



LevelOne

User Manual

WUA-0615

***N_Max* Wireless USB Adapter**

Ver. 1.0.0-0815

Safety

FCC WARNING

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.

To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. (Example - use only shielded interface cables when connecting to computer or peripheral devices).

FCC Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

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.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

CE Marking Warning

Digital Data Communications, declares that this product (Model-no. WUA-0615) is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

The CE-Declaration of Conformity can be downloaded at:

<http://www.levelone.eu/support.php>



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1. Introduction

Congratulations on your purchase of LevelOne *N_Max* Wireless USB Adapter.

This manual helps to get familiar with the LevelOne *N_Max* Wireless LAN Adapter. This manual contains detailed instructions in operation of this product. Please keep this manual for future reference.

With a Wireless LAN Adapter, a laptop computer or a station can communicate with another computer in a wireless way. Easy-to-use utilities are bundled with Wireless LAN Adapter for configuration, monitoring, and diagnosis purposes.

Wireless LAN Adapter can wirelessly transmit and receive data, with the Wireless LAN Adapter, you can locate your Notebook PC or station wherever you want without wires and cables.

Wireless LAN Adapter 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 Wireless LAN Adapter 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.

1.1 User Manual Overview

Introduction	Describes <i>N_Max</i> Wireless USB Adapter.
Unpacking and Setup	Helps user to get started with the basic installation of the <i>N_Max</i> Wireless USB Adapter.
Hardware Installation	Describes the LED indicators of the <i>N_Max</i> Wireless USB Adapter.
Software Installation	Tells how to setup the driver and the utility setting.
Technical Specifications	Lists the technical (general, physical and environmental) specifications of the <i>N_Max</i> Wireless USB Adapter.

2. Unpacking and Setup

This chapter provides the package contents and setup information for the *N_Max* Wireless USB Adapter.

2.1 Features

- Extended and high-speed wireless connectivity with *N_Max* (Draft n) wireless technology
- Hardware Push Button for Wi-Fi Protected Setup
- Backward compliant with IEEE802.11g and 11b standards
- Operates on the 2.4GHz frequency band
- Supports 64/128-bit WEP ,WPA and WPA2 encryption for high level security
- Supports Window 2000/XP/Vista

2.2 Package Contents

Open the box of the *N_Max* Wireless USB Adapter and carefully unpack it. The box should contain the following items:

- WUA-0615 *N_Max* Wireless USB Adapter
- Quick Installation Guide
- CD Manual/Driver/Utility

If any item is found missing or damaged, please contact your local reseller for replacement.

2.3 Setup

The setup of the Wireless USB Adapter can be performed using the following steps:

- Visually inspect the USB Adapter and make sure that it is fully plugged in to the USB port.
- Make sure that there is a well environment that there is no much intrusion to have a better connection.

3. Hardware Installation

3.1 Installation Procedure for USB Adapter

You should install the supplied software BEFORE inserting the Wireless USB Adapter when using Windows 2000, XP or Vista.



Note

The following installation was operated under Windows XP and Vista.

(Procedures are similar for Windows 2000.)

If you have installed the Wireless Adapter driver & utility before, please uninstall the old version first.

3.2 LED Indicator

The Wireless Adapter has Link and PWR LED.

LED	Status	Description
PWR	On	Indicates the power is on.
	Off	Indicates the power is off
LINK	On/Flashing	Indicates the power is on, and the 802.11b/g/n radio is enabled. Flashing indicates wireless network activity.
	Off	Indicates the power is off, or the 802.11b/g/n radio is disabled

3.3 Check the installation

The LEDs of the Wireless USB Adapter are clearly visible and the status of the network link can be seen instantly:

1. Once the device is plugged to the station's USB port, the PWR LED of the Wireless USB Adapter will light up indicating a normal status with power.
2. While the Wireless USB Adapter linked up and transmitting data to the Access Point or to other Wireless LAN station, the LINK LED will start alternate blinking.

3.4 WPS Button

Use the WPS button on the Wireless USB Adapter to automatically connect devices to the network. Within two minutes, press the physical or virtual button on wireless client devices to enable them to join the WLAN.

The WPS configuration process may be initiated on any device and there is no restriction to the order in which buttons are pressed.

Any WPS-compatible devices could unintentionally join the WLAN if they are within range during the two-minute set up period after the WPS button is pressed.

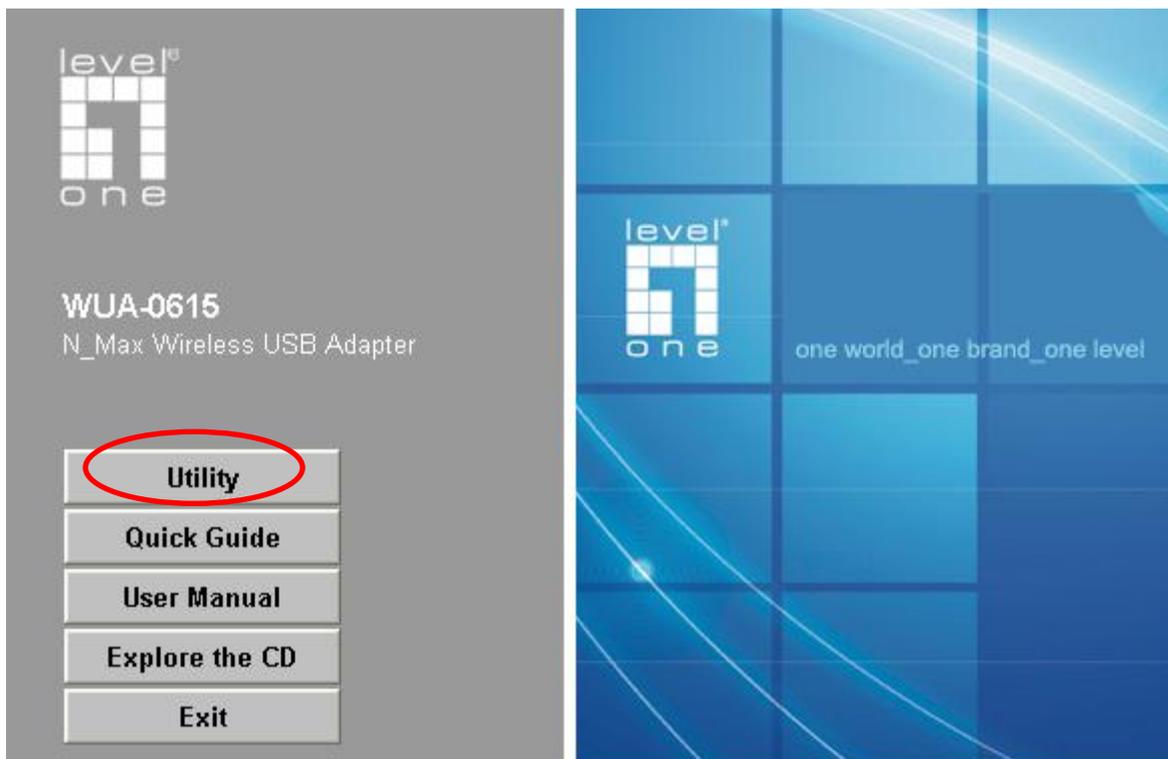
For more details about Wi-Fi Protected Setup, please refer to —**WPS Button**

4. Software Installation

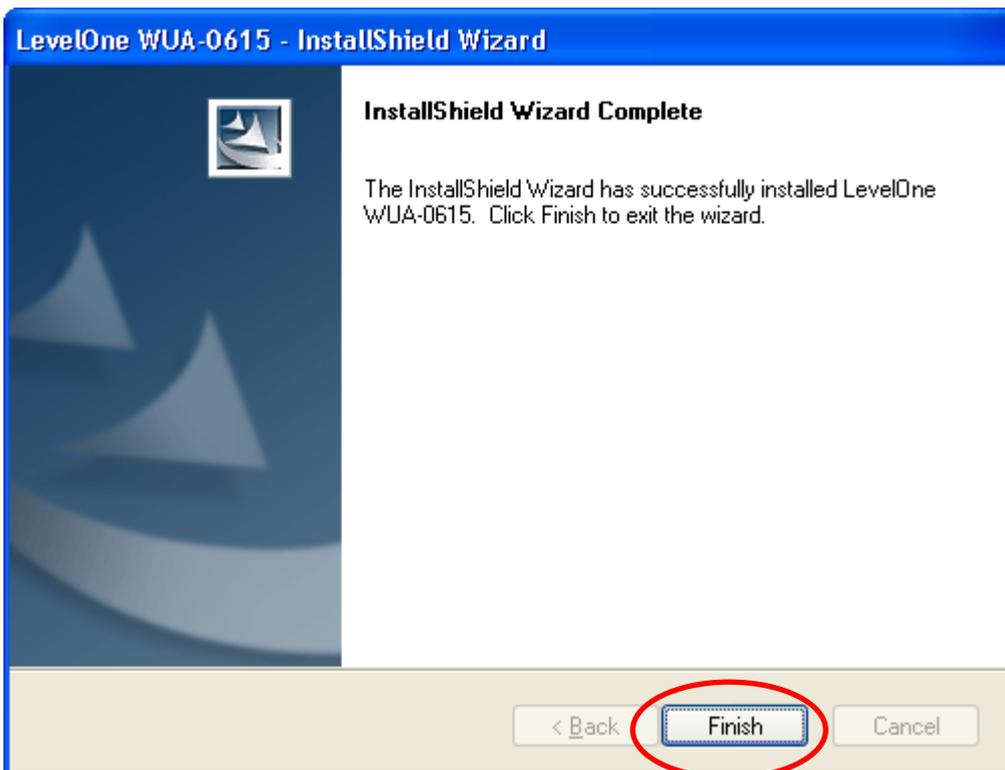
This section will lead you to install the driver and utility of the *N_Max* Wireless USB Adapter.

4.1 Windows XP Utility Installation

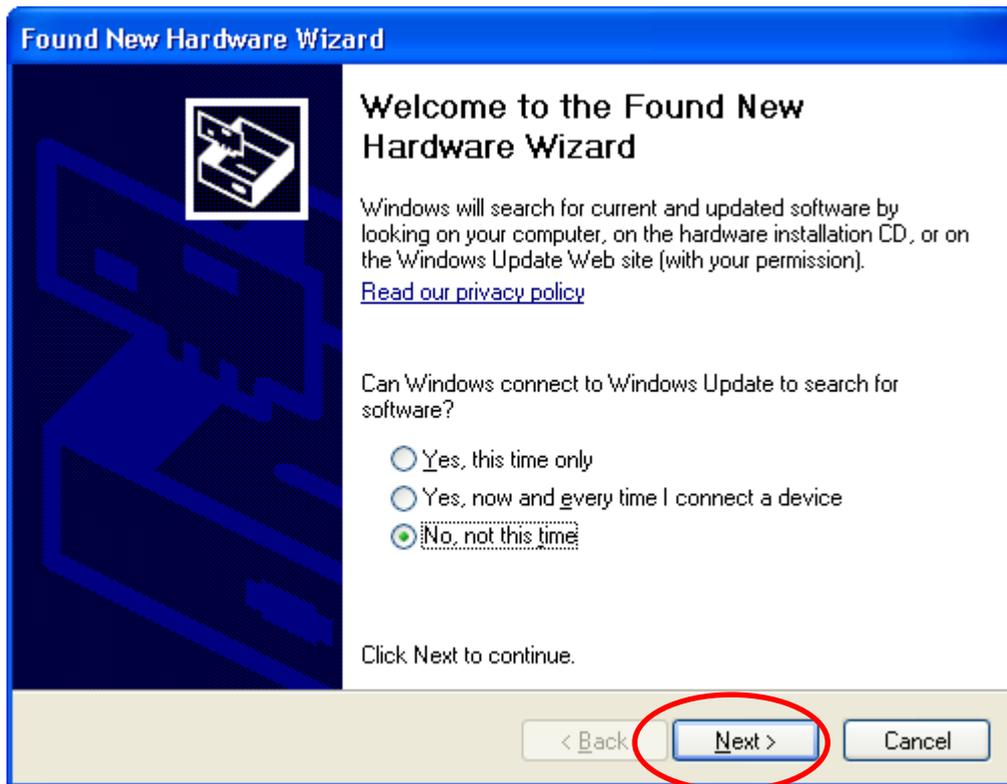
1. Insert the *N_Max* Wireless USB Adapter Utility CD into the computer and then the Auto-run screen will appear. Alternatively, open a file browser and double click on the autorun.exe file located in the CD directory.
2. Click **“Utility”** to install the driver and utility and the install wizard will begin installing the software. Follow the install wizard instructions to complete the installation.



3. Follow the Install Shield Wizard Instructions. Click **“Next”** to continue and follow the on-screen instruction to finish it.



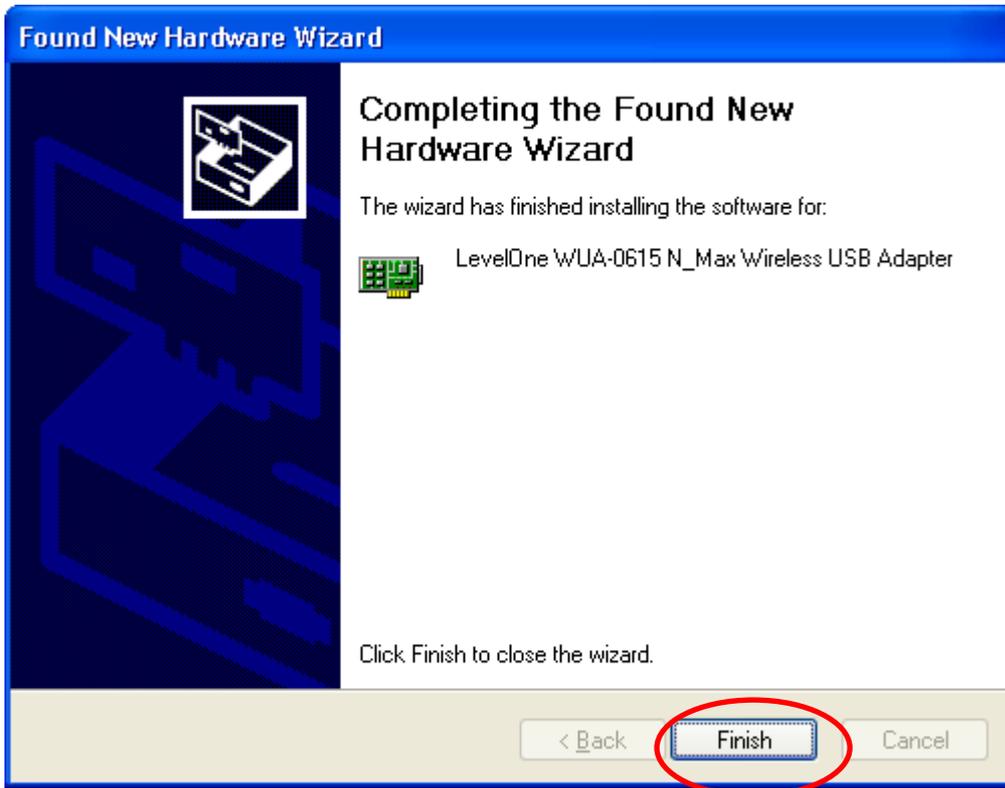
4. Insert the *N_Max* Wireless USB adapter into the USB port, the following screen will prompt, click “**Next**” to continue.



5. Select “**Install the software automatically (Recommended)**” and click “**Next**” to continue.



6. The warning message will pop up, please select “**Continue Anyway**”
7. The software installation has now completed.



The installation program will help you to setup the Wireless LAN utility. ***Be noted that the Windows XP has its own Wireless Utility; you can either use the utility of Windows XP or the provided utility.***

When the Wireless LAN utility is installed properly, you will see the icon on the Windows task bar. The user can configure the wireless settings using the Wireless USB Adapter Configuration Utility. Double-click the utility icon that appears in the taskbar



When the icon in the toolbar represents in full blue color then the signal strength has an excellent performance with the AP, if it represents in half blue color then the signal strength has a fair performance with the AP, and if the icon represents in low blue, then the signal strength has a worst performance with the wireless station.

 Excellent Wireless Signal Strength

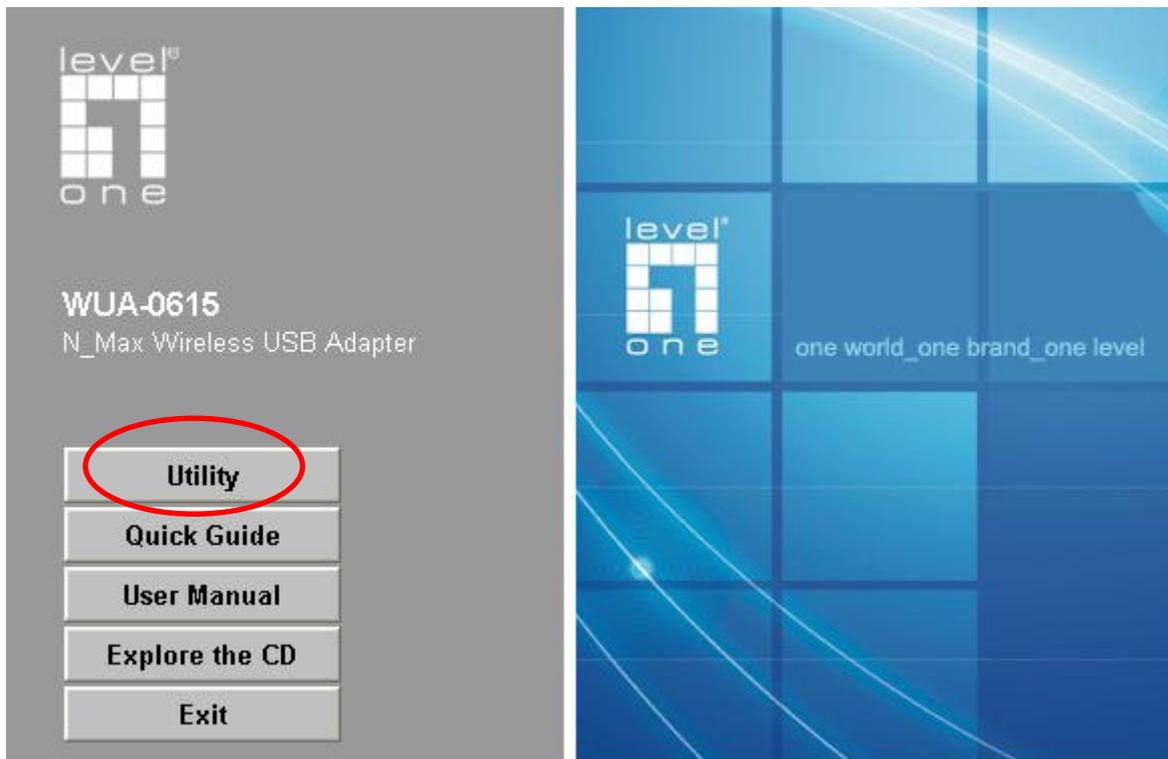
 Adequate Wireless Signal Strength

 Low Wireless Signal Strength

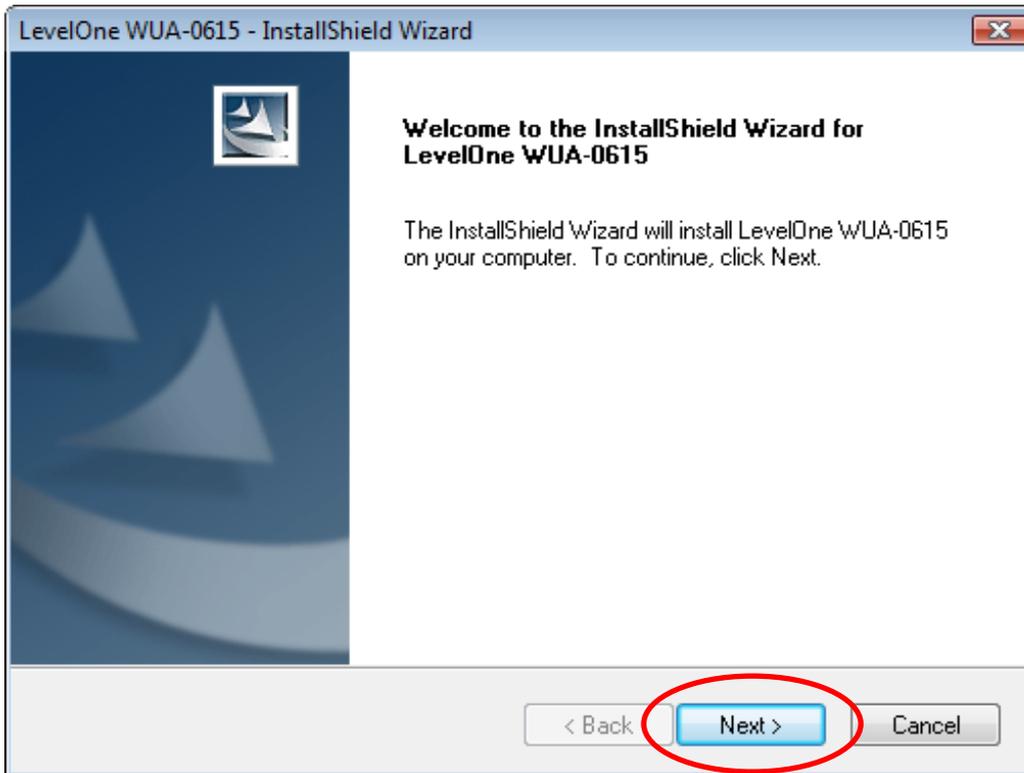
 Wireless Card inactive

4.2 Windows Vista Utility Installation

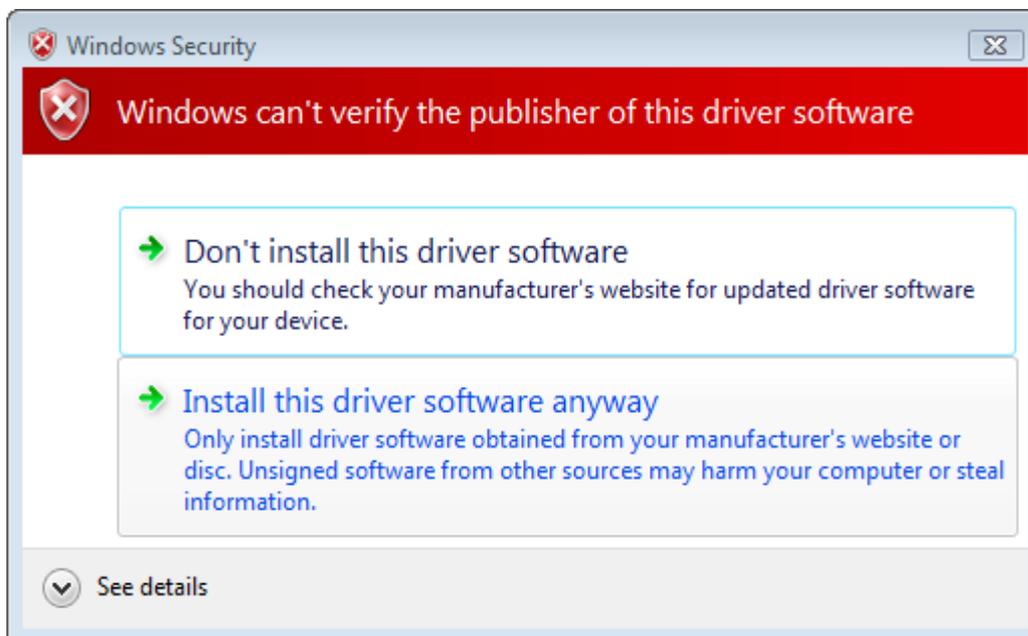
1. Insert the *N_Max* Wireless USB Adapter Utility CD into the computer and then the Auto-run screen will appear. Alternatively, open a file browser and double click on the autorun.exe file located in the CD directory.
2. Click “**Utility**” to install the driver and utility and the install wizard will begin installing the software. Follow the install wizard instructions to complete the installation.



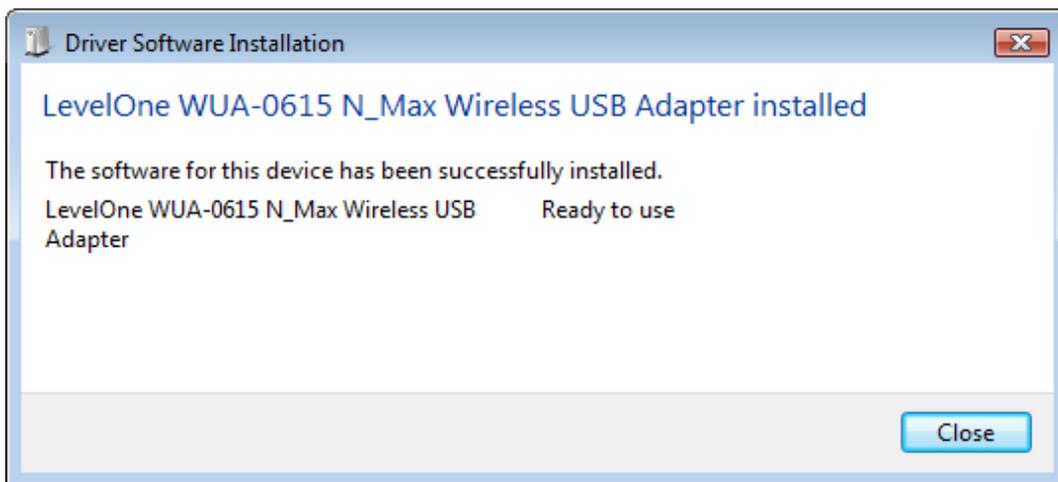
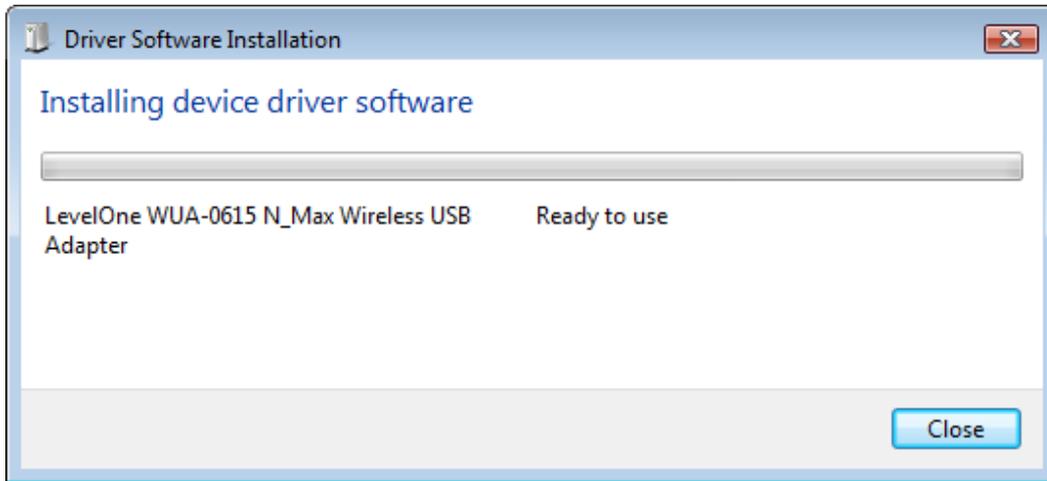
3. Follow the Install Shield Wizard Instructions. Click “**Next**” to continue and follow the on-screen instruction to finish it.



4. On the screen above, click "Next" to start the installation.
 - If using Windows Vista, you may see a warning screen. If you do see this screen, please click "Install this driver software anyway"



5. Follow the on screen instruction and step through the installation procedures.
6. Insert the USB adapter into USB port when installation procedures are completed.
7. The Windows "Driver Software Installation" wizard will prompt and then install the software automatically.



8. When the Windows wizard is complete, you will now have a new icon on your desktop and in your system tray.

The installation program will help you to setup the Wireless LAN utility. ***Be noted that the Windows Vista has its own Wireless Utility; you can either use the utility of Windows Vista or the provided utility.***

When the Wireless LAN utility is installed properly, you will see the icon on the Windows task bar. The user can configure the wireless settings using the Wireless USB Adapter Configuration Utility. Double-click the utility icon that appears in the taskbar



When the icon in the toolbar represents in full blue color then the signal strength has an excellent performance with the AP, if it represents in half blue color then the signal strength has a fair performance with the AP, and if the icon represents in low blue, then the signal strength has a worst performance with the wireless station.

 Excellent Wireless Signal Strength



Adequate Wireless Signal Strength



Low Wireless Signal Strength

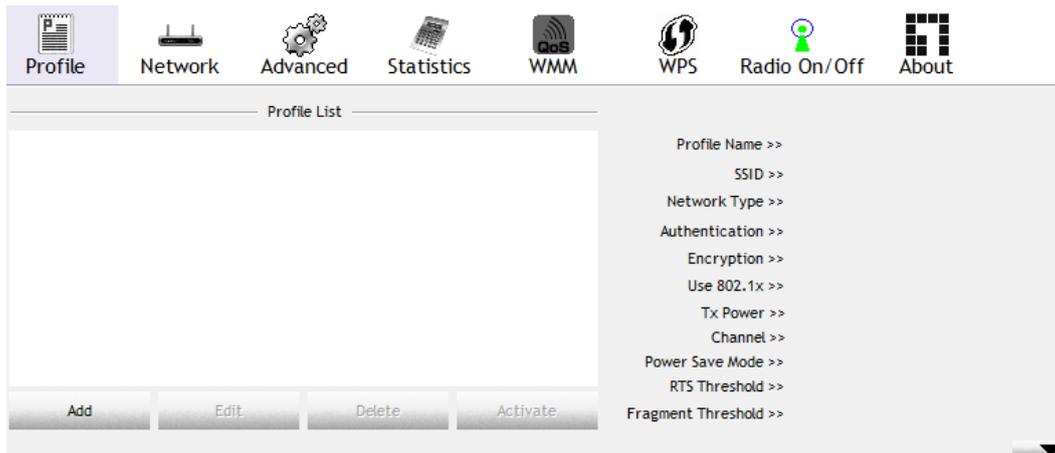


Wireless Card inactive

5. Wireless Utility Configuration (For Windows XP and Vista)

5.1 Profile

The Profile List keeps a record of your favorite wireless settings at home, office, and other public hot-spots. You can save multiple profiles, and activate the correct one at your preference. The following Figure shows the basic profile section.



Profile Name: Profile Name: Name of profile, preset to PROF* (* indicate 1, 2, 3...).

SSID: The access point or Ad-hoc name.

Network Type: Indicates the networks type, including infrastructure and Ad-Hoc.

Authentication: Indicates the authentication mode used.

Encryption: Indicates the encryption Type used.

Use 802.1x: Shows if the 802.1x feature is used or not.

Tx Power: Transmitting power, the amount of power used by a radio transceiver to send the signal out.

Channel: Channel in use for Ad-Hoc mode.

Power Save Mode: Choose from CAM (Constantly Awake Mode) or Power Saving Mode.

RTS Threshold: Users can adjust the RTS threshold number by sliding the bar or keying in the value

directly.

Fragment Threshold: The user can adjust the Fragment threshold number by sliding the bar or key in the value directly.

Add/Edit Profile: The user can add and edit the selected AP to the Profile setting. It will bring up a profile page and save the user's setting to a new profile.

Delete Profile: The user can delete the selected AP from profile page.

Activate Profile: The user can activate the selected AP from profile page.

System Config.:

The screenshot shows a 'System Config' dialog box for 802.1X authentication. The title bar includes 'System Config', 'Auth. \ Encry.', and '8021X'. The main area contains several configuration options: 'Profile Name >>' is a text input field with 'PROF1'; 'SSID >>' is a dropdown menu; 'Network Type >>' is a dropdown menu set to 'Infrastructure'; 'Tx Power >>' is a dropdown menu set to 'Auto'; 'Preamble >>' is a dropdown menu set to 'Auto'; 'Power Save Mode >>' has two radio buttons, 'CAM' and 'PSM', both of which are selected; 'RTS Threshold' has a checkbox, a slider bar from 0 to 2347, and a text box containing '2347'; 'Fragment Threshold' has a checkbox, a slider bar from 256 to 2346, and a text box containing '2346'. At the bottom are 'OK' and 'Cancel' buttons.

Profile Name: The user can choose any name for this profile, or use the default name defined by system.

SSID: The user can key in the intended SSID name or select one of the available APs from the drop-down list.

Power Save Mode: Choose CAM (Constantly Awake Mode) or Power Saving Mode.

Network Type: There are two types, infrastructure and 802.11 Ad-hoc mode. Under Ad-hoc mode, user can also choose the preamble type. The available preamble type includes auto and long. In addition, the channel field will be available for setup in Ad-hoc mode.

RTS Threshold: User can adjust the RTS threshold number by sliding the bar, or key in the value directly. The default value is 2347.

Fragment Threshold: User can adjust the Fragment threshold number by sliding the bar or key in the value directly. The default value is 2346.

Channel: Only available for setting under Ad-hoc mode. Users can choose the channel frequency to start their Ad-hoc network.

Auth. \ Encry.:

System Config Auth. \ Encry. 8021X

Authentication >> Open Encryption >> None 802.1X

WPA Preshared Key >> [Text Field]

Wep Key

Key#1 Hexadecimal [Text Field] Show Password

Key#2 Hexadecimal [Text Field]

Key#3 Hexadecimal [Text Field]

Key#4 Hexadecimal [Text Field]

OK Cancel

Authentication Type: There are 7 types of authentication modes which are open, Shared, LEAP, WPA and WPA-PSK, WPA2 and WPA2-PSK.

Encryption Type: For open and shared authentication mode, the selection of available encryption type are None and WEP. For WPA, WPA2, WPA-PSK and WPA2-PSK authentication mode, both TKIP and AES encryption is available.

WPA Pre-shared Key: This is the key shared between the AP and STA. For WPA-PSK and WPA2-PSK authentication mode, this field must be filled with a key between 8 and 32 characters in length.

WEP Key: Only valid when using WEP encryption algorithms. The key must be identical to the AP's key. There are several formats to enter the keys.

1. Hexadecimal - 40bits : 10 Hex characters.
2. Hexadecimal - 128bits : 26Hex characters.
3. ASCII - 40bits : 5 ASCII characters.
4. ASCII - 128bits : 13 ASCII characters.

802.1x Setting: 802.1x is used for authentication of the "WPA" and "WPA2" certificate by the server.

System Config Auth. \ Encry. 8021X

EAP Method >> PEAP Tunnel Authentication >> EAP-MSCHAP v2 Session Resumption

ID \ PASSWORD Client Certification Server Certification

Authentication ID / Password

Identity >> [Text Field] Authentication ID [Text Field] Domain Name >> [Text Field]

Tunnel ID / Password

Tunnel ID >> [Text Field] Tunnel Password >> [Text Field] Show Password

OK Cancel

Authentication type:

1. **PEAP:** Protect Extensible Authentication Protocol. PEAP transport securely authenticates data by using tunneling between PEAP clients and an authentication server. PEAP can authenticate wireless LAN clients using only server-side certificates, thus simplifying the implementation and administration of a secure wireless LAN.
2. **TLS/Smart Card:** Transport Layer Security. Provides for certificate-based and mutual authentication of the client and the network. It relies on client-side and server-side certificates to perform authentication and can be used to dynamically generate user-based and session-based WEP keys to secure subsequent communications between the WLAN client and the access point.

Session Resumption: The user can choose "Disable" and "Enable".

Tunnel Authentication: Tunnel protocol, List information include "EAP-MSCHAP v2" and "EAP-TLS/Smart card".

ID \ PASSWORD:

Authentication ID/Password: The identity, password and domain name for server.

Tunnel ID/Password: Identity and Password for the server.

Client Certification/Server Certification: Depending on the EAP in use, only the server or both the server and client may be authenticated and require a certificate. Server certificates identify a server, usually an authentication or RADIUS server to clients. Most EAPs require a certificate issued by a root authority or a trusted commercial Certificate Authority.



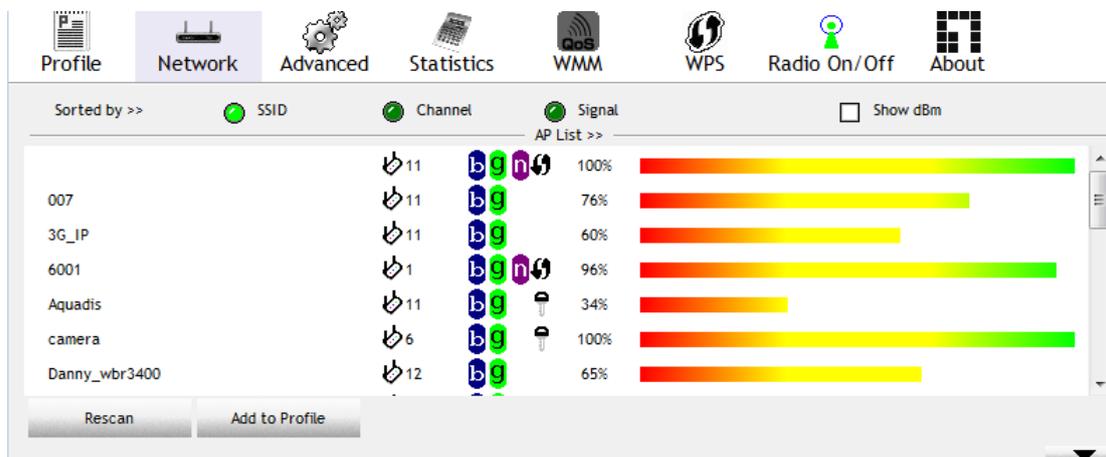


Use certification chain: Place a check in this to enable the certificate use. Select the Certification Authority from the drop-down list.

Server name: Enter the server name if not selected from the existing drop-down list above.

5.2 Network

The network setting page allows you to set and save different wireless settings. You can activate the suitable profile according to the environment where the wireless connection is used.



Sort by: Indicate that the AP list is sorted by SSID, Channel or Signal.

Show dBm: Show the dBm strength of the received signal.

Rescan: Issues a rescan command to the wireless NIC to update information on the surrounding wireless network.

Add to Profile: Add the selected AP to the Profile setting. It will bring up a profile page and save the user's setting to a new profile.

The Profile page is displayed for configuration:

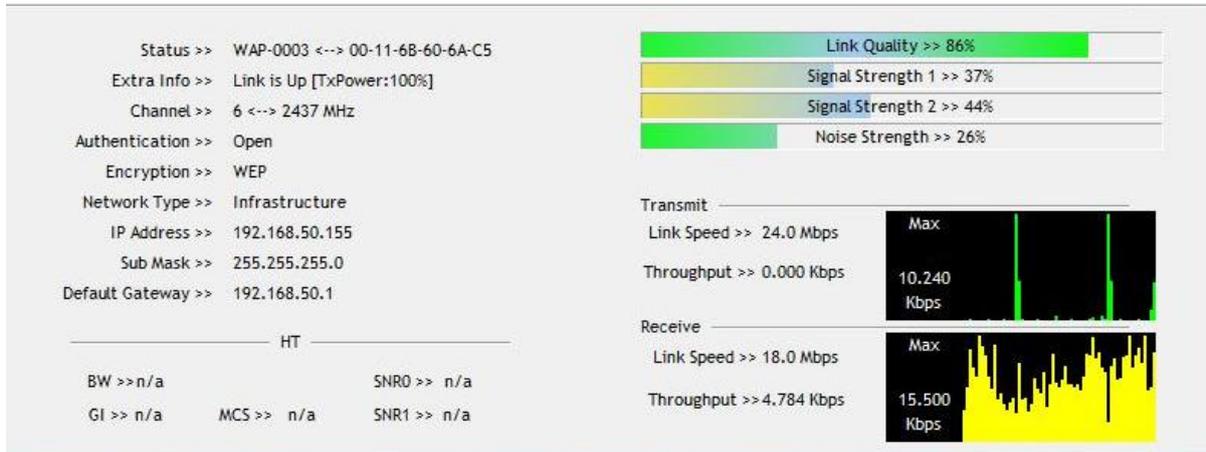
Icon Indications	
Icons	Description
	Connection is successful
	Network type is infrastructure mode
	Network type is ad-hoc mode
	Wireless network is security-enabled
	The network supports 802.11b connections
	The network supports 802.11g connections
	The network supports 802.11n connections

You can press the button on the bottom right corner to display the network status, as shown below.

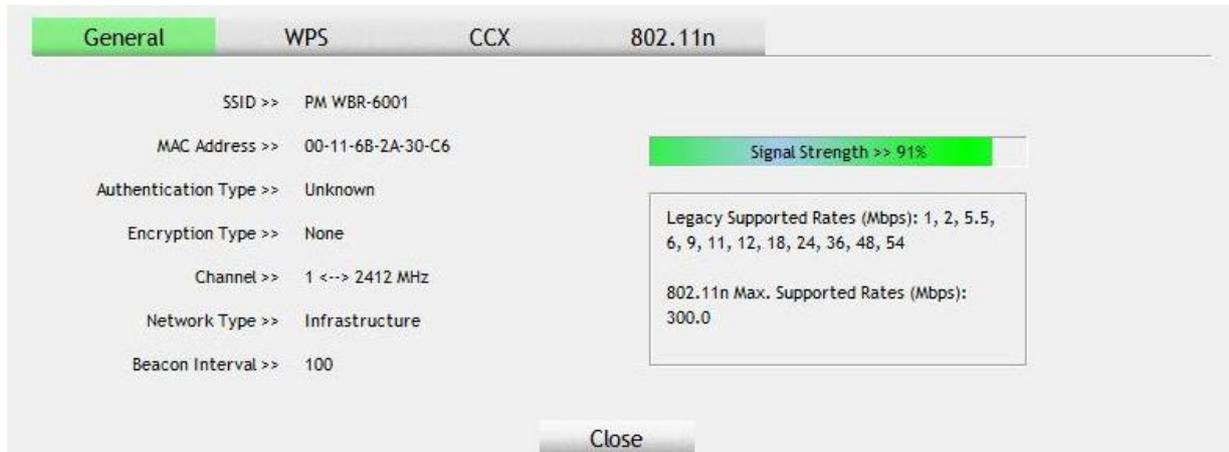


Note

The maximum transmit link speed of this wireless USB adapter is 150 Mbps and the maximum receive link speed is 300 Mbps.

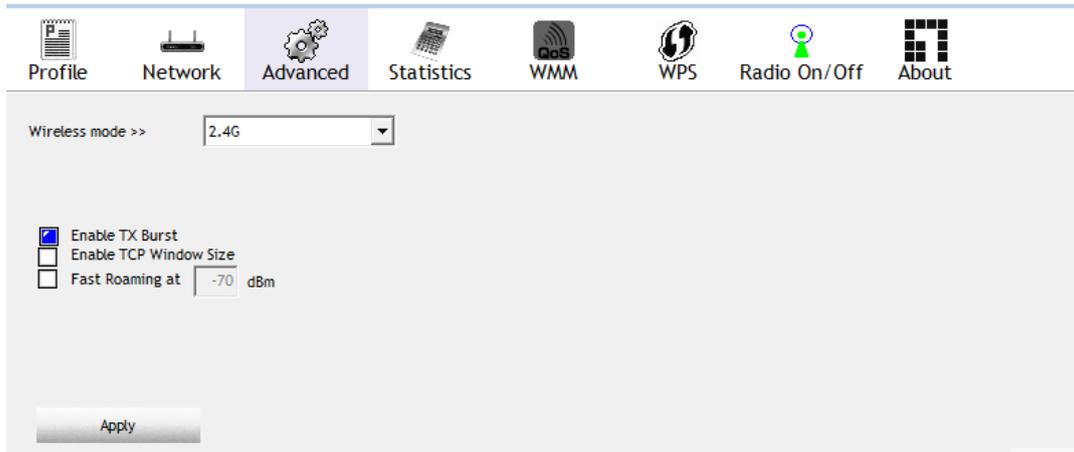


You can also double-click one of the access points on the list to display its general, WPS, CCX and 802.11n information, as shown below.



5.3 Advanced

The Advanced page allows you to configure extended features for the wireless network.



The displayed items on this page can be described as follows:

Wireless Mode: Select 2.4G as the wireless mode.

Enable TX Burst: Enable the option to accelerate the data transmit rate.

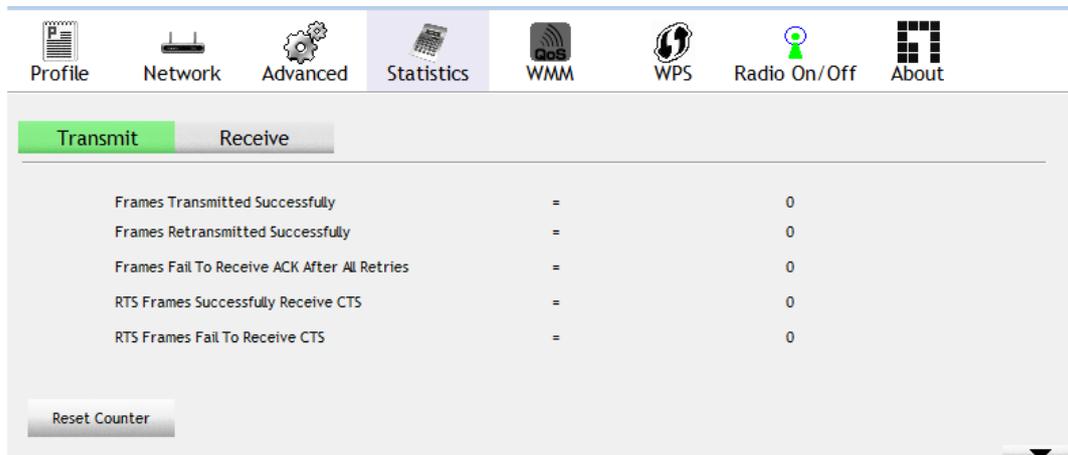
Enable TCP Window Size: Adjust TCP window size automatically for better performance.

Fast Roaming: Enable fast roaming at the specified receive power threshold.

Enable CCX (Cisco Compatible Extensions): Enable this option if the network supports Cisco Compatible Extensions.

5.4 Statistics

The statistics page displays the connected-related statistics with detail counter information.



The screenshot shows the 'Statistics' page with the 'Transmit' tab selected. The page has a navigation bar with icons for Profile, Network, Advanced, Statistics, WMM, WPS, Radio On/Off, and About. Below the navigation bar, there are two tabs: 'Transmit' (selected) and 'Receive'. The main content area displays a table of statistics with a 'Reset Counter' button at the bottom left.

Statistic	Value
Frames Transmitted Successfully	0
Frames Retransmitted Successfully	0
Frames Fail To Receive ACK After All Retries	0
RTS Frames Successfully Receive CTS	0
RTS Frames Fail To Receive CTS	0

Frames Transmitted Successfully: Frames successfully sent.

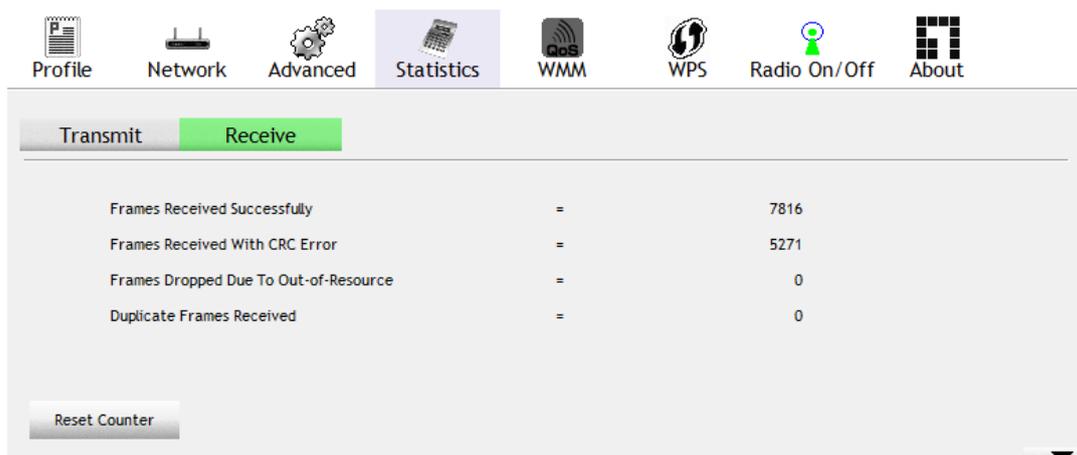
Frames Retransmitted Successfully: Successfully retransmitted frames numbers.

Frames Fail To Receive ACK After All Retries: Frames failed transmit after hitting retry limit.

RTS Frames Successfully Receive CTS: Successfully receive CTS after sending RTS frame.

RTS Frames Fail To Receive CTS: Failed to receive CTS after sending RTS.

Reset counters: Reset counters to zero.



The screenshot shows the 'Statistics' page with the 'Receive' tab selected. The page has a navigation bar with icons for Profile, Network, Advanced, Statistics, WMM, WPS, Radio On/Off, and About. Below the navigation bar, there are two tabs: 'Transmit' and 'Receive' (selected). The main content area displays a table of statistics with a 'Reset Counter' button at the bottom left.

Statistic	Value
Frames Received Successfully	7816
Frames Received With CRC Error	5271
Frames Dropped Due To Out-of-Resource	0
Duplicate Frames Received	0

Frames Received Successfully: The number of frames successfully received.

Frames Received With CRC Error: The number of frames received with a CRC error.

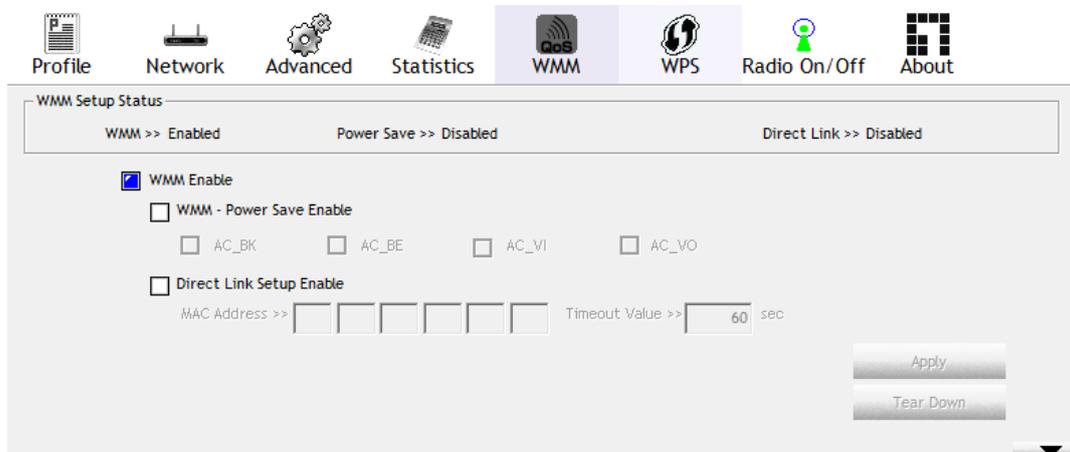
Frames Dropped Due To Out-of-Resource: The number of frames dropped due to a resource issue.

Duplicate Frames Received: The number of duplicate frames received.

Reset counters: Reset counters to zero.

5.5 WMM

Wi-Fi Multimedia (WMM), also known as Wireless Multimedia Extensions (WME), is a Wi-Fi Alliance interoperability certification. It provides basic Quality of Service (QoS) features for IEEE 802.11 wireless networks.



WMM Enable: Enable WMM function.

WMM - Power Save Enable: Enable the power save mode. Please select which ACs you want to enable.

AC_BK: Background / low priority

AC_BE: Best effort

AC_VI: Video first

AC_VO: Voice first

Direct Link Setup Enable: Enable DLS (Direct Link Setup) function.

MAC Address: Fill in the blanks of Direct Link with MAC Address of STA. The STA must conform to these two conditions:

1. Connect with an AP that supports DLS features.
2. Ensure that DLS is enabled.

Timeout Value: The Timeout Value indicates the time in seconds before it disconnects automatically. The value is an integer. The integer must be between 0~65535. A zero value specifies that it stays connected. The default Timeout Value is 60 seconds.

Apply: The AP that supports DLS features the user filled in will be applied.

Tear Down: Select the device that you want to remove from DLS table and click this button.

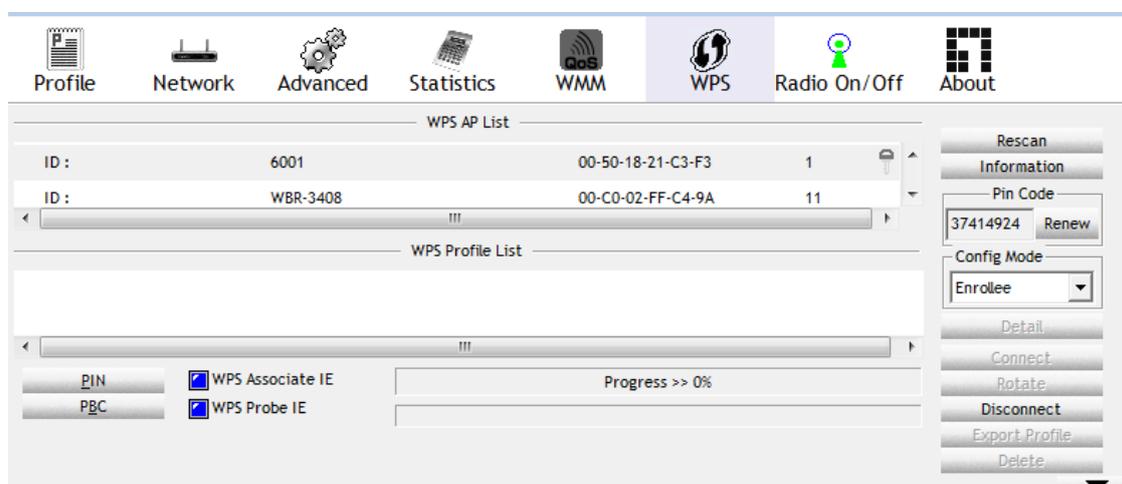
5.6 WPS

Wi-Fi Protected Setup (WPS) is based on push-button or PIN (Personal Identification Number) entry authentication to provide strong WPA/WPA2 encryption keys to client devices. Users can push a button on the access point and the client device to exchange the encryption key. With a PIN, users can enter a code generated by the client device to connect to the network.

WPS Setup - PBC (Push-button Configuration)

1. Push the WPS button on your wireless access point or start WPS standby mode as instructed by the wireless access point's user manual.
2. Before you start to establish the wireless connection using WPS, define the Wireless USB Adapter as a WPS —“Enrollee“ or a —“Registrar“ by selecting the Config Mode options.

Enrollee: An enrollee is the device being added to the network. If the Wireless USB Adapter is set as an enrollee, click the Rescan button on the utility WPS setup page to search for WPS-enabled access points near you. All access points found will be displayed in the WPS AP List. Select an access point on the list and click the Connect button to activate the connection. You can also click the Information button to see the detailed information about the selected access point.



Registrar: A registrar is the network enrollment center. If the Wireless USB Adapter is set as a registrar, click the Rescan button on the utility WPS setup page to search for WPS-enabled wireless devices near you. All enrollees found will be displayed in the WPS Profile List. Select an enrollee on the list and click the Connect button to activate the connection.

3. Press the physical button on the Wireless USB Adapter or click PBC button on this utility page to start to establish a wireless connection (this may require several seconds to one minute to complete)



Note

If WPS fails, click the PBC button few more times to try again.

4. When an access point or a WPS enrollee is connected, you can click Disconnect to disconnect from the connected device, or select another WPS-enabled wireless access point or enrollee, and then click Connect to establish connection.
5. You can also click the “Rotate” button to select the next access point or enrollee in the list and establish a connection.
6. To delete an access point from the list, click Delete.

WPS Setup - PIN Configuration

The WPS PIN (Personal Identification Number) setup is optional to the WPS button setup. It is more secure than using the WPS button. All WPS-compatible devices have their own PIN number.

1. When the Wireless USB Adapter is set as an enrollee, the PIN number of your Wireless USB Adapter is an eight-digit number located at the upper-right position of configuration utility. Remember this number and input it to your wireless access point as the WPS PIN code. Please also refer to the user manual of your wireless access point for instructions about WPS setup.
2. Click PIN button and wait for few seconds to one minute. If a wireless access point with correct PIN code is found, you will be connected to that access point.



Note

You may have to click PIN for few more times to try again. If you still cannot connect to an access point this way, please make sure the PIN code you provided to access point is correct.

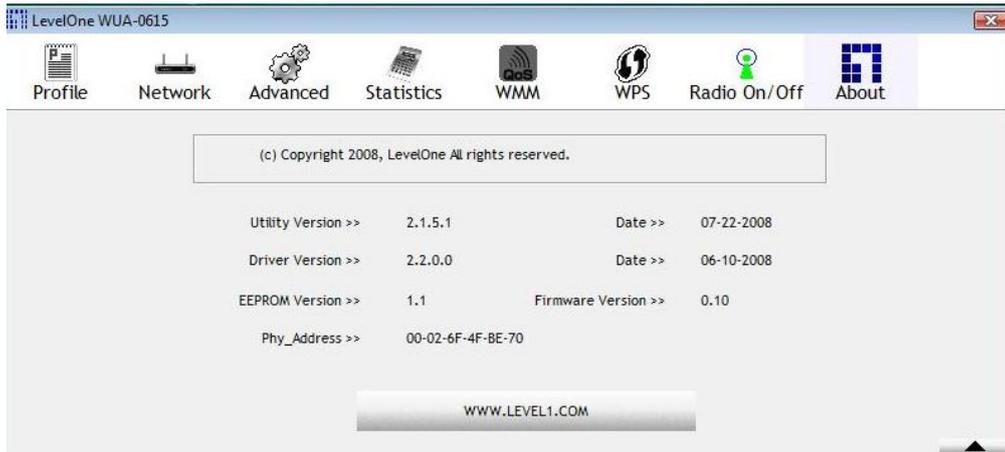
3. When the Wireless USB Adapter is set as a registrar, input the enrollee’s PIN number to the Pin Code box located in the upper-right position of configuration utility.
4. Click PIN button and wait for few seconds to one minute. If a WPS enrollee with correct PIN code is found, it will be connected to the Wireless USB Adapter.

5.7 Radio Setting

Press the Radio On/Off icon to disable or enable the radio signal connection.

5.8 About

This page displays the information of version numbers, configuration utility, firmware and other information regarding this wireless USB adapter. Click the www.level1.com button to visit the LevelOne website for other information.



6. Network Planning

LevelOne WUA-0615 *N_Max* Wireless USB Adapter supports a stand-alone wireless network configuration, as well as an integrated configuration with Ethernet LANs.

The wireless USB adapter can be configured as:

Ad hoc - for small peer-to-peer networks with other wireless devices

Infrastructure -for a wireless extension to an existing wired LAN through an access point

Network Topologies Ad Hoc Wireless LAN

An ad hoc wireless LAN consists of a group of computers, each equipped with a wireless adapter, connected via radio signals as an independent wireless LAN.

Computers in a specific ad hoc wireless LAN must be configured to the same radio channel.

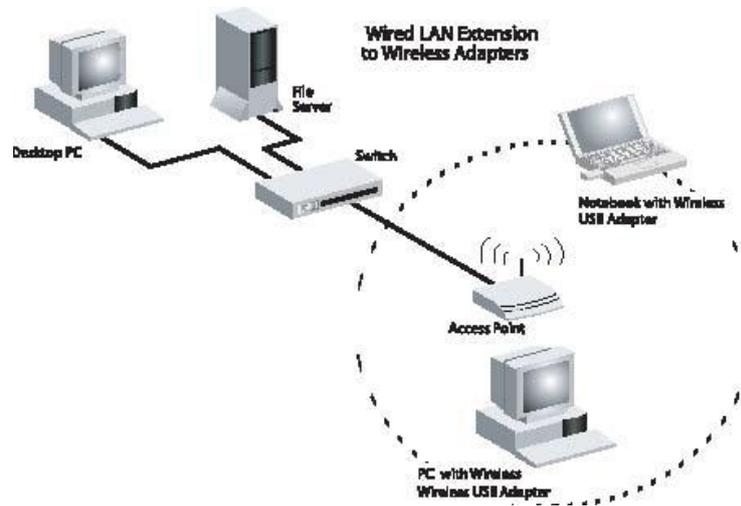
An ad hoc wireless LAN can be used for a small branch office or SOHO operation.



Infrastructure Wireless LAN

LevelOne WUA-0615 can also provide access to a wired LAN for wireless workstations. An integrated wired and wireless LAN is called an Infrastructure configuration. A Basic Service Set (BSS) consists of a group of wireless PC users, and an access point that is directly connected to the wired LAN.

Each wireless PC in this BSS can communicate with to any computer in its wireless group via a radio link, or access other computers or network resources in the wired LAN infrastructure via an access point.



The infrastructure configuration not only extends the accessibility of wireless PCs to the wired LAN, but also increases the effective wireless transmission range for wireless PCs by passing their signal through one or more access points.

A wireless infrastructure can be used for access to a central database, or for connection between mobile workers, as shown in the following figure.

7. Technical Specifications

Technical Specifications

Standard Compliant

IEEE 802.11n Draft 2.0 Specification

IEEE 802.11g

IEEE 802.11b

USB Port Type

USB 2.0/1.1 Connection

Data Transfer Rate

Draft 802.11n: Up to 300Mbps

802.11g: 54 ~ 6 Mbps

802.11b: 11 ~ 1 Mbps

Operating Channels

Ch.1 ~ 11 North America (FCC)

Ch.1 ~ 13 Europe (ETSI)

Operating Frequency

2.412 ~ 2.462GHz North America (FCC)

2.412 ~ 2.472GHz Europe (ETSI)

Transmitter Power (Typical)

Draft 802.11n: 15dBm

802.11g: 14dBm@54 Mbps

15dBm@6 Mbps

802.11b: 18dBm@11 ~ 1 Mbps

Receive Sensitivity (Typical)

Draft 802.11n: -88 dBm MCS 8

-65 dBm MCS 15

802.11g: -90dBm @ 6Mbps

-75dBm @ 54Mbps

802.11b: -91dBm @ 1Mbps

-87dBm @ 11Mbps

Modulation Technique

Draft 802.11n: BPSK, QPSK, 16-QAM, 64-QAM

802.11g: OFDM

802.11b: CCK, QPSK, BPSK

Media Access Protocol

CSMA/CA

Wireless Security

64-bit and 128-bit WEP

WPA-PSK

WPA2-PSK

OS Supported

Windows 2000/XP/Vista

Device Management

Windows Utility Software

Temperature Range

Operating: 0°C to 50°C

Storage: -10°C to 75°C

Humidity (non-condensing)

5% ~ 95% Typical

Power Requirement

5V±0.25V

Dimensions

83mm x 27mm x 12mm

Certifications

CE, FCC