

Boadcom 802.11ag WLAN Card User's Guide, BCM94309MPC0

The Solution

BCM94309MPC0 enables access to wireless local area networks (WLANs), enables the sharing of a local printer and files with others in the network, enables Internet connection sharing, and enables roaming about the office—wire-free. This wireless LAN solution is designed for both the home user and businesses—and it is scalable so that users can be added and new network features can be enabled as networking needs grow.

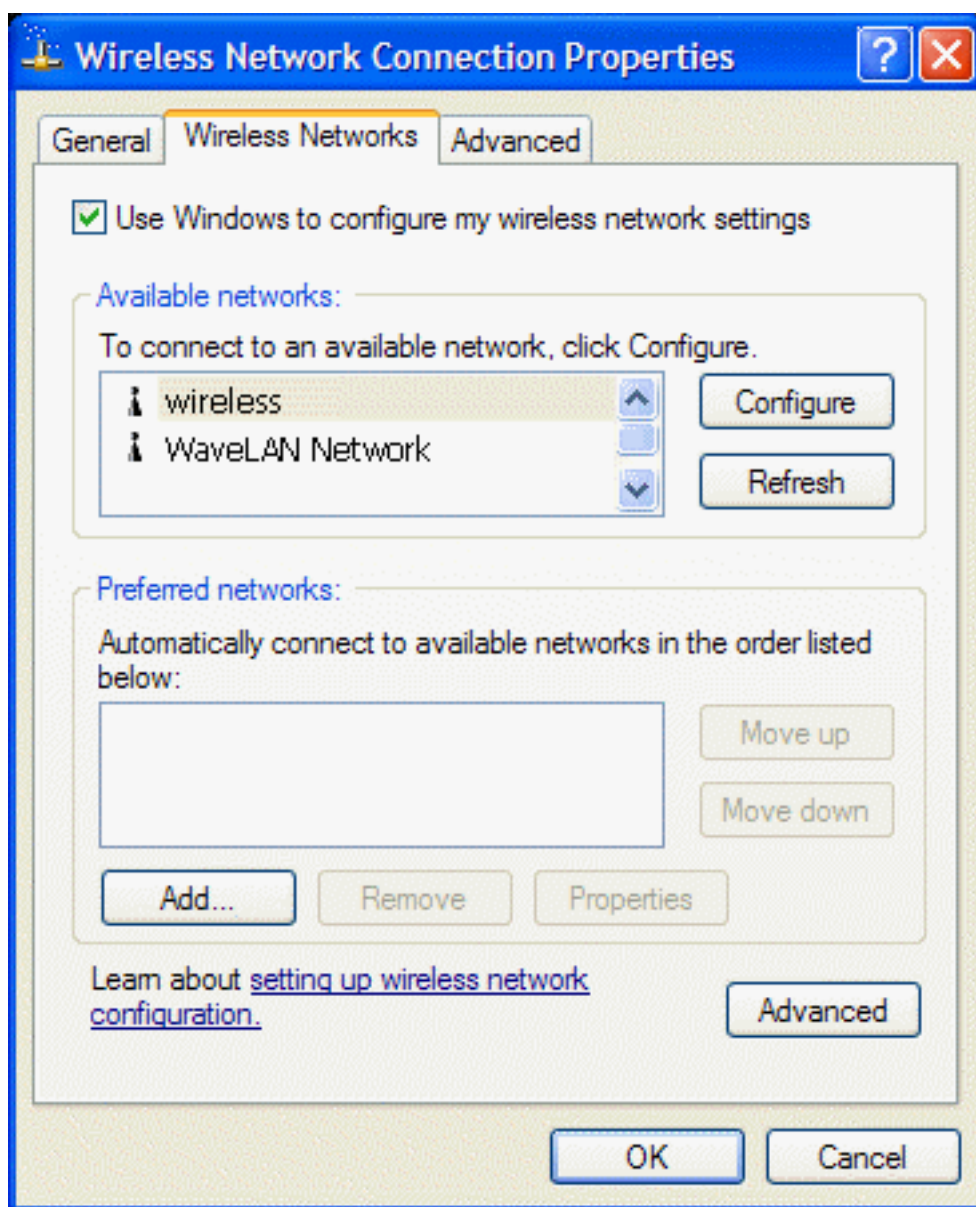
Configuring a Network Profile in Infrastructure Mode (Windows® XP Environment)

Before you can connect to a wireless network, you must configure a network profile for that network on your notebook computer. If you purchased your notebook computer with the **Boadcom WLAN Card** already installed and set up at the factory, follow the network profile configuration instructions provided below. If this is not the case, first verify that the **Boadcom WLAN Card** has been properly installed in your computer according to the installation instructions. Then proceed with the following instructions for configuring your network profiles.

To begin configuring a network profile, open **Wireless Network Connection Properties**.

1. Click **Start**, click **Control Panel**, and then click **Network Connections**.

2. Click **Wireless Network Connection**.
3. Under **Network Tasks**, click **Change settings of this connection**.



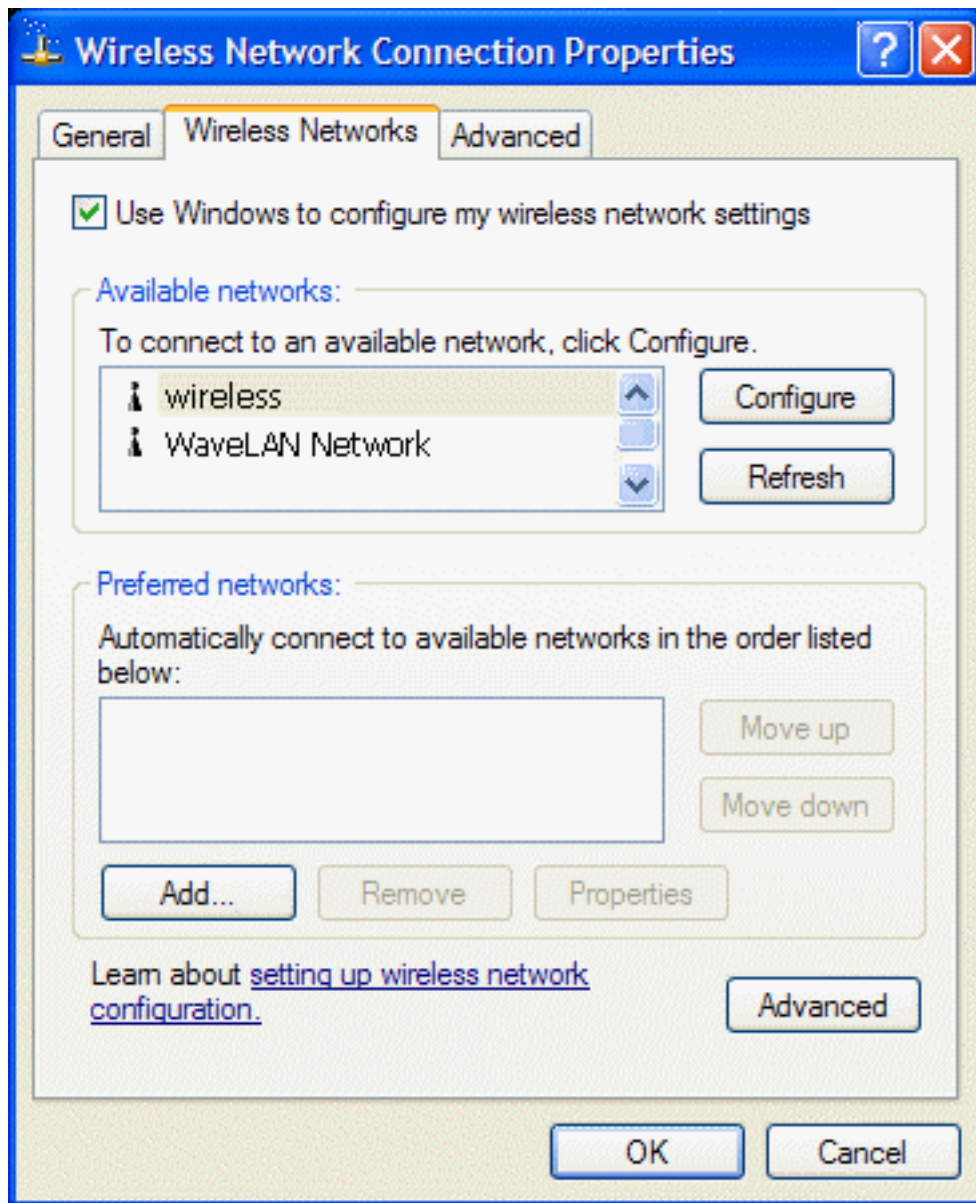
NOTE—For more information on how to configure a network profile and IEEE 802.1x authentication, click **Learn about setting up wireless network configuration**.

You can configure a network profile for networks that are listed under **Available networks** as well as those that are not listed. When you have completed configuring a network profile, the network name and icon appear at the top of the list under **Preferred networks**. Your computer automatically connects to the network at the top of the list. Follow the applicable instruction set below, based on whether or not the network is listed and whether or not the network requires network key information (check with your network administrator or access point (AP) installer to see if network key information is required). **NOTE**—Both the network name and the network key information are case-sensitive.

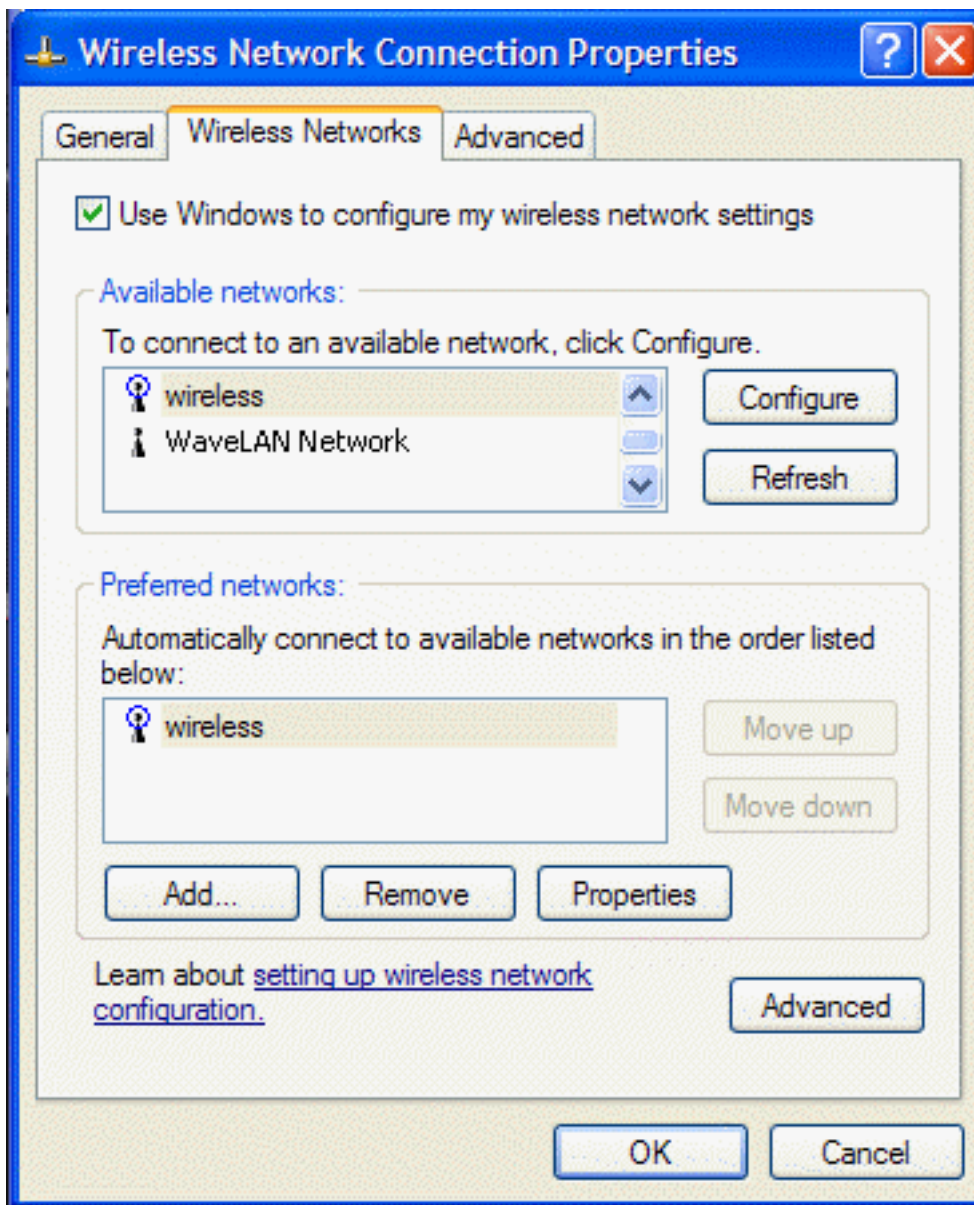
- [Configuring a Profile for a Listed Network That Does Not Require Network Key Information](#)
- [Configuring a Profile for a Listed Network That Requires Network Key Information](#)
- [Configuring a Profile for a Network That Is Not Listed and Does Not Require Network Key Information](#)
- [Configuring a Profile for a Network That Is Not Listed and Requires Network Key Information](#)

Configuring a Profile for a Listed Network That Does Not Require Network

Key Information (Windows XP Environment)



1. Click the network name under **Available networks** and click **Configure**.
2. Click **OK**. The network name and icon appear at the top of the list under **Preferred networks**.



3. Click **OK** to activate the network connection. To verify that the network connection has been made, reopen **Wireless Network Connection Properties**. The computer is connected to the selected network when a blue bubble appears on top of the icon  for that network. If the bubble does not appear, click **Refresh**. If it still does not appear, try to access a Web page to verify that you are connected to the Internet.

Configuring a Profile for a Listed Network That Requires Network Key Information (Windows XP Environment)

Wired Equivalent Privacy (WEP) Security

Wireless Network Connection Properties

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✕

General

Wireless Networks

Advanced

☒ Use Windows to configure my wireless network settings

Available networks:

To connect to an available network, click Configure.

WaveLAN Network

↑

wireless

↓

Configure

Refresh

Preferred networks:

Automatically connect to available networks in the order listed below:

Move up

Move down

Add...

Remove

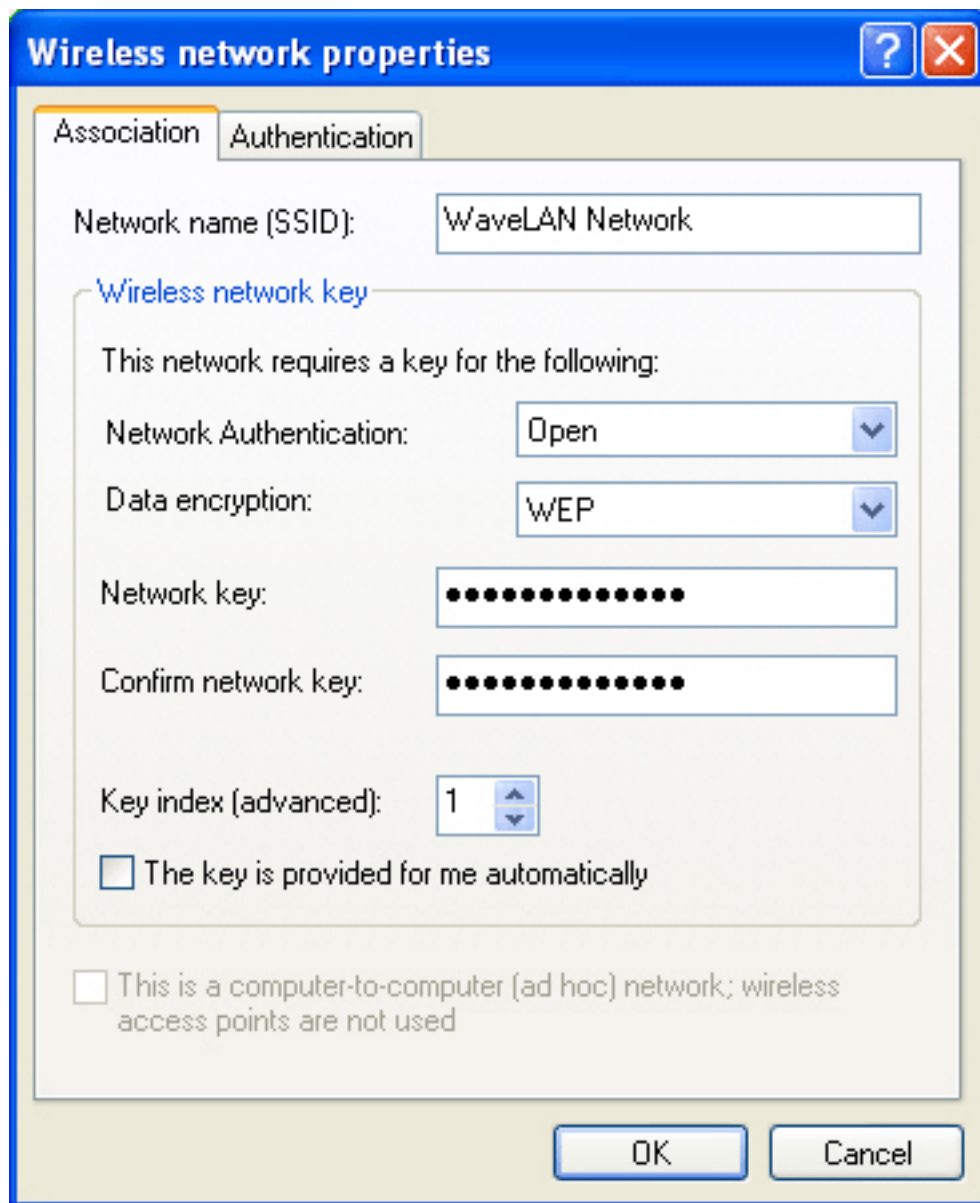
Properties

Learn about [setting up wireless network configuration.](#)

Advanced

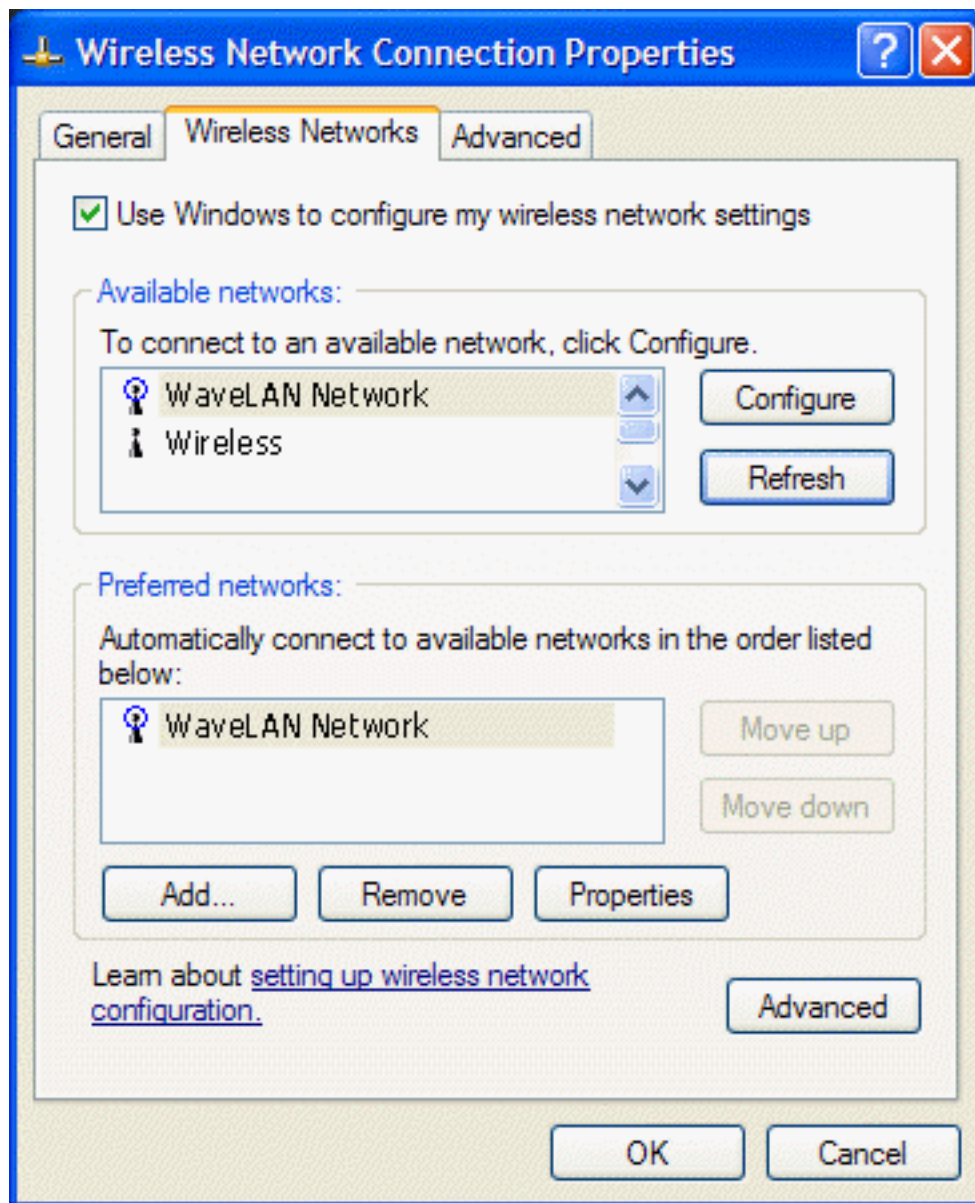
OK

Cancel



The image shows a Windows XP-style dialog box titled "Wireless network properties". It has two tabs: "Association" (selected) and "Authentication". The "Association" tab contains a text field for "Network name (SSID)" with the value "WaveLAN Network". Below this is a section titled "Wireless network key" which contains the text "This network requires a key for the following:". Underneath are two dropdown menus: "Network Authentication" set to "Open" and "Data encryption" set to "WEP". There are two text boxes for "Network key" and "Confirm network key", both filled with dots. Below these is a "Key index (advanced)" spinner box set to "1". At the bottom of the key section is a checkbox labeled "The key is provided for me automatically", which is unchecked. Below the key section is another checkbox labeled "This is a computer-to-computer (ad hoc) network; wireless access points are not used", which is also unchecked. At the bottom right of the dialog are "OK" and "Cancel" buttons.

1. Click the network name under **Available networks** and then click **Configure**.
2. Clear the **The key is provided for me automatically** check box.
3. From the **Network Authentication** list, select **Open**.
4. From the **Data encryption** list, select **WEP**.
5. Type the network key in the **Network key** box and again in the **Confirm network key** box.
6. Click **OK**. The network name and icon appear at the top of the list under **Preferred networks**.



7. Click **OK** to activate the network connection. To verify that the network connection has been made, reopen **Wireless Network Connection Properties**. The computer is connected to the selected network when a blue bubble appears on top of the icon  for that network. If the bubble does not appear, click **Refresh**. If it still does not appear, try to access a Web page to verify that you are connected to the Internet.

Wi-Fi Protected Access (WPA) Security

Encryption

?

×

Wireless Network Connection Properties

General

Wireless Networks

Advanced

☒ Use Windows to configure my wireless network settings

Available networks:

To connect to an available network, click Configure.

WaveLAN Network

↑

wireless

↓

Configure

Refresh

Preferred networks:

Automatically connect to available networks in the order listed below:

Move up

Move down

Add...

Remove

Properties

Learn about [setting up wireless network configuration.](#)

Advanced

OK

Cancel

Wireless network properties

Association Authentication

Network name (SSID): WaveLAN Network

Wireless network key

This network requires a key for the following:

Network Authentication: WPA-PSK

Data encryption: AES

Network key:

Confirm network key:

Key index (advanced): 1

☐ The key is provided for me automatically

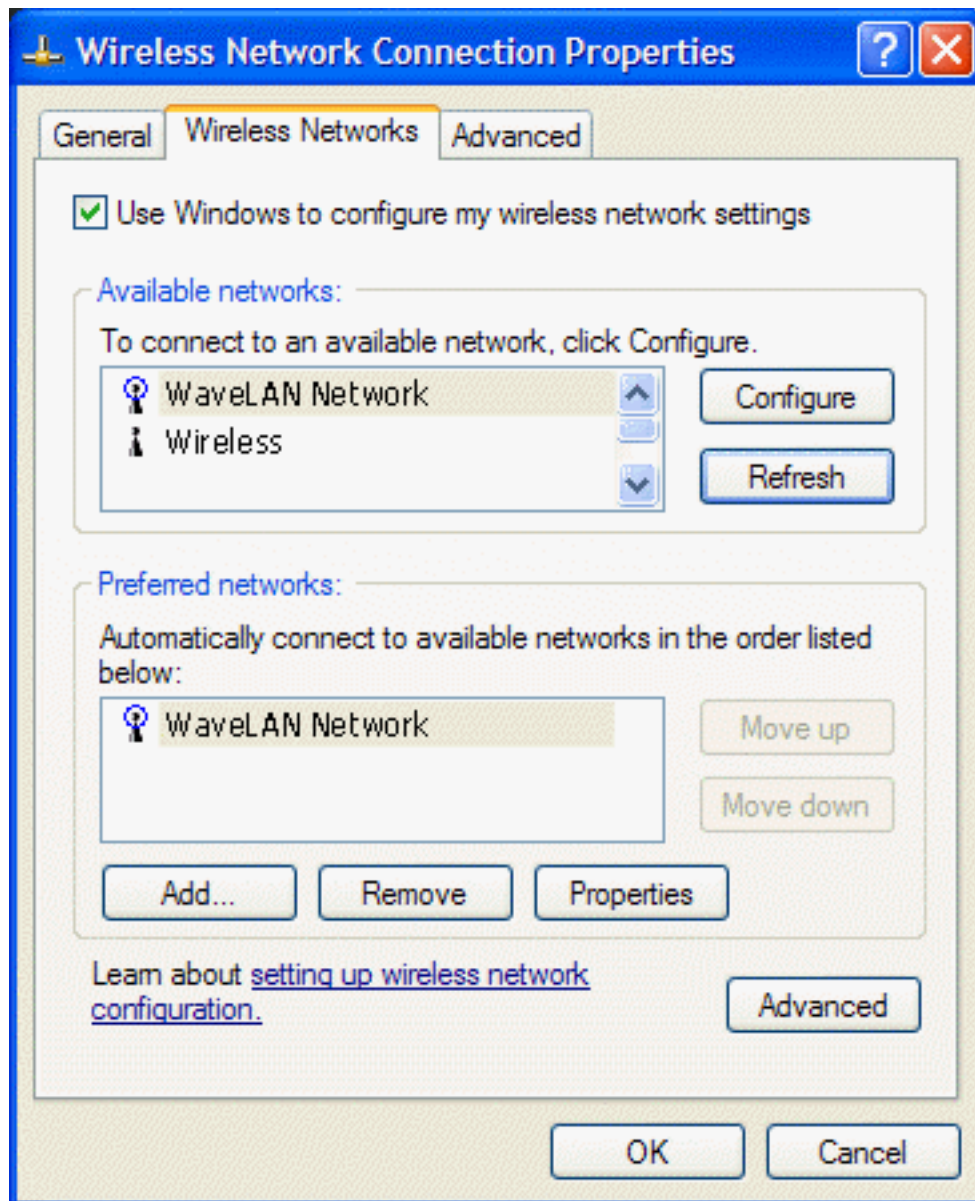
☐ This is a computer-to-computer (ad hoc) network; wireless access points are not used

OK Cancel

1. Click the network name under **Available networks** and then click **Configure**.
2. Clear the **The key is provided for me automatically** check box.
3. From the **Network Authentication** list, select the network authentication type specified by the network administrator/AP installer.
4. From the **Data encryption** list, select the data encryption type specified by the network administrator/AP installer.
5. If required by the network administrator/AP installer, type the network key in the **Network key** box and again in the **Confirm network key** box.

NOTE—A network key is not required for WPA type network authentication.

6. Click **OK**. The network name and icon appear at the top of the list under **Preferred networks**.

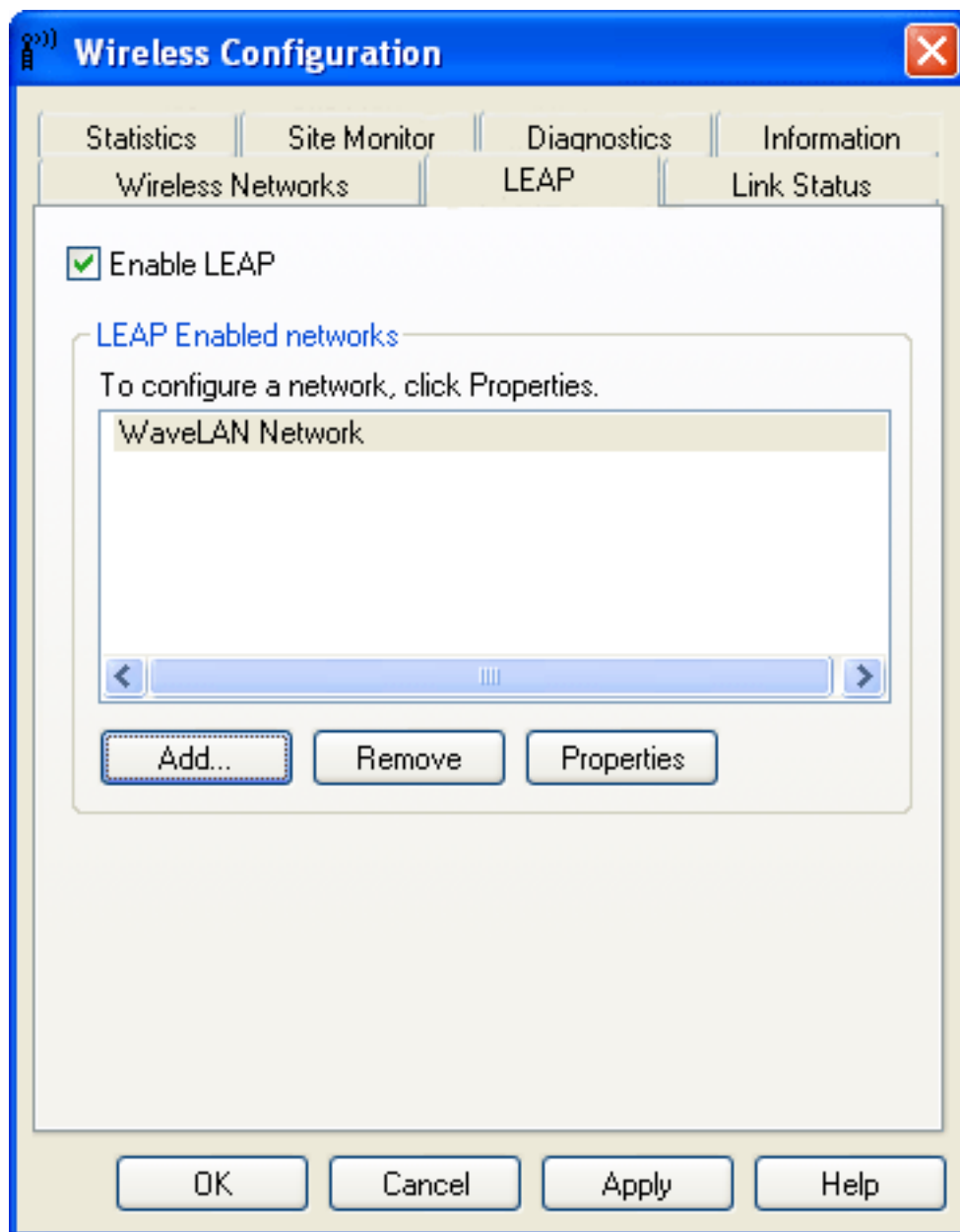


7. Click **OK** to activate the network connection. To verify that the network connection has been made, reopen **Wireless Network Connection Properties**. The computer is connected to the selected network when a blue bubble appears on top of the icon  for that network. If the bubble does not appear, click **Refresh**. If it still does not appear, try to access a Web page to verify that you are connected to the Internet.

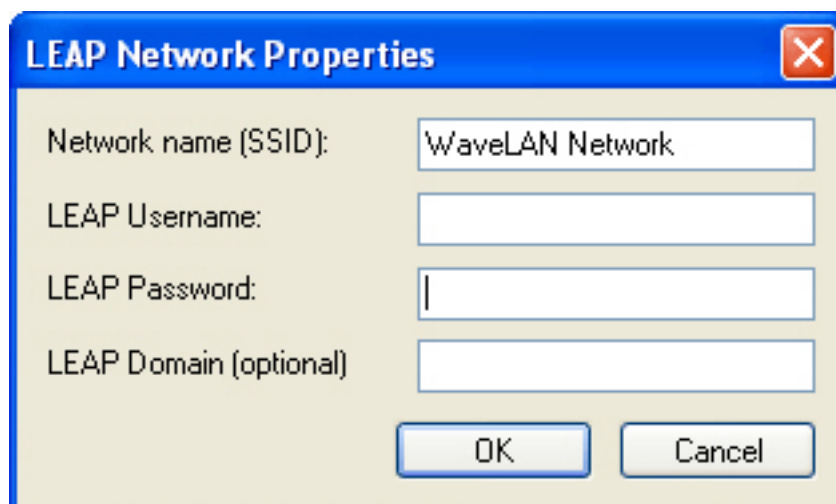
Authentication—Configuring the Network for Light Extensible Authentication Protocol (LEAP) Support

NOTE—Configure the network profile before you begin.

1. Click **Start**, click **Control Panel**, and then click **Wireless Configuration Utility** 

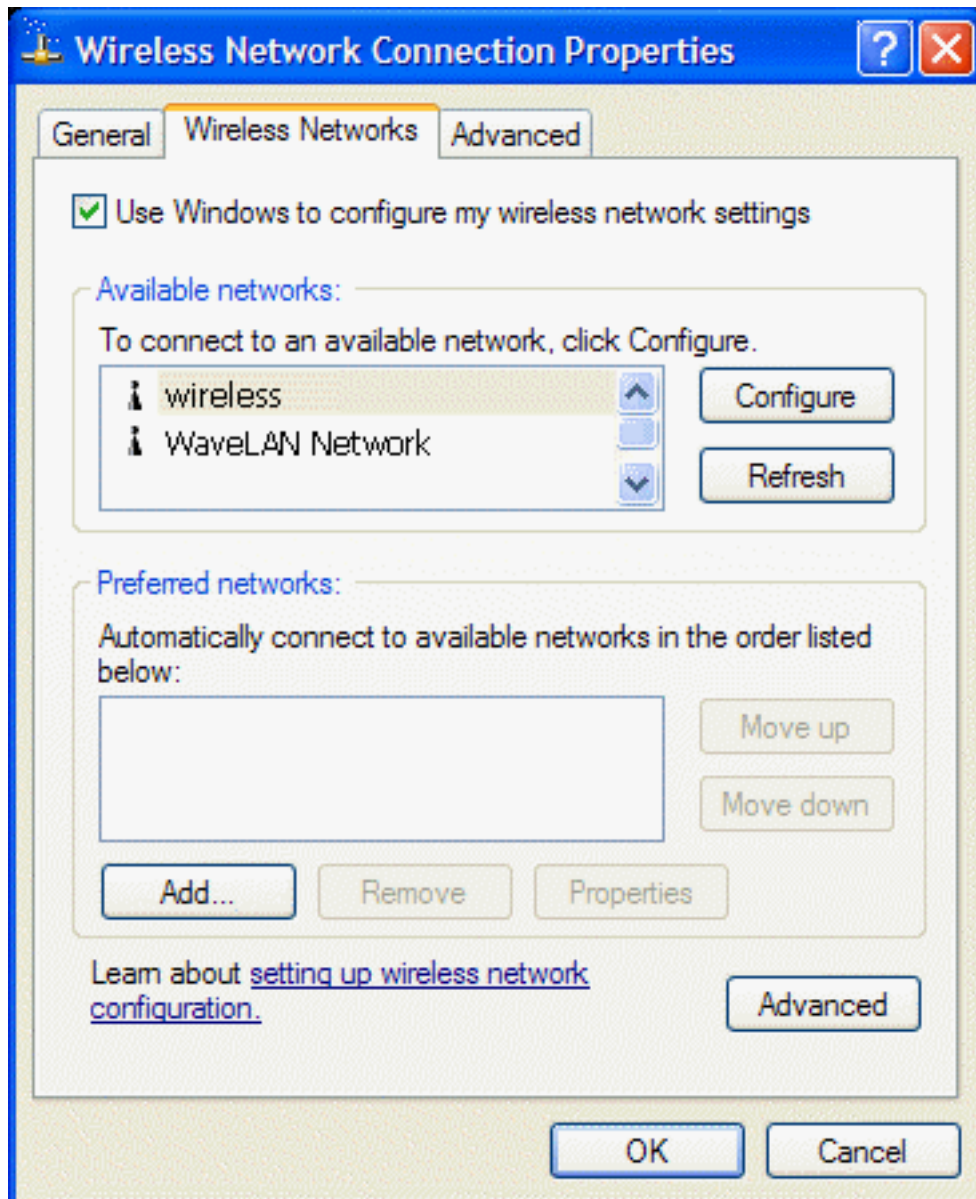


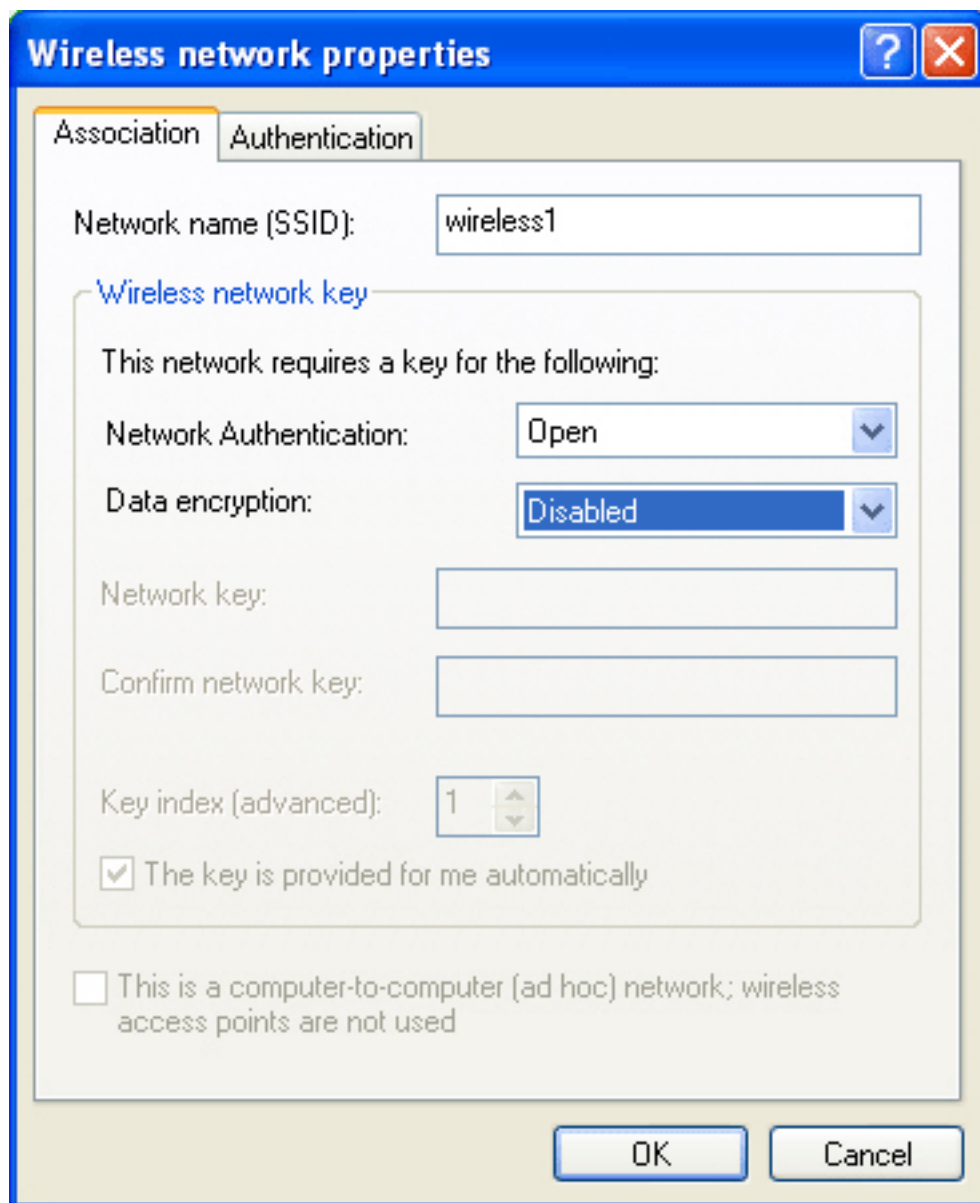
2. Click the **LEAP** tab.
3. Select the **Enable LEAP** check box.
4. Click the network name, and then click **Properties**.



5. Type the network name, LEAP user name, and LEAP password in the respective boxes and click **OK**.

Configuring a Profile for a Network That Is Not Listed and Does Not Require Network Key Information (Windows XP Environment)





The image shows a Windows XP-style dialog box titled "Wireless network properties". It has two tabs: "Association" and "Authentication", with "Authentication" currently selected. The "Association" tab contains a text box for "Network name (SSID)" with the value "wireless1". Below this is a section titled "Wireless network key" which contains the text "This network requires a key for the following:". Underneath are two dropdown menus: "Network Authentication" set to "Open" and "Data encryption" set to "Disabled". There are two empty text boxes for "Network key:" and "Confirm network key:". Below these is a spinner box for "Key index (advanced)" set to "1". At the bottom of this section is a checked checkbox labeled "The key is provided for me automatically". Below the "Wireless network key" section is an unchecked checkbox labeled "This is a computer-to-computer (ad hoc) network; wireless access points are not used". At the bottom right of the dialog are "OK" and "Cancel" buttons.

Wireless network properties

Association Authentication

Network name (SSID): wireless1

Wireless network key

This network requires a key for the following:

Network Authentication: Open

Data encryption: Disabled

Network key:

Confirm network key:

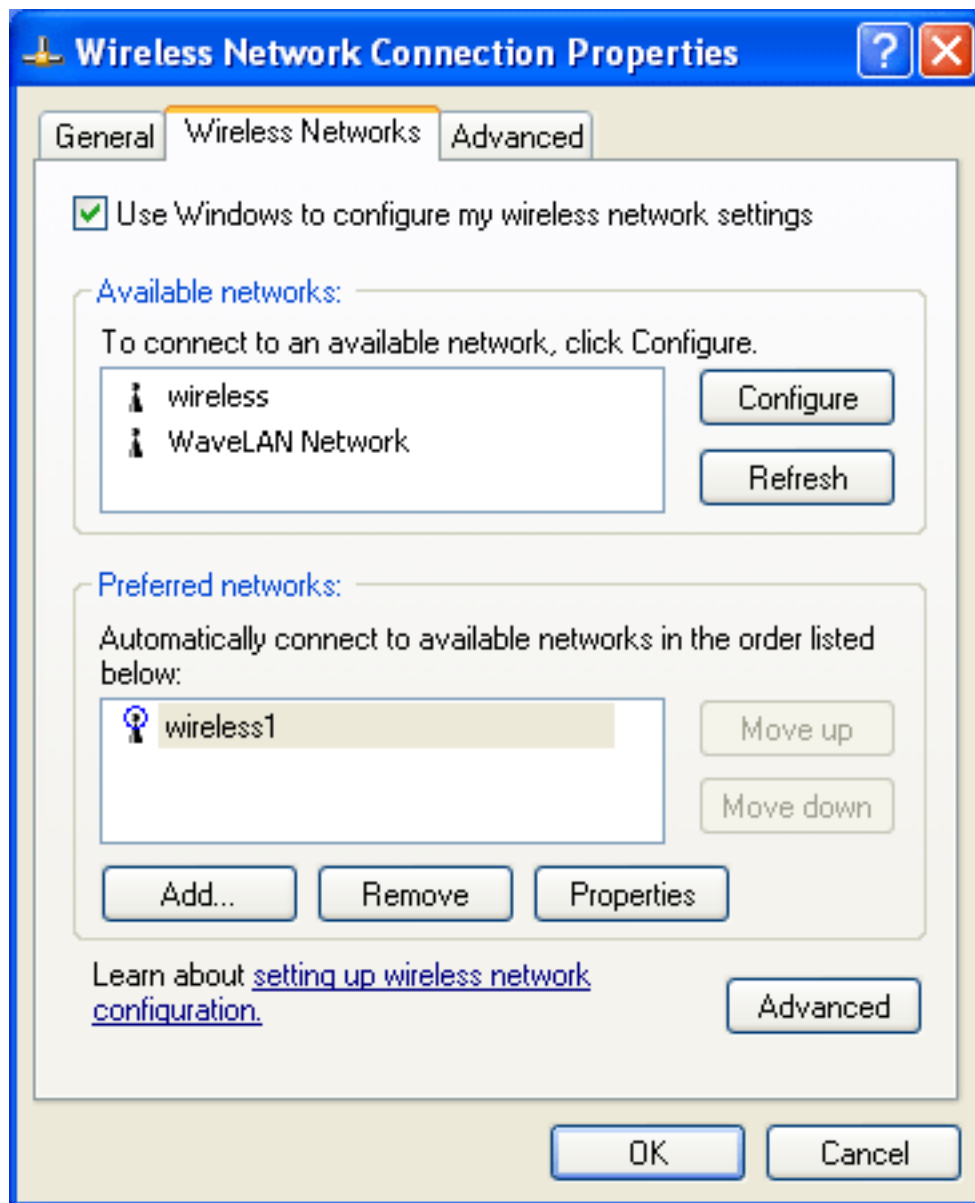
Key index (advanced): 1

☒ The key is provided for me automatically

☐ This is a computer-to-computer (ad hoc) network; wireless access points are not used

OK Cancel

1. Under **Preferred networks**, click **Add**.
2. Type the network name in the **Network name (SSID)** box and Click **OK**.

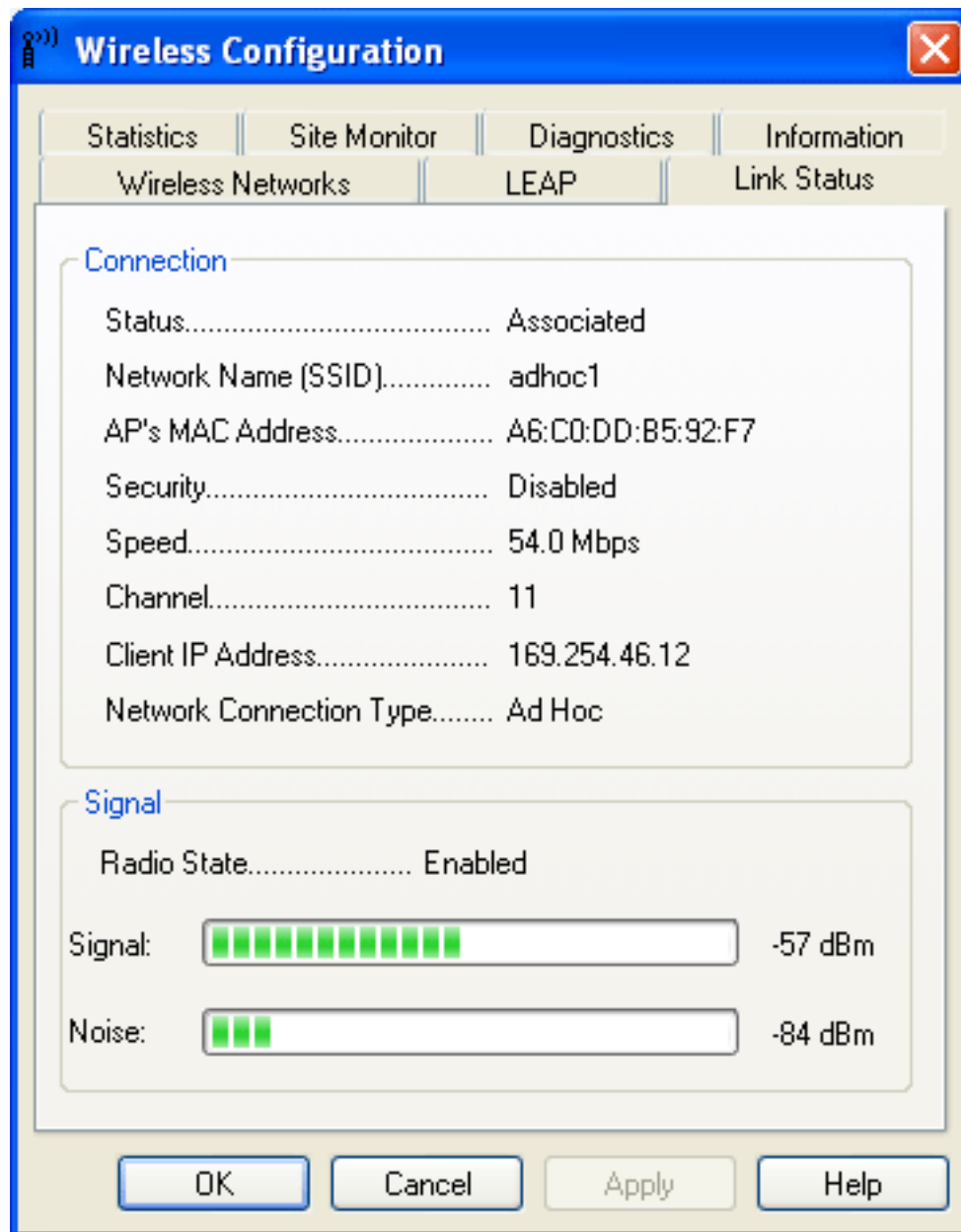


3. Click **OK** to activate the network connection. To verify that the network connection has been made, reopen **Wireless Network Connection Properties**. The computer is connected to the added network when a blue bubble appears on top of the icon  for that network. If the bubble does not appear, click **Refresh**. If it still does not appear, try to access a Web page to verify that you are connected to the Internet.

Using Wireless Utility:

Windows XP Environment

1. Open the [TrueMobile Wireless Utility](#).



2. Click the **Link Status** tab.

The quality of the connection (signal strength and noise) of the particular network you are connected to is indicated by the horizontal bars and the decibel level values that are displayed at the bottom of the **Link Status** tab. The connection quality is also indicated by

the appearance of the utility icon  in the desk top system tray. The description of the signal strength appears when you hover the cursor over the icon.

The table below shows the quality level and suggested action for improving the signal quality for each icon image that may be displayed. If the signal strength indications are anything other than very good or excellent, you should take the appropriate suggested action.



Four vertical green bars indicate that the signal strength is **very good** or **excellent**.



Three vertical green bars indicate that the signal is **good**.



Three vertical yellow bars indicate that the signal strength is **low**.

Suggested action: Move closer to the access point.



Two red vertical red bars indicates that the signal strength is **very low**.

Suggested action: Move closer to the access point.



Uncolored vertical bars indicate that there is **no signal** being received.

Probable causes:

- The computer is trying to establish an initial connection but has not yet succeeded.
- You may have moved out of range of the access point.

Suggested action:

- Wait
- Move closer to the access point.



Uncolored vertical bars with a superimposed red letter x indicate that there is **no radio connection**.

Probable cause: The radio is disabled.

Suggested action: Enable the radio. To enable the radio, right-click the utility icon  in the system tray and click **Enable Radio**.

Disabling the Radio

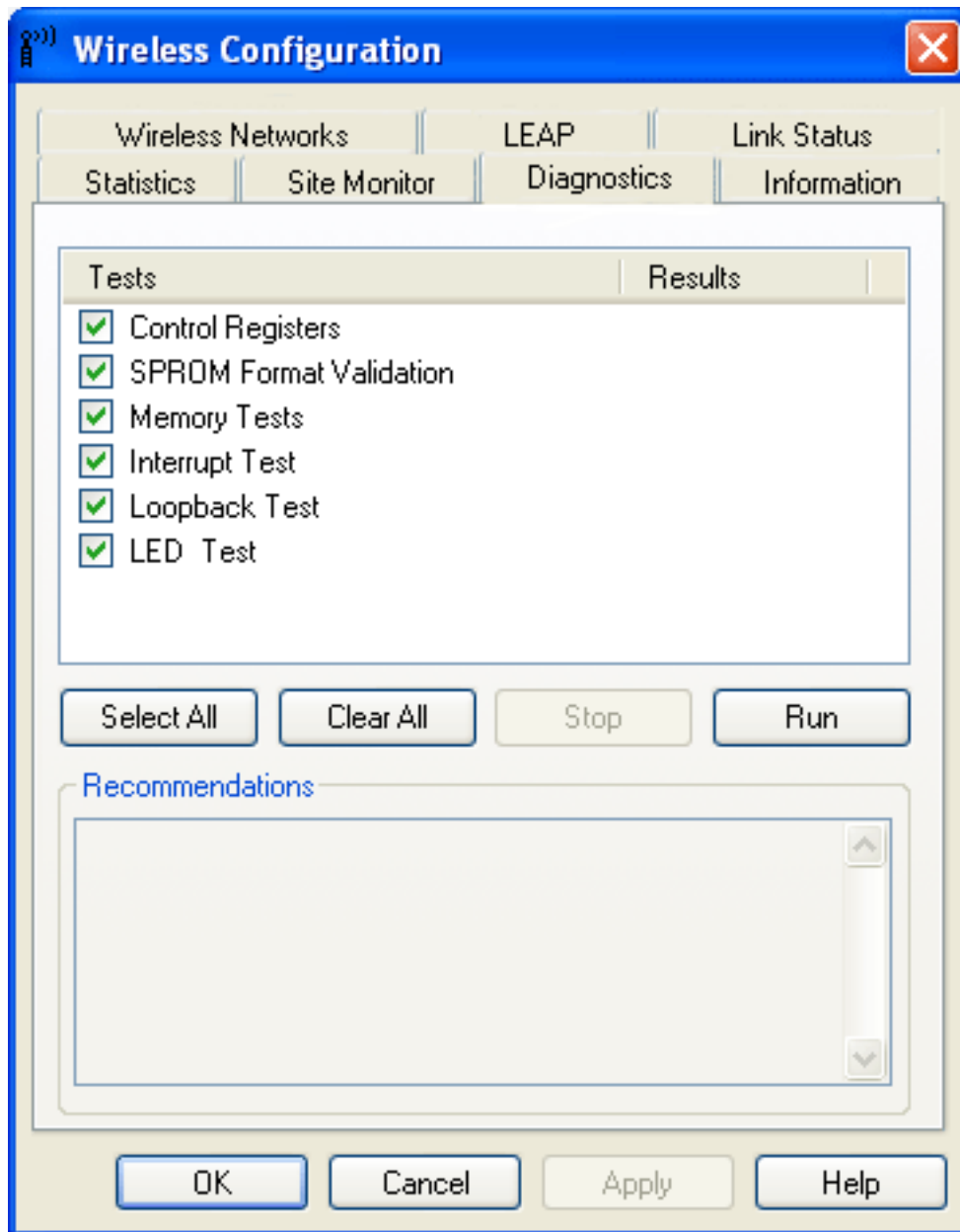
To disable the radio on your **Broadcom WLAN Card**, right-click the utility icon  in the system tray and click **Disable**

Radio. To enable the radio, right-click the icon  and click **Enable Radio**. On newer **Dell TrueMobile** enabled notebooks, the radio can be enabled/disabled by pressing Fn + F2.

Diagnostics

You can run a number of diagnostics on your **Broadcom WLAN Card** to verify its operational and functional status.

NOTE—The network connection is lost when you run the diagnostics. When the test run is over, however, your network connection is automatically reestablished.



Windows XP Environment

1. Open the [Wireless Configuration Utility](#).
 2. Click the **Diagnostics** tab.
 3. To see a description of the test, click each test and look in the **Recommendations** area.
 4. All tests are selected by default. To run an individual test or some but not all of the tests, clear the check box for those tests that you do not want to run.
 5. Click **Run Tests**.
 6. If your **Broadcom WLAN Card** fails any of the diagnostics tests, see [Troubleshooting](#).
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Regulatory Information:

[Information for the User](#)

[Regulatory Information](#)

Information for the User

Wireless Interoperability

The **Broadcom WLAN Card** products are designed to be interoperable with any wireless LAN product that is based on direct sequence spread spectrum (DSSS) and orthogonal frequency division multiplexing (OFDM) radio technology and to comply with the following standards:

- IEEE Std 802.11b-1999. Standard on 2.4 GHz Wireless LAN
- IEEE draft Std 802.11g. Standard on 2.4 GHz Wireless LAN
- IEEE Std 802.11a-1999. Standard on 5 GHz Wireless LAN

The Broadcom WLAN Cards and Your Health

The **Broadcom WLAN Cards**, like other radio devices, emit radio frequency electromagnetic energy. The level of energy emitted by these devices, however, is less than the electromagnetic energy emitted by other wireless devices such as mobile phones. The **Broadcom WLAN Card** devices operate within the guidelines found in radio frequency safety standards and recommendations. These standards and recommendations reflect the consensus of the scientific community and result from deliberations of panels and committees of scientists who continually review and interpret the extensive research literature. In some situations or environments, the use of a **Broadcom WLAN Card** wireless device may be restricted by the proprietor of the building or responsible representatives of the applicable organization. Examples of such situations include the following:

- Using the **Broadcom WLAN Card** equipment onboard airplanes, or
- Using the **Broadcom WLAN Card** equipment in any other environment where the risk of interference with other devices or services is perceived or identified as being harmful.

If uncertain of the policy that applies to the use of wireless devices in a specific organization or environment (an airport, for example), ask for authorization to use the **Broadcom WLAN Card** device before turning it on.

Regulatory Information

USA—Federal Communications Commission (FCC)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of 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. If not installed and used in accordance with the instructions, it 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 tuning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the distance between the equipment and the receiver.
- Connect the equipment to outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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

CAUTION

This device is restricted to indoor use due to its operation in the 5.15 to 5.25 GHz frequency range. FCC requires this product to be used indoors for frequency range 5.15 to 5.25 GHz to reduce the potential for harmful interference to co-channel Mobile Satellite systems.

High power radars are allocated as primary users of the 5.25 to 5.35 GHz and 5.65 to 5.85 GHz bands. These radar stations can cause interference with and/or damage this device.

CAUTION: Exposure to Radio Frequency Radiation.

To comply with FCC RF exposure compliance requirements, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons. This device must not be co-located or operating in conjunction with any other antenna or transmitter.

Canada—Industry Canada (IC)

This device complies with RSS 210 of Industry Canada.

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 this device.”

L ‘ utilisation de ce dispositif est autorisée seulement aux conditions suivantes : (1) il ne doit pas produire de brouillage et (2) l’ utilisateur du dispositif doit être prêt à accepter tout brouillage radioélectrique reçu, même si ce brouillage est susceptible de compromettre le fonctionnement du dispositif.

The term "IC" before the equipment certification number only signifies that the Industry Canada technical specifications were met.

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

To prevent radio interference to the licensed service, this device is intended to be operated indoors and away from windows to provide maximum shielding. Equipment (or its transmit antenna) that is installed outdoors is subject to licensing.

Pour empêcher que cet appareil cause du brouillage au service faisant l'objet d'une licence, il doit être utilisé à l'intérieur et devrait être placé loin des fenêtres afin de fournir un écran de blindage maximal. Si le matériel (ou son antenne d'émission) est installé à l'extérieur, il doit faire l'objet d'une licence.

CAUTION

This device is restricted to indoor use due to its operation in the 5.15 to 5.25 GHz frequency range. Industry Canada requires this product to be used indoors for frequency range 5.15 to 5.25 GHz to reduce the potential for harmful interference to co-channel Mobile Satellite systems. High power radars are allocated as primary users of the 5.25 to 5.35 GHz and 5.65 to 5.85 GHz bands. These radar stations can cause interference with and/or damage this device.

Caution: Exposure to Radio Frequency Radiation.

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada’s website www.hc-sc.gc.ca/rpb.

Europe—EU Declaration of Conformity and Restrictions

Hereby, Broadcom Corp, declares that this equipment complies with the essential requirements and other relevant provisions of Directive 1999/5/EC.

This equipment is marked with the **CE 0984**  symbol and can be used throughout the European community.

This indicates compliance with the R&TTE Directive 1999/5/EC and meets the relevant parts of following technical specifications:

EN 300 328 – Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband Transmission Systems; Data transmission equipment operating in the 2,4GHz ISM band and using spread spectrum modulation techniques; Harmonized EN covering essential requirements under article 3.2 of the R&TTE directive.

EN 301 893 - Broadband Radio Access Networks (BRAN); 5 GHz high performance RLAN; Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive

EN 301 489-17 - Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 17 Specific Conditions for Wideband Data and HIPERLAN Equipment.

EN 60950 - Safety of Information Technology Equipment.

EN 50385 – Product standard to demonstrate the compliances of radio base stations and fixed terminal stations for wireless telecommunication systems with the basic restrictions or the reference levels related to human exposure to radio frequency electromagnetic fields.

Marking by the symbol  indicates that usage restrictions apply.

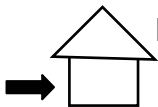
France - 2.4GHz for Metropolitan France :

In all Metropolitan départements, wireless LAN frequencies can be used under the following conditions, either for public or private use:

- Indoor use: maximum power (EIRP*) of 100 mW for the entire 2400-2483.5 MHz frequency band
- Outdoor use: maximum power (EIRP*) of 100 mW for the 2400-2454 MHz band and with maximum power (EIRP*) of 10 mW for the 2454-2483 MHz band

802.11a Restrictions:

- This product is for indoor use only when using channels 36, 40, 44, 48, 52, 56, 60, or 64 (5150–5350 MHz).
- DFS and TPC must remain enabled to ensure product compliance with EC regulations.
- To ensure compliance with local regulations, be sure to select the country in which the access point is installed.
- This product can be used as shown in the table below:

5 GHz wireless LAN IEEE 802.11a	 Indoor Use Only	A, AND, B, CH, D, CY, CZ, DK, ES, EST, F, FIN, FL, FR, GB, GR, H, I, IRL, IS, L, LT, M, MC, N, NL, P, PL, RSM, S, SK, SLO, V
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Taiwan DGT warning statement

低功率電波輻射性電機管理辦法

第十四條經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

第十七條低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。

前項合法通信，指依電信規定作業之無線電信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

在5.25G ~5.35G頻帶內操作之無線資訊傳輸設備僅適於室內使用

Translation:

Article 14

Without permission granted, the frequency change, transmitting power enhance or alter of original design characteristic as well as function by company, enterprise, or user for approved Low-power radio frequency devices is not allowed.

Article 17

Low-power radio-frequency devices shall not influence aircraft security and interfere legal communications; If found, shall cease operating immediately until no interference is achieved.

Above mentioned Legal Communications is defined as radio communications operation follows Telecommunications Act. Low-power radio-frequency devices must susceptible with the interference from legal communications, ISM radio wave radiated devices.

Radio devices using 5.25-5.35GHz bands are restricted to indoor use only.