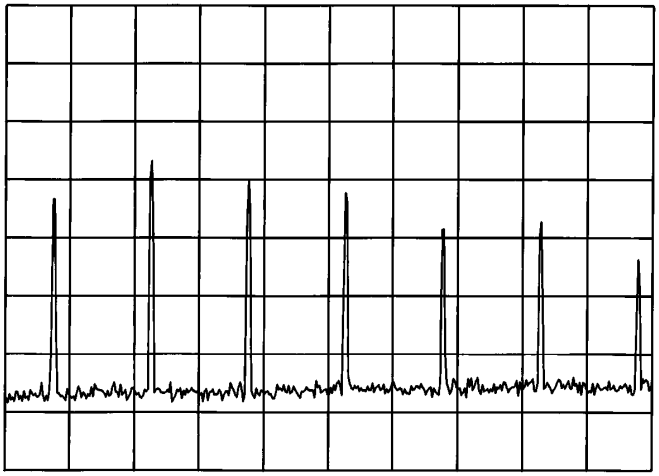
Agilent 8590L-Series
Portable Spectrum Analyzers

Product Overview



8590L
9 kHz to 1.8 GHz

8592L
9 kHz to 22/26.5 GHz

8594L
9 kHz to 2.9 GHz

Low-Cost General Purpose RF or MW Spectrum Analysis with Frequency Accuracy

Agilent Technologies
Innovating the HP Way

Economical and Reliable Solutions with Frequency Accuracy

When you need a full-featured, frequency-accurate RF or microwave spectrum analyzer to meet your field or factory testing requirements, the Agilent Technologies 8590L-Series gives you the features and options you need to get the job done. Reliable and economical, the 8590L operates from 9 kHz to 1.8 GHz with an amplitude range of –115 dBm to +30 dBm; the 8592L operates from 9 kHz to 22 GHz (26.5 GHz optionally) with preselection starting at 2.75 GHz and an amplitude range of –114 dBm to +30 dBm.

NEW!

The 8590L-Series now includes the 8594L for reliable and economical performance from 9 kHz to 2.9 GHz with an amplitude range of –112 dBm to +30 dBm.

Frequency Accuracy with Built-In Frequency Counter

With the 8590L and 8594L you get ±7.6 kHz marker count accuracy at 1 GHz. And with the 8592L you get ±165 kHz at 22 GHz. At lower frequencies you achieve even greater accuracy.

Additional Features and Options

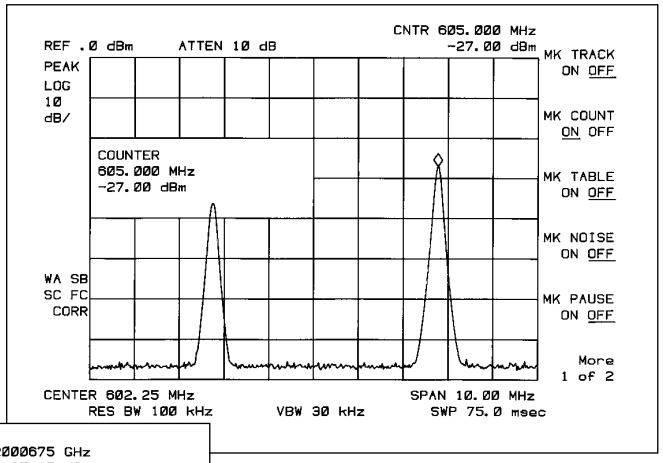
Whether you operate the analyzer manually or remotely, more than 200 functions are available. The Agilent 8590L-Series gives you a full set of marker funtions including marker delta, marker peak search, and up to four on-screen markers. Time and date functions are useful for unattended operation and for data storage or output labels.

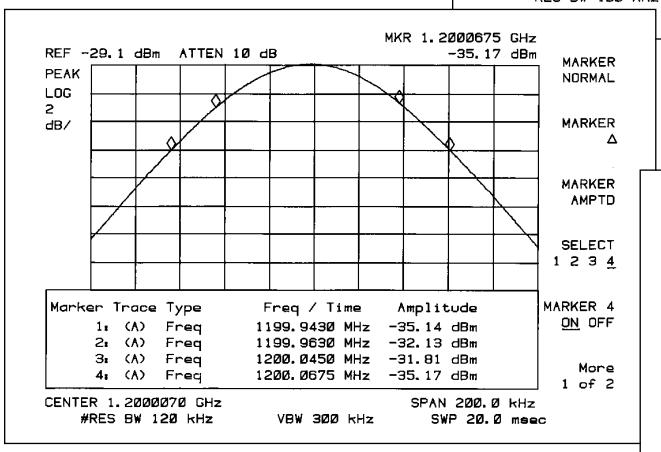
Data storage can be to internal memory, where over 50 traces and states may be saved, or to memory cards through the optional memory-card reader. Data can be directly output to a printer or plotter through the optional GPIB, RS-232, or parallel printer interfaces.

Built-in Measurement Capability

Third-order intercept, percent AM, and "N" dB bandwidth are just a few of the built-in measurements. These measurements are performed at the press of a single softkey. Results are displayed onscreen. And the downloadable program (DLP) capability lets you write your own built-in measurements using the DLP editor and an external keyboard.

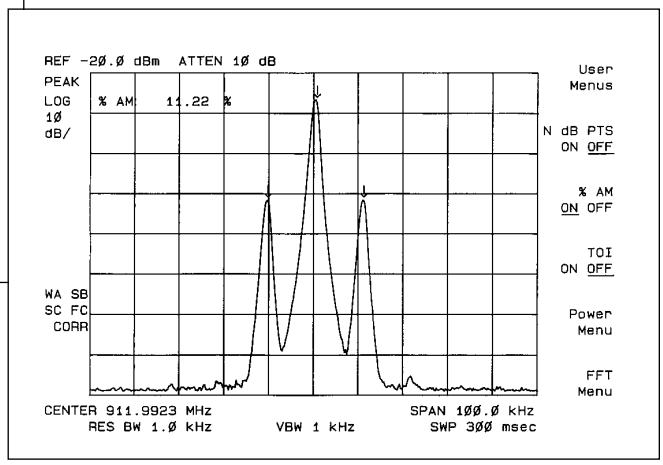
Use the counter to get ±7.6 kHz @ 1 GHz accuracy





Position up to four onscreen markers anywhere on the trace data

Perform continuous tests with built-in measurements such as percent AM



Measurement Personalities

Measurement personalities are application-specific DLPs that are loaded into the analyzer through the optional card reader. They provide measurement routines and a user-interface specific to the application. A scalar measure-ments personality customizes the 8590L with optional built-in 1.8 GHz tracking generator, and a cable TV measurements person-ality equips the 8590L-Series with one-button RF measurements for CATV service and system monitoring.

Agilent 8590E Series Spectrum Analyzers

If you need higher performance, more features, a wider range of options and upgrade capabilities, or additional application-based measurement personalities than the 8590L-series provides, please contact your local Agilent Technologies sales office for information on the 8590E-series of portable spectrum analyzers.

MIL-T-28800 Conformance

The 8590 series spectrum analyzers conform to the environ-mental specifications of MIL-T-28800 class 5 to insure reliable and accurate performance in portable environments as well as indoors. Compliance with the MIL-T-28800 standards of vibration, tempera-ture, humidity, and shock provide assurance that the 8590 series will withstand the rigors of field use.

ISO 9000

This product is manufactured in an ISO 9002 registered facility in concurrence with Agilent's quality commitment.

Specifications

All specifications apply over 0° C to +55° C. The analyzer will meet its specifications after 2 hours of storage at a constant temperature, within the operating temperature range, 30 minutes after the analyzer is turned on, and after CAL FREQ and CAL AMPTD (and for the 8592L CAL YTF) have been run.

Frequency Specifications

Frequency Range

8590L		
50Ω		9 kHz to 1.8 GHz
75Ω (Opt.001)		1 MHz to 1.8 GHz
8592L		9 kHz to 22 GHz
8592L (Opt. 026/027)		9 kHz to 26.5 GHz
Band	LO Harmonic = N	
0	1	9 kHz to 2.9 GHz
1	1	2.75 kHz to 6.5 GHz
2	2	6.0 GHz to 12.8 GHz
3	3	12.4 GHz to 19.4 GHz
4	4	19.1 GHz to 22.0 GHz
4	4 (Opt. 026/027)	19.1 GHz to 26.5 GHz
8594L		
dc coupled		9 kHz to 2.9 GHz
ac coupled		100 kHz to 2.9 GHz

Frequency Reference

Aging	$\pm 2 \times 10^{-6}$/year
Temperature Stability	$\pm 5 \times 10^{-6}$
Initial Achievable Accuracy	$\pm 0.5 \times 10^{-6}$

Frequency Readout Accuracy

(Start, Stop, Center, Marker)	± (freq. readout x freq. ref. error[2] + span accuracy + 1% of span + 20% of RBW + 100 Hz x N[1])

Marker Frequency Counter Accuracy

Span ≤10 MHz x N[1]	± (marker freq. x freq. ref. error[2] + counter resolution + 100 Hz x N[1])
Span >10 MHz x N[1]	± (marker freq. x freq. ref. error[2] + counter resolution + 1 kHz x N[1])
Counter Resolution	
Span ≤10 MHz x N[1]	Selectable from 10 Hz to 100 kHz
Span >10 MHz x N[1]	Selectable from 100 Hz to 100 kHz

Frequency Span

Range	
8590L	0 Hz (zero span), 10 kHz to 1.8 GHz
8592L	0 Hz (zero span), (10 kHz x N[1]) to 19.25 GHz
8594L	0 Hz (zero span), 10 kHz to 2.9 GHz
Resolution	Four digits
Accuracy	
Span ≤10 MHz x N[1]	±2% of span
Span >10 MHz x N[1]	±3% of span

Frequency Sweep Time

Range	20 ms to 100 s
Accuracy	±3%
Sweep Trigger	Free Run, Single, Line, Video, External

Resolution Bandwidth 1 kHz to 3 MHz (3 dB) in 1, 3, 10 sequence. 9 kHz and 120 kHz (6 dB) EMI bandwidths.

Accuracy	±20%
Selectivity	
–60 dB/–3 dB	
3 kHz to 10 kHz	15:1
100 kHz to 3 MHz	15:1
1 kHz, 30 kHz	16:1

Video Bandwidth Range 30 Hz to 1 MHz in 1, 3, 10 sequence

Stability

Noise Sidebands (1 kHz RBW, 30 Hz VBW and sample detector)	
>10 kHz offset from CW signal	≤–90 dBc/Hz + 20 Log N[1]
>20 kHz offset from CW signal	≤–100 dBc/Hz + 20 Log N[1]
>30 kHz offset from CW signal	≤–105 dBc/Hz + 20 Log N[1]
System-Related Sidebands	
>30 kHz offset from CW signal	≤–65 dBc + 20 Log N[1]

Comb Generator Frequency

8592L	100 MHz fundamental frequency
Accuracy	±0.007%

Amplitude Specifications

Amplitude Range

8590L, 8592L, 8594L	Displayed Average Noise Level to +30 dBm
8590L (Opt. 001)	Displayed Average Noise Level to +75 dBmV

Maximum Safe Input Level (Input attenuator ≥10 dB)

Average Continuous Power	+30 dBm (1 W)
8590L (Opt. 001)	+75 dBmV(0.4 W)
Peak Pulse Power	
8590L	+30 dBm (1 W)
8590L (Opt. 001)	+75 dBmV (0.4 W)
8592L, 8594L	+50 dBm (100 W) for <10 µs pulse width and <1% duty cycle, input attenuation ≥30 dB
dc	
8590L	25 Vdc
8590L (Opt. 001)	100 Vdc
8592L	0 Vdc
8594L	0 V (dc coupled) 50 V (ac coupled)

Gain Compression

>10 MHz	≤0.5 dB (total power at input mixer[3] = –10 dBm)

Displayed Average Noise Level

(Input terminated, 0 dB atten., 30 Hz VBW, 1 kHz RBW, sample detector)

8590L	
400 kHz to 1.5 GHz	≤–115 dBm
1.5 GHz to 1.8 GHz	≤–113 dBm
8590L (Opt, 001)	
1 MHz to 1.5 GHz	≤–63 dBmV
1.5 GHz to 1.8 GHz	≤–61 dBmV
8592L	
400 kHz to 2.9 GHz	≤–112 dBm
2.75 GHz to 6.5 GHz	≤–114 dBm
6.0 GHz to 12.8 GHz	≤–102 dBm
12.4 GHz to 19.4 GHz	≤–98 dBm
19.1 GHz to 22 GHz	≤–92 dBm
8592L (Opt. 026)	
19.1 GHz to 26.5 GHz	≤–87 dBm
8594L	
400 kHz to <5 MHz	≤–107 dBm
5 MHz to 2.9 GHz	≤–112 dBm

1. N = LO harmonic. N = 1 for 8590L and 8594L
2. Frequency reference error = (aging rate x period of time since adjustment + initial achievable accuracy + temperature stability)
3. Mixer Power Level (dBm) = Input Power (dBm) –Input Atten. (dB)

Spurious Responses	
Second Harmonic Distortion	
5 MHz to 1.8 GHz *(8590L)*	<–70 dBc for –45 dBm tone at input mixer[3]
10 MHz to 2.9 GHz *(8592L)*	<–70 dBc for –40 dBm tone at input mixer[3]
>10 MHz *(8594L)*	
>2.75 GHz *(8592L)*	<–100 dBc for –10 dBm tone at input mixer[3] (or below displayed average noise level)
Third Order Intermodulation Distortion	
>5 MHz to 1.8 GHz *(8590L)*	<–70 dBc for two –30 dBm tones at
>10 MHz *(8592L, 8594L)*	input mixer[3] and >50 kHz separation
Other Input Related Spurious	
≤1.8 GHz *(8590L)*	<–65 dBc at ≥30 kHz offset, for
≤2.9 GHz *(8594L)*	–20 dBm tone at input mixer[3]
≤18 GHz *(8592L)*	
≤22 GHz *(8592L)*	<–60 dBc at ≥30 kHz offset, for –20 dBm tone at input mixer[3]

Residual Responses (Input terminated and 0 dB attenuation)	
1 MHz to 1.8 GHz *(8590L Opt. 001)*	<–38 dBmV
150 kHz to 1.8 GHz *(8590L)*	<–90 dBm
150 kHz to 6.5 GHz *(8592L)*	<–90 dBm
150 kHz to 2.9 GHz *(8594L)*	<–90 dBm

Display Range	
Log Scale	0 to –70 dB from ref. level is calibrated; 0.1, 0.2, 0.5 dB/division and 1 to 20 dB/ division in 1 dB steps; eight divisions displayed
Linear Scale	Eight divisions
Scale units	dBm, dBmV, dBµV, V, and W
Marker Readout Resolution	0.05 dB for log scale 0.05% of ref. level for linear scale
Reference Level	
Range	same as amplitude range
Resolution	0.01 dB for log scale 0.12% of ref. level for linear scale
Accuracy	±0.3 dB @ –20 dBm
0 dBm to –59.9 dBm	± (0.3 dB + 0.01 x dB from –20 dBm)

Frequency Response	(10 dB input attenuation)	
8590L	Absolute[4]	Relative Flatness[5]
9 kHz to 1.8 GHz	±1.5 dB	±1.0 dB
8592L	Preselector peaked in band > 0	
	Absolute[4]	Relative Flatness[5]
9 kHz to 2.9 GHz	±1.5 dB	±1.0 dB
2.75 GHz to 6.5 GHz	±2.0 dB	±1.5 dB
6.0 GHz to 12.8 GHz	±2.5 dB	±2.0 dB
12.4 GHz to 19.4 GHz	±3.0 dB	±2.0 dB
19.1 GHz to 22 GHz	±3.0 dB	±2.0 dB
19.1 GHz to 26.5 GHz	±5.0 dB	±2.0 dB
8594L	(dc coupled preselector peaked)	
	Absolute[4]	Relative Flatness[5]
9 kHz to 2.9 GHz	±1.5 dB	±1.0 dB

Calibrator Output	
Amplitude	–20 dBm ±0.4 dB
8590L Opt .001	+28.75 dBmV ±0.4 dB

Resolution Bandwidth Switching Uncertainty	
(Referenced to 3 kHz RBW, at ref. level)	
3 kHz to 3 MHz RBW	±0.4 dB
1 kHz RBW	±0.5 dB
Linear to Log Switching	±0.25 dB at ref. level
Display Scale Fidelity	
Log Maximum Cumulative	
0 to –70 dB from ref. level	± (0.4 dB + 0.01 x dB from ref. level)
Log Incremental Accuracy	
0 to –60 dB from ref. level	±0.4 dB/4 dB
Linear Accuracy	±3% of ref. level

Option Specifications

Option 010 and 011 Tracking Generator (Agilent 8590L only)

Frequency Range	
(Opt. 010)	100 kHz to 1.8 GHz
(Opt. 011)	1 MHz to 1.8 GHz
Output Level	
Range	
(Opt 010)	0 to –15 dBm
(Opt. 011)	+42.8 to –27.8 dBmV
Resolution	0.1 dB
Absolute Accuracy	
(@ 300 MHz, –10 dBm)	±1.5 dB
(@ 300 MHz, +38.8 dBmV)	±1.5 dB
Vernier	
Range	15 dB
Accuracy	±1.0 dB
Output Flatness	±1.75 dB
Spurious Output	
Harmonic Spurs	<–25 dBc
(0 dBm/+ 42.8 dBmV Output)	
Nonharmonic Spurs	<–30 dBc

Dynamic Range (Characteristics)		
	Dynamic Range[6]	TG Feedthrough
(Opt. 010)	106 dB	≤–106 dBm
(Opt. 011)	100 dB	≤–57.24 dBmV

Power Sweep	
Range	–15 dBm to 0 dBm
(Opt. 011)	+27.8 dBmV to 42.8 dBmV
Resolution	0.1 dB

4. Referenced to 300 MHz CAL OUT
5. Ref. to midpoint between highest and lowest freq. response deviations
6. Maximum output level minus TG feedthrough

General Specifications

MIL-T-28800: Has been type-tested to the environmental specifications of MIL-T-28800 Class 5.

Temperature Range	
Operating	0°C to +55°C
Storage	–40°C to +75°C
EMI Compatibility	Conducted and radiated emission is in compliance with CISPR Pub. 11/1990 Group 1 Class A.
Audible Noise	<37.5 dBa pressure and <5.0 Bels power (ISODP7779)
Power Requirements	
ON (Line 1)	90 to 132 V rms, 47 to 440 Hz; 195 to 250 V rms, 47 to 66 Hz, Power consumption <500 VA; <180W
Standby (Line 0)	Power consumption <7 W
User Memory (nominal)	121 Kbytes non-volatile RAM
Data Storage (nominal)	50 traces, and 8 state registers internal memory; 24 traces, 32 states memory card (85700A)
Dimensions (Nominal)	
(No handle, feet, or cover)	163 mm (H) x 325 mm (W) x 427 mm (D)
(Overall)	184 mm (H) x 373 mm (W) x 461 mm (D)
Weight (Nominal)	
8590L	14.1 kg (31 lb)
8592L	15.9 kg (35 lb)
8594L	15.9 kg (35 lb)

Inputs/Outputs

Front Panel Connectors	
Input	50Ω Type N
(Opt. 001)	75Ω BNC female
(Opt. 026)	APC 3.5 mm male
(Opt. 027)	50Ω Type N female
Cal Output	50Ω BNC, –20 dBm, 300 MHz
100 MHz Comb Out	100 MHz ±0.007%, SMA
Probe Power	+15 Vdc, –12.6 Vdc, and Gnd (150 mA max each)
Rear Panel Connectors	
Ext. Ref. In	50Ω BNC, 10 MHz, –2 to +10 dBm
10 MHz Ref. Output	50Ω BNC, 10 MHz, 0 dBm
Ext. ALC Input 1 MΩ, (Opt. 010 or 011)	–66 dBV to +6 dBV
Sweep Output	BNC, 0 to +10 V ramp
High Sweep In/Out	BNC, high TTL = sweep, low TTL = Retrace
Aux Video Out	50Ω BNC, 0 to 1 V
Aux IF Output	50Ω BNC, –10 to 60 dBm, 21.4 MHz
Keyboard (Opt. 041 or 043)	5 pin mini-DIN, compatible with Agilent C1405A and most IBM AT keyboards
Ext. Trigger Input	BNC, TTL levels, positive edge trigger
GPIB and Parallel (Opt.041)	SH1, AH1, T6, L4, ST1, RL1, PPO, DC1, C1, C2, C3, & C28 and 25 Pin subminiature D-shell female for parallel
RS-232 and Parallel (Opt.043)	25-Pin 9-pin subminiature D-Shell female and 25-Pin Subminiature D-Shell female for parallel
Aux Interface	9 pin "D" subminiature Pin 1 to 4, TTL Output Pin 5 TTL Input Pin 6 Gnd Pin 7 –15 vdc ±5%; 150 mA max Pin 8 +5 vdc ±5%; 150 mA max Pin 9 +15vdc ±5%; 150 mA max
Monitor Out	50Ω BNC
Selectable Format	NTSC, 15.75 kHz, 60 Hz PAL, 15.625 kHz, 50 Hz

Ordering Information

8590L RF Spectrum Analyzer (9 kHz to 1.8 GHz)
8592L Microwave Spectrum Analyzer (9 kHz to 22/26.5 GHz)
8594L RF Spectrum Analyzer (9 kHz to 2.9 GHz)

Options

001 75Ω Input Impedance (8590L only)
003 Memory Card Reader
010 Tracking Generator (100 kHz to 1.8 GHz, 8590L only)
011 75Ω Tracking Generator (1 MHz to 1.8 GHz, 8590L only)
041 GPIB Interface and Parallel Printer Interface
043 RS-232 Interface and Parallel Printer Interface
026 26.5 GHz Frequency Extension, APC connector (8592L only)
027 26.5 GHz Frequency Extension, Type N Connector (8592L only)
040 Front Panel Protective Cover with Storage
042 Protective Soft Carrying Case/Back Pack
711 50/75Ω Matching Pad with 100V DC Block
908 Rack Mount without Handles
909 Rack Mount with Handles
910 Additional Users, Quick Reference, and Calibration Guides
915 Component Level Information and Service Guide
8ZE Refurbished Spectrum Analyzer (as available)
UK6 Commercial Cal. Certificate
W30 Two Additional Years Return-to-Agilent Service
W32 Two Additional Years Return-to-Agilent Calibration
W50 Four Additional Years Return-to-Agilent Service
W52 Four Additional Years Return-to-Agilent Calibration
0Q8 8590 Customer Service Training

Application Measurement Personalities/Cards

85714A Scalar Measurements Personality[8] (8590L only)
85721A Cable TV Measurements Personality[8]
85921B Cable TV Data Management PC Software[9]
85700A 32 kByte Blank Ram Card[8]
85702A 128 kByte Blank Ram Card[8]
85704A 256 kByte Blank Ram Card[8]
85705A 512 kByte Blank Ram Card[8]

Connectivity
C1405B Keyboard
C2655A HP DeskJet 340 Portable Printer[10]
C2642D HP DeskJet 400 Monochromic/Color Printer[10]
C4562A HP DeskJet 690C Color Printer
C4565A HP DeskJet 870C Color Printer
ITEL-45CHVUC GPIB/Parallel (Centronics) Converter (U.S. and Canada)
ITEL-45CHVEC GPIB/Parallel (Centronics) Converter (International)
C2950A Parallel printer cable (2 meter)
E4444A BenchLink Spectrum Analyzer PC Software
10833A GPIB cable (1 meter)
24542U RS-232 cable (3 meter, 9 pin F to 9 pin F) (for serial 9 pin PC connection to analyzer)
24542G RS-232 cable (3 meter, 25 pin M to 9 pin F) (for serial 25 pin PC or printer connection to analyzer)
24542M RS-232 cable (3 meter, 25 pin M to 9 pin F) (for serial 25 pin modem connection to analyzer)

8. Requires Option 003 Memory Card Reader
9. Requires 85721A Cable TV System Monitor Personality
10. Requires Option 041 or 043 Interface

Agilent Technologies' Test and Measurement Support, Services, and Assistance

Agilent Technologies aims to maximize the value you receive, while minimizing your risk and problems. We strive to ensure that you get the test and measurement capabilities you paid for and obtain the support you need. Our extensive support resources and services can help you choose the right Agilent products for your applications and apply them successfully. Every instrument and system we sell has a global warranty. Support is available for at least five years beyond the production life of the product. Two concepts underlie Agilent's overall support policy: "Our Promise" and "Your Advantage."

Our Promise

"Our Promise" means your Agilent test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you use Agilent equipment, we can verify that it works properly, help with product operation, and provide basic measurement assistance for the use of specified capabilities, at no extra cost upon request. Many self-help tools are available.

Your Advantage

"Your Advantage" means that Agilent offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business needs. Solve problems efficiently and gain a competitive edge by contracting with us for calibration, extra-cost upgrades, out-of-warranty repairs, and on-site education and training, as well as design, system integration, project management, and other professional services. Experienced Agilent engineers and technicians worldwide can help you maximize your productivity, optimize the return on investment of your Agilent instruments and systems, and obtain dependable measurement accuracy for the life of those products.

By internet, phone, or fax, get assistance with all your test and measurement needs.

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