WM820-B

Wireless 802.11N dual-band mini PCI module

User Manual

Rev 1.0

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

-       Reorient or relocate the receiving antenna.

-       Increase the separation between the equipment and receiver.

-       Connect the equipment into an outlet on a circuit different from that

        to which the receiver is connected.

-       Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

IMPORTANT NOTE:

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Operations in the 5.725-5.85GHz band are restricted to indoor usage only

When using the device in the in United States (or where FCC rules apply), it is the responsibility of the professional installer to ensure to control the output power not grater then the application.

USERS MANUAL OF THE END PRODUCT:

In the users manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the FCC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

The FCC part 15.19 statement below has to also be available in the manual:

This device complies with Part 15 of FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

This transmitter module is authorized only for use in device where the antenna may be installed such that 20cm may be maintained between the antenna and users. The final end product must be labled in a visiable area with the following: "Contains TX FCC ID:N89-WM820B" .

Operation is subject to the following two conditions: (1) this device may not cause interference and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

This device and its antenna(s) must not be co-located or operation in conjunction with any other antenna or transmitter.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p) is not more than that permitted for successful communication.

Caution:

The device for the band 5725-5850 MHz is only for indoor usage to reduce potential for harmful interference to co-channel mobile satellite systems.

IMPORTANT NOTE:

IC Radiation Exposure Statement:

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

The device could automatically discontinue transmission in case of absence of information to transmit, or operational failure. Note that this is not intended to prohibit transmission of control or signaling information or the use of repetitive codes where required by the technology.

The device for the band 5725-5850 MHz is only for indoor usage to reduce potential for harmful interference to co-channel mobile satellite systems.

The maximum antenna gain permitted (for devices in the band 5725-5825 MHz) to comply with the e.i.r.p. limits specified for point-to-point and non point-to-point operation as appropriate, as stated in section A9.2(3).

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

USERS MANUAL OF THE END PRODUCT:

In the users manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the IC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. IC statement is required to be available in the users manual: This Class B digital apparatus complies with Canadian ICES-003. Operation is subject to the following two conditions: (1) this device may not

cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

Table of contents

Introduction

The WM820-B is quad-mode wireless network adapter that works on all the frequencies allocated for WLAN operation everywhere in the world. It is in compliance with the Draft IEEE802.11n standard in a 2x3 MIMO configuration. It also complies with the IEEE 802.11a, standards. WM820-B features the compactness and high bus speed of the Mini PCI specifications which gives users of laptops, notebooks, tablet PCs, and other mobile computing devices transparent Internet access anywhere in the world through any Wi Fi network without software changes or additional hardware.

Able to provide greater than 100Mbps real world throughput using high-speed spatial multiplexing modes, the WM821-M provides the freedom to work as you wish, wherever you wish, using whatever kind of application you wish to use. The adapter installs directly in any host device with a Mini PCI slot: just plug it in and you're ready to access local resources and/or the Internet at the highest speed the WLAN, the location, and the host computer can provide. It is ready to work "out of the box" in any embedded device or in any computer running Microsoft® Windows 2000, or XP. The WM820-B Mini PCI Card is truly a "must-have" for every productivity-sensitive laptop, notebook, or tablet PC user and any bandwidth-sensitive embedded design..

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Features

- mPCI 32 interface.
- Draft IEEE 802.11n compatible.
- Backward compatible with IEEE 802.11a standard.
- Wire-free access to networked resources from anywhere beyond the desktop.
- Delivers data rates up to 300 Mbps.
- 802.11n: Dynamically shifts among 130, 117, 104, 78, 52, 39, 26 and 13Mbps in a 20MHz bandwidth and 300, 243, 216, 162, 108, 81, 54 and 27Mbps in a 40MHz bandwidth, based on signal strength, for maximum availability and reliability of connection.
- 802.11a: Dynamically shifts between 54, 48, 36, 24, 18, 12, 9 and 6 Mbps network speed, based on signal strength, for maximum availability and reliability of connection.
- Allows users move between Access Points without resetting the connection reconfigurations.
- Three ultra-mini connectors with for diversity antennae.
- Uses 5GHz frequency band, complying with regulatories worldwide
- Supports most popular operating systems: Window 2000/XP. Linux support is also available.
- Ensures great security by providing the 64/128 bits Wired Equivalent Privacy (WEP) and WiFi Protected Access (WPA) defined in the IEEE standard.
- WPA support. Radius clients in EAP-TLS, EAP, TTLS, EAP-LEAP, EAP, PEAP.
- WPA2, WMM-compliant.
- WiFi-Protected Setup(WPS)-supported

WiFi-Protected Setup(WPS)-supportedWhat is Wireless LAN?

Wireless Local Area Network (WLAN) systems offer a great number of advantages over traditional wired systems. WLANs are flexible and easy to setup and manage. They are also more economical than wired LAN systems.

Using radio frequency (RF) technology, WLANs transmit and receive data through the air. WLANs combine data connectivity with user mobility. For example, users can roam from a conference room to their office without being disconnected from the LAN.

Using WLANs, users can conveniently access shared information, and network administrators can configure and augment networks without installing or moving network cables.

WLAN technology provides users with many convenient and cost saving features:

- **Mobility:** WLANs provide LAN users with access to real-time information anywhere in their organization, providing service opportunities that are impossible with wired networks.

- **Ease of Installation:** Installing is easy for novice and expert users alike, eliminating the need to install network cables in walls and ceilings.

- **Scalability**: WLANs can be configured in a variety of topologies to adapt to specific applications and installations. Configurations are easily changed and range from peer-to-peer networks suitable for a small number of users to full infrastructure networks of thousands of users roaming over a broad area.

This chapter covers how to installing the Wireless MiniPCI Module in your embedded system.

Hardware description

The Wireless MiniPCI Module has a standard MiniPCI interface for attaching to the MiniPCI connector on embedded system.

And this module has IPEX connector to connect to external antenna.

Outlook

Following is the MiniPCI module outlook
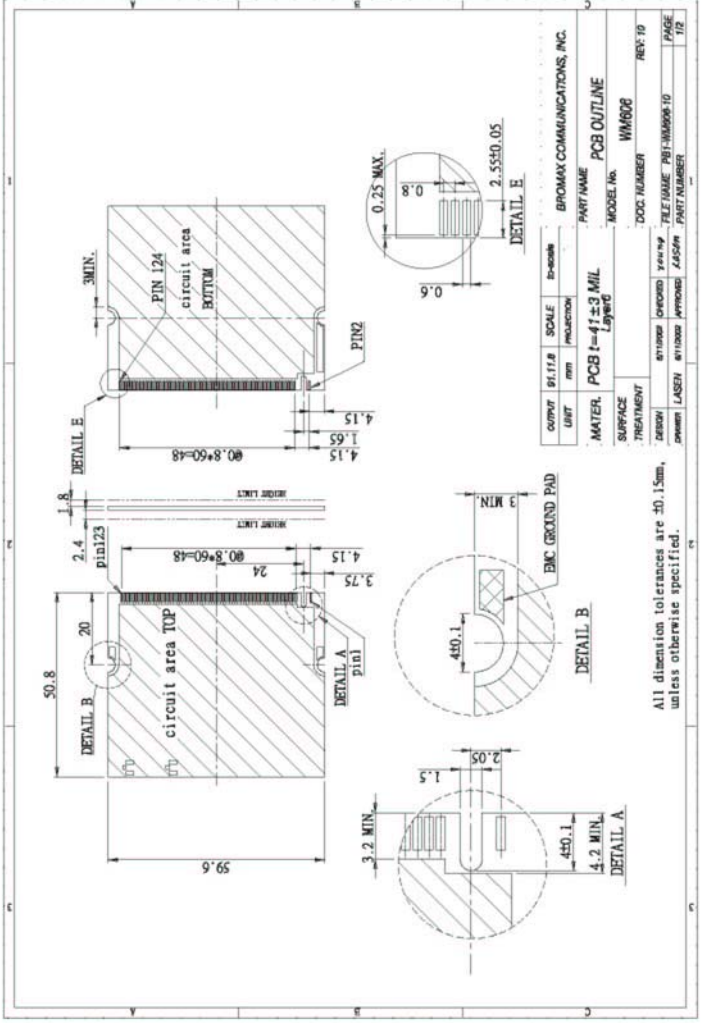
Figure 1: MiniPCI module outlook

Chapter 3 – Driver Installation for Windows

The following sections cover miniPCI Wireless LAN Card driver installation in the Windows Operating Systems.

Note!	***You have to install your hardware first before you begin to install the drivers.***

Driver installation for Windows XP

Follow the steps below to install the MiniPCI Wireless LAN Card drivers for Windows XP.

1. Insert the miniPCI Wireless LAN Card .
2. After Windows XP detects the CardBus Wireless LAN Card, the *Found New Hardware Wizard* window appears. Select **Install the software automatically [Recommended]** and insert the driver CD-ROM into CD-ROM drive and click **Next** to continue.

3.   Click **Continue Anyway** to continue the installation.

4.   The Windows has finished installing software for the device. Click **Finish** to finish the installation

Then system will start to install Wireless utility automatically. Please refer to procedures at Chapter 4.

Chapter 4 – Installing and Using the Wireless Utility

The following sections cover the CardBus Wireless LAN Card utility installation and configuration.

Installation in Windows

After you have installed driver, system will start to install Wireless LAN Utility. Please follow the steps below to install the utility.

1. Once you see the following screen, click **Next** to continue.
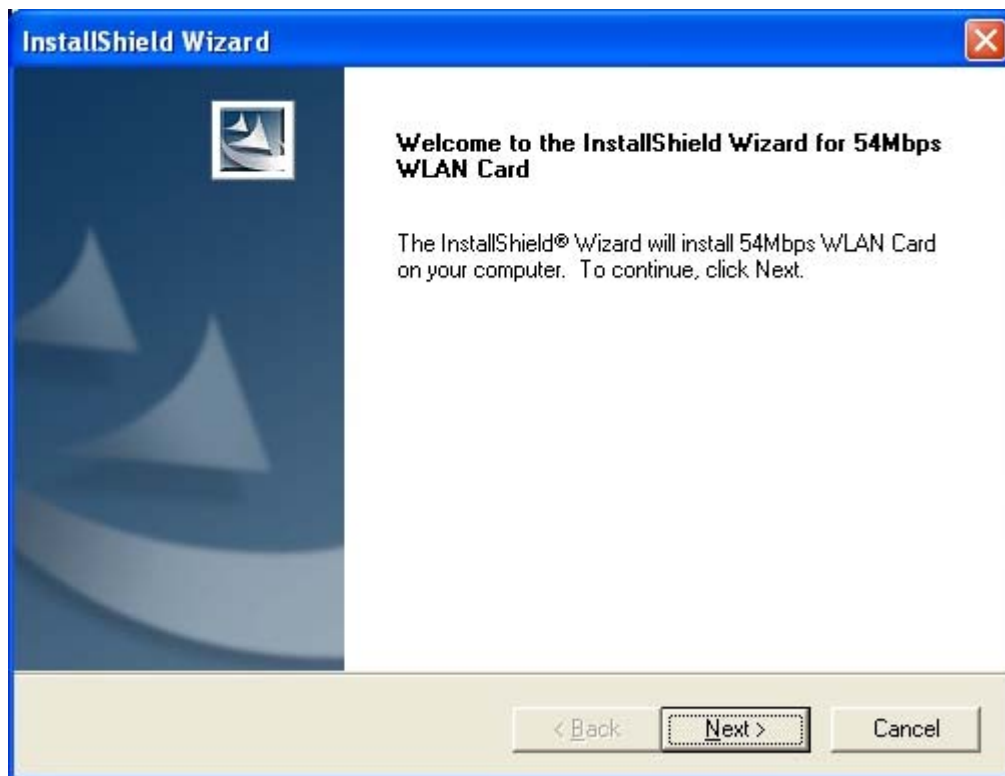
2. The screen will show you the default destination chosen by the utility. Click **Next** to continue or click the **Browse** button to select an alternate destination.

3. The following screen will add program icons to the Program Folder. You may type a new folder name or select one from the existing folders list. Click **Next** to continue or click **Back** to review or change any settings.
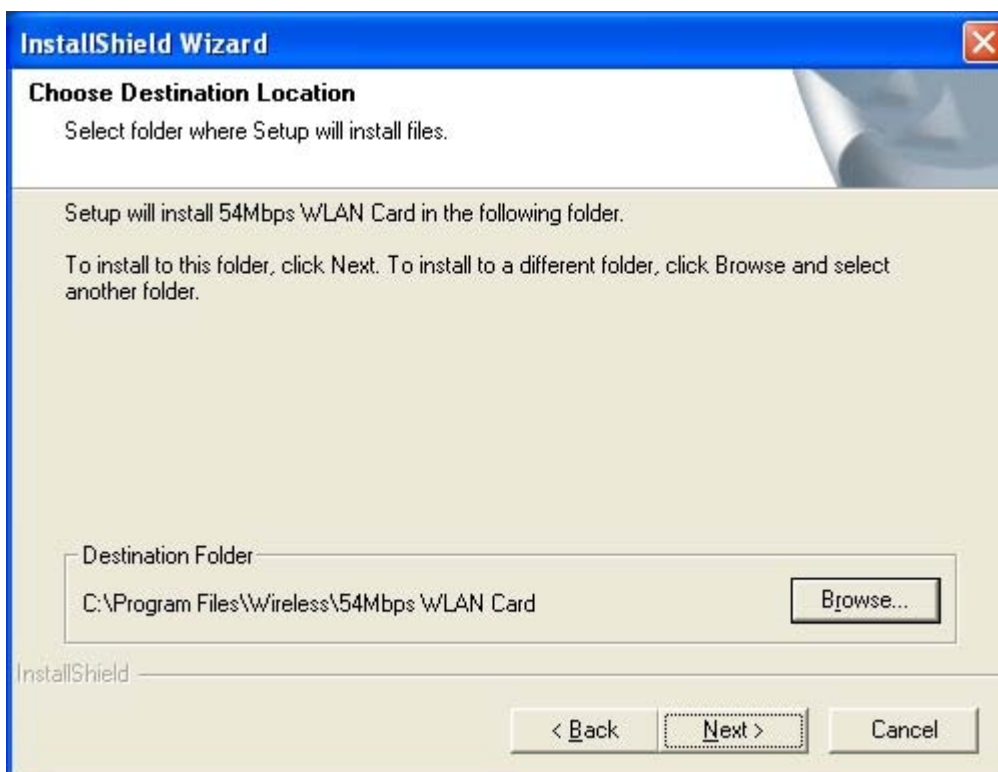
4. The following screen shows the current settings, click **Next** to continue or click **Back** to change the

Destination Folder in step 3.
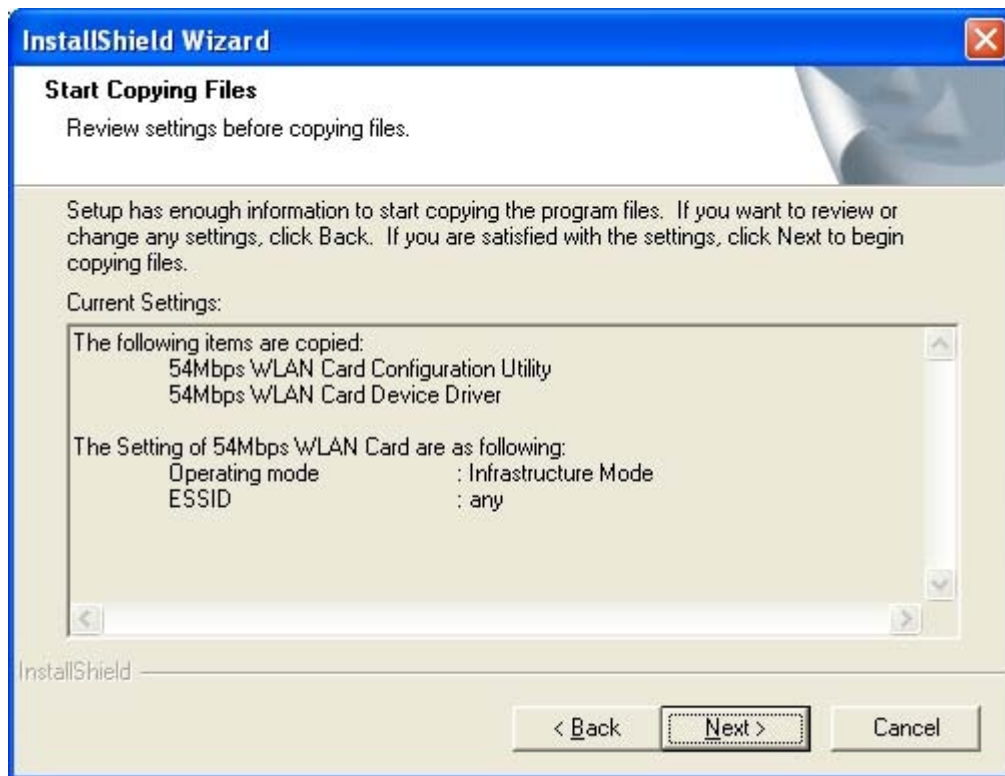
5. The Windows has finished installing Wireless LAN Utility. The following screen will ask you to restart your computer to finish the installation. Click **Finish** to reboot the system.

After you have installed the utility, you will see the Wireless LAN Utility icon in the Windows taskbar:

Using Wireless Utility In Windows XP

Wireless LAN Utility

There are two ways to configure CardBus Wireless LAN Card. One is Wireless LAN Utility; the other one is Windows Wireless Network Configuration.

Use Windows Wireless Network Configuration

1. Click the right key of the mouse and Exit Wireless LAN Utility.

2. Click Windows Wireless Network Configuration icon.

Windows Wireless Network Configuration

3. Click Advanced… button.
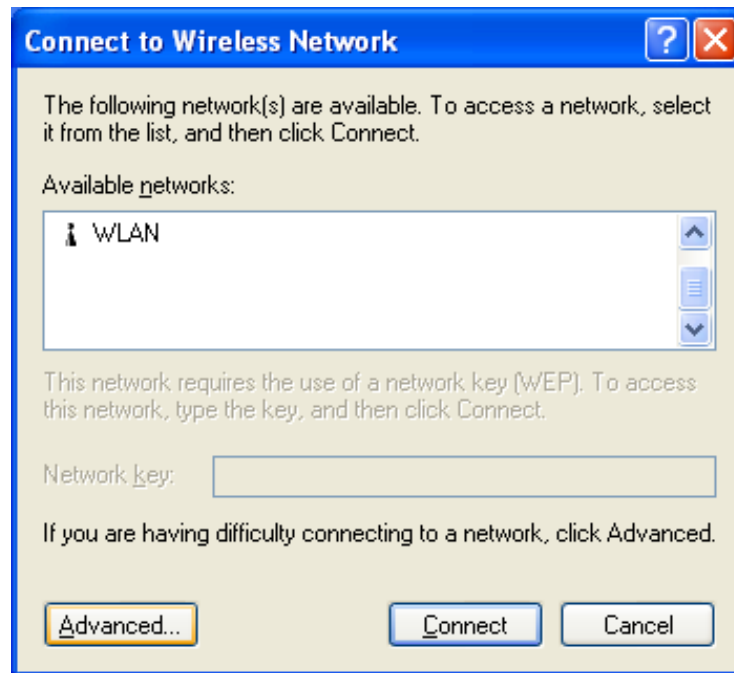
4. Make sure "Use Windows to configure my wireless network settings" is checked and click OK.
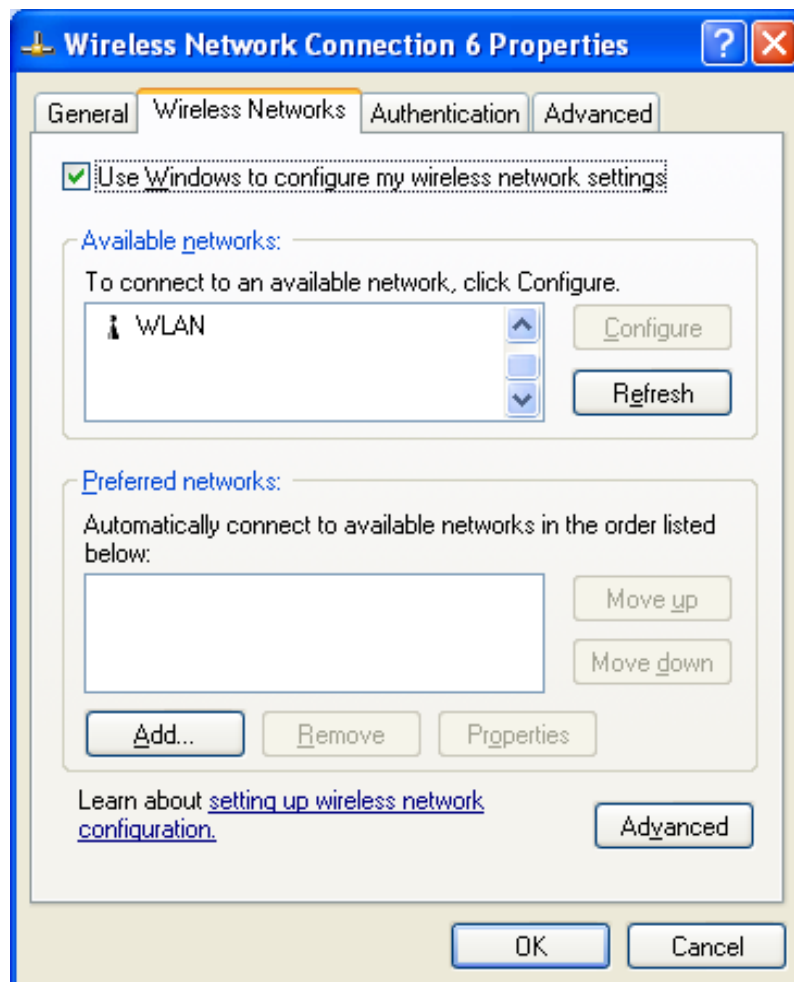
5. Click the Windows Wireless Network Configuration icon again to open the Windows Wireless Network Configuration.

Windows Wireless Network Configuration
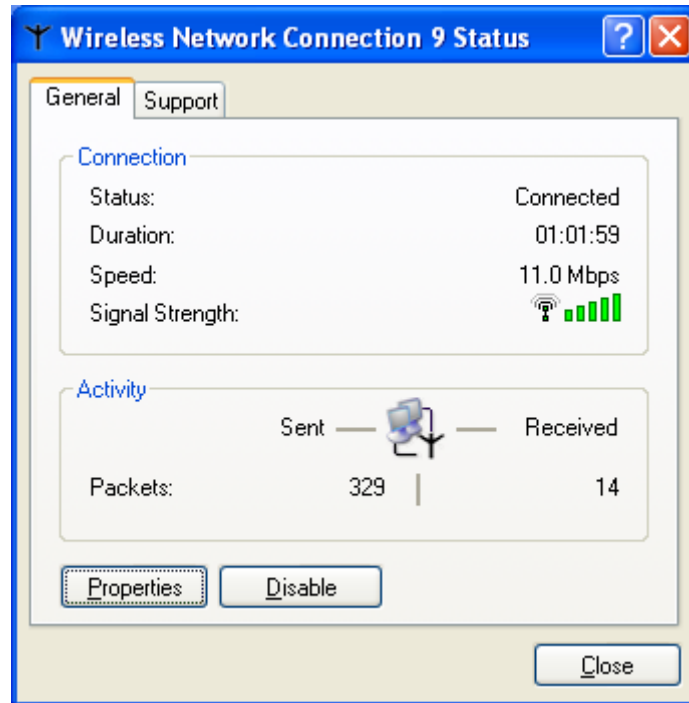
6. Select an available network and click Connect button.
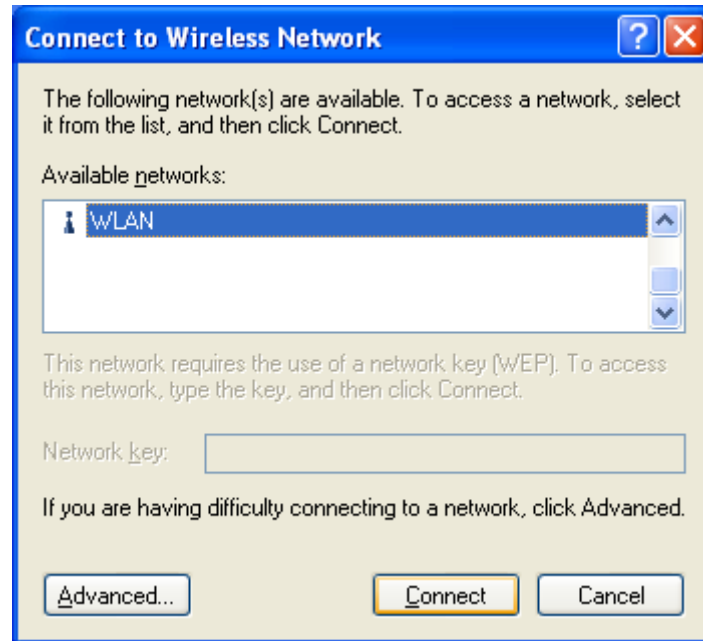
6. The Windows Wireless Network Configuration will be enabled. Click the Windows Wireless Configure icon.
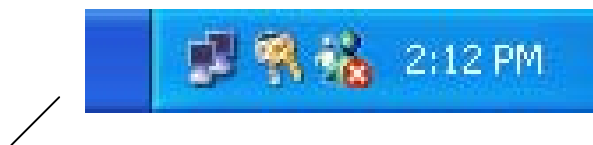
Windows Wireless Network Configuration is enabled

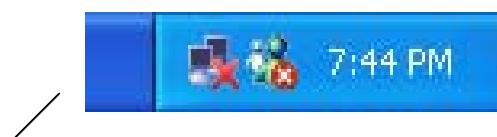1. Click Properties to start Windows Wireless Network Configuration.

Use Wireless LAN Utility
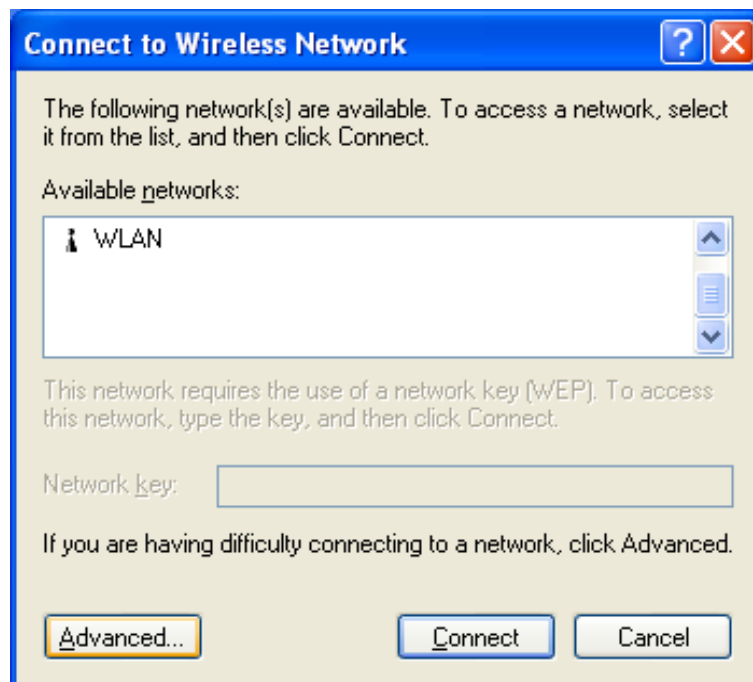
1. Exit the Wireless LAN Utility.

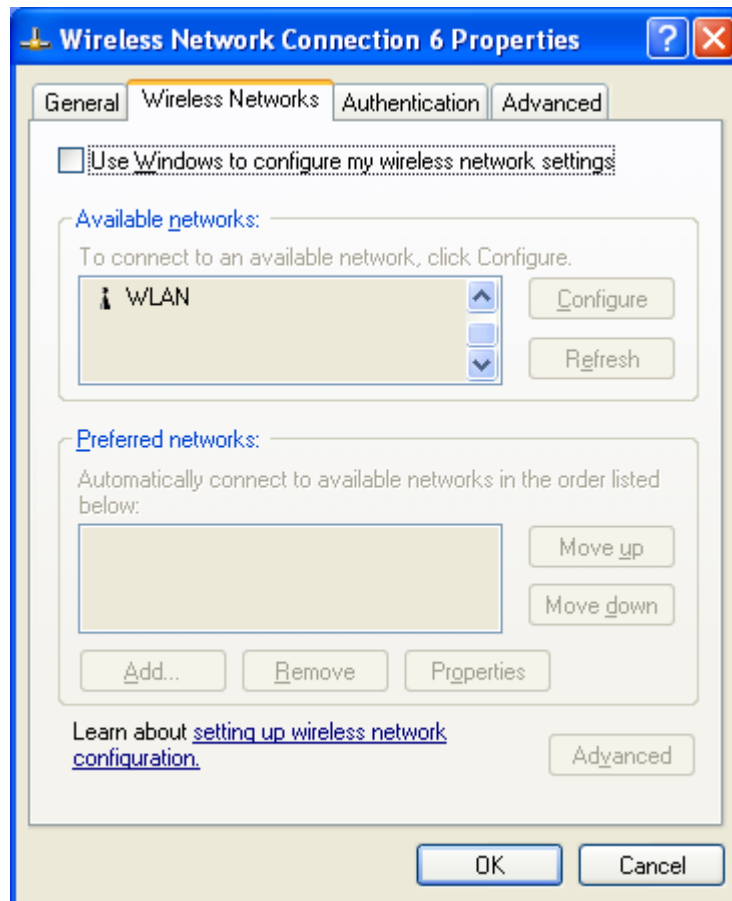2. Click Windows Wireless Network Configuration icon.

Windows Wireless Network Configuration

3. Click Advanced… button.

4. Make sure "Use Windows to configure my wireless network settings" is unchecked and click OK button.

5. Click Start -> All Programs -> IEEE802.11a WLAN CardBus Card then click IEEE802.11a WLAN CardBus Card Utility to restart IEEE802.11a WLAN Card.
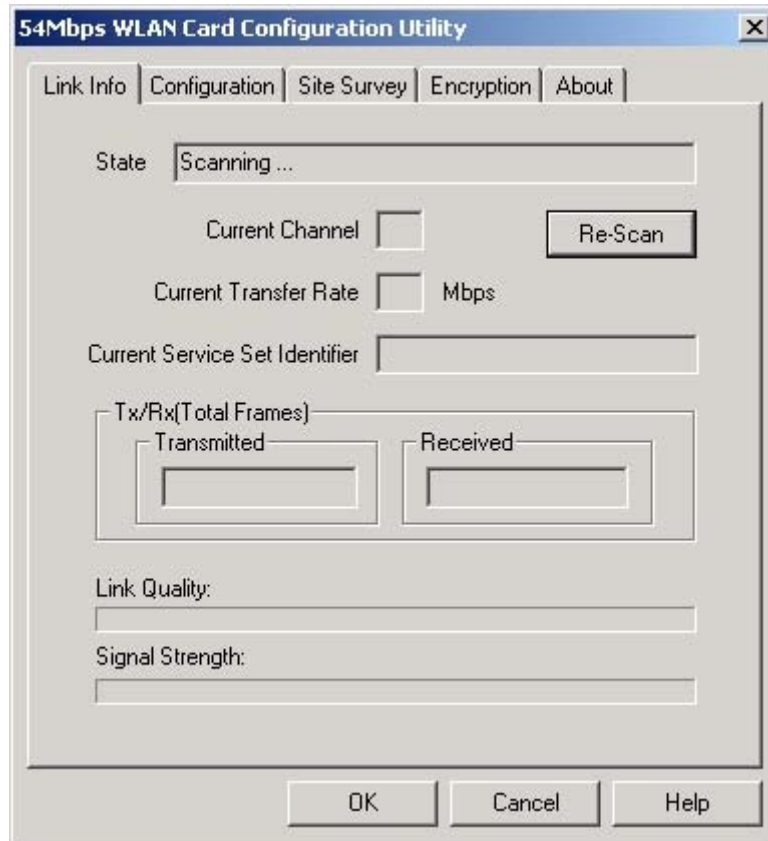

6. The Wireless LAN Utility will appear, Double-click the icon to open the configuration utility.

7. Click Re-Scan button to start Wireless LAN Utility. (Refer to Configuring the Wireless LAN Card.)


Double-click the icon to open the Wireless LAN Utility. (Refer to Configuring the CardBus Wireless LAN Card.)

Configuring the miniPCI Wireless LAN Card

1. This screen shows you the status of your current connection. Click **Re-Scan** to search for wireless connection (the adapter will search for the connection automatically when it is activated).
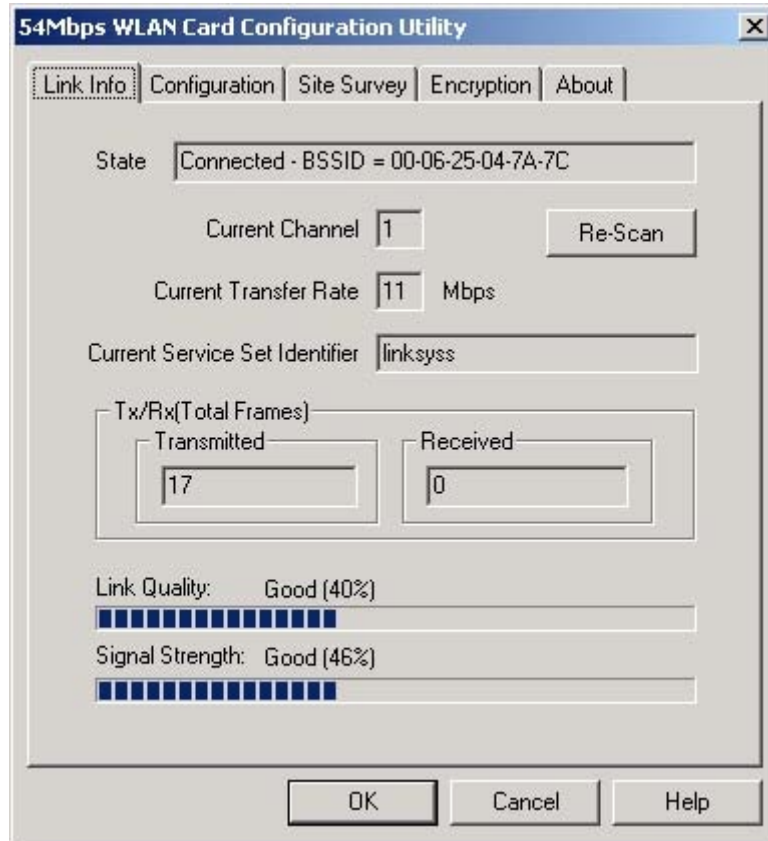

2. Select the "**Configuration"** tab. The **profile** setting allows you to save configurations in different profiles for different working environments. The default profile will contain the initial configuration setting when you install the Card. Under the **Operating Mode** drop-box, you may choose either Infrastructure or Ad-Hoc. The Infrastructure mode allows a wireless adapter to communicate with a wired network employing an Access Point, while the Ad-Hoc mode allows wireless-to-wireless, peer-to-peer communication. If you choose Infrastructure, the **SSID** should have the same name as the Access Point. If you choose **Ad-Hoc**, all clients should share the same **SSID** name. You can select **Enabled Power Saving Mode** to allow your adapter to go to sleep mode while the adapter doesn't precede the data transmission. Or select **Disabled** to make the adapter never go to sleep mode. Click **Apply** to save the settings.
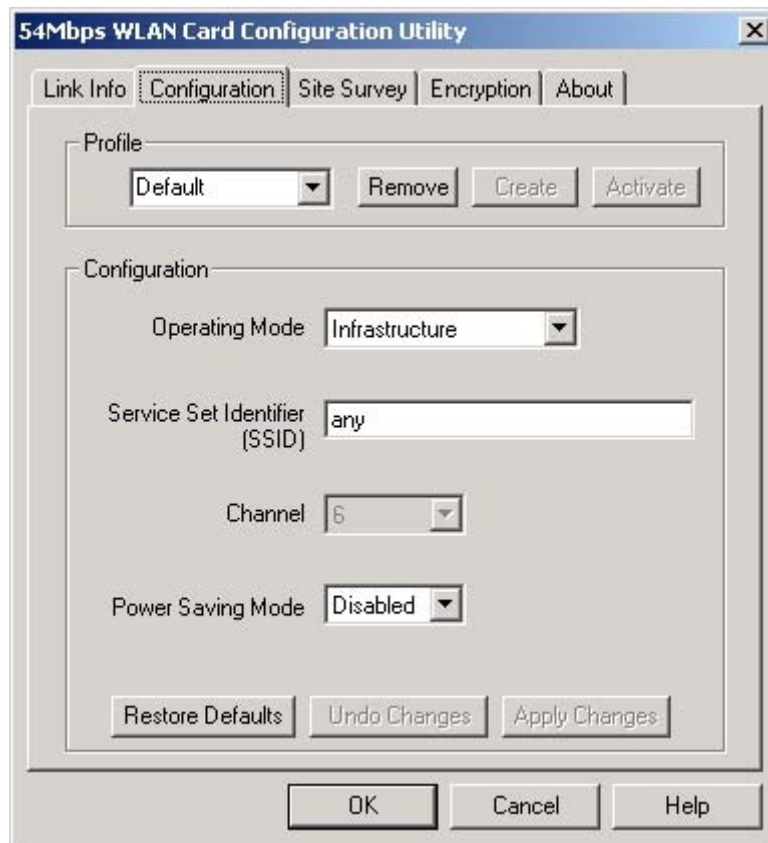
3. Select the "**Site Survey"** tab. The list on the adjacent screen shows you available Access Points and their features. Click on the desired Access Point, and then click **Connect** to connect or **Search** to search for more Access Points. Click **OK** when you are finished.
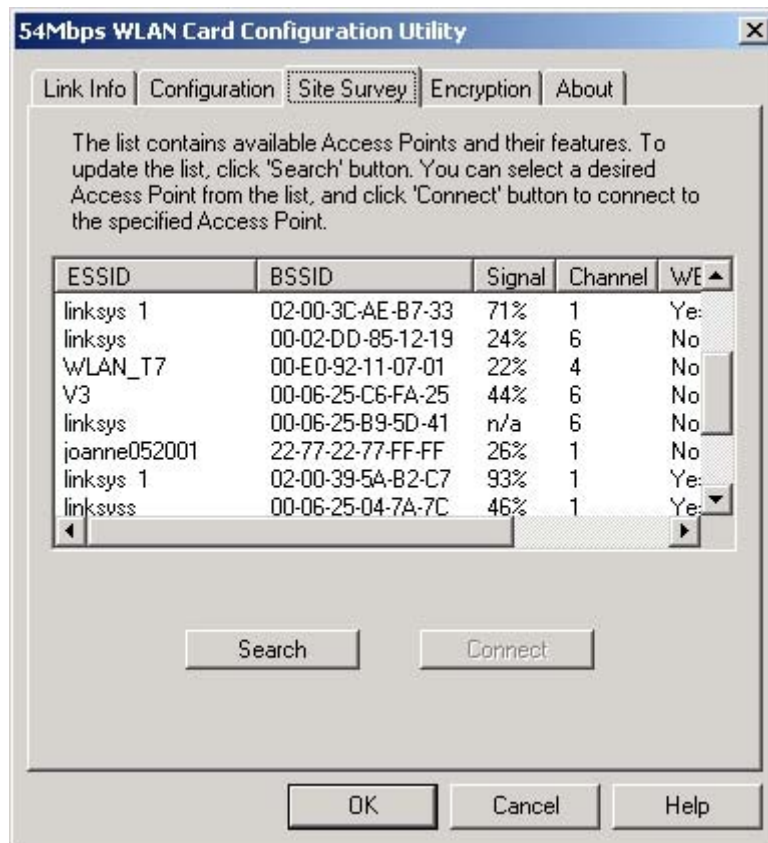
4. Click on the "**Encryption"** tab. Under the drop-box, you can choose to have WEP encryption **Disabled, 64-Bit, or 128-Bit.** Wired Equivalent Privacy (WEP) is an encryption scheme used to protect wireless data communication. The Disabled setting prevents the sharing of data with other computers on the WEP network. For data sharing to be enabled, select the level of encryption desired, either 64 or 128-bit.
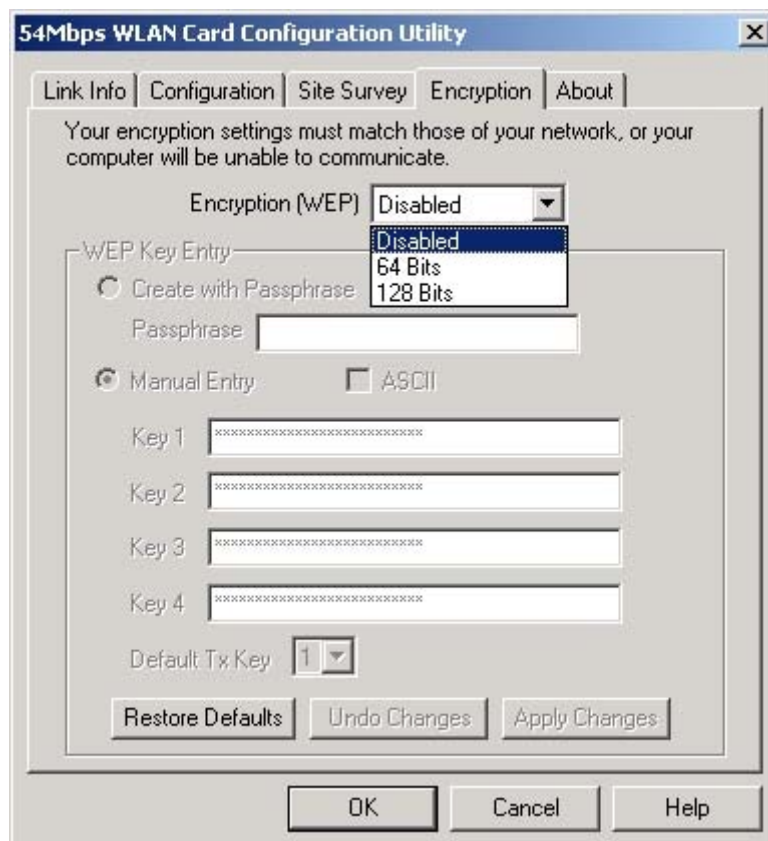
5. The **"About"** tab shows you copyright and version information about the driver, the configuration utility, and the firmware. Click **OK** to complete the configuration.
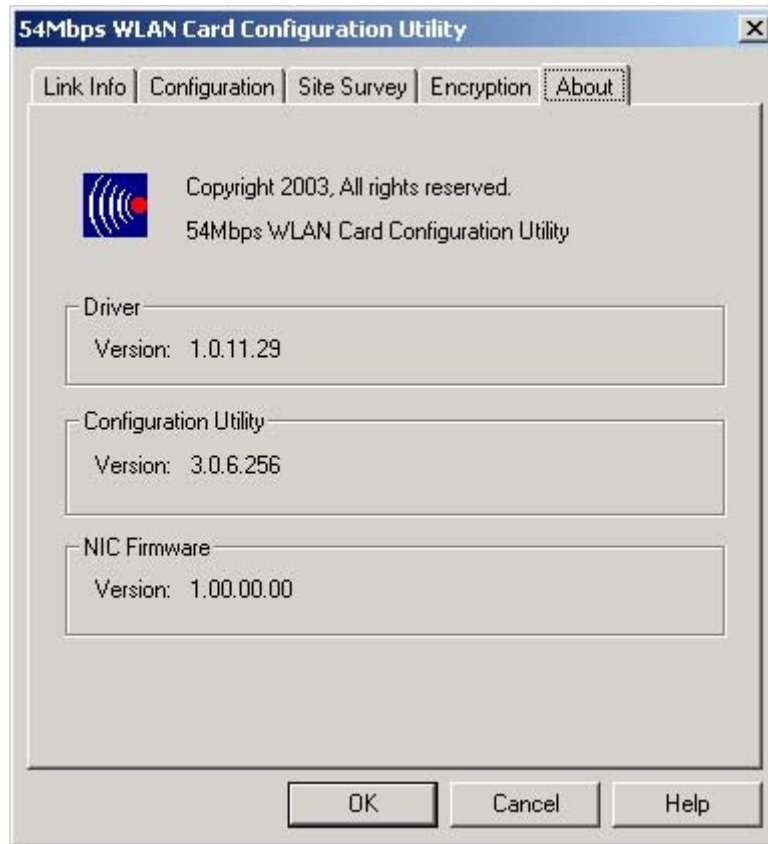
Appendix A – FAQ

1. **What is IEEE 802.11 standard?**

    ➢   The IEEE 802.11 is a wireless LAN industry standard, and the objective of IEEE 802.11 is to make sure that different manufactures' wireless LAN devices can communicate to each other.

2. **What is WEP?**

    ➢   As described in the IEEE 802.11 standard, WEP (Wired Equivalent Privacy) is a data privacy mechanism based on a 40 bit shared key algorithm.

3. **Windows cannot recognize the CardBus Wireless LAN Card.**

    ➢   Please make sure that the LAN Card is inserted into the CardBus slot of your notebook properly (check this when the notebook is powered off).
    ➢   Please check if PC Card support is installed. Double-click the PC Card icon on Control Panel. If PC Card support is not activated, you should activate it now.

4. **In Infrastructure mode, my notebook cannot communicate with the others notebooks on the network.**

    ➢   First, make sure that the SSID is same as the others notebook.
    ➢   Check if the WEP is enabled on the Access Point, if it is, set your Adapter's WEP the same as the Access Point.
    ➢   Also check the Access Point's Authentication Type and Preamble Type and match those settings.

5. **In ad-hoc mode, my notebook cannot communicate with the others notebooks on the network.**

    ➢   Make sure the SSID and the Channel number are the same as other wireless stations.
    ➢   Check if WEP settings are the same in all wireless stations.
    ➢   Check the **Network Properties,** make sure proper protocol is installed and **File and Printer Sharing** is enabled.

Appendix A
Specifications

Specifications	
Product Name	Draft 802.11n-compatible Dual Band WLAN mPCI Card
Interface	mPCI 32 Type III-A
Network Standards	IEEE802.11a/g/b Draft n-compliant
Data Rate	54, 48, 36, 24, 18, 12, 9, 6, 2,1Mbps 20MHz BW: 130, 117, 104, 78, 52, 39, 26 and 13Mbps 40MHz BW: 300, 270, 243, 216, 162, 108, 81, 54 and 27Mbps
Modulation	802.11a/n---- 54, 48, 36,24,18,12,9,6Mbps (OFDM)
Operating Frequency	5.725~5.85 GHz: FCC part 15.247
Operating Channels	11a/n: 161-165 North America;
RF Output Power	15dBm (5GHz) (54Mbps, OFDM) 15dBm (5GHz) (270Mbps, MCS7,MCS15) 19dBm (5GHz, MCS0~6,MCS8~14)
Antenna	Three IPEX connectors with diversity for external antenna
Coverage Area	Indoor: 20M@54Mbps, 35M@24Mbps, 60M@6Mbps, 100M@11Mbps Outdoor: 50M@54Mbps, 65M@48Mbps, 90M@36Mbps, 120M@24,18, 12,9,6Mbps, 80M@11Mbps, 120M@5.5Mbps, 200M@2Mbps, 300M@1Mbps
Receiver Sensitivity	-70 dBm @ 54M (11a,OFDM, 10% PER) -61 dBm @ 54M (11n,OFDM, 10% PER)
Power Consumption	TX power consumption @3.3V: 1000mA RX power consumption @3.3V:1000mA
Support OS	Linux, Windows XP (TBD)
Operating Temperature	0 to 55 ℃
Humidity	20% to 95% Non-condensing
Weight (g)	28 g
Voltage	3.3V