UMTS, or Universal Mobile Telecommunications System is a 3rd generation mobile technology evolved from GSM technology. It uses W-CDMA (Wideband Code Division Multiple Access) as radio access. With increased spectral efficiency and high bandwidth, UMTS can support broadband data, voice and video. The underlying transport for UMTS in the core network can be Asynchronous Transfer Mode (ATM), or IP. UMTS supports integrated services such as multimedia and global roaming to mobile users. In essence, UMTS IuPs interface is the Gateway to the World Wide Web. More precisely, IuPs, as depicted, is the interface between the RNC (Radio Network Controller) and the SGSN (Serving GPRS Support Node).

GL’s Message Automation & Protocol Simulation (MAPS™) designed for UMTS - IuPS interface can simulate RNC (Radio Network Controller), and 3G SGSN (3G Serving GPRS Support Node) by generating RANAP and DTAP signalling messages over SCTP as Transport layer in an IP network as defined by 3GPP standards. The application gives the users the unlimited ability to edit RANAP messages and call control scenarios (message sequences). "Message sequences" are generated through scripts. "Messages" are created using message templates.

The product also supports Mobile traffic core – GTP (ETH101) user-plane packet simulation and Mobile Traffic Core – Gateway (ETH102) Gateway Traffic simulation. These modules also support generation and verification of data traffic such as Email, FTP, Web (HTTP), Video, and more. For more information on MAPS™ UMTS-IuPS, refer to http://www.gl.com/maps-umts-iups-emulator.html.

Main Features
- Simulates RNC, and SGSN.
- Provides fault insertion, and erroneous call flows testing capability.
- Supports all Mobility Management, Session Management, RANAP and DTAP messages.
- Ready scripts for Mobile Originating, Mobile Terminating, Location Updating, GPRS Attach, and Detach procedures for quick testing.
- Supports Authentication, TMSI Reallocation, Encryption, and other optional procedures.
- Supports RTP and Mobile traffic generation and reception (requires additional licenses)
- Impairments can be applied to messages to simulate error conditions
- Supports customization of call flows and message templates using Script and Message editor.
- Supports scripted call generation and automated call reception.
- Supported on Windows® XP and Windows® 7 (32 bit and 64 bit).

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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 values of the variables in the user-events can be changed during script execution.

Testbed Configuration

The configuration window allows users to setup the required test environment with SCTP configurations in UMTS IuPS 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 SGSN in UMTS IuPS interface. MAPS™ is configured to generate and receive RANAP messages to/from valid IP Address in the UMTS network.

Default profile used to configure MAPS™ UMTS IuPS with SGSN or RNC parameters.

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.

**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.
Call Generation and Call Reception

In call generation, MAPS™ is configured for the outgoing 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 may be started manually or they can be automatically triggered by incoming messages.

MAPS™ UMTS IuPS Signaling Flow

Scenario 1: MAPS™ UMTS IuPS acting as RNC

MAPS™ UMTS IuPS is configured to act as RNC and initiates the call flow by sending AttachRequest to the DUT (SGSN).

Sample Place Call Script

```
send "AttachRequest" "AttachRequestImport"
```

decode "AuthenticationRequestExport"

```
send "AuthenticationResponse" "AuthenticationResponseImport"
```

decode "SecurityModeCommandExport"

```
send "SecurityModeComplete" "SecurityModeCompleteImport"
```

decode "AttachAcceptExport"

```
send "AttachComplete" "AttachCompleteImport"
```

Figure: MAPS™ UMTS IuPS - Call Generation

Scenario 2: MAPS™ UMTS IuPS acting as SGSN

MAPS™ UMTS IuPS can also be configured to act as SGSN node processing the call flow by receiving the AttachRequest from the DUT (RNC).

Sample Answer Call Script

```
decode "AttachRequestExport"
```

```
send "AuthenticationRequest" "AuthenticationRequestImport"
```

decode "AuthenticationResponseExport"

```
send "SecurityModeCommand" SecurityModeCommandImport"
```

decode "SecurityModeCompleteExport"

```
send "AttachAccept" "AttachAcceptImport"
```

decode "AttachCompleteExport"

Incoming Call Handler Configuration

This option to preset the script required to handle all possible signaling and call processing messages for responding to the call requests in Call Receive part of the MAPS™ IuPS.

Figure: MAPS™ UMTS IuPS Call Generation & Reception

Figure: MAPS™ UMTS IuPS Call Reception

Incoming Call Handler

This option to preset the script required to handle all possible signaling and call processing messages for responding to the call requests in Call Receive part of the MAPS™ IuPS.

Figure: Incoming Call Handler
Supported Protocols and Specifications

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Buyer’s Guide

PKS164 - MAPS™ UMTS – IuPS Interface Emulation

ETH100 - Mobile Traffic - PacketCheck™

ETH101 - MobileTrafficCore - GTP

ETH102 - MobileTrafficCore - Gateway

Related Software

PKS160 - MAPS™ UMTS – IuCS and Iuh Interface Emulation

PKS130 - MAPS™ SIGTRAN (SS7 over IP)

PKS135 - MAPS™ ISDN SIGTRAN (ISDN over IP)

PKS140 - MAPS™ LTE S1 Interface

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

XX648 – MAPS™ ISDN

XX692 – MAPS™ GSM A

XX693 – MAPS™ GSM A bis

XX649 – MAPS™ SS7

XX647 – MAPS™ SS7 Conformance Test Suite (Test Scripts)

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