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INSTRUMENTS 4 ENGINEERS

Test & Measurement Instruments

PRODUCT CATALOG



Tel: +44 (0) 161 871 7450
www.instruments4engineers.com



1972

-Company established.

1997

- Subsidiary Factory foundation in Qingdao, China.

2006

- 2.9GHz Handheld Spectrum Analyzer Development / Production.

1988

- IPO (Initial Public Offering) to KOSPI. (Korean Stock Market)

2005

- World First Mobile WiMAX 60W AMP Development.
- TL9000/ISO9001 Certification.



History

1989

Signed contract with Netherlands based Phillips for Oscilloscope OEM.
Developed Digital Storage Oscilloscope.

1986

Signed contract with Japanese AARON for developing and producing Oscilloscope.

1998

Developed voice over FLEX System.
Developed GSM LPA and Digital Satellite Receiver.
Developed and started producing CDMA Fiber Optic Repeater.

1997

Established China subsidiary factory.

2003

Developed and started producing LPA for CDMA 1X Base Station.

2001

Completed development of LPA for CDMA 1X Base Station.

2013

- 4GHz Cable and Antenna Analyzer Protek A434L Development.
- 4.4GHz Handheld Spectrum Analyzer Protek A734 Development.



2008~2011

- 3.2GHz Vector Network Analyzer Development / Production. (Protek A333)
- 8GHz Vector Network Analyzer Development / Production. (Protek A338)



2014~2015

- 4GHz VSWR Analyzer Protek A334M Development.
- 6GHz VSWR Analyzer Protek A336M Development.

2007

Completed development of Tracking Generator G632 for Protek 7830.

2006

Developed Handheld Spectrum Analyzer Protek 7830.
Completed development WiMAX 5W AMP for ZTE.
Developed DUO-LIF PAM.

2005

Developed WiBro 60W AMP first in the world.
Completed development AMP SF-C20, C60, W20 for SKT repeater.
Developed Nortel WiBro 35W AMP for ZTE.
Completed development WCDMA 10W AMP for ZTE.

2010

Received a certification of Excellent Quality Product by Korean Public Procurement Service. (PPS) (Protek A333)

2009

Obtained a certification of NEP (New Excellent Product) by Korea Agency for Technology and Standards. (Protek A333)

2008

Won Ministry of Knowledge Economy Korea Technology Award. (Protek A333)
Presented with Good Design Award.
Completed development WiMAX Femtocell, Small BTS, 4G technology for wireless telecommunication. (Protek A333)

2012

MiBOS(LTE Fiber Optic), SmartCell, Trio-M, Trio-MM, Trio-L(LTE RF Repeater) Development.

2011

8GHz Vector Network Analyzer Protek A338 Development / Production.



[RF Analyser]

Protek A338 4Ports — 8GHz Vector Network Analyzer

Protek A338 — 8GHz Vector Network Analyzer

Protek A333 — 3.2GHz Vector Network Analyzer

Protek A334M / A336M — 4GHz / 6GHz VSWR Analyzer

Protek A334S / A336S — 4GHz / 6GHz VSWR Analyzer Module

Protek A734 — 4.4GHz Handheld Spectrum Analyzer

Protek A434L — 4GHz Cable & Antenna Analyzer

8GHz

Vector Network Analyzer

Protek A338 4Ports

Protek A338 Vector Network Analyzer 4 port version has not only fully inherited great features such as fast sweep time, frequency offset, and time domain of Protek A333/A338 series but specialized in pursuing higher efficiency in the production lines of passive components and R&D laboratories by adding more ports. With a great demand on the smartphone production in the fast changing environments, Protek A338 4 port version provides best and affordable solutions for vendors.



Features

- Frequency Range : 300kHz ~ 8GHz, 16 Parameters Support (S11 ~ S44)
- Measurement Time Per Point : 100 μ s Per Point
- Wide Output Power Range : -60dBm to +10dBm
- Dynamic Range : >150dB (1Hz IF Bandwidth)
- Time Domain and Gating Conversion Included
- Two Independent Signal Sources
- Frequency Offset Mode, Including Vector Mixer Calibration Measurements
- Up to 16 Logical Channels with 16 Traces Each
- Multiple Precision Calibration Methods and Automatic Calibration
- Up to 500,001 Measurement Points
- Fixture Simulation
- COM/DCOM Compatible for LabView and Automation Programming

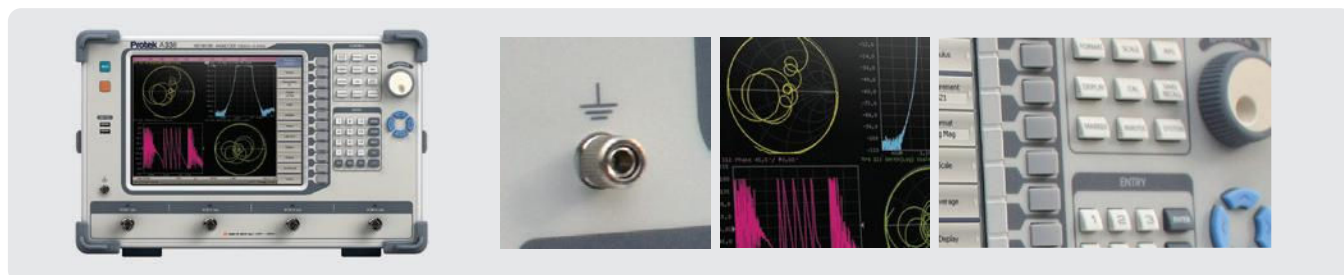


Accessory(Optional)
GK38T (8GHz Electronic Calibration Kit)



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Specifications



Description	Specification		
Frequency Range	300 kHz to 8 GHz		
Frequency Resolution	1 Hz		
CW Frequency Accuracy	±5x10 ⁻⁶		
Impedance	50 Ω		
Test Port Connectors	N-Type Female		
Number of Test Ports	4		
Number of Test Points User-Selectable	1 to 500,001		
Measurement Bandwidths	1 Hz to 30 kHz (with 1/1.5/2/3/5/7 steps)		
Measurement Time Per Test Point	100μs		
Harmonic Distortion	-25 dBc		
Non Harmonic Spurious	-30 dBc		
Output Power Level	300 kHz to 6 GHz	-60 dBm to +10 dBm	
	6 GHz to 8 GHz	-60 dBm to +5 dBm	
Output Power Level Accuracy	±1.5 dB		
Accuracy of Transmission Measurement(Magnitude/Phase) Specifications are based on a matched DUT, a Measurement Bandwidth of 10 Hz, and nominal source power of -10 dBm	+5 dB to +15 dB	0.2 dB	2°
	-50 dB to +5 dB	0.1 dB	1°
	-70 dB to -50 dB	0.2 dB	2°
	-90 dB to -70 dB	1.0 dB	6°
Accuracy of Reflection Measurement(Magnitude/Phase) Specifications are based on a matched DUT, a Measurement Bandwidth of 10Hz, and nominal source power of -10 dBm	-15 dB to 0 dB	0.4 dB	3°
	-25 dB to -15 dB	1.0 dB	6°
	-35 dB to -25 dB	3.0 dB	20°
Receiver Noise Floor (IF bandwidth 10 Hz)	-125 dBm		
Trace Noise (IF bandwidth 3 kHz)	0.001 dB rms		
Uncorrected Directivity	18 dB		
AC Mains Voltage	100 to 240 VAC 50/60Hz		
Power Consumption	80 W		
Dimensions L x W x H	320 x 439 x 238 mm		
Weight	11.7 kgs		

Operating Conditions

Description	Specification
Environmental Temperature	5 °C to 40 °C
Humidity at 25 °C	90%
Atmospheric Pressure	84 to 106.7 kPa



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8GHz Vector Network Analyzer

Protek A338

Protek A338 Vector Network Analyzer is one of a Protek network analyzer family line covering a wider frequency range up to 8.0GHz than 3.2GHz Protek A333 has. The convenience and reliability of Protek A338 are succeeded by Protek A333 and by the wider frequency range. The more applications can be used with Protek A338 in many industries.



Features

- Frequency Range : 300kHz ~ 8GHz
- 4 Built in S-parameters, Frequency Offset, Time Domain, Bias T
- Wide Output Power Level
- 10.4" TFT Color LCD (Touch Screen)
- USB(2)/LAN/Print/Video/Keyboard/Mouse
- GPIB(Optional)
- Windows XP

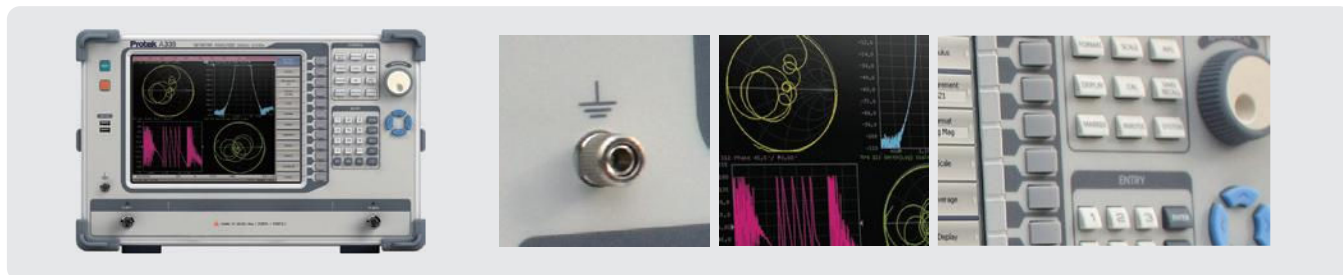


Accessory(Optional)
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Specifications



Description	Specification		
Frequency Range	300 kHz to 8 GHz		
Frequency Resolution	1 Hz		
CW Frequency Accuracy	$\pm 5 \times 10^{-6}$		
Impedance	50 Ω		
Test Port Connectors	N-Type Female		
Number of Test Ports	2		
Number of Test Points User-Selectable	1 to 500,001		
Measurement Bandwidths	1 Hz to 30 kHz (with 1/1.5/2/3/5/7 steps)		
Measurement Time Per Test Point	100 μ s		
Harmonic Distortion	-25 dBc		
Non Harmonic Spurious	-30 dBc		
Output Power Level	300 kHz to 6 GHz	-60 dBm to +10 dBm	
	6 GHz to 8 GHz	-60 dBm to +5 dBm	
Output Power Level Accuracy	± 1.5 dB		
Accuracy of Transmission Measurement(Magnitude/Phase)Specifications are based on a matched DUT, a Measurement Bandwidth of 10 Hz, and nominal source power of -10 dBm	+5 dB to +15 dB	0.2 dB	2°
	-50 dB to +5 dB	0.1 dB	1°
	-70 dB to -50 dB	0.2 dB	2°
	-90 dB to -70 dB	1.0 dB	6°
Accuracy of Reflection Measurement(Magnitude/Phase)Specifications are based on a matched DUT, a Measurement Bandwidth of 10Hz, and nominal source power of -10 dBm	-15 dB to 0 dB	0.4 dB	3°
	-25 dB to -15 dB	1.0 dB	6°
	-35 dB to -25 dB	3.0 dB	20°
Receiver Noise Floor (IF bandwidth 10 Hz)	-125 dBm		
Trace Noise (IF bandwidth 3 kHz)	0.001 dB rms		
Uncorrected Directivity	18 dB		
AC Mains Voltage	100 to 240 VAC 50/60Hz		
Power Consumption	60 W		
Dimensions L x W x H	320 x 439 x 280 mm		
Weight	10.65 kgs		

Operating Conditions

Description	Specification
Environmental Temperature	5 °C to 40 °C
Humidity at 25 °C	90%
Atmospheric Pressure	84 to 106.7 kPa



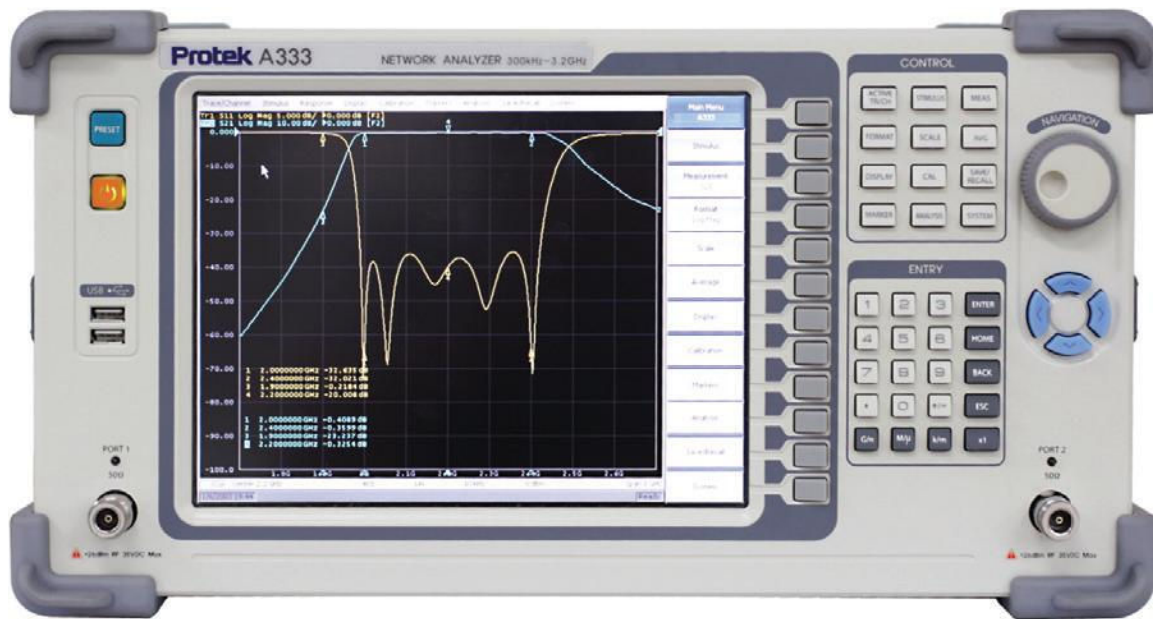
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3.2GHz Vector Network Analyzer

Protek A333



Protek A333 Vector Network Analyzer has been designed for providing user convenience with fast measurement, wide dynamic range, and built-in options such as touch screen, time domain, and frequency offset. In addition, the comparable accuracy and stability enhance the balance of value in A333/A338 for multi-purpose applications from production lines, and R&D laboratories.



Features

- Frequency Range : 300kHz ~ 3.2GHz
- 4 Built in S-parameters, Time Domain, Frequency Offset
- Wide Output Power Level
- 10.4" TFT Color LCD (Touch Screen)
- USB(2)/LAN/Print/Video/Keyboard/Mouse
- GPIB(Optional)
- Windows XP

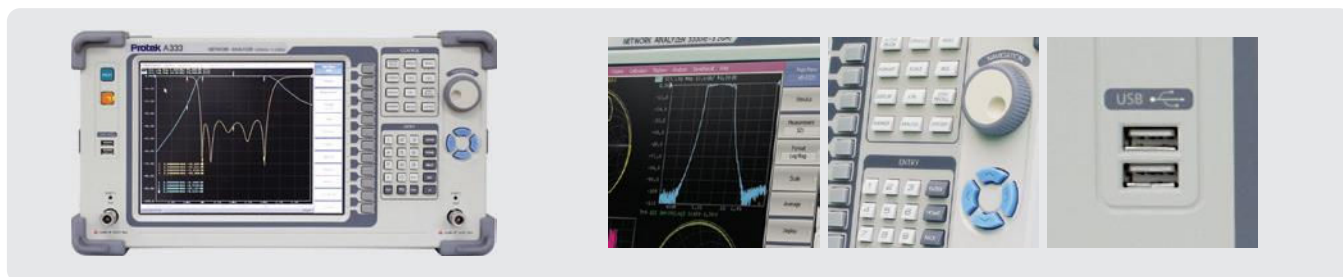


Accessory(Optional)
GK36T (6GHz Electronic Calibration Kit)

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Specifications



Description	Specification		
Frequency Range	300 kHz to 3.2 GHz		
Frequency Resolution	1 Hz		
CW Frequency Accuracy	$\pm 5 \times 10^{-6}$		
Impedance	50 Ω		
Test Port Connectors	N-Type Female		
Number of Test Ports	2		
Number of Test Points User-Selectable	1 to 200,001		
Measurement Time Per Test Point	125 μ s		
Harmonic Distortion	-30 dBc		
Non Harmonic Spurious	-30 dBc		
Output Power Level	-55 dBm to +10 dBm		
Output Power Level Accuracy	± 1.0 dB		
Accuracy of Transmission Measurement(Magnitude/Phase) Specifications are based on a matched DUT, a Measurement Bandwidth of 10 Hz, and nominal source power of -10 dBm	+5 dB to +15 dB	0.2 dB	2°
	-50 dB to +5 dB	0.1 dB	1°
	-70 dB to -50 dB	0.2 dB	2°
	-90 dB to -70 dB	1.0 dB	6°
Accuracy of Reflection Measurement(Magnitude/Phase) Specifications are based on a matched DUT, a Measurement Bandwidth of 10Hz, and nominal source power of -10 dBm	-15 dB to 0 dB	0.4 dB	3°
	-25 dB to -15 dB	1.0 dB	6°
	-35 dB to -25 dB	3.0 dB	20°
Receiver Noise Floor (IF bandwidth 10 Hz)	-120 dBm		
Trace Noise (IF bandwidth 3 kHz)	0.001 dB rms		
Uncorrected Directivity	25 dB		
AC Mains Voltage	100 to 240 VAC 50/60Hz		
Power Consumption	50 W		
Dimensions L x W x H	320 x 439 x 238 mm		
Weight	10.05 kgs		

Operating Conditions

Description	Specification
Environmental Temperature	5 °C to 40 °C
Humidity at 25 °C	90%
Atmospheric Pressure	84 to 106.7 kPa

4GHz / 6GHz VSWR Analyzer

Protek A334M / A336M

Protek A334M/A336M are designed to fulfill the high demands for multipath antenna measurement system. They are optimized to measure VSWR only, and will lead to low material cost of your system. Users can select the option between 4GHz and 6GHz measurement ranges. In the condition that users need to maximize the production efficiency, these VSWR Analyzers will be the best choice.

**Features**

- Frequency Range : 5MHz ~ 4GHz / 6MHz ~ 6GHz
- VSWR Measurement
- Return Loss (Only for A336M)
- 6 Ports (User selectable)
- Impedance : 50 Ω
- Maximum Number Of Points : 2001

Specifications

Description	Specification	
	Protek A334M	Protek A336M(CPU Mounted)
Application	VSWR	VSWR, Return Loss
Max. Input Power	+25dBm Damage level	+25dBm Damage level
Frequency Range	5MHz ~ 4GHz	6MHz ~ 6GHz
Frequency Accuracy	$< \pm 3\text{ppm}$	$< \pm 3\text{ppm}$
Freq. Resolution	10kHz	10kHz
Impedance	50 Ω	50 Ω
Scan Speed	$< 1\text{ ms /data point}$	540 μs /data point
Number of points	126,251,501,1001,2001	251,501,1001,2001
Test Port	6	6
Size	470 x 178 x 324 (mm)	469 x 139 x 362mm
Operating Temp.	0°C ~ +50°C	0°C ~ +50°C
Storage Temp.	-40°C ~ +80°C	-40°C ~ +80°C

4GHz / 6GHz VSWR Analyzer Module

Protek A334S / A336S

Affordable key RF module for VSWR (S11) measurement, which can lead to low material costs of your system.

Small and light fitted module in your system for VSWR (S11) measurement

Multiple choice (A334S/A336S) available based on the frequency range you need.

Features

- 4GHz / 6GHz Frequency Range
- VSWR Measurement
- Return Loss (Only for A336S)
- Impedance : 50 Ω
- Maximum Number Of Points : 2001

**Specifications**

Description	Specification	
	Protek A334S	Protek A336S
Max. Input Power	+25dBm Damage level	+25dBm Damage level
Frequency Range	5MHz ~ 4GHz	6MHz ~ 6GHz
Frequency Accuracy	$< \pm 3\text{ppm}$	$< \pm 3\text{ppm}$
Frequency Resolution	10kHz	10kHz
Impedance	50 Ω	50 Ω
Scan Speed	$< 1\text{ms}$ / data point	540 μs / data point
Test Port	N Female	N Female
Number Of Data Points	126,251,501,1001,2001	251,501,1001,2001
VSWR Range	1~65	1~65
Return Loss Range	0 ~ 60dB	0 ~ 60dB
On-Frequency	+10dBm	+10dBm
On-Channel	+20dBm	+20dBm
Dimension	290.5 x 130 x 51mm	141 x 104 x 39mm
Weight	$< 2\text{kg}$	730g



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4.4GHz

Handheld Spectrum Analyzer

Protek A734

Protek A734 is primarily used to measure the power of the spectrum of known and unknown signals. Protek A734 has been optimized for the convenience of mobility with lightweight, 5.7inch sunlight readable LCD, long battery life(8 hours). Comparable DANL(Displayed Average Noise Level) enables users to detect more accurately low level of signals and additional features such as phase noise measurement, audio listen, and zero span options, will lead users to take advantage of Protek A734 in more field applications than other spectrum analyzers.



Model	Frequency Range	Frequency Accuracy	Max. Input Power	Minimum Span
Protek A734	100kHz ~ 4.4GHz	$\leq \pm 1\text{ppm}$	+20dBm	600Hz

Features

- Frequency Range (100kHz ~ 4.4GHz)
- Zero Span Function
- Minimum Span : 600Hz
- 8 hours operation
- 5.7" TFT Sun-light Readable Screen
- USB, LAN Connectivity



Accessory(Optional)
S134 (Terminating Power Sensor)



Accessory(Optional)
C122R5 (Battery Charger)



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Specifications

Description		Specification		
Frequency	Range	100 kHz to 4.4GHz		
	Span Mode	Center Freq + Span or Start Freq + Stop Freq ,ZERO Span		
	Span	ZERO SPAN, 600 Hz~ 4.4GHz		
	Minimum Span	600 Hz		
	Internal Frequency Reference Accuracy	±1PPM		
	RBW	0.1Hz to 250kHz & 5MHz(0.1, 0.2, 0.4 ,0.8, 1.6, 3.2, 6.5, 13, 25, 50, 100~)		
Amplitude	Measurement Range	DANL ~ 1dB Gain Compression		
		1dB Gain Compression (attenuator 15dB, preamp off)		
		+16dBm Typical, 1Hz to 150MHz		
		+19dBm Typical, 150MHz to 4.4GHz		
	DANL	Displayed Average Noise Level : 0dB ATT, 1Hz RBW		
		FREQ	Preamp ON	Preamp OFF
		10Hz	-124dBm	NA
		100Hz to 10kHz	-130dBm	NA
		10kHz to 500kHz	-142dBm	NA
		500kHz to 10MHz	-142dBm	-153dBm
		10MHz to 100MHz	-148dBm	-161dBm
		100MHz to 1GHz	-144dBm	-158dBm
		1GHz to 2.6GHz	-139dBm	-151dBm
		2.6GHz to 3.3GHz	-135dBm	-151dBm
		3.3GHz to 4.4GHz	-128dBm	-134dBm
	Amplitude Unit	dBm, dBmV, Watt, V		
	Maximum Safe Input Level (preamp off, 15dB Att)	+20dBm		
	DC Volt	±0.2V max		
Sweep	Zero Span Sweep Time	10 ms to 2 sec (±0.1%) All other sweep times are estimates reported after sweep completes		
	Sweep Trigger	freerun, single, external		
Display	TRACE	3 Trace		
	DETECTOR	min, max, sample , avg (power , voltage , log)		
	Marker	5 Marker		
	Marker Function	peak, next peak, center=marker frequency		
	Audio Demodulation	AM & FM		
	Type	5.7" Color TFT-LCD		
	Display Resolution	640*480 pixels		
Input	Feature	Sun-Light Readable		
	RF Connector	RF Signal IN, N type Female 50 Ohm		
	BNC External Time base	10MHz in, BNC type Female		
Dimension		160(W) x 263(H) x 61(D) mm		
Weight		1.75 kg		
BNC Share		Self test, Sync out, Sweep Trigger IN, BNC type Female		

4GHz Cable & Antenna Analyzer

Protek A434L

Protek A434L is a new antenna analyzer cable analyzer designed for use in the field offering the four measurement capabilities such as VSWR, Cable Loss, DTF(Distance to Fault) and power meter with convenient short-cut buttons.

Protek A434L has been lighter with long battery life. The lightweight and simple operation make Protek A434L indispensable to technicians who need an sufficient measuring instrument outdoors for the installation and maintenance of antenna systems.



Model	Frequency Range	Frequency Accuracy	Max. Input Power	Frequency Resolution
Protek A434L	5MHz ~ 4GHz	$\leq \pm 3\text{ppm}$	+25dBm	10kHz

Features

- VSWR, DTF, Cable Loss, Power Meter Functions
- Frequency Range : 5MHz ~ 4GHz
- Number of Data Points : Up to 2001
- Accuracy : $\leq \pm 3\text{ppm}$
- Single & Dual Mode Display
- Smart Battery Indicator
- 7" TFT Sun-light Readable Screen
- USB, LAN Connectivity



Accessory(Option)
D134 (Directional Power Sensor)



Accessory(Option)
S134 (Terminating Power Sensor)



Accessory(Option)
C122R5 (Battery Charger)



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Specifications

Description		Specification
General	Max. Input Power	+25dBm Damage level
	Frequency Range	5MHz ~ 4GHz
	Frequency Accuracy	< ± 3 ppm
	Frequency Resolution	10kHz
	Impedance	50 Ω
	Scan Speed	< 1msec /data point
	Display	Single & Dual mode
	Test Port	N Type Female
	Test Curve Storage	Internal : Minimum 512MB External : Limited by size of USB (32G)
	Screen Storage	
	Setup Storage	
VSWR	Number of Data Points	126, 251, 501, 1001, 2001
	Return Loss Range	0 ~ -60 dB
	VSWR Range	1 ~ 65
Cable Loss	Cable Loss Range	0 ~ -30dB, 0.01dB Resolution
Interference Immunity	On-Frequency	+ 10dBm
	On-Channel	+ 20dBm
DTF	Return Loss Display Range	0 ~ 60dB
	Distance Range	0 ~ 1250m (4125ft)
	VSWR Display Range	0 ~ 65
Miscellaneous	Dimension	260X193X67mm
	Weight	< 2.45kg include battery
	Battery	4hr operating time after full charging
Power Meter(Optional)	Frequency Range	20MHz ~ 3.8GHz
	Sensor Type	Average
	Peak Power Sensor	-40dBm to +10dBm
	Accuracy	$\pm 7\%$
	Test Port	N Type Female



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