Broadcom 802.11g WLAN PCI-E Mini Card User's Guide

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WLCARD-UG200-D2 01.30.03

Introduction: *BCM94311MCG*

Broadcom 802.11g WLAN Solution

The Broadcom 802.11g **WLAN** solution accesses wireless local area networks (LANs), enables the sharing of a local printer and files with others in the network, accesses the Internet, and enables roaming about the office—wire-free. This wireless LAN solution is designed for both the home user and small businesses—and it is scalable so that users can be added and new network features can be enabled as networking needs grow.

WEP is a security protocol for wireless local area networks (defined in IEEE Std 802.11, 1999 Edition) that encrypts data sent over radio waves. The use of the WEP key is optional and can be enabled or disabled. If the network being connecting to has enabled WEP, WEP must also be enabled in the network profile and the WEP key must be set to match the WEP key used by the network. Otherwise, it is impossible to connect to the network.

The *Broadcom 802.11g* enabled notebook makes a wireless connection to a network, as illustrated on the following figure.

Networks 1 and 2 are infrastructure type of networks. The two notebook computers connected by radio waves form an ad hoc type of network.
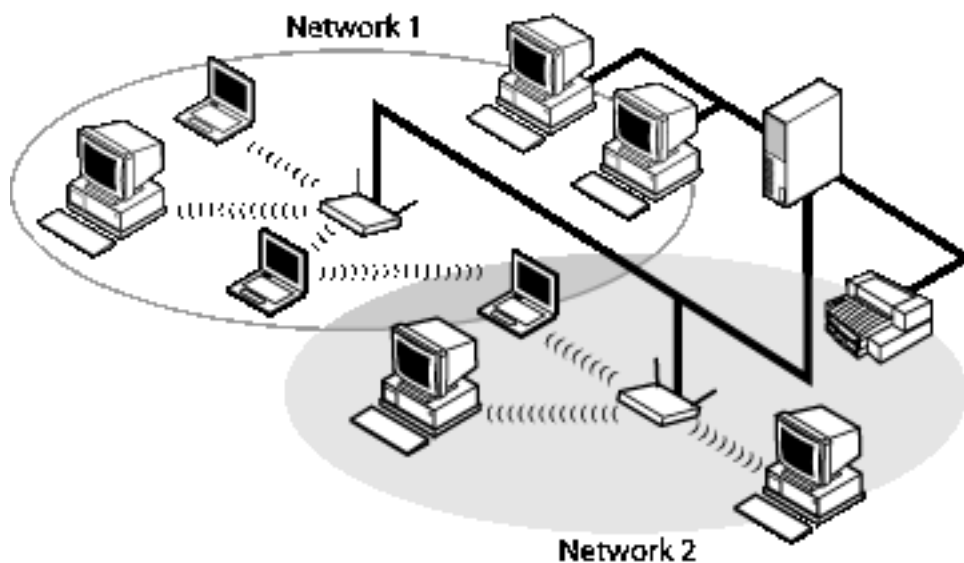
Enterprise Users

Obtain the following information from the network administrator:

- Network names (SSID) of the specific wireless networks to connect to
- WEP (Wired Equivalent Privacy) key information (if any) for the networks to connect to
- For Microsoft® Windows® networking, the customer name and workgroup name
- For a network account, a user name and password
- An IP address (if not using a DHCP server)

Home Users

The access point (AP) that communicates with the **Broadcom 802.11g** enabled notebook has a preassigned network name (SSID) that the notebook recognizes upon startup. To enable WEP, use any string of numbers for the WEP key.

Upon startup, the **Broadcom 802.11g** enabled notebook detects certain wireless networks (WLANs) that are within range. Before connecting to these and other wireless networks, configure a profile for each network.See Completing the setup.

Using the *Broadcom 802.11g WLAN*

The **Broadcom 802.11g** enabled notebook is an IEEE 802.11g based wireless LAN device. A LAN is composed of two or more computers that are connected to each other to share files or common equipment such as a printer or an Internet connection. A wireless LAN provides the same functionality of a wired network, but it eliminates the need to install networking cables and other networking equipment. Not only is a wireless LAN easier to deploy, but it also allows for roaming. For example, when using the WLAN enabled notebook, it is possible to roam from a conference room to an office without being disconnected from the network.

Features and Requirements

An IEEE 802.11 based wireless LAN includes the following features:

- Support for IEEE 802.11g draft specification
- Support for IEEE 802.11b standard
- 2.4-GHz band operation
- Network data rate of up to 54 Mbit/s
- Wired Equivalent Privacy (WEP) encryption

The following items are needed for participating in a wireless LAN:

- **Broadcom 802.11g** enabled notebook computer running on a Microsoft® Windows® XP operating system
- Software compact disc containing the drivers, software reference guide, and Help file

The **Broadcom 802.11g** enabled notebook works with any Wi-Fi CERTIFIED® base station or wireless client adapter.

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Completing the Setup: *Broadcom 802.11g* WLAN User Manual

NOTE—Before starting, obtain the required network information from the network administrator or the wireless access point installer (see The Broadcom 802.11g WLAN Solution in Introduction).

Modes of Operation
Configuring a Network Profile

Modes of Operation

A wireless LAN can be configured for two different modes of operation: infrastructure network and computer-to-computer (ad hoc) network. Whereas each mode has its advantages, one mode may be more appropriate than the other, depending on the location and type of network connection.

Infrastructure Mode

The key difference between the infrastructure type of network and an ad hoc network is that the infrastructure network includes a base station (host) computer that has a built-in wireless network adapter and is connected to a wireless access point (AP). This functionality allows computers on the infrastructure wireless LAN to access the resources and tools of the wired LAN, including Internet access, e-mail, file transfers, and printer sharing.

Characteristics

Networked computers communicate with each other through a dedicated AP. All data transmitted between the computers on this wireless LAN passes through the AP.

Advantages

- Extended range. The access point extends the range of the wireless LAN. Each computer can communicate with other computers equipped by wireless networks that are within the range of the access point.
- Roaming. As the user moves around the home or office, the **Company 54g** enabled notebook determines the best access point to use to ensure continuous communication with the network.
- Network connectivity. An access point can provide wireless LAN access to an existing wired network by bridging the two networks together. This gives users of the wireless LAN access to all the functions of a wired network—from file server access to e-mail and the Internet.

Disadvantages

Because the infrastructure mode offers more features, it requires additional components and setup time to deploy.

Requirements

A base station computer having a wired connection to the Internet, a wireless network adapter, and a connection to an AP.

Computer-to-Computer Mode

A peer-to-peer (ad hoc) network is the easiest to deploy and is ideal for home use or in small offices. This mode allows the sharing of files with other employees, printing to a shared office printer, and access to the Internet through a shared modem. With ad hoc networking, however, the computer is only able to communicate with other wireless networks that are within a certain range and are in the same wireless workgroup.

Characteristics

Networked computers send data directly to each other.

Advantages

- Simple setup
- Cost efficiency

Disadvantages

Communication is limited to those who are located within a certain range.

Configuring a Network Profile

To connect to a wireless network, a network profile for that network must be configured on the *Company* **54g** enabled notebook. If the *Company* **54g** enabled notebook computer came with the *Company* **54g WLAN** card already installed and set up at the factory, follow the network profile configuration instructions provided below.

NOTE—For more information on how to configure a network profile and IEEE 802.1x authentication, click **Learn about setting up wireless network configuration** at the bottom of the **Wireless Networks** tab of **Wireless Network Connection Properties**.

Open **Network Connections** and then open **Properties** for the **Wireless Network Connection** you want to configure by doing the following.

1. Click **Start**, and then click **Control Panel**.
2. Double-click **Network Connections**.
3. Right-click **Wireless Network Connection**, and then click **Properties**.
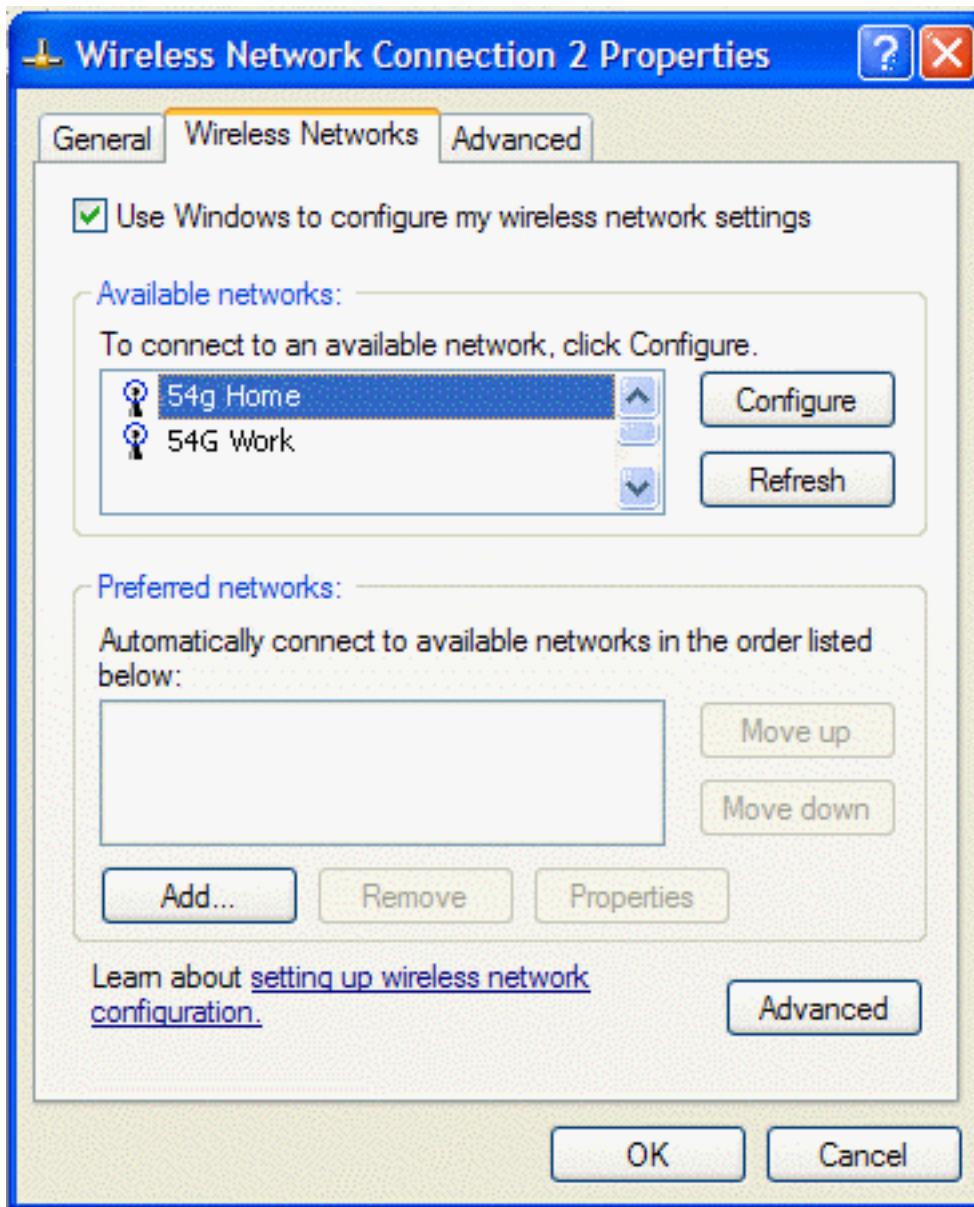
4. Click the **Wireless Networks** tab.

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**. The 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 a WEP key (check with your network administrator to see if a WEP key is required).

NOTE—Both the network name and the network key are case-sensitive.

- Configuring a Profile for a Listed Network That Does Not Require a WEP Key
- Configuring a Profile for a Listed Network That Requires a WEP key
- Configuring a Profile for a Network That Is Not Listed and Does Not Require a WEP Key
- Configuring a Profile for a Network That is Not Listed and Requires a WEP Key

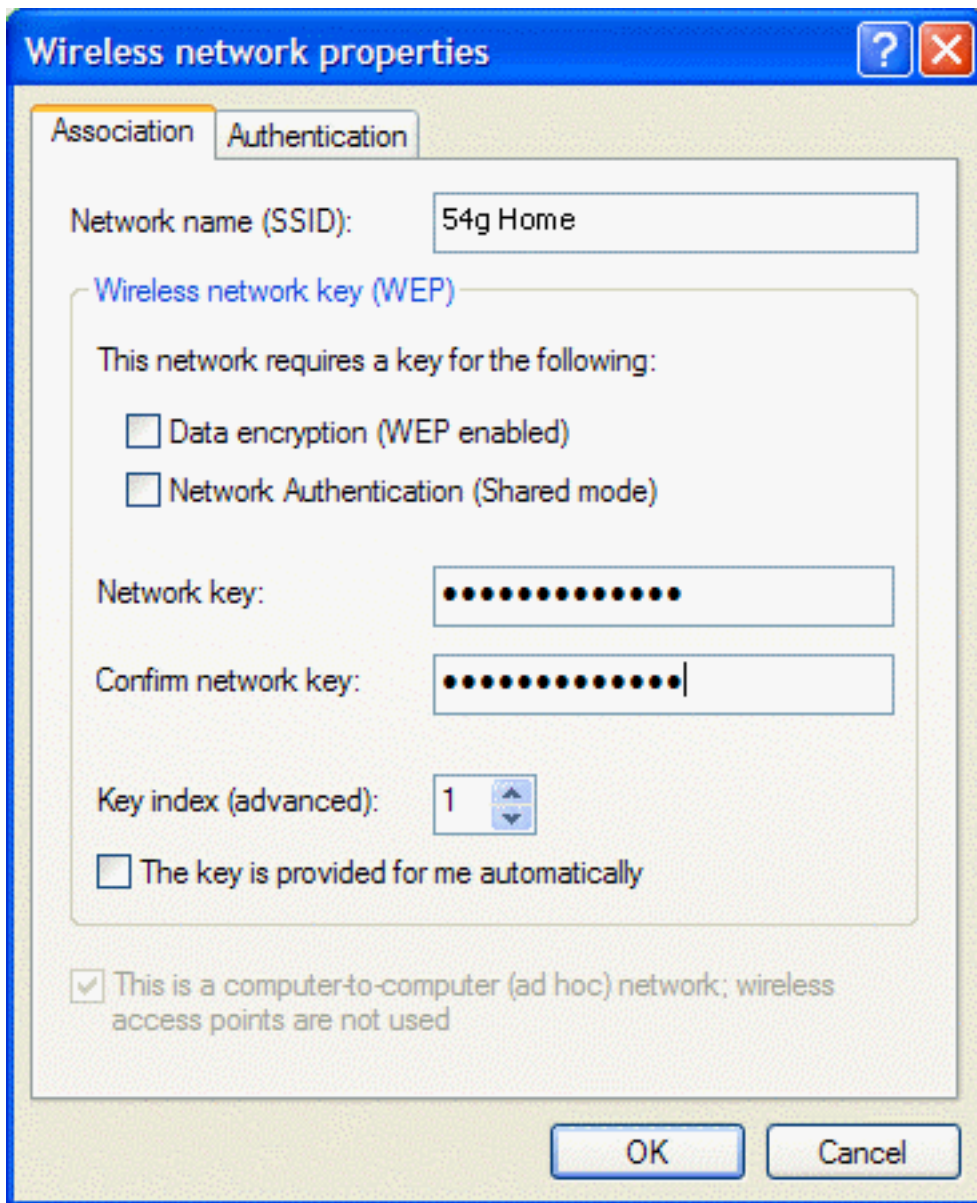## Configuring a Profile for a Listed Network That Does Not Require a WEP Key

1. Open **Network Connections** and then open **Properties** for the **Wireless Network Connection** to configure by

doing the following.
  a. Click **Start**, and then click **Control Panel**.
  2. Double-click **Network Connections**.
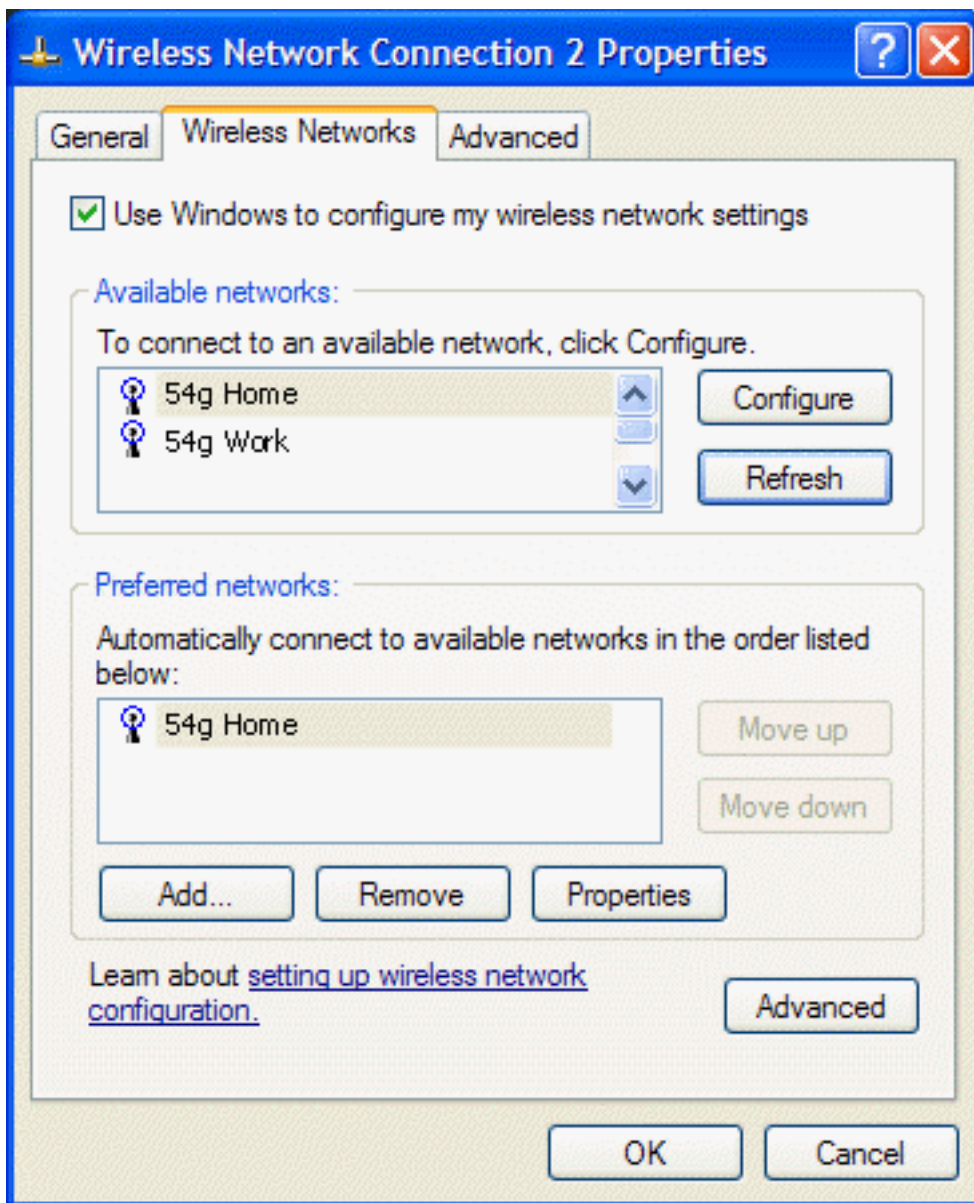 3. Right-click **Wireless Network Connection**, and then click **Properties**.

2. Click the **Wireless Networks** tab.
3. Under **Available networks**, click the network name, and then click **Configure**.

Wireless network properties   [?] [X]

Association   Authentication

Network name (SSID): | 54g Home

Wireless network key (WEP)

This network requires a key for the following:

☐ Data encryption (WEP enabled)

☐ Network Authentication (Shared mode)

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]

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

5. Click **OK** to activate the network connection. To verify that the network connection has been made, reopen **Wireless Network Connection Properties** for that wireless network and click the **Wireless Networks** tab. 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 an Internet connection exists.

Configuring a Profile for a Listed Network That Requires a WEP Key

1. Open **Network Connections** and then open **Properties** for the **Wireless Network Connection** to configure by doing the following.
    a. Click **Start**, and then click **Control Panel**.
    2. Double-click **Network Connections**.
    3. Right-click **Wireless Network Connection**, and then click **Properties**.

2. Click the **Wireless Networks** tab.
3. Under **Available networks**, click the network name, and then click **Configure**.
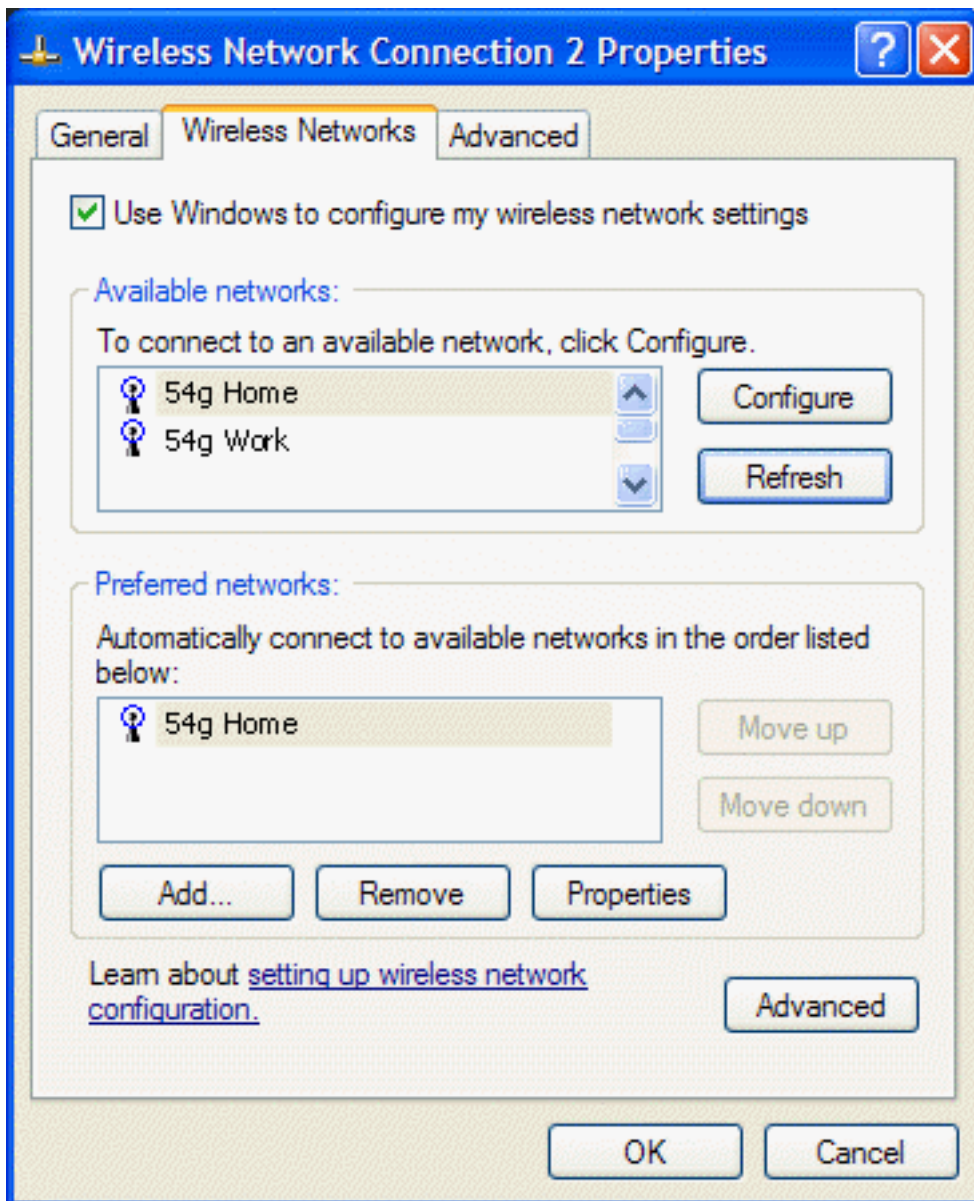
4. Select the **Data encryption (WEP enabled)** box.
5. Clear the **The key is provided for me automatically** box.
6. Type the network key in the **Network key** box and again in the **Confirm network key** box.

> NOTE—It is not necessary to select the **Key format** or the **Key length** before typing the network key. These settings automatically change to the appropriate setting as the network key is typed.

7. Click **OK**. The network name and icon appear at the top of the list under **Preferred networks**.
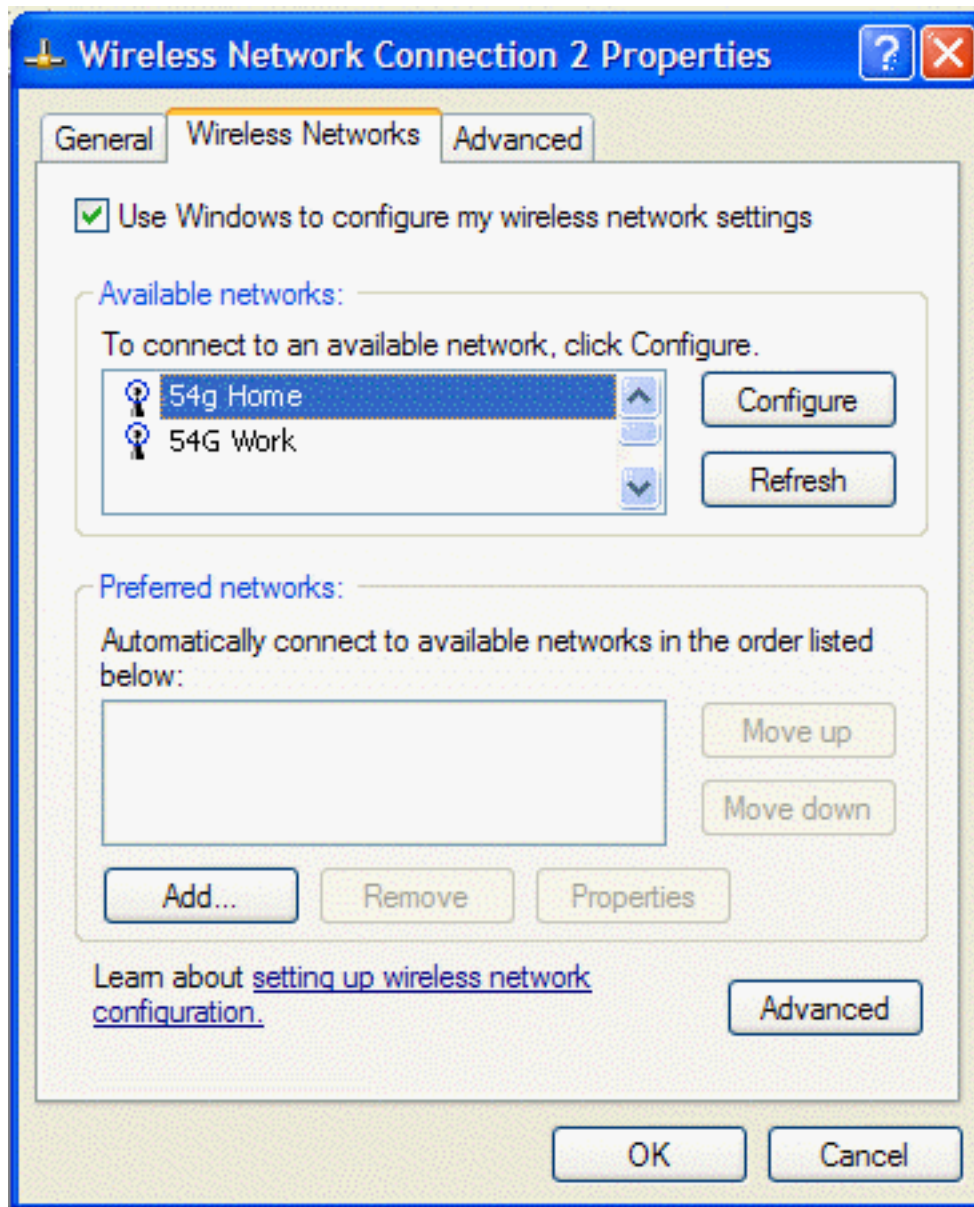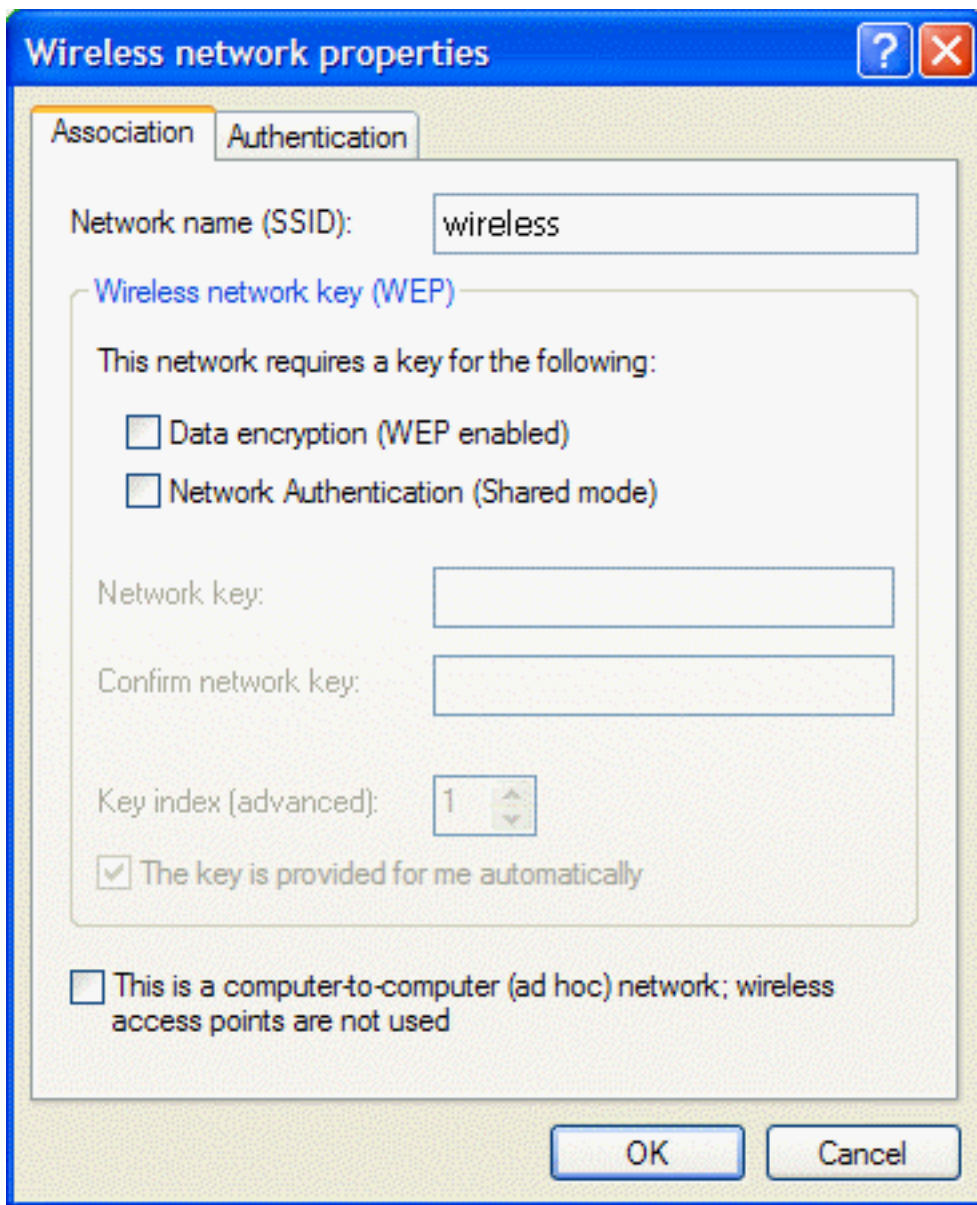
8. Click **OK** to activate the network connection. To verify that the network connection has been made, reopen **Wireless Network Connection Properties** for that wireless network and click the **Wireless Networks** tab. The

   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 an Internet connection exists.

Configuring a Profile for a Network That Is Not Listed and Does Not Require a WEP Key

1. Open **Network Connections** and then open **Properties** for the **Wireless Network Connection** to configure by doing the following.
   a. Click **Start**, and then click **Control Panel**.
   2. Double-click **Network Connections**.
   3. Right-click **Wireless Network Connection**, and then click **Properties**.
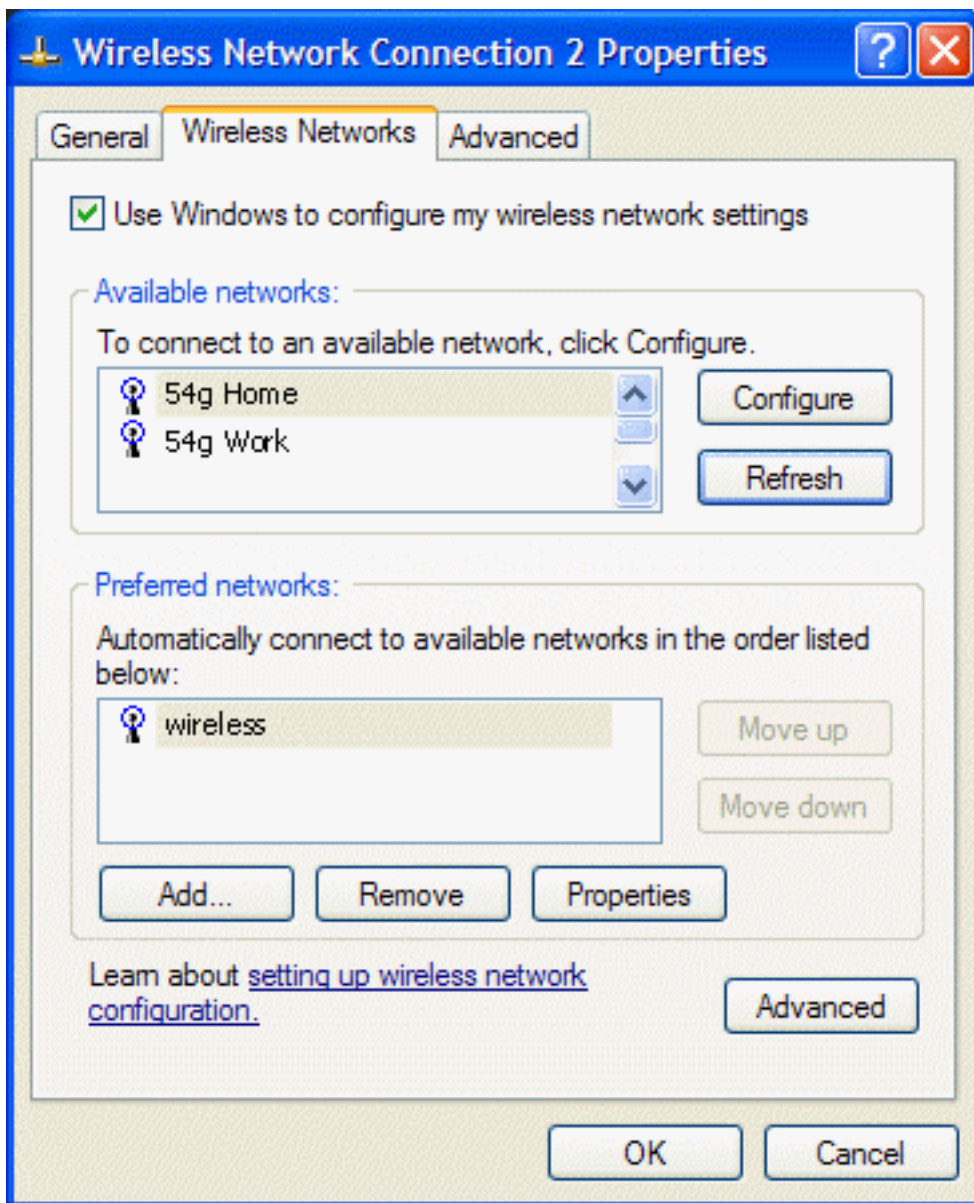
2. Click the **Wireless Networks** tab.
3. Click **Add**.

4. Type the network name in the **Network name (SSID)** box.
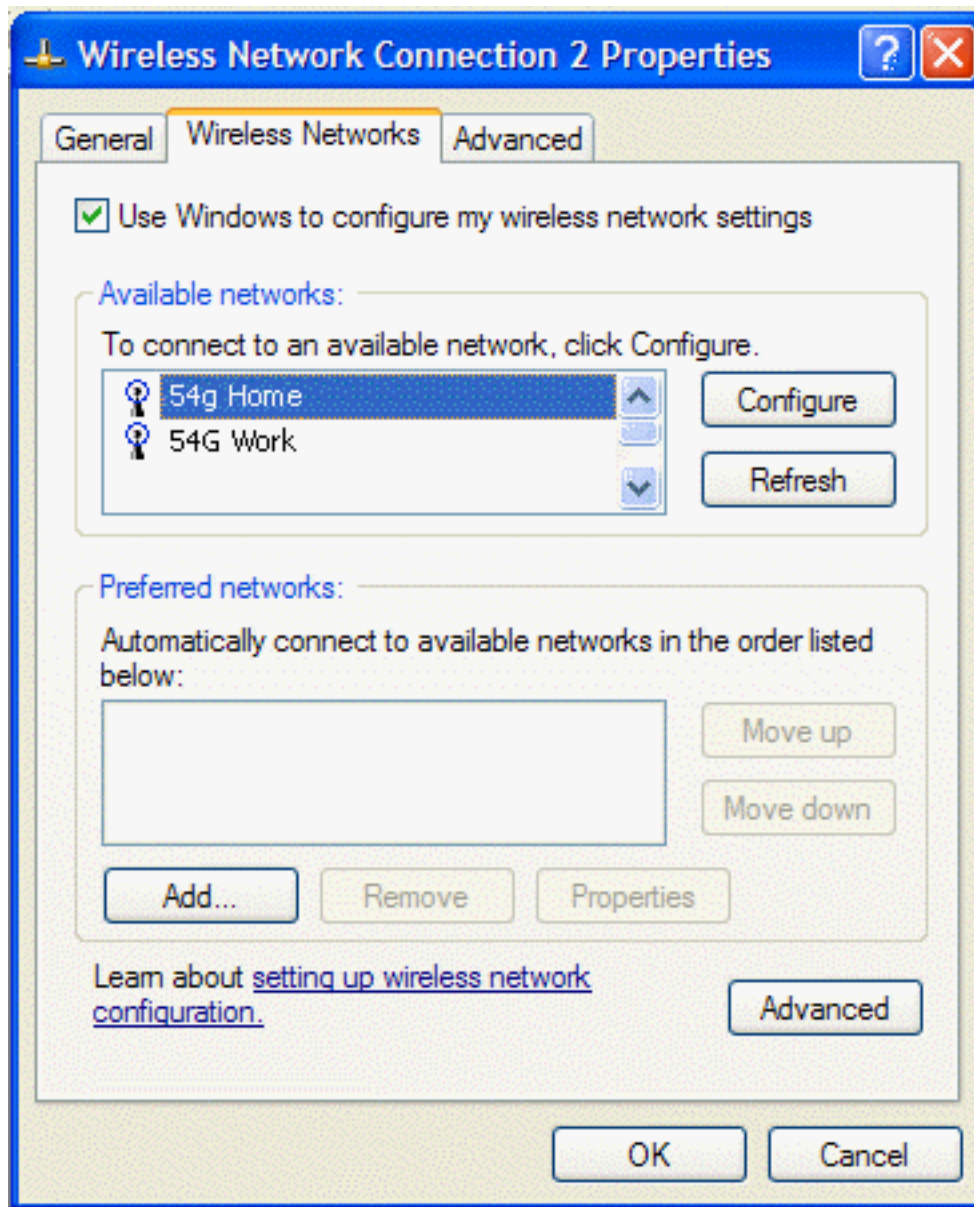5. Click **OK**. The network name and icon appear at the top of the list under **Preferred networks**.
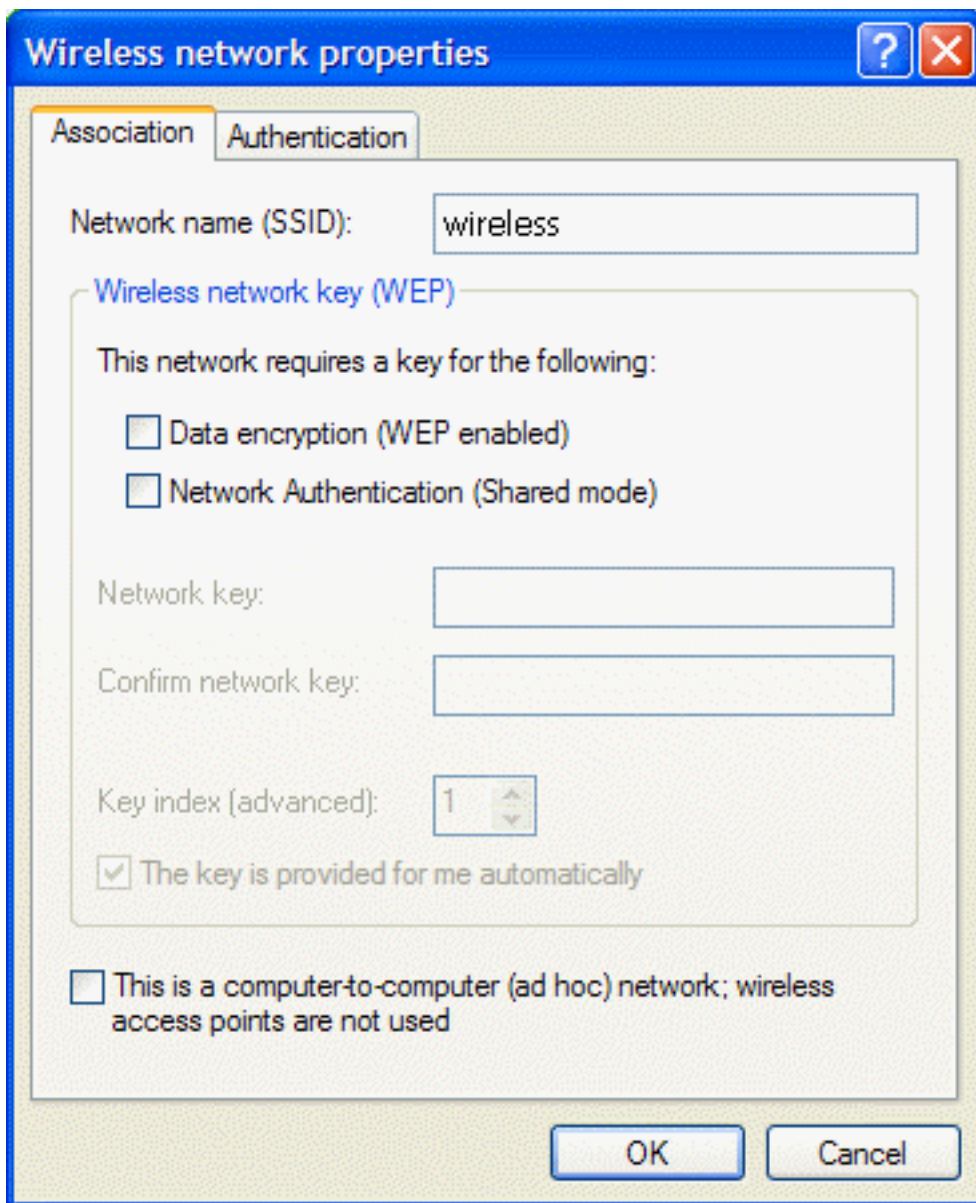
6. Click **OK** to activate the network connection. To verify that the network connection has been made, reopen **Wireless Network Connection Properties** for that network and click the **Wireless Networks** tab. The computer is connected to the selected network when a blue bubble appears on top of the 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 an Internet connection exists.

Configuring a Profile for a Network That Is Not Listed and Requires a WEP Key

1. Open **Network Connections** and then open **Properties** for the **Wireless Network Connection** to configure by doing the following.
    a. Click **Start**, and then click **Control Panel**.
    2. Double-click **Network Connections**.
    3. Right-click **Wireless Network Connection**, and then click **Properties**.
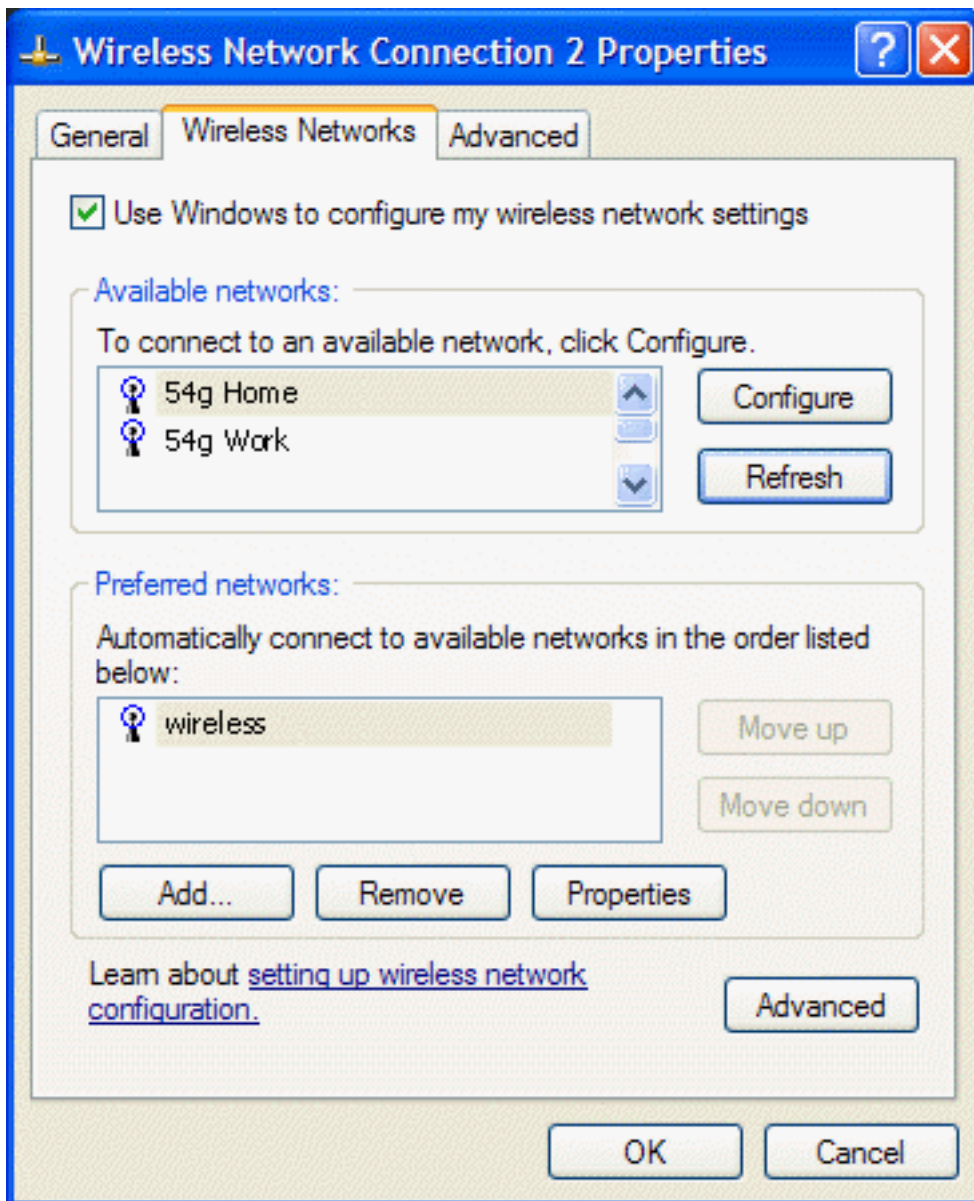
2. Click the **Wireless Networks** tab.
3. Click **Add**.

4. Type the network name in the **Network name (SSID)** box and again in the **Confirm network key** box.
5. Select the **Data encryption (WEP enabled)** box.
6. Clear the **The key is provided for me automatically** box.
7. Type the network key in the **Network key** box and again in the **Confirm network key** box.

   NOTE—It is not necessary to select the **Key format** or the **Key length** before typing the network key. These settings automatically change to the appropriate setting as the network key is typed.

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

9. Click **OK** to activate the network connection. To verify that the network connection has been made, reopen **Wireless Network Connection Properties** for that wireless network and click the **Wireless Networks** tab. 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 an Internet connection exists.

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# Utility Functions: *Company* 54g Wireless LAN (WLAN) User Manual

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Running Utility Functions

The utility functions and details for the wireless network connection are available in **Control Panel**. These functions include **Disabling the network device**, **Renaming the connection**, **View status of this connection**, and **Change settings of this connection**.

Changing Settings

1. Click **Start**, then click **Control Panel**.
2. Double-click **Network Connections**.
3. Click **Wireless Network Connections**, and then click **Change settings of this connection**.

- Click the **Wireless Network** tab to configure available networks, add and remove networks, and change network properties.
- Click the **General** tab, then click **Configure**
    - To change the properties of the network adapter, click the **Advanced** tab.
    - To view details about the driver files, update the driver for the device, roll back to the previous driver, or to uninstall the driver, click the **Driver** tab.
    - To view resource settings, click the **Resources** tab.
    - To change power management settings, click the **Power Management** tab.

The **Advanced** tab in **Network Adapter Properties** lists the properties for the *Company* **54g Wireless LAN (WLAN)** adapter.
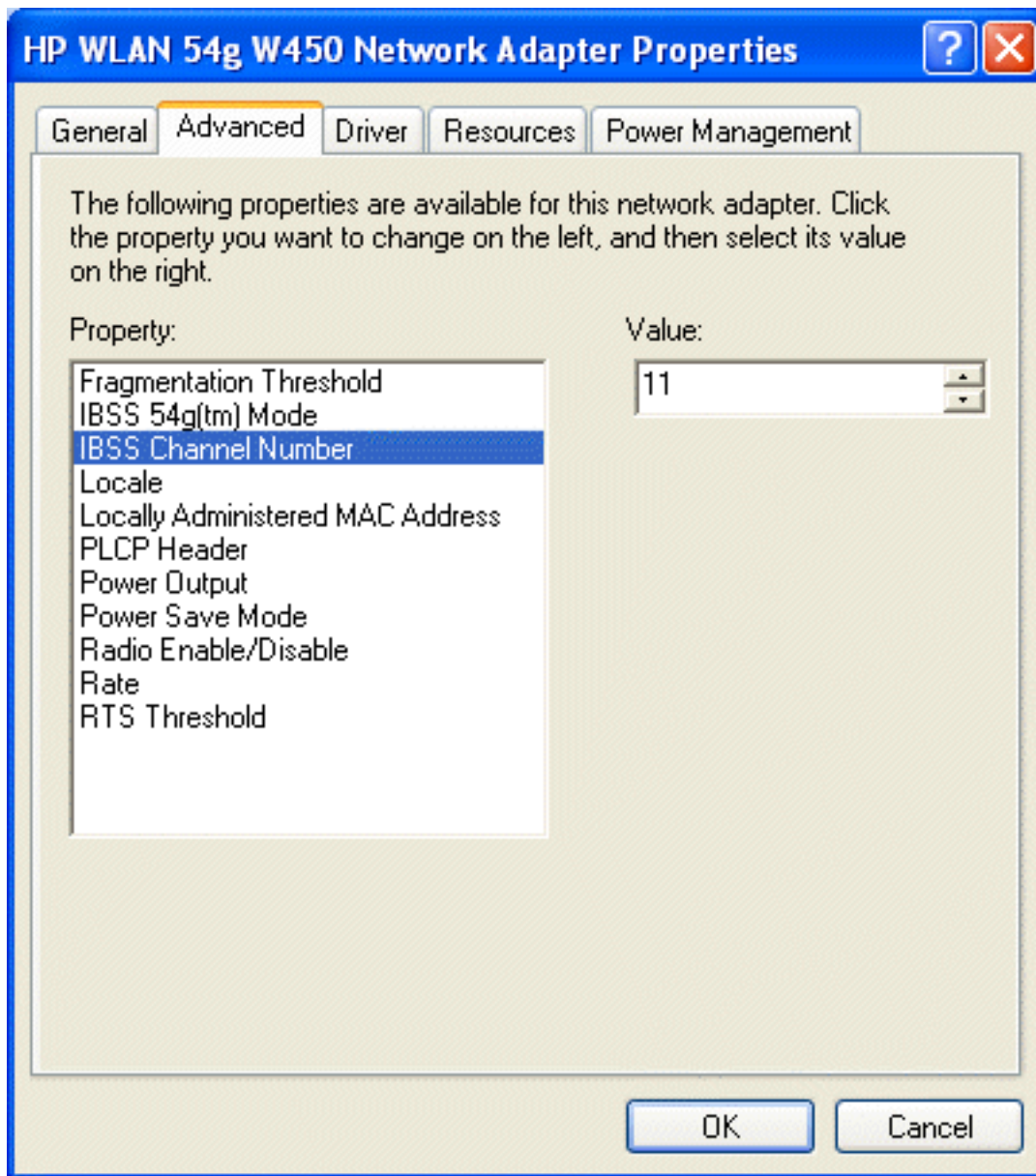
- **IBSS Channel Number** selects the independent basic service set (IBSS) channel number on which to operate. The *Company* **54g** enabled notebook comes preset for use on channels 1—11. This setting is acceptable in most countries. Some countries allow use on more channels. If you travel to a country that allows the use of other channels, change the **IBSS Channel Number** to that number.
- **Locale** selects the adapter properties that comply with the operating regulations for that locale. The **Locale** settings include **USA**, **Israel**, **Japan**, **Jordan**, **Thailand**, and **Worldwide**. This wireless LAN device is normally preset by default for the country in which the device is sold. Before operating this WLAN device, verify that the locale selection is correct by following the steps described in Changing Settings above. On the **Advanced** tab of **HP WLAN 54g W450 Network Adapter Properties**,
  - ❍ Click **Locale**
  - ❍ In the **Value** list, select the appropriate regional location

  If you travel to other countries with the *Company* **54g** enabled notebook, follow the same steps to change the locale setting to match the destination country. Reset the locale setting back to the appropriate home setting after returning. If the destination country is not listed, change the **Locale** setting to **Worldwide**.

- **Radio Enable/Disable** allows you to turn the radio on or off as necessary to comply with restrictions prohibiting the emission of radio signals, such as during takeoff and landing onboard a commercial aircraft.

- **Rate** sets the transmission rate. The default setting is **Use best rate**. This automatically adjusts the data rate to the optimal rate based on the capabilities of the other clients and access points.

The default values for the properties listed below are set for maximum performance. Therefore, It is not recommended for home users to change the settings for any of these properties. Only network administrators or persons having technical wireless LAN experience should attempt to change any of the settings.

- **Fragmentation Threshold** is the threshold at which the IEEE 802.11 adapter break the packet into multiple frames.
- **IBSS 54g (TM) Mode** is used to set the connection type in an ad hoc network. The following options are available:
    - 54g - 802.11b compatible— links at the best rate with an IEEE 802.11b and an IEEE 802.11g network (recommended setting).
    - 54g - Performance— links only with IEEE 802.11g networks at the highest rate. In addition it excludes IEEE 802.11b networks.
    - 802.11b Mode— links only with IEEE 802.11b networks at the highest rate. In addition it excludes IEEE 802.11g networks.
- **Locally Administered MAC Address** is used to override the MAC address of the *Company* **54g Wireless LAN** adapter.
- **PLCP Header** is used to set the header type used for CCK rates. Can be long, auto (short/long).
- **Power Output** is used for putting out a percentage of the maximum output power.
- **Power Save Mode** is used to put the *Company* **54g** enabled notebook into the IEEE 802.11 Power Save mode. In Power Save mode, the radio is periodically powered down to conserve power. When in Power Save mode, packets are stored in the AP until the STA comes on.

Adding a New Network to the List of Preferred Networks

If the *Company* **54g** enabled notebook is running at a location in which a wireless LAN is operating, and it is within range of the access point, the computer automatically connects to the network at the top of the list under **Preferred networks**. A network profile must be configured for each network to add to the list

To add a new network to the list of preferred networks, first check to see if the new network is listed on the **Wireless Networks** tab under **Available networks**. If it is, follow the applicable instructions below according to which operating system your computer is running and whether or not the network requires a WEP key.

NOTE—See the network administrator or the wireless access point installer to obtain a WEP key, as necessary.

- See Configuring a Profile for a Listed Network That Does Not Require a WEP Key in Completing the Setup
- See Configuring a Profile for a Listed Network That Requires a WEP Key in Completing the Setup.

If the network being added to the **Preferred networks** list is not listed in the **Available networks** list, follow the applicable instructions below according to which operating system the computer is running and whether or not the network requires a WEP key.

- See Configuring a Profile for a Network That is Not Listed and Does Not Require a WEP Key in Completing the Setup
- See Configuring a Profile for a Network That is Not Listed and Requires a WEP Key in Completing the Setup.

Viewing or Modifying the Wireless Network Properties

1. Click **Start**, then click **Control Panel**.
2. Click **Wireless Network Connection**, then click **Change settings of this connection**.
3. Click the **Wireless Networks** tab.
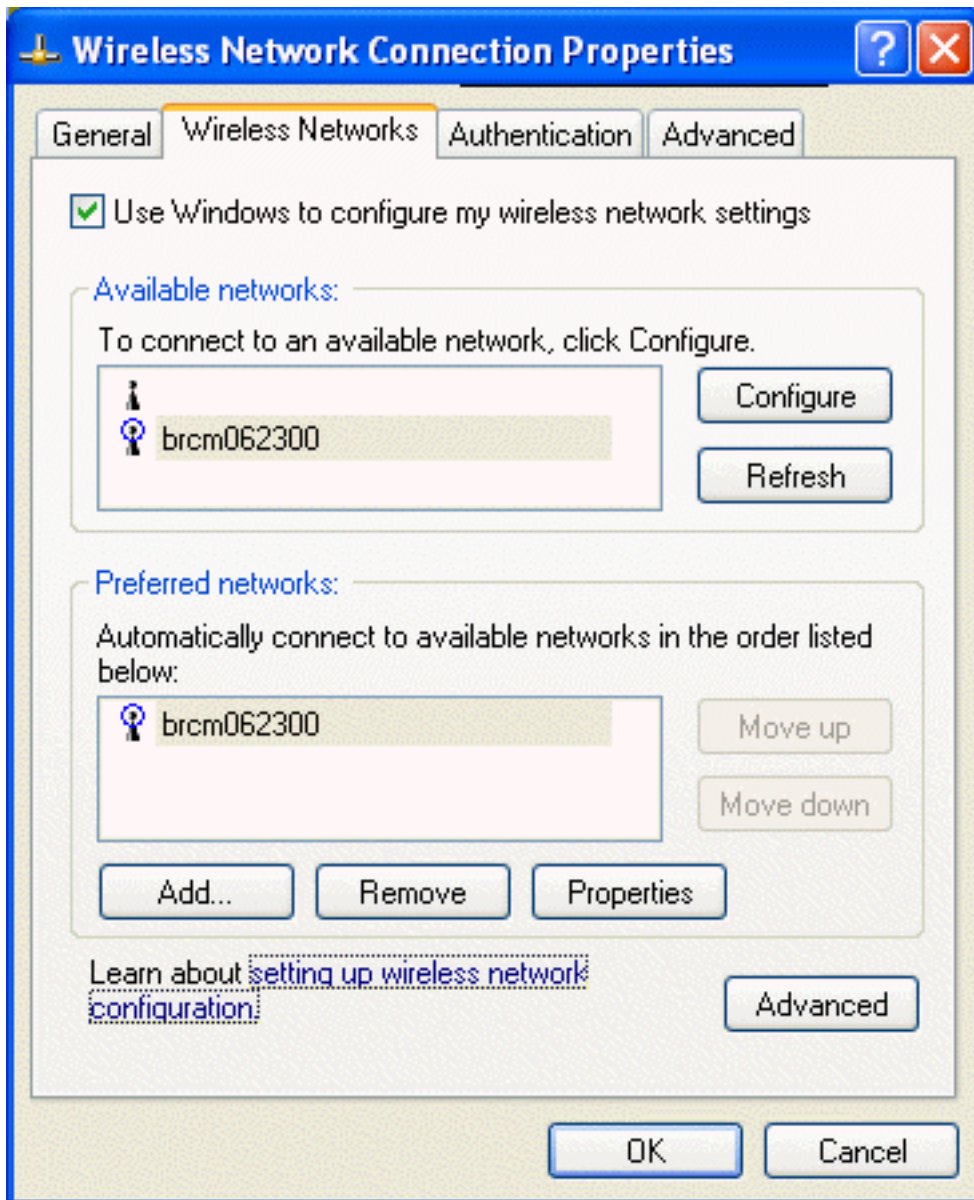
4. Verify that the **Use Windows to configure my wireless network settings** box is selected. If it is not, select it.
5. Under **Preferred networks** click the network name and then click **Properties**.
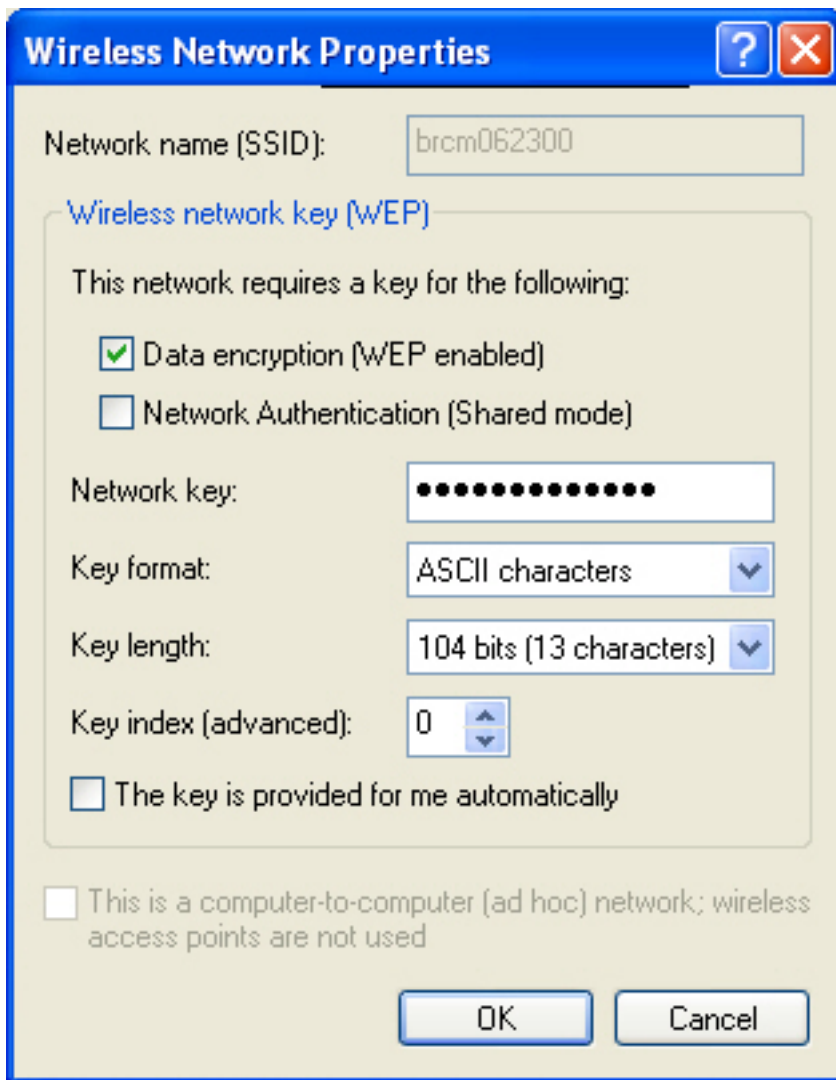
It is possible to enable or disable WEP data encryption and change the network name and the network key (see Completing the setup for instructions).

Setting Up an Ad Hoc (Peer-to-Peer) Group Network for Connecting to the Internet

To connect the computers in an ad hoc group network to the Internet, the Windows Internet connection sharing (ICS) component must be installed. *ICS installation is not required, however, for communication among a group of computers that have a **Company 54g Wireless LAN (WLAN)** installed in each computer*. An ad hoc network must be added under **Preferred networks**. See Running Utility Functions.

Select a desktop computer to serve as the host computer; all other computers are called clients. The host computer must be running the Windows XP operating system. The host computer is the only computer that connects directly to the Internet. *Company* recommends using the desktop computer having the fastest microprocessor and the most memory as the host computer.

NOTE—Internet connection sharing requires that the host computer have either a modem or another network adapter in addition to a wireless network adapter. The modem or the additional network adapter is used to access the Internet. The

Company 54g enabled notebook is used to share the Internet connections with other clients.

Setting Up Internet Connection Sharing (ICS) on the Host Computer

1. Connect the host computer to the Internet.
2. From the host computer **Start** menu, select **Help and Support**.
3. Perform a search on Internet Connection Sharing.
4. From the **Pick a task** list, select **Enable Internet Connection Sharing on a Network Connection**.
5. Follow the instructions on the screen to complete setting up ICS
   .

Adding an Ad Hoc Network

An ad hoc network (for peer-to-peer communicating) can either require a WEP key or not. Instructions for adding and configuring an ad hoc network for both types of ad hoc networks are provided below:
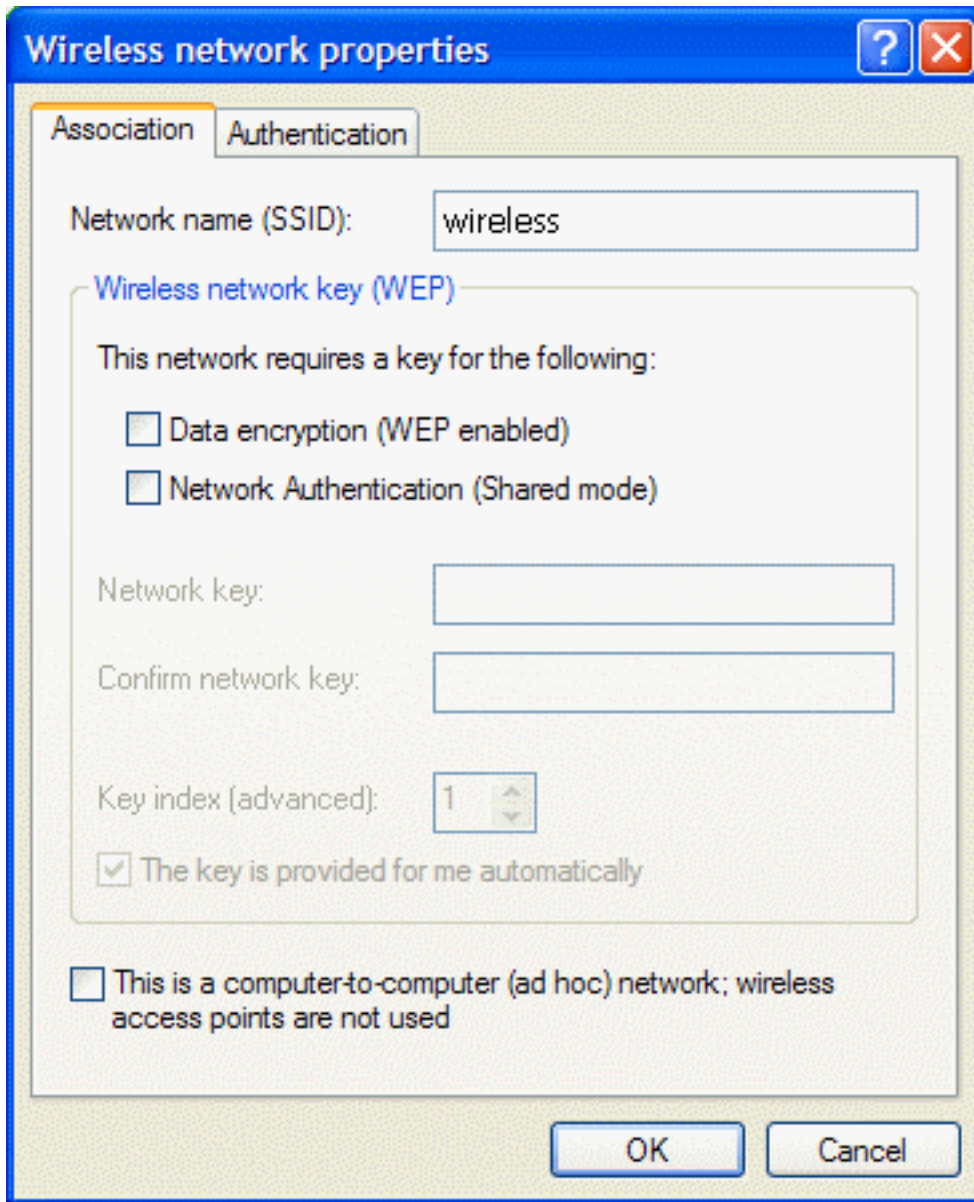
- Adding an Ad Hoc Network That Does Not Require a WEP Key
- Adding an Ad Hoc Network That Requires a WEP Key

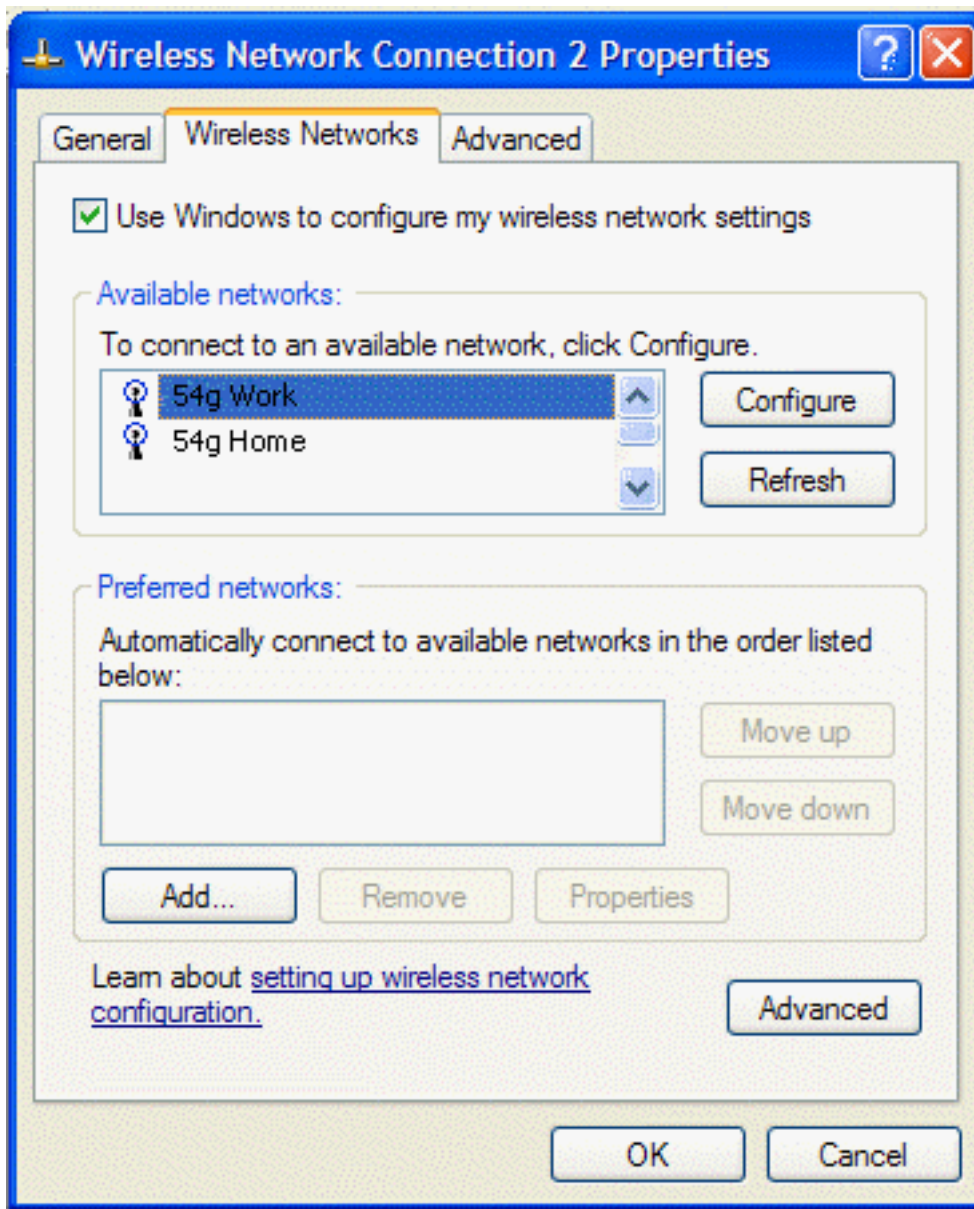## Adding an Ad Hoc Network That Does Not Require a WEP Key

1. Click **Start**, then click **Control Panel**.
2. Click **Wireless Network Connection**, then click **Change settings of this connection**.
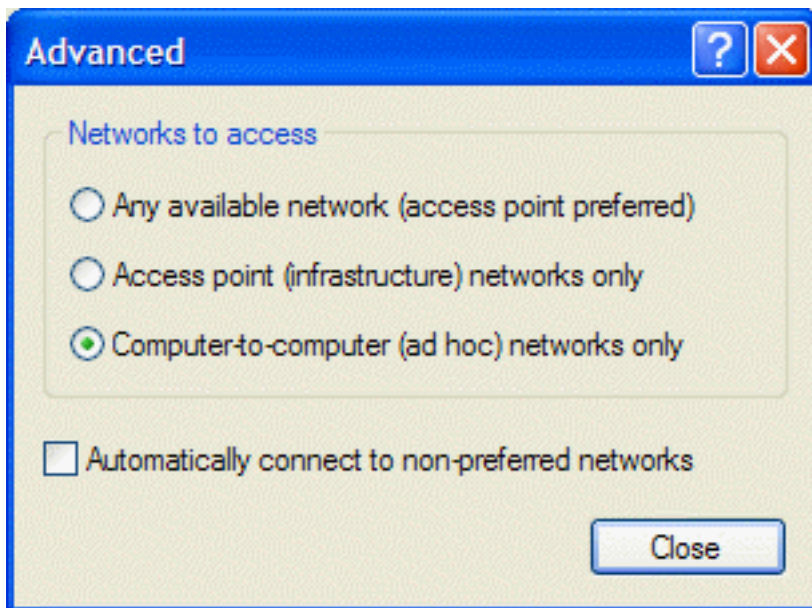3. Click the **Wireless Networks** tab.
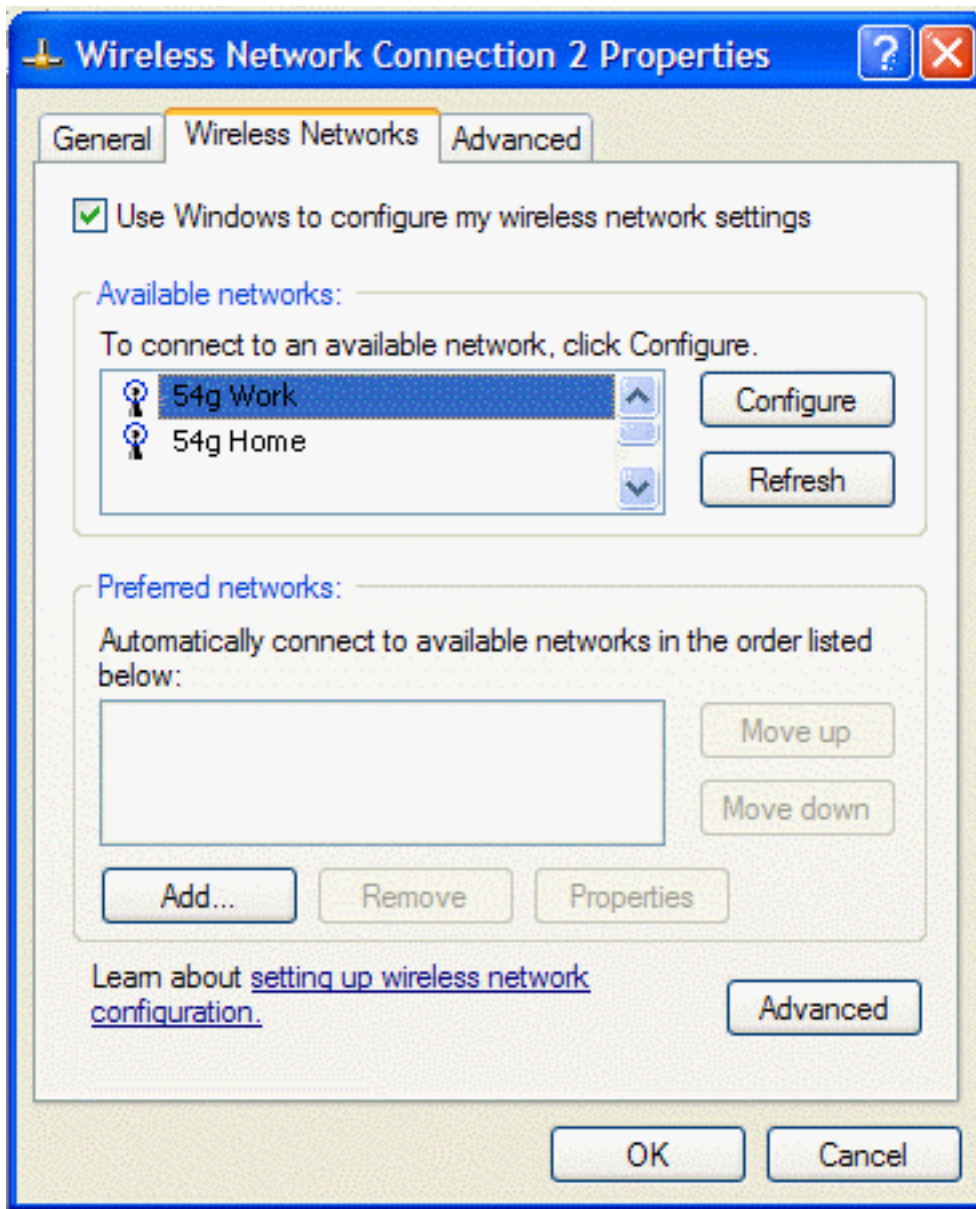
4. Click **Add**.

5. Type the network name in the **Network name (SSID)** box.
6. Select the **This is a computer-to-computer (ad hoc) network; wireless access points are not used** box.
7. Clear the **Data encryption (WEP enabled)** and the **The Key is provided for me automatically** boxes if they are selected.
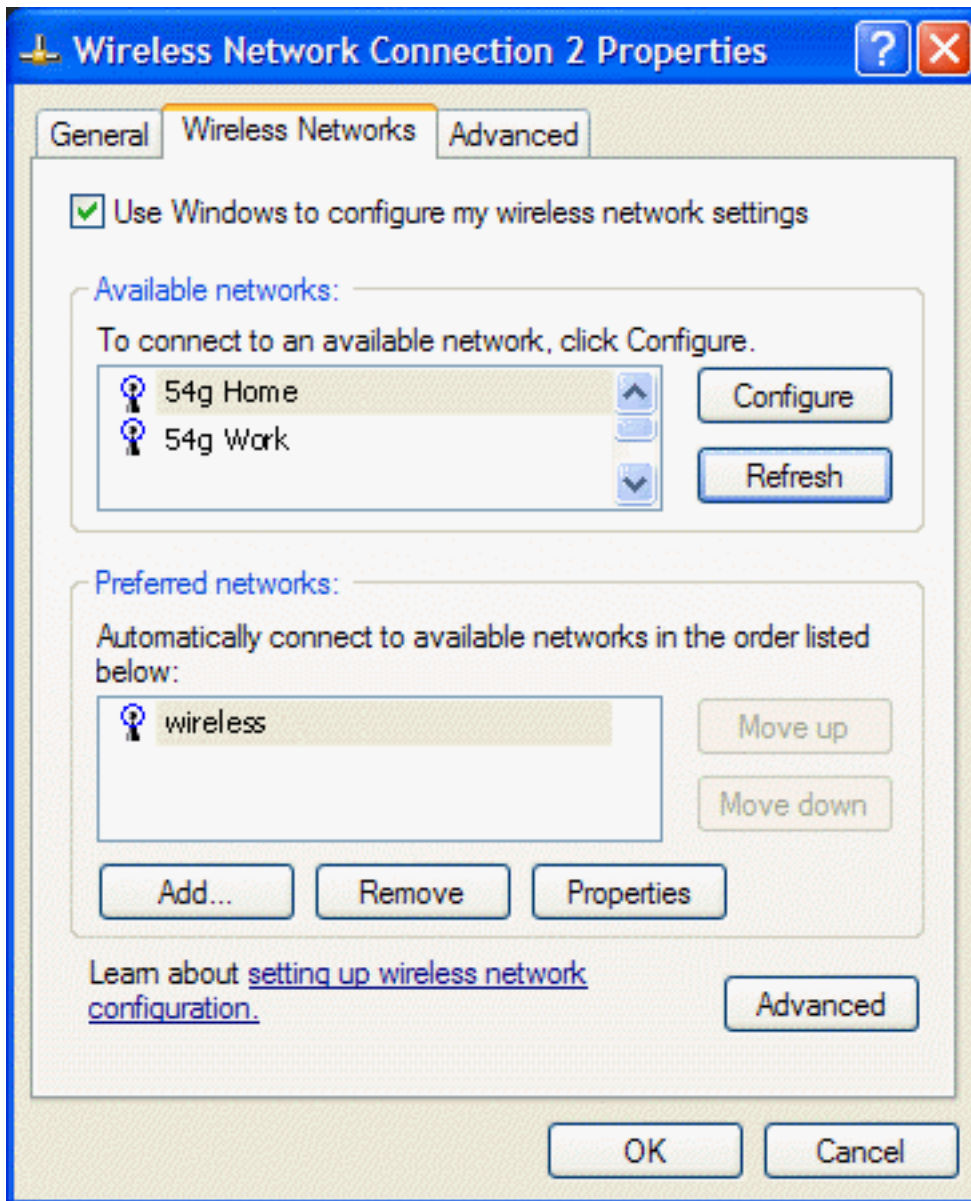8. Click **OK**.

9. Click **Advanced**.

10. Select **Computer-to-computer (ad hoc) networks only**, and click **Close**.

11. Click **OK**. The added ad hoc network appears at the top of the list under **Preferred networks**.

12. To verify that the computer is connected to the added ad hoc network, reopen the **Network Properties** window and click the **Wireless Networks** tab. The computer is connected to the added network when a blue bubble appears on top of the icon for the ad hoc network.

Adding an Ad Hoc Network That Requires a WEP Key

1. Click **Start**, then click **Control Panel**.
2. Click **Wireless Network Connection**, then click **Change settings of this connection**.
3. Click the **Wireless Networks** tab.
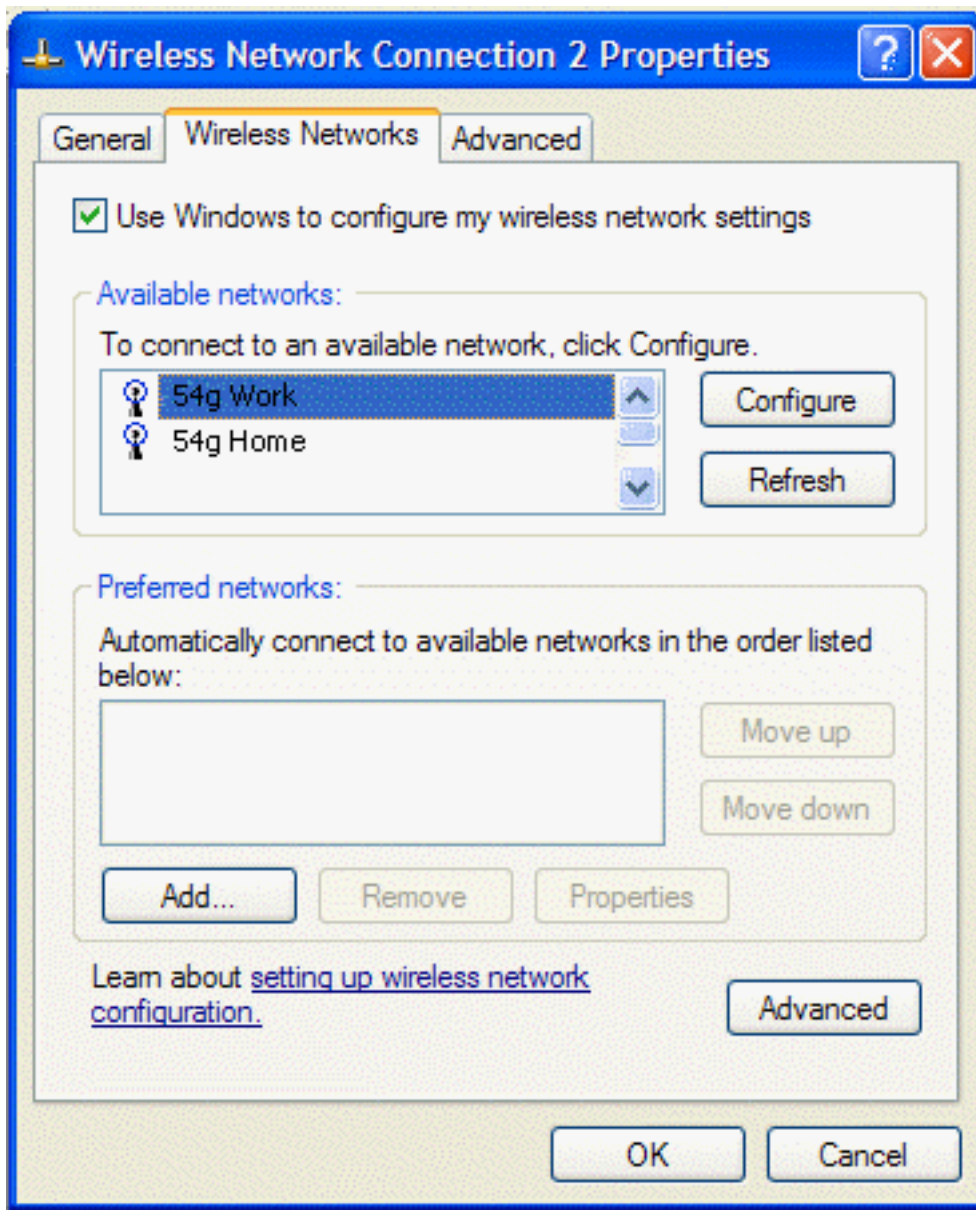
4. Verify that the **Use Windows to configure my wireless network settings** box is selected. If it is not, select it.
5. Click **Add**.
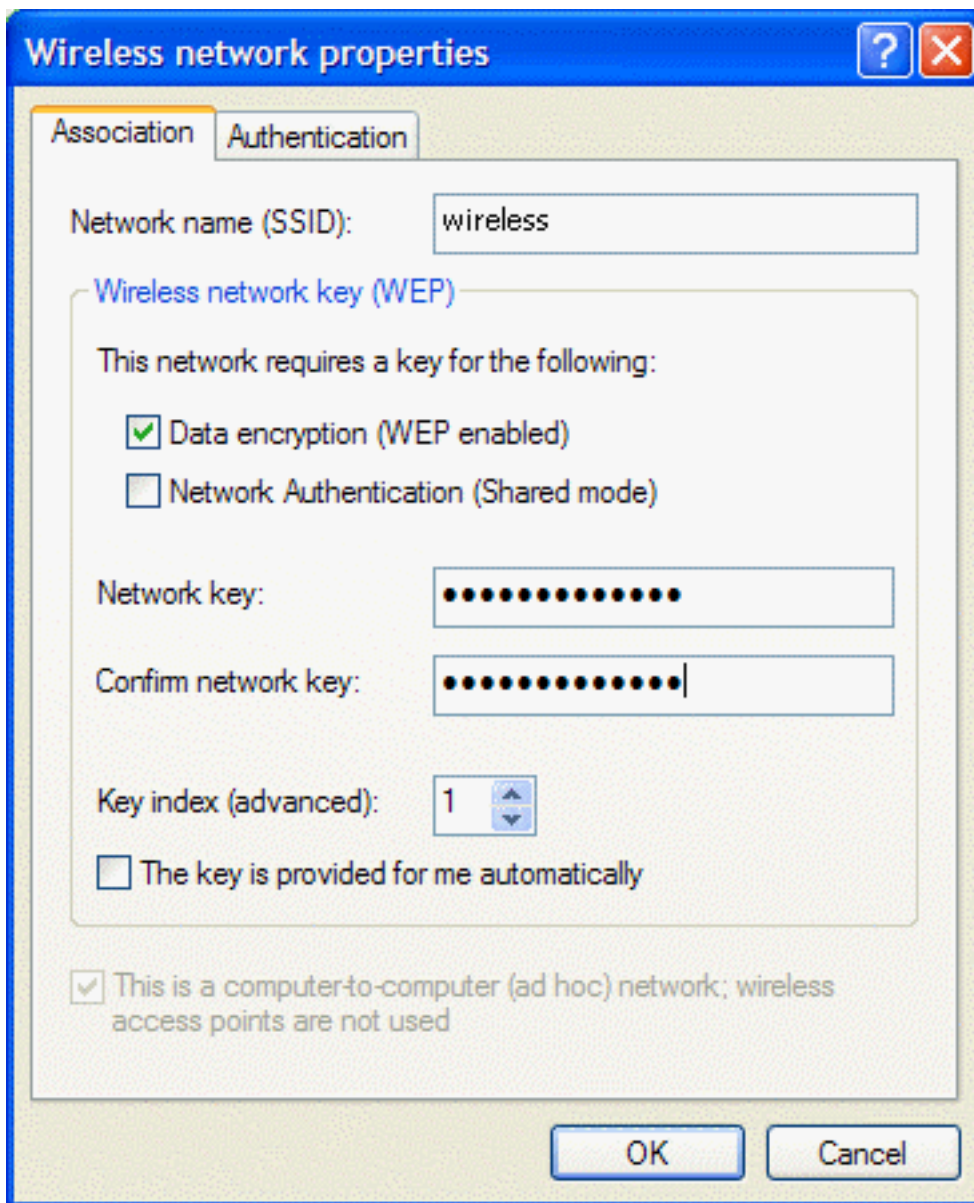
6. Select the **Data encryption (WEP enabled)** box.
7. Type the network name in the **Network name (SSID)** box and again in the **Confirm network key box**.
8. Clear the **The key is provided for me automatically** box.
9. Type the network key in the **Network key** box.

NOTE—It is not necessary to select the **Key format** or the **Key length** before typing the network key. These settings automatically change to the appropriate setting as the network key is typed.

10. Select the **This is a computer-to-computer (ad hoc) network; wireless access points are not used** box.
11. Click **OK**.
12. Click **Advanced**
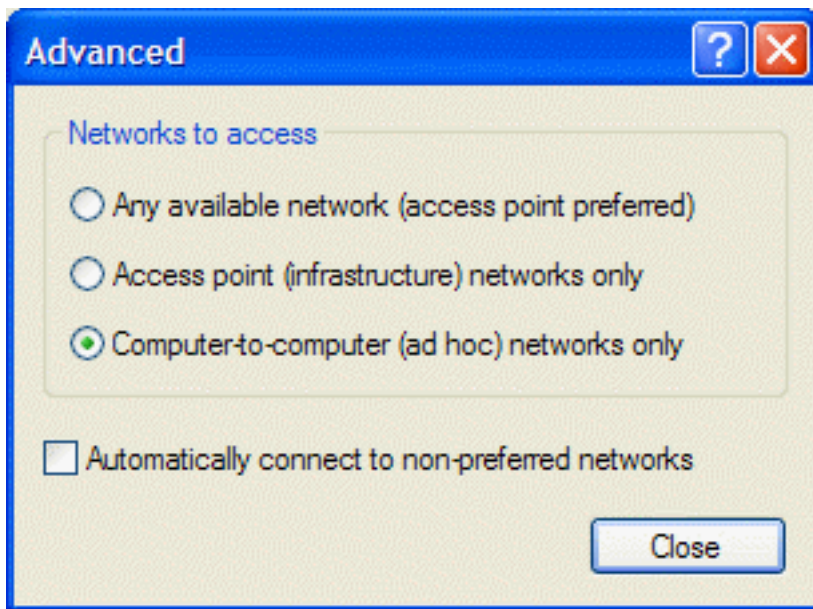
13. Select **Computer-to-computer (ad hoc) networks only**, and click **Close**.
14. Click **OK**. The added ad hoc network appears at the top of the list under **Preferred networks**.
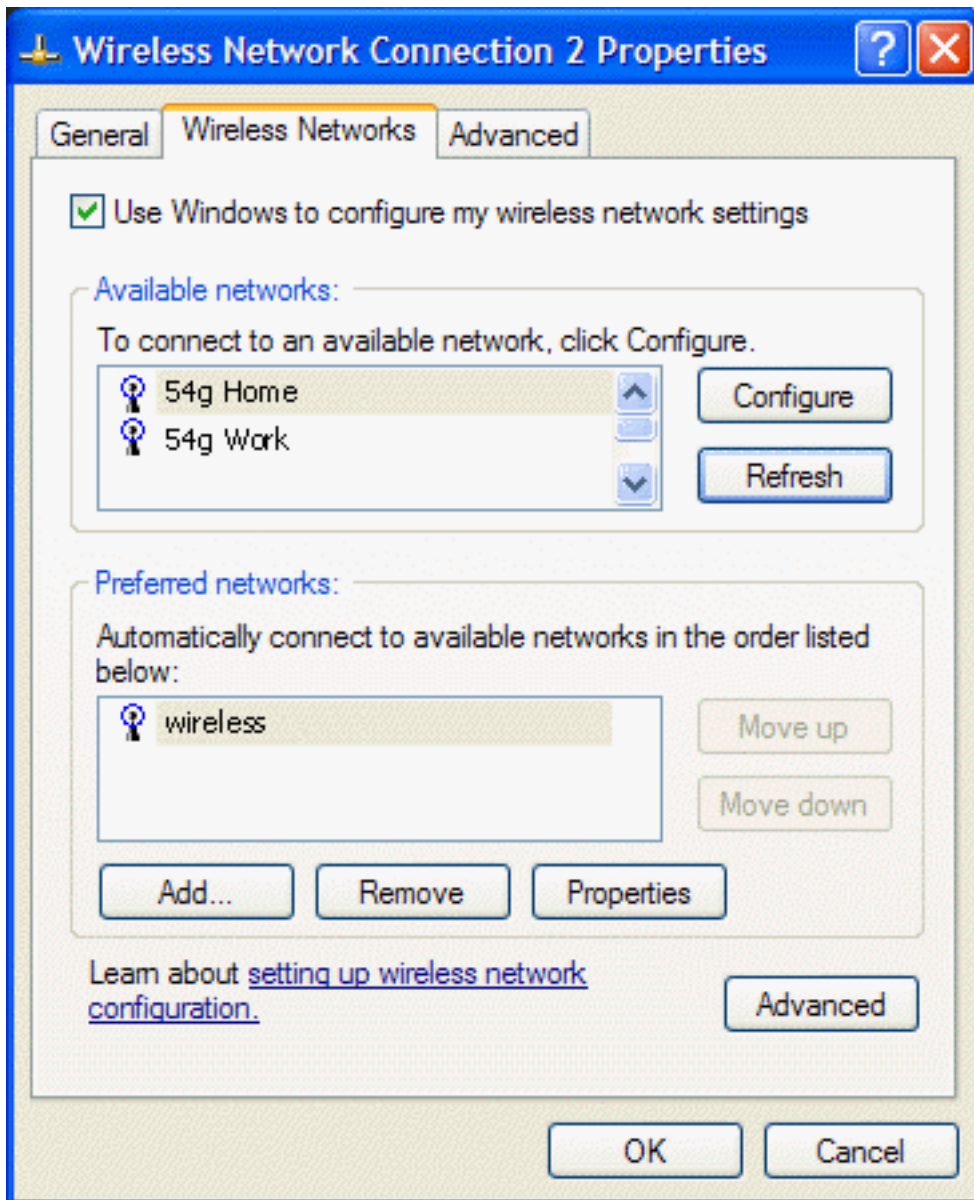
15. To verify that the computer is connected to the added ad hoc network, reopen the **Network Properties** window and click the **Wireless Networks** tab. The computer is connected to the added network when a blue bubble appears on top of the icon for that network.

Disabling the Radio

- To disable the radio on the *Company* **54g** enabled notebook, right-click the wireless network connection icon in the system tray and click **Disable**.

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Operational Information

Wireless Interoperability

The **Integrated 802.11g** enabled notebook is 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 Std 802.11g-2002. Draft standard on 2.4 GHz Wireless LAN

Safety

The **Integrated 802.11g** enabled notebook, like other radio devices, emits radio frequency electromagnetic energy. The level of energy emitted by this devices, however, is less than the electromagnetic energy emitted by other wireless devices such as mobile phones. The **Integrated 802.11g** enabled notebook operates 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 **Integrated 802.11g** enabled notebook 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 **Integrated 802.11g** enabled notebook onboard airplanes, or
- Using the **Integrated 802.11g** enabled notebook 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 airplane, for example), ask for authorization to use the **Integrated 802.11g** enabled notebook before turning it on.

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: 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 étre 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 empecher que cet appareil cause du brouillage au service faisant l'objet d'une licence, il doit etre utilize a l'interieur et devrait etre place loin des fenetres afin de Fournier un ecram de blindage maximal. Si le matriel (ou son antenne d'emission) est installe a l'exterieur, il doit faire l'objet d'une licence.

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 $C \epsilon$ 0984 $\textcircled{!}$ 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 301 489-17 - 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 $\textcircled{!}$ 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

Taiwan DGT warning statement

低功率電波輻性電機管理辦法
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。

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.