# Installation Guide for the Model WG511 802.11g Wireless PC Card



# NETGEAR

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## **Technical Support**

Please refer to the support information card that shipped with your product.

By registering your product at <u>www.NETGEAR.com/register</u>, we can provide you with faster expert technical support and timely notices of product and software upgrades.

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# Chapter 1 Introduction

This chapter introduces the features, package contents, and appearance of the NETGEAR<sup>®</sup> WG511 802.11g Wireless PC Card.

# About the WG511 802.11g Wireless PC Card

The WG511 802.11g Wireless PC Card gives you ultimate mobility in your office or while you are traveling. It frees you from traditional Ethernet wiring and helps you create a wireless network for sharing your broadband cable or DSL Internet access among multiple PCs in and around your home. It is designed for notebook computers running Microsoft<sup>®</sup> Windows<sup>®</sup>. It is both 16-bit PCMCIA and 32-bit CardBus compatible and works in any available PCMCIA or CardBus slot. Its auto-sensing capability allows the highest packet transfer or dynamic range shifting to the lower speeds due to distance or operating limitations in an environment with a lot of electromagnetic interference.

It provides reliable, standards-based 802.11g LAN connectivity that is protected with industry-standard security. It works with Windows 95B, 98, Me, NT4, 2000, and XP operating systems.

# Key Features and Related NETGEAR Products

The WG511 PC Card provides the following features:

- Reliable IEEE 802.11g standard-based wireless technology.
- Supports roaming between access points when configured in Infrastructure mode.

- 11 Mbps high rate speed. Wireless nodes negotiate to operate in the optimal data transfer rate. In a noisy environment or when the distance between the wireless nodes is far, the wireless nodes automatically fall back to operate at the lower transfer rate of two or one Megabit per second.
- Highest level of data encryption using128-bit Shared Key WEP data encryption method. Lower level of data encryption or no data encryption is available to simplify your network setup or to improve data transfer rate.

The following Netgear products can be configured to communicate with the WG511 PC Card.

- WAB102 Dual Band Access Point
- WAB501 Dual Band PC Card
- MA101 802.11b Wireless USB Adapter
- ME102 802.11b Wireless Access Point
- MA311 802.11b Wireless PCI Adapter
- MR314 802.11b Wireless Cable/DSL Router
- MA701 802.11b Wireless Compact Flash Card

# What's in the Box?

The product package should contain the following items:

- WG511 802.11g Wireless PC Card
- Installation Guide for the Model WG511 802.11g Wireless PC Card
- Model WG511 Resource CD, including:
  - Driver and Configuration Utility Software
  - Reference Guide for the Model WG511 802.11g Wireless PC Card in Adobe Acrobat PDF file format
  - Reference Guide for the Model WG511 802.11g Wireless PC Card in HTML format
- Warranty card
- Support information card

If any of the parts are incorrect, missing, or damaged, contact your NETGEAR dealer. Keep the carton, including the original packing materials, in case you need to return the product for repair.

The WG511 802.11g Wireless PC Card has two interfaces. The PCMCIA Type II connector connects to any notebook PC with an available PCMCIA or CardBus slot. The wireless interface of the WG511 802.11g Wireless PC Card remains outside of the notebook PC chassis when the wireless PC card is inserted into a notebook. The green LED indicates the wireless link condition of the WG511 802.11g Wireless PC Card with another wireless node or the associated access point.

# Chapter 2 Installing the WG511 802.11g Wireless PC Card

This section describes how to set up your WG511 802.11g Wireless PC Card for wireless connectivity on your <u>Wireless Local Area Network</u> (WLAN).

**Note:** Indoors, computers can connect over 802.11 wireless networks at a maximum range of up to 500 feet. With this distance, and because walls do not always block wireless signals, others outside your immediate area could access your network. It is important to take appropriate steps to secure your network from unauthorized access. The WG511 802.11g Wireless PC Card provides highly effective security features which are covered in Section 3 of this manual. Netgear strongly recommends you deploy the security features appropriate to your needs.

# What You Will Need Before You Begin

You need to verify your computer meets the minimum system requirements and identify the wireless network configuration settings of the WLAN where you will connect before you can configure your wireless pc card and connect.

# Verify System Requirements

Before installing the WG511 802.11g Wireless PC Card, please make sure that these minimum requirements have been met:

- You must have a Pentium<sup>®</sup> Class notebook computer with an available PCMCIA or Cardbus slot.
- A CD-ROM drive.
- 5 Mbytes of free hard disk space.
- Some versions of Windows may ask for the original Windows operating system installation files to complete the installation of the WG511 driver software.

# **Observe Location and Range Guidelines**

Computers can connect over 802.11g wireless networks indoors at a maximum range of approximately 500 feet. However, the operating distance or range of your wireless connection can vary significantly based on the physical location of the computer with the WG511 802.11g Wireless PC Card. For best results, avoid potential sources of interference, such as:

- Large metal surfaces
- Microwaves
- 2.4 GHz Cordless phones

In general, 802.11g wireless devices can communicate through walls. However, if the walls are constructed with concrete, or have metal, or metal mesh, the 802.11g effective range will decrease if such materials are between the devices.

# **Two Basic Operating Modes**

The WG511 PC Card, like all 802.11b adapters, can operate in the following two basic modes:

• **Infrastructure Mode:** An 802.11 networking framework in which devices and computers communicate with each other by first going through an <u>access</u> <u>point</u> (AP).

For example, this mode is used when computers in a house connect to an Access Point that is attached to a router which lets multiple computers share a single Cable or DSL broadband Internet connection.

• Ad-Hoc Mode: An 802.11 networking framework in which devices or computers communicate directly with each other, without the use of an AP.

For example, Ad-Hoc Mode is used when two Windows computers are configured with file and print sharing enabled and you want to exchange files directly between them.

Both of these configuration options are available with the WG511 PC Card.

# WG511 Default Wireless Configuration Settings

If this is a new wireless network installation, use the factory default settings to set up the network and verify wireless connectivity. If this is an addition to an existing wireless network, you will need to identify the wireless configuration and security parameters already defined.

**Note:** All NETGEAR, Inc. 802.11 wireless access products use the same factory settings as the WG511 and will work without any configuration changes.

Your WG511 802.11g Wireless PC Card factory default basic settings are:

• Wireless network name Service Set Identification (SSID): Wireless

**Note:** In order for the WG511 PC Card to communicate with a wireless access point or wireless adapter, all devices must be configured with the same SSID.

• Mode (Infrastructure or Ad-Hoc): Infrastructure

# Using the WG511 to Connect to a Wireless Access Point Network in Infrastructure Mode



Figure 2-1: NETGEAR WG511 Wireless PC Card in Infrastructure Mode

This section provides instructions for setting up the WG511 802.11g Wireless PC Card. The procedures below provide step-by-step installation instructions for Windows PCs. Use the procedure that corresponds to the version of Windows you are using.

Use the procedure below that corresponds to the version of Windows you are using.

# For Windows XP Users Installing a WG511



#### Insert the WG511 PC Card into your computer.

- a. Power on your notebook and let the operating system boot up completely.
- b. Insert the Model WG511 Resource CD into your CD-ROM drive.
- c. Locate an available PCMCIA or CardBus slot on the side of your notebook. If your notebook computer has two PCMCIA or CardBus slots, the WG511 802.11g Wireless PC Card can be inserted into either slot.
- d. Hold the PC Card with the Netgear logo facing up and insert it into the PC card slot.



#### Install the WG511 driver and configuration utility software.

- a. A Found New Hardware Wizard is displayed. Select Install the software automatically (Recommended) and then click Next.
- b. Windows XP looks into the CD-ROM for the necessary software to be installed. The wizard will automatically install both the driver and the configuration utility onto the hard drive.
- c. After the installation completes, click **Finish** to close the wizard.
- d. After installing the WG511, Windows XP will display a "Wireless Network Connection #" message.
- e. Click on the **X** to close this message.
- f. You should see the WG511 system tray icon on the right in the lower right portion of the Windows task bar.



Windows XP Add New Hardware Wizard



Windows XP Wireless Network Connection Alert

**Note:** The Netgear and Windows XP utilities let you set up your WG511. The Netgear installation utility defaults to turning off the Windows XP utilities. You cannot use both at the same time. The Netgear screens are presented in step 3 below.



WG511 LAN Configuration Utility System Tray Icon



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# Configure your wireless adapter.

- a. The WG511 default settings are as follows:
  - SSID: Wireless
  - Mode (Infrastructure or Ad-Hoc): Infrastructure
  - WEP encryption not enabled.
- b. Click on the System Tray icon to run the wireless LAN configuration utility to verify your settings

**Note:** If your WLAN settings are different from the Netgear default settings, you will not connect. Set up your WG511 accordingly.

Profile Name	Default		
Network Mode	Infrastructure (Access Point)		
<u>s</u> sid	Wireless	•	
<u>I</u> x Rate	Fully Automatic		
<u>C</u> hannel	1 3		
	<u>R</u> estore Defaults		

WG511 Configuration Utility

#### Verify wireless connectivity to your network.

The WG511 has an LED labeled LINK that indicates the wireless link condition of the station. Solid green indicates a good connection. Blinking indicates attempting to connect. Off indicates the card is turned off or not fully plugged in.

Verify connectivity by accessing the Internet or network resources.

**Note:** If you are unable to connect, see "Troubleshooting Tips" on page 20. Also, for problems with accessing network resources, the Windows Client and File and Print Sharing software might not be installed and configured properly on your computers. Please refer to "Preparing Your PCs for Network Access" on page 39 of the Reference Manual on the *Model WG511 Resource CD*.

## For Windows 98/Me Users Installing a WG511

#### Insert the WG511 PC Card into your computer.

- a. Power on your notebook and let the operating system boot up completely.
- b. Have the Windows 98 or Me operating system installation files handy. Windows 98/Me needs these files to complete the creating and installation of new network adapter hardware drivers.

**Note:** The MA401 driver supports Windows 95/B and above. Windows 95 and Windows 95A are not supported.

#### c. Insert the Model WG511 Resource CD into your CD-ROM drive.

- d. Locate an available PCMCIA or CardBus slot on the side of your notebook. If your notebook computer has two PCMCIA or CardBus slots, the WG511 802.11g Wireless PC Card can be inserted into either slot.
- e. Hold the PC Card with the Netgear logo facing up and insert it into the PC card slot.

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#### Install the WG511 driver and configuration utility software.

- a. After inserting the WG511 802.11g Wireless PC Card, the Windows 98/Me Add New Hardware Wizard is displayed. Click **Next**, select **Search for the best driver for your device** (**Recommended**) and click **Next** again.
- b. Windows 98/Me prompts for the location of the driver. Click the CD-ROM drive box and click **Next** to proceed. The wizard will install both the driver and the configuration utility. If Windows requests the Windows operating system files, insert the Windows 98/ Me CD and follow the prompts to proceed.
- c. After the installation completes, click **Finish**.
- d. Click **Yes** when asked if you want to reboot the system.
- e. You should now see the Windows system tray icon on the right in the lower right portion of the Windows task bar.

# Add New Hardware Wizard Windows has found the following new hardware: NETGEAR MA401RA Wireless PC-Card Windows can automatically search for and install software this support your hardware (Nour hardware) Windows can automatically search for and install software this support your hardware (Nour hardware) Windows can automatically search for a better driver (Recommended) Specify the location of the driver (Advanced) Katol Katol

Windows 98/Me Add Hardware Wizard



WG511 LAN Configuration Utility System Tray Icon



# Configure your wireless adapter.

- a. The WG511 default settings are as follows:
  - SSID: Wireless
  - Mode (Infrastructure or Ad-Hoc): Infrastructure
  - WEP encryption not enabled.
- b. Click on the System Tray icon to run the wireless LAN configuration utility to verify your settings

**Note:** If your WLAN settings are different from the Netgear default settings, you will not connect. Set up your WG511 accordingly.

Profile Name	Default		
Network Mode	Infrastructure (Access Point)		
<u>s</u> sid	Wireless	•	
<u>I</u> x Rate	Fully Automatic		
<u>C</u> hannel	1 🗄		
	<u>R</u> estore Defaults		

WG511 Configuration Utility

#### Verify wireless connectivity to your network.

The WG511 has an LED labeled LINK that indicates the wireless link condition of the station. Solid green indicates a good connection. Blinking indicates attempting to connect. Off indicates the card is turned off or not fully plugged in.

Verify connectivity by accessing the Internet or network resources.

**Note:** If you are unable to connect, see "Troubleshooting Tips" on page 20. Also, for problems with accessing network resources, the Windows Client and File and Print Sharing software might not be installed and configured properly on your computers. Please refer to "Preparing Your PCs for Network Access" on page 39 of the Reference Manual on the *Model WG511 Resource CD*.

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## For Windows 2000 Users Installing a WG511

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#### Insert the WG511 PC Card into your computer.

- a. Power on your notebook and let the operating system boot up completely.
- b. Have the Windows 2000 operating system installation files handy. Windows 2000 needs these files to complete the creating and installation of new network adapter hardware drivers.
- c. Insert the Model WG511 Resource CD into your CD-ROM drive.

**Note**: You may need to be logged on to Windows 2000 with administrator rights to complete the installation of new hardware to your PC.

- d. Locate an available PCMCIA or CardBus slot on the side of your notebook. If your notebook computer has two PCMCIA or CardBus slots, the WG511 802.11g Wireless PC Card can be inserted into either slot.
- e. Hold the PC Card with the Netgear logo facing up and insert it into the PC card slot.



#### Install the WG511 driver and configuration utility software.

- a. After inserting the WG511, the Windows Found New Hardware Wizard is displayed. Click **Next**, select **Search for the best driver for your device** (**Recommended**) and the click **Next** again.
- b. When Windows 2000 prompts for the location of the driver software, select the CD-ROM drive. Clicking Next to proceed.
- c. If Windows 2000 warns about a Digital Signature Not Found, click **Yes** to continue. Netgear has tested the WG511 to assure that it is compatible with Windows 2000. If requested, insert the Windows 2000 CD and follow the prompts to proceed.
- d. Click **Finish** to close the wizard. Click **Yes** to reboot the system.
- e. You should now see the Windows system tray icon in the Windows task bar.



#### Windows 2000 Found New Hardware Wizard



#### Digital Signature Not Found



WG511 LAN Configuration Utility System Tray Icon



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# Configure your wireless adapter.

- a. The WG511 default settings are as follows:
  - SSID: Wireless
  - Mode (Infrastructure or Ad-Hoc): Infrastructure
  - WEP encryption not enabled.
- b. Click on the System Tray icon to run the wireless LAN configuration utility to verify your settings

**Note:** If your WLAN settings are different from the Netgear default settings, you will not connect. Set up your WG511 accordingly.

Profile Name	Default		
Network Mode	Infrastructure (Access Point)		
<u>s</u> sid	Wireless	•	
<u>I</u> x Rate	Fully Automatic		
<u>C</u> hannel	1 🗄		
	<u>R</u> estore Defaults		

WG511 Configuration Utility

#### Verify wireless connectivity to your network.

The WG511 has an LED labeled LINK that indicates the wireless link condition of the station. Solid green indicates a good connection. Blinking indicates attempting to connect. Off indicates the card is turned off or not fully plugged in.

Verify connectivity by accessing the Internet or network resources.

**Note:** If you are unable to connect, see "Troubleshooting Tips" on page 20. Also, for problems with accessing network resources, the Windows Client and File and Print Sharing software might not be installed and configured properly on your computers. Please refer to "Preparing Your PCs for Network Access" on page 39 of the Reference Manual on the *Model WG511 Resource CD*.

# Using the WG511 to Connect in Ad-Hoc Mode



#### Figure 2-2: NETGEAR WG511 Wireless PC Card in Ad-Hoc Mode

Ad-Hoc Mode is an 802.11 networking framework in which devices or computers communicate directly with each other, without the use of an access point. For example, Ad-Hoc Mode is used when two Windows computers are configured with file and print sharing enabled and you want to exchange files directly between them. To use the Ad-Hoc mode, install the WG511 following the instructions above for your version of the Windows operating system. However, select Ad-Hoc mode instead of Infrastructure mode. Otherwise all the other settings would be the same. Again, unless both computers are configured to operate in Ad-Hoc mode, you will not be able to connect.

# **WG511 Wireless Connection Indicators**

The WG511 802.11g Wireless PC Card provides the following two indicators which give you feedback on the status of your wireless connection:

- The green LED on the WG511 802.11g Wireless PC Card indicates the wireless link condition of the MA401 Wireless PC Card with another wireless node or associated access point.
- The SysTray icon is on the System Tray portion of the taskbar in the Microsoft Windows desktop. The color of this icon indicates the status of the wireless connection.

## Interpreting the LED on the WG511



Figure 2-3: WG511 LED

- If the LED is on, the card is plugged in to the notebook PC.
- If the LED is on and is a steady green, the WG511 has a connection with an access point or another 802.11 device.
- If the LED is blinking, the WG511 is trying to establish a connection but is unable to do so. If the LED is blinking, check your configuration, or try moving to a different location where the wireless signal quality is better.

# Interpreting System Tray Icon Colors

The <u>System Tray</u> (SysTray) resides on one end of the taskbar in the Microsoft Windows desktop. The wireless LAN configuration utility installation for the MA401 Wireless PC Card adds a configuration and status reporting utility icon in the SysTray.



Color	Condition	Description
Red	The wireless PC Card has no connection to any other wireless node.	The wireless PC Card is not able to link to any access point or the link between the wireless PC Card and the access point is lost. Check your configuration or try moving to a location where the wireless signal quality is better.
Yellow	The wireless PC Card has a connection with another wireless node.	The link condition between the wireless PC Card and the associated access point is weak. Try moving to another location where the wireless signal quality is better, such as closer to the wireless access point. Also, look for any possible sources of interference such as a 2.4 GHz cordless phone or a large metal surface.
Green	The wireless PC Card has a connection with another wireless node.	The wireless PC Card has established good communication with an access point and the signal quality is strong.

If you have problems connected to your wireless network, try the tips below.

Symptom	Cause	Solution
The PC Card LED is not lit.	The wireless PC card is not inserted into the slot properly or the proper wireless WG511 802.11g Wireless PC Card software is not loaded.	Remove and reinsert the wireless PC Card. Check the device manager in Windows to see if the PC Card is recognized in the Windows operating system. Reload the driver if necessary. Try to install the WG511 in a different PCMCIA slot on your system if one is available.
The LED is blinking repeatedly.	The wireless PC Card is attempting to connect to access point but cannot connect.	The access point may not be powered on. The access point and the PC card are not configured with the same wireless parameters. Check the SSID and WEP settings.
I can connect to an access point, but I do not see the other computers on the network.	This could be a physical layer problem or a network configuration problem.	Check to make sure that the access point is physically connected to the Ethernet network. Make sure that the IP addresses and the Windows networking parameters are all configured correctly.

# Chapter 3 Protecting Your Wireless Connection

The absence of a physical connection between nodes makes wireless links vulnerable to information theft. This chapter describes how to use the basic security features of the WG511 802.11g Wireless PC Card to protect your connection.

# **Enabling Basic Wireless Security Features**

There are several ways you can strengthen the security of your wireless connection.

- Enable Wired Equivalent Privacy (WEP) encryption of the wireless data communications.
- Change the factory default SSID setting of the WG511 802.11g Wireless PC Card.

In addition to the WG511 wireless security features, you should also configure appropriate LAN network security features such as requiring a user name and password to access the shared resources in your network.

Netgear strongly recommends that, at a minimum, you configure your wireless network to use an SSID other than the default setting. The procedures below identify how to change the SSID and WEP encryption settings of your WG511 802.11g Wireless PC Card.

# Identifying the Wireless Network Name (SSID) and WEP Security Settings

Print this form, fill in the configuration parameters and put it in a safe place for possible future reference. For an existing wireless network, the person who set up the network will be able to provide this information.

• *Wireless Network Name (SSID):* The <u>Service Set Identification</u> (SSID) identifies the wireless local area network. **Wireless** is the default WG511 SSID. You may customize it by using up to 32 alphanumeric characters. Netgear recommends that you write your customized SSID on the line below.

**Note**: The SSID in the wireless access point is the SSID you configure in the wireless pc card. For the access point and wireless nodes to communicate with each other, all must be configured with the same SSID.

Wireless network name (SSID):

• *WEP Security Encryption key:* The default WEP encryption key number is 1, and the default key size is 64 bits.

**Note:** The key number as well as the key value used by both the Wireless Access Point and wireless nodes must be the same. If they are different, you will not be able to connect.

WEP Encryption Key Size, circle one: 64 or 128 bits

WEP Encryption Passphrase, if used: \_\_\_\_\_

A Passphrase is used to automatically generate the WEP hexadecimal numbers for the key. If the wireless network Access Point uses a Passphrase, you can also use that here. Otherwise, you will have to manually enter the hexadecimal numbers.

WEP Hexadecimal Numbers:

The WEP Hexadecimal Numbers are needed if a Passphrase is not used in the wireless network access point but rather if the key is manually entered.

Use the procedures below to configure basic security settings in the WG511.

# Setting the Wireless Network Name (SSID)

These settings must match the settings of the wireless Access Point. Follow the steps below to perform this procedure.

- 1. Run the Config Utility and select the Configuration tab page.
- 2. To change the SSID, enter a new SSID.

Note: The characters are case sensitive.

3. Click Apply or OK for the changes to take effect.

# **Configuring WEP Encryption Security**

Following the steps below to perform this procedure.

- 1. Run the Config Utility and select the Encryption tab page.
- 2. Select the WEP encryption strength you will use. The choices are:
  - 64-bit WEP data encryption
  - 128-bit WEP data encryption

**Note:** Larger encryption keys require more processing and may slow the communications response times.

3. Check the Create with Passphrase radio button and enter the passphrase. Click Apply and the configuration utility automatically generates the WEP keys.

**Note:** The characters are case sensitive. Be sure to use the same passphrase for all the wireless devices in the network.

If the passphrase method is not available in the other devices, you must manually enter the keys to match exactly what is in the access point and other 802.11b wireless devices.

- 4. The Default Key setting must match what is set in the access point and the other 802.11 wireless devices.
- 5. Click Apply then OK for the changes to take effect.

#### Certificate of the Manufacturer/Importer

It is hereby certified that the Model MA401 Wireless PC Card has been suppressed in accordance with the conditions set out in the BMPT- AmtsblVfg 243/1991 and Vfg 46/1992. The operation of some equipment (for example, test transmitters) in accordance with the regulations may, however, be subject to certain restrictions. Please refer to the notes in the operating instructions.

Federal Office for Telecommunications Approvals has been notified of the placing of this equipment on the market and has been granted the right to test the series for compliance with the regulations.

#### VCCI Statement

This equipment is in the Class B category (information equipment to be used in a residential area or an adjacent area thereto) and conforms to the standards set by the Voluntary Control Council for Interference by Data Processing Equipment and Electronic Office Machines aimed at preventing radio interference in such residential areas. When used near a radio or TV receiver, it may become the cause of radio interference. Read instructions for correct handling.

#### Federal Communications Commission (FCC) Compliance Notice: Radio Frequency Notice



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.
- This device must accept any interference received, including interference that may cause undesired operation.

Note: 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 or more of the following measures: (1) Reorient or relocate the receiving antenna, (2) Increase the separation between the equipment and receiver, (3) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected, (4) Consult the dealer or an experienced radio/TV technician for help.

#### Federal Communications Commission (FCC) Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 1 inch (2.5 cm) during normal operation.

#### Canadian Department of Communications Radio Interference Regulations

This digital apparatus (Model MA401 Wireless PC Card) does not exceed the Class B limits for radio-noise emissions from digital apparatus as set out in the Radio Interference Regulations of the Canadian Department of Communications.

# **NETGEA**R<sup>®</sup>

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