

# Agilent N9330B Handheld Cable and Antenna Tester

25 MHz - 4.0 GHz  
Technical Overview



**Your perfect solution  
for testing cables and  
antennas in today's  
communication networks**



**Agilent Technologies**

# Ensure the reliability of your cable and antenna system



**Easy to use and convenient to carry to any site.**

Today, the increasing range of wireless applications provides end users on the move with faster and more diverse services.

Broadband mobile data and telephony are now becoming ubiquitous, with coverage in most urban and many rural areas.

The number of base stations (BTS) needing fast, efficient installation continues to grow. Moreover, the vast numbers of existing installed base stations need periodic maintenance and, from time to time, trouble shooting and repair.

## N9330B Applications

- **Wireless service providers: base station cable & antenna system I&M**
- **Aerospace and defense: radio and radar cable & antenna system I&M**
- **Broadcasting and radio links: cable & antenna system I&M**
- **Utilities, emergency and security services**
- **Contractors for all the above**

Whether you do your own maintenance test or rely on third-party contractors, you need well-maintained antenna networks and cables to ensure:

- Better voice and data quality
- Fewer dropped calls
- Less dropped links

An efficient and effective cable and antenna tester is an essential basic test tool for network engineers and technicians for wireless network installation and maintenance.

- New site installation and deployment
- Routine maintenance
- Trouble shooting

Verify performance and trouble-shoot base station cable and antenna systems: test wide band or narrow band from 25MHz to 4GHz:

### Key measurements

#### Frequency domain

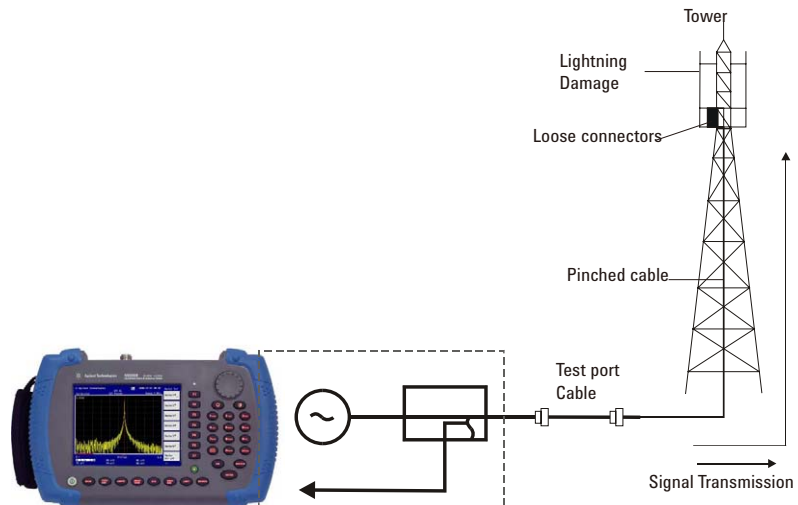
- Return loss vs. Frequency
- VSWR vs. Frequency
- Cable loss test

#### Distance to fault (DTF)

- Return loss vs. Distance
- VSWR vs. Distance
- Fault location

#### High accuracy power measurement

- Support Agilent U2000 series USB power sensor



## Early identification of potential problems

Deteriorating cable and antenna conditions, such as a loose or corroded connector, a pinched or restricted cable, or damaged lightning arrestors cause measurable RF impedance changes. Slight changes in VSWR, power loss and antenna bandwidth drift are early indications of system deterioration.

## Early identification of potential problems

Distance-To-Fault testing uses frequency domain reflectometry (FDR) techniques that readily detects and locates these slight changes in RF impedance. With routine DTF testing as part of a preventative maintenance plan, you can find and fix these problems before the system fails and repairs become costly.

Agilent's N9330B provides fast startup time, so technicians are ready to test in seconds.

It's small size and light weight make it easy to handle and it stands up to rough field use and all weather conditions.

Fast measurement speed means your technicians can evaluate one of the trouble spots in a matter of minutes.

N9330B speeds up installation of cables and antennas at new site, too.

Whatever your tasks, speed is important, with N9330B you can test more sites per day.

And USB data storage lets you save all of the results for post-test analysis.

You will find the Agilent N9330B tester useful and reliable, in rugged field environments for rapid installation of a new cellular network infrastructure, 2-way radio communication system or any type of communication system.

## High accuracy power measurement (option PWM) New

The N9330B now supports high-accuracy, USB plug-and-play power measurements when connected to an Agilent U2000 series USB power sensor. Make true average power measurements for all signal types with wide dynamic range up to 18 GHz with just the push of a button. The Agilent U2000 USB sensors require no external power supplies and with internal zeroing eliminate the need for external

calibration. Without the need for additional boxes, the user can easily set up, calibrate and control the power meter/sensor via the analyzer's USB port.

The N9330B can collect, display and save the power meter results. The analyzer also provides Pass/Fail testing with user set upper and lower limits and a Pass/Fail indicator. Test results are shown in dBm and W when making absolute measurements and in dB and percentage when measurements are relative. Two display modes are available: Meter or the Chart mode to log power measurements over time.



The N9330B supports U2000 series USB power sensor for high accuracy power measurement



Meter mode



## Easier operation

### N9330B optimized usability:

- Long battery life
- Modern USB connectivity
- Sunlight-viewable LCD
- Multi-language UI
- Rugged design for field use

### A fast job, well done

A busy technician needs fast tester setup, quick calibration, and a straightforward, repeatable test procedure.

Agilent N9330B gives you:

- Fast startup time
- Auto calibration
- Test set-up recall
- USB memory stick support
- USB connectivity for PC software
- More direct-access hard keys
- Rapid cursor control and marker movement using scroll knob
- Easy data storage
- Customized, unmistakably named data files and auto-sequential file naming
- Comprehensive results saved in a easy-to-use format
- Auto pass/fail test comparisons

The Agilent N9330B is easy to use, so it minimizes the need for training. Technicians will get up to speed fast - and get their work done quickly.



Well organized front-panel with more hard buttons and function keys for faster access to essential test functions.

The optimum combination of hardkeys and softkeys provides an intuitive interface for all measurements.

The most-used functions are conveniently selectable, via large, front-panel keys.

The front-panel knob provides a simple scroll function, allowing rapid cursor movement to access data points across scan displays, or data entries.

### Powerful functions:

- Smart and fast electronic calibrator
- Powerful post analysis PC software

### Smart, fast calibration

At the start of any new test setup, a three-step calibration is necessary, using an open, a short, and a calibrated test load.

The most accurate calibration method is to use mechanical calibration standards, an optional special 'T-combo' open/short/load, makes it easy for use in the field.



*'T-combo'*  
open/short/50 ohm load



*N9330B-203*  
Electronic calibrator

For fast and automatic calibration, you can choose the N9330B-203 electronic calibrator. Simply connect the electronic calibrator and press a key to run the electronic calibration.

### Use sensible archive file names related to each site tested

The N9330B lets you choose meaningful names for your stored data: names that you customize and relate to your site.

You no longer have to tolerate anonymous file names with no linkage to your site. It is easy to recognise and recall archived data files without the need for cross-referencing.

And you can use sequential file names as you store successive files.

### Powerful PC based post analysis software

Effective cable and antenna testing is more than just the measurements.



Fast export of data via USB interface

Agilent provides a powerful PC based post-analysis tool. This software tool, standard with every Agilent N9330B, provides trace analysis, trace comparison, customized reports and data file management.

The USB connection makes it fast and easy to transfer the measurement data to the PC for analysis.

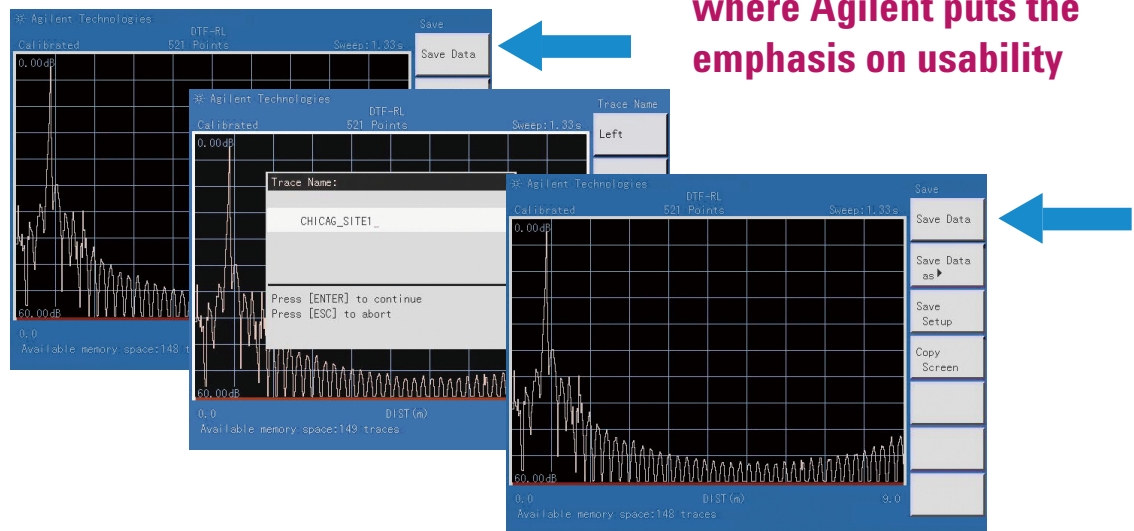
### Store data and setup configuration

When you take the tester out into the field, and have a large number of sites and installations to check, you need sufficient storage capacity for previous, historic data. The internal memory stores up to 200 traces, and you can save screen images.

For fast instrument set up, you can store up to 15 stored configurations in the internal memory.

If you need even more, simply use a USB memory stick for external storage of configurations, traces and screen images.

## Take a closer look and see where Agilent puts the emphasis on usability



Pressing the front panel "Save" function key displays the soft key, "Save DATA as". This then allows you to enter an appropriate file name.

Subsequently, press the "Save DATA" soft key, each new file name automatically increments, as in example: CHICAG\_SITE2, CHICAG\_SITE3,...



# Agilent Technologies

## N9330B Handheld Cable and Antenna Tester

Test port, with connector protection cap



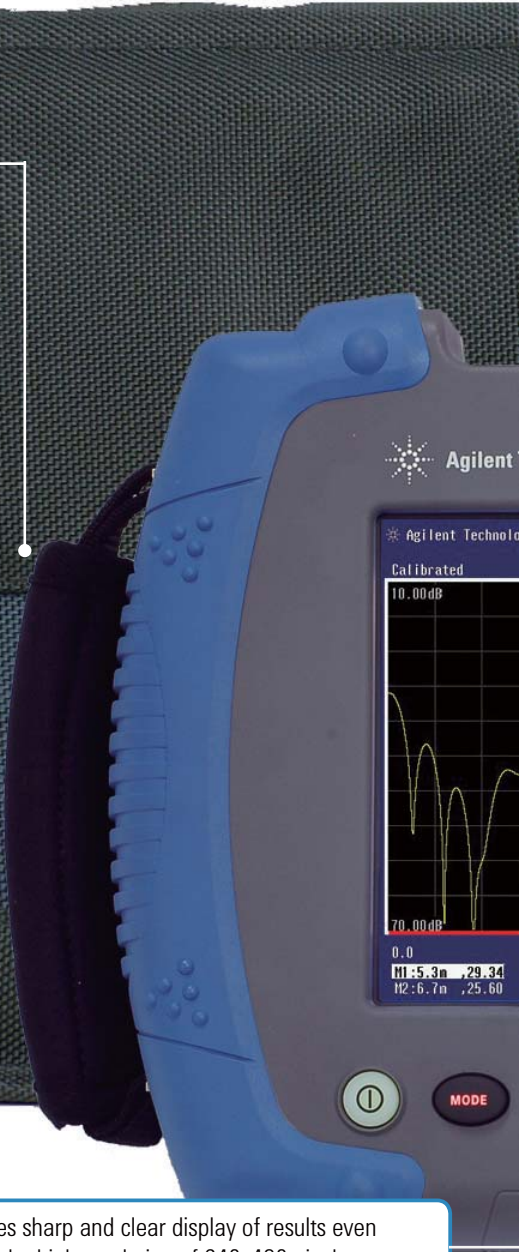
Robust, comfortable, quick-grab hand strap



The protective soft carrying case with its ergonomic design provides further protection for the Agilent N9330B.



The 6.5" transfective LCD gives sharp and clear display of results even working in direct sunlight with the high resolution of 640x480 pixels.



# Agilent Technologies N9330B Handheld Cable and Antenna Tester





## Agilent reliable field use

Testing in the field means working in remote locations and out in the open: sometimes carrying test equipment up towers, or possibly working in small, cramped buildings with no direct access to AC power on site.

You may have to test:

- under temperature extremes
- in bright sunlight or in the dark
- in poor weather conditions

None of these is the best operating environment for precision electronic test equipment.

Agilent designed the N9330B cable and antenna tester for all weather conditions.

### See traces clearly indoors and outdoors New

As with all the newest Agilent portable field equipment, operating under challenging bright sunlight or other difficult natural lighting conditions is not a problem. The bright new 6.5" TFT display with resolution of 640 x 480 pixels provides a superior, bright and clear trace for indoor and outdoor use.

### Back-lit keys for night use New

The new back-lit keys in the N9330B make it easy to see the keys clearly, even in the dark. The user can adjust the brightness of the keys and the duration of the key light, making it easy to use in light or dark, day or night.



Outstanding display technology provides superior performance under the most demanding lighting conditions

### Carry-case options provide safe, comfortable transport

The soft carrying case provides added protection. A convenient shoulder strap leaves hands free for carrying other tools and equipment, or for safe climbing of access towers and gangways.



For further protection of the tester when storing or transporting it in more harsh environments, an optional hard transit case is available.

The tester itself has a strong hand strap for a sure grip when carried without the case.



## **Low-cost, with Agilent worldwide support**

### **Superior battery performance**

Based on customer inputs, Agilent understands that good battery life is essential for remote, on-site testing.

There is often no convenient conventional AC power line connection available at remote BTS or antenna sites.

Agilent N9330B incorporates advanced battery pack technology with intelligent charging technology, to provide you with up to four hours of continuous use.

To maximise useful instrument test time when on site, each tester incorporates smart power management to help conserve battery power.

The long-life lithium-ion batteries in the N9330B have no 'memory', which is an important improvement over earlier battery types.

When extended operation is necessary, you simply switch batteries which only takes seconds.

Earlier battery technology used in some portable testers allowed only limited tester operating time before needing recharging.

### **Worldwide service support**

Of course, when you buy an Agilent tester, you are confident that should you need it you have the best worldwide support.



The Agilent N9330B Cable and Antenna Tester - The newest in Agilent's lineup of low cost handheld instruments.

## N9330B Handheld Cable and Antenna Tester Specifications

<b>Test functions</b>		Return loss SWR Cable loss Distance-to-fault(DTF)
<b>Frequency Range</b>		25 MHz to 4.0 GHz
<b>Frequency Resolution:</b>		100 KHz
<b>Output Power:</b>		0~-20 dBm
<b>Measurement Speed:</b>		<2 second / screen (full span,521 data point ) (CW sweep mode)(3.0 ms/data point,typically)
<b>Number of Data Points:</b>		(maximun): 521(selectable 521,261,131)
<b>Return Loss:</b>	<b>Range:</b> <b>Accuracy:</b> <b>D:</b> <b>RL:</b> <b>Resolution:</b>	0.00 to 60.00dB $A=20 \times \log_{10}(1.1 + 10^{(-D-RL)/20}) + 0.016 \times 10^{(-RL/20)} + 10^{(-3+RL/20)}$ directivity of calibrator return loss value of DUT 0.01 dB
<b>SWR:</b>	<b>Range:</b> <b>Accuracy:</b> <b>Resolution:</b>	1.00 to 65.00 same as RL 0.01
<b>Cable Loss:</b>	<b>Range:</b> <b>Resolution:</b>	0.00 to 30.00 dB 0.01 dB
<b>Measurement Accuracy:</b>		> 42 dB corrected directivity after mechanical calibration > 38 dB corrected directivity after electronic calibration
<b>Distance-to-Fault:</b>	<b>Vertical Range:</b>	Return Loss: 0.00 to 60.00 dB SWR 1.00 to 65.00
<b>Range:</b>		(Number of data points - 1) x Resolution Number of data points=521,261, or 131
<b>Resolution:</b>		Resolution (meter)=( $1.5 \times 10^8$ )x (Vp)/(f2-f1)Hz Where Vp is the cable's relative propagation velocity. where f2 is the stop frequency and f1 is start frequency.
<b>Markers:</b>		6
<b>User storage:</b>	<b>Internal user flash memory:</b> <b>Instrument setup storage:</b> <b>Trace data storage:</b> <b>Screen images storage:</b>	up to 15 up to 200 traces 10 screens Support USB memory stick for instrument setup, trace data and screen image storage
<b>General</b>	<b>Display:</b>	6.5" 640x480 transfective color LCD with adjustable backlight

**Input and output ports:**

<b>RF Test Port:</b>	Type N, female, 50Ω
<b>Maximum Input without Damage:</b>	+25 dBm, ±50 VDC
<b>USB master:</b>	1 x A plug v1.1 protocol
<b>USB slave:</b>	1 x B plug v1.1 protocol

**Electromagnetic Compatibility:**

<b>IEC 61326-1:1997+A1:</b>	1998/EN 61326-1:1997+A1:1998
<b>CISPR 11:1990/EN 55011:</b>	1991 Group 1 Class A
<b>IEC 61000-4-2:1995+A1:</b>	1998/EN 61000-4-2:1995(ESD 4kV CD, 8kV AD)
<b>IEC 61000-4-3:</b>	1995/EN 61000-4-3:1995(3V/m, 80% AM)
<b>IEC 61000-4-4:</b>	1995/EN 61000-4-4:1995(EFT 0.5kV line-line, 1kV line-earth)
<b>IEC 61000-4-5:</b>	1995/EN 61000-4-5:1995(Surge 0.5kV line-line, 1kV line-earth)
<b>IEC 61000-4-6:</b>	1996/EN 61000-4-6:1996(0.15~80 MHz, 80% AM, power line)
<b>IEC 61000-4-11:</b>	1994/EN 61000-4-11:1994(Dips 1 cycle, 100%)
<b>Canada:</b>	ICES-001:1998
<b>Australia/New Zealand:</b>	AS/NZS 2064.1

**Safety:**

<b>IEC 61010-1:</b>	2001/EN61010-1:2001, CSA C22.2 No.61010-1:2004, UL61010-1:2004
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**Temperature:**

<b>Operating temperature range:</b>	-10°C to +50 °C (using battery) 0°C to +40 °C (using AC-DC adapter)
<b>Battery charging temperature range:</b>	0°C to +50 °C
<b>Storage temperature range:</b>	-40°C to +70 °C
<b>Battery storage temperature range:</b>	-20°C to +70 °C

**Environmental:**

According to Agilent Environmental Test Manual class OE, except Temperature

**Power Supply****External DC Input:**

+11 to +25 volt dc, 40W min.

**Internal battery:**

Rechargeable Lithium-ion battery. 4 hours operating time

**Dimensions:**

<b>Size(w x h x d):</b>	317mm x 207 mm x 69 mm (12.5 in x 8.1 in x 2.7 in)
<b>Weight:</b>	Net weight: 2.6 kg (5.73 lbs) Weight with battery: 2.9 kg (6.39 lbs)



# Ordering Information

Model	Description	Number	Connectors
N9330B	25 MHz to 4 GHz Handheld Cable and Antenna Tester		
	Accessories supplied as standard with the tester:		
	<ul style="list-style-type: none"><li>• Soft carrying case</li><li>• Rechargeable battery</li><li>• AC-DC adaptor with power cord</li><li>• USB cable</li><li>• Quick-start Tutorial</li><li>• Documentation CD (also includes measurement analysis PC software)</li></ul>		
Options			
201	Precision mechanical short/open/50 ohm load, DC to 4 GHz		N-type (male)
202	Precision mechanical short/open/50 ohm load, DC to 4 GHz		7/16 DIN (male)
203	Electronic calibrator		N-type (male)
301	Phase-stable extension cable 1.5 m		Type-N (male) to type-N (female)
302	Phase-stable extension cable 1.5 m		Type-N (male) to 7/16 DIN (female)
303	Connector adaptor		Type-N (male) to 7/16 DIN (female)
BAT	Spare battery pack		
BCG	External battery charger		
1DN	Automotive 12V DC charger		
1TC	Hard transit case		
ADP	Spare AC-DC adaptor		
ABA	Hard copy English User Guide		
AB2	Hard copy Chinese User Guide		
PWM	Power monitoring (USB power sensor not included)		
Warranty and service			
	Standard warranty is one year.		
R-51B-001-3C	1-year return-to-Agilent warranty extended to 3-years		
Calibration			
R-51B-001-3	Agilent calibration upfromt support plan, 3-year coverage		



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© Agilent Technologies, Inc. 2013  
 Published in USA, January 15, 2013  
 5989-8567EN



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