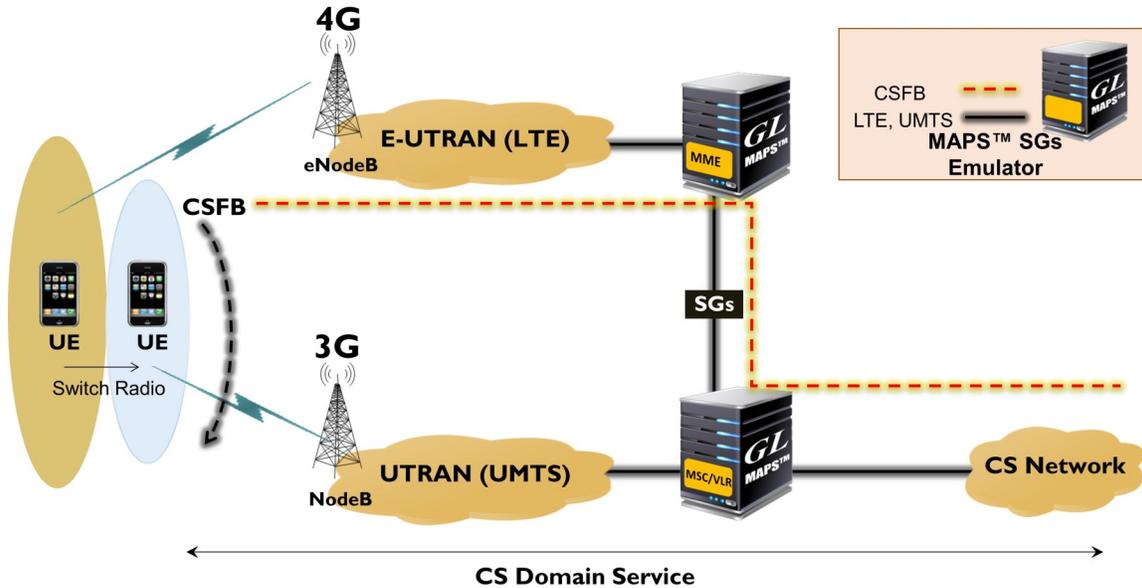


MAPS™ LTE SGs Interface Emulator



Overview

Circuit-Switched Fall-Back (CSFB) is a technology devised to allow Voice and SMS services to travel over Long Term Evolution (LTE) (packet-based all-IP) networks, which cannot normally handle circuit switched services. So, when a LTE device is used to place a voice call or send SMS, the device "falls back" to the 3G or 2G network to complete the call or to deliver the Short Message Service (SMS). During such a call scenario, the UE changes its radio access technology from LTE to a 2G/3G technology that supports circuit-switched services. A new interface (called SGs) between the Mobility Management Entity (MME) and the Mobile Switching Center (MSC) is required.

GL's Message Automation and Protocol Simulation (MAPS™) SGs Emulator is designed to realize the Circuit Switched (CS) fallback function for Voice and SMS delivery via the CS core network using SGs interface between the MME in the Evolved Packet System (EPS) and the Visitor Location Register (VLR), as defined in 3GPP TS 29.118 specifications (SGsAP) SGs interface. MAPS™ SGs emulator integration with GL's multi-protocol and multi-interface lab test solution, covering entire [2G, 3G, and 4G networks](#) simulating CSFB over SGs interface between LTE MME and Universal Terrestrial Radio Access Network (UTRAN) MSC.

For more information, visit [MAPS™ LTE SGs Interface Emulator](#) webpage.



818 West Diamond Avenue - Third Floor, Gaithersburg, MD 20878, U.S.A
(Web) www.gl.com - (V) +1-301-670-4784 (F) +1-301-670-9187 - (E-Mail) info@gl.com

Main Features

- Supports emulation of real-time LTE network using “[MAPS 4G Wireless Lab Suite](#)”
- Emulate LTE MME and UTRAN MSC
- Supports the following SGs interface fallback procedures:
 - Paging for non-EPS Services
 - Location Update for Non-EPS Services
 - Non-EPS Alert
 - Explicit IMSI Detach from EPS Services
 - Explicit IMSI Detach from Non-EPS Services
 - Implicit IMSI Detach from Non-EPS services
 - VLR Failure
 - MME Failure
 - MM Information
 - Tunneling of NAS Messages
 - Mobile Terminating and Mobile Originating SMS Services
- Insertion of impairments to create invalid messages
- Ready-to-use scripts for quick testing
- Provides Call Statistics and Events Status

Testbed Configuration

The testbed setup window allows users to setup the required test environment with SCTP configuration in SGs interface.

SCTP Configuration parameters consists of source / destination IP address, port, including stream id, payload id to configure MAPS™ to simulate MME and MSC/VLR entities in SGs interface. MAPS™ can then generate and receive SGsAP/NAS messages to/from valid IP Address in the LTE network. End user configuration profile used to configure MAPS™ LTE SGs with supported MSC/VLR and MME parameters.

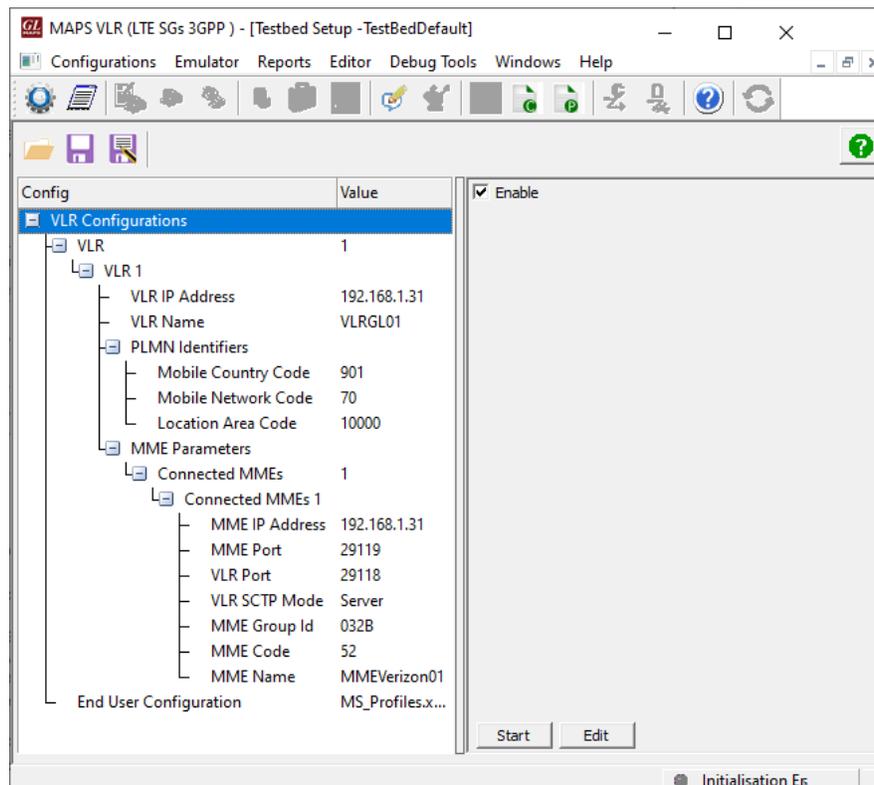


Figure: Testbed Setup

Pre-processing Tools

Message Editor

With message editor, users can build a template for each protocol message type. The value for each field may be changed in the message template prior to testing. The protocol fields comprises of mandatory fixed parameters, mandatory variable parameters, & optional variable parameters.

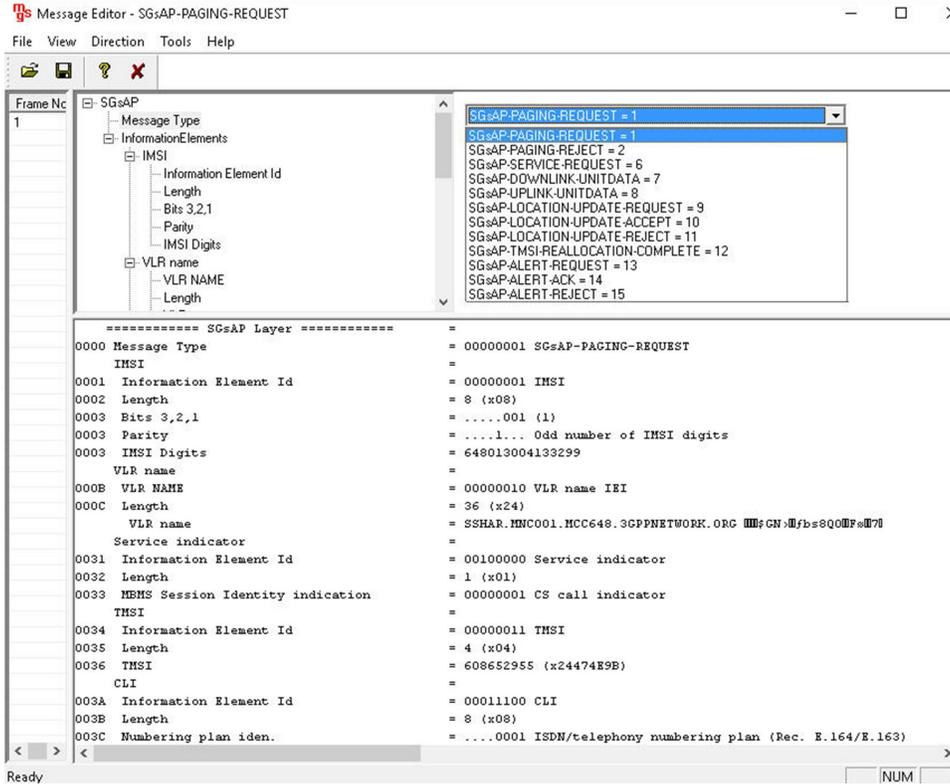


Figure: Message Editor

Script Editor

The script editor allows the user to create / edit scripts and access protocol fields as variables for the message template parameters. The script uses pre-defined message templates to perform send and receive actions.

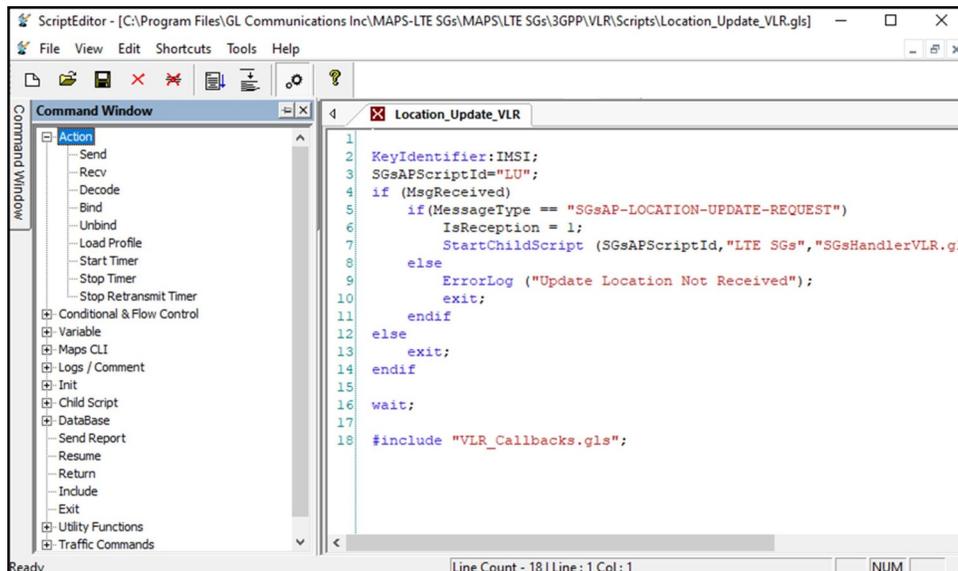


Figure: Script Editor

Pre-processing Tools (Contd.)

Profile Editor

This feature allows loading profile to edit the values of the variables using GUI, replacing the original value of the variables in the message template. An XML file defines a set of multiple profiles with varying parameter values that allow users to configure call instances in call generation and to receive calls.

Includes Location Update type and Identifiers, Mobile ID, IMSI Detach Service Type settings, and SMS parameter settings required for various SGs interface emulation.

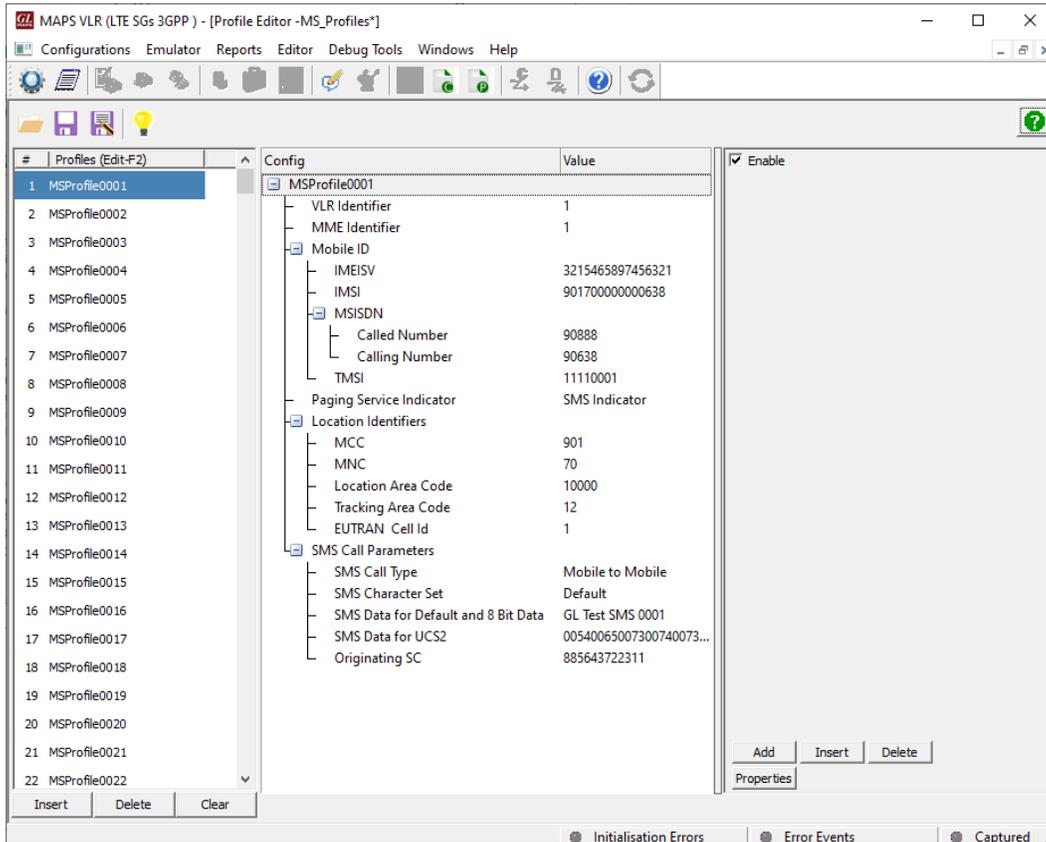


Figure: Profile Editor

Call Generation and Call Reception

In call generation, MAPS™ is configured for the out going messages, while in call receive mode, it is configured to respond to incoming messages. Tests can be configured to run once, multiple iterations and continuously. Also, allows users to create multiple entries using quick configuration feature.

The editor allows to run the added scripts sequentially (order in which the scripts are added in the window) or randomly (any script from the list of added script as per the call flow requirements). The test scripts are started manually at call generation; and at the call reception, the script is automatically triggered by incoming messages.

The screen below is the MAPS™ SGS Emulator configured as VLR receiving and processing the MME-initiated procedures such as Location Updates or Detaches. MAPS™ SGS Emulator configured as MME receives and processes the VLR-initiated procedures such as Paging or Non-EPS Alert.

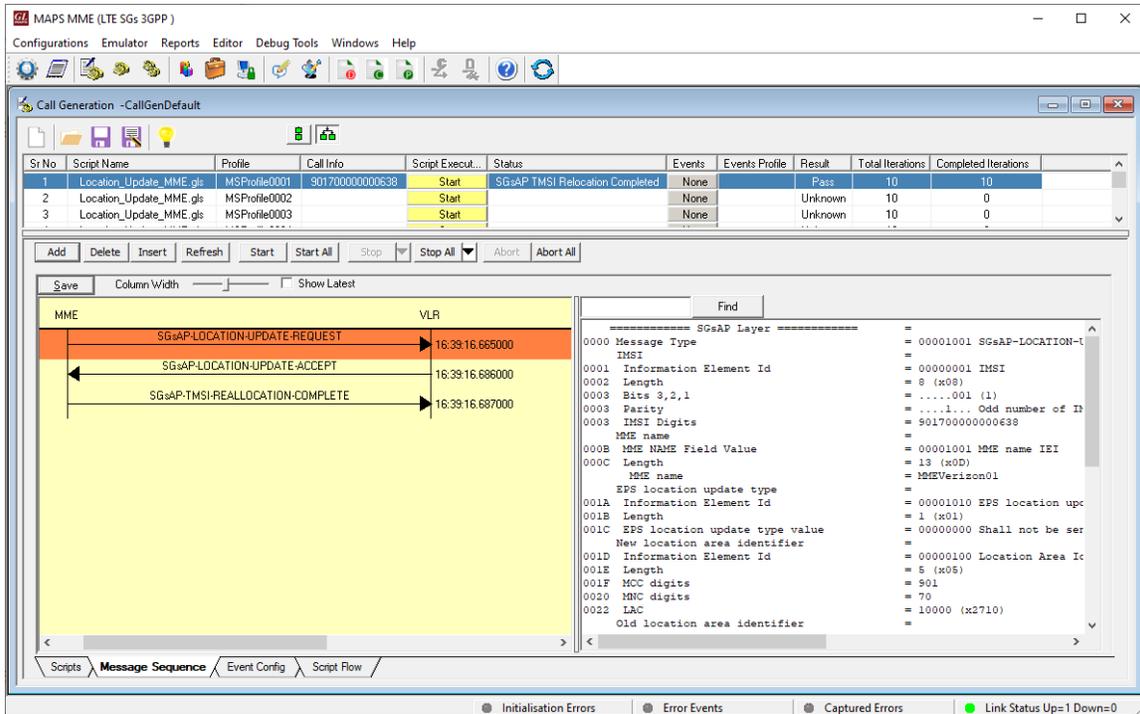


Figure: Call Generation

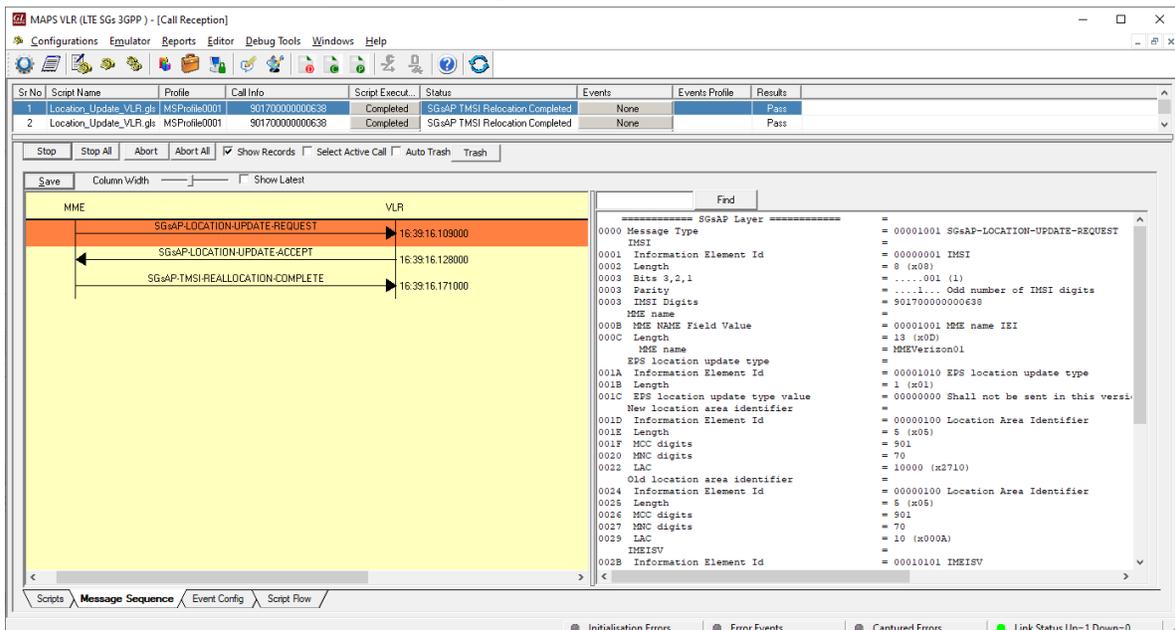


Figure: Call Reception

Typical LTE SGs Interface Procedures

Location Update for Non-EPS Services

The location update for non-EPS services procedure is a general procedure used by UEs which are configured to use CS fallback over SGs. The location update procedures in the SGs interface is always started as a consequence of a direct action from the UEs, combined with attach and tracking area update procedures as per the specification.

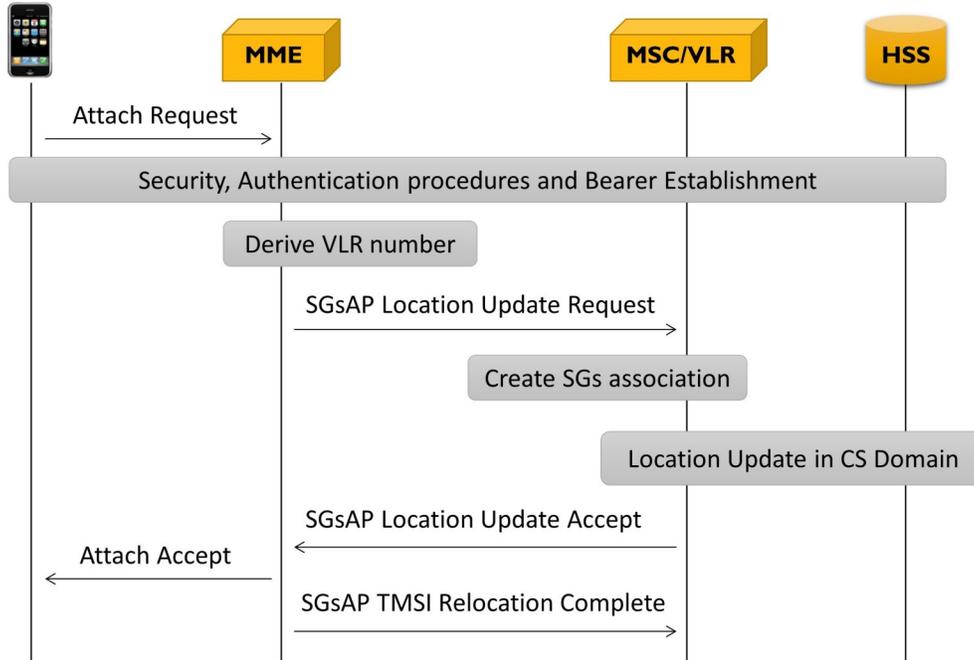


Figure: Typical Location Update Procedure

End-to-End SMS Procedure

The below end-to-end call diagram depicts typical mobile originating SMS service from UE1 and mobile terminating SMS service initiation from the network towards UE2. During SMS over SGs procedure, LTE UE device sends and retrieves CS based SMS messages between MSC and MME.

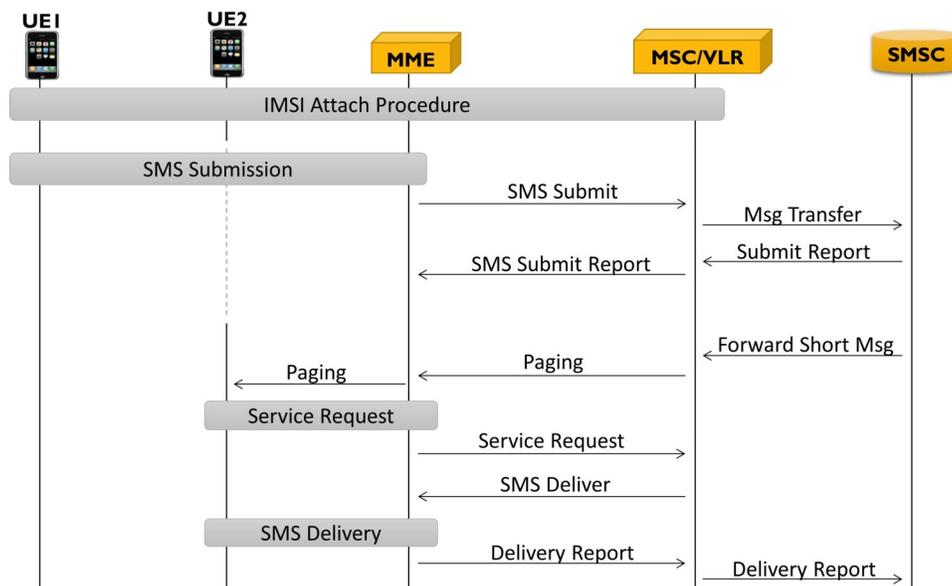


Figure: Typical MO and MT SMS Procedure

Supported Protocols and Specifications

SGsAP
SCTP
IP
Ethernet
SGs

Supported Protocols	Standard / Specification Used
Circuit Switched Fallback in Evolved Packet System	3GPP TS 23.272
SGs Application Part (SGsAP)	3GPP TS 29.118
SCTP	RFC 4960

Buyer's Guide

Item No	Product Description
PKS146	MAPS™ LTE SGs Interface Emulator

Item No	Related Software
PKS140	MAPS™ LTE S1 Interface
PKS142	MAPS™ LTE eGTP (S3, S4, S5, S8, S10, S11 and S16) Interfaces
PKV107	LTE Protocol Analyzer
ETH100	Mobile Traffic - PacketCheck™
ETH101	MobileTrafficCore - GTP
ETH102	MobileTrafficCore - Gateway

For more information, visit [Signaling and Traffic Simulator](#) webpage.



GL Communications Inc.

818 West Diamond Avenue - Third Floor, Gaithersburg, MD 20878, U.S.A
(Web) www.gl.com - (V) +1-301-670-4784 (F) +1-301-670-9187 - (E-Mail) info@gl.com