

# 2.4GHz 802.11n MPCI Module

## User's Guide

## **Regulatory notes and statements Wireless LAN, Health and Authorization for use**

Radio frequency electromagnetic energy is emitted from Wireless LAN devices. The energy levels of these emissions however are far much less than the electromagnetic energy emissions from wireless devices like for example mobile phones. Wireless LAN devices are safe for use frequency safety standards and recommendations. The use of Wireless LAN devices may be restricted in some situations or environments for example:

- On board of airplanes, or
- In an explosive environment, or
- In case the interference risk to other devices or services is perceived or identified as harmful

In case the policy regarding the use of Wireless LAN devices in specific organizations or environments (e.g. airports, hospitals, chemical/oil/gas industrial plants, private buildings etc.) is not clear, please ask for authorization to use these devices prior to operating the equipment.

## **Regulatory Information/disclaimers**

Installation and use of this Wireless LAN device must be in strict accordance with the instructions included in the user documentation provided with the product. Any changes or modifications made to this device that are not expressly approved by the manufacturer may void the user's authority to operate the equipment. The Manufacturer is not responsible for any radio or television interference caused by unauthorized modification of this device, of the substitution or attachment. Manufacturer and its authorized resellers or distributors will assume no liability for any damage or violation of government regulations arising from failing to comply with these guidelines.

## **FCC Interference Statement**

### **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.

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.

**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.

## **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. We declare that the product is limited in CH1~CH11 by specified firmware controlled in the USA.

### **CE Mark Warning**

This is a Class B product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

### **Protection requirements for health and safety – Article 3.1a**

Testing for electric safety according to EN 60950 has been conducted. These are considered relevant and sufficient.

### **Protection requirements for electromagnetic compatibility – Article 3.1b**

Testing for electromagnetic compatibility according to EN 301 489-1, EN 301 48917 and EN 55024 has been conducted. These are considered relevant and sufficient.

### **Effective use of the radio spectrum – Article 3.2**

Testing for radio test suites according to EN 300 328-2 has been conducted. These are considered relevant and sufficient.

**CE in which Countries where the product may be used freely:**

Germany, UK, Italy, Spain, Belgium, Netherlands, Portugal, Greece, Ireland, Denmark, Luxembourg, Austria, Finland, Sweden, Norway and Iceland. France: except the channel 10 through 13, law prohibits the use of other channels.



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

- 1) The antenna must be installed such that 20 cm is maintained between the antenna and users,
- and 2) The transmitter module may not be co-located with any other transmitter or antenna.
- 3) For all products market in US, OEM has to limit the operation channels in CH1 to CH11 for 2.4G band by supplied firmware programming OEM shall not supply any tool or info to the end-user regarding to Regulatory Domain change.

As long as 3 conditions above are met, further transmitter 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 can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not 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: Access point, Wireless Router..etc.). The final end product must be labeled in a visible area with the following: "Contains TX FCC ID: KA2DIR615A1".

**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 user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

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. We declare that the product is limited in CH1~CH11 by specified firmware controlled in the USA.

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## ***INTRODUCTION***

Congratulations on your purchase of this 2.4GHz 802.11n MPCPI Module. This manual helps to get familiar with the 2.4GHz 802.11n MPCPI Module. This manual contains detailed instructions in operation of this product. Please keep this manual for future reference.

With a 2.4GHz 802.11n MPCPI Module, a desktop or laptop computer can communicate with another computer in a wireless way. Easy-to-use utilities are bundled with 2.4GHz 802.11n MPCPI Module for configuration, monitoring, and diagnosis purposes.

2.4GHz 802.11n MPCPI Module can wirelessly transmit and receive data, minimizing the need for wired connections, at a speed of up to fifty-four megabit per second.

2.4GHz 802.11n MPCPI Module provides users with an access to real-time information anywhere in their organization. The mobility provides productivity and service, which are not available under wired networks. The 2.4GHz 802.11n MPCPI Module configuration is easy to change from peer-to-peer networks, suitable for a small number of users, to full infrastructure networks of thousands of users that allow roaming around a broad area.

### **Overview of this User's Guide**

**Introduction.** Describes the 2.4GHz 802.11n MPCPI Module and its features.

**Software Installation.** Tells how to setup the driver and the utility setting.

**Technical Specifications.** Lists the technical (general, physical and environmental) specifications of the 2.4GHz 802.11n MPCPI Module.

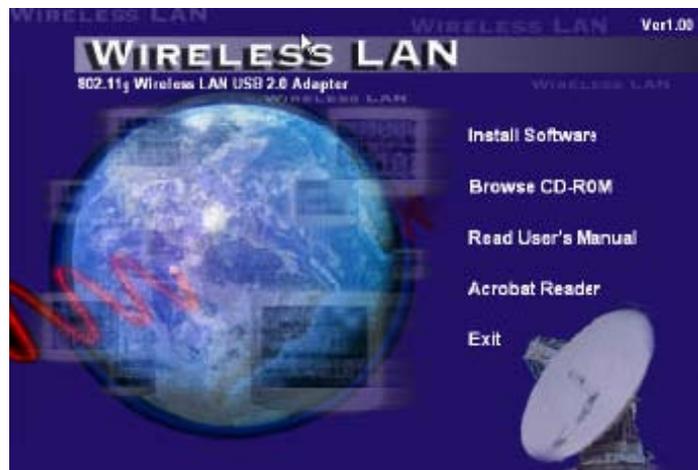
## ***SOFTWARE INSTALLATION***

This section will lead you to install the driver and utility of the 2.4GHz 802.11n MPCPI Module via Windows OS installation.

### **Windows 98se/ME/2000/XP Utility and Driver Installation**

1. Insert the 2.4GHz 802.11n MPCPI Module Driver & Utility CD-ROM into computer's CD-ROM Drive and it will automatically run a setup menu and install the driver and the utility, for Win98se, please reboot the system to install the driver to the system properly. In some specific setting on Windows system, you may need to proceed the software manually, go to your Windows Start menu and choose **Run**, type "D:\Utility\Setup.exe" in the dialog box (D:\ will depend on where your CD-ROM drive is located) and click **OK**.
2. If you need to install the driver manually, refer each Windows OS to the following CD-Rom directory path:  
D:\Drivers\*<Windows OS>*\SIS163U.INF.

***Note: (D:\ will depends on where the CD-ROM drive is located and <Windows OS> will depend on the Windows Operating System you are using).***



3. The Install Shield Wizard screen will appear. Click “Next” to continue.
4. The installation program will help you to setup the Wireless Utility. *Be noted that the Windows XP have its own Wireless Utility; you can either use the utility of Windows XP or the provided utility.*
5. You will see the icon on the Windows task bar when you finish the installation.



When the icon in the toolbar represents in green color, it is properly connected to the network and if it represents in red color, then it is not connected to the network.

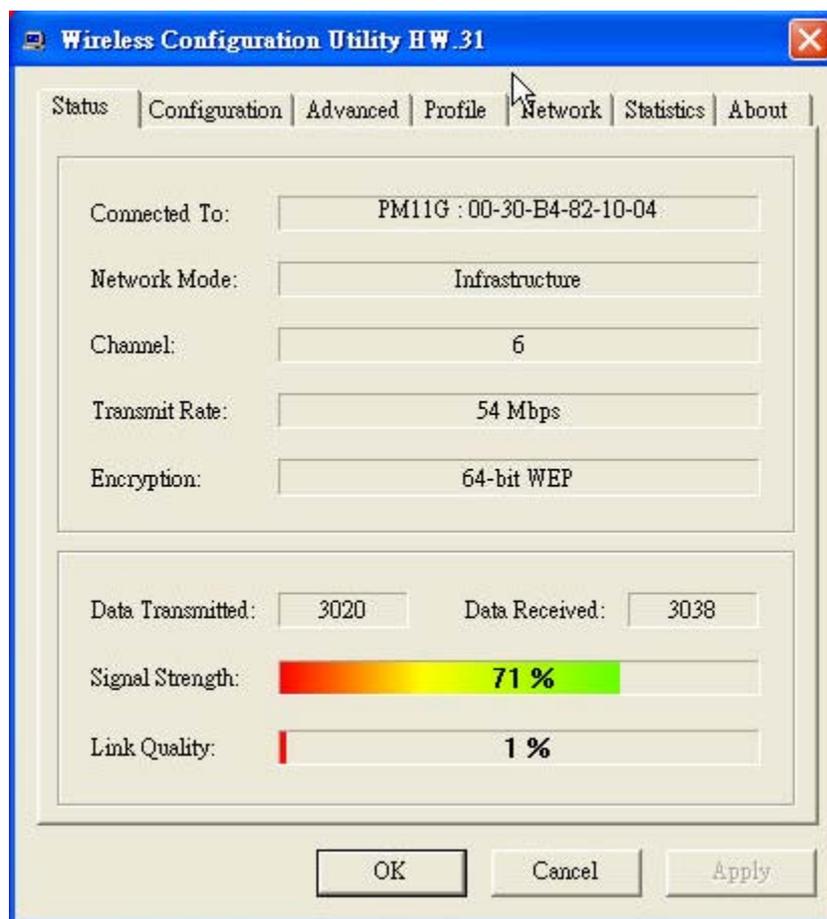
## Wireless Utility Setting

With the 2.4GHz 802.11n MPCI Module utility, users can configure all the functions provided by the Wireless Monitor Utility. Double-click the utility icon that appears in the taskbar.

The Wireless Monitor Utility includes seven tabs: Status, Configuration, Advanced, Profile, Network, Statistics and About.

### Status

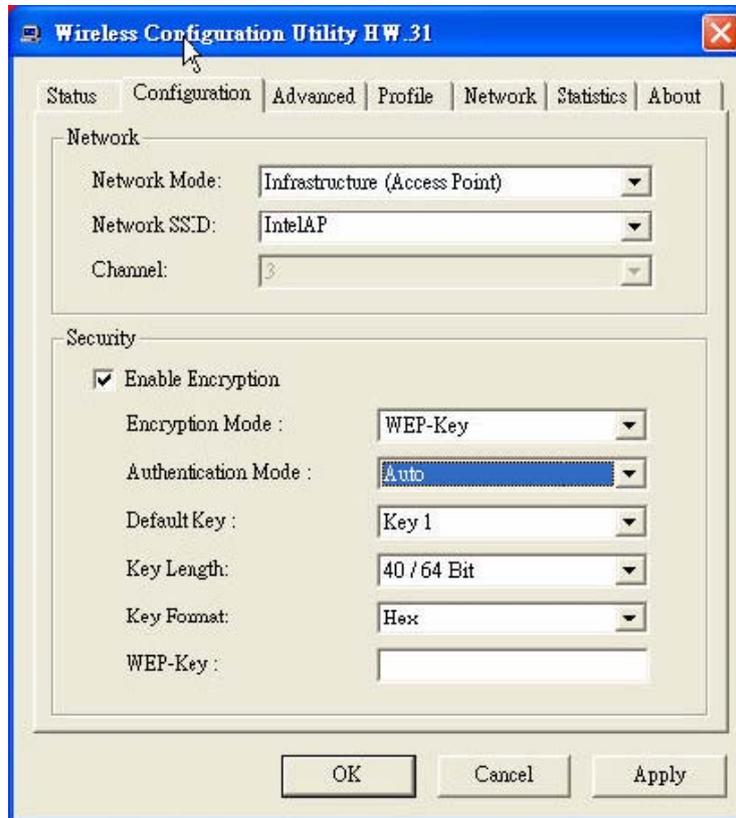
The Status screen shows you the status of the Wireless Adapter, it shows that where the device is connected to, the Network mode, the Channel, the transmit rate and the encryption mode.



There are two dialog boxes showing the data transmitted and the data received. The two signal lines show the Signal Strength and the Link Quality of the device.

## Configuration

The Configuration function helps you to configure the Network and the Security.



**Network:** the setting of the Network mode, the SSID and the Channels.

- Network Mode:

If you want to connect with an Access Point, please set to “Infrastructure” mode. If you have more stations and just want to set them as local network, please set the mode to “Ad-Hoc” mode.

- Network SSID:

The SSID differentiates one Wireless LAN group name from another; so all access points and all devices attempting to connect to a specific Wireless LAN group name must use the same SSID. A device will not be permitted to join the BSS unless it can provide the unique SSID.

If the SSID parameter is “ANY”, it will detect the strongest signal of the wireless station.

- **Channel:**

It shows radio channel numbers that used for Wireless LAN networking. In Ad-Hoc mode stations, each station must have the same channel numbers and SSID. In Infrastructure mode, the 2.4GHz 802.11n MPCII Module will automatically detect the channel number of the Access Point.

**Security:** the setting of the Network Encryption. This function is used to protect wireless communication from eavesdropping. A secondary function of encryption is to prevent unauthorized access to a wireless network, and it can be achieved by using the Encryption function.

- **Encryption Mode:**

There are two kinds of encryption mode, **WEP encryption** and **WPA-PSK**. Click the *Enable Encryption* to activate the security of the 2.4GHz 802.11n MPCII Module.

**WEP-Key:** WEP (Wired Equivalent Privacy) relies on a secret key that is shared between a mobile station and a base station (Access Point).

**WEP-Passphrase:** the Passphrase in the dialog box helps you to create a group of WEP key in the Key Setting.

- **Authentication Mode:**

**Open System:** with the same WEP key between the stations, the stations don't need to be authenticated, and this algorithm was set to default.

**Shared Key:** with the same WEP key between the stations in this Authentication algorithm, this type will use packets with encryption by transferring a challenge text which will be acknowledge by both side of the stations. In order to choose which authentication algorithm will be used, you must know which one the station supports this algorithm first.

It is recommended to select “**Auto**” if you are not familiar with

the setting.

- **Default Key (Key 1 ~ Key 4):**  
You can type the key that you want to use from Key#1 to Key #4, and the key that you type will be the encryption between the stations that you connected with.
- **Key Length, Key Format and WEP Key:** If you select 64bit in Hex format, you must type 10 values in the following range (0~F, hexadecimal), or 64bit in ASCII format, you must type 5 values in the following range (0~9, A~Z and a~z Alphanumeric). If you select 128bit in Hex format, you must type 26 values (0~F, hexadecimal), or 128bit in ASCII format, you must type 13 values in the following range (0~9, A~Z and a~z Alphanumeric).

Be sure that the 2.4GHz 802.11n MPCII Module and the wireless station were set in the same key.

**Note:** After all the settings are completed, click Apply to save the setting.

**WPA-PSK:** WPA-PSK (Wi-Fi Protected Access pre-shared key) is a simpler version that does not support 802.1x and requires a separate RADIUS server for mutual authentication.

Enter a Passphrase in the WPA-PSK dialog box. This passphrase must be the same on each computer that is connected to the wireless network.

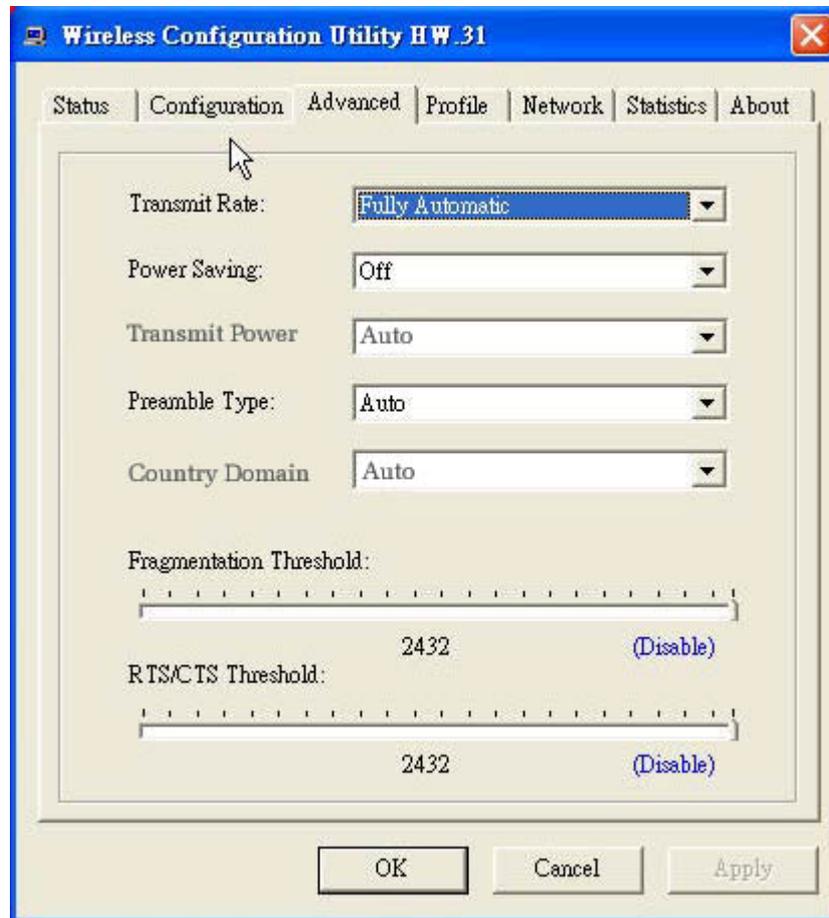


The image shows a 'Security' dialog box with the following elements:

- A checked checkbox labeled 'Enable Encryption'.
- A dropdown menu labeled 'Encryption Mode' with 'WPA-PSK' selected.
- A text input field labeled 'WPA-PSK' which is currently empty.
- A mouse cursor is visible at the bottom center of the dialog box.

## Advanced

The Advanced settings help you to control the Wireless Adapter to adjust with wireless devices in certain environment.



- **Transmit Rate:**

The Fully Automatic will automatically detect the suitable linking transfer rate and auto fall back when the signal is not too strong to transmit data, it will auto fall back from 300Mbps to 1 Mbps.
- **Preamble Type:**

The usage of the preamble is to limit the packet size of the data to transmit. It is recommended to choose the short preamble when the link quality is bad, it is to prevent the wasting time of resending a long packet that is lost. The Default is Auto which access short and long preamble.

- **Fragment Threshold:**

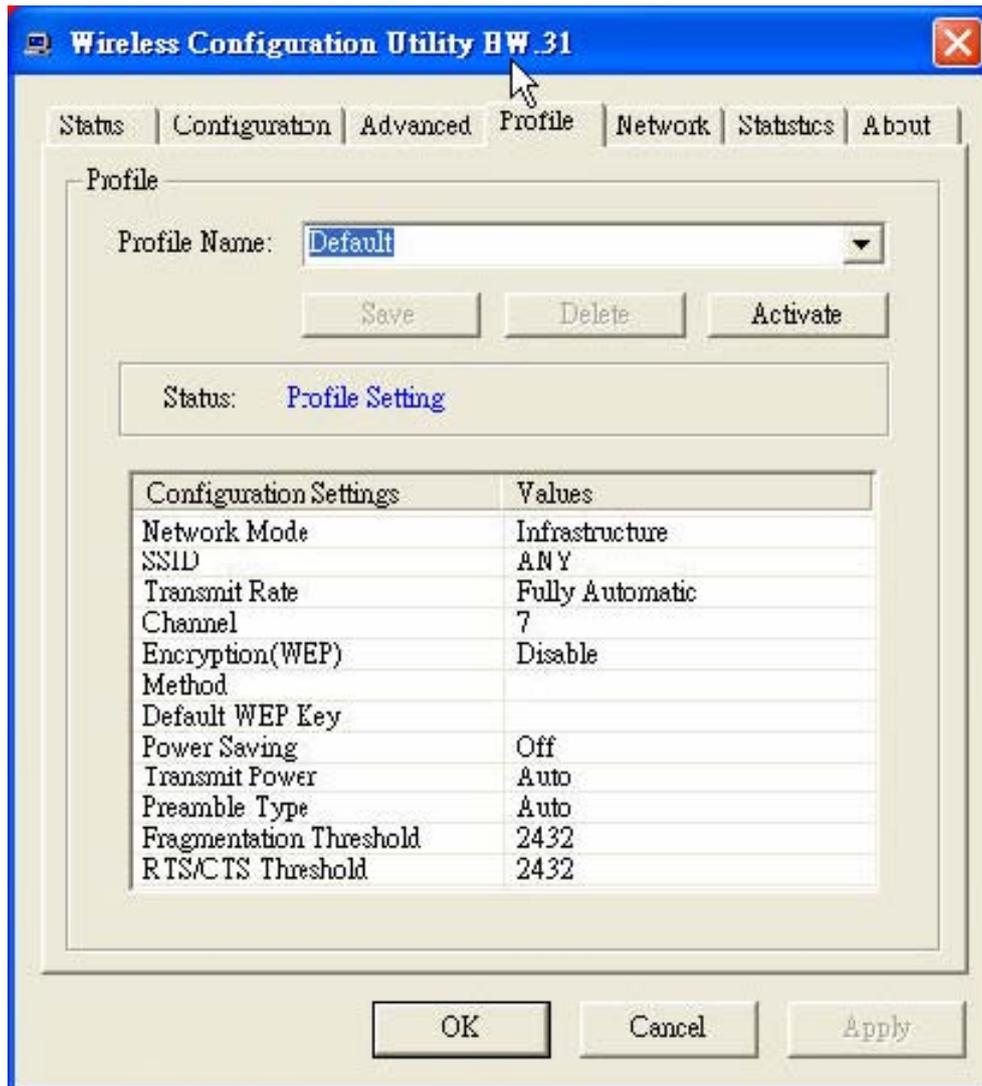
Fragmentation Threshold is a way of transmitting the packets that will be fragmented. Choose a setting within a range of 256 to 2432 bytes. It is recommended to fragment the packet when the link quality is bad, it is to prevent the wasting time of resending a long packet that is lost.

- **RTS/CTS Threshold:**

The RTS/CTS Threshold is a station initiates the process by sending a RTS frame, the other ends receives the RTS and responds with a CTS frame, the station must receive a CTS frame before sending the data frame. This is to prevent the collisions by each station. Choose a setting within a range of 256 to 2432 bytes. It is recommended limiting a long packet to prevent each station waiting too long to transmit a data.

## Profile

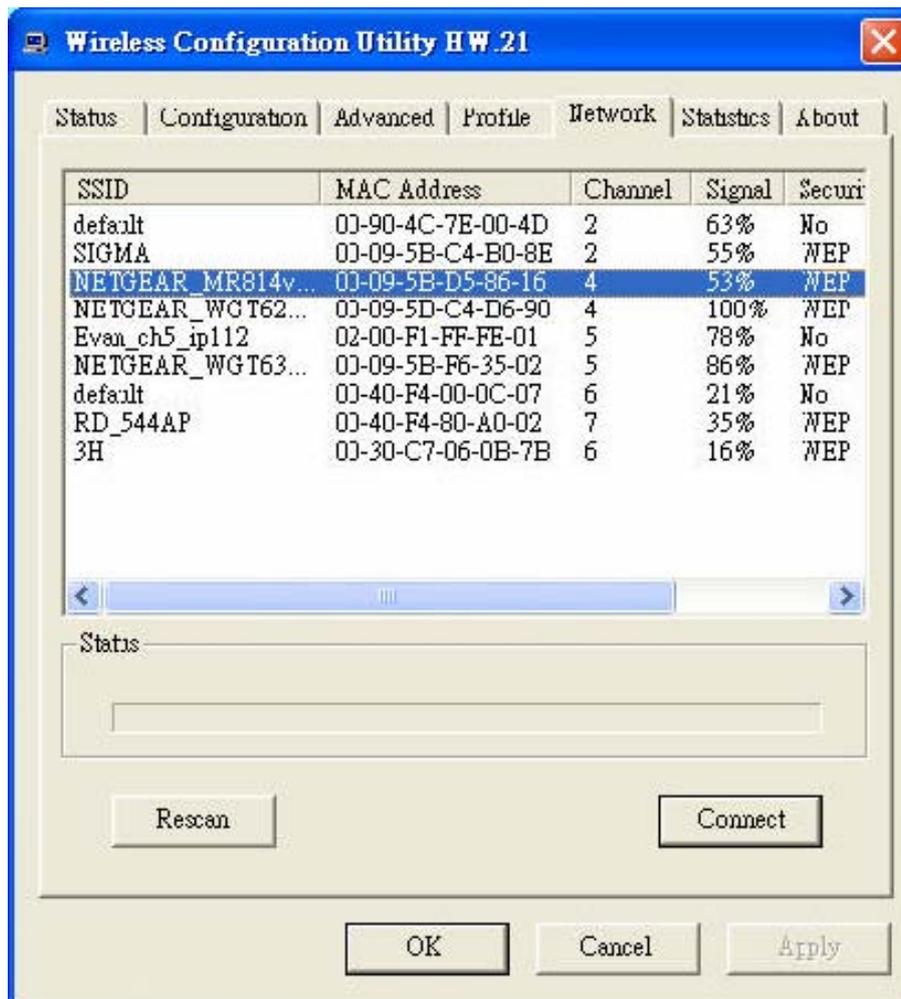
The Profile section allows you to set values for all parameters by selecting a previously defined profile. Type a name in the Profile Name field to create a profile, click “Save” and then click “Apply” when a profile is done. You can click “Delete” if the profile is no longer used, to activate other profile, choose a profile name in the Profile Name field and click Activate.



## Network

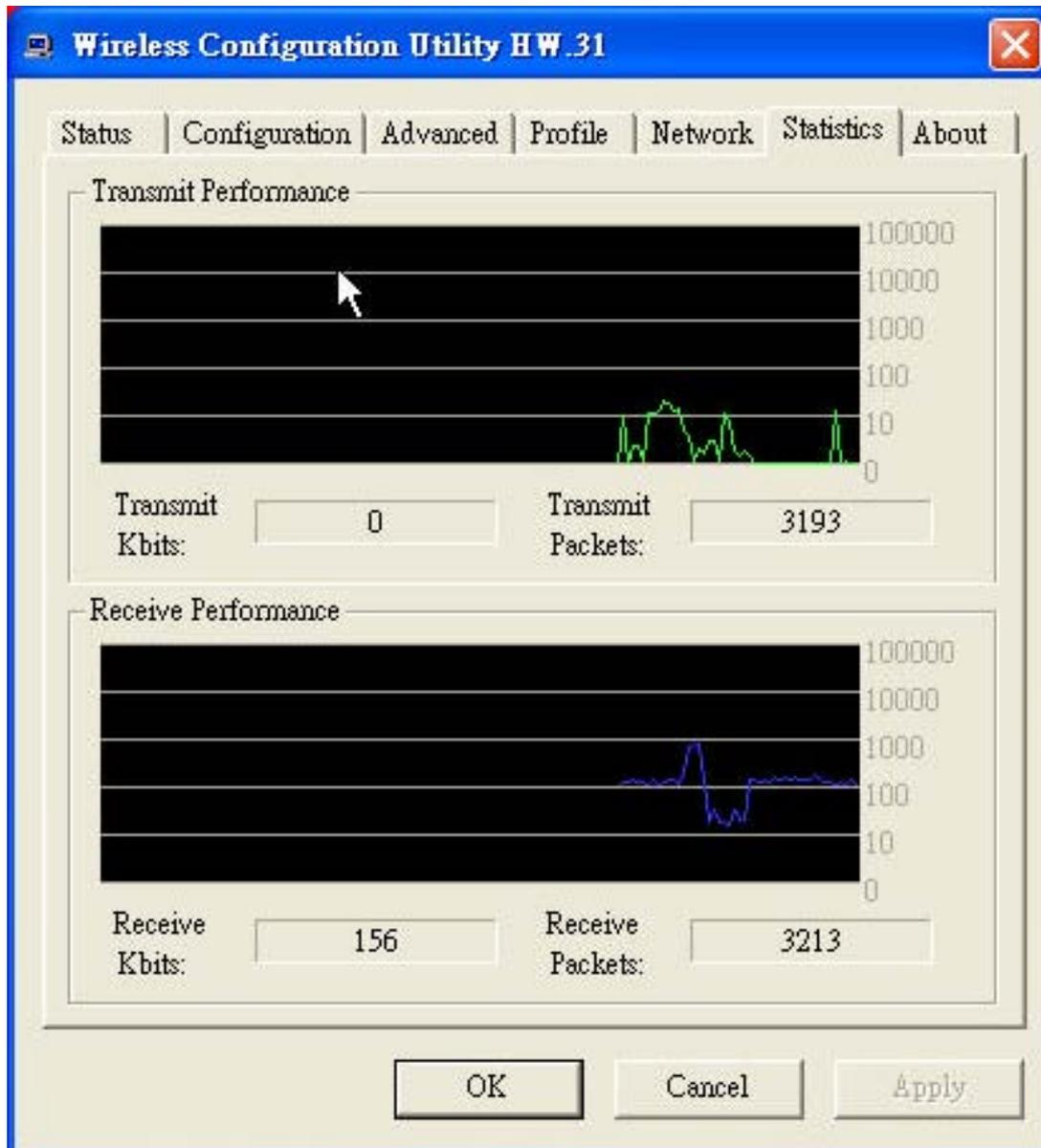
The screen shows all the Wireless devices around your Wireless Adapter. The information of the wireless devices includes the SSID, MAC Address, Channels, Signal, the Security type and the Network mode.

You can click the “Rescan” button to find the new wireless devices, and double-click the device to choose the wireless station that you want to connect with.



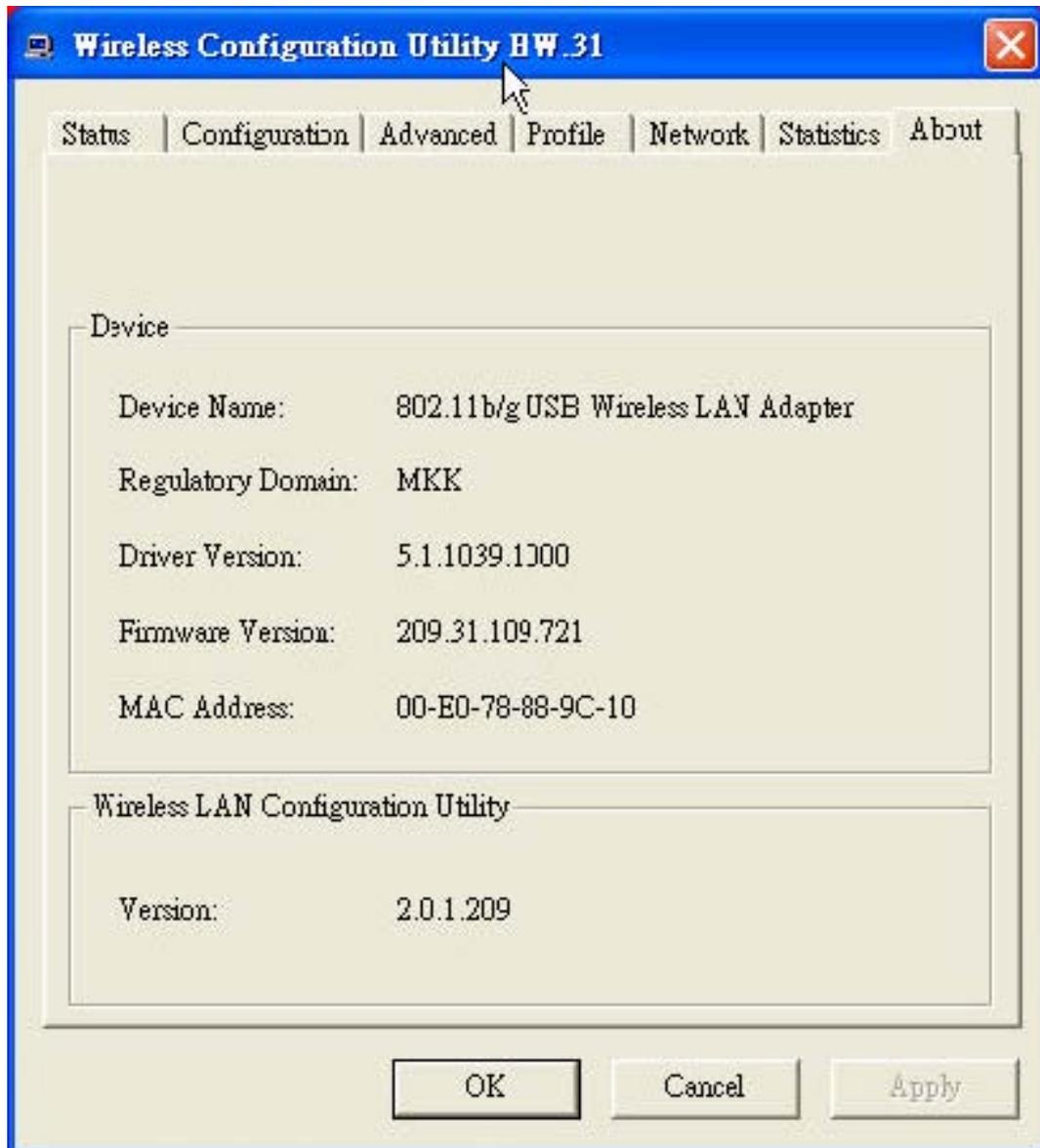
## Statistics

The Statistics section shows the real-time transmit and receive packets of the Wireless Adapter.



## About

The About section shows the Device Name, Regulatory Domain, Driver Version, MAC Address and the Utility version.



## **TECHNICAL SPECIFICATIONS**

<b>General</b>	
Standards	IEEE 802.11N
Radio Technology	IEEE 802.11b Direct Sequence Spread Spectrum (DSSS) IEEE 802.11g Orthogonal Frequency Division Multiplexing (OFDM)
Data Transfer Rate	802.11g: Up to 54Mbps (6/9/12/18/24/36/48/54) 802.11b: Up to 11Mbps (1/2/5.5/11) 802.11n: Up to 300 Mbps (HT40:30/60/90/120/180/240/270/300)
Receiver Sensitivity	Sensitivity for 802.11b 11 Mbps (CCK): -87dBm 5.5 Mbps (CCK): -88dBm 2 Mbps (DQPSK): -89dBm 1 Mbps (DBPSK): -91dBm (typically @PER < 8% packet size 1024 and @25°C + 5°C) Sensitivity for 802.11g 54 Mbps (OFDM): -72dbm 48 Mbps (OFDM): -75dbm 36 Mbps (OFDM): -77dbm 24 Mbps (OFDM): -80dbm 12 Mbps (OFDM): -85dbm 6 Mbps (OFDM): -88dbm (typically @PER < 10% packet size 1024 and @25°C + 5°C) Sensitivity for 802.11n 300 Mbps (OFDM): -63dbm (typically @PER < 10% packet size 1024 and @25°C + 5°C)
Frequency Range	2412 ~ 2462 MHz (North America) 2412 ~ 2472 MHz (General Europe) 2412 ~ 2484 MHz (Japan)
Modulation Schemes	DBPSK, DQPSK, CCK and OFDM (BPSK/QPSK/16-QAM/ 64-QAM)
Channels	1 ~ 11 channels (FCC) 1 ~ 13 channels (ETSI) 1 ~ 14 channels (Japan)
Media Access Protocol	CSMA/CA with ACK
Security	64/128-bits WEP Encryption; WPA
<b>Physical and Environmental</b>	
Driver Support	Windows 98se, Windows 2000, Windows ME, Windows XP
Continuous Current Consumption	802.11n: 2TX: 610mA, 3RX: 570mA
Temperature	Operating Temp : 0°C ~ 55°C Storage : -20°C ~ 65°C
Humidity	5% ~ 95% RH, no condensation
Dimensions	60 x 44.60 x 3.5 mm (W x H x D)
Certifications	FCC Part 15.247 for US, ETS 300 328 for Europe,