<u>Wireless LAN PC Card</u>

<u>TWL-C11</u>

<u>User's Manual</u>

<u>Rev. 1.0</u>

TeLLUS®

Statement of Conditions

Tellus Group Corp. may make improvements or changes in the product described in this documentation at any time. The specifications and information regarding to the product in this manual are subject to change without notice.

Tellus Group Corp. assumes no responsibility for errors contained herein or for direct, indirect, special, incidental or consequential damages with the furnishing, performance, or use of this manual or equipment supplied with it, even if Tellus Group Corp. or its suppliers have been advised of the possibility of such damages.

Electronic Emission Notices

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.

(2) This device must accept any interference received, including interference that may cause undesired operation.

FCC Radio Frequency 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 when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. If the equipment causes interference to radio or television reception, try to correct the interference by using one or more of the following measures:

• Turn the television or radio antenna until the interference stops.

• Move the equipment to one side or the other of the television or radio.

• Move the equipment farther away from the television or radio.

• Plug the equipment into an outlet that is on a different circuit from the television or radio.

To assure continued compliance, any changes or modifications not expressly approved by Tellus Group Corp. could void the user's authority to operate the equipment.

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 the minimum distance between your body and the Antenna as shown below:

Built-in patch antennas: 20cm (8 inches).

Typographical Conventions

It is important to understand the symbol and formatting conventions used in the documentation. The following symbols are used in the guide.

Note: Indicates a note which contains important information.

Caution: Indicates procedures which, if not observed, could result in loss of data or damage to the equipment.

Table of Contents

1　INTRODUCTION

Wireless LAN is local area networking without wires, which uses radio frequencies to transmit and receive data between PC's or other network devices without wires or cables. Wireless LAN configurations include independent networks, suitable for small or temporary peer-to-peer configurations, and infrastructure networks, offering fully distributed data connectivity via micro cells and roaming.

The TWL-C11 is designed to meet the mobility, performance, security, interoperability, management, and reliability requirements of IEEE 802.11b high data rate standard. It is easy to install on various devices with PCMCIA type II card slot. When installed, TWL-C11 can communicate with other IEEE 802.11b compatible products to create a wireless network in your office or home.

1.1　Features

- Compliant with 11 Mbps 802.11b high-speed specification
- Data rate 11/5.5/2/1 Mbps automatic fallback under noisy environment
- Advanced Power Management for battery saving
- Build-in PCB patch diversity antennas
- Supports a wide range of OS (Win95/98/2000/NT, Linux)
- Interoperable with IEEE 802.11b compliant equipment
- Supports full mobility and seamless roaming from cell to cell
- Plug-and-play installation and easy client management with utility software
- Working range up to 300 m an open environment.
- Supports point-to-point and point-to-multipoint access.
- Direct Sequence Spread Spectrum (DSSS) technology provides robust, interference-resistant and secure wireless connection.
- Wireless connection without the hassles and cost of cabling.
- Greater flexibility to locate or move networked PC's

1.2　Applications

- Home networking for device sharing - Remote access to corporate network information E-mail, file transfer and terminal emulation.
- Frequently changing environments - Retailers, manufacturers and banks who frequently rearrange the workplace and change location.
- SOHO (Small Office and Home Office) users - SOHO users need easy and quick installation of a small computer network.
- Inter-building connection - The wireless building-to-building network installs quickly, requires no monthly lease fees, and provides the flexibility to reconfigure easily.
- Hard-to-wire buildings - Historical or old buildings, asbestos installations, and open area where wiring is difficult to employ.
- Education (ex/ campuses)

- Hospitals/Medical offices - Doctors, nurses, and white-collar workers need access to database while being mobile in the hospital.

- Warehouse (inventory)

- Security huts

- Exhibition centers

- Temporary LANs for special projects or peak time - Trade shows, exhibitions, retailers, airline and shipping companies need additional workstations for a peak period. Auditors require workgroups at customer sites.

1.3   Product Kit

TWL-C11 includes the following items. If any listed item is not included, please contact your local dealer.

1.   TWL-C11 Wireless LAN PC Card x 1

2.   Driver & Utility CD-ROM x 1

3.   Quick Start Guide x 1

2 DRIVER/UTILITY INSTALLATION

2.1 System Requirements

Below lists the minimum requirement to use TWL-C11 PC card:

1. A computer with a PCMCIA Type II slot which comply with revision 2.10 of the PCMCIA specification.

2. Win95/98/2000/NT or Linux operating system.

3. Minimum 5 Mbytes free disk space for installing driver and utility program.

2.2 Driver installation

2.2.1 Windows 95/98/2000

1. Boot your notebook PC under Microsoft Windows 95/98/2000/NT.

2. Insert TWL-C11 wireless LAN card into the PCMCIA slot.

> **i**   Follow the direction of "INSERT THIS SIDE UP" indication on TWL-C11's label to insert TWL-C11 into the PCMCIA slot.

> **!**   CAUTION: Do not force the client adapter into the slot. Forcing it will damage both the client adapter and the slot. If the client adapter does not go in easily, remove the card and reinsert it.

3. Windows should automatically recognize that the card has been inserted. It then displays a dialog box titled "New Hardware Found".

4. Tell Windows that the driver is located on CD-ROM drive. Accept all defaults.

5. After successful installation, you will see two network components (TWL-C11 Wireless LAN PC Card Adapter and TCP/IP -> TWL-C11 Wireless LAN PC Card Adapter) installed in your network configuration.
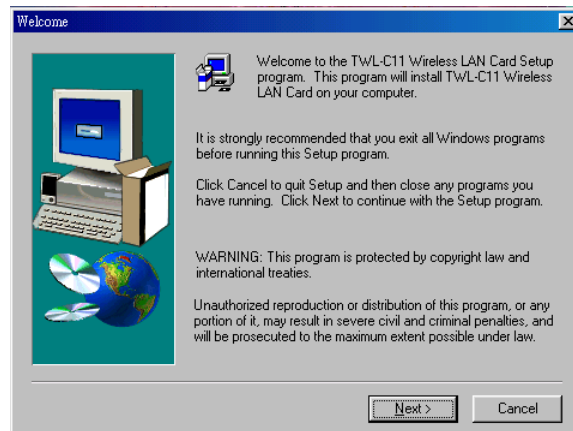
> **i**   Please refer to Windows on-line help or your network administrator to change each setting.
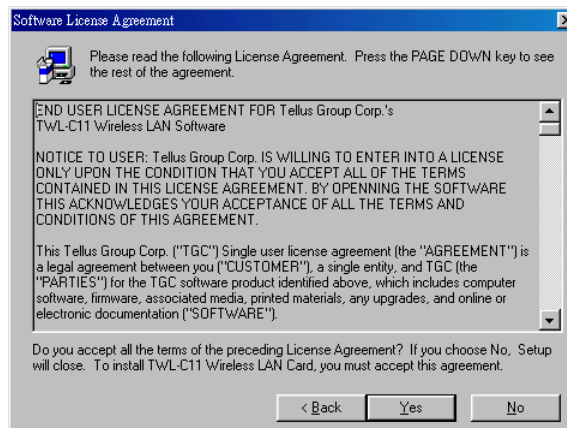
2.2.2 Windows NT

2.2.3 Linux
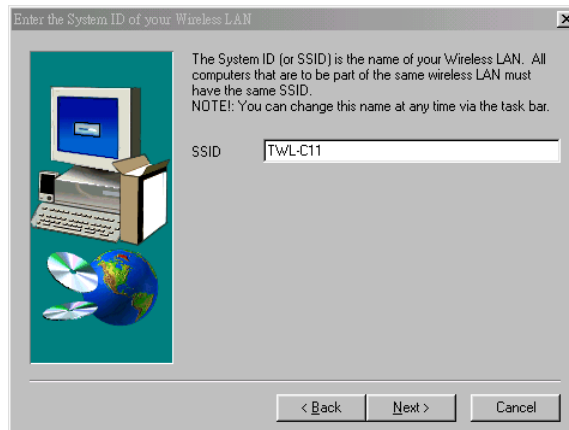
2.3 Configuration Utility Installation

1. Once your system has booted and is idle, insert TWL-C11 Driver & Utility CD into the CD-ROM Drive. Run the SETUP.exe on CD-ROM.

2. Click Next>.

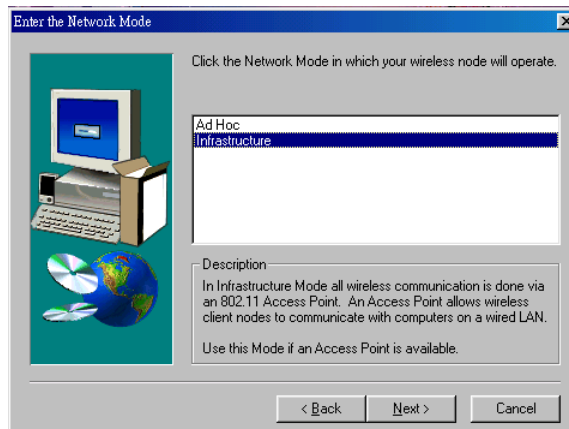3. Click Yes if you agree with the statements.

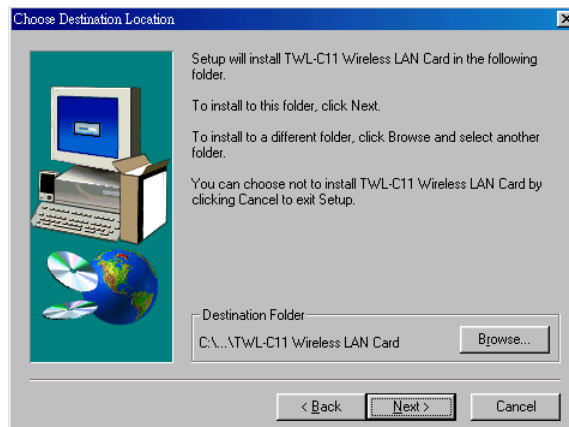4. Click <u>N</u>ext> if you don't want to change the name for SSID.

5. Select Ad Hoc or Infrastructure then click Next>.

i Please refer to the on-line description or Section 3 of this manual to understand the difference between Ad Hoc and Infrastructure. You can change this setting at any time.

6. Click Next> if you don't want to change the directory.

7. Click Next> if you don't want to change the Program Folder.
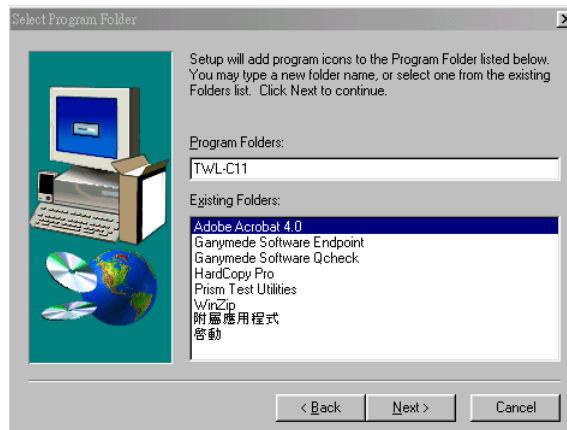
8. Select Yes or No then click Finish.
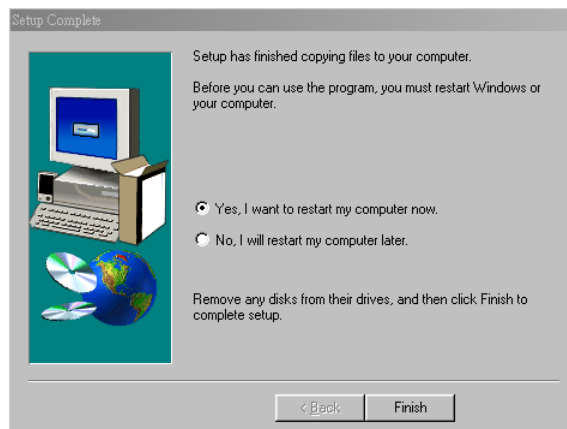
9. After you finish installation and boot again, the driver icon should appear in the system area on the desk-top (computer monitor with antenna) while TWL-C11 is inserted into PCMCIA slot.

i   The color of driver icon will depend on the operation mode and link status.

Color Mode	Ad Hoc	Infrastructure
Red	No link	No link
Yellow	-	Poor link
Green	Linked	Good link

10. Double clicking the icon in the Quick Launch bar will open the TWL-C11 Configuration Utility main menu, providing quick access to all adapter settings.
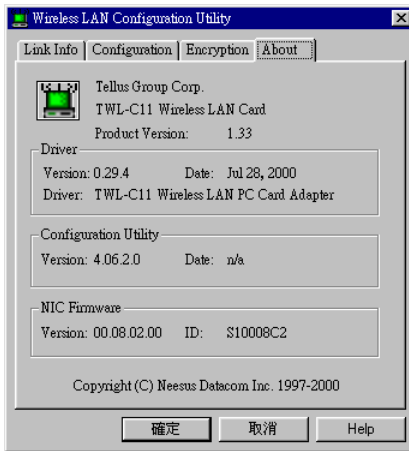
The Configuration Utility provides detail on-line help to instruct you for each setting, please refer to them for detail description.

3   OPERATING THE PC CARD

3.1   Application

3.1.1   Ad-hoc configuration

An Ad-Hoc wireless LAN is a group of computers, each equipped with one TWL-C11 adapter, connected as an independent wireless LAN. Computers in a specific Ad-Hoc wireless LAN must be configured at the same radio channel. Ad-Hoc wireless LAN is applicable at a departmental scale for a branch or SOHO operation.

Notebook with TWL-C11

Desktop PC with TWL-U11   Notebook with TWL-C11

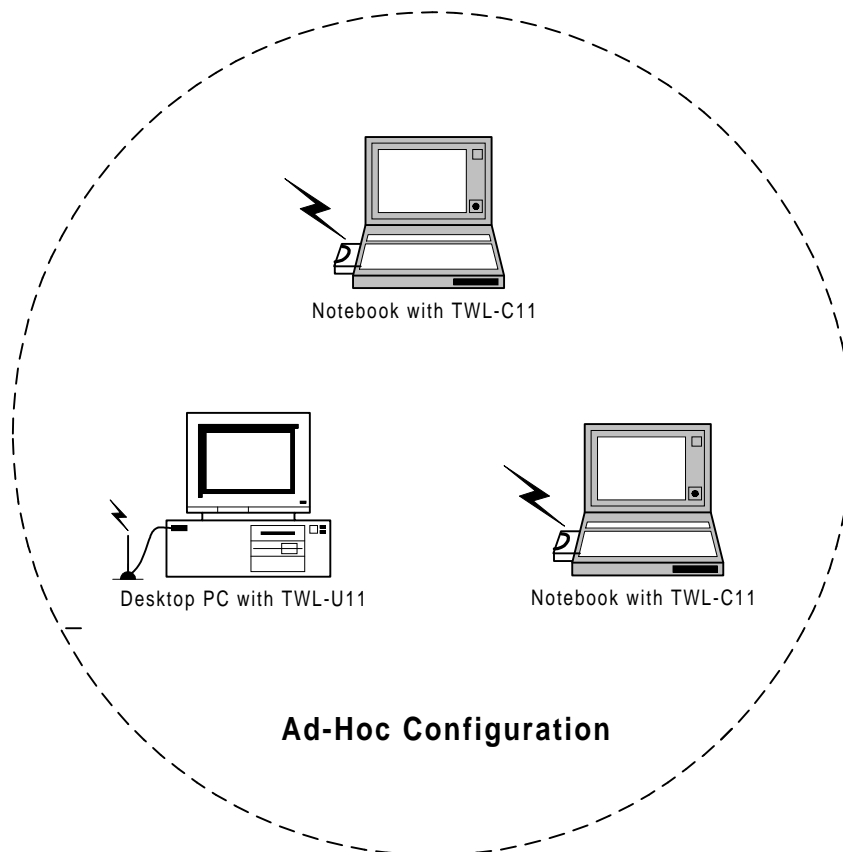**Ad-Hoc Configuration**

3.1.2   Infrastructure configuration

TWL-C11 provides access to a wired LAN for wireless workstations. An integrated wireless and wired LAN is called an Infrastructure configuration. A group of TWL-C11 PC users and an Access Point construct a Basic Service Set (BSS). Each TWL-C11 PC in this BSS can talk to any computer in the wired LAN infrastructure via the Access Point.

Infrastructure configuration not only extends the accessibility of a TWL-C11 PC to the wired LAN, but also doubled the effective wireless transmission range for 2 TWL-C11 PCs. Since Access Point is able to forward data within its BSS, the effective transmission range in an infrastructure LAN is doubled.

BSS ID is, in essential, the ID of each independent TWL-C11. All TWL-C11 PCs configured without roaming options in this independent BSS must be configured with BSS ID of that TWL-A11. Check your TWL-A11 for its BSS ID or use the Access Point Browser Utility program.

Infrastructure is applicable to enterprise scale for wireless access to central database, or wireless application for mobile workers.

Two Access Points could be used as a point-to-point link between two LANs. LAN-Interconnection is applicable to a wireless backbone between buildings.
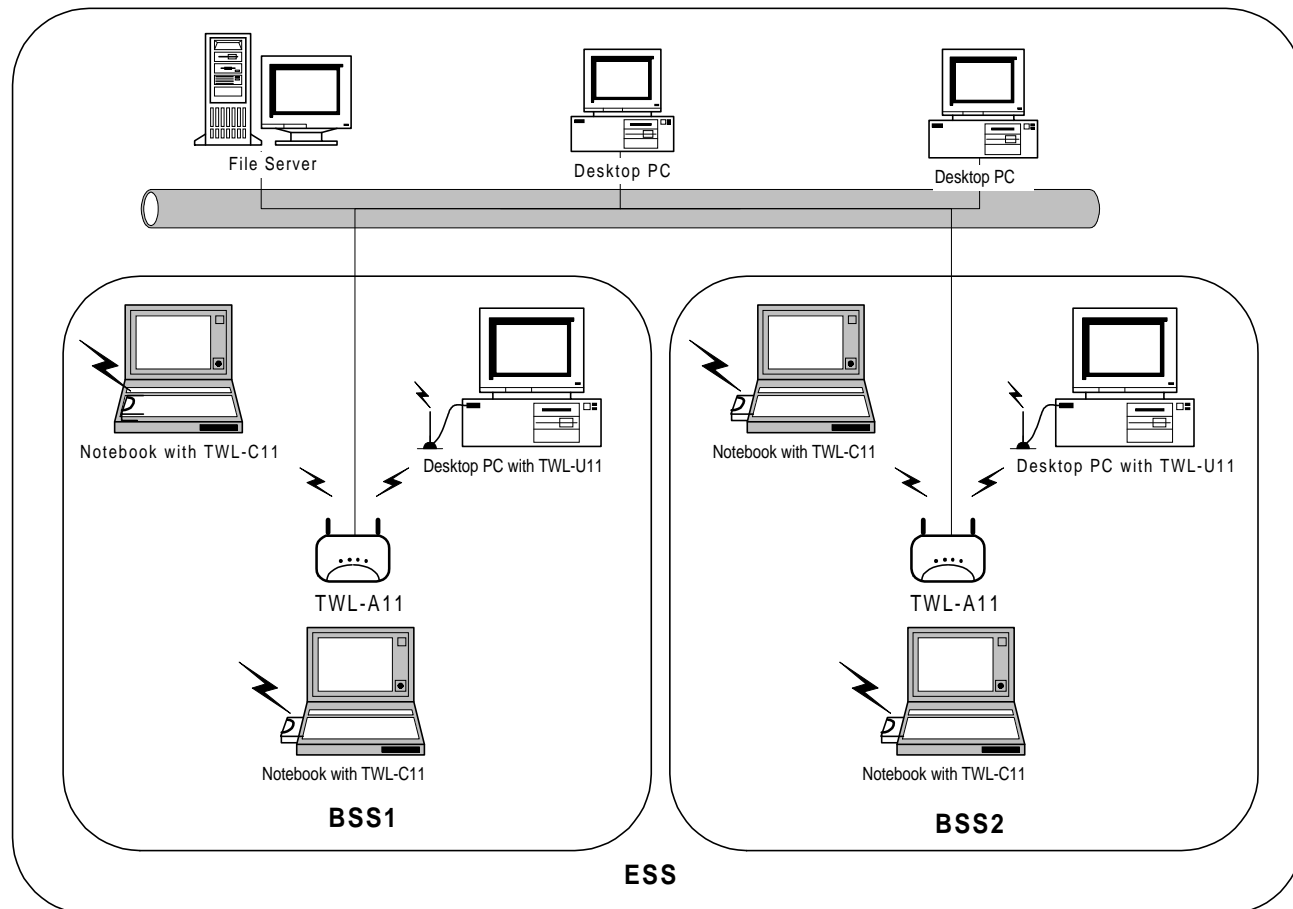
3.1.2.1 Roaming

An Infrastructure configuration also supports roaming capability for mobile workers. More than one BSS can be configured as an Extended Service Set (ESS). On account of a continuous connection to the network, users within this ESS could roam freely. All TWL-C11 PCs and TWL-A11 within one ESS must be configured with the same ESS ID and at the same radio channel.

Before setting up an ESS for roaming, it would be helpful to improve the performance by choosing a feasible radio channel and right places for Access Points.

3.2 Operating

1. Insert the PC Card into the PC slot until it seats snugly. Arrows on the front of the PC Card indicate the insertion direction.

⚠ CAUTION: Align the card properly before putting it into the slot. Insert the card firmly without forcing.
Forcing a misaligned card into the slot can damage the computer or the card.

2. The LED of TWL-C11 shows the operation status of the card.

LED Mode	Ad Hoc	Infrastructure
Blank	No power	No power
Flash	-	No link
Green	Powered	Linked

3. Now, you will be able to operate your notebook just like you are connected with your local area network without wiring.
4. When removing the card, use the release lever or button on your card slot to release the card. When pulling out the card, do not pull on the antenna.

⚠ CAUTION: The antenna on the PC Card is not removable. If you try to remove the card by pulling on the antenna, you may break the antenna and permanently damage the card.

ⓘ Although TWL-C11 is designed for plug-and play, directly removing from PCMCIA slot may cause operating system failure due to your system version. Please double click the PCMCIA icon then select TWL-C11 to stop it before you remove TWL-C11.

3.3 Channels available

The following lists the allowable channel in some country for you reference.

Frequency (MHz)	FCC (US)	IC (Canada)	ETSI (Europe)	Spain	France	MKK (Japan)
2412	1	1	1	-	-	-
2417	2	2	2	-	-	-
2422	3	3	3	-	-	-
2427	4	4	4	-	-	-
2432	5	5	5	-	-	-
2437	6	6	6	-	-	-
2442	7	7	7	-	-	-
2447	8	8	8	-	-	-
2452	9	9	9	-	-	-
2457	10	10	10	10	10	-
2462	11	11	11	11	11	-
2467	-	-	12	-	12	-
2472	-	-	13	-	13	-
2484	-	-	-	-	-	14

4   SYSTEM TROUBLESHOOTING

1	Weak signal or intermittent connection.	1	The PC Card antenna is attached to the end of the PC Card. For best use of the antenna: - Keep the area around the antenna clear from materials that could block radio transmission, such as metal objects, electronic devices, and cordless telephones. - Change the direction of the antenna slightly. - Move your notebook computer a few inches to find a better signal.
		2	Double click driver icon then clink on "Link Info" tab to survey a better location and orientation for a network connection.
2	Windows does not recognize the adapter when installed.	1	Verify that PCMCIA support is installed.
		2	Check whether the computer has a Plug and Play BIOS.
		3	Check whether conflicting with other PCMCIA device.
3	Driver fails to load.	1	A resource conflict could exist. Use the Device Manager resolve resource conflicts. Select System from the Control Panel, then click on the Device Manager tab.
4	Workstation cannot attach to the network.	1	Verify that the adapter Wireless LAN Service Area ID matches the access point ID
		2	Verify that the adapter Data Rate is configured properly for the access point.
5	Network drive mappings disappear when the laptop suspends or the adapter is removed then reinserted.	1	Windows 98 will not restore NetWare network drive mappings under these conditions. Log out and log in again, or restart the machine to restore the connections.

5 SPECIFICATION

General	
Standards compliance	IEEE 802.11b standard for wireless LAN
Security	WEP 128 bit, encryption MD5
Hardware	
RF	Frequency range: 2.4 ~ 2.4835 GHz
Data rate	Supported bit rates: 11 Mbps / 5.5 Mbps / 2 Mbps / 1 Mbps
Modulation	DSSS (Direct Sequence Spread Spectrum)
	DBPSK/DQPSK
Coding	1, 2 Mbps: 11 chip/bit Barker Coding
	5.5, 11 Mbps: Complementary Code Keying
Number of channels	Europe: 13 (3 non-overlapping)
	US: 11 (3 non-overlapping)
	France: 4 (1 non-overlapping)
	Japan: 1 (1 non-overlapping)
Host interface	PC Card 95
	PCMCIA type II 16 bit
Transmit power	+13 dBm (Typ.)
Receive sensitivity	-80 dBm (Typ.) for 11Mbps; -83 dBm (Typ.) for 5.5/2/1 Mbps; (@BER 10E-5)
Power consumption	3.3 V; Tx mode: 350 mA (Max.); Rx mode: 230 mA (Max.); Stand by mode: 20 mA (Max.)
Software	
Driver support	Windows 95/98/2000/NT, Linux
Utility	User setup & diagnostics tool
Mechanical	
Antenna system	Two integrated antennas
Indicator	Green LED for activity
Environmental	0 - 55°C operating temperature
	Humidity 95% (non-condensing)
Package	PCMCIA type II extended
Dimensions	116.2 x 54.0 x 7.0 mm (w/o antenna)
Weight	Less than 50 g
Certificate	
EMC	U.S., Canada: FCC Part 15, sections 15.247, 15.205, 15.209; RSS-210
	Europe: ETS 300 328, ETS 300 826, CE Marked
	Japan: RCR STD-33

6 GLOSSARY

Access Point - Any entity that has station functionality and provides access to the distribution services, via the wireless medium (WM) for associated stations.

Ad-Hoc - A network composed solely of stations within mutual communication range of each other via the wireless medium (WM). An ad hoc network is typically created in a spontaneous manner. The principal distinguishing characteristic of an ad hoc network is its limited temporal and spatial extent. These limitations allow the act of creating and dissolving the ad hoc network to be sufficiently straightforward and convenient so as to be achievable by non-technical users of the network facilities; i.e., no specialized technical skills are required and little or no investment of time or additional resources is required beyond the stations that are to participate in the ad hoc network. The term ad hoc is often used as slang to refer to an independent basic service set (IBSS).

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.

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

Infrastructure - The infrastructure includes the distribution system medium (DSM), access point (AP), and portal entities. It is also the logical location of distribution and integration service functions of an extended service set (ESS). An infrastructure contains one or more APs and zero or more portals in addition to the distribution system (DS).

PCMCIA (Personal Computer Memory Card International Association) - It develops standards for PC cards, formerly known as PCMCIA cards, are available in three "types" which are about the same length and width as credit cards, but range in thickness from 3.3 mm (Type I) to 5.0 mm (Type II) to 10.5 mm (Type III). These cards can be used for many functions, including memory storage, as landline modems and as wireless LAN.

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.

RTS (Request To Send) Threshold – Transmitters contending for the medium may not hear each other. RTS/CTS mechanism can solve this " Hidden Node Problem".

Wired Equivalent Privacy (WEP) - 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.