Chung Nam Electronics (CNE)

IEEE 802.11b/g/n USB WLAN Module
(Model #: WLC322NA)
OEM Manual

Version 0.1

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Contents

Chapter 1: Product Information

1.1 Introduction

The CNE Wireless USB Adapter is a USB 2.0 pen-size wireless module supporting IEEE 802.11b/g /n 2.4GHz radio operation, The WLAN Adapter provide high-speed wireless connection with data rate from 1 Mbps up to 300Mbps theoretically. Additionally, wireless roaming allows the user to move among different AP without losing the current connection. The adapter provides excellent security features including：TKIP, AES, WPA, and up to 128 bit WEP encryption security make the network almost impenetrable.

Featuring high performance transmission rates, simple installation and adaptability, as well as strong security the USB WLAN adapter is the perfect solution for small office and home needs.

1.2 Features

- Complies with IEEE 802.11b/g, IEEE 802.11n Draft 2.0 standards.

- 2T2R Modes for Antenna configurations.

- Dynamic data rate: Maximum data rate up to 300Mbps. Auto fallback switchi
  -ng with 54, 48, 36, 24, 18, 12, 11, 9, 6, 5.5, 2 and 1Mbps.

- Reverse Direction Data Flow and Frame Aggregation.

- Multiple BSSID Support.

- Wireless data encryption with 64, 128 encryption for security

- Lower Power with Advanced Power Management.

- Drivers supports Windows2000, XP and Vista, Linux

1.3 LED Status

The LED on the top of this card indicates Link/Act status. It blinks at green light when sending and receiving data.

Chapter 2: Installation Guide

2.1 Overview

The USB WLAN Adapter Setup Wizard will guide you through the installation procedure for Windows 2000, XP, Vista and Linux. This Wizard will also guide you installing the Utility and drivers.

In case you plug in the hardware before installing the software, you will be prompted by "Found New Hardware Wizard", please click the **Cancel** button, and run the Setup Wizard program from the installation CD-ROM shipped together with the WLAN Adapter.

All of following sections are written based on Windows XP.

* Note: The comments and conditions for other OS platforms may be different from this chapter.

2.2 Installation procedure

2.2.1 Software installation

1. Insert the Resource CD into the CD/DVD-ROM drive of your computer, and execute '**Setup.exe**' to install the driver. *Figure 2-1* should then appear, please select the language that you want (e.g. English) and click '**Next**':
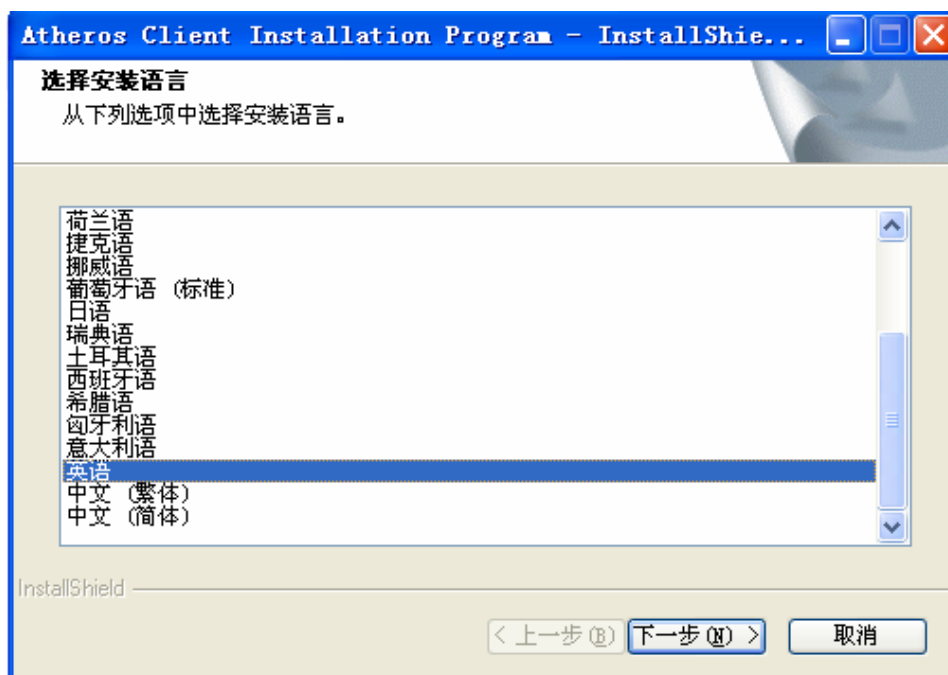

Figure 2-1 Language selection

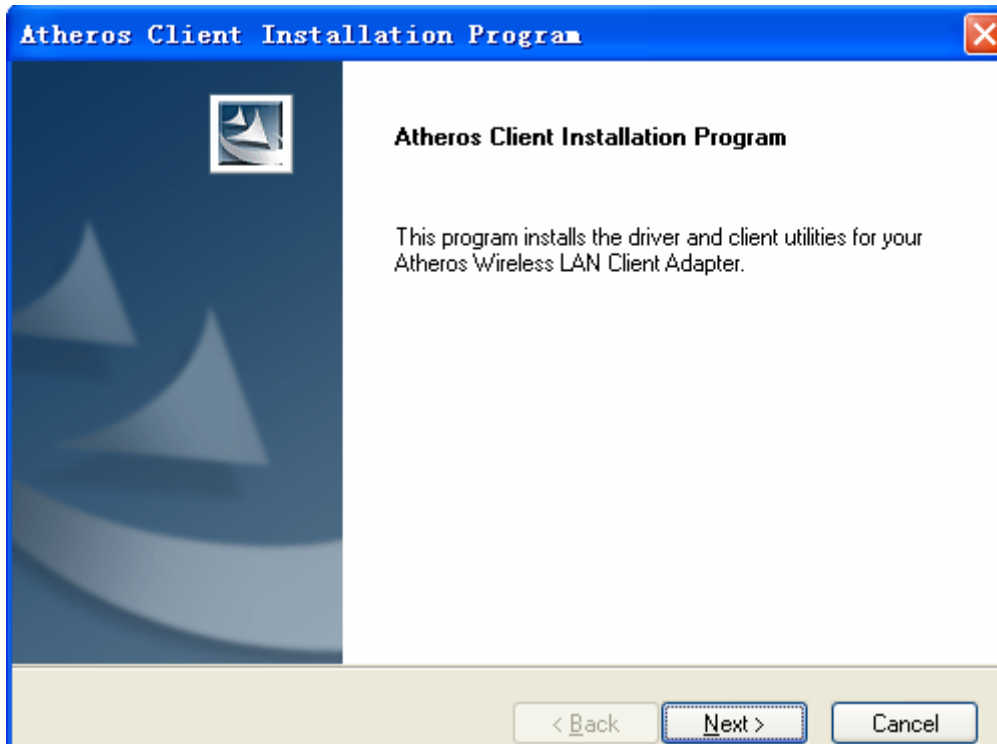2. *Figure 2-2* will appear on the screen, please click '**Next**'

Figure 2-2 Atheros client installation program

3. You will see a license agreement dialog box shown in *Figure 2-3,* select '**I accept the terms of the license agreement**' and click '**Next'**
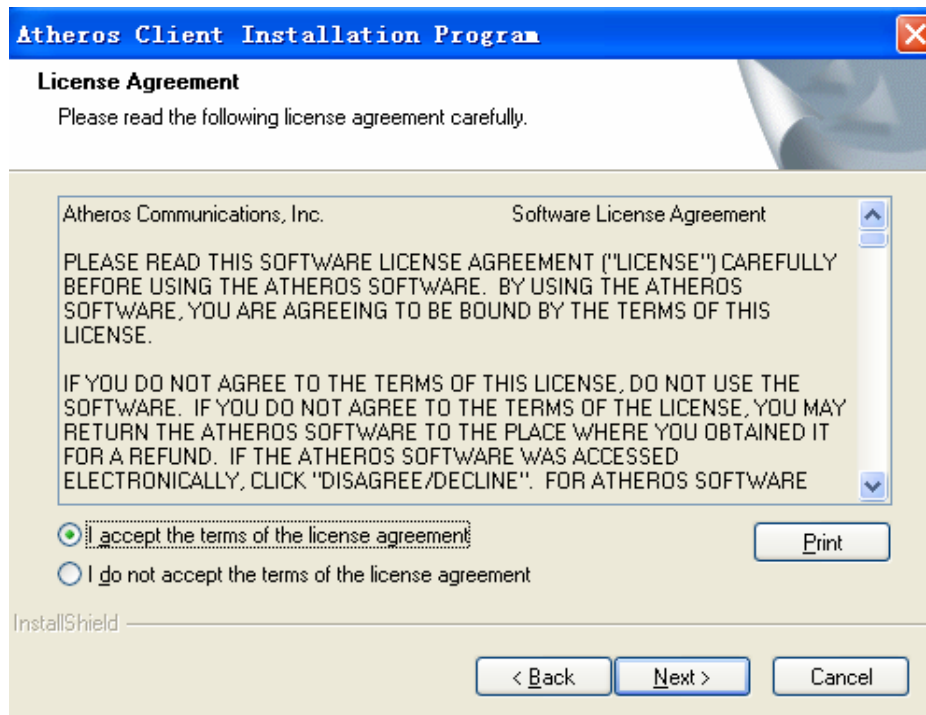

Figure 2-3 license agreement

4. *Figure 2-4* appears on the screen, please select '**Install Client Utilities and Driver**' and click '**Next**'
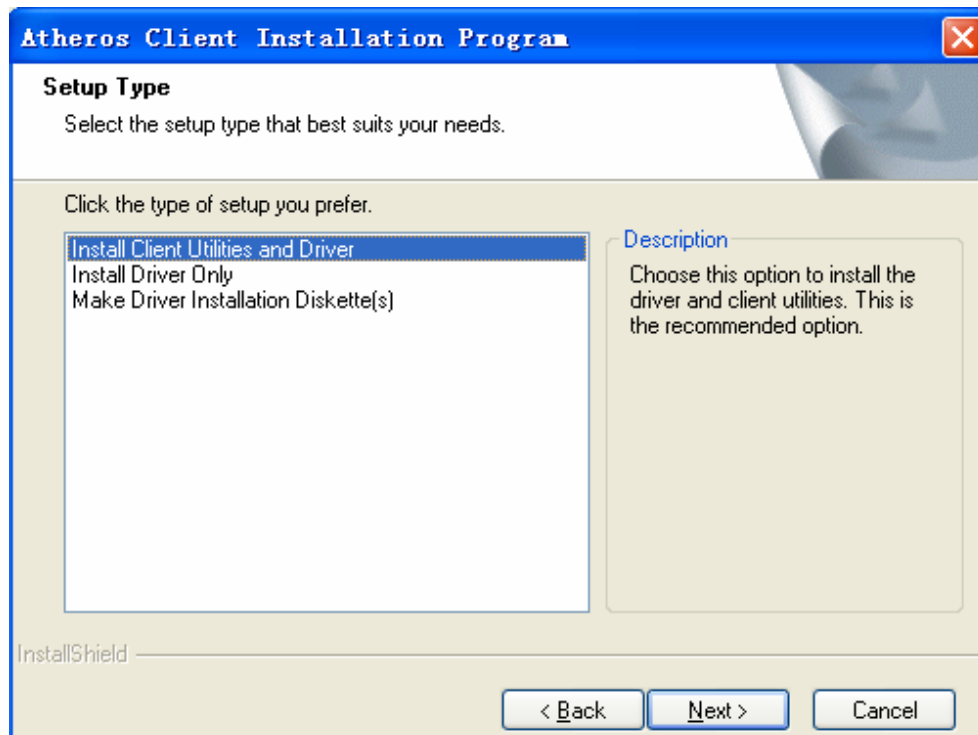

Figure 2-4 Setup Type

5. Choose the path of installation and select program folder in your computer and click '**Next**' to continue.
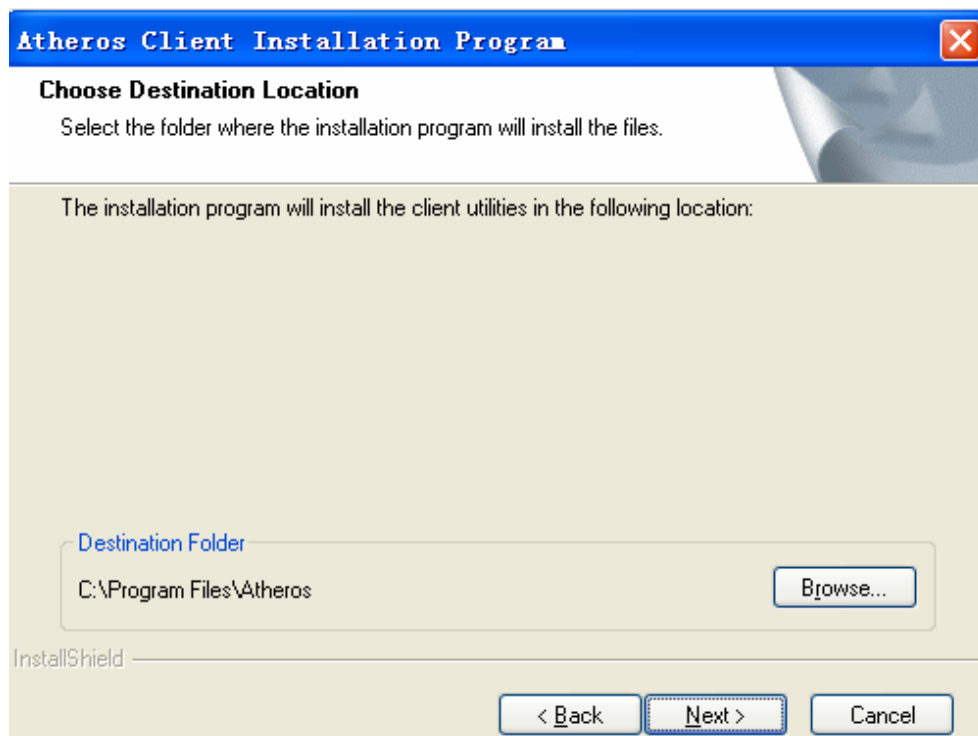

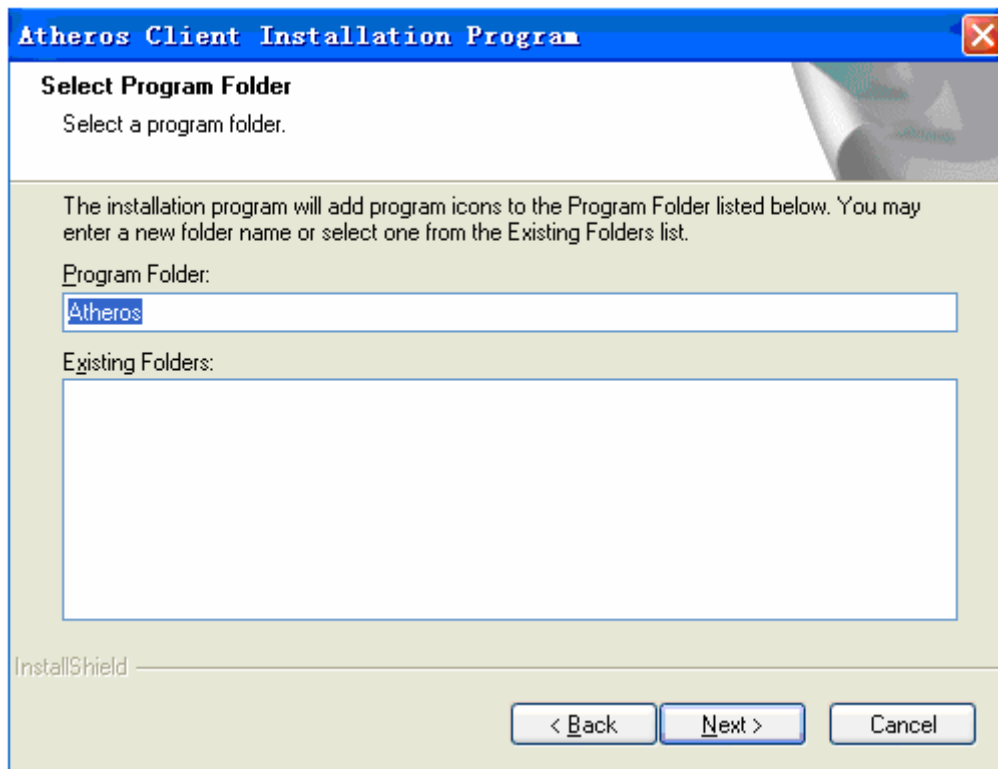*Figure 2-5 choose the path of installation*

Figure 2-6 select program folder

6. The dialog box as *Figure 2-7* will appear, please read it carefully and then click '**Next**'
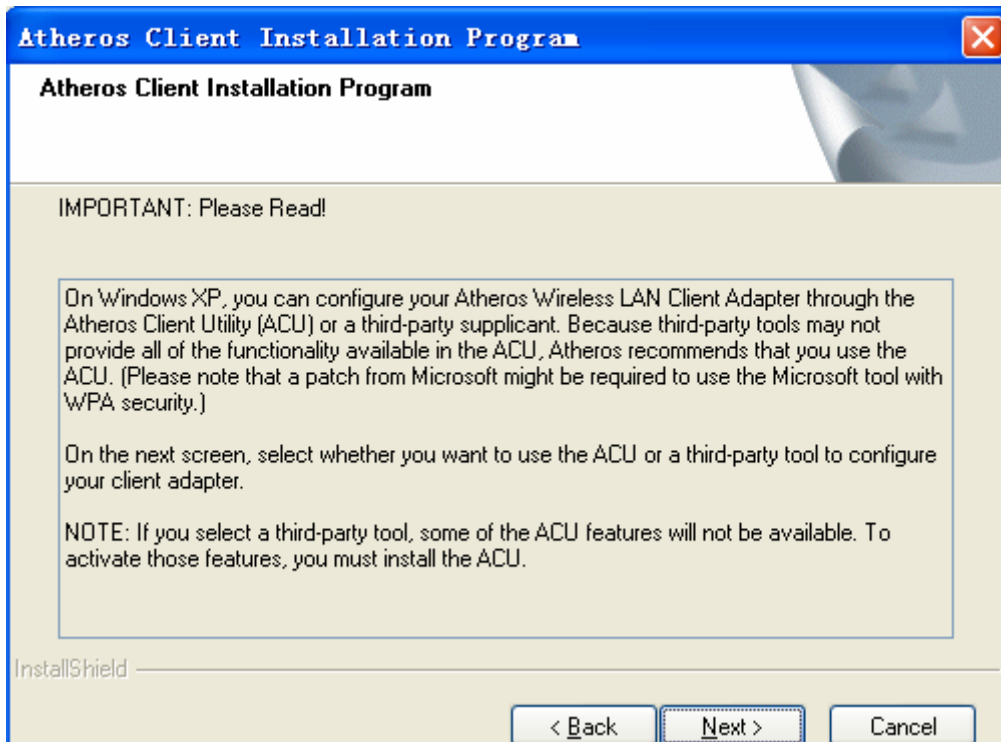
Figure 2-7 Notice of installation

7. Please select '**Atheros Client Utility (ACU) and Supplicant**' in this dialog box as *Figure 2-8 choose configuration* and click '**Next**'

Figure 2-8 choose configuration

8. Please select '**Do Not Install Single Sign On feature set**' as *Figure 2-9 single sign on feature set install option* and click '**Next**'
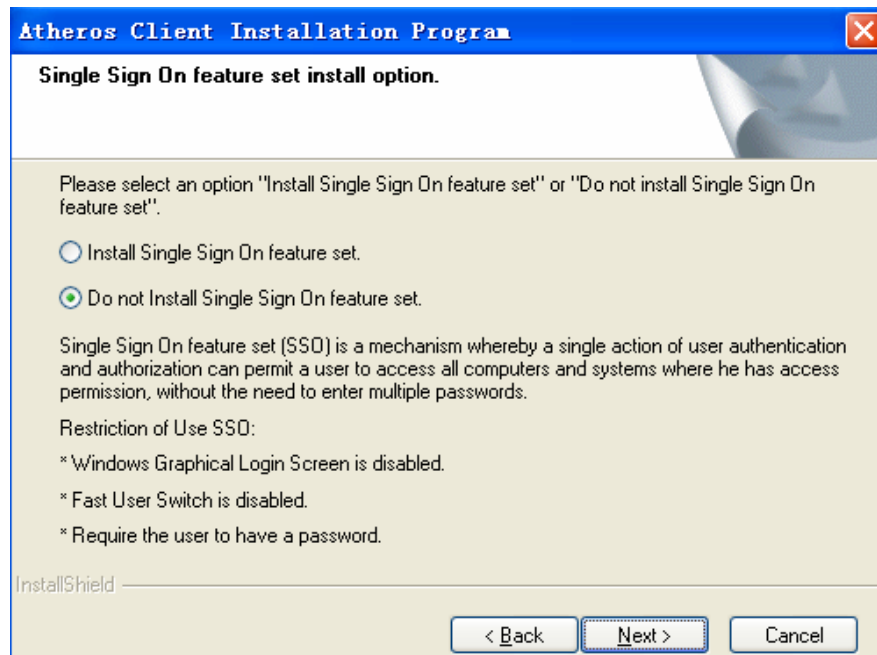
Figure 2-9 single sign on feature set install option

9. A warning box will show in your computer as *Figure 2-10*, please click **OK**
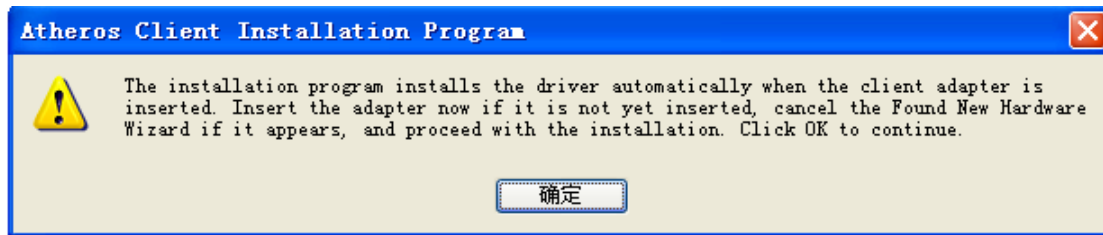
Figure 2-10 install warning

10. Please waiting for running automatically for a moment, after the files have been successfully installed, the screen in *Figure 2-11* will appear. Click the button '**Finish**' to finish the wizard
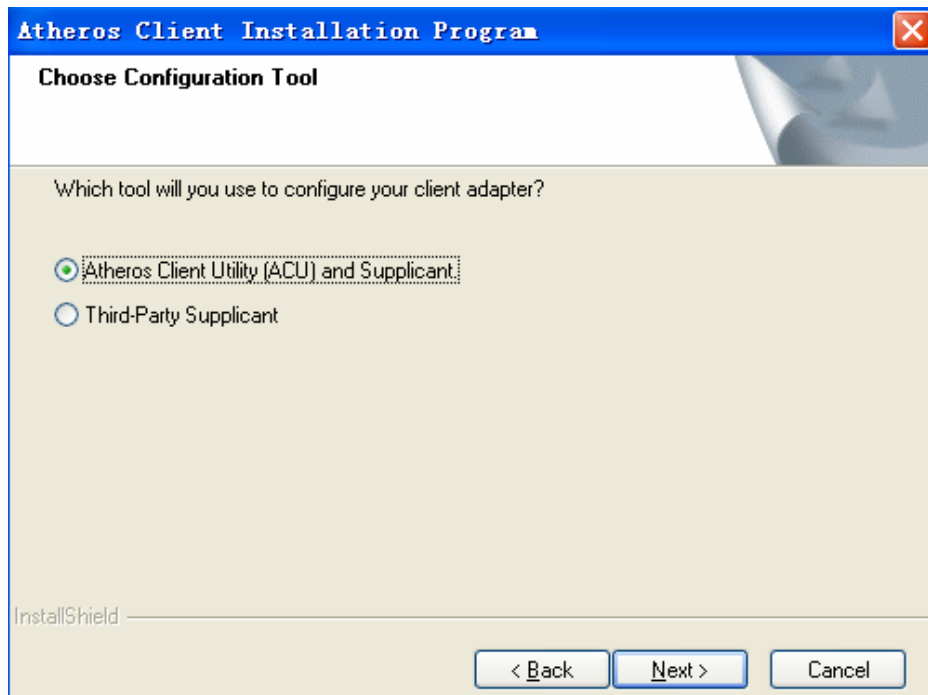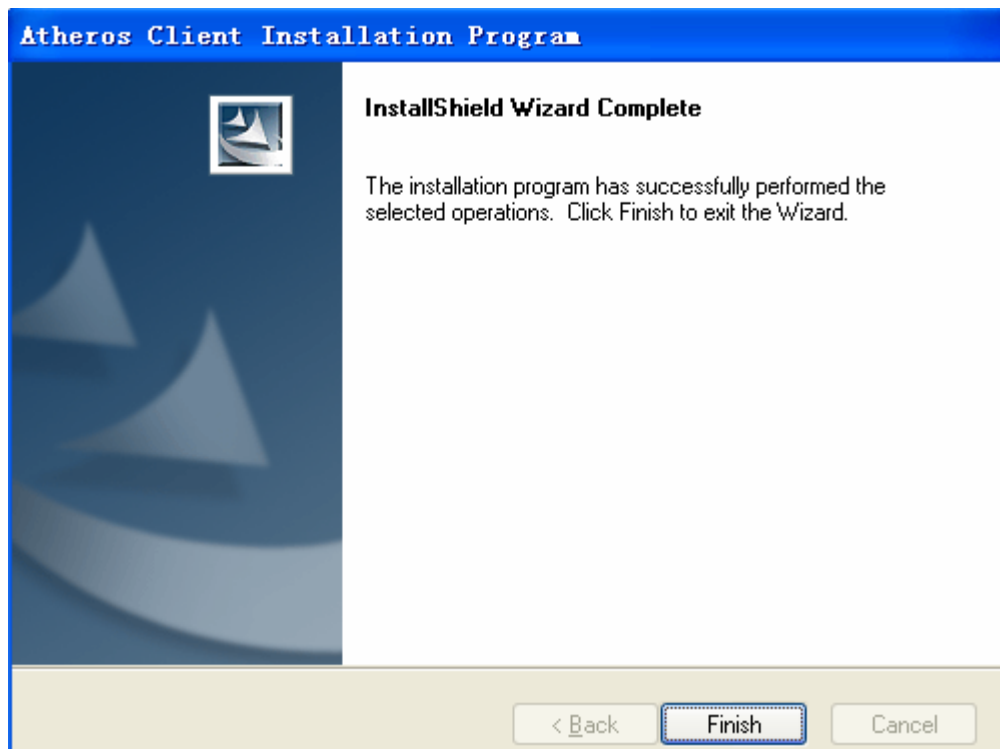

Figure 2-11 finish installing

11. After installing the software, please plug the WLAN Adapter into your computer for hardware installation. In case you want to understand the detail hardware installation instructions, please refer to next section - Hardware Installation.

2.2.2 Hardware Installation

If you have been successfully installed the driver, please plugged the USB WLAN Adapter into embedded computer system. The OS will automatically detect the USB WLAN Adapter and automatically select the appropriate driver for Adapter. If it does not, please follow the setup steps to finish the driver installation.

*Note: This is modular device intended to be use only for embedded system inside, it can be used only to OEM device to a certain distance in which the module will not directly expose to the end users. And can not be remove without professional guide!
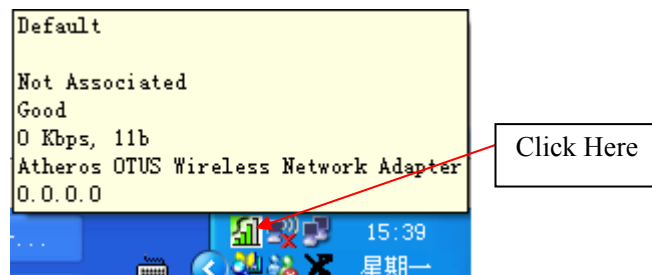
Figure 2-12 the icon of the adapter

When you want to start to use this WLAN Adapter, please click on the icon   in right-click, and a menu as *Figure 2-13* will popup. Please select '**Open Atheros Client Utility**' to start configuration program. If you want to close configuration utility, please click '**Exit**'
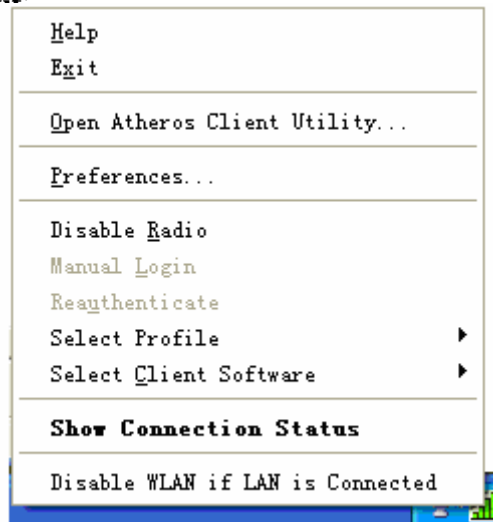
Figure 2-13 the menu of adapter configuration

* Note: If you stopped configuration utility by 'Exit' function, you'll not be able to maintain the wireless link to the access point you wish to use. In this case, you can start configuration utility again by clicking: **Start -> All Programs ->Atheros -> Atheros Client Utility**

Chapter 3: Configuration

This section shows you how to configure you the adapter in order to getting connection to a wireless access point. There are two kinds of ways that you can carry out configuration:
1) Using the Atheros configuration utility which comes with wireless adapter driver;
2) Using built-in windows zero configuration utility.

3.1 Using Atheros configuration utility

Please follow the following instructions in order to use Atheros configuration utility to connect to wireless access point.


1. Right-click the icon located at system icon box of desktop and click '**Open Atheros Client Utility**', the figure of Atheros configuration utility will show up as the *Figure 3-1*.
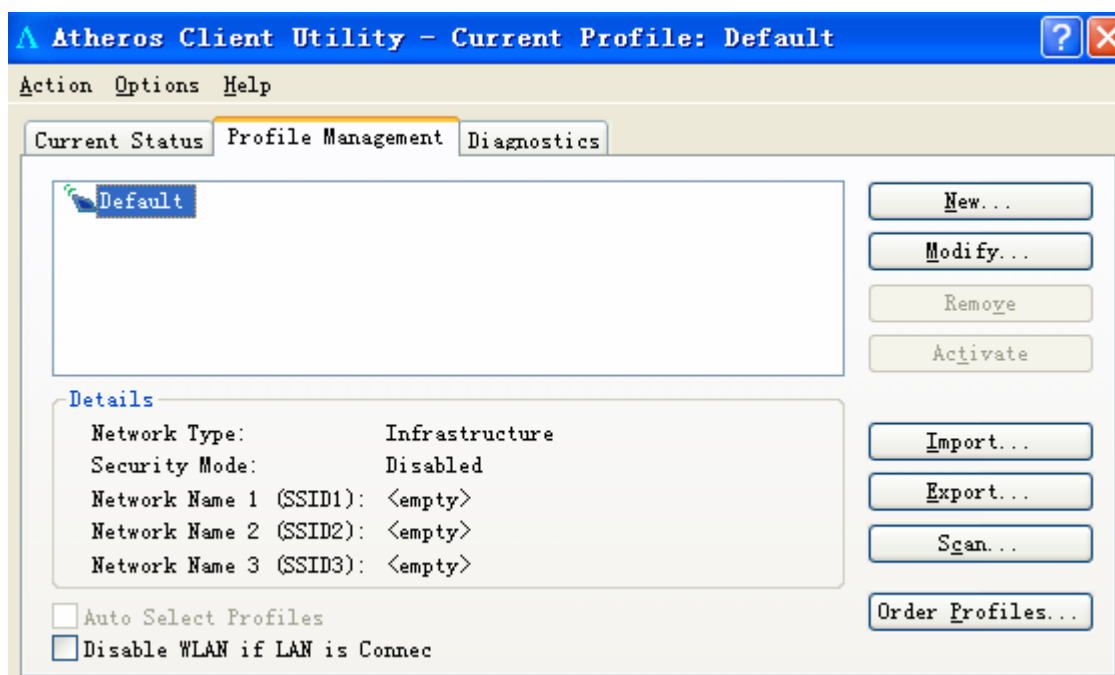
Figure 3-1 the profile management of Atheros configuration utility

● **New :** Create a new profile, or Add a profile from an existing wireless access point or wireless device
● **Modify:** Modify current setting parameter for SSID

● **Import:** Save current Profile

● **Export:** Export old Profile by set previously

● **Scan:** Scan different access point

● **Order:** Profiles-Order for different profiles

2   Please click on the button '**Scan**', and appear a dialog box as *Figure 3-2* of below
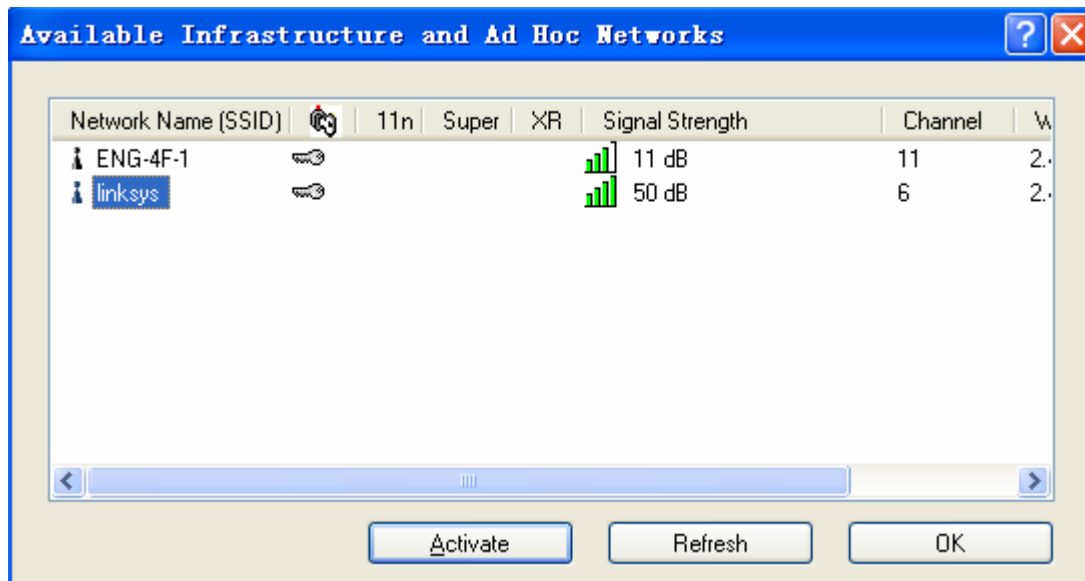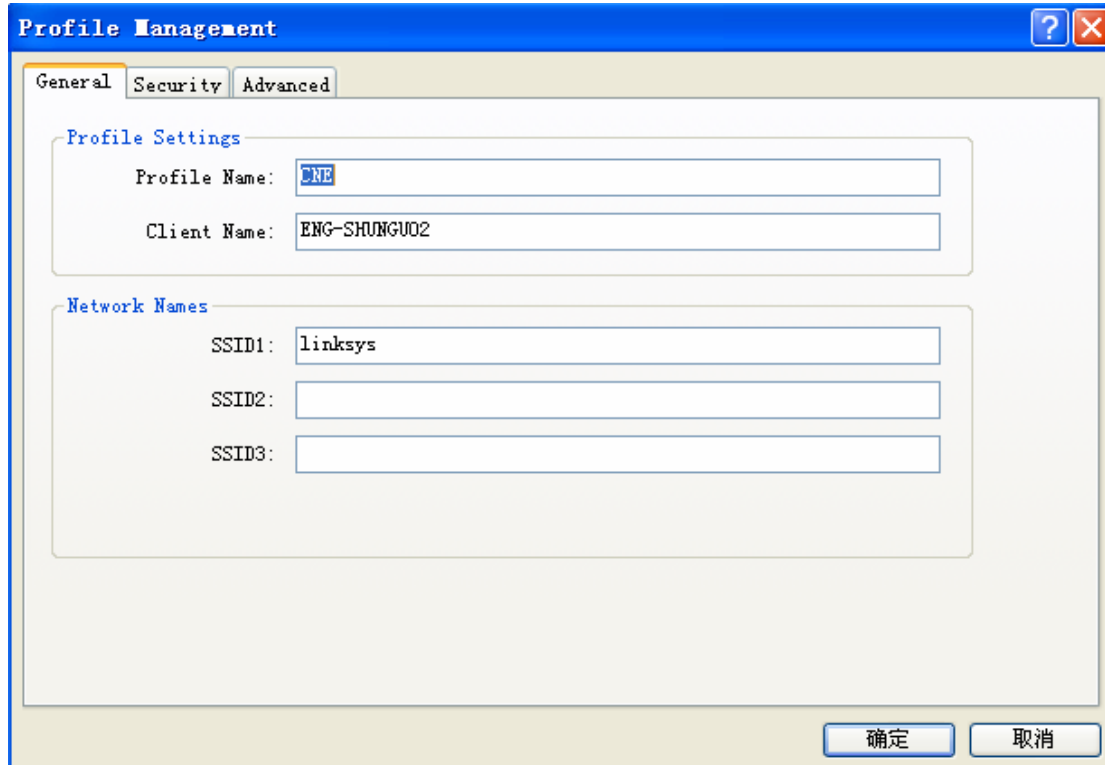
Figure 3-2 Available infrastructure and Ad Hoc Networks

● **Network Name (SSID):** The Service Set IDentifier of wireless access point or other network device. You can think it as the name of access point of wireless device.

● **Signal strength:** shows the strength of signal

● **Channel:** shows transmit signal channel in use

2. Please select a router and click '**Activate**' in dialog box of Available infrastructure and Ad Hoc Networks, appear the information as below, and input your definitional into *Figure 3-3 setting of General of Profile Management*

Figure 3-3 setting of General of Profile Management

● **Profile:** Identifies the configuration profile. This name must be unique. Profile names are not case-sensitive.

● **Client Name:** default

● **SSID1:** default

3. Please click the button 'Security' and select 'Pre-share key (static WEP)' in Profile Management as *Figure 3-4*, and input "xxxxxxxxxxxx" into 'WEP key', and click 'OK'
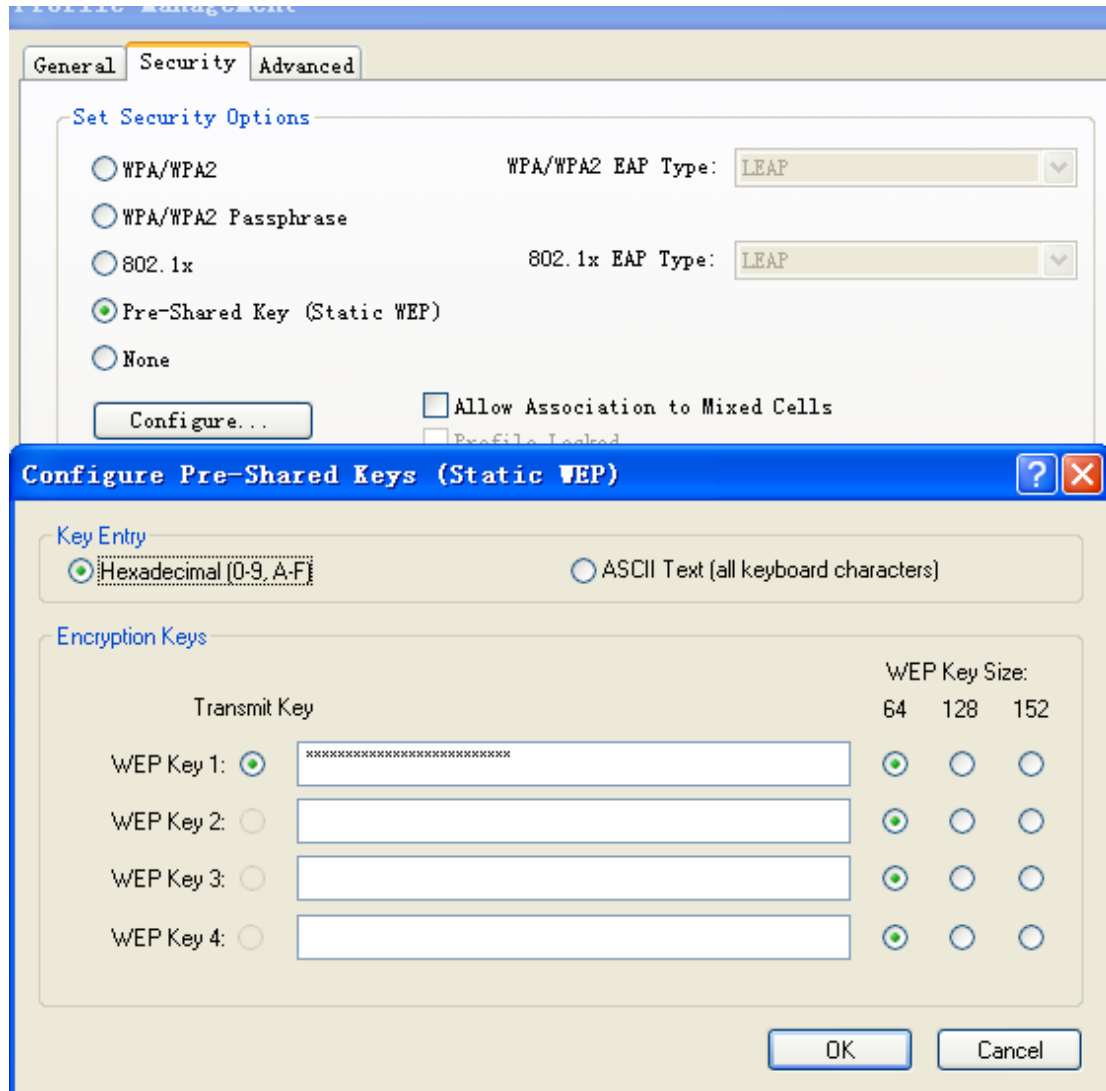
Figure 3-4 Configure Pre-shared Keys (Static WEP）

● **Set security option:** Please select a wireless authentication type you wish to use. Available options are 'WPA/WPA2', 'WPA/WPA2 pass phrase', '802.11x', 'Pre-shared key (static WEP)', and 'None'

● **Key Entry :** Key #1, Key #2, Key #3, Key #4, the Key groups. You can enter 10 hexadecimal digits (any combination of 0-9, a-f, A-F) or 5 ASCII characters for 64-bit (also called 40bits)

3.2 Using Windows Zero Configuration

Windows XP and Vista has a built-in wireless network configuration utility, called as 'Windows Zero Configuration' (WZC). You can also use WZC to configure the wireless network parameter for the adapter

* **Note:** Before setting your wireless network parameter, please start-up 'Windows Zero Configuration' (WZC)

1. Right-click the icon of Atheros configuration utility located at system icon box of desktop, click '**Select Client software**' and select '**Winows**'
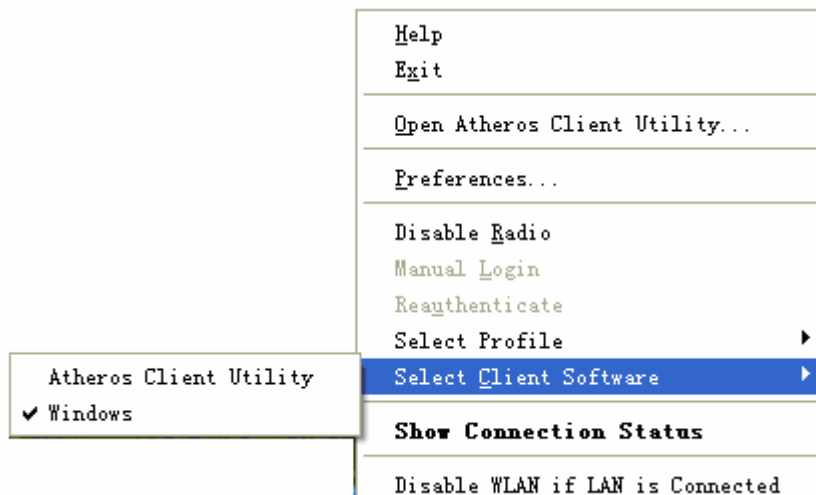
Figure 3-5 Select way of Windows Zero Configuration

2. Click the button **'Start'** (should be located at the bottom-left corner of windows desktop), select '**Control Panel**' **->** '**Network and Internet Connections**' -> '**network Connection**'

3. Right-click '**Wireless Network Connection**' (it may have a number as suffix if you have more than one wireless adapter, please make sure you right-click the '**Ralink 802.11n Wireless LAN Card**', then select '**View Available Wireless Networks**'.
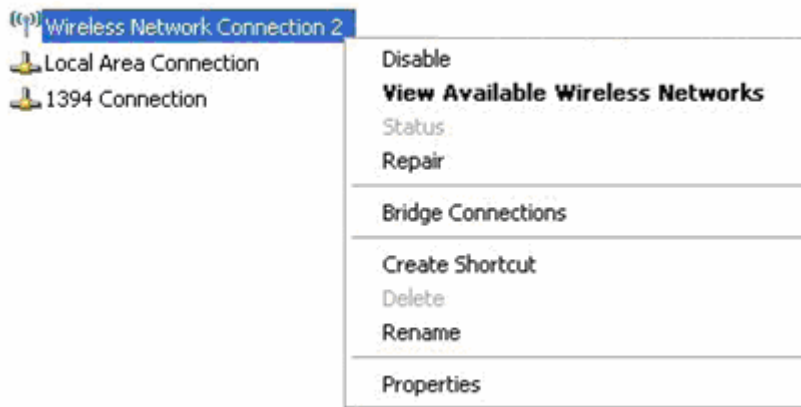
Figure 3-6 set wireless Network Connection

5. All wireless access points in proximity will be displayed here. If the access point you want to use is not displayed here, please try to move your computer closer to the access point, or you can click '**Refresh network list**' to rescan access points. Click the access point you want to use if it's shown, then click '**Connect**'.
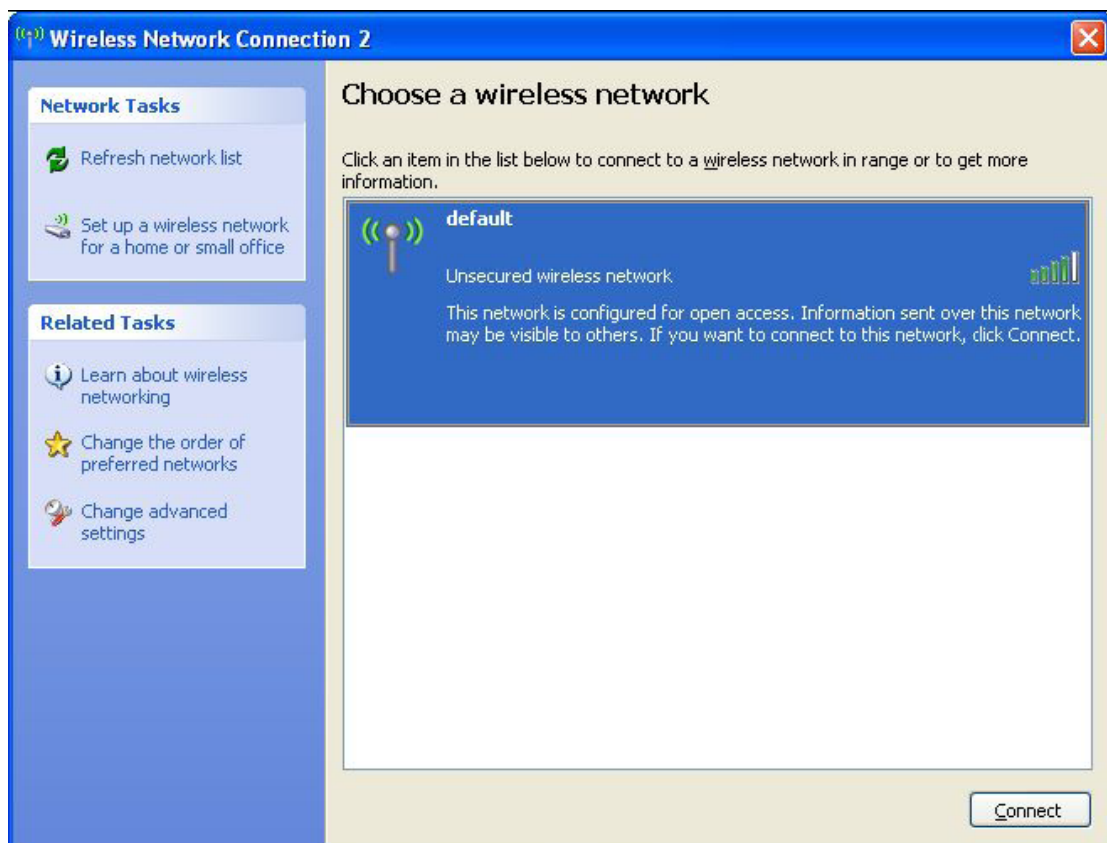
Figure 3-7 Choose a wireless network to connect

6. If the access point is protected by encryption, you have to input its security key or passphrase here. It must match the encryption setting on the access point. If the access

point you selected does not use encryption, you'll not be prompted for security key or passphrase.
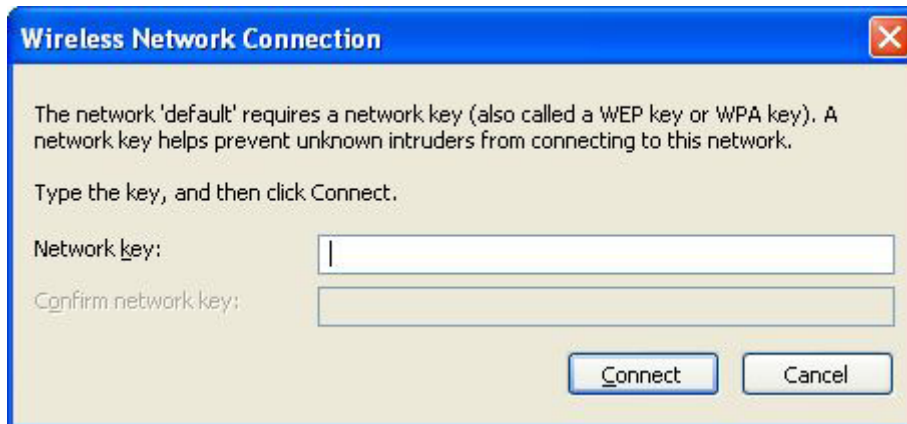
Figure 3-8 setting of security key or passphrase

7. If you can see '**Connected**' message, the connection between your computer and wireless access point is successfully established.
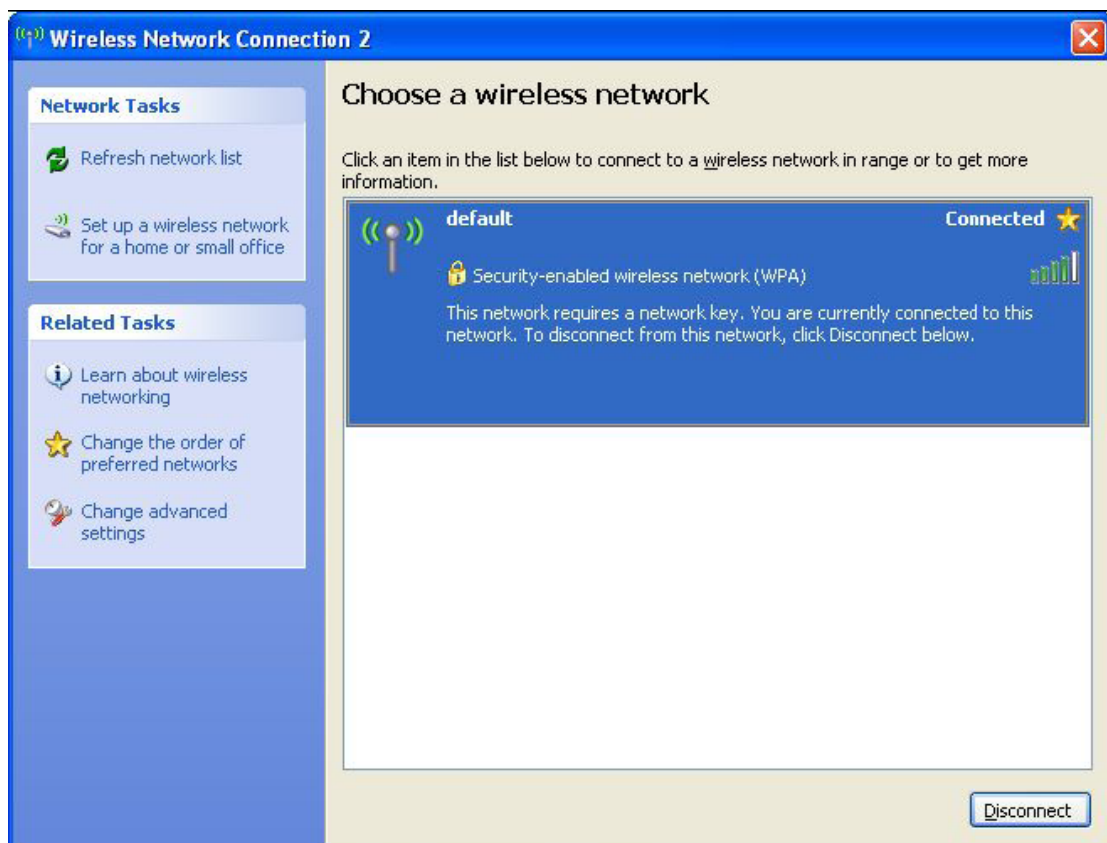
Figure 3-9 wireless network been connect

3.3 Link status

This portion describes the link status of the USB WLAN Adapter. To check the link status of the adapter, please right-click the icon 📶 of Atheros configuration utility located at your system icon box.
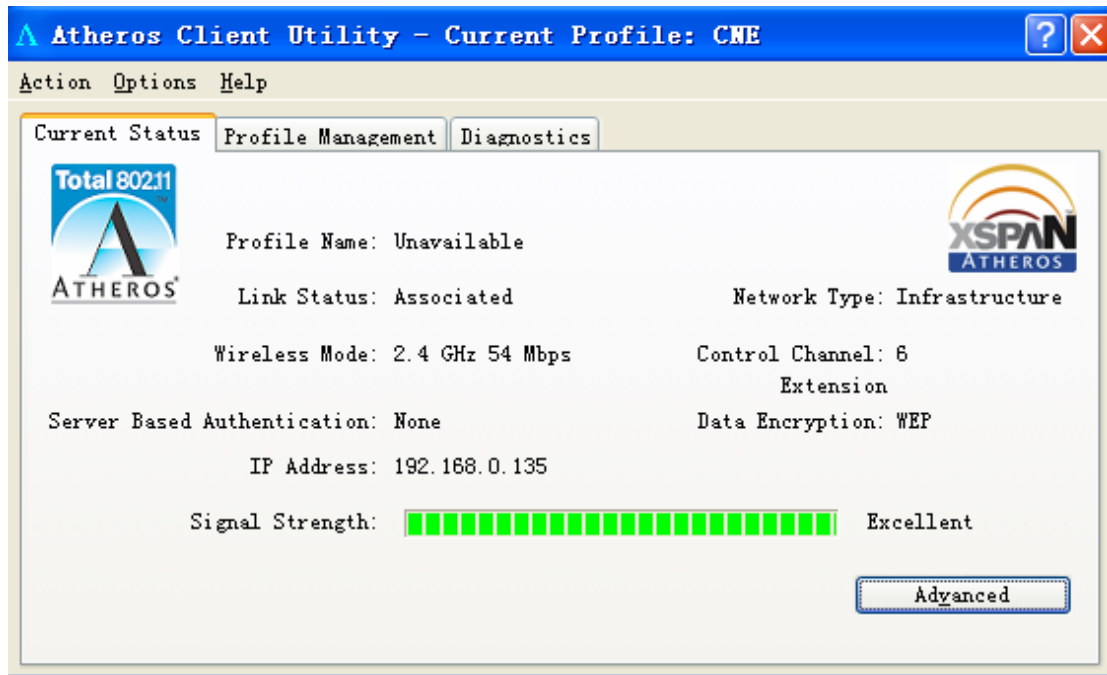
Figure 3-10 Status of the Atheros configuration utility

The *Figure 3-10* will show up on the screen and you can find all the link information (IP Address, Signal Strtength .etc) for the WLAN adapter.

In case you click the button '**Advance**', the screen will all related information for the wireless access point that your WLAN adapter connected to.
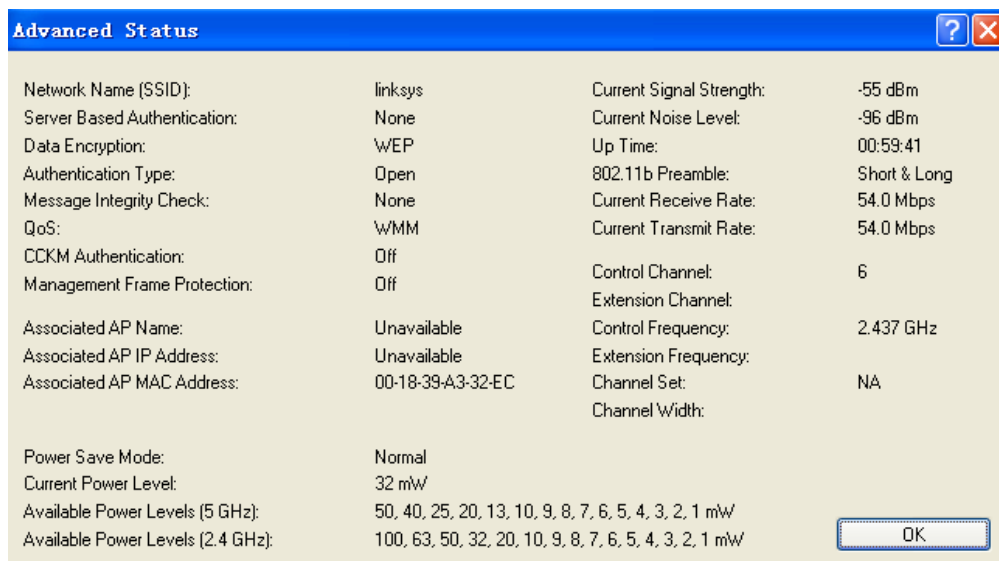
Chapter 4: Regulatory information

4.1 FCC Information to User

This product does not contain any user serviceable components. Any product changes or modifications will invalidate all applicable regulatory certifications and approvals.

4.2 FCC Guidelines for Human Exposure

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.

4.3 OEM Integrator Notice

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;
(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. 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 (host of this device) for any additional compliance requirements required.

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 integrated antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains FCC ID: Q72WLC322NA".

Manual Information To the End User

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."

4.4 FCC 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.

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:

---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.

Chapter 5: Technical Specifications

Appendix A: Specifications

General	
Interface	**A-type USB 2.0 Connector**
Standards	**IEEE802.11b, IEEE802.11g, 802.11n Draft 2.0**
Operating System	**Windows 98SE, ME, 2000, XP, Vista**
Transmission Distance	**In door up to 100m, out door up to 300m (Actual performance depends on environment).**
Frequency	**2.412GHz ~ 2.462GHz**
Sensitivity	**54Mbps -65dBm (Typical)**
	MSC7 HT20 -64dBm(Typical)
	MSC7 HT40 -61dBm(Typical)
Spread Spectrum	**Direct Sequence Spread Spectrum (DSSS)**
Wireless	
Radio Data Rate	**54/48/36/24/18/12/9/6 Mbps 11g OFDM, 11/5.5/2/1 Mbps 11b DSSS**
Modulation	**802.11b: CCK, QPSK, BPSK 802.11g: OFDM Draft-11n: DBPSK, DQPSK, 16-QAM, 64-QAM**
Media Access Protocol	**CSMA/CA with ACK**
Data Security	**64/128 bit WEP, TKIP/AES, IEEE 802.1X authentication**
Physical Environmental	
Working Temperature	**0ºC~40ºC (32ºF~104ºF)**
Storage Temperature	**-40ºC~70ºC (-40ºF~158ºF)**
Humidity	**10%~90% RH, Non-condensing**

Appendix B: Glossary

* **802.11b -** The 802.11b standard specifies a wireless product networking at 11 Mbps using direct-sequence spread-spectrum (DSSS) technology and operating in the unlicensed radio spectrum at 2.4GHz, and WEP encryption for security. 802.11b networks are also referred to as Wi-Fi networks.

* **802.11g -** specification for wireless networking at 54 Mbps using direct-sequence spread-spectrum (DSSS) technology, using OFDM modulation and operating in the unlicensed radio spectrum at 2.4GHz, and backward compatibility with IEEE 802.11b devices, and WEP encryption for security.

* **Ad-hoc Network -** An ad-hoc network is a group of computers, each with a wireless adapter, connected as an independent 802.11 wireless LAN. Ad-hoc wireless computers operate on a peer-to-peer basis, communicating directly with each other without the use of an access point. Ad-hoc mode is also referred to as an Independent Basic Service Set (IBSS) or as peer-to-peer mode, and is useful at a departmental scale or SOHO operation.

* **DSSS** (**D**irect-**S**equence **S**pread **S**pectrum) **-** DSSS generates a redundant bit pattern for all data transmitted. This bit pattern is called a chip (or chipping code). Even if one or more bits in the chip are damaged during transmission, statistical techniques embedded in the receiver can recover the original data without the need for retransmission. To an unintended receiver, DSSS appears as low power wideband noise and is rejected (ignored) by most narrowband receivers. However, to an intended receiver (i.e. another wireless LAN endpoint), the DSSS signal is recognized as the only valid signal, and interference is inherently rejected (ignored).

* **FHSS** (**F**requency **H**opping **S**pread **S**pectrum) **-** FHSS continuously changes (hops) the
  carrier frequency of a conventional carrier several times per second according to a pseudo-random set of channels. Because a fixed frequency is not used, and only the transmitter and receiver know the hop patterns, interception of FHSS is extremely difficult.

* **Infrastructure Network -** An infrastructure network is a group of computers or other devices, each with a wireless adapter, connected as an 802.11 wireless LAN. In infrastructure mode, the wireless devices communicate with each other and to a wired network by first going through an access point. An infrastructure wireless network connected to a wired network is referred to as a Basic Service Set (BSS). A set of two or more BSS in a single network is referred to as an Extended Service Set (ESS). Infrastructure mode is useful at a corporation scale, or when it is necessary to connect the wired and wireless networks.

* **Spread Spectrum -** Spread Spectrum technology is a wideband radio frequency technique developed by the military for use in reliable, secure, mission-critical communications systems. It is designed to trade off bandwidth efficiency for reliability, integrity, and security. In other words, more bandwidth is consumed than in the case of narrowband transmission, but the trade off produces a signal that is, in effect, louder and thus easier to detect, provided that the receiver knows the parameters of the spread-spectrum signal being broadcast. If a receiver is not tuned to the right

frequency, a spread-spectrum signal looks like background noise. There are two main alternatives, Direct Sequence Spread Spectrum (DSSS) and Frequency Hopping Spread Spectrum (FHSS).

* **SSID -** A **S**ervice **S**et **Id**entification is a thirty-two character (maximum) alphanumeric key identifying a wireless local area network. For the wireless devices in a network to communicate with each other, all devices must be configured with the same SSID. This is typically the configuration parameter for a wireless card. It corresponds to the ESSID in the wireless Access Point and to the wireless network name.

* **WEP** (**W**ired **E**quivalent **P**rivacy) **-** A data privacy mechanism based on a 64-bit or 128-bit or 152-bit shared key algorithm, as described in the IEEE 802.11 standard.

* **Wi-Fi -** A trade name for the 802.11b wireless networking standard, given by the Wireless Ethernet Compatibility Alliance (WECA, see http://www.wi-fi.net), an industry standards group promoting interoperability among 802.11b devices.

* **WLAN** (**W**ireless **L**ocal **A**rea **N**etwork) - A group of computers and associated devices communicate with each other wirelessly, which network serving users are limited in a local area.

* **WPA** (**W**i-Fi **P**rotected **A**ccess) **-** A wireless security protocol use TKIP (Temporal Key Integrity Protocol) encryption, which can be used in conjunction with a RADIUS server.

THE END