i>uncertainty-semimajor</i> ”
>Vertical accuracy	O	Vertical accuracy as defined in [OMA LPPE] “ <i>uncertainty-altitude</i> ”
> Maximum Location Age	O	Maximum tolerable age of position estimates used for cached position fixes. Units in seconds from 0 to 65535.
>Delay	O	From (1..256), units in seconds. NOTE: the Delay value should be applied to the timer of the used positioning protocol.
>Requested Velocity	O	Flag, indicating whether velocity estimates shall use the high accuracy format. If set to “true”, the high accuracy velocity format shall be used if supported and applicable. If set to “false” the high accuracy velocity format shall not be used.

Table 44: High Accuracy QoP

9.22 Relative Position

The Relative Position Parameter provides a position relative to some known reference position or another SET. The parameter is defined in [OMA-LPPE].

9.23 Reference Point Id

The Reference Point Id provides a unique Id of a reference point as per [OMA-LPPE].

9.24 Civic Position

The Civic Position Parameter provides a position according to civic address. The parameter is defined in [OMA-LPPE].

10. ASN.1 Encoding of ILP messages (Normative)

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

10.1 Common Part

```

ILP DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

IMPORTS
  Version, SessionID2
    FROM ILP-Components
  PREQ
    FROM ILP-PREQ
  PRES
    FROM ILP-PRES
  PRPT
    FROM ILP-PRPT
  PLREQ
    FROM ILP-PLREQ
  PLRES
    FROM ILP-PLRES
  PINIT
    FROM ILP-PINIT
  PAUTH
    FROM ILP-PAUTH
  PALIVE
    FROM ILP-PALIVE
  PEND
    FROM ILP-PEND
  PMESS
    FROM ILP-PMESS
  Ver3-PSTOP
    FROM ILP-PSTOP;

-- general ILP PDU layout;
ILP-PDU ::= SEQUENCE {
  length      INTEGER(0..65535),
  version     Version,
  sessionID2  SessionID2,
  message     IlpMessage
}

IlpMessage ::= CHOICE {
  msPREQ      PREQ,
  msPRES      PRES,
  msPRPT      PRPT,
  msPLREQ     PLREQ,
  msPLRES     PLRES,
  msPINIT     PINIT,
  msPAUTH     PAUTH,
  msPALIVE    PALIVE,
  msPEND      PEND,
  msPMESS     PMESS,
  . . . ,
  msPSTOP     Ver3-PSTOP}

```


END

10.2 Message Specific Part

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

10.2.1 PREQ

```

ILP-PREQ DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS PREQ;

IMPORTS
LocationId, Position, QoP, SPCSETKey, SPCTID, SPCSETKeylifetime,
MultipleLocationIds, PosTechnology, SETCapabilities
FROM ILP-Components

Ver3-PREQ-extension
FROM ILP-Version-3-message-extensions;

PREQ ::= SEQUENCE {
    SLPMode                SLPMode,
    approvedPosMethods     PosTechnology OPTIONAL,
    locationId             LocationId OPTIONAL,
    multipleLocationIds    MultipleLocationIds OPTIONAL,
    position               Position OPTIONAL,
    triggerParams          TriggerParams OPTIONAL,
    SPCSETKey              SPCSETKey OPTIONAL,
    SPCTID                 SPCTID OPTIONAL,
    SPCSETKeylifetime      SPCSETKeylifetime OPTIONAL,
    qoP                    QoP OPTIONAL,
    SETCapabilities        SETCapabilities OPTIONAL,
    notificationMode       NotificationMode OPTIONAL,
    ...,
    -- version 3 extension element
    ver3-PREQ-extension    Ver3-PREQ-extension OPTIONAL}

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

TriggerParams ::= SEQUENCE {
    triggerType            TriggerType,
    periodicTriggerParams PeriodicTriggerParams    OPTIONAL,
    ...}

TriggerType ::= ENUMERATED {
    periodic(0), areaEvent(1),
    ..., ver-3-velocityEvent(2)}

PeriodicTriggerParams ::= SEQUENCE{
    numberOfFixes          INTEGER(1..8639999),
    intervalBetweenFixes   INTEGER(1..8639999),
    startTime              INTEGER(0..2678400) OPTIONAL,
    ...}
-- intervalBetweenFixes and startTime are in seconds.

```

```

-- numberOfFixes * intervalBetweenFixes shall not exceed 8639999
-- (100 days in seconds) for compatibility with OMA MLP and RLP
-- startTime is in relative time in units of seconds measured from "now"
-- a value of 0 signifies "now", a value of "startTime" signifies startTime
-- seconds from "now"

NotificationMode ::= ENUMERATED {normal(0), basedOnLocation(1), ...}

END

```

10.2.2 PRES

```

ILP-PRES DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS PRES;

IMPORTS
Position, SPCStatusCode, PosTechnology, PosMethod, GNSSPosTechnology
FROM ILP-Components;

PRES ::= SEQUENCE {
    preferredPosMethod      PosMethod OPTIONAL,
    gnssPosTechnology       GNSSPosTechnology OPTIONAL,
    supportedPosMethods     PosTechnology OPTIONAL,
    position                Position OPTIONAL,
    sPCstatusCode           SPCStatusCode OPTIONAL,
    ...}

END

```

10.2.3 PRPT

```

ILP-PRPT DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS PRPT;

IMPORTS
Position, StatusCode
FROM ILP-Components
Ver3-PRPT-extension
FROM ILP-Version-3-message-extensions;

PRPT ::= SEQUENCE {
    position                Position,
    fixNumber               INTEGER(1.. 8639999) OPTIONAL,
    statusCode              StatusCode OPTIONAL,
    ...,
    -- version 3 extension element
    ver3-PRPT-extension     Ver3-PRPT-extension OPTIONAL}

END

```

10.2.4 PLREQ

```

ILP-PLREQ DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS PLREQ;

IMPORTS
LocationId, MultipleLocationIds
FROM ILP-Components;

PLREQ ::= SEQUENCE {
    locationId          LocationId,
    multipleLocationIds MultipleLocationIds OPTIONAL,
    ...,
    -- version 3 extenstion element
    ver3-PLREQ-extension Ver3-PLREQ-extension OPTIONAL}

END

```

10.2.5 PLRES

```

ILP-PLRES DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS PLRES;

IMPORTS
Position, StatusCode, maxPosSize
FROM ILP-Components;

PLRES ::= SEQUENCE {
    positionResults      PositionResults,
    ...}

PositionResults ::= SEQUENCE SIZE (1..maxPosSize) OF PositionResult

PositionResult ::= CHOICE {
    position      Position,
    statusCode    StatusCode,
    ...}

END

```

10.2.6 PINIT

```

ILP-PINIT DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS PINIT;

IMPORTS
LocationId, Position, PosMethod, MultipleLocationIds, PosPayload, SETCapabilities,
UTRAN-GPSReferenceTimeResult, UTRAN-GANSSReferenceTimeResult, GNSSPosTechnology,
GANSSSignals
FROM ILP-Components;

```

```

PINIT ::= SEQUENCE {
    SETCapabilities          SETCapabilities,
    locationId              LocationId,
    posMethod               PosMethod OPTIONAL,
    requestedAssistData     RequestedAssistData OPTIONAL,
    position                Position OPTIONAL,
    posPayload              PosPayload OPTIONAL,
    multipleLocationIds     MultipleLocationIds OPTIONAL,
    utran-GPSReferenceTimeResult UTRAN-GPSReferenceTimeResult
OPTIONAL,
    utran-GANSSReferenceTimeResult UTRAN-GANSSReferenceTimeResult OPTIONAL,
    gnssPosTechnology      GNSSPosTechnology OPTIONAL,
    ...}

RequestedAssistData ::= SEQUENCE {
    almanacRequested        BOOLEAN,
    utcModelRequested       BOOLEAN,
    ionosphericModelRequested BOOLEAN,
    dgpsCorrectionsRequested BOOLEAN,
    referenceLocationRequested BOOLEAN, -- Note: Used also for GANSS
    referenceTimeRequested  BOOLEAN,
    acquisitionAssistanceRequested BOOLEAN,
    realTimeIntegrityRequested BOOLEAN,
    navigationModelRequested BOOLEAN,
    navigationModelData     NavigationModel OPTIONAL,
    gnssRequestedCommonAssistanceDataList
        GnssRequestedCommonAssistanceDataList OPTIONAL,
    gnssRequestedGenericAssistanceDataList
        GnssRequestedGenericAssistanceDataList OPTIONAL,
    extendedEphemeris       ExtendedEphemeris OPTIONAL,
    extendedEphemerisCheck  ExtendedEphCheck OPTIONAL,
    ...}

ExtendedEphemeris ::= SEQUENCE {
    validity    INTEGER (1..256), -- Requested validity in 4 hour steps
    ...}

ExtendedEphCheck ::= SEQUENCE {
    beginTime    GPSTime, -- Begin time of ephemeris extension held by SET
    endTime     GPSTime, -- End time of ephemeris extension held by SET
    ...}

GPSTime ::= SEQUENCE {
    gPSWeek    INTEGER (0..1023),
    gPSTOWhour INTEGER (0..167),
    ...}

GnssRequestedCommonAssistanceDataList ::= SEQUENCE {
    gnssReferenceTime        BOOLEAN,
    gnssIonosphericModel     BOOLEAN,
    gnssAdditionalIonosphericModelForDataID00    BOOLEAN,
    gnssAdditionalIonosphericModelForDataID11    BOOLEAN,
    gnssEarthOrientationParameters    BOOLEAN,
    ...}

GnssRequestedGenericAssistanceDataList ::= SEQUENCE(SIZE(1..maxGANSS)) OF
GnssReqGenericData

```

```

GanssReqGenericData ::= SEQUENCE {
    ganssId          INTEGER(0..15), -- coding according to parameter
definition in Section 12.14
    ganssSBASid     BIT STRING(SIZE(3)) OPTIONAL, --coding according to parameter
definition in section 12.14
    ganssRealTimeIntegrity  BOOLEAN OPTIONAL,
    ganssDifferentialCorrection      DGANSS-Sig-Id-Req OPTIONAL,
    ganssAlmanac                      BOOLEAN,
    ganssNavigationModelData GanssNavigationModelData OPTIONAL,
    ganssTimeModels                BIT STRING(SIZE(16)) OPTIONAL,
    ganssReferenceMeasurementInfo    BOOLEAN,
    ganssDataBits                   GanssDataBits OPTIONAL,
    ganssUTCModel                    BOOLEAN,
    ganssAdditionalDataChoices       GanssAdditionalDataChoices OPTIONAL,
    ganssAuxiliaryInformation         BOOLEAN,
    ganssExtendedEphemeris           ExtendedEphemeris OPTIONAL,
    ganssExtendedEphemerisCheck      GanssExtendedEphCheck OPTIONAL,
    ...}

DGANSS-Sig-Id-Req ::= BIT STRING (SIZE(8)) -- coding according to parameter
definition in Section 12.15

GanssNavigationModelData ::= SEQUENCE {
    ganssWeek  INTEGER(0..4095),
    ganssToe   INTEGER(0..167),
    t-toeLimit INTEGER(0..10),
    satellitesListRelatedDataList      SatellitesListRelatedDataList OPTIONAL,
    ...}

SatellitesListRelatedDataList ::= SEQUENCE(SIZE(0..maxGANSSSat)) OF
SatellitesListRelatedData

SatellitesListRelatedData ::= SEQUENCE {
    satId      INTEGER(0..63),
    iod        INTEGER(0..1023),
    ...}

maxGANSS      INTEGER ::= 16
maxGANSSSat  INTEGER ::= 32

GanssDataBits ::= SEQUENCE {
    ganssTODmin      INTEGER (0..59),
    reqDataBitAssistanceList ReqDataBitAssistanceList,
    ...}

ReqDataBitAssistanceList ::= SEQUENCE {
    gnssSignals      GANSSSignals,
    ganssDataBitInterval      INTEGER (0..15),
    ganssDataBitSatList      SEQUENCE (SIZE(1..maxGANSSSat)) OF INTEGER (0..63)
OPTIONAL,
    ...}

GanssAdditionalDataChoices ::= SEQUENCE {
    orbitModelID      INTEGER(0..7) OPTIONAL,
    clockModelID      INTEGER(0..7) OPTIONAL,
    utcModelID        INTEGER(0..7) OPTIONAL,

```

```

    almanacModelID      INTEGER(0..7) OPTIONAL,
...}

GanssExtendedEphCheck ::= SEQUENCE {
    beginTime   GANSSExtEphTime, -- Begin time of ephemeris extension held by SET
    endTime     GANSSExtEphTime, -- End time of ephemeris extension held by SET
...}

GANSSExtEphTime ::= SEQUENCE {
    gANSStDay      INTEGER (0..8191),
    gANSStODhour   INTEGER (0..23),
...}

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

SatelliteInfo ::= SEQUENCE (SIZE (1..31)) OF SatelliteInfoElement

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

END

```

10.2.7 PAUTH

```

ILP-PAUTH DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS PAUTH;

IMPORTS
SPCSETKey, SPCTID, SPCSETKeylifetime
FROM ILP-Components;

PAUTH ::= SEQUENCE {
    sPCSETKey     SPCSETKey,
    sPCTID        SPCTID,
    sPCSETKeylifetime SPCSETKeylifetime OPTIONAL,
...}

END

```

10.2.8 PALIVE

```

ILP-PALIVE DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS PALIVE;

IMPORTS

```

```

SPCStatusCode
FROM ILP-Components;

PALIVE ::= SEQUENCE {
    sPCStatusCode      SPCStatusCode OPTIONAL,
    ...}

END

```

10.2.9 PEND

```

ILP-PEND DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS PEND;

IMPORTS
Position, StatusCode
FROM ILP-Components
Ver3-PEND-extension
FROM ILP-Version-3-message-extensions;

PEND ::= SEQUENCE {
    position      Position      OPTIONAL,
    statusCode    StatusCode    OPTIONAL,
    ...,
    -- version 3 extension element
    ver3-PEND-extension      Ver3-PEND-extension OPTIONAL}

END

```

10.2.10 PMESS

```

ILP-PMESS DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS PMESS;

IMPORTS
Velocity, PosPayload, UTRAN-GPSReferenceTimeResult, UTRAN-GANSSReferenceTimeResult,
UTRAN-GPSReferenceTimeAssistance, UTRAN-GANSSReferenceTimeAssistance
FROM ILP-Components;

PMESS ::= SEQUENCE {
    posPayload      PosPayload,
    velocity        Velocity OPTIONAL,
    utran-GPSReferenceTimeAssistance      UTRAN-GPSReferenceTimeAssistance OPTIONAL,
    utran-GPSReferenceTimeResult          UTRAN-GPSReferenceTimeResult
OPTIONAL,
    utran-GANSSReferenceTimeAssistance    UTRAN-GANSSReferenceTimeAssistance OPTIONAL,
    utran-GANSSReferenceTimeResult        UTRAN-GANSSReferenceTimeResult OPTIONAL,
    ...}

END

```

10.2.11 PSTOP

```

ILP-PSTOP DEFINITIONS AUTOMATIC TAGS ::=

```

```

BEGIN

EXPORTS Ver3-PSTOP;

Ver3-PSTOP ::= SEQUENCE {
    stopType StopType,
    ...}

StopType ::= ENUMERATED {pause(0), resume(1), ...}

END

```

10.3 Common Elements (SUPL 2)

```

ILP-Components DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS
Version, SessionID2, LocationId, PosTechnology, Position, StatusCode,
QoP, PosMethod, Velocity, PosPayload, SETCapabilities, SPCStatusCode, SPCSETKey,
SPCTID, SPCSETKeylifetime, maxPosSize, UTRAN-GPSReferenceTimeResult, UTRAN-
GANSSReferenceTimeResult, GNSSPosTechnology, UTRAN-GPSReferenceTimeAssistance,
UTRAN-GANSSReferenceTimeAssistance, MultipleLocationIds, GANSSSignals;

IMPORTS
Ver3-PosTechnology-extension, Ver3-PosPayload-extension
FROM ILP-Version-3-parameter-extensions
Ver3-CellInfo-extension, Ver3-PositionEstimate-extension, Ver3-Velocity-extension,
Ver3-SETCapabilities-extension, Ver3-SETCapabilities-extension
FROM Ver3-ILP-Components;

-- 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)}

SessionID2 ::= SEQUENCE {
    slcSessionID          SlcSessionID,
    setSessionID          SetSessionID OPTIONAL,
    spcSessionID          SpcSessionID OPTIONAL
    -- the semantics of OPTIONAL applies to the encoding only.
    -- The parameter itself is MANDATORY. Since the spcSessionID is allocated by the
    SPC,
    -- there is no spcSessionID to be transmitted in the ILP PREQ 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, mnd 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

SlcSessionID ::= SEQUENCE {
    sessionID  OCTET STRING(SIZE (4)),
    slcId      NodeAddress
}

SpcSessionID ::= SEQUENCE {
    sessionID  OCTET STRING(SIZE (4)),
    spcId      NodeAddress
}

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

NodeAddress ::= CHOICE {
    iPAddress  IPAddress,
    fQDN       FQDN,
    ...}

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

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

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

MultipleLocationIds ::= SEQUENCE SIZE (1..maxLidSize) OF LocationIdData

LocationIdData ::= SEQUENCE {
    locationId LocationId,
    relativetimestamp  RelativeTime OPTIONAL, -- if relativetimestamp is present,
    -- then data represents historical measurement, if absent, data
    represents
    -- current measurements
    servingFlag  BOOLEAN, -- if "true" measurements represent serving cell
    ...}
-- status in locationId indicates whether cellInfo is current or stale relative to
timestamp

RelativeTime ::= INTEGER (0..65535) -- relative time to "current" Location Id in
multiples of 0.01sec

maxLidSize  INTEGER ::= 64

SETCapabilities ::= SEQUENCE {

```

```

posTechnology    PosTechnology,
prefMethod       PrefMethod,
posProtocol      PosProtocol,
supportedBearers SupportedBearers OPTIONAL,
...,
  ver3-SETCapabilities-extension      Ver3-SETCapabilities-extension OPTIONAL}

PosTechnology ::= SEQUENCE {
  agpsSETAssisted    BOOLEAN,
  agpsSETBased       BOOLEAN,
  autonomousGPS      BOOLEAN,
  aFLT               BOOLEAN,
  eCID               BOOLEAN,
  eOTD               BOOLEAN,
  oTDOA              BOOLEAN,
  gANSSPositionMethods  GANSSPositionMethods OPTIONAL,
  ...,
  ver3-PosTechnology-extension      Ver3-PosTechnology-extension OPTIONAL}

GANSSPositionMethods ::= SEQUENCE (SIZE(1..16)) OF GANSSPositionMethod

GANSSPositionMethod ::= SEQUENCE {
  ganssId    INTEGER(0..15), -- coding according to parameter definition in Section
12.14
  ganssSBASid                BIT STRING(SIZE(3)) OPTIONAL, --coding
according to parameter definition in section 12.14
  gANSSPositioningMethodTypes  GANSSPositioningMethodTypes,
  gANSSSignals                GANSSSignals,
  ...}

GANSSPositioningMethodTypes ::= SEQUENCE {
  setAssistedBOOLEAN,
  setBased    BOOLEAN,
  autonomous BOOLEAN,
  ...}

-- indicates MS support for particular GANSS signals and frequencies
-- coding according to parameter definition in Section 12.14
GANSSSignals ::= BIT STRING {
  signal1 (0),
  signal2 (1),
  signal3 (2),
  signal4 (3),
  signal5 (4),
  signal6 (5),
  signal7 (6),
  signal8 (7)} (SIZE (1..8))

PrefMethod ::= ENUMERATED {
  agnssSETAssistedPreferred, agnssSETBasedPreferred, noPreference,
  ...}
-- Note: In ULP V2.0, the names of the enumerations are
-- kept the same as in ULP V1.0. ie. agps in the TS ULP actually shall be
-- interpreted as agnss. This means that agpsSETAssistedPreferred and
-- agpsSETBasedPreferred in ULP V2.0 map to agnssSETAssistedPreferred and
-- agnssSETBasedPreferred in ILP.

```

```

PosProtocol ::= SEQUENCE {
    tia801    BOOLEAN,
    rrlp     BOOLEAN,
    rrc      BOOLEAN,
    lpp      BOOLEAN,
    posProtocolVersionRRLP          PosProtocolVersion3GPP OPTIONAL,
    posProtocolVersionRRC          PosProtocolVersion3GPP OPTIONAL,
    posProtocolVersionTIA801       PosProtocolVersion3GPP2 OPTIONAL,
    posProtocolVersionLPP          PosProtocolVersion3GPP OPTIONAL,
    ...}

PosProtocolVersion3GPP ::= SEQUENCE {
    majorVersionField    INTEGER(0..255),
    technicalVersionField INTEGER(0..255),
    editorialVersionField INTEGER(0..255),
    ...}

PosProtocolVersion3GPP2 ::= SEQUENCE (SIZE(1..8)) OF
Supported3GPP2PosProtocolVersion

Supported3GPP2PosProtocolVersion ::= SEQUENCE {
    revisionNumber        BIT STRING(SIZE (6)), -- the location standard revision
number the SET supports coded according to 3GPP2 C.S0022
    pointReleaseNumber    INTEGER(0..255),
    internalEditLevel     INTEGER(0..255),
    ...}

SupportedBearers ::= SEQUENCE {
    gsm                BOOLEAN,
    wcdma              BOOLEAN,
    lte                BOOLEAN,
    cdma               BOOLEAN,
    hprd               BOOLEAN,
    umb                BOOLEAN,
    wlan               BOOLEAN,
    wiMAX              BOOLEAN,
    ...}

CellInfo ::= CHOICE {
    gsmCell            GsmCellInformation,
    wcdmaCell          WcdmaCellInformation, --WCDMA Cell Information/TD-SCDMA Cell
Information
    cdmaCell           CdmaCellInformation,
    hrpdCell           HrpdcCellInformation,
    umbCell            UmbCellInformation,
    lteCell            LteCellInformation,
    wlanAP             WlanAPInformation,
    wimaxBS            WimaxBSInformation,
    ...,
    ver3-CellInfo-extension Ver3-CellInfo-extension}

UTRAN-GPSReferenceTimeResult ::= SEQUENCE {
-- For ue-GPSTimingOfCell values above 37158911999999 are not
-- used in this version of the specification
-- Actual value utran-GPSTimingOfCell = (ms-part * 4294967296) + ls-part
-- used on the uplink i.e. reported by the SET to the SLP
    set-GPSTimingOfCell SEQUENCE {
        ms-part    INTEGER (0.. 16383),

```

```

    ls-part INTEGER (0..4294967295)},
modeSpecificInfo CHOICE {
  fdd SEQUENCE {
    referenceIdentity PrimaryCPICH-Info},
  tdd SEQUENCE {
    referenceIdentity CellParametersID}
},
sfn INTEGER (0..4095),
gpsReferenceTimeUncertainty INTEGER (0..127) OPTIONAL,
...}

UTRAN-GANSSReferenceTimeResult ::= SEQUENCE {
  ganssTimeID INTEGER (0..15),
  set-GANSSReferenceTime SET-GANSSReferenceTime,
...}

SET-GANSSReferenceTime ::= SEQUENCE {
-- Actual value [ns] = (ms-Part * 4294967296 + ls-Part) * 250
-- Actual values [ns] > 86399999999750 are reserved and are considered a
-- protocol error
set-GANSSTimingOfCell SEQUENCE {
  ms-part INTEGER (0..80),
  ls-part INTEGER (0..4294967295)} OPTIONAL,
modeSpecificInfo CHOICE {
  fdd SEQUENCE {
    referenceIdentity PrimaryCPICH-Info},
  tdd SEQUENCE {
    referenceIdentity CellParametersID}} OPTIONAL,
sfn INTEGER (0..4095),
ganss-TODUncertainty INTEGER (0..127) OPTIONAL,
...}

GNSSPosTechnology ::= SEQUENCE {
  gps BOOLEAN,
  galileo BOOLEAN,
  sbas BOOLEAN,
  modernized-gps BOOLEAN,
  qzss BOOLEAN,
  glonass BOOLEAN,
...}

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,
..., -- Coding as in [3GPP GAD]
ver3-PositionEstimate-extension Ver3-PositionEstimate-extension OPTIONAL}
-- this extension defines high accuracy 3D position as defined in [OMA-LPPE]

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, -- Not applicable for TDD
measuredResultsList MeasuredResultsList OPTIONAL,
cellParametersId INTEGER(0..127) OPTIONAL, -- Not applicable for FDD
timingAdvance TimingAdvance OPTIONAL, -- Not applicable for FDD
...}

TimingAdvance ::= SEQUENCE {
tA INTEGER (0..8191),
tAResolution TAResolution OPTIONAL, --If missing, resolution is 0.125 chips
chipRate ChipRate OPTIONAL, --If missing, chip rate is 1.28 Mchip/s
...}

TAResolution ::= ENUMERATED {res10chip(0),res05chip(1),res0125chip(2), ...} --
Corresponding to 1.0-chip, 0.5-chip and 0.125-chip resolutions, respectively

ChipRate ::= ENUMERATED {tdd128(0),tdd384(1), tdd768(2), ...} -- Corresponding to
1.28-Mchips/s, 3.84-Mchips/s and 7.68-Mchips/s chip rates, respectively

HrpdcCellInformation ::= SEQUENCE {
refSECTORID BIT STRING(SIZE (128)) OPTIONAL, -- HRPD Sector Id
refBASELAT INTEGER(0..4194303), -- Base Station Latitude
reBASELONG INTEGER(0..8388607), -- Base Station Longitude

```

```

refWeekNumber  INTEGER(0..65535), -- GPS Week Number
refSeconds     INTEGER(0..4194303), -- GPS Seconds --
...}

UmbCellInformation ::= SEQUENCE {
  refSECTORID   BIT STRING(SIZE (128)), -- UMB Sector Id
  refMCC        INTEGER(0..999), -- Mobile Country Code
  refMNC        INTEGER(0..999), -- Mobile Network Code
  refBASELAT    INTEGER(0..4194303), -- Base Station Latitude
  reBASELONG    INTEGER(0..8388607), -- Base Station Longitude
  refWeekNumber INTEGER(0..65535), -- GPS Week Number
  refSeconds    INTEGER(0..4194303), -- GPS Seconds --
  ...}

-- LTE Cell info per 3GPP TS 36.331. --
-- If not otherwise stated info is related to serving cell -

LteCellInformation ::= SEQUENCE {
  cellGlobalIdEUTRA      CellGlobalIdEUTRA,
  physCellId             PhysCellId,
  trackingAreaCode       TrackingAreaCode,
  rsrpResult             RSRP-Range   OPTIONAL,
  rsrqResult             RSRQ-Range   OPTIONAL,
  tA                     INTEGER(0..255) OPTIONAL, -- Timing Advance as per 3GPP TS 36.321
  measResultListEUTRA    MeasResultListEUTRA OPTIONAL, -- Neighbour measurements
  ...}

-- Measured results of neighbours cells per 3GPP TS 36.331 --

MeasResultListEUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF MeasResultEUTRA

MeasResultEUTRA ::= SEQUENCE {
  physCellId             PhysCellId,
  cgi-Info              SEQUENCE {
    cellGlobalId         CellGlobalIdEUTRA,
    trackingAreaCode     TrackingAreaCode
  } OPTIONAL,
  measResult            SEQUENCE {
    rsrpResult           RSRP-Range   OPTIONAL, -- Mapping to measured values
    rsrqResult           RSRQ-Range   OPTIONAL, -- in 3GPP TS 36.133
    ...
  }
}

PhysCellId ::= INTEGER (0..503)

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

CellGlobalIdEUTRA ::= SEQUENCE {
  plmn-Identity PLMN-Identity,
  cellIdentity CellIdentity,
  ...
}

PLMN-Identity ::= SEQUENCE {
  mcc      MCC      OPTIONAL,
  mnc      MNC
}

```

```

CellIdentity ::= BIT STRING (SIZE (28))

MCC ::= SEQUENCE (SIZE (3)) OF
MCC-MNC-Digit

MNC ::= SEQUENCE (SIZE (2..3)) OF
MCC-MNC-Digit

MCC-MNC-Digit ::= INTEGER (0..9)

RSRP-Range ::= INTEGER(0..97)
RSRQ-Range ::= INTEGER(0..34)
maxCellReport INTEGER ::= 8

WlanAPInformation ::= SEQUENCE { -- as per 802.11v
  apMACAddress      BIT STRING(SIZE (48)), -- AP MAC Address
  apTransmitPower   INTEGER(-127..128) OPTIONAL, -- AP transmit power in dbm
  apAntennaGain     INTEGER(-127..128) OPTIONAL, -- AP antenna gain in dBi
  apSignaltoNoise   INTEGER(-127..128) OPTIONAL, -- AP S/N received at SET
  apDeviceType      ENUMERATED {wlan802-11a(0), wlan802-11b(1), wlan802-11g(2),
...} OPTIONAL,
  apSignalStrength  INTEGER(-127..128) OPTIONAL, -- AP signal strength at SET
  apChannelFrequency INTEGER(0..256) OPTIONAL, -- AP channel/frequency of Tx/Rx
  apRoundTripDelay  RTD OPTIONAL, -- Round Trip Delay between SET and AP
  setTransmitPower  INTEGER(-127..128) OPTIONAL, -- SET transmit power in dBm
  setAntennaGain    INTEGER (-127..128) OPTIONAL, -- SET antenna gain in dBi
  setSignaltoNoise  INTEGER (-127..128) OPTIONAL, -- SET S/N received at AP
  setSignalStrength INTEGER(-127..128) OPTIONAL, -- SET signal strength at AP
  apReportedLocation ReportedLocation OPTIONAL, -- AP Location reported by AP
...}

RTD ::= SEQUENCE { -- as per 802.11v
  rTDValue      INTEGER(0..16777216), -- measured RTD value corresponding to
-- about 500km in units of 1/10 of nanoseconds
  rTDUnits      RTDUnits, -- units of RTD
  rTDAccuracy   INTEGER(0..255) OPTIONAL, -- RTD accuracy
...}

RTDUnits ::= ENUMERATED {
  microseconds(0), hundredsofnanoseconds(1), tensofnanoseconds(2), nanoseconds(3),
  tenthsofnanoseconds(4), ...}

ReportedLocation ::= SEQUENCE { -- as per 802.11v
  locationEncodingDescriptor LocationEncodingDescriptor,
  locationData              LocationData, -- location data field
...}

LocationEncodingDescriptor ::= ENUMERATED {
  lCI(0), aSN1(1), ...}

LocationData ::= SEQUENCE {
  locationAccuracy  INTEGER(0..4294967295) OPTIONAL,
  locationValue     OCTET STRING (SIZE(1..128)),
...}

WimaxBSInformation ::= SEQUENCE {
  wimaxBsID  WimaxBsID, -- WiMax serving base station ID

```

```

wimaxRTD    WimaxRTD    OPTIONAL, -- Round Trip Delay measurements
wimaxNMRList WimaxNMRList OPTIONAL, -- Network measurements
...}

WimaxBsID ::= SEQUENCE {
    bsID-MSB    BIT STRING (SIZE(24)) OPTIONAL,
    bsID-LSB    BIT STRING (SIZE(24)),
    ...}
-- if only LSB is present, MSB is assumed to be identical to the current serving BS
or clamped on network value

WimaxRTD ::= SEQUENCE {
    rTD        INTEGER (0..65535), -- Round trip delay of serving BS in units of 10
ns
    rTDstd     INTEGER (0..1023) OPTIONAL, -- Standard deviation of round trip delay
in units of 10 ns
    ...}

WimaxNMRList ::= SEQUENCE (SIZE (1..maxWimaxBSMeas)) OF WimaxNMR

WimaxNMR ::= SEQUENCE {
    wimaxBsID    WimaxBsID, -- WiMax BS ID for the measurement
    relDelay     INTEGER (-32768..32767) OPTIONAL, -- Relative delay for this
neighbouring BSs to the serving cell in units of 10 ns
    relDelaystd  INTEGER (0..1023) OPTIONAL, -- Standard deviation of Relative delay
in units of 10 ns
    rSSI        INTEGER (0..255) OPTIONAL, -- RSSI in 0.25 dBm steps, starting from -
103.75 dBm
    rSSIstd     INTEGER (0..63) OPTIONAL, -- Standard deviation of RSSI in dB
    bSTxPower   INTEGER (0..255) OPTIONAL, -- BS transmit power in 0.25 dBm steps,
starting from -103.75 dBm
    cINR        INTEGER (0..255) OPTIONAL, -- in dB
    cINRstd     INTEGER (0..63) OPTIONAL, -- Standard deviation of CINR in dB
    bsLocation  ReportedLocation OPTIONAL, -- Reported location of the BS
    ...}

maxWimaxBSMeas INTEGER ::= 32

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
                       -- NOTE: TimeSlotISCP measurement list cannot be
                       -- interpreted without the knowledge of Cell Info
                       -- as defined in [3GPP RRC].
        }}

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, data range from 0 to 91 and from 123 to 127.
-- Values from 92 to 122 are spare

```

```

-- the encoding of cpich-RSCP is (as per 25.331 V5.11.0)
-- cpich-RSCP = 123    CPICH RSCP <-120 dBm
-- cpich-RSCP = 124    -120 ≤ CPICH RSCP < -119 dBm
-- cpich-RSCP = 125    -119 ≤ CPICH RSCP < -118 dBm
-- cpich-RSCP = 126    -118 ≤ CPICH RSCP < -117 dBm
-- cpich-RSCP = 127    -117 ≤ CPICH RSCP < -116 dBm
-- cpich-RSCP = 0      -116 ≤ CPICH RSCP < -115 dBm
-- cpich-RSCP = 1      -115 ≤ CPICH RSCP < -114 dBm
-- ...                ...
-- cpich-RSCP = 89     -27 ≤ CPICH RSCP < -26 dBm
-- cpich-RSCP = 90     -26 ≤ CPICH RSCP < -25 dBm
-- cpich-RSCP = 91     -25 ≤ CPICH RSCP      dBm

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

UTRAN-GPSReferenceTimeAssistance ::= SEQUENCE {
    utran-GPSReferenceTime          UTRAN-GPSReferenceTime,
    gpsReferenceTimeUncertainty     INTEGER (0..127) OPTIONAL,
    utranGPSDriftRate               UTRANGPSDriftRate          OPTIONAL}

UTRAN-GPSReferenceTime ::= SEQUENCE {
    -- For utran-GPSTimingOfCell values above 2322431999999 are not
    -- used in this version of the specification
    -- Actual value utran-GPSTimingOfCell = (ms-part * 4294967296) + 1s-
part
    -- used on the downlink i.e. sent from the SLP to the SET
    utran-GPSTimingOfCell          SEQUENCE {
        ms-part  INTEGER (0..1023),
        ls-part  INTEGER (0..4294967295)
    },
    modeSpecificInfo              CHOICE {
        fdd          SEQUENCE {
            referenceIdentity      PrimaryCPICH-Info},
        tdd          SEQUENCE {
            referenceIdentity      CellParametersID}} OPTIONAL,
    sfn                          INTEGER (0..4095)
}

UTRANGPSDriftRate ::= ENUMERATED {
    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
}

UTRAN-GANSSReferenceTimeAssistance ::= SEQUENCE {
    ganssTimeID INTEGER (0..15),

```

```

    utran-GANSSReferenceTime UTRAN-GANSSReferenceTime,
    ganssDay INTEGER (0..8191) OPTIONAL,
    utranGANSSDriftRate      UTRANGANSSDriftRate      OPTIONAL
}

UTRAN-GANSSReferenceTime ::= SEQUENCE {
    ganssTOD INTEGER (0..86399),
    utran-GANSSTimingOfCell INTEGER (0..3999999)      OPTIONAL,
    modeSpecificInfo        CHOICE {
        fdd      SEQUENCE {
            referenceIdentity PrimaryCPICH-Info},
        tdd      SEQUENCE {
            referenceIdentity CellParametersID}} OPTIONAL,
    sfn          INTEGER (0..4095),
    ganss-TODUncertainty INTEGER (0..127) OPTIONAL,
    ...}

UTRANGANSSDriftRate ::= ENUMERATED {
    utran-GANSSDrift0, utran-GANSSDrift1, utran-GANSSDrift2,
    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}

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), iLPTimeout(16),
    ...}

QoS ::= 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 {
    horvel      Horvel,
    horandvervel Horandvervel,
    horveluncert Horveluncert,
    horandveruncert Horandveruncert,
    ..., -- velocity definition as per [3GPP GAD]
    ver3-Velocity-extension Ver3-Velocity-extension} -- this extension defines high
accuracy 3D velocity as defined in [OMA-LPPE]

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),
    agnssSETassisted(9), agnssSETbased(10), agnssSETassistedpref(11),
    agnssSETbasedpref(12), autonomousGNSS(13), ..., ver3-genericSETassisted(14), ver3-
    genericSETbased(15), ver3-other(16)}

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

SPCTID ::= SEQUENCE {
    rAND         BIT STRING(SIZE (128)),
    slpFQDN      FQDN,
    ...}

SPCSETKeylifetime ::= INTEGER (1..24) -- units in hours

PosPayload ::= CHOICE {
    rrcPayload    OCTET STRING(SIZE (1..8192)),
    rrlpPayload   OCTET STRING(SIZE (1..8192)),
    multiPosPayload    MultiPosPayload,
    ...,
    ver3-PosPayload-extension    Ver3-PosPayload-extension}

MultiPosPayload ::= SEQUENCE {
    lPPPayload    SEQUENCE (SIZE (1..3)) OF OCTET STRING(SIZE (1..60000)) OPTIONAL,
    tIA801Payload SEQUENCE (SIZE (1..3)) OF OCTET STRING(SIZE (1..60000)) OPTIONAL,
    ...}

SPCStatusCode ::= ENUMERATED {operational(0), notOperational(1),
    reducedAvailability(2),
    ...}

maxPosSize INTEGER ::= 1024

END

```

10.4 Message Extensions (SUPL Version 3)

```

ILP-Version-3-message-extensions DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS
Ver3-PREQ-extension, Ver3-PLREQ-extension, Ver3-PEND-extension, Ver3-PRPT-
extension;

IMPORTS
PosPayLoad
FROM ILP-Components
OMA-LPPE-RelativeLocation, OMA-LPPE-ReferencePointUniqueID, OMA-LPPE-CivicLocation
FROM OMA-LPPE;

Ver3-PREQ-extension ::= SEQUENCE {
    gSSParameters          GSSParameters OPTIONAL,
    clientType             ClientType OPTIONAL,
    highAccuracyQoP        HighAccuracyQoP OPTIONAL,
    referencePointId       OMA-LPPE-ReferencePointUniqueID OPTIONAL,
    ...}

GSSParameters ::= SEQUENCE {
    duration               Duration,
    ...}

Duration ::= SEQUENCE {
    timeDuration           INTEGER (1..44640) OPTIONAL, -- time duration in minutes
(maximum time duration is 31 days)
    messageCountDuration  MessageCountDuration OPTIONAL,
    ...} -- either timeDuration or messageCountDuration or both SHALL be included

MessageCountDuration ::= SEQUENCE {
    numUplinkMessages     INTEGER (1..4096) OPTIONAL, -- max number of SUPL POS
messages on uplink
    numDownlinkMessages   INTEGER (1..4096) OPTIONAL, -- max number of SUPL POS
messages on downlink
    numTotalMessages      INTEGER (1..8192) OPTIONAL, -- max number of uplink +
downlink SUPL POS messages
    ...}

ClientType ::= ENUMERATED {
valueaddedservice(0), emergency(1), other(2), ...}

Ver3-PLREQ-extension ::= SEQUENCE {
    posPayLoad            PosPayLoad,
    ...}

HighAccuracyQoP ::= SEQUENCE {
    horacc                INTEGER(0..255), -- as defined in [OMA-LPPE] "uncertainty-semimajor" for
OMA-LPPE-HighAccuracy3Dposition
    veracc                INTEGER(0..255) OPTIONAL, -- as defined in [OMA-LPPE] "uncertainty-altitude"
for OMA-LPPE-HighAccuracy3Dposition
    maxLocAge             INTEGER(0..65535) OPTIONAL, -- in units of seconds
    delay                 INTEGER(1..256) OPTIONAL, -- in units of seconds
    requestVelocity       BOOLEAN, -- used to request high accuracy velocity

```

```

...}

Ver3-PEND-extension ::= SEQUENCE {
    relativePosition      OMA-LPPE-RelativeLocation OPTIONAL,
    civicPosition         OMA-LPPE-CivicLocation OPTIONAL,
    ...}

Ver3-PRPT-extension ::= SEQUENCE {
    relativePosition      OMA-LPPE-RelativeLocation OPTIONAL,
    civicPosition         OMA-LPPE-CivicLocation OPTIONAL,
    ...}

END

```

10.5 Parameter Extensions (SUPL Version 3)

```

ILP-Version-3-parameter-extensions DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS
Ver3-PosTechnology-extension, Ver3-PosPayload-extension;

Ver3-PosTechnology-extension ::= SEQUENCE {
    oTDOA-LTE    BOOLEAN,
    other        BOOLEAN,
    ...}

Ver3-PosPayload-extension ::= SEQUENCE {
    lPPPpayload SEQUENCE (SIZE (1..3)) OF OCTET STRING(SIZE (1..60000)) OPTIONAL,
    tIA801Payload SEQUENCE (SIZE(1..3)) OF OCTET STRING(SIZE (1..60000)) OPTIONAL,
    ...}

END

```

10.6 Common elements (SUPL Version 3)

```

Ver3-ILP-Components DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS Ver3-CellInfo-extension, Ver3-PositionEstimate-extension, Ver3-Velocity-
extension, Ver3-SETCapabilities-extension;

IMPORTS
    OMA-LPPE-HighAccuracy3Dposition, OMA-LPPE-HighAccuracy3Dvelocity
FROM OMA-LPPE;

Ver3-PositionEstimate-extension ::= SEQUENCE {
    highAccuracy3Dposition    OMA-LPPE-HighAccuracy3Dposition OPTIONAL,
    ...}

Ver3-Velocity-extension ::= SEQUENCE {
    highAccuracy3Dvelocity    OMA-LPPE-HighAccuracy3Dvelocity OPTIONAL,
    ...}

Ver3-SETCapabilities-extension ::= SEQUENCE {

```

```
qoPCapabilities          QoPCapabilities OPTIONAL,  
sensorSupport            BOOLEAN OPTIONAL,  
relativePositioningCapabilities  RelativePositioningCapabilities OPTIONAL,  
civicPositioningCapabilities  CivicPositioningCapabilities OPTIONAL,  
...}  
  
QoPCapabilities ::= SEQUENCE {  
  highQualityPositionRX    BOOLEAN,  
  highQualityPositionTX    BOOLEAN,  
  highQualityVelocityRX    BOOLEAN,  
  highQualityVelocityTX    BOOLEAN,  
  ...}  
  
Ver3-CellInfo-extension ::= CHOICE {  
  noCellInfo                NULL,  
  ...}  
  
RelativePositioningCapabilities ::= SEQUENCE {  
  positioningRelativeToReferencePoint  BOOLEAN,  
  ...}  
  
CivicPositioningCapabilities ::= SEQUENCE {  
  positioningAbsoluteCivicAddress      BOOLEAN,  
  ...}  
  
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 3.0 History

Document Identifier	Date	Sections	Description
Draft Version OMA-TS-ILP-V3_0	25 May 2011	N/A	Baseline as agreed in OMA-LOC-2011-0092- INP_SUPL3.0_TS_ILP_baseline
	30 June 2011	Throughout the document	OMA-LOC-2011-0123-CR_SUPL3.0_TS_ILP_missing_scenarios OMA-LOC-2011-0125-CR_SUPL3.0_TS_ILP_D_SLP_update OMA-LOC-2011-0126-CR_SUPL3.0_TS_ILP_editorial_update OMA-LOC-2011-0128-CR_SUPL3.0_TS_ILP_SCR OMA-LOC-2011-0133- CR_SUPL3.0_TS_ILP_Notification_based_on_Current_Location OMA-LOC-2011-0156- CR_SUPL3_0_TS_ILP_Velocity_Event_Triggered_Service OMA-LOC-2011-0160- CR_SUPL3.0_TS_ILP_Missing_Emergency_Support OMA-LOC-2011-0161- CR_SUPL3.0_TS_ILP_high_accuracy_position OMA-LOC-2011-0164- CR_SUPL3.0_TS_ILP_High_Accuracy_QoP OMA-LOC-2011-0170R01- CR_SUPL3.0_TS_ILP_Relative_Position OMA-LOC-2011-0177R04- CR_SUPL3.0_TS_ILP_Velocity_Trigger_Modification OMA-LOC-2011-0179R01- CR_SUPL3.0_TS_ILP_Absolute_Civic_Location
	12 Aug 2011	2.1,3.2, 3.3, 5, 5.1.2, 5.3.1, 5.3.2, 5.3.3, 5.3.4, 7, 7.3,8.1,8.6, 8.8,	Editorial corrections identified in OMA-CONRR_SUPL-V3_0_20110809-D
	7 Sep 2011	Throughout the document	OMA-LOC-2011-0243-CR_SUPL3.0_CONRR_Corrections_D014 OMA-LOC-2011-0247-CR_SUPL3.0_CONRR_Corrections_D015 OMA-LOC-2011-0248-CR_SUPL3.0_CONRR_Corrections_D016 OMA-LOC-2011-0249-CR_SUPL3.0_CONRR_Corrections_D020 OMA-LOC-2011-0250-CR_SUPL3.0_CONRR_Corrections_D021 OMA-LOC-2011-0261-CR_ILP3.0_TS_CONRR_D001 OMA-LOC-2011-0253R04-CR_ILP3.0_TS_CONRR_C400
Candidate Version OMA-TS-ILP-V3_0	20 Sep 2011	All	TP approved via R&A: OMA-TP-2011-0332- INP_SUPL_3.0_ERP_for_Candidate_approval

Appendix B. Static Conformance Requirements (Normative)

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

B.1 SCR for SLC

B.1.1 SLC Procedures

SLC procedures follow SCR of [SUPL 3.0 TS ULP].

B.1.2 ILP Protocol Interface

Item	Function	Reference	Requirement
ILP-B-SLC-001	ILP encoding	ILP 8	
ILP-B-SLC-002	ILP transport	ILP 8	
ILP-B-SLC-003	Support of TCP/IP port number	ILP 8	

B.1.3 ILP Messages

Item	Function	Reference	Requirement
ILP-C-SLC-001	Support of PREQ	ILP 9, 10, 11	
ILP-C-SLC-002	Support of PRES	ILP 9, 10, 11	
ILP-C-SLC-003	Support of PRPT	ILP 9, 10, 11	
ILP-C-SLC-004	Support of PLREQ	ILP 9, 10, 11	
ILP-C-SLC-005	Support of PLRES	ILP 9, 10, 11	
ILP-C-SLC-006	Support of PINIT	ILP 9, 10, 11	
ILP-C-SLC-007	Support of PMESS	ILP 9, 10, 11	
ILP-C-SLC-008	Support of PALIVE	ILP 9, 10, 11	
ILP-C-SLC-009	Support of PEND	ILP 9, 10, 11	
ILP-C-SCL-010	Support of PSTOP	ILP 9, 10, 11	

B.1.4 Support of Parameters for Optional Functions

Item	Function	Reference	Requirement
ILP-D-SLC-0001	Support of position parameter in PREQ	ILP 9, 10, 11	
ILP-D-SLC-0002	Support of triggerParams parameter in PREQ	ILP 9, 10, 11	
ILP-D-SLC-0003	Support of QoP parameter in PREQ	ILP 9, 10, 11	
ILP-D-SLC-0004	Support of sETCapabilities parameter in PREQ	ILP 9, 10, 11	
ILP-D-SLC-0005	Support of gSSParameters parameter in PREQ	ILP 9, 10, 11	
ILP-D-SLC-0006	Support of clientType parameter in PREQ	ILP 9, 10, 11	
ILP-D-SLC-0007	Support of preferredPosMethod parameter in PRES	ILP 9, 10, 11	
ILP-D-SLC-0008	Support of gnssPosTechnology	ILP 9, 10, 11	

Item	Function	Reference	Requirement
	parameter in PRES		
ILP-D-SLC-0009	Support of supportedPosMethods parameter in PRES	ILP 9, 10, 11	
ILP-D-SLC-0010	Support of position parameter in PRES	ILP 9, 10, 11	
ILP-D-SLC-0011	Support of sPCStatusCode parameter in PRES	ILP 9, 10, 11	
ILP-D-SLC-0012	Support of fixNumber parameter in PRPT	ILP 9, 10, 11	
ILP-D-SLC-0013	Support of statusCode parameter in PRPT	ILP 9, 10, 11	
ILP-D-SLC-0014	Support of posPayLoad parameter in PLREQ	ILP 9, 10, 11	
ILP-D-SLC-0015	Support of posMethod parameter in PINIT	ILP 9, 10, 11	
ILP-D-SLC-0016	Support of position parameter in PINIT	ILP 9, 10, 11	
ILP-D-SLC-0017	Support of posPayLoad parameter in PINIT	ILP 9, 10, 11	
ILP-D-SLC-0018	Support of gnssPosTechnology parameter in PINIT	ILP 9, 10, 11	
ILP-D-SLC-0019	Support of sPCStatusCode parameter in PALIVE	ILP 9, 10, 11	
ILP-D-SLC-0020	Support of position parameter in PEND	ILP 9, 10, 11	
ILP-D-SLC-0021	Support of statusCode parameter in PEND	ILP 9, 10, 11	
ILP-D-SLC-0022	Support of stopType parameter in PSTOP	ILP 9, 10, 11	
ILP-D-SLC-0023	Support for Multiple Location IDs	ILP 9, 10, 11	

B.2 SCR for SPC

B.2.1 SPC Procedures

SPC procedures follow SCR of [SUPL 3.0 TS ULP].

B.2.2 ILP Protocol Interface

Item	Function	Reference	Requirement
ILP-B-SPC-001	ILP encoding	ILP 8	
ILP-B-SPC-002	ILP transport	ILP 8	
ILP-B-SPC-003	Support of TCP/IP port number	ILP 8	

B.2.3 ILP Messages

Item	Function	Reference	Requirement
ILP-C-SPC-001	Support of PREQ	ILP 9, 10, 11	
ILP-C-SPC-002	Support of PRES	ILP 9, 10, 11	
ILP-C-SPC-003	Support of PRPT	ILP 9, 10, 11	
ILP-C-SPC-004	Support of PLREQ	ILP 9, 10, 11	
ILP-C-SPC-005	Support of PLRES	ILP 9, 10, 11	
ILP-C-SPC-006	Support of PINIT	ILP 9, 10, 11	
ILP-C-SPC-007	Support of PMESS	ILP 9, 10, 11	
ILP-C-SPC-008	Support of PALIVE	ILP 9, 10, 11	
ILP-C-SPC-009	Support of PEND	ILP 9, 10, 11	
ILP-C-SPC-010	Support of PSTOP	ILP 9, 10, 11	

B.2.4 Support of Parameters for Optional Functions

Item	Function	Reference	Requirement
ILP-D-SPC-0001	Support of position parameter in PREQ	ILP 9, 10, 11	
ILP-D-SPC-0002	Support of triggerParams parameter in PREQ	ILP 9, 10, 11	
ILP-D-SPC-0003	Support of QoP parameter in PREQ	ILP 9, 10, 11	
ILP-D-SPC-0004	Support of sETCapabilities parameter in PREQ	ILP 9, 10, 11	
ILP-D-SPC-0005	Support of gSSParameters parameter in PREQ	ILP 9, 10, 11	
ILP-D-SPC-0006	Support of clientType parameter in PREQ	ILP 9, 10, 11	
ILP-D-SPC-0007	Support of preferredPosMethod parameter in PRES	ILP 9, 10, 11	
ILP-D-SPC-0008	Support of gnssPosTechnology parameter in PRES	ILP 9, 10, 11	
ILP-D-SPC-0009	Support of supportedPosMethods parameter in PRES	ILP 9, 10, 11	
ILP-D-SPC-0010	Support of position parameter in PRES	ILP 9, 10, 11	
ILP-D-SPC-0011	Support of sPCStatusCode parameter in PRES	ILP 9, 10, 11	
ILP-D-SPC-0012	Support of fixNumber parameter in PRPT	ILP 9, 10, 11	
ILP-D-SPC-0013	Support of statusCode parameter in PRPT	ILP 9, 10, 11	
ILP-D-SPC-0014	Support of posPayLoad parameter in PLREQ	ILP 9, 10, 11	

Item	Function	Reference	Requirement
ILP-D-SPC-0015	Support of posMethod parameter in PINIT	ILP 9, 10, 11	
ILP-D-SPC-0016	Support of position parameter in PINIT	ILP 9, 10, 11	
ILP-D-SPC-0017	Support of posPayLoad parameter in PINIT	ILP 9, 10, 11	
ILP-D-SPC-0018	Support of gnssPosTechnology parameter in PINIT	ILP 9, 10, 11	
ILP-D-SPC-0019	Support of sPCstatusCode parameter in PALIVE	ILP 9, 10, 11	
ILP-D-SPC-0020	Support of position parameter in PEND	ILP 9, 10, 11	
ILP-D-SPC-0021	Support of statusCode parameter in PEND	ILP 9, 10, 11	
ILP-D-SPC-0022	Support of stopType parameter in PSTOP	ILP 9, 10, 11	
ILP-D-SPC-0023	Support for Multiple Location Ids	ILP 9, 10, 11	

Appendix C. Timer Tables

This Section defines the ILP relevant timers. Note that default timer value is informative.

C.1 ILP Timers

Timer	Default value	Description	Actions on expiration
LT1	5 sec.	From sending of PREQ to receipt of PRES (successful case) or PEND (error case).	The SLC sends a PEND message to the SPC including a Status Code.
LT2	5 sec.	<p>This timer is only applicable to triggered scenarios.</p> <p>From sending of PLREQ to receipt of PLRES (successful case) or PEND (error case).</p> <p>If PLRES is received after LT2 has expired (and no PEND was sent) and before a new PLREQ has been sent, the SLC SHALL ignore the PLRES. If a new PLREQ is received, the SPC SHALL clear any and all outstanding PLRES it might have stored for delivery and only respond to the latest PLREQ.</p>	<p>Periodic Trigger scenarios: the SLC ignores timer expiration N times consecutively (N configurable) and then sends PEND including Status Code to the SPC.</p> <p>Area or velocity Event Triggered scenarios: the SLC sends PEND including Status Code to the SPC.</p>

Table 45: SLC Timer Values

Timer	Default value	Description	Actions on expiration
PT1	<p><u>For Network Initiated scenarios:</u></p> <p>For non-roaming: PT1 = 11 sec + (optionally) response time in QoP.</p> <p>For roaming: PT1 = ST2 + ST4 + 10 sec.</p> <p><u>For SET Initiated scenarios:</u></p> <p>PT1 = ST1 + 10 sec.</p>	<p>This timer is only applicable to immediate scenarios. From sending of PRES to receipt of PINIT for the successful case or receipt of PEND for the error case.</p>	The SPC sends a PEND message to the SLC including a Status Code.
PT2	5 sec.	<p>From sending of PLREQ to receipt of PLRES (successful case) and PEND (error case).</p> <p>If PLRES is received after PT2 has expired (and no PEND was sent) and before a new PLREQ has been sent, the SPC SHALL ignore the PLRES. If a new PLREQ is received, the SLC SHALL clear any and all outstanding PLRES it might have stored for delivery and only respond to the latest PLREQ.</p>	<p>For immediate scenarios: the SPC MAY either continue or send a PEND message to the SLC.</p> <p>For triggered periodic scenarios: the SPC continues the flow N times consecutively (N configurable) and MAY then decide to either send PEND to the SLC or to continue the flow.</p> <p>For triggered area or velocity event scenarios: the SPC MAY continue the flow or send PEND to the SLC.</p>

Table 46: SPC Timer Values

C.2 ULP Timers

For ULP timers see [SUPL 3.0 TS ULP].