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WLAN 22Mbps MiniPCI Card

1. <u>Product General Information</u>

1.1. Product Description

GL2422MP, the wireless Ethernet adapter for mini PCI type IIIB compliant notebook PCs, set-top box and integrated device, is fully compatible with IEEE 802.11b standard and supporting higher data rate to 22Mbps. Using Direct Sequence spread spectrum technology for immunity from interference, it will automatically fallback to lower data rate in the environment of interference.

22Mbps data rate is designed by the Packet Binary Convolution Code (PBCC) modulation technique. The software supports Windows OS such as Win98, Win2000, Win ME, and Win XP. The Mini PCI card for any integrated device is designed with U.FL or MMCX connector to conduce high performance for integrated product.

1.2. Product Feature

- IEEE 802.11b Direct Sequence high rate compatible.
- Based on DSSS Technology and support the modulation of PBCC mode
- High-Speed wireless connection up to 22Mbps data rate, and support 11/5.5/2/1 Mbps 802.11b standard
- Advanced Power Management supports power saving mode for battery device
- Auto fallback data rate in the environment of interference.
- 64/128/256 Bits WEP Encryption function
- High through-put supports multi-Media data bandwidth requirement
- Plug-and-play Installation
- Support Mini PCI type IIIB interface

1.3. Product Application

- Wireless Networking in Enterprise, SOHO and home environment
- Wireless Networking Access in Hot Spot area such as Airport, Hotel, School, Convention center, Coffee shop, etc…
- Mobile media through wireless LAN
- Mobile networking for notebook PC, and mobile devices
- Build system in Ad-Hoc for Host-Client appliance or Infrastructure mode for multi-access

2. <u>PRODUCT GENERAL</u>

2.1. General Specifications

Standards:	IEEE802.11b Compliant
	Mini PCI standard Type-III-B
Data Rate:	22Mbps / 11Mbps / 5.5 Mbps / 2Mbps / 1 Mbps auto fallback
Security:	64/128/256 bit Wired Equivalent Privacy (WEP)
Dimension	59.75 mm (L) X 44.6 mm (W) X 4. 8 mm (H)

2.2. LED Signal Support

2 Pin (For Power/Status, Tx/Rx)--LED signal supporting

2.3. Interface
Mini PCI Type – III- B

3. <u>PRODUCT HARDWARE SPECIFICATIONS</u>

3.1. RF Specification

3.1.1 General

Emission Type	Direct Sequence Spread Spectrum (DSSS)
RF Frequency	2400MHz – 2497 MHz – Japan Band
	2400MHz – 2483.5MHz – North America, Europe
	2446.5MHz – 2483.5MHz – France
Operating Channel	11 Channels (US, Canada)
	13 Channels (Europe)
	14 Channels (Japan)
Radio Chipset:	RFMD
Media Access	CSMA/CA (Collision Avoidance) with ACK

3.1.2 Transmitter

RF Output Power	18 dBm (Typ.)
Frequency Stability	Within $\pm$ 25 ppm
Data modulation type	PBCC/CCK/QPSK/BPSK
Data modulation speed	22/11/5.5/2/1 Mbps with auto fallback

3.1.3 Receiver

Sensitivity	-80 dBm @ 22Mbps (Typically @25℃±5℃)
	(Less than 8% of PER packet sizes is 1024 bytes)

3.1.4 Antenna Connecter

Built-in one or two HRS U.FL or MMCX type connector

3.1.5. Typical Operation Range

22Mbps	100M
11Mbps	150M
5.5Mbps	250M
2Mbps	300M
1Mbps	350M

3.2. Hardware Specification

3.2.1. Bus Interface

PCI I/O port	32 Bit

3.2.2. MAC Controller

MAC	ACX100A

3.2.3. Memory

EEPROM	8 Kbytes

3.2.4. Power

Power Voltage	3.3v $\pm$ 5%
Power Consumption	650mA by TX (Max.)
	350mA by RX
	Stand by mode TBD
	Sleeping mode TBD

4. PRODUCT SOFTWARE SPECIFICATION

4.1. Driver

NDIS 4.0 LAN driver Win98, NDIS5.0 LAN driver for Win2000 & Win ME, NDIS 5.1 LAN for Win XP

4.2. Configuration Utility

Configuration Utility software program for Win/98, Win2000, Win ME, Win XP

Configurable Parameters	Description
Networking Type	Infrastructure / Ad-Hoc
Channel	Channel number setting (14 channels available)
ESSID	ESSID setting
Rx Rate	Current Receiving data rate
TX Rate	Current Transmitting rate

WEP	Disable, 64 bit, 128 bit and 256 bit
Link Quality	Receiving AP link quality on infrastructure
Signal Strength	Receiving AP signal strength on infrastructure

5. REGULATION COMPLIANCE

Compliant with

FCC Part 15 Class B and C

ETSI EN 300 328-2 and ETSI EN 301 489-1, -17, EN60950, CE-Mark

Telec (Japan, Customized)

WiFi Compliant

6. Environmental Requirement

6.1. Drop and Vibration

6.1.1. Anti-Static Voltage

Static voltage tests by 4 kV in card frame should not cause system fail.

6.1.2. Vibration Test

The vibration test is under the frequency and amplitude 10-25 Hz 1mm in vertical and horizontal direction by 30 minutes that should not cause any damage on product.

6.1.3. Package Drop Test

Dropping the package from the height of 50cm for each of the six (6) faces onto the hardwood floor should not cause any damage on product.

6.2. Operation Environment

6.2.1. Temperature Range

Operating: -0℃ - +50℃ (Except RF output power and sensitivity)

Storage: -20℃ - +70℃

6.2.2. Reliability Test

One cycle of reliability test is keeping at -30℃ by 2 hours, switching temperature up to +60℃ within one hour , and testing at +60℃ by 2 hours, and switching temperature to -30℃ within one hour. Three cycle should be tested and

without any product fail.

6.2.3. Humidity

Operating: 0% to 70%

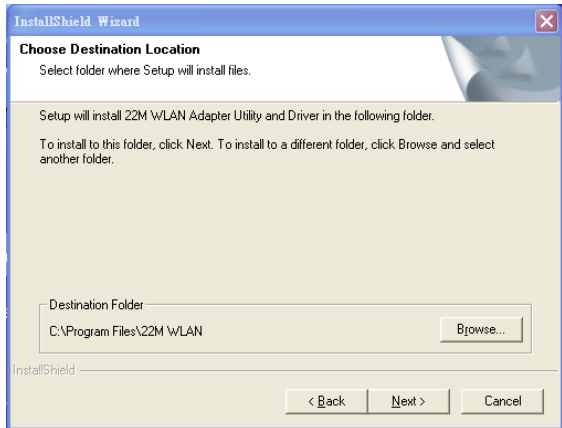Storage   0% to 95% Non-condensing

7. INSTALLATION AND CONFIGURATION
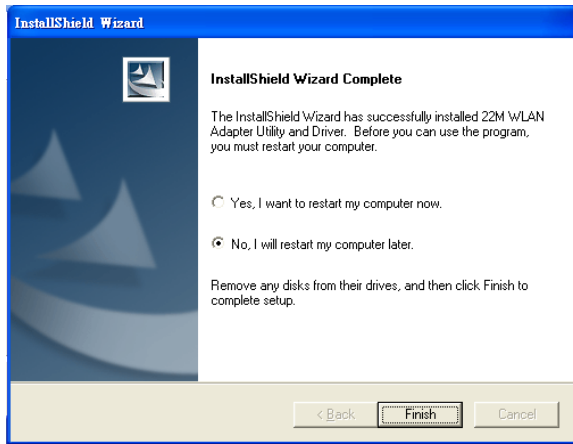
7.1. Installation

1. Start the computer

2. Insert 22Mbps driver CD into the CD-ROM

3. Select "PC Card/PCI Card"

4. Click "Install " button.

5. Click "Next" button.

6. Click "Finish" button to restart computer.

7. Shut down the computer then insert MiniPCI Card into the MiniPCI slot of computer.
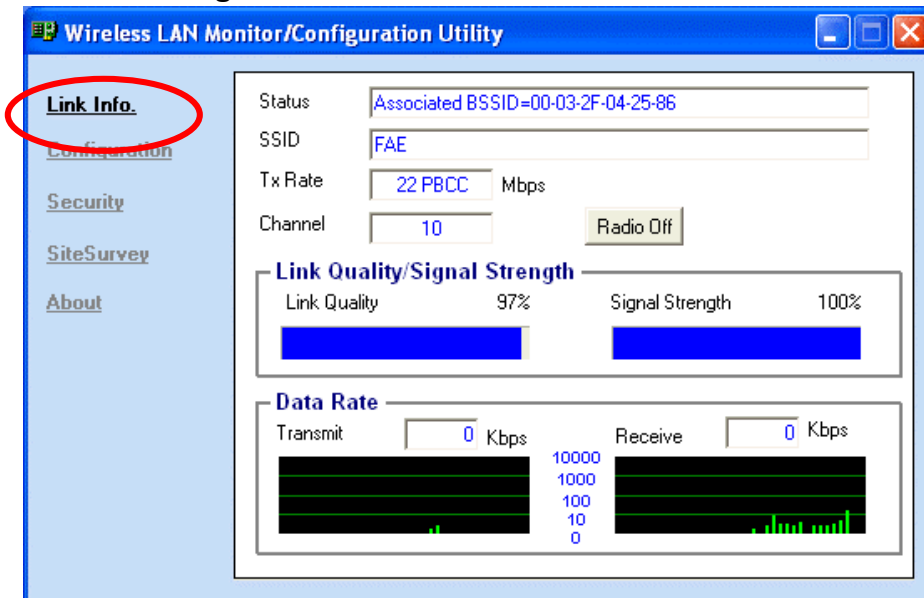
8. Restart computer

7.2. Configuration

1. Double Click "" icon in the right hand corner of the screen.

2. The window of "Link Information" show the current status of wireless mini PCI Card.

Link Info. Page

This is the default page when the utility starts up.

Status: Shows the BSSID associated, which can be used to identify the wireless network.

SSID: Shows current SSID, which must be the same for the wireless client and AP in order for communication to be established.

TxRate: Shows the current data rate used for transmitting.

Channel: Shows the current channel for communication.

Radio Off button: When clicked, you disable the radio signal, and cut-off the wireless connection.

Link Quality: Shows the link quality of the 22Mbps wireless Network PCI Adapter with the Access Point when operating under Infrastructure mode.

Signal Strength: Shows the wireless signal strength of the connection between the 22mpbs wireless Network PCI Adapter with the Access Point.

Data Rate: Shows the statistics of data transfer, and the calculation is based on the number of packets transmitted and received.

Configuration Page

This is the page where you can change the basic settings of the Access Point with the minimum amount of effort to adjust a secure wireless network.
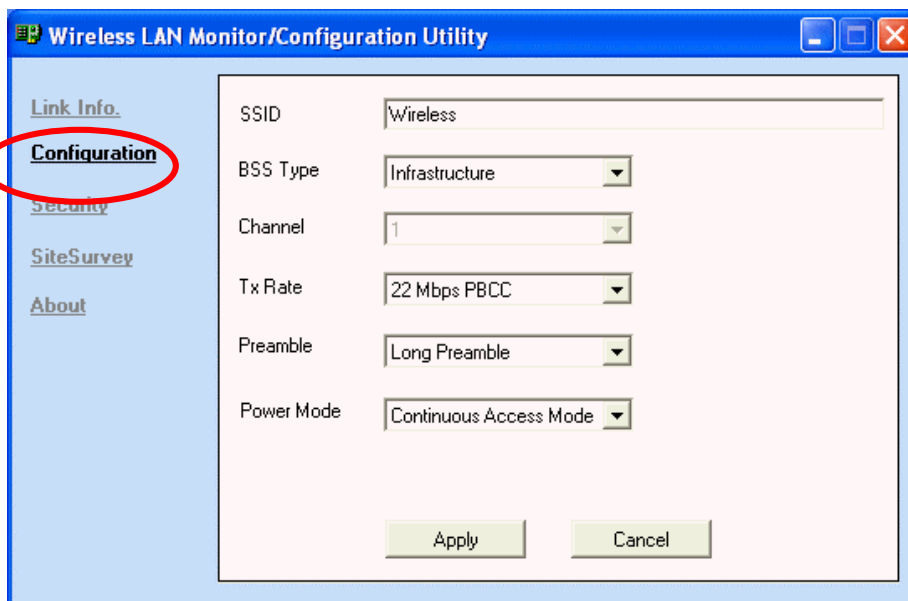
SSID: Service Set Identifier, which is a unique name shared among all clients and nodes in a wireless network. The SSID must be identical for each clients and nodes in the wireless network.

BSS Type: There are two types available for selection

- Infrastructure – to establish wireless communication with LAN and other wireless clients through the use the Access Points.

- Ad-Hoc – to establish point-to-point wireless communication directly with other wireless client devices such as

wireless network PCI Adapter.

Channel: The value of channel that AP will operate in. You can select the channel range of 1 to 11 for North America (FCC) domain, 1 to 13 for European (ETSI) domain and 1 to 14 for Japanese domain.

**Tx Rate:** Select the data rate for data transmission.

Preamble: Select **Long** or **Short** Preamble type. Preamble is a sequence of bits transmitted at 1Mbps that allows the PHY circuitry to reach steady-state demodulation and synchronization of bit clock and frame start. Two different preambles and headers are defined: the mandatory supported Long Preamble and header, which interoperates with the 1 Mbit/s and 2 Mbit/s DSSS specification (as described in IEEE Std 802.11), and an optional Short Preamble and header (as described in IEEE Std 802.11b). At the receiver, the Preamble and header are processed to aid in demodulation and delivery of the PSDU. The Short Preamble and header may be used to minimize overhead and, thus, maximize the network data throughput. However, the Short Preamble is supported only from the IEEE 802.11b (High-Rate) standard and not from the original IEEE 802.11. That means that stations using Short-Preamble cannot communicate with stations implementing the original version of the protocol.

Power Mode: There are 3 modes to choose from

- Continuous Access Mode (default) – the PCI Adapter is constantly operating with full power and it consumes the most power

- Maximum Power Save – the PCI Adapter consumes the least power and only operates when there is wireless network activity.

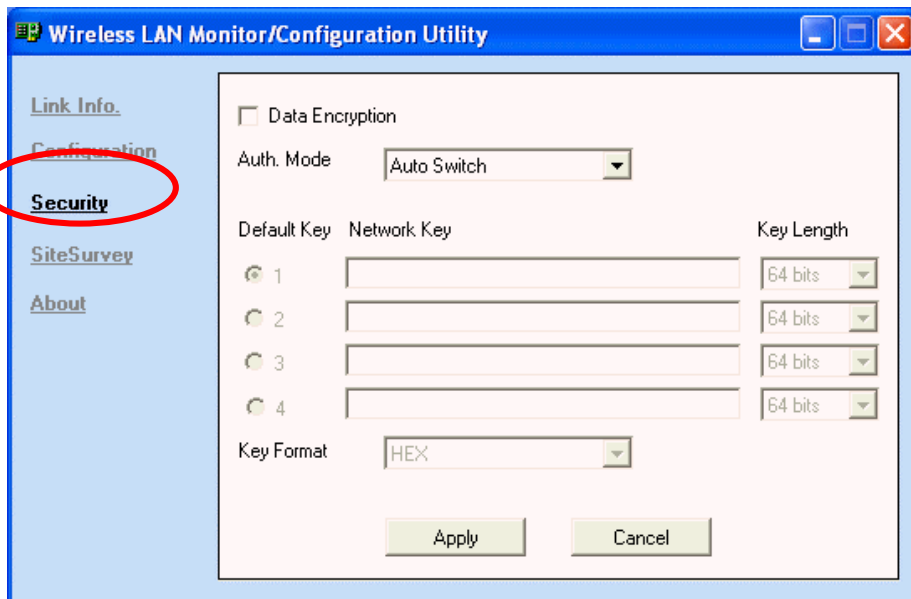- Power Save – the PCI Adapter consumes the moderate level of power.

For the changes made to any of the items above to be effective, click "**Apply**".   The screen will be changed back to **Link Info.** Page
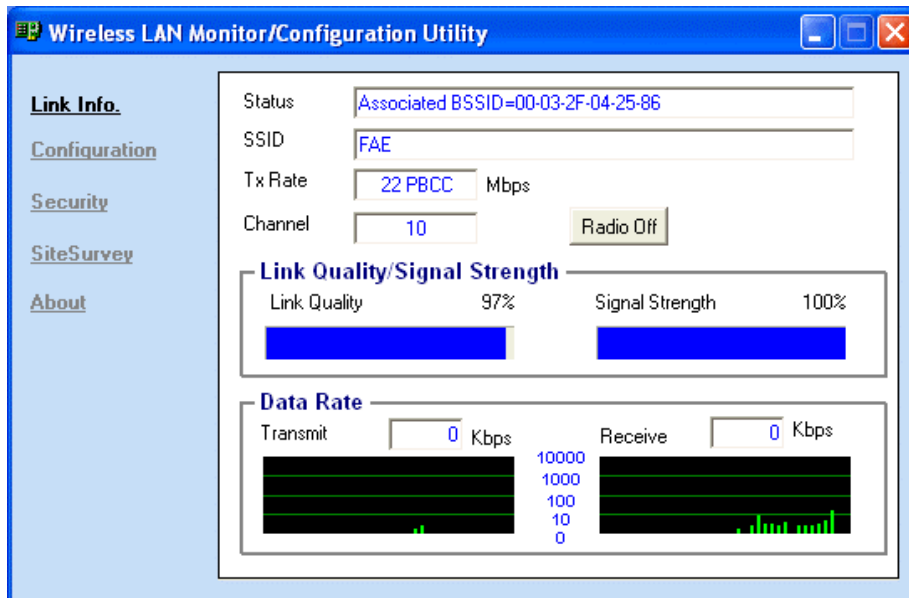
Security Page

This is the page where you configure Security settings of your 22Mbps wireless PCI Adapter.

Data Encryption: Click the box to enable Data Encryption feature.

Aut. Mode: There are three modes available to choose from.

- **Open Authentication** – the sender and receiver do not share secret Key for communication. Instead, each party generates its own key-pairs and ask the other party to accept it. The key is regenerated when the connection is established every time.

- **Shared Authentication** – the sender and receiver shares the common key for data communication, and the key is used for extended length of time.

- **Auto** – depend on the communication to establish, and automatically use the proper authentication mode.

The following will only be activated to allow for configuration when **Data Encryption** is enabled.

Default Key: select one of the 4 keys to use.

Network Key: enter values to these fields, either in HEX or ASCII formats. You only have to enter the key that you will use

Key Length: select 64, 128 or 256 bits as the length of the keys

Key Format: ASCII or **HEX** (Please refer to Appendix G: Glossary for details about these two formats).

SiteSurvey Page

This page allows to utilize the SiteSurvey function to scan for the available wireless network (wireless clients and Access Points) and select one to establish wireless communication.
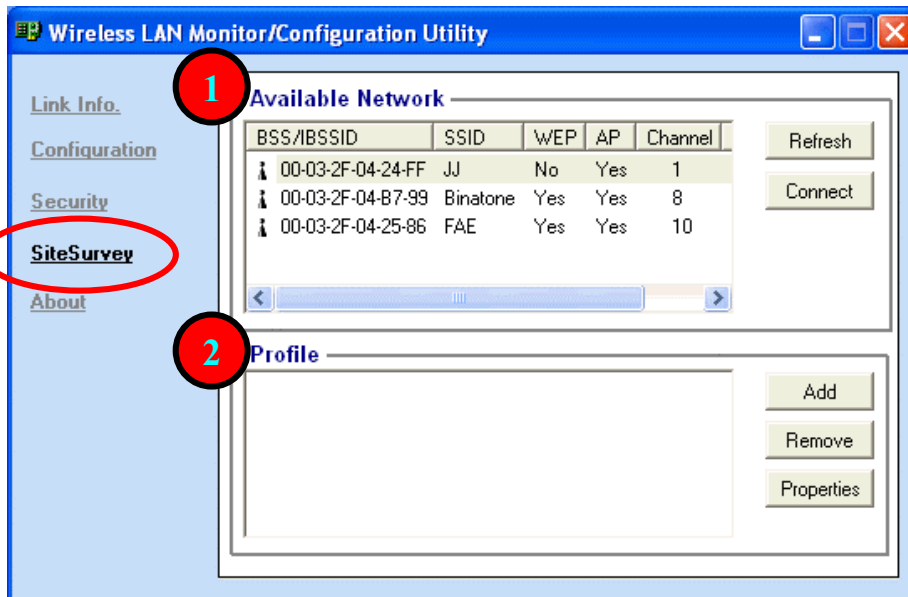
1   **Available Network** – displays the wireless networks (wireless clients and Access Points) that are in your signal range. Select any one of them and establish communication by simply mouse **double-click** or a single click on the "**Connect**" button. Click "**Refresh**" button to start scanning for available network again.

2   **Profile** – You can create and manage the created profiles for Home, offices or public areas.

By double-clicking on one of the created profile, the setting will adapt to the configuration such as SSID, channel, and WEP settings saved by that particular profile.

Click to select any one of the profiles, and you can

     Click on "**Remove**" button to remove the profile, or

     Click on "**Properties**" button to view and change its settings. The Properties is very similar to that of adding profile.

Click "**Add**" to add a profile, and the following screen would appear.

All the detail information about each settings and configuration item are described in previous Configuration and Security Page sessions. Please refer to those two sessions for more information.

When you finish enter the setting for this profile, click "**OK**" to add a new profile.

About Page

This page displays some information about the 22mpbs PCI Adapter utility, which includes the version numbers for Driver, Firmware and Utility.

When there is new version of software available for upgrade, you will be able to identify by version numbers.
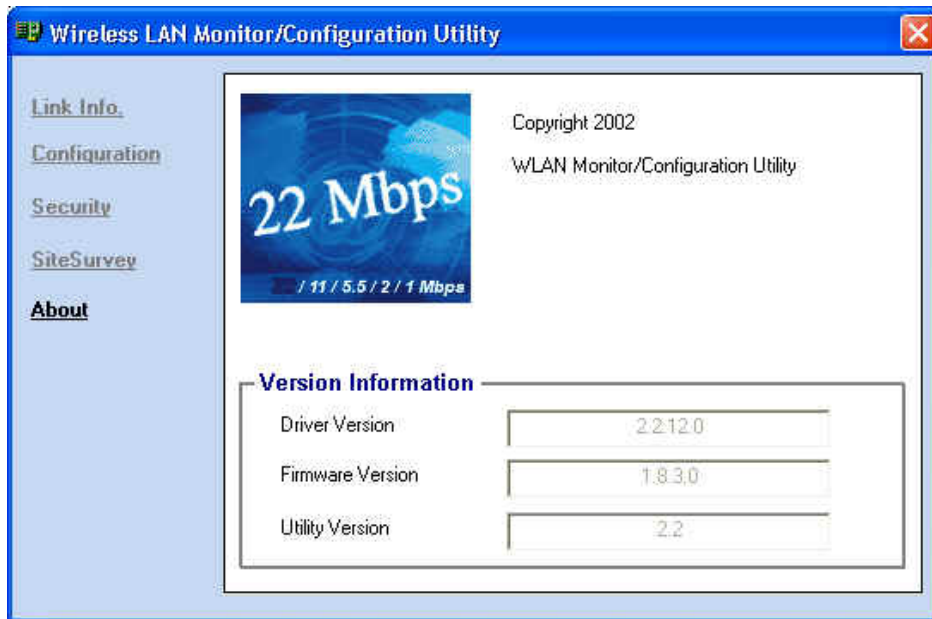
Notice : Our company reserves the right to change specifications detailed in this document at any time without notice, and assumes no responsibility for any errors within this document.

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 t 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 during 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 to 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: 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.

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.

This device is intended only for OEM integrators under the following conditions:

The antenna must be installed such that 20 cm is maintained between the antenna and users, and

The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions above are met, further <u>transmitter</u> test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

IMPORTANT NOTE: In the event that these conditions <u>can not be met</u> (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID <u>can not</u> be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users (for example: Wireless Router, Wireless Access Point, VP). The final end product must be labeled in a visible area with the following: "Contains TX FCC ID: KA2ACX100 ".

Manual Information That Must be Included

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the users manual of the end product which integrate this module.

The users manual for OEM integrators must include the following information in a prominent location " IMPORTANT NOTE: To comply with FCC RF exposure compliance requirements, the antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.