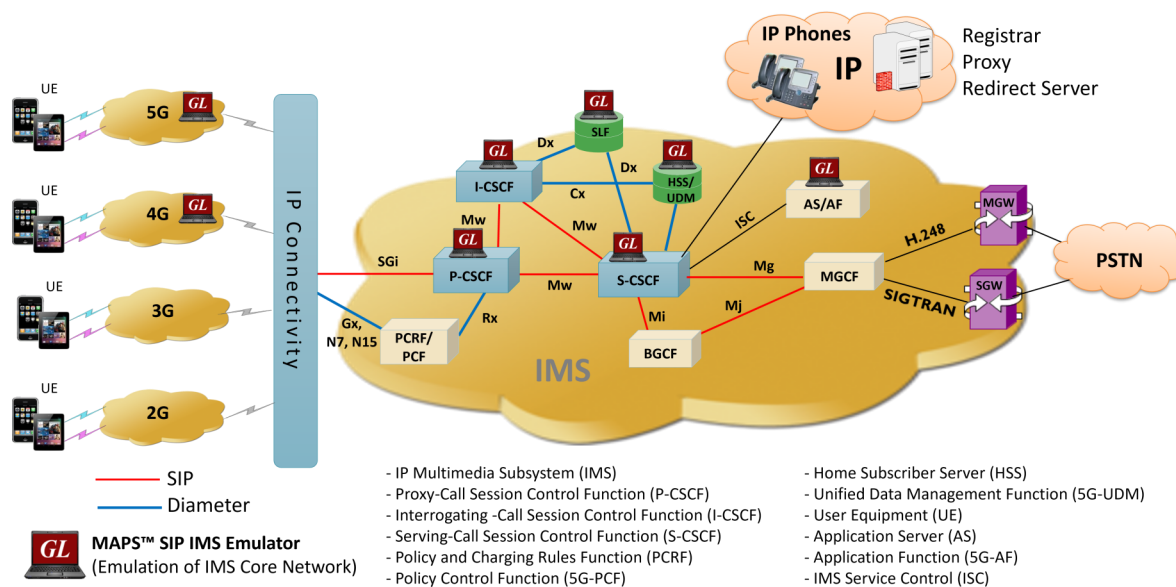


MAPS™ IMS Test Suite



Overview

GL's **MAPS™ IMS** test suite provides an advanced full-fledged network environment that enables user to test their applications, devices, and services prior to deployment on a real-time network. It can be used to emulate all or specific elements within IMS network infrastructure using simple ready-to-use testbed setup. The network architecture shown above outlines the IMS Core Network elements which can be emulated using GL's MAPS™ IMS test tool.

MAPS™ IMS test suite is capable of emulating multiple UEs and IMS core elements such as P-CSCF, I-CSCF, S-CSCF, PCRF/PCF, MGCF and IP-SM-GW which provides the IMS core network. With the help of mobile phones, and other emulated wireless networks, the VoLTE/VoNR Lab setup can be operated in real-time for making VoLTE or 5G New Radio IMS, SMS calls and also for interworking with PSTN and VoIP networks. It includes ready-to-use scripts, as per IETF specification. Test scripts include general messaging and call flow scenarios for multimedia call session setup and control over IP networks. Logging and pass/fail results are also reported. Test cases verify conformance of actions such as registration, call control, proxies and other servers.

For more information, refer to [MAPS™ IMS Network Emulator](#) webpage.

Main Features

- Emulate P-CSCF, I-CSCF, S-CSCF, PCRF, HSS, BGCF, MGCF and IP-SM-GW elements in LTE IMS network supporting Cx/Dx, Rx, Gx, Gm, Mw, SGI, Mi, and Mj interfaces
- Emulate 5G interfaces such as Unified Data Management Function (UDM), Policy Control Function (PCF), Application Function (AF)
- Emulate multiple UEs
- Supports both signaling and traffic emulation (RTP from emulated UE's and GTP from Real UE's) between any two IMS nodes
- Supports emulation of core network, access network, roaming architecture, interworking with other networks
- Complete IMS lab for end to end test solution
- Supports generation and verification of CS domain traffic over LTE-IMS or 5G - IMS, including VoLTE (Voice), VoNR, and SMS services
- Test environment allows user to test each IMS network elements independently using single interface emulation or multi interface emulation
- Any of the network element within the lab environment can be replaced by Device Under Test to test particular node working
- Integrate IMS core network easily with 5G, 4G, 3G, 2G or any PSTN networks to test any call scenario using remote MAPS™
- Build customized call scenarios as MAPS™ provides complete script based solution
- Test any applications and services using IMS core network
- Remotely control/monitor all the interwork interfaces and elements using Remote MAPS™ application

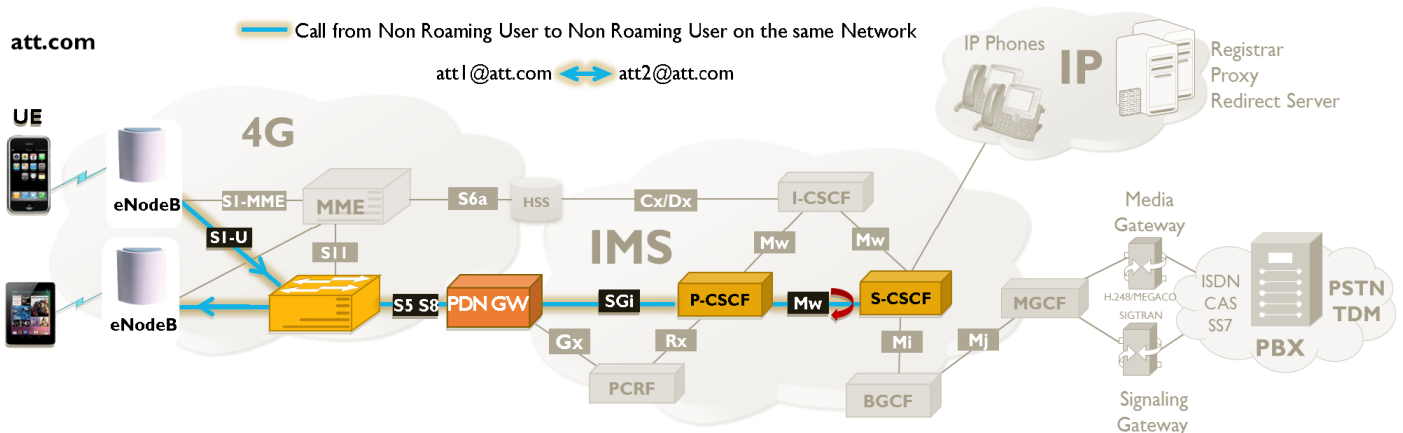


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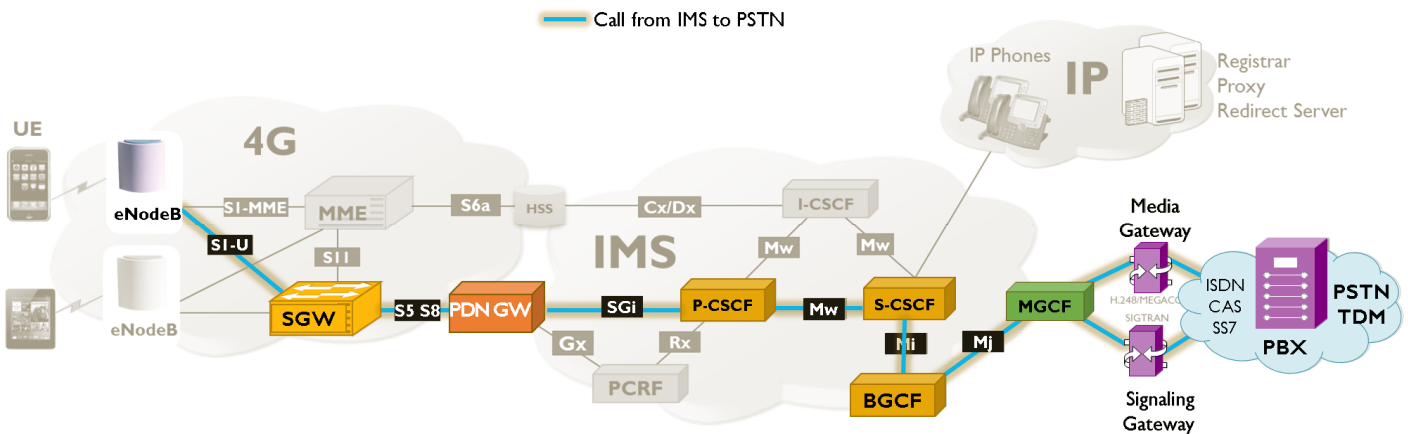
Supported procedures

- IMS Registration via SIP interface (with AKA Authentication, with Digest authentication) over TCP/UDP
- Support for IPsec IMS-AKA (IP Multimedia Services Authentication and Key Agreement)
- IMS Registration from Visited Network
- Mobile induced deregistration - SIP
- Voice call between Roaming or Non Roaming users within the same network or across the network
- Call from IMS to PSTN
- SMS Call from IMS (4G) to UMTS (2G/3G)
- Registration and IMS call with Signaling Compression

Call from UE1 in ATT Network to UE2 in the Same Network

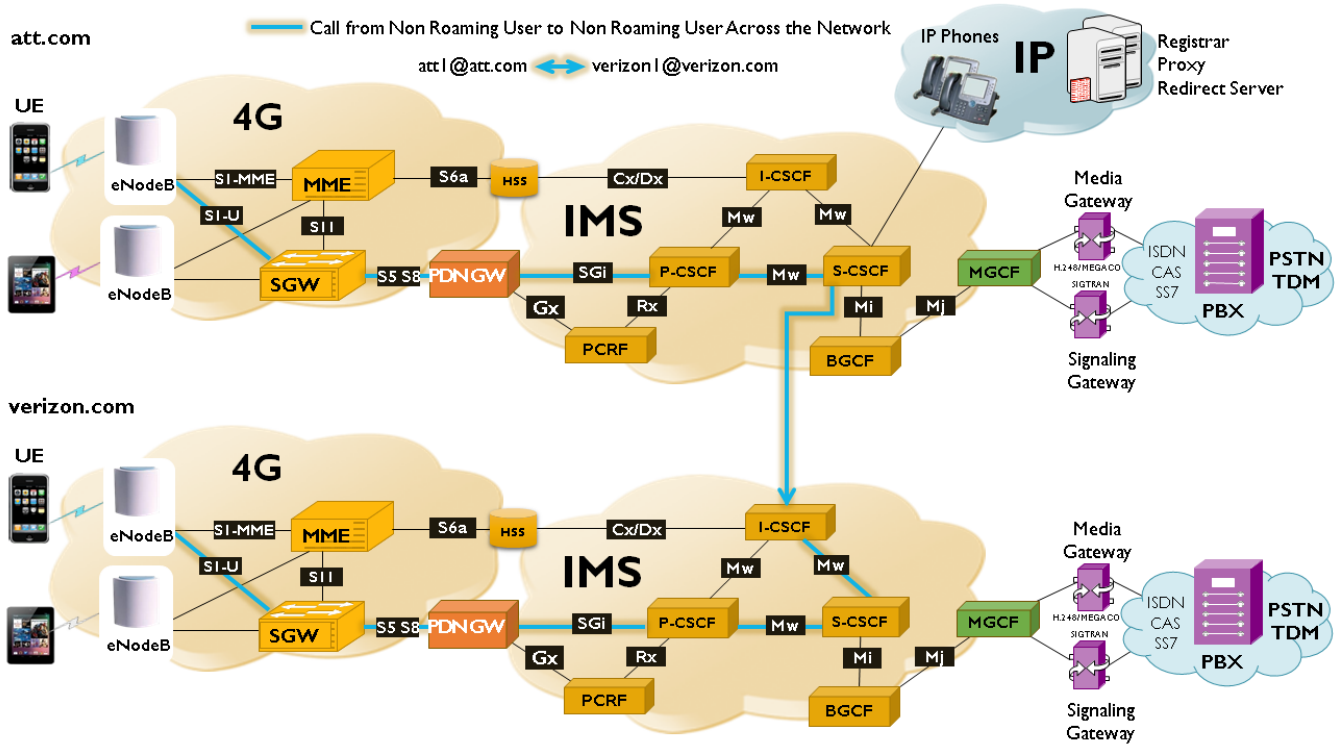


Call from UE1 in ATT Network to UE2 in PSTN Network



Call between UEs in different networks

The following network is an illustration of a Call emulation from Non Roaming User to another Non Roaming User across different LTE – IMS Network (UE1 in ATT network to UE2 in Verizon network).



Remote MAPS™ Server

The Remote MAPS™ Server feature within MAPS™, is a client server module, designed for multi-node multi-interface emulation. In IMS network, MAPS™ can be configured to emulate multiple nodes situated at various locations, which can be controlled using a single Remote Client GUI. The client application connects to the server and remotely accesses the MAPS™ functionalities emulating the configured nodes. The client communicates with the remote MAPS™ Server via the Listener running at the server location.

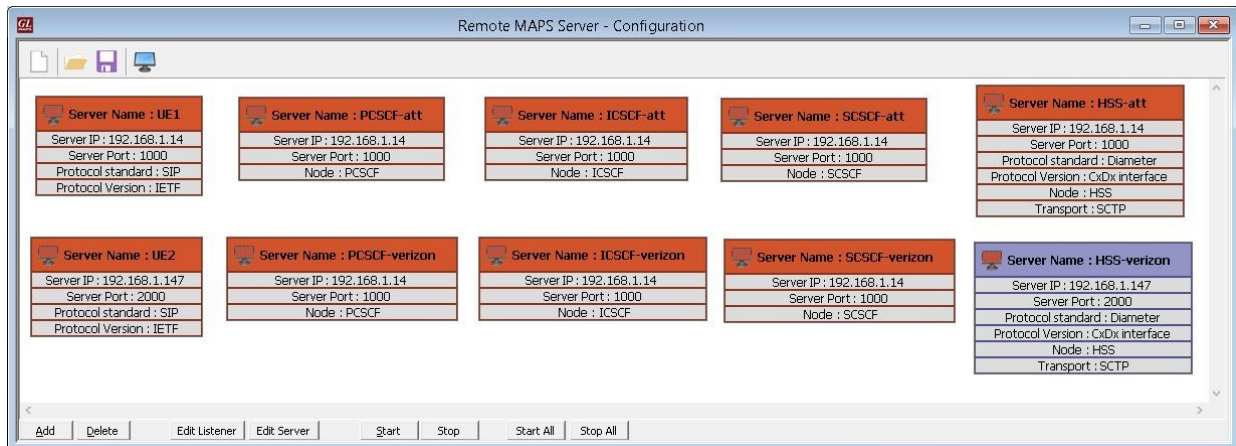


Figure: Remote MAPS™ Server Configuration

SIP/IMS Registration and Call Control Procedure

Below diagram shows the Registration flow at S-CSCF which handles SIP Registrations for ATT Network interacting with I-CSCF and HSS. And the Call flow at I-CSCF interacting with S-CSCF of ATT Network, and HSS and S-CSCF of Verizon Network.

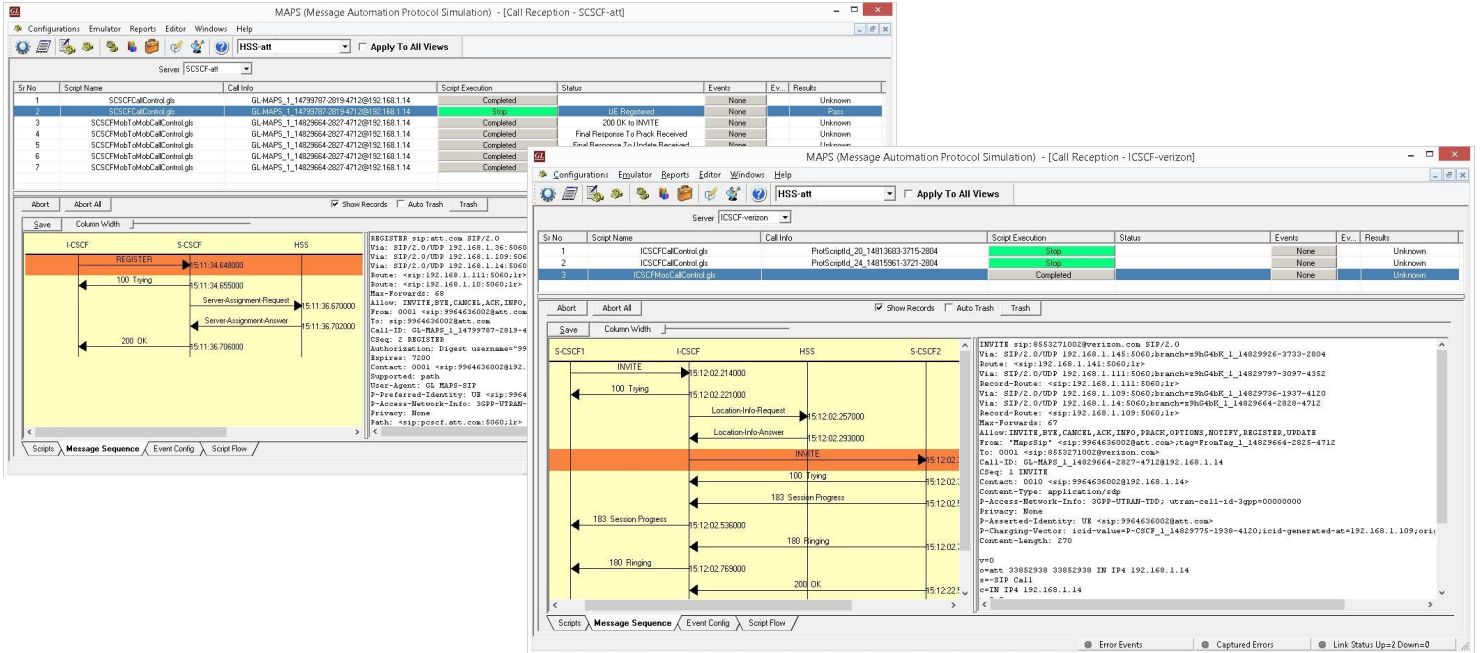


Figure: End-to-end Registration and Call Control Procedures

SMS Call between IMS and UMTS (2G/3G) Network

GL's MAPS™ SIP IMS emulator can emulate functions of an IP-SM-GW element in order to push or pull SMS from LTE-EPC to SMSC over IP/IMS network.

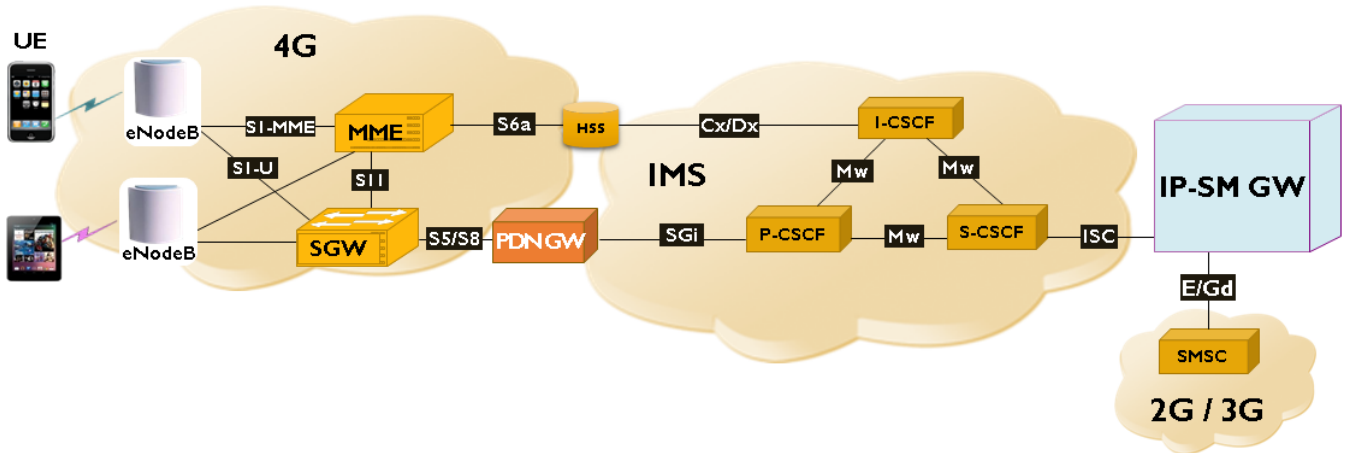


Figure: IMS to UMTS(2G/3G) Call Emulation

Call over LTE Procedure

In SMS over IMS communication, SMS is encapsulated in a SIP message and carried over IMS core network to SMSC. The IP Short Messaging Gateway (IP-SM-GW) network element provides the interconnection between GSM-UMTS network and LTE-EPC network for sending and receiving SMS.

The image below depicts the call flow for transmission of encapsulated SMS messages over LTE via IMS elements.

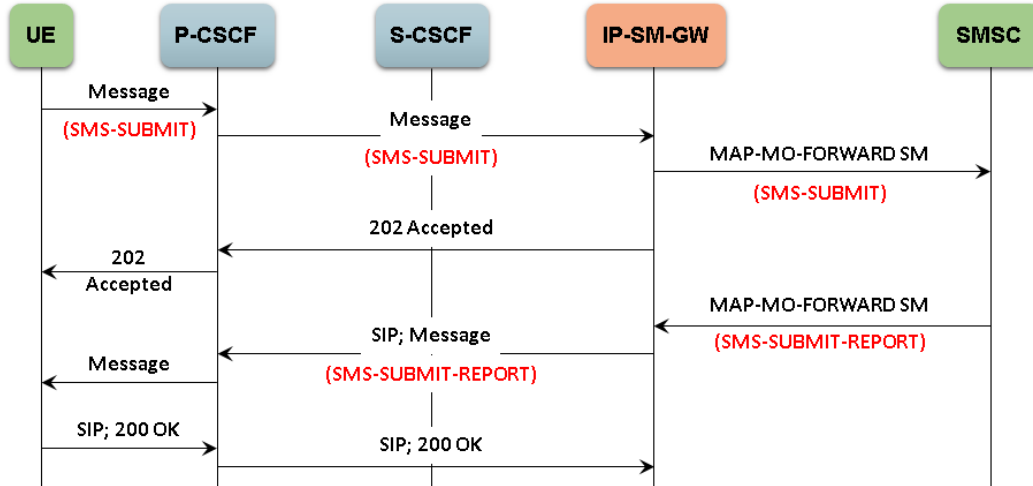


Figure: End-to-end Registration and Call Control Procedures

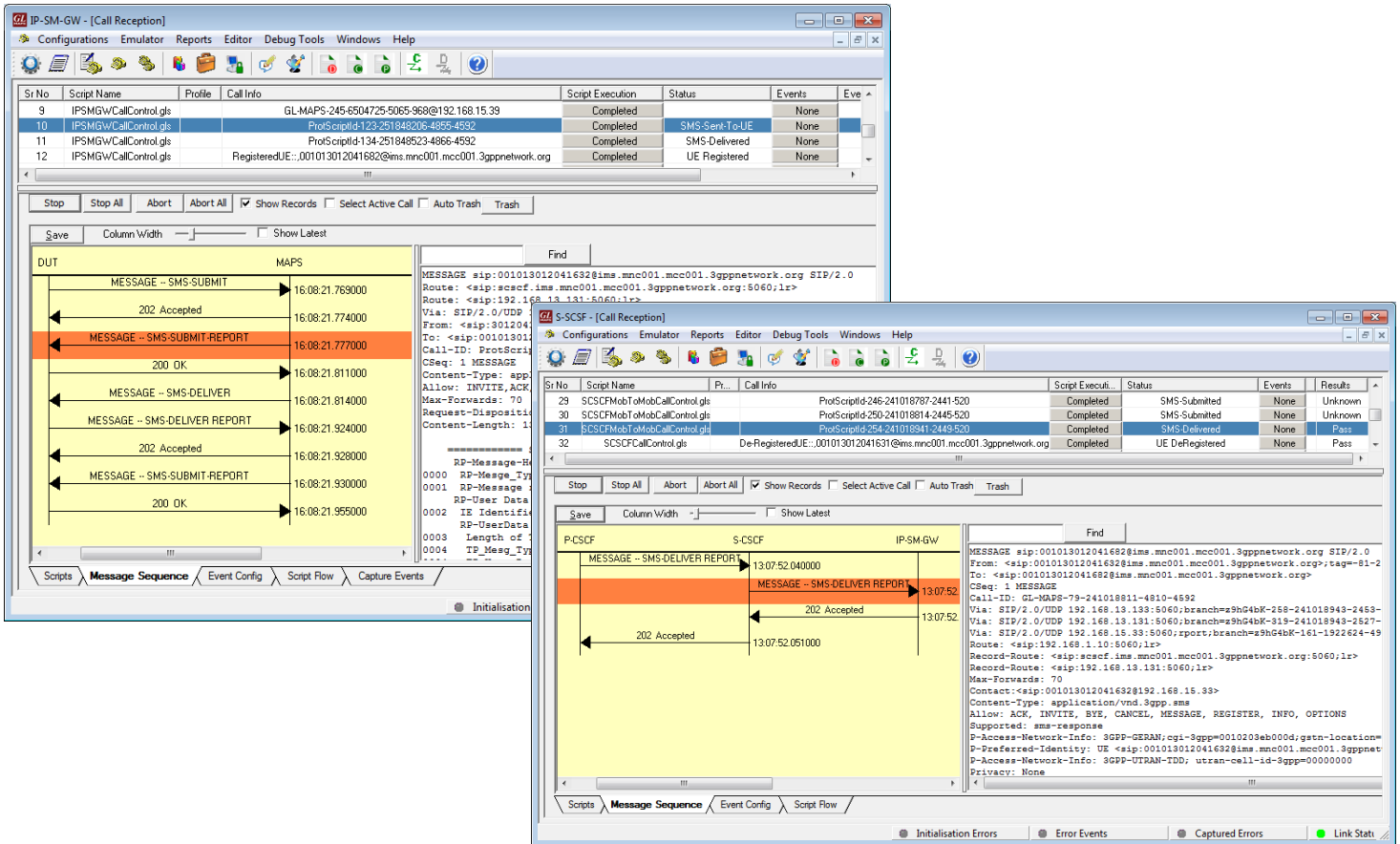


Figure: End-to-End SMS Call Procedures

Supported Protocol Standards

Supported Protocols	Standard / Specification Used
SIP	RFC 3261
SIP Extensions	<p>RFC 3262 - Reliability of Provisional Responses in the Session Initiation Protocol (SIP)</p> <p>RFC 3311 - The Session Initiation Protocol (SIP) UPDATE Method</p> <p>RFC 3455 - Private Header (P-Header) Extensions to the Session Initiation Protocol (SIP) for the 3rd-Generation Partnership Project (3GPP)</p> <p>RFC 3515 - The Session Initiation Protocol (SIP) Refer Method</p> <p>RFC 3310 - HTTP/SIP Digest Authentication Using Authentication and Key Agreement (AKA)</p> <p>RFC 3263 - Session Initiation Protocol (SIP): Locating SIP Servers</p>
Diameter	<p>RFC 3588 - Diameter Base Protocol</p> <p>S6a, S6d, S13 - 3GPP TS 29.272 V10.3.0</p> <p>Rx - 3GPP TS 29214-b10</p> <p>Cx/Dx - 3GPP TS 29.228 & TS29.229</p> <p>Gx - 3GPP TS 29.212 & TS 23.203</p>

Buyer's Guide

Item No	Product Description
PKS127	MAPS™ SIP-IMS Text IP
PKS301	MAPS™ IMS Multi Interface (S-CSCF)

Item No	Related Software
PKS120	MAPS™ SIP
PKS139	MAPS™ Diameter Emulator
PKS126	MAPS™ SIP-I
PKS122	MAPS™ MEGACO
PKS124	MAPS™ MGCP
PKS135	MAPS™ ISDN-SIGTRAN (ISDN over IP)
PKS130	MAPS™ SIGTRAN (SS7 over IP)
PKS140	MAPS™ LTE - S1 Interface
PKS142	MAPS™ LTE- eGTP (S11, S5/S8) Interfaces
PKS164	MAPS™ UMTS – IuPS (over IP) Interface Emulation
PKS160	MAPS™ UMTS – IuCS and IuH Interface Emulation
PKS102	RTP Soft Core for RTP Traffic Generation
PKS103	RTP IuUP Softcore
PKS107	RTP EUROCAE ED137
PKS108	RTP Voice Quality Measurements
PKS106	RTP Video Traffic Generation
PKS200	RTP Pass Through Fax Emulation
ETH100	Packet Traffic Emulation - GTP
ETH101	Mobile Traffic Core-GTP
ETH102	Mobile Traffic Core-Gateway
ETH103	Mobile Traffic - Gb

For more information, refer to [Signaling and Traffic Emulator](#) webpage.



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