Agilent N9330B
Handheld Cable and Antenna Tester

25 MHz to 4.0 GHz
Technical Overview

Your perfect solution for testing cables and antennas in today’s communication networks
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.

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 25 MHz to 4 GHz.

Easy to use and convenient to carry to any site
Ensure the Reliability of Your Cable and Antenna System (continued)

N9330B applications:

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

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.

Distance-To-Fault testing uses frequency domain reflectrometry (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.
Ensure the Reliability of Your Cable and Antenna System (continued)

High accuracy power measurement (option PWM)

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.
Easier Operation

**Powerful functions:**
- Smart and fast electronic calibrator
- Powerful post analysis PC software

**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 an 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.

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.
Easier Operation (continued)

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.

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.

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.
Easier Operation (continued)

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.

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,...
1. Test port, with connector protection cap.
2. Modern USB connectivity for both remote control and memory stick. Support high accuracy power measurement with Agilent U2000 USB power sensor.
3. Rapid marker positioning to measurement points using the fast-scroll rotary control.
4. The protective soft carrying case with its ergonomic design provides further protection for the Agilent N9330B.
5. Robust, comfortable, quick-grab hand strap.
6. The 6.5" transflective LCD gives sharp and clear display of results even working in direct sunlight with the high resolution of 640 x 480 pixels.
7. Easy access to most common tests and settings using keypad.
8. Easy results comparison fast recall of stored data.
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.

See traces clearly indoors and outdoors

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

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.

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 maximize 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.
# N9330B Handheld Cable and Antenna Tester Specifications

## Test functions
- Return loss
- SWR
- Cable loss
- Distance-to-fault (DTF)

## Frequency range
- 25 MHz to 4.0 GHz

## Frequency resolution
- 100 KHz

## Output power
- 0 to –20 dBm

## Measurement speed
- < 2 second/screen (full span, 521 data point) (CW sweep mode) (3.0 ms/data point, typically)

## Number of data points
- (Maximum): 521 (Selectable 521, 261, 131)

## Return loss
- **Range**: 0.00 to 60.00 dB
- **Accuracy**: $A = 20 \times \log_{10} \left(1.1 + 10^{-(D-RL)/20} \times 0.016 \times 10^{(-3+RL/20)}\right)$
- **D**: Directivity of calibrator
- **RL**: Return loss value of DUT
- **Resolution**: 0.01 dB

## SWR
- **Range**: 1.00 to 65.00
- **Accuracy**: Same as RL
- **Resolution**: 0.01

## Cable loss
- **Range**: 0.00 to 30.00 dB
- **Resolution**: 0.01 dB

## Measurement accuracy
- > 42 dB corrected directivity after mechanical calibration
- > 38 dB corrected directivity after electronic calibration

## Distance-to-fault
- **Vertical range**
  - Return loss: 0.00 to 60.00 dB
  - SWR 1.00 to 65.00
- **Range**: Number of data points - 1) x resolution
  - Number of data points = 521, 261, or 131
- **Resolution**: Resolution (meter) = $(1.5 \times 10^8) \times (Vp)/(f_2-f_1)$ Hz
  - Where $Vp$ is the cable’s relative propagation velocity
  - Where $f_2$ is the stop frequency and $f_1$ is start frequency

## Markers
- 6

## User storage: Internal user flash memory
- Instrument setup storage: Up to 15
- Trace data storage: Up to 200 traces
- Screen images storage: 10 screens

## General
- Support USB memory stick for instrument setup, trace data and screen image storage
- Display: 6.5” 640 x 480 transflective color LCD with adjustable backlight
### Input and output ports

<table>
<thead>
<tr>
<th>Port</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF test port</td>
<td>Type N, female, 50 Ω</td>
</tr>
<tr>
<td>Maximum input without damage</td>
<td>+25 dBm, ± 50 VDC</td>
</tr>
<tr>
<td>USB master</td>
<td>1 x A plug v1.1 protocol</td>
</tr>
<tr>
<td>USB slave</td>
<td>1 x B plug v1.1 protocol</td>
</tr>
</tbody>
</table>

### Electromagnetic compatibility

- CISPR 11:1990/EN 55011 1991 Group 1 Class A
- IEC 61000-4-3 1995/EN 61000-4-3:1995 (3 V/m, 80% AM)
- IEC 61000-4-4 1995/EN 61000-4-4:1995 (EFT 0.5 kV line-line, 1 kV line-earth)
- IEC 61000-4-5 1995/EN 61000-4-5:1995 (Surge 0.5 kV line-line, 1 kV line-earth)
- IEC 61000-4-6 1996/EN 61000-4-6:1996 (3 V, 0.15 to 80 MHz, 80% AM, power line)
- IEC 61000-4-11 1994/EN 61000-4-11:1994 (Dips 1 cycle, 100%)
- Canada: ICES-001:1998
- Australia/New Zealand: AS/NZS 2064.1

### Safety


### Temperature

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

### Environmental

According to Agilent Environmental Test Manual class OE, except temperature

### Power supply

- External DC Input: +11 to +25 V DC, 40 W min.
- Internal battery: Rechargeable lithium-ion battery. 4 hours operating time

### Dimensions

<table>
<thead>
<tr>
<th>Size (W x H x D)</th>
<th>317 mm x 207 mm x 69 mm (12.5 in x 8.1 in x 2.7 in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>Net weight: 2.6 kg (5.73 lbs)</td>
</tr>
<tr>
<td></td>
<td>Weight with battery: 2.9 kg (6.39 lbs)</td>
</tr>
</tbody>
</table>
N9330B Handheld Cable and Antenna Tester Specifications (continued)

N9330B handheld cable and antenna tester

Soft carrying case

Rechargeable battery

Hard transit case

Phase-stable extension cable

Automotive 12 V DC adaptor

Electronic calibrator

T-combo’ open/short/50 Ω load
Ordering Information

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Connectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>N9330B</td>
<td>25 MHz to 4 GHz handheld cable and antenna tester</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Accessories supplied as standard with the tester:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Soft carrying case</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Rechargeable battery</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• AC-DC adaptor with power cord</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• USB cable</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Quick-start tutorial</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Documentation CD (also includes measurement analysis PC software)</td>
<td></td>
</tr>
</tbody>
</table>

**Options**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Connectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>201</td>
<td>Precision mechanical short/open/50 Ω load, DC to 4 GHz</td>
<td>N-type (male)</td>
</tr>
<tr>
<td>202</td>
<td>Precision mechanical short/open/50 Ω load, DC to 4 GHz</td>
<td>7/16 DIN (male)</td>
</tr>
<tr>
<td>203</td>
<td>Electronic calibrator</td>
<td>N-type (male)</td>
</tr>
<tr>
<td>301</td>
<td>Phase-stable extension cable 1.5 m</td>
<td>Type-N (male) to type-N (female)</td>
</tr>
<tr>
<td>302</td>
<td>Phase-stable extension cable 1.5 m</td>
<td>Type-N (male) to 7/16 DIN (female)</td>
</tr>
<tr>
<td>303</td>
<td>Connector adaptor</td>
<td>Type-N (male) to 7/16 DIN (female)</td>
</tr>
<tr>
<td>BAT</td>
<td>Spare battery pack</td>
<td></td>
</tr>
<tr>
<td>BCG</td>
<td>External battery charger</td>
<td></td>
</tr>
<tr>
<td>1DN</td>
<td>Automotive 12 V DC charger</td>
<td></td>
</tr>
<tr>
<td>TIC</td>
<td>Hard transit case</td>
<td></td>
</tr>
<tr>
<td>ADP</td>
<td>Spare AC-DC adaptor</td>
<td></td>
</tr>
<tr>
<td>ABA</td>
<td>Hard copy English User Guide</td>
<td></td>
</tr>
<tr>
<td>AB2</td>
<td>Hard copy Chinese User Guide</td>
<td></td>
</tr>
<tr>
<td>PWM</td>
<td>Power monitoring (USB power sensor not included)</td>
<td></td>
</tr>
</tbody>
</table>

**Warranty**

**Select coverage**

- **Included**: 3-year warranty (return to Agilent), standard
- **R-51B-001-5Z**: 5-year warranty assurance plan (return to Agilent): Priority warranty service includes one-time coverage for an EOS/ESD failure.

**Calibration**

**Select Agilent calibration plan**

- **R-50C-011-3**: 3-year calibration assurance plan (return to Agilent): Priority calibration service covering all calibration costs for 3 years; 15% cheaper than buying stand-alone calibrations.
- **R-50C-011-5**: 5-year calibration assurance plan (return to Agilent): Priority calibration service covering all calibration costs for 5 years; 20% cheaper than buying stand-alone calibrations.
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Malaysia 1 800 888 848
Singapore 1 800 375 8100
Taiwan 0800 047 866
Other AP Countries (65) 375 8100

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Ireland 1890 924 204
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