Secure User Plane Location Requirements

Candidate Version 2.0 – 08 Dec 2009

Open Mobile Alliance

OMA-RD-SUPL-V2_0-20091208-C

Contents

Tables

1. Scope (Informative)

This document describes the requirements of the Secure User Plane for Location (SUPL).

2. References

2.1 Normative References

[RFC2119] "Key words for use in RFCs to Indicate Requirement Levels", S. Bradner, March 1997, URL:http://www.ietf.org/rfc/rfc2119.txt

[3GPP2 UMB] 3GPP2 C.S0084-006 Version 2.0, August 2007, "Connection Control Plane for Ultra Mobile Broadband (UMB) Air Interface Specification",

URL:http://www.3gpp2.org/

[3GPP LTE] 3GPP 36.331 "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification"

URL:http://www.3gpp.org/

2.2 Informative References

[22.071] 3GPP TS 22.071: "Location Services (LCS); Service description, Stage 1"

[23.271] 3GPP TS 23.271: "Functional stage 2 description of LCS"

[S.R0066] 3GPP2 SR0066-0 "IP Based Location Services – Stage 1 Requirements", URL: http://www.3gpp2.org/Public_html/specs/S.R0066-0_v1.0_110703.pdf

[X.S0002] 3GPP2 X.S0002-0_v2.0 "MAP Location Services Enhancements," URL : http://www.3gpp2.org/Public_html/specs/X.S0002-0_v2.0_060531.pdf

[IEEE 802.11] "IEEE Standard for Information technology—Telecommunications and information exchange between systems—Local and metropolitan area networks—Specific requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications," IEEE Std 802.11™-2007. URL: http://www.ieee.org

[NWG 1.1.2 stage 2] "WiMAX Forum Network Architecture, Stage 2: Architecture Tenets, Reference Model and Reference Points", Release 1.1,2, WiMAX Forum, 11-Jan-2008 http://www.wimaxforum.org/technology/documents/

[NWG 1.1.2 stage3] "WiMAX Forum Network Architecture, Stage 3: Detailed Protocols and Procedures", Release 1.1.2, WiMAX Forum, 11-Jan-2008 http://www.wimaxforum.org/technology/documents/

[IEEE 802.16-2004] IEEE Std 802.16-2004, "IEEE Standard for Local and metropolitan area networks, Part 16: Air Interface for Fixed and Mobile Broadband Wireless Access Systems", IEEE, 01-Oct-2004 http://www.ieee802.org/16/published.html

[IEEE 802.16e-2005] IEEE Std 802.16e-2005 and IEEE Std 80216-2004/Cor1-2005, "IEEE Standard for Local and metropolitan area networks, Part 16: Air Interface for Fixed and Mobile Broadband Wireless Access Systems, Amendment 2: Physical and Medium Access Control Layers for Combined Fixed and Mobile Operation in Licensed Bands, And Corrigendum 1", IEEE, 28-Feb-2006 http://www.ieee802.org/16/published.html

3. Terminology and Conventions

3.1 Conventions

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

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

3.2 Definitions

Application Service Provider	A provider of software applications that interface with a SUPL server.
Cell Global Identifier	Refers to the cell used by the Mobile Station at the start of the call. (See [23.271]).
Change of Area	A change of area reflects when a SET crosses a geographic area. The SET may be crossing into or out of an area.
Control Plane	The Control Plane is a functional plane containing the signalling structure for the user bearer management. Typically the control plane designates the circuit switched and packet switched wireless signalling networks which enable voice, data, supplementary service operation, etc.
GMLC	The Gateway Mobile Location Center (GMLC) contains functionality required to support LCS. In one PLMN, there may be more than one GMLC (See [23.271]).
GNSS	A Global Navigation Satellite System (GNSS) is a network of satellites that broadcasts navigation signals including time and distance data. GNSS receivers pick up these signals and calculate their precise location anywhere around the globe. Examples of GNSS include Global Positioning System (GPS), GALILEO, etc.,.
I-WLAN	The interworking WLAN refers to the system for interworking between GSM/UMTS/LTE or CDMA systems and WLAN. The intent of GSM/UMTS/LTE or CDMA –WLAN Interworking is to extend GSM/UMTS/LTE or CDMA services and functionality to the WLAN access environment. The GSM/UMTS/LTE or CDMA –WLAN Interworking System provides bearer services allowing a GSM/UMTS/LTE or CDMA subscriber to use a WLAN to access GSM/UMTS/LTE or CDMA PS based services.
I-WiMAX	The interworking WiMAX (I-WiMAX) refers to the system for interworking between 3GPP/3GPP2 systems and WiMAX. The intent of 3GPP/3GPP2–WiMAX Interworking is to extend 3GPP/3GPP2 services and functionality to the WiMAX access environment. The 3GPP/3GPP2–WiMAX Interworking System provides bearer services allowing a 3GPP/3GPP2 subscriber to use a WiMAX to access 3GPP/3GPP2 PS based services.
LCS	Provides the mechanisms to support mobile location services for operators, subscribers and third party service providers (See [23.271]).
Lg	Interface between Gateway MLC - VMSC, GMLC - MSC Server, GMLC - SGSN (gateway MLC interface) (See [23.271]).
Location Server	Software and/or hardware entity offering location capabilities.
Lr	Interface between Gateway MLCs (See [23.271]).
MLS application	An application which requests and consumes the location information. Note: this could be further qualified by distinguishing the application provider and actually application consumer of the location information
MLS application and SUPL Agent classes	MLS Application and SUPL Agent can be classified as follows: - Class1: MLS application and SUPL Agent are in the SET - Class 2: MLS application is in the network and the SUPL Agent is in the SET - Class 3: MLS application is in the SET and SUPL Agent is in the network - Class 4: MLS application and the SUPL Agent are in the network

Network specific parameter	Parameters, extracted from the mobile network, which can be used in a Position Calculation function.
Periodic Location Service	Location service where a multiple periodic location information is needed.
Policy Owner	The privacy policy owner of the SET. Defines/configures the privacy rules to which the MLS applications will comply to.
Quality of Position	A set of attributes associated with a request for the geographic position of a SET. The attributes include the required horizontal accuracy, vertical accuracy, maximum location age, and response time of the SET position.
Security Function	Security function manages the Authentication and Authorization for SUPL Agents and MLS Applications to access User Plane Location Services Note: Authentication between the SUPL Agent and MLS applications is beyond the scope of this work
SET user	User of the SET, the SET user MAY differ from the Policy owner.
SUPL Agent	Service access point which accesses the network resources to obtain location information
SUPL Agent classes	Classifies the deployment architecture of SUPL Agent and MLS application.
SUPL Enabled Terminal (SET)	A logical entity in a device that is capable of communicating with a SUPL network using the SUPL interface. Examples of this could be a UE in UMTS, an MS in GSM or CDMA, or a PC over an IP-based transport
SUPL Location Platform (SLP)	Entity responsible for SUPL Service Management and Position Determination.
SUPL Network	Access network which facilitates the Location determination functionality and provides the SUPL bearer.
SUPL Provider	Location information is sensitive personal information and requires specific care with privacy and security. The bearer related information (like e.g. "Global Cell Identifier") should not be accessible without the network provider's consent. So it is important that whatever policy the network provider decides, when applicable on the provision of SUPL, functionality cannot be breached. Valid scenarios would be: 1) The network provider is the single SUPL provider 2) The network provider and roaming partners are the only SUPL providers. 3) The network provider out-sources the SUPL functionality and there is a single 3rd party SUPL provider. 4) The network provider has an open policy on the provision of SUPL functionality and there are multiple 3rd party SUPL providers.
SUPL User	The user of a MLS application
Target SET	The SET that is being located as part of a SUPL session.
Third Party	A third party is an entity that receives the location information of a target SET from the location server (e.g. GMLC, MPC or SLP).
Timing Advance	Parameter in GSM network indicating distance between Base Station and terminal.
Triggered Location Request	A location request that is initiated due to either a periodic time event or a change of area event.
User Plane	The user plane designates the functional plane where the information is part of the wireless user data and is transported over user bearers such as the wireless packet data network or SMS.
WLAN	A local area network that provides wireless access via IEEE [IEEE 802.11]..

3.3 Abbreviations

3GPP	3rd Generation Partnership Project (3GPP)
3GPP2	3rd Generation Partnership Project 2 (3GPP2)

AFLT	Advanced Forward Link Trilateration
A-GNSS	Assisted Global Navigation Satellite System
A-GPS	Assisted Global Positioning System
API	Application Programming Interface
CDMA	Code Division Multiple Access
CGI	Cell Global Identifier
DoS	Denial of Service
DTD	Document Type Definition
E-CI	Enhanced Cell-ID
EOTD	Enhanced Observed Time Difference
GMLC	Gateway Mobile Location Center (see [23.271])
GMT	Greenwich Mean Time
GNSS	Global Navigation Satellite System
GPRS	General Packet Radio Service
GPS	Global Positioning System
GSM	Global Systems for Mobile Communications
HPLMN	Home Public Land Mobile Network (See [23.271])
HRPD	High Rate Packet Data
H-SLP	Home SLP
HTTP	Hypertext Transfer Protocol
HTTPS	HTTP Secure
I-WLAN	Interworking WLAN
I-WiMAX	Interworking WiMAX
LAN	Local area network
LCS	Location Services
LTE	Long Term Evolution
MLC	Mobile Location Center
MLP	Mobile Location Protocol
MLS	Mobile Location Services
MS	Mobile Station
OMA	Open Mobile Alliance
OTDOA	Observed Time Difference of Arrival
P2M	Point-to-Multipoint
P2P	Point-to-Point
PS	Packet switched services
QoP	Quality of Position
RD	Requirement Document
SET	SUPL Enabled Terminal
SLP	SUPL Location Platform
SMS	Short Message Service

SUPL	Secure User Plane Location
TD-SCDMA	Time Division-Synchronous Code Division Multiple Access
UE	User Equipment
UMB	Ultra Mobile Broadband
UMTS	Universal Mobile Telecommunications Service
WCDMA	Wideband Code Division Multiple Access
WiMAX	Worldwide Interoperability for Microwave Access Forum

4. Introduction (Informative)

Location services based on the location of mobile devices are becoming increasingly widespread. SUPL (Secure User Plane Location) employs user plane data bearers for transferring location assistance information such as GPS assistance data, and for carrying positioning technology-related protocols between mobile terminal and the network. SUPL is intended as an alternative and complement to the existing standards based on signalling in the mobile network control plane.

SUPL assumes that the mobile network or other access network is capable of establishing a data bearer connection between terminal and location server.

SUPL utilises existing standards where available and possible, and SUPL should be extensible to enabling more positioning technologies as the need arises so that they utilise the same mechanism. In the initial phase, SUPL will provide full functionality of A-GPS with minimum changes of current network elements. From SUPL Release 2, A-GNSS concept is introduced to allow all possible Navigation Satellite System assisted positioning technology be utilized, e.g. GPS, GALILEO, and so on.

Note: Applicability of a particular A-GNSS is subject to the support in relevant 3GPP and 3GPP2 specifications that SUPL is reliant on.

This SUPL RD describes the high-level functional requirements for SUPL including SUPL-specific security, interoperability, and privacy.

SUPL is not an application interface protocol. It does not expose an API to LCS applications. Other OMA specifications such as MLP are designed for that function. Hence, any reference to an MLS application in this document, is assumed to request location information via a specification such as MLP.

5. Use Cases (Informative)

5.1 Locating a SET attached to a WLAN network

5.1.1 Short Description

Capability: Locating a SET attached to a WLAN network.

When a SET attached to WLAN network supports SUPL, the MLS application in the network can request and obtain the location of a SET.

When a SET attached to WLAN network supports SUPL, the MLS application in the SET can request and obtain the location of a SET.

5.1.2 Actors

A SET attached to a WLAN network

Network resident MLS application requesting the location of a SET

SET resident MLS application requesting the location of a SET.

SUPL Provider

WLAN Network

5.1.2.1 Actor Specific Issues

The WLAN network is a SUPL enabled network. SUPL enabled network means that the network has a SUPL provider.

A SET is attached to a WLAN network.

5.1.2.2 Actor Specific Benefits

Network resident MLS application can obtain the location of a SET attached to a WLAN network.

SET resident MLS application can obtain the location of a SET attached to a WLAN network.

5.1.3 Pre-conditions

A SET is attached to WLAN network.

5.1.4 Post-conditions

The resulting location information of the targeted SET should be processed securely.

5.1.5 Normal Flow

1. A Network resident MLS application requests the position of a SET attached to a WLAN network.
2. The SUPL provider in the WLAN network communicates with the SET to obtain the position of the SET.
3. After computing the position of the SET, the resulting position is provided to the MLS application via a location application protocol, such as MLP.

5.1.6 Alternative Flow

1. A SET resident MLS application requests the position of the SET attached to a WLAN network.
2. The SUPL provider in the WLAN network communicates with the SET to obtain the position of the SET.

3. After computing the position of the SET, the resulting position is provided to the MLS application in the SET.

5.1.7 Operational and Quality of Experience Requirements

N/A

5.2 Positioning of a SET attached to an Interworking WLAN

5.2.1 Short Description

Capability: Locating a SET attached to an interworking WLAN architecture. The interworking WLAN refers to the network for interworking between GSM/UMTS/LTE or CDMA network and WLAN. The intent of GSM/UMTS/LTE or CDMA – WLAN Interworking is to extend GSM/UMTS/LTE or CDMA services and functionality to the WLAN access environment. The GSM/UMTS/LTE or CDMA –WLAN Interworking network provides bearer services allowing a GSM/UMTS/LTE or CDMA subscriber to use a WLAN to access GSM/UMTS/LTE or CDMA PS based services.

When the SET is attached to interworking WLAN network, the MLS application in the network can request and obtain the location of a SET.

When a SET is attached to interworking WLAN network supports SUPL, the MLS application in the SET can request and obtain the location of a SET.

5.2.2 Actors

SUPL Enabled Terminal is attached to the interworking WLAN network

SUPL Provider

Network resident MLS application requesting the location of a SET.

SET resident MLS application requesting the location of a SET.

GSM/UMTS/LTE or CDMA Interworking WLAN Network

5.2.2.1 Actor Specific Issues

The interworking WLAN refers to the network for interworking between GSM/UMTS/LTE or CDMA network and WLAN to extend GSM/UMTS/LTE or CDMA services and functionality to the WLAN access environment.

A SET attached to an I-WLAN network.

5.2.2.2 Actor Specific Benefits

Network resident MLS application can obtain the location of a SET attached to an interworking WLAN network.

SET resident MLS application can obtain the location of a SET attached to a interworking WLAN network.

5.2.3 Pre-conditions

A SET is attached to an interworking WLAN network and authenticated.

5.2.4 Post-conditions

The resulting location information of the targeted SET should be processed securely.

5.2.5 Normal Flow

1. A Network resident MLS application requests the position of a SET attached to an interworking WLAN network.

2. The SUPL provider in the interworking WLAN network communicates with the SET to obtain the position of the SET.

3. After computing the position of the SET, the resulting position is provided to the MLS application via an location application protocol, such as MLP.

4. A network resident MLS application provides a location services.

5.2.6 Alternative Flow

1. A SET resident MLS application requests the position of the SET attached to an interworking WLAN network.

2. The SUPL provider in the interworking WLAN network communicates with the SET to obtain the position of the SET.

3. After computing the position of the SET, the resulting position is provided to the MLS application in the SET.

5.2.7 Operational and Quality of Experience Requirements

N/A.

5.3 Use Case: Enhanced SET originated location request

5.3.1 Short Description

Capability: Enhanced SET Originated Location Request SHALL allow a SET resident MLS application to request the position from another target terminal, (which is not restricted to a SUPL Enabled Terminal) from the network.

The request will be validated against a privacy framework.

When the SUPL User accesses a SET resident application, the application requests the location of the target terminal from its SUPL agent. A Service Response is sent back to the SUPL User.

Depending upon the privacy settings of the target User, a notification or confirmation message is sent to the target User. If the privacy settings of the target user indicate no notification or confirmation; the target terminal is located without notification or confirmation of the target User.

5.3.2 Actors

SUPL User: Wants to use the application resident on the requesting SET.

Target User: User of the terminal being located.

Requesting SET: Requesting SUPL Enabled Terminal.

Target terminal: Target terminal which is located by the SUPL User.

SET resident application: Location enabled application which has access to, and utilises, SUPL functionality.

SUPL Agent: Application access point handling and proving SUPL functionality.

The H-SLP of the Target terminal which provides the location request service to the SUPL Agent.

5.3.2.1 Actor Specific Issues

Target terminal can be located by any means of location technique supported, and is outside scope of the location request by the requesting SET. Requesting SET can however request a certain QoP.

5.3.2.2 Actor Specific Benefit

Requesting SET, will be able to determine the location of another target terminal, whilst obeying the privacy setting of target user.

5.3.3 Pre-conditions

SUPL User is authorised to make the Enhanced SET originated location request.

The Enhanced SET originated location request must be send to the H-SLP.

The privacy settings related to target user enable the target terminal to be located by requesting SET.

5.3.4 Post-conditions

The requesting SET has retrieved the location of target terminal and result is presented to the SUPL User.

5.3.5 Normal Flow

1. A SUPL User subscribes to a SET resident MLS application, which has access to the SUPL agent on the SET.
2. The SUPL agent on the SET requests the location of the target terminal from the network (H-SLP).
3. The H-SLP resolves the location of the target terminal.
4. The location information related to target terminal is returned to the requesting SET SUPL agent.
5. The SET SUPL agent forwards the result to the SET resident MLS application.

5.3.6 Alternative Flow

The target terminal User declines the location request by the SUPL User.

A corresponding result message is returned to the requesting SET SUPL agent.

5.3.7 Operational and Quality of Experience Requirements

N/A.

5.4 Notification and Verification based on current location

5.4.1 Short Description

Capability: A SET User demands different privacy policies to be applied depending on the current location of SET. In other words, a SUPL User may want notification of the positioning attempt based on the current location of his/her SET. For example, at home, a SUPL User would allow the positioning without notification of his/her SET, however, at the office, a SUPL User may want notification of the request and be prompted for authorization. Under these conditions, an application must notify and obtain reporting authorization from the SUPL User of target SET after performing positioning but prior to reporting the location of target SET. Thus the SUPL User of the target SET shall be given an opportunity to accept or reject the positioning attempt only when the user is at chosen location (s) that are specified in the SUPL User's privacy profile. In these circumstances, the SUPL User will have to be located first and an additional privacy checking, on his/her location will be performed. This additional privacy check may result in the SUPL User being notified before his location is sent to the requesting entity.

5.4.2 Actors

SUPL User wants to be notified of and prompted for authorization to the positioning attempt based on the user's current location.

SUPL Enabled Terminal

SUPL Provider

Network resident MLS application.

5.4.2.1 Actor Specific Issues

N/A

5.4.2.2 Actor Specific Benefits

In this case, the SUPL User benefits from the improved privacy mechanism provided by notification based on current location.

5.4.3 Pre-conditions

The privacy option of the SUPL User is set as “notification with verification based on current location”. The several preferred areas and the privacy settings for designated areas are also specified by the authorized SUPL User.

5.4.4 Post-conditions

N/A

5.4.5 Normal Flow

1. The Network resident MLS application requests the position of a SUPL User.
2. The SLP checks the privacy options of the target SUPL User.
3. The SLP initiates the network initiated SUPL procedures after knowing that the privacy option is set as “notification with verification based on current location”. Before positioning, no "notification" or "notification and verification" procedure is carried out.
4. After positioning the SUPL User, the SLP determines that the position of the target SET belongs to the preferred geographical areas specified by the SUPL User.
5. The SUPL User is notified and prompted for authorization for the positioning attempt.
6. The SUPL User grants his/her acceptance of the positioning attempt.
7. The SLP will report the location of the target SET of SUPL User to the application.

5.4.6 Alternative Flow

1. The Network resident MLS application requests the position of a SUPL User.
2. The SLP checks the privacy options of the target SUPL User.
3. The SLP initiates the network initiated SUPL procedures after knowing that the privacy option is set as “notification with verification based on current location”. Before positioning, no "notification" or "notification and verification" procedure is carried out.
4. After positioning the SUPL User, the SLP determines that the position of the target SET belongs to the preferred geographical areas specified by the SUPL User.
5. The SUPL User is notified and prompted for authorization for the positioning attempt.
6. The SUPL User rejects his/her acceptance of the positioning attempt.
7. The SLP will report an error set as “Failed positioning attempt” to the application, but keeps locally the fact that the positioning attempt was rejected by the SUPL User.

5.4.7 Operational and Quality of Experience Requirements

N/A.

5.5 Triggered location request – "Change of area" event trigger

5.5.1 Short Description

Capability: The "Change of area" triggered location request service informs the client of the SET's location when a requested event occurs, this event being that the SET enters or leaves a predefined area.

This use case describes a network-initiated triggered location request.

5.5.2 Actors

The client which requests the "Change of area" triggered location request service to the SLP. It resides in the network side (Network Initiated case).

The SLP which provides the "Change of area" triggered location request service to the client.

A SET which is capable of executing the positioning procedure with the SLP.

5.5.2.1 Actor Specific Issues

The client can define the event occurrence conditions (area definition and trigger launch condition: e.g. "entering the area" or "leaving the area"). The client should be authorized to request the "Change of area" triggered location request service.

SUPL elements will check for event occurrence.

A rule or a method to stop or to pause/resume the triggered positioning procedure needs to be defined.

5.5.2.2 Actor Specific Benefits

The client has access to a "Change of area" triggered location request service, allowing it to make only one request to the SLP instead of making multiple requests. This improves the signalling between SUPL elements and reduces the number of location requests: not all parameters are needed for every location determination, the change of area location report can be agreed upon once between the SET and the SLP for a large number of location determinations.

5.5.3 Pre-conditions

The user of the target SET has approved that his/her location can be sent to the client..

5.5.4 Post-conditions

The client gets location reports when the "Change of area" triggered location request service identifies that the "Change of area" event has occurred.

5.5.5 Normal Flow

1. The client requests the "Change of area" triggered location request service to the SLP with the identity of the target SET,the area definition and the trigger launch condition: e.g. "entering the area" or "leaving the area".
2. The SLP begins the "Change of area" triggered location request set-up procedure with the SET.
3. The SUPL elements check for the event occurrence.
4. The SLP sends the location report to the client only when the predefined "Change of area" event occurs.

5.5.6 Alternative Flow

If the client requests that the SLP terminates the triggered service, the triggered service will be terminated. This shall lead to a termination procedure between SUPL elements.

By some reason the SLP may terminate the triggered service, this shall lead to a termination procedure between SUPL elements.

If the SET requests that the SLP terminates the triggered service, the triggered service will be terminated. This shall lead to a termination procedure between SUPL elements.

If the SET user requests the triggered service to be paused, no locations or events shall be reported to the client until the SET user requests the triggered service to be resumed.

5.5.7 Operational and Quality of Experience Requirements

Privacy is critical for this service. The "Change of area" triggered location request service should be served with the permission of the target SET's user.

Also, this service must be able to dynamically take into account modifications that might occur in the user's permissions settings.

5.6 Triggered location request – "Periodic" trigger

5.6.1 Short Description

Capability: The "Periodic" triggered location request service generates multiple location determinations of the target terminal at periodic intervals.

This use case describes a network-initiated "Periodic" triggered location request

5.6.2 Actors

The client which requests the "Periodic" triggered location request service to the SLP. It resides in the network side (Network Initiated case).

The SLP which provides the "Periodic" triggered location request service to the SUPL Agent.

A SET which is capable of executing the positioning procedure with the SLP.

5.6.2.1 Actor Specific Issues

The client can define the trigger conditions (period interval, start time, stop time).

The client should be authorized to request the "Periodic" triggered location request service.

SUPL elements perform a location determination at each interval.

A rule or a method to stop or to pause/resume the triggered positioning procedure needs to be defined.

5.6.2.2 Actor Specific Benefits

The client has access to a "Periodic" triggered location request service, allowing it to make only one request to the SLP instead of making multiple requests to the SLP.

This improves the signalling between SUPL elements and reduces the number of location requests: not all parameters are needed for every location determination, the periodic location report can be agreed upon once between the SUPL elements for a large number of location determinations.

5.6.3 Pre-conditions

The user of the target SET has approved that his/her location can be sent to the client.

5.6.4 Post-conditions

The client gets location reports at pre-defined periodic intervals.

5.6.5 Normal Flow

1. The client requests the "Periodic" triggered location request service to the SLP with the identity of the target SET and the trigger launch condition: start time, time interval, stop time.
2. The SLP begins the "Periodic" triggered location request set-up procedure with the SET.
3. A location determination is made at the pre-defined periodic intervals.
4. The SLP sends the location report to the client.

5.6.6 Alternative Flow

If the client requests that the SLP terminates the triggered service, the triggered service will be terminated. This shall lead to a termination procedure between SUPL elements.

By some reason the SLP may terminate the triggered service, this shall lead to a termination procedure between SUPL elements.

If the SET requests that the SLP terminates the triggered service, the triggered service will be terminated. This shall lead to a termination procedure between SUPL elements.

If the SET user requests the triggered service to be paused, no locations or events shall be reported to the client until the SET user requests the triggered service to be resumed.

5.6.7 Operational and Quality of Experience Requirements

Privacy is critical for this service. The "Periodic" triggered location request service should be served with the permission of the target SET's user.

Also, this service must be able to dynamically take into account modifications that might occur in the user's permissions settings.

5.7 Transfer location information to the third party

5.7.1 Short Description

Capability: Notify the third party (can be more than one) the location of the target SET.

When the SUPL user initiates the SET initiated positioning procedure, the SUPL user may want to send his/her location to a third party via the SLP. When the positioning succeeds, the SLP will send the location estimate of the target SET, which initiates this positioning procedure, to the third party. Numerous applications can be realized with this functionality. For example, a child can inform the parent of his/her location and an employee can broadcast his/her location to the other colleagues of a delivery service and so on.

5.7.2 Actors

A SUPL User wants to send his/her location to the third party.

A third party will be notified of the location of a certain SET.

5.7.2.1 Actor Specific Issues

N/A

5.7.2.2 Actor Specific Benefits

It is possible for the SUPL user to send his/her location to third party.

5.7.3 Pre-conditions

N/A

5.7.4 Post-conditions

N/A

5.7.5 Normal Flow

1. A SUPL user runs an application, the location notification service, to send his/her location to a third party. For example, a child can inform the parent of his/her location. An employee can broadcast his/her location to the other colleagues of a delivery service and so on.
2. The SUPL user will specify the third party when he/she requests the location notification service. In some cases, when the application runs, the third party can be automatically designated. For the children, the third party can be the parent of the children.
3. The target SET requests the SLP to obtain own location and to deliver the positioning result to the third party.
4. The target SET and the SLP perform the SUPL procedure to obtain the position of the target SET.
5. The SLP sends the location of the target SET to the designated third party.

5.7.6 Alternative Flow

N/A

5.7.7 Operational and Quality of Experience Requirements

N/A

5.8 Locating a SET attached to a WiMAX network

5.8.1 Short Description

Capability: Locating a SET attached to a WiMAX network.

When a SET attached to WiMAX network supports SUPL, the MLS application in the network can request and obtain the location of a SET.

When a SET attached to WiMAX network supports SUPL, the MLS application in the SET can request and obtain the location of a SET.

5.8.2 Actors

A SET attached to a WiMAX network

Network resident MLS application requesting the location of a SET

SET resident MLS application requesting the location of a SET.

SUPL Provider

WiMAX Network

5.8.2.1 Actor Specific Issues

The WiMAX network is a SUPL enabled network. SUPL enabled network means that the network has a SUPL provider.

A SET is attached to a WiMAX network.

5.8.2.2 Actor Specific Benefits

Network resident MLS application can obtain the location of a SET attached to a WiMAX network.

SET resident MLS application can obtain the location of a SET attached to a WiMAX network.

5.8.3 Pre-conditions

A SET is attached to WiMAX network.

5.8.4 Post-conditions

The resulting location information of the targeted SET should be processed securely.

5.8.5 Normal Flow

1. A Network resident MLS application requests the position of a SET attached to a WiMAX network.
2. The SUPL provider in the WiMAX network communicates with the SET to obtain the position of the SET.
3. After computing the position of the SET, the resulting position is provided to the MLS application via a location application protocol, such as MLP.

5.8.6 Alternative Flow

1. A SET resident MLS application requests the position of the SET attached to a WiMAX network.
2. The SUPL provider in the WiMAX network communicates with the SET to obtain the position of the SET.
3. After computing the position of the SET, the resulting position is provided to the MLS application in the SET.

5.8.7 Operational and Quality of Experience Requirements

N/A

5.9 Locating a SET attached to a UMB network

5.9.1 Short Description

Capability: Locating a SET attached to a UMB network.

When a SET attached to UMB network supports SUPL, the MLS application in the network can request and obtain the location of a SET.

When a SET attached to UMB network supports SUPL, the MLS application in the SET can request and obtain the location of a SET.

5.9.2 Actors

A SET attached to a UMB network

Network resident MLS application requesting the location of a SET

SET resident MLS application requesting the location of a SET.

SUPL Provider

UMB Network

5.9.2.1 Actor Specific Issues

The UMB network is a SUPL enabled network. SUPL enabled network means that the network has a SUPL provider.

A SET is attached to a UMB network.

5.9.2.2 Actor Specific Benefits

Network resident MLS application can obtain the location of a SET attached to a UMB network.

SET resident MLS application can obtain the location of a SET attached to a UMB network.

5.9.3 Pre-conditions

A SET is attached to UMB network.

5.9.4 Post-conditions

The resulting location information of the targeted SET should be processed securely.

5.9.5 Normal Flow

1. A Network resident MLS application requests the position of a SET attached to a UMB network.
2. The SUPL provider in the UMB network communicates with the SET to obtain the position of the SET.
3. After computing the position of the SET, the resulting position is provided to the MLS application via a location application protocol, such as MLP.

5.9.6 Alternative Flow

1. A SET resident MLS application requests the position of the SET attached to a UMB network.
2. The SUPL provider in the UMB network communicates with the SET to obtain the position of the SET.
3. After computing the position of the SET, the resulting position is provided to the MLS application in the SET.

5.9.7 Operational and Quality of Experience Requirements

N/A

5.10 Locating a SET attached to a LTE network

5.10.1 Short Description

Capability: Locating a SET attached to a LTE network.

When a SET attached to LTE network supports SUPL, the MLS application in the network can request and obtain the location of a SET.

When a SET attached to LTE network supports SUPL, the MLS application in the SET can request and obtain the location of a SET.

5.10.2 Actors

A SET attached to a LTE network

Network resident MLS application requesting the location of a SET

SET resident MLS application requesting the location of a SET

SUPL Provider

LTE Network

5.10.2.1 Actor Specific Issues

The LTE network is a SUPL enabled network. SUPL enabled network means that the network has a SUPL provider.

A SET is attached to a LTE network.

5.10.2.2 Actor Specific Benefits

Network resident MLS application can obtain the location of a SET attached to a LTE network.

SET resident MLS application can obtain the location of a SET attached to a LTE network.

5.10.3 Pre-conditions

A SET is attached to LTE network.

5.10.4 Post-conditions

The resulting location information of the targeted SET should be processed securely.

5.10.5 Normal Flow

1. A Network resident MLS application requests the position of a SET attached to a LTE network.
2. The SUPL provider in the LTE network communicates with the SET to obtain the position of the SET.
3. After computing the position of the SET, the resulting position is provided to the MLS application via a location application protocol, such as MLP.

5.10.6 Alternative Flow

1. A SET resident MLS application requests the position of the SET attached to a LTE network.
2. The SUPL provider in the LTE network communicates with the SET to obtain the position of the SET.
3. After computing the position of the SET, the resulting position is provided to the MLS application in the SET.

5.10.7 Operational and Quality of Experience Requirements

N/A

6. Requirements (Normative)

The requirements in this section define the full SUPL Enabler.

6.1 High-Level Functional Requirements

Label	Description	Enabler Release
HLFR-01	SUPL SHALL support positioning procedures performed in collaboration with the target SET and a network resident SUPL function.	SUPL V1.0
HLFR-02	SUPL SHALL support Network-initiated location requests. Network-initiated locating use cases SHALL support P2P (point-to-point) connections and they, if technically feasible, MAY support P2M (point-to-multipoint) connections for emergency. For example, a P2M (point-to-multiple) connection which broadcasts to multiple devices/users is useful for emergency services, especially in a building or hot spot area.	SUPL V1.0
HLFR-03	SUPL SHALL support SET-initiated location requests.	SUPL V1.0
HLFR-04	Immediate location requests SHALL be supported.	SUPL V1.0
HLFR-05	Location information is the result of a successful SUPL location transaction, and SHALL at a minimum, consist of latitude, longitude and timestamp (time at which location estimate is made) but can contain other information, including shape, uncertainty, altitude, speed, direction, QoP, etc.	SUPL V1.0
HLFR-06	A SUPL Agent SHALL be able to specify the desired QoP, including but not limited to accuracy, response time and age of location, in requesting the location of a SET.	SUPL V1.0
HLFR-07	Where multiple transmission methods are available in a network, and the primary transmission method fails or is not available (e.g., GPRS in a voice call with a class B handset) then it SHALL be possible to use an alternative bearer to successfully perform a full session that has been interrupted by the primary transmission method becoming unavailable.	SUPL V1.0
HLFR-08	The SUPL architecture and protocol specification SHOULD not be the limiting factor in the location reporting interval from the SUPL system. E.g., for an underlying Location Technology and Bearer Technology combination that provides a 10 second reporting interval, SUPL should not degrade this reporting interval.	SUPL V2.0
HLFR-09 Triggered Location Requests	Triggered location requests SHALL be supported. Triggered location requests are requests, which require event-based location reporting, or location reporting triggered by some other condition.	SUPL V2.0
HLFR-10 Priority	It SHALL be possible to differentiate between the priorities of different location requests. E.g., it may be necessary to differentiate emergency service requests from commercial services.	SUPL V2.0
HLFR-11	SUPL SHALL support SET-initiated location request for the transfer of the SET's position information to a third party.	SUPL V2.0
HLFR-12	SUPL SHALL support SET-initiated location request to obtain the location of another Target SET	SUPL V2.0

Table 1: High-Level Functional Requirements

6.1.1 Security

Label	Description	Enabler Release
SEC-01	SUPL SHALL ensure that any location information that is stored or exchanged is secure and thus is not accessible to unauthorized access, i.e., unauthorized disclosure, usage, loss or corruption of location data is prevented. - If SUPL provides the ability for the SET or SUPL network to store location information, the location data SHALL be stored in a secure manner and SHALL be available for retrieval by authorized applications. - Note that the authorization here is governed by the Policy owner privacy requirements (i.e., user privacy preferences/profile) and local regulations. Stored location data SHALL only be accessible to those applications that are authorized by the Policy owner. - Emergency services and lawful purposes are exempted from this requirement in that they can override any user privacy preference setting.	SUPL V1.0
SEC-02	SUPL SHALL deliver its content (data which facilitates the SUPL transaction) in a trustworthy and reliable manner, e.g., Location information SHALL be protected against eavesdropping or modification of the data traffic.	SUPL V1.0
SEC-03	It SHALL be possible to authenticate the SUPL Agent, SUPL network and SET user.	SUPL V1.0
SEC-04	SUPL 2.0 specifications SHOULD provide mechanisms to prevent Denial of Service (DoS) attacks	SUPL V2.0

Table 2: High-Level Functional Requirements – Security Items

6.1.1.1 Authentication

Non identified.

6.1.1.2 Authorization

Non identified.

6.1.1.3 Data Integrity

Non identified.

6.1.1.4 Confidentiality

Non identified.

6.1.2 Charging

Label	Description	Enabler Release
CRG-01	SUPL SHALL support the ability for the SUPL provider to apply different charging schemes depending on the service provided. Note that the cost of SUPL to a SET user may be a QoP parameter, which is negotiated between the SET user application and the SUPL Provider	SUPL V1.0
CRG-02	SUPL SHALL record the appropriate information to enable charging schemes, including but not limited to: SET identity, QoP requested, QoP provided, timestamp.	SUPL V1.0

Table 3: High-Level Functional Requirements – Charging Items

6.1.3 Administration and Configuration

Label	Description	Enabler Release
ADMC-01	The architecture SHALL enable SUPL service management and location information control in both the SET and the network, depending on the SUPL Provider's requirements.	SUPL V1.0
ADMC-02	Where the SUPL provider supports the use case to supply the SET with assistance data only, the SET SHALL control the location information.	SUPL V1.0

Table 4: High-Level Functional Requirements – Administration and Configuration Items

6.1.4 Usability

Label	Description	Enabler Release
USAB-01	As SUPL is time-sensitive, all SUPL events and transactions SHALL be time-stamped and SHALL use the most recent up-to-date data available (High Data Quality). The content of the service SHALL be based on up-to-date data. Consistency and coherency are other important factors.	SUPL V1.0
USAB-02	SUPL SHALL be available for value-added commercial applications as well as for emergency service applications within the technical limitations of each access network (Service Support). Additionally, the SUPL architecture SHALL be able to differentiate between emergency services and commercial services. Note 1: In some networks it is not possible to support simultaneous voice and data communication, Hence if simultaneous communication is not supported, SUPL will not be available during voice communication.	SUPL V2.0

Table 5: High-Level Functional Requirements – Usability Items

6.1.5 Interoperability

Label	Description	Enabler Release
IOP-01	The SUPL reference architecture SHALL allow co-existence with existing location related standards specified by 3GPP2, 3GPP and IEEE, i.e., the SUPL architecture SHALL NOT negatively impact the operation and performance of existing standards in any way.	SUPL V2.0
IOP-02	SUPL SHALL support the positioning of roaming SET users. This will include roaming in the context of the bearer utilised for the secure user plane, the SET user, the MLS application and both the SET user and the MLS application. SUPL SHALL support SET roaming between a network which adopts SUPL and a network which adopts existing LCS standards (e.g., [X.S0002], [23.271]). The SUPL architecture needs to work within the framework of these roaming standards and provide support where gaps specific to SUPL are identified. If the roaming network does not have location capability such as A-GPS, alternative solutions MAY be applied. In order to provide seamless QoP to a SET user, it SHALL be possible for SET user roaming in a network which does not support A-GPS to be served by a SUPL provider via its home network.	SUPL V1.0
IOP-03	The SUPL architecture SHALL provide backward compatibility mechanisms (e.g., protocol versioning).	SUPL V1.0
IOP-04	The architecture SHALL support the ability for a SET to provide its SUPL specific capabilities to the SUPL network.	SUPL V1.0

IOP-05	The architecture SHALL support the ability for a SUPL provider to provide its SUPL specific capabilities to the SET.	SUPL V1.0
IOP-06	SUPL SHALL provide the capability to negotiate between SUPL elements such that the SUPL session MAY fallback to an earlier version, if such fallback is allowed by the SUPL Provider and if the requested service is available in the earlier version.	SUPL V2.0
IOP-07	SUPL SHALL support the ability to negotiate positioning protocols versions	SUPL V2.0

Table 6: High-Level Functional Requirements – Interoperability Items

6.1.6 Privacy

Label	Description	Enabler Release
PRIV-01	SUPL SHALL ensure that the end-user's privacy is protected in all transactions consistent with the user's privacy preferences, except for emergency or lawful purposes depending on local/regional regulations. Note that multiple layers of privacy protection MAY be provided.	SUPL V1.0
PRIV-02	SUPL SHALL support a general and synchronised privacy framework. Note that MLS application, SUPL Agent, SUPL network and SET can be part of several domains: Mobile Network Operator, IT domain or device domain. Therefore, several service architectures can be derived from these three domains. As the MLS application, SUPL Agent, SUPL network and SET can be part of the above-mentioned domains, the same level of privacy management SHALL be performed for all service architectures.	SUPL V1.0
PRIV-03	SUPL SHALL support privacy check after positioning if the Policy owner has defined different privacy settings for different geographical locations.	SUPL V2.0
PRIV-04	SUPL SHALL support the notification and verification conditional on the current location of the SET of SUPL user. In this case the notification and, if defined in the SUPL user's privacy settings, verification SHALL be performed after the target SET is positioned but before reporting the location of target SET to MLS Client.	SUPL V2.0

Table 7: High-Level Functional Requirements – Privacy Items

6.1.7 Location Technology

Label	Description	Enabler Release
LOCT-01	The architecture SHALL support Cell ID positioning. Deployment of each technology option is a SUPL provider decision. However, in a Mobile Network, Cell ID SHALL always be the backup positioning method when other positioning methods fail.	SUPL V1.0
LOCT-02	The architecture SHALL support Enhanced Cell ID positioning. Enhanced Cell-ID (E-CI) positioning is defined as enhancing Cell ID positioning by using additional measurements from the Mobile Network that are available in the SET.	SUPL V1.0
LOCT-03	The architecture SHALL support A-GPS positioning.	SUPL V1.0
LOCT-04	The architecture SHALL support standalone-positioning technologies, e.g., autonomous GNSS.	SUPL V2.0
LOCT-05	The architecture SHALL support EOTD positioning if EOTD measurements are available.	SUPL V1.0
LOCT-06	The architecture SHALL support OTDOA positioning if OTDOA measurements are available.	SUPL V1.0

LOCT-07	The architecture SHALL support AFLT positioning if AFLT measurements are available.	SUPL V1.0
LOCT-08	The architecture SHALL support the delivery of assistance data from the SUPL network to the SET.	SUPL V1.0
LOCT-09	SUPL architecture SHALL support an extensible framework so that new location technologies, supported by the network, can be added efficiently and in-line with the overall architecture.	SUPL V1.0
LOCT-10	The architecture SHALL support A-GNSS positioning according to 3GPP and 3GPP2 specifications.	SUPL V2.0

Table 8: High-Level Functional Requirements – Location Technology Items

6.1.8 Emergency Services

Label	Description	Enabler Release
EMER-01	SUPL SHALL allow support for location requests associated with emergency services where applicable by local regulatory requirements.	SUPL V2.0
EMER-02	It SHALL be possible for emergency services location requests to have a higher priority than other location requests based on local regulatory requirements.	SUPL V2.0

Table 9: High-Level Functional Requirements – Emergency Services Items

6.1.9 Triggered Location Requests

Label	Description	Enabler Release
TRIG-01	SUPL SHALL support the periodic trigger of the triggered location request.	SUPL V2.0
TRIG-02	SUPL SHALL support the area event trigger of the triggered location request. The area event is the event where the SET enters, leaves, is inside, or is outside a pre-defined geographical area.	SUPL V2.0

Table 10: High-Level Functional Requirements – Triggered Location Requests Items

6.2 Overall System Requirements

Label	Description	Enabler Release
OSR-01	The SUPL reference architecture and specifications SHALL be compatible with all underlying network technologies (Data Bearer Independence). For example, air interface standards (GSM, WCDMA/TD-SCDMA, LTE, CDMA, HRPD, UMB, WLAN, WiMAX) and transport media (packet data services, SMS, etc) MUST be supported.	SUPL V2.0
OSR-02	SUPL SHALL NOT impose any requirements on the underlying data bearer service. Hence it MUST NOT be necessary to modify the architecture or functionality in underlying network technology.	SUPL V1.0
OSR-03	The SUPL reference architecture will introduce new logical functions. It MUST be possible for these functions to be either hosted in existing LCS elements (for example the GMLC) or in completely new physical entities.	SUPL V1.0
OSR-04	The architecture SHALL support storage of location information for a SET user in order to provide it at a later time.	SUPL V1.0
OSR-05	SUPL SHALL be made adaptable to different legislative environments and variable security requirements so that it is legal to deploy and use SUPL, enabling applications utilizing location information under the laws of different countries.	SUPL V1.0
OSR-06	SUPL SHALL NOT prevent the Application Service Provider from choosing a SUPL provider.	SUPL V1.0

OSR-07	SUPL SHALL support the positioning of a SET attached to a WLAN network.	Future
OSR-08	SUPL SHALL support the positioning of a SET attached to an I-WLAN network.	SUPL V2.0
OSR-09	SUPL SHALL support the positioning of a SET attached to a WiMAX network.	SUPL V2.0
OSR-10	SUPL SHALL support the positioning of a SET attached to an I-WiMAX network.	SUPL V2.0

Table 11: High-Level System Requirements

Appendix A. Change History (Informative)

A.1 Approved Version History

Reference	Date	Description
n/a	n/a	No prior version –or- No previous version within OMA

A.2 Draft/Candidate Version 2.0 History

Document Identifier	Date	Sections	Description
Draft Versions OMA-RD-SUPL -V2_0	23 Aug 2005	All	Initial draft RD for V2.0
	30 Aug 2005	5.1; 5.2; 5.3; 6.1; 6.1.5; 6.1.6; 6.1.8 (New); 6.2	Updated draft RD for V2.0 based on approved contributions at LOC WG August meeting in Montreal, Canada. The requirements were updated based on the following CRs: • OMA-LOC-2005-0374-CR_Use_Case_SUPL_over_WLAN • OMA-LOC-2005-0375-CR_Use_Case_SUPL_over_WLAN_Interworking_with_3GPP_3GPP2 • OMA-LOC-2005-0404-SUPL-2.0-Enhanced-SET-Originated-Request-UseCase • OMA-LOC-2005-0376R02 -CR_SUPL_2.0_RD_Privacy • OMA-LOC-2005-0379R02 -CR_SUPL_2.0_RD_location_information_delivery • OMA-LOC-2005-0380R01 -CR_SUPL_2.0_RD_WLAN_support • OMA-LOC-2005-0393R01 -CR-SUPL-2.0-RD–Enhanced-MO-Request-to-locate-another-SET • OMA-LOC-2005-0414R01-CR_SUPL_2.0_RD_Emertency_Services_support
	17 Oct 2005	3.2; 3.3; 5.1; 5.1.1; 5.1.2; 5.1.5; 5.2; 5.2.1; 5.2.2; 5.2.3; 5.2.5; 5.4 (new); 6.1; 6.1.1; 6.1.2; 6.1.3; 6.1.4; 6.1.5; 6.1.6; 6.1.7; 6.2	Updated RD for V2.0 based on approved contributions at LOC WG September meeting in Jeju, Korea. The requirements were updated based on the following CRs: • OMA-LOC-2005-0432-CR_SUPL_RD_2_0_Definition_I_WLAN • OMA-LOC-2005-0437-CR_SUPL_RD_2_0_Deleting_Arch_Overview_reference • OMA-LOC-2005-0430R01-CR_SUPL_RD_2_0_Clarification_Use_Case_SUPL_over_WLAN • OMA-LOC-2005-0431R01 -CR_SUPL_RD_2_0_Clarification_Use_Case_SUPL_over_WLAN_Interworking_with_3GPP_3GPP2 • OMA-LOC-2005-0372R02-CR_SUPL_RD_2_0_Use_Case_Notification_based_on_current_location • OMA-LOC-2005-0435R01-CR_SUPL_RD_2_0_WLAN_and_I_WLAN_support

Document Identifier	Date	Sections	Description
	21 Nov 2005	3.2; 3.3; 5.1; 5.2; 5.3; 5.4; 5.5 (new) ; 5.6 (new)	Updated RD with approved CRs from LOC WG October meeting in Sydney, Australia. The following contributions were incorporated into the text: • OMA-LOC-2005-0433R01-CR_SUPL_RD_2_0_WLAN_and_I_WLAN_support • OMA-LOC-2005-0467R01-SUPL-v2-0-Use-case-for-Change-of-area-Triggered-location-requests • OMA-LOC-2005-0468R01-SUPL-v2-0-Use-case-for-Periodic-Triggered-location-requests • OMA-LOC-2005-0481R01-CR-WLAN_SET_Originated_Case • OMA-LOC-2005-0482R01-CR-I_WLAN_SET_Originated_Case • OMA-LOC-2005-0503-CR-RD-SUPL2_0-Use-Case-terminology • OMA-LOC-2005-0508-CR-SUPL-2.0-RD-Updated • OMA-LOC-2005-0522-Missed-change-of-term-for-WLAN-terminal Editorial changes in Section 3.3 (Changed "Location" to "Local" for WLAN definition); 5.1.2/5.3.2 (punctuation); 5.2 (added space in heading); 5.4 (inserted an extra line).
	04 Jan 2006	6.1; 6.1.5; 6.1.9 (new)	Updated RD with approved CRs from LOC WG December meeting in Athens, Greece. The following contributions were incorporated into the text: • OMA-LOC-2005-0549R01-CR-SUPL2.0-RD-Backwards_Compatibility • OMA-LOC-2005-0554R01-CR_SUPL_RD_2_0_Triggered_Requirements
	27 Feb 2006	3.2; 5.7 (new); 6.1; 6.1.5	Incorporated the following approved CRs: • OMA-LOC-2005-0551R01-Use_Case_Transfer_location_information_to_third_party • OMA-LOC-2006-0004R02-CR_SUPL_2.0_RD_Positioning-Method-and-Version-Negotiation • OMA-LOC-2006-0017R01-CR_SUPL_2_0_RD_Clarification_Transfer_location_information_to_third_party • OMA-LOC-2006-0018R03-CR_SUPL_RD_2_0_third_party_definition • OMA-LOC-2006-0019R01-CR_SUPL_RD_2_0_E-SLP_definition Editorial changes in Section A.2 (corrected reference to incorporate CRs from prior updates).
	5 May 2006		Applied new RD template (OMA-Template-ReqDoc-20060207-I).
	24 May 2006	3.2; 3.3; 4; 5.3.1; 5.3.2; 5.5.3; 5.5.6; 5.6.2; 5.6.2.1; 5.6.6; 6.1.7	Incorporated the following approved CR: • OMA-LOC-2006-0065R01-SUPL-2.0-RD-several-bugifx • OMA-LOC-2006-0072R01-CR_SUPL2_RD_A-GNSS • OMA-LOC-2006-0130R01-CR-SUPL-2.0-RD-Updated Editorial changes in Sections 2.1, 3.2, 3.3, 6, 6.1, 6.1.1-6.1.6, 6.2, A, A.2 (deleted empty yellow box) and Section 5 (corrected deleted heading title).
	12 Jul 2006	All	Re-applied new RD template (OMA-Template-ReqDoc-20060207-I).
	19 Jul 2006	3.2, 5.3, 6.1	Editorial changes
	26 Jul 2006	All	Cleanup in preparation for Approval as Candidate
	5 Oct 2006	5.5.6; 5.6.6; 6.1.1	Incorporated the following approved CR: • OMA-LOC-2006-0299-CR_SUPL_2.0_RD_Editorial_Corrections • OMA-LOC-2006-0300-CR_SUPL_2_0_RD_DoS_Protection

Document Identifier	Date	Sections	Description
	27 Oct 2006	3.2; 6.1.1; 6.1.6	Incorporated the following approved CR: • OMA-LOC-2006-0298R02-CR_SUPL_2_0_RD_SET_User_definition
	13 Dec 2006	6.1.4	Incorporated the following approved CR: • OMA-LOC-2006-0455-CR_SUPL2_0_RD_SIM_less_emergency_calls_support
	21 Dec 2006	All	Applied new RD template (2006-09-25) Clean-up in preparation for Approval as Candidate
Candidate version OMA-RD-SUPL -V2_0	16 Jan 2007	n/a	Status changed to Candidate by TP R&A TP ref # OMA-TP-2006-0314-INP_RD_SUPL_V2_0_for_Candidate_Approval
Draft version OMA-RD-SUPL -V2_0	14 Apr 2008	2.2; 3.2; 3.3; 4; 5.1.1; 5.1.2.1; 5.2.1; 5.3.1; 5.3.2.1; 5.3.3; 5.4; 5.4.1; 5.7.5; 6.1; 6.1.2; 6.1.5, 6.1.7; 6.1	Incorporated all changes identified in OMA-LOC-2007-0419R14-INP_CONRR_SUPL_V2_0 and CRs: • OMA-LOC-2007-0441R01-CR_SUPL2_0_RD_Proposed_Resolution_A48 • OMA-LOC-2008-0004R01-CR_TS_ULP_WiMAX_references_D366_A009 • OMA-LOC-2008-0005-CR_SUPL_2.0_TS_ULP_ThirdParty_more_than_one_A043 • OMA-LOC-2008-0008-CR_SUPL_2_0_RD_ConrrA0044_WLAN • OMA-LOC-2008-0069-CR_SUPL_v2_0_RD_fix_CONRR_Comment_A30_WiMAX • OMA-LOC-2008-0070-CR_SUPL_v2_0_RD_fix_CONRR_Comment_A30_I_WiMAX
	25 Apr 2008	2.1; 3.2; 3.3; 5.9; 5.10; 6.2	Incorporated the following approved CRs: • OMA-LOC-2007-0454-CR_SUPL_2.0_RD_Fix_for_A016 • OMA-LOC-2008-0116R02-CR_SUPL2_0_RD_UMB • OMA-LOC-2008-0128R03-CR_SUPL2_0_RD_LTE • OMA-LOC-2008-0187-CR_CONRR_RD_SUPL2_0A007_TCS • OMA-LOC-2008-0206R03-CR_SUPL2_0_RD_Editorial_change • OMA-LOC-2008-0210R01-CR_SUPL_2_0_RD_SET_Definition
	20 May 2008	5.1; 5.8; 5.9; 5.10	Incorporated all changes identified in OMA-LOC-2008-0298-SUPL_2_0_Consistency_Review_Comments_LGE and CRs: • OMA-LOC-2008-0299-CR_SUPL2_0_RD_Resolution_A1_A7
Candidate version OMA-RD-SUPL -V2_0	27 Jun 2008	n/a	Status changed to Candidate by TP TP ref#: OMA-TP-2008-0251-INP_SUPL_V2.0_ERP_for_Candidate_Approval
Draft version OMA-RD-SUPL -V2_0	13 Feb 2009	3	Incorporated the following approved CRs: OMA-LOC-2009-0044-CR_SUPL2_0_RD_Section2_References
	01 Apr 2009	6.1.9	Incorporated the following approved CR: OMA-LOC-2009-0057
	02 Apr 2009	3, 5.2	Incorporated the following approved CR: OMA-LOC-2007-0339
	20 Nov 2009		Editorial update to change GSM/UMTS to GSM/UMTS/LTE
Candidate version OMA-RD-SUPL -V2_0	08 Dec 2009	n/a	Status changed to Candidate by TP TP ref#: OMA-TP-2009-0538R02-INP_SUPL_2.0_ERP_for_Candidate_re_approval