Fax Simulation over IP

Calling Group3 Facsimile terminal equipment

Gateway

Gateway

Called Group3 Facsimile terminal equipment

PSTN

PSTN

T.30   **ATA**

IP

G.711 (Pass Through)

T.38

Internet aware fax device

GL's Fax Call Simulators & Analyzers (TDM, IP, Wireless)

- *MAPS™*
- *VQuad™*
- *FaxScan™*
- *GLInsight™*
- *PacketScan™*
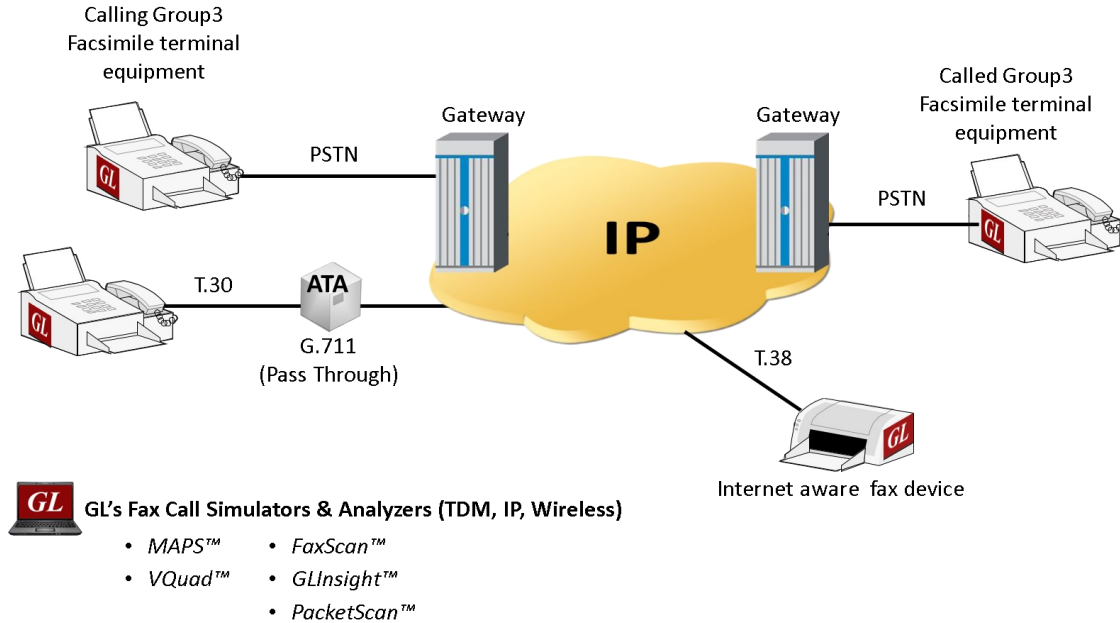
Overview

GL offers a variety of test tools to perform **FAX over IP (FoIP)** simulation and monitoring. Fax simulator supports both **RTP G.711 Pass Through Fax Simulation (PKS200)** and **T.38 Fax Simulation over UDPTL (PKS211)**. Almost all MAPS™ IP based simulation products supports FAX simulation using any of these two methods. Typical applications of our Fax Simulators include load testing of fax servers, qualification testing of T.38 Gateways, testing of ATAs (Analog Terminal Adapters), testing of internet-aware fax machines, and many more. With respect to channel capacity RTP pass-through and T.38 fax simulation over UDPTL supports up to 120 concurrent Fax channels.

GL's **RTP Fax Simulator** simulates multiple Pass-Through fax calls. Fax Pass-Through mode is a method of transmission of modulated fax data over an IP transport. The support for simulation of Fax over IP in Pass-Through mode (using G.711 PCMU and PCMA) has been recently introduced in all IP based MAPS™ simulation products supporting RTP traffic simulation over an established call.

With RTP Fax Simulator you can transmit pre-recorded Tiff image to the DUT (Real-time Fax machine), receive Pass-Through fax from the DUT, and record complete fax call messages as log file along with a Tiff image. Typical applications of our RTP Fax Emulation software are load testing of fax servers, qualification testing of T.38 Gateways, testing of ATAs (Analog Terminal Adapters), testing of internet-aware fax machines, and many more.

As Fax is not ideally suited to travel via a normal phone call, the T38 protocol was developed compliant with **ITU-T T.38 (03/2002)**. A much robust approach is offered using **T.38 Fax Relay protocol**, with redundancy, re-transmission, and efficiency. Implementation of this protocol uses UDPTL to transport T.38 frames.

All GL's call generators such as MAPS™, and VQuad™ supports pass-through RTP fax calls for G.711 PCMU and G.711 PCMA codec. Recently added is the ability to perform Fax Simulation using T.38 Fax Relay protocol over UDPTL.

For more information, please visit Fax Simulation over IP webpage.

## Main Features

Fax Standards	V.34, V.21, V.27, V.29, V.8 and V.17
Data Rate	2400 bps to 33600 bps
ECM/nonECM	supported
Channel Capacity	For T.30 - 2 to 120 ports supported For T.38 - 120 ports (for increased capacity contact GL)
Page sizes	A4, A3, B4, letter, legal
Page Resolutions	204x98, 204x196, 204x391, 408x391, 200x200, 300x300, 400x400
Error Correction Strategies	T.38 - FEC or Redundancy
Rate Management	T.38 - Rate Management 1 (local tcf) or Rate Management 2 (transferred tcf)
Compression	Modified Huffman (MH), Modified READ (MR), or Modified-Modified READ (MMR) Encoding
Fax Call Quality Statistics	Provides fax call quality parameters like Received Page Count, Received Page Error Count, Received Byte Count, Received Line Count, Received Bad Line Count, Received Bad Pkt Count, Transmitted Page Count, Transmitted Byte Count, Transmitted Line Count

Fax Emulation Applications

- **Load Testing** - sending or receiving up to hundreds of faxes simultaneously

- **V.34 Testing** - there are many fax modulations and V.34 is the fastest, permitting many pages to be transmitted quickly

- **High Speed / Low Speed** - fax protocol consists of low speed handshaking and high speed image transmission

- **Multiple Pages** - single or multiple page fax transmission is supported

- **With or without ECM -** Error Correction Mode permits the retransmission of erred pages

- **a-law and μ-law**- In TDM networks, USA uses μlaw and the rest of the world use A-law – both coding standards are supported

- **Over PSTN, IP** - Fax transmission over PSTN FXO / FXS lines, or over VoIP (packet) networks

- Transmit / Record Tiff image and log Facsimile messages to a log file

Generation of Fax Call using MAPS™ (T.30)

MAPS™ SIP can initiate a typical SIP call to the ATA which is configured in Pass through fax mode. Now, the ATA will initiate the call to the connected real time fax machine. Once the call is established **MAPS™** can transmit pre-recorded tiff image in pass-through mode to the fax machine at the other end. Similarly, fax generated from real fax machine can be recorded in the tiff format, and the fax call flow can be analysed in-detail for further troubleshooting.

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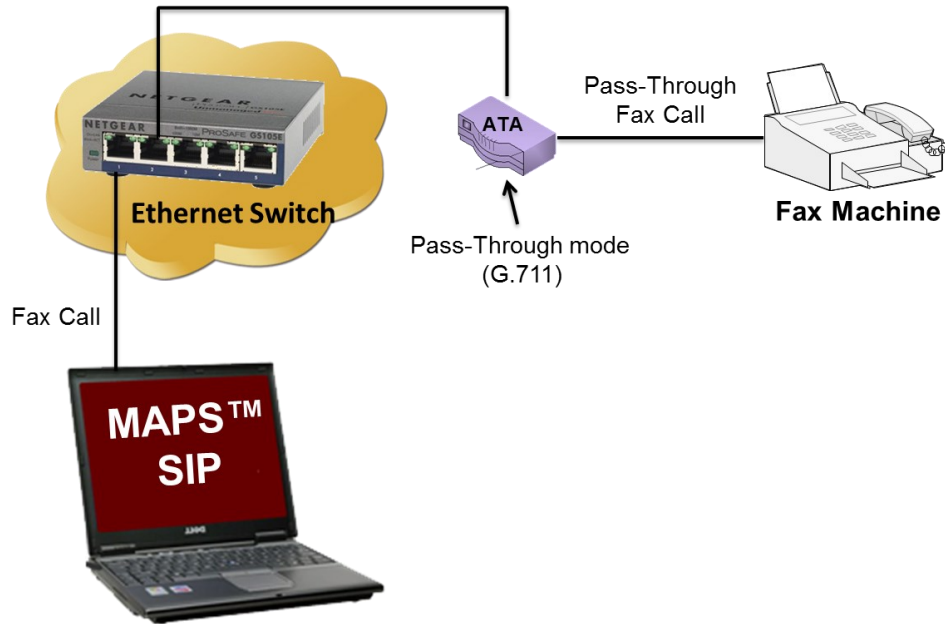
MAPS™ allows the user to initiate fax calls by sending call control messages using proper scripts and profiles. The profile allows necessary parameters of call control messages to be changed during runtime. The below figure depicts the fax call being generated using MAPS™ SIP.
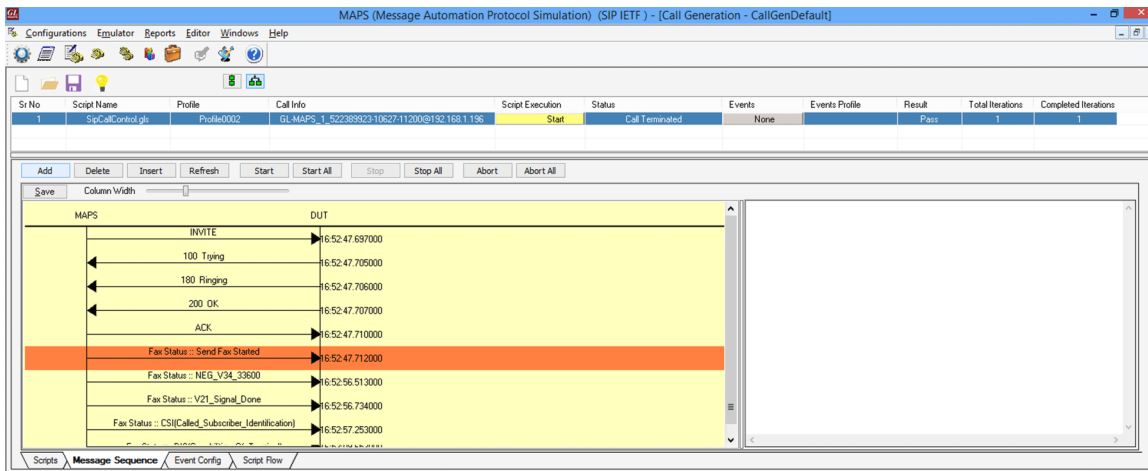

Figure: Fax Call Generation using MAPS™

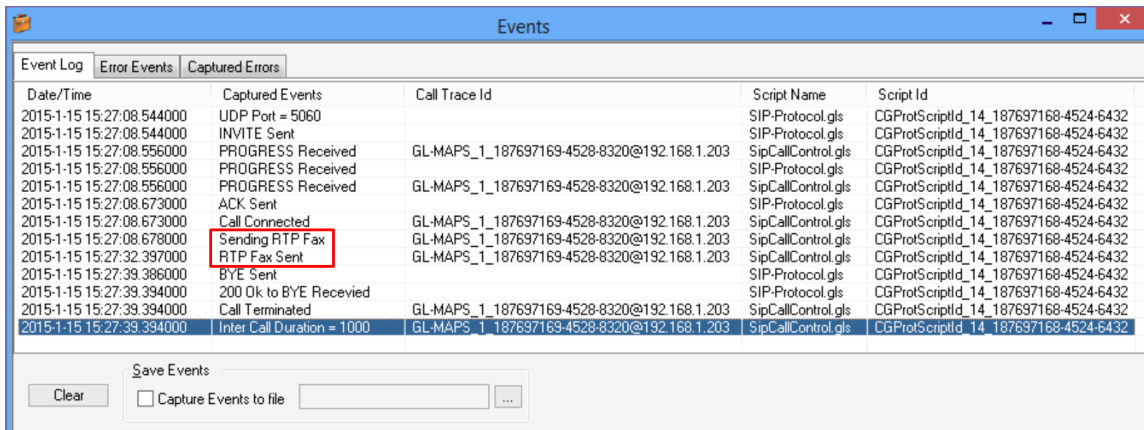The below figure display RTP fax call being transmitted successfully using MAPS™ SIP.

Figure: Successfully RTP Fax Events

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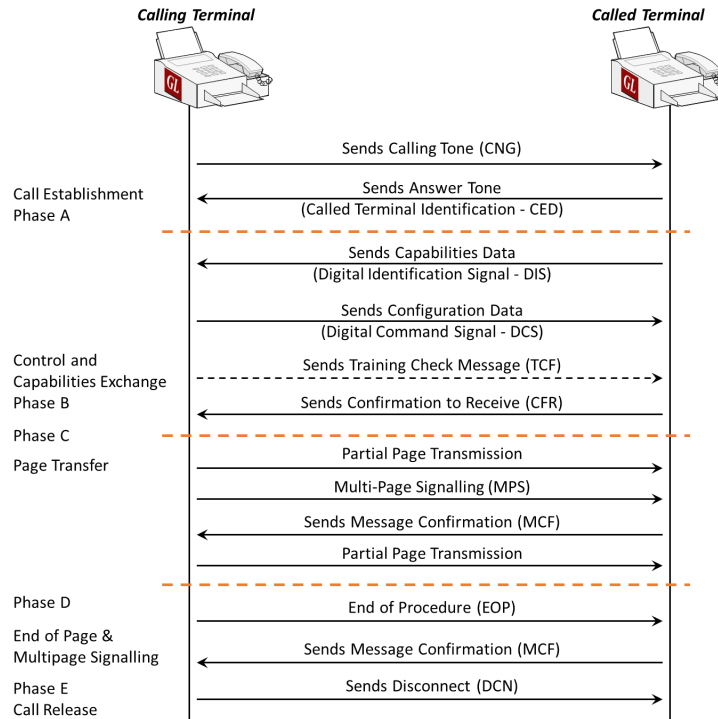
Fax Call Scenario

Figure: Fax Call Scenario

RTP Fax File

GL provides several .tif fax files for transmission/reception. Files were designed by the CCITT (Consulting Committee for International Telephone and Telegraph) many years ago.
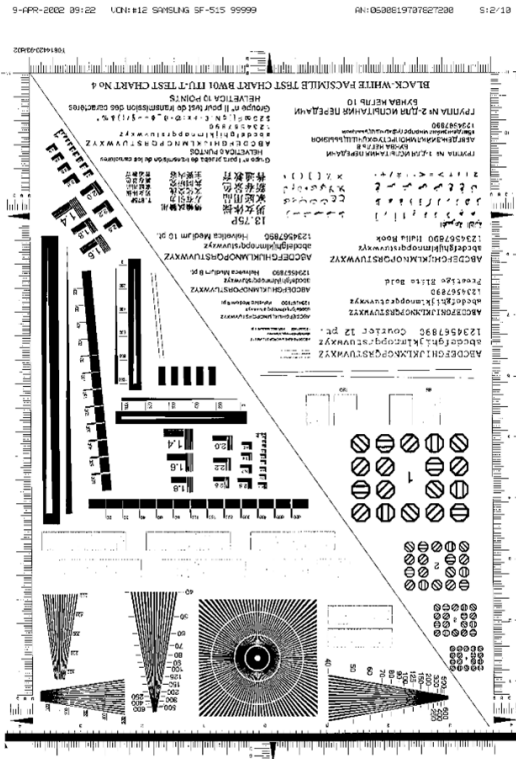

Figure: RTP Fax File

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Fax Simulation using MAPS™ (T.38)

The fax call originating in PSTN network from Group3 Facsimile equipment, switches from analogue mode to digital mode between the gateways, and then again falls back to analogue mode in PSTN network at the receiving end. The T.38 Fax relay protocol is used to carry the fax control signals and image data between the gateways over the IP network.

GL's MAPS™ SIP is a useful tool for simulation of T.38 fax call. It uses SIP signaling to establish the session, and it sticks to standards like ITU-T T.30, ITU-T T.38, ITU-T T.4, ITU-T V.8, ITU-T T.6 during fax call. One could configure MAPS™ to perform different types of action like transmit file, digits, tones or Talk in audio mode before switching over to T.38 mode.

MAPS™ SIP generates Re-Invite to switch from audio mode to image (FAX) mode.
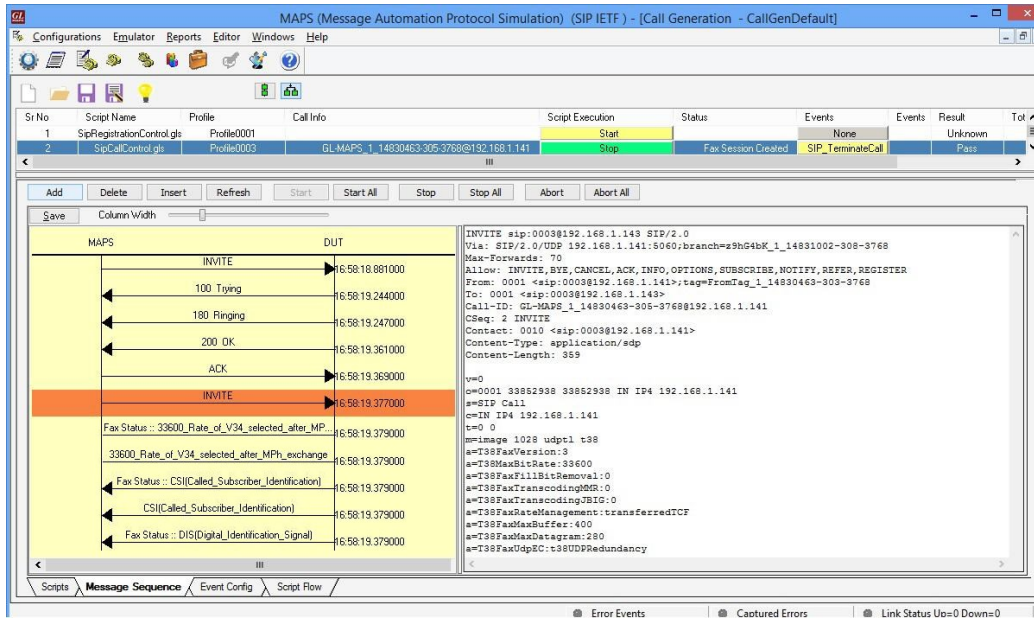

Figure: Fax Call Generation using MAPS™

While the call in progress, as depicted in the below screen, the MAPS™ also provides events related to the progress of the call.
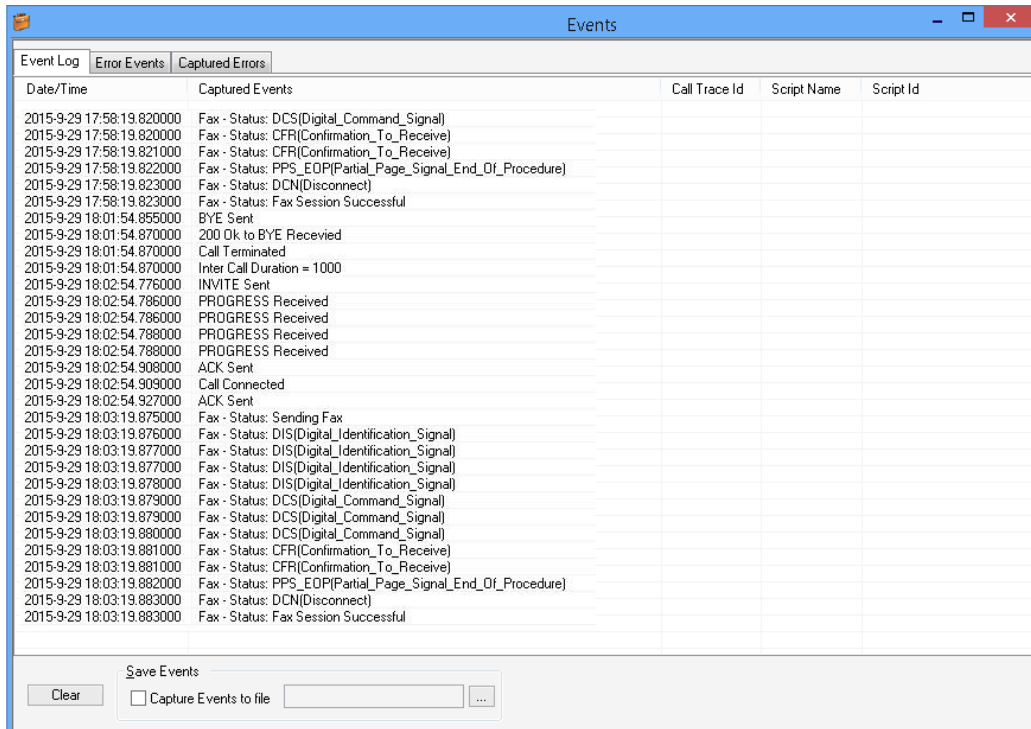

Figure: Successfully Fax Events

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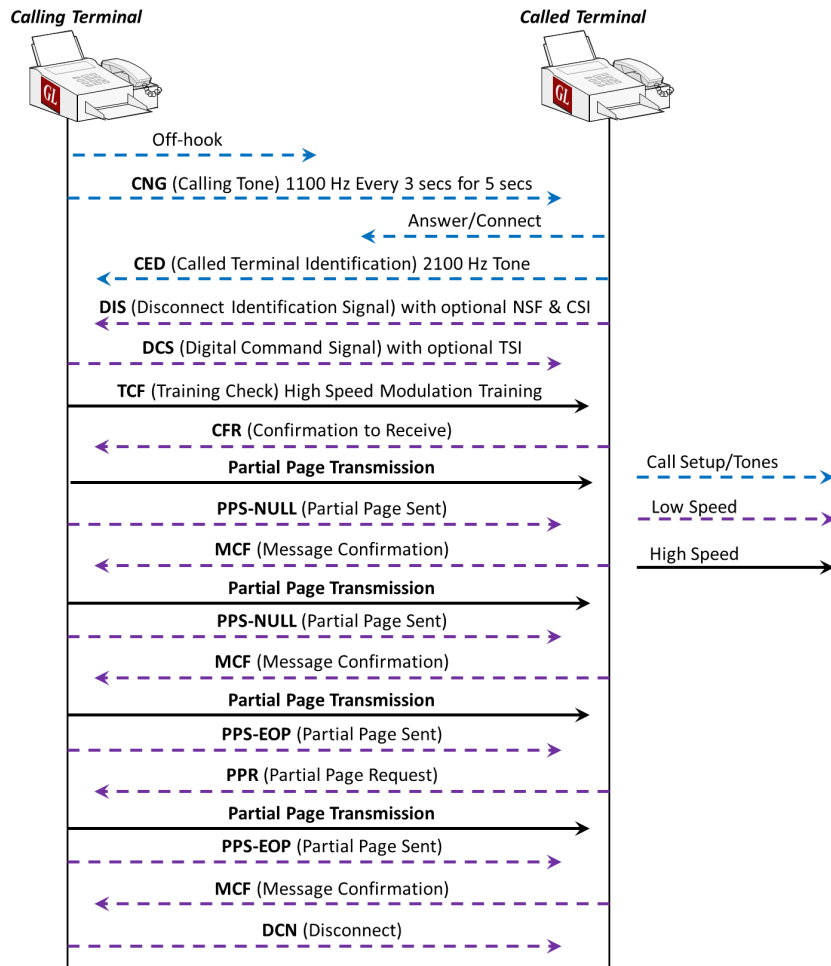
Fax Call Scenario

Figure: Fax Call Scenario

T.38 Fax Call Quality Statistics

After completion of the call, as depicted in the below screenshot, MAPS™ provides call quality statistics.
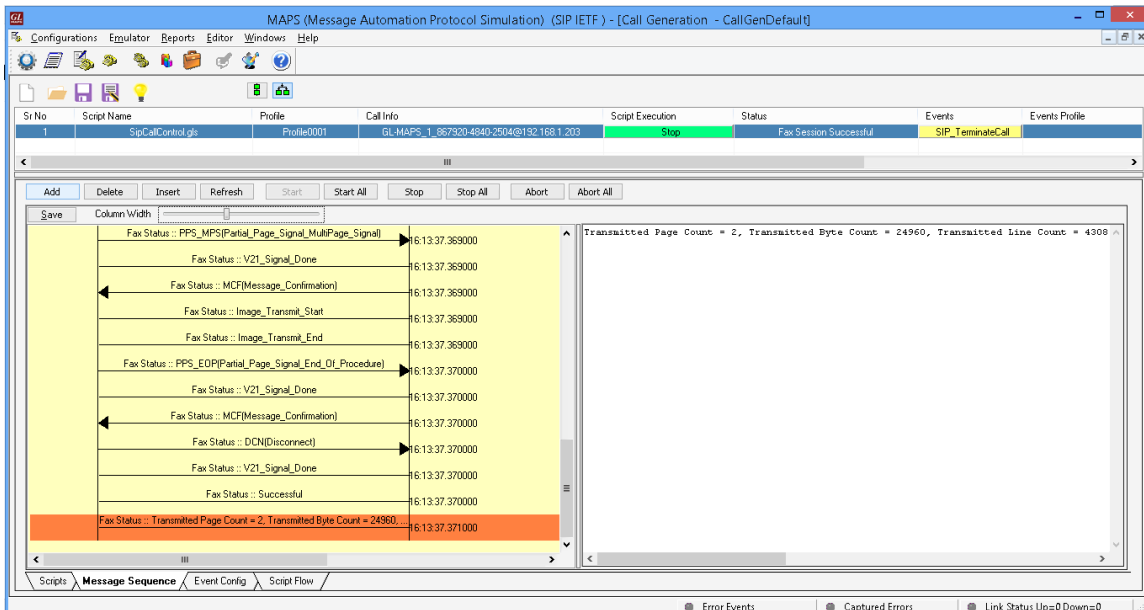

Figure: T.38 Fax Call Quality Statistics

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Supported Data Rate and Protocol

The Fax Emulator supported transmission Group 3 protocols include:

Data Rates (Kbps)	ITU Standard V.27 V.29	V.17	V.34 V.34bis
2.4	X		X
4.8	X		X
7.2	X	X	X
9.6	X	X	X
12		X	X
14.4		X	X
16.8			X
19.2			X
21.6			X
24			X
26.4			X
28.8			X
31.2†			X
33.6†			X

Supported File Formats

- G.711 A-law encoded 8-bit samples
- G.711 µ-law encoded 8-bit samples
- 16-bit linear samples that utilize only the low 13 bits. The upper 3 bits are sign extended
- 16-bit linear samples utilizing all 16-bits
- Fax Image Output
  - Class-F TIFF format as specified in RFC 2301
- PCAP, NGPCAP file format for T.38

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Buyer's Guide

Item No	Product Description
PKS211	T.38 Fax Simulation over UDPTL
PKS200	RTP Pass Through Fax Emulation, requires one of the licenses below, (w/dongle)
PKS202	Fax Port Licences (2 Fax Ports, RO)
PKS203	Fax Port Licences (8 Fax Ports, RO)
PKS204	Fax Port Licences (30 Fax Ports, RO)
PKS205	60 Fax Ports, RO
PKS206	120 Fax Ports, RO

Item No	Related Software/Hardware
VBA032	Near Real-time Voice-band Analyzer
FXT001	GL Insight™ - Single Fax Analysis - TDM
FXT002	GL Insight™ - Single Fax Analysis - IP
PKV100	PacketScan™
UTE001	Portable USB based Dual T1 or E1 Laptop Analyzer
VQT022	VQuad™ 2 Ports Fax Emulation (2-wire, & 4-wire)
VQT022a	VQuad™ 8 Ports Fax Emulation (2-wire, & 4-wire)
VQT035	2-Wire Voice/Data Capture
VQT241	Dual Universal Telephony Adapter (UTA)

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

For more information, please visit Fax Simulation over IP webpage.