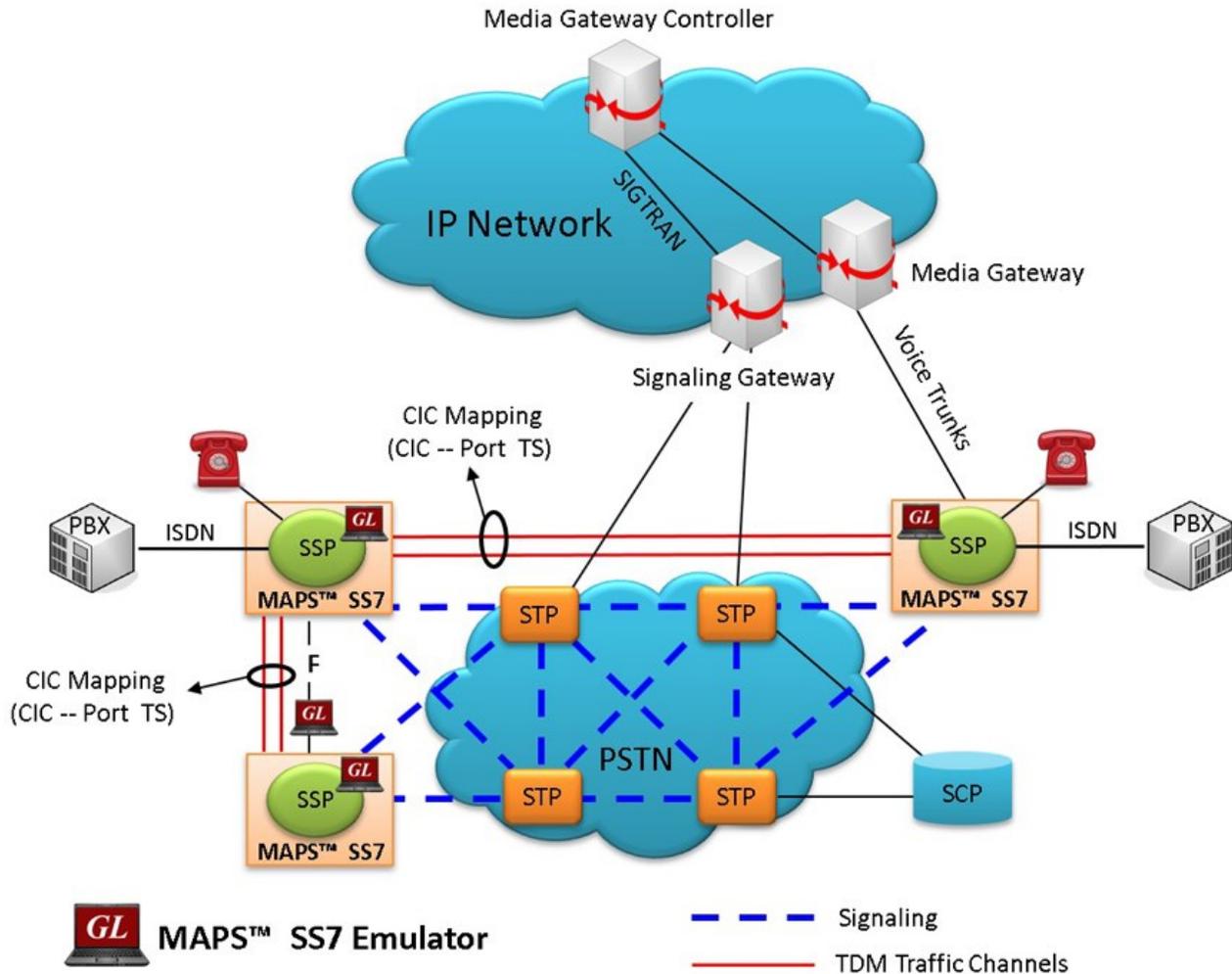# MAPS™ SS7 over TDM/ATM
(Scripted ISUP Simulator)

Overview

GL's MAPS™ SS7 is an advanced protocol simulator/tester for SS7 simulation over TDM/ATM. The tester can simulate Service Switching Point (SSP) and ISUP signaling specification as defined by the ITU-T, ANSI, ETSI, and CHINA standards.

The tester supports testing network elements, error tracking, regression testing, conformance testing, load testing/call generation and generation of high volumes of ISUP traffic. The MAPS™ SS7 functionality covers the ITU, ANSI and CHINA variant of SS7 implementing MTP2, MTP3, ATM, and ISUP protocols. It is able to run pre-defined test scenarios against ISUP test objects in a controlled & deterministic manner.

MAPS™ SS7 ATM uses SSCOP server for establishing SSCOP links over which IN signaling will be carried further for making calls. SSCOP Server is GL's WCS based server module and provides SSCOP, and AAL5 layer services. It uses AAL5 Traffic Generator for traffic generation. Various traffic types like Tone, Digits and File playback are supported.

MAPS™ SS7 supports client-server functionality through Command Line Interface (CLI) such as the Python and Java scripting tools. CLI provides the capability of remote operation, automation, and multi-site connectivity.

The MAPS™ SS7 conformance scripts, suitable for conformance tests and functional tests, where test objects can be accurately, reliably and comfortably validated for compliance with ITU-T standard Q.761-764 and Q.784.

For more information, refer to MAPS™ SS7 Emulator webpage.

Main Features

- SS7 (SSP) simulation over ATM/TDM (T1/E1)
- Supports transmission and detection of TDM traffic - digits, voice file, single /dual tones and fax
- Multiple T1/E1 line interfaces supported
- User-friendly GUI for configuring the SS7 MTP/ATM Layers and user Configurable Signaling Links
- User-configured Circuit Mapping, i.e. defines Circuit Identification Codes (CIC) and map these CICs to Timeslots/Trunks in order to enable Voice/Data traffic
- Supports MTP2 and MTP3 protocol machine. User controlled access to optional ISUP parameters such as timers
- Subsequent Address Message (SAM) configurations available
- Fully Supported Continuity Testing (COT) that includes COT messages
- Supports client-server functionality through CLI such as the Python and Java (requires additional license)
- Script based and protocol independent MAPS™ architecture supports all common framework features.

Testbed Setup Configuration

Test Bed setup is provided to establish communication between MAPS™ SS7 and the DUT over TDM/ATM. It includes Source and Destination SSP Node configurations, Signaling port and timeslot, and CIC group parameter configurations. Default profile is used to configure MAPS™ SS7 with end user parameters.

Once the test parameters are configured properly, ISUP messages over MTP, ATM layer can be transmitted and received successfully.
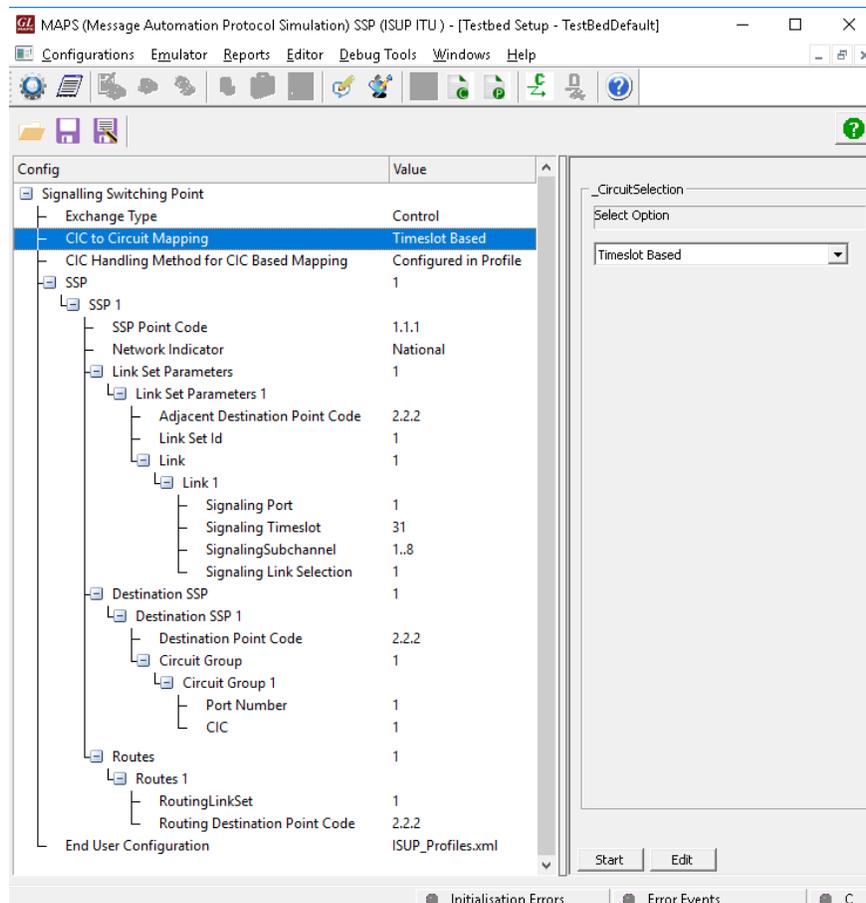

Testbed Configuration

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Pre-processing Tools

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.
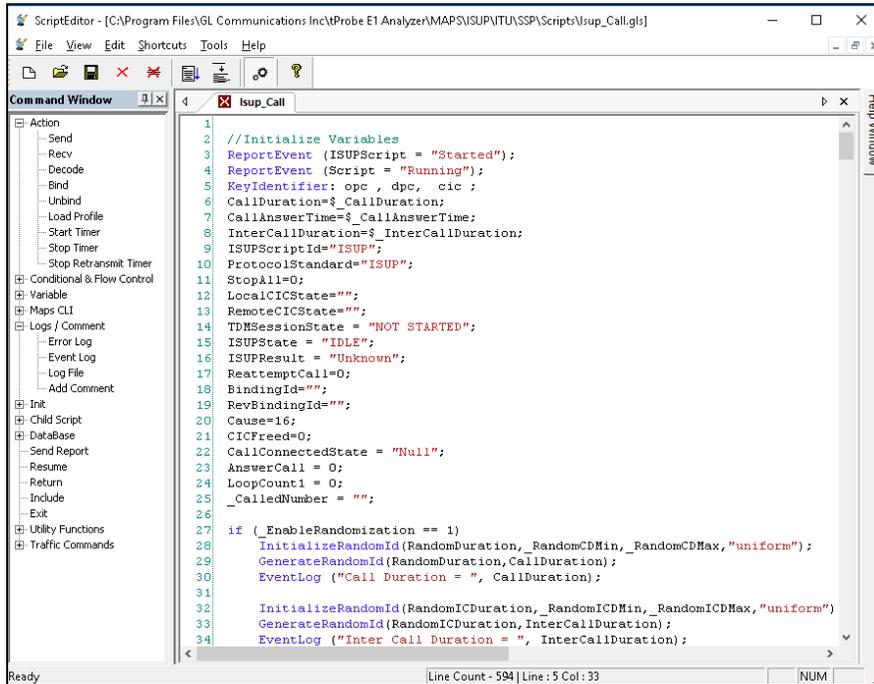
Script Editor

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.

Message Editor

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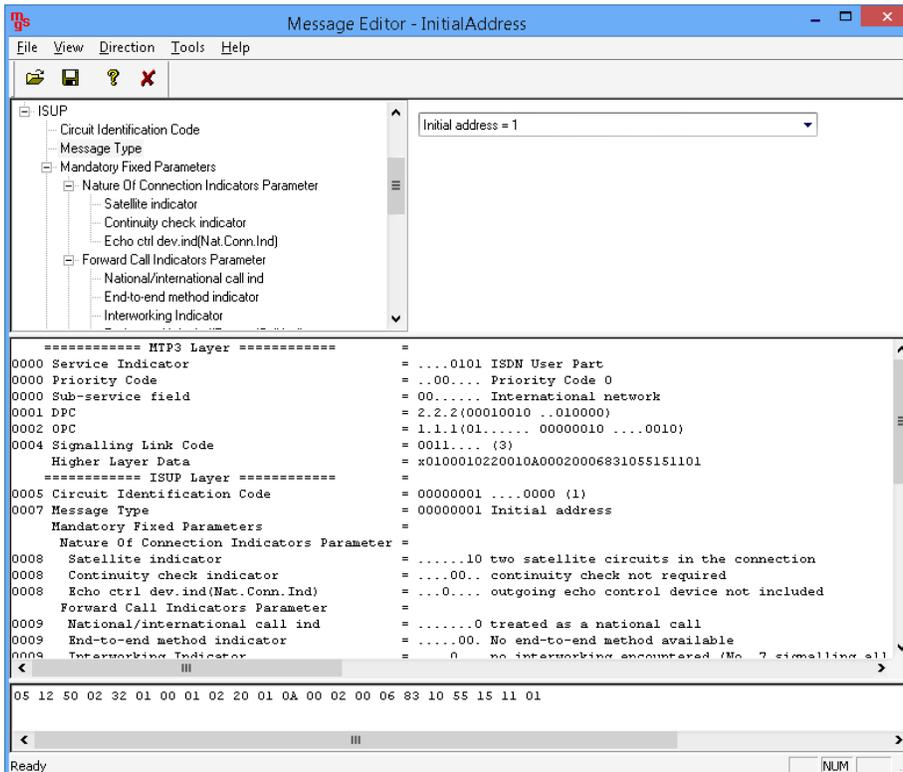
Profile Editor - This feature allows loading profile to edit the values of the variables using GUI. Profiles provide input parameters during script execution replacing the original value of the variables in the message template.

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.

Users can configure the traffic options for Auto traffic type or User-defined traffic type. Supported traffic configuration includes Send/Receive file, DTMF/MF digits, and Single/Dual tones.
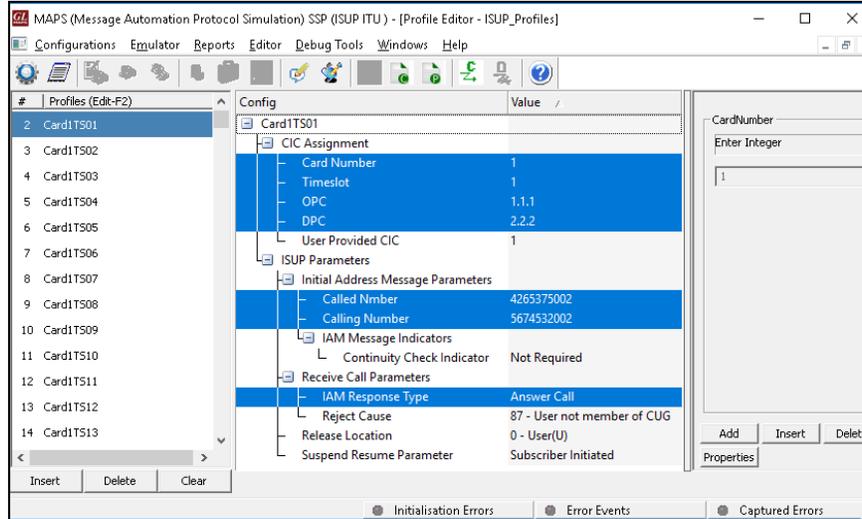
Profile Editor

Call Generation and 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.
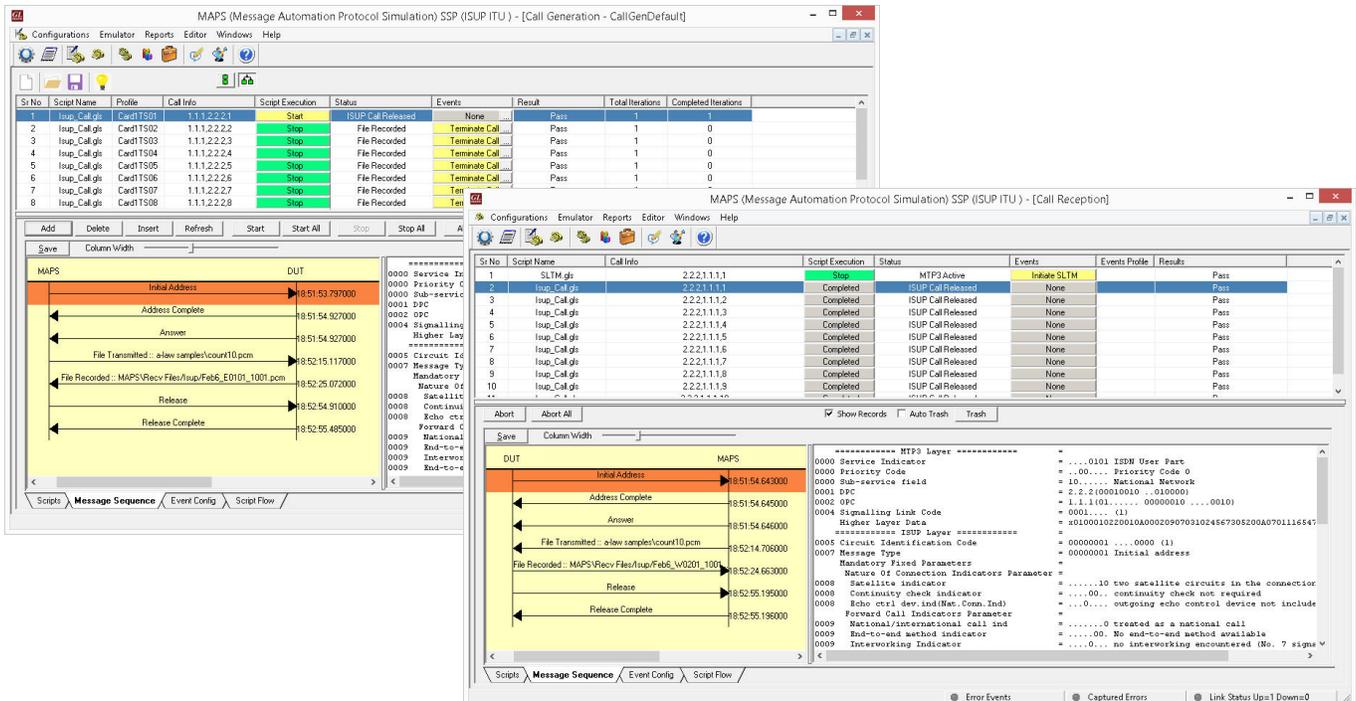
Call Generation and Call Reception

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SS7 Conformance Testing

MAPS™ include inbuilt conformance scripts (*.gls), suitable for conformance and functional testing, where test objects can be accurately, reliably and comfortably validated for compliance with ITU-T standard Q.761-764 and Q.784.

Some of the supported test cases are:

- Test 1.1 (Non-allocated circuits)
- Test 1.2.1 (Reset of circuits)
- Test 1.3.2.1(Circuit blocking /unblocking)
- Test 1.7.1.3 (Receipt of unknown messages)
- Test 2.1.1 (Both way circuit selection)
- Test 3.1 (Normal call release)
- Test 4.1(Unsuccessful call setup)
- Test 6.1.3 (Continuity check call)
- Test 7.1.1 (Successful call setup)
- Test 7.1.2 (Unsuccessful call setup) and others

Typical SS7 Call Procedure

MAPS™ SS7 can be configured as Caller (Signaling Point - SP) and initiates the call flow by sending Initial Address Message (IAM) to the DUT.

MAPS™ SS7 can also be considered at the Network as DUT to receive the incoming request messages and process the call by generating responses.

The **Isup_Call.gls** call control script is configured at the call generation and reception terminal to handle ISUP signaling and TDM traffic over established call.

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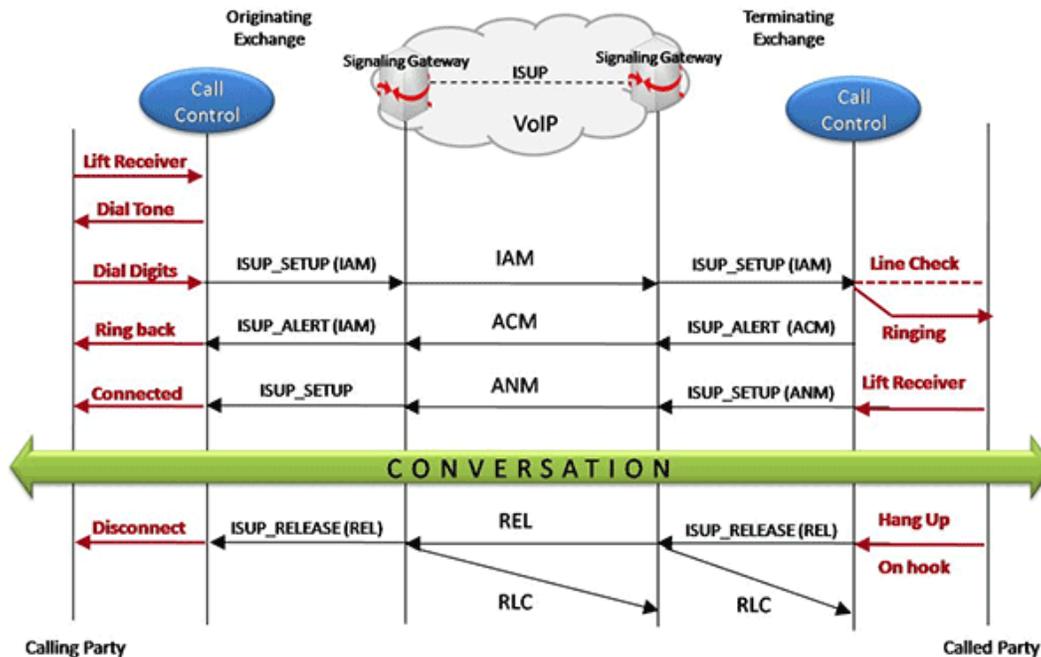
Command Line Interface (CLI)

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

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 and so on. User can also generate and receive calls through commands. This client application is distributed along with MAPS™ Server application

Sample Python API Server and Client console

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Supported Protocol and Specifications

Supported Protocols	Standard / Specification Used
TDM	
MTP3 (ITU)	ITU-T Q.704
ISUP (ITU)	ITU - Q.761, Q.762, Q.763 and Q.764
ISUP Conformance testing	ITU - Q.784.1
ISUP CHINA	Ministry of Posts and Telecommunications of the People's Republic of China, Technical Specification of ISUP, 1996
MTP3 (ANSI)	T1.111.4-1996
ISUP (ANSI)	ANSI - T1.113.1 to T1.113.4
Test & Network Management Messages (ITU, China)	ITU-T Q.703, Q.704
Test & Network Management Messages (ANSI)	ANSI T1.111.4, ANSI T1.111.7
ISUP ETSI	EN 300 356 -1 V3.2.2 (1998-08) Part 1
ATM	
ISUP (ITU)	ITU - Q.761, Q.762, Q.763 and Q.764
ATM	ITU-T I.361
SSCOP	ITU-T Q.2110
MTP3b	ITU-T Recommendation Q.2210
AAL5	Class C & D (ITU-T I.363.5)
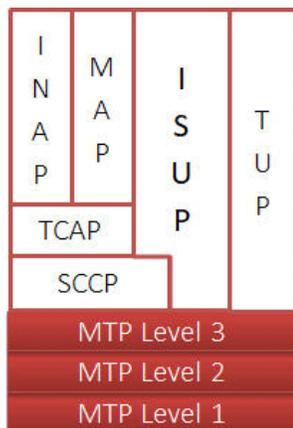
SS7 Protocol Stack over TDM
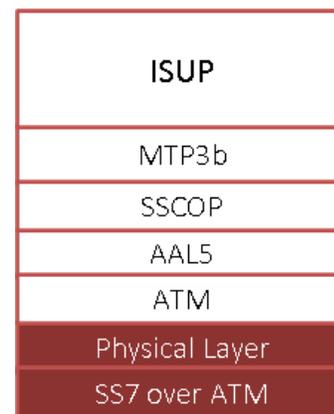
SS7 Protocol Stack over ATM

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Buyer's Guide

Item No	Product Description
XX649	MAPS™ SS7 Emulator
XX647	MAPS™ SS7 Conformance Test Suite (Test Scripts)
XX643	MTP2 Simulator
XX610, XX620	TDM Traffic Options
XXFT0	WCS Fax Emulation Software

Item No	Related Software (TDM Network)
XX694	MAPS™ MAP (B, C, D, E, F, G, and H interfaces)
PKS132	MAPS™ MAP Emulation over IP
XX648	MAPS™ ISDN Emulator
XX692	MAPS™ GSM -A Interface Emulator
XX693	MAPS™ GSM- Abis Interface Emulator
PKS135	MAPS™ ISDN -SIGTRAN (ISDN over IP)

Item No	Related Software (IP Network)
PKS120	MAPS™ SIP
PKS121	MAPS™ SIP Conformance Test Suite (Test Scripts)
PKS122	MAPS™ MEGACO
PKS123	MAPS™ MEGACO Conformance Test Suite (requires PKS122)
PKS124	MAPS™ MGCP (with MGCP Conformance Test Scripts)
PKS130	MAPS™ SIGTRAN (SS7 over IP)
PKS132	MAPS™ MAP Emulation over IP
PKS135	MAPS™ ISDN -SIGTRAN (ISDN over IP)

Document Number: XX649-01

Buyer's Guide (Contd.)

Item No	Related Hardware
PTE001	tProbe™ Dual T1 E1 Laptop Analyzer with Basic Analyzer Software
XTE001	Dual T1 E1 Express (PCIe) Boards (requires additional licenses)
FTE001	QuadXpress T1E1 Main Board (Quad Port– requires additional licenses)
ETE001	OctalXpress T1E1 Main Board plus Daughter Board (Octal Port– requires additional licenses)

Note: PCs which include GL hardware/software require Intel or AMD processors for compliance.

For more information, refer to MAPS™ SS7 Emulator web page.