Getting Started Guide

Agilent Technologies E7415 EMI Measurement Software

Agilent Technologies

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

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Country	Phone Number	Fax Number
Singapore	1-800-375-8100	(65) 836-0252
Malaysia	1-800-828-848	1-800-801664
Philippines	(632) 8426802 1-800-16510170 (PLDT Subscriber Only)	(632) 8426809 1-800-16510288 (PLDT Subscriber Only)
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People's Republic of China	800-810-0189 (preferred) 10800-650-0021	10800-650-0121
India	1-600-11-2929	000-800-650-1101

Guard your Data

Review this product and related documentation to familiarize yourself with instructions before you use the software.

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

CAUTION   The CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, could result in incorrect measurement results or loss of data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

Typeface Conventions

Italics

- Used to emphasize important information:
  Use this software *only* with the Agilent xxxx system.

- Used for the title of a publication:
  Refer to the *E7415A Measurement Guide*.

`User Entry`

- Used for examples of programming code:
  `#endif // ifndef NO_CLASS`

`Path Name`

- Used for a subdirectory name or file path:
  `Edit the file usr/local/bin/sample.txt`

Computer Display

- Used to show messages, prompts, and window labels that appear on a computer monitor:
  The **Edit Parameters** window will appear on the screen.

- Used for labeled keys on computer keyboard or for text you will enter using the computer keyboard:
  Press **Return**.

- Used for menus, lists, dialog boxes, and button boxes on a computer monitor from which you make selections using the mouse or keyboard:
  Double-click **EXIT** to quit the program.

- Used to specify a filename:
  Select **filename** and press **OK**.

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1   Installation Information

Introduction

Thank you for purchasing the E7415A EMI measurement software. The E7415A software is designed to make your EMI testing efficient from initial setup to final report. The E7415A software runs under Windows 95, Windows 98, or Windows NT 4.0.

What You Received with the E7415A

If you are missing any of the following items, notify your local Agilent Technologies sales office or representative.

Standard Product

- CD-ROM (E7415A software with Online Help and Quick Tour)

- Hardware key (attaches to your computer's parallel port)

- E7415A Getting Started Guide

- E7415A Measurement Guide

Option Descriptions

These are the options that can be enabled using your serialized hardware key. View your options for installation in the **Help | About...** dialog box.

Post-Process Reporting (Option 001)

This option disables instrument control and measurement processing, allowing report generation only.

Personal Computer Requirements

Basic Requirements

One of the following Operating Systems must be installed and running on your PC before the E7415A software will function properly:

- Microsoft Windows 95 (Version 4.00.1111, 4.00.950B or later)
- Microsoft Windows 98 and 98 SE (First edition requires DCOM98)
- Windows NT 4.0 (Service Pack 3 or higher)

In addition, the appropriate interface board (NI GPIB or Agilent GPIB) must be installed in your computer along with appropriate driver software. If you are using a NI GPIB interface, use National Instruments NI-488.2, version 1.6 software drivers or later. The latest Agilent drivers for Agilent GPIB interface boards can be downloaded from Agilent's web site. Refer to "Helpful Web Sites" for the appropriate web site URL.

Use the installation instructions provided with your particular interface board to install the software.

Helpful Web Sites

National Instruments NI-488.2 help and information refer to `http://www.ni.com`

Agilent I/O libraries, refer to `http://www.agilent.com/find/iolib`

Minimum PC Requirements

The following table lists the minimum personal computer requirements needed to run the Agilent E7415A software.

Table 1-1   **Minimum PC Requirements for Windows 95, Windows 98, or Windows NT 4.0**

	Windows 95 and Windows 98	Windows NT 4.0
CPU	133 MHz or higher Pentium-compatible CPU	200 MHz or higher Pentium-compatible CPU
RAM	32 MB available RAM	64 MB available RAM
Parallel Port	Hardware key must be installed on parallel port	Hardware key must be installed on parallel port
Graphics	800 x 600 display	800 x 600 display
Hard Disk	100 MB free disk space	100 MB free disk space
CD-ROM Drive	Required (2X or faster)	Required (2X or faster)
GPIB	A supported GPIB Interface board	A supported GPIB Interface board
Pointing Device	Any Windows 95 or Windows 98 compatible mouse or trackball	Any Windows NT compatible mouse or trackball

Recommended PC Requirements

The following table lists the personal computer requirements recommended for optimum performance of the Agilent E7415A software.

Table 1-2   **Recommended PC Requirements**

	Windows NT 4.0
CPU	300 MHz or higher Pentium-compatible CPU
RAM	96 MB available RAM
Parallel Port	Hardware key must be installed on parallel port
Graphics	1024 x 786 display
Hard Disk	200 MB free disk space
CD-ROM Drive	Required (2X or faster)
GPIB	A supported GPIB Interface board
Pointing Device	Any Windows NT compatible mouse or trackball

Supported GPIB Interface boards

The following table lists the GPIB boards supported by the Agilent E7415A software.

Table 1-3   **Supported GPIB Interface boards**

Windows 95 and Windows 98	Windows NT 4.0
Agilent 82341D (ISA) Agilent 82350A (PCI)	Agilent 82341C (ISA) Agilent 82350A (PCI)
National AT-GPIB/TNT (ISA) National PCMCIA-GPIB (PCMCIA) National PCI-GPIB (PCI)	National AT-GPIB/TNT (ISA) National PCMCIA-GPIB (PCMCIA) National PCI-GPIB (PCI)

Additional Software Requirements

The application's Online Help requires the presence of Internet Explorer version 4.0 (which includes the SP1 service pack) or higher to work. If you have an earlier version, download a newer version from Microsoft at `http://www.microsoft.com/windows/ie/default.asp`

Preparing for Use

The products and applications that should be installed are:

- Windows 95 systems:

    DCOM95 1.3 or later needs to be installed before E7415A can be installed. DCOM95 version 1.3 is provided on the E7415A CD-ROM and can be installed by selecting DCOM95 from the installation menu, or by double-clicking \DCOM95\dcom95.exe. It can also be downloaded from the Microsoft web site:
    `http://www.microsoft.com/com/resources/downloads.asp`

    If you install E7415A without DCOM95, you must first uninstall E7415A, install DCOM95 and then reinstall E7415A. Refer to page 1-19 for uninstall instructions.

- Internet Explorer 4.0 or greater

NOTE   Installation of DCOM95, Version 1.3 is required only if you are operating a Windows 95 PC platform.

- Windows 98 systems:

    Since DCOM98 is installed with Windows 98SE, you should not need to install DCOM98. However, if the installation process cannot find the DCOM98 system file, it will prompt you to install DCOM98. If you install E7415A before installing DCOM98, you must first uninstall E7415A, install DCOM98 and then reinstall E7415A. Refer to "Uninstalling Previous Versions" below for uninstall instructions.You can download DCOM98 from the Microsoft web site:
    `http://www.microsoft.com/com/resources/downloads.asp`

- Internet Explorer 4.0 or greater (installed with Windows 98)

Installing the E7415A Software

It takes only a few minutes to install the E7415A software. The setup program in the E7415A software makes the installation easy.

Uninstalling Previous Versions

If a previous version of E7415A has been installed, it is a good idea to uninstall the old software and back up your database files and test setups before updating. Your database files and test setups are not removed during the uninstall process, and will still be accessible after the update is complete:

1. Select **Start | Settings | Control Panel**. Double-click on **Add/Remove Programs**.

2. Scroll down to where the old version of **E7415A** is listed and single-click to highlight that program.

3. Click on the **Add/Remove** button. The dialog window will ask you to confirm file deletion. Click **Yes**.

4. The Uninstall Shield window will appear. Follow the step by step instructions to remove the program.

NOTE   Database files are automatically upgraded to the current version the first time you run E7415A.

CAUTION   This program may share files with other programs. If Windows asks you if you want to delete these files, click the '**No to All**' option. Leaving these files on your computer will not affect its operation.

5. The Uninstall Shield will remove the program from your computer. When the uninstall operation is complete, click **OK** to close the window.

6. Scroll down the list to verify that the program has been removed, then click **OK** to close the window.

Installing E7415A

If one or more applications are running, close those applications before installing the E7415A software. Follow the on-screen instructions for application installation. After completion make sure to restart the computer.

1. Insert the E7415A installation CD into your CD-ROM drive. If auto play is disabled, click on **Start | Run**. The **Run** dialog window will appear. You can either type in the CD-ROM drive designator and program setup file (for example: **D:\E7415A\Startup.exe**) or click **Browse**, select the CD-ROM drive, open the E7415A folder, and double-click **Startup.exe**. Click **OK**.

2. Follow the instructions for installing the E7415A software on your machine.

3. The *Readme* file is shown after installation. After you have read the information in the file, close the window by clicking on the '**X**' in the upper right corner and then click **Finish**.

4. Restart your computer before using the software for the first time.

Start the Software

1. Select **Start | Programs | E7415A | E7415A** to start the software.

2. The **Receiver Setup Wizard** window will appear after starting the program for the first time. Follow the instructions given by the **Setup Wizard** or refer to "Run the Receiver Setup Wizard" below.

Run the Receiver Setup Wizard

The E7415A software uses either an Agilent or National Instruments GPIB interface board and drivers to control the test equipment that you use to make your EMI measurements. If you have not yet installed the GPIB board and drivers, please refer to "Supported GPIB Interface boards" on page 17.

The E7415A has a special "Wizard" that you can use to set up the communication between the software and the receiver you will be using for your measurements:

1. Attach your hardware key to the parallel port on your PC.

2. Connect your computer and the receiver you plan to use via the appropriate GPIB interface cable.

3. To change receivers, select **Tools | Receiver Setup Wizard** from your menu.

4. A screen will appear that will guide you through the setup process. From the "**with New Receiver**" list, select the receiver type you plan to use. Click **Next**.

Verify your Hardware Connection

After successfully running the Receiver Setup Wizard, verify that your instrument connection is working:

1. Select **Setup | Equipment | Receivers**. Double-click on the Receiver folder.

2. From the selection of available receivers select the receiver to which you are connected. A window will appear as shown in Figure 1-1.

3. To check your connection, verify that the Communications Interface, Bus Address and Communication Library settings match that of the GPIB driver, then press Check Device. A window will appear verifying your connection is working properly. If you don't have a proper connection, check your cables, as well as your GPIB hardware settings.

Figure 1-1   **Receiver Setup**
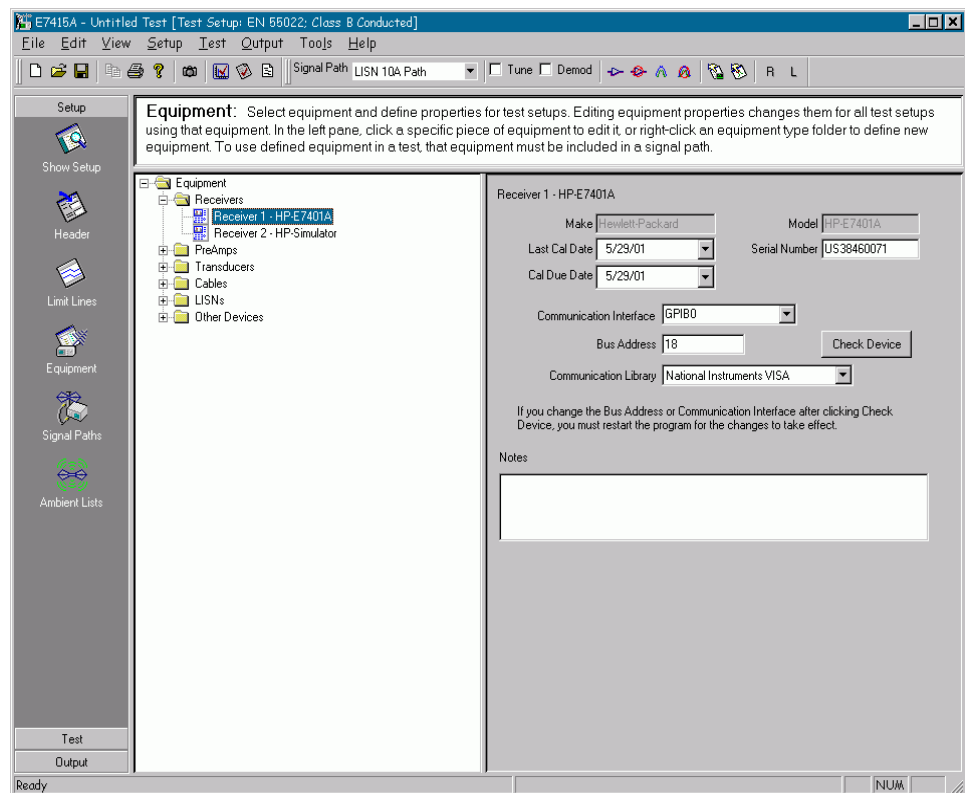
NOTE   Changes to the bus address or communication library will not take affect until you restart the E7415A software.

2   E7415A Product Overview

Introduction

The E7415A EMI measurement software automates radiated and conducted emissions measurements. The overall measurement process consists of two major parts:

- Data acquisition – EUT (equipment under test) emissions in the frequency range of interest are collected using peak detection.

- Data analysis – Further processing of signals close to or exceeding a regulatory limit using other detectors such as quasi-peak or average.

Rapid detection and automated measurement procedures ensure shorter overall measurement times. After an initial sweep, signals in a trace can be added to a signal list for measurement.

Peak, quasi-peak and/or average detection can be selected for the measurement. Signal values as well as differences between limits or a specified limit line margin can be calculated and displayed. Enabling a tune-and-listen function allows identification of ambient signals.

Visual inspection or mathematical comparison of signals allow you to determine those emissions which need further evaluation. In the graphical representation, a zooming function is available for enhancing the frequency resolution of a highlighted area without remeasuring. Signals can be marked for additional or final measurements. All results are stored in the signal list representing final result of the overall measurement process. A built-in Post-Process Report allows easy inclusion of measurement data in both graphical and tabular form, as well as user-specified text to document the results.

These functions and others are accessed from a Main software window and a Sidebar for easy access to measurement functionality. In addition, traditional Menu lists and Toolbar icons are available for alternate access of measurement functions, as well as providing additional important features designed to enhance viewing and signal manipulation.

Window Components and Conventions

A number of conventions are followed throughout this manual as well as in the E7415A Measurement Guide and the Online Help. These terms and conventions can be quickly scanned by viewing the following figures.

Main Screen Naming Conventions

Figure 2-1 illustrates the E7415A main Windows screen with the main components called out. The important E7415A specific components are described below.

Figure 2-1   **Main screen**
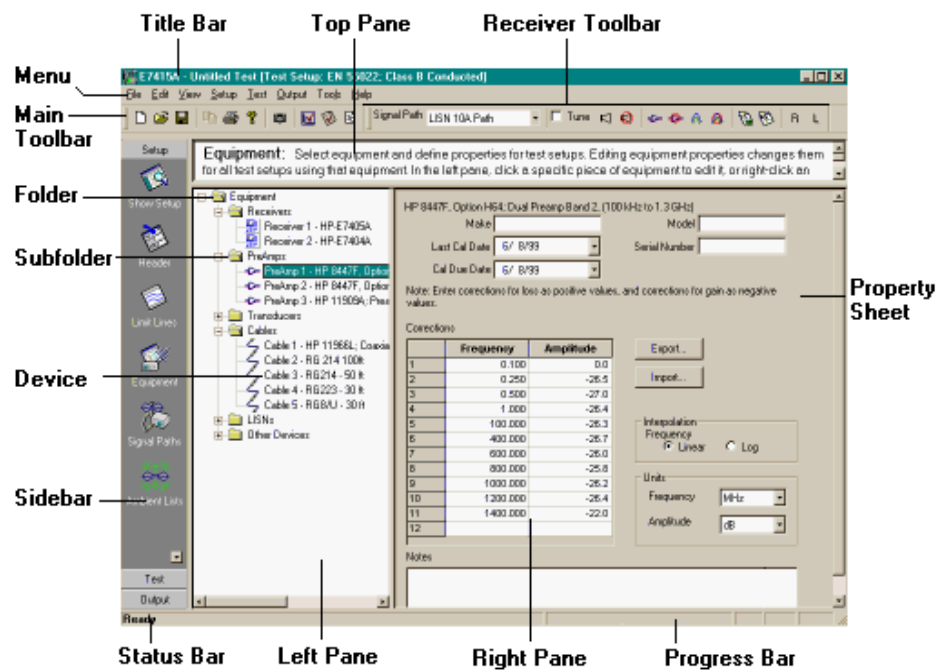
Menu

The Menu provides access to options which allow you to open, save and manipulate data, setups and measurement parameters. Refer to the Online Help under Help | Contents... for a detailed description of menu items.

Main Toolbar

The Toolbar provides an iconified set of options as shown in Figure 2-1. As you become accustomed to using the software, you may find that selecting an icon from the Toolbar is easier than finding the topic in the menu.

Actions available from the Main Toolbar are; New, Open, Save, Copy, Print, Online Help, Snapshot, Graph Settings, List Settings, and Show Setup Summary.

Refer to the Online Help under **Help | Contents...** for a detailed description of Main Toolbar functions.

Sidebar

The sidebar is located along the left hand edge of the Main Screen as shown in Figure 2-1. The main measurement options are normally selected from the Sidebar, though many can be accessed from the Toolbar or the Menu as well.

Sidebar functionality is discussed in more detail in "Sidebar Structure" on page 31.

Status Bar

The Status Bar in the bottom left corner displays text regarding the progress of various functions such as opening setups, taking sweeps, and measurements.

Receiver Toolbar

The Receiver Toolbar starts at the double vertical lines, to the right of the toolbar. The Receiver Toolbar provides rapid access to the signal path and certain receiver options such as Tune and Demodulation functions, inclusion (or exclusion) of a preamplifier, and application of the Max Hold function. To move the Receiver Toolbar, click on the double vertical lines and drag it to its new location. Drag it back to the original location to place the Receiver Toolbar back in its default location.

Refer to the Online Help under **Help | Contents...** for a detailed description of Receiver Toolbar functions.

Top Pane

Watch the Top Pane for information regarding your setup. The Top Pane will provide a description of the active windows within **Sidebar | Setup**.

Other Window Components

In addition to the components of the main screen described above, a number of other conventions are used to describe portions of the graph window and Signal List as shown in Figure 2-2 and Figure 2-3. Please refer to these figures when you are reading the E7415A documentation.

Graph View Naming Conventions

Figure 2-2 illustrates the E7415A Graph View screen with the main components called out. Individual components are described below.

Figure 2-2   **Graph View**
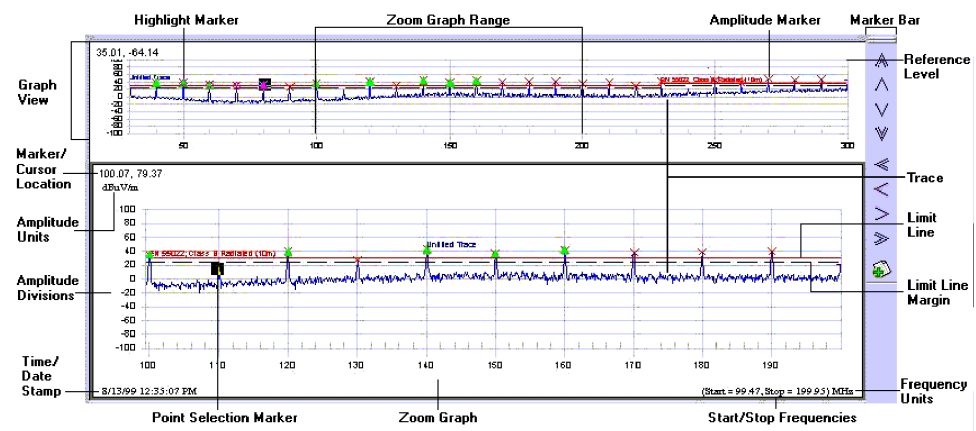
bg81a

Graph View

Shows an overall view of a trace from a predetermined start to stop frequency range. For example, a graph view could minimally include a Limit Line, Limit Line Margin, Segments, and Amplitude Divisions.

Marker/Cursor Position/Location

Shows the position of the cursor as the mouse moves over the graph area. If the mouse is not moving over the graph area, it displays the Point Selection Marker position, which is manipulated on the graph using either the cursor or the Marker Bar. The position is displayed as a frequency/amplitude pair, the units corresponding to the Y-axis amplitude units and the X-axis frequency units.

Amplitude Units

Shows the Y-axis unit type.

Amplitude Divisions

Shows the logarithmic amplitude units on the vertical graticule. Numerical peak levels can also be viewed in the signal list.

Time/Date Stamp

Shows the real time and date the trace was graphed.

Point Selection Marker

The Point Selection Marker is the marker shown on an active graph as a shaded (or black) square over a data point of interest. To move the position of the marker, place your mouse cursor on a signal of interest and left-click. A small "pointing hand" icon will appear at the position you are selecting. Verify that this is the correct position by observing the Marker/Cursor position in the top left of the active graph area.

Zoom Graph

Shows the region of the graph that is placed below the normal graph view in the split-screen display mode. This view is displayed with greater resolution. This graph also displays the actual uncompressed data as taken with the receiver. The original frequency is maintained.

Start/Stop Frequency

Shows the start and stop frequency of the graph. The left and right sides of the graticule correspond to the start and stop frequencies. If the zoom graph is enabled, the start and stop frequency of the zoom graph are displayed.

Frequency Units

Shows the X-axis unit type.

Limit Line Margin

Shows the interval for EUT emissions measurement relative to the applicable limit. This offset is denoted as negative dB.

Limit Line

This line represents the associated regulation limits.

Trace

Shows the graphical representation of one or more receiver sweeps. A trace is comprised of a series of data points in which frequency and amplitude information is stored.

Reference Level

Shows the amplitude power or voltage represented by the top graticule line on the displayed graph or zoom graph.

Marker Bar

The arrow icons on this toolbar place the active marker on the peak or point determined by the chosen icon. The active marker is a solid black square that identifies a point on the trace, and its current frequency and amplitude are displayed in the upper left corner of the graph or zoom graph window.

Amplitude Marker

The crosshatch or x characters that identify peaks on the trace.

Zoom Graph Range

Vertical black lines mark the zoom graph range, or span, on a normal graph view. The zoomed graph appears below the normal graph view.

Highlight Marker

Diamond-shaped characters that identify points on one or more traces corresponding to signals selected from the signal list.

Signal List View Naming Conventions

Figure 2-3 illustrates the E7415A Signal List View screen with the main components called out. Individual components are described below. For information on creating a signal list, refer to "Step 4: Create a Signal List" on page 43.

Figure 2-3   **Signal List View.**

Corner Cell

A click on this cell in the upper left corner will select or deselect the entire signal list. This includes all rows, cells and columns in the table.

Row Number

Clicking on the row number will highlight that row and the information it contains. You can select and highlight multiple rows by clicking on a numbered row while holding the left mouse button down and scrolling up or down to your desired row.

Signal

A signal is typically a frequency and amplitude point that represents a peak on a trace. Each numbered row in the signal list contains the values for each signal or peak. Minimally, a signal is a frequency which can be inserted manually. The signal list can contain data values derived from traces or measurements, or frequencies inserted by the user.

Column Heading

Describes the type of information held in each of the columns. For example, in the **Frequency MHz** column, all the table cells in that column pertain only to the frequency readings. A click on the column heading highlights the entire column.

Table Cell

Each cell contains information for each signal received from the sweep. You can manually alter the cell information by clicking on your chosen cell and typing in the information you want. This is usually numerical information. Some column's table cells (for example, **Trace Name** and **Polarity** columns) will have a separate window appear to input information or have a dropdown menu button appear next to the information so you can select the appropriate option.

Sidebar Structure

The Sidebar Structure allows quick access to the icons which will help you set up and measure EMI data. Use this table to help you find the topic of interest

Table 2-1   **Sidebar Structure**

Sidebar	Sidebar Icons	Location
Setup	Show Setup	page 31
	Header	page 32
	Limit Lines	page 32
	Equipment	page 32
	Signal Paths	page 32
	Ambient Lists	page 32
Test	Sweep	page 33
	Add Peaks To List	page 33
	Measure	page 33
Output	Report	page 34
	Snapshot	page 34

NOTE   These functions are described briefly in this chapter and in Chapter 3 of this guide to illustrate the overall flow of the software. However, the *Measurement Guide* should be used as the final reference and guide for making measurements. Many of the questions you may have about software functionality can only be found there.

Setup

The following functions are listed by icon in the Setup section of the sidebar

Show Setup

Setup | Show Setup   Opens a window that allows you to observe all the settings as they are defined in the **Test Setup** you selected for this measurement, as well as the header information you define in **Setup | Header** (see below). For information on selecting Test Setups, please see "Setup" on page 31.

Header

Setup | Header   Allows you to specify information about this measurement: **Customer Name**, **Project Number**, **Operator Name**, etc.

Limit Lines

Setup | Limit Lines   Opens a window showing the current set of defined limit lines. The E7415A software comes with a standard set of limit lines. You can also define your own limit line by **right clicking** a **Limit Line** folder, selecting **New Limit** and specifying values. See the *Measurement Guide* for a detailed description about how to edit and add new limit lines.

NOTE   Editing an existing limit line will affect all test setups that currently use the limit line with that name.

Equipment

Setup | Equipment   Allows you to specify equipment for a new test setup or one that you are editing. You can add new equipment or edit correction factors for existing equipment. See the *Measurement Guide* for a detailed description about how to specify correction factors in the equipment list.

NOTE   Editing an existing equipment type will affect all test setups which include that piece of equipment.

Signal Paths

Setup | Signal Paths   Allows you to specify equipment to be included in the signal path. You can add new equipment or edit correction factors for existing equipment. See the *Measurement Guide* for a detailed description about how to add components and specify correction factors.

NOTE   Editing an existing signal path will affect all test setups which include this signal path.

Ambient Lists

Setup | Ambient Lists   Opens a window that includes all the currently defined ambient lists. All ambient lists must be user-generated as described in the *Measurement Guide*.

Test

The following functions are listed by icon in the Test section of the sidebar

Sweep

Test | Sweep   Opens a window with two tabs: **Frequency Range** and **Receiver Settings**. The settings that appear when you open the window reflect the current **Test Setup** (selected from Test Setup window at startup, or when you select **File | New**). Use the editable fields on these tabs to specify sweep parameters as described in the *Measurement Guide*.

Add Peaks to List

Test | Add
Peaks to List   Opens a window that allows you to specify a selected trace from which to add peaks to a signal list for measurement. Any signals that are identified as peaks using the specified **Peak Excursion** criteria will be added to the signal list. You can further restrict the criteria by specifying either a limit line or a limit line and margin so that only those peaks which do not pass the limit/margin criteria are added to the signal list. See the *Measurement Guide* for a detailed description of signal lists and how to utilize list settings and functionality to optimize your measurement.

Measure

Test | Measure   Opens a window with three tabs:

- **Select Signals and Detectors** – Allows you to select the signals, a set of governing criteria for signal selection for measurement (if applicable), and the detector to be used for this measurement. For a full description of these parameters please see the *Measurement Guide* or the *Online Help*.

- **For Each Signal** – Allows you to define specific criteria for locating the signals to be measured. Signals are normally located by searching for frequency of interest (the default). Alternately, you can invoke the **Tune and Listen** function before a measurement to help eliminate ambient signals. Finally, you can specify a message which will appear between the measurement of each signal (**Prompt before Measure**). As the measurement proceeds, the signal list is updated according to the specified update criteria (**Always Update**,

Only if Larger, or **Prompt for OK**). See the *Measurement Guide* for a detailed description of how to refine signal lists.

- **Receiver Settings** – Allows you to modify other receiver settings that are used during the measurement process. You can enable a built-in receiver preamp (8546A/2E and E7400A receivers only), and/or specify values for the RBW, VBW, or attenuation. See the *Measurement Guide* for information on these receiver settings and how they affect measurements.

Output

The following functions are listed by icon in the Output Section of the sidebar

Report (Option 001)

Allows you to use the **Post-Process Report** option to select various items such as graph, signal list, one or more snapshots, and compile these items into a single file for viewing, printing, or later use. You can also export reports as .rtf files for further analysis or for measurement presentation.

Snapshot

Allows you to capture the current graph view, the signal list or both.

Hardware Key and License Manager

The serialized hardware key that came with your E7415A software enables and secures the functionality you purchased from Agilent. The key must be plugged into your parallel port to use the E7415A software. Since one hardware key is provided with each E7415A license, only one copy of E7415A software per license can be running at any given time.

The **License Manager Tool** accessed from **Start | Programs | E7415A | License Manager**, enables you to manage licensing security information. You can use the **License Manager** to:

- Add product options to authorized license keys

- Transfer licensed product options between license keys

- Transfer licenses between keys on different computers
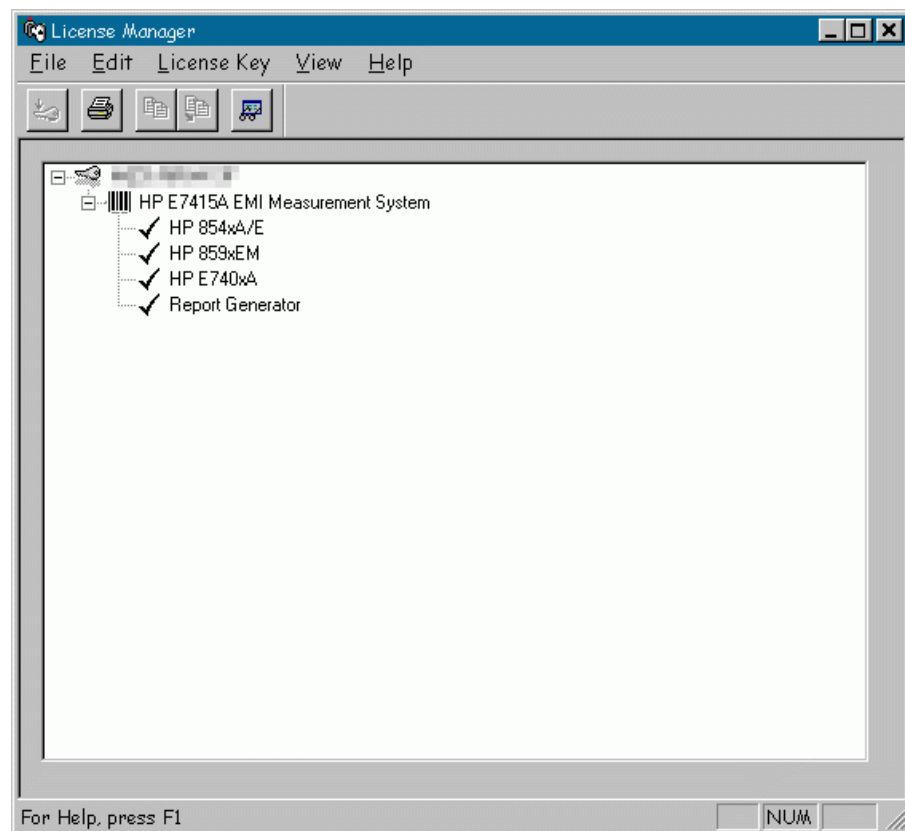
See **Help | Contents** within the License Manager software for more detailed descriptions regarding the License Manager.

NOTE   The **License Manager** above displays all available product options. Your list view may differ depending on the product options purchased.

3   Quick Start

Introduction

If the E7415A software has been installed and your receiver is connected and properly communicating with your PC, you can use this chapter to learn about making a measurement. (If your software and receiver do not appear to be communicating, see "Run the Receiver Setup Wizard" on page 20.)

Procedure

This procedure is meant only to test the software and acquaint you with its overall menu structure. It is highly recommended that before attempting real measurements, that you consult the Measurement Guide for detailed procedures and instructions on how to use the software to make accurate EMI measurements.

Step 1: Setup

1. Click on **Start | Programs | E7415a | E7415A** to open the EMI measurement software.

2. From the **New Test: Select Test** window, use the dropdown list to select a **Test Setup** (for example, `EN 55022 Test Setup`). Select the test needed for your measurement (for example, `EN 55022; Class B, Conducted`), then click **OK**.

   (Later on, you may create your own setups and folders. These saved setups will be available in this window for selection.)

If your software is already open and you have previously selected a setup, you may continue, or start again using **File | New**.

Figure 3-1   **Test Setup Selection**
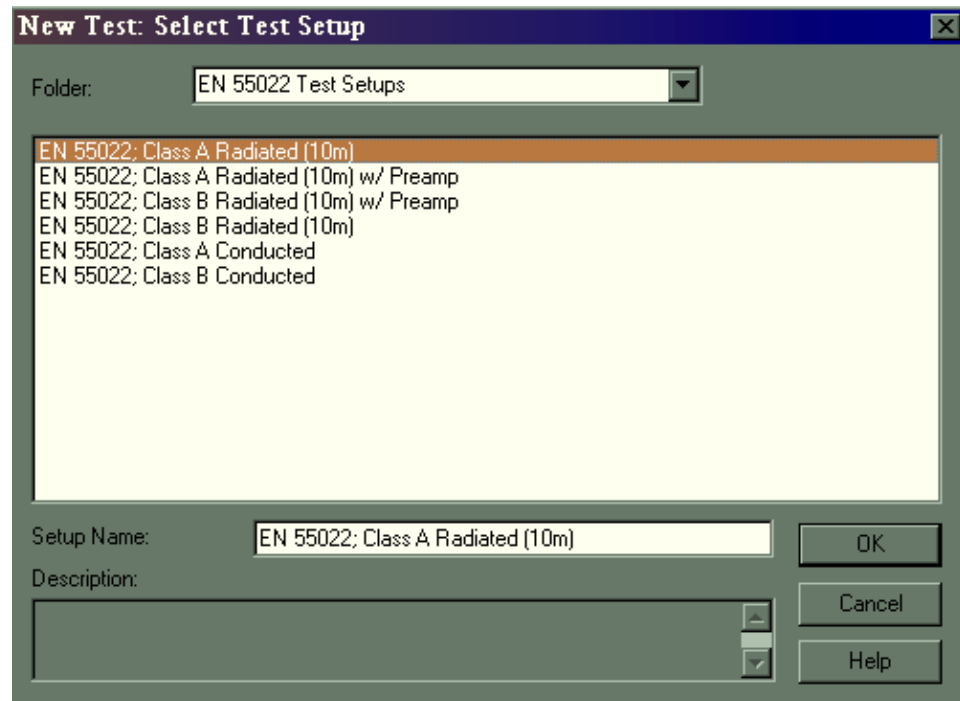
Once a Test Setup has been selected, the limit lines for your selected setup will be displayed on the graph. Default equipment, corrections factors, instrument settings, and so on are loaded.

Step 2: Define the Signal Path

Any of the default test setups provided with the E7415A software will include the limit line(s) for the standard for which the setup was defined, as well as a signal path that includes a suggested set of equipment for making the measurement. You can check (and edit) the equipment and signal path selected by selecting **Setup | Signal Path**.

CAUTION   The equipment in your signal path must match that of your actual configuration. Otherwise, the corrections being applied to the traces and measured signals will not be correct and your measurement results will be invalid.

- From the Sidebar, select **Setup | Signal Path**. Figure 3-2 shows the selected signal paths reflecting typical equipment sets for measuring conducted emissions in compliance with EN55022 Class B limits, which include both quasi-peak and average peak measurements.

Figure 3-2   Signal Path Setup
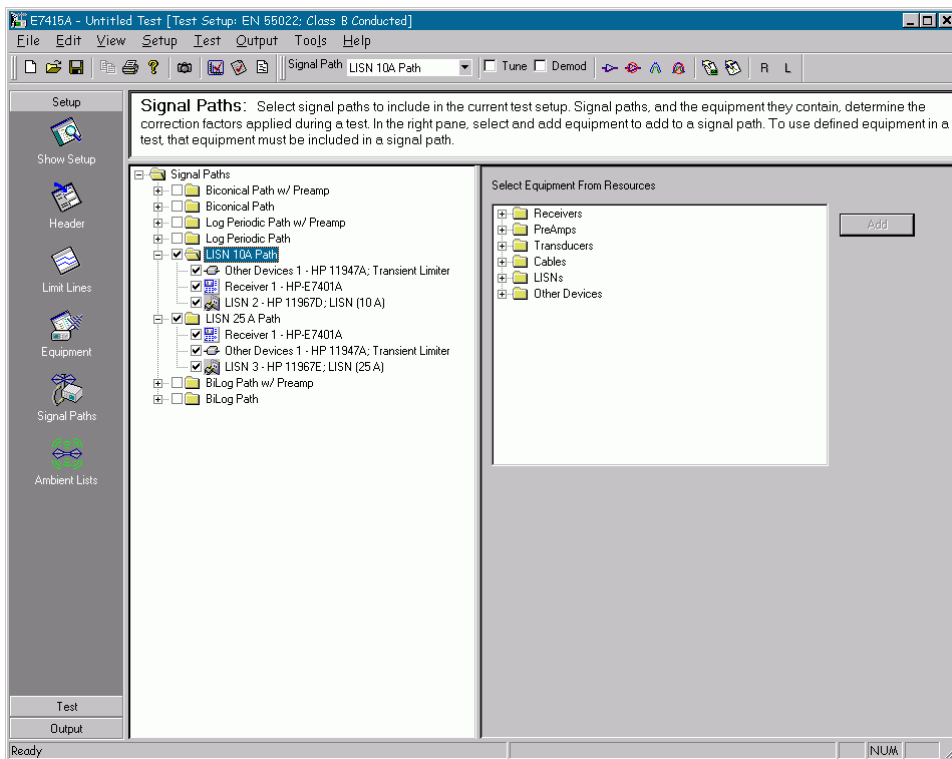
Step 3: Sweep

1. From the Sidebar, select the **Test | Sweep** to open the **Sweep** dialog box.

2. The values in the **Sweep** dialog box reflect the setup you selected in "Step 1: Setup" on page 39 as well as any other default values that apply. See the *Measurement Guide* for information regarding the purpose and use of individual Sweep dialog settings.

3. To name the sweep, enter a name in the **Output Trace** box, such as `55022ClassB_Conducted`.

Figure 3-3   **Sweep Window**
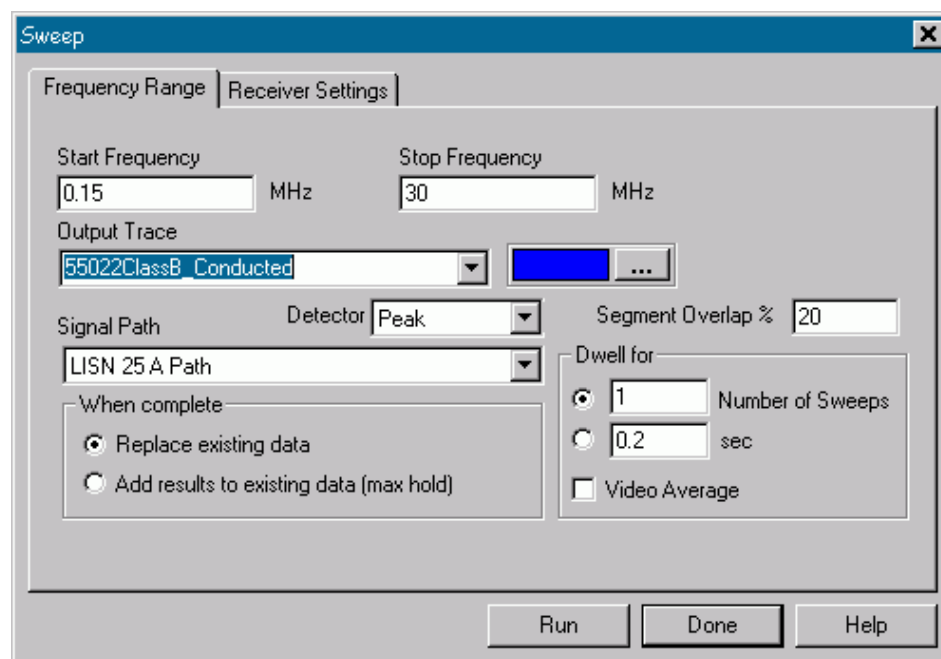
4. Click on Run to start the sweep.

The receiver is in remote mode and a sweep is performed over a frequency range of 150 kHz to 30 MHz (as required for a conducted measurement). The Sweep Control dialog box allows you to pause or abort the procedure. You can monitor the sweep's progress in the Status Bar in the lower left-hand corner of the application window, and view the trace as it is updated on the graph.

Figure 3-4 **Sweep Control Dialog Box**
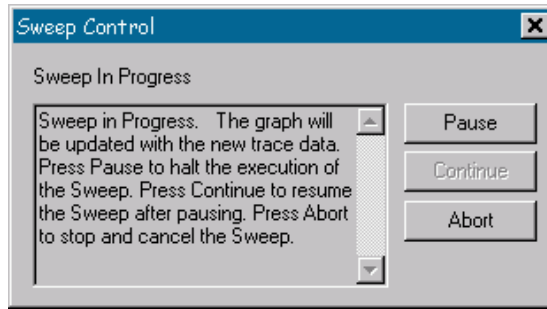
Figure 3-5 **Frequency Band Trace**
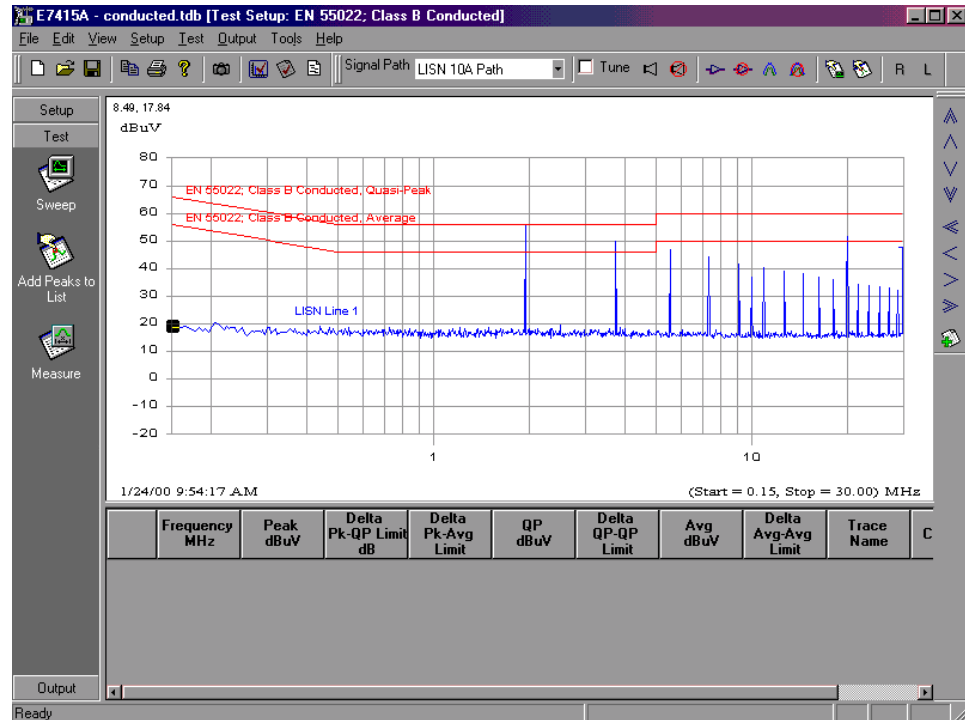
Step 4: Create a Signal List

1. Select **Test | Add Peaks to List**.

Figure 3-6   Add Peaks to List
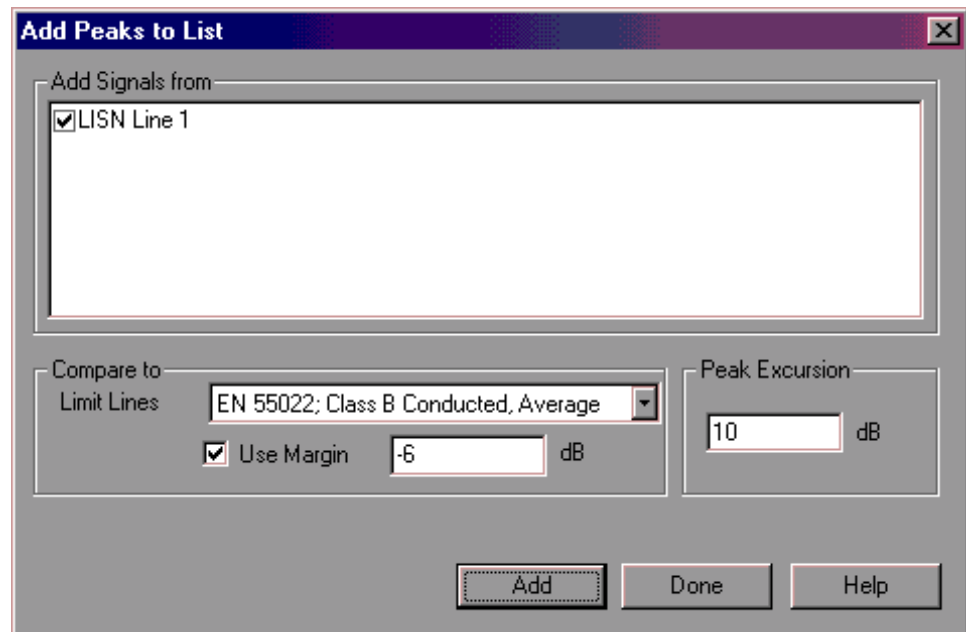
2. In the Add **Peaks To List** dialog box, make sure the same trace name that was defined as the Sweep output trace name is checked. The values shown for the selected limit line, peak excursion and limit line margin are defined by the test setup but can be modified. If you want to change any of these values, please refer to the *Measurement Guide* for detailed information about these values and how to set them.

   All signals that are discerned in the trace by peaks that rise and fall by the amount specified in the Peak Excursion criteria, with a Peak detector value that is above the selected limit line, are added to the signal list table. Note that the total number of signals measured is displayed in the left-hand column of the table and can be viewed by scrolling down to the last signal in the list.

Step 5: Measure

1. Highlight selected signals in the list table by pressing the **Ctrl** key on the keyboard while clicking the numbered rows (left-hand side) of the table.

2. Under the **Test** button, click on the **Measure** icon.

Figure 3-7   Measure Selected Signals
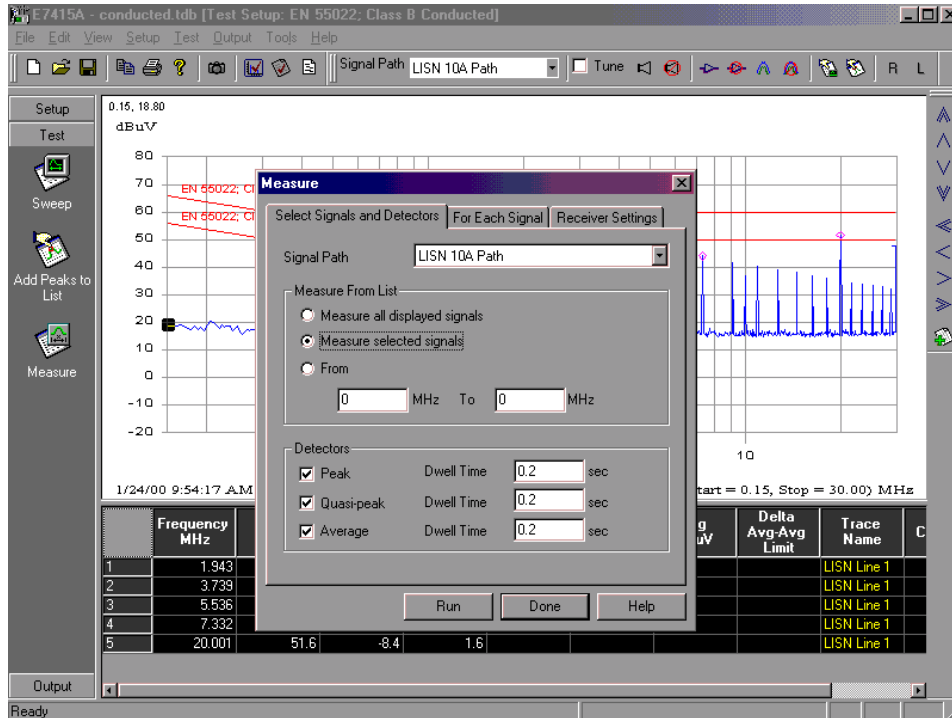
3. In the **Measure From List** area, select **Measure Selected Signals**.

4. In the Detectors area, select Peak, Quasi-Peak and Average. Click on **Run** to begin the measurement.

   Each signal is re-measured using the Peak, Quasi-Peak, and Average detectors. The Measure Control box allows you to pause or abort the process. Once the measurement is complete, the Peak column in the Signal List table is updated with new values acquired with less frequency uncertainty and the Quasi-Peak and Average values are acquired and added to the signal list table.

Step 6: Create a Report

1. Select **Output | Report**.

2. In the **Report** dialog box, enter a **Report Title** (for example, `EN 55022;`
   `Class B Conducted`).

Figure 3-8   **Output Report**
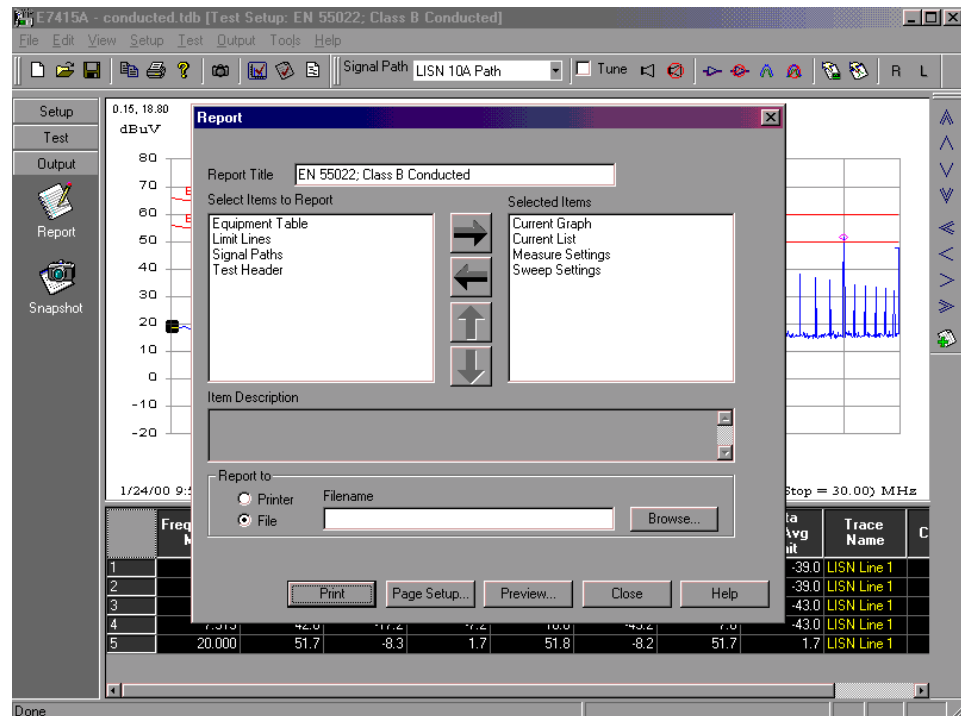
3. In the **Select Items to Report** area, hold down the **Ctrl** key while
   selecting the following report items:

   - **Current Graph**
   - **Current List**
   - **Measure Settings**
   - **Sweep Settings**

4. Click on the **right arrow** ($\rightarrow$) to move the highlighted items into the
   Selected Items area.

   These items will now be included in your report. Change the order of
   the report items by highlighting an item and then using the up and
   down arrow buttons to move the report item up or down in the list.

NOTE   Using the buttons at the bottom of the Report dialog box, you may **Print**,
              Save to a file, manipulate the **Page Setup**, or **Preview** the report.

5. Click on the **Preview** button to view the report, as it will appear when it is printed. Use the scroll bar on the right-hand side of the window to scroll through the contents of the report

Figure 3-9   **Measurement Report**
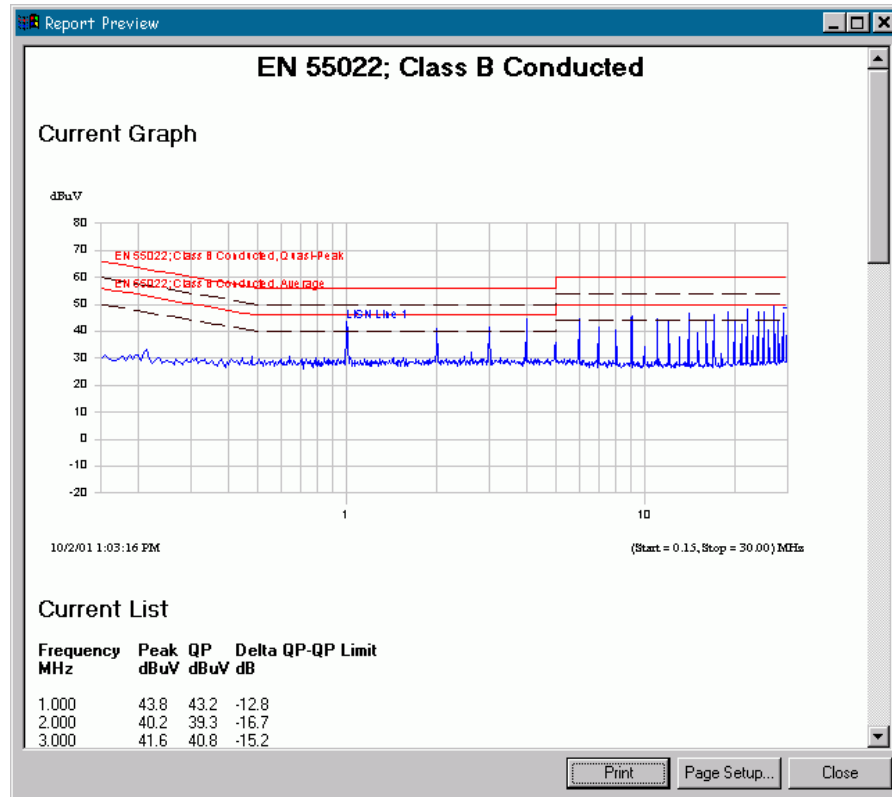
6. .Click **Close** to exit the **Preview** window, then **Close** again to exit the **Report** dialog box.

Congratulations!

You have just completed making a quick measurement for your equipment and limit lines.

Next Step: Customizing the Test Setup

Now you can create a test setup that is customized for your equipment and limit lines.

1. Select **Setup | Limit Lines**. The left-hand panel contains folders used to store limit lines for the different regulations (for example, European Norms, FCC, and so on). **Double-click** a folder icon or **click on the +** to view the available limit lines, then put checks next to the **Limit Lines** to be used in your setup. You can also create a new folder to copy and paste limit lines into and modify. **Right-click** the **Limit Lines** folder and choose **New Folder**. **Right-click** a limit line with similar settings for your setup, then use **right-click** to copy and paste into your new folder. Edit the data in the new limit line's property sheet. (See to Figure 3-10.)

Figure 3-10   Custom Limit Lines
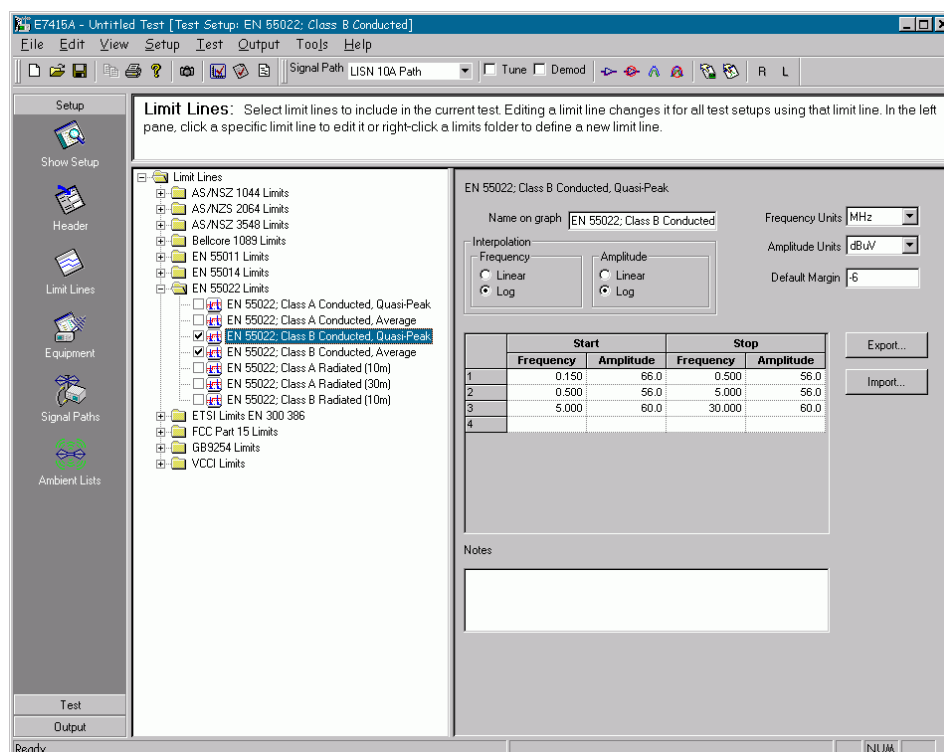
2. Select the **Equipment** icon to add new equipment or modify existing equipment. The Equipment resource is separated into folders for the different types of equipment (for example, receivers, preamplifiers, transducers, and so on). Each device has a property sheet, where you can enter all of the pertinent data for each device, such as, model number, serial number, calibration dates, and correction factors. The bus address is set for communication between the receiver and the software. (See to Figure 3-11.)

Figure 3-11   Custom Equipment Settings
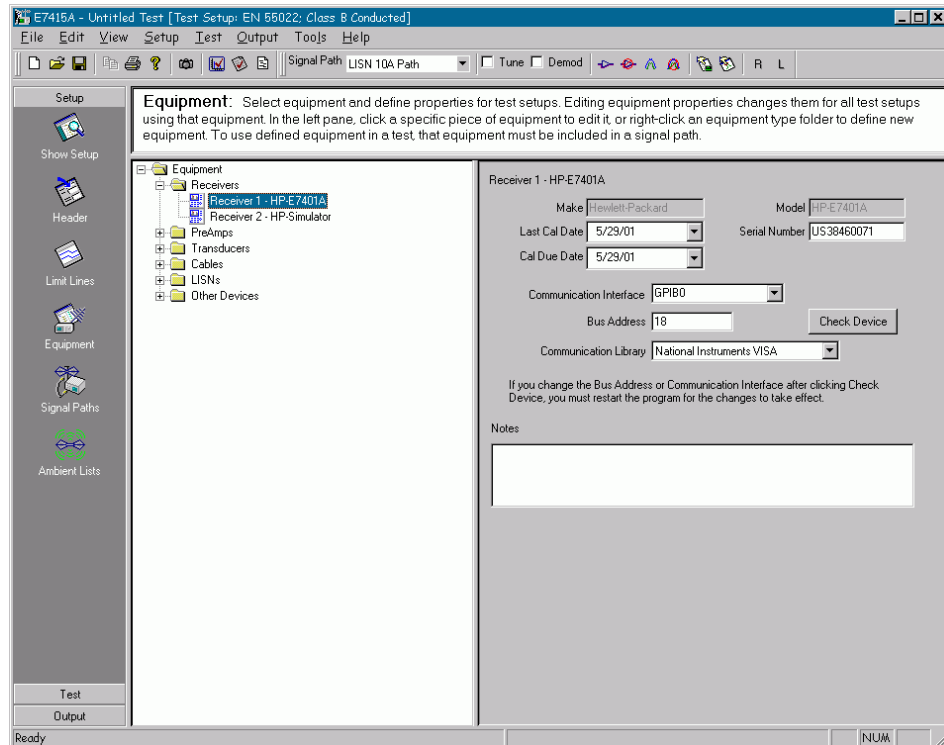
3. Select the **Signal Path** icon to configure the equipment to be used for a test. Signal paths contain all the devices that will constitute an equipment configuration (for example, receiver, antenna, cables, preamplifier, and so on). Correction factors for each device will be summed together for the signal path and the antenna in the path will most likely determine the frequency range of the signal path. The signal path property sheet allows you to view and add any of the defined equipment in order to make a signal path. You can also "check" which signal paths that you want available for your setup. (See to Figure 3-12.)

Figure 3-12   **Custom Signal Paths**
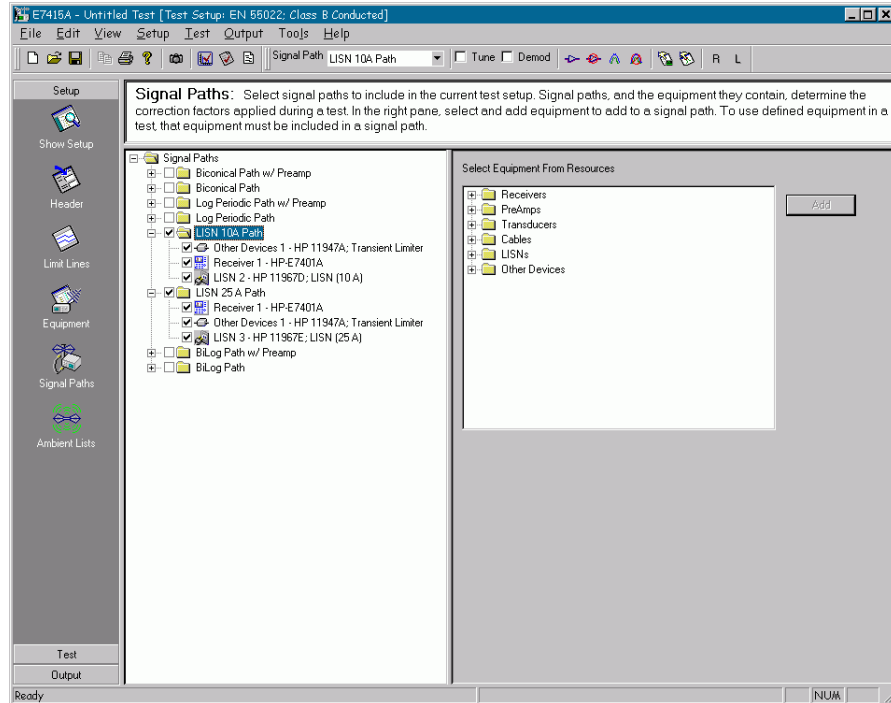
4. Select **File |Save As Setup** to save your new setup.

NOTE   Data is not saved with a setup. If you want to save your data with the
                    setup information, use **File |Save** or **File | Save As...** Refer to the
                    Measurement Guide for detailed instructions about saving files and
                    modifying or creating setups and making measurements.

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