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Agilent Technologies
Signaling Advisor – 37907A

Technical Overview



The Complete Wireless and Advanced Intelligent Network Test Solution

The Agilent Technologies Signaling Advisor is a comprehensive and powerful test and troubleshooting instrument. It enables the user to find problems in today's complex wireless and wire-line telephone networks faster. 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 Signaling Advisor provides detailed test and analysis capabilities for signaling on modern wireless and wire-line telephone networks such as SS7, Cellular, PCS, GSM and GPRS networks. It provides robust and reliable measurements and analysis that go beyond decoding and filtering data.

The Signaling Advisor mainframe is a robust dispatched trouble-shooting tool. Add any appropriate optional decodes and link interface modules, and you are ready to test across multiple links involving different protocol standards for example, at access network interfaces. At the core 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.

Agilent Technologies

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

Signaling Advisor Key Benefits

Have new equipment and services installed faster and have them operate correctly the first time.

- **Install new services more efficiently**

Quickly, easily, and thoroughly test new services before installation by using the Signaling Advisor's graphical emulation environment.

- **Maximize revenue per subscriber**

Optimize networks by monitoring performance and utilization quicker and easier. Trends in network performance and subscriber behavior can easily be examined using the Signaling Advisor's statistical functions.

- **Attract and retain customers**

For the highest quality of service and reliability, monitor all parts of the network and rapidly highlight any problems using the Signaling Advisor.

- **Maintain a more profitable network**

Be sure that the engineering staff is as productive as possible and customers have as few problems as possible. Find problems and solve them faster with the Signaling Advisor.

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Signaling Advisor Features and Functionality

General Feature summary

- Dedicated software for Cellular, PCS/GSM, GPRS, UMTS, cdma2000 and 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, and 64 kb/s)
- Analyze full duplex Ethernet/Fast Ethernet GSM sub-rate signaling
- (8, 16, 32 Kb/s) and TRAU decode support
- Analyze ATM signaling links, including Iu, Iub and Iur for W-CDMA
- Analyze Frame Relay and ISDN connections for WAN
- UMTS (E1/T1 ATM and STM-1/OC-3 ATM)
- 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 protocol stacks
- Graphical configuration and measurement setup
- Triggers and filters (logging and display)
- On-line and context sensitive help
- Protocol help

Monitoring Features

- Graphical call trace with filters and alarms
- User-configurable columnized traffic overview and columnized color 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
- Stand-alone PC software for post-capture analysis
- Timestamping up to 12 microsecond resolution
- Remote Control
- Compatible with capture file formats of Agilent Advisor and Network
- Analyzer protocol analyzers, acceSS7 monitoring system and Agilent 37900D signaling test set
- Export data to CSV file for further ‘off-site’ analysis

EmuLite Features

- 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 all non-IP based GPRS interfaces
- Test SS7, GSM, GPRS, IS-41, CDMA, ISDN plus many more

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SS7 Monitoring

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. The auto configure tool configures the instrument's receiver to match the bearer and then searches the bearer for signaling links (timeslots that are carrying signaling information). The correct protocol stack will be built based on signaling messages.

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. Figure 1 shows a typical protocol stack.

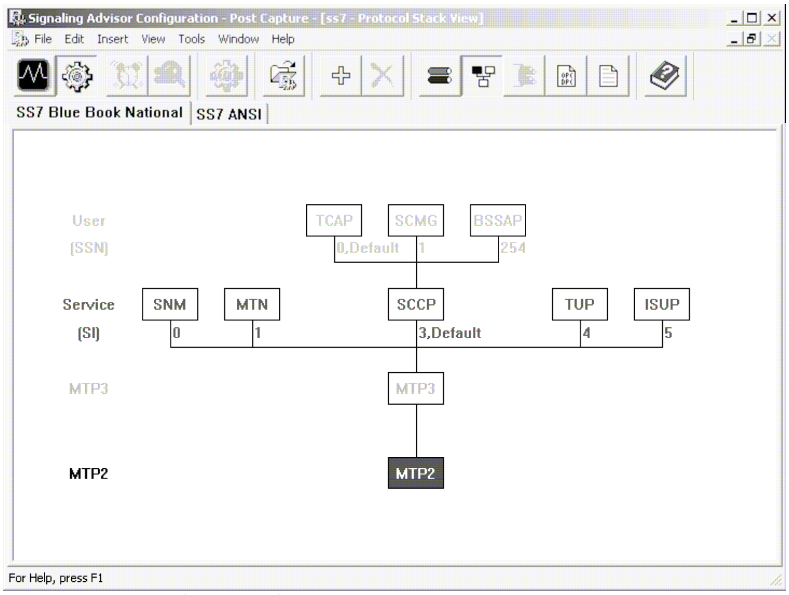


Figure 1: Protocol Stack configuration

Real-time Analysis

The SS7 Signaling Advisor monitors up to 16 bidirectional 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 2 shows a typical real-time measurement setup.

A wide variety of measurement triggers and filters can be set based on almost any interesting variable or event.

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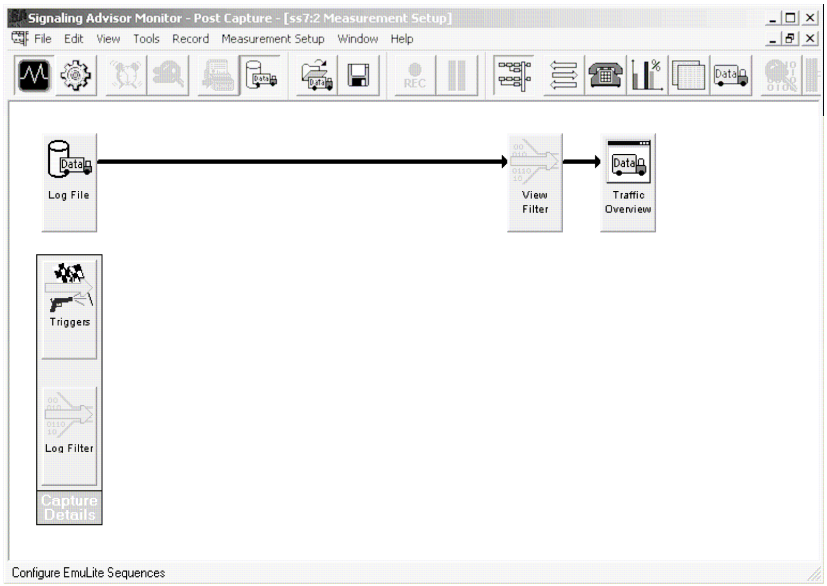


Figure 2: Measurement setup display.

Ethernet Monitoring GPRS and cdma2000

The Fast Ethernet interface and software provides real-time and post capture analysis of Ethernet protocols. Use the powerful Agilent Advisor 10/100 LAN software to analyze your IP links with the Signaling Advisor. The software also offers eight built-in analysis tools:

1. Expert analyzer
2. Node statistics
3. Node and connection statistics
4. Protocol stack statistics
5. Protocol commentators
6. Node discovery
7. Protocol vitals
8. Decodes

This software can also set filters on a wide variety of variables, protocols or events. Automatic Ethernet link negotiation for physical interface line rate and a range of stimulus and response tests are important and powerful features of the 10/100 Ethernet software. The software also supports cdma2000 protocols over 10/100 Ethernet.

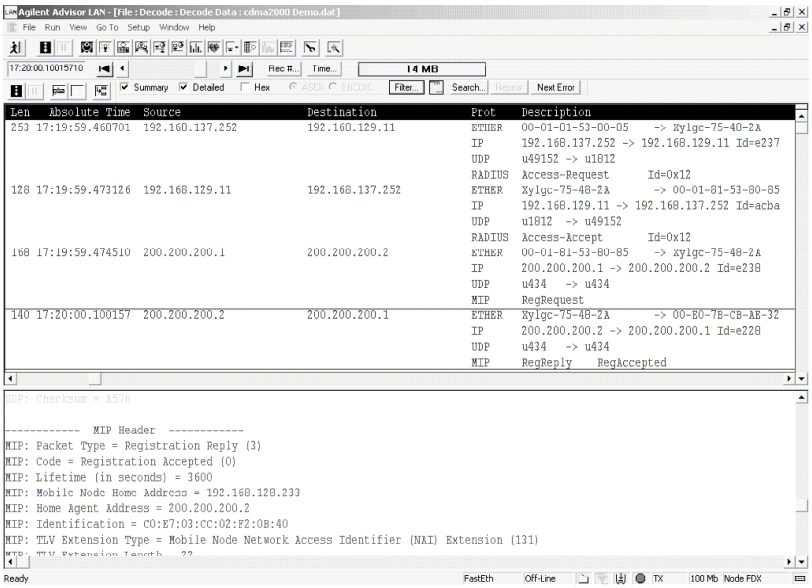


Figure 3: cdma2000 decode.

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ATM Monitoring

The ATM interfaces and software provides real time and post capture analysis ATM and encapsulated LAN protocols, including high speed SS7 and W-CDMA UMTS as well as cdma2000. Monitor and troubleshoot all aspects of the UMTS Radio Access Network (Iu, Iub and Iur interfaces). Use the powerful Agilent Advisor ATM software
with the Signaling Advisor to analyze your ATM links. Agilent Advisor has the most comprehensive and extensive layer 1 and 2 test capabilities for ATM available today. The software also offers (14) built in analysis tools:

1. Line Vital Statistics
2.Filters/Counters Statistics
3. Optical Power and Pulse Amplitude Meter
4. Line Status View with Statistics
5. VP.VC Autodiscovery and Statistics
6. Traffic Generation
7. Quality of Service Application
8. Policing and Traffic Contract Measurements
9. UNI 3.0, 3.1 and 4.0 Signaling and Call Placement
10. Real time IP over ATM filtering
11. Expert Analysis of LAN traffic within ATM Cells
12. LAN over ATM Commentators
13. Health Monitor
14. Decodes

The ATM software has powerful post processing capabilities.
Post processing display filters let you quickly zoom in on selected criteria. You'll spend less time searching through frames and more time focusing on problems. See related literature for more information.

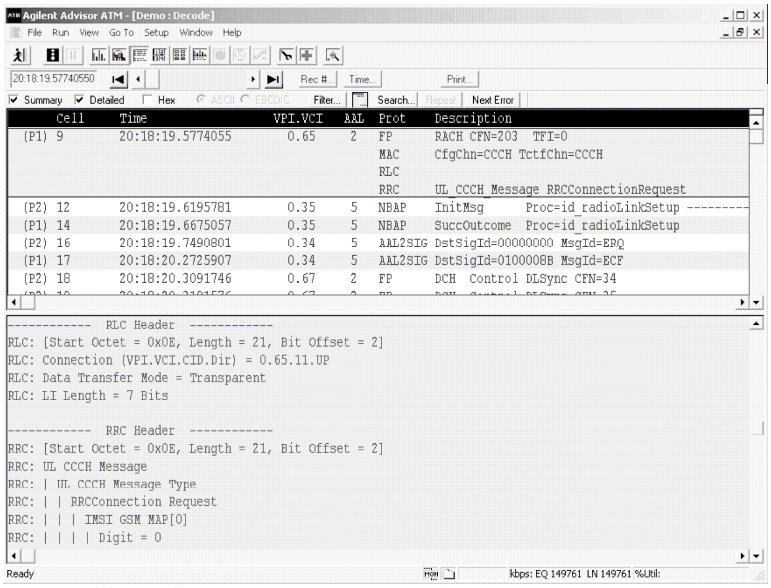


Figure 4: 3G UMTS decodes.

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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. 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 (e.g., 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 and Message Validation

Link status view and link loading information is available for each link under test. 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. The "message sequence validation" function advises the user of errors in message sequences (e.g., messages which do not fit into a normal call pattern). The erroneous 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 Signaling Advisor.

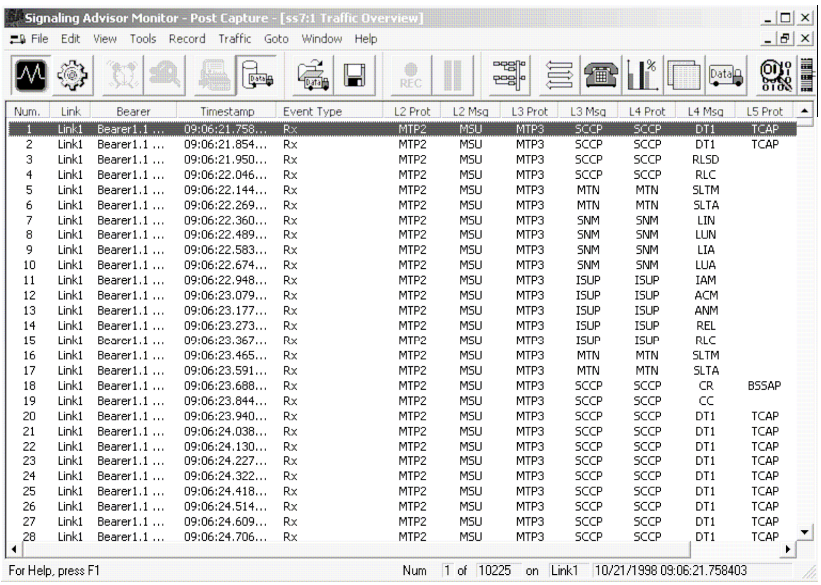


Figure 5: Traffic overview display.

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Call Trace Tool

Call Trace Overview

The graphical 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

Call Trace Tool

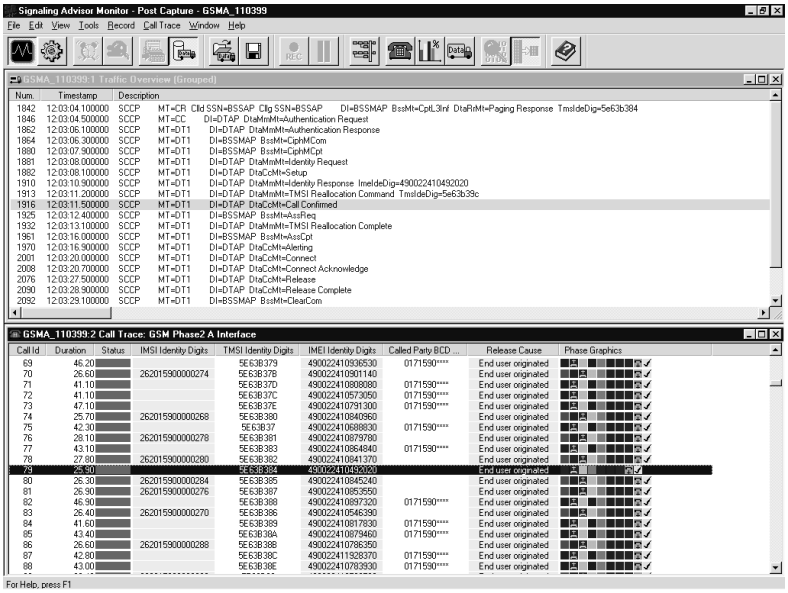


Figure 6: Call trace display.

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Statistics Tool

Graphical Statistics

User-definable graphical statistics are available in real-time or postcapture modes. There are several SS7 message transfer part (MTP) statistics, as well as user part specific statistics (e.g., message types or release causes). Statistics are typically counts or ratios. The statistics may be displayed graphically as:

- 2D Bar charts
- Radar diagram

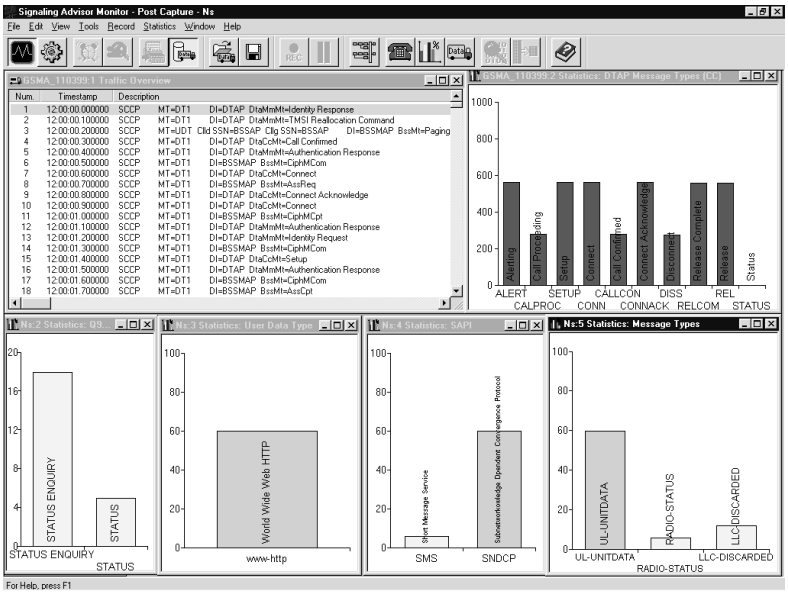


Figure 7: Shows a typical statistics graph.

Tabular Statistics

Tabular statistics are drawn by call traces. This provides a more detailed and dynamic view of network performance, incorporating several programmed measures (handovers, errors, call success rates etc).

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.

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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, and min/mean/max call durations.

Data Export

Statistics can be exported to a CSV (Comma Separated Value) file for further analysis in another application (e.g., spreadsheet or database).

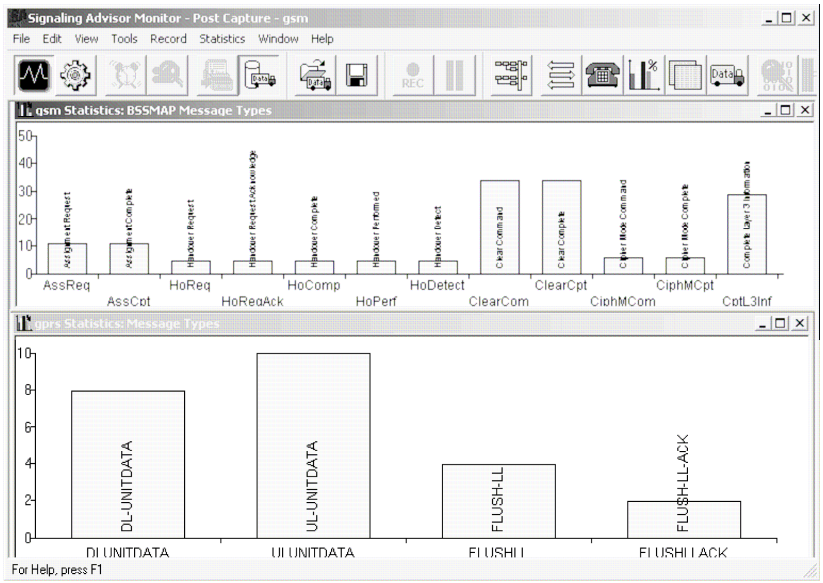


Figure 8: Graphical statistics display.

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EmuLite

Emulation is the ability to define and send signaling messages in a predefined 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 distracts engineers from solving signaling problems rather then 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 and 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 or even indicators.

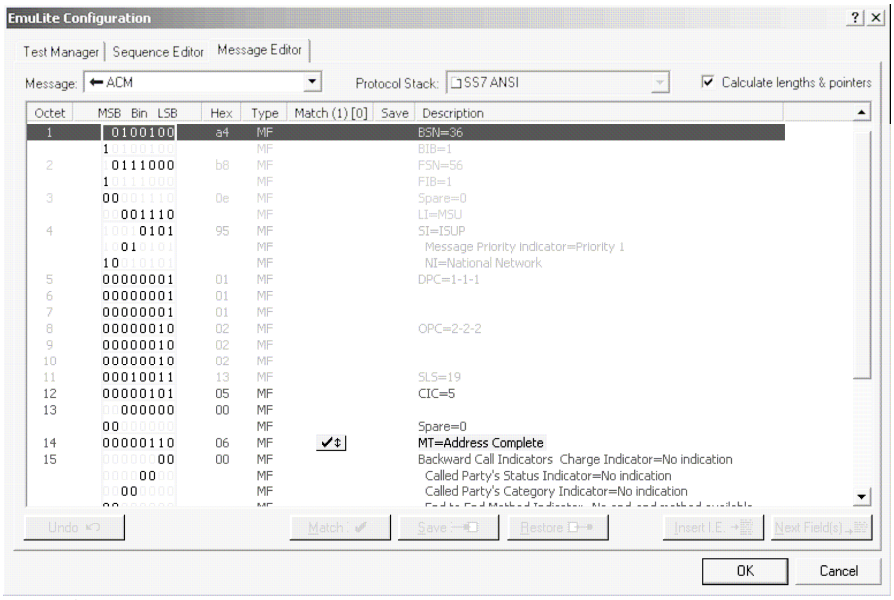


Figure 9: Message editor.

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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.

Conformance and Compatibility 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 or FAIL indicator.

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.

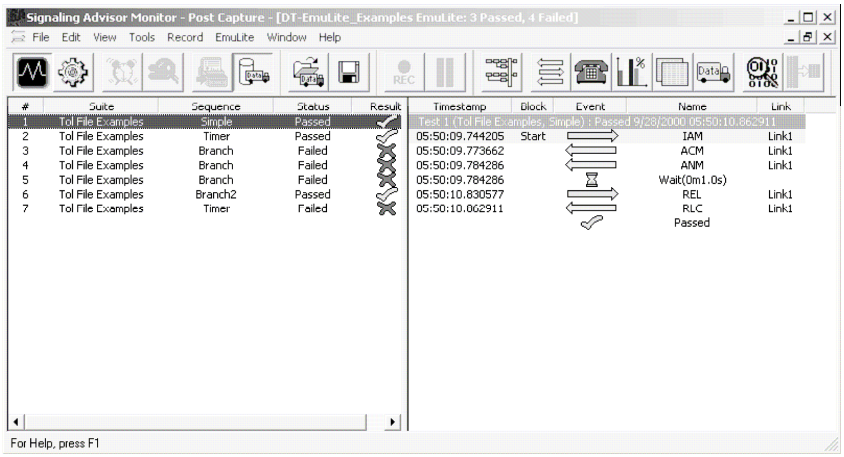


Figure 10: Test analysis display.

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You Don't Need To Be A Signaling Expert to Operate the Signaling Advisor

Today, more developers and field engineers than ever are faced with the challenge of effectively analyze signaling networks. For Signaling Advisor, ease of use was one of the primary design goals. A graphical and self-explanatory user interface allows the user to easily execute tests and identify problems quickly.

Find Problem Calls Faster

Signaling Advisor has graphical call trace, statistics and comprehensive filters to allow rapid message isolation and decoding.

So, when you need to find one specific problem call amongst thousands you can do it in only four mouse clicks. This means that you can resolve your customers' problems fast.

Roll Out New Services Faster and Increase Revenue

Signaling Advisor has a unique "no-programming-needed" graphical emulation environment – EmuLite. You can even copy messages and calls from monitoring sessions directly into EmuLite with just three mouse clicks.

When evaluating the operation of new network elements and services, you need to develop test sequences very easily and quickly.

With EmuLite you can do just that – no programming required. You can complete more tests in less time.

Improve Productivity as Networks Become More Complex

Signaling Advisor features extreme ease-of-use. Automatic configuration, unique Graphical Call Trace, GPRS session trace and intuitive statistics functions mean that you don't need to spend time reading the instruction book.

Even a nonexpert in signaling can easily interpret network behavior using graphical cues. And experts can achieve even more every time they start testing.

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Specifications for 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

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Related Literature

Agilent Signaling Advisor	Configuration Guide	5988-4929EN
Agilent Signaling Advisor	Technical Specification	5988-4930EN
Improving QoS in GSM Networks	Application Note	5988-0305EN
Isolating LNP Problems	Product Note	5988-2180EN
Testing GPRS Signaling	Product Note	5988-0304EN
Monitoring High Speed SS7 Links	Product Note	5988-1887EN
Creating Tests with Emulite	Product Note	5988-0944EN
ATM	Product Overview	5968-1437E
Agilent Advisor – 3G UMTS W-CDMA Test Software J5458A	Product Overview	5988-1164EN
Creating Tests with Emulite	Product Note	5988-0944EN
Agilent Signaling	Product Note	5988-3055EN

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Agilent Ordering Information

37907A **Signaling Advisor mainframe**

Undercradles

E7577A	Link Expansion Undercradle
E7578A	Fast Ethernet Undercradle
J2900A	Agilent Advisor high speed acquisition undercradle
J2912B	Agilent Advisor OC-3/STM-1 plug-in module
J2294D	E1/T1 DB-9/RJ-45 interface module
J2296D	E1 BNC 75 ohm interface module
J2298D	E1/T1 RJ-45/RJ-48C/mini-bantam interface
J2905B	ISDN S/T/U Interface module

Line Interface Modules (LIMs)

E7573A	T1 Link Interface Module
E7574A	V.35 Link Interface Module
E7575A	DS0/DS0A Link Interface Module

Software

37908A **Signaling Advisor Base Software**

Vendor Variants

37908A-051	Nokia A-bis protocol support
37908A-052	Ericsson A-bis protocol support
37908A-053	Alcatel A-bis protocol support
37908A-054	Nortel A-bis protocol support
37908A-055	Motorola A-bis protocol support
37908A-058	Ericsson INAP protocol support
37908A-059	Nortel INAP protocol support
37908A-060	Ericsson MAP/CS1+ Protcocol Support

Additional Capability

37908A-011	Access Network protocol support
37908A-012	GSM Phase 2 and 2+ protocol support
37908A-013	Cellular/PCS protocol support
37908A-043	GPRS decodes for the Gb interface
37908A-120	Emulite Graphical Emulation capability

Warranty and Support Services

Hardware	3 year Agilent instrument warranty and service plans
Software	90-day media replacement

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Canada-French	877 894 4414
China	800 810 0189
Denmark	+45 70 13 15 15
Finland	+358 (0) 10 855 2100
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Norway	+47 23 25 3720
Philippines	1800 1651 0170
Poland	+48 22 723 0066
Russia	+7 095 797 3963
Singapore	1800 375 8100
South Korea	080 769 0800
Spain	+34 91 631 3300
Sweden	0200 88 22 55
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