J4211A SS7
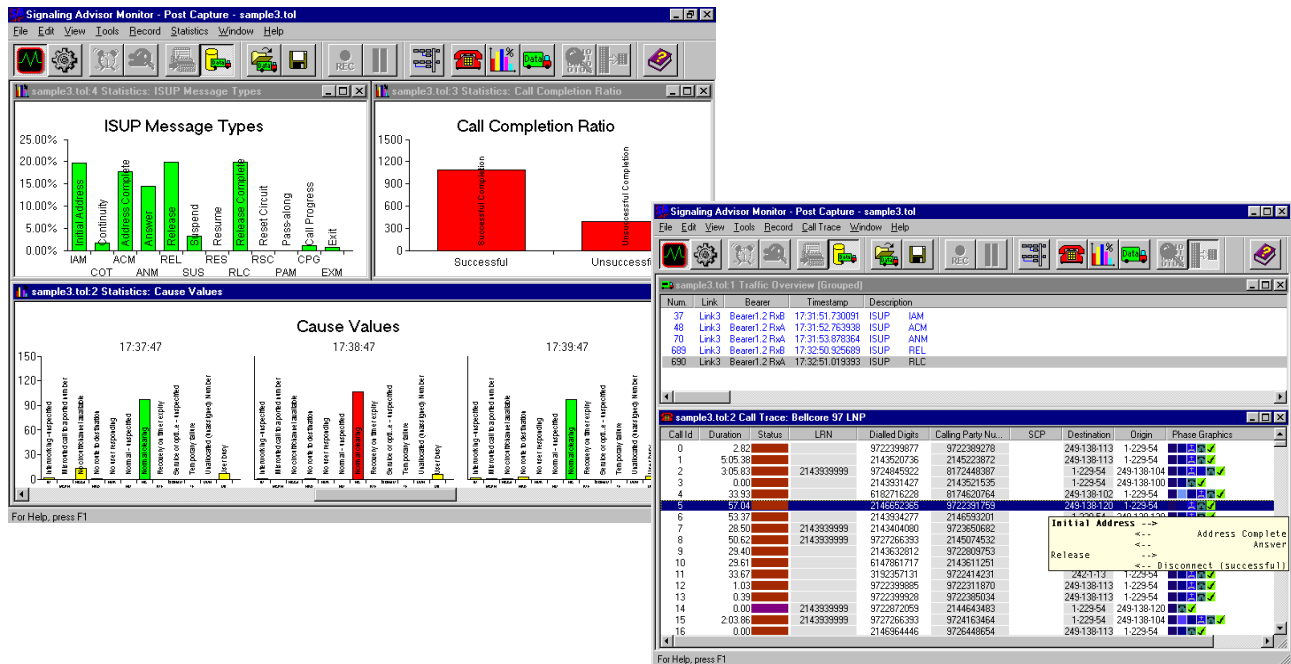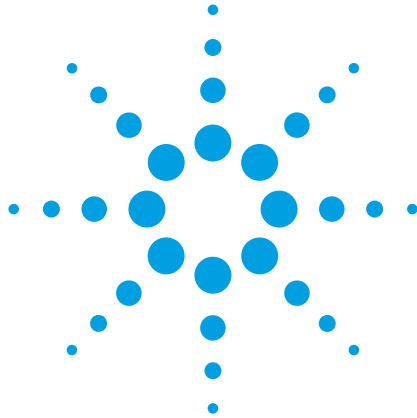# Signaling Advisor

Specifications

Agilent Technologies
Innovating the HP Way

J4211A SS7 Signaling Advisor

Businesses and consumers are increasingly sensitive to even a minor deterioration in service quality. To maintain customer satisfaction and loyalty, your technology teams need tools that help identify potential problems and resolve faults quickly and effectively . . . they need an Agilent Technologies Signaling Advisor.

The SS7 Signaling Advisor is a software application designed to run on a dedicated mainframe. Add any appropriate optional decodes and link interface modules, and you're ready to test across multiple links involving different protocol standards for example, at access network interfaces. At the heart of each Signaling Advisor, the intuitive graphical user interface makes measuring and understanding results easier for signaling engineers, enabling them to check performance and troubleshoot problems in signaling systems quickly and accurately.

Contents

A range of link interface modules (LIMs) provide the physical interfacing to network equipment. Each LIM connects to one type of physical interface (eg, E1 or T1), providing access to all signaling links on up to four bi-directional bearers. The mainframe supports two LIMs (eight bi-directional bearers). An optional undercradle expands capacity to four LIMs (16 bi-directional bearers).

The architecture of the software and mainframe makes it easy for you to keep up with changing technologies and data rates, minimizing the need to replace equipment. Simply add a LIM or decode to bring your instrument in line with new needs. High performance and flexibility are designed into the Signaling Advisor mainframe, enabling it to cater for today's and tomorrow's applications. Separate processors (with independent memory) handle data acquisition and user interface, allowing optimum performance to be achieved.

EmuLite is an option which allows the Signaling Advisor to be upgraded to a fully integrated monitor and emulation solution. EmuLite creates and executes tests faster through use of its graphical message and sequence editors. This allows engineers more time to diagnose signaling problems without the need for programming.

SS7 Signaling Advisor

General capability summary

- Dedicated software for SS7 signaling networks
- Windows 98®-based operation
- Multitasking applications (protocol analysis, statistics, call trace)
- Real-time or post-capture analysis
- Connect to up to 16 duplex physical bearers (E1 or T1, DS0, V.35, RS-232, RS-449)
- Analyze up to 32 duplex signaling links (8/16/32/48/56/64 kb/s)
- Monitor up to 4 full rate GPRS Gb duplex bearers
- Monitor up to 3 full rate high speed SS7 bearers
- Chinese language GUI option
- Voice monitoring
- Link Status view
- Alarm View
- Auto-configuration identifies signaling links and protocols
- Graphical configuration and measurement setup
- Triggers and filters (logging and display)
- On-line and context sensitive help
- Protocol help

Monitor capability summary

- Graphical call trace with filters and alarms
- User-configurable columnised traffic overview and columnised colour coded, protocol decodes
- Graphical (or tabular) time-based statistics with thresholds
- Automatic message and sequence validation
- Point code interpretation
- Storage of captured data and configurations to disk
- Standalone PC software for post-capture analysis
- Timestamping up to 12 microsecond resolution
- Remote Control
- Compatible with capture file formats of acceSS7 monitoring system and 37900D signaling test set
- Export data to CSV file for further 'off-site' analysis

EmuLite capability summary

- Automatic test creation - copy messages and their sequence from call trace
- Graphical editor - quickly create messages - no more programming!
- Intelligent protocol field-based editor - correctly build complex signaling messages - not just in hex!
- Intelligent built in test manager - easily manage the execution of tests
- Graphical analysis tools - instantly identify failed tests and why they failed
- Easily verified network element responses
- Test SS7, GSM, GPRS, IS-41, CDMA, ISDN plus many more.

Summary

Configure

Automatic configuration

The Signaling Advisor makes it easy for you to start monitoring, even if you don't know what timeslots or protocols are being used for signaling. Simply click on the auto-configure button and the instrument configures its receiver to match the bearer and then searches the bearer for signaling links (timeslots that are carrying signaling information). When it finds valid signaling links, it analyzes the signaling messages and selects the correct protocol stack.

Graphical protocol stack editing

If the default protocol stacks do not match the signaling being tested, or a special variant is required, you can quickly change the assigned protocol stack graphically. Service Indicators (SI) and Sub-System Numbers (SSN) can be edited quickly and easily. Figure 2 shows a typical protocol stack.

Point code interpretation

You can program the software to interpret originating and destination point codes (OPCs/DPCs) as text eg, "1234" could be interpreted as "London". The Signaling Advisor can support any point-code format.

Miscellaneous

- FISU/LSSU/PCR filters
- Simplex signaling links supported
- Voice monitoring or emulation (via handset)
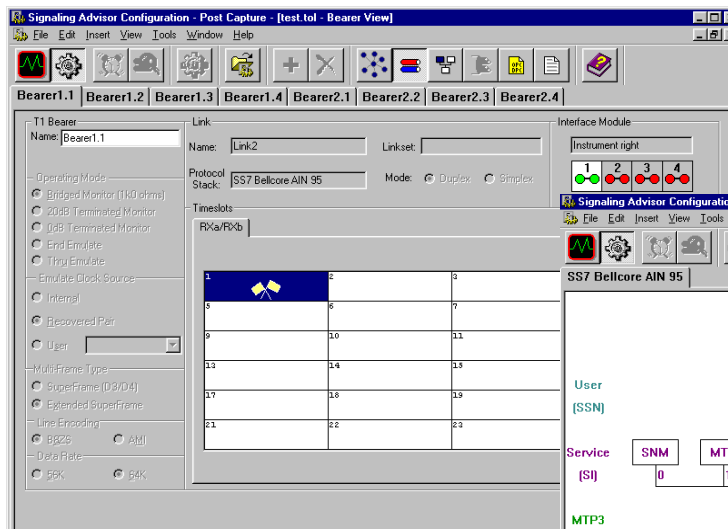- Save or print configurations
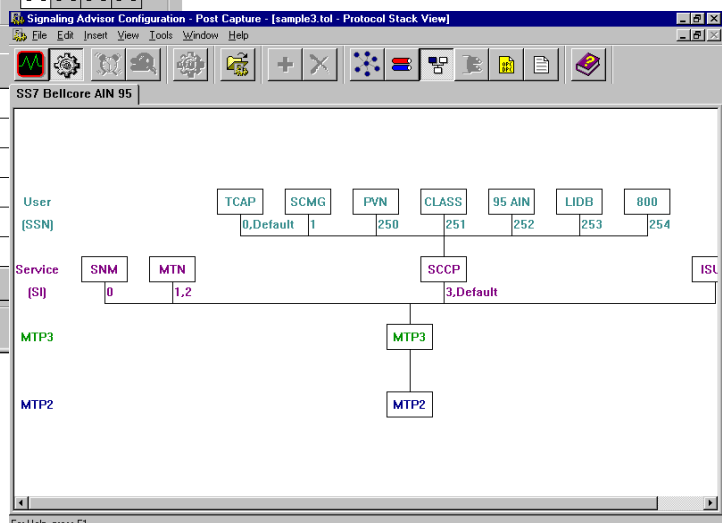

Figure 1 Network configuration diagram.

Figure 2 Protocol stack configuration.

Measurement setup features
● Real-time analysis
● Post-capture analysis
● Applications
● Triggers
● Filters

Measurement setup

Real-time analysis

The SS7 Signaling Advisor monitors up to 16 bi-directional bearers and up to 32 duplex signaling links simultaneously (spread across one or more bearers). Each signaling link can carry a different protocol. Monitored data is processed then automatically stored to hard disk.

Post-capture analysis

All of the capabilities available for real-time analysis are also available for use on previously logged data. The user may perform the same operations as in real time.

Applications

In addition to the default protocol analysis application, it is possible to setup multiple applications for statistical analysis or call traces. Figure 3 shows a typical real-time measurement setup.

Triggers

Users can control the logging period by defining start and stop trigger events. Any number of triggers can be defined. These triggers can be:

● Date and time
● Occurrence of a specified message or parameter value in a message
● Event (eg, CRC error)
● Elapsed time from start trigger
● Repeatable start and stop triggers

Filters

Users can define filters that control the type and amount of data logged and displayed (eg, filtering on selected links). The filters can also accept or reject messages based upon values within messages (eg, message types or parameters within messages). A special view filter allows the user to display only invalid messages (ie, messages which do not conform to the protocol standard configured). Filters can be logically combined using AND/OR.
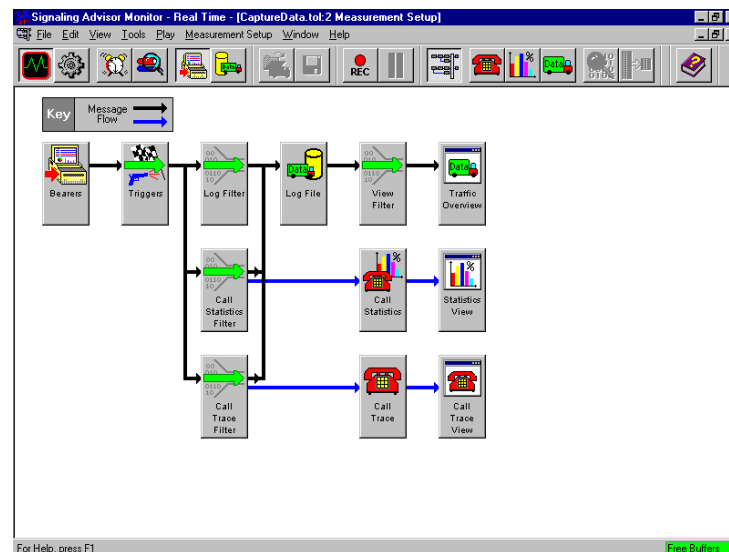

Figure 3 Measurement setup display.

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Monitor features
- Viewing messages
- Time-stamping
- Alarm view
- Link status view
- Message validation
- Message sequence validation
- Data import
- Miscellaneous

Monitor tool

Viewing messages

The main traffic overview display shows (chronologically) every message captured for each signaling link. This overview display shows one line of essential information for each message. The type and format of information is displayed in columns and is controlled by the user. Each message can be decoded further to show a one line description per octet/field.

In the decode view, each protocol level is shown in a different color to make troubleshooting simpler. Users can customize colors to suit personal preference. When analyzing data, the user can pause the display and interrogate decodes before resuming the analysis. Captured data can be saved or exported. Figure 4 shows a typical traffic overview.

Time-stamping

Each captured message is given a timestamp. The timestamp reference is the instrument's internal clock.

Alarm view

If a physical layer alarm occurs (eg, AIS), a pop-up alarm view window appears showing software LEDs for all bearers. This view can be expanded to show individual alarm conditions.

Link status view

Link status and link loading information is available for each link under test. Link loading statistics include erlang rate, percentage breakdown of traffic types, and counts of errored Signaling Units or frames.

Message validation

The software can highlight message-encoding errors found in received messages. In the traffic overview display, a message with an error is highlighted in red. When the message is decoded, the errored section is also shown in red to aid troubleshooting.

Message sequence validation

The "message sequence validation" function advises the user of errors in message sequences (eg, messages which do not fit into a normal call pattern). The errored messages are highlighted in red.

Data import

It is possible to import data from the Agilent acceSS7 monitoring system or from the Agilent 37900D signaling test set or from a text file into the SS7 Signaling Advisor. In the case of the 37900D signaling test set, a software utility is provided with the SS7 Signaling Advisor to perform the necessary file format conversion.

Miscellaneous

- Post-capture synchronization of multiple capture files
- "Hide" sensitive data (eg, credit card information) facility
- Find occurences of a particular message/event. Find next/previous occurrence of the same message/event
- Save selected data (eg, filtered or grouped messages) to a seperate capture file.

Figure 4 Traffic overview display.

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Call trace features
- Call trace overview
- Group function
- Summary view
- Filtering
- LNP call trace
- Alarms
- Data export

Call trace tool

Call trace overview

The call trace application traces calls (or message sequences) across all links and groups the messages together. It is therefore a very powerful facility for troubleshooting, particularly since it operates in both real-time and post-capture modes. The application produces a user-configurable window which contains one line for each call. For example in the case of ISUP, this window would typically show:

- Call identifier
- Call status
- Call duration
- Call setup time
- Call cleardown time
- Called party number
- Calling party number
- OPC/DPC/CIC
- Release cause
- Graphical representation of call phases

Group function

From the call trace overview window, it is very easy to group all the signaling messages related to a specific call or sequence – simply double click on it. Alternatively, it is possible to click on any message in the traffic overview and use the group function to display all the messages associated with it (ie, messages in the same call or sequence).

Figure 5 shows a typical call trace overview.

Summary view

The call trace overview window has a summary view which shows the total number of calls seen, the number of open calls and the number of closed calls.

Filtering

Perhaps the most useful aspect of call trace is its filtering. This allows the user to program the call trace application with specific parameters such as (in the case of ISUP):

- Called party number
- Calling party number
- OPC/DPC/CIC
- Release cause
- Call duration

and to capture and display calls containing the parameter of interest.

Multi-protocol

A range of call traces that link calls across multiple protocols is available.

LNP call trace

The LNP Call Trace is a sophisticated tool for troubleshooting problems related to Local Number Portability. It ties together the ISUP and AIN portions of LNP calls, and provides summary and detailed call analysis in a graphical format.

Alarms

It is possible to program the call trace application to highlight specific calls in the call trace overview which have alarm conditions (eg, calls with abnormal release causes).

Data export

Call trace results can be exported to a CSV (Comma Separated Value) file for analysis in another application (eg, Spreadsheet or Database). There are also special call traces that provide CSV files ready for use in Agilent's OPAS 32 analysis software.
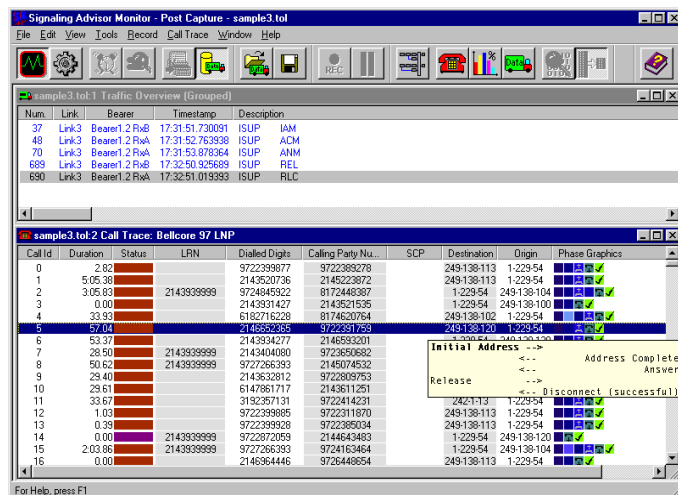
Figure 5 Call trace display.

7

Statistics features
- Graphical statistics
- Tabular statistics
- Time-based statistics
- Statistics thresholds
- Call-based statistics
- Data export

Statistics tool

Graphical statistics

User-definable graphical statistics are available in real-time or post-capture modes. There are several SS7 message transfer part (MTP) statistics, as well as user part specific statistics (eg, message types or release causes). Statistics are typically counts or ratios. Double clicking on any bar on the graph highlights the appropriate message in the traffic overview. The statistics may be displayed graphically as:

- 2D Bar charts
- Radar diagram

Figure 6 shows a typical statistics graph.

Tabular statistics

Tabular statistics are drawn by call traces. This provides a more detailed and dynamic view of network performance, incorporating several programme measures. For example, gather performance data (handovers, errors, call success rates etc) about all BTSs attached to a single BSC in a GSM network.

Time-based statistics

It is possible to produce the graphical statistics as a tabular time series, where the intervals can be set from one minute to 24 hours.

Statistics thresholds

The user can set lower and upper thresholds which, when exceeded, will result in color changes to the statistical graphs to highlight "alarm" conditions.

Call-based statistics

The most advanced statistics features involve using the call trace application to evaluate call based statistics such as call completion ratio, min/mean/max call setup times, min/mean/max call durations.

Data export

Statistics can be exported to a CSV (Comma Separated Value) file for further analysis in another application (eg, Spreadsheet or Database).
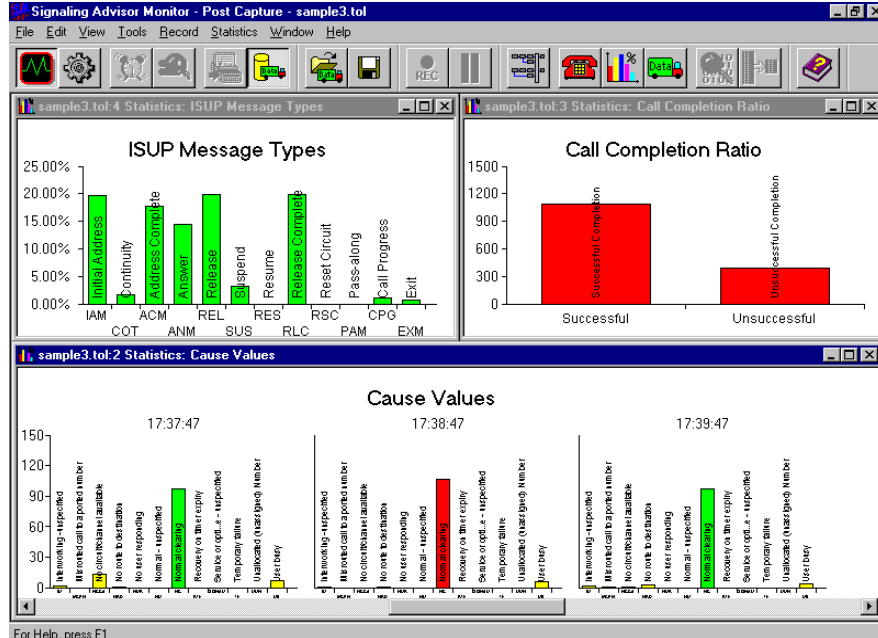
Figure 6 Graphical statistics display.

8

EmuLite features
● Introduction
● Graphical message editor
● Graphical sequence editor
● Call simulation

EmuLite

Introduction

Emulation is the ability to define and send signaling messages in a pre-defined sequence to a unit under test and respond to received messages.

Traditional emulation tools require complex programs to be written to perform even the simplest of tasks. Writing programs using a programing language is time consuming, error prone and defocuses engineers from solving signaling problems onto solving programming problems.

EmuLite revolutionizes the way in which emulation is performed through use of its key capabilities which are summarized in this section.

Graphical message editor

The EmuLite intelligent field based message editor allows message creation/ modification using familiar protocol field names. When creating a message, users are shown the valid selections from which they can choose, significantly reducing the possibility of error. Message fields can be saved into variables. EmuLite automatically updates all lengths, pointers and odd/even indicators.

Graphical sequence editor

Tests are configured using 'drag and drop' icons such as arrows, branches and timers. These automatically generate test scripts - a time-consuming and complicated task if programmed manually. More time can therefore be spent diagnosing signaling problems without the need for programming.

Call simulation

Users can generate test sequences automatically from previously captured data as opposed to entering all the data manually. A sequence of related messages captured using the call trace function can be copied directly to the EmuLite sequence editor. This sequence and the messages within it can then be modified, if required, to create a test ready for execution.
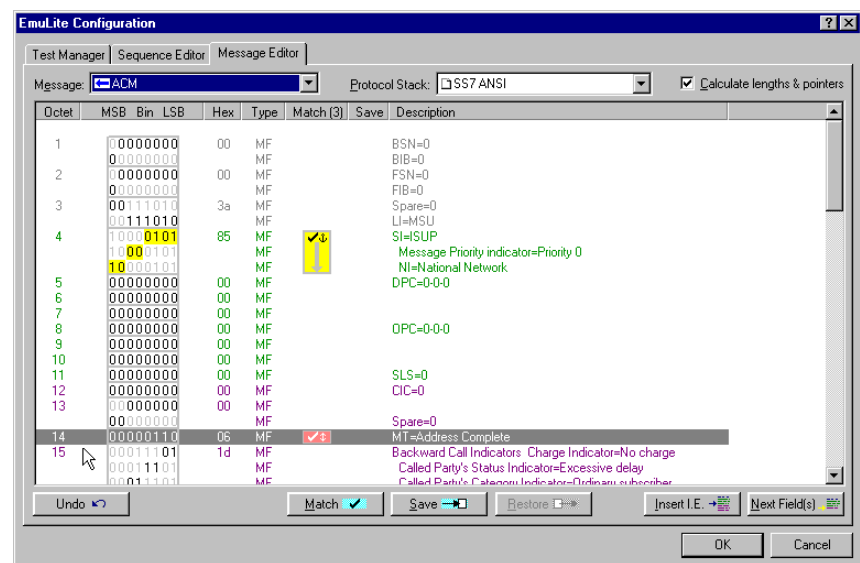
Figure 7 Message editor.
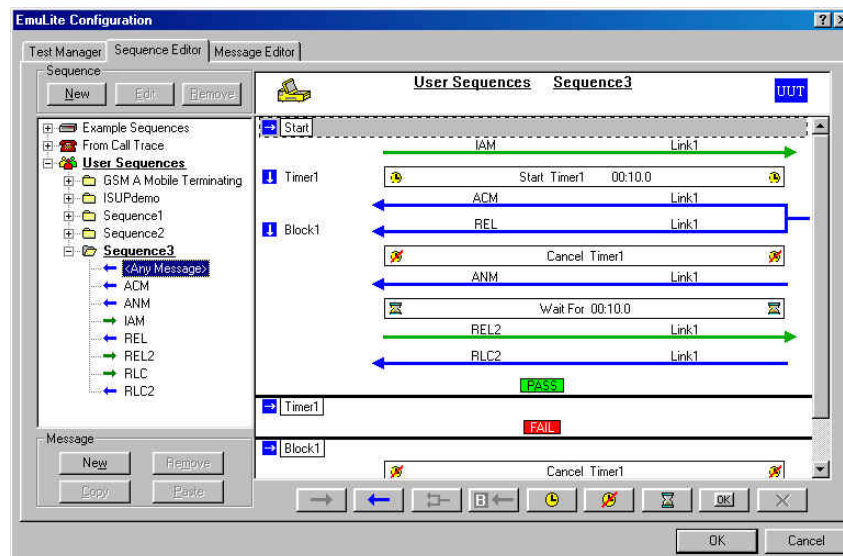
Figure 8 Sequence editor.

9

Conformance/Compatability tests

NIIF (formerly NOF) tests and high speed SS7 sequences are included – ready to run.

Test manager

The test manager allows single or multiple tests to be selected and run sequentially. Results are stored in the test log and can be optionally logged to a .CSV file during execution. The EmuLite status view shows the progress of each test by displaying the messages and a PASS/FAIL indication.

Graphical test analysis

EmuLite's status view identifies all tests which have failed. Advanced decode analysis tools allow messages to be examined in detail providing quick fault identification.

Fully integrated with monitor

EmuLite is fully integrated with the Signaling Advisor's monitor software. All analysis tools such as call trace, statistics and decodes are available for use. The flexibility of this software also allows existing monitor-only customers to upgrade easily to EmuLite.
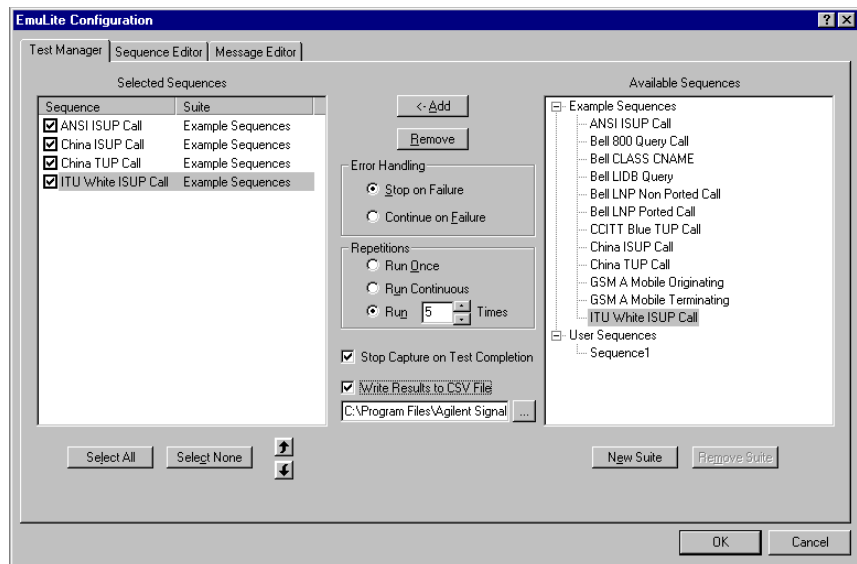
Figure 9 Test manager display.
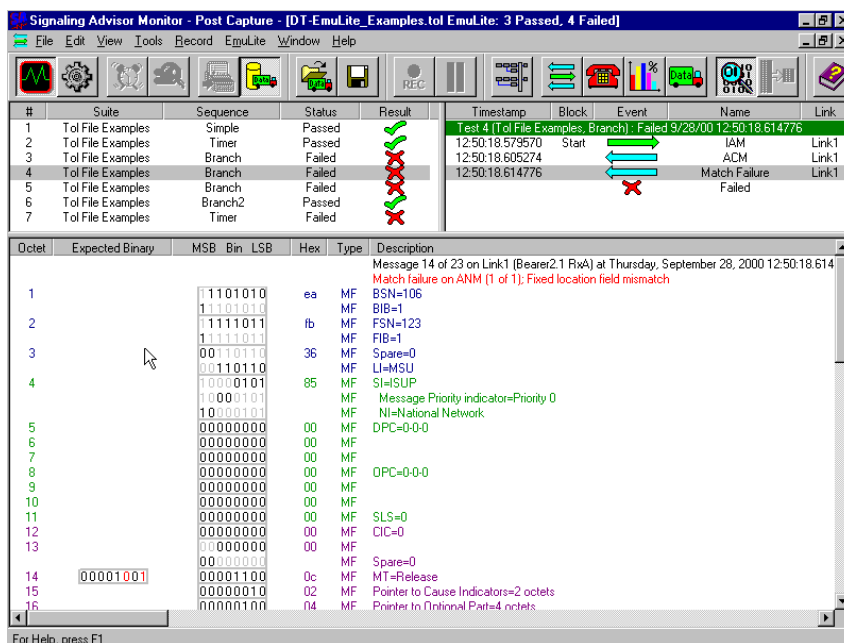
Figure 10 Test analysis display.

10

Protocol decodes

SS7 Signaling Advisor

SS7 Signaling Advisor includes the following protocols as standard:

SS7

Standard	Specification	Revision	Protocol
CCITT/ITU SS7	Q.703	Blue Book/White Books	LAP (MTP2)
	Q.704	Blue/White Books	MTP3, SNM
	Q.707	Blue/White Books	MTN
	Q.721-Q.724	Blue Book	TUP
	Q.761-Q.764	Blue/White Books/2000	ISUP
	Q.711-Q.714	Blue/White Books	SCCP, SCMG
	Q.771-Q.775	Blue/White Books	TCAP
	Q.767	1991	I-ISUP
ANSI	T1.111	1992, 1986	LAP, MTP3 as TR-NPL-246, SNM, MTN
	T1.112	1992, 1988	SCCP, SCMG
	T1.113	1992, 1986, 1985	ISUP
	T1.114	1992, 1988	TCAP
Telcordia (Bellcore)	TR-NPL-246	1992, 1987	MTP2 as T1.111
	TR-NPL-246	1994	MTP3
	TR-NPL-246	1992	SNM, MTN, ISUP, SCCP, SCMG. TCAP
	GR-246-CORE	1997	ISUP, SNM, SCCP, TCAP
	TR-NWT-000215	1993	Automatic callback
	TR-NWT-000220	1993	Screening list editing
	TR-NWT-000227	1993	Automatic recall
	TR-NWT-000954	1992	LIDB
	TR-TSY-31 Issue 3	1988	Calling number delivery
	TR-TSY-32 Issue1	1986	Bulk calling line identity
	TR-TSY-216 Issue2	1988	Customer originated trace
	TR-TSY-217 Issue2	1988	Selective call forwarding
	TR-TSY-218 Issue2	1988	Selective call rejection
	TR-TSY-219 Issue2	1988	Distinctive ringing/call waiting
	TR-TSY-391 Issue2	1988	Calling number delivery block
	TR-NWT-1188 Issue1	1991	Calling name delivery
	TR-TSY-533 Issue 2	1987	800 services
	TR-TSY-402 Issue 2	1989	Private virtual networks
ETSI ISUP	ETS 300 356-1	2000	ISUP version 5 (international)

Optional protocol decodes / functionalities

SS7 Signaling Advisor supports the following protocols as options, as well as a growing number of national variants and vendor variants. EmuLite (option 120) is optional. (Contact your local Sales Engineer for more details):

Option 022: AIN 0.1/0.2 application

Standard	Specification	Revision	Protocol
Telcordia	TR-NWT-1284/1285 Issue 1	Aug 1992	AIN 0.1 protocol spec.
(**Bellcore**)	GR-1299-CORE Issue2	Dec 1995	AIN 0.2 protocol spec.

Option 024: ETSI INAP support.

Standard	Specification	Revision	Protocol
ETSI	ETS 300 374-1	Sep 1994	Core INAP

Option 027: High speed SS7 decodes.

Standard	Specification	Revision	Protocol
ITU-T	ITU-T Q.703 Annex A	Jul 1996	MTP2
	ITU-T Q.704	White Book 1993	MTP3, SNM
China	GF001-9001	1990	SNM, MTP3

Option 080: ITU-T Q.921/Q.931

Standard	Specification	Revision	Protocol
	CCITT Q.921	Red Book	LAPD modulo 8
	CCITT Q.921	Blue Book	LAPD modulo 128
	ITU-T Q.921	White Book	LAPD modulo 128
	CCITT Q.931/Q.932	Blue Book	ISDN level 3
	ITU-T Q.931/Q.932	White Book	ISDN level 3

Option 081: ETSI ISDN and supplementary services

Standard	Specification	Revision	Protocol
ETSI	ETS 300 102.1	Oct 1993	Spec. for basic call control
	ETS 300 196	Jan 1994	Support for supplementary services
	ETS 300 130-1	Apr 1994	MCID supplementary service
	ETS 300 138-1	Apr 1994	CUG supplementary service
	ETS 300 182-1	Apr 1994	AOC supplementary service
	ETS 300 207-1	Sep 1994	DIV supplementary service
	ETS 300 286	May 1993	UUS supplementary service
	ETS 300 359	Jul 1995	CCBS supplementary service
	ETS 300 052	Apr 1994	MSN service
	ETS 300 055	Apr 1994	TP service
	ETS 300 058	Apr 1994	CW service
	ETS 300 061	Apr 1994	SUB service
	ETS 300 064	Apr 1994	DDI service
	ETS 300 092	Apr 1994	CLIP
	ETS 300 093	Apr 1994	CLIR
	ETS 300 098	Apr 1994	COLR
	ETS 300 141	Aug 1993	HOLD
	ETS 300 007	Jun 1991	Packet mode terminal
	ETS 300 097	May 1992	COLP
	ETS 300 267-1	Feb 1994	7 kHz telephony and video telephony
	ETS 300 185-1	Apr 1994	CONF conference call
	ETS 300 195-1	Apr 1994	Add-on inter-working
	ETS 300 369-1	May 1995	ECT service

Option 082: ETSI V5.1/V5.2 (No emulation)

Standard	Specification	Revision	Protocol
ETSI	ETS 300 324-1	Feb 1994	V5.1 interface specification
	ETS 300 347-1	Sep 1994	V5.2 interface specification

Option 086: QSIG

Standard	Specification	Revision	Protocol
ECMA	ECMA-143	Jun 1997	PISN – circuit mode bearer services - inter-exchange signaling procedures and protocol
	ECMA-165	Jun 1997	PISN – generic functional protocol for the support of supplementary services – inter-exchange signaling procedures and protocol (QSIG-GF)
	ECMA-164	Sep 1997	PISN – inter-exchange signaling protocol – name identification supplementary services (QSIG-NA)
	ECMA-174	Jun 1997	PISN – inter-exchange signaling protocol – call diversion supplementary service (QSIG-CF)
	ECMA-178	Sep 1997	PISN – inter-exchange signaling protocol – call transfer supplementary service (QSIG-CT)
	ECMA-192	Jun 1997	PISN – inter-exchange signaling protocol – call offer supplementary service (QSIG-CO)
	ECMA-242	Dec 1998	PISN – inter-exchange signaling protocol – message waiting indication supplementary service (QSIG-MWI)

Option 100: X.25 and X.75 (No call trace or emulation)

Standard	Specification	Revision	Protocol
ITU-T	X.25	1996	X.25 Level 2 LAP-B
	X.25	1996	X.25 Level 3
	X.75	1996	X.75 Level 3

Option 040: GSM phases 1, 2 and 2+

Standard	Specifications	Revision	Protocol
Phase 1	04.08	3.11.0 1990	DTAP
	08.08	3.9.3 1990	BSSMAP
	08.58	3.5.1 1990	A-bis
	09.02	3.8.0 1990	MAP
Phase 2	04.08	4.10.0 1994/5	DTAP
	04.11	4.3.0 1994/5	SMS
	03.40	4.6.0 1994/5	SMS
	04.80 - ETS 300 564	3rd edition, March 1996	Supplementary services
	08.08	4.8.0 1994/5	BSSMAP
	08.58	4.5.0 1994/5	A-bis
	08.60	4.4.1	TRAU (16k enhanced full rate)
	08.60	4.2.0	TRAU (16k)
	08.61	4.0.2.	TRAU (8k half rate)
	08.61	4.0.2.	TRAU (8k half rate in 16k)
	09.02	4.9.0 1994/5	MAP
Phase 2+	03.40	7.1.0	SMS
	04.08	7.1.2	DTAP
	04.11	7.4.0	SMS
	04.63	6.0.0	PDS
	04.68	6.0.0	GCC
	04.69	6.0.0	BCC
	04.80	7.0.0	Supplementary services
	08.08	7.1.0	BSSMAP
	08.58	7.0.0	Abis
	08.60	7.2.1	TRAU (16k)
	09.02	7.0.0	MAP
	29.078	4.0.0	CAMEL Phase 3

Option 043: GPRS protocol support

Standard	Specification	SMG Level	Version	Number	Revision	Status	Protocol
ETSI	GSM 04.08	31	7.7.0	EN 300 940	Aug1999	R98	Mobile Radio Interface layer 3 specification
	GSM 04.64	31	7.3.0	TS 101	Aug1999	R98	GPRS MS-SGSN LLC
	GSM 04.65	31	7.2.0		Nov 1999	R98	GPRS MS-SGSN SNDCP
	GSM 08.16	31	7.1.0		July 1999	R98	GPRS BSS-SGSN Interface: Network service
	GSM 08.18	31	7.2.0		Dec 1999	R98	GPRS BSS-SGSN BSS GPRS protocol
	GSM 09.60	31	7.3.0		Jan 2000	R98	GPRS tunneling protocol (GTP)
	GSM 12.15	31	7.4.0		Jan 2000	R98	GPRS charging
ITU-T	Q.922				1992		ISDN data link layer specification for frame mode bearer service
	Q.933				October 1995		ISDN signaling specification for frame mode switched and permanent virtual connection control and status
ANSI	T.617				1991		DSS1 signaling specification for frame relay bearer service
	T.618				1991		DSS1 core aspects of frame relay protocol for user with FR bearer service

Option 041: IS-41B/C/D

Standard	Specification	Revision	Protocol
IS-41B/C/D	EIA/TIA IS-41-B	Dec 1991	MAP
	EIA/TIA IS-41-C	Feb 1996	MAP
	EIA/TIA-41-D	Dec 1997	MAP
	IS-771	April 2001	WIN
	IS-826	April 2001	WIN Pre-Paid Charging

Option 042: IS-634 and CDG IOS-634

Standard	Specification	Revision	Protocol
IS-634	IS-634-0	Rev.0	A interface
	IS-634-A	1998	A1 interface
	CDG IOS-634	Version 2.4.0, March 2000	MSC to BS interface
	A-S0001.A	Version 3.1	A interface I.O.S.

EmuLite

Option 120: Graphical emulation creation and execution environment (including automatic protocol support)

Standard	Specification	Revision	Protocol
SS7	Q.703	1988,1992	ITU MTP2
	T1.111.3	1988, 1992	ANSI MTP2
	GR001-9001	1990	China MTP2
SS7 high speed	Q.703 Annex A	1996	ITU MTP2 high speed
ISDN	Q.920-Q.921	1988	CCITT ISDN LAPD mod8/mod128
GPRS network service	GSM 08.16	7.1.0, July 1999	ETSI GPRS NS

Supplied Conformance/Compatability Tests

Standard	Specification	Revision	Protocol
SS7 High Speed	Q.703 Annex A	1996	ITU MTP2 High Speed
	NIIF (NOF) Part 3, Attachment A	Jan 2000	ANSI MTP

Typical emulation performance

The following figures are the typical transmit and receive rates of Message Signaling Units (MSUs) for the EmuLite application.

Message Length in Octets (average)	Transmit Rate (messages/sec)	Transmit and Receive Rate (messages/sec)
20	150	100
50	80	60
100	50	50

Typical specifications for instrument hardware – mainframe and interfaces

37907A Signaling Advisor mainframe

Number of LIM slots available: 2. Processing capacity: Up to 32 duplex signaling links (64 kb/s at 1 erlang). Telephone handset connector: RJ11. Physical dimensions:
L × W × H (mm): 310 × 310 × 100.
Weight: 7 kg.
Volume: 10 liters.

Power:
100-120Vac±10%, 220-240Vac±10%,
50-60Hz, 110VA max.

Operating conditions
Temperature:
Operating: +5 °C to +40 °C
(+41 °F to +104 °F);
Non-operating: –25 °C to +60 °C
 (–13 °F to +140 °F).
Humidity:
Operating: 20% to 80% relative humidity non-condensing to 40 °C. Storage: 10% to 90% relative humidity to 60 °C.
Altitude:
Operation: 4,575 meters (15,000 feet);
Storage 15,250 meters (50,000 feet).

Safety conditions
This instrument is designed for indoor use. Safety class I

Integrated PC (minimum specification)
Processor: Intel Pentium or equivalent.
Clock speed: 300 MHz (min).
RAM: 128 MB.
Hard disk: 3 GB IDE (min).
Floppy drive: 3.5 inch, 1.44 MB DOS format.
Display: 10.4 inch LCD color SVGA (active matrix TFT).
Pointing device: Integrated mouse (external serial mouse also supplied as standard).
Operating system: MS Windows® 98
External interfaces
Video output: SVGA, 800 × 600 resolution.
Printer: Parallel port.
Serial: RS-232-C.
PCMCIA PC cards: Slots for one type III or two type II.

E7577A Signaling Advisor undercradle

Number of LIM slots available: 2.
Physical dimensions:
L × W × H (mm): 310 × 310 × 50.
Weight: 1 kg.

Interface modules

A range of link interface modules (LIMs) allow the GSM/GPRS Signaling Advisor to connect to most network interfaces (each LIM supports four duplex signaling links):
2.048 Mb/s (E1) – balanced
2.048 Mb/s (E1) – unbalanced
1.544 Mb/s (T1)
DS0
V.35
RS-232
RS-449

E7571A 2.048 Mb/s (E1) balanced LIM

Features:
- Monitor four bi-directional links per LIM (eight receivers)
- GSM sub-rate 32/16/8 kb/s and TRAU support
- Fractional E1 support

Connectors: 8 × LEMO 3-pin connectors. or 8 × Bantam connectors.

Line codes: HDB3 or AMI.

Framing: To ITU-T G.732, (CRC4) as specified in ITU-T G.704.

Timestamp accuracy : +/− 12μsec.

Level 1 receive alarm indications:
- Loss of signal
- Alarm indication signal
- Line code violation
- Out of frame (loss of frame)
- Remote alarm indication.
- Out of multiframe (CRC4)

Receiver levels:
Terminated: Tx level less 30 dB flat loss, less 6 dB cable loss at 1.024 MHz.
Bridged: Tx level less 6 dB cable loss at 1.024 MHz.

Receiver impedances
Terminated: 120 ohm.
Bridged: 3.7 kohm.
Receive clock tolerance:
2.048 MHz ± 50 ppm.

E7572A 2.048 Mb/s (E1) unbalanced LIM

Features:
- Monitor four bi-directional links per LIM (eight receivers)
- GSM sub-rate 32/16/8 kb/s and TRAU support
- Fractional E1 support

Connectors: 8 × LEMO 3-pin connectors. or 8 × BNC connectors.

Line codes: HDB3 or AMI.

Framing: To ITU-T G.732 (CRC4) as specified in ITU-T G.704.

Timestamp accuracy : +/− 12μsec.

Level 1 receive alarm indications:
- Loss of signal
- Alarm indication signal
- Line code violation
- Out of frame (loss of frame)
- Remote alarm indication
- Out of multiframe (CRC4)

Receiver levels:
Terminated: Tx level less 30 dB flat loss, less 6 dB cable loss at 1.024 MHz.
Bridged: Tx level less 6 dB cable loss at 1.024 MHz.

Receiver impedances
Terminated: 75 ohm.
Bridged: 2.4 kohm.
Receive clock tolerance:
2.048 MHz ± 50 ppm.

E7573A 1.544 Mb/s (T1) LIM

Features:
- Monitor four bi-directional links per LIM (eight receivers)
- GSM sub-rate 32/16/8 kb/s and TRAU support
- Fractional T1 support

Connectors: 4 × dual Bantam connectors.

Line codes: B8ZS or AMI.

Framing: SF (superframe) and ESF (extended superframe.

Timestamp accuracy : +/− 15μsec.

Level 1 receive alarm indications:
- Loss of signal
- Alarm indication signal
- Bipolar violation
- Loss of frame
- Remote defect indication
- Severely errored frame.

Receiver levels:
Terminated: Tx level less 20 dB flat loss, less 6 dB cable loss at 0.772 MHz.
Bridged: Tx level less 6 dB cable loss at 0.772 MHz.

Receiver impedances
Terminated: 100 ohm.
Bridged: 1 kohm.
Receive clock tolerance:
1.544 MHz ± 50 ppm.

E7574A Datacom LIM

Features:
- Monitor four bi-directional links per LIM (eight receivers)
- Support V.35, RS-449 (V.11), RS-232 (V.28) interfaces
- Support data rates of 64 kb/s for V.35 and R-S449, and up to 64 kb/s for RS-232.

Connectors: 2 × CHAMP 50-pin connectors.

Framing: None.

Timestamp accuracy : +/− 350μsec at 64 k/bs

Level 1 receive alarm indications:
- Loss of signal
- Loss of clock.

Receiver levels
Terminated:

V.35:	Mark voltage: −0.2 V to −1.0 V, Space voltage: 0.2 V to 1.0 V, Common mode voltage: ± 2 V.
RS-449:	Mark voltage: −0.2 V to −6.0 V, Space voltage: 0.2 V to 6.0 V, Common mode voltage: ± 7 V.
RS-232:	Mark voltage: −3 V to −15 V, Space voltage: 3 V to 15 V.

Receiver impedances
V.35 (bridged): > 20 kohm.
RS-449 (bridged): > 20 kohm.
RS-232 (bridged): 3 kohm to 7 kohm.
Receive clock tolerance: ± 4% at up to 56 kb/s, ± 1% at 64 kb/s.

E7575A DS0- A LIM

Features:
- Monitor four bi-directional links per LIM (eight receivers)
- Support 64 kb/s and 56 kb/s data rates.

Connectors: 4 × dual Bantam connectors, 1 × female DB9 (clock input).

Line codes: AMI.

Framing: None.

Timestamp accuracy : +/− 350μsec at 64 k/bs

Level 1 receive alarm indications:
- Loss of signal
- Loss of clock cycle
- Loss of byte clock cycle

Receiver levels:
Mark voltage: ± 2.7V to >5.5 V
Space voltage: 0 ± 1.0 V.

Receiver impedances
Terminated: 135 ohm.
Bridged: > 2 kohm.
Receive clock tolerance: ± 1%.

Agilent Technologies'
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