



CYW43XX

Evaluating Chips Using WinDVT Scripts

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1. Overview



1.1 Introduction

The tests described in this document were developed to evaluate the performance of a CYW43XX chip in a Cypress WLAN SDIO module for design verification testing (DVT). The tests are run by entering a command line.

1.2 Purpose and Audience

This Technical Information Manual describes how to set up and test a Cypress WLAN card based on the CYW43XX family of IEEE 802.11a/b/g/n MAC/Baseband/Radio chips using the Agilent N4010A Wireless Connectivity Test Set on a Windows® computer. The CYW43XX family includes the CYW4319, CYW4325, CYW4329, CYW4330, CYW4334, CYW4336, and CYW43362. References made to CYW43XX apply to all of the chips listed above.

This document is intended for engineers who are testing a CYW43XX WLAN card.

1.3 Hardware Requirements

The hardware requirements are listed below.

- Agilent® N4010A Wireless Connectivity Test Set with software options 103 and 110.
- A Windows®-based laptop computer with an SDIO slot, or a socket for commercially available Cardbus-to-SDIO host adapter, or a Windows-based desktop with a PCI-to-SDIO adapter (such as those from Arasan Chip Systems, Inc. or Soliton Systems K.K.; contact your Cypress representative for details).
- BCM943XX evaluation board
- BCM9SDIO2CONAD card and mictor cable¹.
- Attenuator (6 dB or 10 dB)
- RF and Ethernet cables

1.4 Software Requirements

The software required to run the WinDVT tests is listed below. You may have to reboot the PC after installing some of these software packages.

- Windows® 2000 (SP4 or greater), Windows XP Professional SP2, or Windows XP Home SP2
- ActiveTcl²
- Latest WLAN driver for a PC running Windows® XP³

1. Custom-built ribbon cable from Tyco® Electronics Corp. (vendor # 00001/104474): Blue Ribbon cable assembly, MFG # 013850038050KL2A, overall length = 52.6 cm (go to <http://www.precisionint.com/highspeeddata/blueribbon/> for more information).
2. To download a copy of the latest release (for example, "ActiveTcl8.5.11.0.295402-win32-ix86-threaded.exe"), go to <http://downloads.activestate.com/ActiveTcl/releases/>.

- WinDVT N4010A CYW43xx Test Scripts (N4010_WinDVT.zip)³
- MS Office 2003.
- Microsoft .NET Framework 1.1, Service Pack 1⁴
- Agilent IO Libraries Suite⁵
- Agilent N4010A WLAN Test Suite⁶
- Agilent N4010A software options⁷ with compatible firmware installed on the instrument:
 - 103: WLAN 2.4 GHz and 5 GHz
 - 110: I/O Connectivity
 - 108: WLAN 802.11n (if you are planning to test WLAN 802.11n)

1.5 References

The references in this section may be used in conjunction with this document.

Note: Cypress provides customer access to technical documentation and software through its Customer Support Portal (CSP) and Downloads & Support site (see [Technical Support on page 6](#)).

For Broadcom documents, replace the “xx” in the document number with the largest number available in the repository to ensure that you have the most current version of the document

Document (or Item) Name	Broadcom Number	Cypress Number	Source
Single-Chip IEEE 802.11™ a/b/g/n MAC/Baseband/Radio with Integrated SDIO and USB Interfaces	4319-DSxx-R	002-15200	CSP
IEEE 802.11™ a/b/g MAC/Baseband/Radio Plus Bluetooth 3.0 + HS and FM Receiver Single-Chip Combination	4325-DSxx-R	002-15049	CSP
Single-Chip IEEE 802.11™ a/b/g/n MAC/Baseband/Radio with Integrated Bluetooth 2.1 + EDR and FM Transceiver	4329-DS1xx-R	–	CSP
Single-Chip IEEE 802.11™ a/b/g/n MAC/Baseband/Radio with Integrated Bluetooth 4.0 + HS and FM Transceiver	4330-DS2xx-R	–	CSP
Single-Chip IEEE 802.11™ a/b/g/n MAC/Baseband/Radio with Integrated Bluetooth 4.0 + HS and FM Transceiver	4334-DS1xx-R	–	CSP
Single-Chip IEEE 802.11 b/g/n MAC/Baseband/Radio + SDIO	4336-DSxx-R	–	CSP
Single-Chip IEEE 802.11 b/g/n MAC/Baseband/Radio + SDIO	43362-DS1xx-R	–	CSP

3. This file can be obtained from the Cypress Customer Support Portal (<https://support.Cypress.com>).

4. To download a copy of the latest release, go to <http://www.microsoft.com/download/en/details.aspx?displaylang=en&id=33>.

5. To download a copy of the latest release, go to <http://www.home.agilent.com/agilent/product.jspx?ckey=1985909&id=1985909&nid=-34466.977662.00&cmpid=zzfindiosuite&lc=eng&cc=US>.

6. To download a copy of the latest release, go to <http://www.home.agilent.com/agilent/editorial.jspx?cc=US&lc=eng&ckey=561329&nid=-33762.536883549.02&id=561329>.

7. To download a copy of the latest release, go to <http://www.home.agilent.com/agilent/editorial.jspx?cc=US&lc=eng&ckey=561329&nid=-33762.536883549.02&id=561329>.

1.6 Acronyms and Abbreviations

In most cases, acronyms and abbreviations are defined on first use.
For a comprehensive list of acronyms and other terms used in Cypress documents, go to <http://www.cypress.com/glossary>.

1.7 Technical Support

Cypress provides a wealth of data at <http://www.cypress.com/internet-things-iot> to help you to select the right IoT device for your design, and quickly and effectively integrate the device into your design. Cypress provides customer access to a wide range of information, including technical documentation, schematic diagrams, product bill of materials, PCB layout information, and software updates. Customers can acquire technical documentation and software from the Cypress Support Community website (<http://community.cypress.com/>).

2. Test Setup



2.1 Windows PC Setup

2.1.1 Setting Up Test Folders

From the docSAFE tab of Cypress's customer support portal (see [Technical Support on page 6](#)), copy the N4010_WinDVT.zip file to C:\WLAN. All related files, including executables and test results, will be stored in this folder. After extracting the information from the zip file, you should see the following folders and files in C:\WLAN\N4010_WinDVT:

Name	Size	Type
N4010_Waveforms		File Folder
reportTemplates		File Folder
Results		File Folder
BCM_DUT.tcl	13 KB	ActiveTcl Script
BCM_DUT_432x.tcl	13 KB	ActiveTcl Script
BCM_DUT_433x.tcl	13 KB	ActiveTcl Script
dvt.config	2 KB	CONFIG File
N4010.tcl	26 KB	ActiveTcl Script
win_dvt.tcl	61 KB	ActiveTcl Script
xlUtils.tcl	11 KB	ActiveTcl Script


Note: Depending on the CYW43XX chip being tested, copy the corresponding CYW_DUT_432x.tcl or CYW_DUT_433x.tcl file to C:\WLAN\N4010_WinDVT and rename it as CYW_DUT.tcl. Ensure that the original files are kept intact

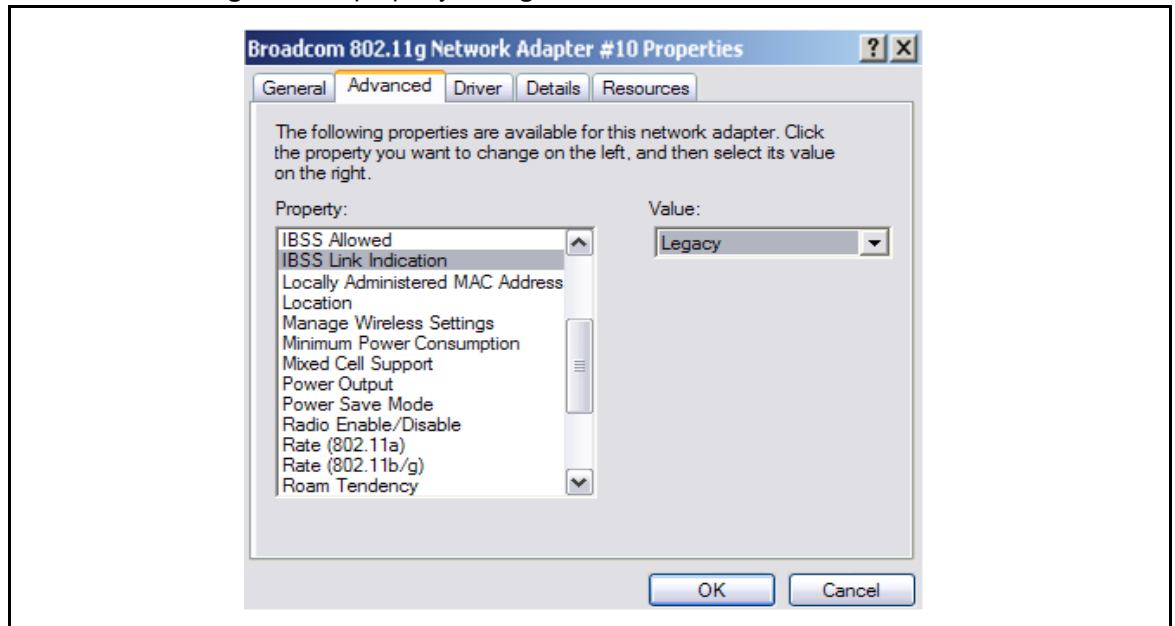
2.2 Installing the SDIO Windows XP Driver

A preliminary default version of the nvram.txt file for each Cypress reference board type and board revision is released with the hardware reference design package available from the docSAFE tab of Cypress's customer support portal (<http://community.cypress.com/>). Typically the file is named after the board it supports, such as BCM94336sdg.txt or BCM943362sdg.txt. The content in this default NVRAM file may likely change as the design goes through testing and tuning during the development stage.

In development environments where previous drivers have been installed, it may be necessary to uninstall a previously installed driver before proceeding with driver installation. If so, refer to [Appendix A: "Removing Drivers," on page 28](#)

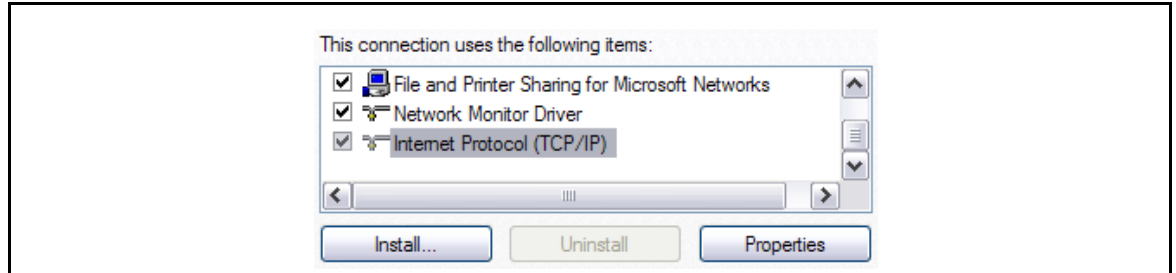
2.2.1 To install an SDIO device driver:

1. Rename the NVRAM file to “nvram.txt” and copy it to C:\Windows\system32\drivers\
2. Turn off the power of a test Windows XP-based PC.
3. Install the Broadcom adapter into the PC.
4. Turn PC power on and allow time for Windows XP to start.
5. Start the Windows Device Manager:
 - a. Click the **Start** button: .
 - b. Right-click **My Computer**, and then click **Manage**.
 - c. In the left pane of **Computer Management**, double-click **Device Manager**.
6. In the right pane of **Computer Management**, right-click **Network adapters**, and click **Scan for hardware changes**.
7. Follow the Windows on-screen instructions to install the SDIO device driver.
8. Double-click on the newly installed network adapter to view the adapter properties.
9. On the **Advanced** tab of **Adapter Properties**, set the **IBSS Link Indication** property to **Legacy**, set the **IBSS 54g™ Mode** property to **54g-Auto**, and then click **OK**.

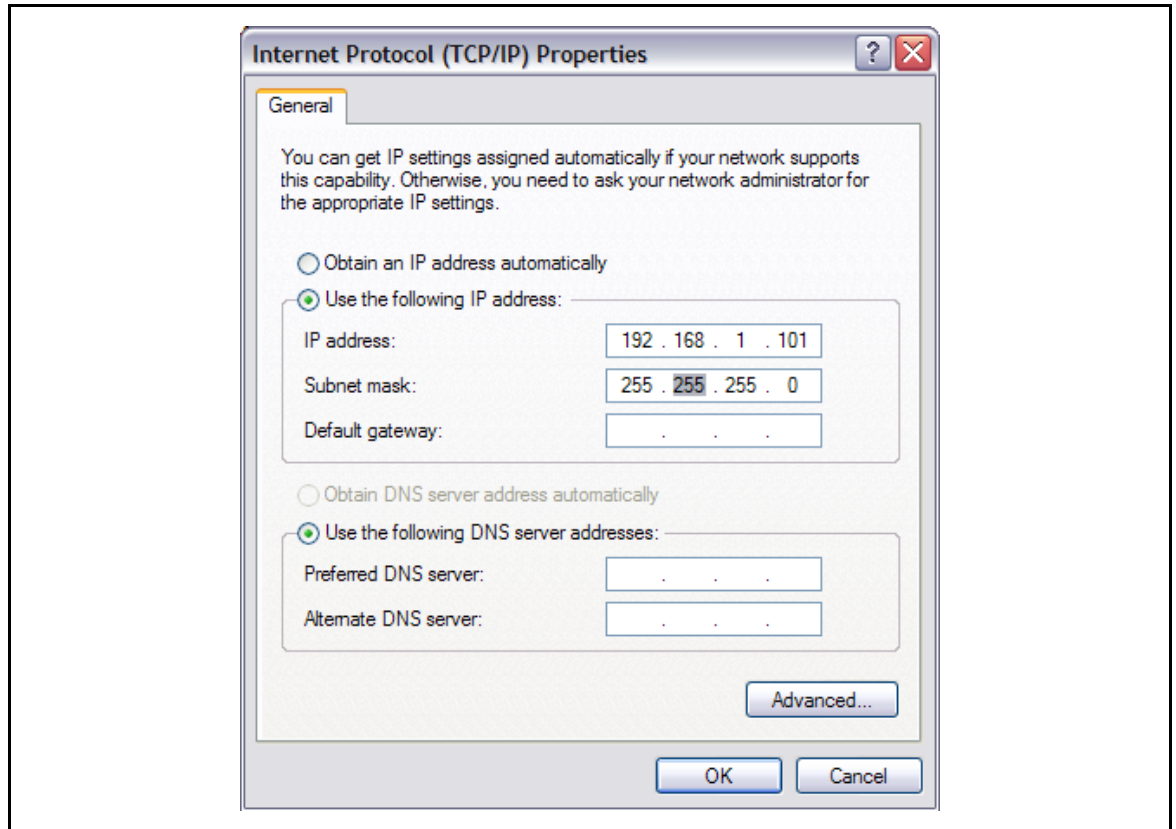


2.2.2 To set the static IP address for the 802.11g SDIO WLAN adapter:

10. Click the **Start** button, then select **Control Panel**.
11. In the Control Panel, double-click **Network Connections**.
12. Right-click **Wireless Network Connection**, then select **Properties**.
13. In the **Wireless Network Connection Properties** window, click **Internet Protocol (TCP/IP)**, then click the **Properties** button.



14. Select the **Use the following IP address** option.
15. Set the IP address to **192.168.1.101** and the Subnet mask to **255.255.255.0**, and then click **OK**.



2.2.3 To copy the WLAN test tools to enable driver test commands:

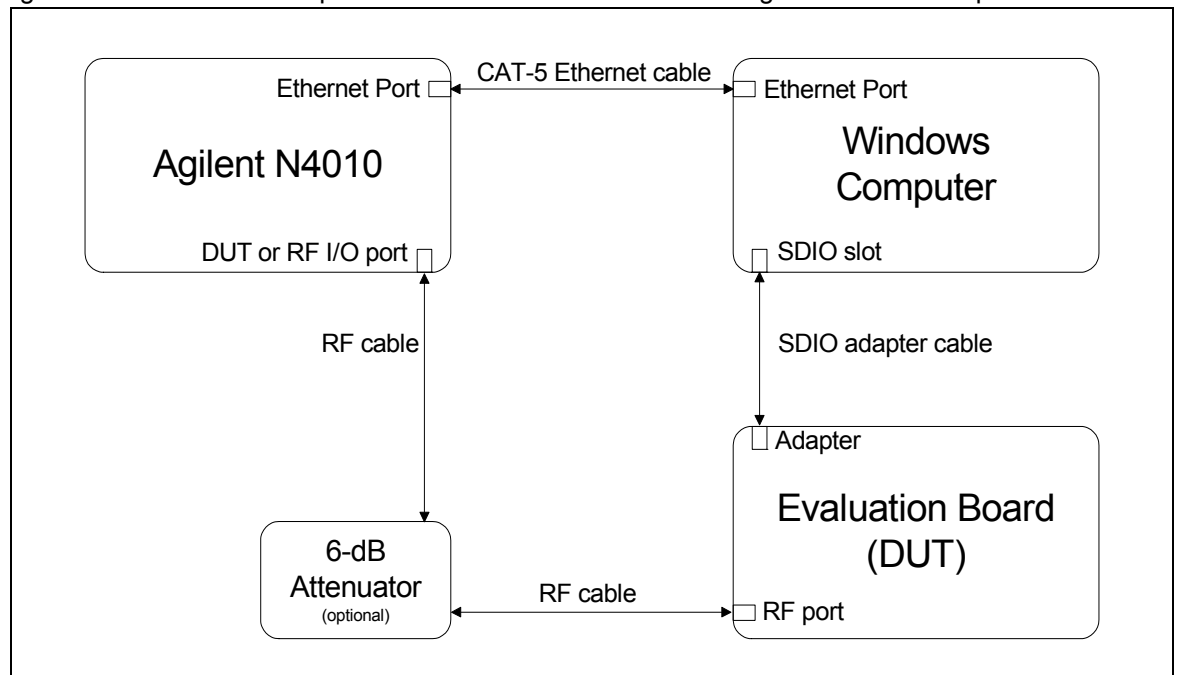
16. Copy wl.exe to C:\Windows\system32\
17. Copy brcm_wlu.dll to C:\Windows\system32\

2.3 Hardware Configuration

Figure 2-1 shows the hardware connections using a Windows computer before running WinDVT tests using the N4010A. The computer controls the Broadcom Evaluation Board (DUT) over SDIO with WL commands in a DOS environment and uses an Ethernet connection to communicate with the Agilent N4010A on the Virtual Front Panel interface. The cable connection steps are as follows:

1. Use an RF cable to connect the N4010 DUT (or RF I/O) port to the RF port of the Evaluation Board (DUT). Optionally, a 6-dB attenuator pad can be connected between them using a second RF cable.
2. Connect the N4010 Ethernet port (on rear side) to the Ethernet port of the Windows computer. This connection can be made using GPIO-USB, USB-USB, or an Ethernet connection.
3. Use an SDIO adapter cable to connect the Evaluation Board (with adapter) to the SDIO slot of the computer.

Figure 2-1. Hardware Setup Connection For WinDVT Tests Using a Windows Computer



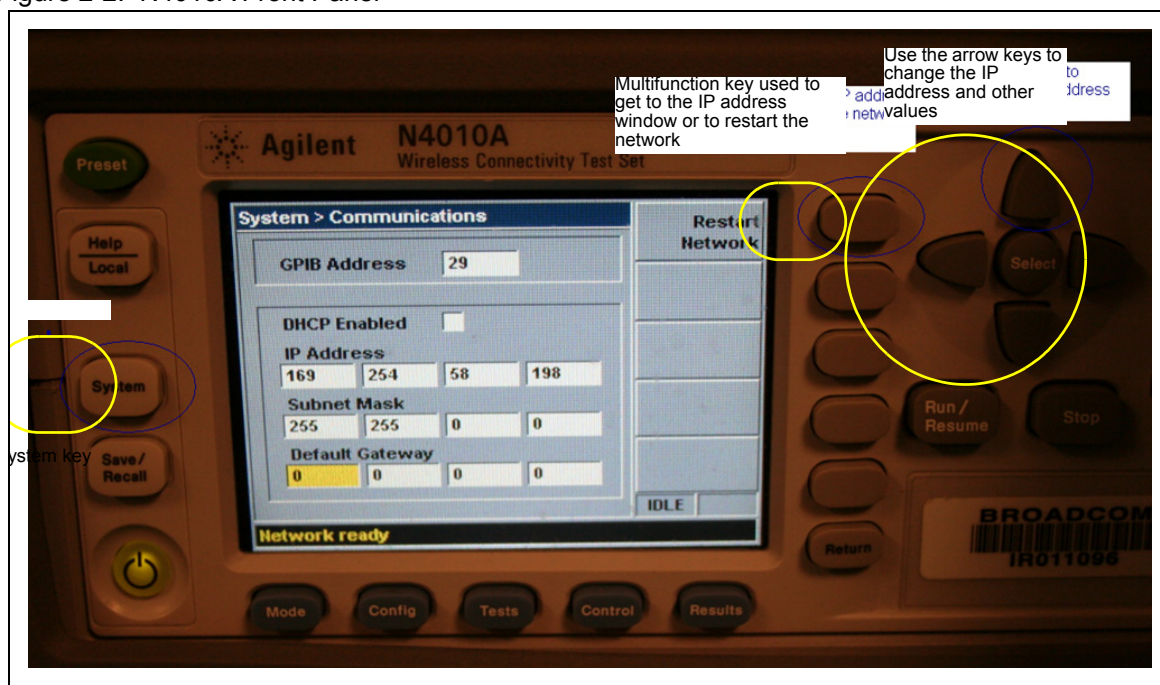
2.4 Setting Up the N4010A

You must get the IP address of the N4010A to run the WinDVT test scripts. If you are using a DHCP server, make sure DHCP is enabled.

To enter the IP address for the N4010A, follow the steps below. See [Figure 2-2](#) for a reference to the N4010A front panel.

1. Press the **System** key on the N4010A.
2. Press the multifunction command button corresponding to **Comms** on the N4010A display.
3. Use the arrow up/arrow down keys to enter the IP address information, including subnet mask and default gateway. The IP address information entered here must match the IP information entered in the dvt.config file (see [Configuration Example on page 13](#)).
4. After entering the IP address and the related information, press the multifunction command button corresponding to **Restart Network**. If the N4010A is able to communicate with the Windows computer, **Network Ready** will be displayed on the N4010A (see [Figure 2-2](#)).

Figure 2-2. N4010A Front Panel



2.5 Configuring WinDVT

Test options can be set using the dvt.config file located in the C:\WLAN\N4010_WinDVT folder. Transmit analysis includes output power, frequency error, spectral mask, and EVM. Measurements are based on the default target output power, which is set in the nvram.txt file.

Transmit configuration parameters:

- Channels—1 through 14 for 2.4 GHz; 36–64, 100–140, 149–165 in incremental steps of 4 for 5 GHz.
- Rates—1, 2, 5.5, 11 (802.11b); 6, 9, 12, 18, 24, 36, 48, 54 (802.11ag); M0–7 (802.11n)
- MCS modes—MM, GF (used with 802.11n rates only; otherwise the MCS mode setting is ignored)
- Test Short GI—Yes/No (802.11n only)

RxPER (receiver sensitivity) configuration parameters for the DUT in the RF chamber:

- Channels—1 through 14 for 2.4 GHz; 36–64, 100–140, 149–165 in incremental steps of 4 for 5 GHz.
- Rates—1, 2, 5.5, 11 (802.11b); 6, 9, 12, 18, 24, 36, 48, 54 (802.11ag); M0–7 (802.11n)
- MCS modes—MM, GF (802.11n)
- Test Short GI—Yes/No (Interframe Gap; 802.11n only)
- Test STBC—Yes/No (802.11n only)
- Sensitivity Only—True/False (add the RxSensitivity Sheet)

Pwr vs. Evm:

- Channels—1 through 14 for 2.4 GHz; 36–64, 100–140, 149–165 in incremental steps of 4 for 5 GHz.
- Standard—802.11g/802.11n/802.11a

Note: The above configuration is used to perform tests in HT20 mode. To test in HT40 mode, add the suffix “M” after channel number, as shown the examples below of HT40 channel settings for 2.4G and 5G, respectively.

- Channels: 3M, 7M, 11M
- Channels: 38M, 102M, 159M

2.5.1 Configuration Example

An example of the dvt.config file is shown below. The IP address, cable loss value, test type, and driver folder parameters must be changed as needed. Based on the information in [Configuring WinDVT on page 12](#), Tx and Rx channels are set for the 2.4 GHz band, the Tx and Rx rates are set for 802.11b and 802.11ag, MCS modes for Tx and Rx are set for 802.11n, the short GI test is enabled for Tx only, space-time block coding (STBC) is enabled for Rx, the Rx sensitivity-only test is disabled, and the power vs. EVM test is set for 2.4 GHz and 802.11.

```
N4010 IP Address: 169.254.58.198
Cable Loss: 10.8
Tests List: TxAnalysis
#Tests List: TxAnalysis, Pwr_Vs_Evm, RxPER
Driver Folder: C:\WLAN\drivers

Tests Configuration Start
<TxAnalysis>
# Includes TxPower, EVM, Frequency Error, Spectral Mask
Channels: 1, 7, 11
Rates: 1, 11, 6, 54
MCS Modes: MM, GF
Test Short GI: Yes
</TxAnalysis>

<RxPER>
Channels: 1, 7, 11
Rates: 1, 11, 6, 54
MCS Modes: MM, GF
Test Short GI: No
Test STBC: Yes
Sensitivity Only: False
</RxPER>

<Pwr_Vs_Evm>
Channels: 1, 7, 11
Standard: 802.11g
</Pwr_Vs_Evm>
Tests Configuration End
```

3. Running Tests and Retrieving Data



3.1 Test Procedure

The tests described below use Tcl-based DVT scripts developed by Broadcom engineers. The tests are designed to run on the Windows XP operating system. The scripts provide a command and control interface to run transmit/receive tests with the N4010A. Test results are captured in Excel® spreadsheet files.

Channels, bands, rates, and more can be configured individually for both transmit and receive. Using the proprietary WinDVT scripts, the following elements can be tested:

- Transmit: output power, frequency error, Error Vector Magnitude (EVM), Spectral Mask
- Receive: sensitivity
- Power vs. EVM

Before starting the test, open the dvt.config file and verify that the configuration parameters match the tests you are trying to run. Follow the steps below to execute WinDVT.

1. On the laptop, click **Start**, then click **All Programs**. In the **Accessories** group, click **Command Prompt**.
2. In the Command Prompt window, go to C:\Windows\system32\ and enter the following commands:
 - a. **wl ver**—This command ensures the DUT can communicate with the laptop.
 - b. **wl mpc 0**—This command ensures the DUT is not in Sleep mode.
 - c. **wl up**—This command ensures that the wl engine is activated.
3. In the Command Prompt window, go to C:\WLAN\N4010_WinDVT, type in **tclsh win_dvt.tcl projectname**, and press **Enter** to run the WinDVT test script based on the dvt.config file. The test should be completed in 5 to 15 minutes based on the number of channels and rates.

3.2 Retrieving Test Results

To retrieve the test results, go to C:\WLAN\N4010_WinDVT\Results\projectname\Run_xxxxxxxx-xxxxxx. Below is an example of the contents of this folder. Double-click the respective .xls files to view the results for a given test.

Name	Size	Type
BCM9a962_RC5_90_125_31.xls	22 KB	Microsoft Excel Worksheet
Pwr_Vs_Evm_g_54Mbps.xls	74 KB	Microsoft Excel Worksheet
RxPER_Channel_1.xls	233 KB	Microsoft Excel Worksheet
RxPER_Channel_4.xls	233 KB	Microsoft Excel Worksheet
RxPER_Channel_7.xls	233 KB	Microsoft Excel Worksheet
RxPER_Channel_11.xls	233 KB	Microsoft Excel Worksheet
RxPER_Channel_13.xls	234 KB	Microsoft Excel Worksheet
SpectralMask_Channel_1.xls	1,823 KB	Microsoft Excel Worksheet
SpectralMask_Channel_4.xls	1,823 KB	Microsoft Excel Worksheet
SpectralMask_Channel_7.xls	1,823 KB	Microsoft Excel Worksheet
SpectralMask_Channel_11.xls	1,823 KB	Microsoft Excel Worksheet
SpectralMask_Channel_13.xls	1,823 KB	Microsoft Excel Worksheet

3.3 Test Result Examples

Figure 3-3 shows an example of a test results spreadsheet that was generated during transmit testing.

Figure 3-3. Test Results Spreadsheet Generated During Transmit Testing

	A	B	C	D	E	F	G	H	I	J	K
1	SI No	Channel	Rate	Rate Type	Guard Interval	MM / GF	Tx Power	EVM	Freq Err	SPMSK	SPMSK Margin
2	1	1	54	Legacy	Normal	NA	15.42 dBm	-29.87 dB	-0.54 ppm	PASS	7.32493 dB
3	2	1	11	Legacy	Normal	NA	17.30 dBm	21.22%	-0.89 ppm	PASS	5.76020 dB
4	3	1	M7	11n	Normal	MM	14.36 dBm	-31.24 dB	-1.30 ppm	PASS	3.76620 dB
5	4	7	54	Legacy	Normal	NA	15.61 dBm	-26.74 dB	-0.92 ppm	PASS	7.80055 dB
6	5	7	11	Legacy	Normal	NA	17.74 dBm	23.27%	-1.21 ppm	PASS	5.85100 dB
7	6	7	M7	11n	Normal	MM	14.92 dBm	-29.02 dB	-1.24 ppm	PASS	4.39068 dB
8	7	13	54	Legacy	Normal	NA	15.99 dBm	-24.96 dB	-1.09 ppm	PASS	10.30063 dB
9	8	13	11	Legacy	Normal	NA	17.83 dBm	23.01%	-1.47 ppm	PASS	6.43833 dB
10	9	13	M7	11n	Normal	MM	14.85 dBm	-27.41 dB	-1.45 ppm	PASS	4.24212 dB

Figure 3-4 shows an example of a spectral mask plot generated in the spreadsheet during transmit testing.

Figure 3-4. Spectral Mask Test Results Graph Generated During Transmit Testing

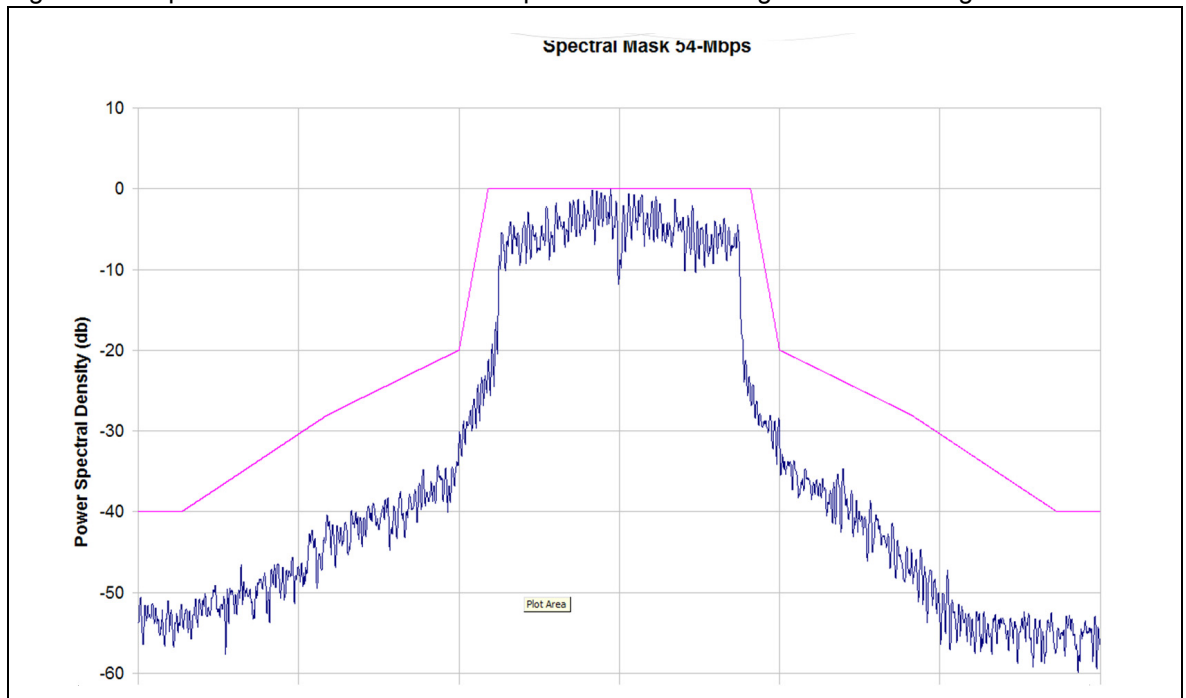


Figure 3-5 shows an example of a graph produced in the spreadsheet during testing of transmit power vs. Error Vector Magnitude (EVM).

Figure 3-5. Test Results Graph Generated During Transmit Testing—Power vs. EVM

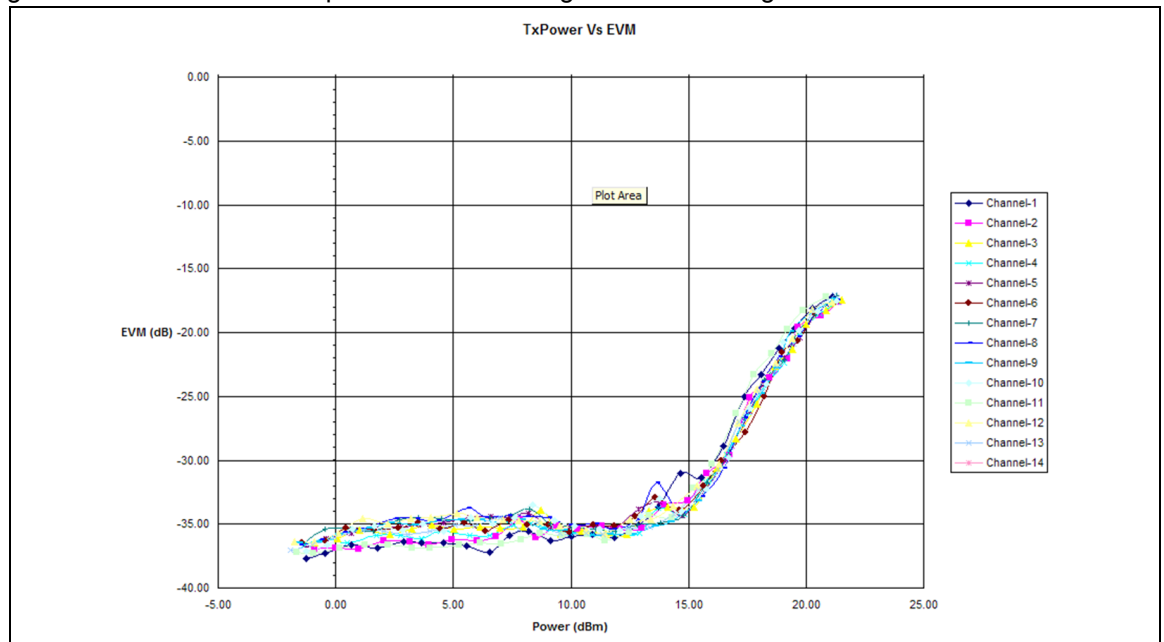


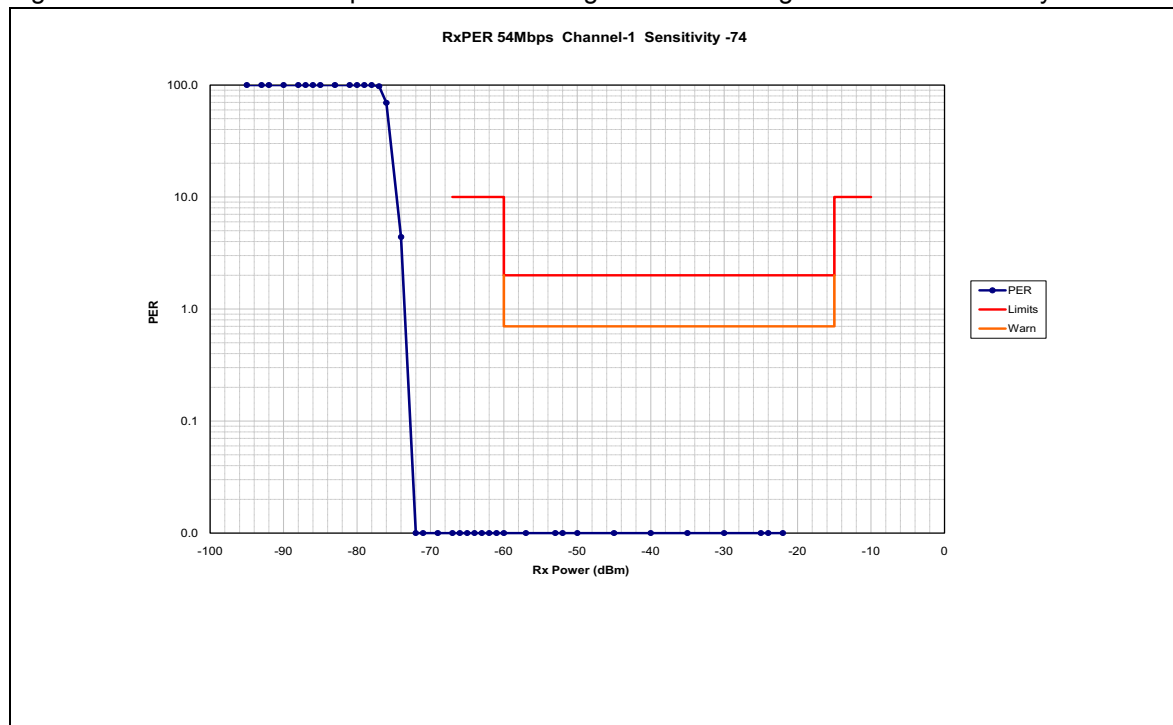
Figure 3-6 shows an example of the results produced in the spreadsheet during receive testing.

Figure 3-6. Test Results Generated During Receive Testing

B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
Channel	Rate	Rate Type	Guard Interval	MM / GF	STBC	Sensitivity	PER DATA															
	1	Legacy	Normal	NA	NA		.95	.93	.92	.90	.88	.87	.86	.85	.83	.81	.80	.79	.78	.77	.76	.74
	2	Legacy	Normal	NA	NA																	
	5.5	Legacy	Normal	NA	NA																	
	11	Legacy	Normal	NA	NA																	
	6	Legacy	Normal	NA	NA																	
	9	Legacy	Normal	NA	NA																	
	12	Legacy	Normal	NA	NA																	
	18	Legacy	Normal	NA	NA																	
	24	Legacy	Normal	NA	NA																	
	36	Legacy	Normal	NA	NA																	
	48	Legacy	Normal	NA	NA																	
1	54	Legacy	Normal	NA	NA	-76.0	98.8	98.6	98.6	97.0	99.0	96.4	99.2	99.0	98.8	98.4	99.0	90.2	42.0	15.8	6.0	0.0
	M0	11n	Normal	MM																		
	M0	11n	Short	MM																		
	M0	11n	Normal	MM	STBC																	

Figure 3-7 shows an example of a graph produced in the spreadsheet during receive testing of receiver sensitivity.

Figure 3-7. Test Results Graph Generated During Receive Testing—Receiver Sensitivity



4. Creating a Transmission Test



This section describes the WL commands used to set up TX modulation and data rate.

1. From the **Start** menu, select **Run...**
2. Type **cmd**, then click **OK**.
3. Navigate to the directory that contains **wl.exe**.
4. Enter the **wl ver** command to check the current WL driver version.

A screenshot of a Windows Command Prompt window. The title bar reads "C:\ Command Prompt". The command prompt shows the following text:

```
C:\>wl ver
4.160 RC17.0
wl0: Jul 11 2007 05:05:20 version 4.160.17.0
C:\>_
```

Note: If the **wl ver** command returns an error message, the current directory may not be the one that contains **wl.exe**.

5. Enter the **wl rate** and **wl rateset** commands to check the modulation and data packet rates.

A screenshot of a Windows Command Prompt window. The title bar reads "C:\ Command Prompt". The command prompt shows the following text:

```
C:\>wl ver
4.160 RC17.0
wl0: Jul 11 2007 05:05:20 version 4.160.17.0

C:\>wl rate
54 Mbps

C:\>wl rateset
[ 1(b) 2(b) 5.5(b) 6 9 11(b) 12 18 24 36 48 54 ]

C:\>
```

6. Enter **wl rate 54** to set the TX modulation as OFDM at 54 Mbps.
7. Enter **wl rateset 54b** to set the beacon rate at 54 Mbps.

Note: The default setting for rate is Auto (maximum 54 Mbps but not forced), and for rateset is Default (all rates). For CCK 11 Mbps, the commands become **wl rate 11** and **wl rateset 11b**.

8. Enter **wl channel x** to set the TX channel, where x is a channel number from 1 to 14 (for example, **wl channel 7** sets the midband channel, 7).

Note: Enter **wl country All** before specifying channel 13 or 14.

9. Enter **wl down** or **wl up** to refresh the WL setting.
10. Enter **wl pkteng_start 00:11:22:33:44:55 tx 1000 1024 0** to instruct the DUT to transmit packets continuously.
 - ❑ **pkteng_start**: Start to use packet engine instead of epi_tcp above.
 - ❑ **tx 00:11:22:33:44:55**: Instruct the DUT to transmit packets from this physical address.
 - ❑ **1000**: Inter-packet gap in microseconds (µs).
 - ❑ **1024**: Packet data length in bytes.
 - ❑ **0**: Packet engine parameter for continuous mode
11. Enter **wl pkteng_stop tx** to stop the continuous transmission from the DUT if the above packet engine command is being used.
12. To adjust the Tx output power using closed-loop power control, enter **wl txpwr1 -o -d [xx]**, where [xx] is the desired target power in dBm.
 - a. **-o**: Turn on override to disable regulatory and other limits
 - b. **-d**: Specify power in dBm units
 - c. **-q**: Can be used to replace the **-d** option to specify power in quarter dBm units
13. Enter the following wl commands to set the DUT in TX mode:


```
wl ver
wl down
wl country ALL
wl mpc 0
wl band a
wl mimo_bw_cap 1
wl chanspec //syntax: {-c <channel #> -b <band: 2 for 2.4G, 5 for 5G> -w
<BW = 20 or 40> -s <sideband: -1, 0 ,1>}
wl mimo_txbw 4
wl mimo_preamble 0
wl nrate -m <0 to 7> -s 0
wl up
wl pkteng_start 00:11:22:33:44:55 tx 100 1024 0
```

See [Section 5: “Using TX Measurement Software,” on page 20](#) for transmit-related measurements using the Agilent N4010A.

5. Using TX Measurement Software



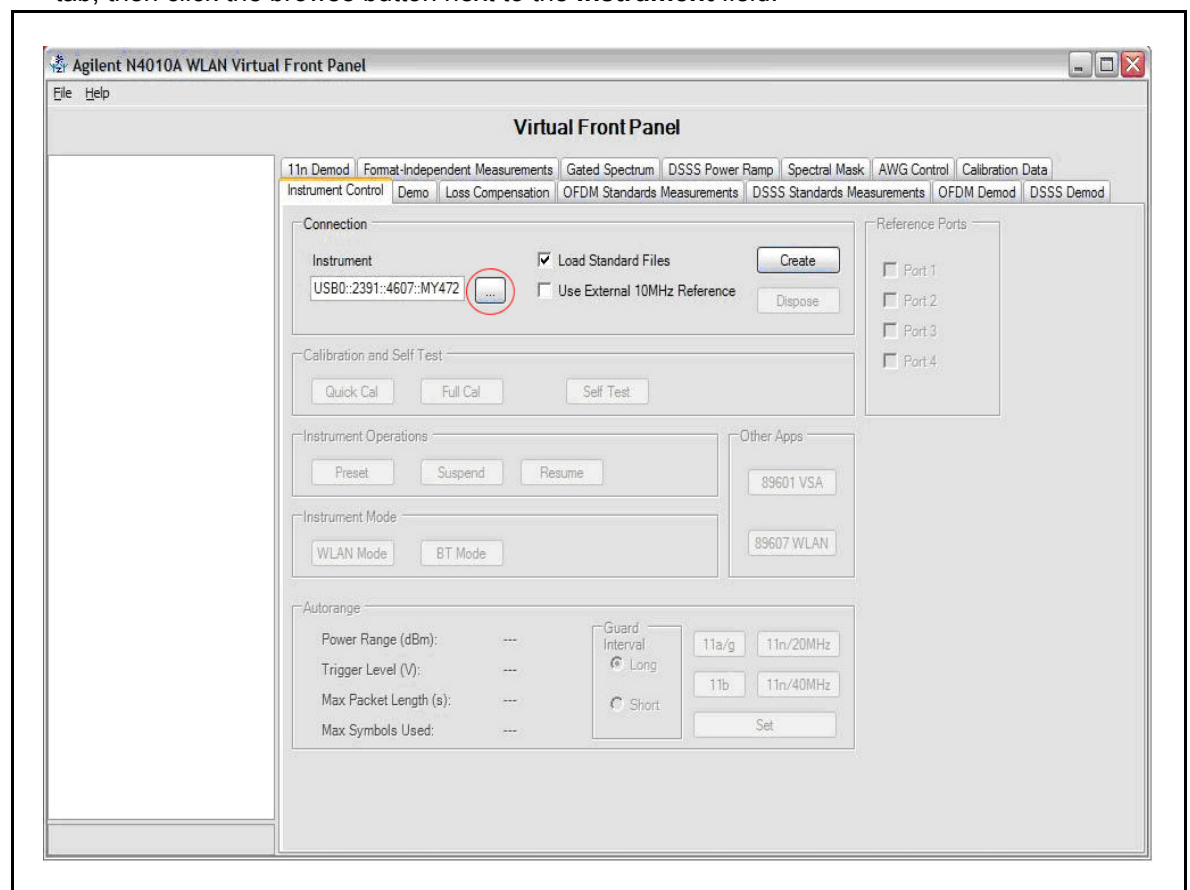
5.1 N4010A Transmit-Related Measurements

The following measurements are based on a continuous transmission from the DUT to the N4010A. See [Section 4: “Creating a Transmission Test,” on page 18](#) for the procedure to set up this transmission.

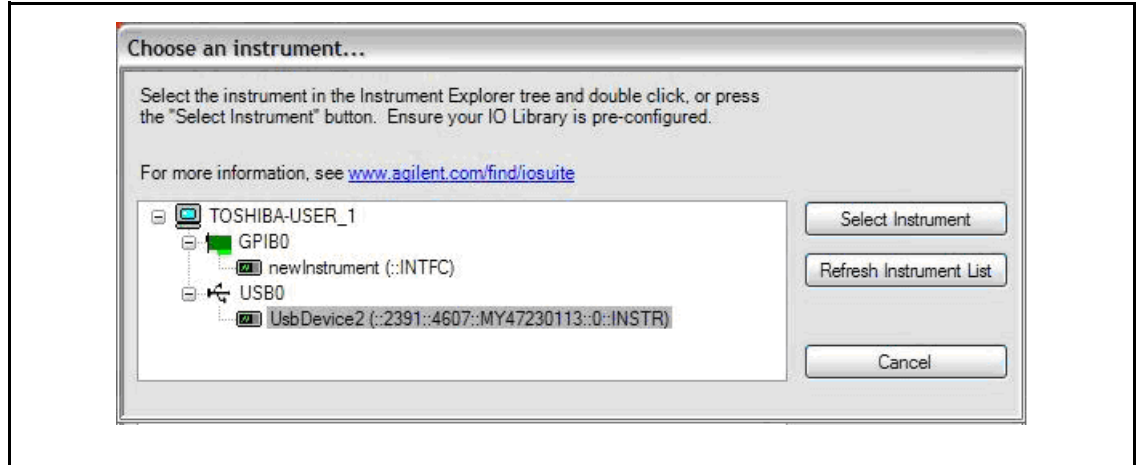
5.1.1 N4010A TX-Related Measurement Setup

This section shows how to use the N4010A Virtual Front Panel (VFP) to define the measurement settings for the N4010A.

1. From the **Start** menu, select **All Programs, Agilent N4010A WLAN Test Suite**, then **Virtual Front Panel**.
2. The N4010A must be set for remote control by the VFP software. Click the **Instrument Control** tab, then click the browse button next to the **Instrument** field.

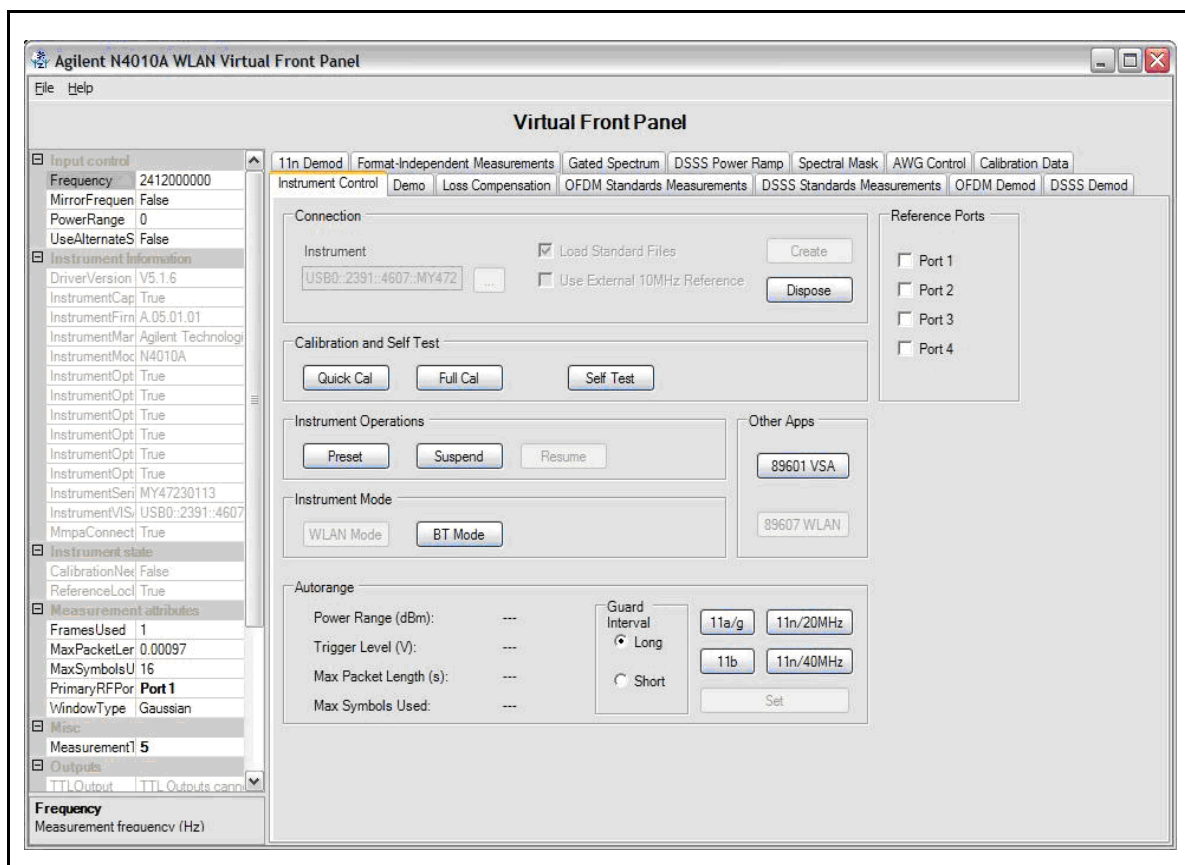


3. Click **Refresh Instrument List**. Locate the correct connection type (USB in this case) and highlight the listed instrument. Click **Select Instrument** to establish remote control of the instrument. If successful, the rest of the options on the Instrument Control tab are unlocked, and the physical front panel on the N4010A prints the message, “This instrument is being operated remotely by Agilent N4010 WLAN Test Software”.

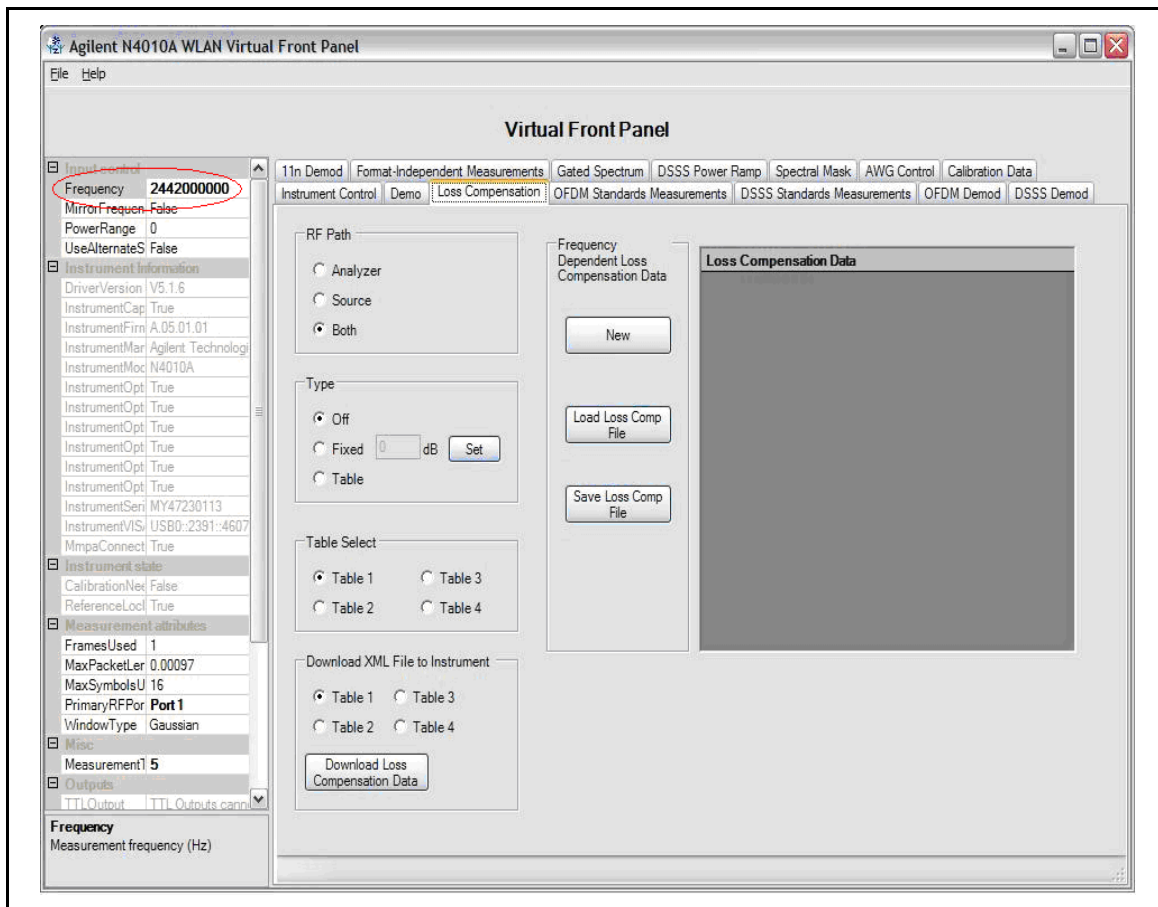


Note: In some cases, the N4010A instrument address is not read correctly by the PC, so it is not remotely controlled even though its name and address still show in the instrument list. When this happens, click **Refresh Instrument List** and try again. If it still fails, reboot both the N4010A and the computer.

The N4010A Virtual Front Panel must target the DUT's transmitting channel (frequency) to perform the measurement.

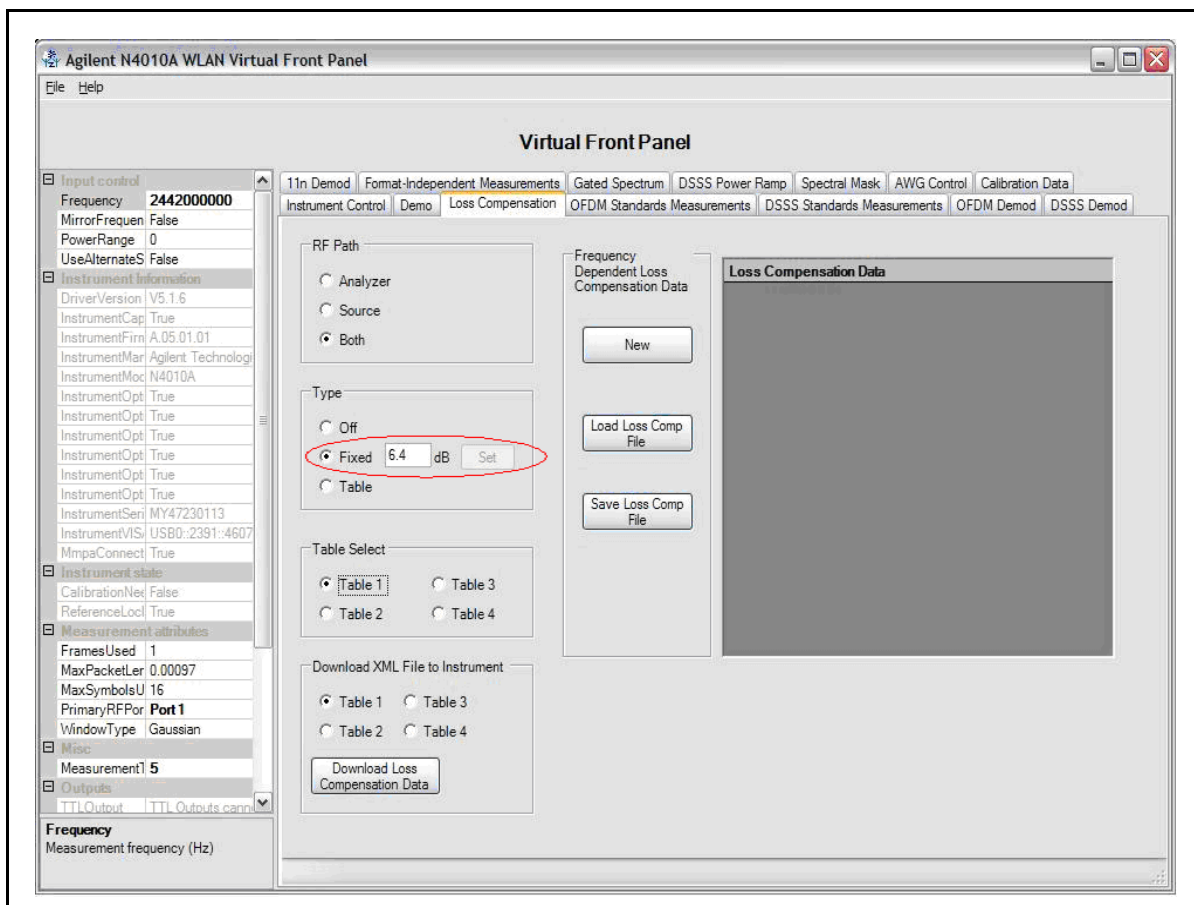


1. The procedure in [Creating a Transmission Test on page 18](#) used channel 7 as an example (see [Step 8](#)). Double-click the **Frequency** input control and type **2442000000** for channel 7.



- Click the **Loss Compensation** tab. Select the **Fixed** Type, then type **6.4** dB, then click **Set**. This sets a fixed attenuation level of 6.4 dB for the path from the DUT's RF output to the N4010A's RF input, independent of the set frequency band.

Note: The 6.4 dB value is derived from a 6 dB attenuator plus 0.4 dB RF cable loss. The actual loss must be determined according to the hardware setups. For example, the value could be 0.4 dB if the attenuator is excluded.



- Click the **Instrument Control** tab. In the Autorange section, click **11a/g**. OFDM modulation was set on the DUT transmitter with a WL command (see [Step 6 on page 18](#)).

Autorange examines the transmitted signal from the DUT and automatically configures the optimum settings for the N4010A to correctly perform the DUT transmitter measurements. For Autorange to work, the DUT must transmit a burst signal (for example, packet transmission).

Note: This step is critical to ensure correct measurements with the N4010A and should be rechecked or rerun at a later time if an unexpected result occurs.

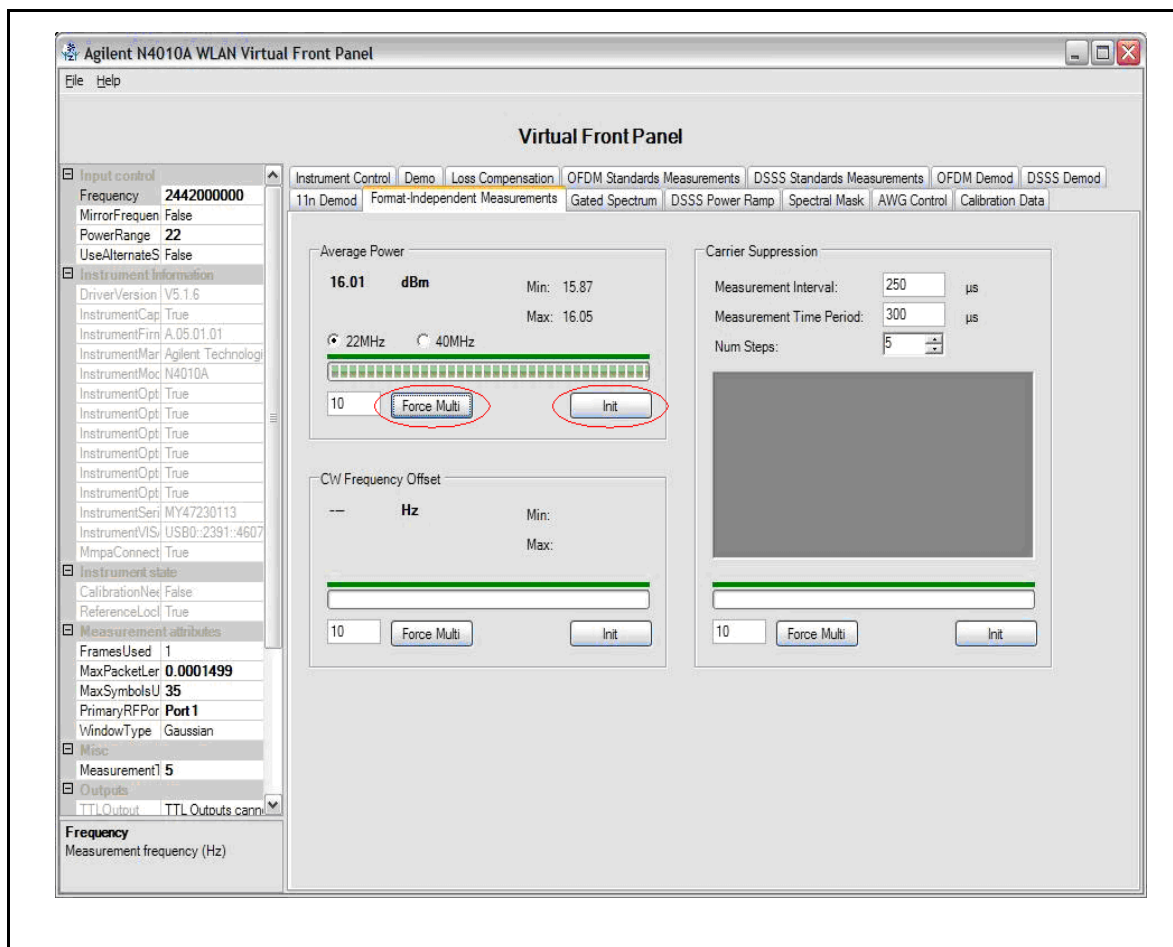
- After a few seconds, the auto setting numbers display in the Autorange section. Click **Set** to store them as measurement attributes.

Note: Depending on the quality of the burst signal being transmitted from the DUT, it may require a few tries before the Autorange recognizes optimal settings for the DUT. Actual numbers for the optimal settings depend on the device being tested and, therefore, cannot be provided here. However, it is recommended to first test a known good device to produce the Autorange settings, then use these settings as a reference when Autoranging other DUTs of similar types

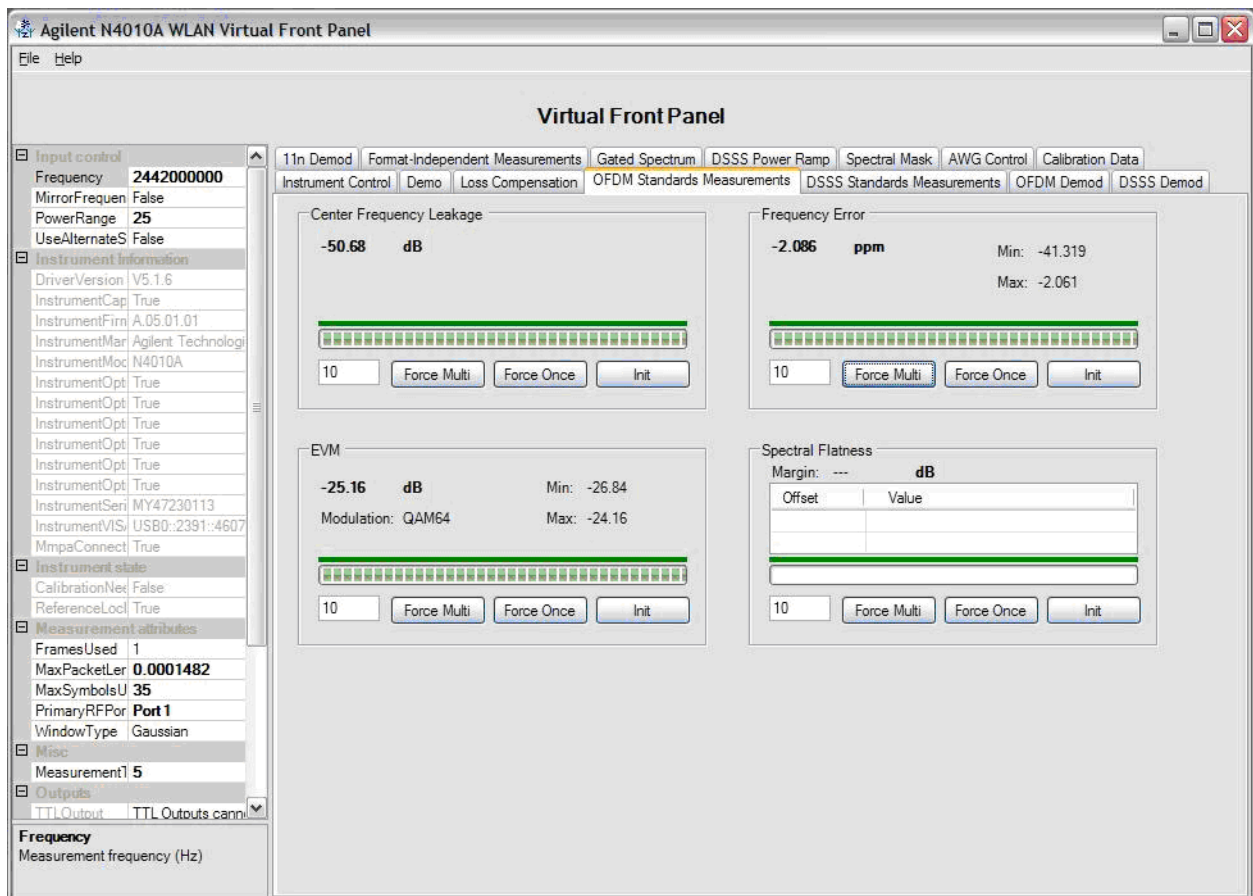
5.1.2 Taking Transmit-Related Measurements

The N4010A should now be ready to take the TX measurements.

1. Click the **Format-Independent Measurements** tab.
2. To set TX output power, click **Force Multi** (for multiple measurements) or **Init** (for a single measurement) in the Average Power section.

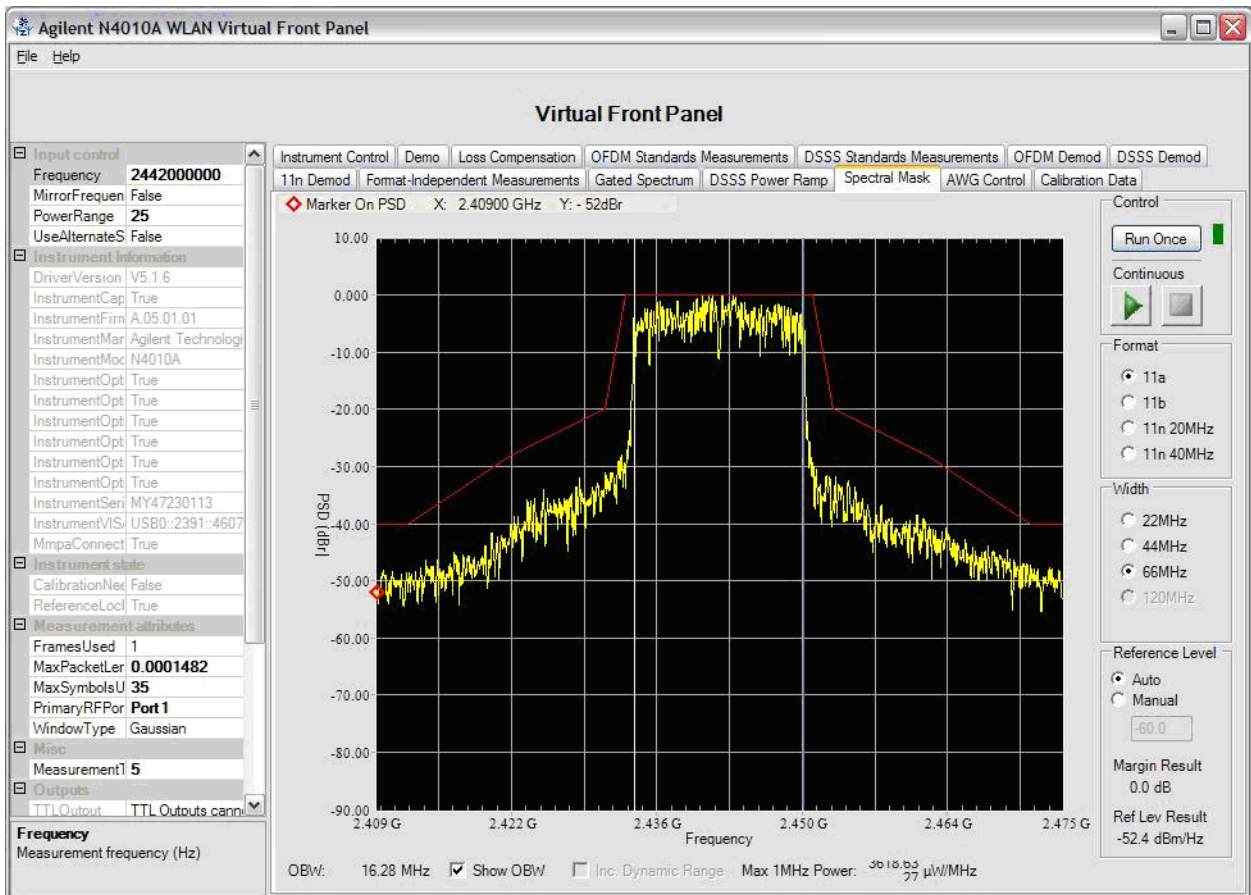


3. Click the **OFDM Demod** or **OFDM Standards Measurements** tabs to take EMV measurements.
4. Carrier Frequency Leakage and Frequency Error measurements can be taken under the **OFDM Standard Measurements** tab.



5. Click the **Spectral Mask** tab for spectral mask measurements.
6. For OFDM, select **11a** in the Format section.

7. If **Continuous** measurement is selected, it must be stopped to select other tabs in the VFP.




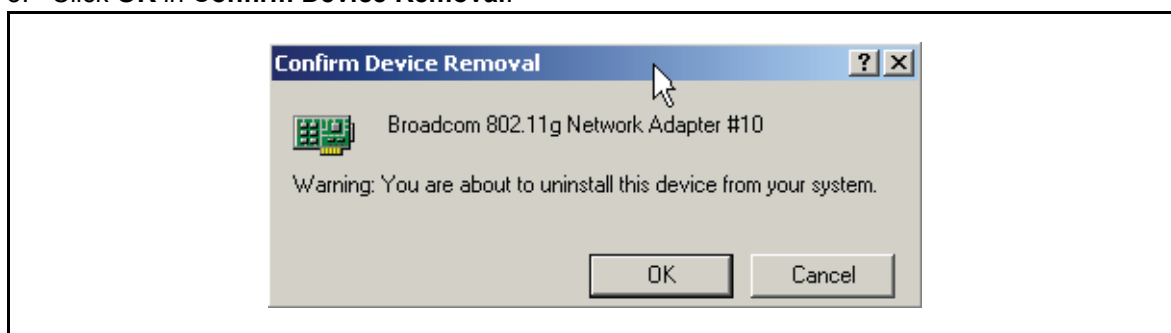
8. To disconnect, click the **Instrument Control** tab, then click **Dispose**.

A. Removing Drivers



A.1 Uninstalling a Driver

1. Start the Windows Device Manager.
 - a. Click the **Start** button .
 - b. Right-click **My Computer**, and then click **Manage**.
 - c. In the left pane of **Computer Management**, double-click **Device Manager**.
2. In the right pane of **Computer Management** under **Network adapters**, right-click **Broadcom 802.11g Network Adapter #10**, and then click **Uninstall**.
3. Click **OK** in **Confirm Device Removal**.



4. Delete the following files, if necessary:

Table 1:


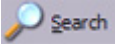
Filename	Location
bcmsddhd.sys	C:\Windows\system32\drivers\
nvrnm.txt	C:\Windows\system32\drivers\
oem#.inf	C:\Windows\inf\
oem#.pnf	C:\Windows\inf\
wl.exe	C:\Windows\system32\
brcm_wlu.dll	C:\Windows\system32\

The following files are typical SDIO driver files released with the Windows XP driver or design package:

bcm94329sdagb.txt
bcmsddhd.inf
bcmsddhd.sys
brcm_wlu.dll
wl.exe

A.1.1 Deleting the Correct oem#.inf and oem#.pnf Files

In some cases, multiple instances of Broadcom network adapters are installed. To locate the correct oem#.inf and oem#.pnf files for deletion, take the following steps with help from the Windows search facility:

1. Click the **Start** button  and then click **Search** .
2. In the **Search Companion** pane of **Search Results**, type **C:\Windows\inf\oem*.inf** in the **All or part of the file name** box, type **Broadcom Corporation** in the **A word or phrase in the file** box, select **Local Hard Drives (C:)** from the **Look in** list, and then click **Search**.
3. If more than one INF file appears in the **Search Results**, open each in a text editor.

Delete the Broadcom oem#.inf file and the associated Broadcom oem#.pnf file for the oem#.inf file that looks similar to the file shown below.

```
;;bcmsddhd.inf
;;
;; Copyright 1998-2005, Broadcom Corporation
;; All Rights Reserved.
;;
;; This is UNPUBLISHED PROPRIETARY SOURCE CODE of Broadcom Corporation;
;; the contents of this file may not be disclosed to third parties, copied
or
;; duplicated in any form, in whole or in part, without the prior written
;; permission of Broadcom Corporation.
;;

[Version]
Signature="$Windows NT$"; Combined Win9x/Win2K inf
Class=Net
ClassGUID={4d36e972-e325-11ce-bfc1-08002be10318}
Provider=%V_BCM%
Compatible=1
DriverVer=06/10/2009, 4.218.84.1
CatalogFile=BCM43XX.CAT
CatalogFile=NTamd64=BCM43XX64.CAT

[Manufacturer]
%V_BCM% = BROADCOM, NTamd64
```

Revision History



Document Revision History

Document Title: CYW43XX Evaluating Chips Using WinDVT Scripts				
Document Number: 002-15465				
Revision	ECN#	Issue Date	Origin of Change	Description of Change
**	—	01/04/10	—	43XX-TI100-R: Initial release.
*A	—	01/16/12	—	43XX-TI101-R: Updated: <ul style="list-style-type: none"> ■ “Introduction” on page 7. ■ “Hardware Requirements” on page 7. ■ “Software Requirements” on page 7. ■ “Windows PC Setup” on page 8. ■ “Hardware Configuration” on page 12. ■ “Configuring WinDVT” on page 14. ■ “Test Procedure” on page 16. ■ “Retrieving Test Results” on page 17. ■ “Test Result Examples” on page 17. Added: <ul style="list-style-type: none"> ■ “Installing the SDIO Windows XP Driver” on page 9. ■ Section 4: “Creating a Transmission Test,” on page 21. ■ Section 5: “Using TX Measurement Software,” on page 23. ■ Appendix A: “Removing Drivers,” on page 20. Removed: <ul style="list-style-type: none"> ■ “Installing ActiveTcl” on page 2. ■ “Installing WLAN Drivers” on page 3.
*B	5548383	31/01/2017	UTSV	Updated to Cypress template