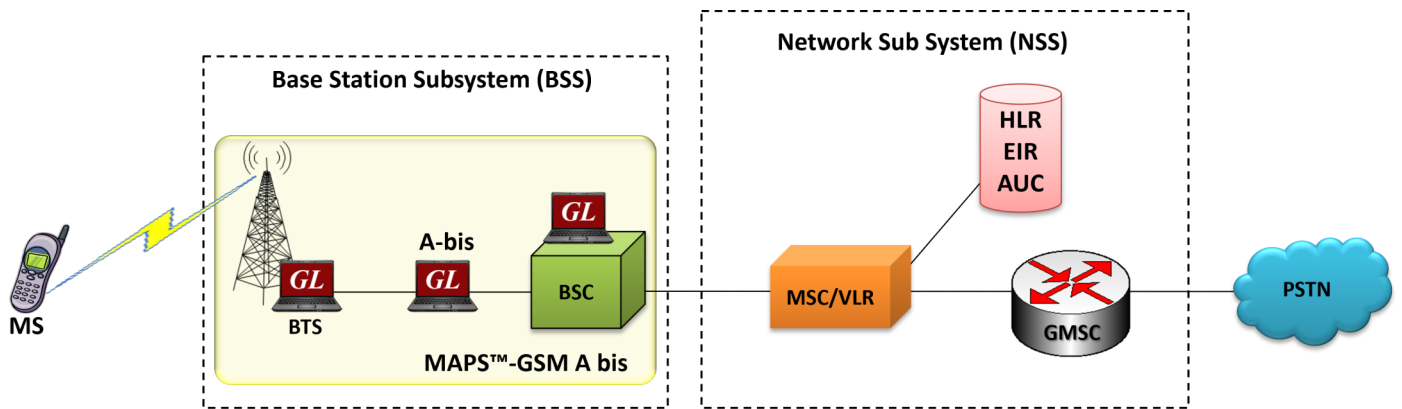


# MAPS™ GSM - Abis over IP Interface Emulator



 MAPS™ – Emulate elements in GSM network

## Overview

GL's Message Automation & Protocol Simulation (MAPS™) GSM Abis Interface emulator is an advanced protocol emulator for Global System for Mobile communication (GSM) emulation over Abis interface that can emulate BTS messages and signaling specification as defined by 3GPP standards. Supports testing network elements Base Transceiver Station (BTS) and Base Station Controller (BSC), error tracking, regression testing, conformance testing, load testing of high volumes of GSM traffic. It can run pre-defined test scenarios against GSM Abis interface test objects in a controlled and deterministic manner.

MAPS™ GSM Abis over IP supports CS Domain RTP traffic emulation including digits, voice file, single tone, dual tones, IVR, FAX, and Video. With regular RTP traffic, the maximum simultaneous calls up to 2500, and calls per second up to 250 is achievable. Almost all industry standard voice codec are supported.

GL provides virtual real-time GSM GPRS network emulating all the network elements and GSM Abis, GSM A, C / D / E, Gb, and GnGp interfaces using "[MAPS™ 2G Wireless Lab Suite](#)".

MAPS™ supports [Command Line Interface \(CLI\)](#) allowing remote controlling of the application through multiple command-line based clients.

For more details, refer to [MAPS™ GSM Abis Interface Emulator](#) webpage.

## Main Features

- GSM Abis interface emulation over IP
- GSM Abis Interface emulator can be configured to act as either BSC or BTS
- Supports transmission and detection of RTP traffic - Auto digits, voice file, tones, fax, user-defined traffic, and IVR
- Supported codec types include G.711, G.729, G.726, GSM, AMR, EVRC, SMV, iLBC, SPEEX, G.722, and more. AMR, EVRC variants requires additional licenses
- Configure AGCH, ACCH, SDCCH, BCCH and other logical channels
- Supports Location Update Call, Mobile Originating Speech Call, Emergency Call, Short Message Services, and Mobile Terminating Voice Call procedures
- Access to all BTS Message Parameters such as TMSI, IMSI, Request Reference, and others
- Supports Authentication, TMSI Reallocation, Encryption and other optional procedures
- Supports end-to-end UE Movement procedure emulation using "[MAPS™ 2G Wireless Lab Suite](#)"
- User Defined Statistics for RTP voice quality metrics
- Supports powerful utilities such as Message Editor, Script Editor and Profile Editor which allow new scenarios to be created or existing scenarios to be modified using BTS messages and parameters
- Supports Client-Server functionality with additional licensing. clients are "TCL", "Python", "VBScript" and ".Net"

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## Testbed Setup Configuration

The Testbed configuration feature allows the users to configure the necessary BTS and BSC GSM Abis interface entities with source and destination IP addresses and port number in order to establish communication between the MAPS™ and the DUT. Once the TCP layer is configured properly, BTSM messages can be transmitted and received over TCP layer.

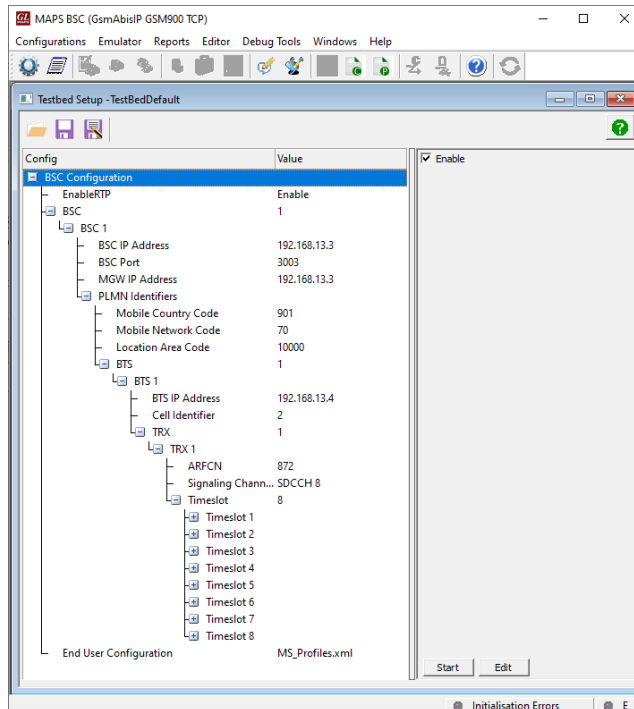


Figure: Testbed Setup

## Pre-processing Tools

### Profile Editor

The Profile editor 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. Traffic profiles are available supporting RTP traffic types - Auto Traffic Digits, Auto Traffic File, Auto Traffic Tones, IVR, and User-defined traffic.

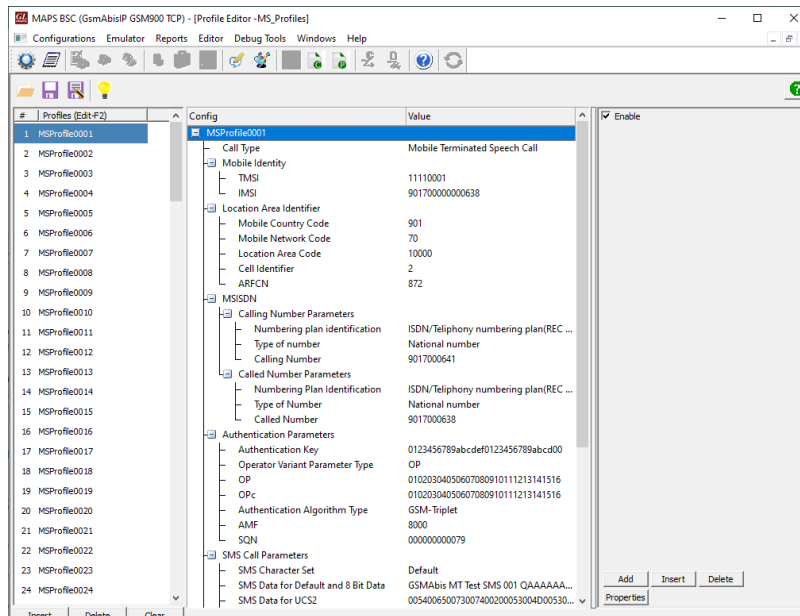


Figure: Profile Editor

## Pre-processing Tools (Contd.)

### 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.

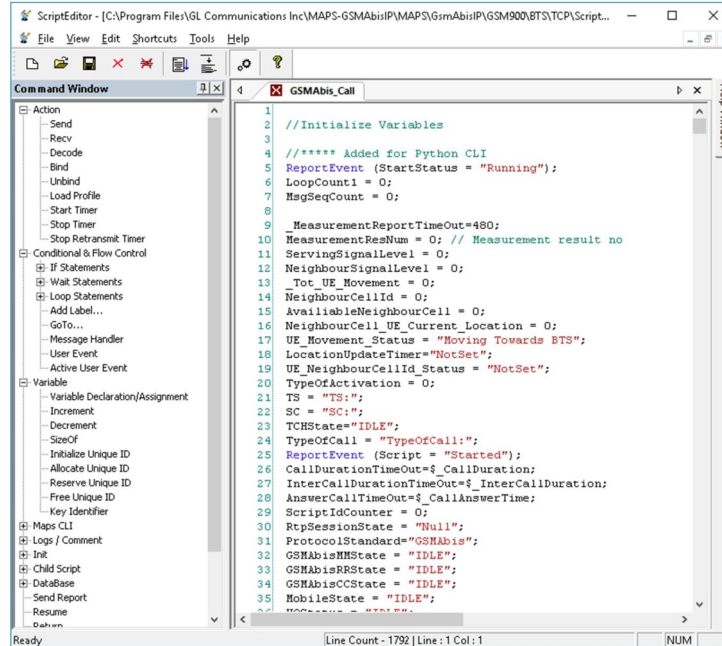


Figure: Script Editor

### 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.

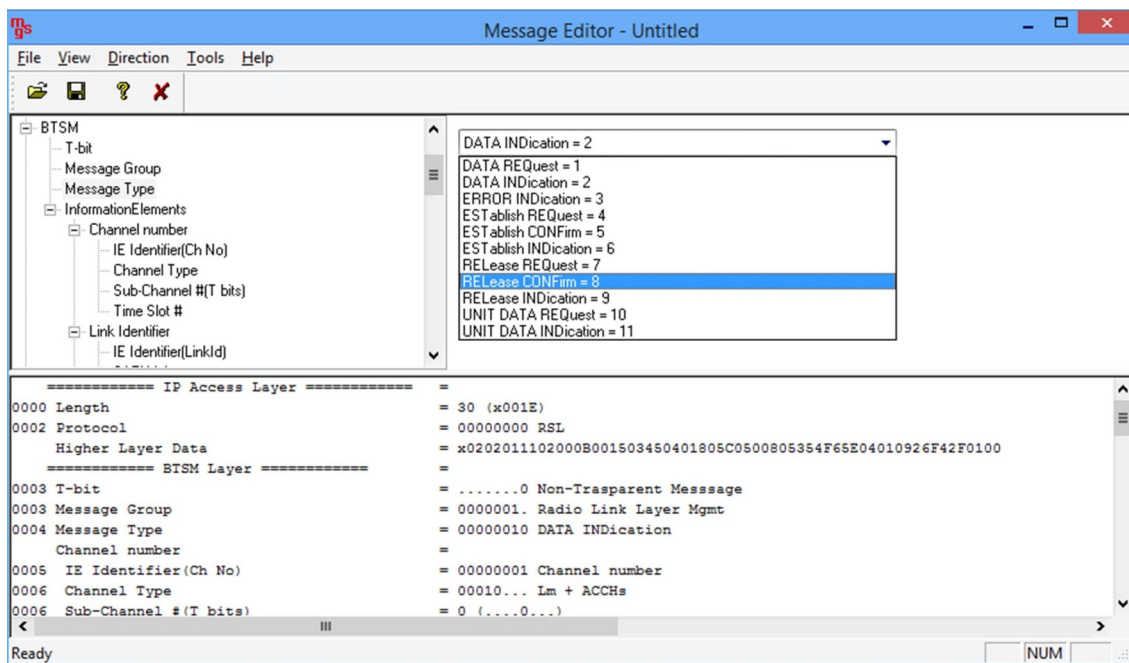


Figure: Message Editor

## Call Generation and Reception

In call generation, MAPS™ GSM Abis is configured for the out going messages, while in call receive mode, it is configured to respond to incoming messages. The 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.

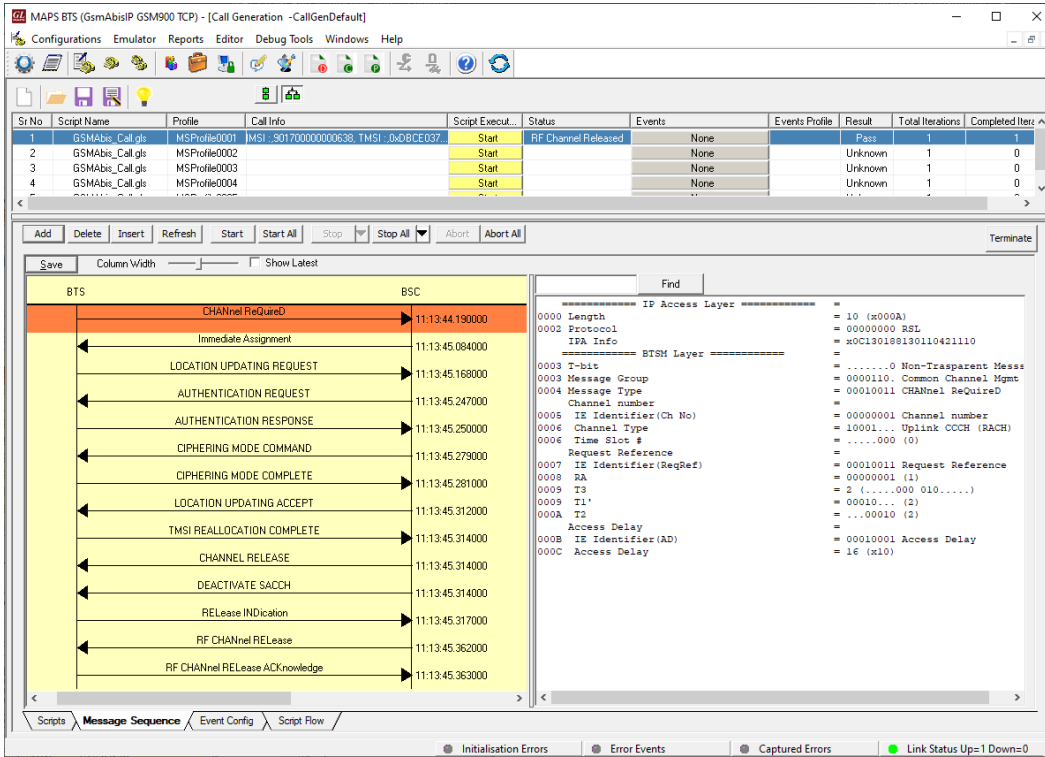


Figure: Call Generation

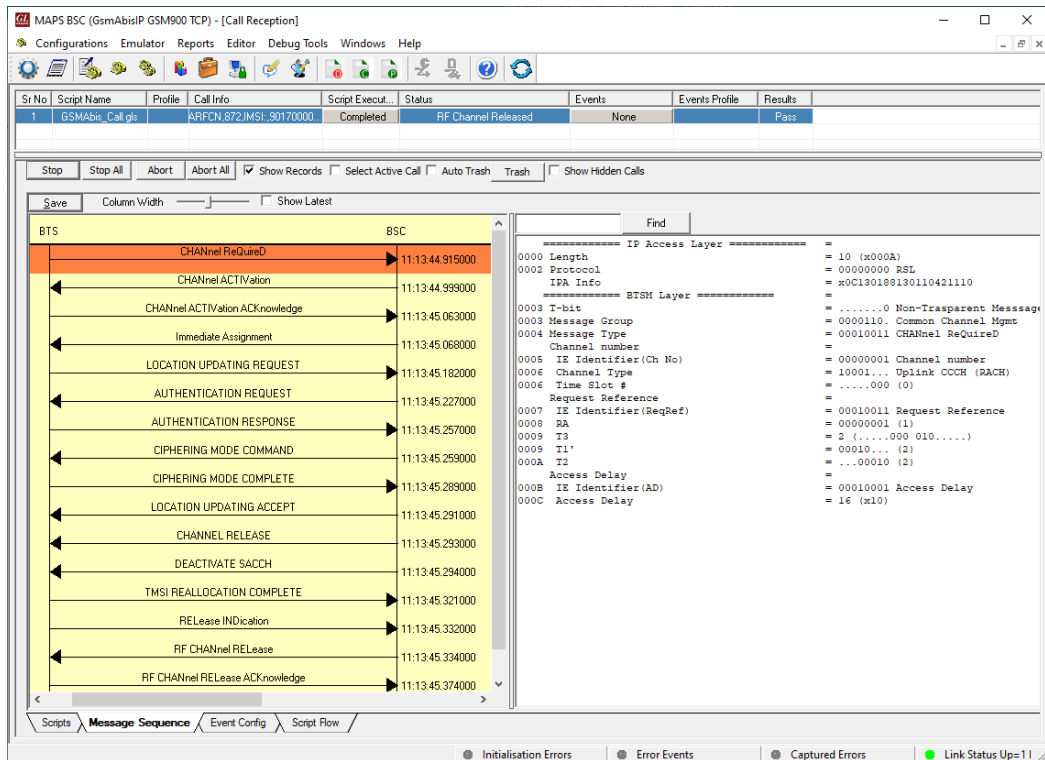


Figure: Call Reception

## GSM Abis Interface Call Procedures

MAPS™ GSM Abis can be configured as BTS or BSC to emulate LUC, MOC, and MTC call procedures in the GSM Abis interface. In Channel Assignment procedure, Channel Required request message is sent from BTS end, the BSC activates the channel and replies with Immediate Assignment message to BTS.

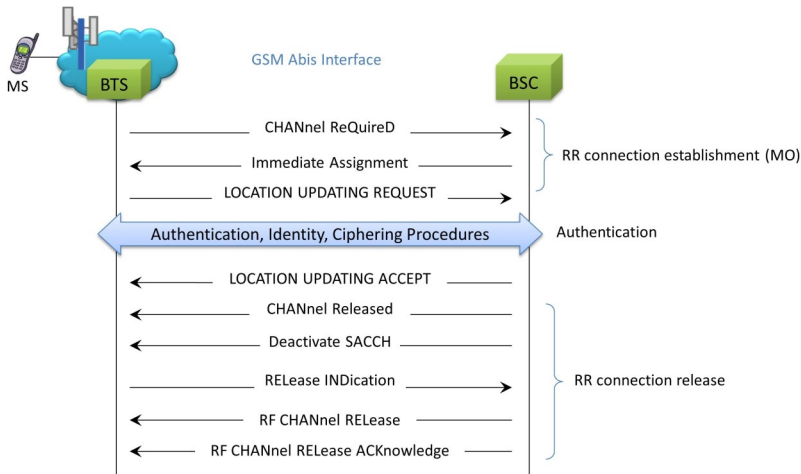


Figure: LUC Call Procedure

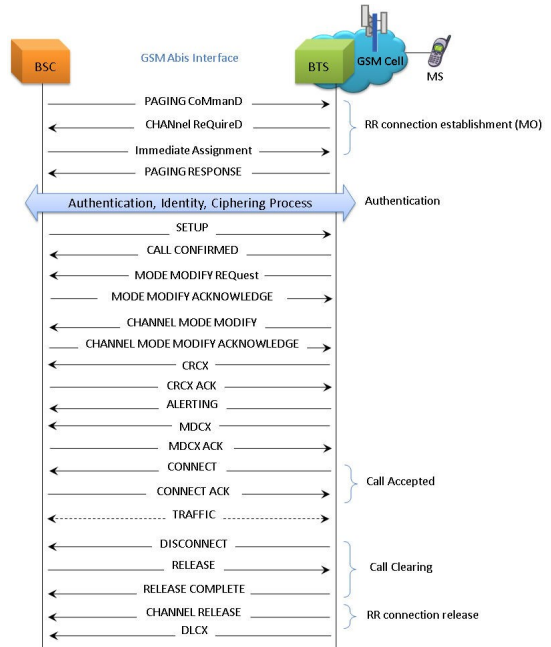


Figure: MTC Call Procedure

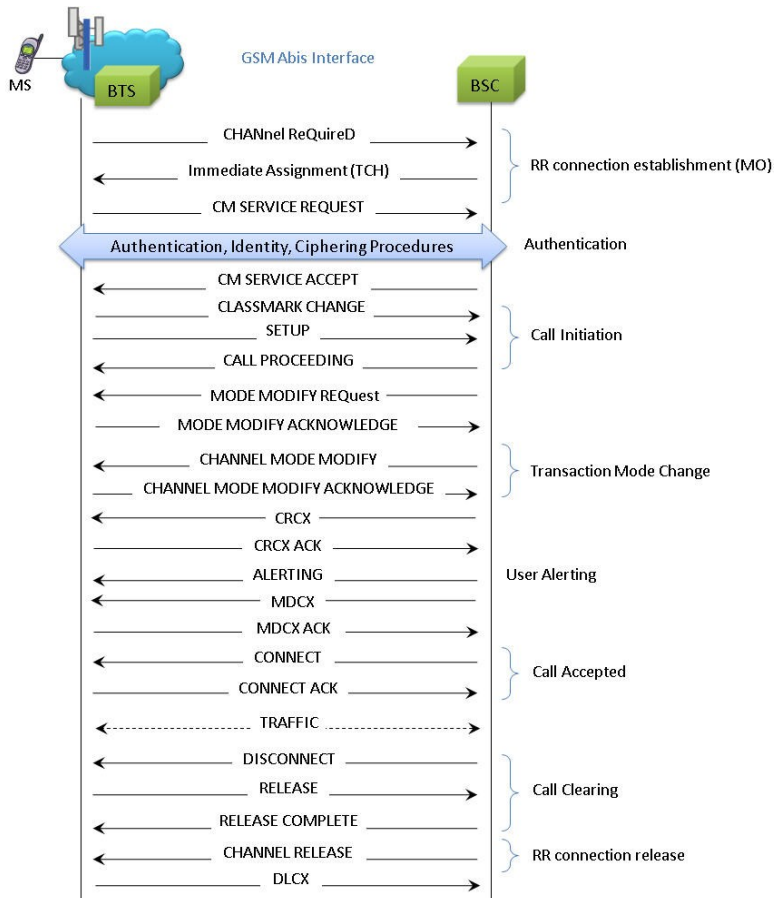


Figure: MOC Call Procedure

## SMS Procedure

The Short Message Service (SMS) is a mechanism of short messages delivery over the mobile networks. It is a store and forward way of transmitting messages to and from mobile phones. The SMS uses signaling channel as opposed to dedicated channels, hence these messages can be sent / received simultaneously with the voice / data / fax service over a GSM network. The SMS supports national and international roaming, and can be sent to any other GSM mobile around the world.

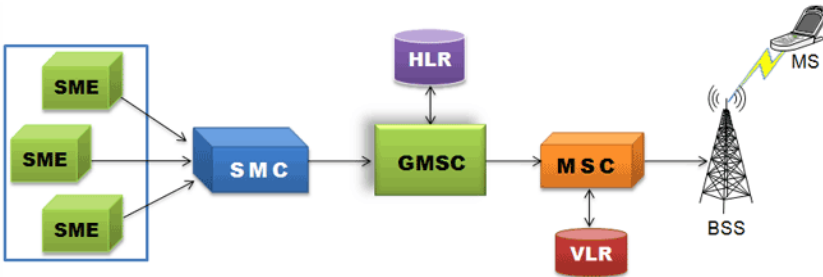


Figure: SMS Network

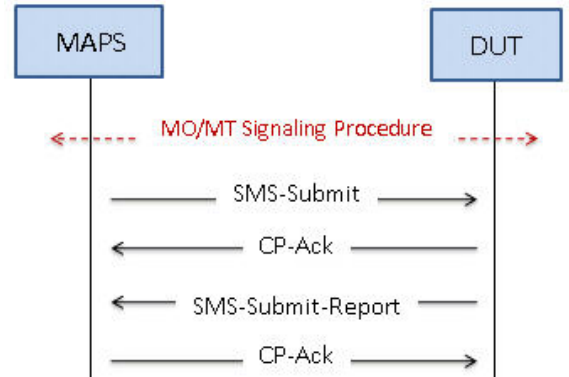


Figure: SMS Call Procedure

## Supported Protocol Standards

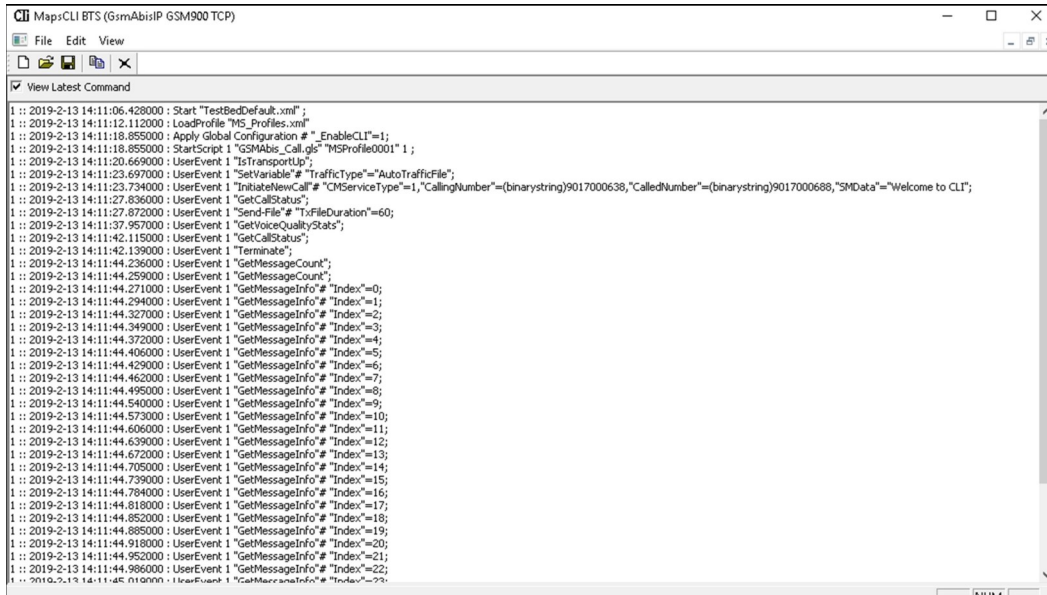
CM	MM	RR	SMS	GCC	BCC
BTSM					
IPA					
SCTP					
IUA					
MAC					
GSM Abis over IP					

Supported Protocols	Standard / Specification Used
BTSM	3GPP TS 48.058, Rel. 8.0.0, "Base Station Controller – Base Transceiver
MM, CC	3GPP TS 24.008 Rel.8.0.0 "Mobile radio interface Layer 3 specification;
RR	3GPP TS 44.018 Rel. 8.0.0 "Mobile radio interface layer 3 specification;
SMS	3GPP TS 23.040 Rel. 8.0.0 "Technical realization of the Short Message

## Command Line Interface (CLI)

MAPS™ GSM Abis IP emulator can be configured as server-side application, to enable remote controlling of the application through multiple command-line based clients. Supported clients include TCL, Python, VBScript, Java, and .Net.

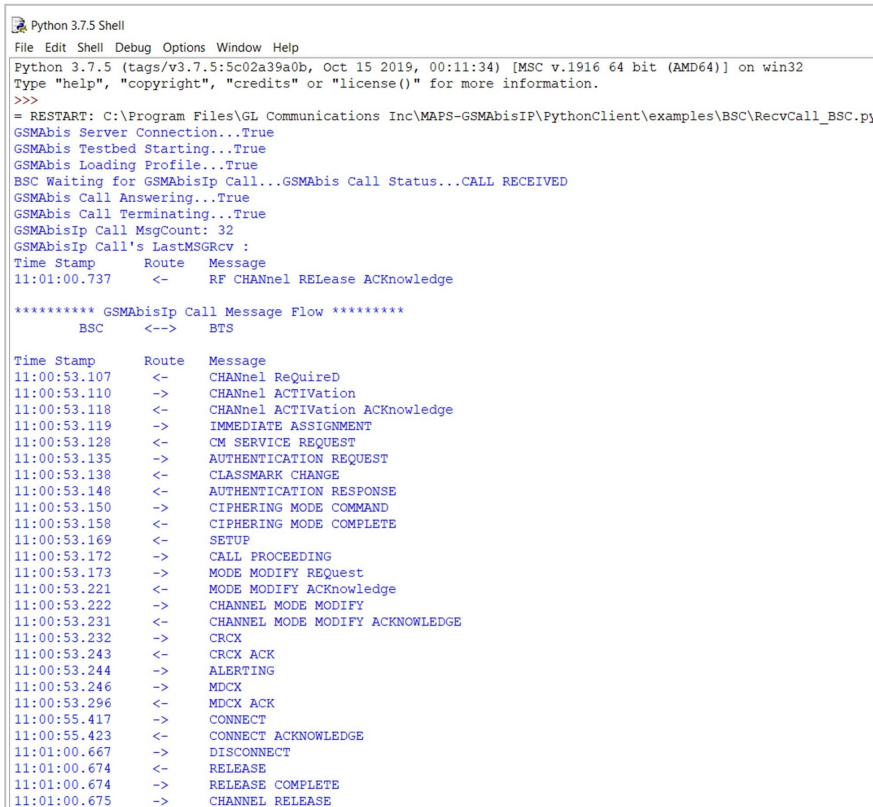
Clients can remotely perform all functions such as start testbed setup, load scripts, and profiles, apply user events such as send digits / file / tones, detect digits / file / tones, dial, originate call, terminate call, start and stop traffic . User can also generate and receive calls through commands. This client application is distributed along with MAPS™ Server application.



```

CLI MapsCLI BTS (GsmAbisIP GSM900 TCP)
View Latest Command
1 :: 2019-2-13 14:11:06.428000 : Start "TestBedDefault.xml";
1 :: 2019-2-13 14:11:12.112000 : LoadProfile "MS_Profiles.xml"
1 :: 2019-2-13 14:11:18.855000 : Apply Global Configuration # " _EnableCLI"=1;
1 :: 2019-2-13 14:11:18.855000 : StartScript 1 "GSMABIS_Call.gst" "MSProfile0001" 1;
1 :: 2019-2-13 14:11:20.699000 : UserEvent 1 "IsTransportUp";
1 :: 2019-2-13 14:11:23.697000 : UserEvent 1 "SetVariable# "TrafficType"="AutoTrafficFile";
1 :: 2019-2-13 14:11:23.734000 : UserEvent 1 "InitiateNewCall#" "CMServiceType"=1,"CallingNumber"=(binarystring)9017000638,"CalledNumber"=(binarystring)9017000688,"SMDData"="Welcome to CLI";
1 :: 2019-2-13 14:11:27.836000 : UserEvent 1 "GetCallStatus";
1 :: 2019-2-13 14:11:27.872000 : UserEvent 1 "Send-File#" "TxFileDuration"=60;
1 :: 2019-2-13 14:11:37.957000 : UserEvent 1 "GetVoiceQualityStats";
1 :: 2019-2-13 14:11:42.115000 : UserEvent 1 "GetCallStatus";
1 :: 2019-2-13 14:11:42.139000 : UserEvent 1 "Terminate";
1 :: 2019-2-13 14:11:44.236000 : UserEvent 1 "GetMessageCount";
1 :: 2019-2-13 14:11:44.259000 : UserEvent 1 "GetMessageCount";
1 :: 2019-2-13 14:11:44.271000 : UserEvent 1 "GetMessageInfo#" "Index"=0;
1 :: 2019-2-13 14:11:44.294000 : UserEvent 1 "GetMessageInfo#" "Index"=1;
1 :: 2019-2-13 14:11:44.327000 : UserEvent 1 "GetMessageInfo#" "Index"=2;
1 :: 2019-2-13 14:11:44.349000 : UserEvent 1 "GetMessageInfo#" "Index"=3;
1 :: 2019-2-13 14:11:44.372000 : UserEvent 1 "GetMessageInfo#" "Index"=4;
1 :: 2019-2-13 14:11:44.406000 : UserEvent 1 "GetMessageInfo#" "Index"=5;
1 :: 2019-2-13 14:11:44.429000 : UserEvent 1 "GetMessageInfo#" "Index"=6;
1 :: 2019-2-13 14:11:44.462000 : UserEvent 1 "GetMessageInfo#" "Index"=7;
1 :: 2019-2-13 14:11:44.495000 : UserEvent 1 "GetMessageInfo#" "Index"=8;
1 :: 2019-2-13 14:11:44.540000 : UserEvent 1 "GetMessageInfo#" "Index"=9;
1 :: 2019-2-13 14:11:44.573000 : UserEvent 1 "GetMessageInfo#" "Index"=10;
1 :: 2019-2-13 14:11:44.606000 : UserEvent 1 "GetMessageInfo#" "Index"=11;
1 :: 2019-2-13 14:11:44.639000 : UserEvent 1 "GetMessageInfo#" "Index"=12;
1 :: 2019-2-13 14:11:44.672000 : UserEvent 1 "GetMessageInfo#" "Index"=13;
1 :: 2019-2-13 14:11:44.705000 : UserEvent 1 "GetMessageInfo#" "Index"=14;
1 :: 2019-2-13 14:11:44.739000 : UserEvent 1 "GetMessageInfo#" "Index"=15;
1 :: 2019-2-13 14:11:44.794000 : UserEvent 1 "GetMessageInfo#" "Index"=16;
1 :: 2019-2-13 14:11:44.819000 : UserEvent 1 "GetMessageInfo#" "Index"=17;
1 :: 2019-2-13 14:11:44.852000 : UserEvent 1 "GetMessageInfo#" "Index"=18;
1 :: 2019-2-13 14:11:44.885000 : UserEvent 1 "GetMessageInfo#" "Index"=19;
1 :: 2019-2-13 14:11:44.918000 : UserEvent 1 "GetMessageInfo#" "Index"=20;
1 :: 2019-2-13 14:11:44.952000 : UserEvent 1 "GetMessageInfo#" "Index"=21;
1 :: 2019-2-13 14:11:44.986000 : UserEvent 1 "GetMessageInfo#" "Index"=22;
1 :: 2019-2-13 14:11:45.019000 : UserEvent 1 "GetMessageInfo#" "Index"=23;
  
```

Figure: MAPS™ CLI Server



```

Python 3.7.5 Shell
File Edit Shell Debug Options Window Help
Python 3.7.5 (tags/v3.7.5:5c02a39a0b, Oct 15 2019, 00:11:34) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:\Program Files\GL Communications Inc\MAPS-GSMAbisIP\PythonClient\examples\BSC\RecvCall_BSC.py
GSMAbis Server Connection...True
GSMAbis Testbed Starting...True
GSMAbis Loading Profile...True
BSC Waiting for GSMAbisIp Call...GSMAbis Call Status...CALL RECEIVED
GSMAbis Call Answering...True
GSMAbis Call Terminating...True
GSMAbisIp Call MsgCount: 32
GSMAbisIp Call's LastMSGRCV :
Time Stamp Route Message
11:01:00.737 <- RF CHANnel RELease ACKnowledge

***** GSMAbisIp Call Message Flow *****
BSC <--> BTS

Time Stamp Route Message
11:00:53.107 <- CHANnel ReQuireD
11:00:53.110 -> CHANnel ACTIVation
11:00:53.118 <- CHANnel ACTIVation ACKnowledge
11:00:53.119 -> IMMEDIATE ASSIGNMENT
11:00:53.128 <- CM SERVICE REQUEST
11:00:53.135 -> AUTHENTICATION REQUEST
11:00:53.138 <- CLASSMARK CHANGE
11:00:53.148 <- AUTHENTICATION RESPONSE
11:00:53.150 -> CIPHERING MODE COMMAND
11:00:53.158 <- CIPHERING MODE COMPLETE
11:00:53.169 <- SETUP
11:00:53.172 -> CALL PROCEEDING
11:00:53.173 -> MODE MODIFY ReQuest
11:00:53.221 <- MODE MODIFY ACKnowledge
11:00:53.222 -> CHANNEL MODE MODIFY
11:00:53.231 <- CHANNEL MODE MODIFY ACKNOWLEDGE
11:00:53.232 -> CRCX
11:00:53.243 <- CRCX ACK
11:00:53.244 -> ALERTING
11:00:53.246 -> MDCX
11:00:53.296 <- MDCX ACK
11:00:55.417 -> CONNECT
11:00:55.423 <- CONNECT ACKNOWLEDGE
11:01:00.667 <- DISCONNECT
11:01:00.674 <- RELEASE
11:01:00.674 -> RELEASE COMPLETE
11:01:00.675 -> CHANNEL RELEASE
  
```

Figure: Python Client Sample Script

## Buyer's Guide

Item No	Product Description
<a href="#">PKS134</a>	MAPS™ GSM Abis IP Emulator
<a href="#">PKS102</a>	RTP Traffic
<a href="#">PKS200</a>	RTP Pass Through Mode Fax Emulation
<a href="#">PKS170</a>	CLI Support for MAPS™

For more details, refer to [MAPS™ GSM Abis Interface Emulator](#) webpage.

For complete list of MAPS™ products, refer to [Message Automation & Protocol Simulation \(MAPS™\)](#) webpage.



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