EDIMAX
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N150 High Power Outdoor Wireless Access Point/Range Extender with Built-in 12dBi Antenna

EW-7303HPn V2

User Manual

Version 2.0 / September, 2011

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

The Outdoor Router is an affordable IEEE 802.11b/g /n specifications of Outdoor Router solution; setting SOHO and enterprise standard for high performance, secure, manageable and reliable WLAN+. This document describes the steps required for the initial IP address assign and other configuration of the outdoor router. The description includes the implementation of the above steps.

2.1 package content

The package of the WLAN Broadband Router includes the following items,

- ✓ Outdoor Router
- ✓ DC 12V Power Adapter
- ✓ Documentation CD
- ✓ POE Injector
- ✓ Tie

2.2 product features

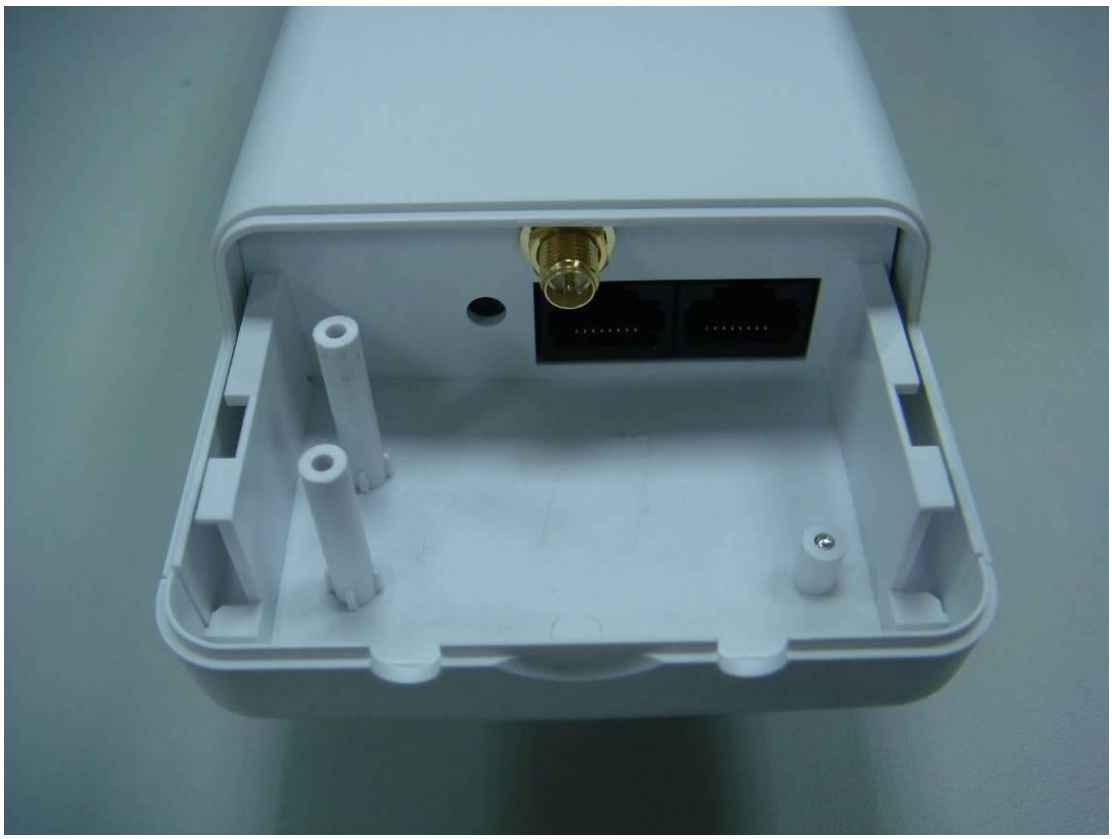
- ➢ Compatible with IEEE 802.11n Specifications provides wireless speed up to 150Mbps data rate.
- ➢ Compatible with IEEE 802.11g standard to provide wireless speeds of 54Mbps data rate.
- ➢ Compatible with IEEE 802.11b standard to provide wireless speeds of 11Mbps data rate.
- ➢ Maximizes the performance and ideal for media-centric applications like streaming video, gaming and Voice over IP technology.
- ➢ Support various operation (Bridge/Gateway/Ethernet Converter) modes between wireless and wired Ethernet interfaces.
- ➢ Supports WPS, 64-bit and 128-bit WEP, WPA, WPA2 encryption to protect the wireless data transmission.
- ➢ Support TKIP/AES/TKIPAES of WPA algorithms.
- ➢ Support IEEE 802.3x full duplex flow control on 10/100M Ethernet interface.
- ➢ Support DHCP server to provide clients auto IP addresses assignment.
- ➢ Support 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.
- ➢ Support WEB based management and configuration.
- ➢ Support System Log.
- ➢ Support Dynamic DNS
- ➢ Support NTP

*Maximum performance, actual data rates and coverage may vary depending on network conditions and environmental factors. Stated ranges are based on independent test results and are not guaranteed. Long range coverage requires an additional high power access point to receive the wireless signal from the EW-7303HPn V2 – coverage range from an EW-7303HPn directly to a computer/wireless device is significantly less.

2.3 front 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 ACT	ON	Port linked.
	Off	No link.
	Flashing	Data is transmitting or receiving on the WAN interface.
4. LAN LED ACT	ON	Port linked.
	Off	No link.
	Flashing	Data is transmitting or receiving on the LAN interface.

2.4 rear panel description



Interfaces	Description
SMA connector	For external antenna. You can use the SMA connector to connect with 2.4GHz external antenna.
Secondary(Middle)	The RJ-45 sockets allow LAN connection through Category 5 cables. Support auto-sensing on 10/100M speed and half/ full duplex; comply with IEEE 802.3/ 802.3u respectively.
Main(Right)	The RJ-45 socket allows WAN connection through a Category 5 cable. Support auto-sensing on 10/100M speed and half/ full duplex; comply with IEEE 802.3/ 802.3u respectively.

3. Installation

3.1 Hardware Installation

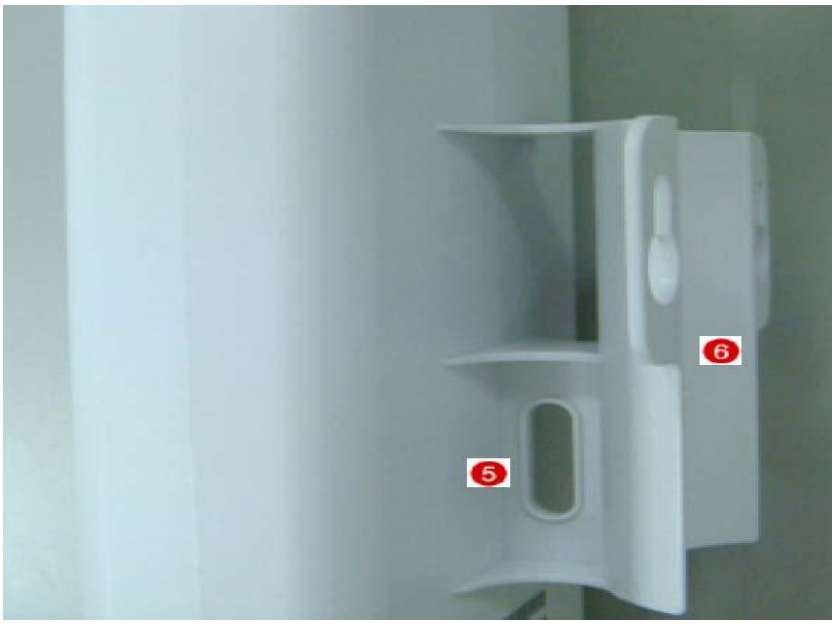
3.1.1 Appearance and Interface Introduction

Notes: The product shot is for reference only please refer to physical product.

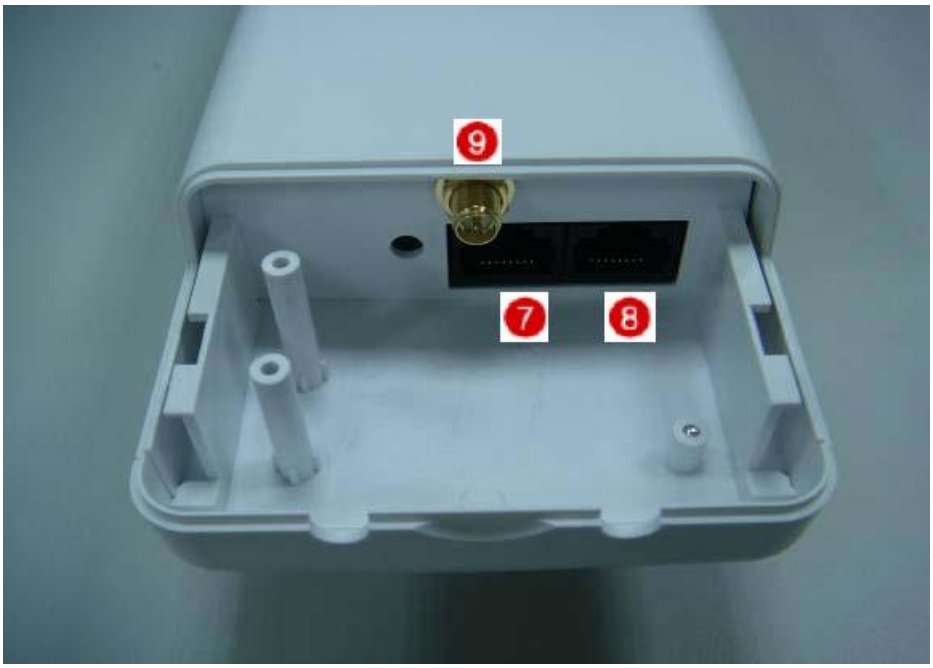
1.LED Panel

2. Waterproof Sliding Door
3. Pass trough Ethernet cable from this cable
4. Push this button to remove upper housing

5. Wall Mount
6. Pole Mount



7. Secondary port with POE
8. Main port
9. SMA connector for external antenna



3.1.2 Hardware installation steps

Step2: Pass through Ethernet cable from the hole, insert the cable to Secondary port.

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

Step3: Install the upper housing and make sure the housing is well installed.

3.2 Software Installation

Step4:

Install POE Injector

DC: Insert adapter

POE: This hole is linked to Secondary port of the Outdoor Router with RJ-45.

LAN: This hole is linked to LAN side PC/Hub or Router/ADSL modem device with RJ-45

Step5: Complete the hardware installation as diagram at below

Notes: Use **Reset button** on POE injector. Push continually the reset button of POE injector about 5 ~ 10 seconds to reset the configuration parameters to factory defaults.

There is no software driver or utility installation needed, but only the configuration setting. Please refer to chapter 4 for software configuration.

Notice: It will take about 50 seconds to complete the boot up sequence after powered on the Outdoor Router; Power LED will be active, and after that the WLAN Activity LED will be flashing to show the WLAN interface is enabled and working now.

4. Software configuration

There are web based management and configuration functions allowing you to have the jobs done easily.

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

Default IP Address: 192.168.2.1

Default IP subnet mask: 255.255.255.0

WEB login User Name: admin

WEB login Password: 1234

Telnet login User Name: admin

Telnet login Password: 1234

4.1 Prepare your PC to configure the WLAN Broadband Router

For OS of Microsoft Windows 2000/ XP:

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

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

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

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

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

- ✓ IP Address: *192.168.2.1*, any IP address within 192.168.2.2 to 192.168.2.254 is good to connect the Wireless LAN Access Point. Don't use 192.168.2.1
- ✓ IP Subnet Mask: *255.255.255.0*

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

For OS of Microsoft Windows Vista / 7:

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

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

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

4. Move mouse and click *General* tab, Select *Specify an IP address* and type in values as following example.

- ✓ IP Address: *192.168.2.1*,, any IP address within 192.168.2.1 to 192.168.2.254is 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.

For OS of Microsoft Windows NT:

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

2. Move mouse and double-click the right button on Network icon. The Network window will appear. Click Protocol tab from the Network window.

3. Check the installed list of Network Protocol window. 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 Add button.

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

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

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

- ✓ IP Address: *192.168.2.1*, any IP address within 192.168.2.1 to 192.168.2.254 is good to connect the Wireless LAN Access Point. Don't use 192.168.2.1
- ✓ IP Subnet Mask: *255.255.255.0*

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

4.2 Connect to the WLAN Broadband Router

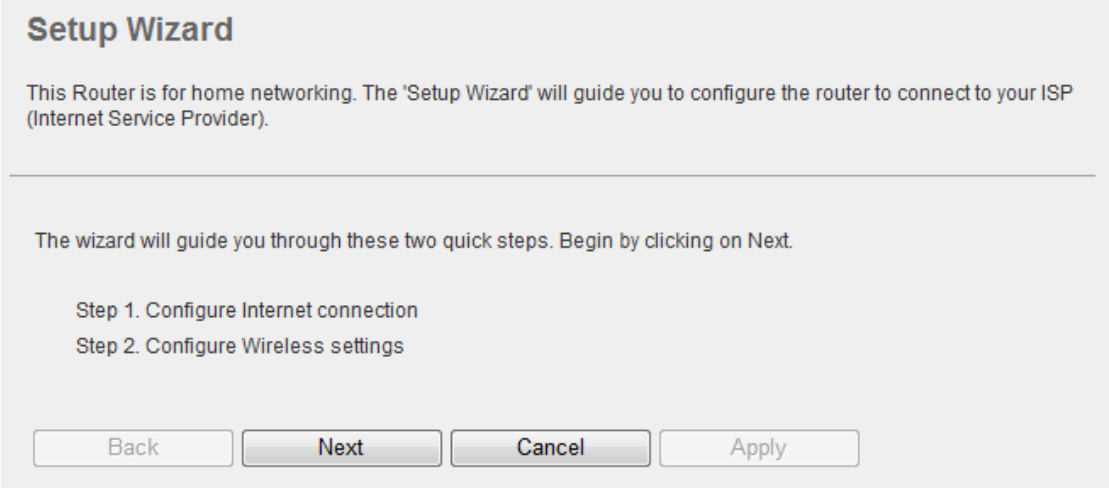
Open a WEB browser, i.e. Microsoft Internet Explorer 6.1 SP1 or above, then enter 192.168.2.1 on the URL to connect the WLAN Broadband Router.

4.3 Management and configuration on the Outdoor Router

4.3.1 Wizard

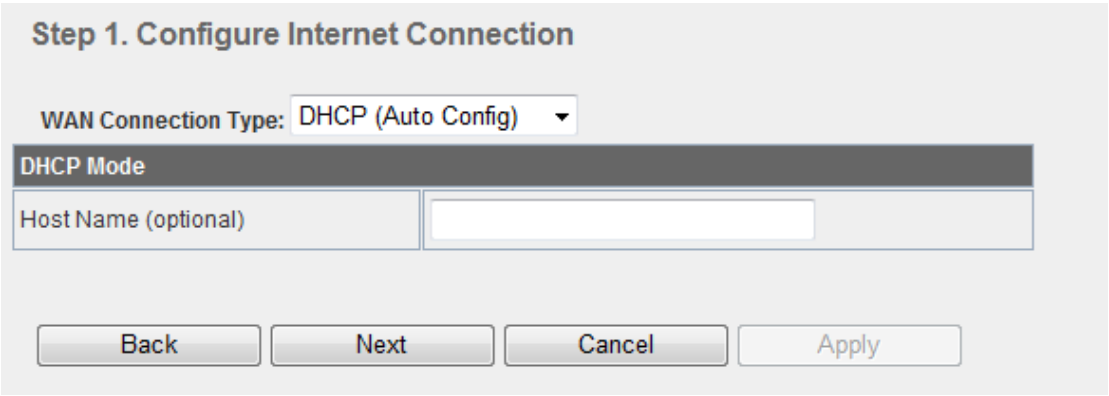
This Wizard page guides you to configure Internet connection and Wireless Settings quickly.

Step 1: configure Internet connection



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

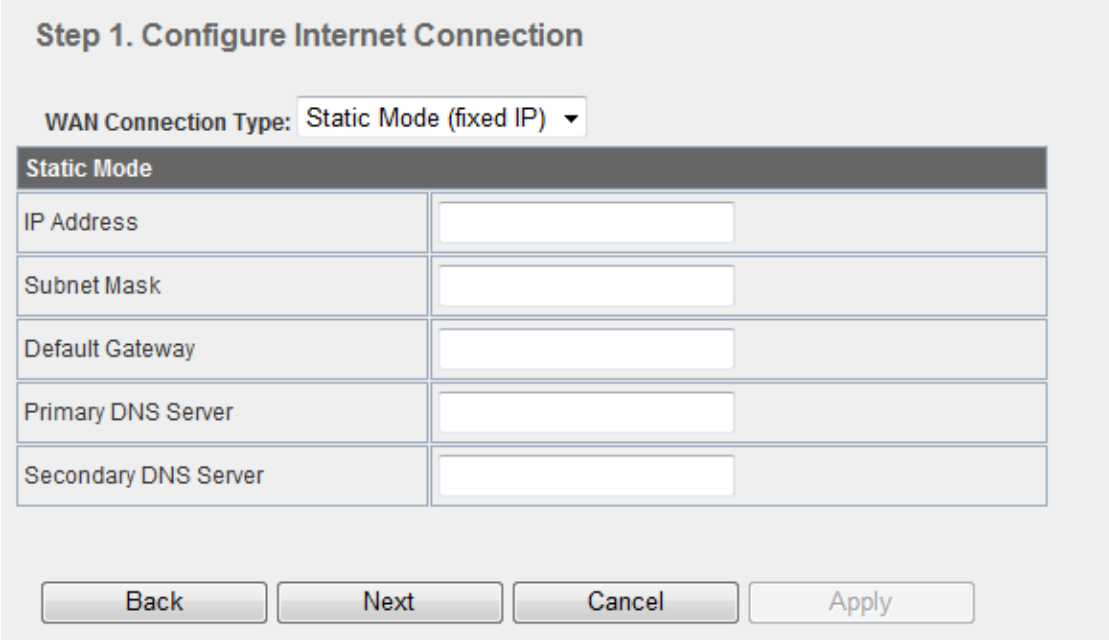
a. DHCP (Auto Configure)



If you select **DHCP** option, please click ***Next*** button to jump at Step2.

b. Static Mode (fixed IP)

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

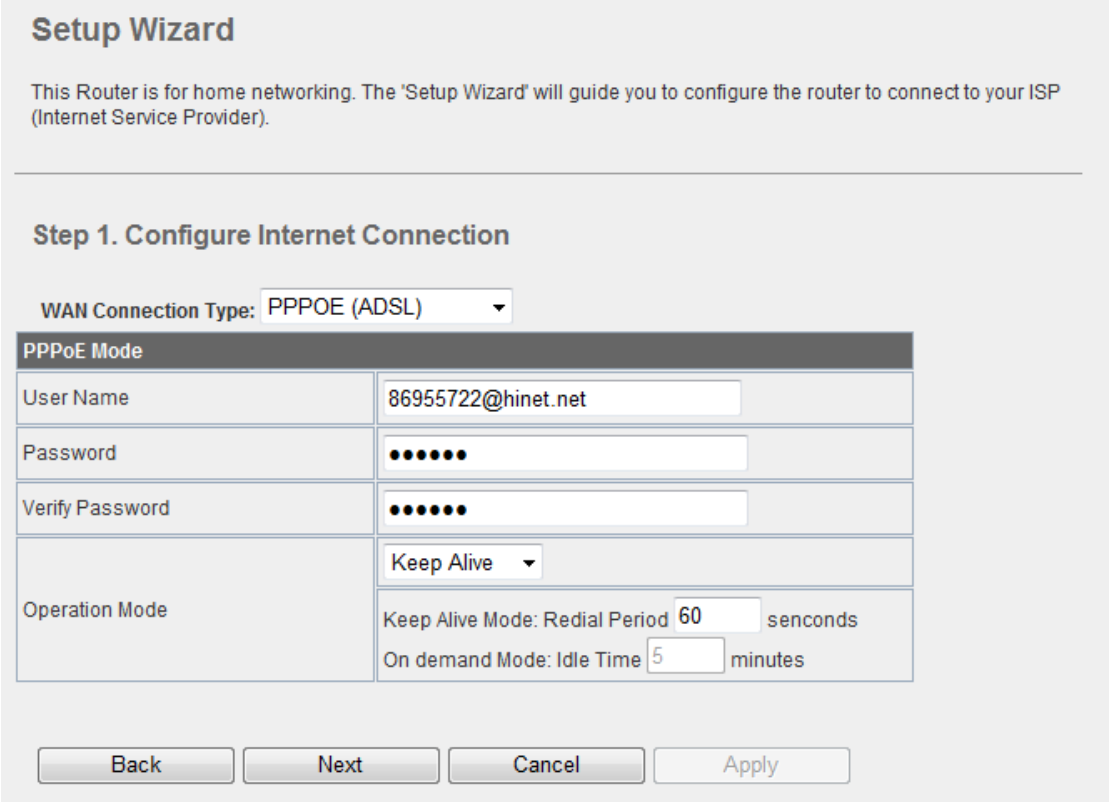


Item	Description
IP Address	Fill in the IP address for WAN interface.
Subnet Mask	Fill in the subnet mask for WAN interface.
Default Gateway	Fill in the default gateway for WAN interface out going data packets.
Primary DNS Server	Fill in the IP address of Domain Name Server 1.
Secondary DNS Server	Fill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

When you finish these settings, then click ***Next*** button to jump at Step2.

c. PPPOE Connection

If you select **PPPOE**, please fill in these fields on next page.

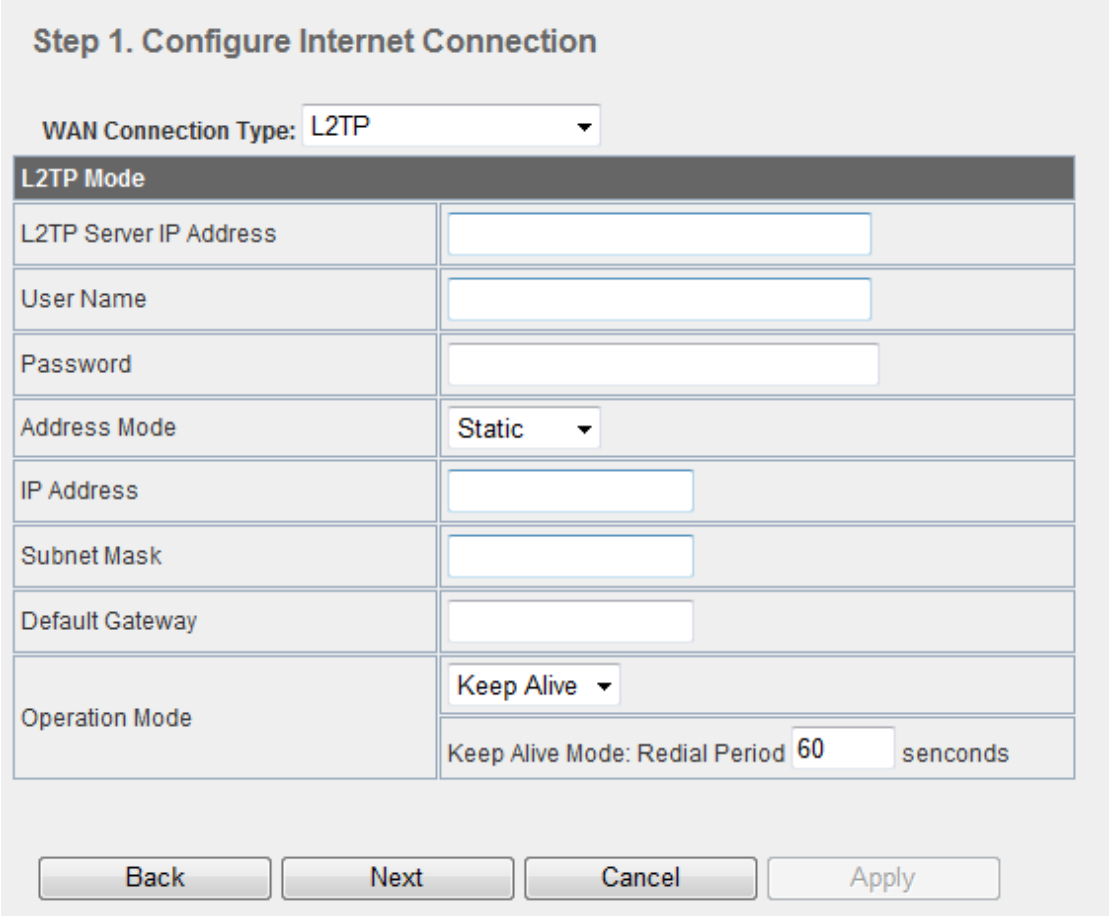


Item	Description
User Name	If you select the PPPoE support on WAN interface, fill in the user name and password to login the PPPoE server.
Password	If you select the PPPoE support on WAN interface, fill in the user name and password to login the PPPoE server.
Verify Password	Fill in the password again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

When you finish these settings, then click ***Next*** button to jump at Step2.

d. L2TP

If you select L2TP, please fill in these fields on next page.



Item	Description
L2TP Server IP Address	Allow user to make a tunnel with remote site directly to secure the data transmission among the connection. User can use embedded L2TP client supported by this router 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 and password to login the L2TP server.
Password	Fill in the user name and password to login the L2TP server.
Address Mode	**Static:** To configure the IP address information by manually, please fill in the related setting at below. **Dynamic:** The option allows the machine to get IP address information automatically from DHCP server on WAN side.
IP Address	Fill in the IP address for WAN interface.
Subnet Mask	Fill in the subnet mask for WAN interface.

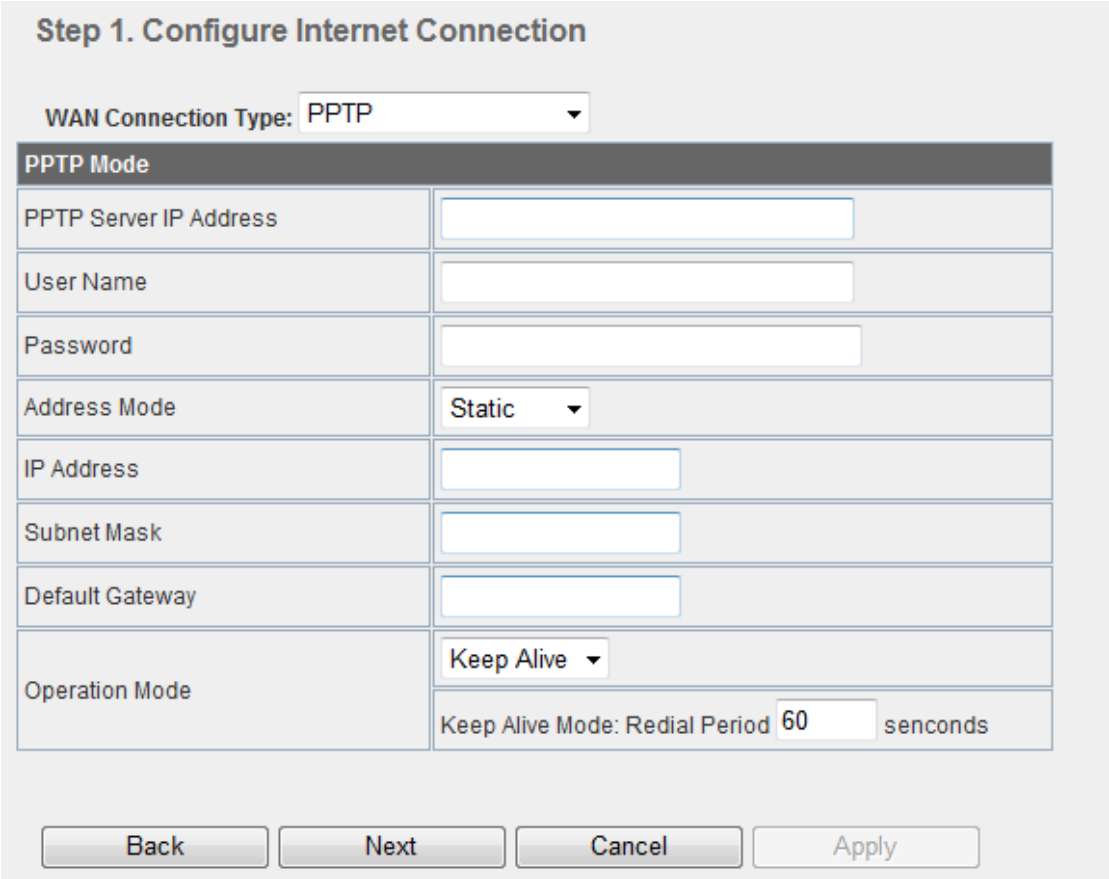
Default Gateway	Fill in the default gateway for WAN interface out going data packets.
Operation Mode	**Keep Alive:** Keep the L2TP connection all the time. Please also configure the Redial Period field. **Manual:** Let user connect the L2TP connection manually.

When you finish these settings, then click ***Next*** button to jump at Step2.

e. PPTP

If you select **PPTP**, please fill in these fields on next page.

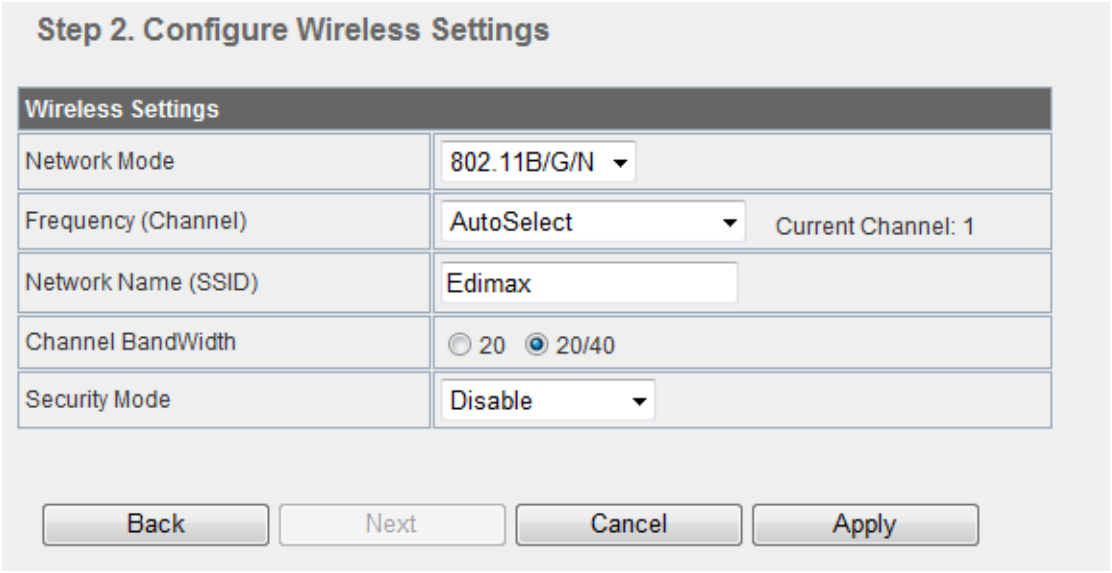
Item Description



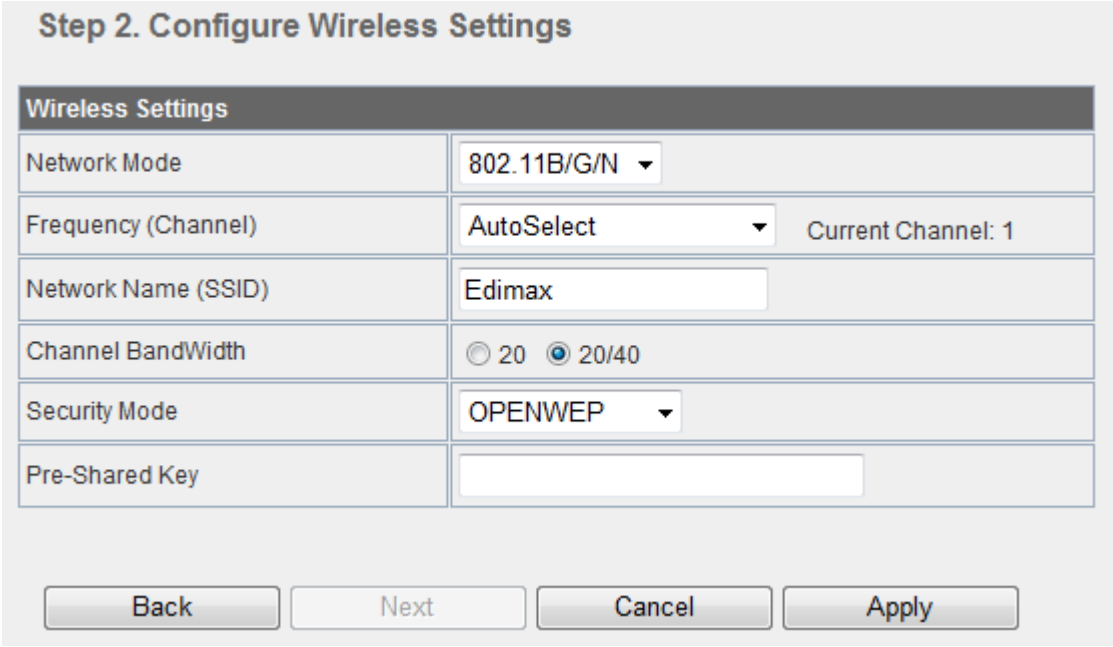
Item	Description
PPTP Server IP Address	Allow user to make a tunnel with remote site directly to secure the data transmission among the connection. User can use embedded PPTP client supported by this router to make a VPN connection. If you select the PPTP support on WAN interface, fill in the IP address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

Step 2: configure Wireless Settings

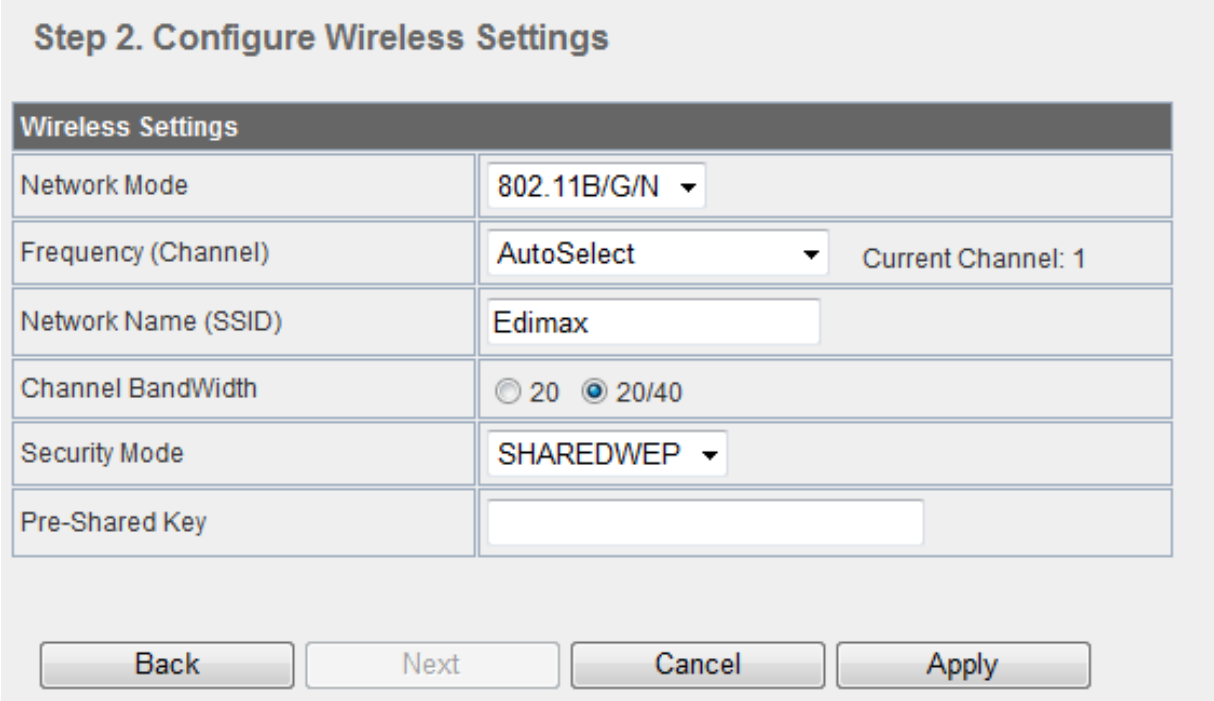
There are three options (Disable, WEP, WPA-PSK/WPA2-PSK) for Wireless security connection.



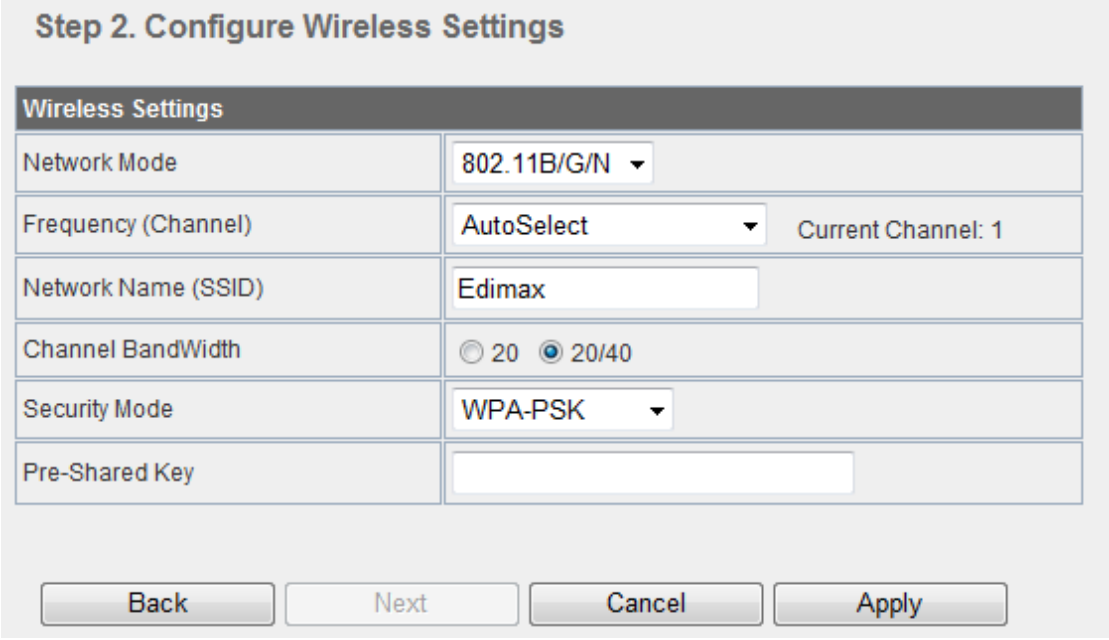
OPEN WEP



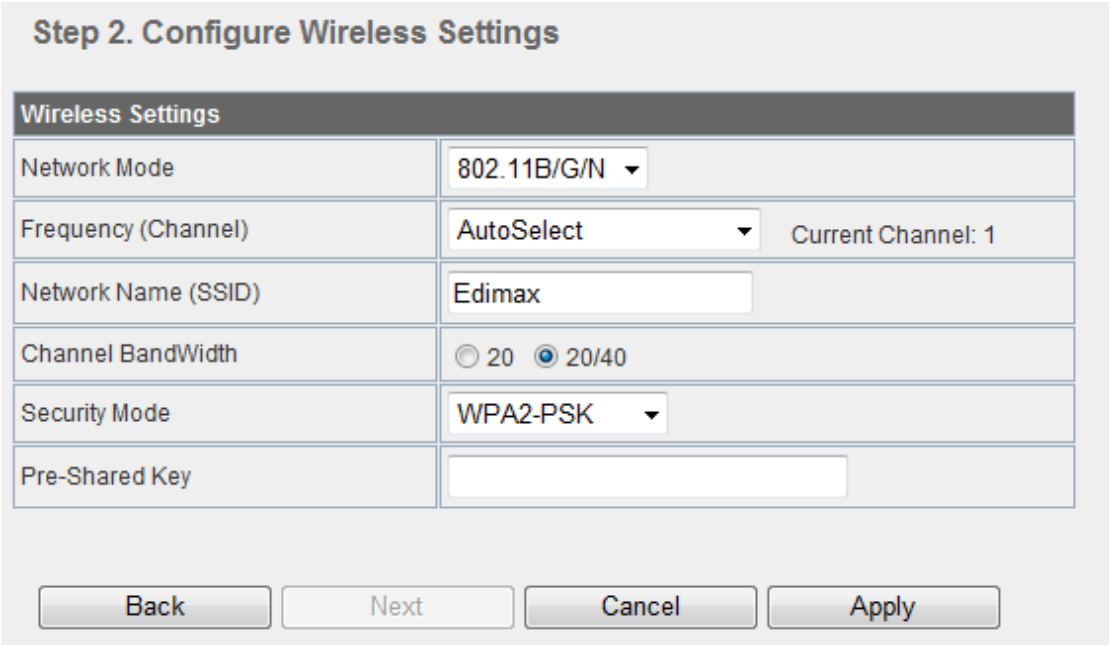
SHAREDWEP



WPA-PSK



WPA2-PSK

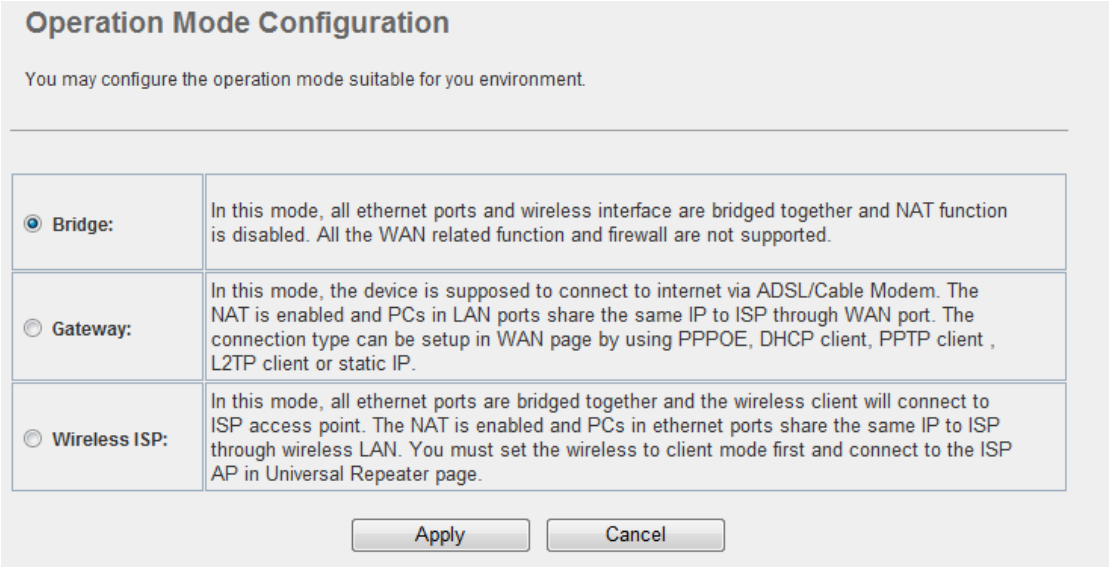


Item	Description
Network Mode	Click to select wireless mode from pull down menu.
Frequency (Channel)	Select the wireless communication frequency/channel from pull-down menu.
Network Name (SSID)	It is the wireless network name. The SSID can be 32 bytes long.
Channel Bandwidth	Select the operating channel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

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

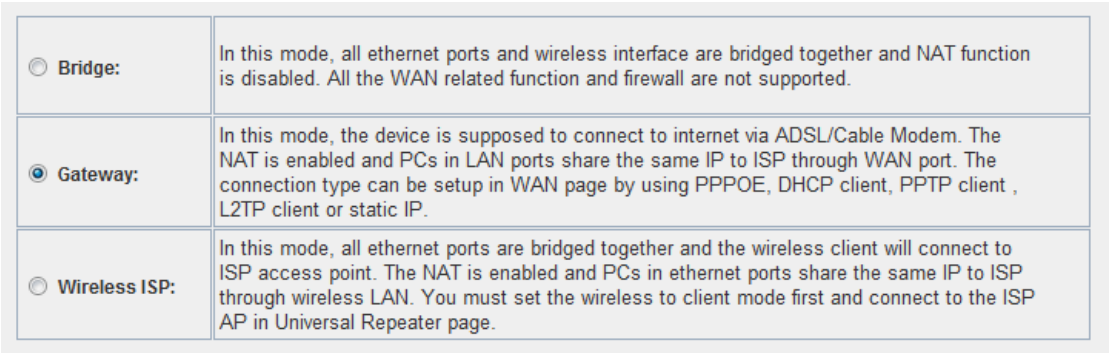
4.3.2 Operation Mode

a. Bridge:



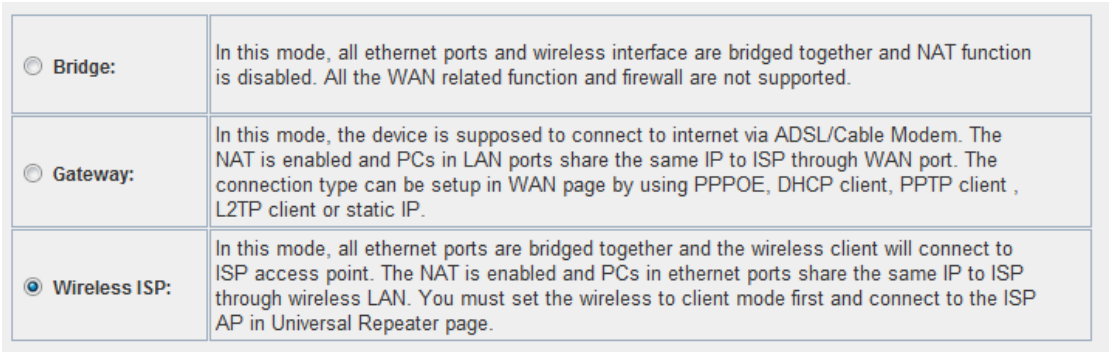
The **Bridge** mode allows that all Ethernet and wireless interfaces are bridged into a single bridge interface.

b. Gateway:



The **Gateway** mode allows that the first Ethernet port is treated as WAN port and the Ethernet port and the wireless interface are bridged together and are treated as LAN ports.

c. Wireless ISP

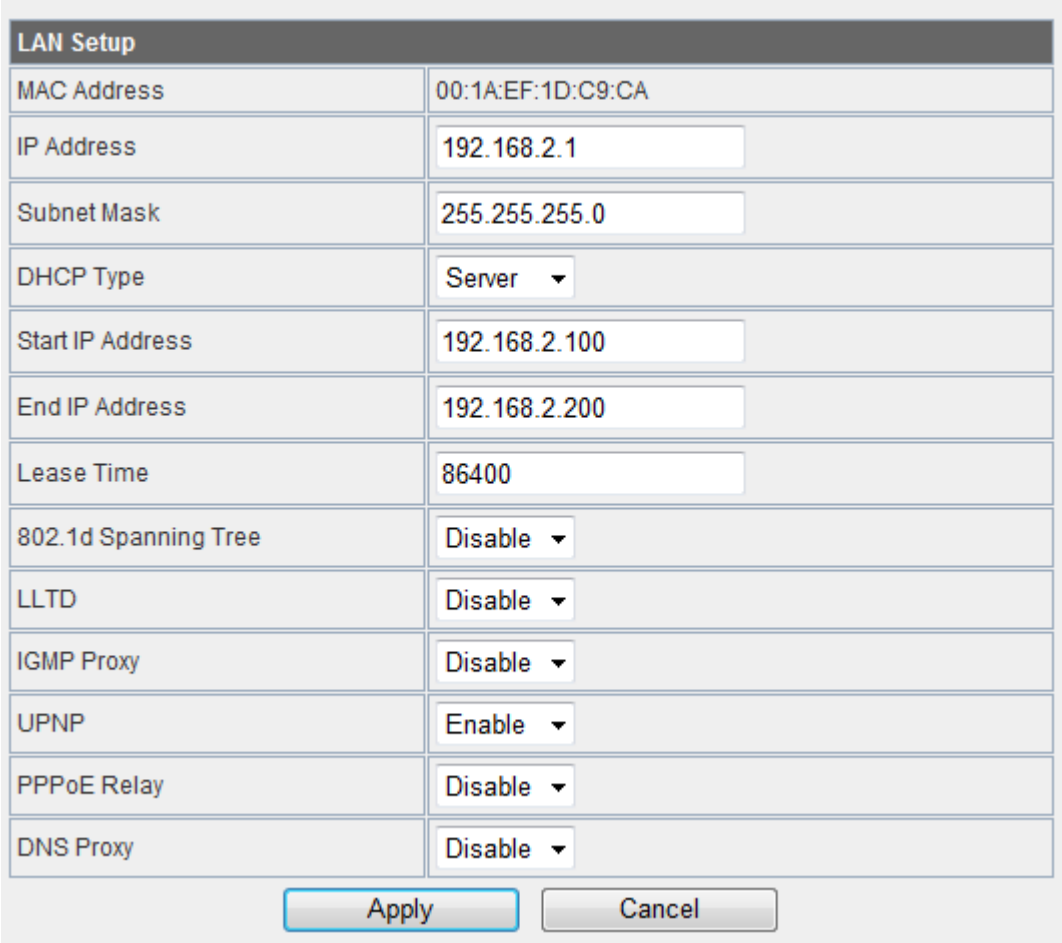


Bridge:	In this mode, all ethernet ports and wireless interface are bridged together and NAT function is disabled. All the WAN related function and firewall are not supported.
Gateway:	In this mode, the device is supposed to connect to internet via ADSL/Cable Modem. The NAT is enabled and PCs in LAN ports share the same IP to ISP through WAN port. The connection type can be setup in WAN page by using PPPOE, DHCP client, PPTP client , L2TP client or static IP.
Wireless ISP:	In this mode, all ethernet ports are bridged together and the wireless client will connect to ISP access point. The NAT is enabled and PCs in ethernet ports share the same IP to ISP through wireless LAN. You must set the wireless to client mode first and connect to the ISP AP in Universal Repeater page.

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

.4.3.3 Internet Settings

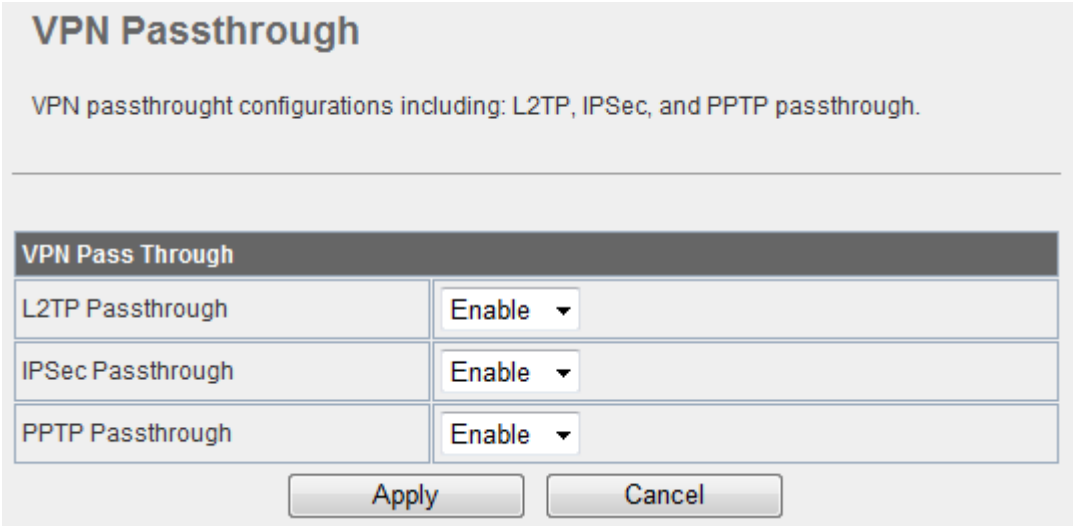
4.3.3.1 LAN



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

IGMP Proxy	Select enable or disable the IGMP proxy function from pull-down menu.
UPNP	Select enable or disable the UPnP protocol from pull-down menu.
DNS Proxy	Select enable or disable the DNS Proxy function from pull-down menu.

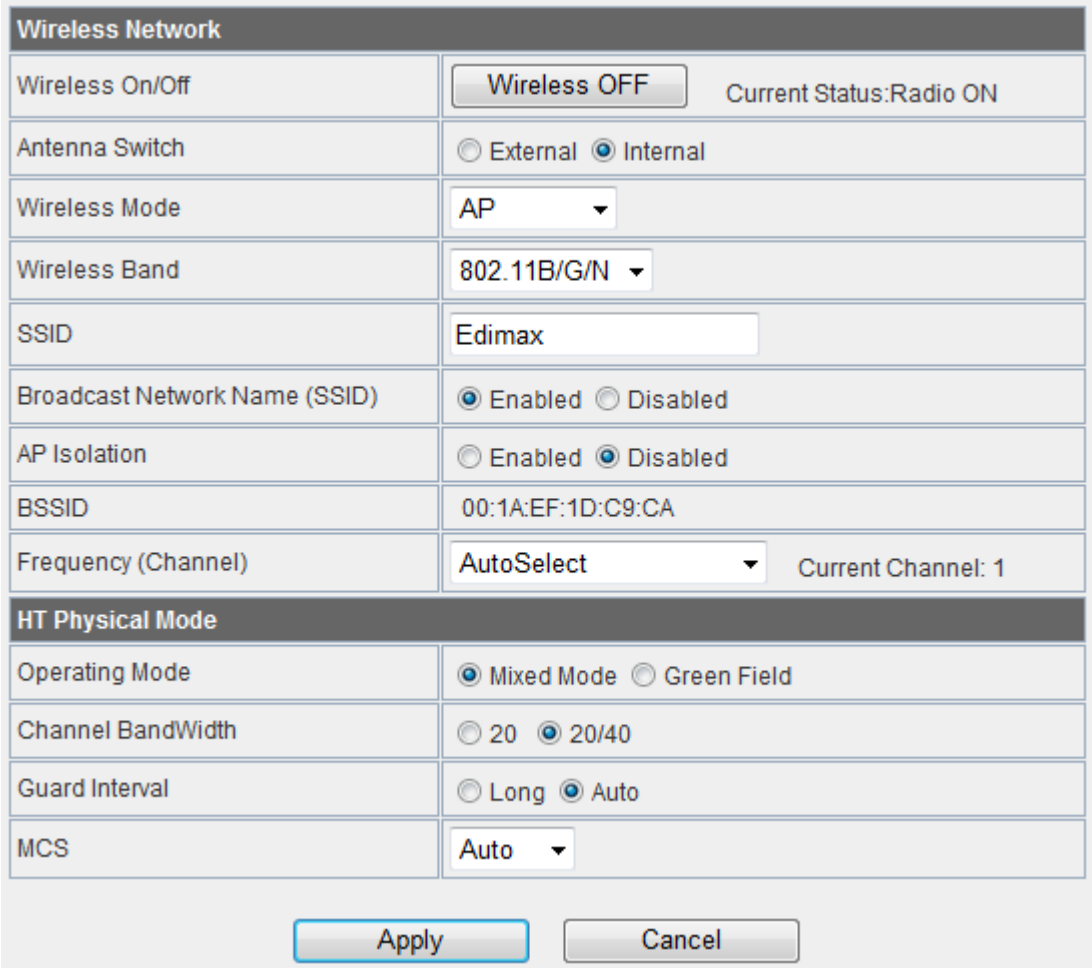
4.3.3.3 VPN Passthrough



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

4.3.4 Wireless Settings

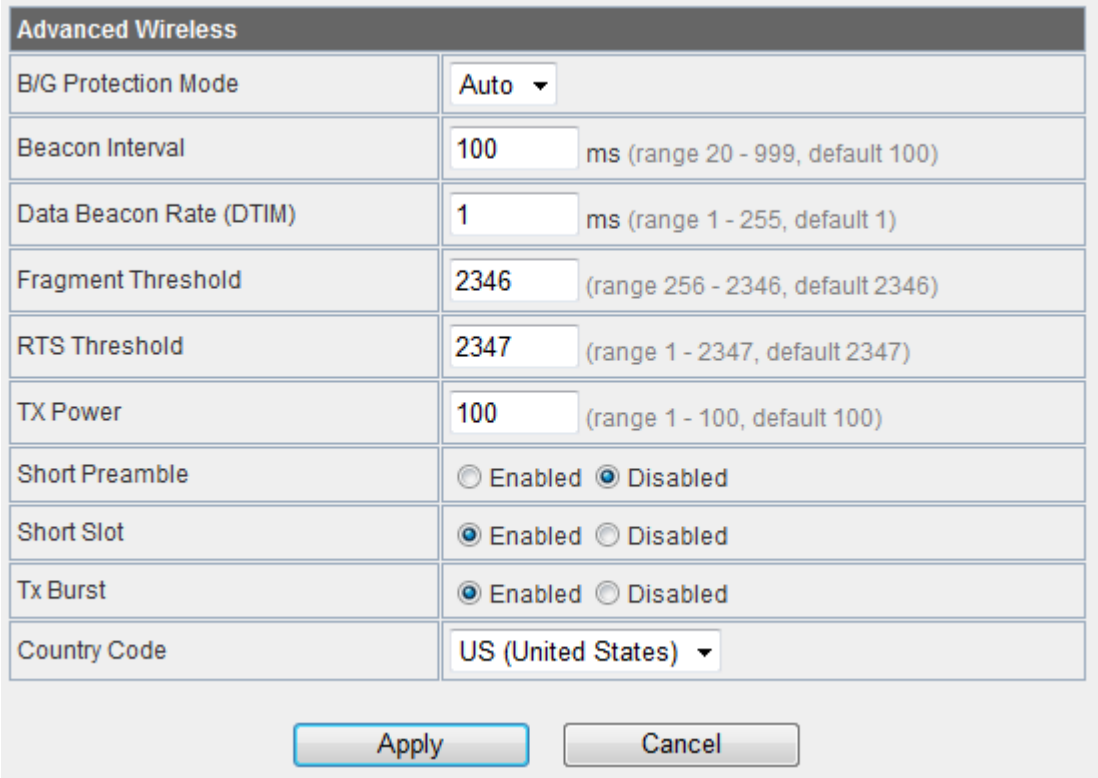
4.3.4.1 Basic



Item	Description
Wireless On/Off	Click ***Wireless OFF*** button to turn off wireless RF radio. Click ***Wireless ON*** button to turn on wireless RF radio.
Antenna Switch	Select Internal antenna or External antenna for using. The default is using Internal antenna.
Wireless Mode	Click to select wireless mode from pull down menu.
Wireless Band	Click to select wireless band from pull down menu.
SSID	It is the wireless network name. The SSID can be 32 bytes long. User 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 connection between wireless clients. Only allows connection between wireless client and this AP router.
MBSSID AP Isolation	Enable this function will turn off connection between clients with different MBSSID. Example: The client connected with BSSID 1. When enable this function, it will not connect with BSSID 2. Only can access between clients with SSID 1.
BSSID	Show the MAC address of Wireless interface.
Frequency (Channel)	Select the wireless communication frequency/channel from 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 effect under Mixed Mode.
MCS	Select 0~7 or “Auto” from pull down menu. The default is “Auto”. Only effect under Mixed Mode.

4.3.4.2 Advanced

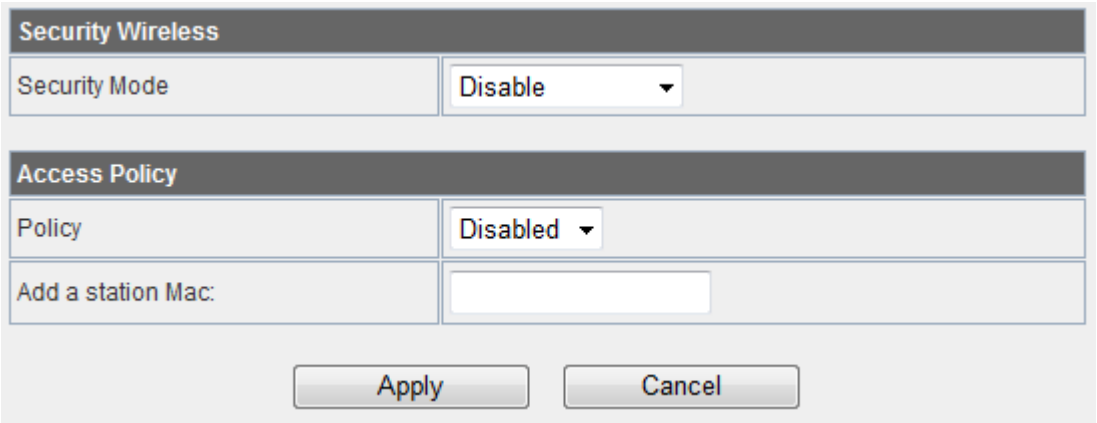


Item	Description
Beacon Interval	Beacons are the packets sending by Access point to synchronize the wireless network. The beacon interval is the time interval between beacons sending by this unit in AP or AP+WDS operation. The default and recommended beacon interval is 100 milliseconds.
Data Beacon Rate(DTM)	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 to 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 case of 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 not supported by some of very early stage of 802.11b station cards. If there is no such kind of stations associated to 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 serial of packages with single ACK reply from the clients. Enable this function to apply it.
Country Code	Select the country code for wireless from pull down menu.

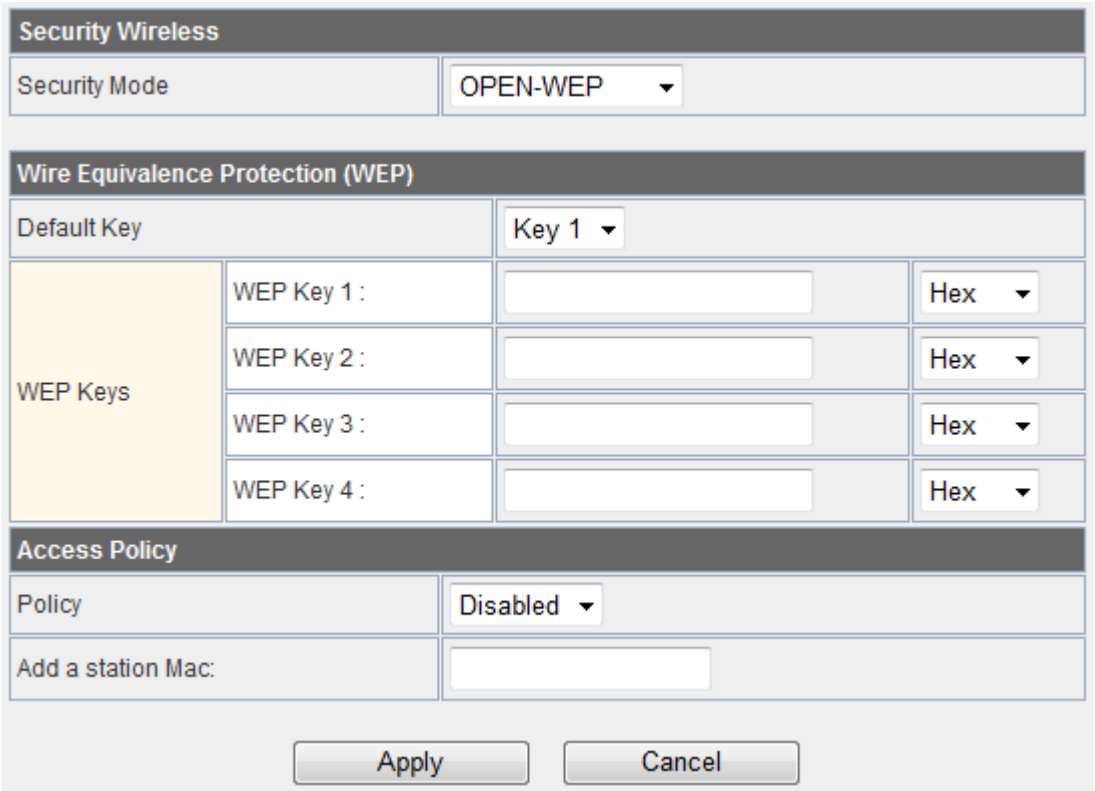
3.4.3.4.3 Security

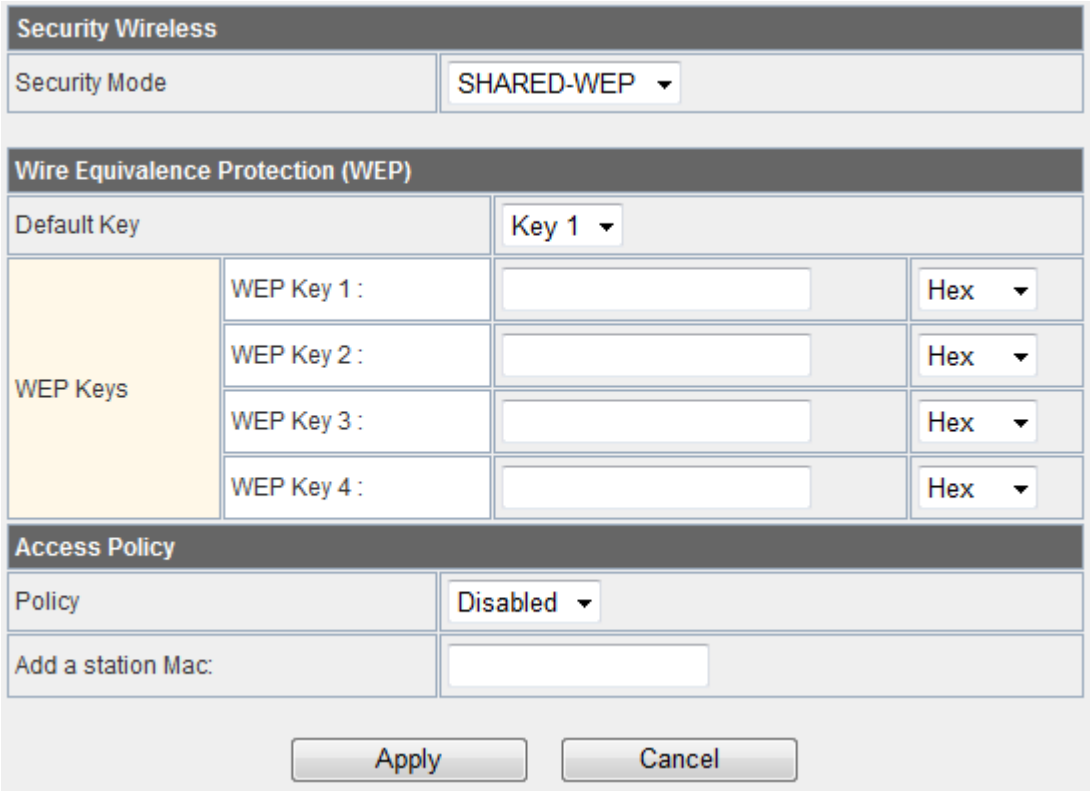
a. Disable



f 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

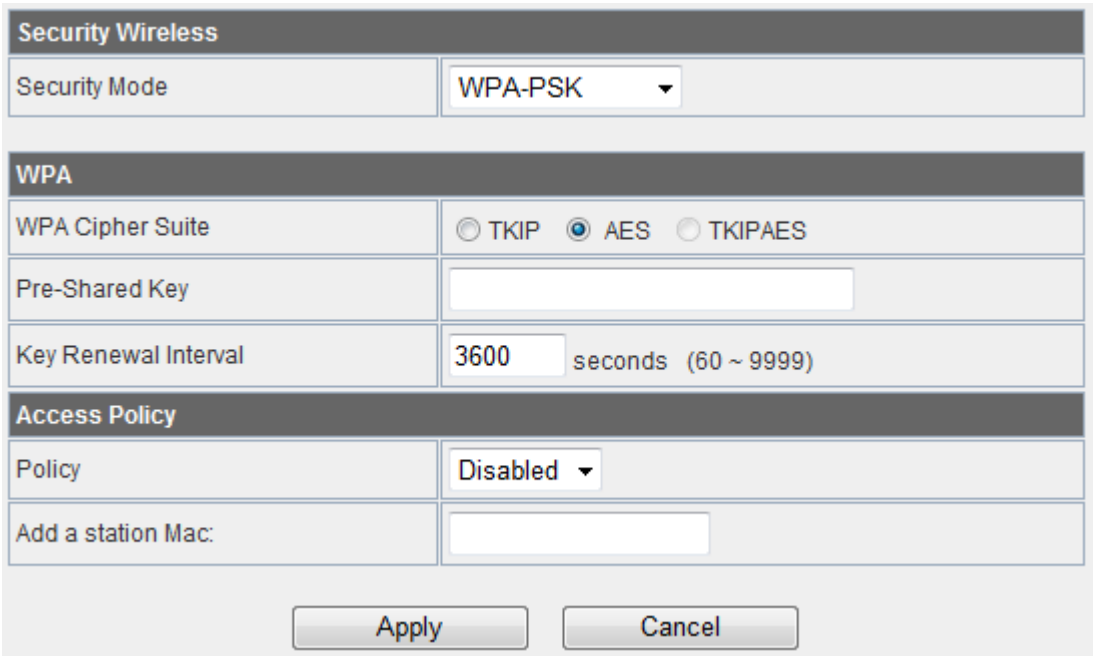


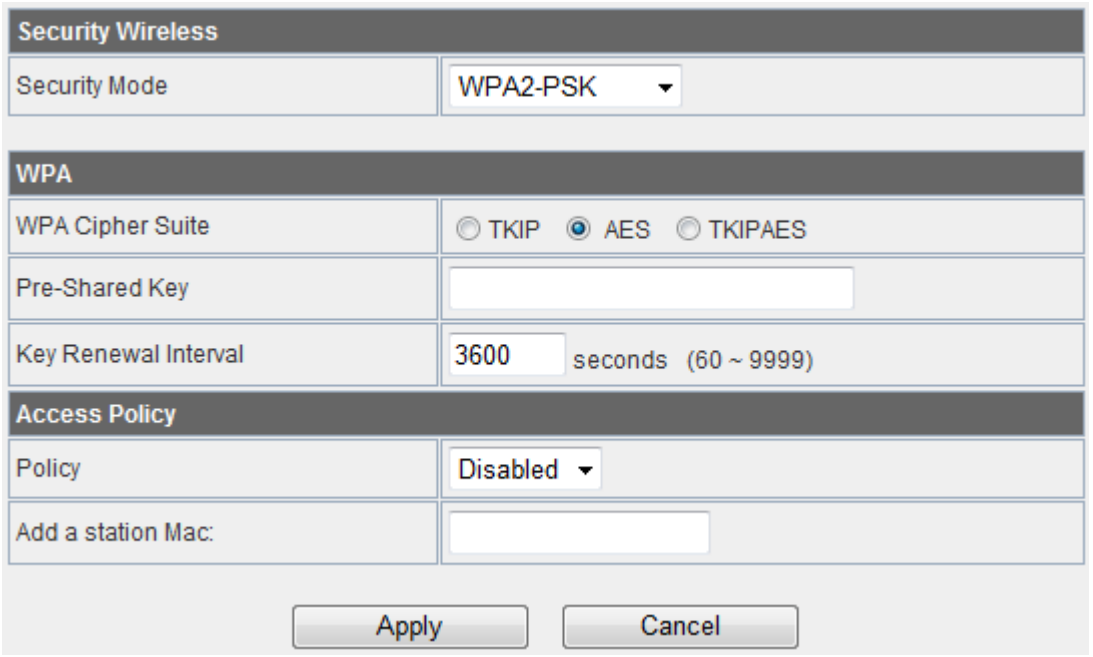


If you set Security Mode to "**OPEN-WEP or SHARED-WEP`"**, please fill in the related configurations at below.

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

c. WPA-PSK/WPA2PSK

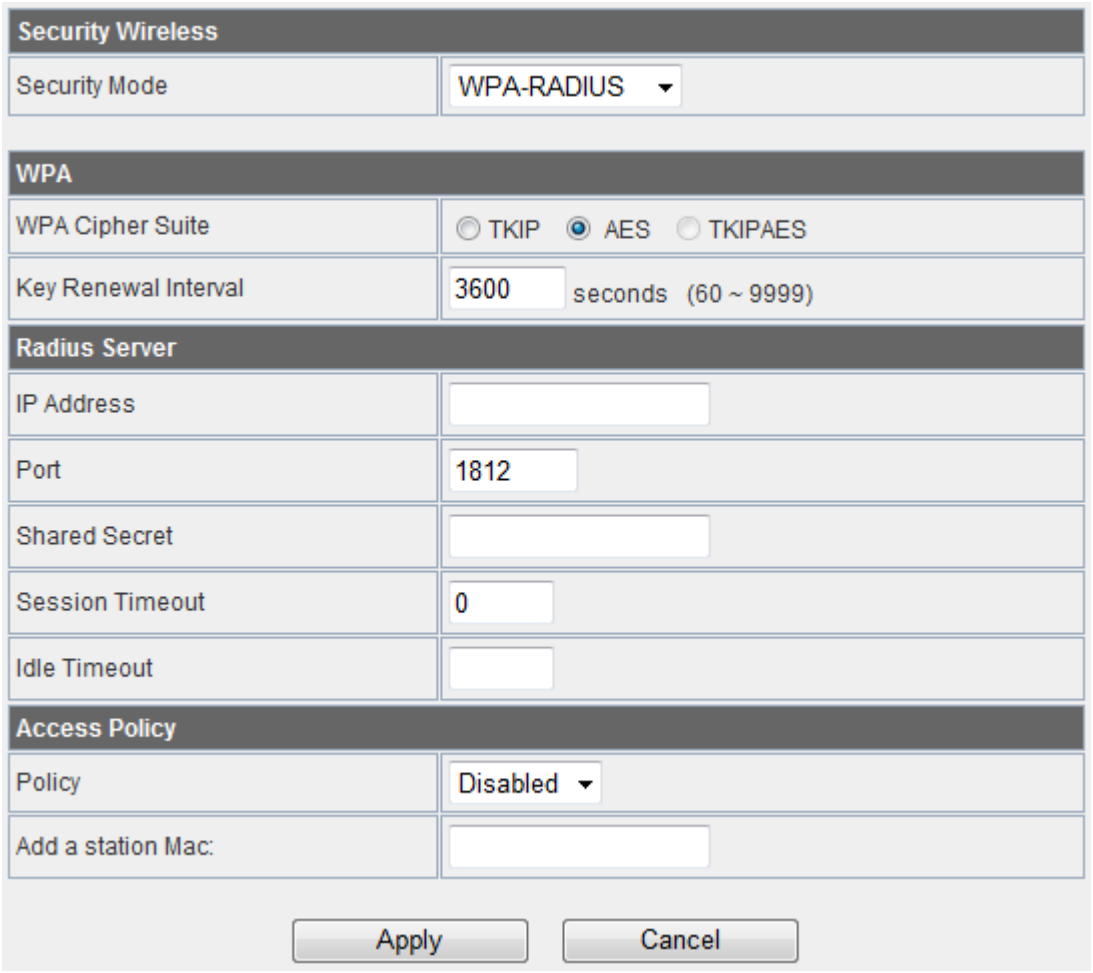




If you set Security Mode to "**WPAPSK or WPA2-PSK"**, please fill in the related configurations at below.

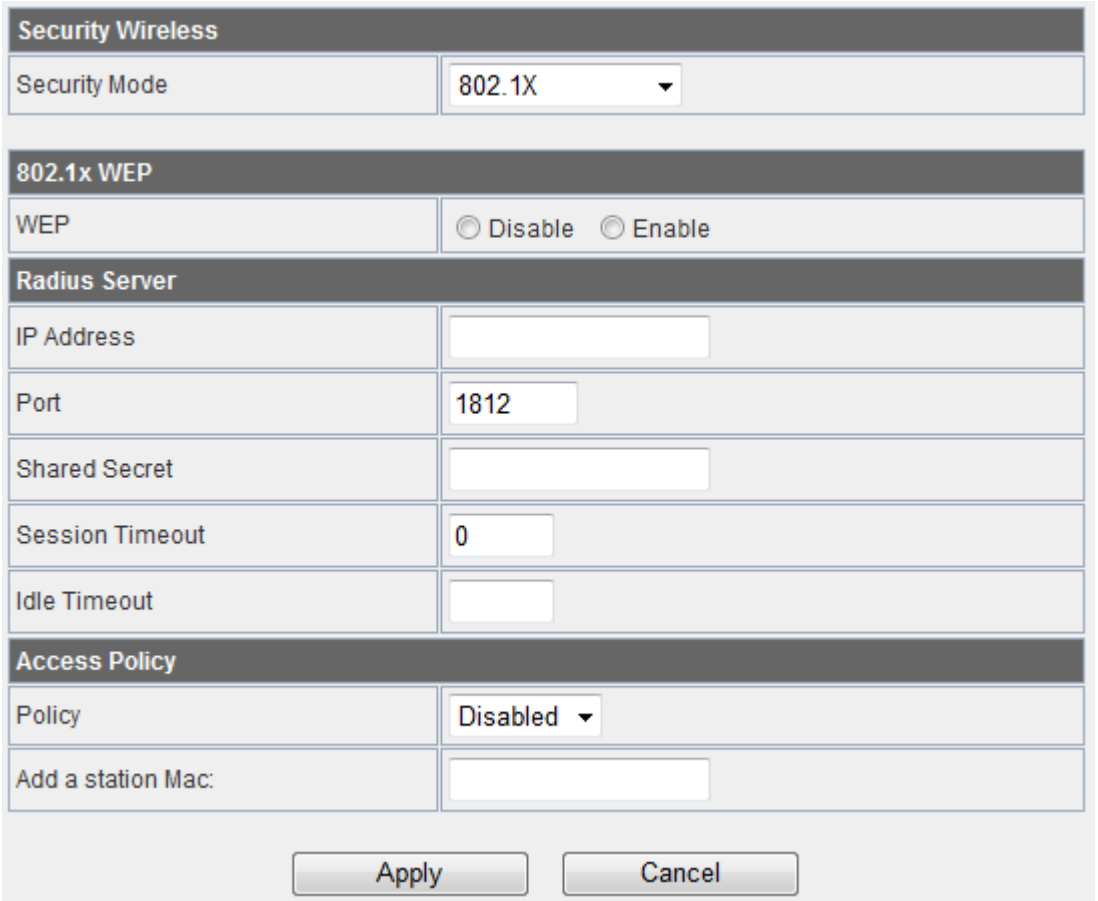
Item	Description
WPA Algorithms	Select **TKIP**, **AES**, or **TKIPAES** for WPA algorithms.
Pass Phrase	Please fill in a passphrase like 'test wpa 123', or a hexadecimal string like '65E4 E123 456 E1'.
Key Renewal Interval	Please fill in a number for Group Key Renewal interval time.

d. WPA-RADIUS



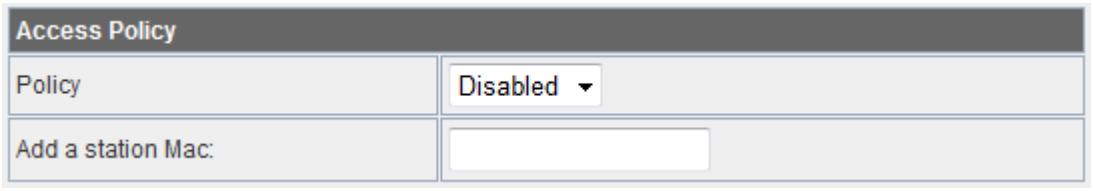
Item	Description
WPA Algorithms	Select **TKIP** or **AES** for WPA algorithms.
Key Renewal Interval	Please fill in a number for Group Key Renewal interval time.
IP Address	Enter the RADIUS Server's IP Address provided by your ISP.
Port	Enter the RADIUS Server's port number provided by your ISP. (The Default is 1812.)
Shared Secret	Enter the password that the Wireless Router shares 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 second and must be larger than 60.
Idle Timeout	Enter the idle timeout in the column.

e.802.1X



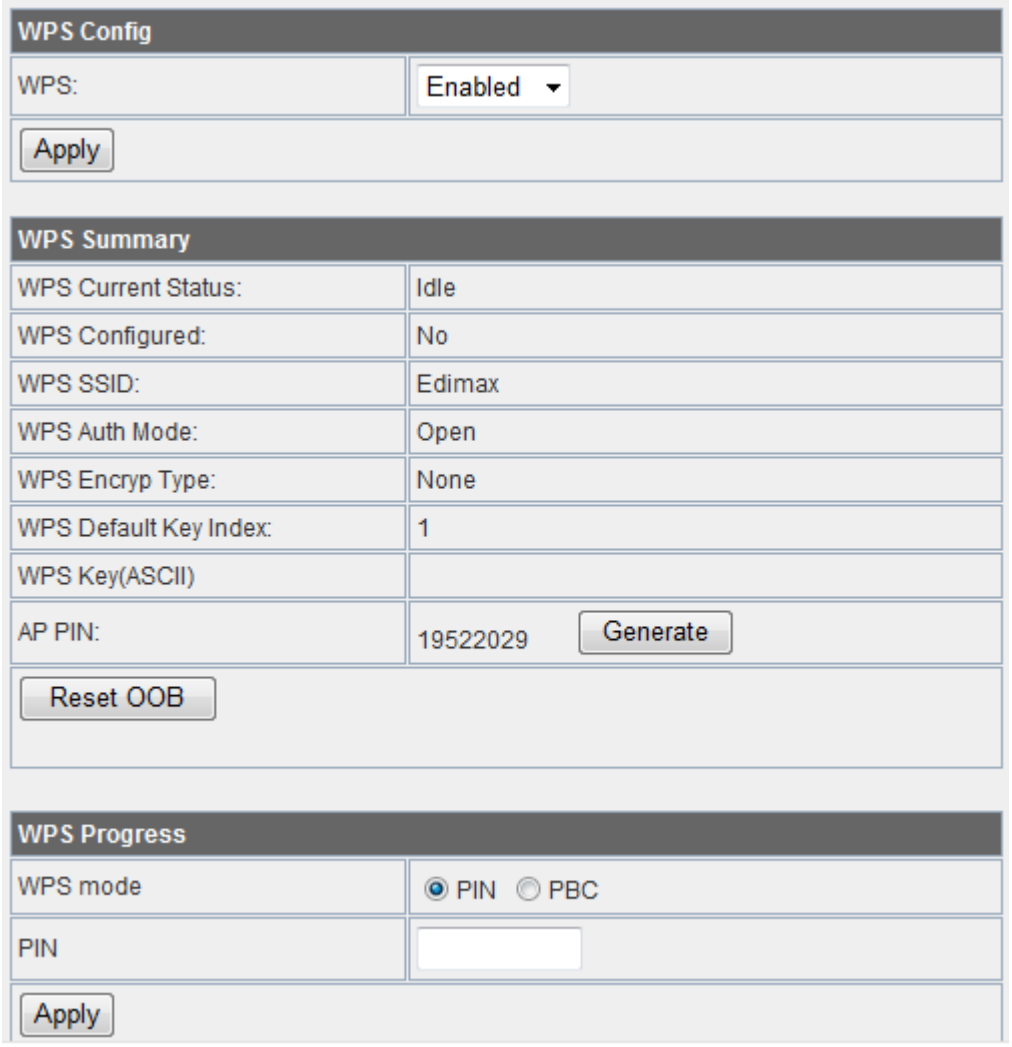
Item	Description
WEP	Select Disable or Enable For WEP
IP Address	Enter the RADIUS Server's IP Address provided by your ISP.
Port	Enter the RADIUS Server's port number provided by your ISP. (The Default is 1812.)
Shared Secret	Enter the password that the Wireless Router shares with the RADIUS Server.
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 second and must be larger than 60.
Idle Timeout	Enter the idle timeout in the column.

f. Access Policy



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

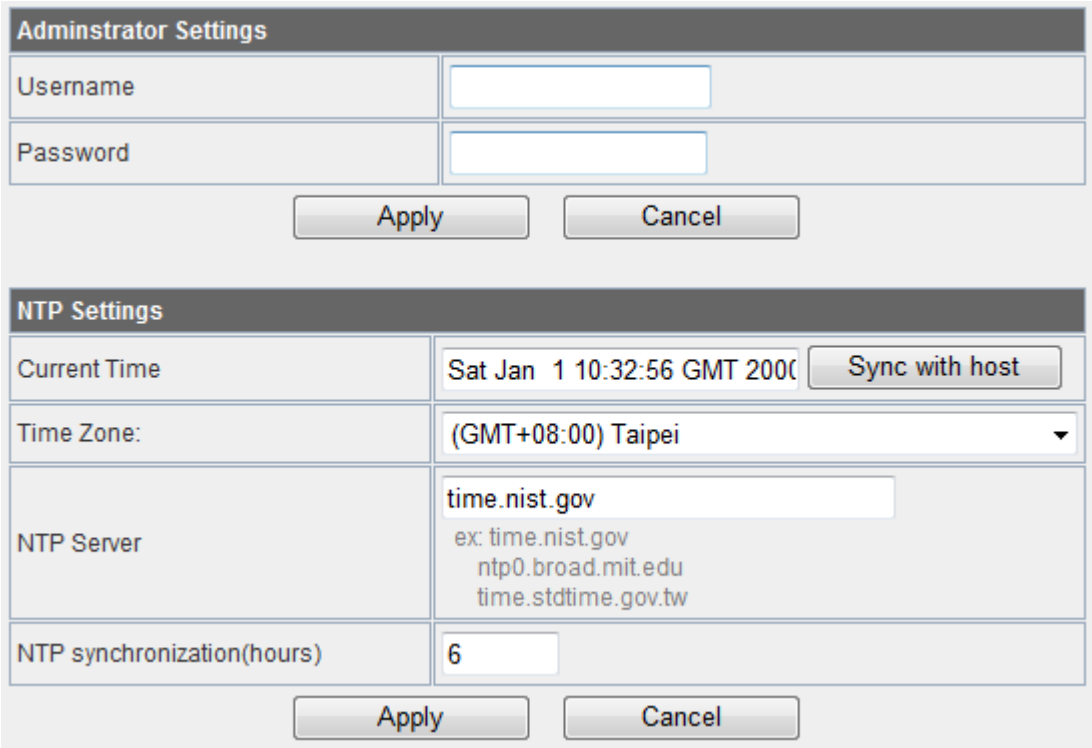
4.3.4.4 WPS



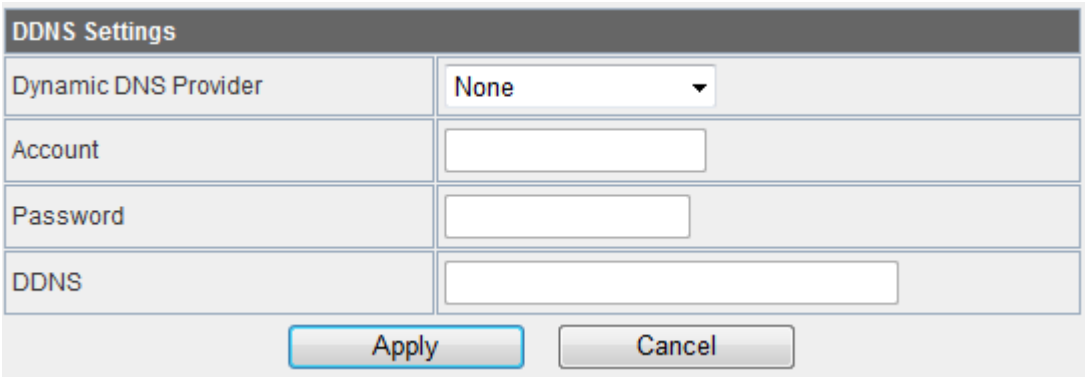
Item	Description
WPS	Select **Enable** or **Disable** the Wi-Fi Protected Setup function. Then click ***Apply*** button to take effect function after change.
WPS Summary	After enabling the WPS function, if there is connection the WPS Summary will show related information and status.
AP PIN	Here shows the AP's PIN code (Personal Identification Number) that the enrollee should enter the registrar's PIN code to make a connection. Click ***Generate*** button to generate a new AP PIN code.
Reset OOB	Click ***Reset OOB*** button 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.

4.3.5Administration

4.3.5.1 Management

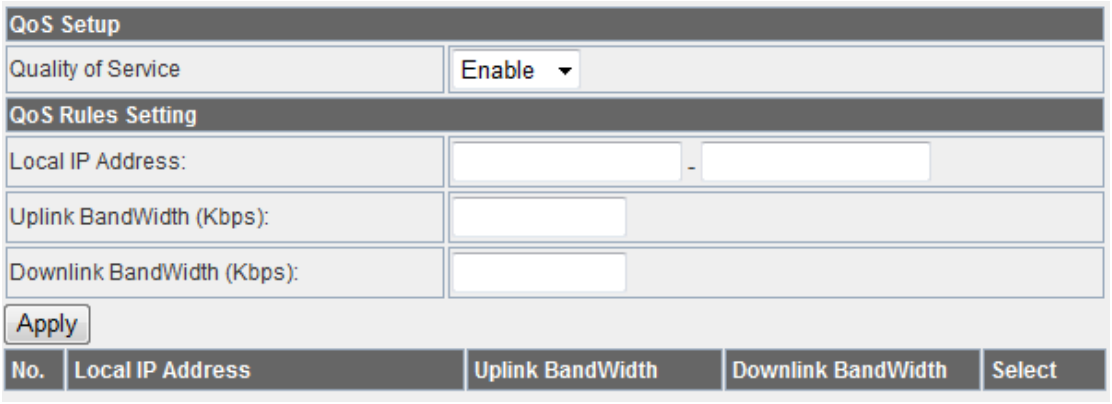


Item	Description
Username	Fill in the user name for web management login control.
Password	Fill in the password for web management login control.
Current Time	It shows the current time.
Time Zone	Select the time zone in your country from pull-down menu..
NTP Server	Fill in NTP server IP address.
NTP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



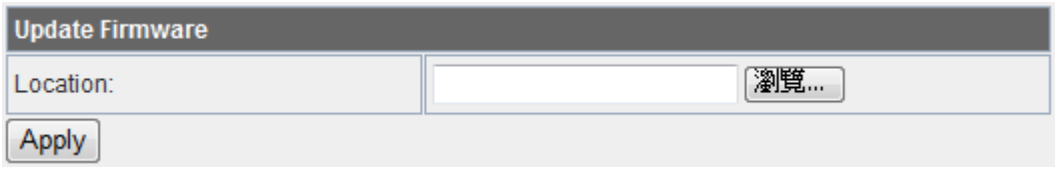
Item	Description
Dynamic DNS Provider	Click the drop down menu to pick up the right DDNS provider you registered.
Account	Fill in the account of DDNS you registered.
Password	Fill in the password of DDNS you registered.
DDNS	Fill in the domain name that you registered.

4.3.5.2 Qos



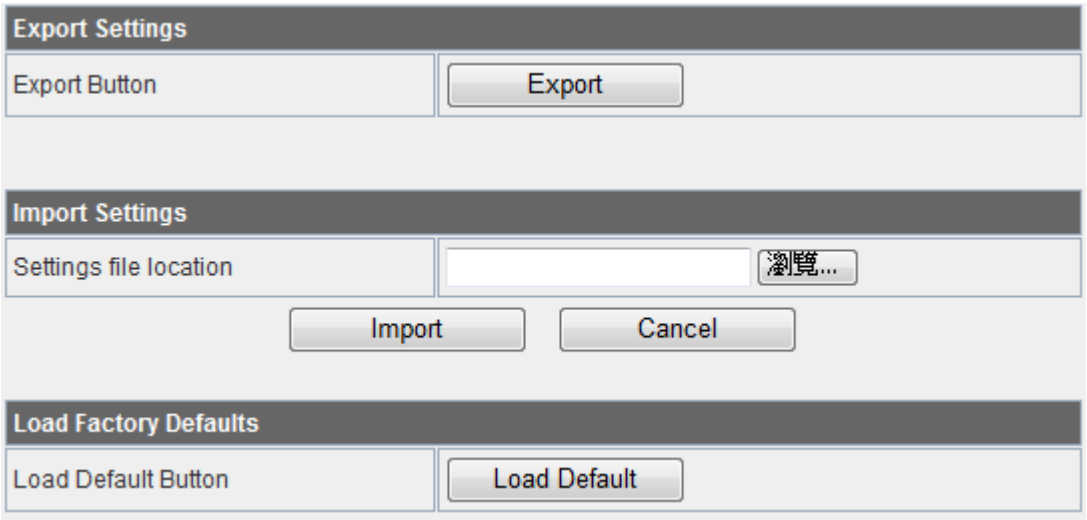
Item	Description
Uplink Speed	Input uplink Maximum upload speed
Downlink Speed	Input downlink Maximum upload speed
Local IP Address	Fill in the local IP address
Uplink Bandwidth	Fill limit upload bandwidth
Downlink Bandwidth	Fill limit downlink bandwidth

4.3.5.3 Upload Firmware



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

4.3.5.4 Settings Management



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

This page shows the current status and some basic settings of the device, includes system info, Internet Configurations and Local Network.

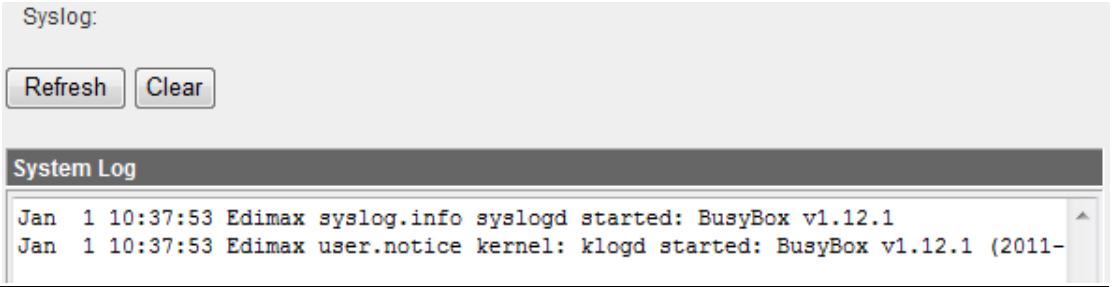
4.3.6.5 Status

This page shows the current status and some basic settings of the device, includes system info, Internet Configurations and Local Network.

System Information	
Firmware Version	7303HPn v1.05
Model Name	EW-7303HPn v2
System Up Time	0 days, 2 hours, 35 mins, 58 secs
Operation Mode	Gateway Mode
Wireless Information	
Status	Radio ON
Mode	AP
SSID	Edimax
Channel	1
Encryption	OPEN
BSSID	00:1A:EF:1D:C9:CA
WAN Information	
Connected Type	PPPOE
WAN IP Address	
Subnet Mask	
Default Gateway	
DNS1	
DNS2	
MAC Address	00:1A:EF:1D:C9:CE
LAN Information	
DHCP Server	Enabled
LAN IP Address	192.168.2.1
Subnet Mask	255.255.255.0
MAC Address	00:1A:EF:1D:C9:CA

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 display screen.

4.4 Configuration Examples

4.4.1 Example one – PPPoE on the WAN

Sales division of Company ABC likes to establish a WLAN network to support mobile communication on sales' Notebook PCs. MIS engineer collects information and plans the WLAN Broadband Router implementation by the following configuration.

*WAN configuration:*PPPoE

User Name	User123
Password	Password123

Note: User Name and password are provided by your ISP

LAN configuration:

IP Address	192.168.2.1
Subnet Mask	255.255.255.0
DHCP Client Range	192.168.2.100 –192.168.2.200

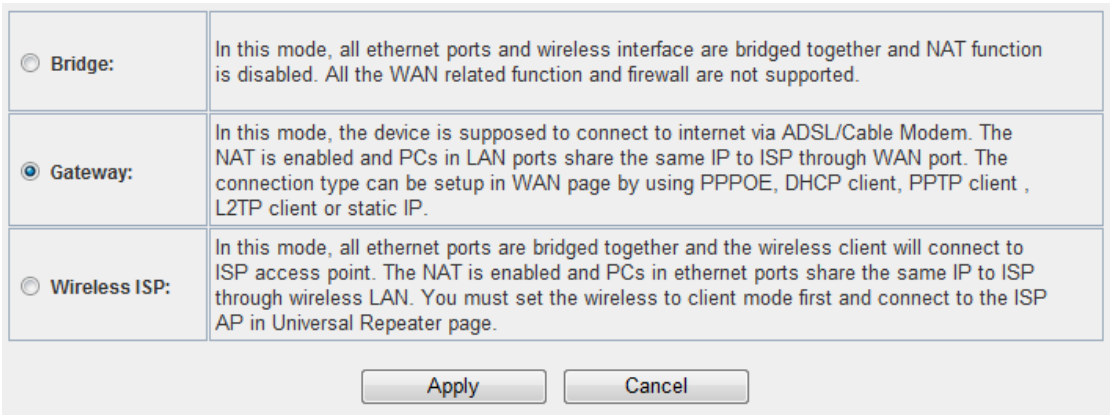
WLAN configuration:

SSID	AP
Channel Number	AutoSelect

1. Configure the Operation Mode Configuration

Open “Operation Mode Configuration ” page, select Gateway.

Press “***Apply***” button to confirm the configuration setting.

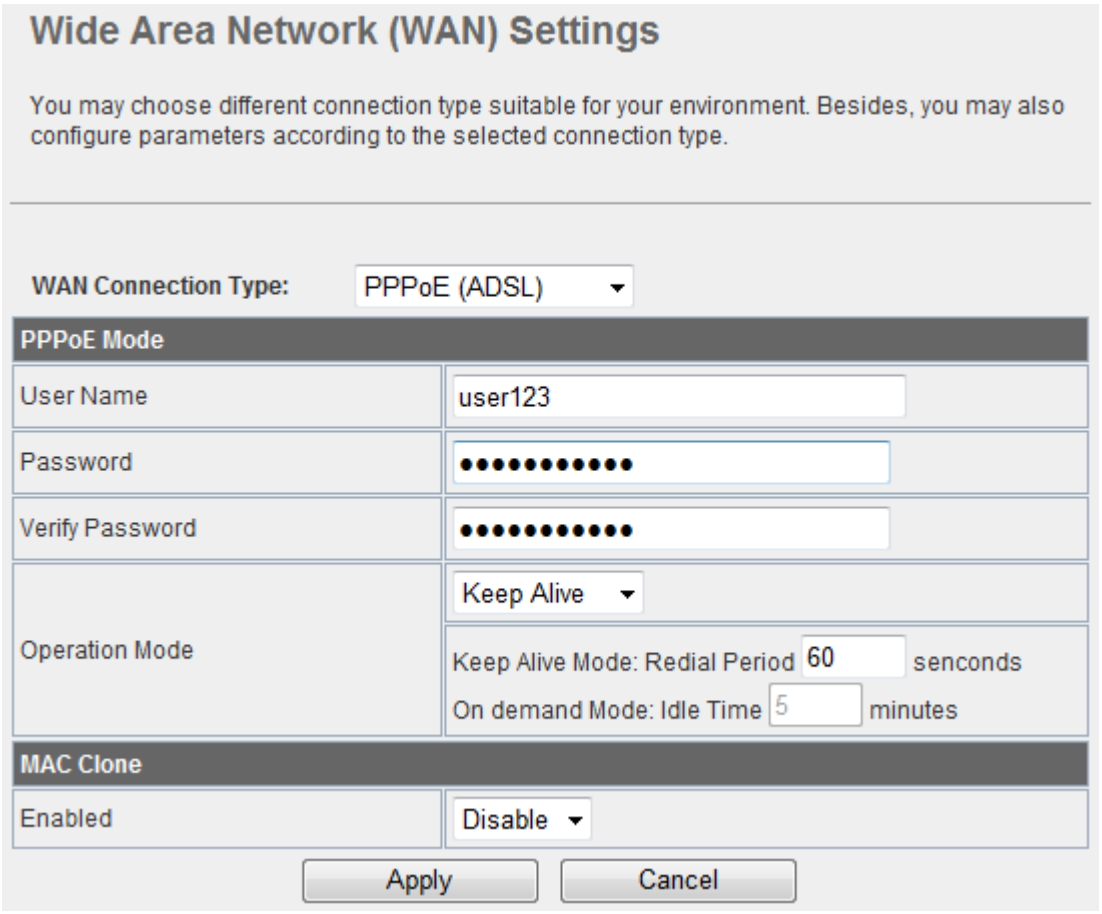


2. Configure the WAN interface:

Open “Wide Area Network (WAN) Settings” page, select PPPoE then enter the User Name “user123” and Password “password123”, the password is encrypted to display on the screen.

Press “***Apply***” button to confirm the configuration setting.

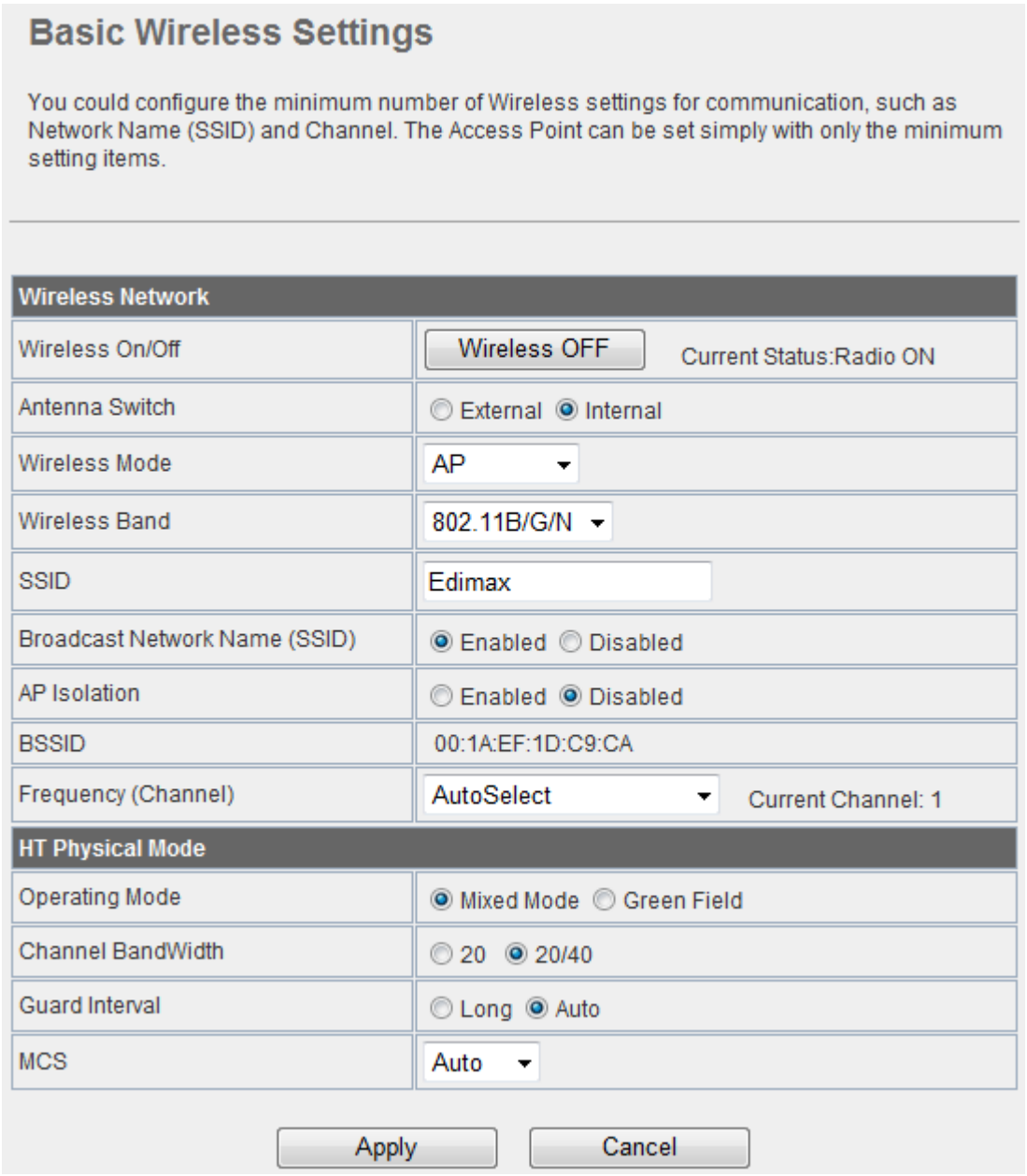
.



3. Configure the WLAN interface:

Open “Basic Wireless Settings” page, enter the SSID ”Edimax”, Channel Number ”AutoSelect”.

Press “***Apply***” button to confirm the configuration setting.



4. Configure the LAN interface:

Open “Local Area Network (LAN) settings” page, enter the IP Address “192.168.2.1”, Subnet Mask “255.255.255.0”. Enable DHCP Server, DHCP client range “192.168.2.100” to “192.168.2.200”, default Gateway “192.168.2.1” .

Press “***Apply***” button to confirm the configuration setting

4.4.2 Example two – fixed IP on the WAN

Company ABC likes to establish a WLAN network to support mobile communication on all employees' Notebook PCs. MIS engineer collects information and plans the WLAN Broadband Router implementation by the following configuration.

WAN configuration : Fixed IP

IP Address	10.10.10.10
Subnet Mask	255.255.255.0
Default Gateway	10.10.10.1
Primary DNS Address	168.95.1.1

LAN configuration:

IP Address	192.168.2.1
Subnet Mask	255.255.255.0
DHCP Client Range	192.168.2.100 – 192.168.2.200

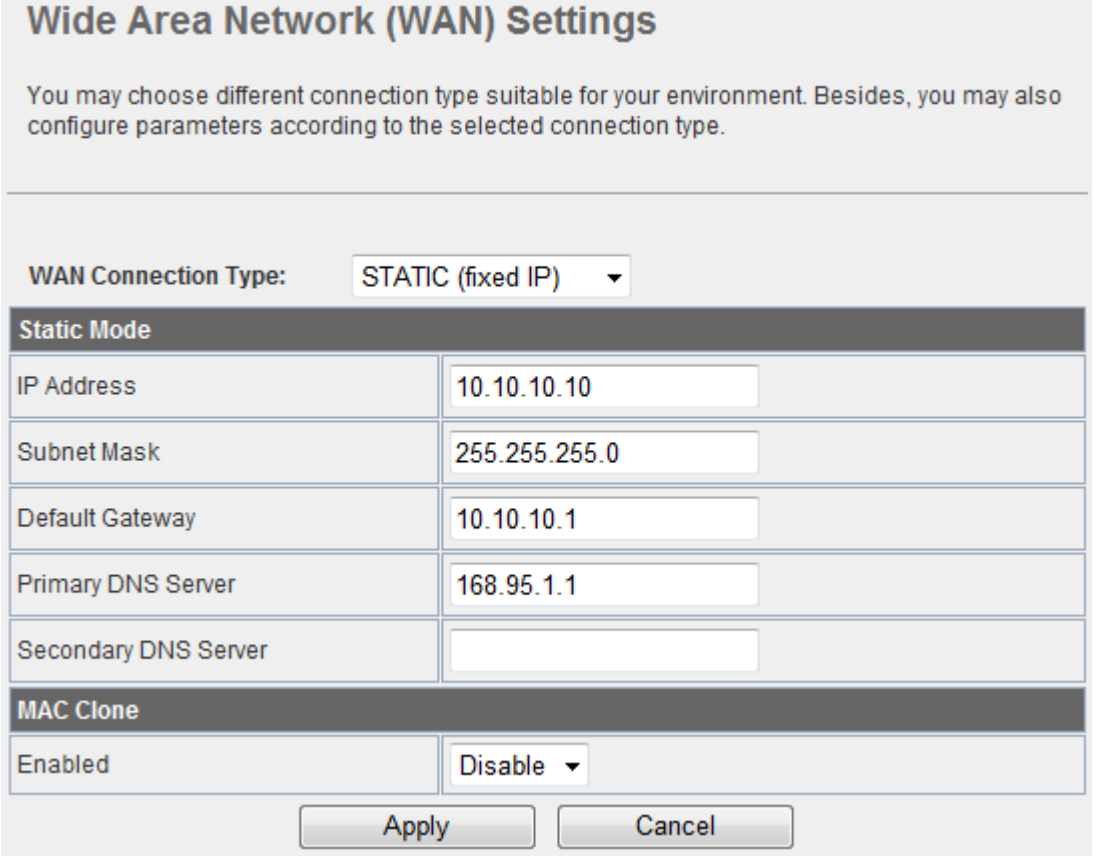
WLAN configuration:

SSID	Edimax
Channel Number	AutoSelect

1. Configure the WAN interface:

Open “Wide Area Network (WAN) Settings” page, select STATIC(fixed IP) then enter IP Address “10.10.10.10”, subnet mask “255.255.255.0”, Default gateway “10.10.10.1”.

Press “***Apply***” button to confirm the configuration setting.

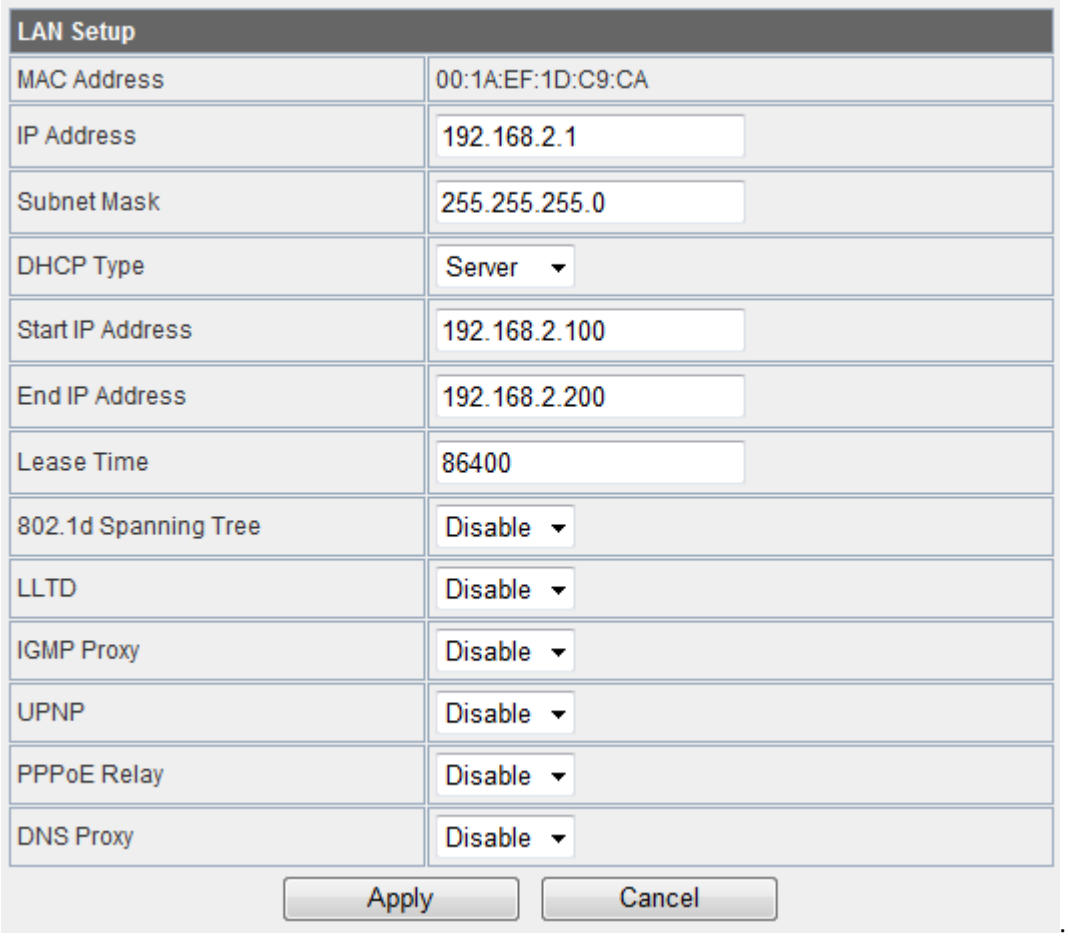


2. Configure the LAN interface:

Open “Local Area Network (LAN) settings” page, enter the IP Address “192.168.2.1”, Subnet Mask “255.255.255.0”. Enable DHCP Server, DHCP client range “192.168.2.100” to “192.168.2.200”, default

Gateway “192.168.1.254” .

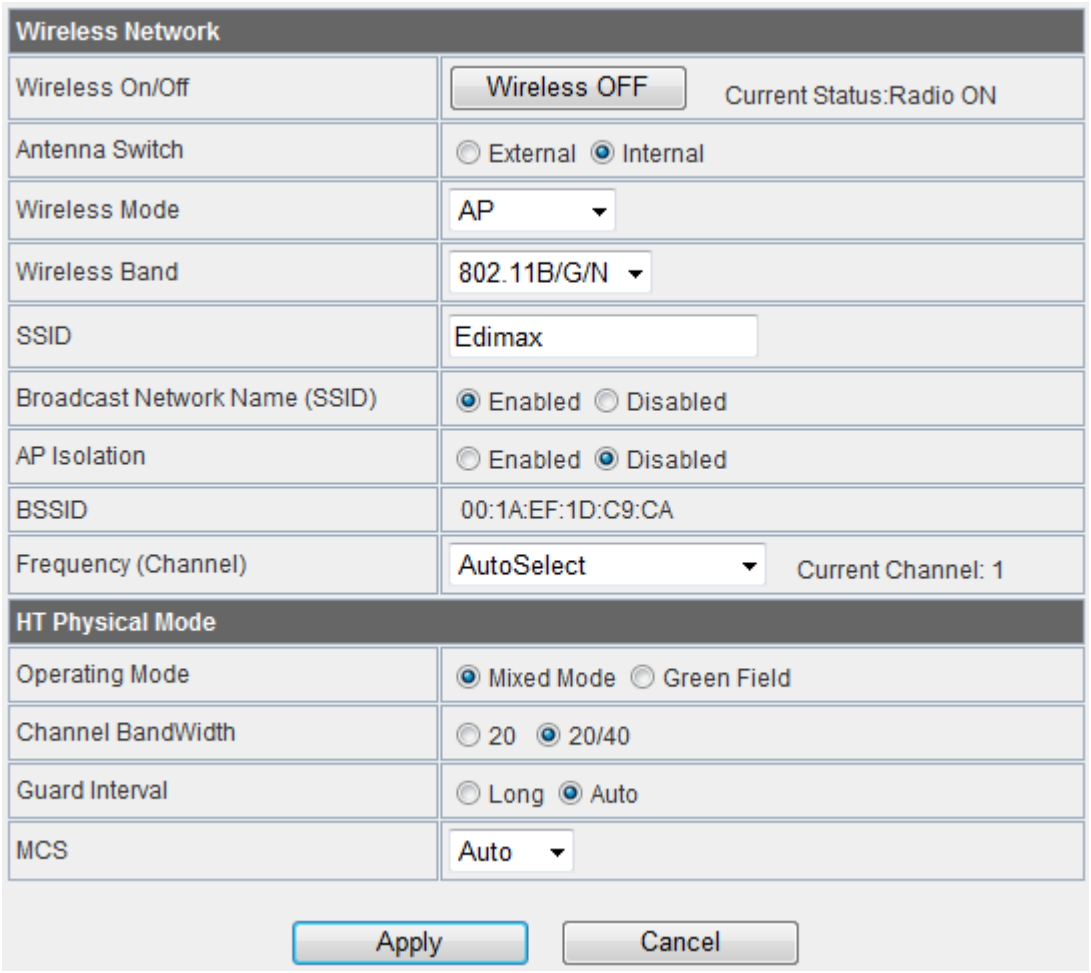
Press “***Apply***” button to confirm the configuration setting



3. Configure the WLAN interface:

Open “Basic Wireless Settings” page, enter the SSID ” Edimax”, Channel Number ”AutoSelect”.

Press “***Apply***” button to confirm the configuration setting.



4.4.3 Example three –set WLAN to be WAN as WISP

User Mr. ABC likes to configure this WLAN Broadband Router to be a WiFi client. In order to communicate with another AP. Mr. ABC collects information and plans the WLAN Broadband Router implementation by the following configuration.

WAN configuration: DHCP (Auto config)

IP Address	n/a
Subnet Mask	n/a
Default Gateway	n/a
Primary DNS Address	n/a

LAN configuration:

IP Address	192.168.2.1
Subnet Mask	255.255.255.0
DHCP Client Range	192.168.2.100 –192.168.2.200

WLAN configuration:

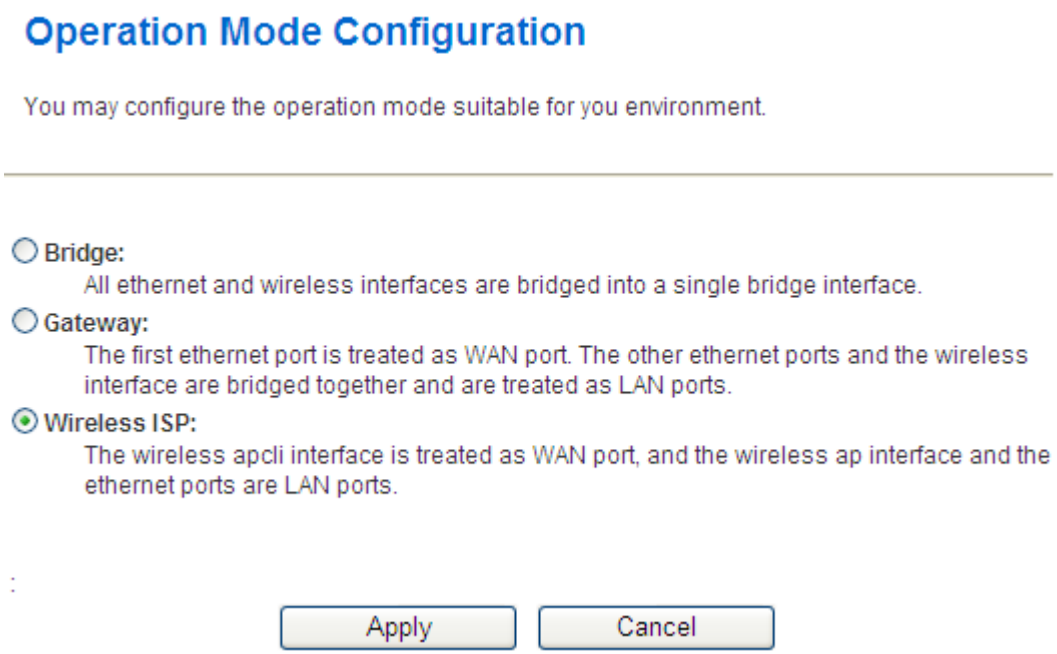
SSID	Edimax
Channel Number	1

WISP *configuration:*

SSID	TEST AP
Channel Number	Channel 1
Wireless Encryption	n/a
DHCP server	192.168.88.50~192.168.88.150

1. Configure the Operation Mode:

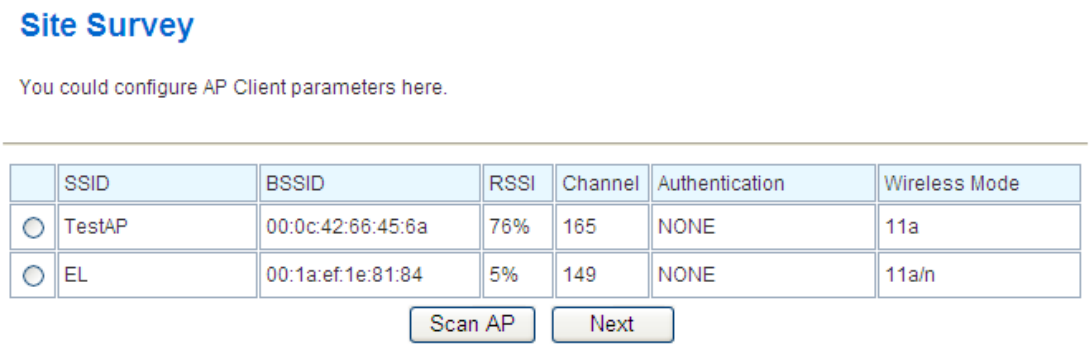
Open “Operation Mode Configuration” page, select **Ethernet Converter**, then click “***Apply***” button to confirm the configuration setting and reboot the WLAN Broadband Router. After reboot, the wireless LAN will become to WAN interface.



2. Site Survey:

Open “Site Survey” page under Wireless Settings, and select the AP “testap”.

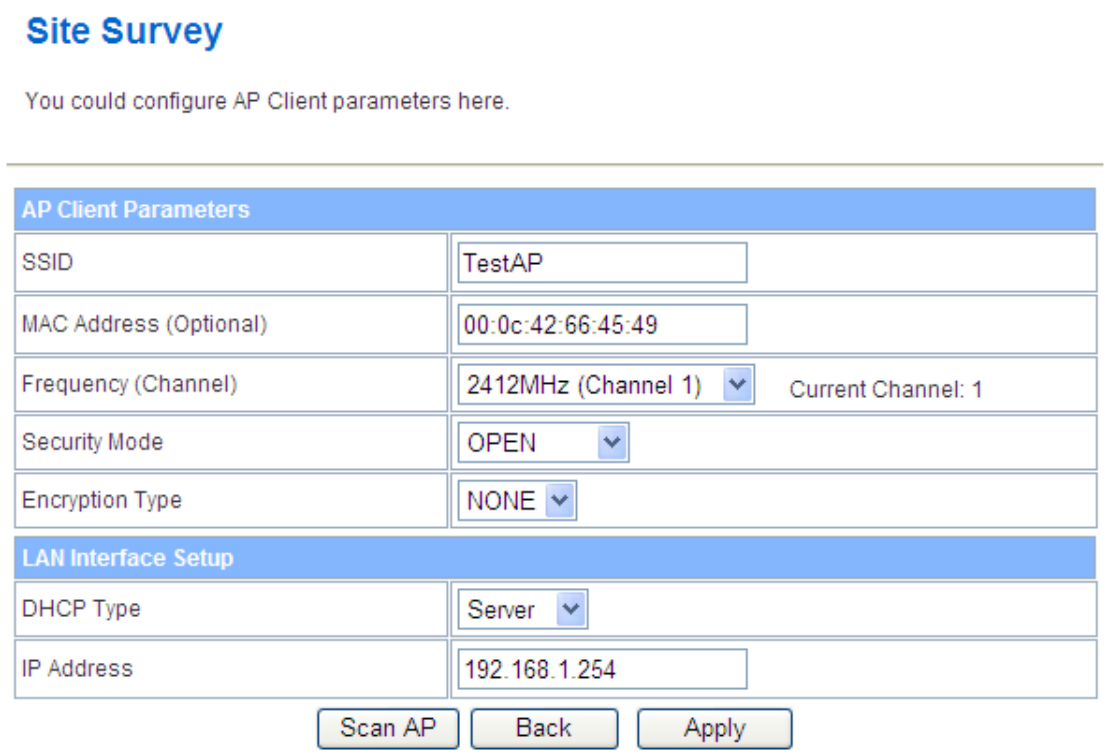
Press “***Connect***” button to connect with the AP.



3. Wireless encryption setting:

If the AP has encryption setting, it will pop out a window for you filling the encryption setting.

Please fill up the encryption code and click "***Apply***" button to connect with the AP.



4. Station Link Status:

After connection with AP, you can open “Link Status” page under Wireless Settings to check Link Status.

Access Point Status

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

System Information	
Firmware Version	1.0.18-N_H
System Up Time	7 mins, 19 secs
Operation Mode	AP Client Mode
Wireless Information	
Status	Radio ON
Mode	AP
SSID	RalinkInitAP_1906B8
Channel	1
Encryption	OPEN
BSSID	00:1A:EF:19:06:B8
WAN Information	
Connected Type	DHCP
WAN IP Address	192.168.88.187
Subnet Mask	255.255.255.0
Default Gateway	192.168.88.1
DNS1	168.95.1.1
DNS2	168.95.1.1
MAC Address	00:1A:EF:19:06:B9
LAN Information	
DHCP Server	Enabled
LAN IP Address	192.168.1.254
Subnet Mask	255.255.255.0
MAC Address	00:1A:EF:19:06:B8

5. FREQUENTLY ASKED QUESTIONS (FAQ)

5.1 What and how to find my PC's IP and MAC address?

5.1 What and how to find my PC's IP and MAC address?

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 address,

- ✓ Open the Command program in the Microsoft Windows.
- ✓ Type in "ipconfig /all", then press the Enter button.
- ✓ 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 Wireless LAN?

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

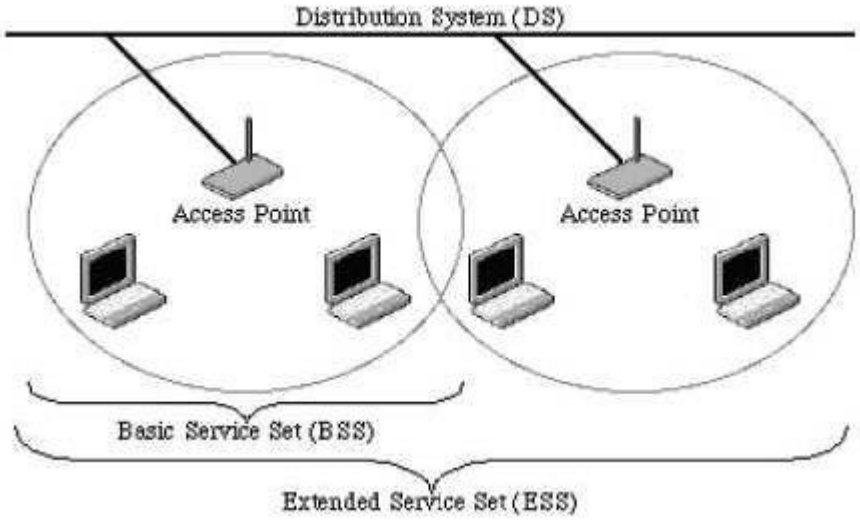
5.3 What are ISM bands?

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 define 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



xample 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 distinguish a particular a particular access point from others. Also know as just SSID. Serve 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 door, aluminum studs.
- ✓ Electrical devices: microwaves, monitors and electrical motors.

Solutions to overcome the interferences:

- ✓ Minimizing the number of walls and ceilings.
- ✓ Position the WLAN antenna for best reception.
- ✓ Keep WLAN devices away from other electrical devices, eg: microwaves, monitors, electric motors…etc.
- ✓ 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 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 function is that offers 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?

The proposed 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 size equal to 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 leads 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 that your 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 small 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 include 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 specification. 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 bit

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 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'snot 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), has been viewed as insufficient

for securing confidential business communications. A longer-term solution, the IEEE 802.11i standard, is under development. However, since the IEEE 802.11i standard is not expected to be published until the end of 2003, several members of the WI-Fi Alliance teamed up with members of the IEEE 802.11i task group to develop a significant near-term enhancement to Wi-Fi security. Together, this team developed Wi-Fi Protected Access.

To upgrade a WLAN network to support WPA, Access Points will require a WPA software upgrade. Clients will 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, will 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, defines 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, which will replace DES and 3DES.

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 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-Access Point 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 feature allows WLAN AP to talk directly to other APs via 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) indicates the network stack of any packet is 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 your special application that request the clients to register to a server machine with one identified MAC address. Since that all the clients will communicate outside world through the WLAN Broadband Router, so have the cloned MAC address set on the WLAN Broadband Router will solve the issue.

5.25 What is DDNS?

DDNS is the abbreviation of Dynamic Domain Name Server. It is designed for user owned the DNS server with dynamic WAN IP address.

5.26 What is NTP Client?

NTP client is designed for fetching the current timestamp from internet via Network Time protocol. User can specify time zone, NTP server IP address.

5.27 What is VPN?

VPN is the abbreviation of Virtual Private Network. It is designed for creating point-to point private link via shared or public network.

5.28 What is IPSEC?

IPSEC is the abbreviation of IP Security. It is used to transferring data securely under VPN.

5.29 What is WLAN Block Relay between Clients?

An Infrastructure Basic Service Set is a BSS with a component called an Access Point (AP). The access point provides a local relay function for the BSS. All stations in the BSS communicate with the access point and no longer communicate directly. All frames are relayed between stations by the access point.
This local relay function effectively doubles the range of the IBSS.

5.30 What is WMM?

WMM is based on a subset of the IEEE 802.11e WLAN QoS draft standard. WMM adds prioritized capabilities to Wi-Fi networks and optimizes their performance when multiple concurring applications, each with different latency and throughput requirements, compete for network resources. By using WMM, end-user satisfaction is maintained in a wider variety of environments and traffic conditions. WMM makes it possible for home network users and enterprise network managers to decide which data streams are most important and assign them a higher traffic priority.

5.31 What is WLAN ACK TIMEOUT?

ACK frame has to receive ACK timeout frame. If remote does not receive in specified period, it will be retransmitted.

5.32 What is Modulation Coding Scheme (MCS)?

MCS is Wireless link data rate for 802.11n. The throughput/range performance of an AP will depend on its implementation of coding schemes. MCS includes variables such as the number of spatial streams modulation, and the data rate on each stream. Radios establishing and maintaining a link must automatically negotiate the optimum MCS based on channel conditions and then continuously adjust the selection of MCS as conditions change due to interference, motion, fading, and other events.

5.33 What is Frame Aggregation?

Every 802.11 packet, no matter how small, has a fixed amount of overhead associated with it. Frame Aggregation combines multiple smaller packets together to form one larger packet. The larger packet can be sent without the overhead of the individual packets. This technique helps improve the efficiency of the 802.11n radio allowing more end user data to be sent in a given time.

5.34 What is Guard Intervals (GI)?

. A GI is a period of time between symbol transmission that allows reflections (from multipath) from the
previous data transmission to settle before transmitting a new symbol. The 802.11n draft specifies two guard intervals: 400ns (short) and 800ns (long). Support of the 400ns GI is optional for transmit and receive. The purpose of a guard interval is to introduce immunity to propagation delays, echoes, and reflections to which digital data is normally very sensitive.

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Edimax Technology co., Ltd
6F., No.3, Wu-Chuan 3rd Road, Wu-Gu,
New Taipei

Edimax Technology Europe B.V.
Nijverheidsweg 25 5683 CJ Best
The Netherlands

Edimax Computer Company
3350 Scott Blvd., Bldg.15 Santa Clara,
CA 95054, USA