

## UMTS Gn & Gp Interfaces Simulation over IP

## Test Cases as per UMTS 3GPP Mobile Standards

## Provides Enhanced Mobile Radio and Internet Access

## Supports GTP-C Messages

## Scripted Call Generation and Automated Call Reception

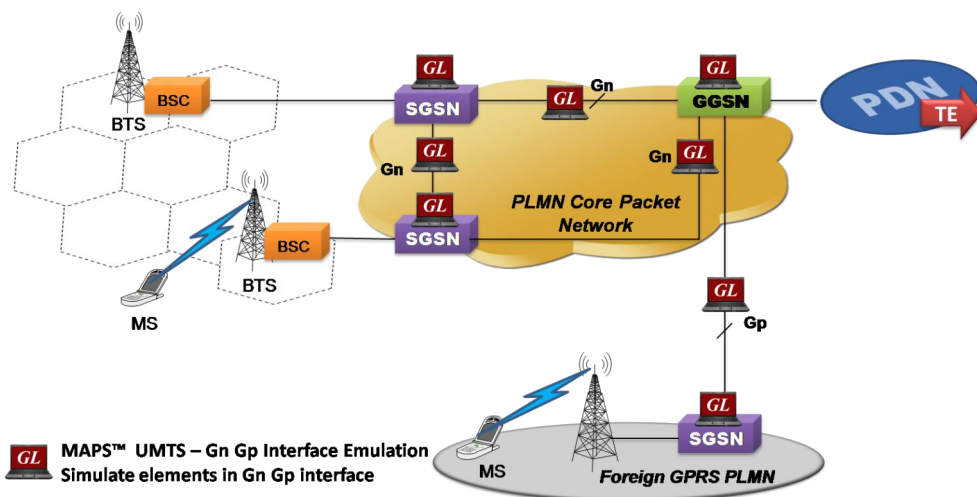
## Customization of Call Flow with Message & Sequence Editors

## Provides Fault Insertion, & Erroneous Call Flow Testing

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

# MAPS™ UMTS – GnGp Interfaces Emulation

(Simulate UMTS Gn and Gp over IP)



### Overview

GPRS and UMTS are evolutions of the Global System for Mobile Communications (GSM) networks. GPRS is a 2.5G mobile communications technology that enables mobile wireless service providers to offer their mobile subscribers with packet-based data services over GSM networks. The GPRS/UMTS packet core is primarily composed of two major network elements Gateway GPRS Support Node (GGSN) and Serving GPRS Support Node (SGSN).

GL's MAPS™ GnGp Interface Emulator is an advanced protocol simulator/tester for GTP simulation over Gn, Gp interfaces that can simulate GTP messages and signaling specification as defined in 3GPP TS 29.060 GPRS Tunneling Protocol (GTP) standard. The tester supports testing network elements SGSN and GGSN, error tracking, regression testing, and load testing/call generation. It can run pre-defined test scenarios against GTP interface test objects in a controlled & deterministic manner.

GTP Interface Emulator supports powerful utilities like Message Editor, Script Editor, and Profile Editor which allow new scenarios to be created or existing scenarios to be modified using GTP messages and parameters.

GL's MAPS™ GnGp software benefits Network Equipment Providers of SGSN, and GGSN entities, with -

- Accelerated time to market
- Reduced development costs
- Reduced project risk of internally developed GTP applications

For more information on MAPS™ - UMTS Gn Gp Interfaces Emulation, refer to [www.gl.com/maps-umts-gngp-emulator.html](http://www.gl.com/maps-umts-gngp-emulator.html)

### Main Features

- Simulates SGSN and GGSN.
- Supports GTP Control plane.
- Generates hundreds of Control Signaling (Load Testing).
- Generates and processes GTP messages.
- Insertion of impairments to create invalid messages.
- Supports customization of call flows and message templates using Script and Message editors.
- Supports scripted call generation and automated call reception.
- Provides Call Statistics and Events Status.

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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.

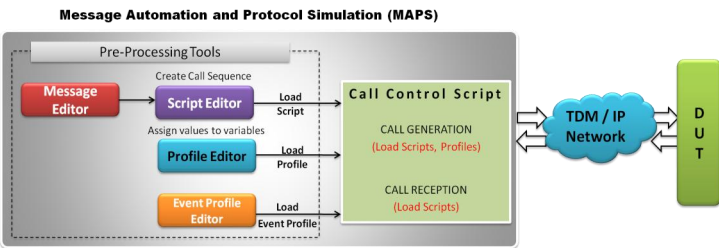


Figure: MAPS™ application Working Principle

## Testbed Configuration

Test Bed Setup provides options to establish communication between MAPS™ and the DUT. It includes configuration parameters to be set for UDP configuration. Once the testbed is setup, UMTS messages can be transmitted and received over IP network to the DUT.

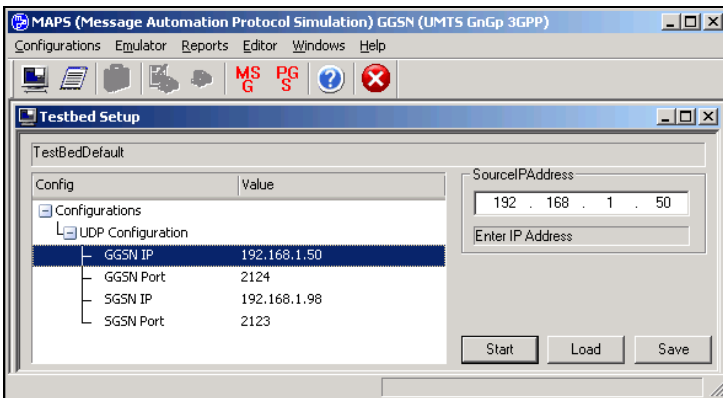


Figure: Testbed Setup

## 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.

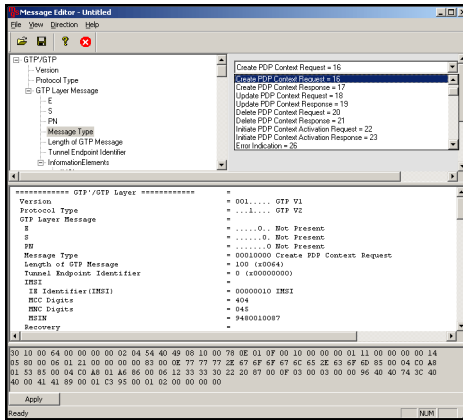


Figure: Message Editor

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

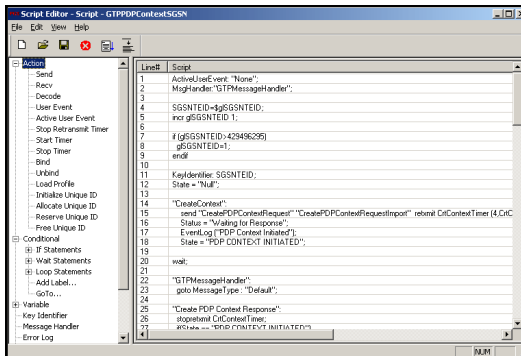


Figure: Script Editor

**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.

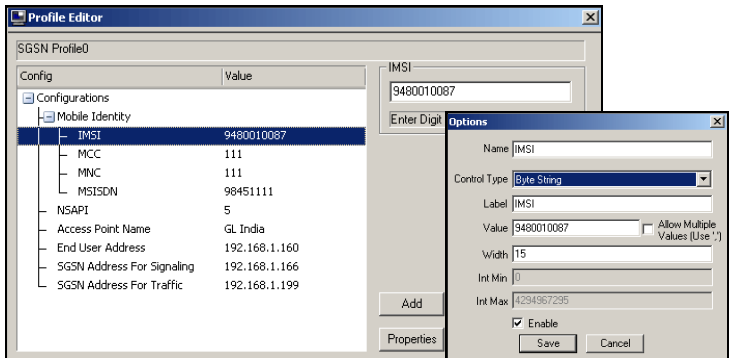


Figure: Profile Editor



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### 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 may be started manually or they can be automatically triggered by incoming messages.

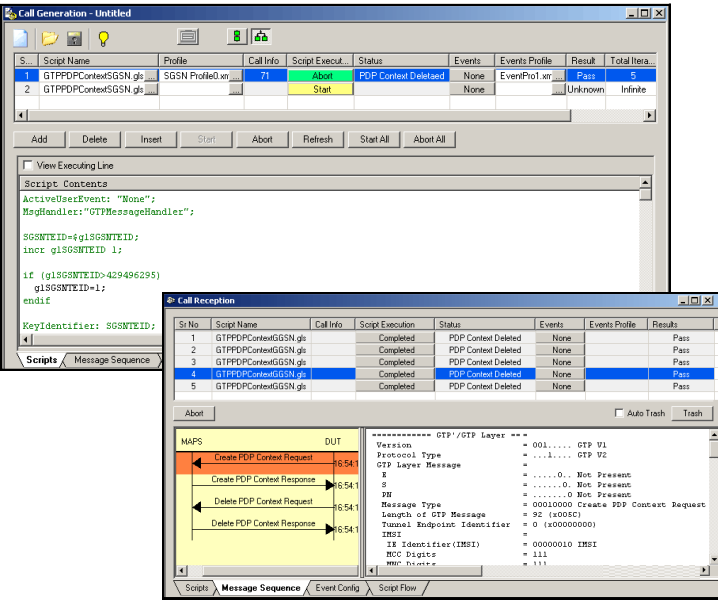


Figure: MAPS™ GnGp Call Generation and Reception

### 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™ GnGp.

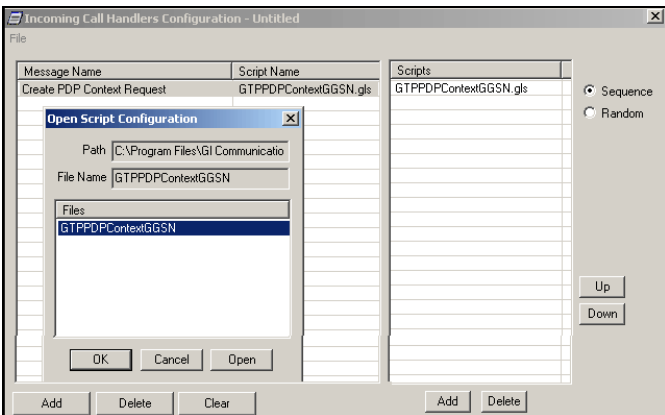
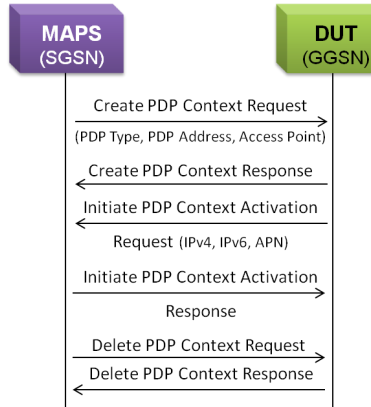


Figure: Incoming Call Handler

### MAPS™ GnGp Signaling Flow

#### Scenario 1: MAPS™ GnGp acting as SGSN and testing DUT (GGSN)

MAPS™ GnGp is considered as Caller (User End) and initiates the call flow by sending CreatePDPContextRequest to the DUT.

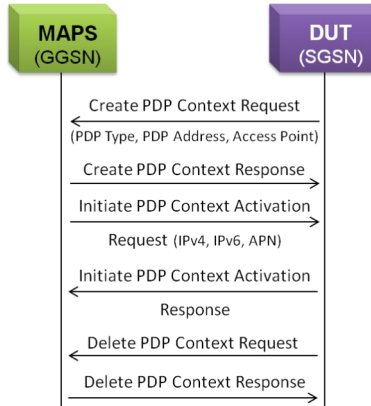


#### Sample Place Call Script

```
send "CreatePDPContextRequest" "CreatePDPContextRequestImport";
decode "CreatePDPContextResponseExport";
decode "InitiatePDPContextActivationRequestExport";
send "InitiatePDPContextActivationResponse";
"InitiatePDPContextActivationResponseImport";
decode "DeletePDPContextRequestExport";
send "DeletePDPContextResponse" "DeletePDPContextResponseImport";
```

#### Scenario 2: MAPS™ GnGp resides at the network (GGSN) testing DUT (SGSN)

MAPS™ GnGp is considered as the GGSN processing the call flow by receiving the CreatePDPContextRequest from the caller (SGSN).



#### Sample Answer Call Script

```
decode "CreatePDPContextRequestExport";
send "CreatePDPContextResponse" "CreatePDPContextResponseImport";
send "InitiatePDPContextActivationRequest";
"InitiatePDPContextActivationRequestImport";
decode "InitiatePDPContextActivationResponseExport";
decode "DeletePDPContextRequestExport";
send "DeletePDPContextResponse" "DeletePDPContextResponseImport";
```



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## Supported Protocols and Specifications

Supported Protocols	Standard / Specification Used
GTP	TS 29.060 V9.2.0 (2010-03)

### Buyer's Guide

[PKS166](#) - MAPS™ UMTS - GnGp Interface Emulation

### Related Software

[XX692](#) – MAPS™-GSM A Interface Emulator

[XX648](#) – MAPS™ ISDN Interface Emulator

[XX600](#) – Basic Client/Server Scripted Control Software

[XX693](#) – MAPS™ GSM A bis Interface Emulator

[PKS130](#) - MAPS™ SIGTRAN (SS7 over IP)

[XX120](#) - SS7 Analysis Software

[PKS140](#) - MAPS™ LTE S1 Interface

[PKS142](#) - MAPS™ LTE eGTP (S3, S4, S5, S8, S10, S11 & S16) Interfaces

[PKV107](#) - LTE Protocol Analyzer

[PKS164](#) - MAPS™ UMTS – Iu-PS Interface Emulation

[PKS160](#) - MAPS™ UMTS – Iu-CS and Iuh 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

### Related Software...

[PKS137](#) - MAPS™ GSM A Emulation over IP

[PKS135](#) - MAPS™ ISDN SIGTRAN (ISDN over IP)

[XX100](#) - ISDN Analyzer Software

[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)

### Related Hardware

[UTE001](#) - USB based Dual T1 or E1 Laptop Analyzer

[PTE001](#) - tProbe™ T1 E1 Base Unit

[HTE001](#) - Universal T1 E1 PCI Card

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



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