TwinMOS

Netkey 802.11b Series

Wireless LAN Adapter

User's Manual

TwinMOS®

Contents

1 PACKAGE CONTENTS

Unpack your *Netkey WLAN adapter* kit and verify that all items are present.

- *Netkey* Wireless LAN Adapter
- User's Manual (on CD)
- Driver (on CD)

If any of the items described appear to be damaged or missing, please contact your reseller.

2 INTRODUCTION

The *Netkey* WLAN adapter is a wireless network client that complies with the IEEE 802.11b standard on wireless LANs. The IEEE 802.11b standards compliance means this adapter gives you the flexibility to connect it to any 802.11b network. The IEEE 802.11b Ethernet standard allows you to connect computers and devices at speeds up to 11Mbps, dependent upon the distance between wireless adapters, the configuration of your working environment, or the capabilities or limitations of your computer systems.

This *Netkey* WLAN Adapter supports following WLAN features

- Automatic transmit data rate select mechanism in the transmit range of 1, 2, 5.5 and 11 Mbps.
- Center frequency channel selection (2.4 GHz)
- Roaming over multiple channels.
- Supports PCMCIA interface
- Supports power save mode
- 128-bit Wired Equivalent Privacy (WEP) data encryption.
- Plug and Play installation

This *Netkey* comes with software drivers for the most popular Microsoft Windows operating systems and can be integrated into a larger network, running Windows XP, Windows 2000, Windows ME, or Windows 98 in either Ad-Hoc mode or infrastructure mode. This manual provides a quick introduction to wireless technology and its application as it relates to networking. Take a moment to read through this manual and familiarize you with wireless technology. You should also give yourself some time to become familiar with your new wireless network.

3 WIRELESS NETWORK OVERVIEW

A wireless local area network (LAN) is a flexible data communications system implemented as an extension to, or as an alternative for, a wired LAN. Using radio frequency (RF) technology, wireless LANs transmit and receive data over the air, minimizing the need for wired connections. Thus, wireless LANs combine data connectivity with user mobility.

A local area network that transmit and receive over the air typically in an unlicensed frequency such as the 2.4GHz band. A wireless LAN does not require lining up devices for line of sight transmission like IrDA. Wireless access points (base stations) are connected to an Ethernet hub or server and transmit a radio frequency over an area of several hundred to a thousand feet which can penetrate walls and other nonmetal barriers. Roaming users can be handed off from one access point to another like a cellular phone system. Laptops use wireless modems that plug into an existing Ethernet port or that are self contained on PC cards, while stand-alone desktops and servers use plug-in cards (ISA, PCI, etc.).

Wireless LANs offer the following productivity, convenience, and cost advantages over traditional wired networks

Mobility

WLAN provide LAN users to access data in any location within the operating range of the WLAN. Ad-hoc management decisions based on real-time information can significantly improve worker efficiency.

Installation Speed and Simplicity

Installing a wireless LAN system can be fast and easy and can eliminate the need to pull cable through walls and ceilings.

Installation Flexibility

Wireless technology allows the network to go where wire cannot go.

Reduced Cost-of-Ownership

While the initial investment required for wireless LAN hardware can be higher than the cost of wired LAN hardware, overall installation expenses and life-cycle costs can be significantly lower. Long-term cost benefits are greatest in dynamic environments requiring frequent moves and changes.

Scalability

Wireless LAN systems can be configured in a variety of topologies to meet the needs of specific applications and installations. Configurations are easily changed and range from peer-to-peer networks suitable for a small number of users to full infrastructure networks of thousands of users that enable roaming over a broad area.

3.1 Installation Considerations

Designed to go up to 300 feet (100 meters) indoors and up to 900 feet (273 meters) outdoors, *Netkey* WLAN adapter lets you access your network from virtually anywhere you want. Keep in mind, however, that the number and thickness of walls, ceilings or other objects that the wireless signals must pass thru may limit range. Typical ranges vary depending on the types of materials and background RF noise in your home or business. The key to maximizing range is to follow these basic principles:*Keep the number of walls and ceilings between the access point and your receiving device to a minimum* - Each wall or ceiling can reduce your TwinMOS *Netkey* Wireless product's range from 3-90 feet (1-30 meters.) For some businesses or for a large residential home deployment, it may be more beneficial to have more than one access point with overlapping coverage.

1. *Be aware of the direct line between Access Points, Residential Gateways, and Computers* - A wall that is 1.5 feet thick (.5 meters), at a 45-degree angle appears to be almost 3 feet (1 meter) thick. At a 2-degree angle it looks over 42 feet (14 meters) thick! Try to make sure that the Access Points and Adapters are positioned so that the signal will travel straight through a wall or ceiling for better reception.

2. *Building Materials make a difference* - A solid metal door or aluminum studs may have a negative effect on range. Try to position Access Points, Residential Gateways, and Computers so that the signal passes through drywall or open doorways and not other materials.

3. Make sure that the antenna is positioned for best reception by using the software signal strength tools included with your product.

4. Keep your product away (at least 3-6 feet or 1-2 meters) from electrical devices that generate RF noise, like microwaves, monitors, electric motors, etc.

For the average residence, range should not be a problem. If you experience low or no signal strength in areas of your home that you wish to access, consider positioning the Access Point in a location directly between the Residential Gateways and/or Computers that will be connected. Additional Access Points can be connected to provide better coverage in rooms where the signal does not appear as strong as desired.

Using radio frequency (RF) technology, WLANs transmit and receive data over the air, minimizing the need for wired connections. Thus, WLANs combine data connectivity with user mobility, and, through simplified configuration, enable movable LANs.

3.2 Other TwinMOS Wireless LAN products include:

IEEE 802.11b Booming Mini-PCI 3B (B103), NetKey USB Stick WLAN Card (B240) and Booming Cardbus WLAN Card (B230) with laptop computers.

IEEE 802.11b Octopus Pure PCI WLAN Card (B110) with desktop computers.

IEEE 802.11b NetKey Wireless Access Point (B-AP-11)

IEEE 802.11b Booming Wireless Router (B-AP-20)

4   Netkey WIRELESS NETWORK SCENARIOS

The *Netkey* WLAN adapter enables you to:

● Connect your computer to an Ad-Hoc workgroup of wireless computing devices (see Figure 1-1).

● Connect your computer to a Small Office/Home Office (SOHO) network that includes a Residential Gateway (RG) access point (see Figure 1-2).

● Connect your computer to a Local Area Network (LAN) Infrastructure that includes Access Points, or other IEEE 802.11 compliant LAN systems (see Figure 1-3 and Figure 1-4).

● Expand the capabilities of your Access Points, to support wireless devices that have been equipped with *Netkey*.

Ad-Hoc Workgroup

The Ad-Hoc workgroup configuration enables you to quickly set up a small wireless workgroup, where the workgroup participants can exchange files using features like "Files and Printer Sharing" as supported by Microsoft Networking.
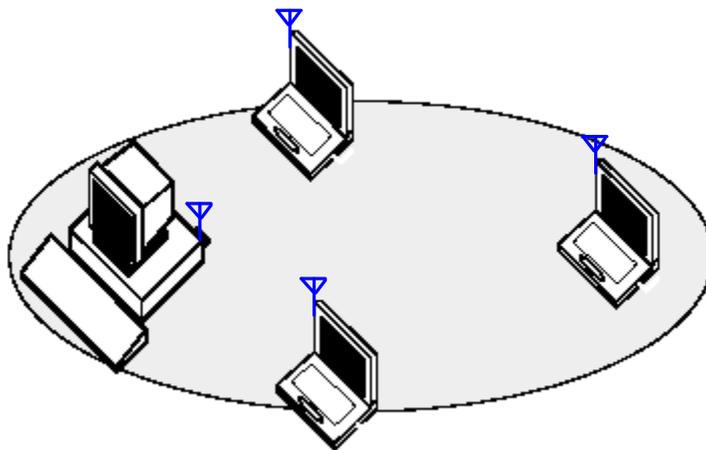
Figure 1-1 Ad-Hoc Wireless Workgroup

You can use this option to setup a temporary or ad-hoc network in environments where no access points are available (for example in Small Office/Home Office (SOHO) environments). As long as the stations are within range of one another, this is the easiest and least expensive way to set up a wireless network.

Home Networking

With the TwinMOS *Netkey* WLAN adapter, wireless access to the Internet or other computers is at your fingertips. All you need to do is connect the wireless computers to an external cable, an xDSL or a ISDN modem and you are ready to

- Share files and printers, and

xDSL
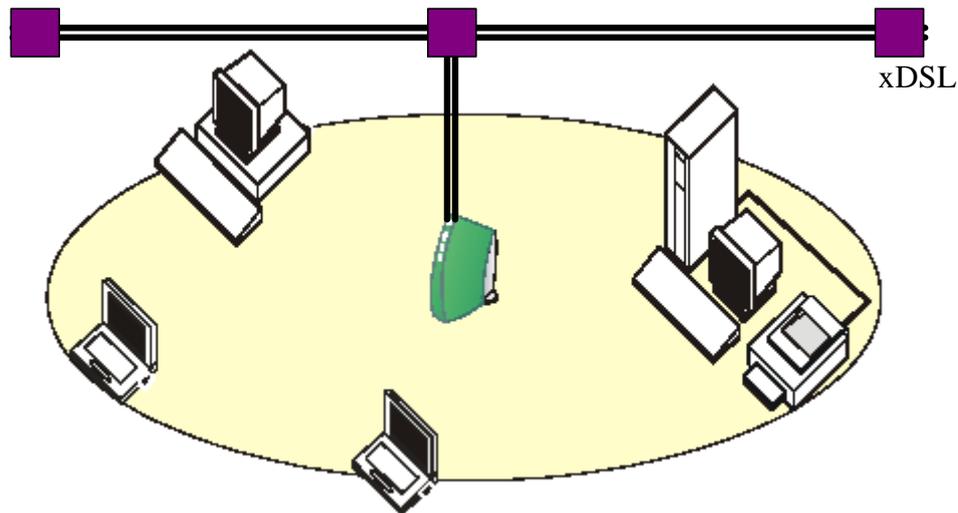
- Access the Internet

Figure 1-2 Connect to a Residential Gateway (RG)

Enterprise Networking

With the 11 Mbps Wireless LAN access point you can connect to a corporate Local Area Network (LAN) infrastructure to have wireless access to all network facilities. LAN Infrastructures may either be:

- Stand-alone wireless LANs (Figure 1-3).

Network Name
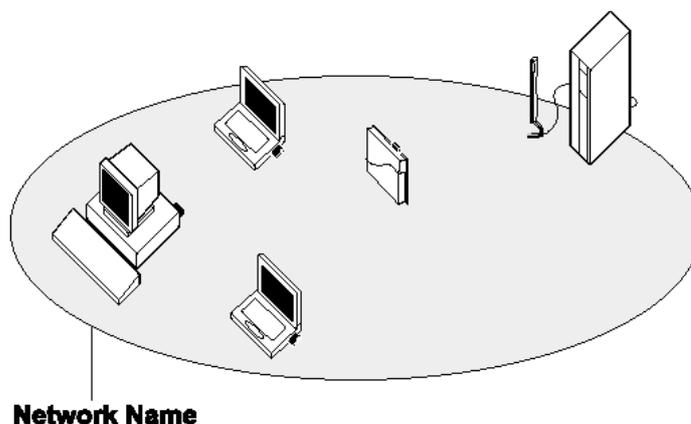
- Wireless network infrastructures connected to an existing Ethernet network (Figure 1-4).
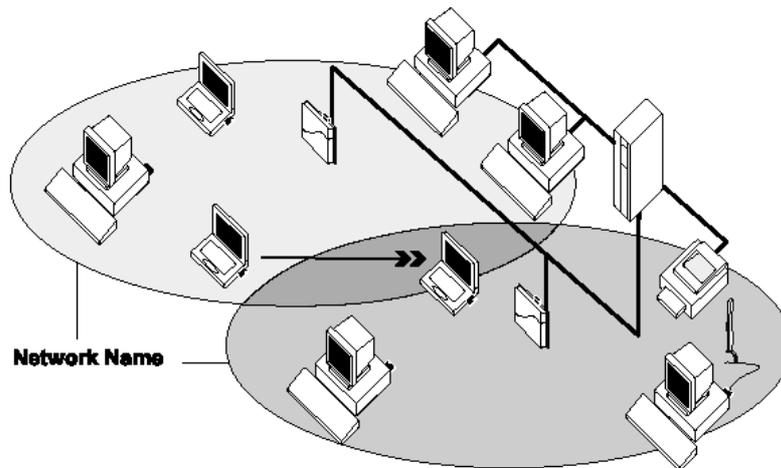
Figure 1-3 Stand Alone Wireless LAN

Figure 1-4 LAN Infrastructure

It's Easy

The *Netkey* functions like any standard wired Ethernet card, but Netkey does not need any wires!

Where an Ethernet card requires a cable connection to a hub and/or patch panel, the cable physically ties you down to the location of the wired connection.

Netkey allows you to connect your computer to a Local Area Network (LAN) system from anywhere within the wireless coverage area. Expanding or re-designing your network is easy: Add or relocate access point, power-up your (new) wireless computers, and you're done!

Unlike Ethernet, TwinMOS *Netkey* will enable you to roam throughout the network while remaining connected to the LAN.

Note *The Netkey wireless adapter is a radio product. Refer to the flyer "Information to the User" for regulatory information that may apply in your country.*

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5   Getting Started

On the following pages we will show you two modes of networking:

    ⦙ **Infrastructure** – using an Access Point Router, such as the B-AP-12.

    ⦙ **Ad-Hoc** – directly connecting to another computer, using a wireless network adapter, such as the Booming B111 in a laptop computer and the NetKey B220 in a PDA.

An **Infrastructure** network Type includes an Access Point Router . The following page contains the following TwinMOS network devices:

A wireless **DHCP** Router/Access Point – **Booming B-AP-12/B-AP-20**

A laptop computer with a wireless network adapter - **Booming B203/NetKey B240**

A desktop computer with a wireless network adapter- **Booming B111**

A PDA with a wireless compact flash adapter - **NetKey B220**

Please refer to the following sections of this manual for additional information to setting network:

Using the Configuration Utility- *learn the settings you must use on each computer in your network which to communicate with.*

Troubleshooting – *learn how to check the actual installation of the network adapters' drivers and other tips for troubleshooting.*

Getting Started

Setting Up an Infrastructure Network
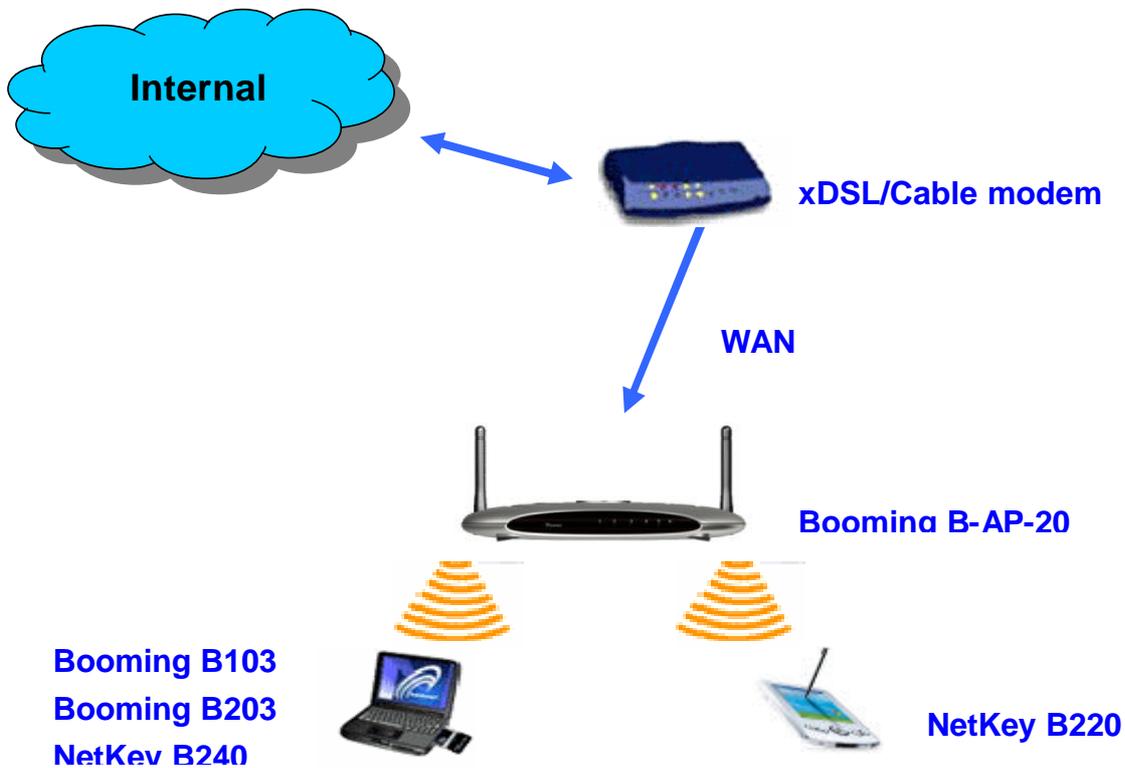
Setting Procedure

1. Connect the xDSL/Cable modem to a wireless router (such as the **B-AP-20**). *See also the Quick Installation Guide with the Booming B-AP-20.*

2. If you have a desktop computer in your network, install the drivers for the **Booming B203** wireless network adapter. *See also the Quick Installation Guide with the Booming 203.*

3. Install the **NetKey B220** into your PDA. *See the Quick Installation Guide with the NetKey B220. In all the previous installations, the LEDs will light ON to indicate connection.*

Getting Started
Setting Up an Ad Hoc Network

Booming B111
NetKey B240

Booming B103
Booming B203
NetKey B240

Wireless

NetKey B220

Setting Procedure

1. In the example above, a **NetKey B240** USB Wireless Network adapter is installed. A Wireless PCI Adapter **Booming B111** also could be installed in a desktop computer. *See the Quick Installation Guide with above products*

2. Install a wireless cardbus adapter (such as the **Booming B102/B203**) into a laptop computer. *See the Quick Installation Guide with the related network adapter.* Set the wireless configuration for the adapters to Ad-Hoc mode, set the adapters to the same channel, and assign an IP Address to each computer on the Ad-Hoc network.

3. Install and configure the **NetKey B220**. *See the Quick Installation Guide.*

About IP Address……

Assigning IP Addresses to the computers on LAN. Please notice that the assigned **IP Address of each computer must be in the same subnet on LAN**, The subnet mask, on the other hand, must be exactly the same for all the computers on LAN.

If the first computer, for example, is assigned an IP Address:192.168.1.2 with a Subnet Mask of 255.255.255.0, then the second computer can be assigned an IP Address of 192.168.1.3 with the same Subnet Mask.

IMPORTANT: If computers or other devices are assigned the same IP Address, one or more of the devices may not be visible on LAN.

6   CONFIGURATION UTILITY

TwinMOS Netkey uses the Configuration Utility as the management software. The utility provides the user an easy interface to change any settings related to the wireless adapter. On the PDA, go to **Start > Program Files**. Clicking on the utility icon will start the Configuration Utility.

6.1 General Page

Click General Page to access the Information as below.
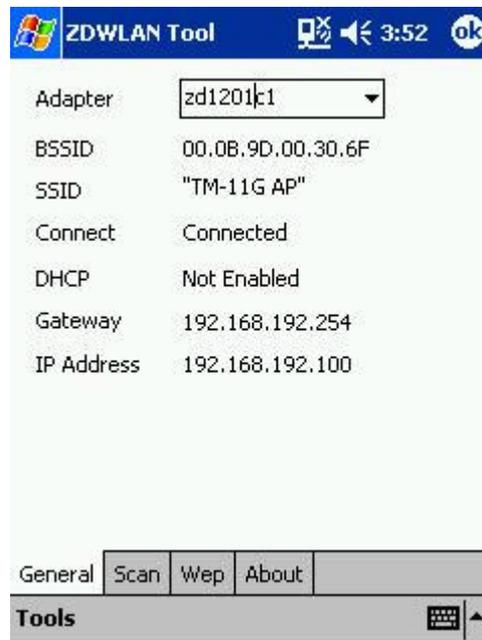
Adapter

Show the name of the *Netkey* WLAN Compact Flash Adapter.

BSSID (Basic Service Set Identifier)

A 48-bit identifier used by all stations in a BSS in IEEE 802.11 frame headers.

SSID (Service Set Identifier)

The name identifies a wireless network. Access Point and wireless clients attempting to connect to a specific WLAN must use the same SSID.

Connect

Show Connection status between access point and WLAN adapter.

DHCP (Dynamic Host Configuration Protocol)

It is a protocol for assigning dynamic IP addresses automatically. With a DHCP-capable gateway/router, there is no need to manually assign an IP address.

Gateway

Generally, It is IP addresses of gateway/router with DHCP-capable.

IP Address

It is IP addresses of WLAN Compact Flash Adapter.

6.2 WEP Page Setting

Click WEP Page to access the Information as below.

WEP Enable

Select to Enable/Disable encryption function.

WEP Key Value to set

The keys are used to encrypt data transmitted in the wireless network. Fill the text box by following the rules below.
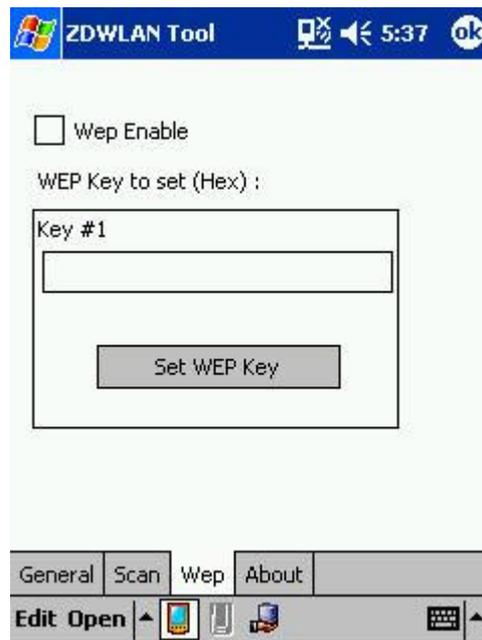
6.3 Scan Page

Click Scan Page to list wireless AP/Router on LAN as below.

Scan Again Button

For scanning wireless access point/router, Pls click the button to refresh the SSID list status.   Then click your desired access point/router.

Apply

Click the Apply button to show selected SSID on left blank and network type (Infrastructure/Ad-hoc).

7   TROUBLESHOOTING

If you encounter some problems while installing the *Netkey* WLAN adapter or you want to confirm whether your adapter is installed properly or not, we have listed the procedure for checking the various components after you have installed the adapter.

In Windows CE:

1. Connection issue:

If your wireless connection to the Access Point is disconnected**, you can reset and force a connection request by going to the utility program, selecting** ZDtool utility**, checking parameters, then selecting** scan again **to force re-scan again.**

2. Roaming issue:

If your device roams to a new Access Point **that is a different subnet, you may need to do one or both of the following: (1) Unplug and re-insert the Wireless LAN Compact Flash Adapter, or (2) Hard reset your device to force a** release and renew **of a re-assignment of the IP address in a DHCP enable Access Point.**

8 TECHNICAL SPECIFICATIONS

Physical Specification

Dimensions	45.99x37.28x2.5 mm
Weight	13 g
Host Interface	Compact Flash Type I
LED Display	● Power Status ● Act for TX/RX ● Link Status
Temperature & Humidity	
Operation	0 to 55 maximum humidity 95%
Transit	-20 to 65 humidity 15% to 95%
Storage	-20 to 65 humidity 10% to 95%

Power Characteristics

Operating Voltage	3.3V ± 10%
Current Consumption	Nominal 240mA , Max. 300mA

Networking Characteristics

Compatibility	● IEEE 802.11 Standard for WLAN (DSSS) ● Internal Wi-Fi certified by TwinMOS
Host OS	
Media Access Protocol	CSMA/CA with ACK
Network Type	● Infrastructure ● Ad-Hoc ● Pseudo IBSS
Network Protocol	TCP/IP,

RF Characteristics

Frequency Range	2.400-2.484 GHz, Direct Sequence Spread Spectrum (DSSS)

Operating Channels	● 1-11 United States (FCC) ● 1-11 Canada (DOC) ● 1-14 Japan (MKK) ● 1-13 Europe (Except Spain and France) (ETSI)
Modulation Technique	● 11 Mbps: CCK ● 5.5 Mbps: CCK ● 2 Mbps:　DQPSK ● 1 Mbps: DBPSK
Spreading	11-chip Barker Sequence
Transmit Power	13 dBm @ Nominal Temp Range
Receive Sensitivity	Nominal Temp Range: 11 Mbps 10^{-5} BER @ -82 dBm, minimum
Security	●　64/128-bit WEP Encryption
Antenna	Built-in Diversity Antenna
Operating Range	Open Space: 100 ~ 300m; Indoor: 30m ~ 100m The transmission speed varies in the surrounding environment.
EMC Certification	FCC part 15B, 15C; R&TTE

FCC CAUTION

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 radiated 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:

-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.

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

IMPORTANT NOTE:
FCC Radiation Exposure Statement:

The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

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 20cm (8 inches) during normal operation.