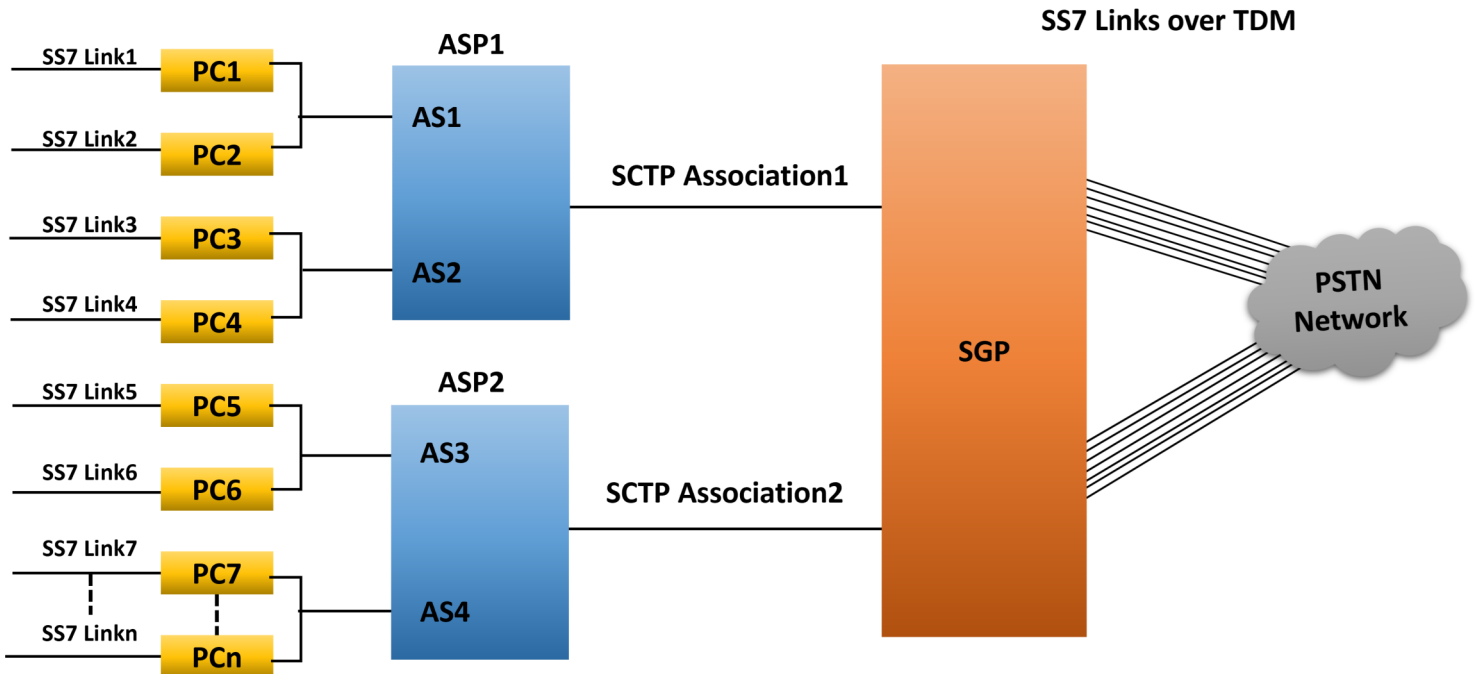


MAPS™ M3UA Conformance



Overview

SIGTRAN protocols are an extension of the SS7 protocol family, transmitted over IP networks. A Signaling Gateway (SG) converts SS7 TDM layers into SIGTRAN IP format. It maintains the same application and call management functions as SS7 but operates through two protocol layers atop the Internet Protocol (IP): Stream Control Transport Protocol (SCTP) and M3UA (MTP3 User Adaptation Layer).

The M3UA is a protocol for the transport of any SS7 MTP3-User signaling (e.g. ISUP and SCCP messages) over IP using the Stream Control Transport Protocol (SCTP) or any other suitable transport protocol. This protocol would be used between a Signaling Gateway (SG) and an Application Service Provider (ASP) (e.g. Media Gateway Controller - MGC) or IP-resident Database.

GL's [Message Automation and Protocol Simulation \(MAPS™\)](#) M3UA Conformance Test Suite (requires an additional license) is a comprehensive test suite designed with over 100 test cases, following the specifications of IETF RFC 3332 (M3UA Conformance). It includes built-in conformance scripts (*.gls) for M3UA interfaces in accordance with 3GPP standards. MAPS™ M3UA Conformance can be configured as a server with a conformance script to emulate various network-side procedures, conforming to various UP/Down test cases and automating the entire DUT testing process.

Supported Test Cases

- ASP State Maintenance Procedures
- ASP Traffic Maintenance procedures
- Message Transfer
- Routing Key Management procedures

For more information, refer to [MAPS™ SIGTRAN \(SS7 over IP\) Protocol Emulator](#) webpage.

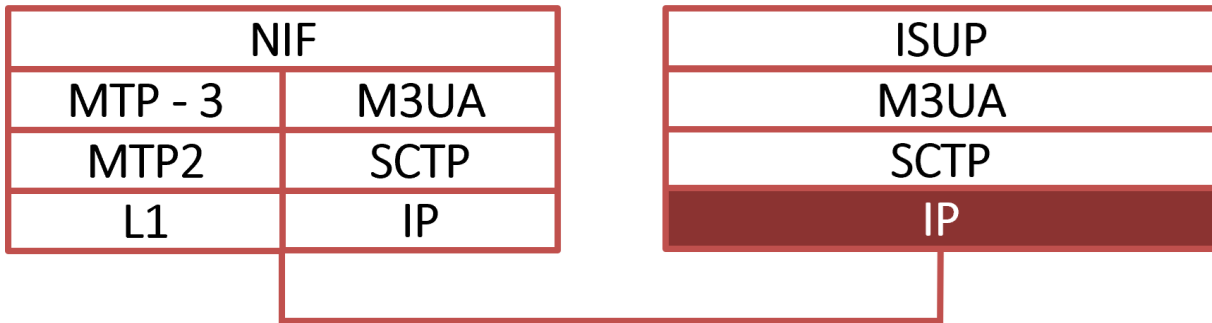


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Key Features

- Emulates ASP and SGP nodes.
- Generates and process M3UA (valid and invalid) messages.
- Insertion of impairments to create invalid messages.
- Supports customization of call flow and message templates using Script and Message Editor.
- Ready-to-use scripts for quick testing
- Supports scripted call generation and automated call reception.
- Provides Call Statistics and Events Status.
- Automation, Remote access, and Schedulers to run tests 24/7.

Protocol Stack and Standards



Supported Protocols	Standard / Specification Used
NIF - Nodal Interworking Function	TS 102 381 [1]
M3UA	RFC 3332
SCTP - Stream Control Transmission Protocol	RFC 9260
MTP2 - Message Transfer Part 2	Q.703, ITU-T Blue Book
MTP3 - Message Transfer Part 3	Q.703, ITU-T Blue Book

Testbed Setup Configuration

Testbed Setup provides options to establish communication between MAPS™ M3UA and the DUT. It includes configuration for M3UA conformance and association mode. Once the testbed setup is configured properly, the M3UA association messages can be transmitted and received over IP network using M3UA to the DUT. End user configuration profile is used to configure MAPS™ M3UA Conformance with end terminal parameters.

The screenshot shows the MAPS ASP (M3UAConformance ITU) configuration window. The window title is "MAPS ASP (M3UAConformance ITU) - [Testbed Setup - TestBedDefault]". The menu bar includes "Configurations", "Emulator", "Reports", "Editor", "Debug Tools", "Windows", and "Help". The toolbar contains various icons for file operations and system functions. The main area is divided into a "Config" pane on the left and a "Value" pane on the right. The "Config" pane shows a tree view of configuration options under "ASP Configuration". The "Value" pane shows the corresponding values for each configuration option. A "Start" button and an "Edit" button are located at the bottom right of the configuration area. The status bar at the bottom shows "Initialisation Errors" and "Error Events".

Config	Value
ASP Configuration	
ASP Simulation Mode	Conformance Mode
ASPs	1
ASPs 1	
SCTP Association	
ASP SCTP Mode	Client
ASP IP Address	10.251.104.30
ASP Source Port	2005
SGP IP Address	10.251.104.3
SGP Port	2005
ASP Identifier Configuration	
Include ASP Identifier	True
ASP Identifier	1
Traffic Mode Configuration	
Include Traffic Mode Type	True
Traffic Mode Type	Load-Share
AS Configuration	
Dynamic Registration	True
Include Routing Context in ASP Active	True
SS7 Link Configuration	
SS7 Links	1
SS7 Links 1	
Local RK Identifier	2
M3UA Routing Context Indicator	Present
M3UA Routing Context	1
M3UA NetworkAppearance Indicator	Present
M3UA Network Appearance	1
Network Indicator	International
Signaling Link Selection	0
Destination Point Code	1.1.1
Conformance Test Configuration	ASP_Conformance_Profiles.xml

Figure: Testbed Configuration

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.

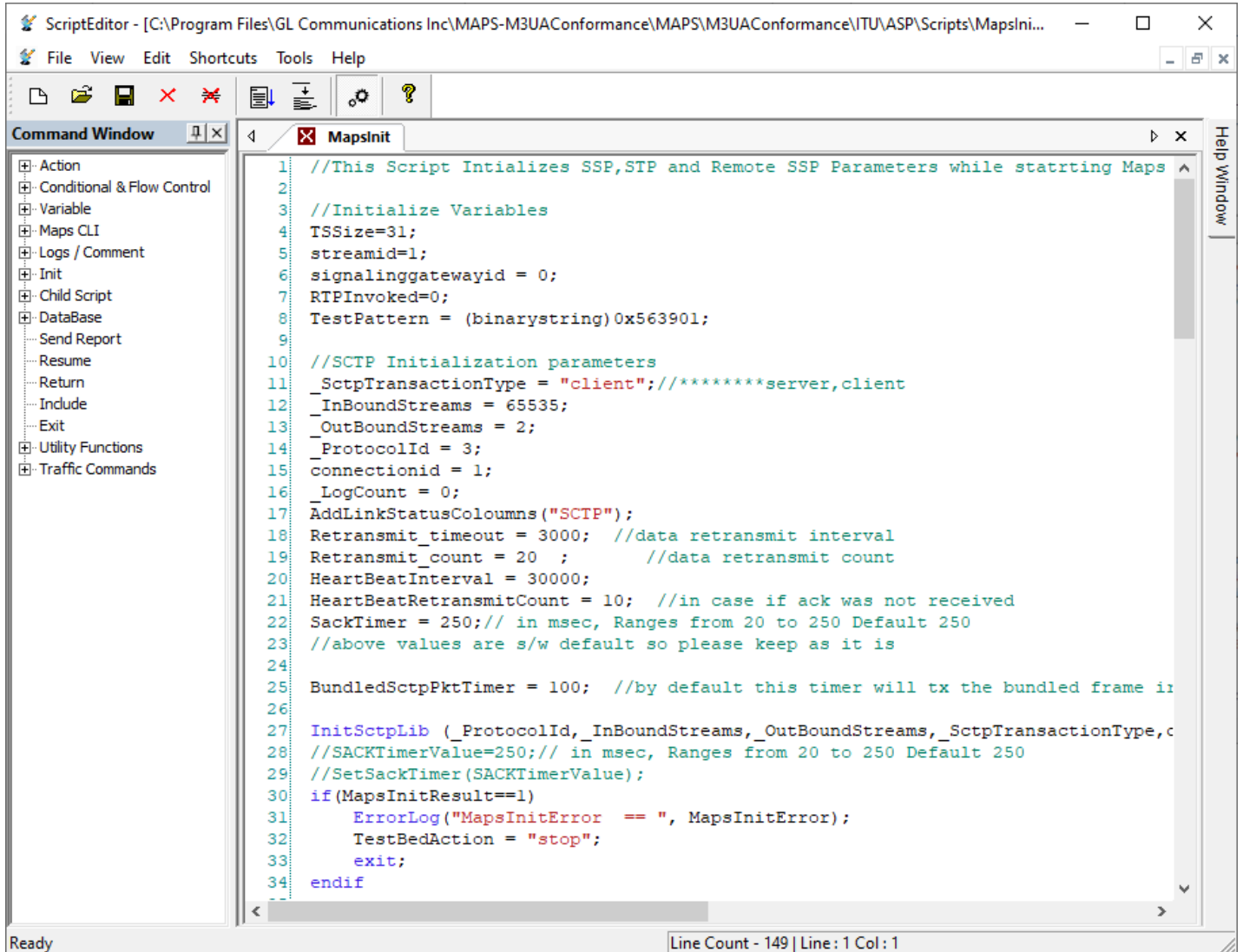


Figure: Script Editor

Profile Editor

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 and to perform conformance testing.

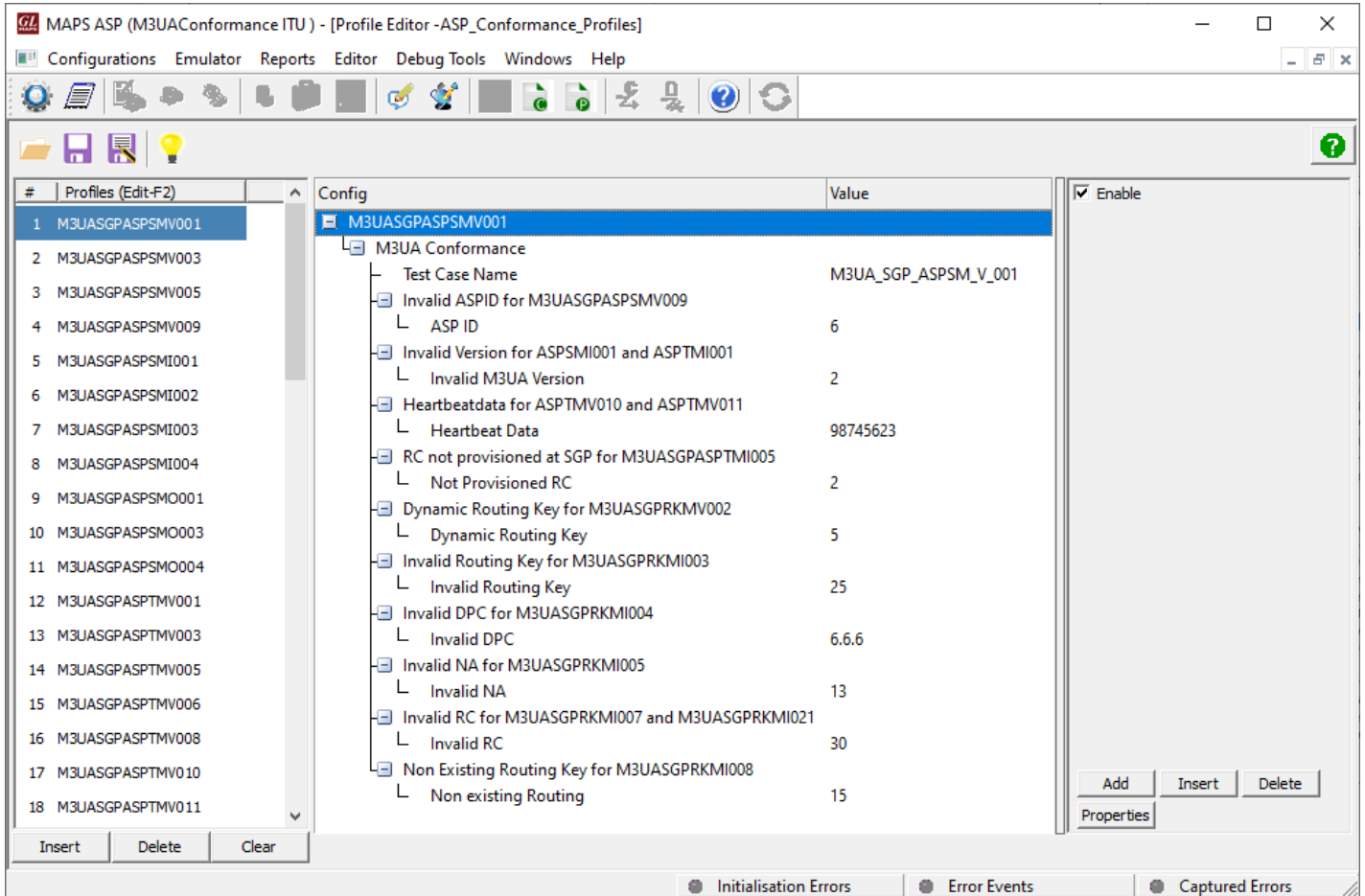


Figure: Profile Editor

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.

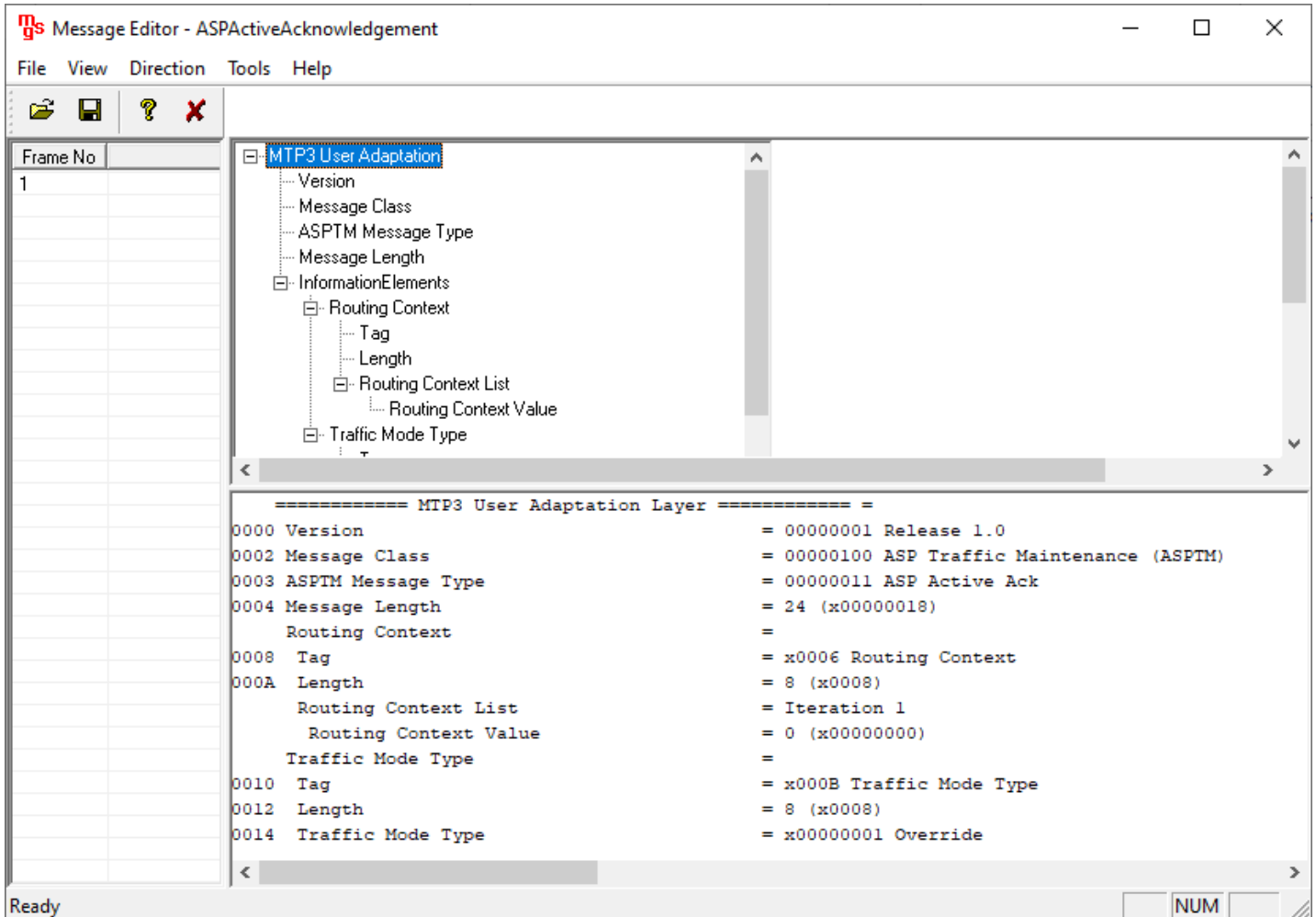


Figure: Message Editor

Call Generation and 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.

The screenshot displays the MAPS ASP (M3UAConformance ITU) - [Call Generation - All_ASP_Testcases] window. The window title bar includes the application name and standard window controls. The menu bar contains: Configurations, Emulator, Reports, Editor, Debug Tools, Windows, Help. The toolbar includes icons for file operations and execution. The main area is divided into several sections:

- Table:** A table with columns: Sr..., Script Name, Profile, Call Info, Script Execution, Status, Events, Events Profile, Result, Total Iterations, Completed Iteration. It lists four test cases, all with 'Start' in the Script Execution column and 'ASP Down' in the Status column.
- Buttons:** Add, Delete, Insert, Refresh, Start, Start All, Stop, Stop All, Abort, Abort All.
- Message Sequence Diagram:** A diagram showing the interaction between ASP and SGP. The sequence is: ASP Up (17:23:48.268000), ASP Up Acknowledgement (17:23:48.351000), Notify (17:23:48.352000), ASP Down (17:23:58.354000), and ASP Down Acknowledgement (17:23:58.458000).
- Log:** A log of MTP3 User Adaptation Layer messages. The messages are:


```

0000 Version = 00000001 Release 1.0
0002 Message Class = 00000011 ASP State Mainte
0003 ASPSM Message Type = 00000001 ASP Up
0004 Message Length = 16 (x00000010)
      ASP Identifier =
0008 Tag = x0011 ASP Identifier
000A Length = 8 (x0008)
000C ASP Identifier = 1 (x00000001)
      
```
- Bottom Bar:** Includes tabs for Scripts, Message Sequence, Event Config, Script Flow, and M3UA SGP Conformance Report. It also shows status indicators for Initialisation Errors, Error Events, Captured Errors, and Link Status Up=1 Down=0.

Figure: Call Generation

The screenshot displays the MAPS SGP (M3UAConformance ITU) - [Call Reception] window. The window title bar includes the application name and standard window controls. The menu bar contains: Configurations, Emulator, Reports, Editor, Debug Tools, Windows, Help. The main area is divided into several sections:

- Table:** A table with columns: S..., Script Name, Profile, Call Info, Script Execution, Status, Events, Events Profile, Results. It lists two test cases: 'Check_SCTP_Status.gls' (Status: Stop) and 'M3UA_SGP.gls' (Status: Completed, Result: Pass).
- Buttons:** Stop, Stop All, Abort, Abort All, Show Records, Select Active Call, Auto Trash, Trash.
- Message Sequence Diagram:** A diagram showing the interaction between ASP and SGP. The sequence is: ASP Up (17:43:39.332000), ASP Up Acknowledgement (17:43:39.333000), Notify (17:43:39.334000), ASP Down (17:43:49.452000), and ASP Down Acknowledgement (17:43:49.453000).
- Log:** A log of MTP3 User Adaptation Layer messages. The messages are:


```

0000 Version = 00000001 Re
0002 Message Class = 00000011 AS
0003 ASPSM Message Type = 00000001 AS
0004 Message Length = 16 (x000000
      ASP Identifier =
0008 Tag = x0011 ASP I
000A Length = 8 (x0008)
000C ASP Identifier = 1 (x00000000)
      
```
- Bottom Bar:** Includes tabs for Scripts, Message Sequence, Event Config, Script Flow, and M3UA ASP Conformance Report. It also shows status indicators for Initialisation Errors, Error Events, Captured Errors, and Link Status Up=1 Down=0.

Figure: Call Reception

SCTP Conformance Test Report

The SCTP Conformance Test Report tab displays Date/Time, Test Purpose Number, Status, Test Configuration, Precondition, Reference, Test Description, and Test Result for the selected test case. This information is provided to verify the conformance result, as shown below.

The screenshot shows the MAPS ASP (M3UAConformance ITU) - [Call Generation -All_ASP_Testcases] application window. The window title bar includes standard OS controls and a menu bar with options: Configurations, Emulator, Reports, Editor, Debug Tools, Windows, Help. Below the menu bar is a toolbar with various icons. The main area displays a table with columns: Sr..., Script Name, Profile, Call Info, Script Execution, Status, Events, Events Profile, Result, Total Iterati... The table contains four rows of test cases. The first row is selected, showing a 'Pass' result. Below the table is a control bar with buttons: Add, Delete, Insert, Refresh, Start, Start All, Stop, Stop All, Abort, Abort All. The main content area shows a detailed report for the selected test case, M3UA_SGP_ASPSM_V_001, with the following details:

Headers	Value
Date/Time	2023-03-09 17:43:49.557000
Test Purpose Num...	M3UA_SGP_ASPSM_V_001
Status	Mandatory
Test Configuration	One ASP is configured in an AS. If necessary AS and ASP have to be pre-configured at the IUT.
Precondition	Successfully established SCTP association between the SGP and the ASP .ASP marked as ASP-DOWN at the SGP
Reference	Section 4.3.1 [1] & Section 4.3.4.1 [1] of RFC 3332
Test Description	Ensure that the IUT; upon reception of an ASP Up message; responds with an ASP Up Ack.
Software Test Res...	Pass
Manual User Verif...	Result Pending : User Intervention Timer Expired
Failure Cause	N/A

At the bottom of the window, there is a navigation bar with tabs: Scripts, Message Sequence, Event Config, Script Flow, and M3UA SGP Conformance Report (selected). Below the navigation bar is a status bar with indicators: Initialisation Errors, Error Events, Captured Errors, and Link Status Up=1 Do.

Figure: SCTP Conformance Test Report

Buyer's Guide

Item No	Product Description
PKS130	MAPS™ M3UA Conformance MAPS™ SIGTRAN Emulator

Item No	Related Software
PKS129	MAPS™ SCTP Conformance
PKS135	MAPS™ ISDN SIGTRAN (ISDN IP)
PKS136	MAPS™ INAP over IP Emulator (ANSI, ITU)
PKS152	MAPS™ SIGTRAN ANSI MAP

For more information, refer to [MAPS™ SIGTRAN \(SS7 over IP\) Protocol Emulator](#) webpage.



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