Agilent 8147 Optical Time Domain Reflectometer

Technical Specifications

Specifications

Specifications describe the instrument's warranted performance, measured with typical PC-type connectors. Uncertainties due to the refractive index of the fiber are not considered. Characteristics and typical data provide information about the non-warranted instrument performance.

The Agilent 8147 OTDR is produced to the ISO 9001 international quality system standard as part of Agilent's commitment to continually increasing customer satisfaction through improved quality control.

Agilent Technologies

Optical Performance

Modules	Agilent E4311A				Agilent E4312A				Agilent E4313A			
Central wavelength	1310 ± 15 nm				1550 ± 15 nm				1310/1550 ± 15 nm			
Fiber type	single-mode				single-mode				single-mode			
Pulsewidth	30 ns	100 ns	1 μs	10 μs	30 ns	100 ns	1 μs	10 μs	30 ns	100 ns	1 μs	10 μs
Dynamic range (dB) [2]	13	16	22	**30**	12	15	21	**30**	13/12	16/15	22/21	**30/30**

Modules	Agilent E4314A				Agilent E4315A				Agilent E4316A			
Central wavelength	1310 ± 15 nm				1550 ± 15 nm				1310/1550 ± 15 nm			
Fiber type	single-mode				single-mode				single-mode			
Pulsewidth	30 ns	100 ns	1 μs	10 μs	30 ns	100 ns	1 μs	10 μs	30 ns	100 ns	1 μs	10 μs
Dynamic range (dB) [2]	16	20	28	35	15	19	27	34	16/15	20/19	28/27	35/34

Modules	Agilent E4317A				Agilent E4318A				Agilent E4319A			
Central wavelength	1310 ± 15 nm				1550 ± 15 nm				1310/1550 ± 15 nm			
Fiber type	single-mode				single-mode				single-mode			
Pulsewidth	100 ns	1 μs	10 μs	20 μs	100 ns	1 μs	10 μs	20 μs	100 ns	1 μs	10 μs	20 μs
Dynamic range (dB) [2]	24	32	39	40	23	31	38	39	24/23	32/31	39/38	40/39

Modules	Agilent E4321A				Agilent E4324A			
Central wavelength	1625 ± 15 nm				1310/1550 ± 15 nm			
Fiber type	single-mode				single-mode			
Pulsewidth	100 ns	1 μs	10 μs	20 μs	100 ns	1 μs	10 μs	20 μs
Dynamic range (dB) [2]	25	31	38	**42**	28/27	34/33	41/40	**45/43**

In all Agilent OTDR single-mode modules, the following pulsewidths are selectable:
10 ns, 30 ns, 100 ns, 300 ns, 1 μs, 3 μs, 10 μs
(20 μs is selectable with the Agilent E4317A – Agilent E4319A, Agilent E4321A, Agilent E4324A)

All Agilent OTDR modules are equipped with a CW-Source capability at the selected wavelength.

Resolution

Modules	Agilent E4313A / Agilent E4316A		Agilent E4319A		Agilent E4321A	Agilent E4324A
	Agilent E4311A Agilent E4314A	Agilent E4312A Agilent E4315A	Agilent E4317A	Agilent E4318A		
Central wavelength	1310 ± 15 nm	1550 ± 15 nm	1310 ± 15 nm	1550 ± 15 nm	1625 ± 15 nm	1310/1550 ± 15 nm
Event deadzone [3]	4 m	4 m	4 m	4 m	5 m	4.5 m
Attenuation deadzone [4]	10 m	12 m	10 m	12 m	14 m	10/12 m

Distance Accuracy [5]

Offset error	Scale error	Sampling error
±0.5 m	$\pm 5 \times 10^{-5}$	sampling spacing

Loss/reflectance accuracy [6]

Backscatter measurements 1 dB steps	Reflectance measurements [7]
±0.05 dB	±2.0 dB

Note:

[1] Guaranteed specification, Bold values are typical specifications.

[2] Measured with a standard single-mode fiber at SNR = 1 noise level and with 3 minutes averaging time at 25°C, Optimize mode: dynamic.

[3] Reflectance ≤ -35 dB at a pulsewidth of 10 ns and with a span of ≤ 4 km, Optimize mode: resolution.

[4] Typical specification @ Reflectance ≤ -50 dB at a pulsewidth of 30 ns and with a span of ≤ 4 km,
Guaranteed specification @ Reflectance ≤ -35 dB at a pulsewidth of 30 ns and with a span of ≤ 4 km, Optimize mode: resolution:
20m@1310nm/30m@1550nm: Agilent E4311A - Agilent E4316A, Agilent E4324A
30m@1310nm/40m@1550nm: Agilent E4317A - Agilent E4319A
30m@1625nm: Agilent E4321A

[5] Distance accuracy: offset error + scale error * distance + sampling error,

[6] SNR ≥ 15 dB and with 1 μs, averaging time maximum 3 minutes,

[7] -20 dB to -60 dB,

CW mode

Output power: ≤ 0 dBm
Stability: (15 min., T = constant):
±0.05 dB after 10 min. warm-up.

Optical Interfaces

Output connector: optional Diamond HMS-10, FC/PC, DIN 47256, ST, FC/APC, Biconic, SC, NEC D4, E-2000. All are user- exchangeable.

Note: for other connector types, please contact your local Agilent sales office or representative.

General

Laser safety class:
21 CFR Class I, IEC825 Class 3A.
Recalibration period: 2 years

Horizontal parameters

Start: 0 km to 495 km.
Span: 1 km to 500 km.
Readout resolution: 0.1 m.
Minimum sample spacing: 10 cm.
Refractive index:1.00000–2.00000.
Length unit: km, ft or miles selectable (10 cm resolution).
Measurement points: up to 16000.

Vertical parameters

Vertical scale: 0.1 to 5.0 dB/Div (in 1, 2 ,5 mode).

Readout resolution: 0.001 dB.
Reflectance range:
20 dB (typ. -14 dB) to -60 dB.
Backscatter coefficient:
20–80 dB at 1 μs.

Scan trace

Type of events:
reflective and non-reflective events

Maximum number of events: 100.

Threshold for non-reflective events:
0.0 (disabled) to 5.0 dB, selectable in 0.01 dB steps.

Threshold for reflective events:
-65.0 to -14.0 dB and 0.00 dB (disabled), selectable in 0.1 dB steps.

Threshold for fiber end:
0.0 (disabled) up to 20 dB. Storage

3.5" floppy disk drive: for high density, 1440 kByte floppy disks. MS-DOS format compatible. Reduced operating ranges during access of 5°C to 40°C, with 35% to 95% humidity at 40°C.

Built-in 1.4GByte hard disk drive:
more than 20,000 traces and related instrument settings.

Thermal printer (optional):
print whilst instrument continues to operate. Reduced operating ranges during access of 5°C to 40°C, with 35% to 85% humidity at 40°C.

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Trace format: Bellcore certified according to GR-196-CORE Issue 1 OTDR Data Standard.

Trace information:
five comment labels of up to 15 alpha-numeric characters and five comments of up to 41 alpha-numeric characters are provided for each trace.

Real-time clock and date:
provided.

Pulsewidth: selectable, from 10 ns to 10 μs (20 μs for the AgilentE4317A–AgilentE4319A, E4321A and E4324A).

Automatic setup and analysis:
provided.

Instrument settings:
storage and recall of user-selectable instrument settings.

Built-in analysis tools
Two-way averaging
Subtraction
Optical Returnloss
Compare mode
Macrorecorder

Display

VGA-LCD: 16 cm (6.3")
Color TFT and B/W.

Display points: 640 x 480 points.

Measurement update rate: 0.3 seconds/update in refresh mode.

Interfaces

RS232C: max. baud rate: 115200.
Centronics: parallel port (SPP).
VGA monitor: DSUB 15 pin.
Keyboard: PS/2 (Mini DIN).
Mouse: PS/2 (Mini DIN).
LAN (optional):
RJ-45 connector. Supports TCP/IP and Novell IPX protocols. For fast data transfer only.
GP-IB (options) capabilities:
all instrument parameters and modes can be programmed.

GP-IB interface function codes:
SH1, AH1, T5, L4, SR0, RL1, PP0, DT0, C0.
Note: there are two free slots which can be used for only two of the DC/LAN/GP-IB options.

General

Operating temperature:
0°C to +55°C.
Storage temperature:
-40°C to +70°C.
Humidity:
95% R.H. from 0°C to +40°C.
Note: reduced ranges when printer and/or floppy disk drive are installed.
Dimensions:
218 mm H, 371 mm W, 305 mm D.
(8.6" x 14.6" x 12.0").
Weight: net 9 kg (19.8 lbs), including laser module.Power
AC: 100–240 Vrms ± 10%
150 VAmax, 50–60 Hz.
DC (optional): 11–30 V.
Battery back-up:
typ. five years with instrument switched off at 20°C.

Ordering Information

Agilent E4310A OTDR Mainframe.

Options:
001 DC input, 11-30V.
002 Built-in thermal printer.
003 Color screen, VGA-LCD.
004 GP-IB interface.
005 LAN interface.
W30 3Yrs of Customer Return Repair Service
W50 5Yrs of Customer Return Repair Service
AB2 China - chinese localization.

Agilent E4311A
1310 nm 30dB SM laser module.

Agilent E4312A
1550 nm 30dB SM laser module.

Agilent E4313A
1310/1550 nm 30/30dB SM laser module.

Agilent E4314A 1310 nm 35dB SM laser module.

Agilent E4315A
1550 nm 34dB SM laser module.

Agilent E4316A
1310/1550 nm 35/34dB SM laser module.

Options:
022 Angled contact output connector.

Agilent E4317A
1310 nm 40dB SM laser module.

Agilent E4318A
1550 nm 39dB SM laser module.

Agilent E4319A
1310/1550 nm 40/39dB SM laser module.

Options:
022 Angled contact output connector.

Agilent E4321A
1625 nm 42dB SM laser module.

Agilent E4324A 1310/1550 nm 45/43dB SM laser module.

Options:
022 Angled contact output connector.

For all Agilent-OTDR modules the following support options are available:

W30 3Yrs of Customer Return Repair Service
W32 3Yrs of Customer Return Calibration Service
W50 5Yrs of Customer Return Repair Service
W52 5Yrs of Customer Return Calibration Service

All modules come with a commercial cal. certificate.

UK6 Commercial cal. certificate

Agilent E6090A
Agilent OTDR Toolkit (PC Analysis Software).

81000AI
Connector interface Diamond HMS-10.

81000FI
Connector interface FC/PC/SPC.

81000GI
Connector interface NEC D4.

81000HI
Connector interface E-2000.

81000KI
Connector interface SC.

81000NI
Connector interface FC/APC.

81000SI
Connector interface DIN 47256/4108.

81000VI
Connector interface ST.

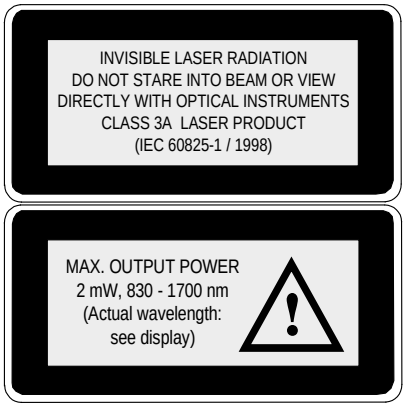
81000WI
Connector interface Biconic.

Accessories supplied:
Users guide,
OTDR's programming guide,
Power cord,
RS232C cable,
CD-ROM upgrade.
TraceViewer & PC Filetransfer Software.

Related Agilent literature:
Agilent E6000C Mini-OTDR
Agilent E6091A Toolkit II *plus*
p/n 5988-2238EN

Laser Safety Information

Internationally, all OTDRs specified by this data sheet are classified as Class 3A according to IEC 60825-1 (1998).



In the USA, the same OTDRs are classified as Class I according to 21 CFR 1040.10 (1995).

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Asia Pacific:
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(fax) (852) 2506 9284

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