Wireless 150N Outdoor Range Extender / Access Point

User Manual

Model 525497

INTELLINET®
NETWORK SOLUTIONS

INT-525497-UM-1013-01

Table of Contents

1. Terminology

3DES	Triple Data Encryption Standard
AES	Advanced Encryption Standard
ANSI	American National Standards Institute
AP	Access Point
CCK	Complementary Code Keying
CSMA/CA	Carrier Sense Multiple Access/Collision Avoidance
CSMA/CD	Carrier Sense Multiple Access/Collision Detection
DDNS	Dynamic Domain Name Server
DH	Diffie-Hellman Algorithm
DHCP	Dynamic Host Configuration Protocol
DSSS	Direct Sequence Spread Spectrum
EAP	Extensible Authentication Protocol
ESP	Encapsulating Security Payload
FCC	Federal Communications Commission
FTP	File Transfer Protocol
IEEE	Institute of Electrical and Electronic Engineers
IKE	Internet Key Exchange
IP	Internet Protocol
ISM	Industrial, Scientific and Medical
LAN	Local Area Network
MAC	Media Access Control
MD5	Message Digest 5
NAT	Network Address Translation
NT	Network Termination
NTP	Network Time Protocol
PPTP	Point to Point Tunneling Protocol
PSD	Power Spectral Density
RF	Radio Frequency
SHA1	Secure Hash Algorithm
SNR	Signal to Noise Ratio
SSID	Service Set Identification
TCP	Transmission Control Protocol
TFTP	Trivial File Transfer Protocol

TKIP	Temporal Key Integrity Protocol
UPnP	Universal Plug and Play
VPN	Virtual Private Network
WDS	Wireless Distribution System
WEP	Wired Equivalent Privacy
WLAN	Wireless Local Area Network
WPA	Wi-Fi Protected Access

2. Introduction

This Intellinet Network Solutions Wireless 150N Outdoor Range Extender / Access Point (AP) serves multiple purposes — an access point for your wireless network supporting wireless bridge for point-to-point connections or WDS setups, an integrated antenna for long range transmissions — and brings it all together so that the devices can access a high-speed Internet connection.

2.1 Package Contents

Ensure that the following items were included in your purchase:

- ✓ Outdoor Range Extender / Access Point
- ✓ DC 12V Power Adapter
- ✓ User manual on CD
- ✓ POE Injector
- ✓ Tie

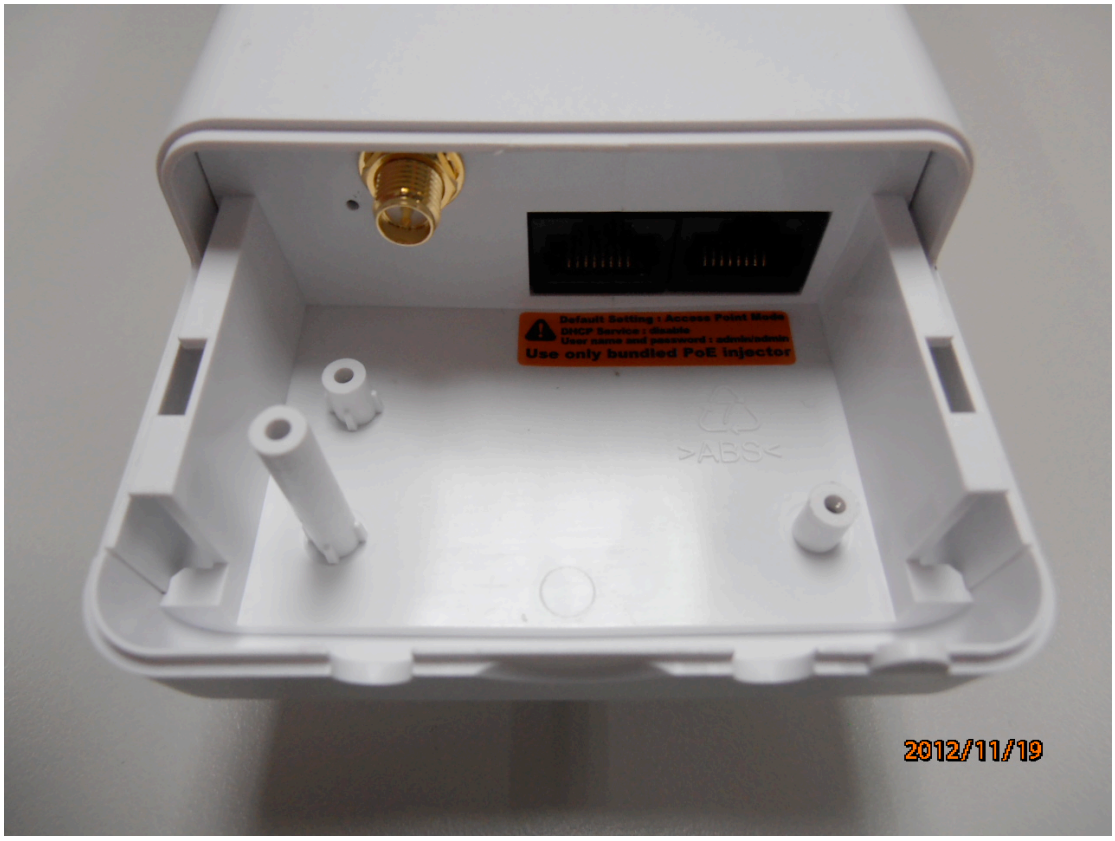
2.2 Product Features

- ➢ Compatible with IEEE 802.11n specifications, providing wireless data rate speeds up to 150 Mbps
- ➢ Compatible with the IEEE 802.11g standard to provide wireless speeds of 54 Mbps data rate
- ➢ Compatible with the IEEE 802.11b standard to provide wireless speeds of 11 Mbps data rate
- ➢ Maximizes performance and is ideal for mediacentric applications like streaming video, gaming and Voice over IP technology
- ➢ Supports various operational modes (Bridge/Gateway/Ethernet Converter) between wireless and wired Ethernet interfaces
- ➢ Supports WPS, 64-bit and 128-bit WEP, WPA and WPA2 encryption to protect wireless data transmission
- ➢ Supports TKIP/AES/TKIPAES of WPA algorithms
- ➢ Supports IEEE 802.3x full duplex flow control on 10/100M Ethernet interfaces
- ➢ Supports DHCP server to provide clients with auto IP address assignments
- ➢ Supports DHCP client, static IP, PPPoE, L2TP and PPTP of WAN Interface
- ➢ Supports firewall security with port filtering, IP filtering, MAC filtering, port forwarding, DMZ hosting and URL filtering functions
- ➢ Supports Web-based management and configuration
- ➢ Supports System Log
- ➢ Supports Dynamic DNS
- ➢ Supports NTP

2.3 Rear Panel Description

LED Indicator	State	Description
1. PWR LED	ON	The WLAN Broadband Router is powered ON.
	Off	The WLAN Broadband Router is powered Off.
2. WLAN LED	ON	Wireless Radio On.
	Off	Wireless Radio Off.
	Flashing	Data is transmitting or receiving on the wireless.
3. WAN LED	ON	Port linked.
	Off	No link.
	Flashing	Data is transmitting or receiving on the WAN interface.
4. LAN LED	ON	Port linked.
	Off	No link.
	Flashing	Data is transmitting or receiving on the LAN interface.

2.3 Front Panel Description



Interfaces	Description
SMA connector	For an external antenna. You can use the SMA connector to connect with a 5GHz external antenna.
Secondary (middle)	The RJ45 sockets allow LAN connection through Category 5 cables. Supports auto-sensing on 10/100M speed and half/ full duplex; complies with IEEE 802.3/ 802.3u, respectively.
Main (right)	The RJ45 socket allows WAN connection through a Category 5 cable. Supports auto-sensing at 10/100M speeds and half/full duplex; complies with IEEE 802.3/ 802.3u, respectively.
Reset (bottom)	Press the Reset button about 5 - 10 seconds to reset the configuration parameters to factory defaults.

3. Hardware Installation

3.1 Appearance and Interface Introduction

Note: The product images are for reference only; refer to the actual product.

1. LED Panel

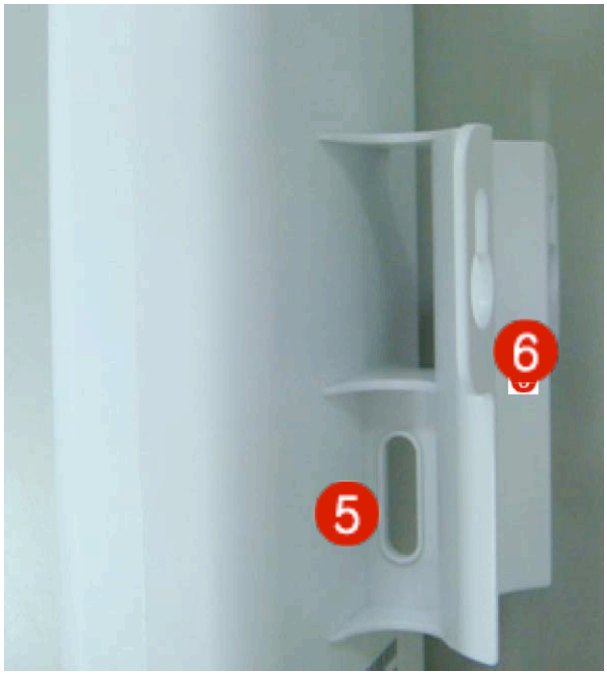
2. Waterproof sliding cover

3. Passthrough for Ethernet cable

4. Push this button to remove the upper housing

5. Pole Mount

6. Wall Mount

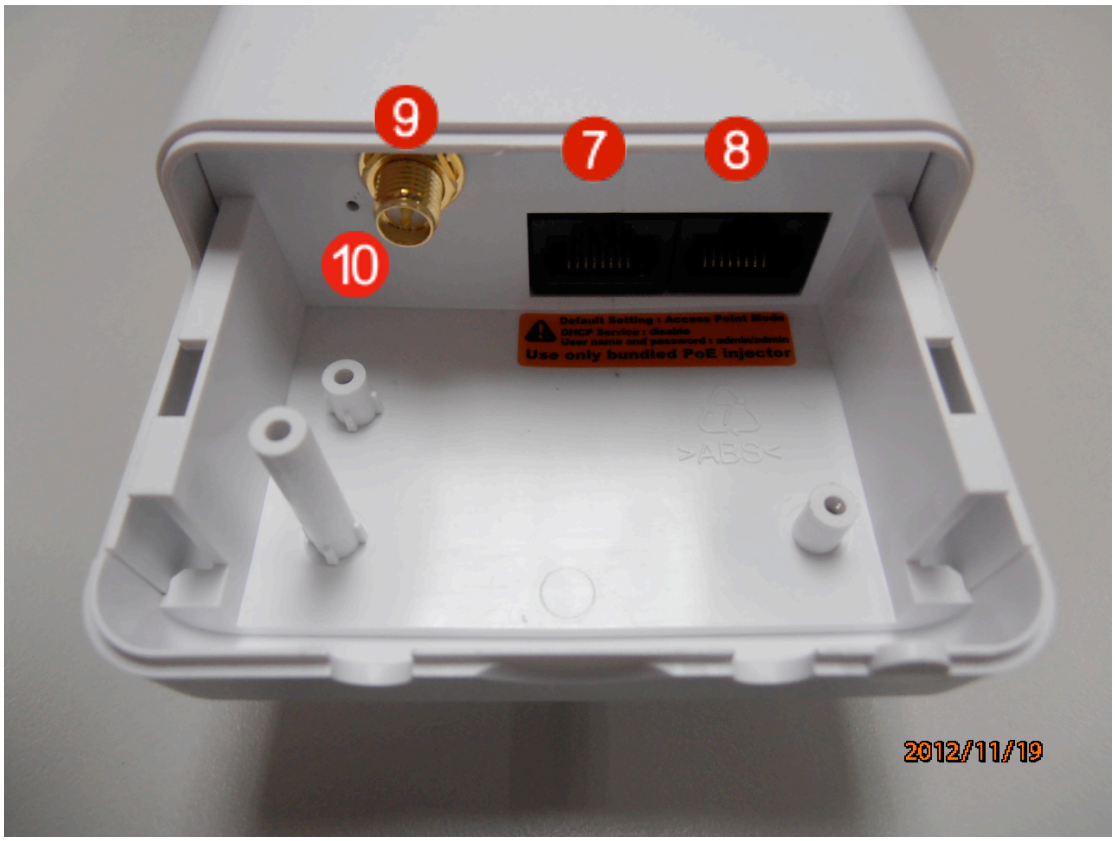


7. Secondary port with PoE

8. Main port

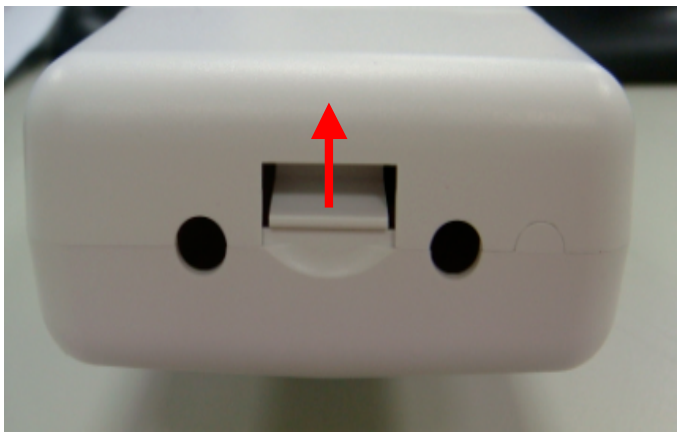
9. SMA connector for external antenna

10. Reset button



3.2 Hardware Installation Steps

Step 1: Push the button on the side to remove upper housing.



Step 2: Pass Ethernet cable through the hole; insert the cable into the secondary port.

Note: RJ-45 8P8C Ethernet cable is required.

Step 3: Install the upper housing and make sure the housing is well installed.

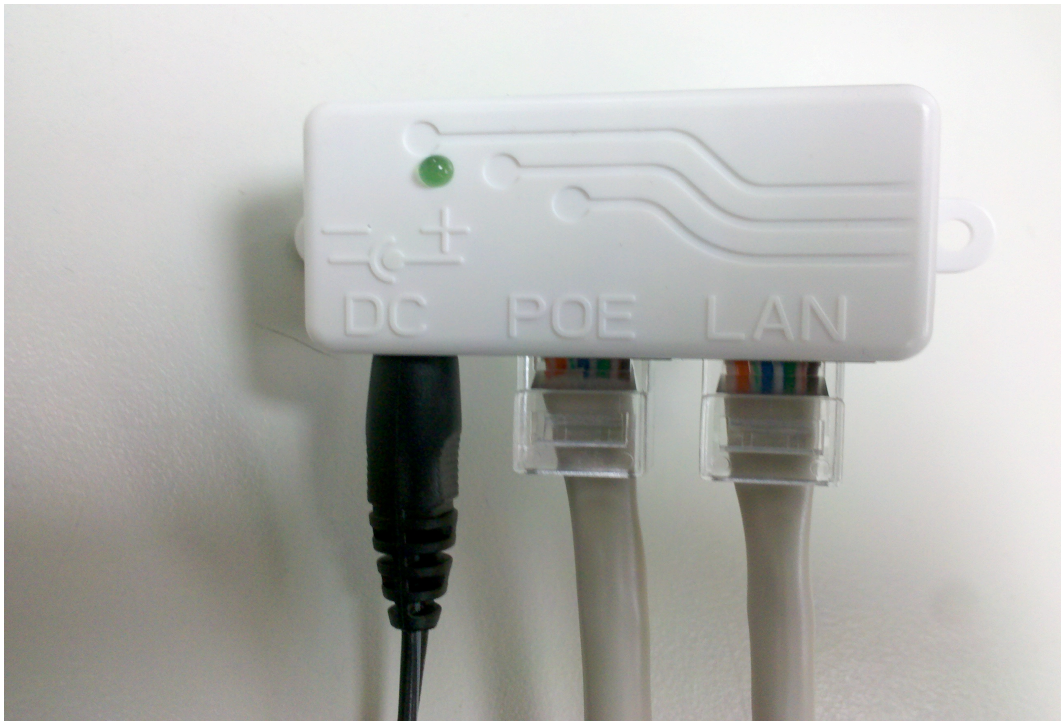
Step 4: Complete the hardware installation as shown below.

Install PoE Injector

DC: Insert adapter

PoE: This jack is linked to the secondary port of the AP with RJ45.

LAN: This jack is linked to the LAN side of a PC/hub or router/ADSL modem device with RJ45.



There is no software driver or utility installation needed — only the configuration settings. Refer to Chapter 4 for software configuration.

Notice: It will take about 50 seconds to complete the boot-up sequence after powering on. The Power LED will light, then the WLAN Activity LED will flash to indicate the WLAN interface is enabled and operational.

4. Software Configuration

There are Web-based management and configuration functions allowing you to use this device more easily.

The AP is delivered with the following factory default parameters on the Ethernet LAN interfaces.

Default IP address: 192.138.2.1

Default IP subnet mask: 255.255.255.0

Web login user name: admin

Web login password: admin

Telnet login user name: admin

Telnet login password: admin

4.1 Prepare your PC to configure the WLAN Broadband Router

For Windows 2000/ XP:

1. Click the *Start* button and select Settings, then click *Control Panel*. The *Control Panel* window will appear.

2. Double-click the right mouse button on the *Network and Dial-up Connections* icon. Double-click the *Local Area Connection* icon. The *Local Area Connection* window will appear. Click the *Properties* button in the *Local Area Connection* window.

3. Check the installed list of *Network Components*. If TCP/IP is not installed, click the *Add* button to install it; otherwise, go to Step 6.

4. Select *Protocol* in the *Network Component Type* dialog box and click the *Add* button.

5. Select *TCP/IP* in the *Microsoft of Select Network Protocol* dialog box, then click the *OK* button to install the TCP/IP protocol. It may need the Microsoft Windows CD to complete the installation. Close and go back to the *Network* dialog box after the TCP/IP installation.

6. Select *TCP/IP* and click the properties button in the *Network* dialog box.

7. Select Specify an IP address and type in values as per the following example.

- ✓ IP Address: *192.168.1.1* — any IP address within 192.168.1.1 to 192.168.1.254 is good to connect the Wireless LAN Access Point. Don't use 192.138.2.1.
- ✓ IP Subnet Mask: *255.255.255.0.*

8. Click *OK* to complete the IP parameters setting.

For Windows Vista / 7:

1. Click the *Start* button and select *Settings*, then click *Control Panel*. The *Control Panel* window will appear.

2. Double-click the right mouse button on *Network Connections*. The *Network Connections* window will appear. Double-click the *Local Area Connection* icon, and the User Account Control window is shown. Right-click on the Continue button to set properties.

3. In the *Local Area Connection Properties* window, choose the *Networking* tab and click *Internet Protocol Version 4 (TCP/IPv4)*, then click on the *Properties* button.

4. Click on the *General* tab, select *Specify an IP address* and enter values per the following example.

- ✓ IP Address: *192.168.1.1* — any IP address within 192.168.1.1 to 192.168.1.254 is good to connect the Wireless LAN Access Point. Don't use 192.168.2.1.
- ✓ IP Subnet Mask: *255.255.255.0*

5. Click *OK* to complete the IP parameters setting.

6. NOTE: Procedures for Windows 8 are similar.

4.2 Connect to the AP

Open a Web browser — i.e., Microsoft Internet Explorer 6.1 SP1 or above — then enter 192.168.2.1 in the URL field to connect the WLAN Broadband Router.

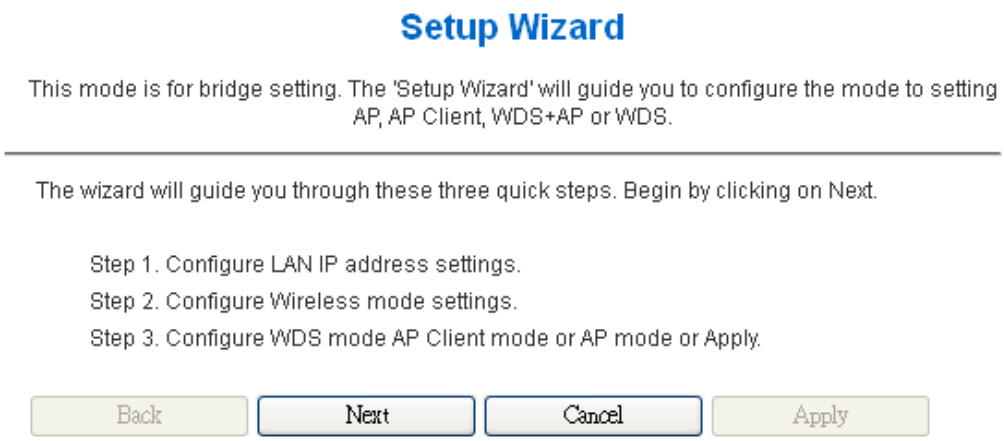
4.3 Management and configuration of the AP

4.3.1 Wizard

The setup wizard will be changed when you select different operation modes.

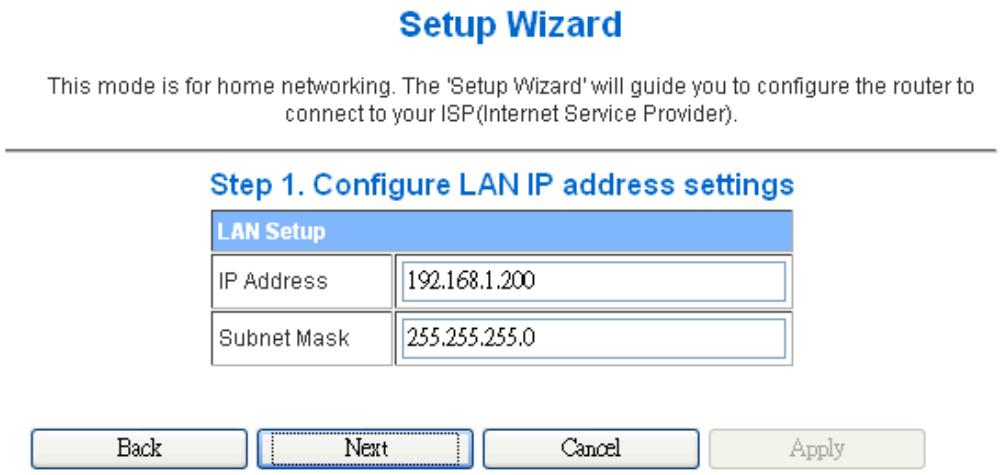
4.3.1.1 Bridge Mode

This mode is for bridge setting. The Setup Wizard will guide you to configure the device to connect to your ISP (Internet Service Provider).



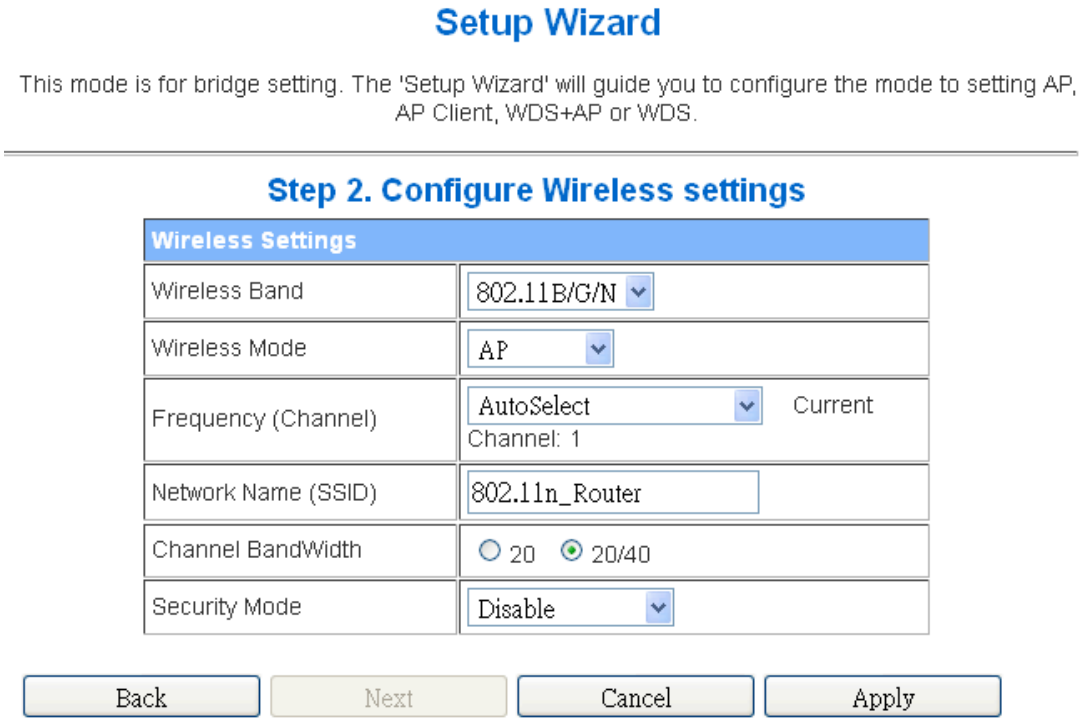
Click ***Next*** to go to the next step for LAN IP address settings.

Step 1: Configure LAN IP address settings



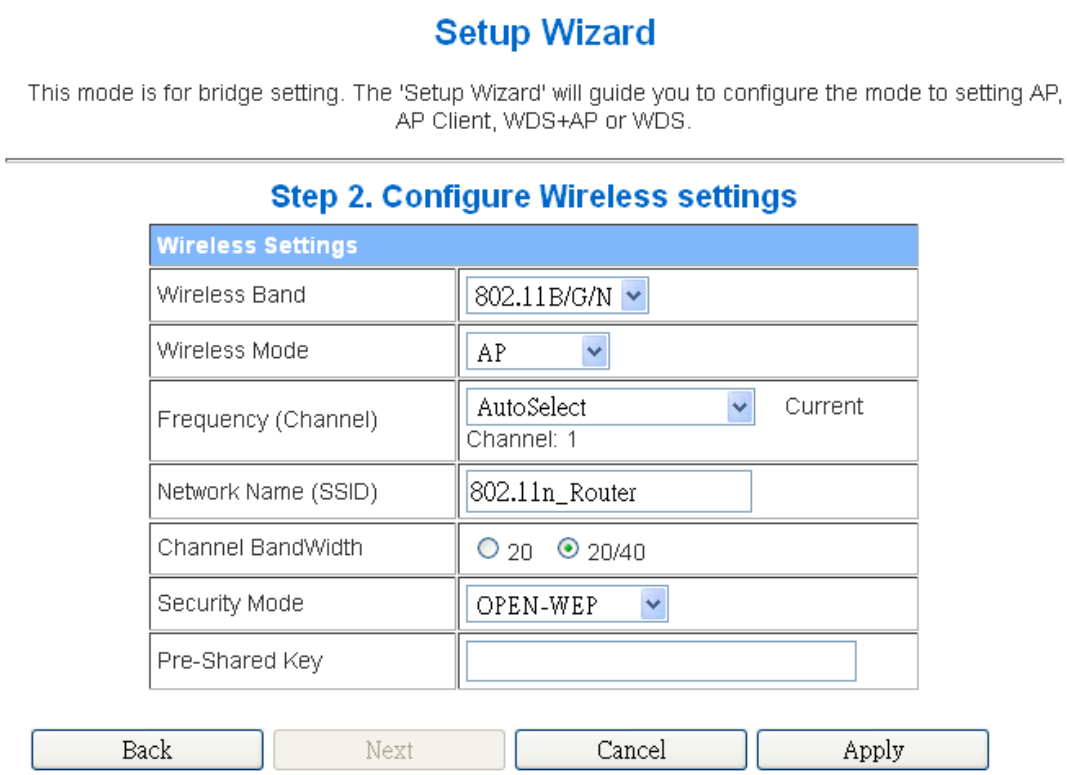
Step 2: Configure Wireless Settings

There are four options (Disable, Open- WEP, Shared-WEP, WPA-PSK/WPA2-PSK) for the wireless security connection.



Item	Description
Network Band	Click to select a wireless band from pull-down menu.
Network Mode	Click to select a wireless mode from pull-down menu.
Frequency (Channel)	Select the wireless communication frequency/channel from pull-down menu.
Network Name (SSID)	It is the wireless network name. The SSID can be 32 bytes long.
Channel Bandwidth	Select the operating channel width 20 MHz or 20/40 MHz.
Security Mode	Select the security mode related to wireless data encryption.
Pre-Shared Key	**WEP:** When you select WEP, input 5, 13 (ASCII), 10 or 26 (hexadecimal) characters for the WEP Key. **WPA-PSK/WPA2-PSK:** When WPA/WPA2 Pre-shared key encryption is selected, fill in the Pre-shared key. The format can be passphrase or hex (64 characters).

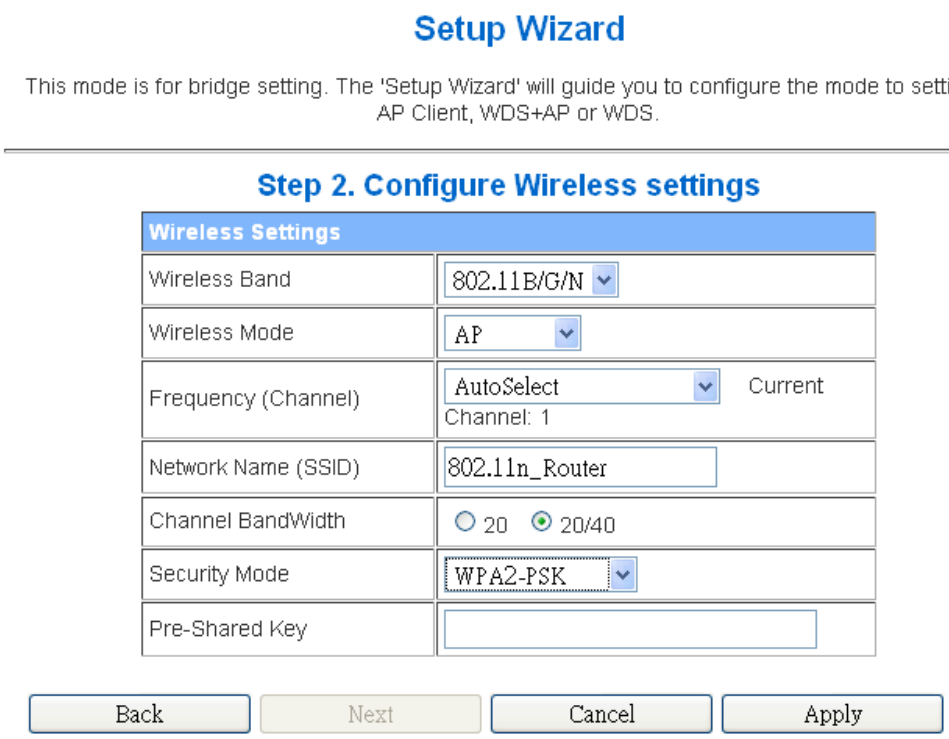
OPEN WEP



SHARED WEP

WPA-PSK

WPA2-PSK

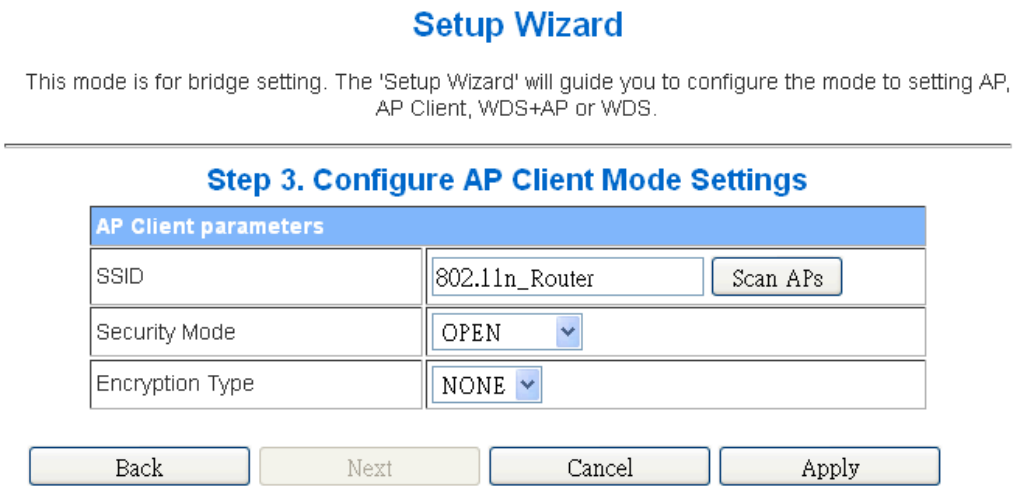


When you finish these settings, click ***Apply*** to save.

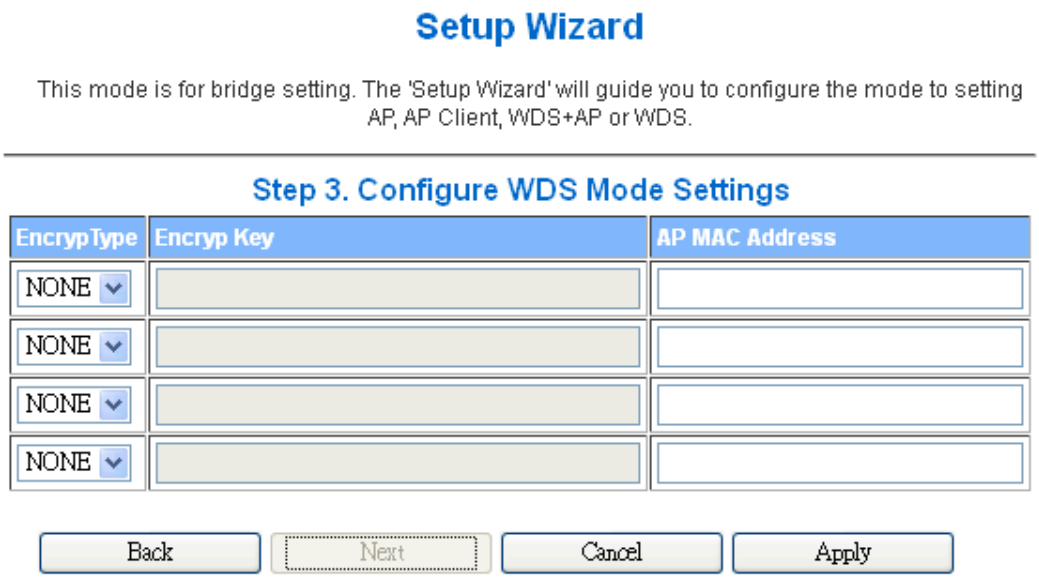
Choose either Client or WDS, then click *Next* to go to Step 3.

Step 3:

a. Configure AP Client Mode Settings



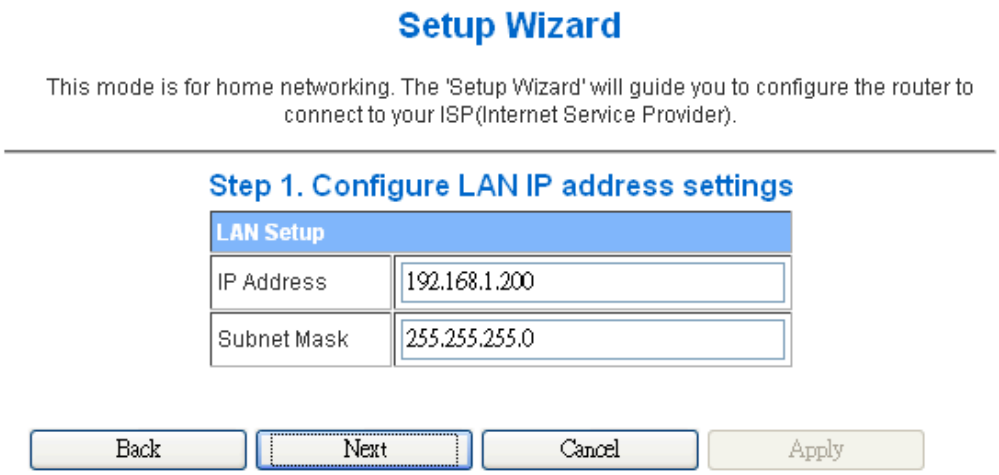
b. Configure WDS Mode Settings



4.3.1.2 Gateway Mode

This mode is for home networking. The Setup Wizard will guide you to configure the device to connect to your ISP (Internet Service Provider).

Step 1: Configure LAN IP address settings



Step 2: Configure the Internet connection

Click ***Next*** to go to the next step for Internet connection settings. There are five options (DHCP, Static Mode, PPPOE, L2TP, PPTP) for Internet connection on the WAN port.

a. DHCP (Auto Configure)

If you select the **DHCP** option, click ***Next*** to jump to Step 3.

b. Static Mode (fixed IP)

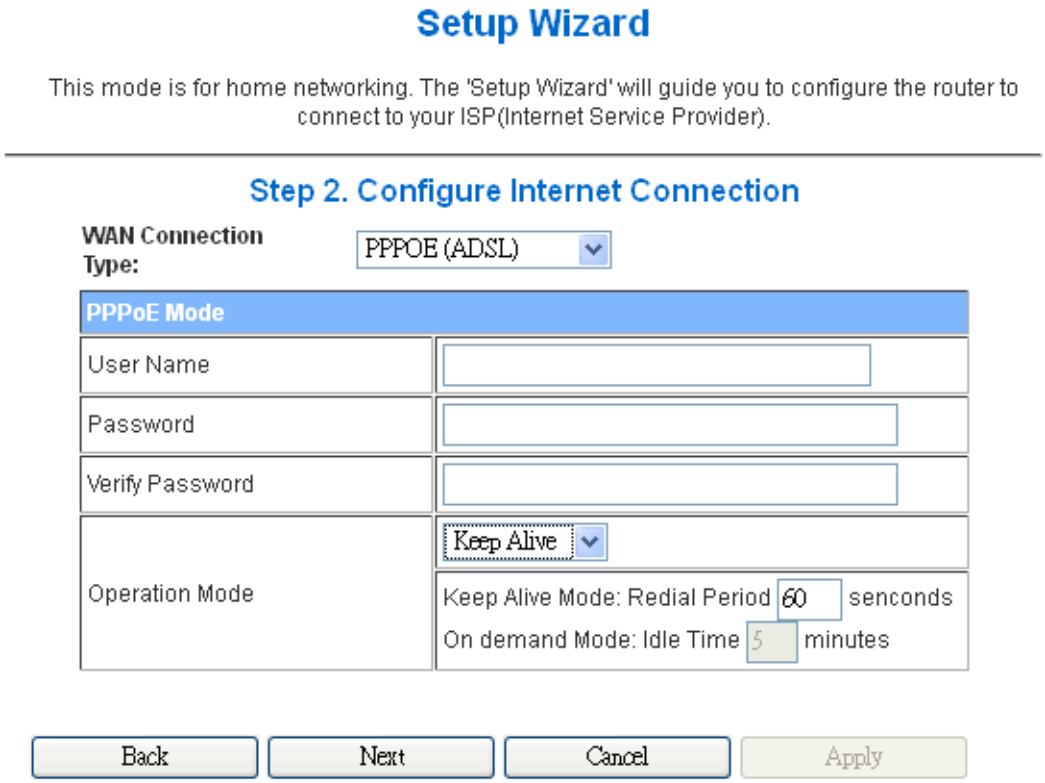
If you select **Static Mode (fixed IP)**, fill in these fields.

Item	Description
IP Address	Fill in the IP address for the WAN interface.
Subnet Mask	Fill in the subnet mask for the WAN interface.
Default Gateway	Fill in the default gateway for WAN interface outgoing data packets.
Primary DNS Server	Fill in the IP address of Domain Name Server 1.
Secondary DNS Server	Fill in the IP address of Domain Name Server 2.

When you finish these settings, click ***Next*** to jump to Step 3.

c. PPPOE (ADSL)

If you select **PPPOE**, fill in these fields.



Item	Description
User Name	If you select the PPPoE support on the WAN interface, fill in the user name to log in to the PPPoE server.
Password	If you select the PPPoE support on the WAN interface, fill in the password to log in to the PPPoE server.
Verify Password	Fill in the password again for verification.
Operation Mode	**Keep Alive:** Keep the PPPoE connection all the time. Also configure the Redial Period field. **On Demand:** Configure the Idle Time field. When time is up, the PPPoE connection will disconnect. The connection will re-connect when any outgoing packet arises. **Manual:** Lets a user connect manually.

When you finish these settings, click ***Next*** to jump to Step 3.

d. L2TP

If you select L2TP, fill in these fields.

Item	Description
L2TP Server IP Address	Allows you to make a tunnel with a remote site directly to secure the data transmission among the connection. You can use embedded L2TP client supported by this device to make a VPN connection. If you select the L2TP support on WAN interface, fill in the IP address for it.
User Name	Fill in the user name to log in to the L2TP server.
Password	Fill in the password to log in to the L2TP server.
Address Mode	**Static:** To configure the IP address information manually, fill in the related settings below. **Dynamic:** The option allows the machine to get IP address information automatically from the DHCP server on the WAN side.
IP Address	Fill in the IP address for the WAN interface.
Subnet Mask	Fill in the subnet mask for the WAN interface.
Default Gateway	Fill in the default gateway for WAN interface outgoing data packets.
Operation Mode	**Keep Alive:** Keep the L2TP connection all the time. Also configure the Redial Period field. **Manual:** Lets a user connect manually.

When you finish these settings, click ***Next*** to jump to Step 3.

e. PPTP

If you select **PPTP**, fill in these fields.

Item	Description
PPTP Server IP Address	Allows you to make a tunnel with a remote site directly to secure the data transmission among the connection. You can use embedded PPTP client supported by this device to make a VPN connection. If you select the PPTP support on the WAN interface, fill in the IP address for it.
User Name	Fill in the user name to log in to the PPTP server.
Password	Fill in the password to log in to the PPTP server.
Address Mode	**Static:** To configure the IP address information manually, fill in the related settings below. **Dynamic:** This option allows the machine to get IP address information automatically from the DHCP server on the WAN side.
IP Address	Fill in the IP address for the WAN interface.
Subnet Mask	Fill in the subnet mask for the WAN interface.
Default Gateway	Fill in the default gateway for WAN interface outgoing data packets.
Operation Mode	**Keep Alive:** Keep the PPTP connection all the time. Also configure the Redial Period field. **Manual:** Lets a user connect manually.

When you finish these settings, click ***Next*** to jump to Step 3.

Step 3: Configure Wireless Settings

There are three options (Disable, WEP, WPA-PSK/WPA2-PSK) for the Wireless security connection.

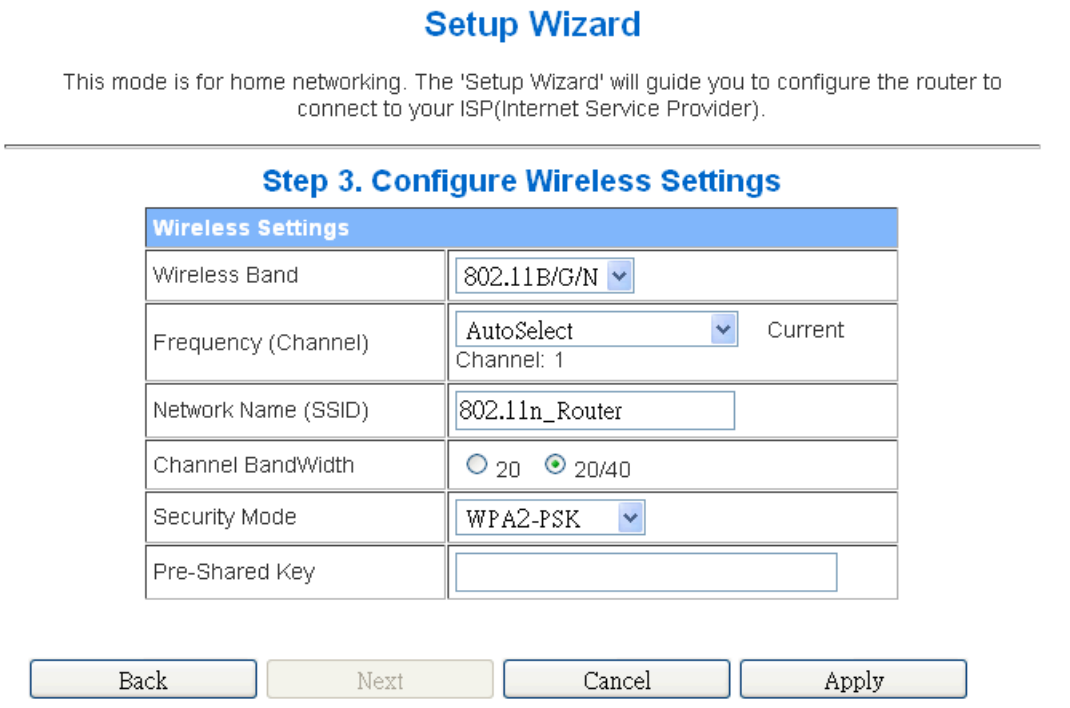
Item	Description
Network Band	Click to select wireless band from pull-down menu.
Network Mode	Click to select wireless mode from pull-down menu.
Frequency (Channel)	Select the wireless communication frequency/channel from pull-down menu.
Network Name (SSID)	It is the wireless network name. The SSID can be 32 bytes long.
Channel Bandwidth	Select the operating channel width 20 MHz or 20/40 MHz.
Security Mode	Please select the security mode related to the wireless data encryption.
Pre-Shared Key	**WEP:** When you select WEP, input 5, 13 (ASCII), 10 or 26 (hexadecimal) characters for WEP Key. **WPA-PSK/WPA2-PSK:** When WPA/WPA2 Pre-shared key encryption is selected, fill in the Pre-shared key. The format can be passphrase or hex (64 characters).

OPEN WEP

SHARED WEP

WPA-PSK

WPA2-PSK

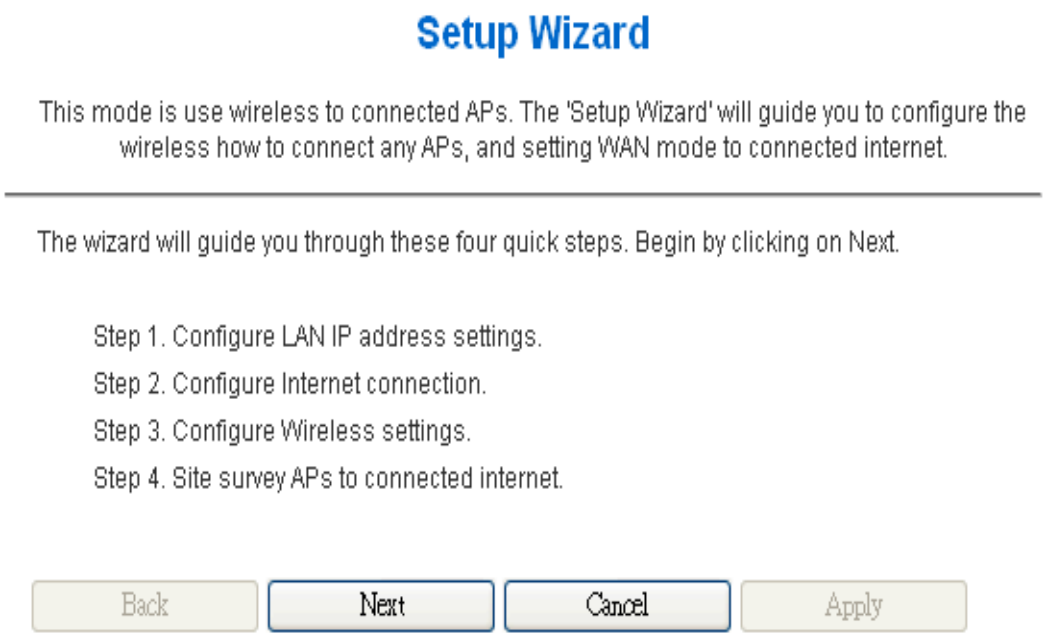


When you finish these settings, click ***Apply*** to save.

Choose either Client or WDS, then click *Next* to go to Step 3.

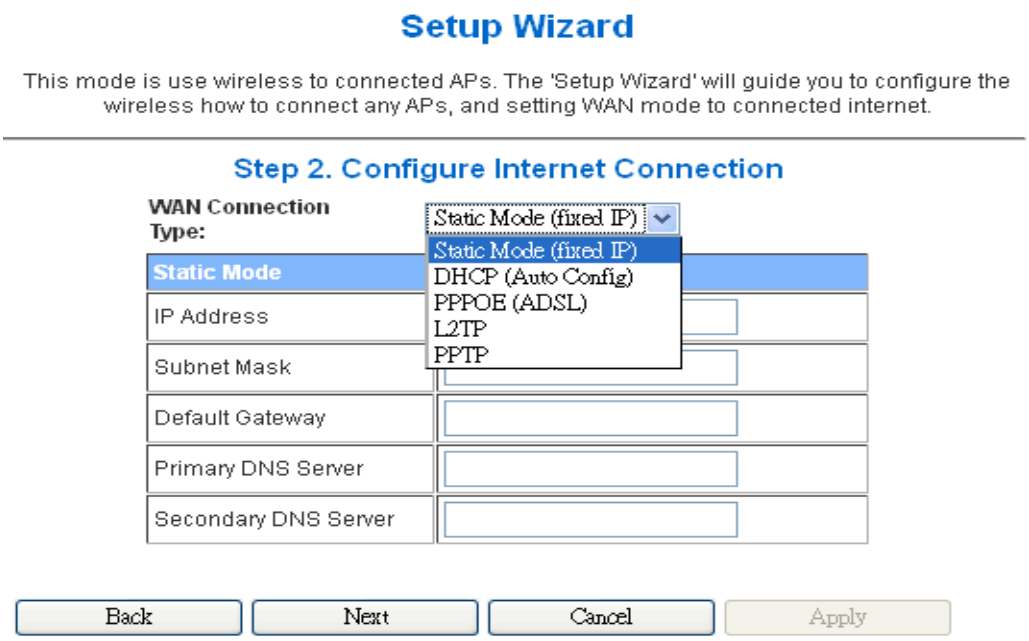
4.3.1.3 WISP Mode

This mode is for home networking. The Setup Wizard will guide you to configure the device to connect to your ISP (Internet Service Provider).



Step 1: Configure LAN IP address settings

Step2: Configure Internet connection



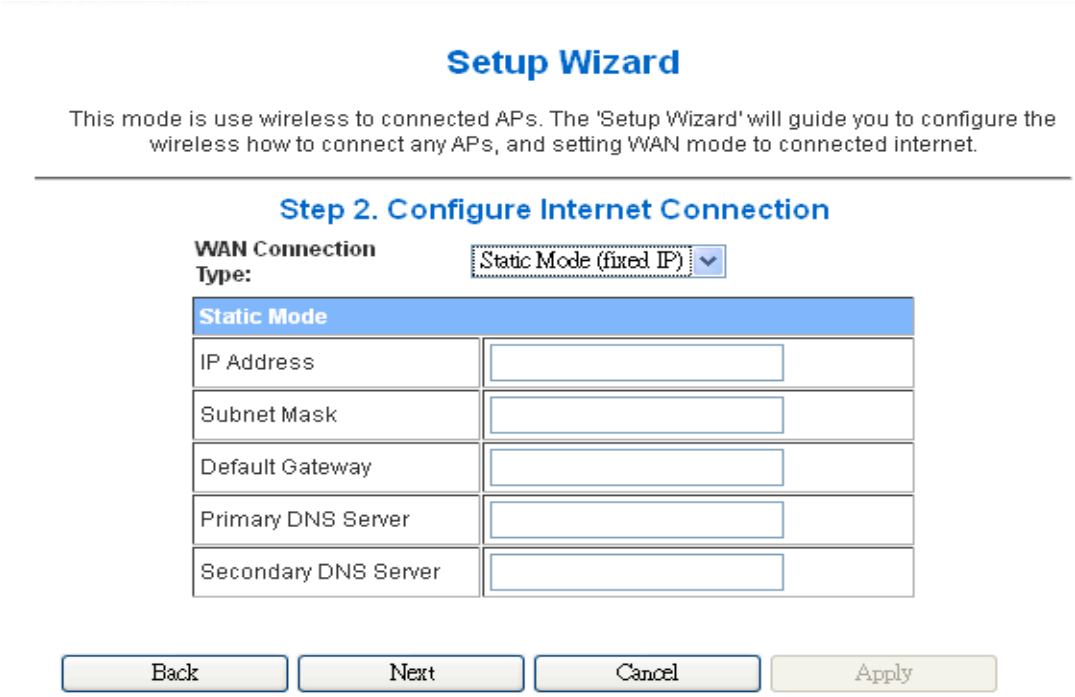
Click ***Next*** to go to the Internet connection settings. There are five options (DHCP, Static Mode, PPPOE, L2TP, PPTP) for Internet connection on the WAN port.

a. DHCP (Auto Configure)

If you select **DHCP** option, click ***Next*** to jump to Step 3.

b. Static Mode (fixed IP)

If you select **Static Mode (fixed IP)**, fill in these fields.



Item	Description
IP Address	Fill in the IP address for the WAN interface.
Subnet Mask	Fill in the subnet mask for the WAN interface.
Default Gateway	Fill in the default gateway for WAN interface outgoing data packets.
Primary DNS Server	Fill in the IP address of Domain Name Server 1.
Secondary DNS Server	Fill in the IP address of Domain Name Server 2.

When you finish these settings, click ***Next*** to jump to Step 3.

c. PPPOE (ADSL)

If you select **PPPOE**, fill in these fields.

Item	Description
User Name	If you select the PPPoE support on WAN interface, fill in the user name to log in to the PPPoE server.
Password	If you select the PPPoE support on WAN interface, fill in the password to log in to the PPPoE server.
Verify Password	Fill in the password again for verification.
Operation Mode	**Keep Alive:** Keep the PPPoE connection all the time. Also configure the Redial Period field. **On Demand:** Configure the Idle Time field. When time is up, the PPPoE connection will disconnect. The connection will re-connect when any outgoing packet arises. **Manual:** Lets a user connect manually.

When you finish these settings, click ***Next*** to jump to Step 3.

d. L2TP

If you select L2TP, fill in these fields.

Item	Description
L2TP Server IP Address	Allows you to make a tunnel with remote site directly to secure the data transmission among the connection. You can use embedded L2TP client supported by this device to make a VPN connection. If you select the L2TP support on WAN interface, fill in the IP address for it.
User Name	Fill in the user name to log in to the L2TP server.
Password	Fill in the password to log in to the L2TP server.
Address Mode	**Static:** To configure the IP address information manually, fill in the related settings below. **Dynamic:** The option allows the machine to get IP address information automatically from the DHCP server on the WAN side.
IP Address	Fill in the IP address for the WAN interface.
Subnet Mask	Fill in the subnet mask for the WAN interface.
Default Gateway	Fill in the default gateway for WAN interface outgoing data packets.
Operation Mode	**Keep Alive:** Keep the L2TP connection all the time. Also configure the Redial Period field. **Manual:** Lets a user connect manually.

When you finish these settings, click ***Next*** to jump to Step 3.

e. PPTP

If you select **PPTP**, fill in these fields.

Item	Description
PPTP Server IP Address	Allows you to make a tunnel with remote site directly to secure the data transmission among the connection. You can use embedded PPTP client supported by this device to make a VPN connection. If you select the PPTP support on the WAN interface, fill in the IP address for it.
User Name	Fill in the user name to log in to the PPTP server.
Password	Fill in the password to log in to the PPTP server.
Address Mode	**Static:** To configure the IP address information manually, fill in the related settings below. **Dynamic:** This option allows the machine to get IP address information automatically from the DHCP server on the WAN side.
IP Address	Fill in the IP address for the WAN interface.
Subnet Mask	Fill in the subnet mask for the WAN interface.
Default Gateway	Fill in the default gateway for WAN interface outgoing data packets.
Operation Mode	**Keep Alive:** Keep the PPTP connection all the time. Also configure the Redial Period field. **Manual:** Lets a user connect manually.

When you finish these settings, click ***Next*** to jump to Step 3.

Step 3: Configure Wireless Settings

There are five options (Disable, OPENWEP,WPA-PSK WPA2-PSK) for the Wireless security connection.

Item	Description
Network Band	Click to select wireless band from pull-down menu.
Network Mode	Click to select wireless mode from pull-down menu.
Frequency (Channel)	Select the wireless communication frequency/channel from pull-down menu.
Network Name (SSID)	It is the wireless network name. The SSID can be 32 bytes long.
Channel Bandwidth	Select the operating channel width 20 MHz or 20/40 MHz.
Security Mode	Select the security mode related wireless data encryption.
Pre-Shared Key	**WEP:** When you select WEP, input 5, 13 (ASCII), 10 or 26 (hexadecimal) characters for WEP Key. **WPA-PSK/WPA2-PSK:** When WPA/WPA2 Pre-shared key encryption is selected, fill in the Pre-shared key. The format can be passphrase or hex (64 characters).

OPEN WEP

When you finish these settings, click ***Next*** to jump to Step 4.

SHARED WEP

When you finish these settings, click ***Next*** to jump to Step 4.

WPA-PSK

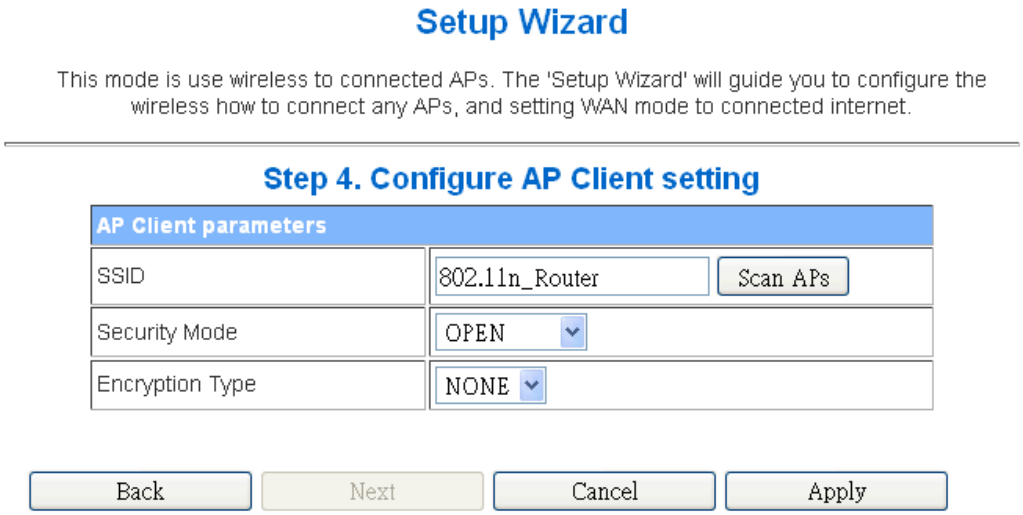
When you finish these settings, click ***Next*** to jump to Step 4.

WPA2-PSK

Item	Description
Network Band	Click to select wireless band from pull-down menu.
Network Mode	Click to select wireless mode from pull-down menu.
Frequency (Channel)	Select the wireless communication frequency/channel from pull-down menu.
Network Name (SSID)	It is the wireless network name. The SSID can be 32 bytes long.
Channel Bandwidth	Select the operating channel width 20 MHz or 20/40 MHz.
Security Mode	Select the security mode related wireless data encryption.
Pre-Shared Key	**WEP:** When you select WEP, input 5, 13 (ASCII), 10 or 26 (hexadecimal) characters for WEP Key. **WPA-PSK/WPA2-PSK:** When WPA/WPA2 Pre-shared key encryption is selected, fill in the Pre-shared key. The format can be passphrase or hex (64 characters).

When you finish these settings, click ***Apply*** to save.

Step 4. Configure AP Client setting

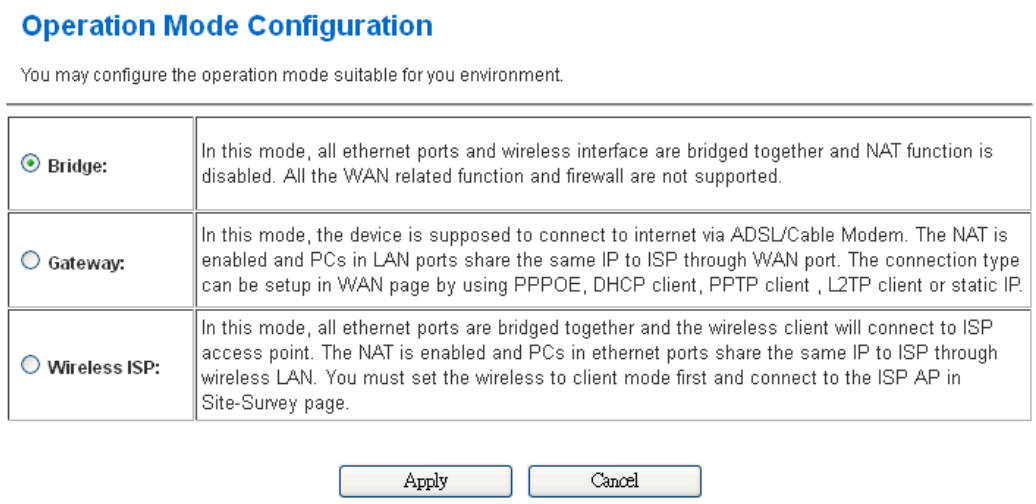


SCAN APs

	SSID	BSSID	RSSI	Channel	Authentication	Wireless Mode
○	LP-7696_RD	00:1a:ef:00:00:08	20%	1	WPA2PSK/AES	11b/g/n
○	XPossible-charles	00:1a:ef:2c:e0:3c	10%	1	WPA1PSKWPA2PSK/AES	11b/g/n
○	Amped_2.4GHz	00:1a:ef:00:20:03	9%	1	WPA1PSKWPA2PSK/AES	11b/g/n
○	CD-R King test	00:1a:ef:20:f8:8a	20%	1	WPAPSK/AES	11b/g/n
○	hinet_VDSL	28:10:7b:42:de:de	5%	6	WPAPSK/TKIP	11b/g
○	RTK 11n AP	00:1a:ef:18:7d:18	25%	6	NONE	11b/g/n
○	RTK 11n AP_LNK	00:1a:ef:21:f2:4a	9%	11	WEP	11b/g
○	LP-8696C	00:1a:ef:18:4c:78	5%	11	WPA2PSK/AES	11b/g
○	loopcomm	00:1a:ef:28:54:25	10%	11	WPA2PSK/AES	11b/g/n
○	XPossible	00:1a:ef:21:f2:77	50%	11	NONE	11b/g/n

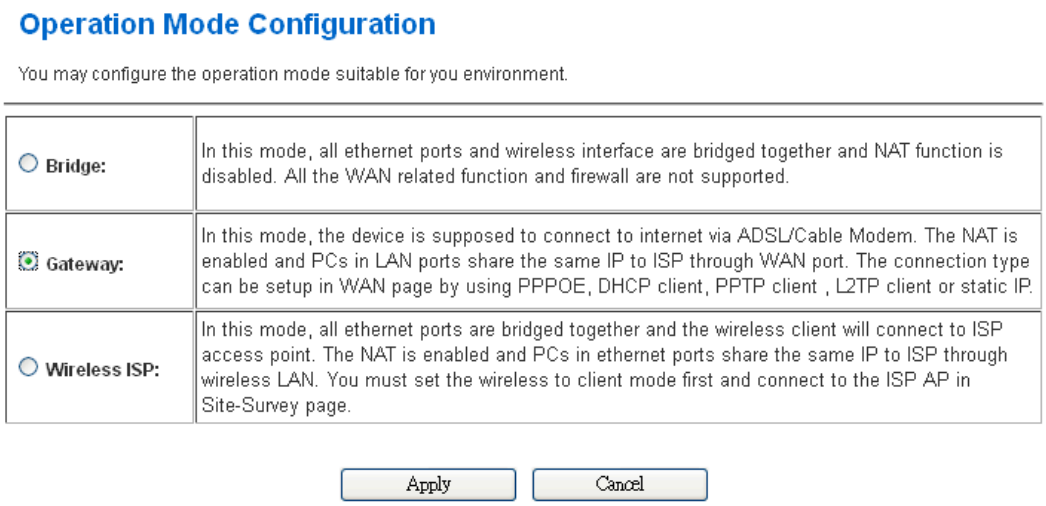
4.3.2 Operation Mode

a. Bridge:



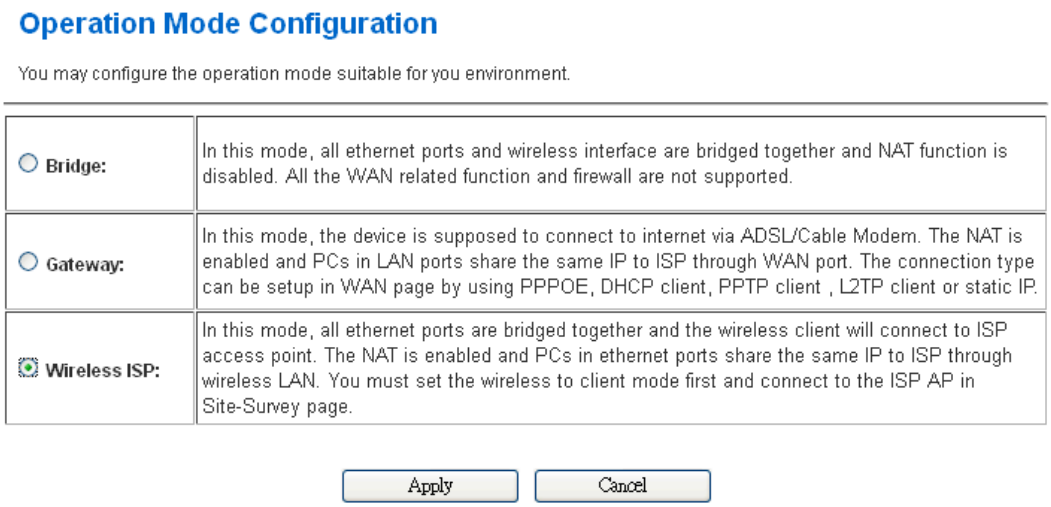
Bridge mode allows all Ethernet and wireless interfaces to be bridged into a single bridge interface.

b. Gateway:



Gateway mode allows the first Ethernet port to be treated as a WAN port. The Ethernet port and the wireless interface are bridged together and are treated as LAN ports.

c. Wireless ISP

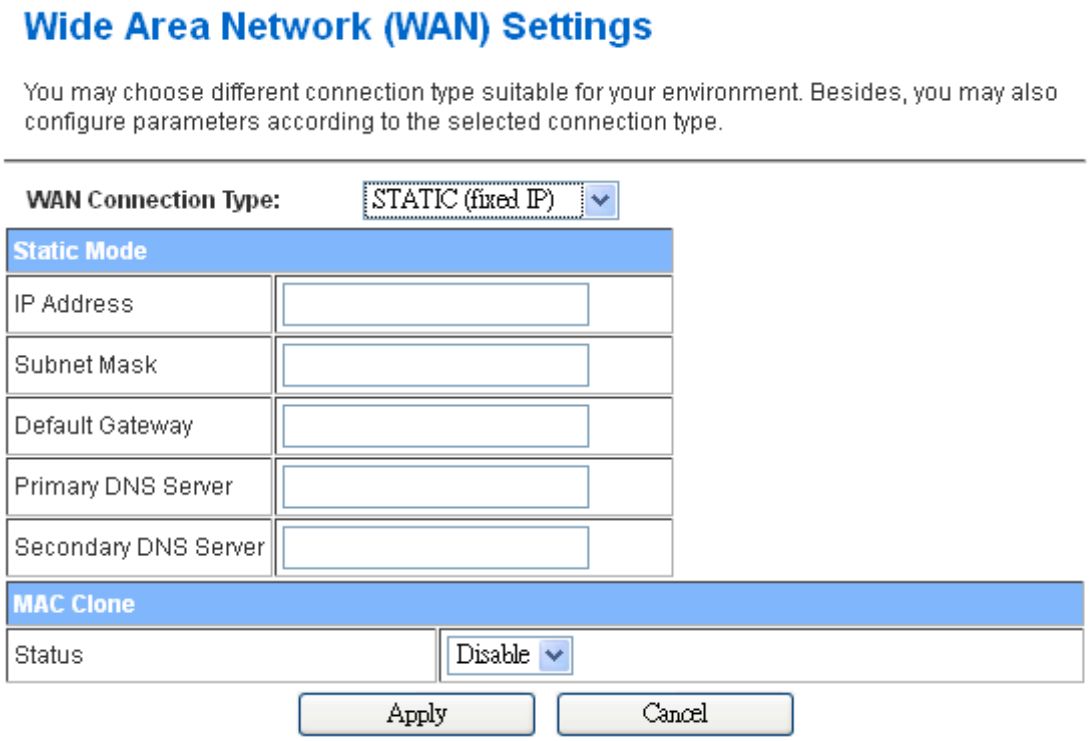


The **Wireless ISP** mode allows that the wireless interface is treated as a WAN port, and the Ethernet ports are LAN ports.

4.3.3 Internet Settings

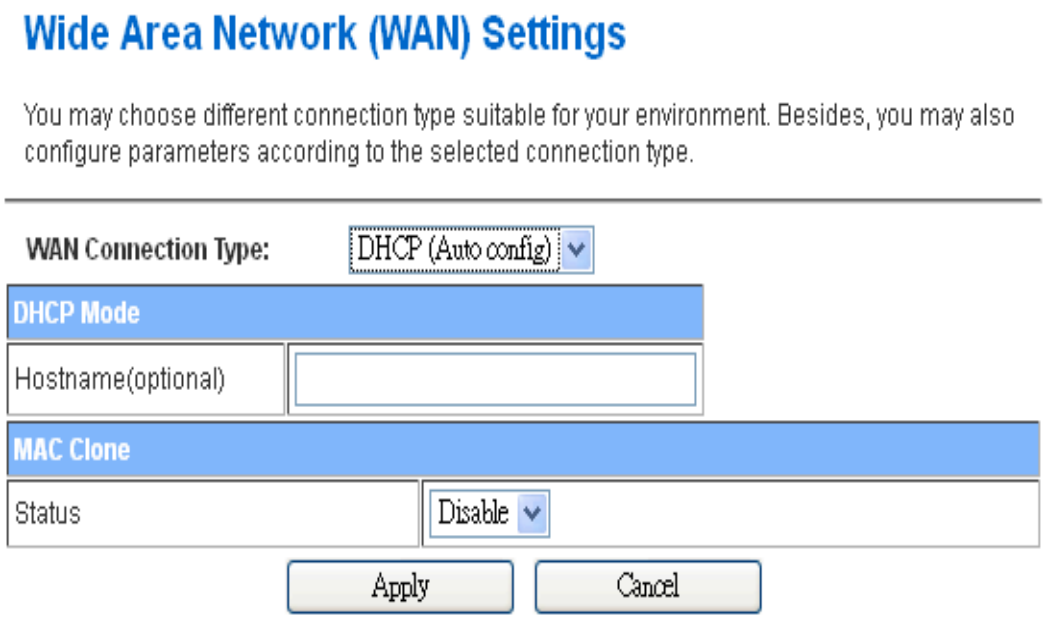
4.3.3.1 WAN

a. STATIC



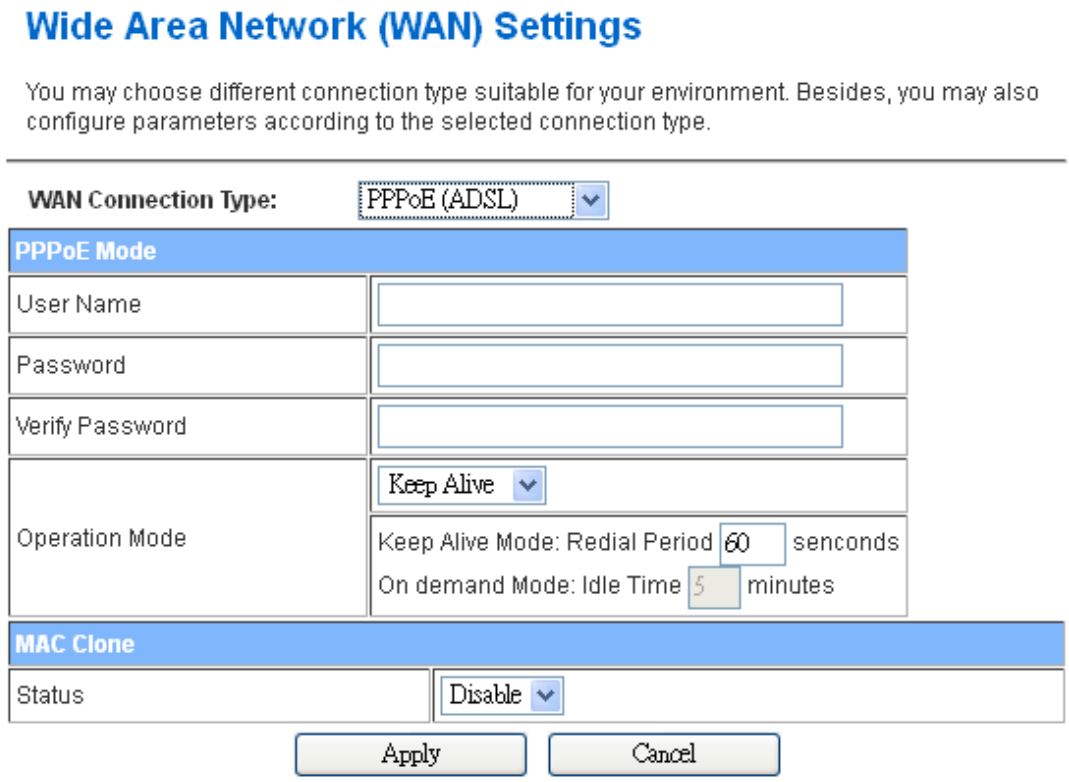
Item	Description
IP Address	Fill in the IP address for the WAN interface.
Subnet Mask	Fill in the subnet mask for the WAN interface.
Default Gateway	Fill in the default gateway for WAN interface outgoing data packets.
Primary DNS Server	Fill in the IP address of Domain Name Server 1.
Secondary DNS Server	Fill in the IP address of Domain Name Server 2.
MAC Clone	Use the NIC MAC address of the PC on the LAN side as the MAC address of the WAN interface.

b. DHCP



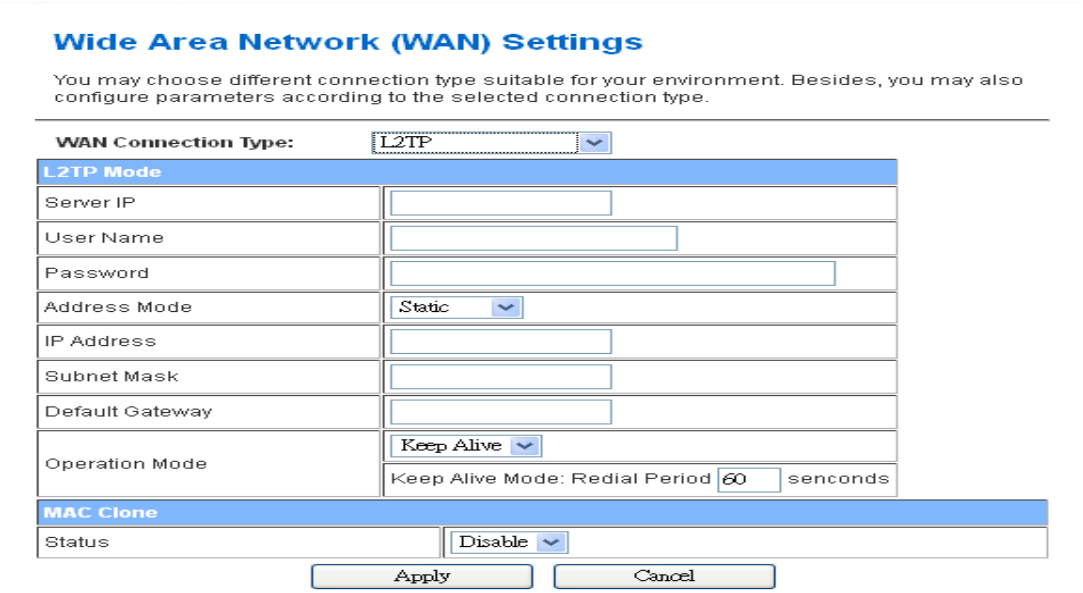
Item	Description
Hostname	Fill in the host name for the DHCP server. The default value is empty.
MAC Clone	Use the NIC MAC address of the PC on the LAN side as the MAC address of the WAN interface.

. PPPoE



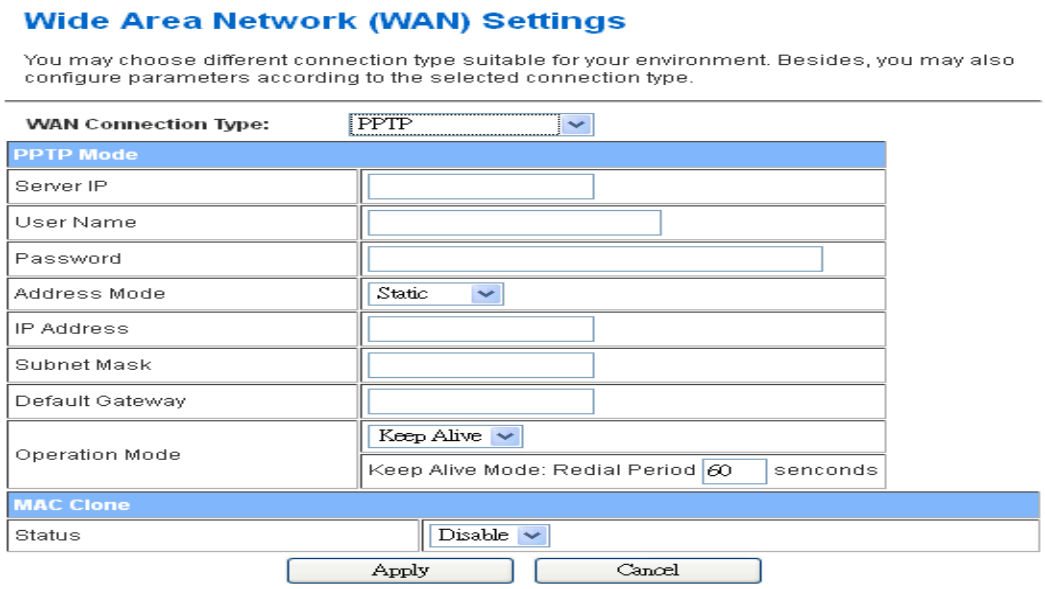
Item	Description
User Name	If you select the PPPoE support on the WAN interface, fill in the user name to log in to the PPPoE server.
Password	If you select the PPPoE support on the WAN interface, fill in the password to log in to the PPPoE server.
Verify Password	Fill in the password again for verification.
Operation Mode	**Keep Alive:** Keep the PPPoE connection all the time. Also configure the Redial Period field. **On Demand:** Configure the Idle Time field. When time is up, the PPPoE connection will disconnect. The connection will re-connect when any outgoing packet arises. **Manual:** Lets a user connect manually.
MAC Clone	Use the NIC MAC address of a PC on the LAN side as the MAC address of the WAN interface.

d. L2TP



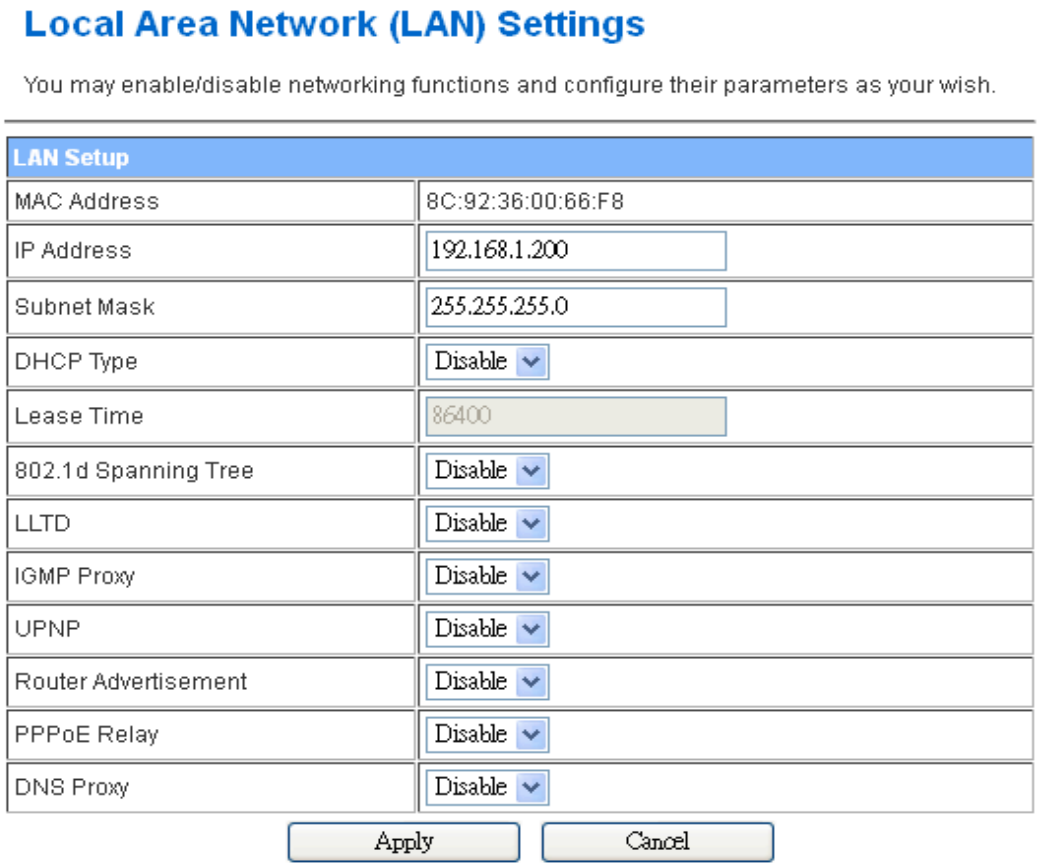
Item	Description
Server IP	Allows you to make a tunnel with a remote site directly to secure the data transmission among the connections. You can use embedded L2TP client supported by this device to make a VPN connection. If you select the L2TP support on the WAN interface, fill in the IP address for it.
User Name	Fill in the user name to log in to the L2TP server.
Password	Fill in the password to log in to the L2TP server.
Address Mode	**Static:** To configure the IP address information manually, fill in the related settings below. **Dynamic:** This option allows the machine to get IP address information automatically from the DHCP server on the WAN side.
IP Address	Fill in the IP address for the WAN interface.
Subnet Mask	Fill in the subnet mask for the WAN interface.
Default Gateway	Fill in the default gateway for WAN interface outgoing data packets.
Operation Mode	**Keep Alive:** Keep the L2TP connection all the time. Also configure the Redial Period field. **On Demand:** Configure the Idle Time field. When time is up, the L2TP connection will disconnect. The connection will re-connect when any outgoing packet arises. **Manual:** Lets a user connect manually.
MAC Clone	Use the NIC MAC address of a PC on the LAN side as the MAC address of the WAN interface.

e. PPTP



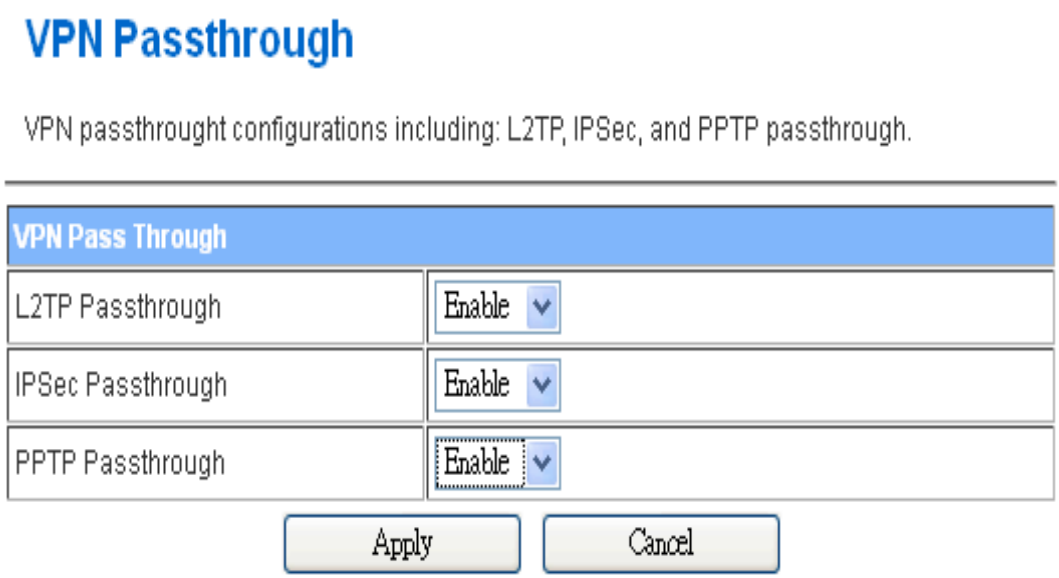
Item	Description
Server IP	Allows you to make a tunnel with a remote site directly to secure the data transmission among the connection. You can use embedded PPTP client supported by this device to make a VPN connection. If you select the PPTP support on the WAN interface, fill in the IP address for it.
User Name	Fill in the user name to log in to the PPTP server.
Password	Fill in the password to log in to the PPTP server.
Address Mode	**Static:** To configure the IP address information manually, fill in the related settings below. **Dynamic:** This option allows the machine to get IP address information automatically from the DHCP server on the WAN side.
IP Address	Fill in the IP address for the WAN interface.
Subnet Mask	Fill in the subnet mask for the WAN interface.
Default Gateway	Fill in the default gateway for WAN interface outgoing data packets.
Operation Mode	**Keep Alive:** Keep the PPTP connection all the time. Also configure the Redial Period field. **On Demand:** Configure the Idle Time field. When time is up, the PPTP connection will disconnect. The connection will re-connect when any outgoing packet arises. **Manual:** Lets a user connect manually.
MAC Clone	Use the NIC MAC address of a PC on the LAN side as the MAC address of the WAN interface.

4.3.3.2 LAN



Item	Description
MAC Address	Use the NIC MAC address of a PC on the LAN side as the MAC address of the WAN interface.
IP Address	Fill in the IP address for the WAN interface.
Subnet Mask	Fill in the subnet mask for the WAN interface.
DHCP Type	**Disable:** Disable the DHCP server on LAN side. **Server:** Enable the DHCP server on LAN side.
Lease Time	Fill in the lease time of the DHCP server function.
LLTD	Select enable or disable the Link Layer Topology Discover function from the pull-down menu.
IGMP Proxy	Select enable or disable the IGMP proxy function from the pull-down menu.
UPNP	Select enable or disable the UPnP protocol from the pull-down menu.
DNS Proxy	Select enable or disable the DNS Proxy function from the pull-down menu.

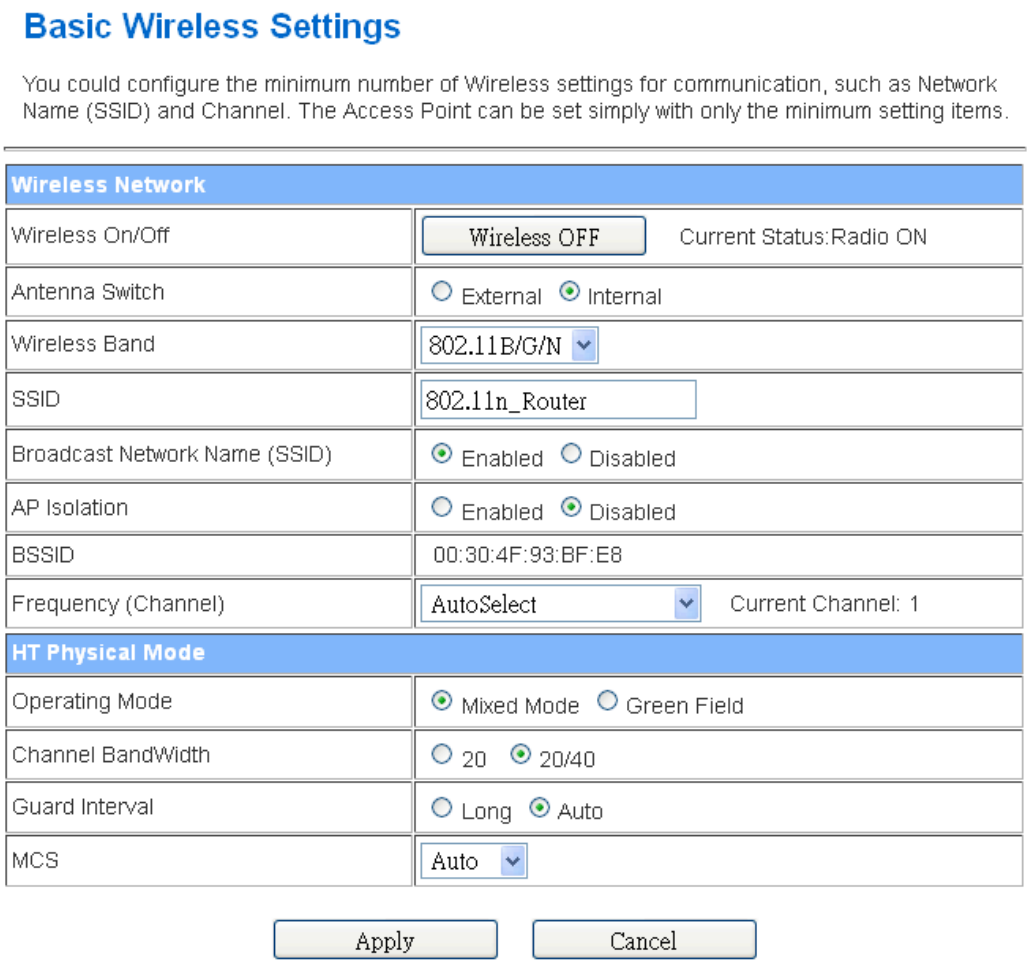
4.3.3.3 VPN Passthrough



Item	Description
L2TP Passthrough	Select enable or disable the L2TP passthrough function from pull-down menu.
IPSec Passthrough	Select enable or disable the IPSec passthrough function from pull-down menu.
PPTP Passthrough	Select enable or disable the PPTP passthrough function from pull-down menu.

4.3.4 Wireless Settings

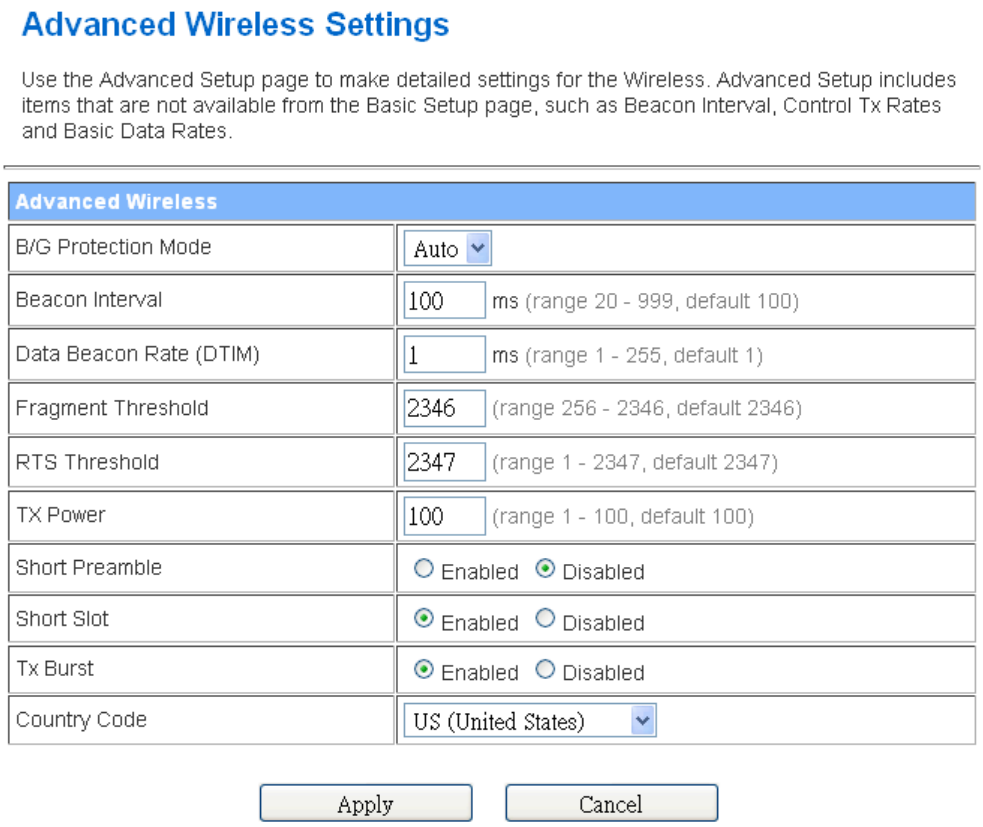
4.3.4.1 Basic



Item	Description
Wireless On/Off	Click ***Wireless OFF*** to turn off the wireless RF radio. Click ***Wireless ON*** to turn on the wireless RF radio.
Antenna Switch	Select Internal antenna or External antenna. The default is Internal antenna.
Wireless Mode	Click to select a wireless mode from pull-down menu.
Wireless Band	Click to select a wireless band from pull-down menu.
SSID	It is the wireless network name. The SSID can be 32 bytes long. You can use the default SSID or change it.
Broadcast Network Name (SSID)	Enable or disable the SSID broadcast function.
AP Isolation	Wireless network is similar to the virtual local area network. All of the wireless client devices can access each other completely. When you enable this function, it will turn off the connection between wireless clients, only allowing the

	connection between a wireless client and this device.
BSSID	Show the MAC address of the wireless interface.
Frequency (Channel)	Select the wireless communication frequency/channel from the pull-down menu.
Operating Mode	Select “Mixed Mode” for 11b/g/n mode or “Green Field” for 11n mode.
Channel Bandwidth	Select the operating channel width 20 MHz or 20/40 MHz.
Guard Interval	Select “Long” or “Auto.” Guard intervals are used to ensure that distinct transmissions do not interfere with one another. Only works in Mixed Mode.
MCS	Select 0-7 or “Auto” from the pull-down menu. The default is “Auto.” Only works in Mixed Mode.

4.3.4.2 Advanced



Item	Description
Beacon Interval	Beacons are the packets sent by the access point to synchronize the wireless network. The beacon interval is the time interval between beacons sent by this unit in AP or AP+WDS operation. The default and recommended beacon interval is 100 milliseconds.
Data Beacon Rate (DTM)	This is the Delivery Traffic Indication Map. It is used to alert the clients that multicast and broadcast packets buffered at the AP will be transmitted immediately after the transmission of this beacon frame. You can change the value from 1 to 255. The AP will check the buffered data according to this value. For example, selecting “1” means to check the buffered data at every beacon.
Fragment Threshold	The fragmentation threshold determines the size at which packets are fragmented (sent as several pieces instead of as one block). Use a low setting in areas where communication is poor or where there is a great deal of radio interference. This function will help you improve the network performance.
RTS Threshold	The RTS threshold determines the packet size at which the radio issues a request to send (RTS) before sending the packet. A low RTS Threshold setting

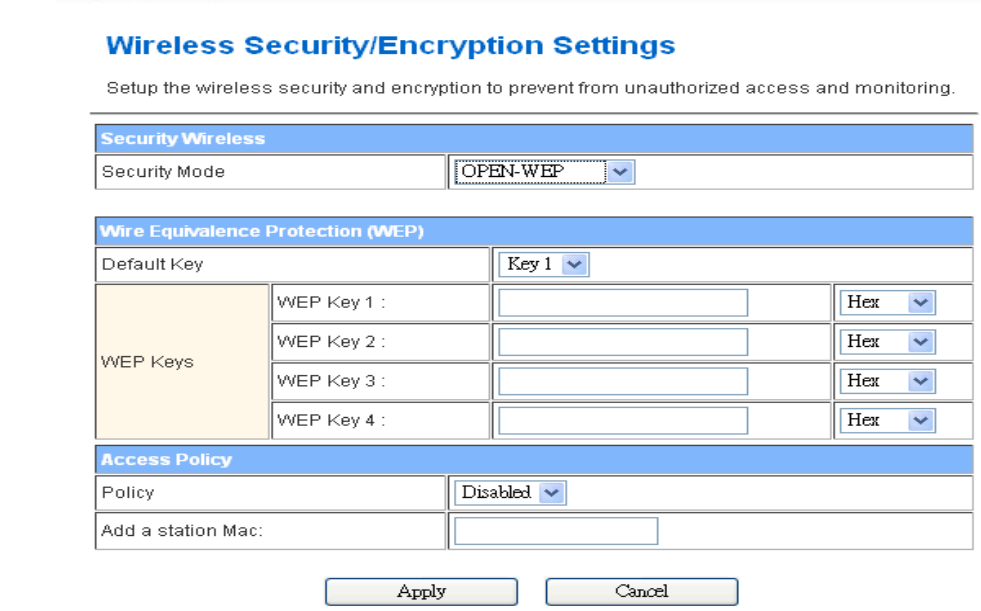
	can be useful in areas where many client devices are associating with the device, or in areas where the clients are far apart and can detect only the device and not each other. You can enter a setting ranging from 0 to 2347 bytes.
TX Power	The default TX power is 100%. In cases where you're shortening the distance and the coverage of the wireless network, input a smaller value to reduce the radio transmission power. For example, input 80 to apply 80% Tx power.
Short Preamble	Default: Disable. It is a performance parameter for 802.11 b/g mode and is not supported by some very-early-stage 802.11b station cards. If there is no such kind of station associated with this AP, you can enable this function.
Short Slot	It is used to shorten the communication time between this AP and station.
TX Burst	The device will try to send a series of packages with single ACK reply from the clients. Enable this function to apply it.
Country Code	Select the country code for wireless from the pull-down menu.

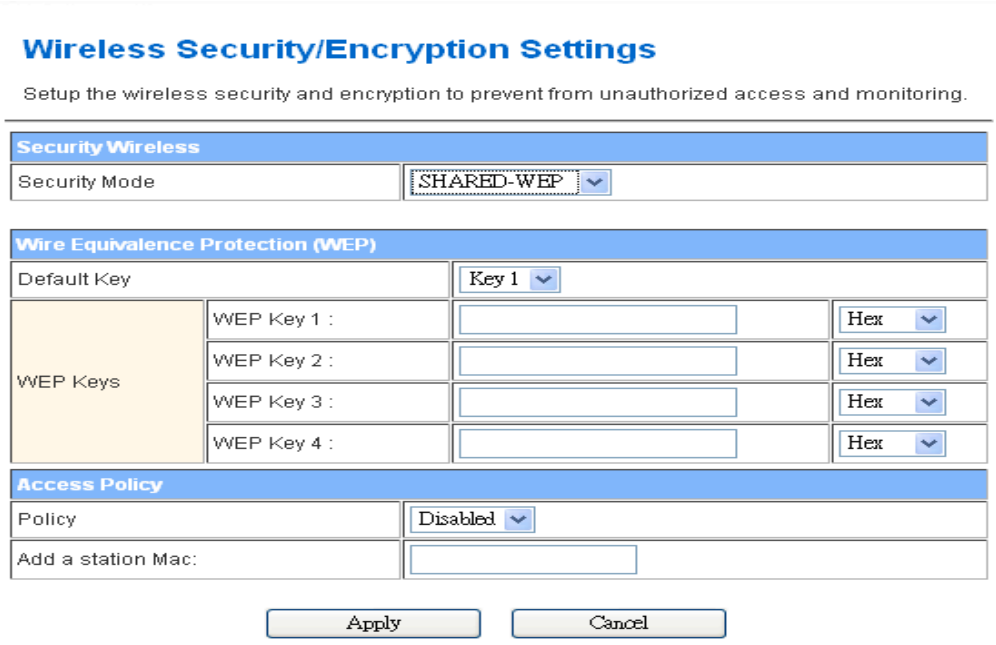
4.3.4.3 Security

a. Disable

If you set Security Mode to **Disable,** the wireless data transmission will not include encryption to prevent from unauthorized access and monitoring.

b. OPEN-WEP // SHARED-WEP

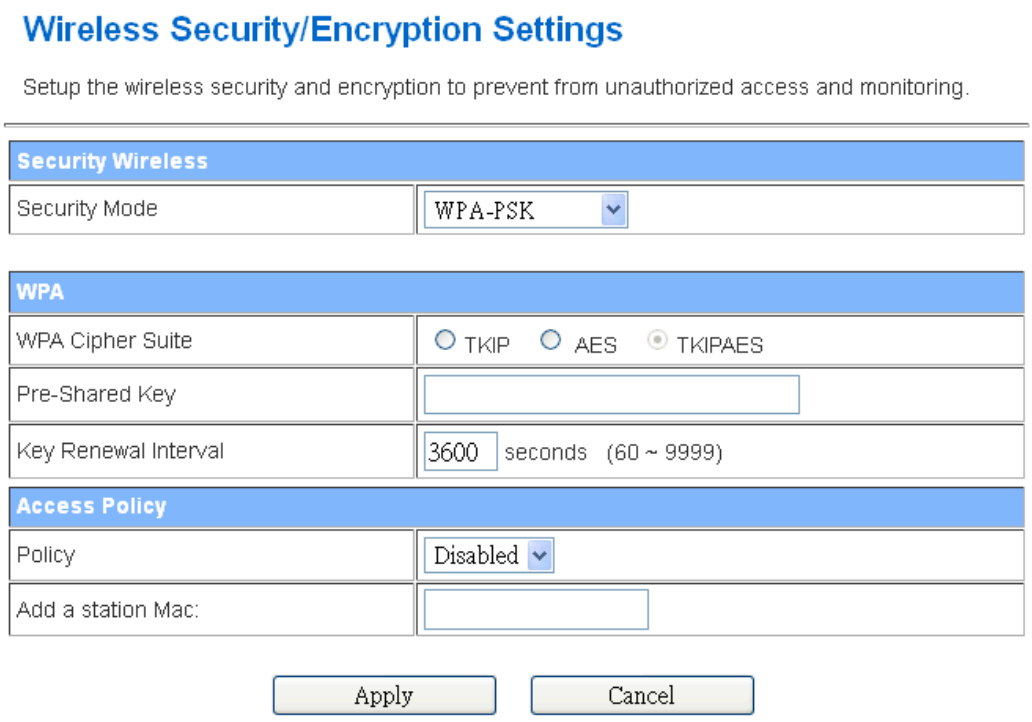


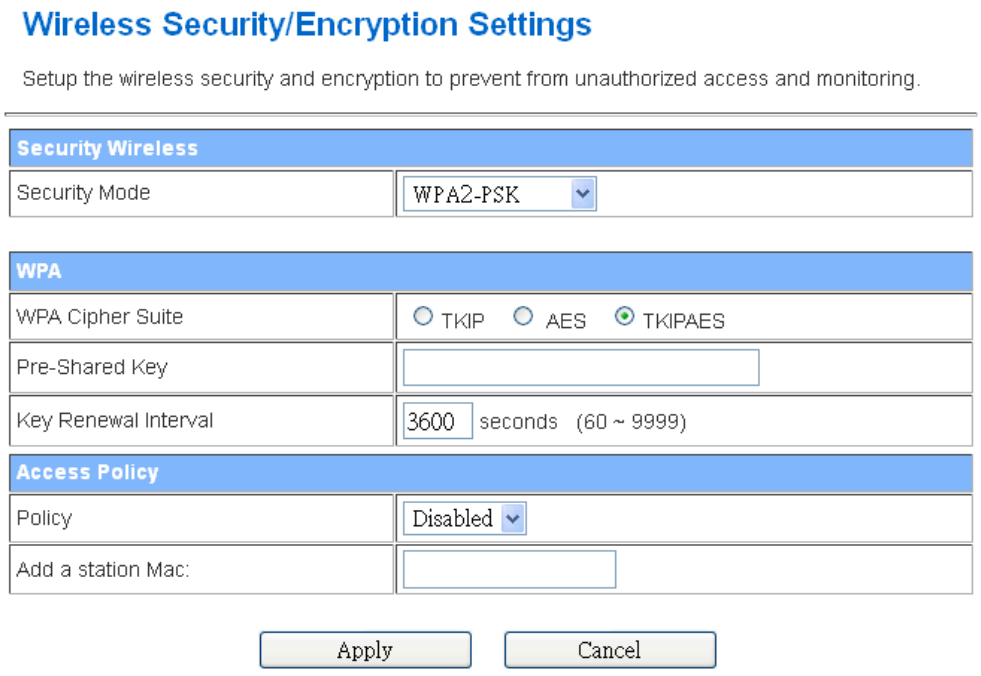


If you set Security Mode to **OPEN-WEP or SHARED-WEP**, fill in the related configurations as below.

Item	Description
Default Key	Specify a Key number.
WEP Keys (1-4)	When you select WEPAUTO, input 5, 13 (ASCII), 10 or 26 (hexadecimal) characters for WEP Key.

c. WPA-PSK/WPA2PSK





If you set Security Mode to "**WPAPSK or WPA2-PSK,"** fill in the related configurations as below.

Item	Description
WPA Cipher Suite	Select **TKIP**, **AES** or **TKIPAES** for WPA algorithms.

Pre-Shared Key	Fill in a passphrase like “test wpa 123” or a hexadecimal string like “65E4 E123 456 E1.”
Key Renewal Interval	Fill in a number for Group Key Renewal interval time.

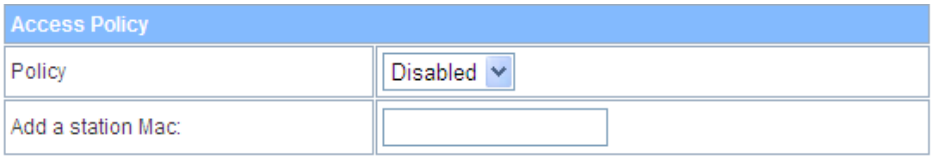
d. WPA-RADIUS/WPA2-RADIUS

Item	Description
WPA Cipher Suite	Select **TKIP** or **AES** for WPA algorithms.
Key Renewal Interval	Fill in a number for Group Key Renewal interval time.
IP Address	Enter the RADIUS Server's IP Address provided by your ISP.
Port	Enter the RADIUS Server's port number provided by your ISP. (The Default is 1812.)
Shared Secret	Enter the password shared with the RADIUS Server.
Session Timeout	Session timeout interval is for 802.1x re-authentication setting. Set to zero to disable 802.1x re-authentication service for each session. Session timeout interval unit is seconds and must be larger than 60.
Idle Timeout	Enter the idle timeout in the column.

e. 802.1X

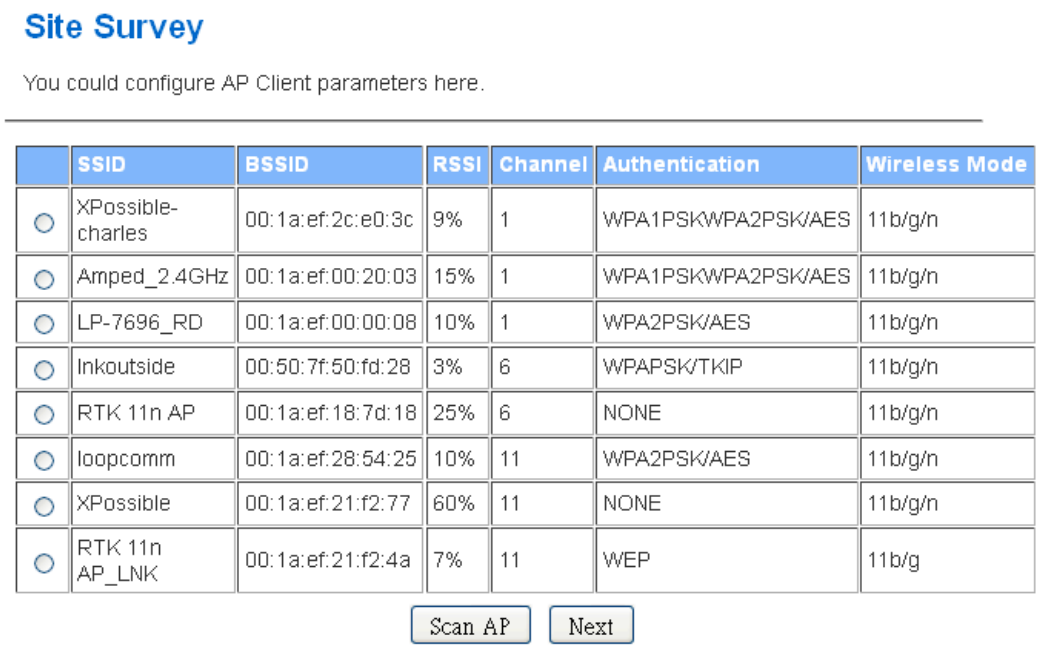
Item	Description
WEP	Select Disabled or Enabled for WEP.
IP Address	Enter the RADIUS Server's IP Address provided by your ISP.
Port	Enter the RADIUS Server's port number provided by your ISP. (The Default is 1812.)
Shared Secret	Enter the password shared with the RADIUS Server.
Session Timeout	Session timeout interval is for 802.1x re-authentication setting. Set to zero to disable 802.1x re-authentication service for each session. Session timeout interval unit is seconds and must be larger than 60.
Idle Timeout	Enter the idle timeout in the column.

f. Access Policy



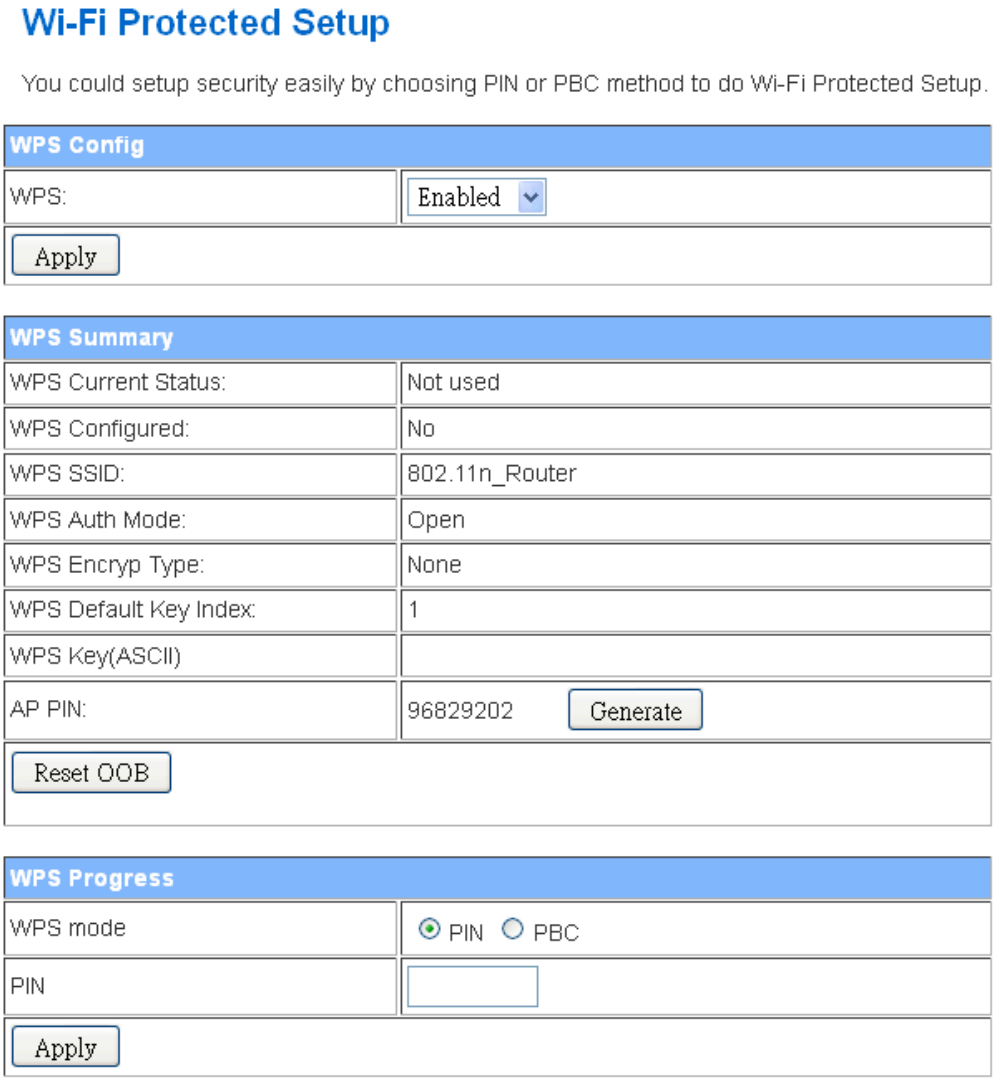
Item	Description
Policy	Select **Disabled, Allow** or **Reject** from the drop-down menu to choose a wireless access control mode. This is a security control function; only those clients registered in the access control list can link to this WLAN device.
Add a station MAC	Fill in the MAC address of a client to register this device's access capability.

4.3.4.4 Site Survey



You can configure AP Client parameters here.

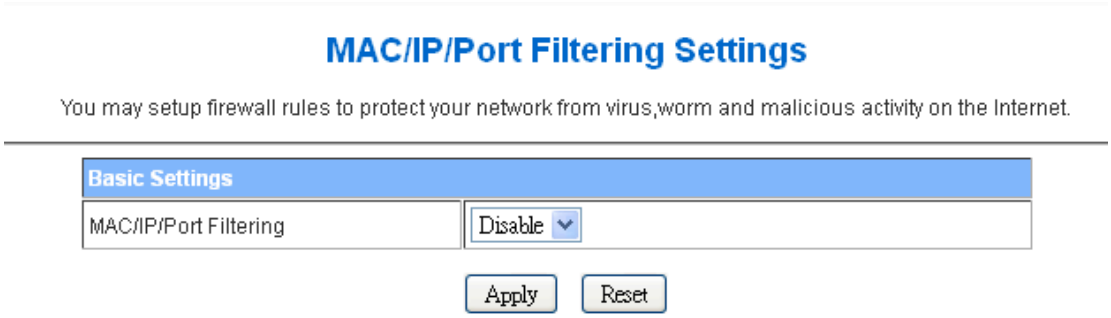
4.3.4.5 WPS



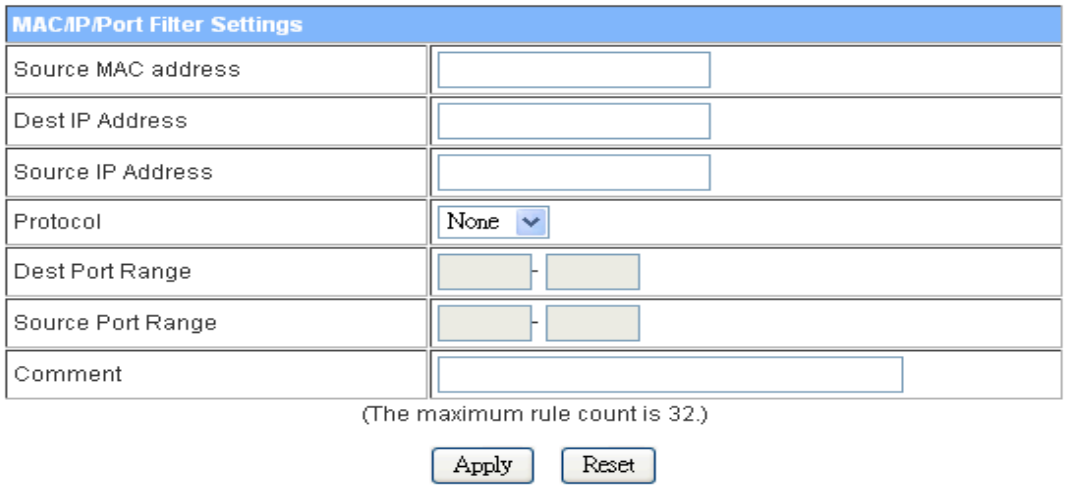
Item	Description
WPS	Select to **Enable** or **Disable** the Wi-Fi Protected Setup function. Then click ***Apply*** for it to take effect.
WPS Summary	After enabling the WPS function, if there is connection the WPS Summary will show related information and status.
AP PIN	This shows the AP's PIN (Personal Identification Number) code that the enrollee should enter to make a connection. Click ***Generate*** to generate a new AP PIN code.
Reset OOB	Click ***Reset OOB*** to reset WPS AP to the OOB (out-of-box) configuration.
WPS mode	Select WPS mode. **PIN**: Personal Identification Number. **PBC**: Push Button Communication.
PIN	Input enrollee's PIN code to AP-registrar.

4.3.5 Firewall

4.3.5.1 MAC/IP/Port Filtering

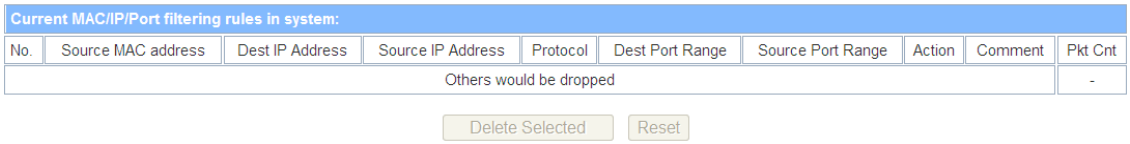


Item	Description
MAC/IP/Port Filtering	Select to **Enable** or **Disable** the MAC/IP/Port Filtering function.



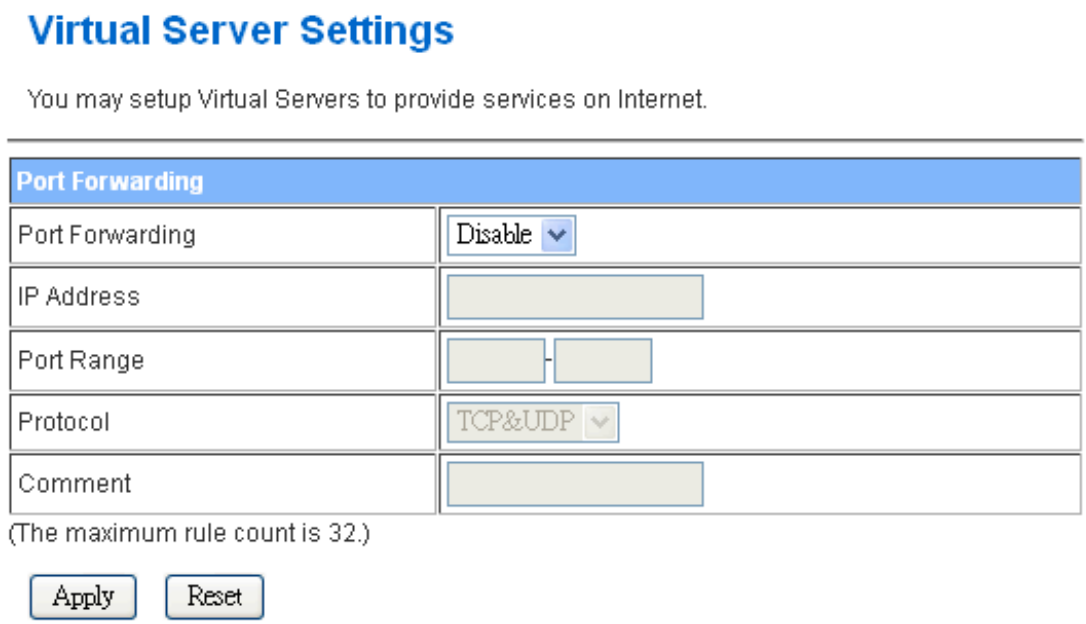
Item	Description
Source MAC address	Fill in the MAC address of the source NIC to restrict data transmission.
Dest IP Address	Fill in the IP address of the destination to restrict data transmission.
Source IP Address	Fill in the IP address of the source to restrict data transmission.
Protocol	Select the protocol that you want to restrict. There are four options: None, TCP, UDP and ICMP.
Dest Port Range	Fill in the start-port and end-port number of the destination to restrict data transmission.
Source Port Range	Fill in the start-port and end-port number of the source to restrict data transmission.
Action	Select **Accept** or **Drop** to specify the action of filtering policies.

Comment	Make a comment for the filtering policy.

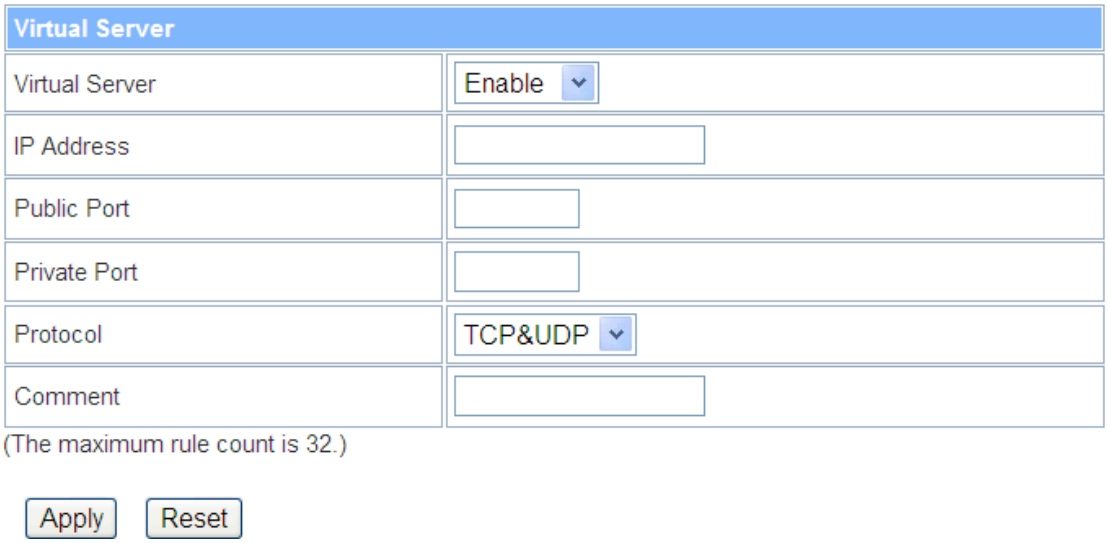


Item	Description
□	Make a mark for the next action.
Delete Selected	Click ***Delete Selected*** to delete all that you selected.
Reset	Click ***Reset*** to clear selected items.

4.3.5.2 Port Forwarding

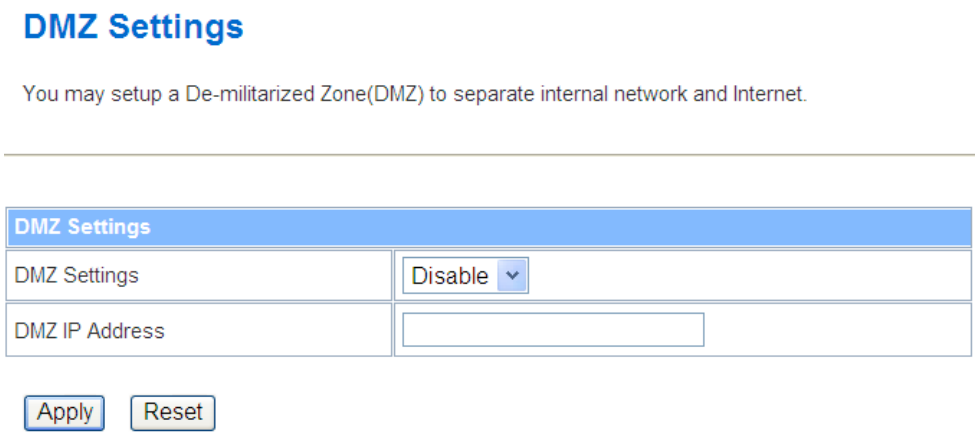


Item	Description
Port Forwarding	Select to **Enable** or **Disable** the Port Forwarding function.
IP Address	To forward data packets coming from the WAN to a specific IP address hosted in the local network behind the NAT firewall, fill in the IP address.
Port Range	To forward data packets coming from the WAN to a specific IP address hosted in the local network behind the NAT firewall, fill in the port range.
Protocol	Specify the protocol: TCP&UDP, TCP or UDP.
Comment	Make a comment for the port forwarding policy.



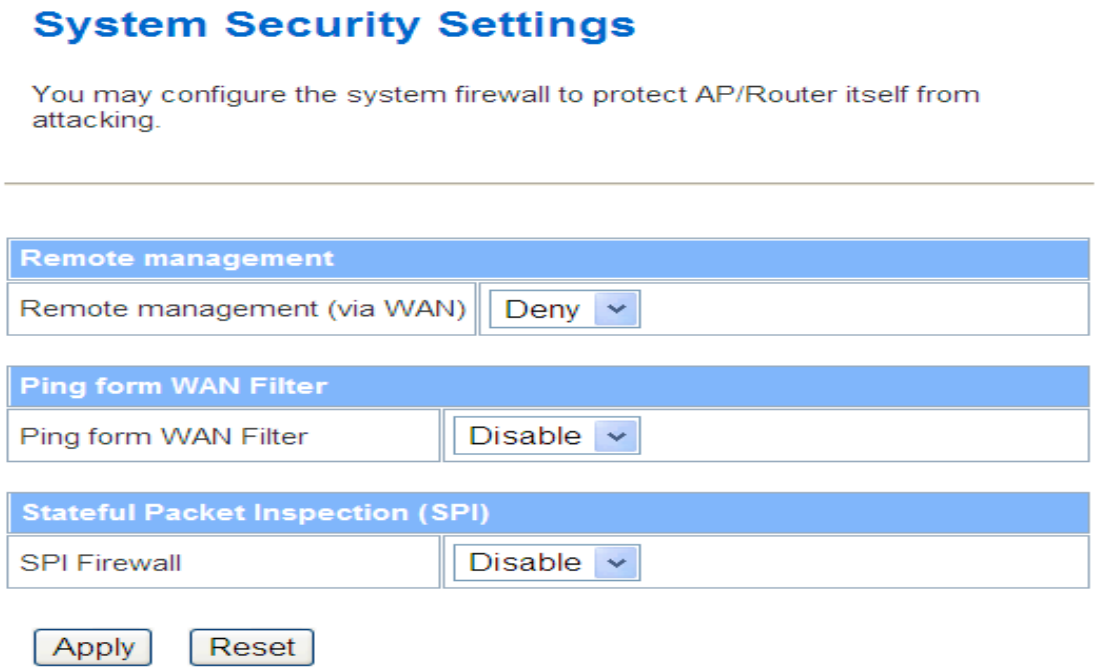
Item	Description
Virtual Server	Select to **Enable** or **Disable** the Virtual Server function.
IP Address	To forward data packets coming from the WAN to a specific IP address hosted in the local network behind the NAT firewall, fill in the IP address.
Public Port	To forward data packets coming from the WAN to a specific IP address hosted in the local network behind the NAT firewall, fill in the public port.
Private Port	To forward data packets coming from the WAN to a specific IP address hosted in local network behind the NAT firewall, fill in the private port.
Protocol	Specify the protocol: TCP&UDP, TCP or UDP.
Comment	Make a comment for the virtual server policy.

4.3.5.3 DMZ



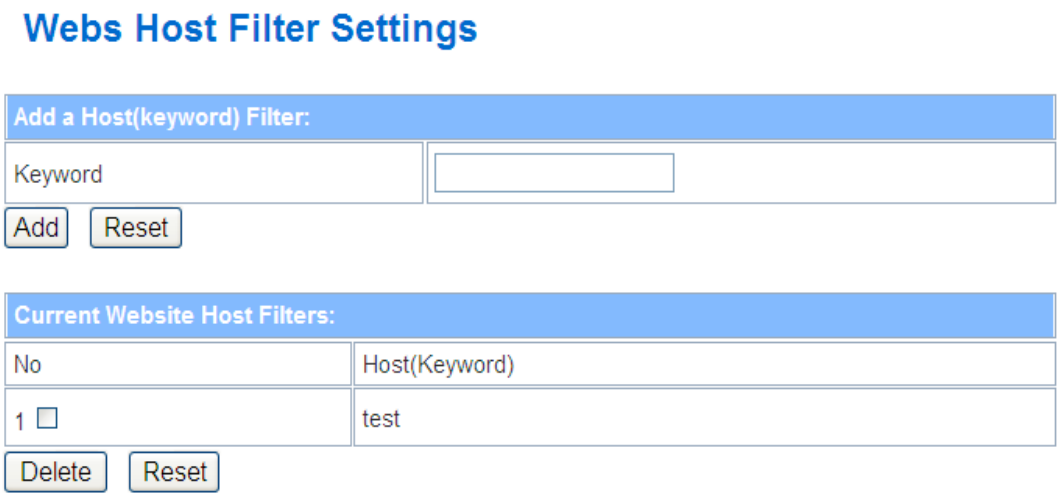
Item	Description
DMZ Settings	Enable or Disable the DMZ function.
DMZ IP Address	To support DMZ in your firewall design, fill in the IP address of the DMZ host that can be accessed from the WAN interface.

4.3.5.4 System Security



Item	Description
Remote management	Select to **Deny** or **Allow** the remote management function.
Ping from WAN Filter	Select **Disable** or **Enable** to allow pinging from the WAN.
SPI Firewall	Select to **Disable** or **Enable** the SPI firewall function.

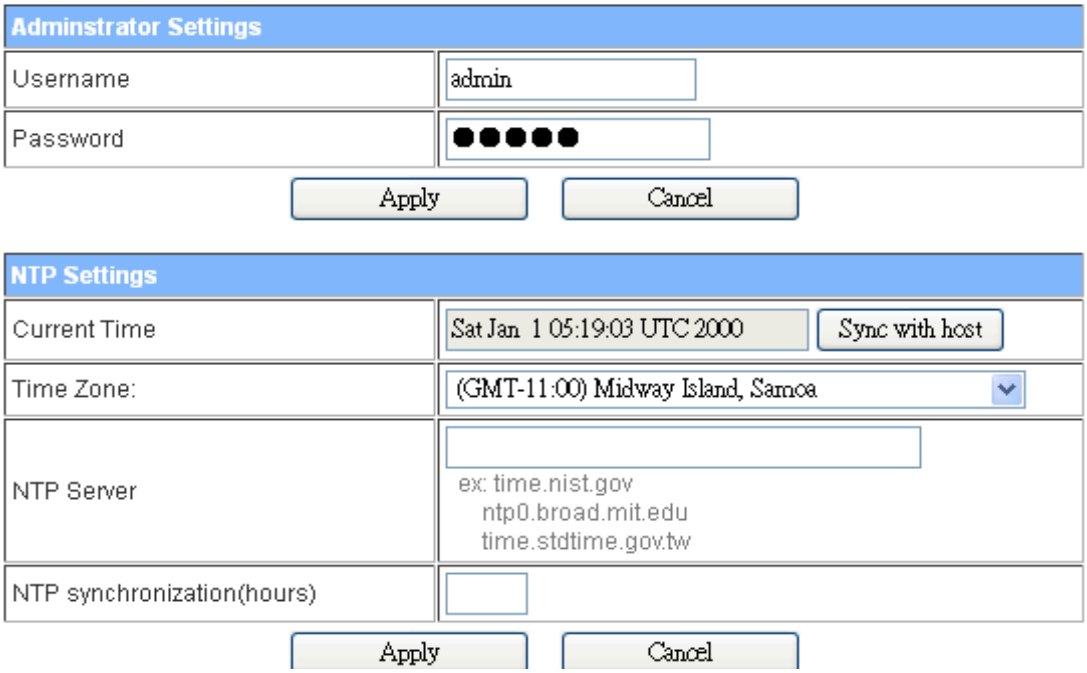
4.3.5.5 Content Filtering



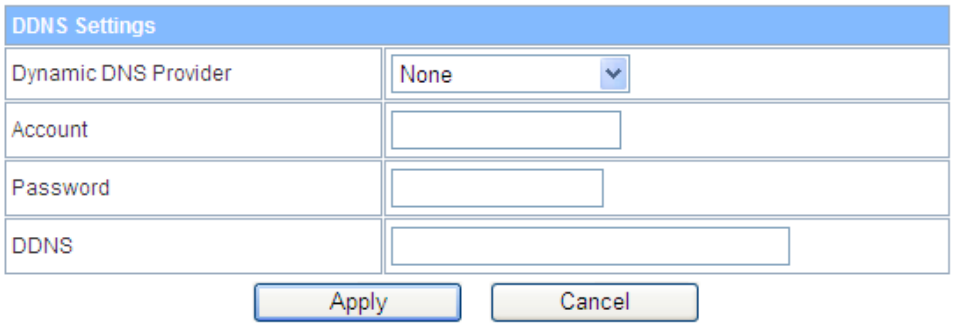
Item	Description
Keyword	Enter the name of the website you wish to filter.
Add	Click to save the keyword(s).
Delete	Click ***Delete*** to delete all that you selected.
Reset	Click ***Reset*** to clear selected items.

4.3.6 Administration

4.3.6.1 Management

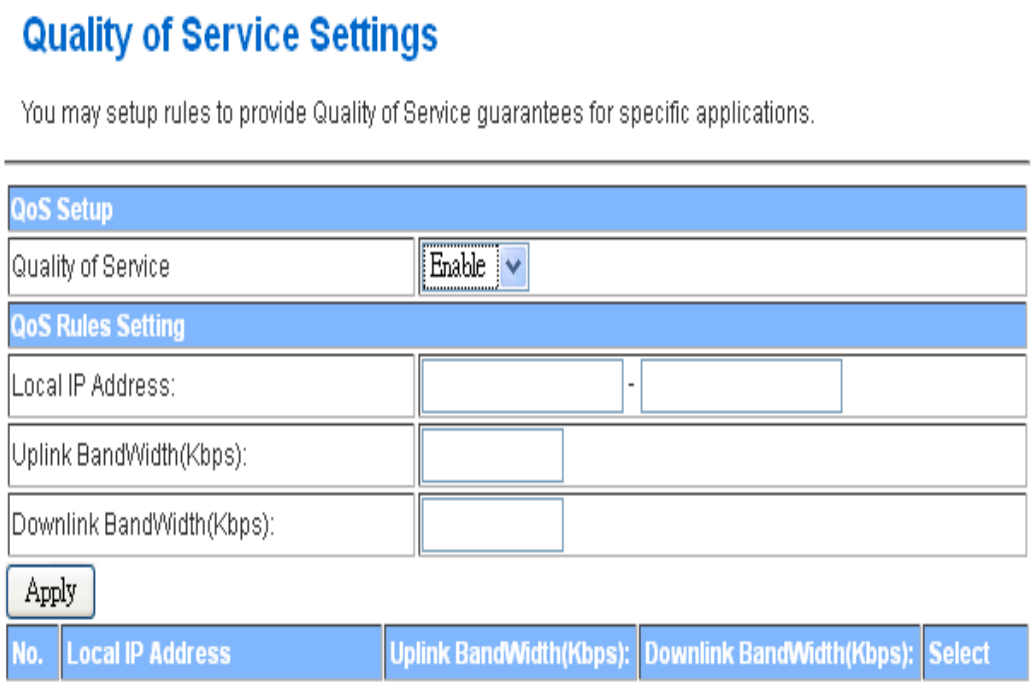


Item	Description
Username	Fill in the user name for web management login control.
Password	Fill in the password for web management login control.
Current Time	It shows the current time.
Time Zone	Select the time zone in your country from the pull-down menu.
NTP Server	Fill in the NTP server IP address.
NTP synchronization	Fill in a number to decide the synchronization frequency with the NTP server.



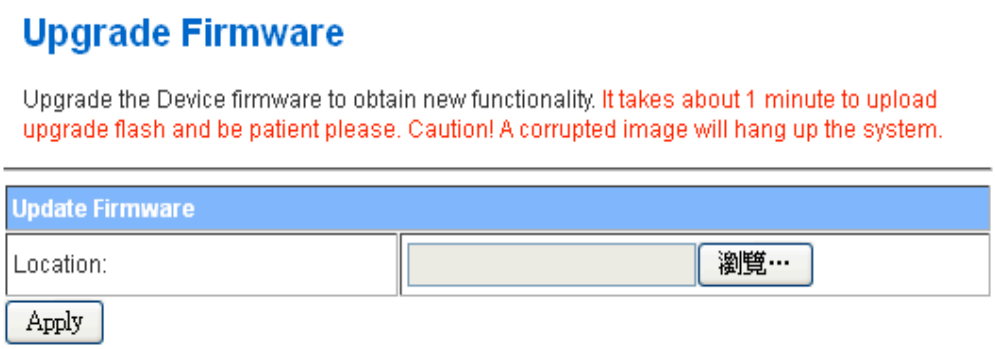
Item	Description
Dynamic DNS Provider	Select the DDNS provider you registered with from the drop-down menu.
Account	Fill in the account of the DDNS you registered with.
Password	Fill in the password of the DDNS you registered.
DDNS	Fill in the domain name that you registered.

4.3.6.2 QoS



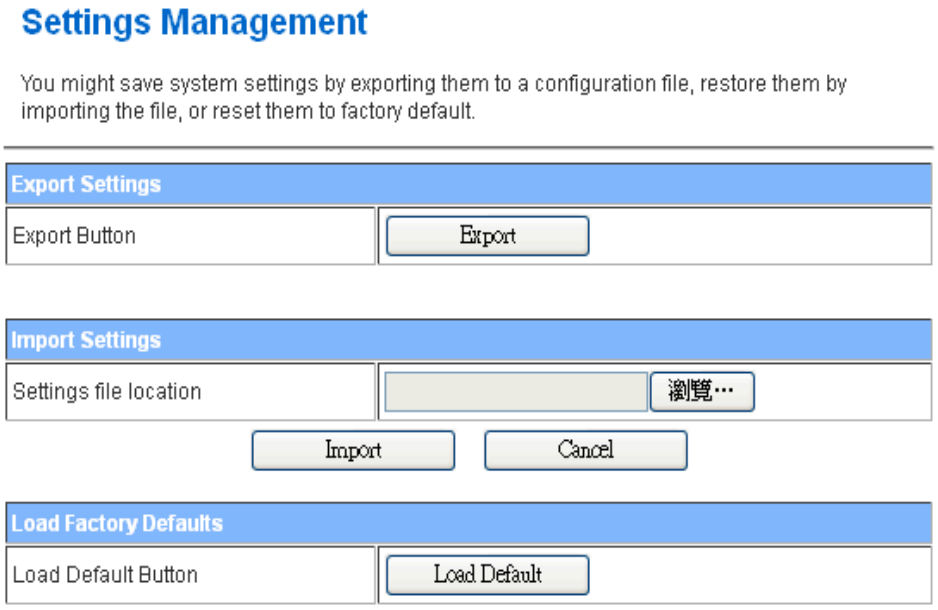
Item	Description
Uplink Speed	Input the uplink maximum upload speed.
Downlink Speed	Input the downlink maximum upload speed.
Local IP Address	Enter the local IP address.
Uplink Bandwidth	Enter the limit upload bandwidth.
Downlink Bandwidth	Enter the limit downlink bandwidth.

4.3.6.3 Upload Firmware



Item	Description
Location	Click the ***Browse*** button to select the new firmware image file on the PC. Then click the ***Apply*** button to upgrade the firmware.

4.3.6.4 Settings Management



Item	Description
Export Button	Click ***Export*** to export the current configuration to your PC.
Settings file location	Click ***Browse*** to select the configuration file from your PC, then click ***Import*** to update the configuration.
Load Default Button	Click the ***Load Default*** button to reset the configuration parameters to factory defaults.

4.3.6.5 Status

This page shows the current status and some basic settings of the device, including system info, Internet configurations and local network info.

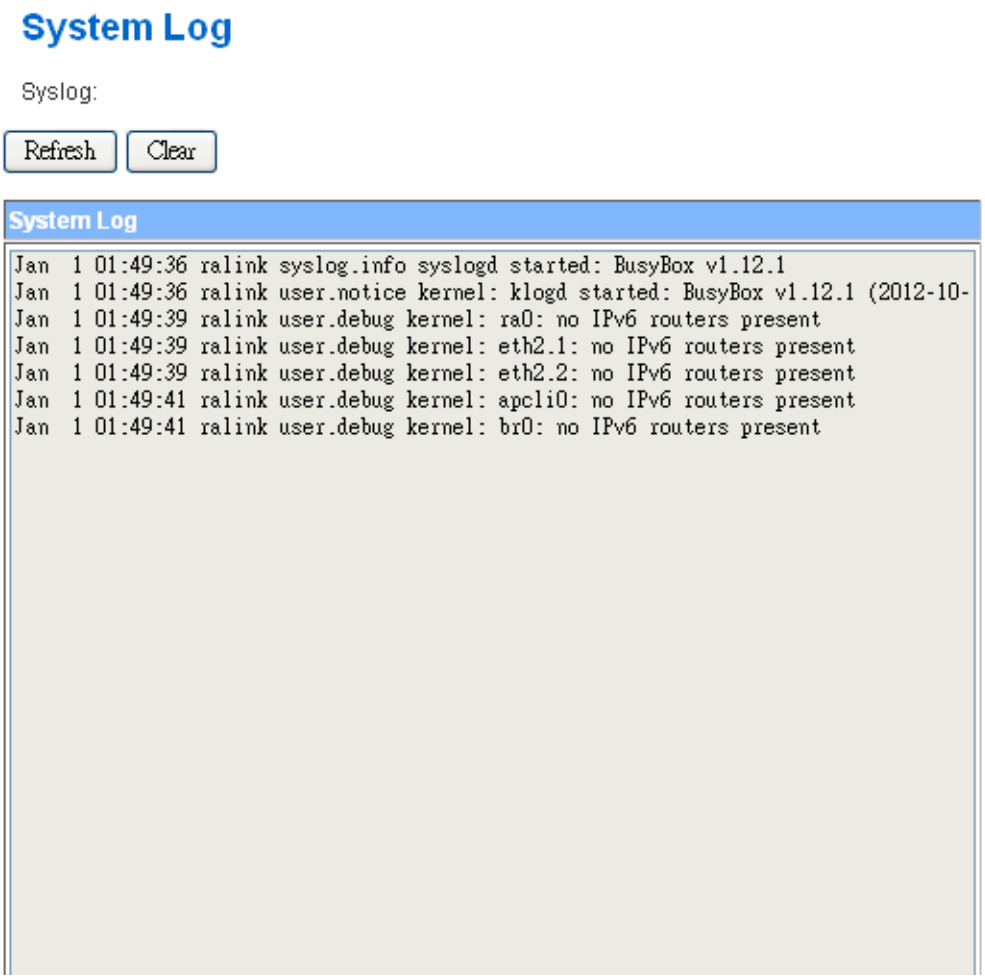
Access Point Status

This page show the current status and some basic settings of the device.

System Information	
Firmware Version	1.1.06-N_H (Nov 19 2012)
System Up Time	0 days, 0 hours, 46 mins, 41 secs
Operation Mode	Wireless ISP Mode
Repeater Information	
Repeater Status	N/A
Repeater Device	N/A
Repeater Mac Address	N/A
Repeater RSSI	N/A
Wireless Information	
Status	Radio ON
Mode	AP
SSID	802.11n_Router
Channel	1
Encryption	Disable
BSSID	00:30:4F:93:BF:E8
WAN Information	
Connected Type	DHCP
WAN IP Address	
Subnet Mask	
Default Gateway	
DNS1	
DNS2	
MAC Address	00:30:4F:93:BF:E9
LAN Information	
DHCP Server	Enabled
LAN IP Address	192.168.1.200
Subnet Mask	255.255.255.0
MAC Address	00:30:4F:93:BF:E8

4.3.6.6 System Log

This page is used to view system logs.



Item	Description
Refresh	Click the ***Refresh*** button to refresh the log shown on the screen.
Clear	Click the ***Clear*** button to clear the log displayed on the screen.

5. FREQUENTLY ASKED QUESTIONS (FAQ)

5.1 What are (and how do I find) my PC's IP and MAC addresses?

IP address is the identifier for a computer or device on a TCP/IP network. Networks using the TCP/IP protocol route messages based on the IP address of the destination. The format of an IP address is a 32-bit numeric address written as four numbers separated by periods. Each number can be zero to 255. For example, 191.168.1.254 could be an IP address.

The MAC (Media Access Control) address is your computer's unique hardware number. (On an Ethernet LAN, it's the same as your Ethernet address.) When you're connected to the Internet from your computer (or host as the Internet protocol thinks of it), a correspondence table relates your IP address to your computer's physical (MAC) address on the LAN.

To find your PC's IP and MAC addresses,

- ✓ Open the Command program in Microsoft Windows.
- ✓ Type in "ipconfig /all," then press <Enter>.
- ✓ Your PC's IP address is the one entitled IP Address and your PC's MAC address is the one entitled Physical Address.

5.2 What is a Wireless LAN?

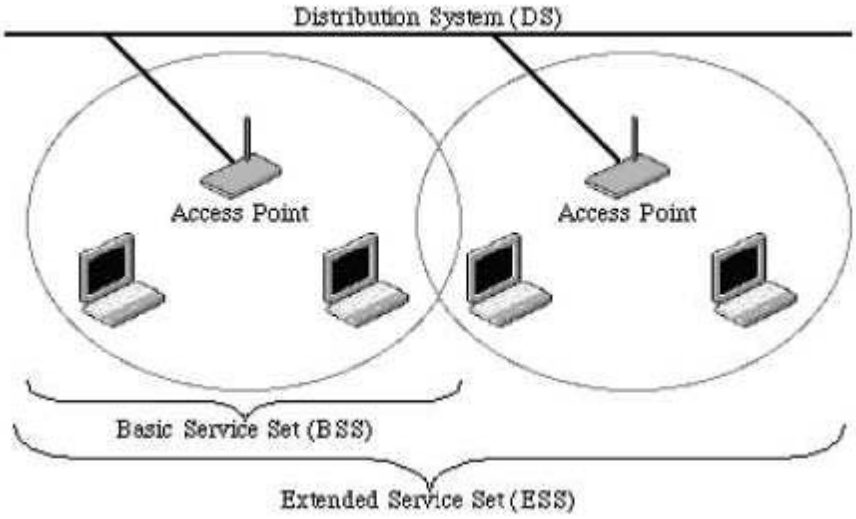
A wireless LAN (WLAN) is a network that allows access to the Internet without the need for any wired connections to the user's machine.

5.3 What are ISM bands?

ISM stands for Industrial, Scientific and Medical; radio frequency bands that the Federal Communications Commission (FCC) authorized for wireless LANs. The ISM bands are located at 915 +/-13 MHz, 2450 +/-50 MHz and 5800 +/-75 MHz.

5.4 How does wireless networking work?

The 802.11 standard defines two modes: infrastructure mode and ad hoc mode. In infrastructure mode, the wireless network consists of at least one access point connected to the wired network infrastructure and a set of wireless end stations. This configuration is called a Basic Service Set (BSS). An Extended Service Set (ESS) is a set of two or more BSSs forming a single sub-network. Since most corporate WLANs require access to the wired LAN for services (file servers, printers, Internet links) they will operate in infrastructure mode.



Example 1: wireless Infrastructure Mode

Ad hoc mode (also called peer-to-peer mode or an Independent Basic Service Set, or IBSS) is simply a set of 802.11 wireless stations that communicate directly with one another without using an access point or any connection to a wired network. This mode is useful for quickly and easily setting up a wireless network anywhere that a wireless infrastructure does not exist or is not required for services, such as a hotel room, convention center or airport, or where access to the wired network is barred (such as for consultants at a client site).

Example 2: Wireless Ad Hoc Mode

5.5 What is BSSID?

A six-byte address is that distinguishes a particular access point from others. Also known simply as SSID. Serves as a network ID or name.

5.6 What is ESSID?

The Extended Service Set ID (ESSID) is the name of the network you want to access. It is used to identify different wireless networks.

5.7 What are potential factors that may causes interference?

Factors of interference:

- ✓ Obstacles: walls, ceilings, furniture, etc.
- ✓ Building materials: metal doors, aluminum studs.
- ✓ Electrical devices: microwaves, monitors and electrical motors.

Solutions to overcome the interferences:

- ✓ Minimize the number of walls and ceilings.
- ✓ Position the WLAN antenna for best reception.
- ✓ Keep WLAN devices away from other electrical devices; e.g., microwaves, monitors and electric motors.
- ✓ Add additional WLAN Access Points if necessary.

5.8 What are the Open System and Shared Key authentications?

IEEE 802.11 supports two subtypes of network authentication services: open system and shared key. Under open system authentication, any wireless station can request authentication. The station that needs to authenticate with another wireless station sends an authentication management frame that contains the identity of the sending station. The receiving station then returns a frame that indicates whether or not it recognizes the sending station. Under shared key authentication, each wireless station is assumed to have received a secret shared key over a secure channel that is independent from the 802.11 wireless network communications channel.

5.9 What is WEP?

An option of IEEE 802.11 functionality is offering frame transmission privacy similar to a wired network. The Wired Equivalent Privacy generates secret shared encryption keys that both source and destination stations can use to alert frame bits to avoid disclosure to eavesdroppers. WEP relies on a secret key that is shared between a mobile station (e.g., a laptop with a wireless Ethernet card) and an access point (i.e., a base station). The secret key is used to encrypt packets before they are transmitted, and an integrity check is used to ensure that packets are not modified in transit.

5.10 What is Fragment Threshold?

This protocol uses the frame fragmentation mechanism defined in IEEE 802.11 to achieve parallel transmissions. A large data frame is fragmented into several fragments, each of a size equal to the fragment threshold. By tuning the fragment threshold value, we can get varying fragment sizes. The determination of an efficient fragment threshold is an important issue in this scheme. If the fragment threshold is small, the overlap part of the master and parallel transmissions is large. This means the spatial reuse ratio of parallel transmissions is high. In contrast, with a large fragment threshold, the overlap is small and the spatial reuse ratio is low. However, high fragment threshold lead to low fragment overhead. Hence there is a trade-off between spatial re-use and fragment overhead.
Fragment threshold is the maximum packet size used for fragmentation. Packets larger than the size programmed in this field will be fragmented.
If you find corrupted packets or asymmetric packet reception (all send packets, for example), you may want to try lowering your fragmentation threshold. This will cause packets to be broken into smaller fragments. These smaller fragments, if corrupted, can be resent faster than a larger fragment. Fragmentation increases overhead, so you'll want to keep this value as close to the maximum value as possible.

5.11 What is RTS (Request to Send) Threshold?

The RTS threshold is the packet size at which packet transmission is governed by the RTS/CTS transaction. The IEEE 802.11-1997 standard allows for short packets to be transmitted without RTS/ CTS transactions. Each station can have a different RTS threshold. RTS/CTS is used when the data packet size exceeds the defined RTS threshold. With the CSMA/CA transmission mechanism, the transmitting station sends out an RTS packet to the receiving station and waits for the receiving station to send back a CTS (Clear to Send) packet before sending the actual packet data. This setting is useful for networks with many clients. With many clients and a high network load, there will be many more collisions. By lowering the RTS threshold, there may be fewer collisions and performance should improve. Basically, with a faster RTS threshold, the system can recover from problems faster. RTS packets consume valuable bandwidth, however, so setting this value too low will limit performance.

5.12 What is Beacon Interval?

In addition to data frames that carry information from higher layers, 802.11 includes management and control frames that support data transfer. The beacon frame, which is a type of management frame, provides the "heartbeat" of a wireless LAN, enabling stations to establish and maintain communications in an orderly fashion. Beacon Interval represents the amount of time between beacon transmissions. Before a station enters power save mode, the station needs the beacon interval to know when to wake up to receive the beacon (and learn whether there are buffered frames at the access point).

5.13 What is Preamble Type?

There are two preamble types defined in IEEE 802.11 specifications. A long preamble basically gives the decoder more time to process the preamble. All 802.11 devices support a long preamble. The short preamble is designed to improve efficiency (for example, for VoIP systems). The difference between the two is in the synchronization field. The long preamble is 128 bits, and the short is 56 bits.

5.14 What is SSID Broadcast?

Broadcast of SSID is done in access points by the beacon. This announces your access point (including various bits of information about it) to the wireless world around it. By disabling that feature, the SSID configured in the client device must match the SSID of the access point. Some wireless devices don't work properly if SSID isn't broadcast (for example the D-link DWL-120 USB 802.11b adapter). Generally, if your client hardware supports operation with SSID disabled, it's not a bad idea to run that way to enhance network security. However it's no replacement for WEP, MAC filtering or other protections.

5.15 What is Wi-Fi Protected Access (WPA)?

Wi-Fi’s original security mechanism, Wired Equivalent Privacy (WEP), was long ago recognized as insufficient for securing confidential business communications. Before the long-term solution — the IEEE 802.11i standard — was developed, a significant short-term enhancement to Wi-Fi security was introduced: Wi-Fi Protected Access. To upgrade older WLAN networks to support WPA, access points require a WPA software upgrade, and clients may require a software upgrade for the network interface card and possibly a software update for the operating system. For enterprise networks, an authentication server, typically one that supports RADIUS and the selected EAP authentication protocol, would need to be added to the network.

5.16 What is WPA2?

It is the second generation of WPA. WPA2 is based on the final IEEE 802.11i amendment to the 802.11 standard.

5.17 What is 802.1x Authentication?

802.1x is a framework for authenticated MAC-level access control, and defines the Extensible Authentication Protocol (EAP) over LANs (WAPOL). The standard encapsulates and leverages much of EAP, which was defined for dial-up authentication with Point-to-Point Protocol in RFC 2284. Beyond encapsulating EAP packets, the 802.1x standard also defines EAPOL messages that convey the shared key information critical for wireless security.

5.18 What is Temporal Key Integrity Protocol (TKIP)?

The Temporal Key Integrity Protocol, pronounced tee-kip, is part of the IEEE 802.11i encryption standard for wireless LANs. TKIP is the next generation of WEP, the Wired Equivalency Protocol, which is used to secure 802.11 wireless LANs. TKIP provides per-packet key mixing, a message integrity check and a re-keying mechanism, thus fixing the flaws of WEP.

5.19 What is Advanced Encryption Standard (AES)?

Security issues are a major concern for wireless LANs., AES is the U.S. government's next-generation cryptography algorithm.

5.20 What is Inter-Access Point Protocol (IAPP)?

The IEEE 802.11f Inter-Access Point Protocol (IAPP) supports Access Point Vendor interoperability, enabling roaming of 802.11 stations within an IP subnet. IAPP defines messages and data to be exchanged between access points and between the IAPP and high-layer management entities to support roaming. The IAPP protocol uses TCP for inter-AP communication and UDP for RADIUS request/ response exchanges. It also uses Layer 2 frames to update the forwarding tables of Layer 2 devices.

5.21 What is Wireless Distribution System (WDS)?

The Wireless Distribution System allows WLAN APs to talk directly to other APs via a wireless channel, like the wireless bridge or repeater service.

5.22 What is Universal Plug and Play (UPnP)?

UPnP is an open networking architecture that consists of services, devices and control points. The ultimate goal is to allow data communication among all UPnP devices regardless of media, operating system, programming language and wired/wireless connection.

5.23 What is Maximum Transmission Unit (MTU) Size?

Maximum Transmission Unit (MTU) controls the network stack so that any packet larger than this value will be fragmented before the transmission. During the PPP negotiation, the peer of the PPP connection will indicate its MRU and will be accepted. The actual MTU of the PPP connection will be set to the smaller one of MTU and the peer's MRU.

5.24 What is Clone MAC Address?

Clone MAC address is designed for special applications in which you request that clients register to a server machine with one identified MAC address.