Agilent N8300A

Wireless Networking Test Set

Getting Started Guide

Agilent Technologies

Notices

Edition

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Agilent Technologies, Inc.

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The following general safety precautions must be observed during all phases of operation of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Agilent Technologies Inc. assumes no liability for the customer's failure to comply with these requirements.

CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

Electrical Rating

100-240 VAC, 50/60 Hz, 270 W max.

This equipment is for indoor use only.

CAUTION

This instrument has an autoranging line voltage input, ensure the supply voltage is within the specified range.

Before Applying Power Protective Earthing Installation Warning

This is a Safety Class 1 Product (provided with a protective earthing ground, incorporated in the power cord). The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. Any interruption of the protective conductor inside or outside of the instrument is likely to make the instrument dangerous. Intentional interruption is prohibited. If you energize this instrument by an auto transformer (for voltage reduction or mains isolation), the common terminal must be connected to the earth terminal of the power source.

WARNING

Install the instrument so that the detachable power cord is readily identifiable and is easily reached by the operator. The detachable power cord is the instrument disconnecting device. It disconnects the mains circuits from the mains supply before other parts of the instrument. The front panel switch is only a standby switch and is not a LINE switch.

Do Not Remove The Instrument Cover

Operating personnel must not remove instrument covers. Only qualified service personnel must make component replacement and internal adjustments. Instruments that appear damaged or defective should be made inoperative and secured against unintended operation until qualified service personnel can repair them.

Do Not Operate In An Explosive Atmosphere

Do not operate the instrument in the presence of flammable gases or fumes.

Sound Emission

Herstellerbesch einigung

Diese Information steht im Zusammenhang mit den Anforderungen der Maschinenlarminformationsverordnu-ng vom 18 Januar 1991.

- Sound Pressure LpA < 70 dB.
- Am Arbeitsplatz.
- Normaler Betrieb.
- Nach DIN 45635 T. 19 (Typprufung).

Manufacturers Declaration

This statement is provided to comply with the requirements of the German Sound DIN 45635 T. 19 (Typprufung).

- Sound Pressure LpA < 70 dB.
- At operator position.
- Normal operation.
- According to ISO 7779 (Type Test).

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MATLAB ® is a U.S. registered trademark of Math Works, Inc.

Norton Ghost™ is a U.S. trademark of Symantec Corporation.

General Specifications

Operating Temperature Range: 25ºC +/- 10ºC

Operating Humidity Range: 95% rh at 25ºC

Altitude: 3,000m

Weight: 18.25 Kg

Shipping Weight: 18.25 Kg

Dimensions: 190mm (h) x 425 mm (w) x 495 mm (d)

Introduction

Welcome to the Getting Started Guide for the Agilent N8300A Wireless Networking Test Set. The main purpose of this guide is to provide you with the basic steps to getting started with your test set It provides an introduction on using the test set, and where you can go to get additional help information.

With the N6301A measurement application, the N8300A is a one-box RF parametric test set targeting manufacturing and design engineers who need a standard-compliant 802.16e and 802.16d physical layer (PHY) test tool for both mobile and fixed WiMAX Tx and Rx applications. The N6302A measurement application provides 802.11a,b,g and n WLAN RX and TX testing. With option 404 (MIMO/Multi-port Connectivity) only the N8300A has Broadcast mode, providing parallel, multiple device-under-test (DUT) receiver calibration and test.

Based on an architecture comprising an integrated Vector Signal Analyzer (VSA) and Vector Signal Generator (VSG), the N8300A provides a graphical user interface, a SCPI interface and consistency of software and measurements with industry leading WiMAX and WLAN test tools that enables fast test development.

This guide is structured as follows:

1 Installation and Setup

This book provides information on items such as turning on the test set, navigating Windows without a mouse, and power requirements.

For more details, refer to the information below and the other pages in this section.

Technical Documentation

Getting Started	Turn on process, Windows XP use/configuration, Front and rear panel
Help File	Descriptions of front panel key functionality and the corresponding SCPI commands. May also include some concept information. Also contains the Getting Started information in online format.

The product documentation can be found a number of ways. It is:

A printed version of the Getting Started Guide that ships with your test set.

Accessed through the product Help system

On the product website:

http://www.agilent.com/find/n8300a

Agilent Technologies N8300A Test Set

Agilent Technologies N8300A Test Set with Option 404
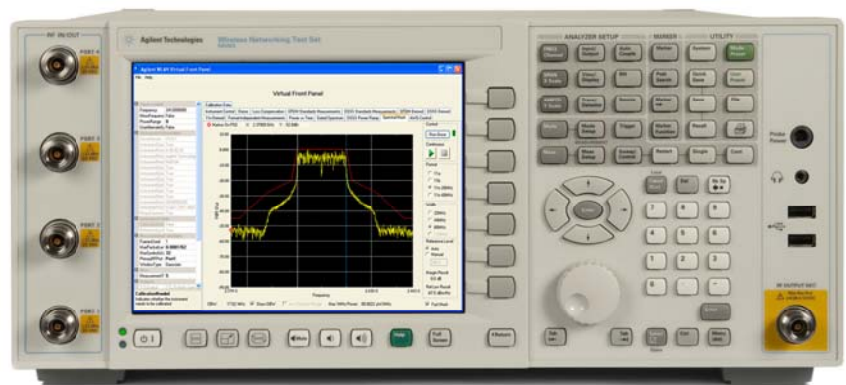
NOTE	Operating system settings have been optimized for the best performance. Modification of these settings may degrade test set performance and measurement speed. Those that can be safely modified are described in Test Set Configuration.
	The N8300A is an Open Windows environment, so you can install non-approved software on the test set. However, installation of non-approved software may affect test set performance. Agilent does not warrant the performance with non-approved software installed.

Initial Inspection

WARNING	To avoid hazardous electrical shock, do not perform electrical tests when there are signs of shipping damage to any portion of the outer enclosure (covers, panels, connectors).

Inspect the shipping container for damage.   If the shipping container or cushioning material is damaged, it should be kept until the contents of the shipment have been checked for completeness and the instrument has been checked mechanically and electrically.   If the contents are incomplete or if there is mechanical damage or defects notify the nearest Agilent Technologies office. If the shipping container is damaged, or the cushioning material shows signs of stress, notify the carrier as well as the Agilent Technologies office.   Keep the shipping material for carrier's inspection.

Item	Description
Getting Started Guide	Provides first-time power on instructions, licensing information, operating system information, and general hardware information.
Power Cable (See AC power Cord)	Connection for test set power.

Shipping Problems?

If the shipping materials are damaged or the contents of the container are incomplete:

Contact the nearest Agilent Technologies office to arrange for repair or replacement (see "Returning a Test Set for Service" on page 81). You will not need to wait for a claim settlement.

Keep the shipping materials for the carrier's inspection.

If you must return a test set   to Agilent Technologies, use the original (or comparable) shipping

Turning on the Test Set the First Time

Initial power-on requires:

- Powering On the Test Set

- Accepting the End-User License Agreement (EULA) Screen

- Setting System Date and Time

- Anti-virus Software and Firewalls

TIP	You can get automatic electronic notification of new firmware releases and other product updates/information by subscribing to the Agilent Technologies Test & Measurement E-Mail Notification Service for Agilent instruments at http://www.agilent.com/find/notifyme If you do not have a USB mouse available you may want to refer to Navigating Windows Without a Mouse.

Powering On the Test Set

1   Ensure that the short BNC cable supplied with your test set is connected from the SOURCE 10 MHz OUT connector to the ANALYZER 10 MHz IN connector on the test set's rear panel. Also, you must ensure that the USB cable supplied is connected from one of the test set's four upper USB ports to the USB port on the lower right of the test set's rear panel. These BNC and USB connections are shown in the following graphic.

2 Position the test set so that you have easy access to the power cord and plug it in.

| **WARNING** | If this product is not used as specified, the protection provided by the equipment could be impaired. This product must be used in a normal condition (in which all means for protection are intact) only. |

3 Press the power switch (located in the lower left-hand corner of the test set's front panel) to turn the test set on. See "Front Panel Features" on page 19.

4 The test set can require >5 minutes to power-on. This time is affected by the Windows XP boot-up time and by the number of measurement applications that you are pre-loading.

| **NOTE** | Allow the test set to warm-up for 30 minutes before making a calibrated measurement. To meet its specifications, the test set must meet the operating temperature requirements. |

Accepting the End-User License Agreement (EULA) Screen

The License Agreement screen asks you to accept the terms of the End-User License Agreement for Windows XP. You must accept this agreement to continue the Windows XP installation and configuration. If you do not accept this agreement, the test set shuts down and the next time you turn it on the Windows XP Setup Wizard starts from the beginning again.

For more information about the End-User License Agreement for Windows XP, see the Questions and answers about the End-User License Agreement topic in the Microsoft Windows XP Help and Support Center.

If you have connected a USB mouse, position the cursor appropriately and use the left mouse button to navigate the License Agreement screen.

If you do not have a mouse available to navigate the screen, then use the test set front panel keys as follows:

1 Press the Tab key to select the License Agreement text box.

2 Use the up and down arrow keys, or rotate the knob to read the agreement.

3 Press the Tab key again. This accesses I don't accept this agreement. You need to press the up arrow to select I accept this agreement.

4 Press Select, or Tab then Enter to finish this screen and move to the Date and Time Settings screen.

Setting System Date and Time

The Date and Time Settings screen is used to set the appropriate date, time and time zone If you have connected a USB mouse, position the cursor and use the left mouse button to navigate the Date and Time Settings screen. Alternatively, the procedure for navigating this screen using a USB keyboard or the front panel is as follows:

5 Press the Tab (tab right or tab left) key to move between items in the Date and Time Settings screen. (The settings include the Date, Time, and Time Zone boxes, the Automatically adjust clock for daylight saving changes check box, and the Next button).

6 Use the left and right arrow keys to move between different parts of the item (for example, month, day, year, and hour, minute, seconds).

7 Use the up and down arrow keys to scroll through the different values available for the selected item (for example, month, day).

8 Use the Space key to select or clear the "Automatically adjust clock for daylight saving changes" check box when it is the active item.

9 When you have completed the date and time settings, press Enter, or Tab then Enter to finish this screen and continue the Windows XP Setup Wizard.

Anti-virus Software and Firewalls

No anti-virus software is shipped with the test set. It is recommended that you install anti-virus software if your test set will be connected to a network. Check with your IT department for their recommendations.

The test set is shipped with the Windows XP firewall enabled. Do not modify the default network settings as this may cause the test set to not operate properly.

Licensing New Measurement Application Software - After Initial Purchase

Additional measurement application software can be ordered after your initial purchase of the test set. The licenses themselves are downloaded from the license website onto the memory stick so they can be loaded into the test set.

Licenses can be installed using any available USB memory stick. In this case, we recommend that the latest version of the test set software be installed. (Use a 5 MB or larger memory stick.) This ensures that the measurement application being licensed and activated is already installed and is the most current version.

A license key is usually for one test set model/serial number combination. The license key will only install itself on that test set.

NOTE	No calibration is required after a measurement application installation.

Installation Procedure over USB

1   Redeem the Option Upgrade Entitlement Certificate by following the instructions on the Certificate.

2   After redeeming your Option Upgrade Entitlement Certificate you will receive an e-mail with an attached License File.

3   Locate a USB storage device and save the .lic file to the root directory of the USB storage device.

4   Connect the USB storage device to any of the USB ports on the test set.

5   The test set will automatically consume the license file. (This may take a few minutes) When the license is consumed the Agilent License Manager will display a "Successful License Installation" message.

6   Alternatively the license file can be manually installed over USB or LAN by placing the license file in the following folder on the test set.

C:\Program Files\Agilent\licensing

Installation Procedure over SCPI

The SCPI command required to install the license is:

SYSTem:LKEY <feature>, <license key>

Example:

SYST:LKEY "N6301A-1FP", "02F501B3270CCD737555A8A17B279D73E039BB95E001246AFD087 436F9F9C1EFDFBEEBB26EBDFA970CCB"

Verify the Installation

1   Press System, Show, System to display the list of Installed Applications.
2   Verify that the new Application appears in the list.

If you require further assistance, please contact the Agilent support team.

Online assistance: http://www.agilent.com/find/assist

If you do not have access to the Internet, contact your local Agilent Technologies Sales and Service Office, or if in the United States, call 1-800-829-4444.

Navigating Windows Without a Mouse

See also the section Windows Shortcuts and Miscellaneous Tasks on page 72.

Key Presses	Actions
Esc	Exits/closes a Windows dialog box (does not exit an Application window)
Enter	Does the current "default action". If a menu item or a button is currently "highlighted", then the Enter key will activate that menu item or button.
Alt	Moves focus/control to the pull down menus bar in the active Window
Right Arrow	In pull-down menu: opens the next menu to the right, or opens a submenu In a dialog box: selects an option button
Left Arrow	In pull-down menu: opens the next menu to the left, or opens a submenu In dialog box: selects an option button
Up Arrow	In pull-down menu: Moves to next selection up in the menu In dialog box: selects an option button
Down Arrow	In pull-down menu: Moves to next selection down in the menu In dialog box: selects an option button
Tab	In dialog box: moves to the next/previous field
Del	Deletes the currently selected item
Alt + Tab	Switches between the next/previous Application
Alt + Enter	Shows the Properties of the currently selected item
Alt + Esc	Cycles through items in the order that they had been opened
Backspace	In My Computer or Windows Explorer: move up one level In Internet Explorer: works like the BACK arrow key
Ctrl + Left arrow	Moves to the left one word at a time
Ctrl + Right arrow	Moves to the right one word at a time

Ctrl + Tab	In dialog box: moves to the next/previous Tab location
Alt + Space	Opens the window control menu for the currently active window, allowing you to minimize, maximize, move and restore (size) the window
Ctrl + Esc	Opens the Windows Start Menu
Ctrl + Alt + Delete	Opens the Windows Task Manager

NOTE	The following section, "Using the Interactive Help System Without a Mouse", refers mainly to the N6301A WiMAX applications. With the N6302A WLAN application, a keyboard and mouse are highly recommended for front panel operation and access of the Help System.

Agilent Technologies N8300A
Using the Interactive Help System without a Mouse

To Open the Help Window:
Press the green **Help** key on the Front Panel

Navigation Tabs · Navigation Pane · Topic Pane · Help Window · Help
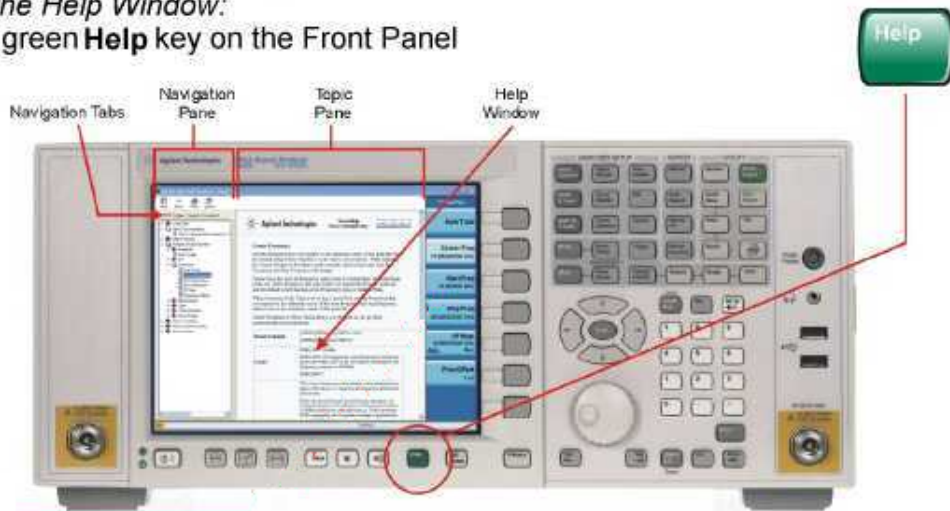
To Toggle Focus between the Navigation and Topic Panes:
Press the **Next Window** key

In the NAVIGATION PANE	In the TOPIC PANE
To Scroll Up or Down the Topic List: Press the **Up** or **Down Arrow** key	*To Scroll Up or Down:* Press the **Up** or **Down Arrow** key
To Expand or Collapse the tree for a Selected Topic: Press the **Right** or **Left Arrow** key	*To go to the Next or Previous page:* Use the **Tab** keys to select the **Right** or **Left Pointer** button (in the Topic Pane). Then, press **Enter**
To Display the Selected Help Topic: Press the **Enter** key	
To Scroll Horizontally or Vertically: Press **Ctrl + Left/Right Arrow** or **Up/Down Arrow** keys	*To go Back or Forward:* Press the **Alt + Left** or **Right Arrow** key
To switch Tabs: Press **Ctrl + Tab** keys	

To Close the Help Window:
Press the **Cancel (Esc)** key

LOCAL
Cancel (Esc)

Power Requirements

The N8300A Wireless Networking Test set requires a power source of 100/120V ac and 220/240V ac single phase.   Line frequency is 50-60Hz.   The rated power consumption is 270W maximum.

There is an IEC 60320-1 mains inlet provided on the rear of the N8300A for connection to mains power via the supplied power cord set. The only physical installation of your Agilent test set is a connection to a power source. Line voltage does not need to be selected.

The N8300A Wireless Networking Test set operates from a voltage source of 100/120V ac and 220/240V ac single phase and requires no switching or change of fuse. The test set does not contain customer serviceable fuses.

This test set has been designed and tested in accordance with IEC publication 61010-1:2001, Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, and has been supplied in a safe condition.   The instruction documentation contains information and warnings that must be followed by the user to ensure safe operation and to maintain the instrument in a safe condition.

WARNING	This is a Safety Class 1 Product (provided with a protective earthing ground incorporated in the power cord). The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. Any interruption of the protective conductor inside or outside of the product is likely to make the product dangerous. Intentional interruption is prohibited. (IEC 348 clauses 17.3.3c & 17.3.4) Failure to ground the test set properly can result in personal injury. Before turning on the test set, you must connect its protective earth terminals to the protective conductor of the main power cable. Insert the main power cable plug into a socket outlet that has a protective earth contact only. DO NOT defeat the earth-grounding protection by using an extension cable, power cable, or autotransformer without a protective ground conductor.

CAUTION	This product is designed for use in Installation Category II and Pollution Degree 2 per IEC 61010 Second Edition and IEC 664 respectively.
	This test set has autoranging line voltage input. Ensure the supply voltage does not vary more than +/- 10% from the specified range. The Mains wiring and connectors shall be compatible with the connector used in the premise electrical system. Failure, to ensure adequate earth grounding by not using the correct components may cause product damage, and serious injury.

AC Power Cord

The N8300A Wireless Networking Test Set is supplied with a three wire power cable.   Different cables are available for different power mains configurations.

WARNING	If this product is not used as specified, the protection provided by the equipment could be impaired. This product must be used in a normal condition (in which all means for protection are intact) only.

Install the test set so that the detachable power cord is readily identifiable and easily reached by the operator. The detachable power cord is the test set disconnecting device. It disconnects the mains circuits from the mains supply before other parts of the test set. The front panel switch is only a standby switch and is not a LINE switch. Alternatively, an externally installed switch or circuit breaker (which is readily identifiable and is easily reached by the operator) may be used as a disconnecting device.

CAUTION	Always use the three-prong AC power cord supplied with this product. Failure to ensure adequate earth grounding by not using this cord can cause product damage.

Test Set Location and Rack Mounting Requirements

Locating the test set

Make sure that both the fan inlet area and the exhaust vent area are not obstructed. The minimal clearance required is 2 inches for these vents on the sides of the test set. Lack of adequate clearance can result in excessive audible noise. This is because airflow restrictions cause additional airflow noise and cause the fans to speed up so they can draw in enough air for the required cooling.

The test set has plastic feet for convenience in bench operation.

Cooling and Rack Mounting

CAUTION	Ventilation Requirements
	When operating the N8300A, do not position the equipment so as to block the cooling holes or impair the airflow. Allow at least 100 mm between the N8300A and other objects.
	When installing the instrument in a cabinet, the convection into and out of the instrument must not be restricted. The ambient temperature (outside the cabinet) must be lest than the maximum operating temperature of the instrument by 4 degrees C for every 100 Watts dissipated in the cabinet. If the total power dissipated in the cabinet is greater then 800 Watts, then forced convection must be used.

Do not rack mount the N8300A test set side by side with another N8300 test set, or an instrument with side to side ventilation. Make sure that the exhaust air from the first unit is directed away from the inlet of the second unit. If the pre-heated air from the first unit is directed into the second test set, it results in excessive operating temperatures in the second unit and can cause instrument failures.

Test Set Maintenance

Cleaning the test set

WARNING	To prevent electrical shock, disconnect the Agilent Technologies model N8300A from mains before cleaning. Use a dry cloth to clean the external case parts. Do not attempt to clean internally. No Operator serviceable parts inside. Refer servicing to qualified personnel. To prevent electric shock do not remove covers.

Battery Information

The test set uses a lithium battery located on the CPU board. This is not an operator replaceable part. See "Returning a Test Set for Service" on page 81. Replaceable parts must be approved or supplied by Agilent Technologies.

You can order the service documentation for the test set through your Agilent Sales and Service office.

WARNING	Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended. Discard used batteries according to the manufacturer's instructions. Do not throw batteries away but collect as small chemical waste.

DO NOT THROW BATTERIES AWAY BUT
COLLECT AS SMALL CHEMICAL WASTE.

sk780a

Protecting Against Electrostatic Discharge

Electrostatic discharge (ESD) can damage or destroy electronic components (the possibility of unseen damage caused by ESD is present whenever components are transported, stored, or used).

Test Equipment and ESD

To help reduce ESD damage that can occur while using test equipment:

- Before connecting any coaxial cable to an test set connector for the first time each day, momentarily short the center and outer conductors of the cable together.

- Personnel should be grounded with a 1 MW resistor-isolated wrist-strap before touching the center pin of any connector and before removing any assembly from the test set.

- Be sure that all instruments are properly earth-grounded to prevent build-up of static charge.

WARNING	Do not use these first three techniques when working on circuitry with a voltage potential greater than 500 volts.

- Perform work on all components or assemblies at a static-safe workstation.

- Keep static-generating materials at least one meter away from all components.

- Store or transport components in static-shielding containers.

- Always handle printed circuit board assemblies by the edges. This reduces the possibility of ESD damage to components and prevent contamination of exposed plating.

Additional Information about ESD

For more information about ESD and how to prevent ESD damage, contact the Electrostatic Discharge Association (http://www.esda.org). The ESD standards developed by this agency are sanctioned by the American National Standards Institute (ANSI).

Upgrading the Measurement Application in the Test Set

This topic explains how to upgrade the application software on the test set:

- Equipment Required
- To Perform The Upgrade

Equipment Required

- An Agilent N8300A to be upgraded
- A USB mouse
- A USB keyboard
- A USB memory stick containing the new version of the application

To Perform The Upgrade

1   If the test set is not running, start it.

2   Connect the USB mouse and keyboard into the test set (install any device drivers that Windows requires).

3   When the WiMax measurement application is running, close it by clicking the Close button at the top-right corner of the application window. Click on "Yes" when you are asked if you want to shut down the application.

4   Connect the USB memory stick into one of the USB ports on the test set, and wait for the system to recognize the device.

5   Start Windows Explorer by clicking My Computer from the Start menu.

6   Navigate to the folder on the memory stick that contains the new version of the application. Then, right-click the application and choose "Run as..."
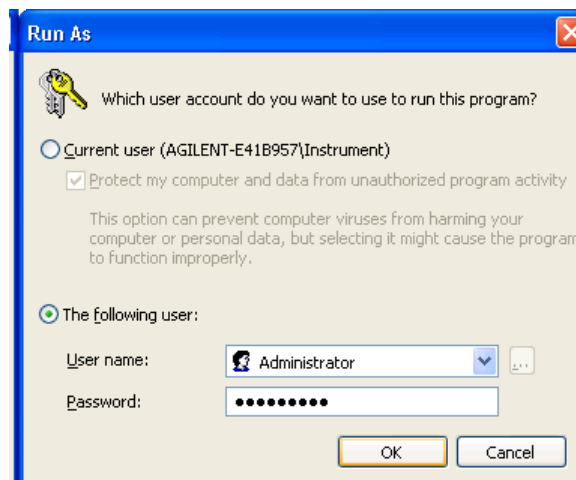
7 In the Run As dialog box, select "The following user". Set the user to Administrator and type the password. By default this password is set to "agilent4u".

8 Click OK to start the N8300A installation program.

9 Click "Next" to display the license agreement screen.

10 Click "I accept the terms of the license agreement" then "Next" to get to the install page.

11 Click install and the installation will start.

12 When the installation is complete, click "Finish".

13 Installation is now complete. You may start the new application by double-clicking the "Launch" icon on the desktop.

2 Front and Rear Panel Features

This section provides information on the test set's front and rear panel features and symbols, along with display annotations.

For more details, refer to the pages in this section.

Front Panel Features

The display, keys, RF, and USB connectors are located on the front panel. The test set includes a number of keys and a Cursor Control knob that enable you to navigate Windows without connecting a USB mouse and keyboard. However, you can use the test set more easily and efficiently when a USB mouse and keyboard are connected.

NOTE	With the N6302A WLAN application, a keyboard and mouse are essential for front panel operation and access of the Help System.

The front panel features are listed in this topic in alphabetical order and refer only to operation with the N6301A WiMAX Aplication.
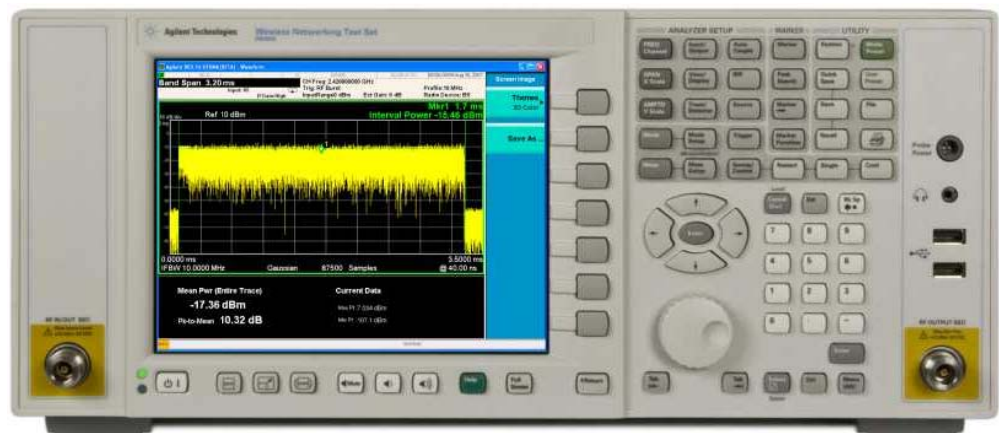
Analyzer Setup Keys

These keys set the parameters used for making measurements in the current Mode and Measurement.

Back Space Key

Press this key to delete the previous character when entering alphanumeric information. It also works as the Back key in Help and Explorer windows.

Ctrl Key

Ctrl works the same as a pc keyboard. Use it to navigate in Windows applications, or to select multiple items in lists.

Delete Key

Press this key to delete files, or to perform other deletion tasks.

Enter and Arrow Keys

The Enter key terminates data entry when either no unit of measure is needed, or you want to use the default unit.

The arrow keys:

- Increment and decrement the value of the current measurement selection.

- Navigate help topics.

- Navigate, or make selections, within Windows dialogs.

- Navigate within forms used for setting up measurements.

- Navigate within tables.

NOTE	The arrow keys cannot be used to move a mouse pointer around on the display.

Full Screen Key

Pressing this key turns off the softkeys to maximize the graticule display area.

Headphones Output

Headphones can be used to hear any available audio output.

Help Key

Opens the test set's online help system at the Welcome page.

Knob

Increments and decrements the value of the current active function.

Local/Cancel/(Esc) Key

If you are in remote operation, Local:

- returns test set control from remote back to local (the front panel).

- turns the display on (if it was turned off for remote operation).

- can be used to clear errors. (Press the key once to return to local control, and a second time to clear error message line.)

If you have not already pressed the units or Enter key, Cancel exits the currently selected function without changing its value. Esc works the same as it does on a pc keyboard. It:

- exits Windows dialogs

- resets input overloads

- clears errors

- aborts printing

- cancels operations.

Marker Keys

Markers are often available for a measurement, to measure a very specific point/segment of data within the range of the current measurement data.

Measurement Keys

These keys select the Mode, and the Measurement within the mode. They also control the initiation and frequency of measurement.

Menu/ (Alt) Key

Alt works the same as a pc keyboard. Use it to change control focus in Windows pull-down menus.

Menu Keys

Key labels appear to the left of the menu keys to identify the current function of each key. The displayed functions are dependent on the currently selected Mode and Measurement, and are directly related to the most recent key press.

Numeric Keypad

Enters a specific numeric value for the current function. Entries appear on the upper left of the display, in the measurement information area.

Power Standby On/Off

Turns the test set on. A green light indicates power on. A yellow light indicates standby mode.

NOTE	The front-panel switch is a standby switch, not a LINE switch (disconnecting device). The test set continues to draw power even when the line switch is in standby.
	The main power cord can be used as the system disconnecting device. It disconnects the mains circuits from the mains supply.

Probe Power

Supplies power for external high frequency probes and accessories.

Return Key

Exits the current menu and returns to the previous menu.

RF IN/OUT 50 Ohm

This Type-N connector provides an RF signal path out of the test set, and is always used as the RF input. The maximum input level is +25 dBm peak.

RF OUTPUT 50 Ohm

This Type-N connector is an optional path for all RF signals out of the test set. The maximum input level is +33 dBm peak.

Select / Space Key

Select is also the Space key and it has typical pc functionality. For example, in Windows dialogs, it selects files, checks and unchecks check boxes, and picks radio button choices. It opens a highlighted Help topic.

Speaker Control Keys

Enables you to increase or decrease the speaker volume, or mute it.

Tab Keys

Use these keys to move between fields in Windows dialogs.

USB Connectors

Standard USB 2.0 ports, Type A. Connect to external peripherals such as a mouse,
keyboard, DVD drive, or hard drive.

Utility Keys

These keys control system-wide functionality like:

- test set configuration information and I/O setup,

- printer setup and printing,

- file management, save and recall,

- test set presets.

Window Control Keys

These keys select between single or multiple window displays. They zoom the current window to fill the data display, or change the currently selected window. They can be used to switch between the Help window navigation pane and the topic pane.

Overview of Key Types

The keys labeled FREQ Channel, System, and Marker Function are all examples of front-panel keys. Most of the dark or light gray keys access menus of functions that are displayed along the right side of the display. These displayed key labels are next to a column of keys called menu keys.

Menu keys list functions based on which front-panel key was pressed last. These functions are also dependant on the current selection of measurement application (Mode) and measurement (Meas).

If a menu key function's numeric value can be changed, it is called an active function. The function label of the active function is highlighted after that key has been selected. For example, press AMPTD Y Scale. This calls up the menu of related amplitude functions. Note the function labeled Reference Level (the default selected key in the Amplitude menu) is highlighted. Reference Level also appears in the upper left of the display in the measurement information area. The displayed value indicates that the function is selected and its value can now be changed using any of the data entry controls.

Some menu keys have multiple choices on their label like On/Off or Auto/Man. The different choices are selected by pressing the key multiple times. Take an Auto/Man type of key as an example. To select the function, press the menu key and notice that Auto is underlined and the key becomes highlighted. To change the function to manual, press the key again so that Man is underlined. If there are more than two settings on the key, keep pressing it until the desired selection is underlined.
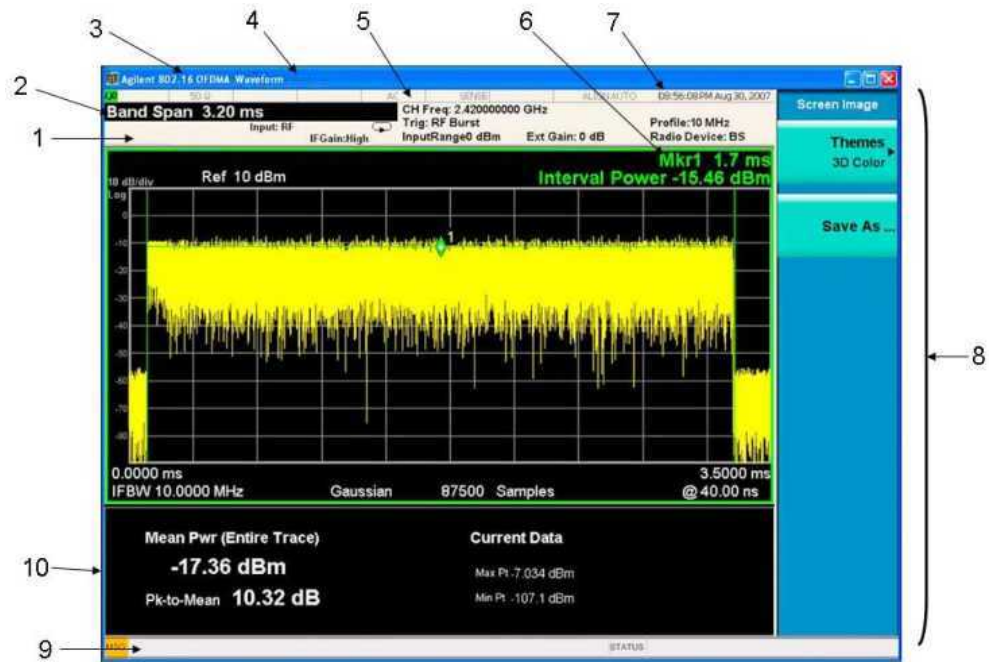
When a menu first appears, one key label will be highlighted to show which key is the default selection. If you press Marker Function, the Marker Function Off key is the menu's default key, and it will be highlighted. Some of the menu keys are grouped together by a yellow bar running behind the keys near the left side. When you press a key within the yellow bar region, such as Marker Noise, the highlight will move to that key to show it has been selected. The keys that are linked by the yellow bar are related functions, and only one of them can be selected at any one time. For example, a marker can only have one marker function active on it. So if you select a different function it turns off the previous selection. If the current menu is two pages long, the yellow bar could include keys on the second page of keys.

In some key menus, a key label will be highlighted to show which key has been selected from multiple available choices. And the menu is immediately exited when you press one of the other keys. For example, when you press the Select Trace key (in the Trace/Detector menu), it will bring up its own menu of keys. The Trace 1 key will be highlighted. When you press the Trace 2 key, the highlight moves to that key and the screen returns to the Trace/Detector menu.

If a displayed key label shows a small solid-black arrow tip pointing to the right, it indicates that additional key menus are available. If the arrow tip is not filled in solid then pressing the key the first time selects that function. Now the arrow is solid and pressing it again will bring up an additional menu of settings.

Display Annotations

This shows the display annotation as it is on the N6301A WiMAX Measurement Application display. Other measurement application modes have some annotation differences.

Item	Description	Function Keys
1	Measurement bar - Shows general measurement settings and information. ↦ ⤵ Indicates single/continuous measurement. Some measurements include limits that the data is tested against. A Pass/Fail indication may be shown in the lower left of the measurement bar.	All the keys in the Analyzer Setup part of the front panel.
2	Active Function (measurement bar) - when the current active function has a settable numeric value, it is shown here.	Currently selected front panel key.

|		
3	Banner - shows the name of the selected measurement application and the measurement that is currently running.	Mode, Meas
4	Measurement title (banner) - shows title information for the current Measurement, or a title that you created for the measurement.	Meas View/Display, Display, Title
5	Settings panel - displays system information that is not specific to any one application. Input/Output status - RLTS indicate Remote, Listen, Talk, SRQ Input impedance and coupling Selection of external frequency reference Setting of automatic internal alignment routine	Local and System, I/O Config Input/Output, Amplitude, System and others
6	Active marker frequency, amplitude or function value	Marker
7	Settings panel - time and date display.	System, Control Panel
8	Key labels that change based on the most recent key press.	Softkeys
9	Displays information, warning and error messages. Message area - single events, Status area - conditions	
10	Measurement settings for the data currently being displayed in the graticule area.	Keys in the Analyzer Setup part of the front panel.

This shows the display when running the N6302A WLAN Measurement Application. Other measurement application modes have some annotation differences. This is a windows application and requires a keyboard and mouse for operation.

Agilent N4010A WLAN Virtual Front Panel

File   Help

Virtual Front Panel
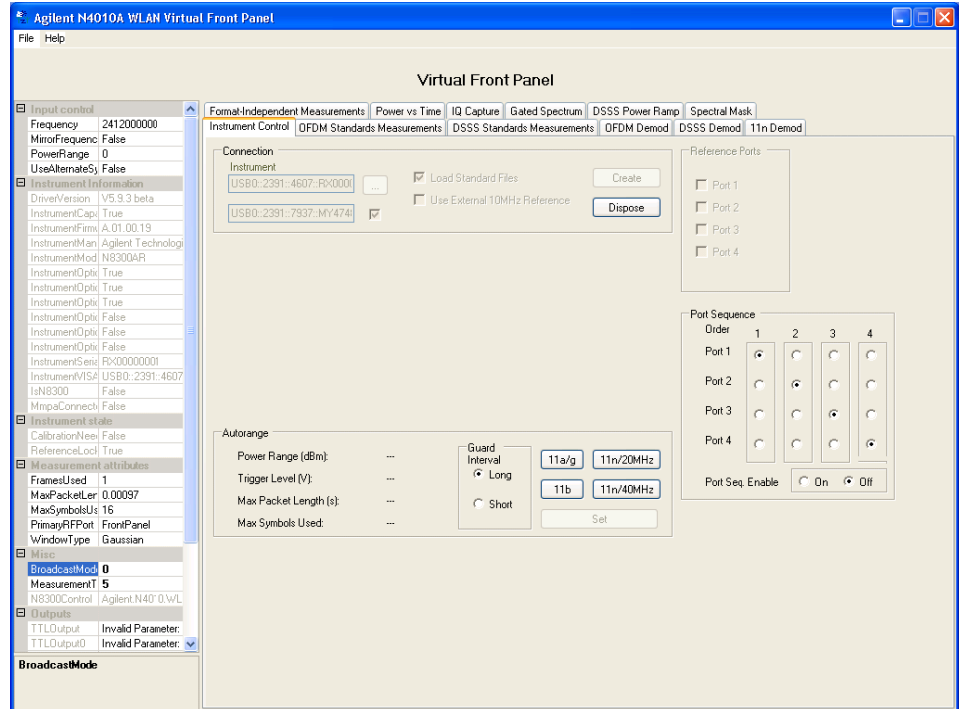
| | | To change to a WiMAX measurement application from the WLAN application, click the close window (x) button. Press Mode to display the available measurement applications in the softkey menu and make your selection. |

NOTE

Rear Panel Features

The test set's rear panel provides multiple connector types which are listed in this topic in alphabetical order.

NOTE	You must ensure that the short BNC cable supplied with your test set is connected from the SOURCE 10 MHz OUT connector to the ANALYZER 10 MHz IN connector on the test set's rear panel. Also, you must ensure that the USB cable supplied is connected from one of the test set's four upper USB ports to the USB port on the lower right of the test set's rear panel. These BNC and USB connections are shown in the following graphic.

ANALYZER 10 MHz IN

Permanently connected to the SOURCE 10 MHz OUT connector.

ANALYZER 10 MHz OUT

An output of the test set's internal 10 MHz frequency reference signal. It is used to lock the frequency reference of other test equipment to the test set.

ANALYZER TRIG IN

Allows external triggering of measurements.

ANALYZER TRIG OUT

A trigger output used to synchronize other test equipment with the test set. Configurable from the Input/Output keys.

AM

A BNC connector for inputting an AM signal.

Analog Out

Not functional for this release.

AUX I/O

Not functional for this release.

BNC3

Not functional for this release.

DIGITAL BUS I/O

Not functional for this release.

EVENT 1

Not functional for this release.

EXT CLK

Not functional for this release.

EXT REF IN

Input for a 1 to 50 MHz external frequency reference signal.

FM

A BNC connector for inputting an FM signal.

GPIB

A General Purpose Interface Bus (GPIB, IEEE 488.1) connection that can be used for remote test set operation.

I INPUT

Not functional for this release.

I OUT Q OUT, I OUT, Q OUT

Not functional for this release.

Q INPUT

Not functional for this release.

LAN

A TCP/IP Interface that is used for remote test set operation.

LAN port for Agilent Internal Use Only

An interface for use with Agilent Signal Studio.

Line power input

The AC power connection. See the product specifications for more details.

MONITOR

Allows connection of an external VGA monitor.

PAT TRIG

Not functional for this release.

PULSE

A BNC connector for inputting a pulsed signal (+1V = on; 0V = off).

SOURCE 10 MHz OUT

Outputs the 10 MHz reference signal used by the internal timebase. Permanently connected to the ANALYZER 10 MHz IN port.

SOURCE REF IN

Not functional for this release.

SOURCE TRIG IN

Not functional for this release.

SOURCE TRIG OUT

Not functional for this release.

SWEEP OUT

This is a multiple use connector. For signal routing selections.

USB Connectors

USB-A: There are four Hi-Speed USB connectors in the centre area of the rear panel, and two front panel Hi-Speed USB connectors for use with high-speed products (480 Mbps). Use the universal serial bus (USB) connectors to connect USB devices to the test set (for example, mouse, keyboard, external storage device).

Mini-USB: This port is located on the lower right of the test set's rear panel. In order for the test set to operate correctly, you must use the supplied USB cable to connect this connector to one of the four Hi-Speed USB connectors in the centre area of the rear panel.
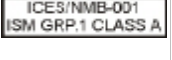
USB-B: USB TMC (test and measurement class) connects to an external PC controller to control the test set and for data transfers over a 480 Mbps link.

You can connect or disconnect USB devices without shutting down or restarting the test set. Note that before you disconnect a USB device, you need to inform Windows that you are ejecting, removing, or unplugging it, by using the **Safely Remove Hardware** item in the notification area. (The notification area is located at the far right of the taskbar.)

Note, the test set will attempt to boot from a USB storage device connected to one of the USB connectors, therefore ensure that any USB storage devices are disconnected before turning on the test set.

Front and Rear Panel Symbols

│		This symbol is used to indicate power ON (green LED).
⏻		This symbol is used to indicate power STANDBY mode (yellow LED).
~		This symbol indicates the input power required is AC.
⚠		The instruction documentation symbol. The product is marked with this symbol when it is necessary for the user to refer to instructions in the documentation.
CE		The CE mark is a registered trademark of the European Community.
N10149		The C-Tick mark is a registered trademark of the Australian Spectrum Management Agency.
ICES/NMB-001 ISM GRP.1 CLASS A		This is a marking of a product in compliance with the Canadian Interference-Causing Equipment Standard (ICES-001). This is also a symbol of an Industrial Scientific and Medical Group 1 Class A product (CISPR 11, Clause 4).
CSA		The CSA mark is a registered trademark of the Canadian Standards Association International.
♻		This symbol indicates separate collection for electrical and electronic equipment mandated under EU law as of August 13, 2005. All electric and electronic equipment are required to be separated from normal waste for disposal (Reference WEEE Directive 2002/96/EC). To return unwanted products, contact your local Agilent office, or see http://www.agilent.com/environment/product/ for more information.
⊓		The out position of a bi-stable push control switch

		The In position of a bi-stable push control switch
		Indicates a Protective Conductor Terminal that must be connected to earth ground before operating the equipment – protects against electrical shock in case of a fault.
Warning		Warning denotes a hazard. It calls attention to a procedure which, if not correctly performed or adhered to, could result in injury or loss of life. Do not proceed beyond a warning note until indicated conditions are fully understood and met.
Caution		Caution denotes a hazard. It calls attention to a procedure which, if not correctly performed or adhered to, could result in damage to or destruction of the instrument. Do not proceed beyond a caution note until the indicated conditions are fully understood and met.

3 Test Set Configuration

The topics in this book describe the Microsoft Windows XP configuration and the settings used with the Agilent test set software. It includes information about changing some of the system settings. And it describes the Windows operating system configuration and the software installations that are present on the Hard Disk Drive when the test set leaves the factory.

The front panel of the test set has been designed with the keys needed to navigate windows for: accessing menus, traversing in dialogs, selecting items, and depressing displayed buttons. It is possible to use the front panel for changing Windows XP configuration items, but it is much easier to perform these tasks with a USB mouse and external keyboard. For front panel operation with the N6302A WLAN measurement application, a keyboard and mosue are essential. For specifics on navigating using the front panel, see the front panel description.

Customer Installation of Software

Agilent Measurement Application Software

The N6301A 802.16 OFDMA and/or N6301A 802.16 OFDM and/or N6302A WLAN Measurement Application software is installed in the N8300A Wireless Networking Test Set measurement platform. This application requires a license to execute the software.

Installation of Other 3rd Party Software

The N8300A is an Open Windows environment, so you can install non-approved software on the test set. However, installation of non-approved software may affect test set performance. Agilent does not warrant the performance of the N8300A with non-approved software installed.

NOTE	Before installing any additional programs on the test set, you should exit the Measurement application.
	Also, you must not remove any applications or programs that are installed on the test set when it is shipped from the factory.

If you install programs other than those which Agilent has tested, it could cause problems with the test set's application. If this happens, you should try uninstalling the program that has caused the problem, or try changing the program's configuration. If this does not correct the problem, you may have to use the Agilent Recovery system to reinstall the test set's system software.

User Accounts

Administrator Login

The Administrator account ships from the factory with the password "agilent4u". Using the Administrator account you can perform the following operations:

- Install software

- Configure network and printer access

- Access all files on the test set

- Add or change user accounts and passwords

- Change Windows settings

- Run any application

User Login

The default user account that ships from the factory is "Instrument" with the password "measure4u". This user is a member of the Power Users group. Using the test set account you can perform the following operations:

- Install software

- Configure network and printer access

- Access files on the test set that are accessible to the Power Users group

- Run applications that are accessible to the Power Users group

AgilentOnly user account

The test set contains a user account called "AgilentOnly" that can be used by Agilent's customer support in the event that the Administrator password was changed and has since been lost/forgotten. You must not remove or modify the AgilentOnly account.

Agilent Service user accounts

User accounts are defined for Agilent's use if it is necessary to service the test set.

Customer creation of accounts

You can create additional user accounts and decide on the level of security granted to any new user accounts created. For example, the level of security can be assigned as administrator, power user, user, backup operators. User names are not case sensitive but passwords are case sensitive.

NOTE	For the measurement software to operate the user account executing the software must be assigned Administrator or Power User privileges. Otherwise, the measurement software will not operate correctly.

It is Agilent's expectation that each user's My Documents folder is mapped to the D: drive. This is to avoid overwriting the user's data in the event the Agilent Recovery must be performed. Also, this facilitates convenient backup by copying the contents of the D: drive to external media. All users accounts created by the factory already have My Documents mapped to the D: drive. Please map all new users My Documents folders to the D: drive.

Windows Configuration

The Windows settings have been optimized for the best measurement performance. Any modifications to these settings may degrade test set performance and measurement speed. In general, most Windows System settings (typically set through the Windows Control Panel) should not be modified. Those that can be safely modified are listed below.

CAUTION	To recover from problems caused by changing Windows systems settings, you may have to reinstall the Windows system and test set application using the Agilent Recovery process.

Settings That Can Be Changed

You may change the following Windows settings or administrative tasks (available from the Windows Control Panel) to select your personal preferences.

NOTE	Before changing any Windows System settings, exit the test set application.

You May Use This Feature	To Do This...
Automatic Updates	Configure Microsoft Automatic Updates.
Security Center	Install and configure an Anti Virus program.
User Accounts	Setup new test set user accounts. **CAUTION** To recover from problems caused by changing Windows systems settings, you may have to reinstall the Windows system and test set application using the Agilent Recovery process.

Network Connections	Add the test set to a network.
Printers and Faxes	Install and configure a printer.
Date and Time	Set the time and date.
System	Modify System Properties, Advanced Tab settings of Performance, Adjust for Best Performance. Leave all other settings unchanged.

Settings That Must Not Be Changed

Avoid changing any settings in this section. Changes to the following settings may degrade test set performance, screen displays, and measurement speed.

Do NOT Use This Feature	To Do This...
Power Options	Do not change Power Options. (Power Scheme, Power Button, Hibernate)
System	Do not modify System Properties, Hardware Tab settings (Device Manager, Drivers). Do not modify System Properties, Advanced Tab settings (Performance, User Profiles, Startup and Recovery, Environment Variables, Error Reporting)
Fonts	Do not remove installed Fonts.
Display	Do not change the following Display Settings: Screen Saver settings The screen resolution, 1024 x 768

	DPI setting from Normal size (96 DPI)
User Accounts	Do not delete or modify the "AgilentOnly" user account.

In addition, DO NOT:

Add, delete, or modify hard-disk drive partitions.

Delete or modify Agilent registry entries.

Change the contents of any directories containing the name "Agilent"

Stop these services:

— The MSSQL$CDF service or uninstall the "Microsoft SQL Server Desktop Engine"
— The IIS server or tamper with any virtual directories (or their contents) that came

configured with the test set.
(Statement about IIS? - Disable if concerned about security AND will not be using
Advanced features of Licensing, etc.)

Uninstall these libraries, interfaces, or programs:

— The Agilent I/O Libraries
— The .NET Framework or any Hotfixes or Service Packs for the .NET Framework
— The "Microsoft Visual J# .NET Redistributable Package 1.1"
— Programs that begin with "Agilent"
— The Adobe Acrobat Reader

Modify

— The Agilent I/O Library "GPIB27", "GPIB28" interfaces shown as configured test set I/O in the Agilent Connection Expert or I/O Config.

Copying the Help from the Test Set to Your Computer

It is possible to copy the Help in compiled HTML Help format (.chm) from the test set's hard disk drive, and then view the Help on a computer. In this case, you use the Help just like any other Windows help file (.chm).

To Copy the Help from the Test Set to Your computer

1 Connect a USB storage device to one of the test set's USB-A connectors, or ensure the test set has an active LAN connection on your organization's network.

2 Open My Computer on the test set, and navigate to the help file using the following path:
C:\Program Files\Agilent\N8300A\Application\Help\N8300A.en-US.chm

3 Select the N8300A.en-US.chm file, and under File and Folder Tasks, select Copy this file.

4 In Copy Items, browse to the USB storage device or network location you want to copy to, and then select Copy.

| NOTE | In the same folder as the Help file are two Programming Application Notes in PDF format. These can also be copied to your computer if required. |

Configuring Printers

Printers are configured using the Microsoft Windows Control Panel. It is easily accessed from the Windows Start menu or from under the front panel System key. This setup process is most easily done using a USB Mouse and an External Keyboard. If you don't have a mouse it can be done using front panel keys, and you might want to reference the section on "Navigating Windows Without a Mouse" on page 11.

When setting up a new printer, you may need to load the printer driver (unless you are using a network printer that your IT department has set up to include the driver). The manufacturer of the printer supplies the driver software and process. That may require that you attach an external USB disk drive. An alternative is to connect the test set to the LAN and download the driver from the printer manufacturer's internet site.

Configuring LAN

Hostname

The Computer Name, or hostname, is pre-configured from the factory. It must be a unique name such that it will not conflict with other equipment on your LAN. The pre-configured Computer Name is N8300Axxxxxxxxx, where xxxxxxxxx is the last 9 digits of the test set's serial number.

To change the Computer Name consult the Microsoft Windows XP Help and Support Center.

IP Address & Gateway

The test set is pre-configured to obtain an IP Address using DHCP. The IP Address and Gateway can be changed. Consult the Microsoft Windows XP Help and Support Center to configure the LAN.

Windows Security

Microsoft recommends the following three steps to ensure the test set's Windows XP operating system is protected:

1 Use an internet firewall.

2 Get the latest critical Windows updates.

3 Use up-to-date antivirus software.

To check the status or make changes in the security settings for you test set, open the Windows Security Center, click Start, Control Panel, and then click Security Center.

NOTE	The window may look slightly different on your test set.

Windows Firewall

The test set is shipped with the Windows Firewall enabled.

| NOTE | The window may look slightly different on your test set. |

Windows Firewall Exceptions for programs and ports have been added to allow proper operation of the test set over a network. Modifying these settings may cause the test set to not operate properly.

Automatic Updates

The default test set setting is to automatically check for critical Windows Updates, notify you, download the updates and install them, if the test set has internet access.

You can change the configuration of the Microsoft Automatic Updates. You can choose not to have automatic updates. Then you can manually update Windows by accessing Internet Explorer and from the Tools menu select Windows Update.

| NOTE | Be aware that downloading and installing Windows Updates can be network and CPU usage intensive (impacting the test set performance) and some Windows Updates will automatically reboot the test set. It is recommended that Windows Updates be performed when the test set is not in normal use. |

Virus Protection

There is no antivirus software included with your test set. Antivirus application software has been tested to be compatible with the test set.

NOTE	Having antivirus software installed may have a slight impact on the test set performance.

Spyware Protection

There is no anti-spyware software installed on the test set.

System Maintenance

Backup

It is recommended that you have a regular backup strategy. Your IT department may already have a backup strategy in place which is suitable for the test set and its data. Using the Agilent Recovery system in conjunction with a regular backup strategy should allow full recovery of the test set data.

Windows XP has a Backup utility that you can use to archive files and folders in case of a hard disk drive failure. See the Microsoft Windows XP Help and Support Center for more information on this utility. You can also use third party backup utilities. However, you must ensure that this third party software is compatible with the test set's system software. See "Customer Installation of Software" on page 38 for more information.

When performing backups, we recommend that you backup the data to an external storage device connected to the network or one of the test set's USB connectors. Also, you should perform backups at times when the test set is not being used for normal operations as it may impact the test set's overall performance.

System Restore

Windows XP contains capability to restore the system to a previous point in time. System Restore is enabled with default settings as provided by Microsoft. However, System Restore is not 100% successful. Therefore it is not the recommended method to backup the test set. System Restore has not been tested to verify successful restoring.

Disk Defragmenting

Over time the test set's hard disk will become fragmented. Windows XP has a Disk Defragmenter utility that you can use to defragment the hard disk. See the Microsoft Windows XP Help and Support Center for more information on this utility.

NOTE	Running Disk Defragmenter should be performed when the measurement application is not running. Measurement throughput will be significantly impacted while disk defragmentation is in process.

Hard Drive Partitioning and Use

The drive is partitioned into 3 sections: C:, D: and E:

- The C: partition contains the Windows XP operating system and software installed by Agilent.
  This is an Open System which means you can install additional software, and these should be installed on the C: drive. However, only a limited set of software applications are tested for use with the Agilent measurement software. The installation and/or use of other software is not warranted, and could interfere with the operation of the measurement software. If test set repair is ever needed, the Agilent version of the C: drive is the only part of the test set software that is restored by the Agilent Recovery process. You will have to reload any other software that you have added in the test set.

- The D: partition is reserved for data storage. The User Accounts that are configured by Agilent have their My Documents folder mapped to the D: drive. This is for the convenience of backing-up the measurement data. You should always back-up the data on the D: drive to an external device. This allows you to restore the data if you ever need to replace the hard drive.

- The E: partition is reserved for Agilent's use. The primary use of the E: drive is for housing the Calibration and Alignment data. Do not change or overwrite the files on this drive. This could cause your test set to not meet specifications, or even to stop functioning correctly. Do not use this drive for data storage. It is also recommended that you back up the contents of this drive to an external device.

Hard Drive Recovery Process

The Agilent Recovery System can be used to repair errors on the test set's C: drive partition, or to restore the original factory configuration of the system software. The Agilent Recovery System is stored in a separate hidden hard disk drive partition.

Repairing errors on the hard disk drive may result in loss of data or files. If you need more information about the Windows "chkdsk" error repair process, see the chkdsk documentation in the Microsoft Windows XP Help and Support Center.

Restoring the original factory system software does not restore any of the following items:

- Windows system configurations that were made after the test set was shipped from the

- factory. For example, Windows and Service Pack updates, user accounts, and windows configuration settings. After an Agilent Recovery, these configurations will have to be redone.

- Additional software that was installed after the test set was shipped from the factory. After an Agilent Recovery, that software will need to be re-installed.

- Any data or programs saved on the D: or E: drives.

- Any upgrades that were made to the Agilent measurement application software.

NOTE	It is recommended that you use a regular back up strategy. Your IT department may already have a back up strategy in place which is suitable for the test set and its data. See the System Maintenance section. Using the Agilent Recovery System in conjunction with a regular back up strategy should allow you to fully recover the test set software and data.

It is recommended that routine backups of the test set information be performed to keep current archives of the test set information. This will allow a full recovery of the test set information after the test set recovery system operations are performed. See the "Backing Up the test set Information" section for more details.

Using the test set Recovery System:

1 Make sure the test set is turned off.

2 Turn on the test set.

3 After the "Agilent Technologies" screen is displayed

Then the following screen contents will be displayed for 3 seconds.

Please select the operating system to start:

    Microsoft Windows XP Professional

    Agilent Recovery System

Use the up and down arrow keys to move the highlight to your choice.

Press Enter to choose.
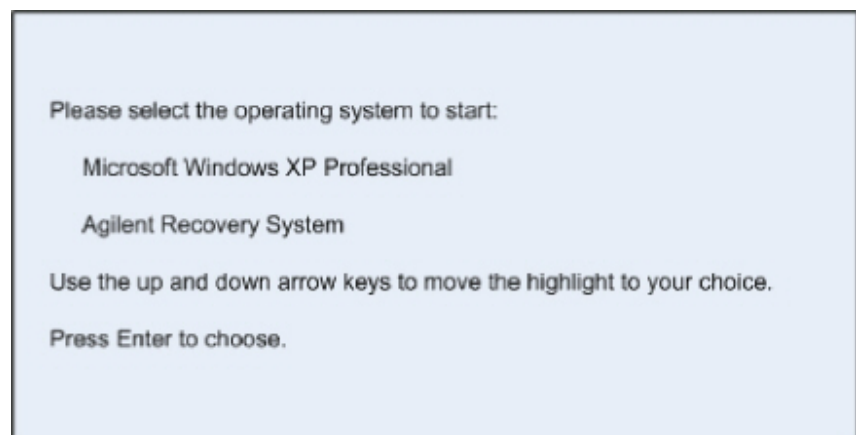
4   Press the down arrow key to move the highlight to "Agilent Recovery System", press the Enter key.

5   When the Agilent Recovery System has booted, follow the on-screen instructions to perform the desired recovery operations.

6   After exiting the Agilent Recovery System, the test set will reboot. If the original factory test set system has been restored, the test set will re-execute the Turning on the Test Set the First Time process.

7 Additional recovery steps may be required to fully recover the system to a more current working state. This could involve restoring your own backups of the test set configuration, including re-installing applications, data, and performing system customizations.

Configuring Recovery Prompt Timing

You can configure the time at which the test set power-up process waits for the selection of the recovery process by performing the following steps:

1 Get to My Computer, Properties

2 Select "Advanced" tab

3 In the "Startup and Recovery" section, select "Settings"

4 Under the "System Startup" section, you can either uncheck "Time to display list of operating systems:" or change the seconds to delay for it.

NOTE	You must be logged in as an administrator in order to change these settings. See User Accounts for more information.

4 Using Microsoft Windows XP

NOTE	The capabilities described in this section are Microsoft Windows XP features. The discussion provided here gives some guidelines for using the capabilities with the test set. You will have to refer to the Windows XP help documentation for more information. Your version of Windows may not match these instructions exactly.
	You need an external keyboard and mouse to fully use these features.

Remote Desktop: Using the N8300A Remotely

Windows Remote Desktop is recommended for remote control of the test set. It offers fully-interactive control, that is almost identical to direct face-to-face control of the test set.

NOTE	The Remote Desktop functionality is a Microsoft Windows XP capability. The following discussion provides some guidelines for using this capability with the test set. You will have to refer to the Windows XP help documentation for more information. As Windows evolves, these instructions may no longer be exact.

You need an external keyboard and mouse to fully use this functionality.

NOTE	You cannot utilse the Remote Desktop feature when running the N6302A WLAN measurment application. However, if you have the Agilent N4010A WLAN Test Suite installed on your PC, you can control the N8300A using the N4010A virtual front panel in the similar manner to running the WLAN virtual front panel on the test set.

Overview of Remote Desktop Operation

Using the Remote Desktop functionality of the test set allows you to control and interact with the test set from a remote desktop client computer, as though you were sitting in front of the test set.

When you have configured the test set for remote connectivity, and configured a separate computer to act as a remote desktop client computer, you can send commands to the test set from the remote desktop client computer, and you can see the test set Display on the screen of the remote desktop client computer.

This Section provides full details of how to set up the test set for remote connectivity, and also how to set up a computer running any 32-bit version of Microsoft Windows as a remote desktop client computer.

Basic Setup for Remote Desktop Operation
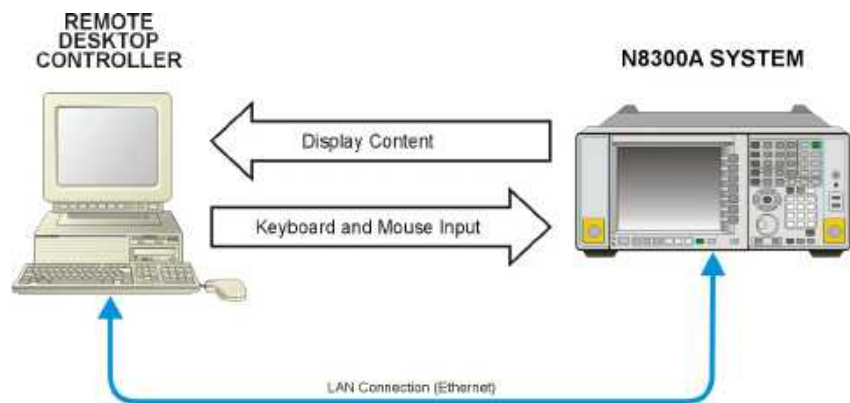
Setting Up Remote Desktop Operation

Setting Up the Test Set

Before the test set may be controlled via a Remote Desktop Connection, it must be set up to allow connection from a remote computer.

NOTE	To perform this operation successfully, you must have Administrator level access to the test set.

To perform setup, do the following:

1 Open the Windows Control Panel, by either:

  ▪ from the test set Application, pressing System, Control Panel..., or,

  ▪ from the Windows Desktop, clicking Start, Control Panel.

2 If the Control Panel appears with "Category View", click Performance and Maintenance, then click System. If the Control Panel appears with "Classic View", double-click System.

3 Select the Remote Tab of the System dialog.

4 A Warning Message appears, informing you that it may be necessary to configure your internet connection sharing or personal firewall to permit Remote Desktop connections. The details of such configuration are beyond the scope of this document.

5 In the "Remote Desktop" section of the dialog, check the "Allow users to connect remotely to this computer" checkbox.

6 Click the "Select Remote Users..." button, then follow the on-screen instructions to add users. All users who have Administrative level access are listed as already having permission. You should also ensure that the "Instrument" user is on the list of allowed remote users.

Setting Up the Remote Computer

The procedure depends on whether the remote desktop client computer to be set up is running Windows XP, or another version of Microsoft Windows.

Remote Computer running Windows XP Windows XP includes the Remote Desktop Connectivity Client software, so no additional setup is required.

Remote Computer running another Version of Windows You can use any 16-bit version of Windows (Windows 95, 98, ME, NT4, or 2000) to install and run the Client software for Remote Desktop Connectivity. However, you need to have available a Windows XP installation CD-ROM, because that contains the Client software. You can also use Windows Vista as a client operating system.

NOTE	The following instructions relate to software provided by Microsoft Corporation. Agilent offers no warranty regarding the operation of such software. The procedure described here may be changed by Microsoft at some future time.

To install the Client software, do the following:

1 When the Welcome Screen appears, select Perform additional tasks.

2 From the "What do you want to do?" screen, select Set up Remote Desktop Connection.

3 The "Remote Desktop Connection InstallShield Wizard" appears. Click Next to begin the installation, and follow the on screen instructions provided by the Wizard.

4 Once the Remote Desktop Client Software is installed, you can access it via the Windows Start menu, under All Programs > Accessories > Communications > Remote Desktop Connection.

Running a Remote Desktop Session

Initializing a Remote Desktop Session

NOTE	In order to initialize a Remote Desktop Session, you need to know the "Computer Name" of the test set. This information can be shown on the test set display by following the procedure in the Section How To Locate the Computer Name of the Test Set.

After setting up both the test set and the remote desktop client computer for Remote Desktop Connectivity, as described in the Section "Setting Up Remote Desktop Operation" on page 59, you are ready to start a Remote Desktop session.

To start a Remote Desktop session from the remote desktop client computer:

1 Click Start > All Programs > Accessories > Communications > Remote Desktop Connection.

2 A Remote Desktop Connection dialog appears.
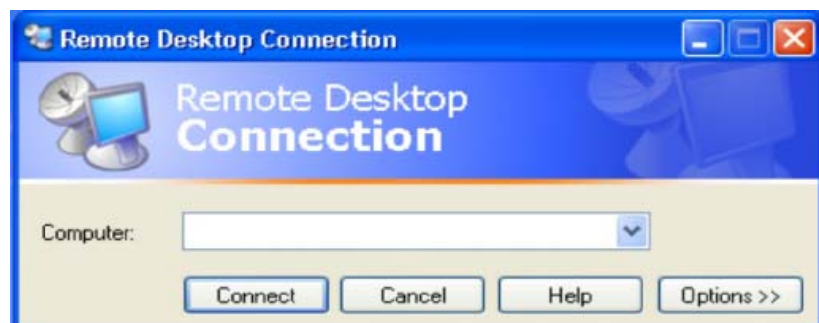
In the box titled Computer, enter the Computer Name of the test set. (For instructions on how to obtain this, see the Section "How To Locate the Computer Name of the Test Set" on page 70.)

3 Click Connect.

4 Log in to the test set. In the login dialog that appears, enter the login account name and password. The default account name is "Instrument" and the default password is "measure4u," but note that these parameters may be changed by test set users.

NOTE	Only the current User or an Administrator can remotely log into the test set. To see who the current user of the test set is, press Ctrl+Esc on the test set until you can view the current user name on the Start menu. If no one is currently logged into the test set, any valid test set user can remotely log in.

5 The test set Display appears on the screen of the remote desktop client computer. Because the test set Front Panel keys are not available when using the test set remotely, three alternative methods are available to mimic the functions of the Front Panel keys, as detailed in the Sections, "Popup Menus for Remote Desktop Operation" and "Keycode Commands for Remote Desktop Operation".

Setting Remote Desktop Options
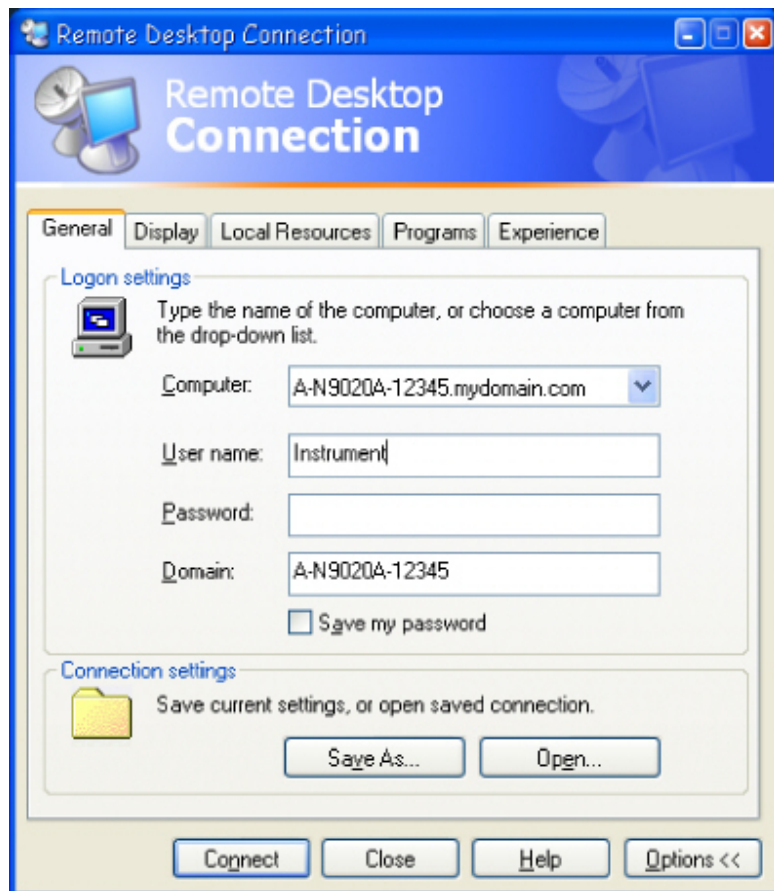
Clicking the Options button in the Remote Desktop Connection dialog displays the Options dialog:

The Options dialog has several tabs. Generally, the default settings are correct. However, there are some restrictions on particular settings under certain tabs, as listed below.

- Under the General tab, ensure that the Computer Name, User name and Domain name are correctly set. You may choose to enter the password and save it for future sessions, by checking the Save my password box.
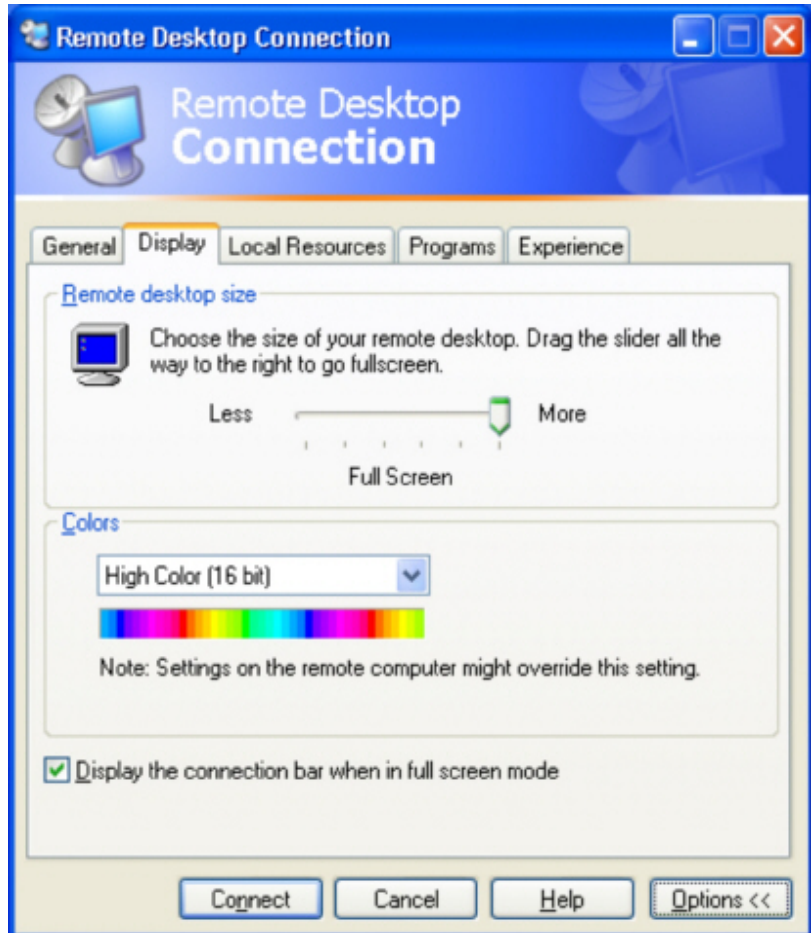
- The information displayed under the Display tab is as shown below:

- Under Remote desktop size, you may select the size of the window in which the test set display will appear. Do not select any size smaller than 1024 x 768 pixels. Selecting a remote desktop size smaller than 1024 x 768 results in the test set display not being fully visible. In such circumstances, scroll bars do not appear, so portions of the display are not accessible.

- Under Colors, you may select any setting that uses 15 bits or more. Selecting a color setting that uses fewer than 15 bits results in dithering and incorrect color rendition of the remote desktop window.

- The information displayed under the Experience tab is as follows:
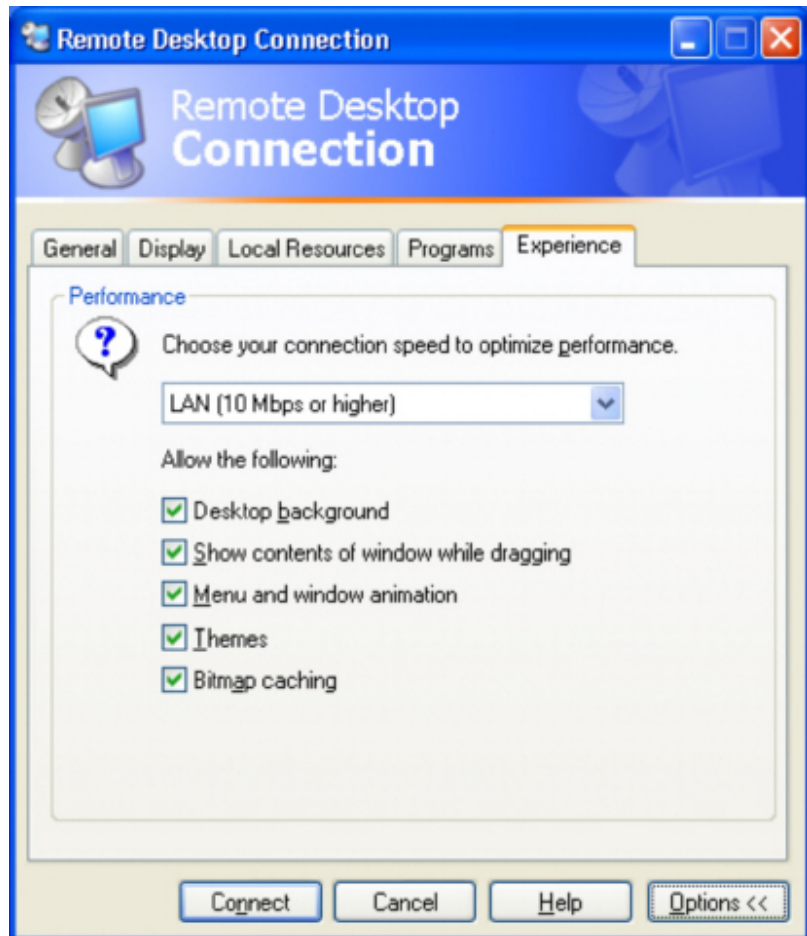
To optimize the performance of the Remote Desktop session, choose the appropriate connection format from the drop-down listbox.

Ending a Remote Desktop Session

There are two ways to disconnect the remote desktop client computer from the test set, ending the Remote Desktop session.

1 If the remote desktop window is full-screen, click the X at the right of the connection bar that appears at the top center of the window. If the remote desktop window is not full-screen, click the red X box at the right of the window's title bar. In both cases, a dialog appears, asking you to confirm that you wish to disconnect. Click OK to disconnect.

2 Move the cursor to the bottom left of the remote desktop window, to cause the taskbar to appear. Click Start, then click the red Disconnect button at the lower right of the Start menu (this corresponds to the Shut Down button in a non-remote Windows session). A dialog appears, asking you to confirm that you wish to disconnect. Click Disconnect to disconnect.

Popup Menus for Remote Desktop Operation

Right-clicking the mouse over the application display window pops up the following menu hierarchy, which may be used as alternatives to the Front Panel keys.

Setup ▶					Frequency
Marker ▶			Marker		Span
Control ▶		Trigger	Peak Search		Amplitude
Mode ▶	(List of Modes)	Sweep-Control	Marker To		Source Control
Meas ▶		Restart	Marker Function		Input-Output
Mode Preset	(List of Measurements)	Single			View-Display
User Preset		Continuous			Trace-Detector
Utility ▶	System				Auto Couple
Window ▶	Zoom	File			BW
Return	Split Screen	Quick Save			Mode Setup
Local	Next	Save			Meas Setup
Help	Full Screen	Recall			
Exit		Page Setup			
		Print			

The function of each selection in the popup menu is generally identical to that of the corresponding Front Panel key. There are certain additional items, as listed below:

- Exit. Selecting this item closes the Application software.

- Utility > Page Setup. Selecting this item opens a printer setup dialog.

> **NOTE** The popup menus are also available when using the test set directly, provided that a mouse or other pointing device is attached to it.

Keycode Commands for Remote Desktop Operation

When using the test set in Remote Desktop mode, the following combinations of remote keyboard keys can be used to mimic th

Agilent N8300A Remote Desktop Keycodes

ANALYZER SETUP

Ctrl+Shift+F	Ctrl+Shift+O	Ctrl+Shift+C
FREQ Channel	Input/Output	Auto Couple

Ctrl+Shift+S	Ctrl+Shift+V	Ctrl+Alt+B
SPAN X Scale	View/Display	BW

Ctrl+Shift+A	Ctrl+Alt+T	Ctrl+Alt+U
AMPTD Y Scale	Trace/Detector	Source

Ctrl+Shift+M	Ctrl+Shift+E	Ctrl+Shift+T
Mode	Mode Setup	Trigger

MARKER

Ctrl+Alt+K
Marker

Ctrl+Alt+P
Peak Search

Ctrl+Alt+N
Marker →

Ctrl+Alt+F
Marker Function

UTILITY

Ctrl+Shift+Y	Ctrl+M
System	Mode Preset

Ctrl+Q	Ctrl+U
Quick Save	User Preset

Ctrl+S	Ctrl+F
Save	File

Ctrl+R	Ctrl+P
Recall	🖨

MEASUREMENT

Ctrl+Alt+M	Ctrl+Alt+E	Ctrl+Shift+W	Ctrl+Alt+R	Ctrl+Alt+S	Ctrl+Alt+C
Meas	Meas Setup	Sweep/Control	Restart	Single	Cont

Ctrl+Shift+F1

Ctrl+Shift+F2

Ctrl+Shift+F3

Ctrl+Shift+F4

Ctrl+Shift+F5

Ctrl+Shift+F6

Ctrl+Shift+F7

Esc	Delete	Backspace
Cancel (Esc)	Del	Bk Sp ← ■

Shift+Tab	Tab
Tab ⇤	Tab ⇥

Space Bar	Ctrl	Alt
Select ☑	Ctrl	Menu (Alt)

Ctrl+Shift+R
◀ Return

Ctrl+Shift+L	Ctrl+Shift+Z	Ctrl+Shift+N

F1	Ctrl+Shift+B
Help	Full Screen

Keycode Commands

To mimic the following Front Panel key:	Press these keys on the Remote Computer keyboard:
AMPTD Y Scale	Ctrl+Shift+A
Auto Couple	Ctrl+Shift+C
Bk Sp	Backspace
BW	Ctrl+Alt+B
Cancel (Esc)	Esc
Cont	Ctrl+Alt+C
Ctrl	Ctrl
Decrease Audio Volume	the Volume Control slider
Del	Delete
Down Arrow	Down Arrow
Enter	Enter (Return)
File	Ctrl+F
FREQ Channel	Ctrl+Shift+F
Full Screen	Ctrl+Shift+B
Help	F1
Increase Audio Volume	the Volume Control slider
Input/Output	Ctrl+Shift+O
Left Arrow	Left Arrow
Marker	Ctrl+Alt+K
Marker ->	Ctrl+Alt+N
Marker Function	Ctrl+Alt+F
Meas	Ctrl+Alt+M
Meas Setup	Ctrl+Alt+U
Menu (Alt)	Alt
Mode	Ctrl+Shift+M
Mode Preset	Ctrl+M

Mode Setup	Ctrl+Shift+E
Mute	the Mute checkbox under the Volume Control
Next Window	Ctrl+Shift+N
Peak Search	Ctrl+Alt+P
Print	Ctrl+P
Quick Save	Ctrl+Q
Recall	Ctrl+R
Restart	Ctrl+Alt+R
Return	Ctrl+Shift+R
Right Arrow	Right Arrow
Save	Ctrl+S
Select	Space Bar
Single	Ctrl+Alt+S
Softkey 1	Ctrl+Shift+F1
Softkey 2	Ctrl+Shift+F2
Softkey 3	Ctrl+Shift+F3
Softkey 4	Ctrl+Shift+F4
Softkey 5	Ctrl+Shift+F5
Softkey 6	Ctrl+Shift+F6
Softkey 7	Ctrl+Shift+F7
Source	Ctrl+Alt+U
Source Control	Ctrl+Shift+E
SPAN X Scale	Ctrl+Shift+S
Split Screen	Ctrl+Shift+L
Sweep/Control	Ctrl+Shift+W
System	Ctrl+Shift+Y
Tab	Tab
Trace/Detector	Ctrl+Alt+T

Trigger	Ctrl+Shift+T
Up Arrow	Up Arrow
User Preset	Ctrl+U
View/Display	Ctrl+Shift+V
Zoom	Ctrl+Shift+Z
1	1a
2	2a
3	3a
4	4a
5	5a
6	6a
7	7a
8	8a
9	9a
–	Use the – key to enter a negative value, as appropriate[a]
. (Decimal Point)	. (Period)[a]
0 (Zero)	0 (Zero)[a]

For remote keyboards that feature a numeric keypad, use either the appropriate numeric keypad key or the main keypad key.

NOTE	The effect of pressing Ctrl+Alt+Delete on the keyboard of the remote desktop client computer always applies to the remote desktop client computer, and not to the test set. Generally, the effect of pressing this key combination is to display the Windows Task Manager. Therefore, pressing this key combination on the remote desktop client computer does not allow you to reboot the test set.

How To Locate the Computer Name of the Test Set

To connect a remote desktop client computer to the test set, you need to know its "Computer Name." The Computer Name can be displayed as follows:

From the Agilent Application:

1 On the test set Front Panel, press System, Show, System.

2 A page listing various parameters appears. The test set's Computer Name is shown in the list alongside the title "Computer Name".

From the Windows Desktop (with a mouse attached to the test set):

1 Click Start, Control Panel.

2 If the Control Panel window appears in Category View, click Performance and Maintenance, then System, to display the System Properties dialog. If the Control Panel appears in Classic View, double-click System to display the System Properties dialog.

3 Click on the Computer Name tab of the System Properties dialog.

4 To close the System Properties dialog, click Cancel.

From the Windows Desktop (without a mouse attached to the test set):

1 Press Ctrl+Esc to display the Windows Start menu, then use the Up Arrow or Down Arrow keys to select the Control Panel item. Press Enter to open the Control Panel dialog.

2 If the Control Panel window appears in Category View, press Tab to select Performance and Maintenance, then press Tab to select System. The System Properties dialog is displayed. If the Control Panel appears in Classic View, press Tab to select System, then press Enter, to display the System Properties dialog.

3 Press Ctrl+Tab until the Computer Name tab is selected. The Computer Name is displayed under "Full computer name."

4 To close the System Properties dialog, press Tab to select the Cancel button, then press Enter.

5 To close the Control Panel dialog, press Alt+Select to open the drop-down File menu, then press the Down Arrow until the Close menu item is selected. Press Enter to close the Control Panel dialog.

Capturing/Printing Displays and Windows

| NOTE | This capture/print functionality is a Microsoft Windows XP capability. The following discussion provides some guidelines for using this capability with the test set. You will have to refer to the Windows XP help documentation for more information. |

You need an external keyboard and mouse to use this feature.

Save the Desktop:

1   Capture the entire desktop by pressing the external keyboard Print Screen key. This saves the

2   desktop on the Windows clipboard.

3   Open a graphics software program like Microsoft Paint.

4   Paste the clipboard contents into the program. (Ctrl + v)

5   Save the image in a file.

Save the Current Active Window:

1   Click on the window you want to capture (activate it).

2   Capture the window by pressing the keys on the external keyboard Alt + Print Screen key. This

3   saves the active window on the Windows clipboard.

4   Open a graphics software program like Microsoft Paint.

5   Paste the clipboard contents into the program. (Ctrl + v)

6   Save the image in a file.

Windows Shortcuts and Miscellaneous Tasks

This section provides a list of windows shortcuts (key combinations) that are useful when you operate the test set without an attached mouse and keyboard. (See also Navigating Windows Without a Mouse on page 11.) Although these shortcuts are available in any Windows XP system, they are not commonly used when a mouse and keyboard are attached.

This section also includes details of certain windows tasks that may be required from time to time when using or configuring the test set.

Windows Shortcuts (Key Combinations)

You can use the following combinations of front panel keys to perform basic windows tasks when using the test set without an attached mouse and keyboard.

Windows Shortcut Key Combinations

To do the following:	Press:
Display the Windows Start Menu	Ctrl+Esc
Cycle through all open applications	Alt+Tab
Select the first menu of a menu bar	Alt
Move through menu headings	Left Arrow, Right Arrow
Open (drop down) a menu	Down Arrow
Move through items in an expanded menu	Up Arrow, Down Arrow
Close the current menu selection	Esc
Cancel the current menu bar selection	Alt
Open an application's control menu (usually the left-most menu on the menu bar, starting with File)	Alt+Select
In a dialog: move between tabs	Ctrl+Tab
In a dialog: move forward through dialog box items	Tab
In a dialog: move backward through dialog box items	Shift+Tab
In a dialog: open a list box	Alt+Down Arrow
In a dialog list box or check box: select or	Select

deselect items	
In a dialog list box or check box: select or deselect one item at a time	Shift+Up Arrow, Shift+Down Arrow
In My Computer, expand a selected folder	Enter
In My Computer, open a folder one level up from the current folder	Bk Sp

Example: Navigating an Application Menu without a Mouse or Keyboard

This example uses Microsoft Excel, but you can use a similar sequence of operations to select and execute any menu item of any application.
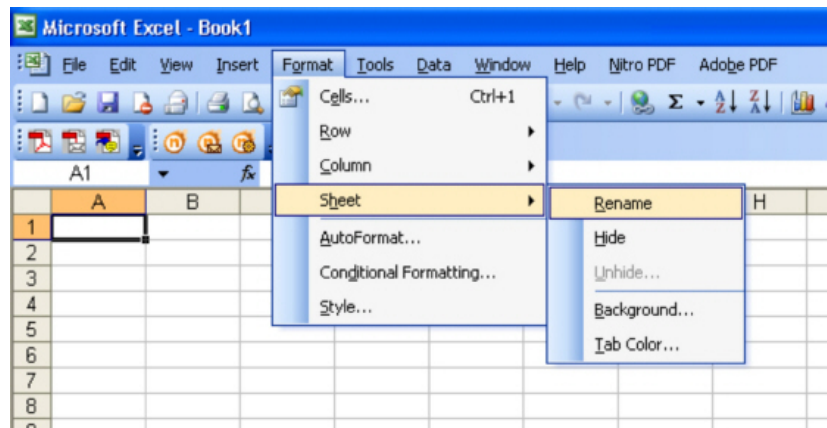
To select and execute the item Sheet > Rename option from the Format menu in the menu bar shown below

perform the following operations:

1   With the focus in the appropriate window, press Alt to select the File menu in the menu bar.

2   Use the Right Arrow and Left Arrow keys to move horizontally to the Format menu.

3   Press Down Arrow to expand the Format menu.

4   Use the Down Arrow and Up Arrow keys to move vertically to the Sheet menu item.

5   Press Right Arrow to expand the Sheet sub-menu.

6   The Rename sub-menu item appears already selected. (If another item in the same sub-menu is required, use the Down Arrow and Up Arrow keys to move vertically to that item.)

7   Press Enter to execute the selected action.

Windows Taskbar: Auto-hide

The Windows taskbar should always be in the auto-hide mode when using the test set application. If the taskbar is not set to auto-hide, the lower part of the test set display is obscured by the taskbar.

If a mouse is attached to the test set, and you move the mouse cursor to the bottom of the display (either deliberately or accidentally), the taskbar automatically appears. Provided that the taskbar is in auto-hide mode, you can make it disappear again by moving the mouse cursor away from the bottom of the screen.

If at any time the Windows taskbar is inadvertently set to the non-auto-hide mode, you can restore the auto-hide behavior by doing the following:

1 Click Start > Control Panel. If not using a mouse, press Ctrl+Esc.

2 If the Control Panel window appears in Classic View, click Taskbar and Start Menu. If the Control Panel window appears in Category View, click Appearance and Themes > Taskbar and Start Menu. If not using a mouse, use the shortcut key combinations specified in the Section "Windows Shortcuts (Key Combinations)" on page 70 to make these selections.

3 The Taskbar and Start Menu Properties dialog appears. Select the Taskbar tab.

4 Check the Auto-hide the taskbar check box. If not using a mouse, press Tab repeatedly until the auto-hide option is selected, then press Select to toggle the check box state.

5 Click or select OK to apply the change and close the dialog.

The Windows Startup Folder

All Windows XP systems include a special folder, called the Startup folder. If a program, or a shortcut to a program, is placed in the Startup folder (either by Windows itself, or by a third-party application, or by any user), that program automatically runs every time Windows is restarted.

When your test set is first configured by Agilent, shortcuts to the appropriate application software and supporting programs are placed in the Startup folder. The exact contents of the Startup folder depends on the options you purchased with your test set.

NOTE	You should never delete items that appear in the Startup folder, or move any item from the Startup folder to another folder. Deleting or moving any item in the Startup folder may cause applications not to start automatically when Windows is restarted, or may cause certain options to be unavailable when using the test set.

If you wish to view the contents of the Startup folder, do one of the following:

- Either click Start, All Programs, then select Startup, or,

- Click Start, My Computer, then navigate to the folder C:\Documents and Settings\All Users\Start Menu\Programs\Startup. (Note that additional startup items may also appear in the corresponding startup folder for the user that is currently logged on. For example, the startup folder for the administrator user is C:\Documents and Settings\administrator\Start Menu\Programs\Startup.)

5 Troubleshooting

This section provides contact information for Agilent service centers, and troubleshooting information that is applicable to the test set hardware, operating system, and test set application.

WARNING	No operator serviceable parts inside. Refer servicing to qualified personnel. To prevent electrical shock do not remove covers.

Check the Basics

- Is there power at the receptacle?

- Is the test set turned on? Check to see if the green LED beside the power switch is on. Also, listen for internal fan noise to determine if the test set cooling fans are running.

- If other equipment, cables, and connectors are being used with your test set, make sure they are connected properly and operating correctly.

- Is the Measurement Application running? If not, there is a software launch shortcut/icon on the desktop.

- Does the Measurement Application have the focus? (That is, is the blue window banner highlighted?) If not, move focus to the application with Alt-Tab.

- Review the measurement procedures being performed when the problem first appeared. Are all of the settings correct?

- If the test set is not functioning as expected, return the test set to a known state by pressing Mode Preset.

NOTE	Some test set settings are not affected by a Preset. If you wish to reset the test set settings, press System, Power On, Restore Power On Defaults.

- Is the measurement being performed, and the results that are expected, within the specifications and capabilities of the test set? Refer to the specifications for your test set. Refer to http://www.agilent.com/find/n8300a).

- If the test set is not communicating via the LAN connection, check for the presence of blinking yellow LEDs on the rear panel LAN connector. If the receive LED is not blinking, check the LAN cable and LAN integrity.

- Check if the external frequency reference is selected but not available. Verify that it is selected by pressing Input/Output, Freq Ref In. If External is selected, changing the setting to Sense allows the test set to sense the presence of an external reference and use it only if it is available. The frequency of the reference should be set correctly.

- If you are using a Windows program, other than the test set application, you may notice it running slow. Place the test set application in single sweep/measurement.

TIP	You can get automatic electronic notification of new firmware releases and other product updates/information by subscribing to the Agilent Technologies Test & Measurement E-Mail Notification Service for your test set at http://agilent.com/find/notifyme

Problems with Microsoft Windows XP

The Microsoft Windows XP operating system settings have been optimized for the best performance. Modification of these settings may degrade test set performance and measurement speed. Those that can be safely modified are described in Test Set Configuration on page 37.

The N8300A is an Open Windows environment, so you can install software on the test set. However, installation of non-approved software may affect test set performance. Agilent does not warrant the performance with non-approved software installed.

Returning a Test Set for Service

Calling Agilent Technologies

Agilent Technologies has offices around the world to provide you with complete support for your test set. To obtain servicing information or to order replacement parts, contact the nearest Agilent Technologies office listed below. In any correspondence or telephone conversations, refer to your test set by its product number, full serial number, and software revision.

Press System, Show, System, and the product number, serial number, and software revision information will be displayed on your test set screen. A serial number label is also attached to the rear panel of the test set.

Locations for Agilent Technologies

Online assistance: http://www.agilent.com/find/assist

United States	Latin America	New Zealand
(tel) 1 800 829 4444	(tel) (305) 269 7500	(tel) 0 800 738 378
(fax) 1 800 829 4433	(fax) (305) 269 7599	(fax) 64 4 495 8950
Canada	Japan	Asia Pacific
(tel) 1 877 894 4414	(tel) (81) 426 56 7832	(tel) (852) 3197 7777
(fax) (905) 282-6495	(fax) (81) 426 56 7840	(fax) (852) 2506 9284
Europe	Australia	
(tel) (31 20) 547 2323	(tel) 1 800 629 485	
(fax) (31 20) 547 2390	(fax) (61 3) 9210 5947	

Read the Warranty

Please read and become familiar with the terms of your test set's warranty.

If your test set is covered by a separate maintenance agreement, please be familiar with its terms.

Service Options

Agilent Technologies offers several optional maintenance plans to service your test set after the warranty has expired. Call your Agilent Technologies office for full details.

If you want to service the test set yourself after the warranty expires, you can purchase the service documentation that provides all necessary test and maintenance information.

You can order the service documentation, Option 0BW (assembly level troubleshooting information) through your Agilent Technologies office.

Returning for Service

When you are returning an test set to Agilent Technologies for service, please be as specific as possible about the problem. If you have recorded any error messages that appeared on the display, have completed a functional test, or have any other specific data on the performance of your test set, please include a copy of this information.

Packaging the Test Set

Use original packaging or comparable. It is best to pack the unit in the original factory packaging materials if they are available.

CAUTION	Analyzer damage can result from using packaging materials other than those specified. Never use styrene pellets in any shape as packaging materials. They do not adequately cushion the equipment or prevent it from shifting in the carton. They cause equipment damage by generating static electricity and by lodging in the test set louvers, blocking airflow.

You can repackage the test set with commercially available materials, as follows:

1 Attach a completed service tag to the test set.

2 Wrap the test set in antistatic plastic to reduce the possibility of damage caused by electrostatic discharge.

3 Use a strong shipping container. The carton must be both large enough and strong enough to accommodate the test set. A double-walled, corrugated cardboard carton with 159 kg (350 lb) bursting strength is adequate. Allow at least 3 to 4 inches on all sides of the test set for packing material.

4 Surround the equipment with three to four inches of packing material and prevent the equipment from moving in the carton. If packing foam is not available, the best alternative is plastic bubble-pak. This material looks like a plastic sheet filled with 1-1/4 inch air bubbles. Use the pink-colored bubble which reduces static electricity. Wrapping the equipment several times in this material should both protect the equipment and prevent it from moving in the carton.

5 Seal the shipping container securely with strong nylon adhesive tape.

6 Mark the shipping container **"FRAGILE, HANDLE WITH CARE"** to assure careful handling.

7 Retain copies of all shipping papers.

Agilent Technologies