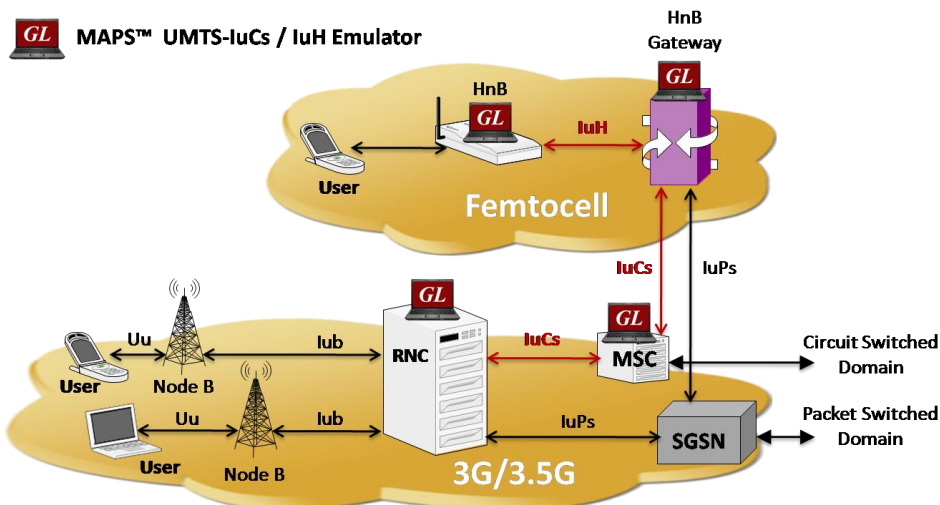


# MAPS™ UMTS for Iu-CS, Iu-H Interfaces (Simulate UMTS over IP)



## Overview

To emulate the various components of UMTS as depicted in the picture, GL utilizes its MAPS™ foundation architecture – a versatile platform for detailed emulation of a wide variety of protocols. MAPS™ supports emulation of many protocols like ISDN, SS7, GSM, LTE, SIP, Megaco, MGCP, SIGTRAN, and many others. MAPS™ UMTS IuCs can emulate the RNC (Radio Network Controller) and the MSC (Mobile Switching Centre) by generating RANAP and DTAP signaling messages over SCTP.

GL's MAPS™ also simulates UMTS – IuH interface and Femto Home Node B (HnB), and a Femto Home Node Gateway (HnB-GW) entities by generating RANAP signaling messages over SCTP as Transport layer.

MAPS™ also supports RTP traffic simulation (requires additional licensing) over UMTS-IuCs and UMTS-IuH interfaces. RTP traffic simulation supports following actions for almost all standard codecs: Transmitting Voice Files; Transmitting DTMF, MF Digits, and other Tones and Dual Tones; Recording Voice Files; Monitoring Single and Dual Tones, and MF digits; Loopback, Talk using Microphone, Play to Speaker.

For comprehensive details on the application, please visit <http://gl.com/maps-umts-iucs-iuh-emulator.html> webpage.

## Main Features

- Simulates RNC, MSC, Home NodeB (HnB) and Home NodeB Gateway (HnB GW) entities.
- Generates and process all Mobility Management, Session Management, RANAP and DTAP messages.
- User controlled access to RANAP, and DTAP messages.
- Ready scripts for Mobile Originating, Mobile Terminating, Location Updating procedures for quick testing,
- Supports Authentication, TMSI Reallocation, Encryption, and other optional procedures
- Provides fault insertion, and erroneous call flows testing capability.
- Impairments can be applied to messages to simulate error conditions
- Supports RTP traffic generation and reception (requires additional license)
- Supported Codecs includes G.711, G.729, G.729B (8 kbps), G.726, GSM (13.2 kbps), AMR, AMR\_WB, EVRC, SMV, iLBC, SPEEX, G722, G722.1, SPEEX\_WB, iSAC
- Supports customization of call flows and message templates using Script & Message editor.
- Supports scripted call generation and automated call reception.
- Provides detail protocol trace with full message decoding, and graphical ladder diagrams of call flow with time stamp

UMTS – IuCS, IuH Interfaces  
Simulation over IP

Test Cases as per UMTS 3GPP  
Mobile Standards

Provides Enhanced Mobile  
Radio and Internet Access

Supports RANAP & DTAP  
Signaling Messages

Scripted Call Generation and  
Automated Call Reception

Customization of Call Flow  
with Message & Sequence  
Editors

Provides Fault Insertion, &  
Erroneous Call Flow Testing

Analysis and Simulation  
Capability on par with any  
Protocol Tester in the Market



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## Working Principle

- **Message Editor** - Used to edit / create Message Templates
- **Message Templates** - Backbone of MAPS™ application that contains various protocol fields with default values
- **Script Editor** -
  - Creates a script for scenario based testing (call flow) with DUT
  - Uses pre-defined message templates in the script
  - Access protocol fields as variables using import/export files
- **Profile Editor** – Creates or edit profiles containing values assigned to the variables replacing the original values.
- **Event Profile Editor** - allows you to create Event Profiles for user-defined events in a script. The value in the profiles can be changed during script execution.

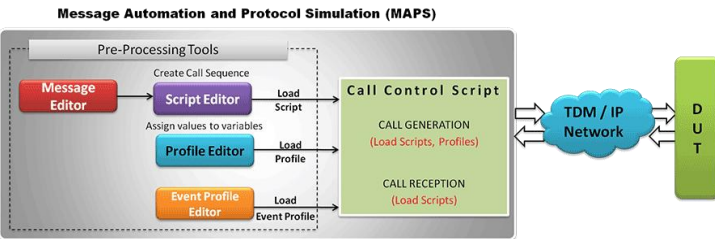


Figure: MAPS™ Working Principle

## Testbed Configuration

The configuration window allows users to setup the required test environment with SCTP configuration in luCS and luH interface.

**SCTP Configuration** - consists of Source, and Destination/ Device under Test (DUT) IP address and port configuration parameters used to configure MAPS™ to simulate RNC and MSC in luCS interface and to simulate HnB and HnB-GW in luH interface. MAPS™ is configured to generate and receive RANAP messages to/from valid IP Address in the UMTS network.

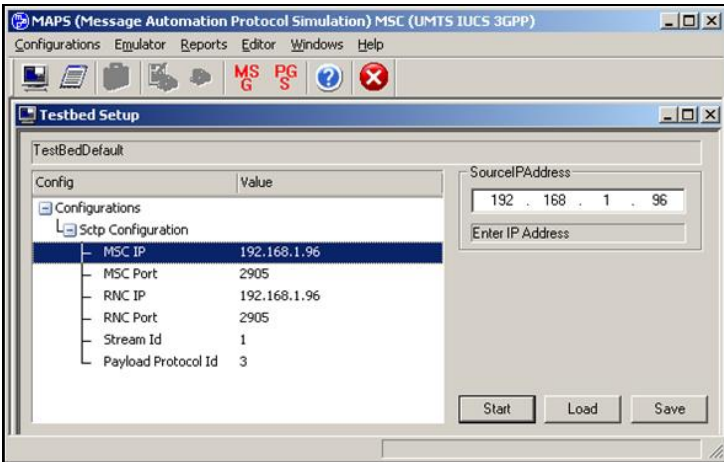


Figure: Testbed Setup

## 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, and optional variable parameters.

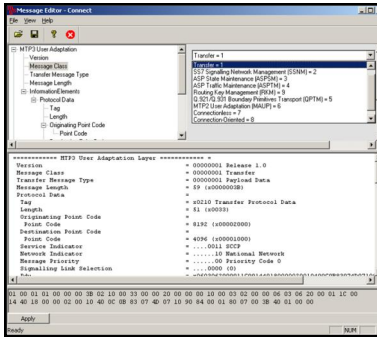


Figure: Message Editor

**Script Editor** - The script editor allows the user to create / edit scripts and also import/export files that define variables for the message template parameters. The script uses pre-defined message templates to perform send and receive actions. The editor allows to run the added scripts sequentially (in-order) or randomly (any script from the list of added scripts as per the call flow requirements).

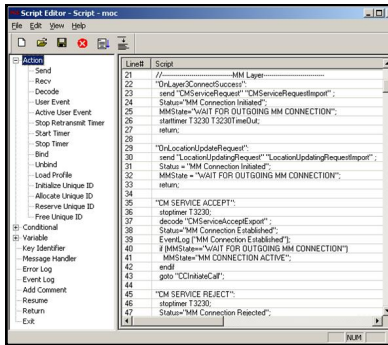


Figure: Script Editor

**Profile Editor** - The profile editor allows user to edit or create profiles in order to define values to the variables for the message templates.

The users can edit the values of the variables thus replacing the original value of the variables in the message template.

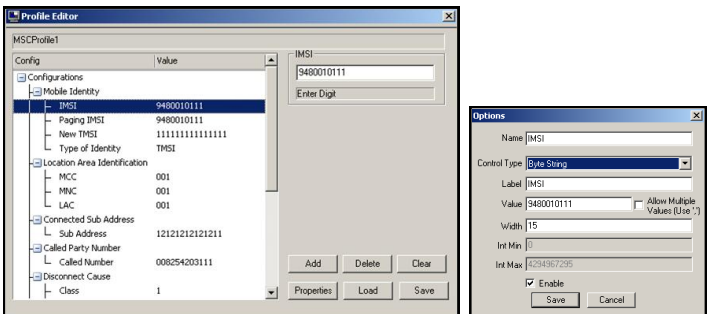


Figure: Profile Editor



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### Call Generation and Call Reception

In call generation, MAPS™ is configured for the out going calls, and in call receive mode, it is configured to respond to incoming calls. Tests can be configured to run once, multiple iterations or continuously. Scripts can be set to run sequentially according to a call scenario or randomly.

The test scripts may be started manually or they can be automatically triggered by incoming messages. In receive mode, MAPS™ can be automated to respond to messages using script configuration dialog, where a receive script is preset against particular message expected to arrive.

Supported call simulation scenarios are:

- **Mobile Originating Call (MOC)** - MOC call is initiated by the user equipment (UE) and the Authentication process is initiated by the network
- **Location Updating (LU)** - Whenever mobile station (MS) moves out of its location to a new location then it needs to inform the network about its new location. The UE initiates the call by sending location update message to the network.
- **Mobile Terminating Call (MTC)**- Network initiated MTC by sending Paging message towards UE. UE will send the Paging Response message.

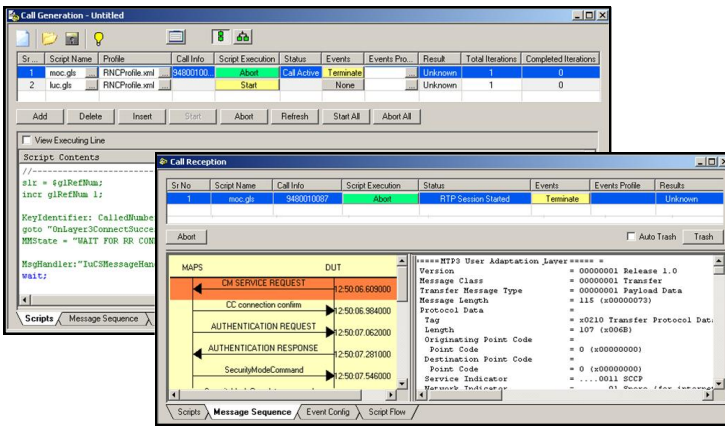


Figure: MAPS™ IuCS Call Generation & Reception

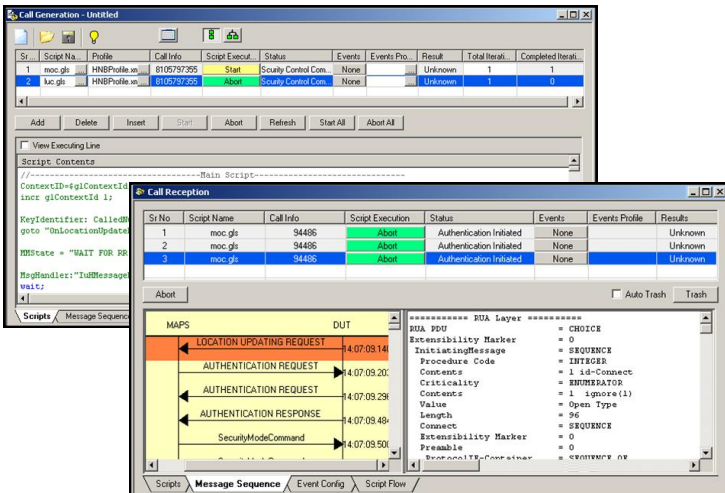
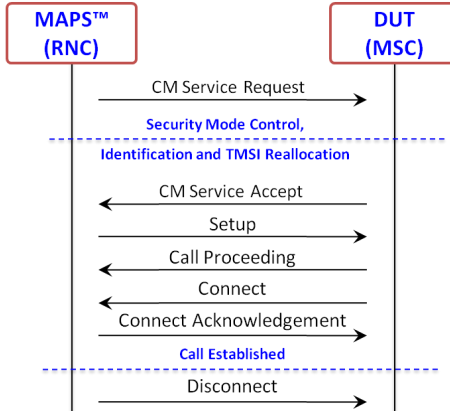


Figure: MAPS™ IuH Call Generation & Reception

### MAPS™ UMTS Signaling Flow

#### Scenario 1: MAPS™ UMTS acting as RNC and testing DUT (MSC) in IuCS Interface (MOC Call Flow)

MAPS™ UMTS IuCS is considered as Caller (User End) and initiates the MOC call flow by sending CM Service Request to DUT.



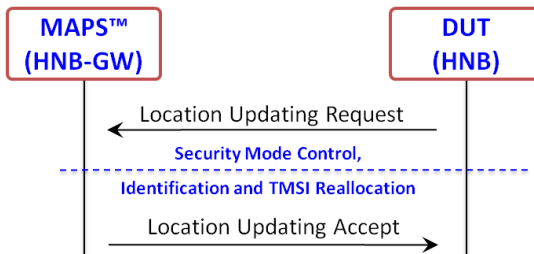
#### Sample MOC Place Call Script

```

send "CMServiceRequest" "CMServiceRequestImport";
decode "CCconnectionconfirmExport";
send "AuthenticationRequestExport";
decode "AuthenticationResponse"
AuthenticationResponseImport";
send "SecurityModeCommandExport";
decode "SecurityModeComplete"
"SecurityModeCompleteImport";
decode "CMServiceAcceptExport";
    
```

#### Scenario 2: MAPS™ UMTS is acts as HnB-GW testing DUT (HnB) in IuH Interface (LUC Call Flow)

MAPS™ UMTS IuH is configured as HnB-GW, which initiates authentication process by receiving the LocationUpdatingRequest from the caller (HnB).



#### Sample LUC Answer Call Script

```

decode "LocationUpdatingRequestExport";
send "AuthenticationRequest" "AuthenticationRequestImport";
decode "AuthenticationResponseExport";
send "SecurityModeCommand" SecurityModeCommandImport";
decode "SecurityModeCompleteExport";
send "LocationUpdatingAccept" "LocationUpdatingAcceptImport";
    
```



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## Supported Protocols and Specifications

Supported Protocols	Standard / Specification Used
<b>Iu-CS Interface</b>	
SCCP	Q.713, CCITT (ITU-T) Blue Book
MTP3	Q.703, ITU-T Blue Book
RANAP	3GPP TS 25.413 V9.1.0
MM / CC	3GPP TS 24.008 V5.16.0 (2006-06)
RR	3GPP TS 04.18 V8.13.0
SMS	3GPP TS 03.40 V7.5.0 & 3GPP TS 04.11 V7.1.0 GSM 03.38 version 7.2.0 Release 1998
<b>Iu-H Interface</b>	
RUA	3GPP TS 25468 V9.1.0
RANAP	3GPP TS 25.413 V9.1.0
MM / CC	3GPP TS 04.08 V7.17.0
RR	3GPP TS 04.18 V8.13.0
SMS	3GPP TS 03.40 V7.5.0 & 3GPP TS 04.11 V7.1.0 GSM 03.38 version 7.2.0 Release 1998

### Buyer's Guide

PKS160 - MAPS™ UMTS – Iu-CS Interface Emulation

MAPS™ UMTS – Iuh Interface Emulation

PKS102 - RTP Traffic Option

### Related Software

PKS164 - MAPS™ UMTS – Iu-PS Interface Emulation

XX165 - T1 or E1 UMTS Protocol Analyzer

OLV165 - Offline UMTS Protocol Analyzer

LTS206 - OC-3 / STM-1 UMTS Protocol Analysis

LTS306 - OC-12 / STM-4 UMTS Protocol Analysis

PKS130 - MAPS™ SIGTRAN (SS7 over IP)

XX120 - SS7 Analysis Software

PKS135 - MAPS™ ISDN SIGTRAN (ISDN over IP)

XX100 - ISDN Analyzer Software

PKV107 - LTE Protocol Analyzer

### Related Software...

PKS140 - MAPS™ LTE S1 Interface

PKS142 - MAPS™ LTE eGTP (S11, S5/S8) Interfaces

PKS120 - MAPS™ SIP

PKS121 - MAPS™ SIP Conformance Test Suite (Test Scripts)

PKS122 – MAPS™ MEGACO

PKS123 – MAPS™ MEGACO Conformance Test Suite (Test Scripts)

PKS124 - MAPS™ MGCP

PKS125 - MAPS™ MGCP Conformance Test Suite (Test Scripts)

PKB100 - RTP Toolbox™

PKS100 - PacketGen™

PKV100 - PacketScan™ (Online and Offline)

For complete list of MAPS™ products, refer to <http://gl.com/maps.html> webpage.



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