HEWLETT PACKARD

HP E7415A
EMI Measurement Software

Getting Started Guide

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Guard your Data

Typeface Conventions

Italics
- Used to emphasize important information:
  Use this software *only* with the HP xxxxxX system.

- Used for the title of a publication:
  Refer to the *HP 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.**

Contents

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 on a personal computer (PC) platform.

What You Received with Your E7415A

If you are missing any of the following items, notify your local
Hewlett-Packard sales office or representative.

Standard Product

- CD-ROM

  ○ E7415A software

  ○ Online Help

  ○ E7415A Quick Tour

- Serialized hardware key

- E7415A Getting Started Guide

- E7415A Measurement Guide

Option Descriptions

Option 001

Report Generator

Option 101

Asset Control Module (ACM) for the HP 8590 EM series EMC analyzer

Option 102

Asset Control Module (ACM) for the HP 8542E/8546A EMC receiver

Option 488

National Instruments AT-GPIB/TNT interface card and drivers for Windows
95/98 and NT.

Option 630

- 1.44 MB, 3.5 inch floppy disks

  ○ E7415A software

  ○ Online Help

  ○ E7415A Quick Tour

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 or higher).

- Microsoft Windows 98

- Windows NT 4.0 (Service Pack 3 or higher)

In addition, the appropriate interface board (NI GPIB or HP-IB) board must be installed in your computer along with appropriate driver software. For the GPIB boards this is National Instruments NI-488.2, version 1.5 or later for Windows 95, Windows 98, or Windows NT 4.0. For HPIB cards this is included in HP I/O Libraries G.02.02 or above.

Information for installing the boards and software is provided later in this chapter.

NOTE

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

NOTE

For HP I/O Libraries refer to web page:
http://www.tmo.hp.com/tmo/country/BE/CtryNews/software/English
/HP_IO_Libraries.html

Minimum PC Requirements

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	Pentium P-5 running at 133 MHz or faster	Pentium P-5 running at 200 MHz or faster
RAM	32 MB free RAM	64 MB free RAM
Parallel Port	Hardware key *must* be installed on parallel port	Hardware key *must* be installed on parallel port
Graphics	600 x 800 display	600x800 display
Hard Disk	100 MB free disk space	100 MB free disk space
CD-ROM Drive[1]	Required (except with Option 630 as noted)	Required (except with Option 630 as noted)
GPIB	National Instrument Corporation's AT-GPIB/TNT Interface board, or Hewlett Packard HP-IB card (HP 82341C/D).	National Instrument Corporation's AT-GPIB/TNT Interface board, or Hewlett Packard HP-IB card (HP 82341C/D).
Pointing Device	Any Windows 95 or Windows 98 compatible mouse or trackball	Any Windows NT compatible mouse or trackball

1. Or a 3.5 inch floppy disk drive for Option 630.

Recommended PC Requirements

Table 1-2   Recommended PC Requirements

	Windows NT 4.0
CPU	Pentium P-5 running at 300 MHz or faster
RAM	96 MB free RAM or greater
Parallel Port	Hardware key *must* be installed on parallel port
Graphics	1024 x 768 display
Hard Disk	200 MB free disk space
CD-ROM Drive[1]	Required (except with Option 630 as noted)
GPIB	National Instrument Corporation's AT-GPIB/TNT Interface board, or Hewlett Packard HP-IB card (HP 82341C/D).
Pointing Device	Any Windows NT compatible mouse or trackball

1. Or a 3.5 inch floppy disk drive for Option 630.

Additional Software Requirements

The application's Online Help requires the presence of Internet Explorer version 3.02 or higher to work. If you have an earlier version, you can download a newer version from Microsoft at **http://www.microsoft.com/ie**.

Preparing for Use

The products and applications that should be installed are:

- On Windows 95

  ❍ DCOM 95 needs to be installed before this application can be installed. DCOM95 version 1.3 is provided on the application CD-ROM and can be installed by doubleclicking *\DCOM95\dcom95.exe*. It can also be downloaded from: *http://www.microsoft.com/com/dcom/dcom95/dcom1_3.asp*

Setting Up the AT-GPIB/TNT

The sections which follow explain how to install and configure the various cards that support the E7415A software.

<table>
<tr><td>

NOTE

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These sections provide information for use with a desktop PC. If you are using a laptop computer with a GPIB-PCMCIA card, please follow the instructions that come with that card and its drivers.

</td></tr>
</table>

The E7415A software uses National Instruments Corporation's AT-GPIB interface board or Hewlett-Packard's HP-IB card and drivers to control the test equipment that you use to make your EMI measurements. Set up the AT-GPIB interface board and the NI-488.2 software, or the HP-IB card and the G.02.02 HPIB software before installing other products.

Windows 95 and Windows 98 base address and IRQ assignments can be found by selecting **Settings | Control Panel | System | Device Manager.** For Windows NT 4.0 the base address and IRQ assignments can be found by selecting **Start | Programs | Administrative Tools | Windows NT Diagnostics,** and the Resources tab. Other diagnostic programs may be used to determine valid IRQ and base address settings.

Hardware Interface Installations

The E7415A software uses one of the following interface types with the EMC analyzer to make your EMI measurements.

- AT-GPIB/TNT(PnP)
- AT-GPIB/TNT
- HP-IB interface

The E7415A software communicates with the EMC receiver via the interface card and drivers.

The sections which follow explain how to install and configure the various cards or ports that support the E7415A software.

<table>
<tr><td>

NOTE

</td><td>

For complete installation and configuration instructions, refer to the documentation shipped with your interface package.

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</table>

Where to Start

Normally your current installation will fall into one of the following three categories:

- No current GPIB or HP-IB board installation. You bought the E7415A software *with* Option 488 which includes all the hardware and software necessary to install an interface board and drivers. If you fall into this category, you will be installing the drivers from your E7415A Installation CD.

- No Current GPIB or HP-IB board installation. You have *not* purchased Option 488, but have decided to purchase your GPIB or HP-IB board separately. In this case you can install the drivers from the HP or National Instruments CD *or* from the E7415A Installation CD.

- You already have a GPIB or HP-IB board and drivers installed on your computer. In this case, you can skip most of the steps which follow. Skip to "Installing the E7415A Software" on page 1-21. If, after you run the Receiver Setup Wizard, you find that you are not communicating with your selected receiver, first verify that you are running NI GPIB drivers Version 1.5 or later. If you are using an HP-IB card, verify that the HP I/O libraries version is G.02.02 or later. If the versions match, verify that you are not using 16 bit drivers. Finally, refer to the appropriate "Hardware Diagnostics" sections in this document for information on resolving settings conflicts.

NOTE

If you have purchased a board separately, it is possible that the recommended slots described in the sections which follow, are not appropriate. *Always* verify installation of your interface board with the manufacturers instructions before trying to insert the hardware into a slot.

Setup of AT-GPIB/TNT for Windows 95/98

There are four basic steps to install and configure the AT-GPIB/TNT interface:

- Install drivers

- Configure Hardware

- Install Hardware

- Verify Hardware

NOTE

For this installation, it is best to install the drivers before installing the hardware. This makes it easier to change the GPIB board settings in the event that the default settings result in a settings conflict.

Software Installation (AT-GPIB/TNT Drivers)

1. From the **Start** menu, select **Settings, Control Panel**, then double-click on the **Add/Remove Programs** icon.

2. Depending on which source you are using for your GPIB software, you will follow a slightly different procedure:

   ❍ If you are using a CD supplied by National Instruments:

   Insert the *NI-488.2 software for Windows and the AT-GPIB/TNT* CD-ROM into your CD-ROM drive and follow the instructions or, if you are using Windows Explorer, open the CD-ROM and doubleclick on **Setup.exe**.

   ❍ If you are using an E7415A Installation CD:

   Insert the application CD-ROM into your CD drive and select **National Instruments Drivers**; or, if you are using Windows Explorer, open the **National Instruments Drivers** folder on the CD and doubleclick on **ni488215.exe**.

3. In the Add/Remove Programs Properties window, select the **Install/Uninstall** tab and click on the **Install** button.

4. Follow the setup instructions displayed on the computer screen to complete the installation. From the GPIB setup options, select the **GPIB setup option from the NI-488.2 (M) software.** (Do not use the option for the GPIB analyzer. This does not pertain to the E7415A software.)

Hardware Configuration (AT-GPIB/TNT)

Follow the procedure below to configure the hardware *before* it is installed.

1. From the Windows 95/98 Start menu, select **Settings**, **Control Panel**, then double-click on the **Add New Hardware** icon.

2. Start the Add New Hardware wizard by clicking on **Next**. When it prompts you to search for hardware, click on **No**. (No is selected at this time because the hardware has not been installed yet.)

3. Click **Next** to display the hardware types list, then double-click on **National Instruments GPIB Interfaces.**

4. Select the **AT-GPIB/TNT** model, then click **Next**.

5. The Add New Hardware wizard will display the DMA, I/O range, and Interrupt Request for the AT-GPIB/TNT card. ***Write these values down!*** You will need to check them later against the *physical* settings on the board itself.

6. Use the settings from the step above to configure the AT-GPIB/TNT card. Refer to the *AT-GPIB/TNT Getting Started* manual to assist you with this procedure.

7. When Windows 95/98 has finished installing the software necessary for supporting your hardware, click on **Next** to end the installation. When the software prompts you to restart the computer, click on **No**. (In order to install the hardware, you will want to power down the computer completely.)

Hardware Installation (AT-GPIB/TNT)

1. Shut down Windows 95/98 and turn off the computer.

2. Remove the computer cover.

3. Insert the GPIB board into any unused 16-bit ISA slot with the GPIB connector sticking out of the opening on the back panel. Do not force the board into place. If possible, avoid using the first or last slot as it is difficult to connect the GPIB interface cable with the card in either of these locations.

NOTE

If you have purchased a board separately, it is possible that the recommended slots described in the sections which follow, are not appropriate. *Always* verify installation of your interface board with the manufacturers instructions before trying to insert the hardware into a slot.

4. Turn on the computer to start Windows 95/98.

5. In the Start menu, click on **Settings, Control Panel**. Double-click on the **Systems** icon and select the **Device Manager** tab. Verify that there are no conflicts then click **OK**.

NOTE

Settings conflicts are indicated by an ! sign on the AT-GPIB/TNT driver in the Device Manager. If you have conflicts, check that settings you made on the board match those you chose in Step 5 in "Hardware Configuration (AT-GPIB/TNT)" on page 1-10.

Hardware Verification (AT-GPIB/TNT)

1. From the Windows 95/98 Start menu, select **Settings then Control Panel.**

2. In the Control Panel window double-click on the **System** icon.

3. In the System Properties window, select the **Device Manager** tab then double-click on **National Instruments GPIB Interfaces.**

4. Select **AT-GPIB/TNT** then click on the **Properties** button.

5. In the AT-GPIB/TNT Properties window, select the **Resources** tab.

6. Verify that the I/O range, DMA, and Interrupt Request are the same values as what were set on the card and that there are no conflicts.

7. Click the **OK** button to close the AT-GPIB/TNT Properties window.

8. Click the **OK** button to close the System Properties window.

9. To test the AT-GPIB/TNT card, follow the instructions provided in the National Instruments *AT-GPIB/TNT Installation Guide* or *AT-GPIB/TNT Getting Started* manual.

Diagnostics (AT-GPIB/TNT)

The exact procedure to run the GPIB diagnostics varies from driver version to driver version. The steps shown here illustrate one method for running the diagnostics, but your drivers may require a slightly different set of steps. If you are uncertain how to proceed, please refer to the documentation that came with your GPIB board software.

1. To test the AT-GPIB/TNT card, select the Windows 95/98 Start button, **Programs, NI-488.2M Software for Windows 95**, then **Diagnostics**.

2. In the Diagnostics window, select **Test All.**

3. When the message "**Please close all GPIB applications**" appears, select **OK**.

4. When the test is complete, the message "**Passed**" will be displayed. Select **Exit**.

5. If the test does not pass, refer to the *AT-GPIB/TNT Getting Started* manual for more information.

**Setup of
AT-GPIB/TNT(PnP)
for Windows 95/98**

There are three basic steps for installing and configuring the
AT-GPIB/TNT(PnP) card.

- Driver installation

- Hardware setup and installation

- Verification

NOTE

For this installation, it is best to install the drivers before installing the
hardware. This makes it easier to change the GPIB board settings in the
event that the default settings result in a settings conflict.

Software Installation (AT-GPIB/TNT(PnP) Drivers)

1. From the Windows 95/98 Start menu, select **Settings**, **Control Panel**, then
   double-click on the **Add/Remove Programs** icon.

2. Depending on which source you are using for your GPIB software, you
   will follow a slightly different procedure:

   ❍ If you are using a CD supplied by National Instruments:

     Insert the *NI-488.2 software for Windows and the
     AT-GPIB/TNT(PnP)* CD-ROM into your CD-ROM drive and follow
     the instructions or, if you are using Windows Explorer, open the
     CD-ROM and doubleclick on **Setup.exe**.

   ❍ If you are using an E7415A Installation CD:

     Insert the application CD-ROM into your CD drive and select
     National Instruments Drivers; or, if you are using Windows Explorer, open
     the **National Instruments Drivers** folder on the CD and doubleclick on
     ni488215.exe.

3. In the Add/Remove Programs Properties window, select the **Install/Uninstall**
   tab and click on the **Install** button.

4. Follow the setup instructions displayed on the computer screen to
   complete the installation.

Hardware Installation (AT-GPIB/TNT(PnP))

1. Shut down Windows 95/98 and turn off the computer.

2. Remove the computer cover.

3. Remove the expansion slot cover on the back panel of the computer.

4. Insert the GPIB board into any unused 16-bit ISA slot with the GPIB connector sticking out of the opening on the back panel. Do not force the board into place. If possible, avoid using the first or last slot as it is difficult to connect the GPIB interface cable with the card in either of these locations.

NOTE

If you have purchased a board separately, it is possible that the recommended slots described in the sections which follow, are not appropriate. *Always* verify installation of your interface board with the manufacturers instructions before trying to insert the hardware into a slot.

5. Turn on the computer. When Windows 95/98 is loaded, the message "**New Hardware Found. National Instruments AT 488.2 Plug and Play**" is displayed.

6. From the Windows dialog box, click **OK** to select the default driver.

   The installation is now complete.

Hardware Verification (AT-GPIB/TNT(PnP))

It is important to test your hardware configuration before attempting to use the AT-GPIB interface. The exact procedure for AT-GPIB/TNT(PnP) verification varies from driver version to driver version. Please refer to the documentation that came with your GPIB board.

Diagnostics (AT-GPIB/TNT (PnP))

The exact procedure to run the GPIB diagnostics varies from driver version to driver version. The steps shown here illustrate one method for running the diagnostics, but your drivers may require a slightly different set of steps. If you are experiencing conflicts and you are unsure which method to use, please refer to the documentation that came with your GPIB board.

1. From the Windows 95/98 S**tart** menu, select **Programs, NI-488.2 Software for Windows 95/98**, then **Diagnostics**.

2. In the Diagnostics window, select **Test All.**

3. When the message "Please close all GPIB applications" appears, select **OK**.

4. When the test is complete, the message "**Passed**" will be displayed. Select **Exit**.

5. Click on the Windows 95/98 **Start** button and select **Settings** then **Control Panel.**

6. In the Control Panel window, double-click on the **System** icon.

7. In the System Properties window, select the **Device Manager** tab then double-click on **National GPIB Interface**.

8. Select **AT-GPIB/PnP** then click on the **Properties** button.

9. In the AT-GPIB/PnP Properties window, select the **Resources** tab.

10. Verify that there are no conflicts. If there are no resource conflicts, the interface card should work properly. In case of conflicts (that is, if there are no IRQs available on the computer), refer to Appendix C in the *Getting Started with Your Plug and Play GPIB Hardware and Software for Windows 95/98* document.

11. Click the **OK** button to close the AT-GPIB/PnP Properties window.

12. Click the **OK** button to close the System Properties window.

Setup of AT-GPIB/TNT for Windows NT 4.0

There are four basic steps for installing and configuring the AT-GPIB/TNT card.

- Install drivers
- Configure Hardware
- Install Hardware
- Verify Hardware

NOTE

For this installation, the drivers are installed before installing the hardware. This makes it easier to change GPIB board settings in the event that the default settings result in a settings conflict.

NOTE

You must have System Administrative privileges to install the AT-GPIB/TNT driver on Windows NT.

Software Installation (AT-GPIB/TNT Drivers)

1. From the **Start** menu, select **Settings**, **Control Panel**, then double-click on the **Add/Remove Programs** icon.

2. Depending on which source you are using for your GPIB software, you will follow a slightly different procedure:

   ❍ If you are using a CD supplied by National Instruments:

   Insert the *NI-488.2 software for Windows and the AT-GPIB/TNT* CD-ROM into your CD-ROM drive and follow the instructions or, if you are using Windows Explorer, open the CD-ROM and doubleclick on **Setup.exe**.

   ❍ If you are using an E7415A Installation CD:

   Insert the application CD-ROM into your CD drive and select **National Instruments Drivers**; or, if you are using Windows Explorer, open the **National Instruments Drivers** folder on the CD and doubleclick on **ni488215.exe**.

3. In the Add/Remove Programs Properties window, select the **Install/Uninstall** tab and click on the **Install** button.

4. Follow the setup instructions displayed on the computer screen to complete the installation. From the GPIB setup options, select the **GPIB setup option from the NI-488.2 (M) software.** (Do not use the option for the GPIB analyzer. This does not pertain to the E7415A software.)

Hardware Configuration (AT-GPIB/TNT)

Follow the procedure below to configure the hardware *before* it is installed:

1. From the Windows NT Start menu, select **Settings, Control Panel,** then double-click on the **GPIB** icon.

2. In the GPIB configuration window, select **GPIB0** from the GPIB board listing

3. Click on **Board Type** button and select **AT-GPIB/TNT** and press **OK**.

4. Click on **Configure**.

5. The GPIB0 (AT-GPIB/TNT) window displays the default values for the DMA, I/O range, and Interrupt Request for the AT-GPIB/TNT card. The Add New Hardware wizard will display the DMA, I/O range, and Interrupt Request for the AT-GPIB/TNT card. ***Write these values down!*** You will need to check them later against the *physical* settings on the board itself.

6. When Windows NT has finished the hardware configuration for the GPIB card, click on **OK**. When you are prompted to "**restart the NI-488.2M driver to force your changes**," click on **NO** for now.

Hardware Installation (AT-GPIB/TNT)

1. Use the settings you wrote down in Step 5 above to configure the AT-GPIB/TNT board, or if there is a known conflict, make any necessary changes. Refer to the *AT-GPIB/TNT Getting Started* manual to assist you with this procedure.

TIP

If you forgot to write down the DMA, I/O Range, and Interrupt Request settings from Step 5 above, you can check the values as follows: Click on **Programs, Administrative Tools (Common), Windows NT Diagnostics.** In the Windows NT Diagnostics dialog box, click on the **Resources** tab. Click on the **IRQ, I/O Port**, and **DMA** buttons to verify that the GPIB board settings.

2. Shut down Windows NT and turn off the computer.

3. Remove the computer cover.

4. Remove the expansion slot cover on the back panel of the computer.

5. Insert the GPIB board into any unused 16-bit ISA slot with the GPIB connector sticking out of the opening on the back panel. Do not force the board into place. If possible, avoid using the first or last slot as it is difficult to connect the GPIB interface cable with the card in either of these locations.

NOTE

If you have purchased a board separately, it is possible that the recommended slots described in the sections which follow, are not appropriate. *Always* verify installation of your interface board with the manufacturers instructions before trying to insert the hardware into a slot.

6. Turn on the computer to start Windows NT.

Hardware Verification (AT-GPIB/TNT)

1. From the Windows NT Start menu, select **Settings** then **Control Panel**.

2. In the Control Panel window, double-click on the **Devices** icon.

3. In the Devices window, scroll down to the GPIB devices and verify that the GPIB Port Driver (AT-GPIB/TNT) is listed.

4. Verify that the Status is Started and the Startup is System.

Diagnostics (AT-GPIB/TNT)

The exact procedure to run the GPIB diagnostics varies from driver version to driver version. The steps shown here illustrate one method for running the diagnostics, but your drivers may require a slightly different set of steps. If you are uncertain how to proceed, please refer to the documentation that came with your GPIB board software.

1. To test the AT-GPIB/TNT card, click on the **Windows NT Start** button, then select **Programs, NI-488.2M for Windows NT**, and **Diagnostics**.

2. In the Diagnostic window, select **Test All.**

3. When the message "**Please close all GPIB applications before proceeding**" appears, select **OK**.

4. When the test is complete, the message "**Passed**" will be displayed under the Status column. Select **Exit**.

5. If the test does not pass, refer to the *AT-GPIB/TNT Getting Started* manual for more information.

HP-IB Interface HP 82341C

The HP-IB interface card (HP 82341C) can be configured and installed on Windows 95/98 and NT using the following steps:

HP 82341C Software Installation

1. Place the E7415A Installation CD into the CD-ROM drive of your computer.

2. From the **Start** menu, select **Run**.

3. In the **Run** dialog box, select the CD-ROM drive. Use the **Browse** button if you do not know the location of the CD-ROM drive.

4. Change directories to **Hewlett Packard Drivers** on the CD-ROM and doubleclick on the **wng0202.exe**. Click **OK** to start the installation. Follow the prompts.

5. Verify SICL and VISA file locations and then press **Next**.

6. The message 'Do you want to view the HP i/o libraries readme file now?' is displayed. Click on **No**.

7. The configuration dialog is displayed next. Choose 'Configure interfaces automatically' and click on **Next**.

8. When the installation is complete, the message 'The installation of HP I/O libraries is complete' is displayed. Click on **OK**

NOTE   You will need to restart your computer in order for these settings to show up. However, for now it is recommended that you simply shut down your computer in order to install your HP-IB board. When you start your computer after the installation of the hardware, your new settings will appear.

HP 82341C Hardware Installation

The HP-IB interface card (HP 82341C) can be configured and installed using the following steps:

1. If you have not already done so, shut down and turn off your computer.

2. Remove the computer cover and install the HP-IB interface card. If possible, avoid using the first or last slot as it is difficult to connect the HP-IB interface cable with the card in either of these locations.

3. Use the default switch settings.

4. Turn on the computer to start windows.

HP 82341C Software Configuration

1. From the **Start** menu, select **Programs | HP_I_O Libraries | I_O Config.**

2. From the available interface types listing select **HP 82340/82341 HP-IB**, and click on **Configure** and then **OK**. An **hpib7-GPIB0** entry is inserted into the Configured Interfaces listing. Click **OK**.

HP 82341C Hardware Verification

1. Connect the HP-IB card to the instrument.

2. From the **Start** menu, select **Programs | HP_I_O Libraries | VISA Assistant.** Within the application in the left hand panel the GPIB0 interface should be displayed. If this is not displayed use the I_O config utility (as in "HP 82341C Software Configuration" above, and change the IRQ number to one of the other available numbers and try again.

HP-IB Interface HP 82341D

The HP-IB interface card (HP 82341D) can be configured and installed using the following steps:

HP 82341D Hardware Installation

1. Shut down and turn off your computer.

2. Remove the computer cover and install the HP-IB interface card. If possible, avoid using the first or last slot as it is difficult to connect the HP-IB interface cable with the card in either of these locations.

3. Turn on the computer to start Windows 95/98 or NT.

4. As soon as Windows comes up it detects the HP-IB card and prompts for the driver file **hp341i32.vxd**. If this message is displayed, change the directory to Windows System folder and click on OK.

HP 82341D Hardware Verification

1. Connect the HP-IB card to the receiver using the appropriate interface cable.

2. From the **Start** menu, select **Programs | HP_I_O Libraries | VISA Assistant.**

3. Within the application, in the left hand panel the GPIB0 interface should be displayed. If this is not displayed From the **Start** menu, select **Programs | HP_I_O Libraries | I_O Config.** From the available interface types listing select **HP 82340/82341 HP-IB**, and click on **Configure** and then **OK**. An **hpib7-GPIB0** entry is inserted into the Configured Interfaces listing. Click **OK**.

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.

NOTE   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 reboot the system.

1. Insert the E7415A installation CD into your CD-ROM drive.

2. From Windows Explorer, find the drive letter mapped to the CD-ROM (for example, Z:\) and doubleclick.

3. Open the E7415A folder and doubleclick on **Setup.exe** .

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

NOTE   If a read only file message appears, click **Yes.**

5. The Readme file is shown after installation. After you have read the information in the file, close it and click on **Finish**.

6. 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. Follow the instructions in Chapter 2 for a quick overview of the menu structure or click on **Quick Tour** in the software toolbar to view a brief tour of the software functionality.

Run the Receiver Setup Wizard   The E7415A software uses National Instruments Corporation's AT-GPIB interface board or Hewlett-Packard's HP-IB card 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 see "Setting Up the AT-GPIB/TNT" on page 1-7.

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. From the software Menu (located on the top of the Main software screen as shown in Figure 2-1), select **Tools | Receiver Setup Wizard**.

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.**

2. From the setup 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 Library source matches that of the driver (for example, National Instruments for GPIB and Hewlett Packard for HP-IB) then press **Check Device**. If your connection is working properly a window will appear to verify this. Otherwise, check your cable connections, as well as the hardware settings selected in "Setting Up the AT-GPIB/TNT" on page 1-7.

Figure 1-1   *To test the connection between your computer and the connected receiver, select* **Setup | Equipment | Receivers.**
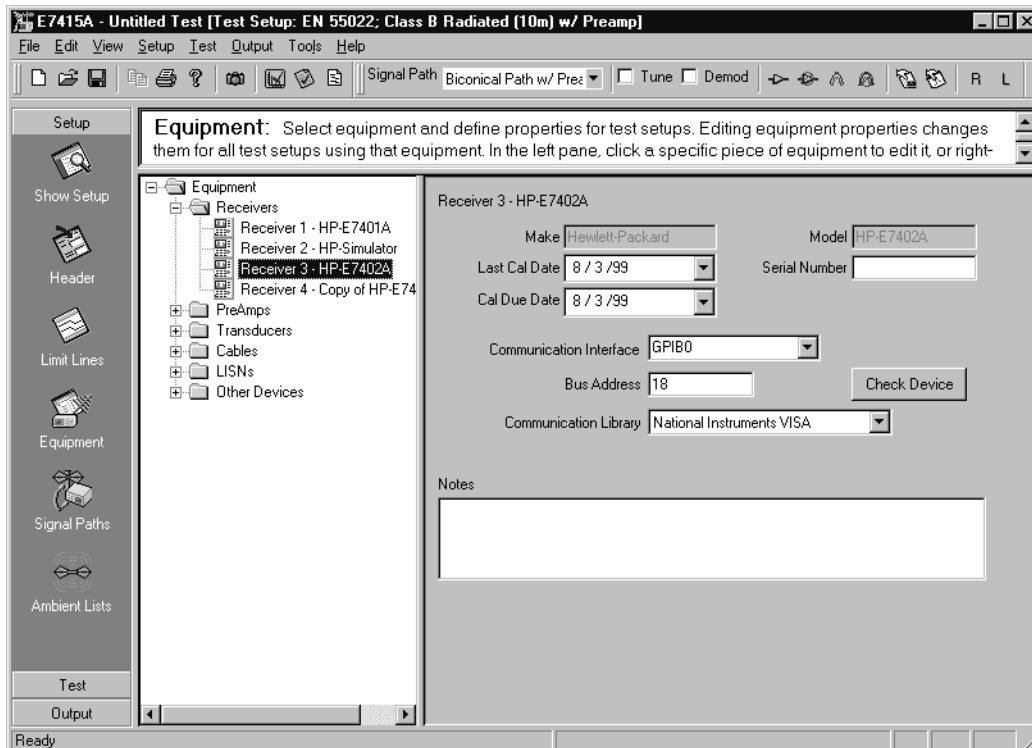
2   E7415A Product Overview

The E7415A commercial radiated EMI precompliance software automates radiated emissions measurements on Information Technology Equipment (ITE) and Industrial, Scientific, and Medical (ISM) equipment. 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 are saved in signal lists for measurement.

Signals saved in lists serve as the input to measurements. Peak, quasi-peak and/or average detection methods can be selected for the measurement. Signal values as well as differences between limits or a specified limit line margin are calculated and displayed. A tune-and-listen function allows identification of ambient signals.

Visual inspection or mathematical comparison of signals enable 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 report generator 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 administered from a Main software window and a rolling 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 *Measurement Guide* and the Online Help. These terms and conventions can be quickly scanned by viewing the following figures.

Figure 2-1 *Naming conventions of the parts of the Main screen. Individual components are described in the sections which follow*
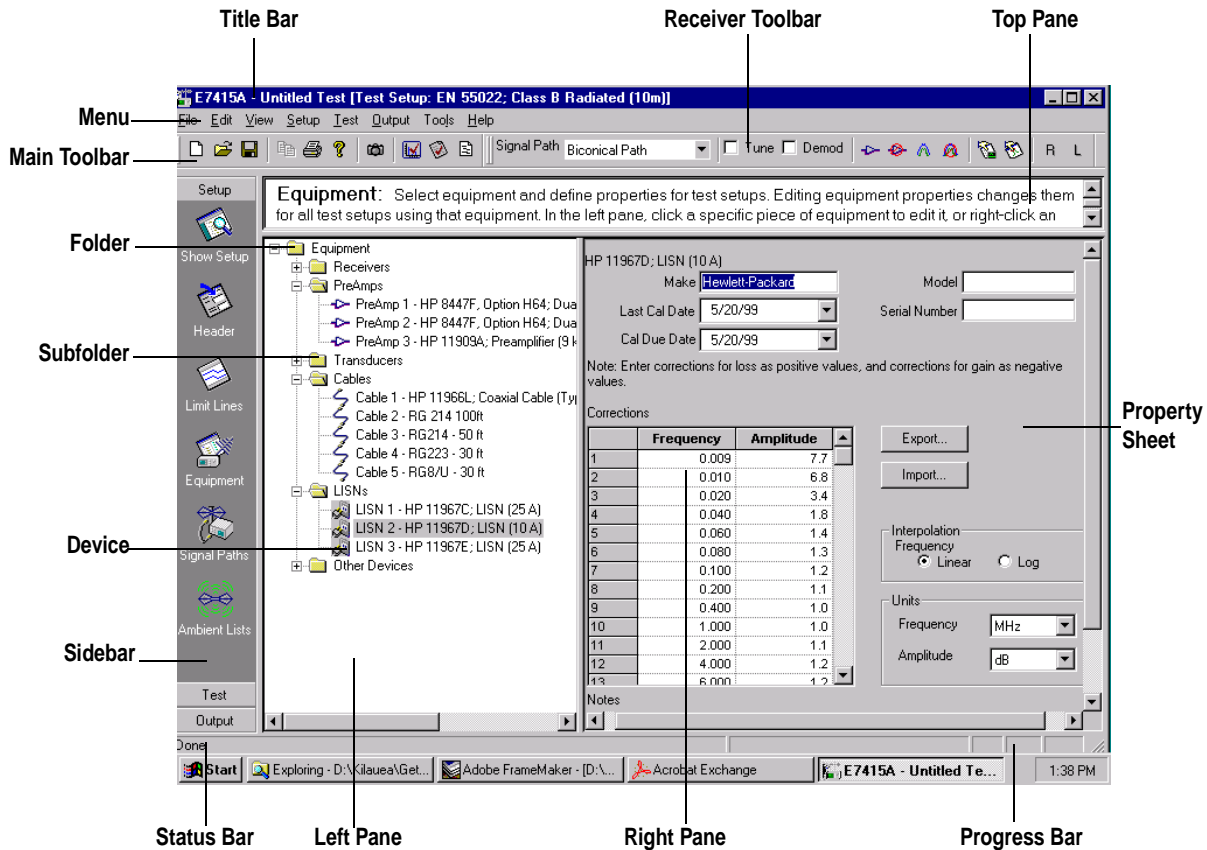
Menu

The Menu bar provides access to a set of menus which allow you to open, save and manipulate data, setups and measurement parameters. Please refer to the Online Help for a detailed description of each of these 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 dropdown lists of the main Menu selections.

Some of the items in the Setup, Test and Output menus have a corresponding icon in the Toolbar.

For a detailed description of each icon, please refer to the Online Help.

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.

For a detailed description of each function, please refer to the Online Help.

Sidebar

The sidebar is located along the lefthand 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 2-5.

Top Pane

Watch the Top Pane for information regarding the window currently shown. The Top Pane will provide a "mini" version of the Online Help reference for this window.

Status Bar

Like the Top Pane, the Status Bar, at the bottom of the screen, will show an abbreviated version of the Online Help reference for any icon or item on the screen to which you move your mouse. The Status Bar can be very useful in situations where you want a quick reminder of how a given item works.

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 below. Please refer to these figures when you are reading the E7415A documentation.

Figure 2-2 Components of the Graph view
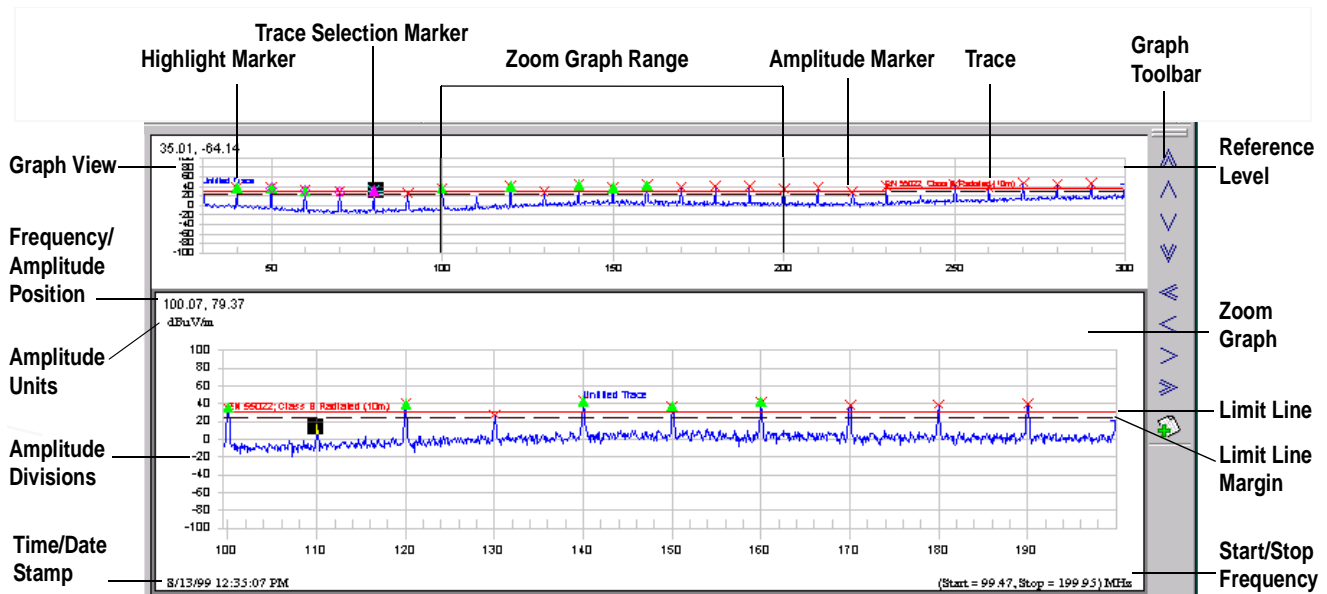
Graph Toolbar

This bar appears as shown in Figure 2-2 on the righthand portion of the screen when it is in graph mode. The arrow icons on this Toolbar control the markers on the graph, moving it to the peak determined by the chosen arrow. Place your cursor on any of these icons and view the Status Bar on the bottom of the screen as a quick reminder of its use

Figure 2-3 Components of the Signal List View. See "Step 3: Create a Signal List" on page 3-5 for information of creating a signal list.

Sidebar Structure

Figure 2-4   *The Sidebar allows quick access to the icons which will help you set up and measure EMI data. Use this diagram to help you find the topic of interest*

Sidebar   Sidebar Icons

Setup		
	Show Setup	page 2-6
	Header	page 2-6
	Limit Lines	page 2-6
	Equipment	page 2-6
	Signal Paths	page 2-6
	Ambient Lists	page 2-6

Test		
	Sweep	page 2-8
	Add Peaks to List	page 2-8
	Measure	page 2-8

Output		
	Report	page 2-10
	Snapshot	page 2-10
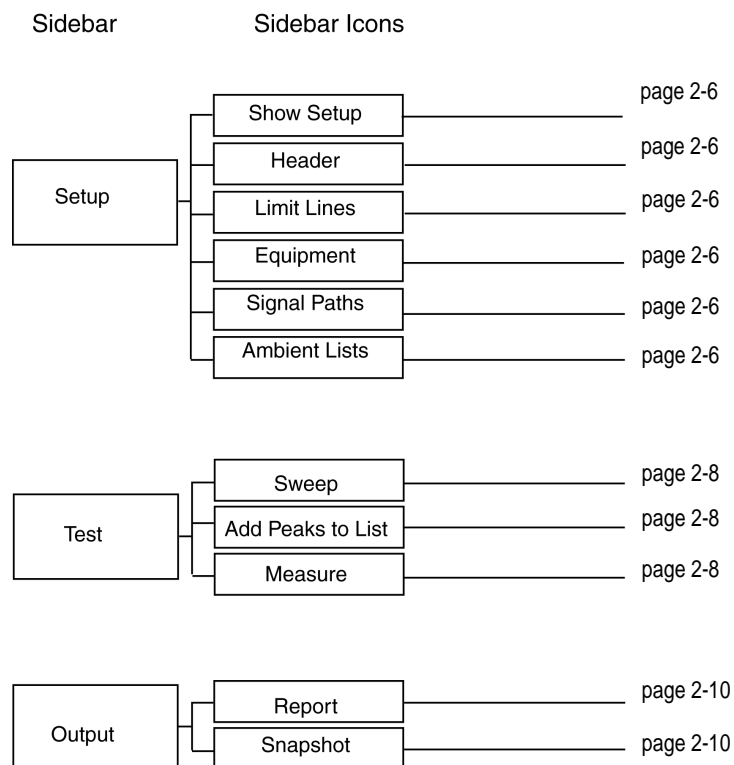
NOTE   These functions are described briefly in this chapter and in Chapter 3 of this manual to illustrate the overall flow of the software. However, the *Measurement Guide* should be used as the final reference and guide for making measurements. Many of the questions you may have about software functionality can only be found there.

Setup

Show Setup

Brings up 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 "Step 1: Setup" on page 3-1.

Header

Setup | Header

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

Limit Lines

Setup | Limit Lines

Brings up 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 rightclicking 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 by rightclicking on a folder or item. 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 by rightclicking on a folder or item. 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

Brings up a window that includes all the currently defined ambient lists. All ambient lists must be user-generated as described in the *Measurement Guide*.

Test

Sweep

Test | Sweep

Brings up 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**). Toggle between these tabs to specify measurement/sweep parameters as described in the *Measurement Guide*.

Add Peaks to List

Test | Add Peaks to List

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 reduce the set 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 make it into the signal list. See the *Measurement Guide* for a detailed description of signal lists and how to work with them to optimize your measurement.

Measure

Test | Measure

Brings up 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 the frequency of interest (the default). Alternately, you can specify that before measurement, a Tune and Listen function be invoked to help eliminate ambient signals set of signals to be measured. Finally, you can specify a message between the measurement of each signal (Prompt before Measure). As 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 add in the receiver preamp, and/or specify values for the RBW or VBW that may improve signal discrimination. See the *Measurement Guide* for information on these receiver settings and how they affect measurements.

Output

Report

Selecting Report will cause the software to gather all the current receiver and measurement settings into a single file for viewing and later use. You can export reports for further analysis or for measurement presentation.

Snapshot

Allows you to take a screenshot of the current graph view, the signal list or both.

3   Quick Start

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 a little about making a measurement. (If your software and receiver do not appear to be communicating, see "Run the Receiver Setup Wizard" on page 1-21.)

NOTE   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, E7415, E7415** to open the EMI measurement software.

2. From the New Test window use the dropdown list to select a Test Setup (for example, EN 55022 Class B Conducted), then click **OK.**

NOTE   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   Select from pre-existing setups in the New Test:Select Test Setup window.
Later on, you may have reason to define your own setups. These setups
will then appear in this window for selection
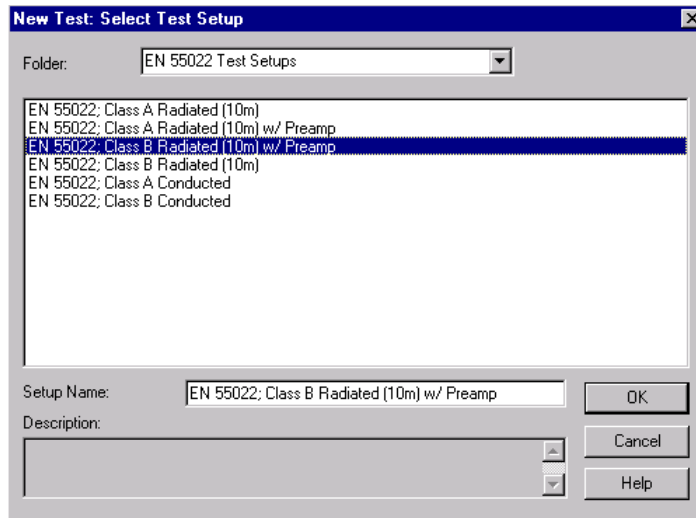
Once a Test Setup has been selected, the limit lines for your selected setup
will be displayed on the graph. Default equipment, corrections factors,
instrument settings, and so on are loaded.

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

Take care, when making real measurements, that the equipment in your
signal path, matches that of your real configuration. Otherwise, the
corrections being applied to the traces and measured signals will not be
correct and your measurement results will be invalid.

1. From the Main software window, select from the Sidebar, Setup and then
    select the Signal Path icon. From Figure 3-2 you can see that the signal
    paths selected reflect the equipment and order required by CISPR
    regulation EN55022 Class B Conducted, which governs both quasi-peak
    and average measurements.

Figure 3-2   Selected signal paths for the governing regulation selected in "Step 1: Setup" on page 3-1
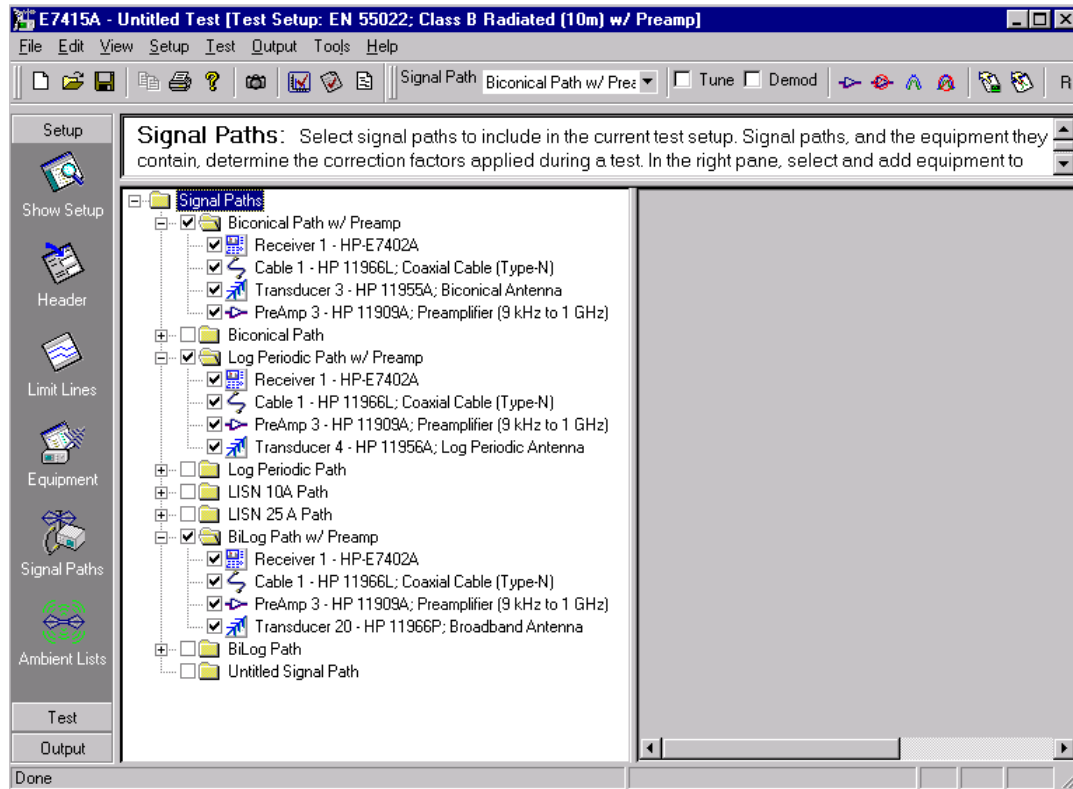
Step 2: Sweep

1. From the Side Bar, click the **Test** button, then click on the Sweep Icon to open the Sweep dialog box.

Figure 3-3   ***Specify the sweep criteria in the sweep window. The Sweep dialog box defaults to the settings for the setup chosen in the Setup dialog box. You can change these settings to suit your measurement***
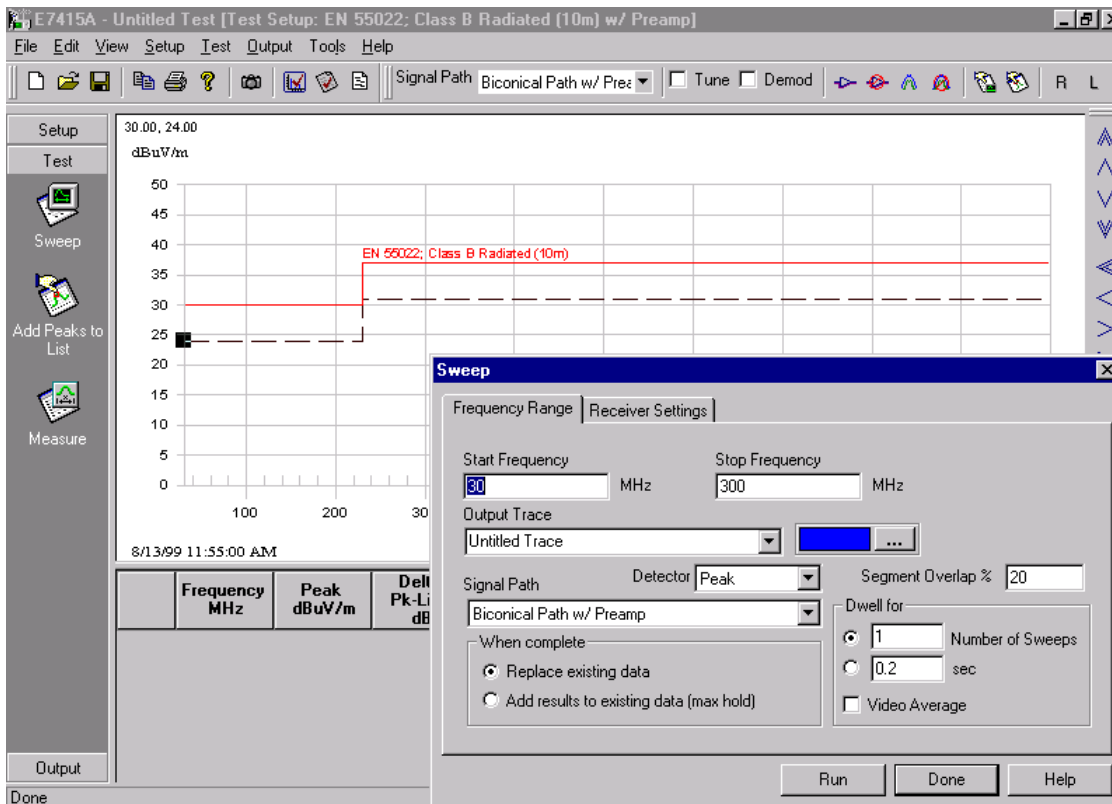
2. The values in the Sweep Dialog box will reflect the setup you selected in "Step 1: Setup" (above) as well as any other default values that apply. See the *Measurement Guide* for information regarding the purpose and use of individual Sweep Dialog settings.

3. Click on **Run** to start the sweep.

The receiver is in remote mode and a sweep is being carried out over a frequency range of 150 kHz to 30 MHz (as required for a conducted measurement). The Sweep Control box allows you to pause or abort the procedure. You can monitor the status of the sweep in the bottom most left-hand corner of the application window and also view the trace as it is updated on the graph.

Figure 3-4   ***As the receiver sweeps through the specified frequency band, the graph appears on your computer screen***
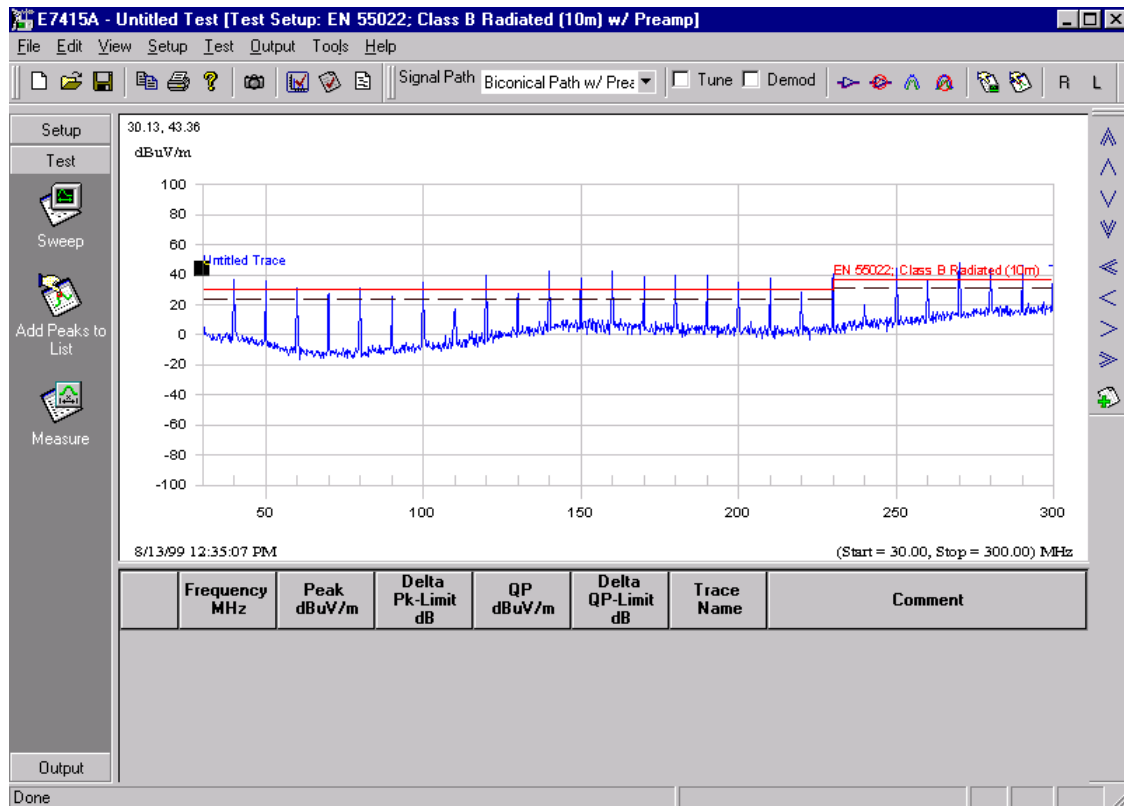
Step 3: Create a Signal List

1. Under the Test button in the Sidebar, click on the Add Peaks to List icon.

Figure 3-5   ***To create a signal list, bring up the Add Peaks to List window and specify a name for the list. Signals that fulfill the specified measurement criteria will be added to the list***
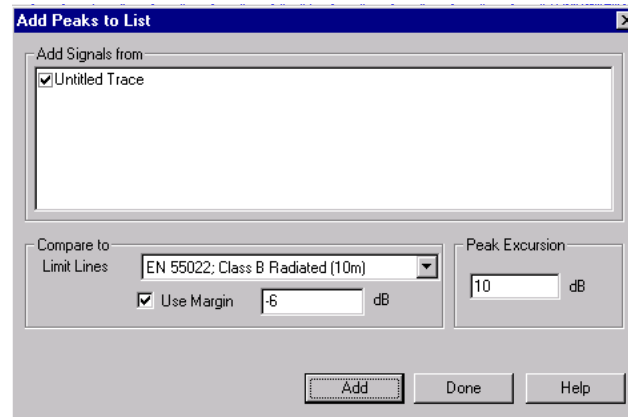
2. In the Add Peaks to List dialog box, make sure the same trace name that was selected as the Sweep trace is checked. The values shown for the selected limit line, peak excursion and limit line margin will match those you selected in the Sweep Dialog box selected in "Step 2: Sweep". If you want to change any of these values, please refer to the *Measurement Guide* for detailed information about these values and how to set them.

   All signals that rise and fall above the noise floor 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.

Step 4: Measure

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

NOTE

Only "highlighted" signals can be measured, and that the entire *row* must be highlighted.

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

Figure 3-6 *Specific signals can be selected from the signal list and then, by pressing Measure (in the side bar), these peaks are remeasured for greater accuracy.*
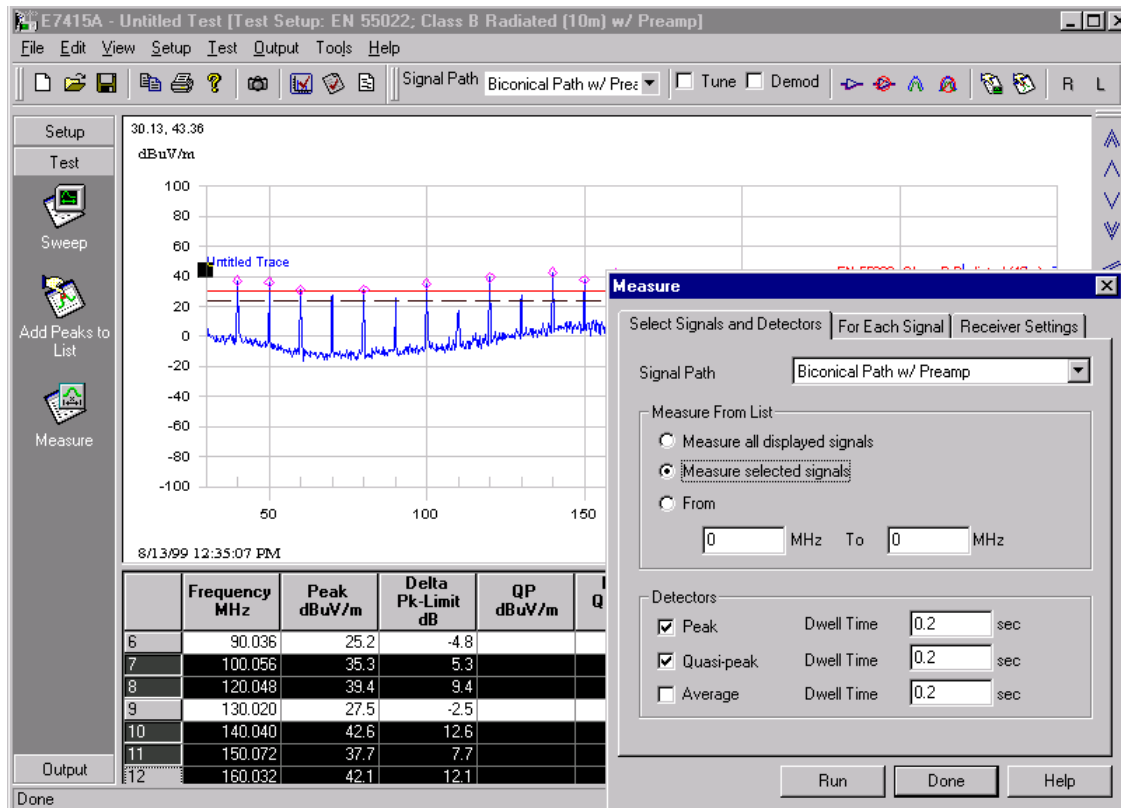
3. In the Measure From List area, select **Measure Selected Signals** option.

4. In the Detectors area, check the Quasi-Peak checkbox so that both Peak and Quasi-Peak are checked. Click on the **Run** button to begin the measurement.

    Each signal is re-measured using the Peak and Quasi-Peak 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 QP (Quasi-Peak) column is acquired and added to the signal list table.

Step 5: Create a Report

1. From the Side bar, click on the **Output** button.

2. Under the Output button, click on the **Report** icon.

3. In the Report dialog box, enter a Report Title (for example, Initial Scan).

Figure 3-7 *To generate a report, click on the Report icon in the Sidebar and select those measurement elements you want in the report.*
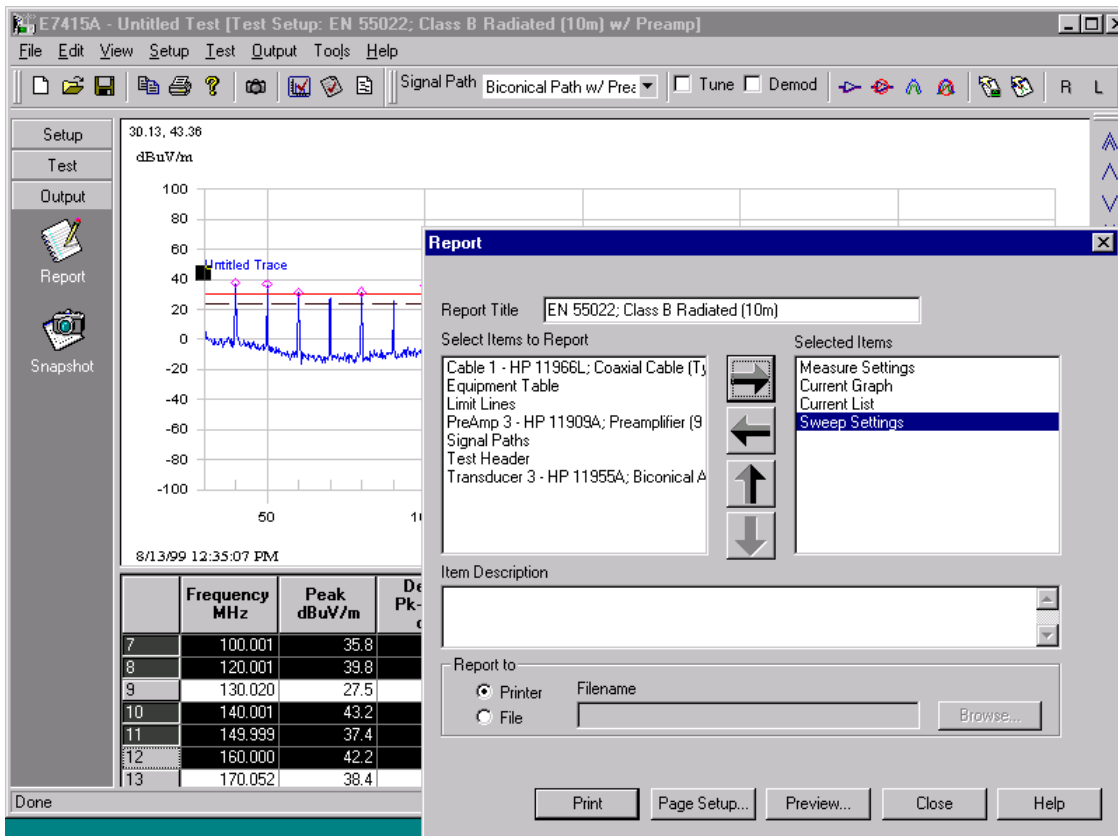
4. In the Select Items to Report area, hold down the **[Ctrl]** key while clicking on the following report items to highlight:

   ❍ **Current Graph**

   ❍ **Current List**

   ❍ **Measure Settings**

   ❍ **Sweep Settings**

5. Click on the right arrow key (→) to move the highlighted items into the Selected Items area.

   These items will now be included in your report. You can change the order of the report items by highlighting an item and then using the up and down arrow keys 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.

6. 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 3-8   A Report preview
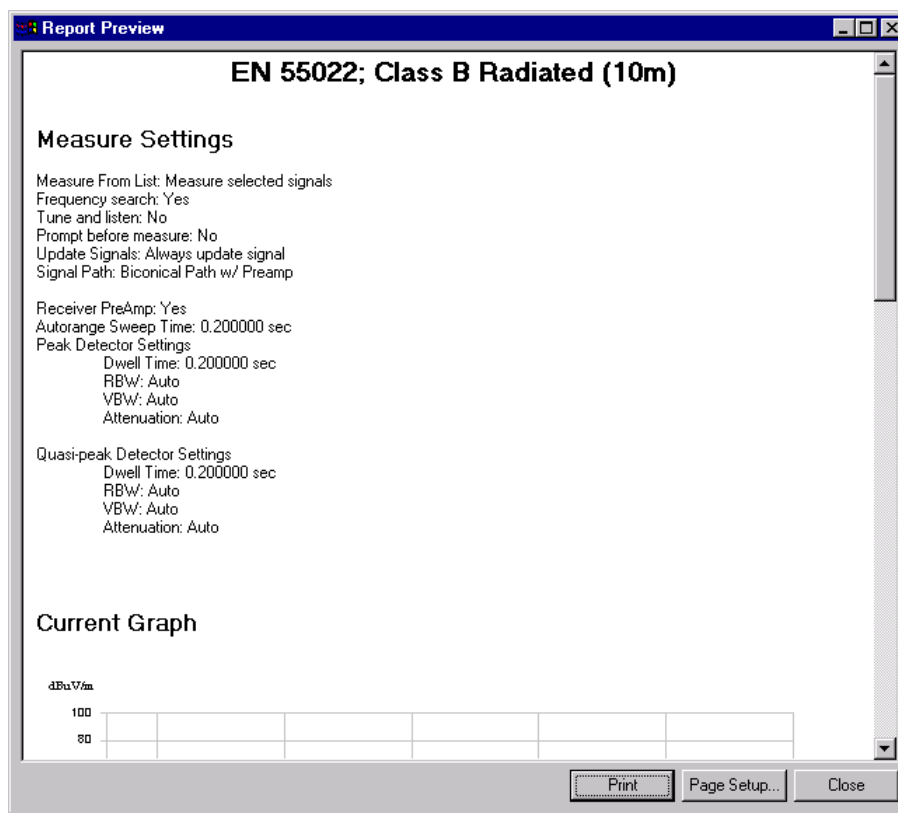
7. Click **Close** to exit the Preview window, then **Close** again to exit the Report dialog box.

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. From the Side bar, click on the **Setup** button then select the Limit Lines icon. 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 on a folder to view the available limit lines, then click the limit line checkbox to select limit lines for your setup. You can also create a new limit line, modify an existing limit line, or create new folders with any combination of new and existing limit lines by choosing the appropriate right-mouse button function, then entering data into the limit line property sheet.

Figure 3-9   ***Select the limit line that represents the regulation to which you must conform. Refer to the Measurement Guide for information on how to select the appropriate regulation-specified limit line data***
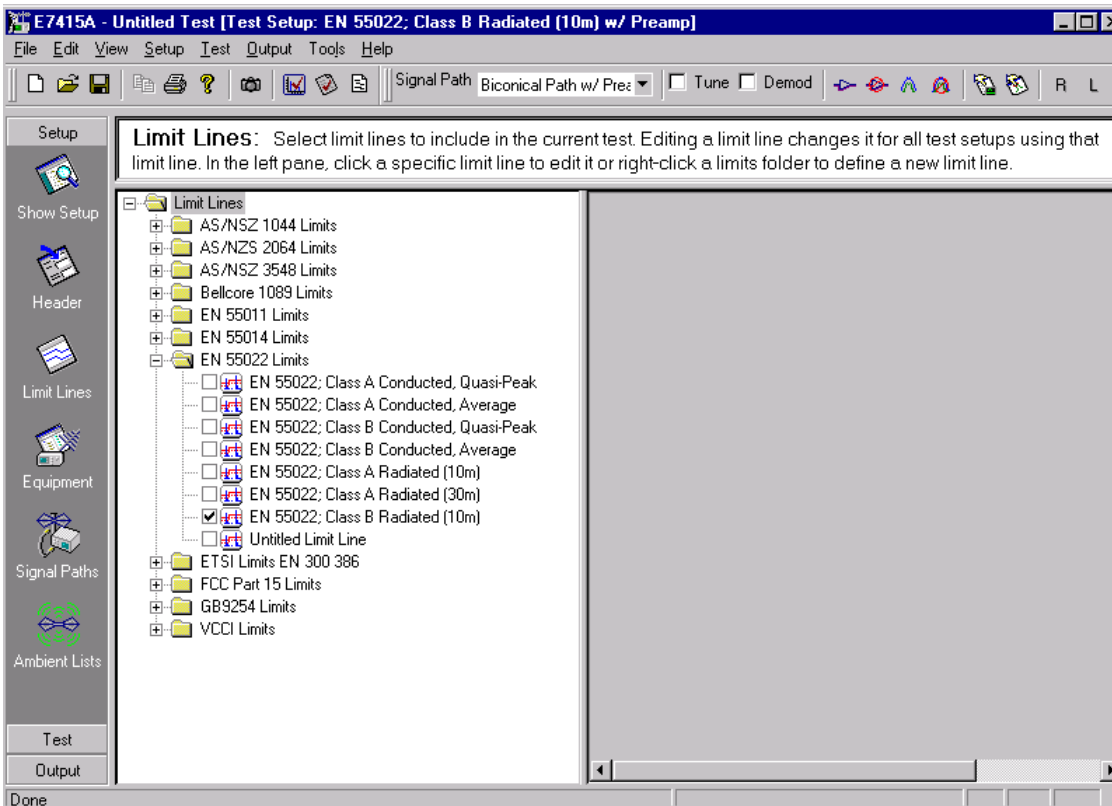
2. Select the **Equipment** icon to add new equipment or modify existing equipment. The Equipment resource is separated into folders for the different types of equipment (for example, receivers, preamplifiers, transducers, and so on). Each device has a property sheet, where you can enter all of the pertinent data for each device, such as, model number, serial number, calibration dates, and correction factors. Place a check next to the equipment that you want for your setup. (Same method as limit line folders.)

Figure 3-10   In the Setup view of the sidebar, select Equipment to specify the equipment that will comprise your measurement setup. Note that the regulation you are using may indicate which equipment to use 'for the test
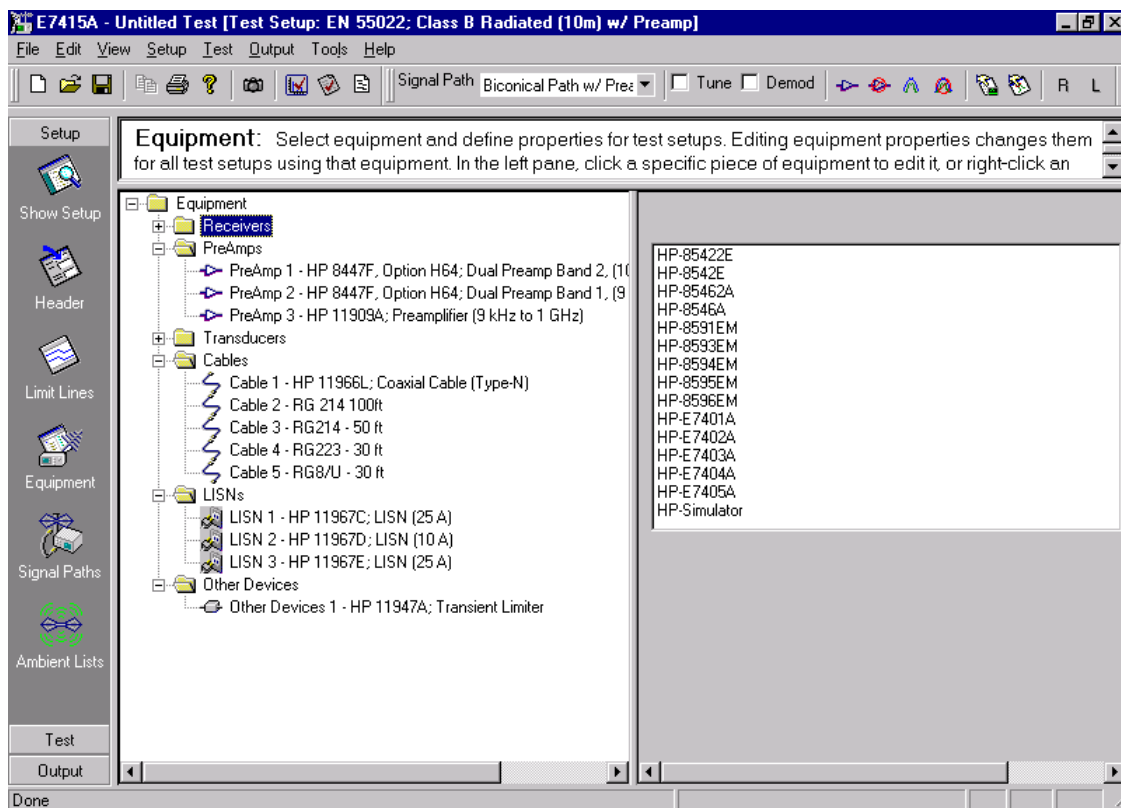
3. Select the **Signal Path** icon to configure the equipment to be used for a test. Signal paths contain all the devices that will constitute an equipment configuration (for example, receiver, antenna, cables, preamplifier, and so on). Correction factors for each device will be summed together for the signal path, the bus address is set for communication between the receiver and the software, 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.

Figure 3-11   From the Sidebar select Setup and Signal Paths to configure the equipment selected for the measurement
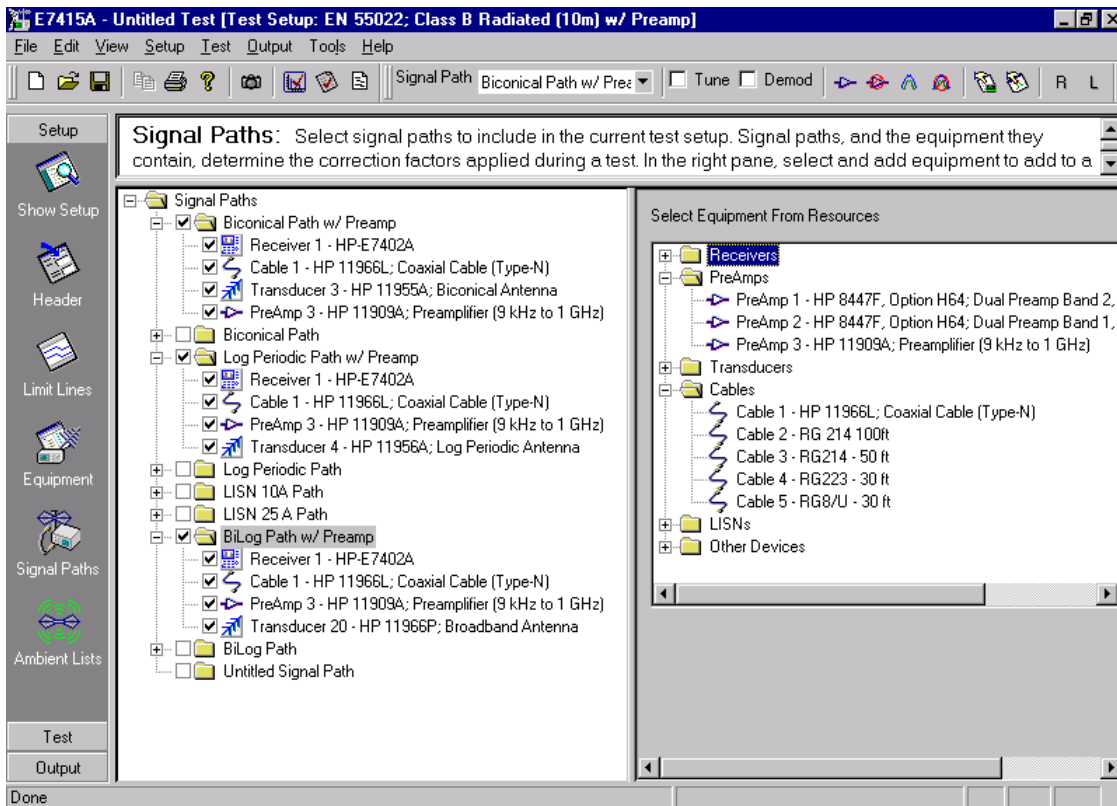
4. From the main menu bar, click on **File, Save As Setup** to save your new setup.

NOTE   Refer to the *Measurement Guide* for detailed instructions about how to modify or create setups and make measurements.

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