



# **Compaq 802.11b WLAN Mini PCI User Manual**

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# **Chapter 1    About the Wireless Mini PCI Card**

## **1-1 Introduction**

The Compaq 802.11b Mini PCI card allows you to access wireless Local Area Networks, share a local printer and files with others in your network, access the Internet, and roam about the office—wire-free. This wireless Local Area Network solution is designed for both large and small businesses, and it is scalable so that you can add users and new network features as your networking needs grow.

## **1-2 Using a Wireless Local Area Network**

This product is a Local Area Network (LAN) device. A LAN is composed of two or more computers that are connected to each other in order to share files or common equipment such as a printer or a modem. 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 a tablet PC with a Compaq 802.11b Mini PCI card, you can roam from a conference room to an office without being disconnected from the network.

## **1-3 Features and Requirements**

An 802.11b based wireless LAN includes the following features:

- Support for the IEEE 802.11b standard
- 2.4-GHz band operation
- Network data rate up to 11 Mbps
- Wired Equivalent Privacy (WEP) encryption

To participate in a wireless LAN, you need the following items:

- Compaq 802.11b Mini PCI card
- Software CD containing application, drivers, software reference guide, and help file
- A tablet PC with a Mini PCI Type III slot, a CD drive, and Microsoft Windows XP Tablet Edition.

The Compaq 802.11b Mini PCI card is Wi-Fi (Wireless Fidelity) certified and will work with any other Wi-Fi certified base station or wireless client adapter.

## **Chapter 2   Network Configuring and Planning**

A wireless LAN can be configured for two different modes of operation. While each method has its advantages, one may be better suited for your needs. Review the following configurations to determine which mode is best for you.

- Peer-to-Peer Network
- Base Station Network

### **2-1 Peer-to-Peer Network**

A Peer-to-Peer network is also called an “ad hoc” network. This mode is the easiest to deploy and is ideal for small offices. As a user on this type of network, you are able to share files with other employees, print to a shared office printer, and access the Internet through a shared modem. However, with peer-to-peer networking, your computer is only able to communicate with other wireless clients that are within a certain range and in your 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 in a certain range

## 2-2 Base Station Network

A Base Station network is also called an “infrastructure” network. The key difference between a wireless Base Station network and a peer-to-peer network is the addition of one extra element—the base station or access point. Additionally, the wireless Base Station can provide access to an existing wired LAN. This link allows computers on the infrastructure wireless LAN to access the other wired LAN’s resources and tools, including Internet access, electronic mail delivery, file transfer, and printer sharing.

### Characteristics

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

### 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 you move throughout the building, the Compaq 802.11b WLAN Mini PCI card 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 electronic mail and the Internet.

### Disadvantages

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

### Requirements

One base station, such as the:

- WL310 Wireless Home Office Gateway
- WL410 Wireless SMB Access Point
- WL510 Wireless Enterprise Access Point

## Chapter 3 Wireless Utility and Configuration

### 3-1 Configuring the Compaq 802.11b Mini PCI Card in Microsoft Windows XP Tablet Edition

The Compaq 802.11b Mini PCI software consists of the Windows XP Tablet Edition device drivers. Configuration information and troubleshooting in Windows XP Tablet Edition is available in Microsoft's Help and Support Center on Windows XP systems. Links to the appropriate Microsoft Web sites are also available here.

To access this information:

1. From the Start menu, select **Control Panel**.
2. Click **Network and Internet Connections**.
3. Click **Network Connections**.
4. Right-click the connection for your Compaq 802.11b Mini PCI device, and select **Properties**.
5. From the General tab, click the **Configure** button.
6. From the General tab, click the **Troubleshoot** button.

When the Help and Support Center window appears, you can access information regarding the network adapter. To access configuration information of your adapter, follow the on-screen instructions. For the network adapter to function in a wireless LAN, you must change the settings at least once.

## 3-2 Configuring Your Wireless Networking Settings

After the Compaq 802.11b Mini PCI card has been configured, set up the wireless settings in Windows XP Tablet Edition. Configuration information and troubleshooting in Windows XP Tablet Edition is available in Microsoft's Help and Support Center on Windows XP systems. Links to the appropriate Microsoft Web sites are also available here.

To access this information:

1. From the Start menu, select **Control Panel**.
2. Click **Network and Internet Connections**.
3. Click **Network Connections**.
4. Right-click the connection for your Compaq 802.11b Mini PCI device, and select **Properties**.
5. Click on the **Wireless Networks** tab.
6. Click on the link Setting Up Wireless Network Configuration.

When the Help and Support Center window appears, you can access information regarding wireless network configuration. To access configuration information of your adapter, follow the on-screen instructions.



### 3-3 Wireless LAN Activity Light

There is a wireless LAN activity light on computers that support the Compaq 802.11b WLAN Mini PCI card. Once the Compaq 802.11b WLAN Mini PCI card and drivers are installed, the wireless LAN activity light provides quick feedback to the user on the current status of the wireless LAN. On the tablet PC, look for the wireless LAN icon (shown below) to identify this light. You may also refer to the *Hardware Guide* included with the tablet PC.

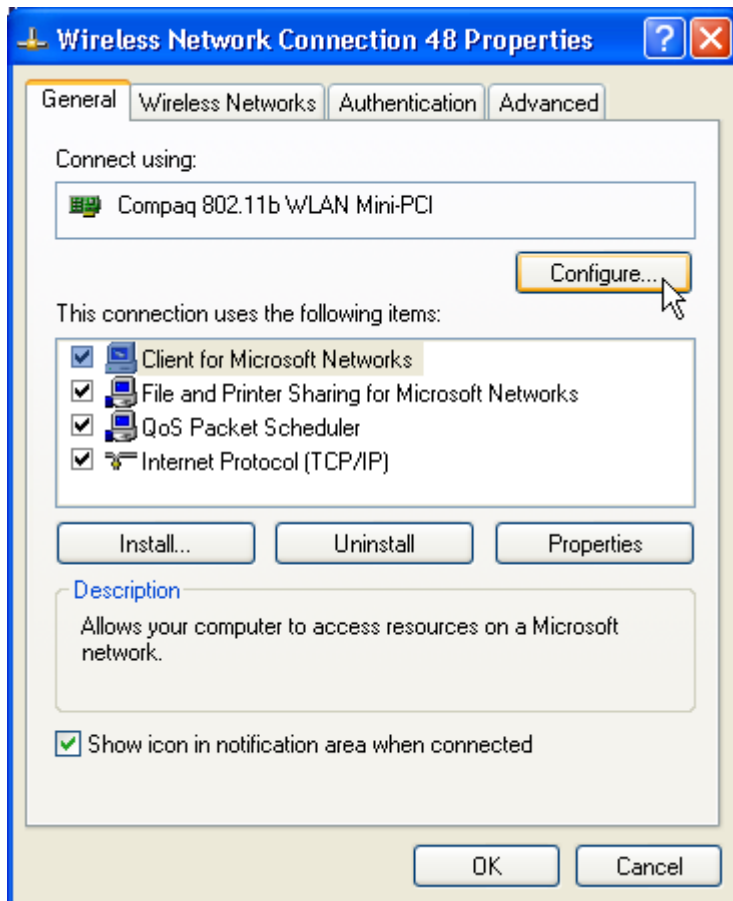


Light status definitions:

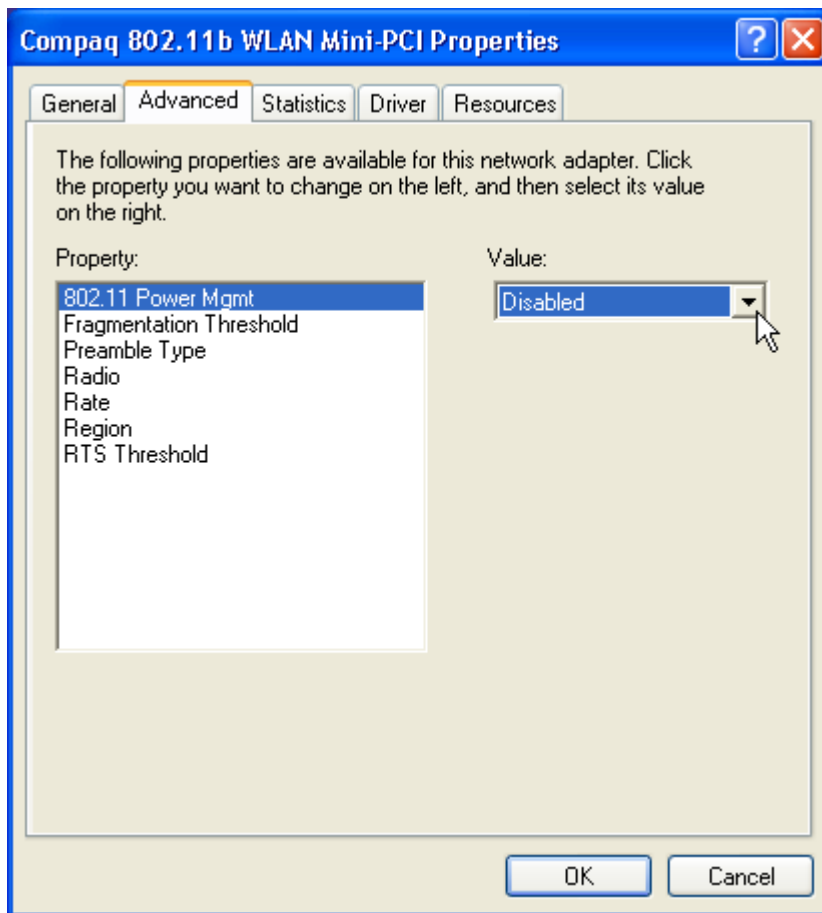
- Light flashing:                      Access Point search mode
- Light on:                              Active link
- Light off:                              Radio power off

### 3-4 Advanced Network Property Page

You can configure the advanced wireless settings by clicking the **Configure** button in the **General** tab from the Wireless Network Connection Properties window shown below.



The following window shows the content of **Advanced** tab:



You can configure these advanced settings as described below.

### 802.11 Power Management

This property controls whether 802.11 power management is used. If power management is set on, the Compaq 802.11b WLAN Mini PCI card operates in a power saving mode.

- **Disabled:** Disable 802.11 power management. Default setting.
- **Enable:** Enable 802.11 power management.

### Fragmentation Threshold

This attribute specifies the current maximum size, in octets, of data that may be delivered to the wireless network at once. A frame is broken into fragments if its size exceeds the value of this attribute. Lower fragmentation thresholds can increase throughput in areas where high interference is encountered. Higher fragmentation thresholds can increase data throughput if there is little interference. The default value of this attribute is **2346**. The minimum value is 256.

## Preamble Type

The preamble type property controls the length of the preamble. The type of preamble allows the user to trade off compatibility with pre-802.11b wireless LAN cards for some transmit throughput increase on 802.11b wireless LANs. Set preamble type:

- **Short:** Only compatible with 802.11b wireless LAN networks. Allows faster transmittal of data on 802.11b wireless LAN networks.
- **Long:** Compatible with 802.11b and pre-802.11b wireless LAN networks.
- **Auto:** Automatically choose short or long preamble type. Default setting.

## Radio

Set this attribute to control your radio emissions. Some situations may require you to turn off your Compaq 802.11b WLAN Mini PCI radio. Flying on an airplane is one example where the radio is required to be turned off.

- **On:** Card can transmit and receive signals. Default setting.
- **Off:** Card cannot transmit and receive signals.

## Rate

Sets transmit rate of the Compaq 802.11b WLAN Mini PCI card. Setting a fixed rate will force the card to connect at only that speed to other 802.11b and pre-802.11b clients or access points. Setting the speed to Auto allows the card to automatically select the optimum transmit rate based on the capabilities of the other clients and access points.

- **Fixed 1 Mbps:** Set transmit rate to 1 Mbps.
- **Fixed 2 Mbps:** Set transmit rate to 2 Mbps.
- **Fixed 5.5 Mbps:** Set transmit rate to 5.5 Mbps.
- **Fixed 11 Mbps:** Set transmit rate to 11 Mbps.
- **Auto:** Set transmit rate to auto adjustment. Default setting.

## **Region**

Configures the Compaq 802.11b WLAN Mini PCI card for compliance in the listed regions. The region setting must match the region you are in for your card to interoperate with local equipment and to comply with local laws and regulations.

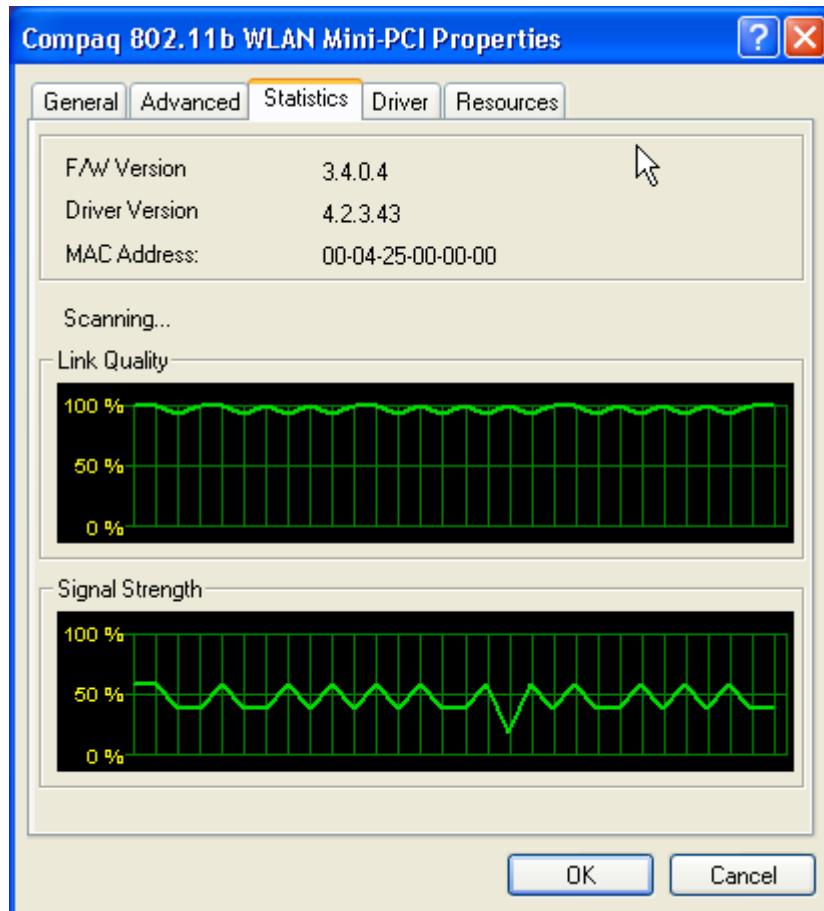
- **Canada**
- **Europe (except France)**
- **France**
- **Japan**
- **Japan (MKK1):** also known as TELEC.
- **USA**

## **RTS Threshold**

Setting this attribute turns on RTS/CTS handshake for frames of Data or Management type transmitted by the Compaq 802.11b WLAN Mini PCI card. When a data packet to transmit is greater than or equal to the RTS Threshold, the card will use a RTS/CTS handshake before sending the data packet. The default value of this attribute is **2347**.

### 3-5 Statistics Properties

You can obtain more information from the **Statistics** tab in the window shown below.



It includes the following information.

#### **Firmware version**

Displays the current firmware version of the Compaq 802.11b WLAN Mini PCI card.

#### **Driver version**

Displays the current driver version for the Compaq 802.11b WLAN Mini PCI card.

**MAC address**

Display the MAC address of your Compaq 802.11b WLAN Mini PCI card.

**Associated BSSID**

Displays the MAC address of the access point that your card is currently associated.

**Link Quality**

Indicates the condition of the current wireless link. The higher the quality, the better the throughput.

**Signal Strength**

Indicates the signal strength with respect to the current connected access point. In general, you will get stronger signal strength when you are closer to the associated access point.

# Appendix A Specifications for the Compaq 802.11b WLAN Mini PCI Card

## Physical Specifications

Dimensions	(L × W × H)	59.6mm × 50.8mm × 4.8mm
Weight	14.2 gram	
Temperature and Humidity (non condensing)		
Operation	10 to 49 °C	Maximum humidity 90%
Transit (shipping)	-30 to 70 °C	Humidity 5 to 90%
Storage	-20 to 60 °C	Humidity 5 to 90%

## Power Characteristics

Standby mode	68 mA
Receive mode	270 mA (Nominal)
Transmit mode	550 mA (Nominal)
Power supply	3.3 V

## Networking Characteristics

Compatibility	<ul style="list-style-type: none"><li>• IEEE 802.11 Standard for Wireless LANs (DSSS)</li><li>• Wi-Fi (Wireless Fidelity) certified by the Wireless Ethernet Compatibility Alliance (WECA)</li><li>• Mini PCI specification</li></ul>
Host operating system	<ul style="list-style-type: none"><li>• Microsoft Windows XP Tablet Edition</li></ul>
Media Access Protocol	CSMA/CA (Collision Avoidance) with Acknowledgement (ACK)



## Regulatory Information

Wireless communication is often subject to local radio regulations. Although wireless networking products have been designed for operation in the license-free 2.4 GHz band, local radio regulations may impose a number of limitations to the use of wireless communication equipment.

### Radio Characteristics

R-F frequency band	2.4 GHz (2412-2472 MHz)		
Sub-channels	1	2412	
	2	2417	
	3	2422	
	4	2427	
	5	2432	
	6	2437	
	7	2442	
	8	2447	
	9	2452	
	10	2457	
	11	2462	
	12	2467	ETSI approved countries and Japan only
	13	2472	
	14	2484	
Spreading	11-chip Barker Sequence, DQPSK, DBPSK and CCK		
Bit Error Rate (BER)	Better than 8%		
Nominal output power	16 dBm		
Encryption	128-bit (RC4), also supports 64-bit RC4/WEP (Wired Equivalent Privacy)		

The range of the wireless signal is related to the Transmit Rate of the wireless communication. Communications at lower Transmit Rates will travel larger distances.

- The range of your wireless devices can be affected when the antennas are placed near metal surfaces and solid high-density materials.
- Range is also impacted due to “obstacles” in the signal path of the radio that may either absorb or reflect the radio signal.

# Appendix B Troubleshooting

## Using the World Wide Web

Support services are available on the Internet through the Compaq support forum. You can either browse the postings as a guest, or register as a user and submit your own questions. Compaq responds to questions within one business day. To access the Compaq support forum, go to the Compaq Web site at <http://www.compaq.com>.

## Preparing to Call Technical Support

If you cannot solve a problem using the troubleshooting tips in this section, you may need to call technical support. To receive the fastest possible solution when you call, run the tablet PC diagnostics utility. Refer to your computer documentation for information on running diagnostics. Refer to the *Worldwide Telephone Numbers* booklet included with the tablet PC for information about contacting a Compaq authorized dealer, reseller, or service provider. Have the following information available before calling Compaq:

- Applicable error messages
- Add-on options
- Operating system
- Third-party hardware or software
- Detailed questions
- Technical Support Registration number, if you have previously called Compaq Technical Support for assistance with your product (this number is assigned to you the first time you call Technical Support).

## Problem Solving

### *1. My computer does not recognize the wireless network card.*

Solutions:

- Ensure that the wireless network card has been inserted into the Mini PCI slot.
- Ensure the antennas are connected.

### *2. The wireless network card does not work properly.*

Solutions:

- Right-click **My Computer** and then choose **Properties** from the menu. Click **Hardware** and then the **Device Manager** tab from the System Properties window and click Network Adapter from the list. “Compaq 802.11b WLAN Mini PCI” will be listed if it is installed successfully. If you see a Yellow Question Mark in front of the

wireless network card, then the wireless card is not properly installed. Perform the following steps:

- Check and make sure that you have inserted the right card and have installed the proper driver.
- Remove the driver and install it again. Then reboot your computer.
- Confirm that the workstation and the wireless network are configured with the same SSID.

### ***3. I cannot connect to one of the users in the network.***

Solutions:

- Make sure each network client is up and running.
- Make sure your Network Name (SSID) settings are correct.
- Make sure your WEP settings are correct.
- Move your computer closer to the base station or other network client.
- Make sure the network client you need to reach is within range, or within range of an access point.
- Make sure the network settings are correct for your local area network.
- On a tablet PC, the Compaq 802.11b Mini PCI radio may not be enabled. Go to Device Manager in Control Panel and open the Compaq 802.11b Mini PCI properties page. Click on the Advanced tab. Verify that the Radio property is set to On.
- Make sure the Wireless LAN Status Light on the tablet PC is solid green.

Contact your network administrator for other networking issues.

## Appendix C Glossary

**Access Point** - An internetworking device that seamlessly connects wired and wireless networks together.

**Ad Hoc** - A peer- to-peer wireless network without Access Point. A group of wireless clients consistent an independent wireless LAN.

**backbone** - The core infrastructure of a network, the portion of the network that transports information from one central location to another central location. The information is then off-loaded onto a local system.

**BSS** - Basic Service Set. An Access Point associated with several wireless stations.

**ESS** - Extended Service Set. More than one BSS can be configured as an Extended Service Set. An ESS is basically a roaming domain.

**ESSID** –Extended Service Set Identifier. The length of the ESSID information is between 0 and 32 octets. A 0 length identifier indicates the broadcast SSID.

**Ethernet** - A popular local area data communications network, originally developed by Xerox Corp., which accepts transmission from computers and terminals. Ethernet operates on 10/100 Mbps transmission rate over shielded coaxial cable or over shielded twisted pair telephone wire.

**infrastructure** - An integrated wireless and wired LAN is called an infrastructure configuration.

**Roaming** - A function that allows one to travel with a mobile end system (wireless LAN mobile station, for example) through the territory of a domain (an ESS, for example) while continuously connecting to the infrastructure.

**SSID** – Same as ESSID.

**WEP** –Wired Equivalent Privacy. The optional cryptographic confidentiality algorithm specified by IEEE 802.11 used to provide data confidentiality that is subjectively equivalent to the confidentiality of a wired local area network (LAN) medium that does not employ cryptographic techniques to enhance privacy.

## **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: To assure continued compliance, (example - use only shielded interface cables when connecting to computer or peripheral devices) 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.

## **Statement Needed to be Shown on End Product**

Since this module is installed inside the end product, the end product should be affixed a label on visible area showing that this product contain a RF module, and also its FCC ID.

## **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.

## **Warning**

- This equipment must be installed and operated in accordance with provided instructions and a minimum 20 cm spacing must be provided between computer mounted antenna and person's body (excluding extremities of hands, wrist and feet) during wireless modes of operation.
- Optional vehicle mounted antenna must not exceed 5.11 dBi antenna gain and should be professionally installed.
- 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.

## **CAUTION**

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