DrayTek

VigorAP 810

802.11n Access Point

Your reliable networking solutions partner

User's Guide

V2.7

VigorAP 810
Wireless Access Point
User's Guide

Version: 2.7

Firmware Version: V1.3.4

(For future update, please visit DrayTek web site)

Date: October 13, 2021

Copyright Information

Copyright Declarations

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Safety Instructions and Approval

Safety Instructions

- Read the installation guide thoroughly before you set up the modem.
- The modem is a complicated electronic unit that may be repaired only be authorized and qualified personnel. Do not try to open or repair the modem yourself.
- Do not place the modem in a damp or humid place, e.g. a bathroom.
- The modem should be used in a sheltered area, within a temperature range of +5 to +40 Celsius.
- Do not expose the modem to direct sunlight or other heat sources. The housing and electronic components may be damaged by direct sunlight or heat sources.
- Do not deploy the cable for LAN connection outdoor to prevent electronic shock hazards.
- Keep the package out of reach of children.
- When you want to dispose of the modem, please follow local regulations on conservation of the environment.

Warranty

We warrant to the original end user (purchaser) that the modem will be free from any defects in workmanship or materials for a period of two (2) years from the date of purchase from the dealer. Please keep your purchase receipt in a safe place as it serves as proof of date of purchase. During the warranty period, and upon proof of purchase, should the product have indications of failure due to faulty workmanship and/or materials, we will, at our discretion, repair or replace the defective products or components, without charge for either parts or labor, to whatever extent we deem necessary tore-store the product to proper operating condition. Any replacement will consist of a new or re-manufactured functionally equivalent product of equal value, and will be offered solely at our discretion. This warranty will not apply if the product is modified, misused, tampered with, damaged by an act of God, or subjected to abnormal working conditions. The warranty does not cover the bundled or licensed software of other vendors. Defects which do not significantly affect the usability of the product will not be covered by the warranty. We reserve the right to revise the manual and online documentation and to make changes from time to time in the contents hereof without obligation to notify any person of such revision or changes.

Be a Registered Owner

Web registration is preferred. You can register your Vigor router via https://myvigor.draytek.com.

Firmware & Tools Updates

Due to the continuous evolution of DrayTek technology, all modems will be regularly upgraded. Please consult the DrayTek web site for more information on newest firmware, tools and documents.

https://www.draytek.com

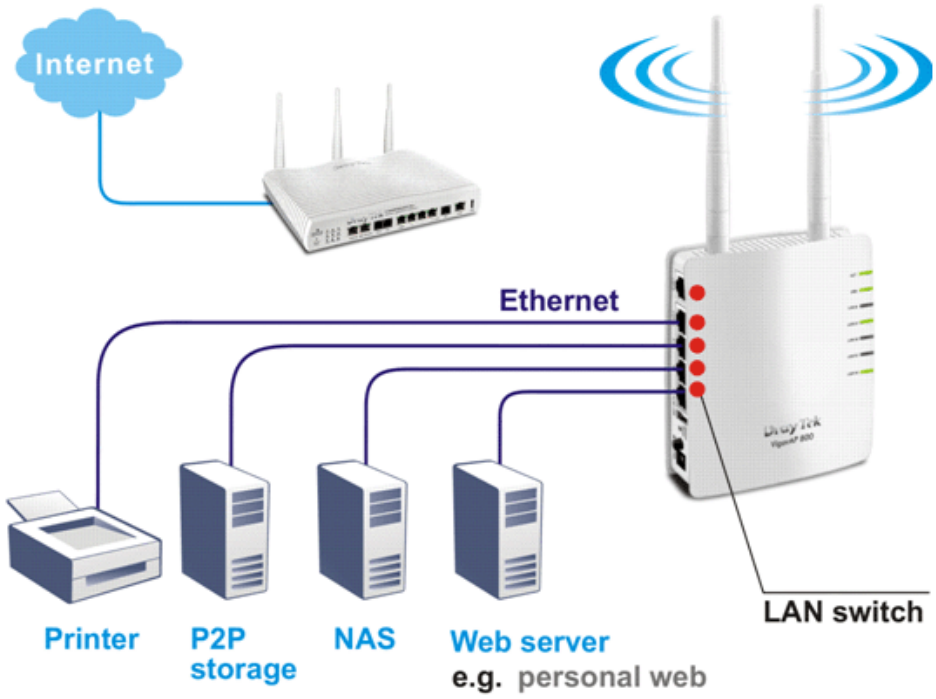
Table of Contents

1 Introduction

1.1 Introduction

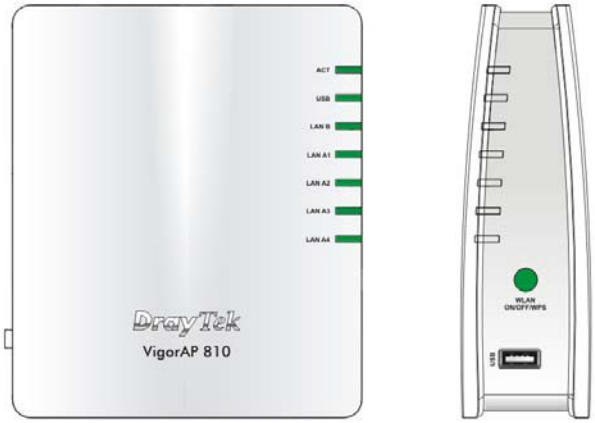
Thank you for purchasing this VigorAP 810! With this high cost-efficiency VigorAP 810, computers and wireless devices which are compatible with 802.11n can connect to existing wired Ethernet network via this VigorAP 810, at the speed of 300Mbps.

Easy install procedures allows any computer users to setup a network environment in very short time - within minutes, even inexperienced users. Just follow the instructions given in this user manual, you can complete the setup procedure and release the power of this access point all by yourself!

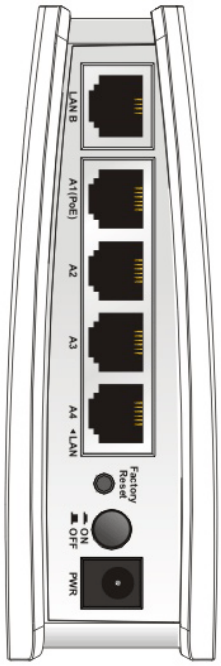


1.2 LED Indicators and Connectors

Before you use the Vigor modem, please get acquainted with the LED indicators and connectors first.



	Status	Explanation
ACT	Off	The system is not ready or is failed.
	Blinking	The system is ready and can work normally.
USB	On	A USB device is connected and active.
	Blinking	The data is transmitting.
LAN B	On	A normal connection is through its corresponding port.
	Off	LAN is disconnected.
	Blinking	Data is transmitting (sending/receiving).
LAN A1 - A4	On	A normal connection is through its corresponding port.
	Off	LAN is disconnected.
WLAN (Green LED) on WLAN button	On	Press the button and release it within 2 seconds. When the wireless function is ready, the green LED will be on.
	Off	Press the button and release it within 2 seconds to turn off the WLAN function. When the wireless function is not ready, the LED will be off.
	Blinking (Green)	Data is transmitting (sending/receiving).
WPS (Orange LED) on WLAN button	Blinking (Orange)	When WPS function is enabled by web user interface, press this button for more than 2 seconds to wait for client's device making network connection through WPS. When the orange LED blinks with 1 second cycle for 2 minutes, it means that the AP is waiting for wireless client to connect with it.
USB	Connector for a printer.	



Interface	Description
LAN B	Connecter for xDSL / Cable modem (Giga level) or router.
LAN A1 (PoE) - A4	Connecter for xDSL / Cable modem (Giga level) / computer or router.
	Restore the default settings. Usage: Turn on the AP. Press the button and keep for more than 6 seconds. Then the AP will restart with the factory default configuration.
	ON/OFF: Power switch.
	PWR: Connecter for a power adapter.

1.3 Hardware Installation

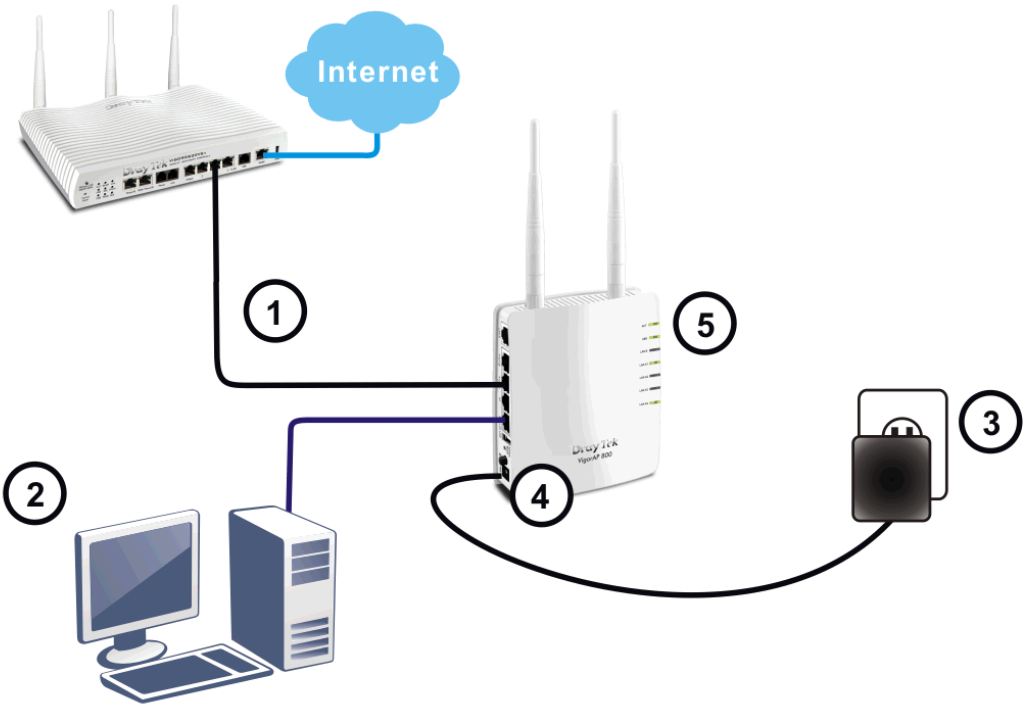
This section will guide you to install the VigorAP 810 through hardware connection and configure the device's settings through web browser.

Before starting to configure VigorAP 810, you have to connect your devices correctly.

1.3.1 Wired Connection for PC in LAN

1. Connect VigorAP 810 to ADSL modem, router, or switch/hub in your network through the **LAN A** port of the access point by Ethernet cable.
2. Connect a computer to other available LAN A port. Make sure the subnet IP address of the PC is the same as VigorAP 810 management IP, e.g., **192.168.1.X**.
3. Connect the A/C power adapter to the wall socket, and then connect it to the PWR connector of the access point.
4. Power on VigorAP 810.
5. Check all LEDs on the front panel. **ACT** LED should blink and **LAN** LEDs should be on if the access point is correctly connected to the ADSL modem or router.

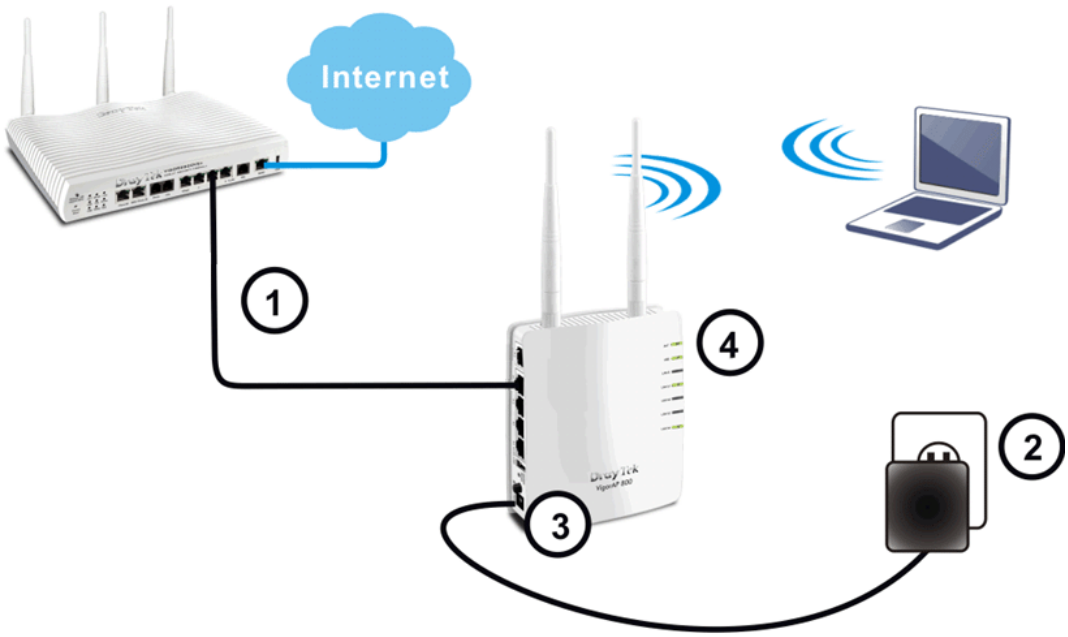
(For the detailed information of LED status, please refer to section 1.2.)



1.3.2 Wired Connection for Notebook in WLAN

1. Connect VigorAP 810 to ADSL modem or router in your network through the **LAN A** port of the access point by Ethernet cable.
2. Connect the A/C power adapter to the wall socket, and then connect it to the PWR connector of the access point.
3. Power on VigorAP 810.
4. Check all LEDs on the front panel. **ACT** LED should be steadily on, **LAN** LEDs should be on if the access point is correctly connected to the ADSL modem or router.

(For the detailed information of LED status, please refer to section 1.2.)

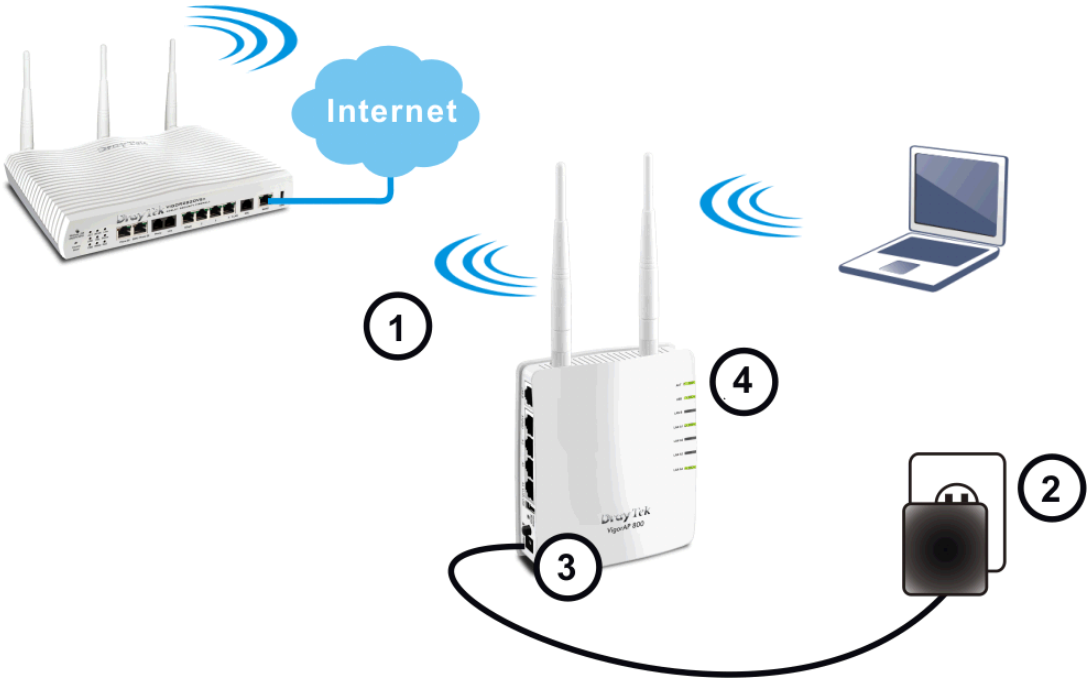


1.3.3 Wireless Connection

VigorAP 810 can access Internet via an ADSL modem, router, or switch/hub in your network through wireless connection.

1. Connect VigorAP 810 to ADSL modem or router via wireless network.
2. Connect the A/C power adapter to the wall socket, and then connect it to the PWR connector of the access point.
3. Power on VigorAP 810.
4. Check all LEDs on the front panel. **ACT** LED should be steadily on, **LAN** LEDs should be on if VigorAP 810 is correctly connected to the ADSL modem, router or switch/hub.

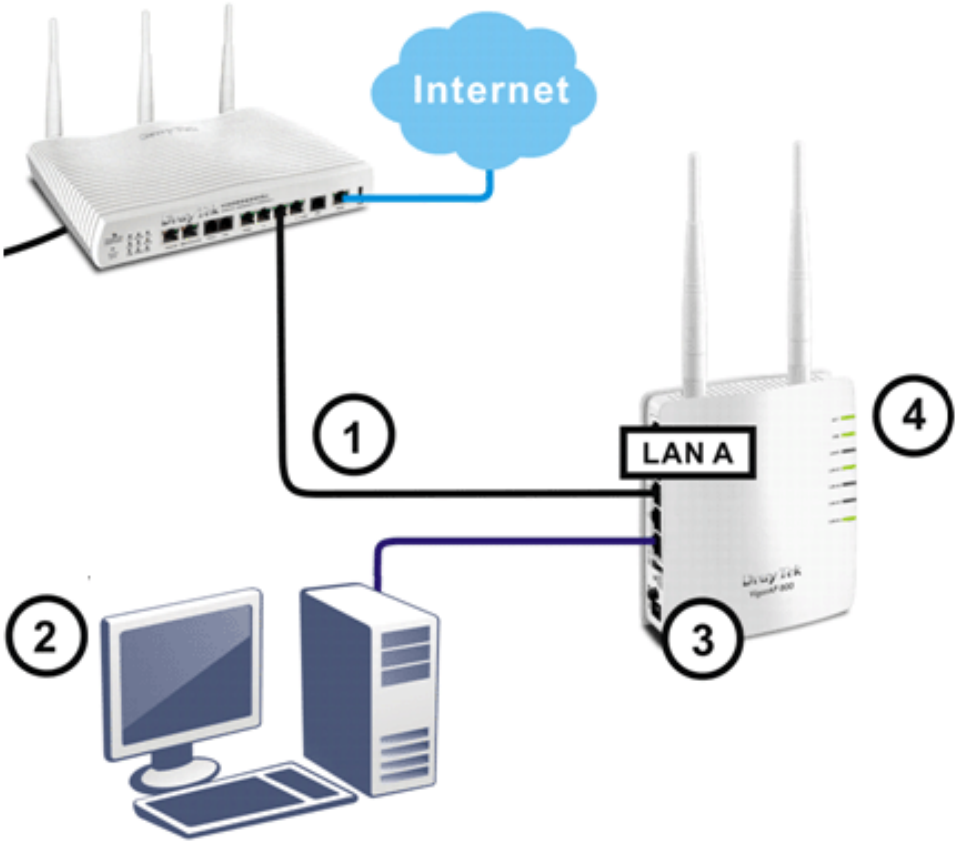
(For the detailed information of LED status, please refer to section 1.2.)



1.3.4 POE Connection

VigorAP 810 can gain the power from the connected switch, e.g., VigorSwitch P2260. PoE (Power over Ethernet) can break the install limitation caused by the fixed power supply.

1. Connect VigorAP 810 to a switch in your network through the **LAN A1 (PoE)** port of the access point by Ethernet cable.
2. Connect a computer to VigorSwitch P2260. Make sure the subnet IP address of the PC is the same as VigorAP 810 management IP, e.g., **192.168.1.X**.
3. Power on VigorAP 810.
4. Check all LEDs on the front panel. **ACT** LED should be steadily on, **LAN** LEDs should be on if the access point is correctly connected to the ADSL modem, router or switch/hub.



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2 Network Configuration

After the network connection is built, the next step you should do is setup VigorAP 810 with proper network parameters, so it can work properly in your network environment.

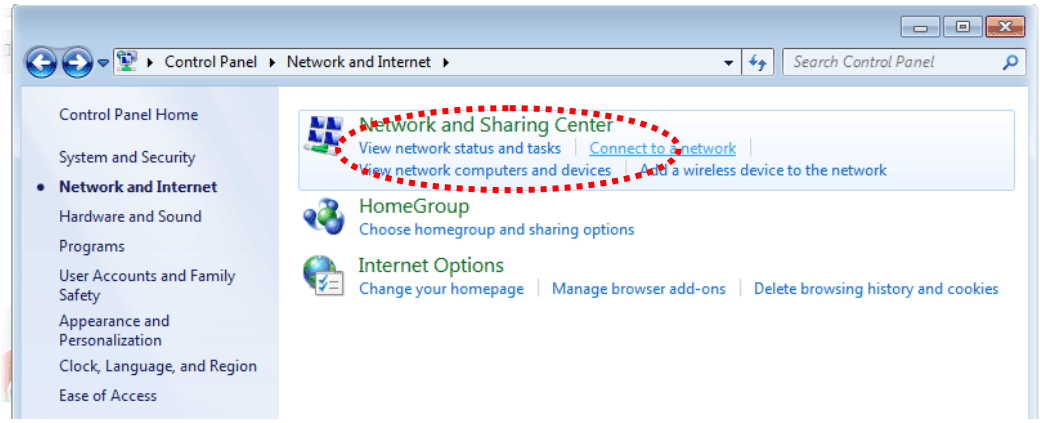
Before you can connect to the access point and start configuration procedures, your computer must be able to get an IP address automatically (use dynamic IP address). If it's set to use static IP address, or you're unsure, please follow the following instructions to configure your computer to use dynamic IP address:

For the default IP address of this AP is set "192.168.1.2", we recommend you to use "192.168.1.X (except 2)" in the field of IP address on this section for your computer.
If the operating system of your computer is…

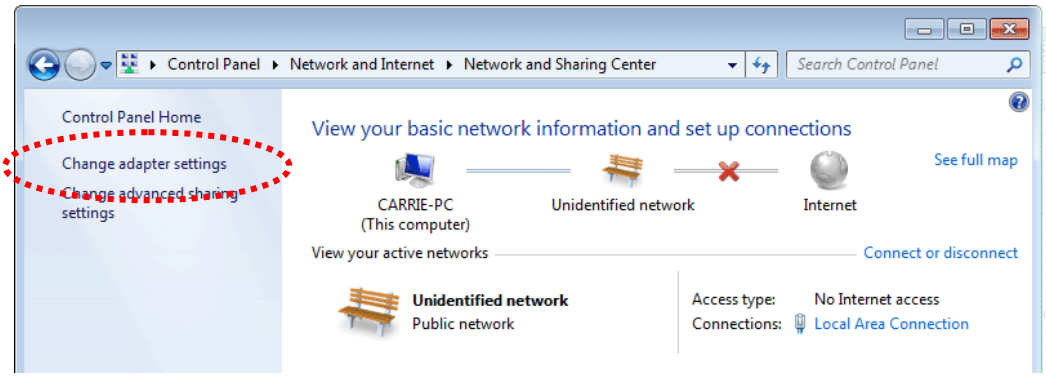
Windows 7	**- please go to section 2.1**
Windows 2000	**- please go to section 2.2**
Windows XP	**- please go to section 2.3**
Windows Vista	**- please go to section 2.4**

2.1 Windows 7 IP Address Setup

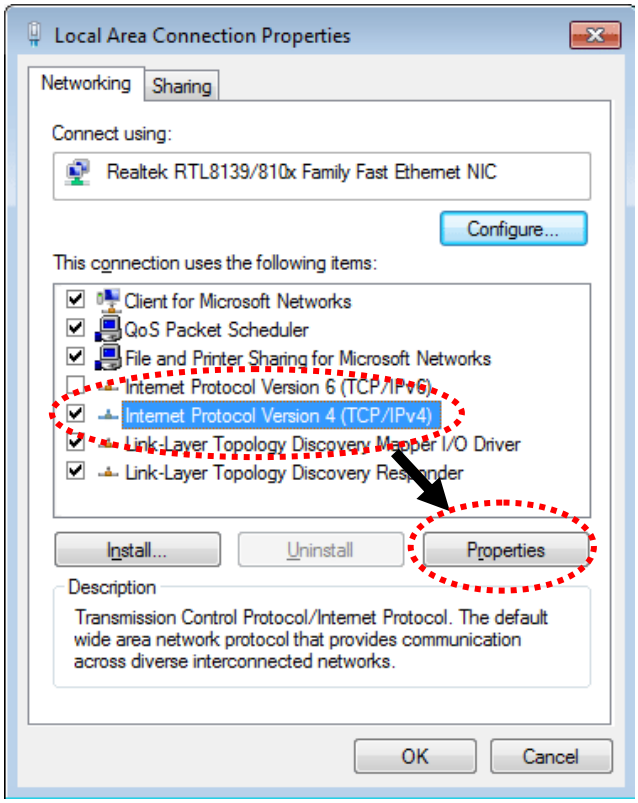
Click **Start** button (it should be located at lower-left corner of your computer), then click Control Panel. Double-click **Network and Internet**, and the following window will appear. Click **Network and Sharing Center**.



Next, click **Change adapter settings** and click **Local Area Connection**.



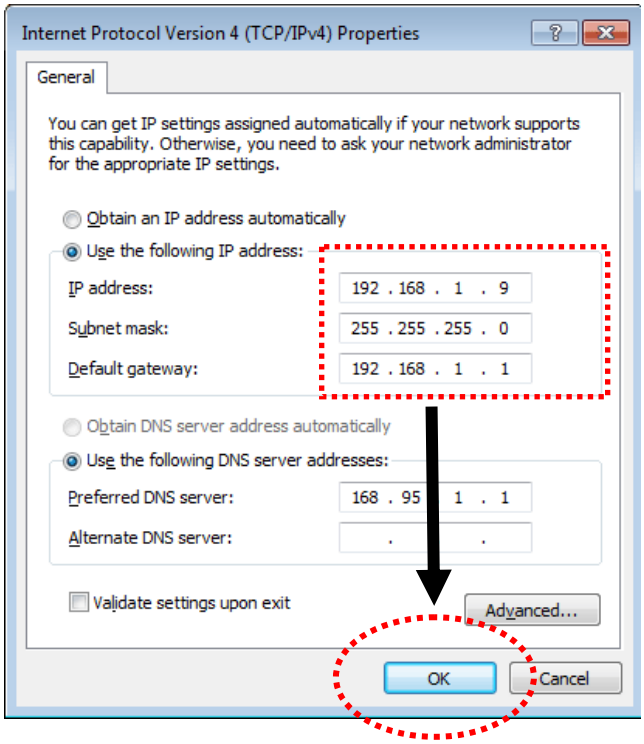
Then, select **Internet Protocol Version 4 (TCP/IPv4)** and click **Properties**.



Under the General tab, click **Use the following IP address.** Then input the following settings in respective field and click **OK** when finish.

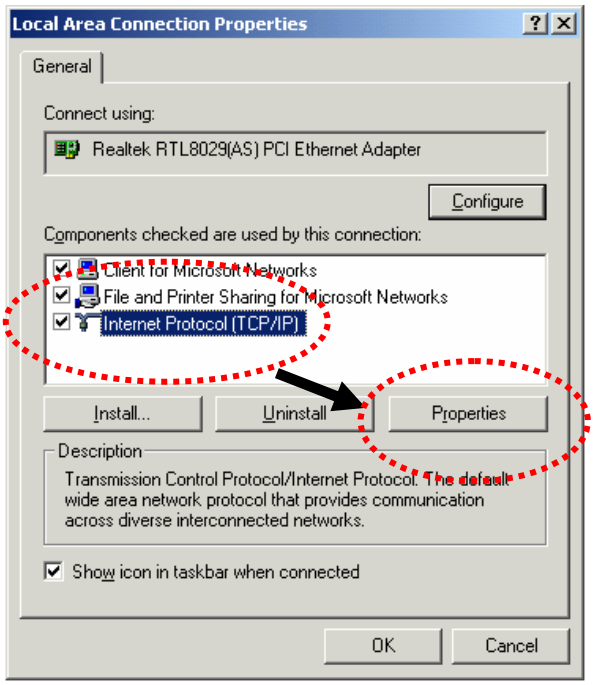
IP address: **192.168.1.9**

Subnet Mask: **255.255.255.0**



2.2 Windows 2000 IP Address Setup

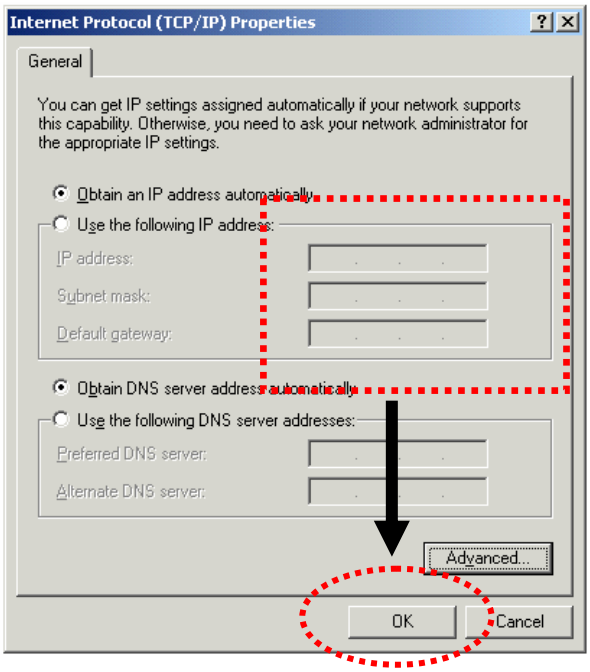
Click **Start** button (it should be located at lower-left corner of your computer), then click control panel. Double-click **Network and Dial-up Connections** icon, double click **Local Area Connection,** and **Local Area Connection Properties** window will appear. Select **Internet Protocol (TCP/IP)**, then click **Properties**.



Select **Use the following IP address**, then input the following settings in respective field and click **OK** when finish.

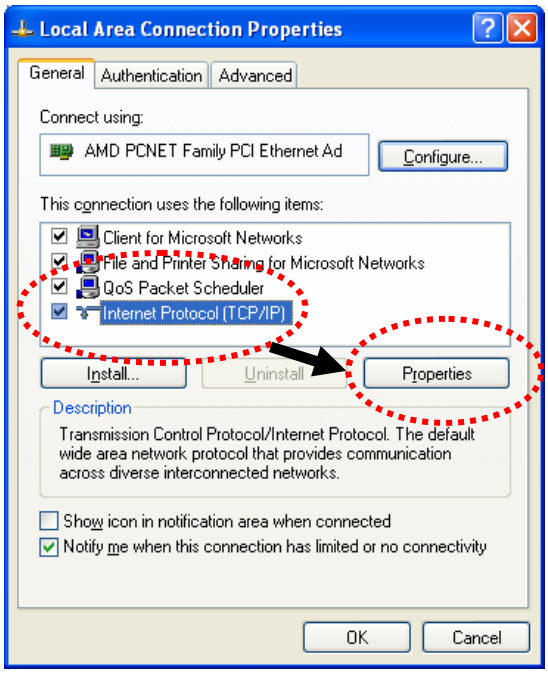
IP address: **192.168.1.9**

Subnet Mask: **255.255.255.0**



2.3 Windows XP IP Address Setup

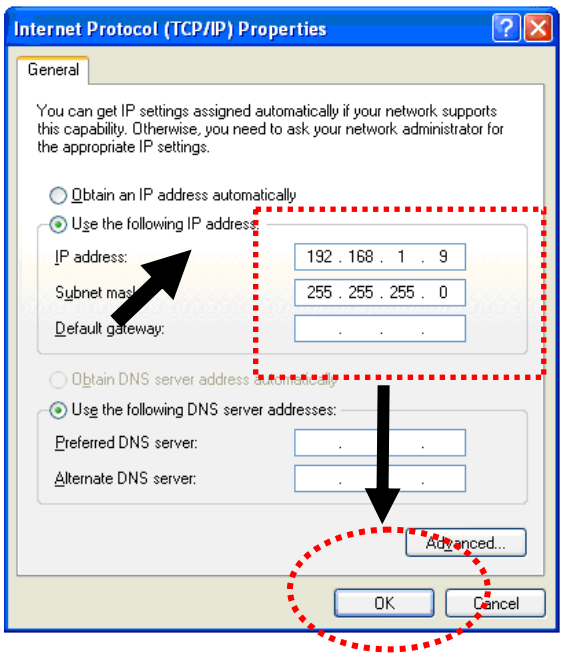
Click **Start** button (it should be located at lower-left corner of your computer), then click control panel. Double-click **Network and Internet Connections** icon, click **Network Connections,** and then double-click **Local Area Connection, Local Area Connection Status** window will appear, and then click **Properties**.



Select **Use the following IP address**, then input the following settings in respective field and click **OK** when finish:

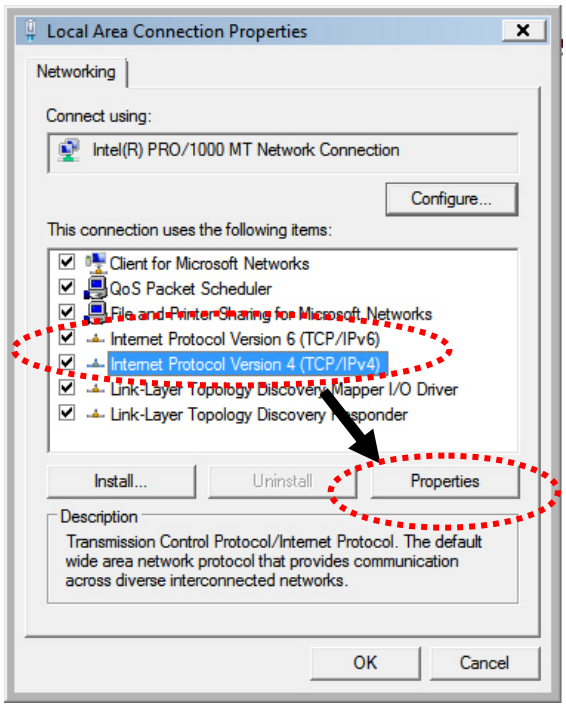
IP address: **192.168.1.9**

Subnet Mask: **255.255.255.0**.



2.4 Windows Vista IP Address Setup

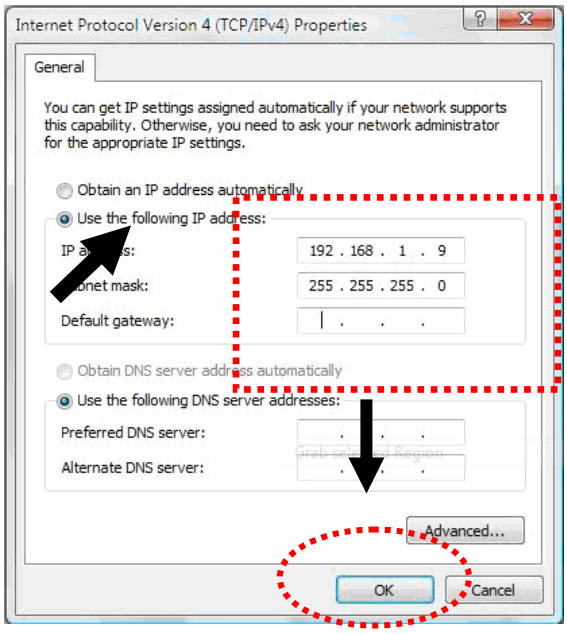
Click **Start** button (it should be located at lower-left corner of your computer), then click control panel. Click **View Network Status and Tasks**, then click **Manage Network Connections.** Right-click **Local Area Netwrok, then select 'Properties'. Local Area Connection Properties** window will appear, select **Internet Protocol Version 4 (TCP / IPv4)**, and then click **Properties**.



Select **Use the following IP address**, then input the following settings in respective field and click **OK** when finish:

IP address: **192.168.1.9**

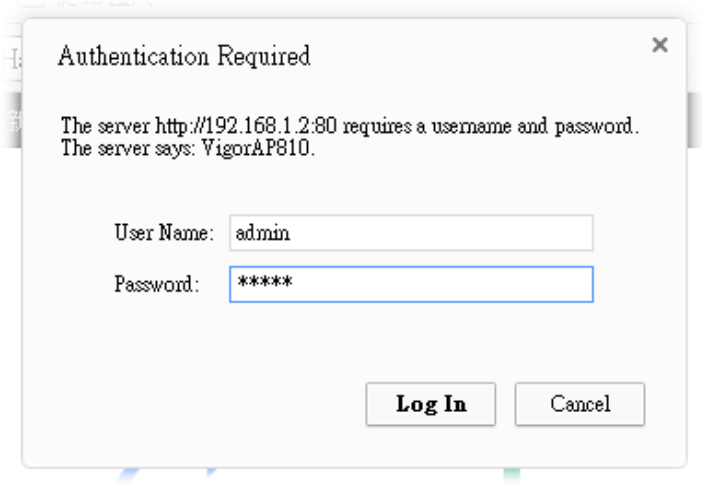
Subnet Mask: **255.255.255.0**.



2.5 Accessing to Web User Interface

All functions and settings of this access point must be configured via web user interface. Please start your web browser (e.g., IE).

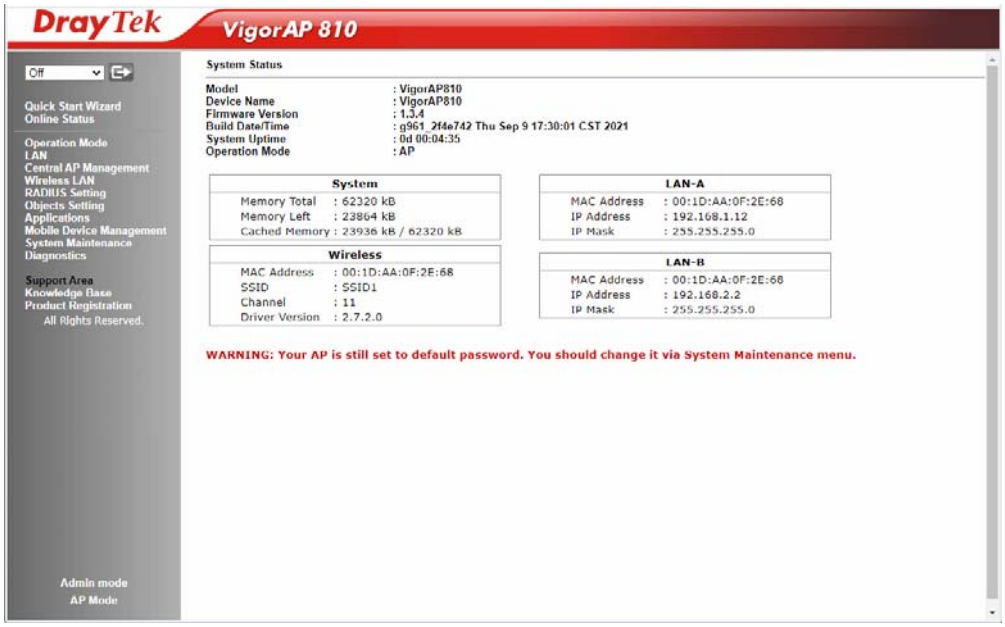
1. Make sure your PC connects to the VigorAP 810 correctly.
2. Open a web browser on your PC and type **http://192.168.1.2.** A pop-up window will open to ask for username and password. Pease type “admin/admin” on Username/Password and click **OK**.



Note 1: You may either simply set up your computer to get IP dynamically from the router or set up the IP address of the computer to be in the same subnet as **the IP address of VigorAP 810.**

- If there is no DHCP server on the network, then VigorAP 810 will have an IP address of 192.168.1.2.
- If there is DHCP available on the network, then VigorAP 810 will receive it’s IP address via the DHCP server.

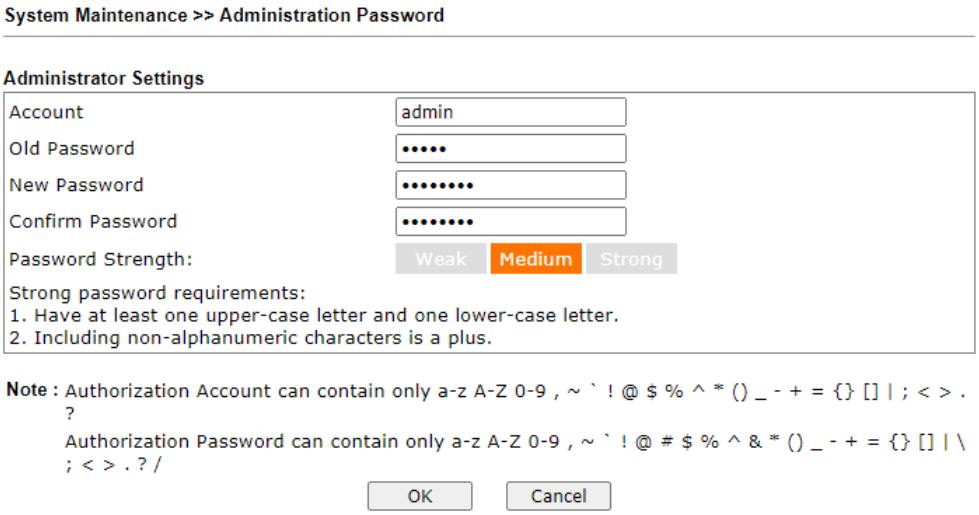
3. The **Main Screen** will pop up.



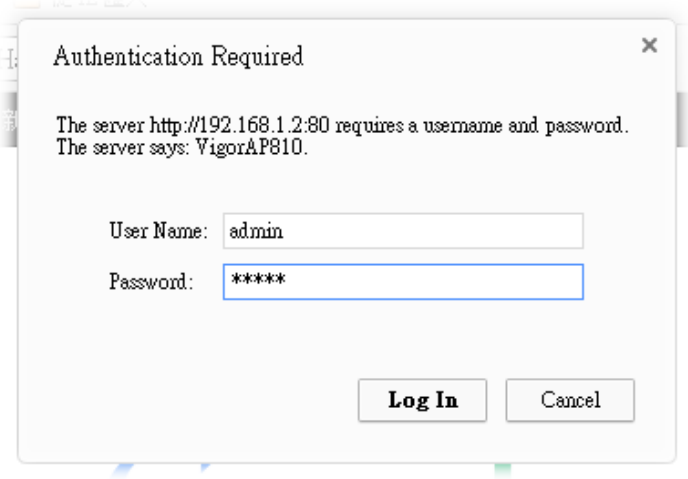
Note: If you fail to access to the web configuration, please go to "Trouble Shooting" for detecting and solving your problem. For using the device properly, it is necessary for you to change the password of web configuration for security and adjust primary basic settings.

2.6 Changing Password

1. Please change the password for the original security of the modem.
2. Go to **System Maintenance** page and choose **Administration Password.**



3. Enter the new login password on the field of **Password**. Then click **OK** to continue.
4. Now, the password has been changed. Next time, use the new password to access the Web User Interface for this modem.

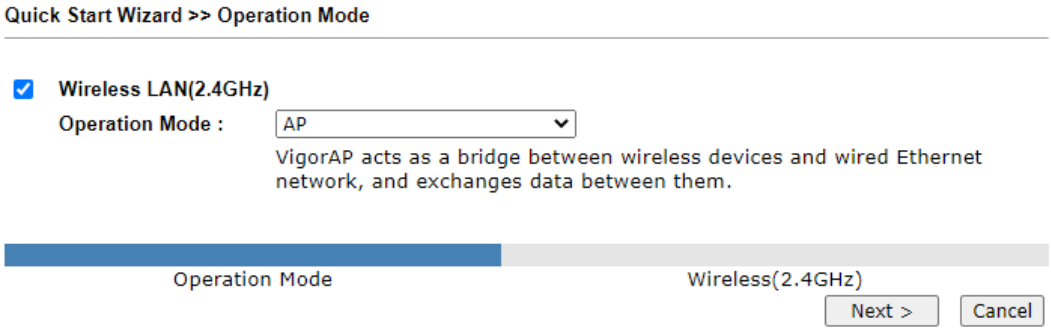


2.7 Quick Start Wizard

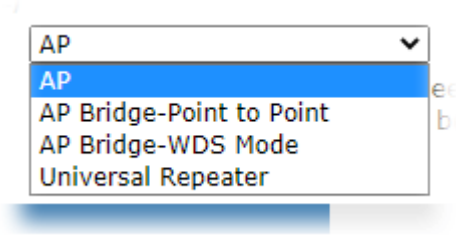
Quick Start Wizard will guide you to configure 2.4G wireless setting, 5G wireless setting and other corresponding settings for Vigor Access Point step by step.

2.7.1 Configuring Wireless Settings – General

This page displays general settings for the operation mode selected.



Available settings are explained as follows:

Item	Description
Operation Mode	There are six operation modes for wireless connection. Settings for each mode are different. 

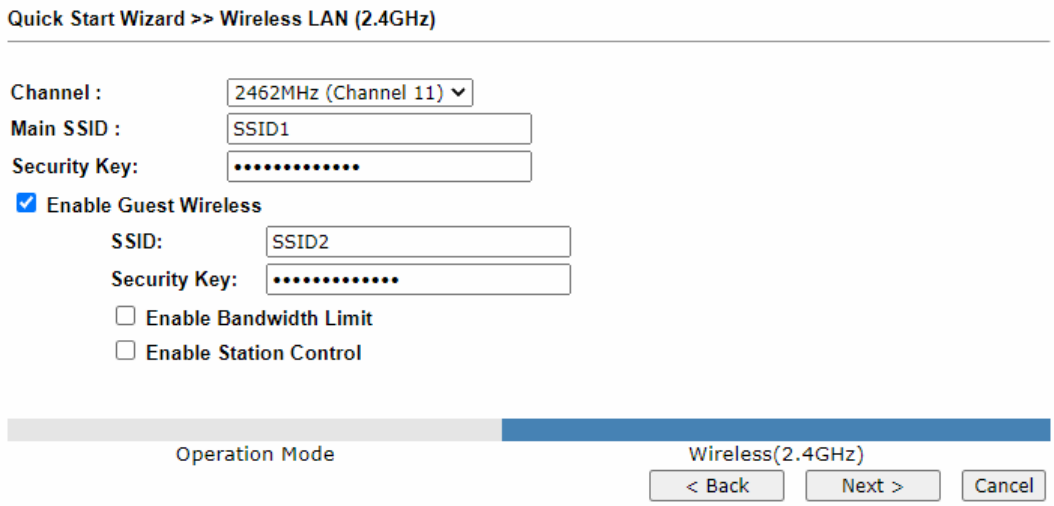
After finishing this web page configuration, please click **Next** to continue.

2.7.2 Configuring 2.4GHz Wireless Settings Based on the Operation Mode

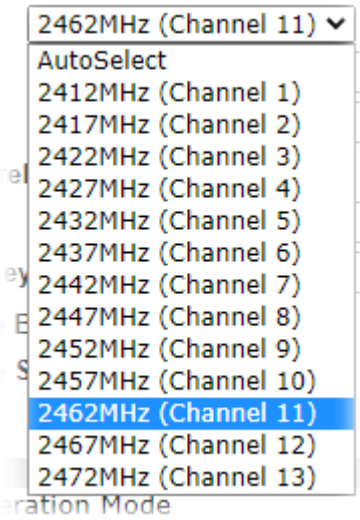
In this page, the advanced settings will vary according to the operation mode chosen on 2.7.1.

Settings for AP

When you choose AP as the operation mode for wireless LAN (2.4GHz), you will need to configure the following page.



Available settings are explained as follows:

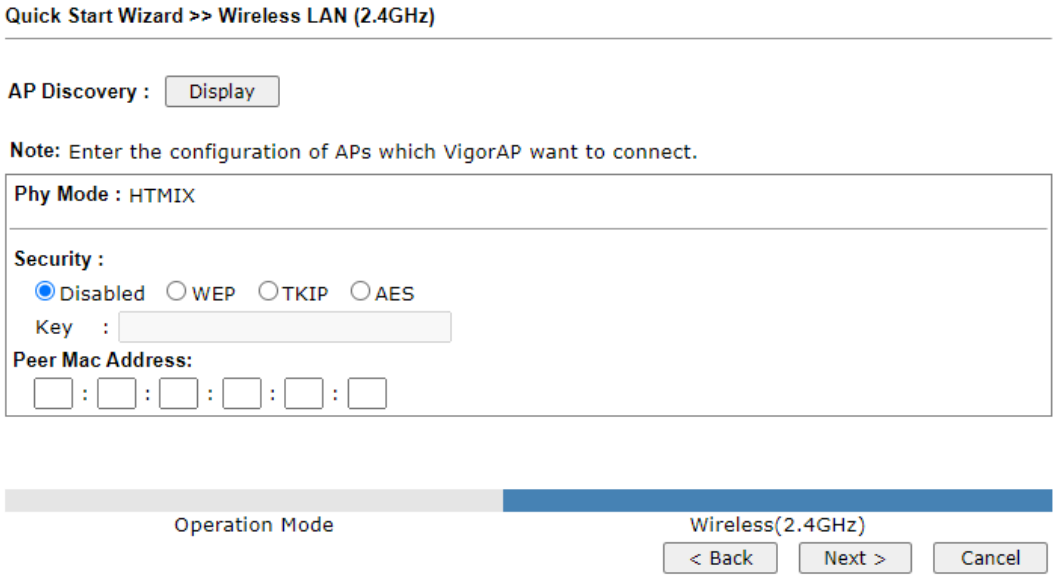
Item	Description
Channel	Means the channel frequency of the wireless LAN. The default channel is 6. You may switch channel if the selected channel is under serious interference. If you have no idea of choosing the frequency, please select **AutoSelect** to let system determine for you. 
Main SSID	Set a name for VigorAP to be identified.
Security Key	Type **8~63** ASCII characters, such as 012345678..(or 64

	Hexadecimal digits leading by 0x, such as "0x321253abcde...").
Enable Guest Wireless	Check the box to enable the **guest** wireless setting. Such feature is especially useful for free Wi-Fi service. For example, a coffee shop offers free Wi-Fi service for its guests for one hour every day. **SSID** – Set a name for VigorAP which can be identified and connected by wireless guest. **Security Key** – Set **8~63** ASCII characters or **8~63** ASCII characters which can be used for logging into VigorAP by wireless guest. **Enable Bandwidth Limit** – Check the box to define the maximum speed of the data uploading/downloading which will be used for the guest connecting to Vigor device with the same SSID. ● **Upload Limit** – Scroll the radio button to choose the value you want. ● **Download Limit** –Scroll the radio button to choose the value you want. **Enable Station Control** – Check the box to set the duration for the guest connecting /reconnecting to Vigor device. ● **Connection Time** –Scroll the radio button to choose the value you want. ● **Reconnection Time** –Scroll the radio button to choose the value you want.

After finishing this web page configuration, please click **Next** to continue.

Settings for AP Bridge-Point to Point

When you choose AP Bridge- Point to Point as **Operation Mode** and click **Next**, you will need to configure the following page:

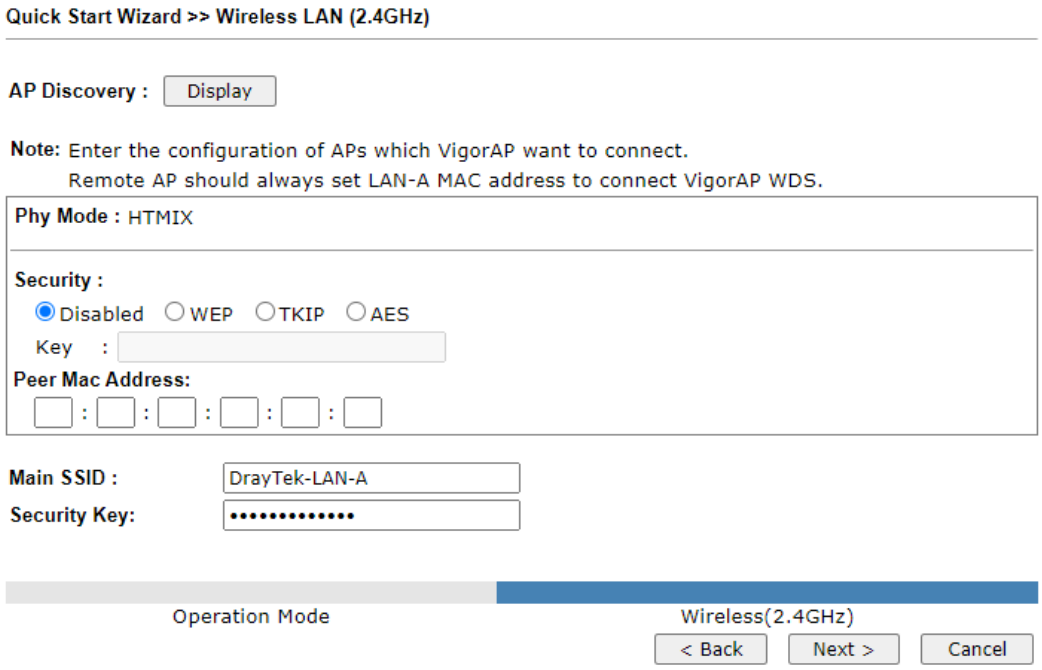


Available settings are explained as follows:

Item	Description
AP Discovery	Click this button to open the AP Discovery dialog. VigorAP can scan all regulatory channels and find working APs in the neighborhood.
Phy Mode	Data will be transmitted via HTMIX communication channel. Each access point should be setup to the same **Phy** mode for connecting with each other.
Security	Select WEP, TKIP or AES as the encryption algorithm. Type the key number if required.
Peer MAC Address	Type the peer MAC address for the access point that VigorAP 810 connects to.

Settings for AP Bridge-WDS

When you choose AP Bridge- WDS as **Operation Mode** and click **Next**, you will need to configure the following page:

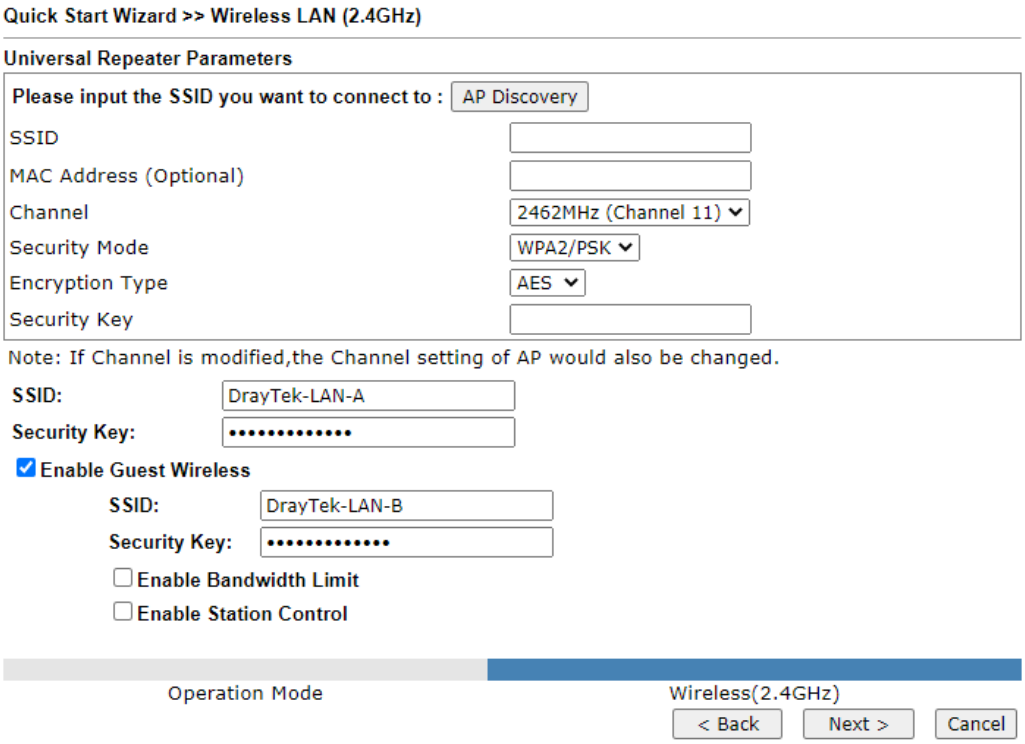


Available settings are explained as follows:

Item	Description
AP Discovery	Click this button to open the AP Discovery dialog. VigorAP can scan all regulatory channels and find working APs in the neighborhood.
Phy Mode	Data will be transmitted via HTMIX communication channel. Each access point should be setup to the same **Phy** mode for connecting with each other.
Security	Select WEP, TKIP or AES as the encryption algorithm. Type the key number if required. Or, you can click Disable to disable the function.
Peer MAC Address	Type the peer MAC address for the access point that VigorAP 810 connects to.
Main SSID	Set a name for VigorAP to be identified.
Security Key	Type **8~63** ASCII characters, such as 012345678..(or 64 Hexadecimal digits leading by 0x, such as "0x321253abcde...").

Advanced Settings for Universal Repeater

When you choose Bridge-Universal Repeater as **Operation Mode** and click **Next**, you will need to configure the following page:



Available settings are explained as follows:

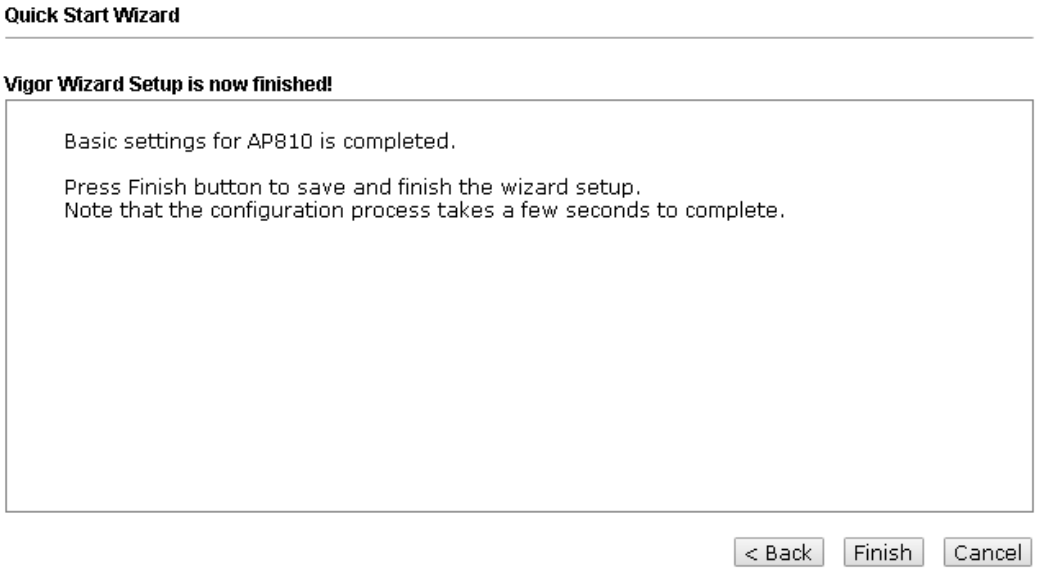
Item	Description
Universal Repeater Parameters	
AP Discovery	Click this button to open the AP Discovery dialog. VigorAP can scan all regulatory channels and find working APs in the neighborhood.
SSID / MAC Address (Optional)	SSID means the identification of the wireless LAN. After choosing one of the AP from AP Discovery window and clicking **OK**, the settings (SSID and MAC Address) related to the selected AP will be displayed on these fields automatically. Later, VigorAP will be allowed to access Internet through the selected AP, by using SSID displayed here.
Channel	Means the channel frequency of the wireless LAN. The default channel is 6. You may switch channel if the selected channel is under serious interference.
Security Mode	There are several modes provided for you to choose. Each mode will bring up different parameters (e.g., WEP keys, Pass Phrase) for you to configure.
Encryption Type for Open/Shared	This option is available when Open/Shared is selected as Security Mode. Choose **None** to disable the WEP Encryption. Data sent to the AP will not be encrypted. To enable WEP encryption for data

	transmission, please choose **WEP**. **WEP Keys -** Four keys can be entered here, but only one key can be selected at a time. The format of WEP Key is restricted to 5 ASCII characters or 10 hexadecimal values in 64-bit encryption level, or restricted to 13 ASCII characters or 26 hexadecimal values in 128-bit encryption level. The allowed content is the ASCII characters from 33(!) to 126(~) except '#' and ','.
Encryption Type for WPA/PSK and WPA2/PSK	This option is available when WPA/PSK or WPA2/PSK is selected as **Security Mode**. Select **TKIP** or **AES** as the algorithm for WPA.
WEP Keys	Four keys can be entered here, but only one key can be selected at a time. The format of WEP Key is restricted to 5 ASCII characters or 10 hexadecimal values in 64-bit encryption level, or restricted to 13 ASCII characters or 26 hexadecimal values in 128-bit encryption level. The allowed content is the ASCII characters from 33(!) to 126(~) except '#' and ','.
Security Key	Type **8~63** ASCII characters, such as 012345678..(or 64 Hexadecimal digits leading by 0x, such as "0x321253abcde..."). Such feature is available for **WPA/PSK or WPA2/PSK** mode.
Use the same SSID and Security Key as above	In general, under the network environment, same SSID and security key can be used for the host (wireless client) and the repeater (VigorAP) in Universal Repeater mode. Check it to use the same SSID and security key configured as above. **SSID -** SSID can be any text numbers or various special characters. For VigorAP is set as “Repeater”, the purpose of the device is to extend the Wi-Fi service. Therefore, the characters set here will be regarded as “main SSID”. Other wireless client can receive the wireless signal from VigorAP by using the SSID configured here. **Security -** Set **8~63** ASCII characters or 64 Hexadecimal digits which can be used for logging into VigorAP by other wireless client.
Enable Guest Wireless	Check the box to enable the **guest** wireless setting. **SSID** – Set a name for VigorAP. Wireless guest is allowed to access into Internet via VigorAP with the SSID configured here. **Security Key** – Set **8~63** ASCII characters or 64 Hexadecimal digits which can be used for logging into VigorAP by wireless guest. **Enable Bandwidth Limit** – Check the box to define the maximum speed of the data uploading/downloading which will be used for the guest connecting to Vigor device with the same SSID. ● **Upload Limit** –Scroll the radio button to choose the value you want. ● **Download Limit** –Scroll the radio button to choose the

	value you want. **Enable Station Control** – Check the box to set the duration for the guest connecting /reconnecting to Vigor device. ● **Connection Time** –Scroll the radio button to choose the value you want. **Reconnection Time** –Scroll the radio button to choose the value you want.

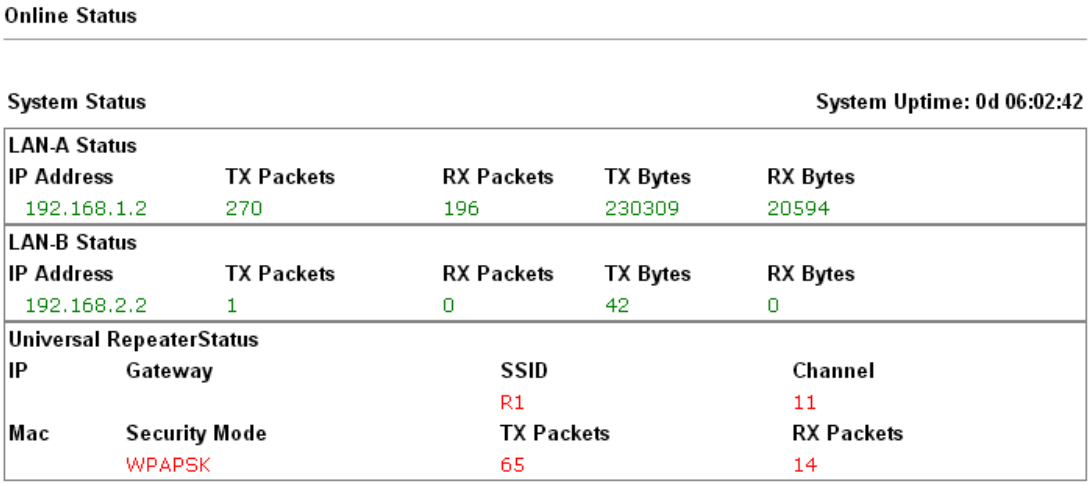
2.7.3 Finishing the Wireless Settings Wizard

When you see this page, it means the wireless setting wizard is almost finished. Just click **Finish** to save the settings and complete the setting procedure.



2.8 Online Status

The online status shows the LAN status, Station Link Status for such device.



Detailed explanation is shown below:

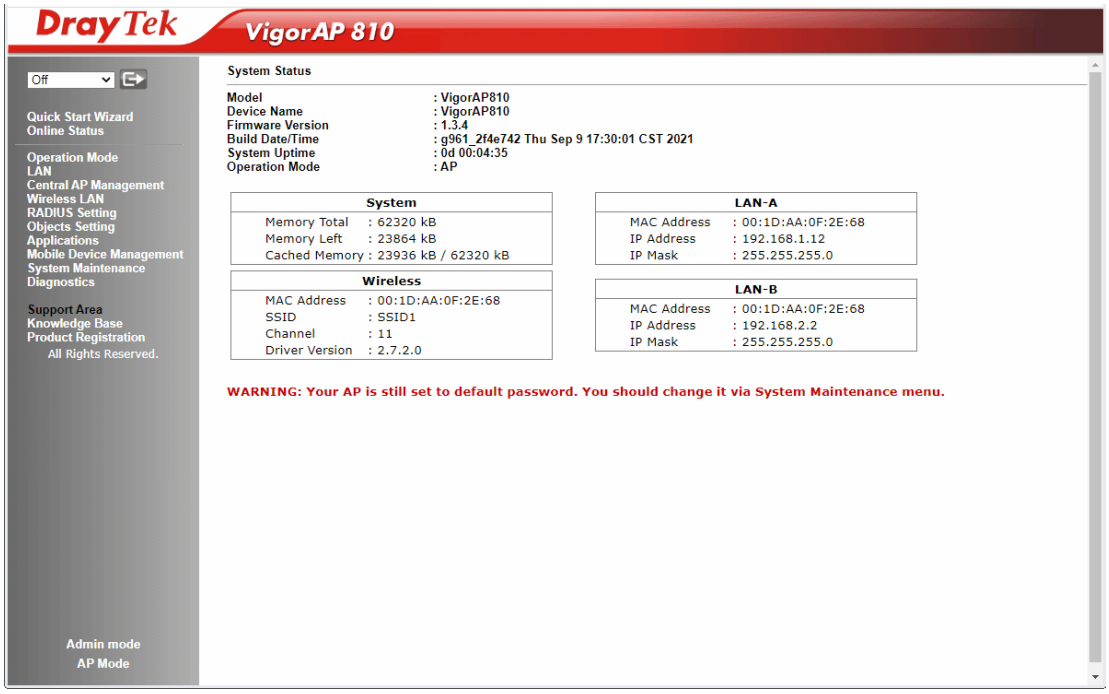
Item	Description
IP Address	Displays the IP address of the LAN interface.
TX Packets	Displays the total transmitted packets at the LAN interface.
RX Packets	Displays the total number of received packets at the LAN interface.
TX Bytes	Displays the total transmitted size at the LAN interface.
RX Bytes	Displays the total number of received size at the LAN interface.

3 Advanced Configuration

This chapter will guide users to execute advanced (full) configuration.

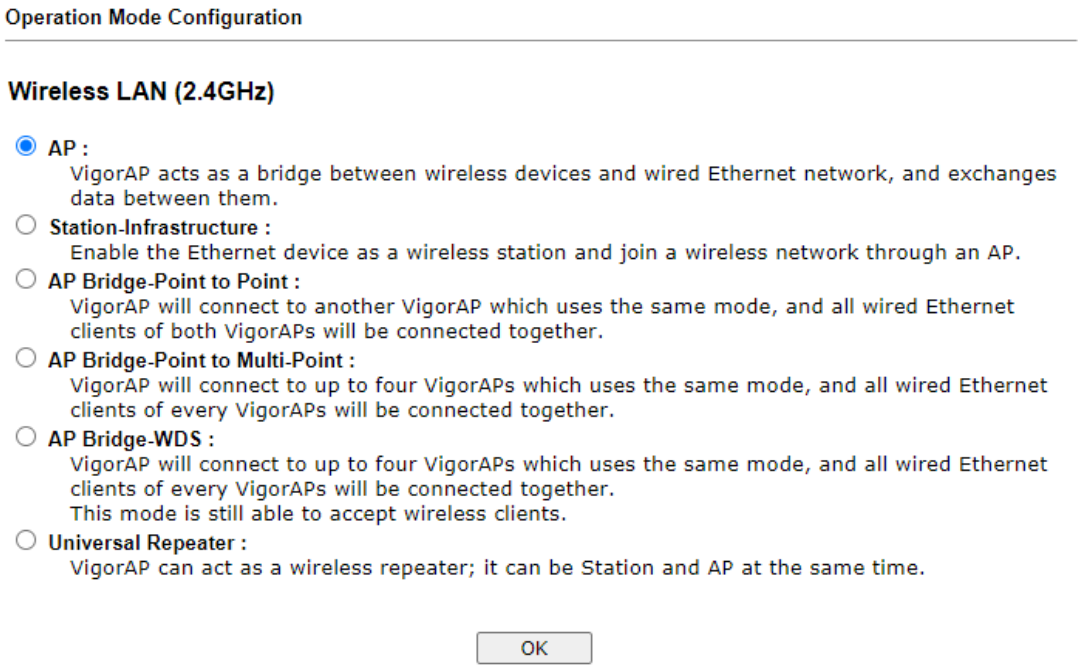
1. Open a web browser on your PC and type **http://192.168.1.2.** The window will ask for typing username and password.
2. Please type “admin/admin” on Username/Password for administration operation.

Now, the **Main Screen** will appear. Be aware that “Admin mode” will be displayed on the bottom left side.



3.1 Operation Mode

This page provides several available modes for you to choose for different conditions. Click any one of them and click **OK**. The system will configure the required settings automatically.



Available settings are explained as follows:

Item	Description
AP	This mode allows wireless clients to connect to access point and exchange data with the devices connected to the wired network.
Station-Infrastructure	Enable the Ethernet device such as TV and Game player connected to the VigorAP 810 to an access point.
AP Bridge-Point to Point	This mode can establish wireless connection with another VigorAP 810 using the same mode, and link the wired network which these two VigorAP 810s connected together. Only one access point can be connected in this mode.
AP Bridge-Point to Multi-Point	This mode can establish wireless connection with other VigorAP 810s using the same mode, and link the wired network which these VigorAP 810s connected together. Up to 4 access points can be connected in this mode.
AP Bridge-WDS	This mode is similar to AP Bridge to Multi-Point, but access point is not work in bridge-dedicated mode, and will be able to accept wireless clients while the access point is working as a wireless bridge.
Universal Repeater	This product can act as a wireless range extender that will help you to extend the networking wirelessly. The access point can act as Station and AP at the same time. It can use Station function to connect to a Root AP and use AP function to service

	all wireless clients within its coverage.

Note: The **Wireless LAN** settings will be changed according to the **Operation Mode** selected here. For the detailed information, please refer to the section of **Wireless LAN**.

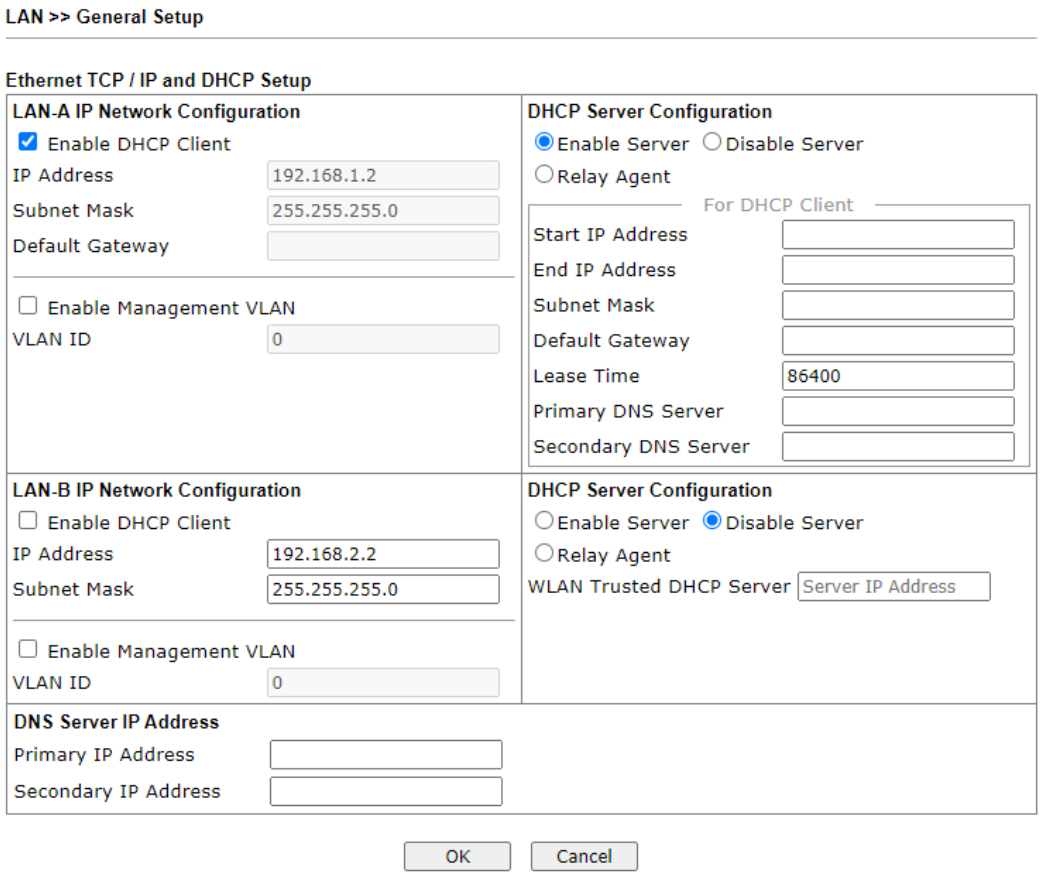
3.2 LAN

Local Area Network (LAN) is a group of subnets regulated and ruled by modem.

3.2.1 General Setup

Click **LAN** to open the LAN settings page and choose **General Setup**.

Note: Such page will be changed according to the **Operation Mode** selected. The following screen is obtained by choosing **AP** as the operation mode.



Available settings are explained as follows:

Item	Description
LAN-A IP Network	**Enable DHCP Client** – When it is enabled, VigorAP will be treated as a client and can be managed / controlled by AP

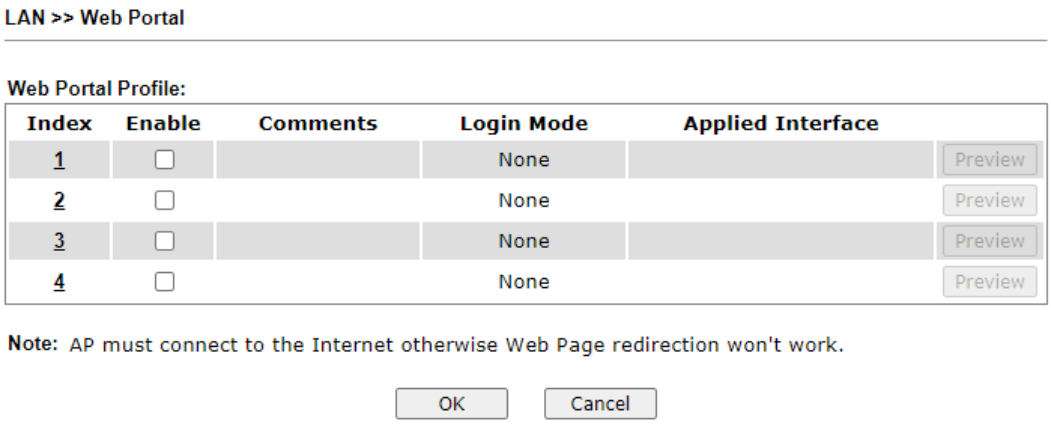
Configuration	Management server offered by Vigor router (e.g., Vigor2862). **IP Address** – Type in private IP address for connecting to a local private network (Default: 192.168.1.2). **Subnet Mask** – Type in an address code that determines the size of the network. (Default: 255.255.255.0/ 24) **Default Gateway** – In general, it is not really necessary to specify a gateway for VigorAP. However, if it is required, simply type an IP address as the gateway for VigorAP. It will be convenient for the access point to acquire more service (e.g., accessing NTP server) from Vigor router. **Enable Management VLAN** – VigorAP supports tag-based VLAN for wireless clients accessing Vigor device. Only the clients with the specified VLAN ID can access into VigorAP. **VLAN ID** – Type the number as VLAN ID tagged on the transmitted packet. “0” means no VALN tag.
LAN-B IP Network Configuration	**Enable DHCP Client** – When it is enabled, VigorAP will be treated as a client and can be managed / controlled by AP Management server offered by Vigor router (e.g., Vigor2862). **IP Address** – Type in private IP address for connecting to a local private network (Default: 192.168.2.2). **Subnet Mask** – Type in an address code that determines the size of the network. (Default: 255.255.255.0/ 24) **Enable Management VLAN** – VigorAP 902 supports tag-based VLAN for wireless clients accessing Vigor device. Only the clients with the specified VLAN ID can access into VigorAP. **VLAN ID** – Type the number as VLAN ID tagged on the transmitted packet. “0” means no VALN tag.
DHCP Server Configuration	DHCP stands for Dynamic Host Configuration Protocol. DHCP server can automatically dispatch related IP settings to any local user configured as a DHCP client. **Enable Server -** Enable Server lets the modem assign IP address to every host in the LAN. ● **Start IP Address -** Enter a value of the IP address pool for the DHCP server to start with when issuing IP addresses. If the 1st IP address of your modem is 192.168.1.2, the starting IP address must be 192.168.1.3 or greater, but smaller than 192.168.1.254. ● **End IP Address -** Enter a value of the IP address pool for the DHCP server to end with when issuing IP addresses. ● **Subnet Mask -** Type in an address code that determines the size of the network. (Default: 255.255.255.0/ 24) ● **Default Gateway** - Enter a value of the gateway IP address for the DHCP server. ● **Lease Time** - It allows you to set the leased time for the specified PC.

	● **Primary DNS Server -** You must specify a DNS server IP address here because your ISP should provide you with usually more than one DNS Server. If your ISP does not provide it, the modem will automatically apply default DNS Server IP address: 194.109.6.66 to this field. ● **Secondary DNS Server -** You can specify secondary DNS server IP address here because your ISP often provides you more than one DNS Server. If your ISP does not provide it, the modem will automatically apply default secondary DNS Server IP address: 194.98.0.1 to this field. **Relay Agent -** Specify which subnet that DHCP server is located the relay agent should redirect the DHCP request to. ● **DHCP Relay Agent -** It is available when Enable Relay Agent is selected. Set the IP address of the DHCP server you are going to use so the Relay Agent can help to forward the DHCP request to the DHCP server. **Disable Server -** Disable Server lets you manually or use other DHCP server to assign IP address to every host in the LAN. ● **WLAN Trusted DHCP Server –**There is no right for such VigorAP to assign IP address for wireless LAN user. However, you can specify another valid DHCP server on other VigorAP to make the wireless LAN client obtaining the IP address from the designated DHCP server. Specify a DHCP server in such field. All the IP addresses of the devices on LAN of VigorAP will be assigned via such specified server. It is used to avoid IP assignment interference due to multiple DHCP servers in one LAN.
DNS Server IP Address	**Primary DNS Server -** You must specify a DNS server IP address here because your ISP should provide you with usually more than one DNS Server. If your ISP does not provide it, the modem will automatically apply default DNS Server IP address: 194.109.6.66 to this field. **Secondary DNS Server -** You can specify secondary DNS server IP address here because your ISP often provides you more than one DNS Server. If your ISP does not provide it, the modem will automatically apply default secondary DNS Server IP address: 194.98.0.1 to this field.

After finishing this web page configuration, please click **OK** to save the settings.

3.2.2 Web Portal

This page allows you to configure a profile with specified URL for accessing into or display a message when a wireless/LAN user connects to Internet through this router. No matter what the purpose of the wireless/LAN client is, he/she will be forced into the URL configured here while trying to access into the Internet or the desired web page through this router. That is, a company which wants to have an advertisement for its products to users can specify the URL in this page to reach its goal.

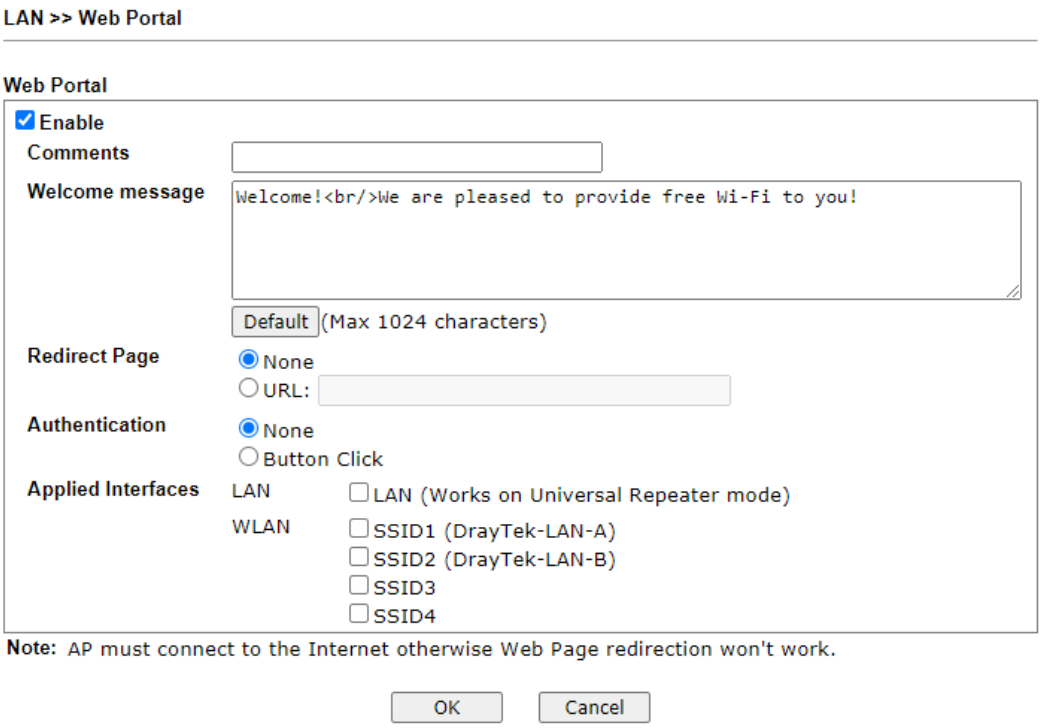


Each item is explained as follows:

Item	Description
Index	Display the number link which allows you to configure the profile.
Enable	Check the box to enable such profile.
Comments	Display the content (Disable, URL Redirect or Message) of the profile.
Login Mode	Display the login mode that a client uses to access into Internet.
Applied Interface	Display the applied interfaces of the profile.
Preview	Open a preview window according to the configured settings.

After finishing this web page configuration, please click **OK** to save the settings.

To configure the profile, click any index number link to open the following page.



Available settings are explained as follows:

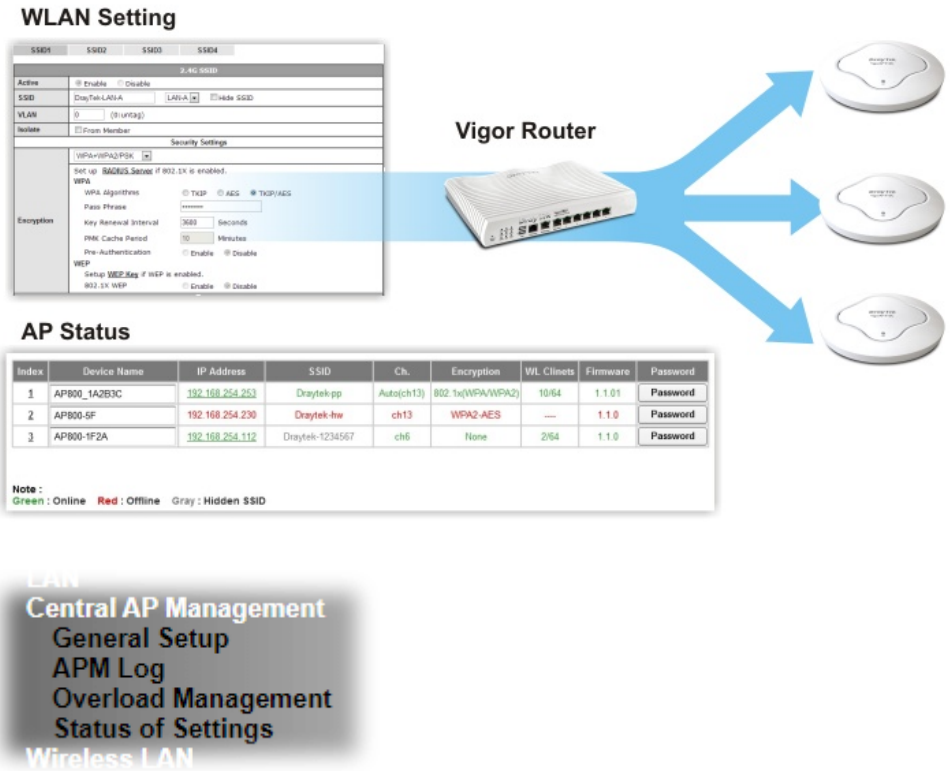
Item	Description
Enable	Check the box to enable this function.
Comments	Enter a brief comment to explain such web portal profile.
Welcome message	Enter words or sentences here. The message will be displayed on the screen for several seconds when the wireless users access into the web page through the router. ● **Default** – Click it to restore the default content.
Redirect Page	**None -** User can access into Internet directly. **URL Redirect -** Any user who wants to access into Internet through this router will be redirected to the URL specified here first. It is a useful method for the purpose of advertisement. For example, force the wireless user(s) in hotel to access into the web page that the hotel wants the user(s) to visit.
Authentication	**None** – User can access into Internet directly without authentication. **Button Click** – When a client tries to access into Internet, a welcome message page with a button named “Accept” will appear on the screen first. The client must click that button (Accept) and then he/she is allowed to access Internet.
Applied Interfaces	Check the box(es) representing different interfaces to be applied by such profile. ● **LAN** – If it is selected and Universal Repeater is specified as connection mode for such AP, both LAN client and WLAN client can access into Internet via web portal. Yet,

	if AP mode is selected, only wireless LAN client shall access into Internet via web portal. ● **WLAN** - The advantage is that each SSID (1/2/3/4) for wireless network can be applied with different web portal separately.

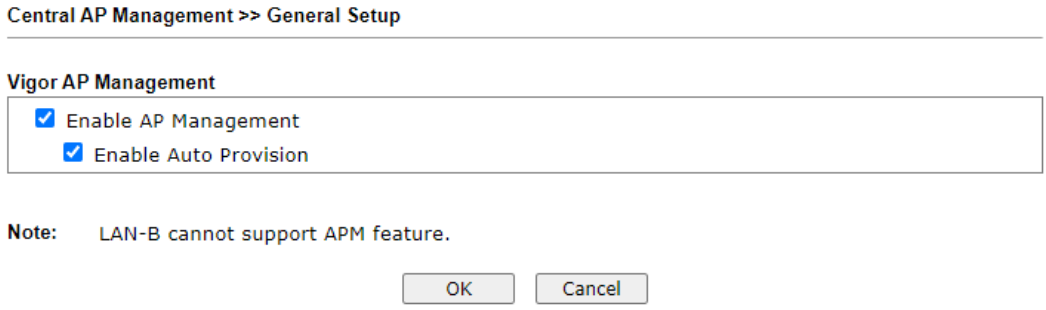
After finishing all the settings here, please click **OK** to save the configuration.

3.3 Central AP Management

Central AP Management allows you to configure VigorAP 810 to be managed by Vigor2862 series.



3.3.1 General Setup



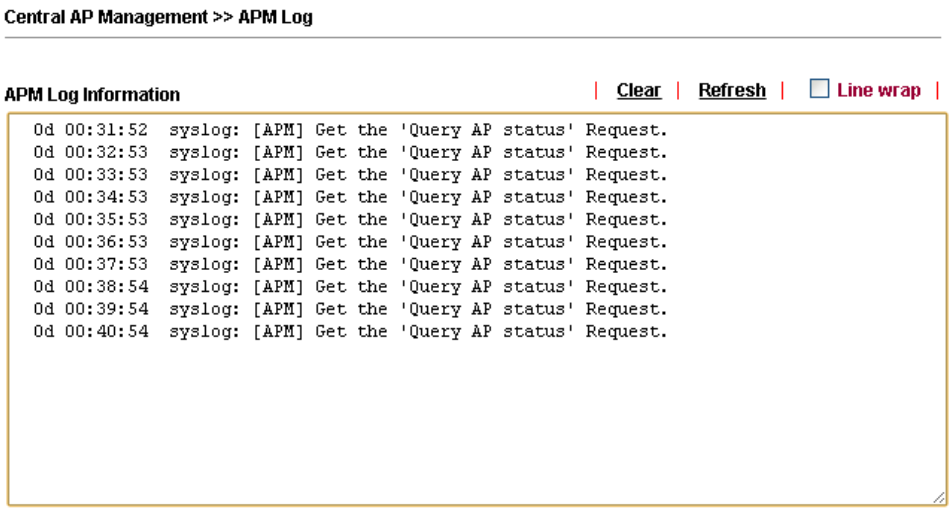
Available settings are explained as follows:

Item	Description
Enable AP Management	Check the box to enable the function of AP Management.
Enable Auto Provision	VigorAP can be controlled under Central AP Management in Vigor router. When both Vigor router and VigorAP have such feature enabled, once VigorAP is registered to Vigor router, the **WLAN profile** pre-configured on Vigor router will be applied to VigorAP immediately. Thus, it is not necessary to configure VigorAP separately.

3.3.2 APM Log

This page will display log information related to wireless stations connected to VigorAP and central AP management.

Such information also will be delivered to Vigor router (e.g., Vigor2862 series) and be shown on **Central AP Management>>APM Log** of Vigor router.

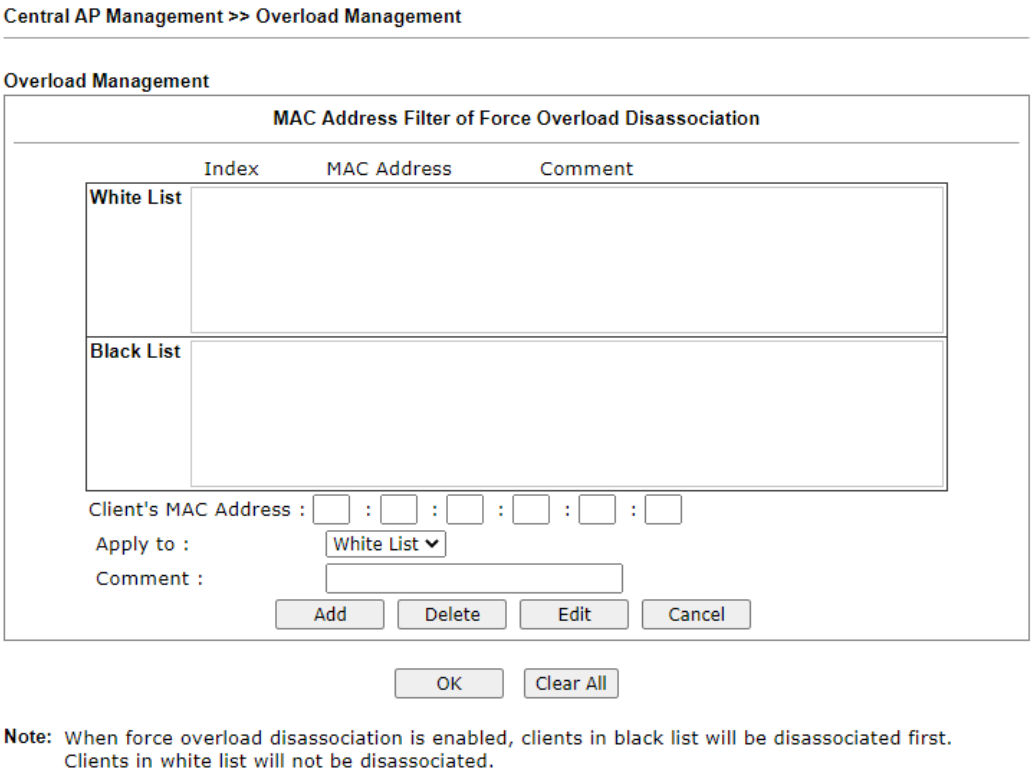


3.3.3 Overload Management

Load Balance can help to distribute the traffic for all of the access points (e.g., VigorAP) registered to Vigor router. Thus, the bandwidth will not be occupied by certain access points.

However, traffic overload might be occurred if too many wireless stations connected to VigorAP for data incoming and outgoing. Therefore, “Force Overload Disassociation” is required to terminate the network connection of the client’s station to release network traffic. When the function of “Force Overload Disassociation” in web user interface of Vigor router (e.g., Vigor2862) is enabled, wireless clients specified in **black list** of such web page will be disassociated to solve the problem of traffic overload.

The following web page is used to configure white list and black list for wireless stations.



Available settings are explained as follows:

Item	Description
White List/Black List	Display the information (such as index number, MAC address and comment) for all of the members in White List/Black List. Wireless stations listed in Black List will be forcefully disconnected first when traffic overload occurs and "Force Overload Disassociation" is enabled.
Client's MAC Address	Specify the MAC Address of the remote/local client.
Apply to	**White List** – MAC address listed inside Client's MAC Address will be categorized as one of members in White List. **Black List** - MAC address listed inside Client's MAC Address will be categorized as one of members in Black List.
Comment	Type any words as notification.
Add	Add a new MAC address into the White List/Black List.
Delete	Delete the selected MAC address in the White List/Black List.
Edit	Edit the selected MAC address in the White List/Black List.
Cancel	Give up the configuration.

3.3.4 Status of Settings

Load Balance can help to distribute the traffic for all of the access points (e.g., VigorAP) registered to Vigor router. This web page displays the settings related to Load Balance for VigorAP. In which, Station Number Threshold, Traffic Threshold and Force Overload Disassociation indicate settings configured in Vigor router.

Central AP Management >> Status of Settings

Function Name	Status	Value
Load Balance		
Station Number Threshold	✓	
Max WLAN(2.4GHz) Station Number		15
Traffic Threshold	✗	
Upload Limit		None bps
Download Limit		None bps
Force Overload Disassociation	✗	
Disassociate By		None
RSSI Threshold		-50 dBm
Rogue AP Detection		
Rogue AP Detection	✗	

Below shows a setting example for Load Balance settings configured in Vigor router.

Central Management >> AP >> Load Balance

AP Load Balance By Station Number or Traffic

Station Number Threshold

Wireless LAN (2.4GHz) 64 (3-128)
Wireless LAN (5GHz) 64 (3-128)
Wireless LAN (5GHz-2) 64 (3-128)

Traffic Threshold

Upload Limit User defined 0K bps (Default unit: K)
Download Limit User defined 0K bps (Default unit: K)

Action When Threshold Exceeded

- Stop accepting new connections
- Dissociate existing station by longest idle time
- Dissociate existing station by worst signal strength if it is less than -0 dBm (100 %)

Choose to Apply

All APs (All APs / Specific APs)

Note:
The maximum station number of Wireless LAN (2.4GHz) will be applied to both Wireless LAN (2.4GHz) and Wireless LAN (5GHz) if the firmware version of AP900 is less than or equal to 1.1.4.1.

OK Cancel

3.4 General Concepts for Wireless LAN

The VigorAP 810 is equipped with a wireless LAN interface compliant with the standard IEEE 802.11n draft 2 protocol. To boost its performance further, the VigorAP 810 is also loaded with advanced wireless technology to lift up data rate up to 300 Mbps*. Hence, you can finally smoothly enjoy stream music and video.

> **Note**: * The actual data throughput will vary according to the network conditions and environmental factors, including volume of network traffic, network overhead and building materials.

In an Infrastructure Mode of wireless network, VigorAP 810 plays a role as an Access Point (AP) connecting to lots of wireless clients or Stations (STA). All the STAs will share the same Internet connection via VigorAP 810. The **General Setup** will set up the information of this wireless network, including its SSID as identification, located channel etc.

Security Overview

WEP (Wired Equivalent Privacy) is a legacy method to encrypt each frame transmitted via radio using either a 64-bit or 128-bit key. Usually access point will preset a set of four keys and it will communicate with each station using only one out of the four keys.

WPA (Wi-Fi Protected Access), the most dominating security mechanism in industry, is separated into two categories: WPA-personal or called WPA Pre-Share Key (WPA/PSK), and WPA-Enterprise or called WPA/802.1x.

In WPA-Personal, a pre-defined key is used for encryption during data transmission. WPA applies Temporal Key Integrity Protocol (TKIP) for data encryption while WPA2 applies AES. The WPA-Enterprise combines not only encryption but also authentication.

Since WEP has been proved vulnerable, you may consider using WPA for the most secure connection. You should select the appropriate security mechanism according to your needs. No matter which security suite you select, they all will enhance the over-the-air data protection and /or privacy on your wireless network. The VigorAP 810 is very flexible and can support multiple secure connections with both WEP and WPA at the same time.

WPS Introduction

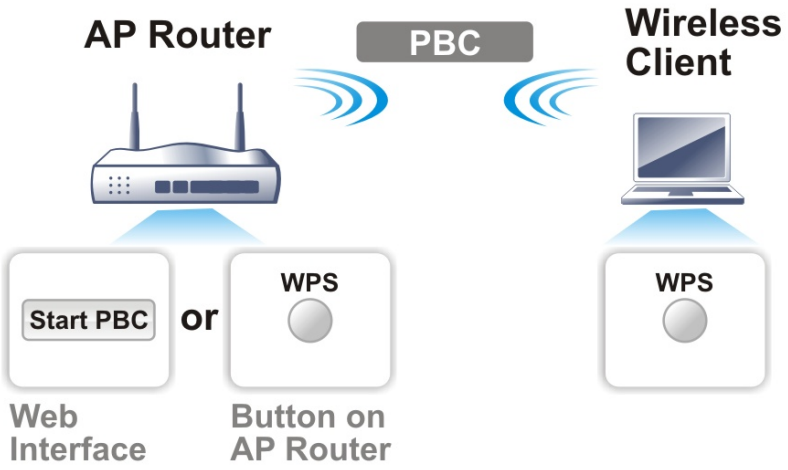
WPS (Wi-Fi Protected Setup) provides easy procedure to make network connection between wireless station and wireless access point (VigorAP 810) with the encryption of WPA and WPA2.

It is the simplest way to build connection between wireless network clients and VigorAP 810. Users do not need to select any encryption mode and type any long encryption passphrase to setup a wireless client every time. He/she only needs to press a button on wireless client, and WPS will connect for client and VigorAP 810 automatically.

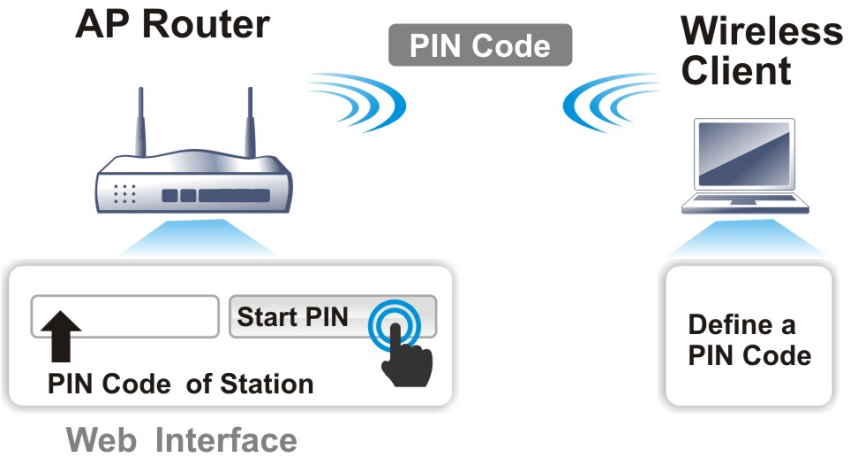
Note: Such function is available for the wireless station with WPS supported.

There are two methods to do network connection through WPS between AP and Stations: pressing the ***Start PBC*** button or using ***PIN Code***.

On the side of VigorAP 810 series which served as an AP, press **WPS** button once on the front panel of VigorAP 810 or click **Start PBC** on web configuration interface. On the side of a station with network card installed, press **Start PBC** button of network card.

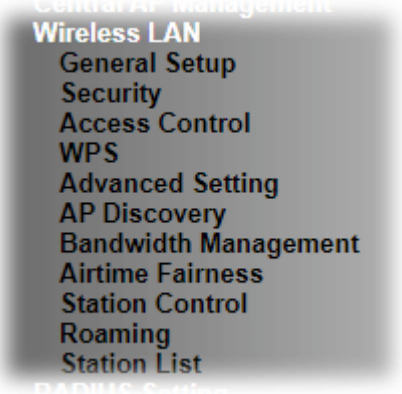


If you want to use PIN code, you have to know the PIN code specified in wireless client. Then provide the PIN code of the wireless client you wish to connect to the VigorAP 810.



3.5 Wireless LAN Settings for AP Mode

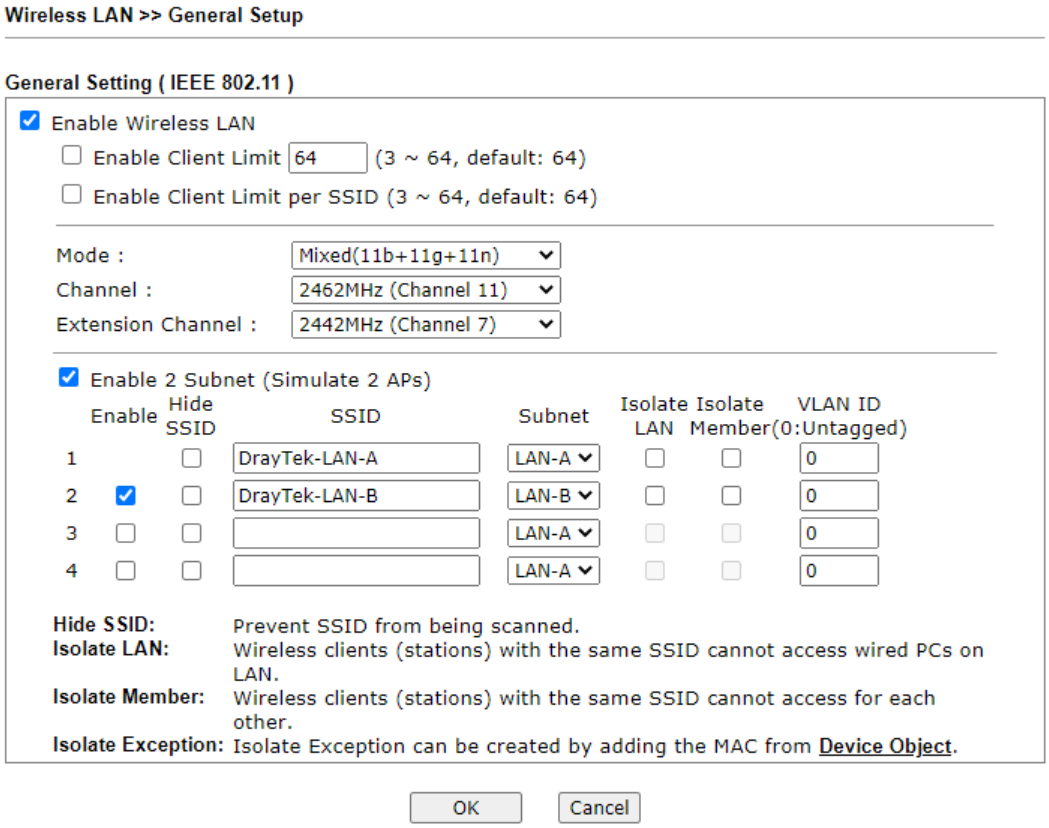
When you choose **AP** as the operation mode, the Wireless LAN menu items will include General Setup, Security, Access Control, WPS, Advanced Setting, AP Discovery, Bandwidth Management, Airtime Fairness, Station Control, Roaming, and Station List.



Note: The **Wireless LAN** settings will be changed according to the **Operation Mode** selected in section 3.1.

3.5.1 General Setup

By clicking the **General Setup**, a new web page will appear so that you could configure the SSID and the wireless channel. Please refer to the following figure for more information.



Available settings are explained as follows:

Item	Description
Enable Wireless LAN	Check the box to enable wireless function.
Enable Client Limit	Check the box to set the maximum number of wireless stations which try to connect Internet through Vigor AP. The number you can set is from 3 to 64.
Enable Client Limit per SSID	Define the maximum number of wireless stations per SSID which try to connect to Internet through Vigor device. The number you can set is from 3 to 64.
Mode	At present, VigorAP 810 can connect to 11b only, 11g only, 11n only, Mixed (11b+11g), Mixed (11g+11n) and Mixed (11b+11g+11n) stations simultaneously. Simply choose Mixed (11b+11g+11n) mode.
Channel	Means the channel of frequency of the wireless LAN. You may switch channel if the selected channel is under serious interference. If you have no idea of choosing the frequency, please select **AutoSelect** to let system determine for you.
Extension Channel	With 802.11n, there is one option to double the bandwidth per channel. The available extension channel options will be varied according to the **Channel** selected above. Configure the

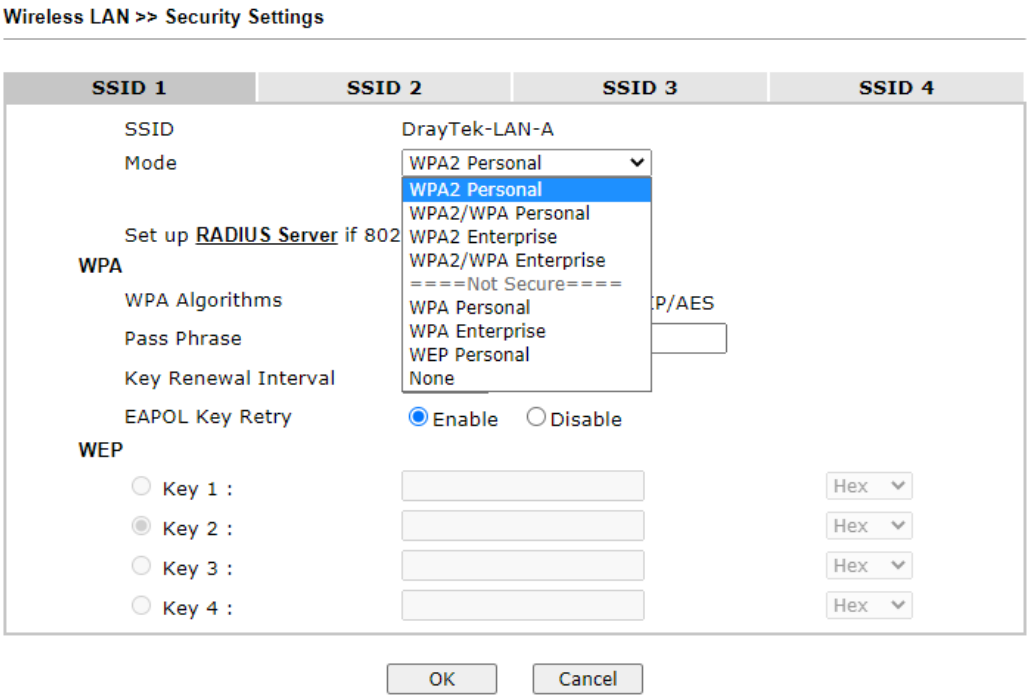
	extension channel you want.
Enable 2 Subnet (Simulate 2 APs)	Check the box to enable the function for two independent subnets. Once you enable this function, LAN-A and LAN-B would be independent. Next, you can connect one router in LAN-A, and another router in LAN-B. Such mechanism can make you feeling that you have two independent AP/subnet functions in one VigorAP 810. If you disable this function, LAN-A and LAN-B ports are in the same domain. You could only connect one router (no matter connecting to LAN-A or LAN-B) in this environment.
Enable	SSID #1 is enabled in default. SSID #2 ~ #4 can be enabled manually.
Hide SSID	Check it to prevent from wireless sniffing and make it harder for unauthorized clients or STAs to join your wireless LAN. Depending on the wireless utility, the user may only see the information except SSID or just cannot see any thing about VigorAP 810 while site surveying. The system allows you to set three sets of SSID for different usage.
SSID	Set a name for VigorAP 810 to be identified. Default settings are DrayTek-LAN-A and DrayTek-LAN-B. When **Enable 2 Subnet** is enabled, you can specify subnet interface (LAN-A or LAN-B) for each SSID by using the drop down menu.
Subnet	Choose LAN-A or LAN-B for each SSID. If you choose LAN-A, the wireless clients connecting to this SSID could only communicate with LAN-A.
Isolate LAN	Check this box to isolate the wireless connection from LAN. It can make the wireless clients (stations) with remote-dial and LAN to LAN users not accessing for each other.
Isolate Member	Check this box to make the wireless clients (stations) with the same SSID not accessing for each other.
VLAN ID	Type the value for such SSID. Packets transferred from such SSID to LAN will be tagged with the number. If your network uses VLANs, you can assign the SSID to a VLAN on your network. Client devices that associate using the SSID are grouped into this VLAN. The VLAN ID range is from 3 to 4095. The VLAN ID is 0 by default, it means disabling the VLAN function for the SSID.

After finishing this web page configuration, please click **OK** to save the settings.

3.5.2 Security

This page allows you to set security with different modes for SSID 1, 2, 3 and 4 respectively. After configuring the correct settings, please click **OK** to save and invoke it.

By clicking the **Security Settings**, a new web page will appear so that you could configure the settings.

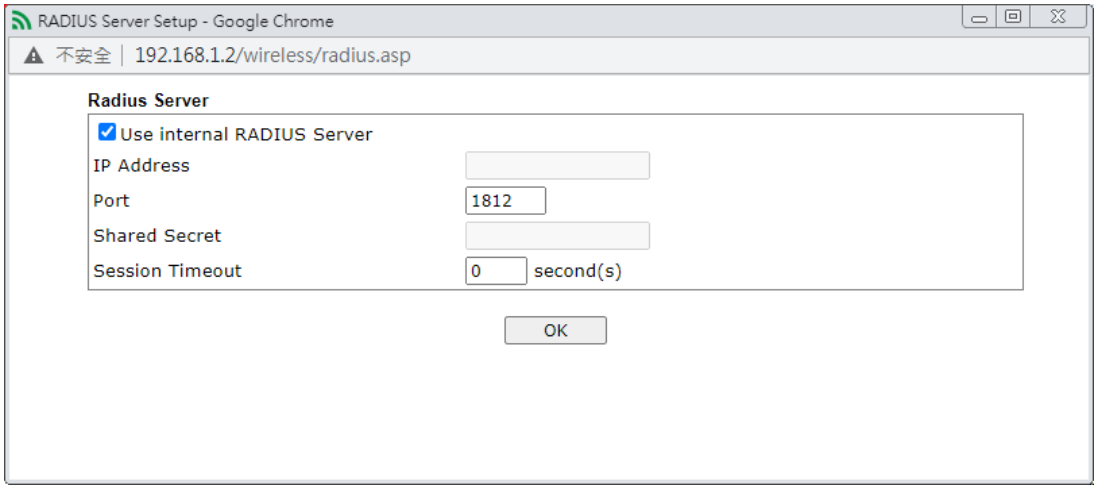


Available settings are explained as follows:

Item	Description
Mode	There are several modes provided for you to choose. Below shows the modes with higher security; **WPA2 Personal, WPA2/WPA Personal -** Accepts only WPA clients and the encryption key should be entered in PSK. The WPA encrypts each frame transmitted from the radio using the key, which either PSK (Pre-Shared Key) entered manually in this field below or automatically negotiated via 802.1x authentication. The WPA encrypts each frame transmitted from the radio using the key, which either PSK (Pre-Shared Key) entered manually in this field below or automatically negotiated via 802.1x authentication. Select WPA, WPA2 or Auto as WPA mode. **WPA2 Enterprise, WPA2/WPA Enterprise -** The WPA encrypts each frame transmitted from the radio using the key, which either PSK (Pre-Shared Key) entered manually in this field below or automatically negotiated via 802.1x authentication. Below shows the modes with basic security; **WPA Personal** - Accepts only WPA clients and the encryption key should be entered in PSK. The WPA encrypts each frame

	transmitted from the radio using the key, which either PSK (Pre-Shared Key) entered manually in this field below or automatically negotiated via 802.1x authentication. **WPA Enterprise** - The WPA encrypts each frame transmitted from the radio using the key, which either PSK (Pre-Shared Key) entered manually in this field below or automatically negotiated via 802.1x authentication. **WEP Personal** - Accepts only WEP clients and the encryption key should be entered in WEP Key. **None** - The encryption mechanism is turned off.
WPA Algorithms	Select TKIP, AES or TKIP/AES as the algorithm for WPA. Such feature is available for **WPA2 Enterprise, WPA Enterprise, WPA Personal** or **WPA2 Personal** or **WPA2/WPA Personal** mode.
Pass Phrase	Either **8~63** ASCII characters, such as 012345678..(or 64 Hexadecimal digits leading by 0x, such as "0x321253abcde..."). Such feature is available for **WPA Personal** or **WPA2 Personal** or **WPA2/WPA Personal** mode.
Key Renewal Interval	WPA uses shared key for authentication to the network. However, normal network operations use a different encryption key that is randomly generated. This randomly generated key that is periodically replaced. Enter the renewal security time (seconds) in the column. Smaller interval leads to greater security but lower performance. Default is 3600 seconds. Set 0 to disable re-key. Such feature is available for **WPA2 Enterprise, WPA Enterprise, WPA Personal** or **WPA2 Personal** or **WPA2/WPA Personal** mode.
EAPOL Key Retry	EAPOL means Extensible Authentication Protocol over LAN. **Enable** - The default setting is "Enable". It can make sure that the key will be installed and used once in order to prevent key reinstallation attack.
Key 1 – Key 4	Four keys can be entered here, but only one key can be selected at a time. The format of WEP Key is restricted to 5 ASCII characters or 10 hexadecimal values in 64-bit encryption level, or restricted to 13 ASCII characters or 26 hexadecimal values in 128-bit encryption level. The allowed content is the ASCII characters from 33(!) to 126(~) except '#' and ','. Such feature is available for **WEP** mode.

Click the link of **RADIUS Server** to access into the following page for more settings.



Available settings are explained as follows:

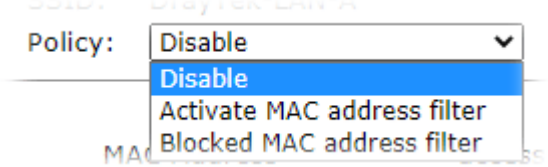
Item	Description
Use internal RADIUS Server	There is a RADIUS server built in VigorAP 810 which is used to authenticate the wireless client connecting to the access point. Check this box to use the internal RADIUS server for wireless security. Besides, if you want to use the external RADIUS server for authentication, do not check this box. Please refer to the section, **3.10 RADIUS Setting** to configure settings for internal server of VigorAP 810.
IP Address	Enter the IP address of external RADIUS server.
Port	The UDP port number that the external RADIUS server is using. The default value is 1812, based on RFC 2138.
Shared Secret	The external RADIUS server and client share a secret that is used to authenticate the messages sent between them. Both sides must be configured to use the same shared secret.
Session Timeout	Set the maximum time of service provided before re-authentication. Set to zero to perform another authentication immediately after the first authentication has successfully completed. (The unit is second.)

After finishing this web page configuration, please click **OK** to save the settings.

3.5.3 Access Control

For additional security of wireless access, the **Access Control** facility allows you to restrict the network access right by controlling the wireless LAN MAC address of client. Only the valid MAC address that has been configured can access the wireless LAN interface. By clicking the **Access Control**, a new web page will appear, as depicted below, so that you could edit the clients' MAC addresses to control their access rights (deny or allow).

Available settings are explained as follows:

Item	Description
Policy	Select to enable any one of the following policy or disable the policy. Choose **Activate MAC address filter** to type in the MAC addresses for other clients in the network manually. Choose **Blocked MAC address filter,** so that all of the devices with the MAC addresses listed on the MAC Address Filter table will be blocked and cannot access into VigorAP 810. 
MAC Address Filter	Display all MAC addresses that are edited before.
MAC	**Client's MAC Address -** Manually enter the MAC address of wireless client. **Add -** Add a new MAC address into the list. **Delete -** Delete the selected MAC address in the list. **Edit -** Edit the selected MAC address in the list.
Object	In addition to enter the MAC address of the device manually, you can **Device Group** - Select one of the existed device groups and click **Add**. All the devices belonging to the selected group will be shown on the MAC Address Filter table. **Device Object** - Select one of the existed device object and click **Add**. The MAC address of the device will be shown on the MAC Address Filter table.

Cancel	Give up the access control set up.
Backup	Click it to store the settings (MAC addresses on MAC Address Filter table) on this page as a file.
Restore	Click it to restore the settings (MAC addresses on MAC Address Filter table) from an existed file.

After finishing this web page configuration, please click **OK** to save the settings.

3.5.4 WPS

Open **Wireless LAN>>WPS** to configure the corresponding settings.

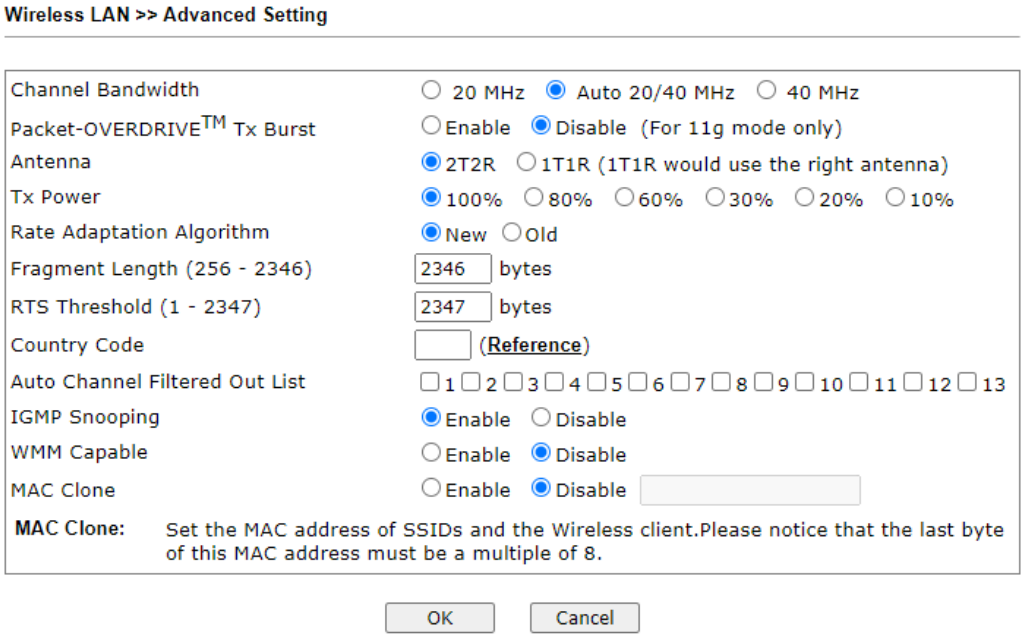
Available settings are explained as follows:

Item	Description
Enable WPS	Check this box to enable WPS setting.
WPS Configured	Display related system information for WPS. If the wireless security (encryption) function of VigorAP 810 is properly configured, you can see 'Yes' message here.
WPS SSID	Display current selected SSID.
WPS Auth Mode	Display current authentication mode of the VigorAP 810. Only WPA2 Personal and WPA Personal support WPS.
WPS Encrypt Type	Display encryption mode (None, WEP, TKIP, AES, etc.) of VigorAP 810.
Configure via Push Button	Click **Start PBC** to invoke Push-Button style WPS setup procedure. VigorAP 810 will wait for WPS requests from wireless clients about two minutes. The WPS LED on VigorAP 810 will blink fast when WPS is in progress. It will return to normal condition after two minutes. (You need to setup WPS within two minutes)
Configure via Client	Type the PIN code specified in wireless client you wish to connect, and click **Start PIN** button. The WLAN LED on

PinCode	VigorAP 810 will blink fast when WPS is in progress. It will return to normal condition after two minutes. (You need to setup WPS within two minutes).

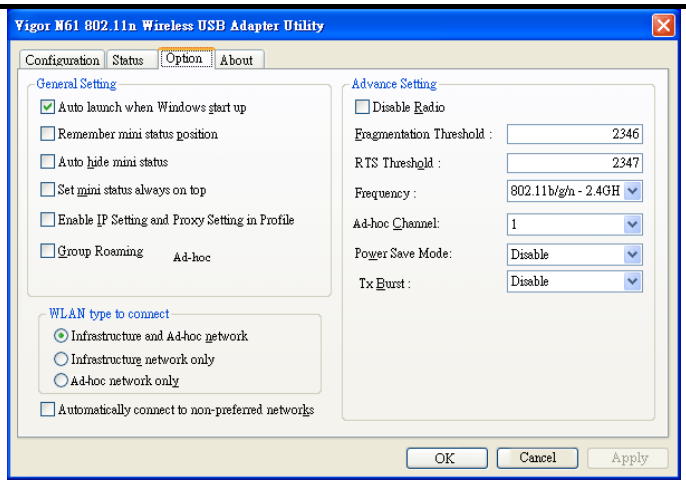
3.5.5 Advanced Setting

This page is to determine which algorithm will be selected for wireless transmission rate.



Available settings are explained as follows:

Item	Description
Channel Bandwidth	**20 MHZ-** the AP will use 20MHz for data transmission and receiving between the AP and the stations. **Auto 20/40 MHZ–** the AP will scan for nearby wireless AP, and then use 20MHz if the number of AP is more than 10, or use 40MHz if it's not. **40 MHZ-** the AP will use 40MHz for data transmission and receiving between the AP and the stations.
Packet-OVERDRIVE	This feature can enhance the performance in data transmission about 40%* more (by checking **Tx Burst**). It is active only when both sides of Access Point and Station (in wireless client) invoke this function at the same time. That is, the wireless client must support this feature and invoke the function, too. **Note:** Vigor N61 wireless adapter supports this function. Therefore, you can use and install it into your PC for matching with Packet-OVERDRIVE (refer to the following picture of Vigor N61 wireless utility window, choose **Enable** for **TxBURST** on the tab of **Option**).

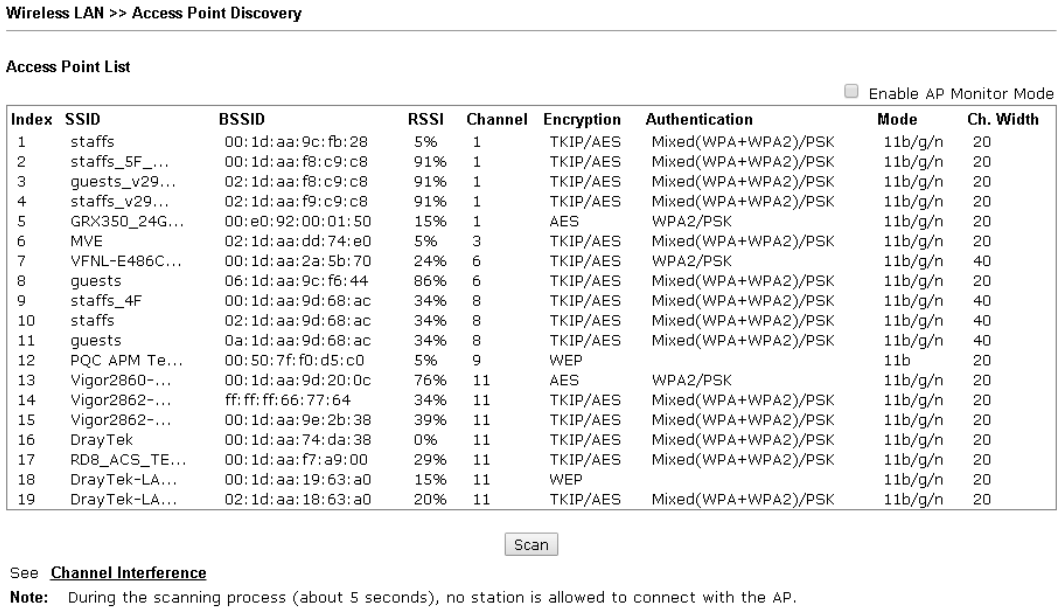
	
Antenna	VigorAP can be attached with two antennas to have good data transmission via wireless connection. However, if you have only one antenna attached, please choose 1T1R.
Tx Power	The default setting is the maximum (100%). Lowering down the value may degrade range and throughput of wireless.
Rate Adaptation Algorithm	Wireless transmission rate is adapted dynamically. Usually, performance of “new” algorithm is better than “old”.
Fragment Length	Set the Fragment threshold of wireless radio. Do not modify default value if you don’t know what it is, default value is 2346.
RTS Threshold	Minimize the collision (unit is bytes) between hidden stations to improve wireless performance. Set the RTS threshold of wireless radio. Do not modify default value if you don’t know what it is, default value is 2347.
Country Code	VigorAP broadcasts country codes by following the 802.11d standard. However, some wireless stations will detect / scan the country code to prevent conflict occurred. If conflict is detected, wireless station will be warned and is unable to make network connection. Therefore, changing the country code to ensure successful network connection will be necessary for some clients.
Auto Channel Filtered Out List	The selected wireless channels will be discarded if **AutoSelect** is selected as **Channel** selection mode in **Wireless LAN>>General Setup**.
IGMP Snooping	Check **Enable** to enable IGMP Snooping. Multicast traffic will be forwarded to ports that have members of that group. Disabling IGMP snooping will make multicast traffic treated in the same manner as broadcast traffic.
WMM Capable	To apply WMM parameters for wireless data transmission, please click the **Enable** radio button.
MAC Clone	Click **Enable** and manually enter the MAC address of the device with SSID 1. The MAC address of other SSIDs will change based on this MAC address.

After finishing this web page configuration, please click **OK** to save the settings.

3.5.6 AP Discovery

VigorAP 810 can scan all regulatory channels and find working APs in the neighborhood. Based on the scanning result, users will know which channel is clean for usage. Also, it can be used to facilitate finding an AP for a WDS link. Notice that during the scanning process (about 5 seconds), no client is allowed to connect to Vigor.

This page is used to scan the existence of the APs on the wireless LAN. Please click **Scan** to discover all the connected APs.



Wireless LAN >> Access Point Discovery

Access Point List

Enable AP Monitor Mode

Index	SSID	BSSID	RSSI	Channel	Encryption	Authentication	Mode	Ch. Width
1	staffs	00:1d:aa:9c:fb:28	5%	1	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20
2	staffs_5F_...	00:1d:aa:f8:c9:c8	91%	1	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20
3	guests_v29...	02:1d:aa:f8:c9:c8	91%	1	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20
4	staffs_v29...	02:1d:aa:f9:c9:c8	91%	1	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20
5	GRX350_24G...	00:e0:92:00:01:50	15%	1	AES	WPA2/PSK	11b/g/n	20
6	MVE	02:1d:aa:dd:74:e0	5%	3	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20
7	VFNL-E486C...	00:1d:aa:2a:5b:70	24%	6	TKIP/AES	WPA2/PSK	11b/g/n	40
8	guests	06:1d:aa:9c:f6:44	86%	6	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20
9	staffs_4F	00:1d:aa:9d:68:ac	34%	8	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	40
10	staffs	02:1d:aa:9d:68:ac	34%	8	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	40
11	guests	0a:1d:aa:9d:68:ac	34%	8	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	40
12	PQC APM Te...	00:50:7f:f0:d5:c0	5%	9	WEP		11b	20
13	Vigor2860-...	00:1d:aa:9d:20:0c	76%	11	AES	WPA2/PSK	11b/g/n	20
14	Vigor2862-...	ff:ff:ff:66:77:64	34%	11	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20
15	Vigor2862-...	00:1d:aa:9e:2b:38	39%	11	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20
16	DrayTek	00:1d:aa:74:da:38	0%	11	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20
17	RD8_ACS_TE...	00:1d:aa:f7:a9:00	29%	11	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20
18	DrayTek-LA...	00:1d:aa:19:63:a0	15%	11	WEP		11b/g/n	20
19	DrayTek-LA...	02:1d:aa:18:63:a0	20%	11	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20

Scan

See Channel Interference

Note: During the scanning process (about 5 seconds), no station is allowed to connect with the AP.

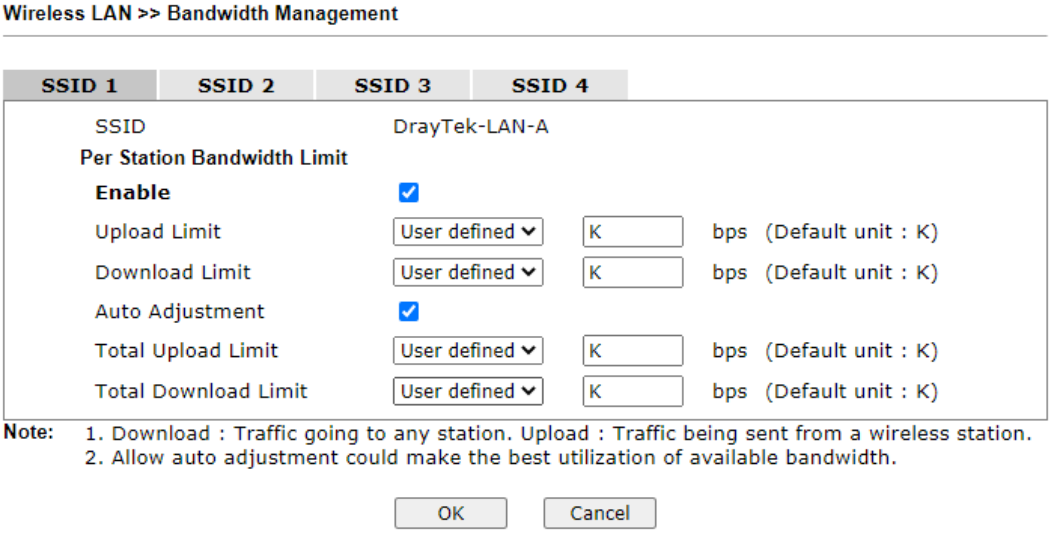
Each item is explained as follows:

Item	Description
Enable AP Monitor Mode	This function can help to get and keep the records of APs detected by such device after clicking Scan. In general, only the available AP will be detected by Vigor device. Once the AP is unavailable, it will be deleted from the Access Point List immediately. However, if such function is enabled, the system will keep the record of the AP (once detected by Vigor device) until it is available for Vigor device again.
SSID	Display the SSID of the AP scanned by VigorAP 810.
BSSID	Display the MAC address of the AP scanned by VigorAP 810.
RSSI	Display the signal strength of the access point. RSSI is the abbreviation of Receive Signal Strength Indication.
Channel	Display the wireless channel used for the AP that is scanned by VigorAP 810.
Encryption	Display the encryption mode for the scanned AP.
Authentication	Display the authentication type that the scanned AP applied.
Mode	Display the wireless connection mode that the scanned AP used.
Ch. Width	Display the channel width that the scanned AP used.

Scan	It is used to discover all the connected AP. The results will be shown on the box above this button
Channel Statistics	It displays the statistics for the channels used by APs.

3.5.7 Bandwidth Management

The downstream or upstream from FTP, HTTP or some P2P applications will occupy large of bandwidth and affect the applications for other programs. Please use Bandwidth Management to make the bandwidth usage more efficient.



Available settings are explained as follows:

Item	Description
SSID	Display the specific SSID name of the AP.
Enable	Check this box to enable the bandwidth management for clients.
Upload Limit	Define the maximum speed of the data uploading which will be used for the wireless stations connecting to Vigor AP with the same SSID. Use the drop down list to choose the rate. If you choose **User defined**, you have to specify the rate manually.
Download Limit	Define the maximum speed of the data downloading which will be used for the wireless station connecting to Vigor AP with the same SSID. Use the drop down list to choose the rate. If you choose **User defined**, you have to specify the rate manually.
Auto Adjustment	Check this box to have the bandwidth limit determined by the system automatically.
Total Upload Limit	When Auto Adjustment is checked, the value defined here will be treated as the total bandwidth shared by all of the wireless stations with the same SSID for data uploading.
Total Download Limit	When Auto Adjustment is checked, the value defined here will be treated as the total bandwidth shared by all of the wireless stations with the same SSID for data downloading.

After finishing this web page configuration, please click **OK** to save the settings.

3.5.8 Airtime Fairness

Airtime fairness is essential in wireless networks that must support critical enterprise applications.

Most of the applications are either symmetric or require more downlink than uplink capacity; telephony and email send the same amount of data in each direction, while video streaming and web surfing involve more traffic sent from access points to clients than the other way around. This is essential for ensuring predictable performance and quality-of-service, as well as allowing 802.11n and legacy clients to coexist on the same network. Without airtime fairness, offices using mixed mode networks risk having legacy clients slow down the entire network or letting the fastest client(s) crowd out other users.

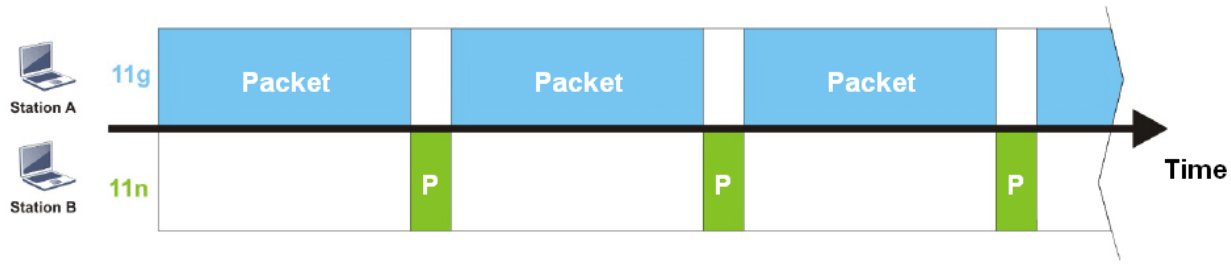
With airtime fairness, every client at a given quality-of-service level has equal access to the network's airtime.

The wireless channel can be accessed by only one wireless station at the same time.

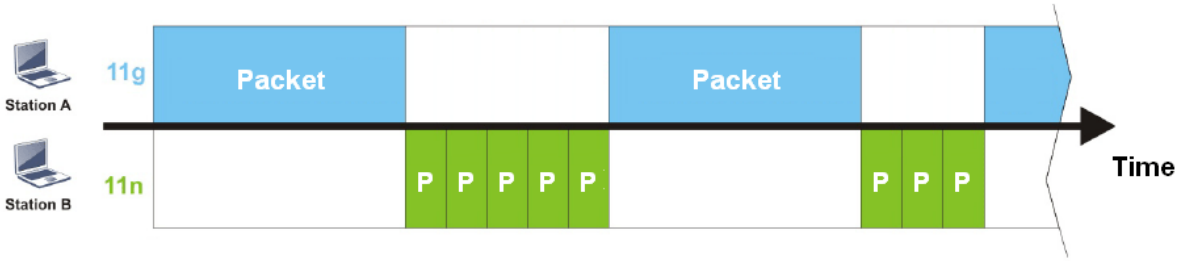
The principle behind the IEEE802.11 channel access mechanisms is that each station has ***equal probability*** to access the channel. When wireless stations have similar data rate, this principle leads to a fair result. In this case, stations get similar channel access time which is called airtime.

However, when stations have various data rate (e.g., 11g, 11n), the result is not fair. The slow stations (11g) work in their slow data rate and occupy too much airtime, whereas the fast stations (11n) become much slower.

Take the following figure as an example, both Station A(11g) and Station B(11n) transmit data packets through VigorAP 810. Although they have equal probability to access the wireless channel, Station B(11n) gets only a little airtime and waits too much because Station A(11g) spends longer time to send one packet. In other words, Station B(fast rate) is obstructed by Station A(slow rate).



To improve this problem, Airtime Fairness is added for VigorAP 810. Airtime Fairness function tries to assign *similar airtime* to each station (A/B) by controlling TX traffic. In the following figure, Station B(11n) has higher probability to send data packets than Station A(11g). By this way, Station B(fast rate) gets fair airtime and it's speed is not limited by Station A(slow rate).



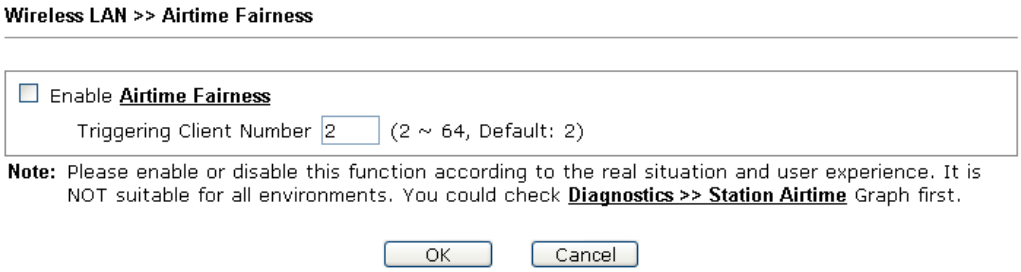
It is similar to automatic Bandwidth Limit. The dynamic bandwidth limit of each station depends on instant active station number and airtime assignment. Please note that Airtime Fairness of 2.4GHz and 5GHz are independent. But stations of different SSIDs function together, because they all use the same wireless channel. IN SPECIFIC ENVIRONMENTS, this function can reduce the bad influence of slow wireless devices and improve the overall wireless performance.

Suitable environment:

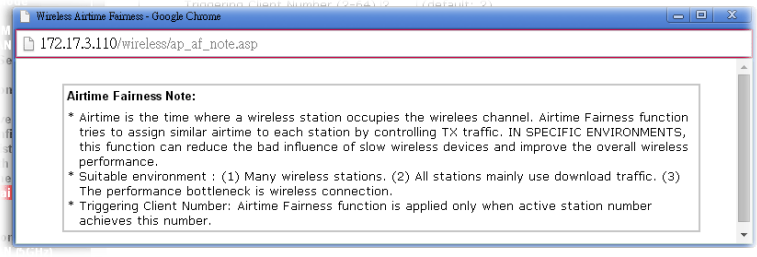
(1) Many wireless stations.

(2) All stations mainly use download traffic.

(3) The performance bottleneck is wireless connection.



Available settings are explained as follows:

Item	Description
Enable Airtime Fairness	Try to assign similar airtime to each wireless station by controlling TX traffic. **Airtime Fairness** – Click the link to display the following screen of airtime fairness note.  **Triggering Client Number –**Airtime Fairness function is applied only when active station number achieves this number.

After finishing this web page configuration, please click **OK** to save the settings.

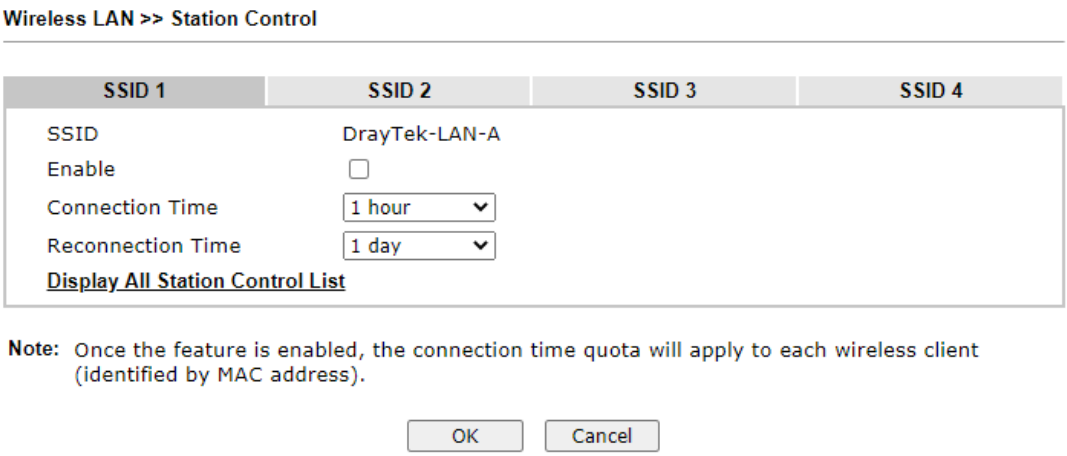
Note: Airtime Fairness function and Bandwidth Limit function should be mutually exclusive. So their webs have extra actions to ensure these two functions are not enabled simultaneously.

3.5.9 Station Control

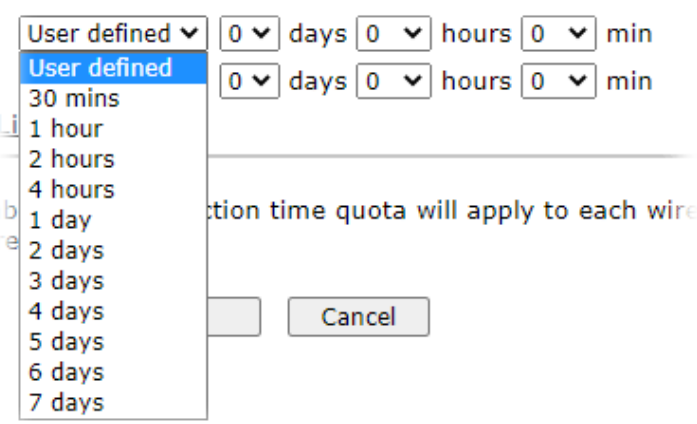
Station Control is used to specify the duration for the wireless client to connect and reconnect VigorAP. If such function is not enabled, the wireless client can connect VigorAP until it shuts down.

Such feature is especially useful for free Wi-Fi service. For example, a coffee shop offers free Wi-Fi service for its guests for one hour every day. Then, the connection time can be set as "1 hour" and reconnection time can be set as "1 day". Thus, the guest can finish his job within one hour and will not occupy the wireless network for a long time.

Note: Up to 300 Wireless Station records are supported by VigorAP.



Available settings are explained as follows:

Item	Description
SSID	Display the SSID that the wireless station will use it to connect with Vigor router.
Enable	Check the box to enable the station control function.
Connection Time / Reconnection Time	Use the drop down list to choose the duration for the wireless client connecting /reconnecting to Vigor router. Or, type the duration manually when you choose **User defined**. 

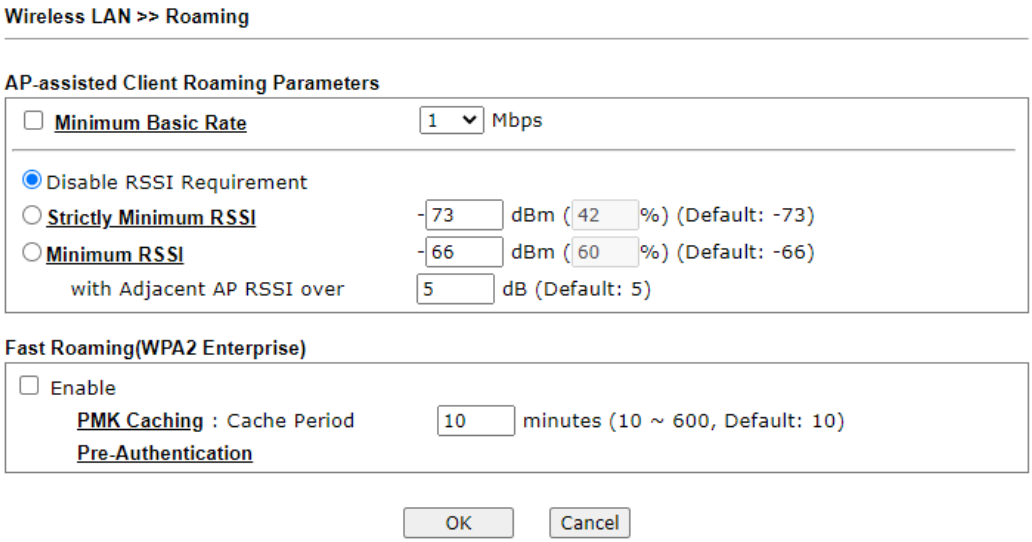
Display All Station Control List	All the wireless stations connecting to Vigor router by using such SSID will be listed on Station Control List.

After finishing all the settings here, please click **OK** to save the configuration.

3.5.10 Roaming

The network signal for a single wireless access point might be limited by its coverage range. Therefore, if you want to expand the wireless network in a large exhibition with a quick method, you can install multiple access points with enabling the Roaming feature for each AP to reach the purpose of expanding wireless signals seamlessly.

These access points connecting for each other shall be verified by pre-authentication. This page allows you to enable the roaming feature and the pre-authentication.



Available settings are explained as follows:

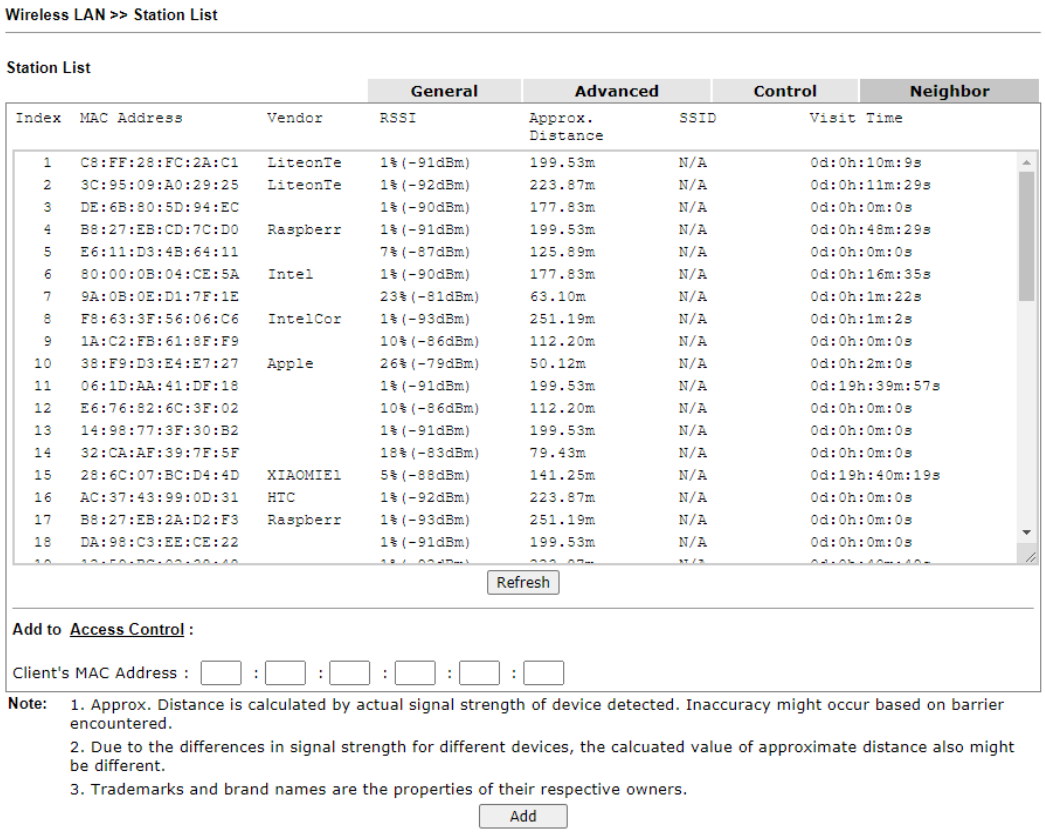
Item	Description
AP-assisted Client Roaming Parameters	When the link rate of wireless station is too low or the signal received by the wireless station is too worse, VigorAP 810 will automatically detect (based on the link rate and RSSI requirement) and cut off the network connection for that wireless station to assist it to connect another Wireless AP to get better signal. **Minimum Basic Rate –** Check the box to use the drop down list to specify a basic rate (**Mbps**). When the link rate of the wireless station is below such value, VigorAP 810 will terminate the network connection for that wireless station. **Disable RSSI Requirement -** If it is selected, VigorAP will not terminate the network connection based on RSSI. **Strictly Minimum RSSI -** VigorAP uses RSSI (received signal strength indicator) to decide to terminate the network connection of wireless station. When the signal strength is below the value (**dBm**) set here, VigorAP 810 will terminate the network connection for that wireless station. **Minimum RSSI -** When the signal strength of the wireless

	station is below the value (**dBm**) set here and adjacent AP (must be DrayTek AP and support such feature too) with higher signal strength value (defined in the field of **With Adjacent AP RSSI over**) is detected by VigorAP 810, VigorAP 810 will terminate the network connection for that wireless station. Later, the wireless station can connect to the adjacent AP (with better RSSI). ● **With Adjacent AP RSSI over –** Specify a value as a threshold.
Fast Roaming (WPA2 Enterprise)	**Enable –** Check the box to enable fast roaming configuration. **PMK Caching -** Set the expire time of WPA2 PMK (Pairwise master key) cache. PMK Cache manages the list from the BSSIDs in the associated SSID with which it has pre-authenticated. Such feature is available for **WPA2/802.1** mode. **Pre-Authentication -** Enables a station to authenticate to multiple APs for roaming securer and faster. With the pre-authentication procedure defined in IEEE 802.11i specification, the pre-four-way-handshake can reduce handoff delay perceivable by a mobile node. It makes roaming faster and more secure. (Only valid in WPA2)

After finishing this web page configuration, please click **OK** to save the settings.

3.5.11 Station List

Station List provides the knowledge of connecting wireless clients now along with its status code. Each tab (general, advanced, control, neighbor) will display different status information (including MAC address, Vendor, SSID, Auth, Encrypt, Tx/Rx Rate, Hostname, RSSI, Link Speed, BW, PSM, WMM, PHMd, MCS, Connection Time, Reconnection Time, Approx. Distance, Visit Time, and so on)



Available settings are explained as follows:

Item	Description
MAC Address	Display the MAC Address for the connecting client.
SSID	Display the SSID that the wireless client connects to.
Auth	Display the authentication that the wireless client uses for connection with such AP.
Encrypt	Display the encryption mode used by the wireless client.
Tx Rate/Rx Rate	Display the transmission /receiving rate for packets.
Refresh	Click this button to refresh the status of station list.
Add to Access Control	**Client's MAC Address** - For additional security of wireless access, the Access Control facility allows you to restrict the network access right by controlling the wireless LAN MAC address of client. Only the valid MAC address that has been configured can access the wireless LAN interface.
Add	Click this button to add current typed MAC address into **Access Contro**l.

General

Display general information (e.g., MAC Address, SSID, Auth, Encrypt, TX/RX Rate) for the station.

Advanced

Display more information (e.g., AID, PSM, WMM, RSSI PhMd, BW, MCS, Rate) for the station.

Control

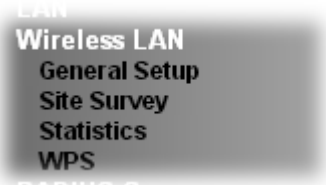
Display connection and reconnection time of the wireless stations.

Neighbor

Display more information for the neighboring wireless stations.

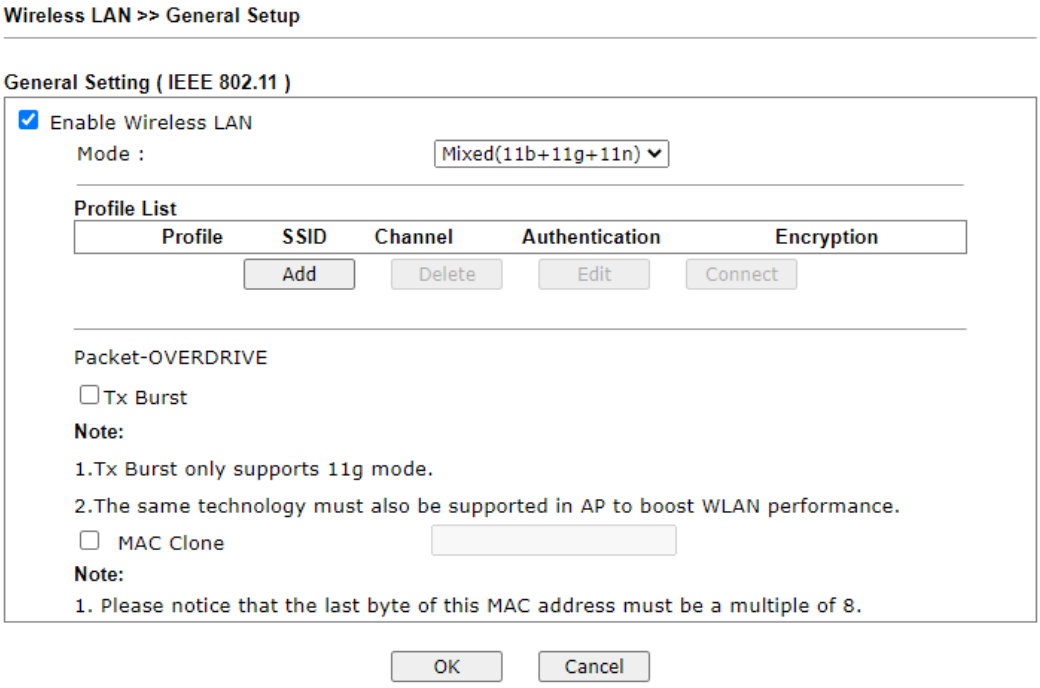
3.6 Wireless LAN Settings for Station-Infrastructure Mode

When you choose **Station-Infrastructure** as the operation mode, the Wireless LAN menu items will include General Setup, Site Survey, Statistics and WPS.



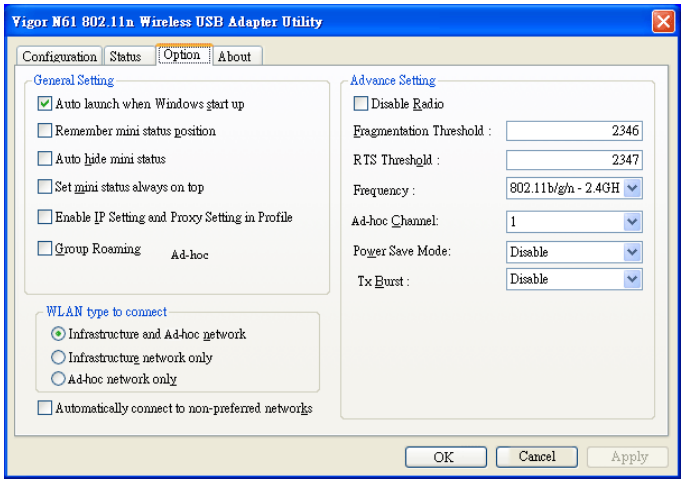
3.6.1 General Setup

By clicking the **General Setup**, a new web page will appear so that you could configure the wireless profile and choose proper mode. Please refer to the following figure for more information.



Available settings are explained as follows:

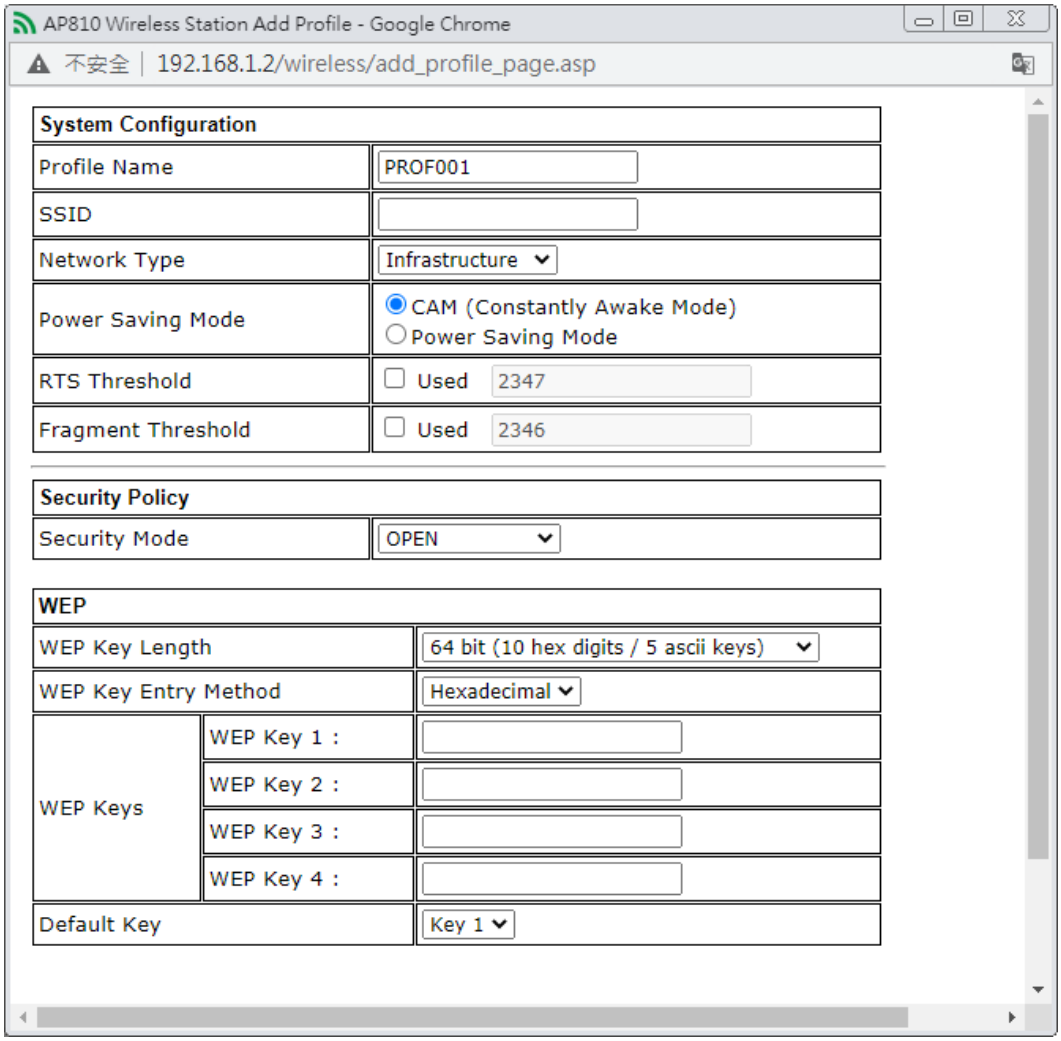
Item	Description
Enable Wireless LAN	Check the box to enable wireless function.
Mode	At present, VigorAP 810 can connect to 11 b only, 11 g only, 11 n only, Mixed (11b+11g), Mixed (11b+11g+11n) and Mixed (11g+11n) stations simultaneously. Simply choose Mixed (11b+11g+11n) mode.
Add	Click this button to add new wireless profiles.
Delete	Click this button to delete the selected wireless profile.
Edit	Click this button to modify the existing wireless profile.
Connect	Click this button to connect the wireless station to AP with the selected profile.
Packet-OVERDRIVE	This feature can enhance the performance in data transmission

	about 40%* more (by checking **Tx Burst**). It is active only when both sides of Access Point and Station (in wireless client) invoke this function at the same time. That is, the wireless client must support this feature and invoke the function, too. **Note:** Vigor N61 wireless adapter supports this function. Therefore, you can use and install it into your PC for matching with Packet-OVERDRIVE (refer to the following picture of Vigor N61 wireless utility window, choose **Enable** for **TxBURST** on the tab of **Option**). 
MAC Clone	Check this box and manually enter the MAC address for Station mode driver.

After finishing this web page configuration, please click **OK** to save the settings.

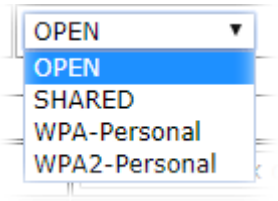
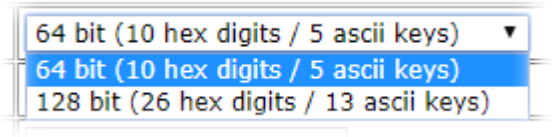
Add a New Wireless Profile

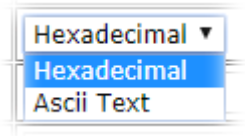
To add a new wireless profile for the stations, click **Add.** The following dialog box will appear.



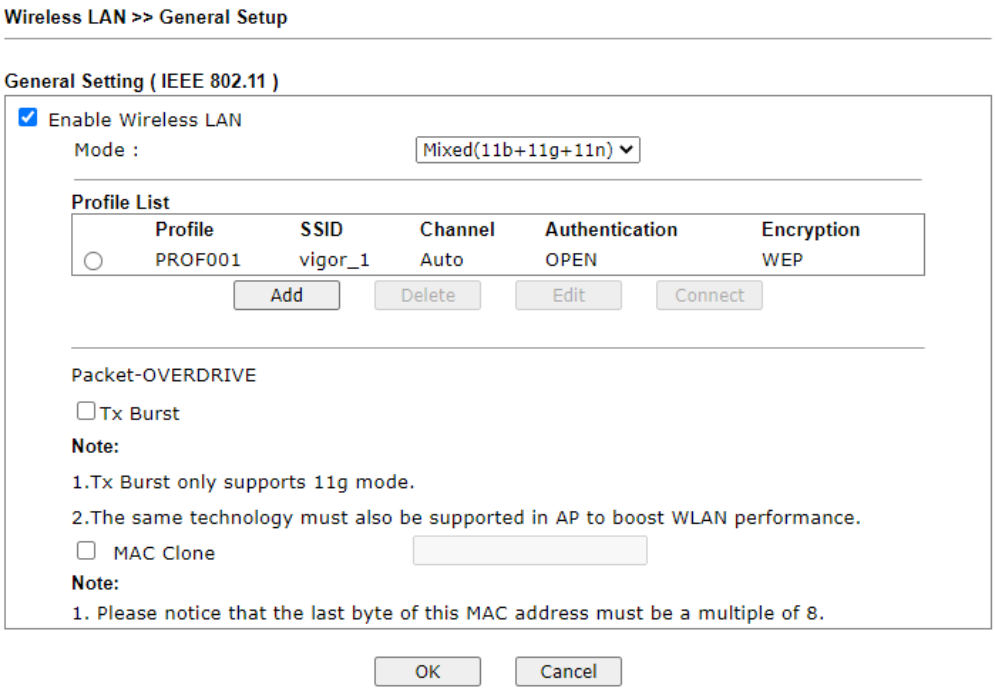
Available settings are explained as follows:

Item	Description
Profile Name	Type a name for the new profile.
SSID	Type the name for such access point that can be used for connection by the stations.
Network Type	**Infrastructure** - In this mode, you can connect the access point to Ethernet device such as TV and Game player to enable the Ethernet device as a wireless station and join to a wireless network through an access point or AP router. **802.11 Ad Hoc** – An ad-hoc network is a network where wireless stations can communicate with peer to peer (P2P).
Power Saving Mode	Choose the power saving mode for such device. **CAM** – Choose this item if it is not necessary to perform power saving job. **Power Saving Mode** – Choose this item to get into the power saving status when there is no data passing through the access point.
RTS Threshold	Set the RTS threshold of wireless radio. Do not modify default value if you don't know what it is, default value is 2347.

Fragment Threshold	Set the Fragment threshold of wireless radio. Do not modify default value if you don't know what it is, default value is 2346.
Security Mode	802.11 standard defines two mechanisms for authentication of wireless LAN clients: Open Authentication and Shared Key Authentication. Choose one of the security modes from the drop down list. If you choose OPEN or SHARED, you have to type WEP information. **OPEN** – Open authentication is basically null authentication algorithm, which means that there is no verification of the user. **SHARED** – It works similar to Open authentication with only one major difference. If you choose OPEN with WEP encryption key, the WEP keys is used to encrypt and decrypt the data but not for authentication. In Shared key authentication, WEP encryption will be used for authentication.  If you choose **WPA-Personal** or **WPA2-Personal**, the corresponding WPA settings will be listed as follows. You have to choose the WPA algorithms and type the pass phrase for such security mode. **WPA Algorithms** – Choose Temporal Key Integrity Protocol (TKIP) or AES for data encryption. **Pass Phrase** – Please type 8 to 63 alphanumerical characters here.
WEP	**WEP Key Length** - WEP (Wired Equivalent Privacy) is a common encryption mode. It is safe enough for home and personal use. However, if you need higher level of security, please consider using WPA encryption (see next section). Some wireless clients do not support WPA, but support WEP. Therefore WEP is still a good choice for you if you have such kind of client in your network environment.  **WEP Key Entry Method** - There are two types of WEP key length: 64-bit and 128-bit. Using 128-bit is safer than 64-bit, but it will reduce some data transfer performance. There are two types of key method: ASCII and Hex. When you select a key format, the number of characters of key will be displayed. For example, if you select 64-bit as key length, and Hex as key format, you'll see the message at the right of

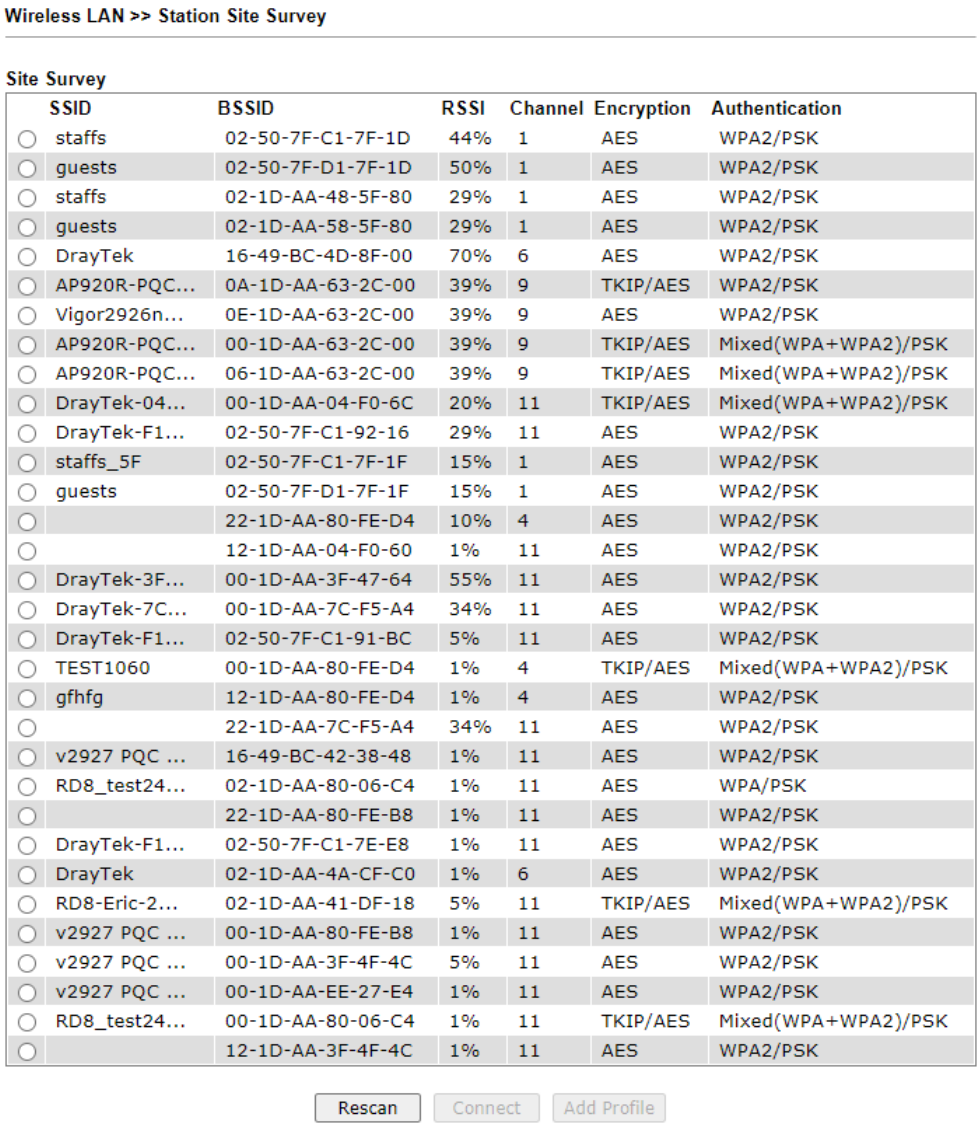
	Key Format is 'Hex (10 characters) which means the length of WEP key is 10 characters.  **WEP Keys (Key 1 – Key 4) -** Four keys can be entered here, but only one key can be selected at a time. The format of WEP Key is restricted to 5 ASCII characters or 10 hexadecimal values in 64-bit encryption level, or restricted to 13 ASCII characters or 26 hexadecimal values in 128-bit encryption level. The allowed content is the ASCII characters from 33(!) to 126(~) except '#' and ','. Such feature is available for **WEP** mode. **Default Key** – Choose one of the key settings.

Below shows an example for a wireless profile created.



3.6.2 Site Survey

The page will list the access points nearby as VigorAP 810 is set to Station mode. You can select one of the access points to associate.



Wireless LAN >> Station Site Survey

Site Survey

	SSID	BSSID	RSSI	Channel	Encryption	Authentication
○	staffs	02-50-7F-C1-7F-1D	44%	1	AES	WPA2/PSK
○	guests	02-50-7F-D1-7F-1D	50%	1	AES	WPA2/PSK
○	staffs	02-1D-AA-48-5F-80	29%	1	AES	WPA2/PSK
○	guests	02-1D-AA-58-5F-80	29%	1	AES	WPA2/PSK
○	DrayTek	16-49-BC-4D-8F-00	70%	6	AES	WPA2/PSK
○	AP920R-PQC...	0A-1D-AA-63-2C-00	39%	9	TKIP/AES	WPA2/PSK
○	Vigor2926n...	0E-1D-AA-63-2C-00	39%	9	AES	WPA2/PSK
○	AP920R-PQC...	00-1D-AA-63-2C-00	39%	9	TKIP/AES	Mixed(WPA+WPA2)/PSK
○	AP920R-PQC...	06-1D-AA-63-2C-00	39%	9	TKIP/AES	Mixed(WPA+WPA2)/PSK
○	DrayTek-04...	00-1D-AA-04-F0-6C	20%	11	TKIP/AES	Mixed(WPA+WPA2)/PSK
○	DrayTek-F1...	02-50-7F-C1-92-16	29%	11	AES	WPA2/PSK
○	staffs_5F	02-50-7F-C1-7F-1F	15%	1	AES	WPA2/PSK
○	guests	02-50-7F-D1-7F-1F	15%	1	AES	WPA2/PSK
○		22-1D-AA-80-FE-D4	10%	4	AES	WPA2/PSK
○		12-1D-AA-04-F0-60	1%	11	AES	WPA2/PSK
○	DrayTek-3F...	00-1D-AA-3F-47-64	55%	11	AES	WPA2/PSK
○	DrayTek-7C...	00-1D-AA-7C-F5-A4	34%	11	AES	WPA2/PSK
○	DrayTek-F1...	02-50-7F-C1-91-BC	5%	11	AES	WPA2/PSK
○	TEST1060	00-1D-AA-80-FE-D4	1%	4	TKIP/AES	Mixed(WPA+WPA2)/PSK
○	gfhfg	12-1D-AA-80-FE-D4	1%	4	AES	WPA2/PSK
○		22-1D-AA-7C-F5-A4	34%	11	AES	WPA2/PSK
○	v2927 PQC ...	16-49-BC-42-38-48	1%	11	AES	WPA2/PSK
○	RD8_test24...	02-1D-AA-80-06-C4	1%	11	AES	WPA/PSK
○		22-1D-AA-80-FE-B8	1%	11	AES	WPA2/PSK
○	DrayTek-F1...	02-50-7F-C1-7E-E8	1%	11	AES	WPA2/PSK
○	DrayTek	02-1D-AA-4A-CF-C0	1%	6	AES	WPA2/PSK
○	RD8-Eric-2...	02-1D-AA-41-DF-18	5%	11	TKIP/AES	Mixed(WPA+WPA2)/PSK
○	v2927 PQC ...	00-1D-AA-80-FE-B8	1%	11	AES	WPA2/PSK
○	v2927 PQC ...	00-1D-AA-3F-4F-4C	5%	11	AES	WPA2/PSK
○	v2927 PQC ...	00-1D-AA-EE-27-E4	1%	11	AES	WPA2/PSK
○	RD8_test24...	00-1D-AA-80-06-C4	1%	11	TKIP/AES	Mixed(WPA+WPA2)/PSK
○		12-1D-AA-3F-4F-4C	1%	11	AES	WPA2/PSK

Rescan | Connect | Add Profile

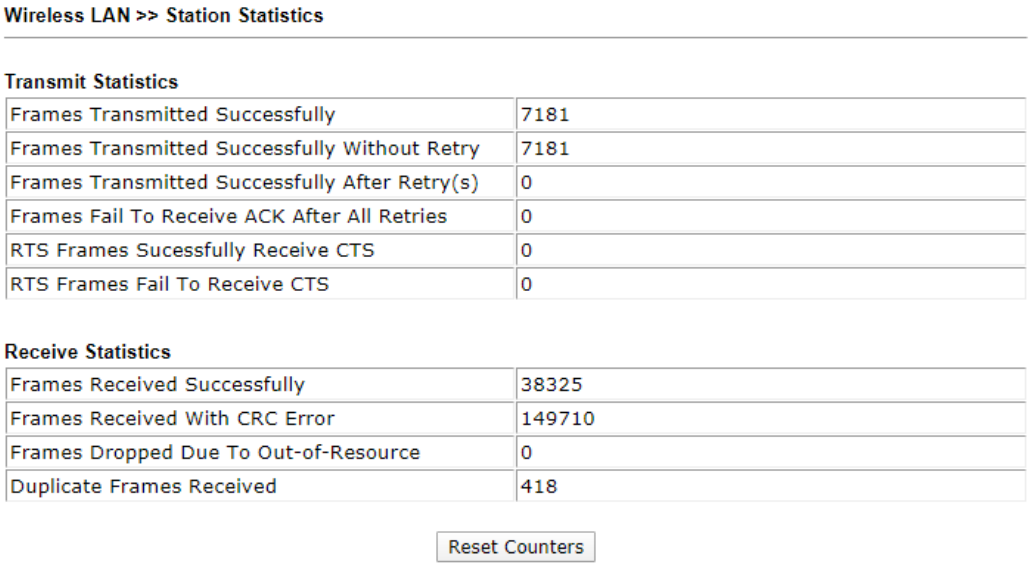
Available settings are explained as follows:

Item	Description
SSID	Display the SSID name of the access point.
BSSID	Display the BSSID (MAC Address) of the access point.
RSSI	Display the signal strength of the access point. RSSI is the abbreviation of Receive Signal Strength Indication.
Channel	Display the channel number of the access point.
Encryption	Display the encryption setting of the access points. If you have selected the access point with security setting, you have to go to 2-7 Wireless Security to set the same security with the access point you want to associate.
Authentication	Display the authentication type of the access point.

Scan/Rescan	Search the stations connected to such access point.
Connect	Connect to the wireless AP that you choose.
Add Profile	The system will add a profile automatically for you to connect with the wireless AP that you choose.

3.6.3 Statistics

This page displays the statistics for data transmission and receiving between the access point and the stations.



Wireless LAN >> Station Statistics

Transmit Statistics

Frames Transmitted Successfully	7181
Frames Transmitted Successfully Without Retry	7181
Frames Transmitted Successfully After Retry(s)	0
Frames Fail To Receive ACK After All Retries	0
RTS Frames Sucessfully Receive CTS	0
RTS Frames Fail To Receive CTS	0

Receive Statistics

Frames Received Successfully	38325
Frames Received With CRC Error	149710
Frames Dropped Due To Out-of-Resource	0
Duplicate Frames Received	418

Reset Counters

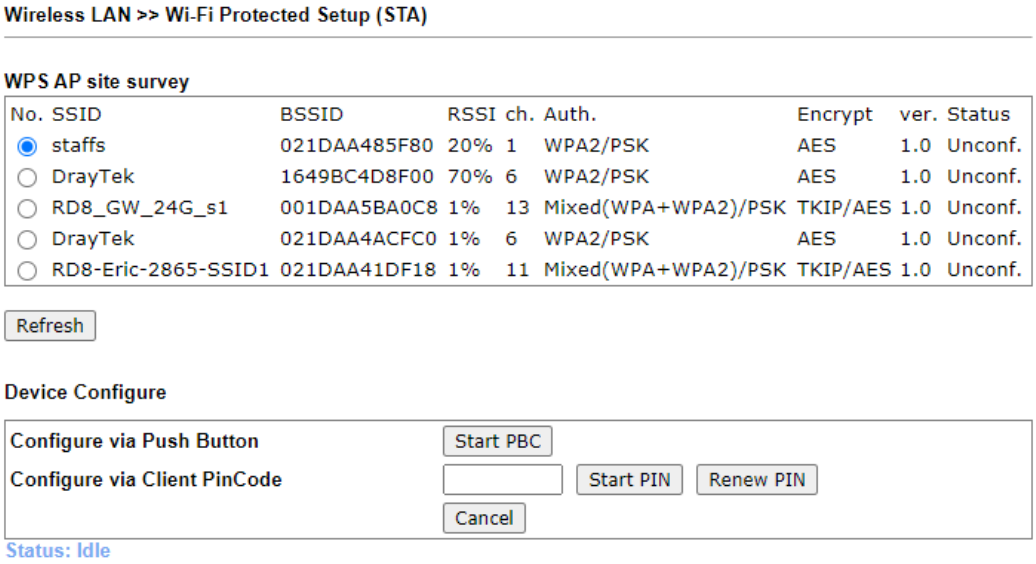
3.6.4 WPS (Wi-Fi Protected Setup)

Wi-Fi Protected Setup (WPS) is the simplest way to build connection between wireless network clients and the access point. You don't have to select encryption mode and input a long encryption passphrase every time when you need to setup a wireless client. You only have to press a button on wireless client and the access point, and the WPS will do the setup for you.

VigorAP 810 supports two types of WPS: Push-Button Configuration (PBC), and PIN code. If you want to use PBC, you have to switch VigorAP 810 to WPS mode and push a specific button on the wireless client to start WPS mode. You can push Reset/WPS button of this VigorAP 810, or click **PBC Start** button in the web configuration interface to do this; if you want to use PIN code, you have to provide the PIN code of the wireless client you wish to connect to this access point and then switch the wireless client to WPS mode.

Note: WPS function of VigorAP 810 will not work for those wireless AP/clients do not support WPS.

To use WPS function to set encrypted connection between VigorAP 810 and WPS-enabled wireless AP, please open **Wireless LAN >>WPS**. The following information will be displayed:



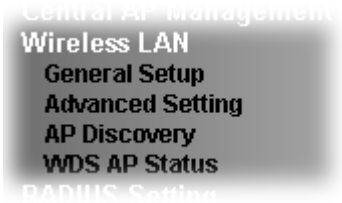
Available settings are explained as follows:

Item	Description
SSID	Display the SSID name of the access point.
BSSID	Display the BSSID (MAC Address) of the access point.
RSSI	Display the signal strength of the access point. RSSI is the abbreviation of Receive Signal Strength Indication.
Ch. (Channel)	Display the channel number of the access point.
Auth. (Authentication)	Display the authentication type of the access point.
Encrypt (Encryption)	Display the encryption setting of the access points. If you have selected the access point with security setting, you have to go to 2-7 Wireless Security to set the same security with the access point you want to associate.
Ver. (Version)	Display the version of WPS.
Status	Display the status of WPS access point.
Refresh	Click this button to refresh the AP site survey.
Start PBC	Click **Start PBC** to make a WPS connection within 2 minutes.
PIN Start	When using PinCode method, it is required to enter PIN Code (Personal Identification Number Code, 8-digit numbers) into Registrar. When the wireless station is Enrollee, the users can use Renew PIN to re-generate a new PIN code.
Renew PIN	Click this button to re-generate a new PIN code.

Note: When you're using PBC type WPS setup, you must press **PBC** button (hardware or software) of wireless client within 2 minutes. If you didn't press **PBC** button of wireless client within this time period, please press **PBC** button (hardware or software) of this access point again.

3.7 Wireless LAN Settings for AP Bridge-Point to Point/AP Bridge-Point to Multi-Point Mode

When you choose AP Bridge-Point to Point or Point-to Multi-Point Mode as the operation mode, the Wireless LAN menu items will include General Setup, Advanced Setting, AP Discovery and WDS AP Status.

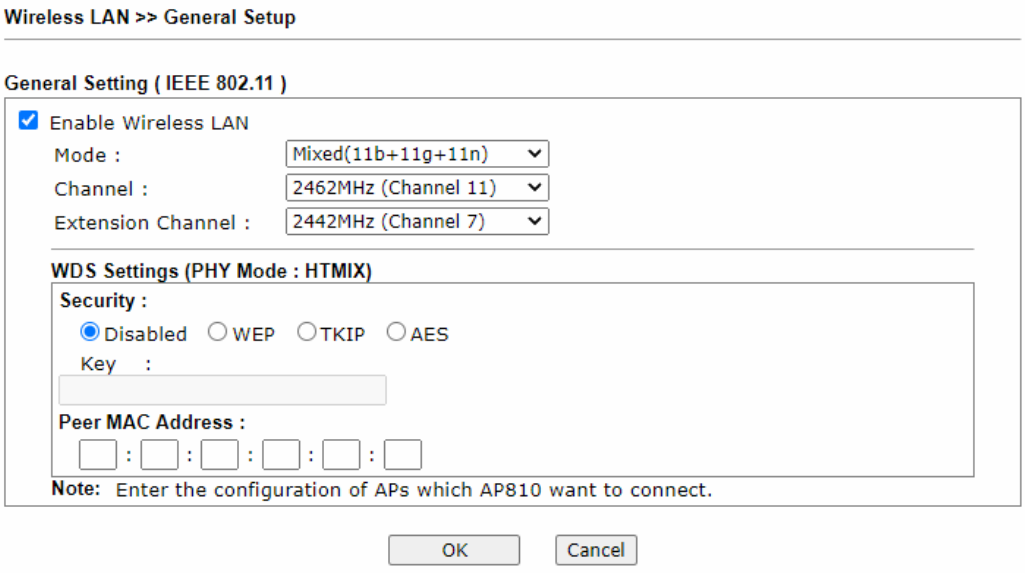


AP Bridge-Point to Point allows VigorAP 810 to connect to **another** VigorAP 810 which uses the same mode. All wired Ethernet clients of both VigorAP 810s will be connected together.

Point-to Multi-Point Mode allows AP 810 to connect up to **four** AP 810s which uses the same mode. All wired Ethernet clients of every VigorAP 810 will be connected together.

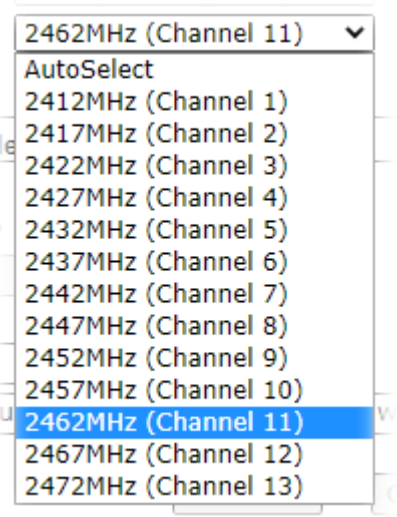
3.7.1 General Setup

By clicking the **General Setup**, a new web page will appear so that you could configure the Phy mode, security, Tx Burst and choose proper mode. Please refer to the following figure for more information.



Available settings are explained as follows:

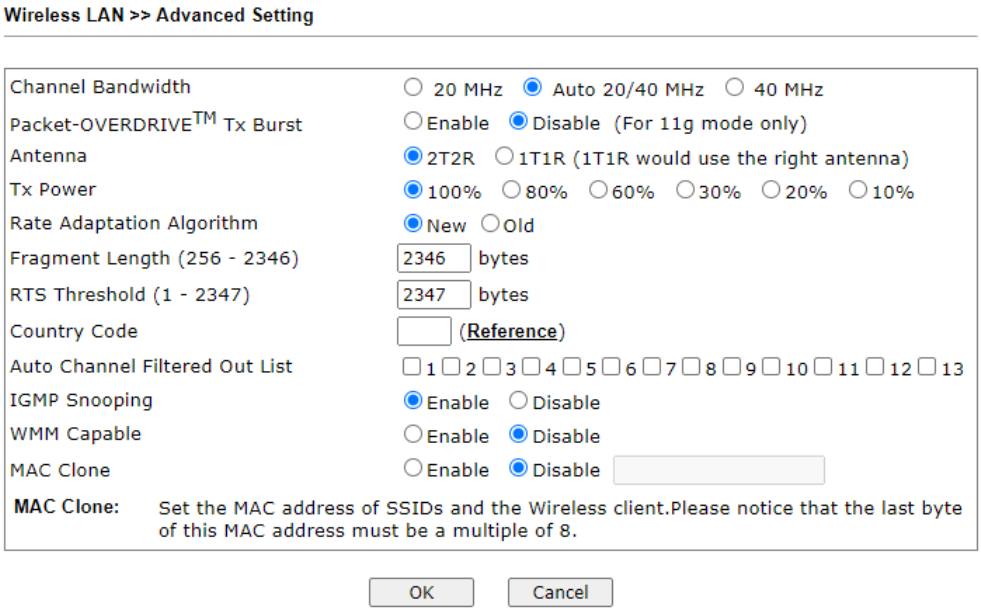
Item	Description
Enable Wireless LAN	Check the box to enable wireless function.
Mode	At present, VigorAP 810 can connect to 11b only, 11g only, 11n only, Mixed (11b+11g), Mixed (11g+11n) and Mixed (11b+11g+11n) stations simultaneously. Simply choose Mixed (11b+11g+11n) mode.
Channel	Means the channel of frequency of the wireless LAN. The default channel is 11. You may switch channel if the selected channel is under serious interference. If you have no idea of

	choosing the frequency, please select **AutoSelect** to let system determine for you. 
Extension Channel	With 802.11n, there is one option to double the bandwidth per channel. The available extension channel options will be varied according to the **Channel** selected above.
PHY Mode	HTMIX (11b/g/n mixed mode) is specified VigorAP 810.
Security	Select WEP, TKIP or AES as the encryption algorithm. Type the key number if required. Or click **Disabled** to ignore such feature.
Peer Mac Address	Type the peer MAC address for the access point that VigorAP 810 connects to.

After finishing this web page configuration, please click **OK** to save the settings.

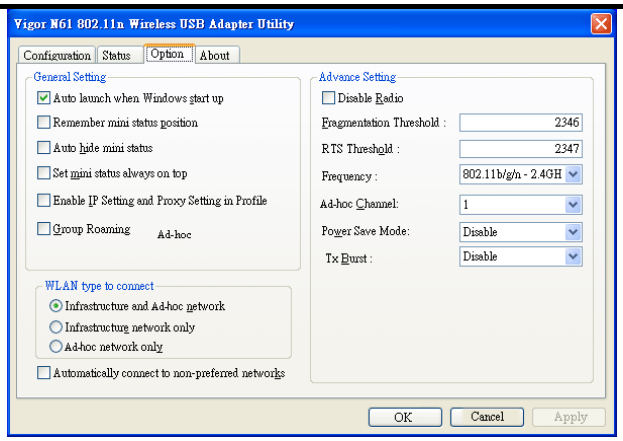
3.7.2 Advanced Setting

This page is to determine which algorithm will be selected for wireless transmission rate.



Available settings are explained as follows:

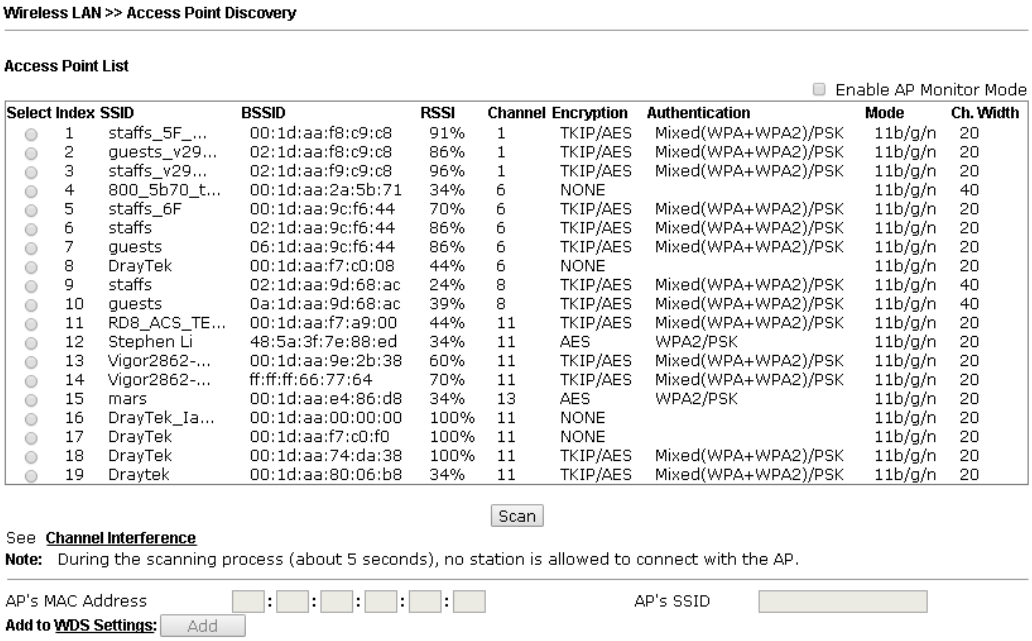
Item	Description
Channel Bandwidth	**20 MHz-** the device will use 20MHz for data transmission and receiving between the AP and the stations. **Auto 20/40 MHz–** the AP will scan for nearby wireless AP, and then use 20MHz if the number of AP is more than 10, or use 40MHz if it's not. **40 MHz-** the device will use 40MHz for data transmission and receiving between the AP and the stations.
Packet-OVERDRIVE	This feature can enhance the performance in data transmission about 40%* more (by checking **Tx Burst**). It is active only when both sides of Access Point and Station (in wireless client) invoke this function at the same time. That is, the wireless client must support this feature and invoke the function, too. **Note:** Vigor N61 wireless adapter supports this function. Therefore, you can use and install it into your PC for matching with Packet-OVERDRIVE (refer to the following picture of Vigor N61 wireless utility window, choose **Enable** for **TxBURST** on the tab of **Option**).

	
Antenna	VigorAP can be attached with two antennas to have good data transmission via wireless connection. However, if you have only one antenna attached, please choose 1T1R.
Tx Power	The default setting is the maximum (100%). Lowering down the value may degrade range and throughput of wireless.
Rate Adaptation Algorithm	Wireless transmission rate is adapted dynamically. Usually, performance of “new” algorithm is better than “old”.
Fragment Length	Set the Fragment threshold of wireless radio. Do not modify default value if you don’t know what it is, default value is 2346.
RTS Threshold	Minimize the collision (unit is bytes) between hidden stations to improve wireless performance. Set the RTS threshold of wireless radio. Do not modify default value if you don’t know what it is, default value is 2347.
Country Code	VigorAP broadcasts country codes by following the 802.11d standard. However, some wireless stations will detect / scan the country code to prevent conflict occurred. If conflict is detected, wireless station will be warned and is unable to make network connection. Therefore, changing the country code to ensure successful network connection will be necessary for some clients.
Auto Channel Filtered Out List	The selected wireless channels will be discarded if **AutoSelect** is selected as **Channel** selection mode in **Wireless LAN>>General Setup**.
IGMP Snooping	Check **Enable** to enable IGMP Snooping. Multicast traffic will be forwarded to ports that have members of that group. Disabling IGMP snooping will make multicast traffic treated in the same manner as broadcast traffic.
WMM Capable	To apply WMM parameters for wireless data transmission, please click the **Enable** radio button.
MAC Clone	Click **Enable** and manually enter the MAC address of the device with SSID 1. The MAC address of other SSIDs will change based on this MAC address.

3.7.3 AP Discovery

VigorAP 810 can scan all regulatory channels and find working APs in the neighborhood. Based on the scanning result, users will know which channel is clean for usage. Also, it can be used to facilitate finding an AP for a WDS link. Notice that during the scanning process (about 5 seconds), no client is allowed to connect to VigorAP 810.

This page is used to scan the existence of the APs on the wireless LAN. Yet, only the AP which is in the same channel of VigorAP 810 can be found. Please click **Scan** to discover all the connected APs.



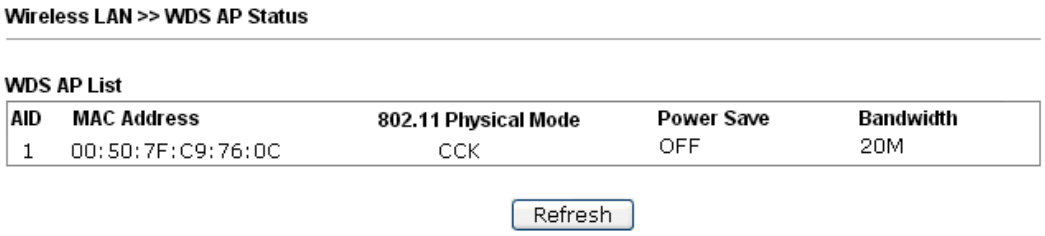
Available settings are explained as follows:

Item	Description
Enable AP Monitor Mode	This function can help to get and keep the records of APs detected by such device after clicking Scan. In general, only the available AP will be detected by Vigor device. Once the AP is unavailable, it will be deleted from the Access Point List immediately. However, if such function is enabled, the system will keep the record of the AP (once detected by Vigor device) until it is available for Vigor device again.
SSID	Display the SSID of the AP scanned by VigorAP 810.
BSSID	Display the MAC address of the AP scanned by VigorAP 810.
RSSI	Display the signal strength of the access point. RSSI is the abbreviation of Receive Signal Strength Indication.
Channel	Display the wireless channel used for the AP that is scanned by VigorAP 810.
Encryption	Display the encryption mode for the scanned AP.
Authentication	Display the authentication type that the scanned AP applied.
Mode	Display the wireless connection mode that the scanned AP

	used.
Ch. Width	Display the channel width that the scanned AP used.
Scan	It is used to discover all the connected AP. The results will be shown on the box above this button
Channel Statistics	It displays the statistics for the channels used by APs.
AP's MAC Address	If you want the found AP applying the WDS settings, please type in the AP's MAC address.
AP's SSID	To specify an AP to be applied with WDS settings, you can specify MAC address or SSID for the AP. Here is the place that you can type the SSID of the AP.
Add	Type the MAC address of the AP. Click **Add**. Later, the MAC address of the AP will be added and be shown on WDS settings page.

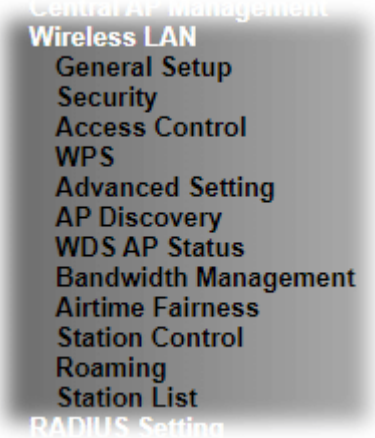
3.7.4 WDS AP Status

VigorAP 810 can display the status such as MAC address, physical mode, power save and bandwidth for the working AP connected with WDS. Click **Refresh** to get the newest information.



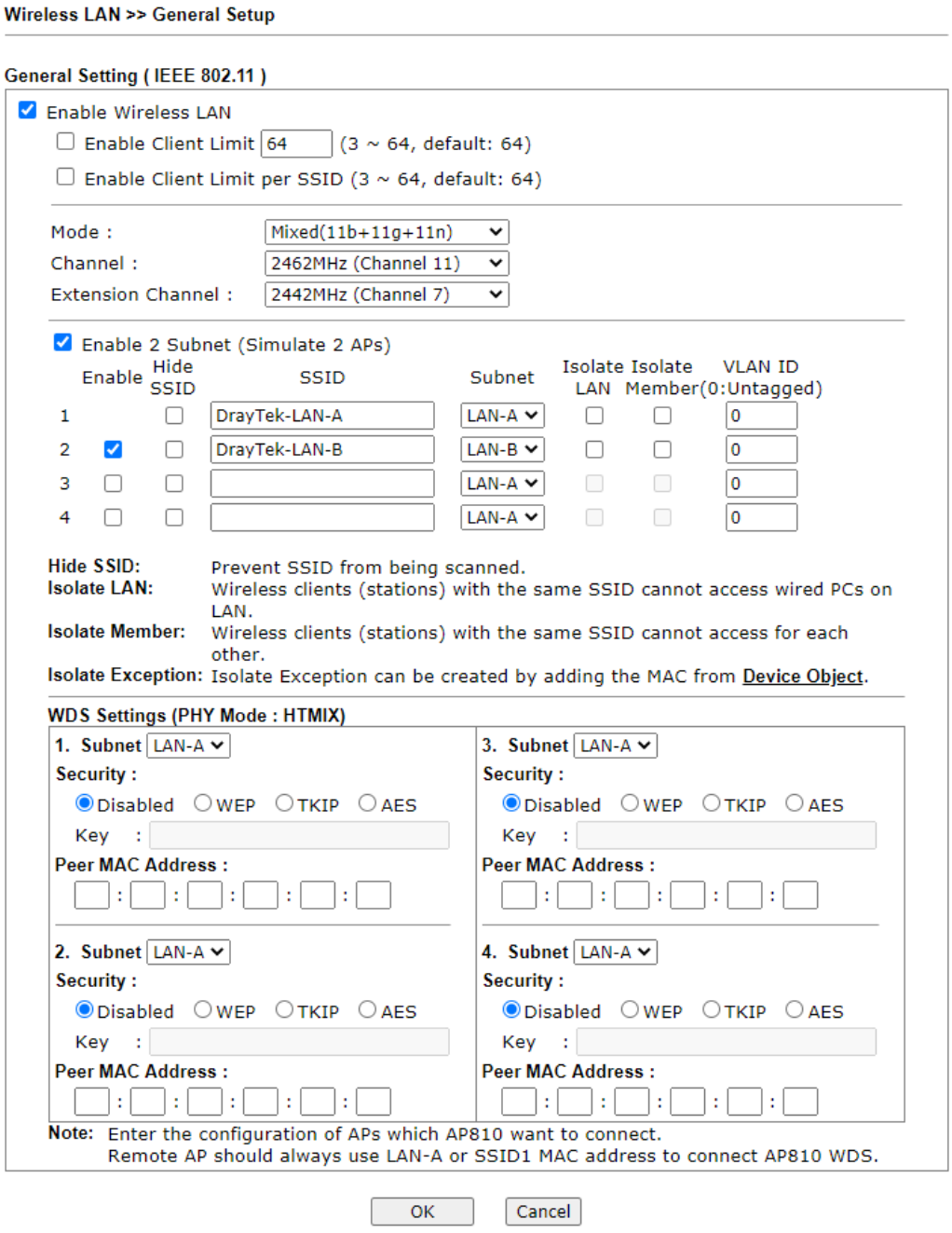
3.8 Wireless LAN Settings for AP Bridge-WDS Mode

When you choose AP Bridge-WDS as the operation mode, the Wireless LAN menu items will include General Setup, Security, Access Control, WPS, Advanced Setting, AP Discovery, WDS AP Status, Bandwidth Management, Airtime Fairness, Station Control and Roaming.



3.8.1 General Setup

By clicking the **General Setup**, a new web page will appear so that you could configure the Phy mode, security, Tx Burst and choose proper mode. Please refer to the following figure for more information.



Available settings are explained as follows:

Item	Description
Enable Wireless LAN	Check the box to enable wireless function.
Enable Client Limit	Check the box to set the maximum number of wireless stations which try to connect Internet through Vigor AP. The number you can set is from 3 to 64.
Enable Client Limit	Define the maximum number of wireless stations per SSID

per SSID	which try to connect to Internet through Vigor device. The number you can set is from 3 to 64.
Mode	At present, VigorAP 810 can connect to 11b only, 11g only, 11n only, Mixed (11b+11g), Mixed (11g+11n) and Mixed (11b+11g+11n) stations simultaneously. Simply choose Mixed (11b+11g+11n) mode.
Channel	Means the channel of frequency of the wireless LAN. You may switch channel if the selected channel is under serious interference. If you have no idea of choosing the frequency, please select **AutoSelect** to let system determine for you.
Extension Channel	With 802.11n, there is one option to double the bandwidth per channel. The available extension channel options will be varied according to the **Channel** selected above. Configure the extension channel you want.
Enable 2 Subnet (Simulate 2 APs)	Check the box to enable the function for two independent subnets. Once you enable this function, LAN-A and LAN-B would be independent. Next, you can connect one router in LAN-A, and another router in LAN-B. Such mechanism can make you feeling that you have two independent AP/subnet functions in one VigorAP 810. If you disable this function, LAN-A and LAN-B ports are in the same domain. You could only connect one router (no matter connecting to LAN-A or LAN-B) in this environment.
Enable	SSID #1 is enabled in default. SSID #2 ~ #4 can be enabled manually.
Hide SSID	Check it to prevent from wireless sniffing and make it harder for unauthorized clients or STAs to join your wireless LAN. Depending on the wireless utility, the user may only see the information except SSID or just cannot see any thing about VigorAP 810 while site surveying. The system allows you to set three sets of SSID for different usage.
SSID	Set a name for VigorAP 810 to be identified. Default settings are DrayTek-LAN-A and DrayTek-LAN-B. When **Enable 2 Subnet** is enabled, you can specify subnet interface (LAN-A or LAN-B) for each SSID by using the drop down menu.
Subnet	Choose LAN-A or LAN-B for each SSID. If you choose LAN-A, the wireless clients connecting to this SSID could only communicate with LAN-A.
Isolate LAN	Check this box to make the wireless clients (stations) with the same SSID not accessing for wired PC in LAN.
Isolate Member	Check this box to make the wireless clients (stations) with the same SSID not accessing for each other.
VLAN ID	Type the value for such SSID. Packets transferred from such SSID to LAN will be tagged with the number. If your network uses VLANs, you can assign the SSID to a VLAN on your network. Client devices that associate using the SSID are grouped into this VLAN. The VLAN ID range is

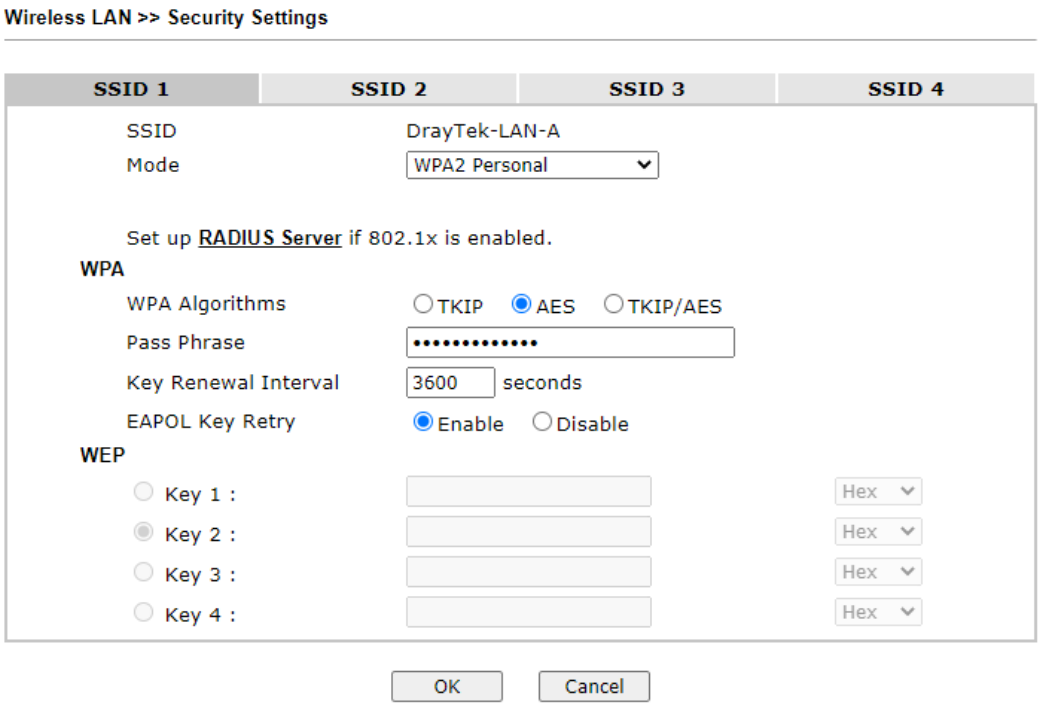
	from 3 to 4095. The VLAN ID is 0 by default, it means disabling the VLAN function for the SSID.
PHY Mode	Data will be transmitted via HTMIX mode. Each access point should be setup to the same **PHY Mode** for connecting with each other.
Subnet	Choose LAN-A or LAN-B for each SSID.
Security	Select WEP, TKIP or AES as the encryption algorithm.
Peer MAC Address	Four peer MAC addresses are allowed to be entered in this page at one time.

After finishing this web page configuration, please click **OK** to save the settings.

3.8.2 Security

This page allows you to set security with different modes for SSID 1, 2, 3 and 4 respectively. After configuring the correct settings, please click **OK** to save and invoke it.

By clicking the **Security Settings**, a new web page will appear so that you could configure the settings.

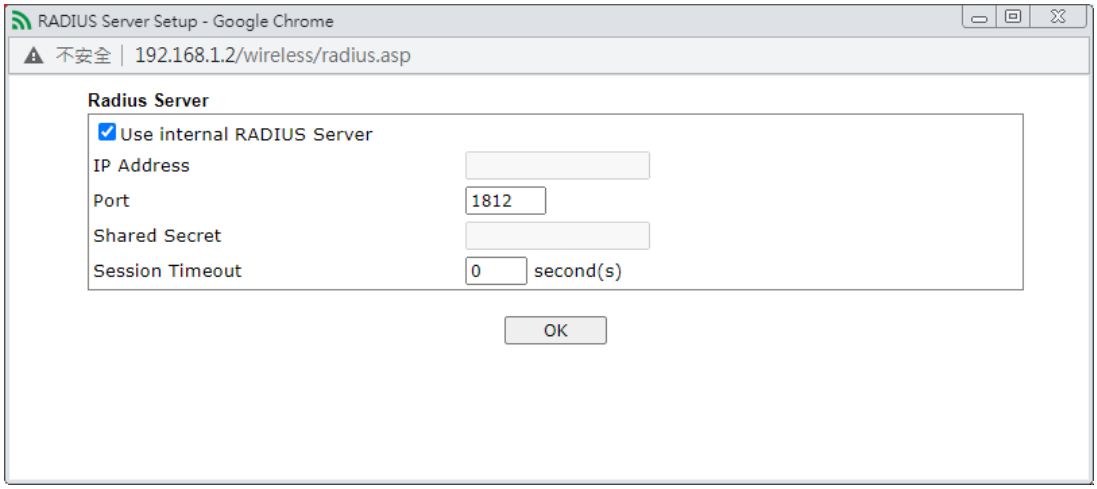


Available settings are explained as follows:

Item	Description
Mode	There are several modes provided for you to choose. Below shows the modes with higher security; **WPA2 Personal, WPA2/WPA Personal -** Accepts only WPA clients and the encryption key should be entered in PSK. The WPA encrypts each frame transmitted from the radio using the key, which either PSK (Pre-Shared Key) entered manually in this field below or automatically negotiated via 802.1x authentication. The WPA encrypts each frame transmitted from the radio using the key, which either PSK (Pre-Shared Key) entered manually in this field below or automatically negotiated via 802.1x authentication. Select WPA, WPA2 or Auto as WPA mode. **WPA2 Enterprise, WPA2/WPA Enterprise -** The WPA encrypts each frame transmitted from the radio using the key, which either PSK (Pre-Shared Key) entered manually in this field below or automatically negotiated via 802.1x authentication. Below shows the modes with basic security; **WPA Personal** - Accepts only WPA clients and the encryption key should be entered in PSK. The WPA encrypts each frame

	transmitted from the radio using the key, which either PSK (Pre-Shared Key) entered manually in this field below or automatically negotiated via 802.1x authentication. **WPA Enterprise** - The WPA encrypts each frame transmitted from the radio using the key, which either PSK (Pre-Shared Key) entered manually in this field below or automatically negotiated via 802.1x authentication. **WEP Personal** - Accepts only WEP clients and the encryption key should be entered in WEP Key. **None** - The encryption mechanism is turned off.
WPA Algorithms	Select TKIP, AES or TKIP/AES as the algorithm for WPA. Such feature is available for **WPA2 Enterprise, WPA Enterprise, WPA Personal** or **WPA2 Personal** or **WPA2/WPA Personal** mode.
Pass Phrase	Either **8~63** ASCII characters, such as 012345678..(or 64 Hexadecimal digits leading by 0x, such as "0x321253abcde..."). Such feature is available for **WPA Personal** or **WPA2 Personal** or **WPA2/WPA Personal** mode.
Key Renewal Interval	WPA uses shared key for authentication to the network. However, normal network operations use a different encryption key that is randomly generated. This randomly generated key that is periodically replaced. Enter the renewal security time (seconds) in the column. Smaller interval leads to greater security but lower performance. Default is 3600 seconds. Set 0 to disable re-key. Such feature is available for **WPA2 Enterprise, WPA Enterprise, WPA Personal** or **WPA2 Personal** or **WPA2/WPA Personal** mode.
EAPOL Key Retry	EAPOL means Extensible Authentication Protocol over LAN. **Enable** - The default setting is "Enable". It can make sure that the key will be installed and used once in order to prevent key reinstallation attack.
Key 1 – Key 4	Four keys can be entered here, but only one key can be selected at a time. The format of WEP Key is restricted to 5 ASCII characters or 10 hexadecimal values in 64-bit encryption level, or restricted to 13 ASCII characters or 26 hexadecimal values in 128-bit encryption level. The allowed content is the ASCII characters from 33(!) to 126(~) except '#' and ','. Such feature is available for **WEP Personal** mode.

Click the link of **RADIUS Server** to access into the following page for more settings.



Available settings are explained as follows:

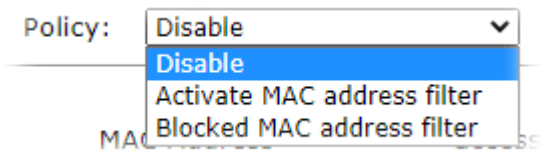
Item	Description
Use internal RADIUS Server	There is a RADIUS server built in VigorAP 810 which is used to authenticate the wireless client connecting to the access point. Check this box to use the internal RADIUS server for wireless security. Besides, if you want to use the external RADIUS server for authentication, do not check this box. Please refer to the section, **3.10 RADIUS Setting** to configure settings for internal server of VigorAP 810.
IP Address	Enter the IP address of external RADIUS server.
Port	The UDP port number that the external RADIUS server is using. The default value is 1812, based on RFC 2138.
Shared Secret	The external RADIUS server and client share a secret that is used to authenticate the messages sent between them. Both sides must be configured to use the same shared secret.
Session Timeout	Set the maximum time of service provided before re-authentication. Set to zero to perform another authentication immediately after the first authentication has successfully completed. (The unit is second.)

After finishing this web page configuration, please click **OK** to save the settings.

3.8.3 Access Control

For additional security of wireless access, the **Access Control** facility allows you to restrict the network access right by controlling the wireless LAN MAC address of client. Only the valid MAC address that has been configured can access the wireless LAN interface. By clicking the **Access Control**, a new web page will appear, as depicted below, so that you could edit the clients' MAC addresses to control their access rights (deny or allow).

Available settings are explained as follows:

Item	Description
Policy	Select to enable any one of the following policy or disable the policy. Choose **Activate MAC address filter** to type in the MAC addresses for other clients in the network manually. Choose **Blocked MAC address filter,** so that all of the devices with the MAC addresses listed on the MAC Address Filter table will be blocked and cannot access into VigorAP 810. 
MAC Address Filter	Display all MAC addresses that are edited before.
MAC	**Client's MAC Address -** Manually enter the MAC address of wireless client. **Add -** Add a new MAC address into the list. **Delete -** Delete the selected MAC address in the list. **Edit -** Edit the selected MAC address in the list.

Object	In addition to enter the MAC address of the device manually, you can **Device Group** - Select one of the existed device groups and click **Add**. All the devices belonging to the selected group will be shown on the MAC Address Filter table. **Device Object** - Select one of the existed device object and click **Add**. The MAC address of the device will be shown on the MAC Address Filter table.
Cancel	Give up the access control set up.
Backup	Click it to store the settings (MAC addresses on MAC Address Filter table) on this page as a file.
Restore	Click it to restore the settings (MAC addresses on MAC Address Filter table) from an existed file.

After finishing this web page configuration, please click **OK** to save the settings.

3.8.4 WPS

Open **Wireless LAN>>WPS** to configure the corresponding settings.

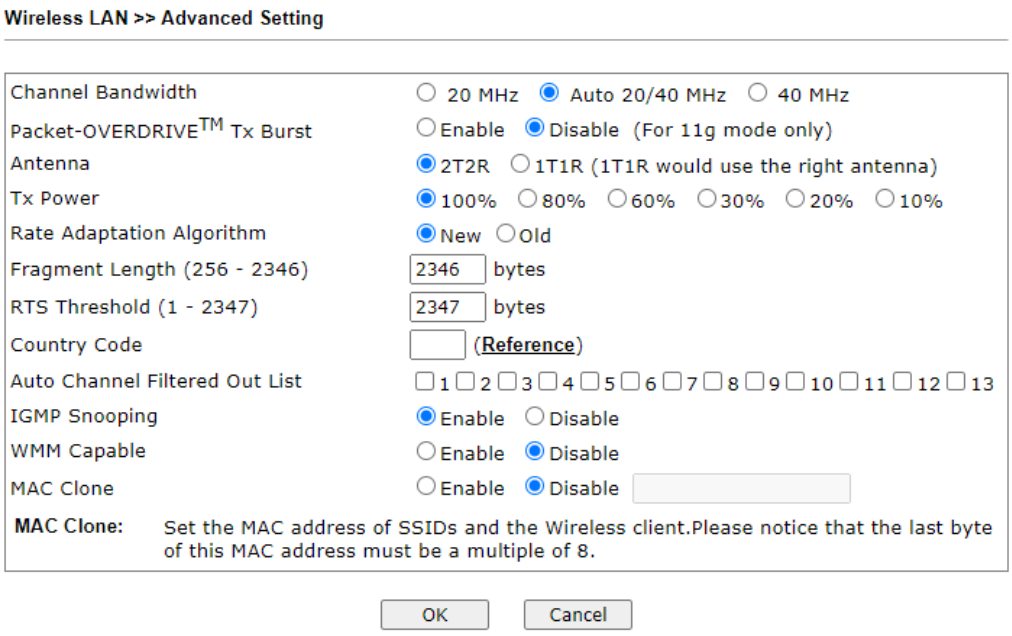
Available settings are explained as follows:

Item	Description
Enable WPS	Check this box to enable WPS setting.
WPS Configured	Display related system information for WPS. If the wireless security (encryption) function of VigorAP 810 is properly configured, you can see 'Yes' message here.
WPS SSID	Display current selected SSID.
WPS Auth Mode	Display current authentication mode of the VigorAP 810r. Only WPA2/PSK and WPA/PSK support WPS.
WPS Encryp Type	Display encryption mode (None, WEP, TKIP, AES, etc.) of VigorAP 810.

Configure via Push Button	Click **Start PBC** to invoke Push-Button style WPS setup procedure. VigorAP 810 will wait for WPS requests from wireless clients about two minutes. The WPS LED on VigorAP 810 will blink fast when WPS is in progress. It will return to normal condition after two minutes. (You need to setup WPS within two minutes)
Configure via Client PinCode	Type the PIN code specified in wireless client you wish to connect, and click **Start PIN** button. The WLAN LED on VigorAP 810 will blink fast when WPS is in progress. It will return to normal condition after two minutes. (You need to setup WPS within two minutes).

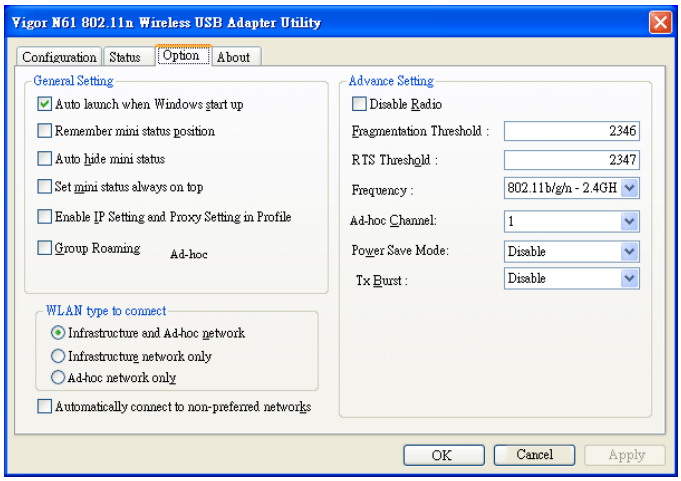
3.8.5 Advanced Setting

This page is to determine which algorithm will be selected for wireless transmission rate.



Available settings are explained as follows:

Item	Description
Channel Bandwidth	**20 MHZ-** the AP will use 20Mhz for data transmission and receiving between the AP and the stations. **Auto 20/40 MHZ–** the AP will use 20Mhz or 40Mhz for data transmission and receiving according to the station capability. Such channel can increase the performance for data transmission. **40 MHZ-** the AP will use 40Mhz for data transmission and receiving between the AP and the stations.
Packet-OVERDRIVE	This feature can enhance the performance in data transmission about 40%* more (by checking **Tx Burst**). It is active only when both sides of Access Point and Station (in wireless client) invoke this function at the same time. That is, the wireless client must support this feature and invoke the

	function, too. **Note:** Vigor N61 wireless adapter supports this function. Therefore, you can use and install it into your PC for matching with Packet-OVERDRIVE (refer to the following picture of Vigor N61 wireless utility window, choose **Enable** for **TxBURST** on the tab of **Option**). 
Antenna	VigorAP can be attached with two antennas to have good data transmission via wireless connection. However, if you have only one antenna attached, please choose 1T1R.
Tx Power	The default setting is the maximum (100%). Lowering down the value may degrade range and throughput of wireless.
Rate Adaptation Algorithm	Wireless transmission rate is adapted dynamically. Usually, performance of “new” algorithm is better than “old”.
Fragment Length	Set the Fragment threshold of wireless radio. Do not modify default value if you don’t know what it is, default value is 2346.
RTS Threshold	Minimize the collision (unit is bytes) between hidden stations to improve wireless performance. Set the RTS threshold of wireless radio. Do not modify default value if you don’t know what it is, default value is 2347.
Country Code	VigorAP broadcasts country codes by following the 802.11d standard. However, some wireless stations will detect / scan the country code to prevent conflict occurred. If conflict is detected, wireless station will be warned and is unable to make network connection. Therefore, changing the country code to ensure successful network connection will be necessary for some clients.
Auto Channel Filtered Out List	The selected wireless channels will be discarded if **AutoSelect** is selected as **Channel** selection mode in **Wireless LAN>>General Setup**.
IGMP Snooping	Check **Enable** to enable IGMP Snooping. Multicast traffic will be forwarded to ports that have members of that group. Disabling IGMP snooping will make multicast traffic treated in the same manner as broadcast traffic.
WMM Capable	To apply WMM parameters for wireless data transmission,

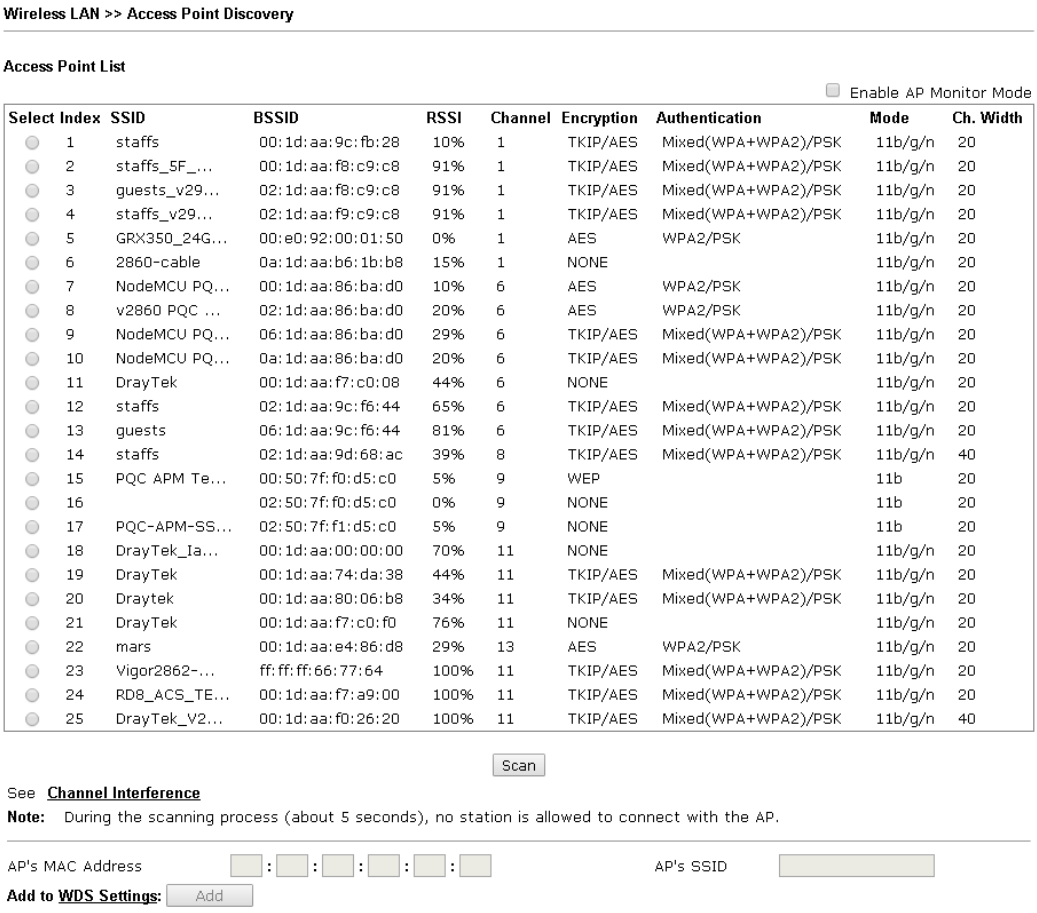
	please click the **Enable** radio button.
MAC Clone	Click **Enable** and manually enter the MAC address of the device with SSID 1. The MAC address of other SSIDs will change based on this MAC address.

After finishing this web page configuration, please click **OK** to save the settings.

3.8.6 AP Discovery

VigorAP 810 can scan all regulatory channels and find working APs in the neighborhood. Based on the scanning result, users will know which channel is clean for usage. Also, it can be used to facilitate finding an AP for a WDS link. Notice that during the scanning process (about 5 seconds), no client is allowed to connect to Vigor.

This page is used to scan the existence of the APs on the wireless LAN. Yet, only the AP which is in the same channel of VigorAP 810 can be found. Please click **Scan** to discover all the connected APs.



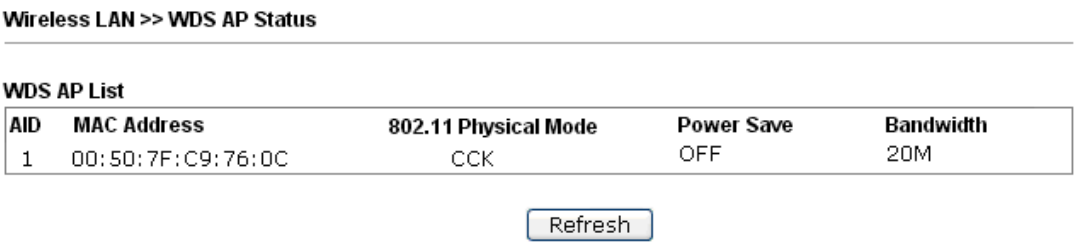
Each item is explained as follows:

Item	Description
Enable AP Monitor Mode	This function can help to get and keep the records of APs detected by such device after clicking Scan. In general, only the available AP will be detected by Vigor device. Once the AP is unavailable, it will be deleted from the Access Point List immediately. However, if such function is enabled, the system will keep the record of the AP (once

	detected by Vigor device) until it is available for Vigor device again.
SSID	Display the SSID of the AP scanned by VigorAP 810.
BSSID	Display the MAC address of the AP scanned by VigorAP 810.
RSSI	Display the signal strength of the access point. RSSI is the abbreviation of Receive Signal Strength Indication.
Channel	Display the wireless channel used for the AP that is scanned by VigorAP 810.
Encryption	Display the encryption mode for the scanned AP.
Authentication	Display the authentication type that the scanned AP applied.
Mode	Display the wireless connection mode that the scanned AP used.
Ch. Width	Display the channel width that the scanned AP used.
Scan	It is used to discover all the connected AP. The results will be shown on the box above this button
Channel Statistics	It displays the statistics for the channels used by APs.
AP's MAC Address	If you want the found AP applying the WDS settings, please type in the AP's MAC address.
AP's SSID	To specify an AP to be applied with WDS settings, you can specify MAC address or SSID for the AP. Here is the place that you can type the SSID of the AP.
Add	Click **Repeater** for the specified AP. Next, click **Add**. Later, the MAC address of the AP will be added and be shown on WDS settings page.

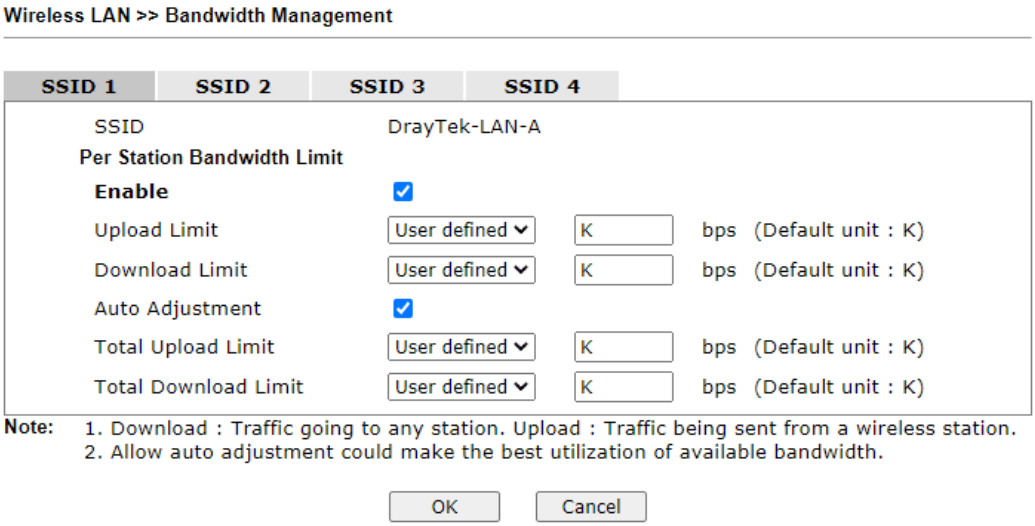
3.8.7 WDS AP Status

VigorAP 810 can display the status such as MAC address, physical mode, power save and bandwidth for the working AP connected with WDS. Click **Refresh** to get the newest information.



3.8.8 Bandwidth Management

The downstream or upstream from FTP, HTTP or some P2P applications will occupy large of bandwidth and affect the applications for other programs. Please use Bandwidth Management to make the bandwidth usage more efficient.



Available settings are explained as follows:

Item	Description
SSID	Display the specific SSID name of the AP.
Enable	Check this box to enable the bandwidth management for clients.
Upload Limit	Define the maximum speed of the data uploading which will be used for the wireless stations connecting to Vigor AP with the same SSID. Use the drop down list to choose the rate. If you choose **User defined**, you have to specify the rate manually.
Download Limit	Define the maximum speed of the data downloading which will be used for the wireless station connecting to Vigor AP with the same SSID. Use the drop down list to choose the rate. If you choose **User defined**, you have to specify the rate manually.
Auto Adjustment	Check this box to have the bandwidth limit determined by the system automatically.
Total Upload Limit	When Auto Adjustment is checked, the value defined here will be treated as the total bandwidth shared by all of the wireless stations with the same SSID for data uploading.
Total Download Limit	When Auto Adjustment is checked, the value defined here will be treated as the total bandwidth shared by all of the wireless stations with the same SSID for data downloading.

After finishing this web page configuration, please click **OK** to save the settings.

3.8.9 Airtime Fairness

Airtime fairness is essential in wireless networks that must support critical enterprise applications.

Most of the applications are either symmetric or require more downlink than uplink capacity; telephony and email send the same amount of data in each direction, while video streaming and web surfing involve more traffic sent from access points to clients than the other way around. This is essential for ensuring predictable performance and quality-of-service, as well as allowing 802.11n and legacy clients to coexist on the same network. Without airtime fairness, offices using mixed mode networks risk having legacy clients slow down the entire network or letting the fastest client(s) crowd out other users.

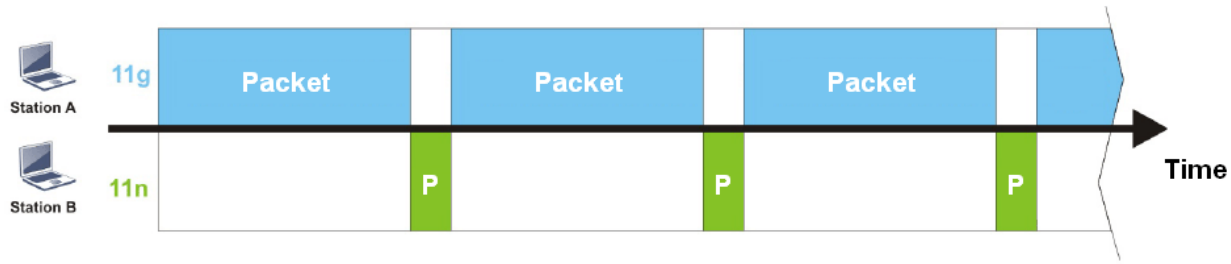
With airtime fairness, every client at a given quality-of-service level has equal access to the network's airtime.

The wireless channel can be accessed by only one wireless station at the same time.

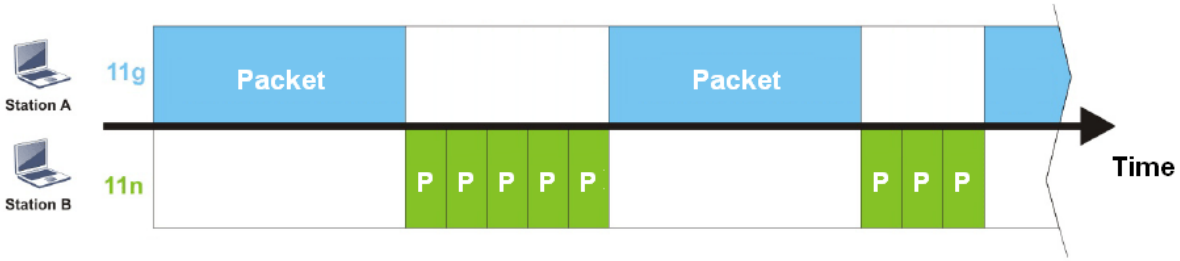
The principle behind the IEEE802.11 channel access mechanisms is that each station has ***equal probability*** to access the channel. When wireless stations have similar data rate, this principle leads to a fair result. In this case, stations get similar channel access time which is called airtime.

However, when stations have various data rate (e.g., 11g, 11n), the result is not fair. The slow stations (11g) work in their slow data rate and occupy too much airtime, whereas the fast stations (11n) become much slower.

Take the following figure as an example, both Station A(11g) and Station B(11n) transmit data packets through VigorAP 810. Although they have equal probability to access the wireless channel, Station B(11n) gets only a little airtime and waits too much because Station A(11g) spends longer time to send one packet. In other words, Station B(fast rate) is obstructed by Station A(slow rate).



To improve this problem, Airtime Fairness is added for VigorAP 810. Airtime Fairness function tries to assign *similar airtime* to each station (A/B) by controlling TX traffic. In the following figure, Station B(11n) has higher probability to send data packets than Station A(11g). By this way, Station B(fast rate) gets fair airtime and it's speed is not limited by Station A(slow rate).



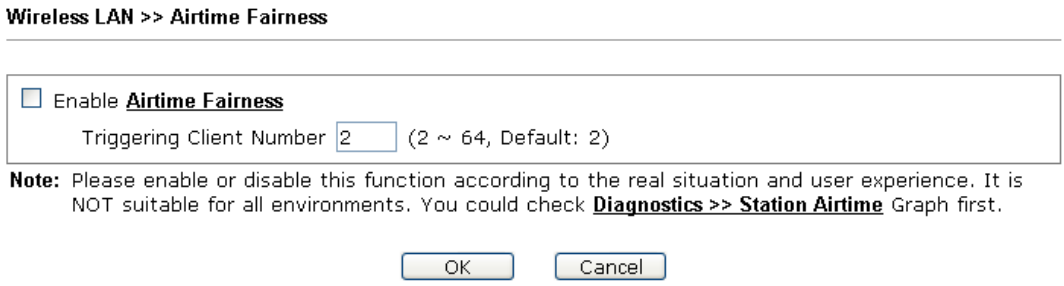
It is similar to automatic Bandwidth Limit. The dynamic bandwidth limit of each station depends on instant active station number and airtime assignment. Please note that Airtime Fairness of 2.4GHz and 5GHz are independent. But stations of different SSIDs function together, because they all use the same wireless channel. IN SPECIFIC ENVIRONMENTS, this function can reduce the bad influence of slow wireless devices and improve the overall wireless performance.

Suitable environment:

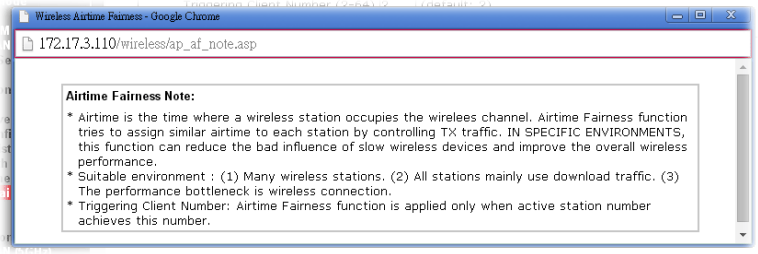
(1) Many wireless stations.

(2) All stations mainly use download traffic.

(3) The performance bottleneck is wireless connection.



Available settings are explained as follows:

Item	Description
Enable Airtime Fairness	Try to assign similar airtime to each wireless station by controlling TX traffic. **Airtime Fairness** – Click the link to display the following screen of airtime fairness note.  **Triggering Client Number –**Airtime Fairness function is applied only when active station number achieves this number.

After finishing this web page configuration, please click **OK** to save the settings.

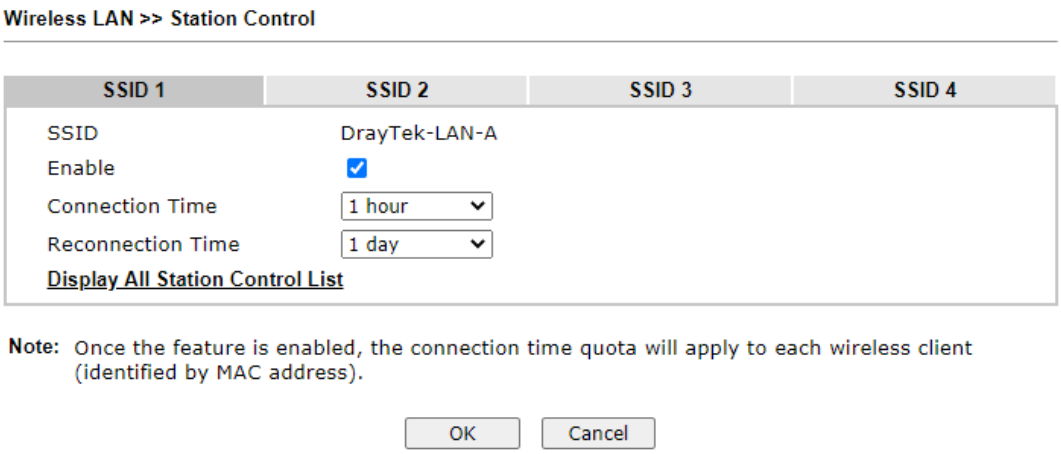
Note: Airtime Fairness function and Bandwidth Limit function should be mutually exclusive. So their webs have extra actions to ensure these two functions are not enabled simultaneously.

3.8.10 Station Control

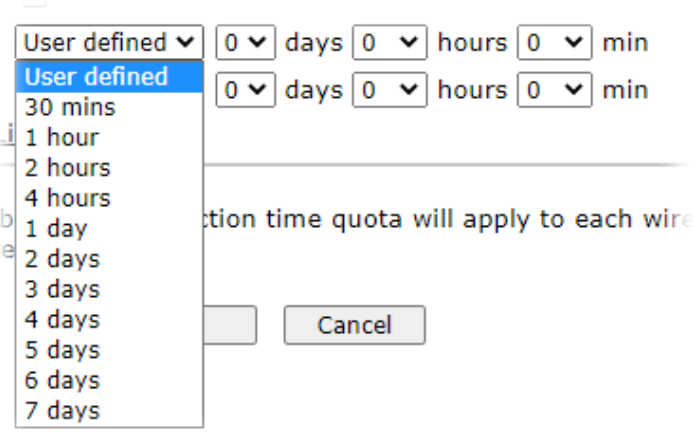
Station Control is used to specify the duration for the wireless client to connect and reconnect VigorAP. If such function is not enabled, the wireless client can connect VigorAP until it shuts down.

Such feature is especially useful for free Wi-Fi service. For example, a coffee shop offers free Wi-Fi service for its guests for one hour every day. Then, the connection time can be set as “1 hour” and reconnection time can be set as “1 day”. Thus, the guest can finish his job within one hour and will not occupy the wireless network for a long time.

Note: Up to 300 Wireless Station records are supported by VigorAP.



Available settings are explained as follows:

Item	Description
SSID	Display the SSID that the wireless station will use it to connect with Vigor router.
Enable	Check the box to enable the station control function.
Connection Time / Reconnection Time	Use the drop down list to choose the duration for the wireless client connecting /reconnecting to Vigor router. Or, type the duration manually when you choose **User defined**. 

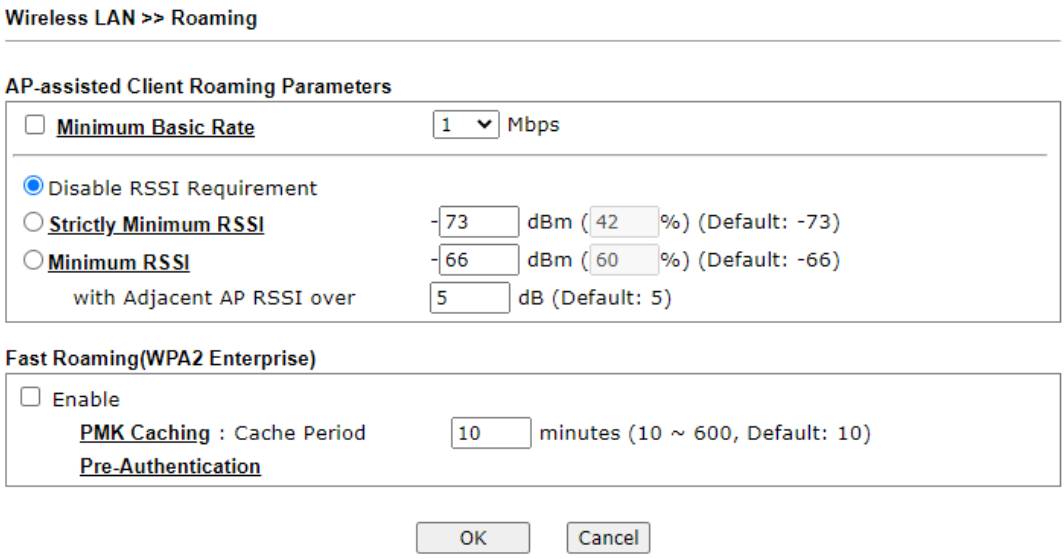
Display All Station Control List	All the wireless stations connecting to Vigor router by using such SSID will be listed on Station Control List.

After finishing all the settings here, please click **OK** to save the configuration.

3.8.11 Roaming

The network signal for a single wireless access point might be limited by its coverage range. Therefore, if you want to expand the wireless network in a large exhibition with a quick method, you can install multiple access points with enabling the Roaming feature for each AP to reach the purpose of expanding wireless signals seamlessly.

These access points connecting for each other shall be verified by pre-authentication. This page allows you to enable the roaming feature and the pre-authentication.



Available settings are explained as follows:

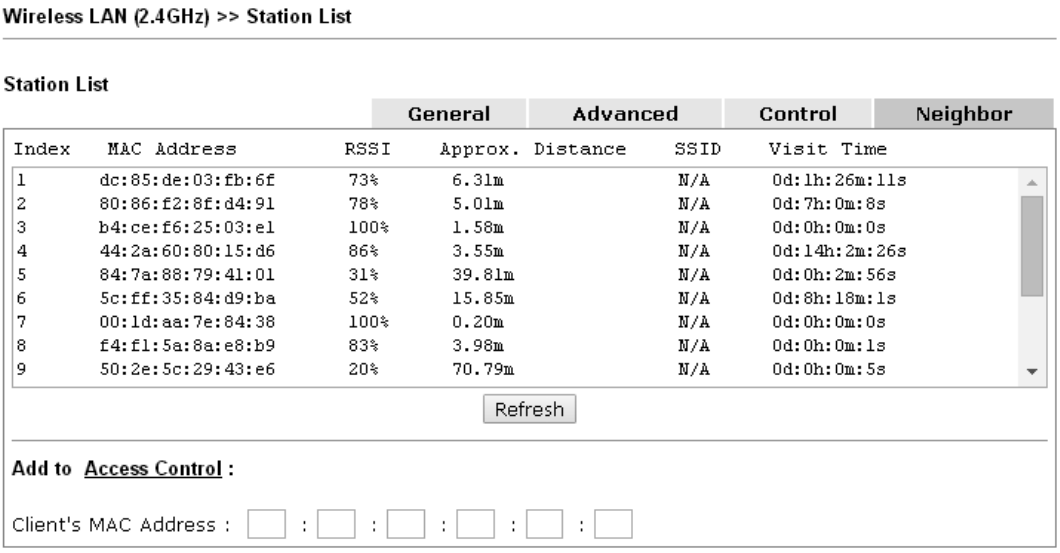
Item	Description
AP-assisted Client Roaming Parameters	When the link rate of wireless station is too low or the signal received by the wireless station is too worse, VigorAP 810 will automatically detect (based on the link rate and RSSI requirement) and cut off the network connection for that wireless station to assist it to connect another Wireless AP to get better signal. **Minimum Basic Rate –** Check the box to use the drop down list to specify a basic rate (**Mbps**). When the link rate of the wireless station is below such value, VigorAP 810 will terminate the network connection for that wireless station. **Disable RSSI Requirement -** If it is selected, VigorAP will not terminate the network connection based on RSSI. **Strictly Minimum RSSI -** VigorAP uses RSSI (received signal strength indicator) to decide to terminate the network connection of wireless station. When the signal strength is below the value (**dBm**) set here, VigorAP 810 will terminate the network connection for that wireless station. **Minimum RSSI -** When the signal strength of the wireless

	station is below the value (**dBm**) set here and adjacent AP (must be DrayTek AP and support such feature too) with higher signal strength value (defined in the field of **With Adjacent AP RSSI over**) is detected by VigorAP 810, VigorAP 810 will terminate the network connection for that wireless station. Later, the wireless station can connect to the adjacent AP (with better RSSI). ● **With Adjacent AP RSSI over –** Specify a value as a threshold.
Fast Roaming (WPA/802.1x)	**Enable –** Check the box to enable fast roaming configuration. **PMK Cache Period -** Set the expire time of WPA2 PMK (Pairwise master key) cache. PMK Cache manages the list from the BSSIDs in the associated SSID with which it has pre-authenticated. Such feature is available for **WPA2/802.1** mode. **Pre-Authentication -** Enables a station to authenticate to multiple APs for roaming securer and faster. With the pre-authentication procedure defined in IEEE 802.11i specification, the pre-four-way-handshake can reduce handoff delay perceivable by a mobile node. It makes roaming faster and more secure. (Only valid in WPA2) **Enable** - Enable IEEE 802.1X Pre-Authentication. **Disable** - Disable IEEE 802.1X Pre-Authentication.

After finishing this web page configuration, please click **OK** to save the settings.

3.8.12 Station List

Station List provides the knowledge of connecting wireless clients now along with its status code.



Available settings are explained as follows:

Item	Description
MAC Address	Display the MAC Address for the connecting client.
SSID	Display the SSID that the wireless client connects to.
Auth	Display the authentication that the wireless client uses for connection with such AP.
Encrypt	Display the encryption mode used by the wireless client.
Tx Rate/Rx Rate	Display the transmission /receiving rate for packets.
Refresh	Click this button to refresh the status of station list.
Add to Access Control	**Client's MAC Address** - For additional security of wireless access, the Access Control facility allows you to restrict the network access right by controlling the wireless LAN MAC address of client. Only the valid MAC address that has been configured can access the wireless LAN interface.
Add	Click this button to add current typed MAC address into **Access Contro**l.

General

Display general information (e.g., MAC Address, SSID, Auth, Encrypt, TX/RX Rate) for the station.

Advanced

Display more information (e.g., AID, PSM, WMM, RSSI PhMd, BW, MCS, Rate) for the station.

Control

Display connection and reconnection time of the wireless stations.

Neighbor

Display more information for the neighboring wireless stations.

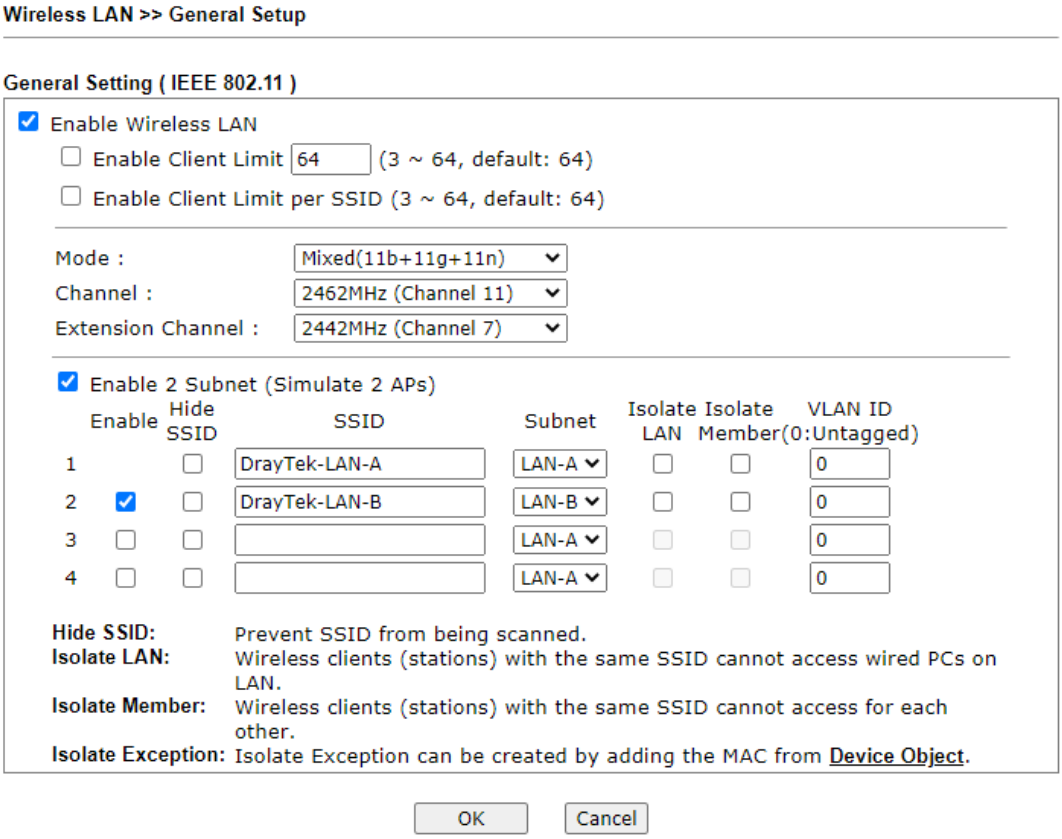
3.9 Wireless LAN Settings for Universal Repeater Mode

When you choose Universal Repeater as the operation mode, the Wireless LAN menu items will include General Setup, Security, WPS, AP Discovery, Universal Repeater, Bandwidth Management, Airtime Fairness, Station Control, Roaming and Station List.

3.9.1 General Setup

By clicking the **General Setup**, a new web page will appear so that you could configure the SSID and the wireless channel.

Please refer to the following figure for more information.



Available settings are explained as follows:

Item	Description
Enable Wireless LAN	Check the box to enable wireless function.
Enable Client Limit	Check the box to set the maximum number of wireless stations which try to connect Internet through Vigor AP. The number you can set is from 3 to 64.
Enable Client Limit per SSID	Define the maximum number of wireless stations per SSID which try to connect to Internet through Vigor device. The number you can set is from 3 to 64.
Mode	At present, VigorAP 810 can connect to 11b only, 11g only, 11n only, Mixed (11b+11g), Mixed (11g+11n) and Mixed (11b+11g+11n) stations simultaneously. Simply choose Mixed (11b+11g+11n) mode.
Channel	Means the channel of frequency of the wireless LAN. You may switch channel if the selected channel is under serious interference. If you have no idea of choosing the frequency, please select **AutoSelect** to let system determine for you.
Rate	If you choose 11g Only or 11b Only, such feature will be available for you to set data transmission rate.

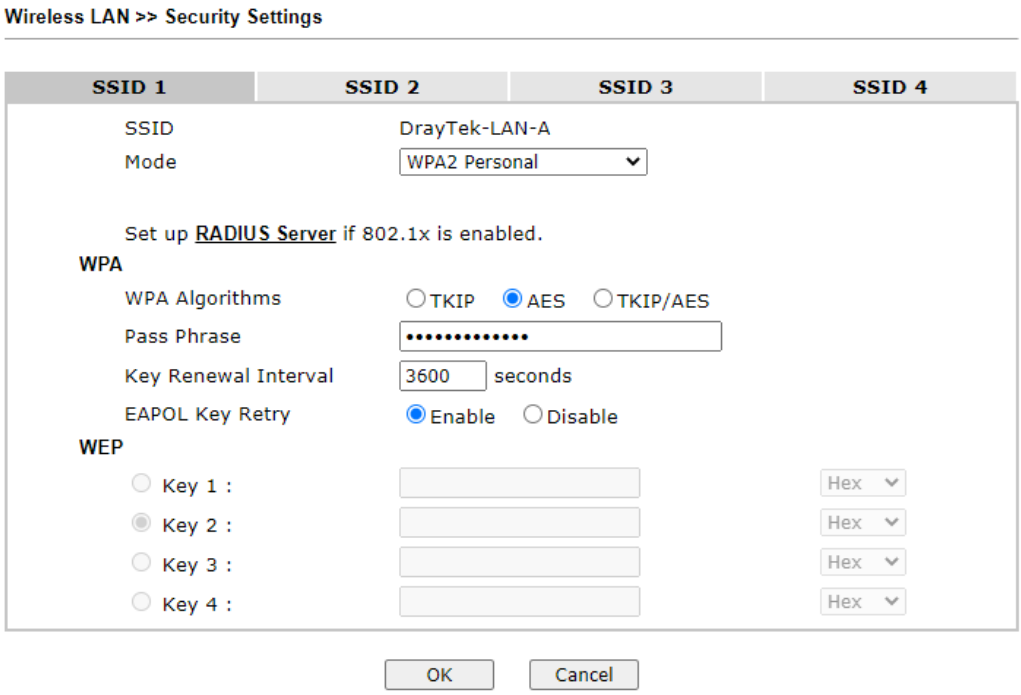
Extension Channel	With 802.11n, there is one option to double the bandwidth per channel. The available extension channel options will be varied according to the **Channel** selected above. Configure the extension channel you want.
Enable 2 Subnet (Simulate 2 APs)	Check the box to enable the function for two independent subnets. Once you enable this function, LAN-A and LAN-B would be independent. Next, you can connect one router in LAN-A, and another router in LAN-B. Such mechanism can make you feeling that you have two independent AP/subnet functions in one VigorAP 810. If you disable this function, LAN-A and LAN-B ports are in the same domain. You could only connect one router (no matter connecting to LAN-A or LAN-B) in this environment.
Enable	SSID #1 is enabled in default. SSID #2 ~ #4 can be enabled manually.
Hide SSID	Check it to prevent from wireless sniffing and make it harder for unauthorized clients or STAs to join your wireless LAN. Depending on the wireless utility, the user may only see the information except SSID or just cannot see any thing about VigorAP 810 while site surveying. The system allows you to set three sets of SSID for different usage.
SSID	Set a name for VigorAP 810 to be identified. Default settings are DrayTek-LAN-A and DrayTek-LAN-B. When **Enable 2 Subnet** is enabled, you can specify subnet interface (LAN-A or LAN-B) for each SSID by using the drop down menu.
Subnet	Choose LAN-A or LAN-B for each SSID. If you choose LAN-A, the wireless clients connecting to this SSID could only communicate with LAN-A.
Isolate LAN	Check this box to make the wireless clients (stations) with the same SSID not accessing for wired PC in LAN.
Isolate Member	Check this box to make the wireless clients (stations) with the same SSID not accessing for each other.
VLAN ID	Type the value for such SSID. Packets transferred from such SSID to LAN will be tagged with the number. If your network uses VLANs, you can assign the SSID to a VLAN on your network. Client devices that associate using the SSID are grouped into this VLAN. The VLAN ID range is from 3 to 4095. The VLAN ID is 0 by default, it means disabling the VLAN function for the SSID.

After finishing this web page configuration, please click **OK** to save the settings.

3.9.2 Security

This page allows you to set security with different modes for SSID 1, 2, 3 and 4 respectively. After configuring the correct settings, please click **OK** to save and invoke it.

By clicking the **Security Settings**, a new web page will appear so that you could configure the settings.

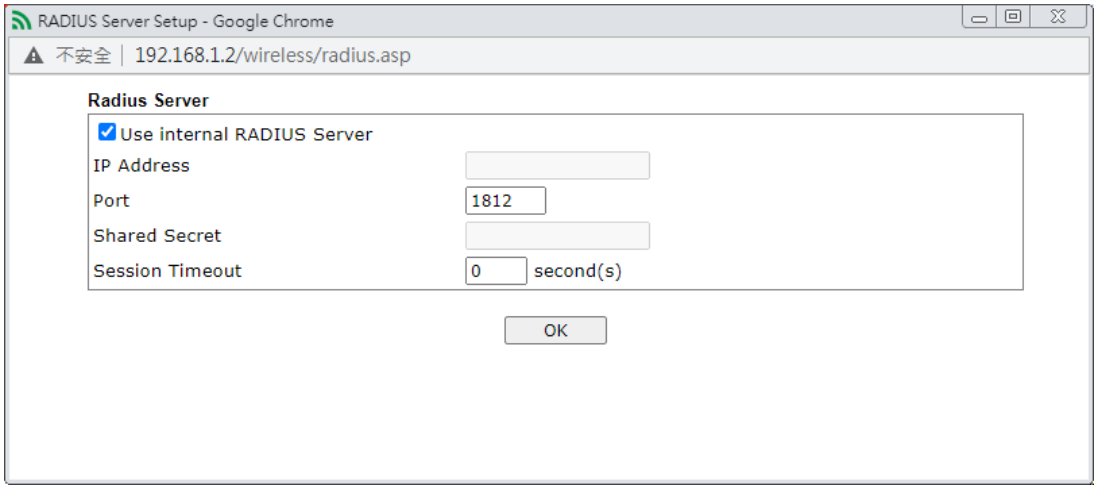


Available settings are explained as follows:

Item	Description
Mode	There are several modes provided for you to choose. Below shows the modes with higher security; **WPA2 Personal, WPA2/WPA Personal -** Accepts only WPA clients and the encryption key should be entered in PSK. The WPA encrypts each frame transmitted from the radio using the key, which either PSK (Pre-Shared Key) entered manually in this field below or automatically negotiated via 802.1x authentication. The WPA encrypts each frame transmitted from the radio using the key, which either PSK (Pre-Shared Key) entered manually in this field below or automatically negotiated via 802.1x authentication. Select WPA, WPA2 or Auto as WPA mode. **WPA2 Enterprise, WPA2/WPA Enterprise -** The WPA encrypts each frame transmitted from the radio using the key, which either PSK (Pre-Shared Key) entered manually in this field below or automatically negotiated via 802.1x authentication. Below shows the modes with basic security; **WPA Personal** - Accepts only WPA clients and the encryption key should be entered in PSK. The WPA encrypts each frame transmitted from the radio using the key, which either PSK

	(Pre-Shared Key) entered manually in this field below or automatically negotiated via 802.1x authentication. **WPA Enterprise** - The WPA encrypts each frame transmitted from the radio using the key, which either PSK (Pre-Shared Key) entered manually in this field below or automatically negotiated via 802.1x authentication. **WEP Personal** - Accepts only WEP clients and the encryption key should be entered in WEP Key. **None** - The encryption mechanism is turned off.
WPA Algorithms	Select TKIP, AES or TKIP/AES as the algorithm for WPA. Such feature is available for **WPA2 Enterprise, WPA Enterprise, WPA Personal** or **WPA2 Personal** or **WPA2/WPA Personal** mode.
Pass Phrase	Either **8~63** ASCII characters, such as 012345678..(or 64 Hexadecimal digits leading by 0x, such as "0x321253abcde..."). Such feature is available for **WPA Personal** or **WPA2 Personal** or **WPA2/WPA Personal** mode.
Key Renewal Interval	WPA uses shared key for authentication to the network. However, normal network operations use a different encryption key that is randomly generated. This randomly generated key that is periodically replaced. Enter the renewal security time (seconds) in the column. Smaller interval leads to greater security but lower performance. Default is 3600 seconds. Set 0 to disable re-key. Such feature is available for **WPA2 Enterprise, WPA Enterprise, WPA Personal** or **WPA2 Personal** or **WPA2/WPA Personal** mode.
EAPOL Key Retry	EAPOL means Extensible Authentication Protocol over LAN. **Enable** - The default setting is "Enable". It can make sure that the key will be installed and used once in order to prevent key reinstallation attack.
Key 1 – Key 4	Four keys can be entered here, but only one key can be selected at a time. The format of WEP Key is restricted to 5 ASCII characters or 10 hexadecimal values in 64-bit encryption level, or restricted to 13 ASCII characters or 26 hexadecimal values in 128-bit encryption level. The allowed content is the ASCII characters from 33(!) to 126(~) except '#' and ','. Such feature is available for **WEP** mode.

Click the link of **RADIUS Server** to access into the following page for more settings.



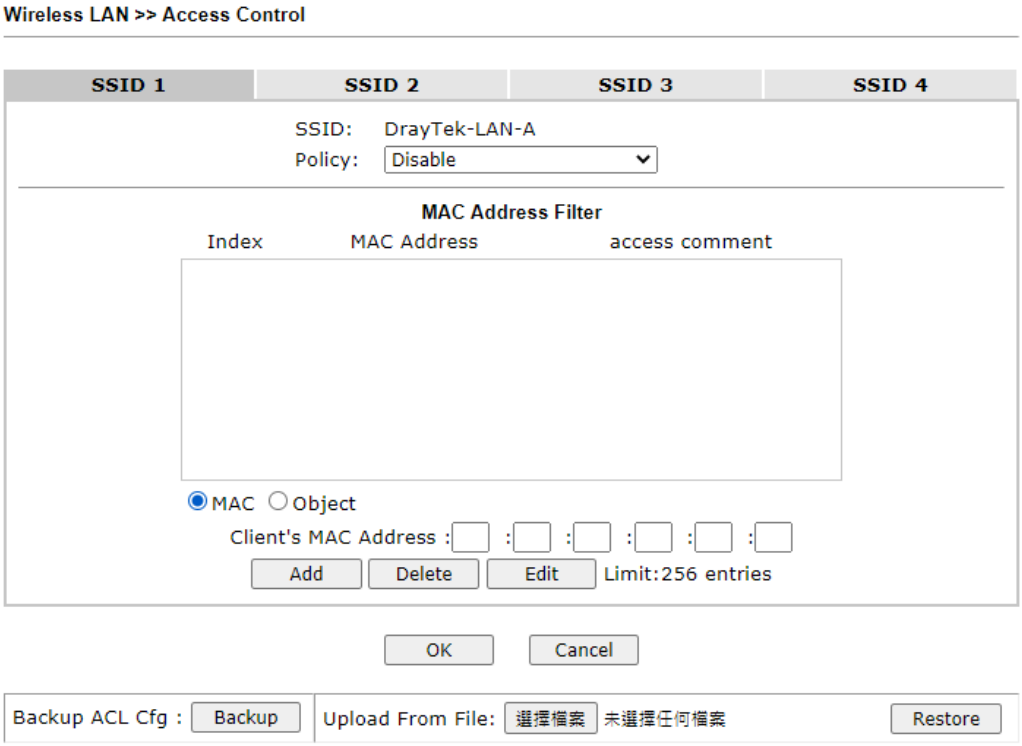
Available settings are explained as follows:

Item	Description
Use internal RADIUS Server	There is a RADIUS server built in VigorAP 810 which is used to authenticate the wireless client connecting to the access point. Check this box to use the internal RADIUS server for wireless security. Besides, if you want to use the external RADIUS server for authentication, do not check this box. Please refer to the section, **3.10 RADIUS Setting** to configure settings for internal server of VigorAP 810.
IP Address	Enter the IP address of external RADIUS server.
Port	The UDP port number that the external RADIUS server is using. The default value is 1812, based on RFC 2138.
Shared Secret	The external RADIUS server and client share a secret that is used to authenticate the messages sent between them. Both sides must be configured to use the same shared secret.
Session Timeout	Set the maximum time of service provided before re-authentication. Set to zero to perform another authentication immediately after the first authentication has successfully completed. (The unit is second.)

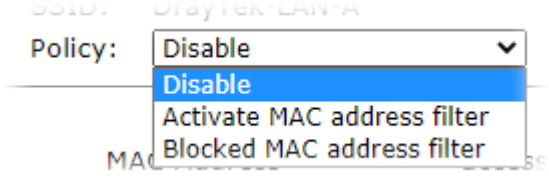
After finishing this web page configuration, please click **OK** to save the settings.

3.9.3 Access Control

For additional security of wireless access, the **Access Control** facility allows you to restrict the network access right by controlling the wireless LAN MAC address of client. Only the valid MAC address that has been configured can access the wireless LAN interface. By clicking the **Access Control**, a new web page will appear, as depicted below, so that you could edit the clients' MAC addresses to control their access rights (deny or allow).



Available settings are explained as follows:

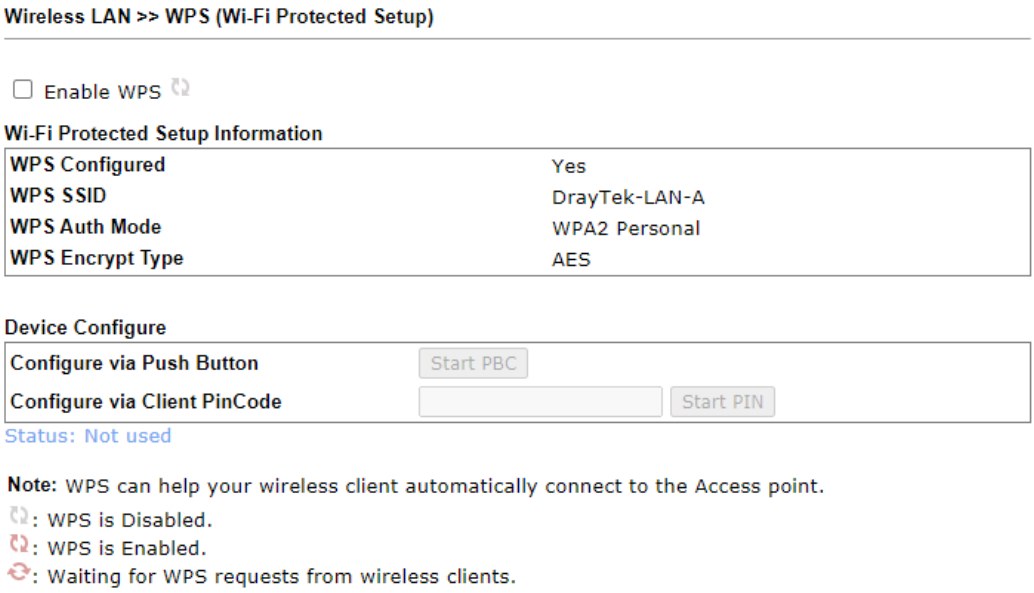
Item	Description
Policy	Select to enable any one of the following policy or disable the policy. Choose **Activate MAC address filter** to type in the MAC addresses for other clients in the network manually. Choose **Blocked MAC address filter,** so that all of the devices with the MAC addresses listed on the MAC Address Filter table will be blocked and cannot access into VigorAP 810. 
MAC Address Filter	Display all MAC addresses that are edited before.
MAC	**Client's MAC Address -** Manually enter the MAC address of wireless client. **Add -** Add a new MAC address into the list. **Delete -** Delete the selected MAC address in the list. **Edit -** Edit the selected MAC address in the list.
Object	In addition to enter the MAC address of the device manually,

	you can **Device Group** - Select one of the existed device groups and click **Add**. All the devices belonging to the selected group will be shown on the MAC Address Filter table. **Device Object** - Select one of the existed device object and click **Add**. The MAC address of the device will be shown on the MAC Address Filter table.
Cancel	Give up the access control set up.
Backup	Click it to store the settings (MAC addresses on MAC Address Filter table) on this page as a file.
Restore	Click it to restore the settings (MAC addresses on MAC Address Filter table) from an existed file.

After finishing this web page configuration, please click **OK** to save the settings.

3.9.4 WPS

Open **Wireless LAN>>WPS** to configure the corresponding settings.



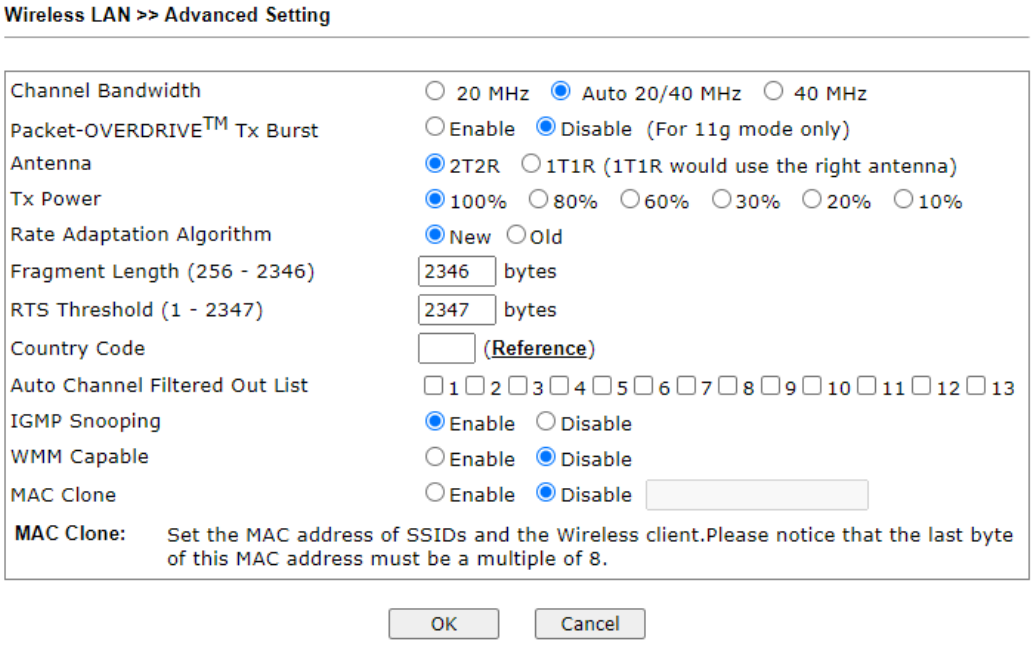
Available settings are explained as follows:

Item	Description
Enable WPS	Check this box to enable WPS setting.
WPS Configured	Display related system information for WPS. If the wireless security (encryption) function of VigorAP 810 is properly configured, you can see 'Yes' message here.
WPS SSID	Display current selected SSID.
WPS Auth Mode	Display current authentication mode of the VigorAP 810. Only WPA2/PSK and WPA/PSK support WPS.
WPS Encrypt Type	Display encryption mode (None, WEP, TKIP, AES, etc.) of VigorAP 810.
Configure via Push	Click **Start PBC** to invoke Push-Button style WPS setup

Button	procedure. VigorAP 810 will wait for WPS requests from wireless clients about two minutes. The WPS LED on VigorAP 810 will blink fast when WPS is in progress. It will return to normal condition after two minutes. (You need to setup WPS within two minutes)
Configure via Client PinCode	Type the PIN code specified in wireless client you wish to connect, and click **Start PIN** button. The WLAN LED on VigorAP 810 will blink fast when WPS is in progress. It will return to normal condition after two minutes. (You need to setup WPS within two minutes).

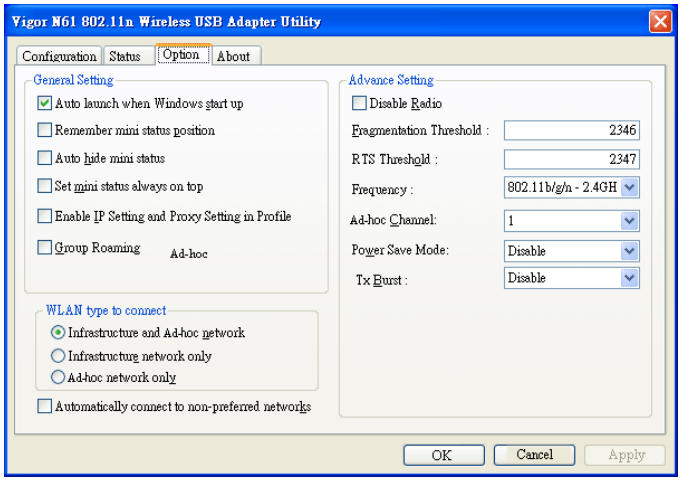
3.9.5 Advanced Setting

This page is to determine which algorithm will be selected for wireless transmission rate.



Available settings are explained as follows:

Item	Description
Channel Bandwidth	**20 MHz-** the device will use 20MHz for data transmission and receiving between the AP and the stations. **Auto 20/40 MHz–** the AP will scan for nearby wireless AP, and then use 20MHz if the number of AP is more than 10, or use 40MHz if it's not. **40 MHz-** the device will use 40MHz for data transmission and receiving between the AP and the stations.
Packet-OVERDRIVE	This feature can enhance the performance in data transmission about 40%* more (by checking **Tx Burst**). It is active only when both sides of Access Point and Station (in wireless client) invoke this function at the same time. That is, the wireless client must support this feature and invoke the function, too. **Note:** Vigor N61 wireless adapter supports this function.

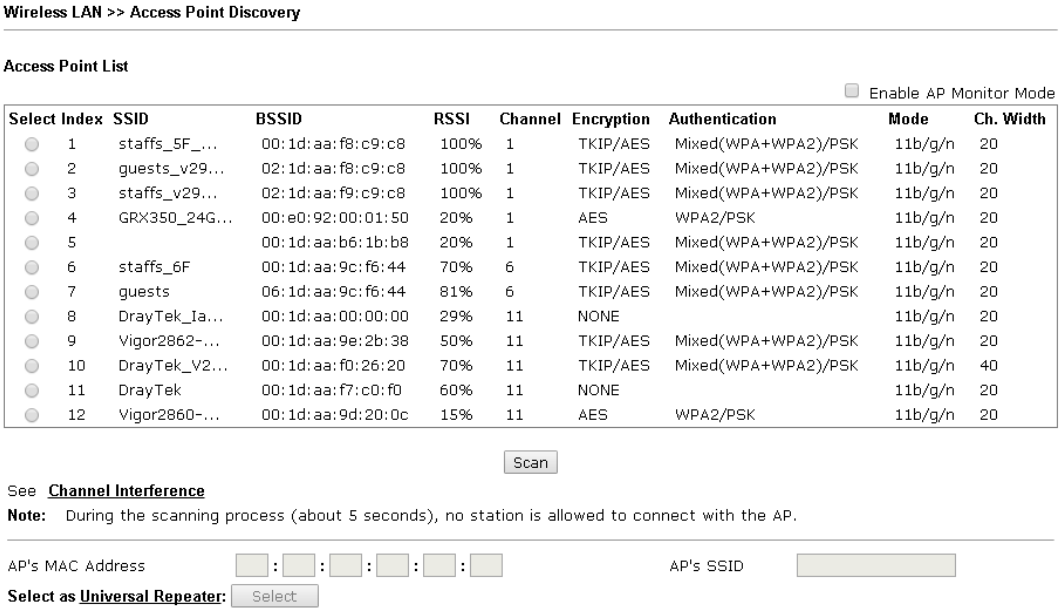
	Therefore, you can use and install it into your PC for matching with Packet-OVERDRIVE (refer to the following picture of Vigor N61 wireless utility window, choose **Enable** for **TxBURST** on the tab of **Option**). 
Antenna	VigorAP can be attached with two antennas to have good data transmission via wireless connection. However, if you have only one antenna attached, please choose 1T1R.
Tx Power	The default setting is the maximum (100%). Lowering down the value may degrade range and throughput of wireless.
Rate Adaptation Algorithm	Wireless transmission rate is adapted dynamically. Usually, performance of “new” algorithm is better than “old”.
Fragment Length	Set the Fragment threshold of wireless radio. Do not modify default value if you don’t know what it is, default value is 2346.
RTS Threshold	Minimize the collision (unit is bytes) between hidden stations to improve wireless performance. Set the RTS threshold of wireless radio. Do not modify default value if you don’t know what it is, default value is 2347.
Country Code	VigorAP broadcasts country codes by following the 802.11d standard. However, some wireless stations will detect / scan the country code to prevent conflict occurred. If conflict is detected, wireless station will be warned and is unable to make network connection. Therefore, changing the country code to ensure successful network connection will be necessary for some clients.
Auto Channel Filtered Out List	The selected wireless channels will be discarded if **AutoSelect** is selected as **Channel** selection mode in **Wireless LAN>>General Setup**.
IGMP Snooping	Check **Enable** to enable IGMP Snooping. Multicast traffic will be forwarded to ports that have members of that group. Disabling IGMP snooping will make multicast traffic treated in the same manner as broadcast traffic.
WMM Capable	To apply WMM parameters for wireless data transmission, please click the **Enable** radio button.
MAC Clone	Click **Enable** and manually enter the MAC address of the device with SSID 1. The MAC address of other SSIDs will

	change based on this MAC address.

3.9.6 AP Discovery

VigorAP 810 can scan all regulatory channels and find working APs in the neighborhood. Based on the scanning result, users will know which channel is clean for usage. Also, it can be used to facilitate finding an AP for a WDS link. Notice that during the scanning process (about 5 seconds), no client is allowed to connect to Vigor.

This page is used to scan the existence of the APs on the wireless LAN. Yet, only the AP which is in the same channel of VigorAP 810 can be found. Please click **Scan** to discover all the connected APs.



Each item is explained as follows:

Item	Description
Enable AP Monitor Mode	This function can help to get and keep the records of APs detected by such device after clicking Scan. In general, only the available AP will be detected by Vigor device. Once the AP is unavailable, it will be deleted from the Access Point List immediately. However, if such function is enabled, the system will keep the record of the AP (once detected by Vigor device) until it is available for Vigor device again.
SSID	Display the SSID of the AP scanned by VigorAP 810.
BSSID	Display the MAC address of the AP scanned by VigorAP 810.
RSSI	Display the signal strength of the access point. RSSI is the abbreviation of Receive Signal Strength Indication.
Channel	Display the wireless channel used for the AP that is scanned by VigorAP 810.
Encryption	Display the encryption mode for the scanned AP.
Authentication	Display the authentication type that the scanned AP applied.

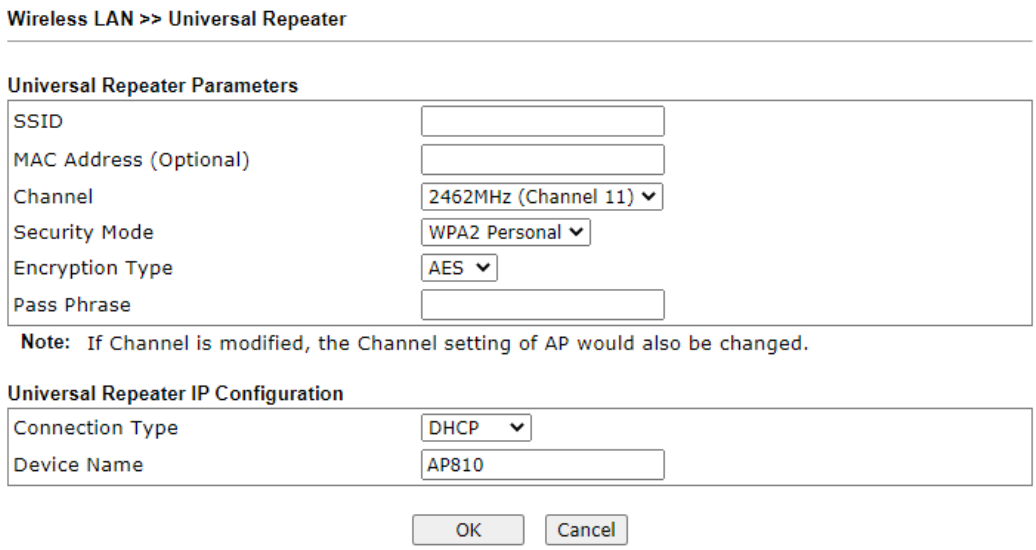
Mode	Display the wireless connection mode that the scanned AP used.
Ch. Width	Display the channel width that the scanned AP used.
Scan	It is used to discover all the connected AP. The results will be shown on the box above this button
Channel Statistics	It displays the statistics for the channels used by APs.
AP's MAC Address	If you want the found AP applying the WDS settings, please type in the AP's MAC address.
AP's SSID	To specify an AP to be applied with WDS settings, you can specify MAC address or SSID for the AP. Here is the place that you can type the SSID of the AP.
Select as Universal Repeater	In **Universal Repeater** mode, WAN would work as station mode and the wireless AP can be selected as a universal repeater. Choose one of the wireless APs from the Scan list.

After finishing this web page configuration, please click **OK** to save the settings.

3.9.7 Universal Repeater

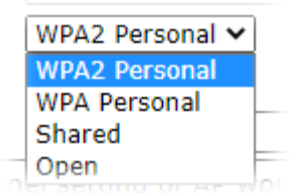
The access point can act as a wireless repeater; it can be Station and AP at the same time. It can use Station function to connect to a Root AP and use AP function to serve all wireless stations within its coverage.

Note: While using **Universal Repeater** mode, the access point will demodulate the received signal. Please check if this signal is noise for the operating network, then have the signal modulated and amplified again. The output power of this mode is the same as that of WDS and normal AP mode.



Available settings are explained as follows:

Item	Description
Universal Repeater Parameters	
SSID	Set the name of access point that VigorAP 810 wants to connect to.

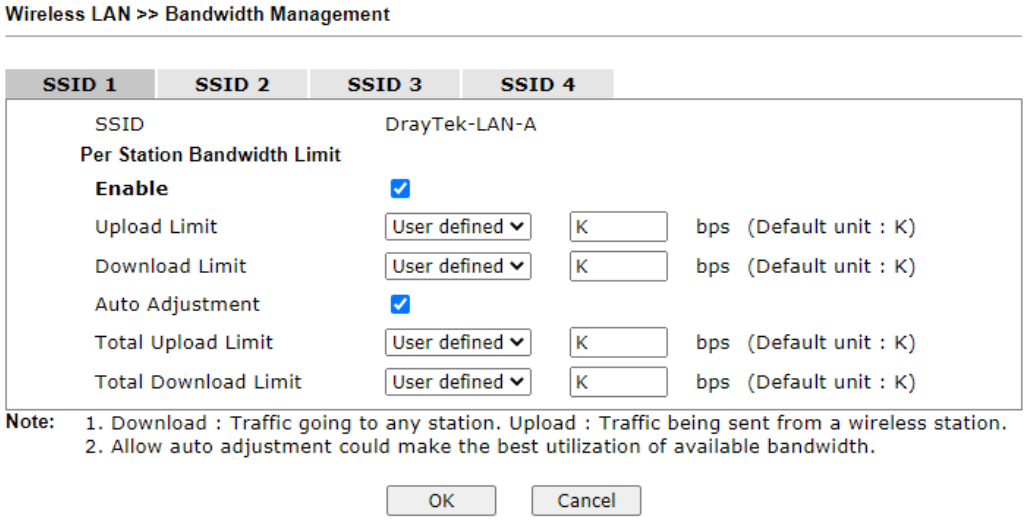
MAC Address (Optional)	Type the MAC address of access point that VigorAP 810 wants to connect to.
Channel	Means the channel of frequency of the wireless LAN. The default channel is 11. You may switch channel if the selected channel is under serious interference. If you have no idea of choosing the frequency, please select **AutoSelect** to let system determine for you.
Security Mode	There are several modes provided for you to choose. Each mode will bring up different parameters (e.g., WEP keys, Pass Phrase) for you to configure. 
Encryption Type for Open/Shared	This option is available when Open/Shared is selected as Security Mode. **Encryption Type** - Choose **None** to disable the WEP Encryption. Data sent to the AP will not be encrypted. To enable WEP encryption for data transmission, please choose **WEP**. **WEP Keys** - Four keys can be entered here, but only one key can be selected at a time. The format of WEP Key is restricted to 5 ASCII characters or 10 hexadecimal values in 64-bit encryption level, or restricted to 13 ASCII characters or 26 hexadecimal values in 128-bit encryption level. The allowed content is the ASCII characters from 33(!) to 126(~) except '#' and ','.
Encryption Type for WPA Personal and WPA2 Personal	This option is available when WPA Personal or WPA2 Personal is selected as **Security Mode**. **Encryption Type** - Select **TKIP** or **AES** as the algorithm for WPA. **Pass Phrase** - Either **8~63** ASCII characters, such as 012345678 (or 64 Hexadecimal digits leading by 0x, such as "0x321253abcde...").
Universal Repeater IP Configuration	
Connection Type	Choose DHCP or Static IP as the connection mode. **DHCP** – The wireless station will be assigned with an IP from VigorAP. **Static IP** – The wireless station shall specify a static IP for connecting to Internet via VigorAP.
Device Name	This setting is available when **DHCP** is selected as **Connection Type**. Type a name for the VigorAP as identification. Simply use the default name.
IP Address	This setting is available when **Static IP** is selected as **Connection Type**.

	Type an IP address with the same network segment of the LAN IP setting of VigorAP. Such IP shall be different with any IP address in LAN.
Subnet Mask	This setting is available when **Static IP** is selected as **Connection Type**. Type the subnet mask setting which shall be the same as the one configured in LAN for VigorAP.
Default Gateway	This setting is available when **Static IP** is selected as **Connection Type**. Type the gateway setting which shall be the same as the default gateway configured in LAN for VigorAP.

After finishing this web page configuration, please click **OK** to save the settings.

3.9.8 Bandwidth Management

The downstream or upstream from FTP, HTTP or some P2P applications will occupy large of bandwidth and affect the applications for other programs. Please use Bandwidth Management to make the bandwidth usage more efficient.



Available settings are explained as follows:

Item	Description
SSID	Display the specific SSID name of the AP.
Enable	Check this box to enable the bandwidth management for clients.
Upload Limit	Define the maximum speed of the data uploading which will be used for the wireless stations connecting to Vigor AP with the same SSID. Use the drop down list to choose the rate. If you choose **User defined**, you have to specify the rate manually.
Download Limit	Define the maximum speed of the data downloading which will be used for the wireless station connecting to Vigor AP with the same SSID. Use the drop down list to choose the rate. If you choose **User defined**, you have to specify the rate manually.

Auto Adjustment	Check this box to have the bandwidth limit determined by the system automatically.
Total Upload Limit	When Auto Adjustment is checked, the value defined here will be treated as the total bandwidth shared by all of the wireless stations with the same SSID for data uploading.
Total Download Limit	When Auto Adjustment is checked, the value defined here will be treated as the total bandwidth shared by all of the wireless stations with the same SSID for data downloading.

After finishing this web page configuration, please click **OK** to save the settings.

3.9.9 Airtime Fairness

Airtime fairness is essential in wireless networks that must support critical enterprise applications.

Most of the applications are either symmetric or require more downlink than uplink capacity; telephony and email send the same amount of data in each direction, while video streaming and web surfing involve more traffic sent from access points to clients than the other way around. This is essential for ensuring predictable performance and quality-of-service, as well as allowing 802.11n and legacy clients to coexist on the same network. Without airtime fairness, offices using mixed mode networks risk having legacy clients slow down the entire network or letting the fastest client(s) crowd out other users.

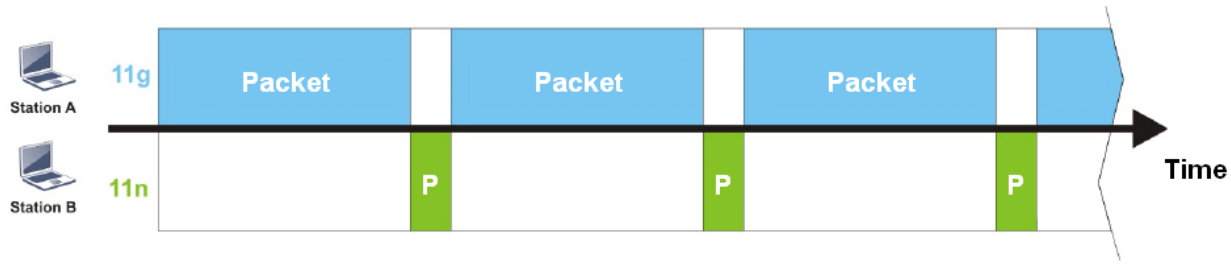
With airtime fairness, every client at a given quality-of-service level has equal access to the network's airtime.

The wireless channel can be accessed by only one wireless station at the same time.

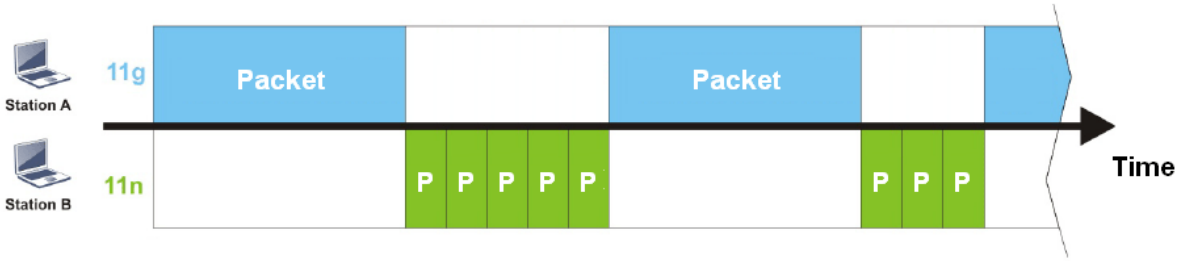
The principle behind the IEEE802.11 channel access mechanisms is that each station has ***equal probability*** to access the channel. When wireless stations have similar data rate, this principle leads to a fair result. In this case, stations get similar channel access time which is called airtime.

However, when stations have various data rate (e.g., 11g, 11n), the result is not fair. The slow stations (11g) work in their slow data rate and occupy too much airtime, whereas the fast stations (11n) become much slower.

Take the following figure as an example, both Station A(11g) and Station B(11n) transmit data packets through VigorAP 810. Although they have equal probability to access the wireless channel, Station B(11n) gets only a little airtime and waits too much because Station A(11g) spends longer time to send one packet. In other words, Station B(fast rate) is obstructed by Station A(slow rate).



To improve this problem, Airtime Fairness is added for VigorAP 810. Airtime Fairness function tries to assign *similar airtime* to each station (A/B) by controlling TX traffic. In the following figure, Station B(11n) has higher probability to send data packets than Station A(11g). By this way, Station B(fast rate) gets fair airtime and it's speed is not limited by Station A(slow rate).



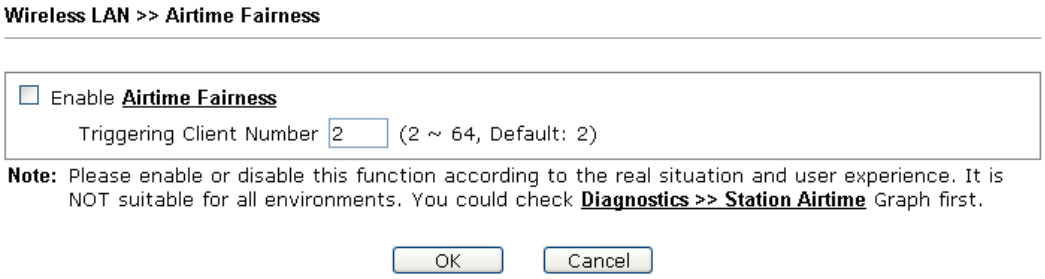
It is similar to automatic Bandwidth Limit. The dynamic bandwidth limit of each station depends on instant active station number and airtime assignment. Please note that Airtime Fairness of 2.4GHz and 5GHz are independent. But stations of different SSIDs function together, because they all use the same wireless channel. IN SPECIFIC ENVIRONMENTS, this function can reduce the bad influence of slow wireless devices and improve the overall wireless performance.

Suitable environment:

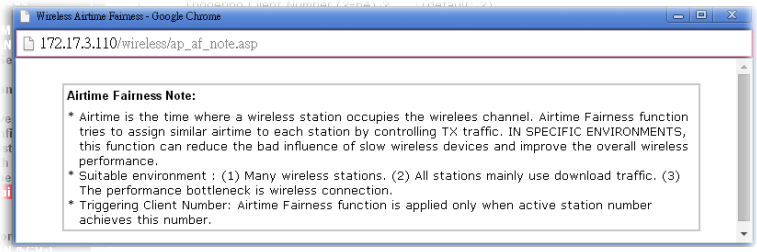
(1) Many wireless stations.

(2) All stations mainly use download traffic.

(3) The performance bottleneck is wireless connection.



Available settings are explained as follows:

Item	Description
Enable Airtime Fairness	Try to assign similar airtime to each wireless station by controlling TX traffic. **Airtime Fairness** – Click the link to display the following screen of airtime fairness note.  **Triggering Client Number –**Airtime Fairness function is applied only when active station number achieves this number.

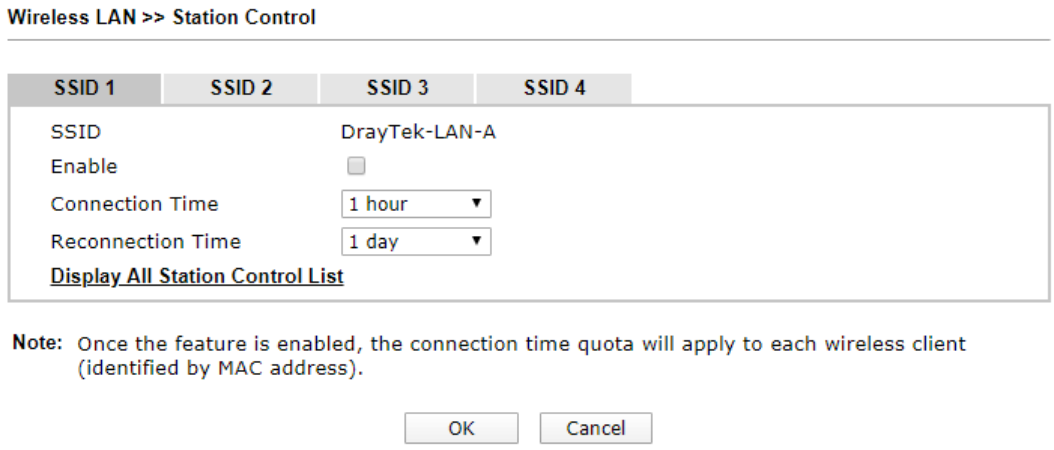
After finishing this web page configuration, please click **OK** to save the settings.

3.9.10 Station Control

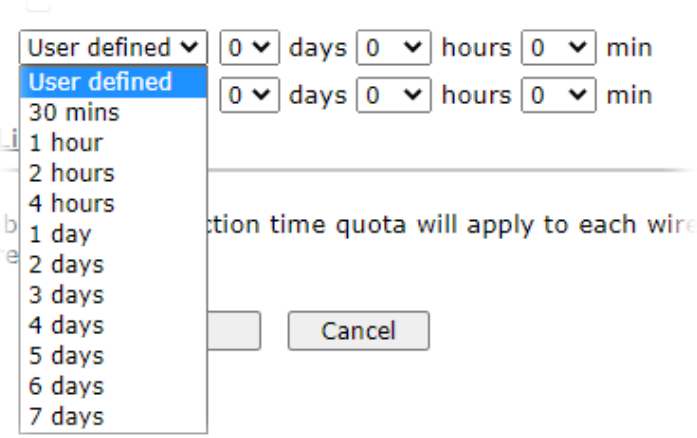
Station Control is used to specify the duration for the wireless client to connect and reconnect VigorAP. If such function is not enabled, the wireless client can connect VigorAP until it shuts down.

Such feature is especially useful for free Wi-Fi service. For example, a coffee shop offers free Wi-Fi service for its guests for one hour every day. Then, the connection time can be set as “1 hour” and reconnection time can be set as “1 day”. Thus, the guest can finish his job within one hour and will not occupy the wireless network for a long time.

Note: Up to 300 Wireless Station records are supported by VigorAP.



Available settings are explained as follows:

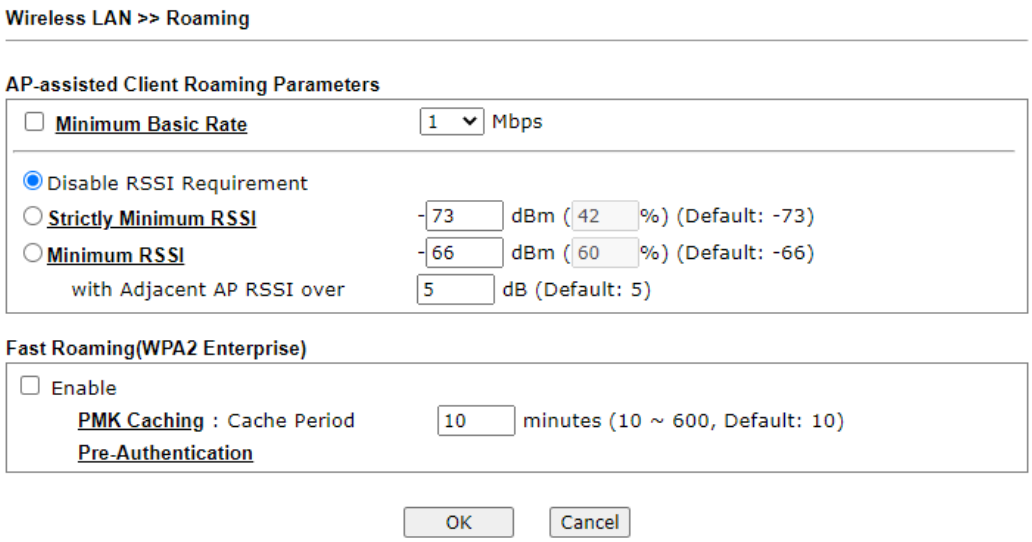
Item	Description
SSID	Display the SSID that the wireless station will use it to connect with Vigor router.
Enable	Check the box to enable the station control function.
Connection Time / Reconnection Time	Use the drop down list to choose the duration for the wireless client connecting /reconnecting to Vigor router. Or, type the duration manually when you choose **User defined**. 
Display All Station Control List	All the wireless stations connecting to Vigor router by using such SSID will be listed on Station Control List.

After finishing all the settings here, please click **OK** to save the configuration.

3.9.11 Roaming

The network signal for a single wireless access point might be limited by its coverage range. Therefore, if you want to expand the wireless network in a large exhibition with a quick method, you can install multiple access points with enabling the Roaming feature for each AP to reach the purpose of expanding wireless signals seamlessly.

These access points connecting for each other shall be verified by pre-authentication. This page allows you to enable the roaming feature and the pre-authentication.



Available settings are explained as follows:

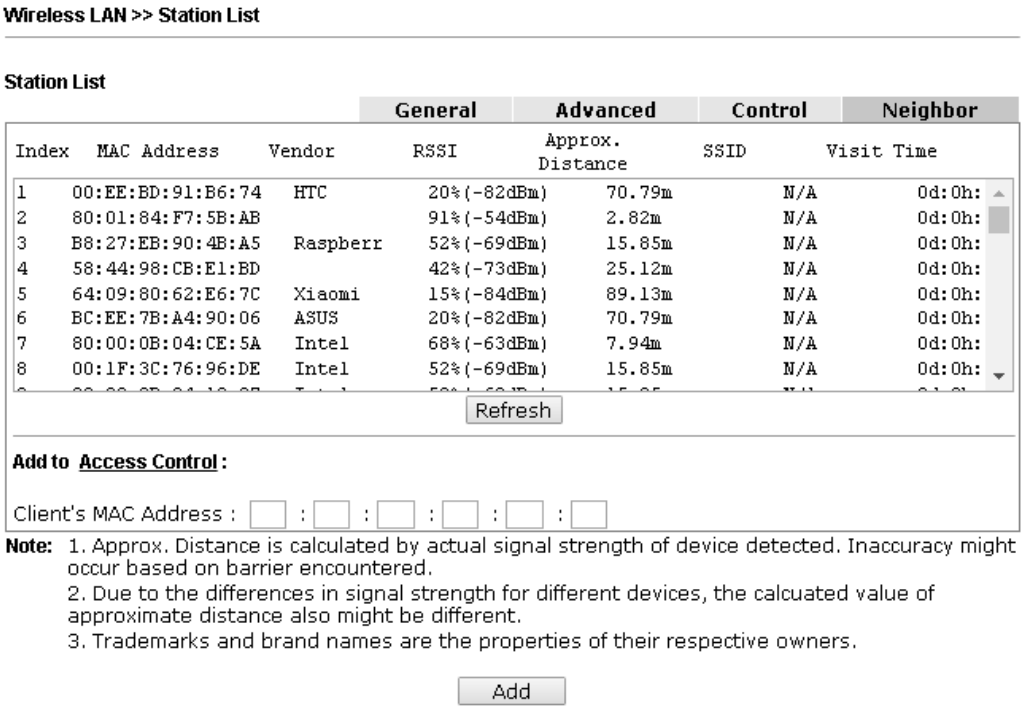
Item	Description
AP-assisted Client Roaming Parameters	When the link rate of wireless station is too low or the signal received by the wireless station is too worse, VigorAP 810 will automatically detect (based on the link rate and RSSI requirement) and cut off the network connection for that wireless station to assist it to connect another Wireless AP to get better signal. **Minimum Basic Rate –** Check the box to use the drop down list to specify a basic rate (**Mbps**). When the link rate of the wireless station is below such value, VigorAP 810 will terminate the network connection for that wireless station. **Disable RSSI Requirement** - If it is selected, VigorAP will not terminate the network connection based on RSSI. **Strictly Minimum RSSI** - VigorAP uses RSSI (received signal strength indicator) to decide to terminate the network connection of wireless station. When the signal strength is below the value (**dBm**) set here, VigorAP 810 will terminate the network connection for that wireless station. **Minimum RSSI** - When the signal strength of the wireless station is below the value (**dBm**) set here and adjacent AP (must be DrayTek AP and support such feature too) with higher signal strength value (defined in the field of **With Adjacent AP RSSI over**) is detected by VigorAP 810, VigorAP 810 will terminate the network connection for that wireless station. Later, the wireless station can connect to the adjacent AP (with better

	RSSI). ● **With Adjacent AP RSSI over –** Specify a value as a threshold.
Fast Roaming (WPA/802.1x)	**Enable –** Check the box to enable fast roaming configuration. **PMK Caching: Cache Period -** Set the expire time of WPA2 PMK (Pairwise master key) cache. PMK Cache manages the list from the BSSIDs in the associated SSID with which it has pre-authenticated. Such feature is available for **WPA2/802.1** mode. **Pre-Authentication -** Enables a station to authenticate to multiple APs for roaming securer and faster. With the pre-authentication procedure defined in IEEE 802.11i specification, the pre-four-way-handshake can reduce handoff delay perceivable by a mobile node. It makes roaming faster and more secure. (Only valid in WPA2) **Enable** - Enable IEEE 802.1X Pre-Authentication. **Disable** - Disable IEEE 802.1X Pre-Authentication.

After finishing this web page configuration, please click **OK** to save the settings.

3.9.12 Station List

Station List provides the knowledge of connecting wireless clients now along with its status code.



Available settings are explained as follows:

Item	Description
MAC Address	Display the MAC Address for the connecting client.
SSID	Display the SSID that the wireless client connects to.
Auth	Display the authentication that the wireless client uses for connection with such AP.
Encrypt	Display the encryption mode used by the wireless client.
Tx Rate/Rx Rate	Display the transmission /receiving rate for packets.
Refresh	Click this button to refresh the status of station list.
Add to Access Control	**Client's MAC Address** - For additional security of wireless access, the Access Control facility allows you to restrict the network access right by controlling the wireless LAN MAC address of client. Only the valid MAC address that has been configured can access the wireless LAN interface.
Add	Click this button to add current typed MAC address into **Access Contro**l.

General

Display general information (e.g., MAC Address, SSID, Auth, Encrypt, TX/RX Rate) for the station.

Advanced

Display more information (e.g., AID, PSM, WMM, RSSI PhMd, BW, MCS, Rate) for the station.

Control

Display connection and reconnection time of the wireless stations.

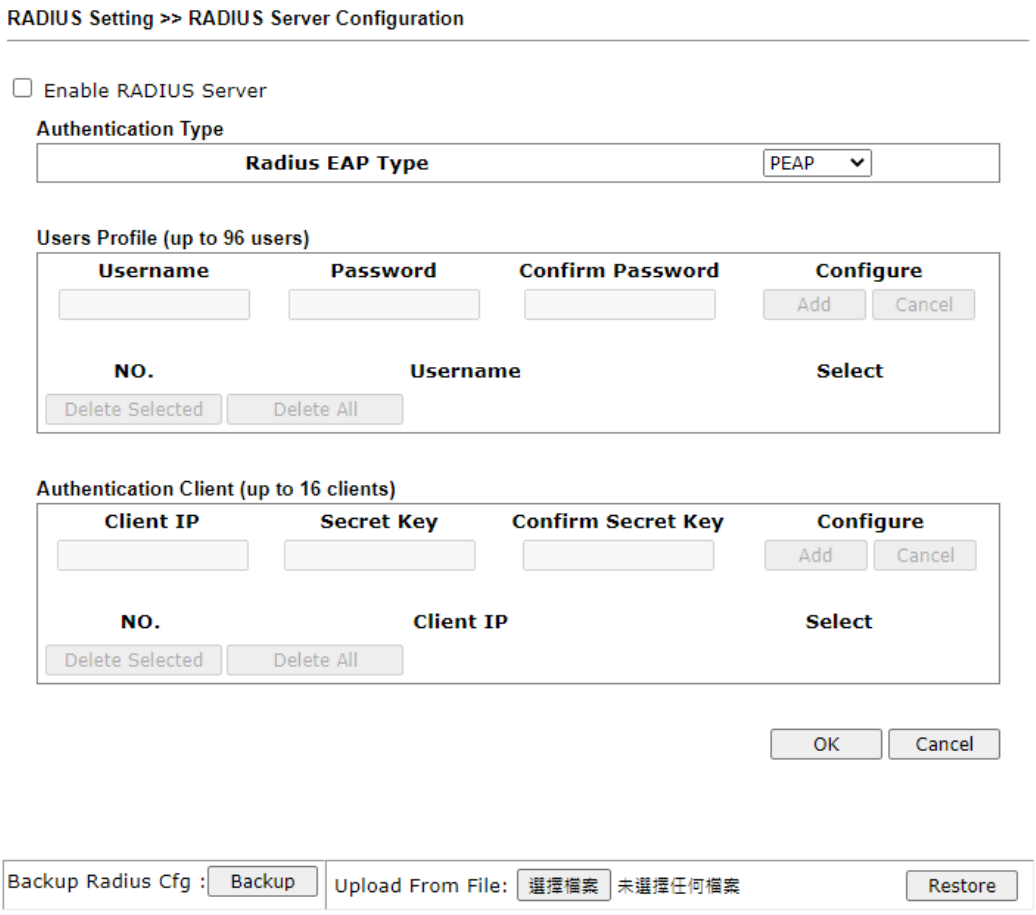
Neighbor

Display more information for the neighboring wireless stations.

3.10 RADIUS Setting

VigorAP 810 offers a built-in RADIUS server to authenticate the wireless client that tries to connect to VigorAP 810. The AP can accept the wireless connection authentication requested by wireless clients.

3.10.1 RADIUS Server



Available settings are explained as follows:

Item	Description
Enable RADIUS Server	Check it to enable the internal RADIUS server.
Authentication Type	Let the user to choose the authentication method for RADIUS server. **Radius EAP Type** – There are two types, PEAP and EAP TLS, offered for selection. If EAP TLS is selected, a certificate must be installed or must be ensured to be trusted.

Users Profile	**Username** – Type a new name for the user profile. **Password** – Type a new password for such new user profile. **Confirm Password** – Retype the password to confirm it. **Configure** ● **Add** – Make a new user profile with the name and password specified on the left boxes. ● **Cancel** – Clear current settings for user profile. **Delete Selected** – Delete the selected user profile (s). **Delete All** – Delete all of the user profiles.
Authentication Client	This internal RADIUS server of VigorAP 810 can be treated as the external RADIUS server for other users. Specify the client IP and secret key to make the wireless client choosing VigorAP 810 as its external RADUIS server. **Client IP** – Type the IP address for the user to be authenticated by VigorAP 810 when the user tries to use VigorAP 810 as the external RADIUS server. **Secret Key** – Type the password for the user to be authenticated by VigorAP 810 while the user tries to use VigorAP 810 as the external RADIUS server. **Confirm Secrete Key** – Type the password again for confirmation. **Configure** ● **Add** – Make a new client with IP and secrete key specified on the left boxes. ● **Cancel** – Clear current settings for the client. **Delete Selected** – Delete the selected client(s). **Delete All** – Delete all of the clients.
Backup	Click it to store the settings (RADIUS configuration) on this page as a file.
Restore	Click it to restore the settings (RADIUS configuration) from an existed file.

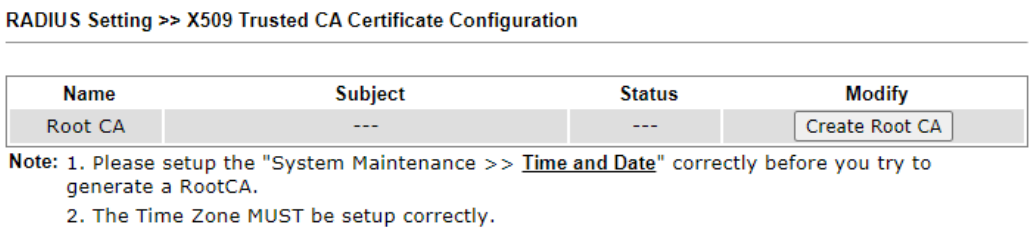
After finishing this web page configuration, please click **OK** to save the settings.

3.10.2 Certificate Management

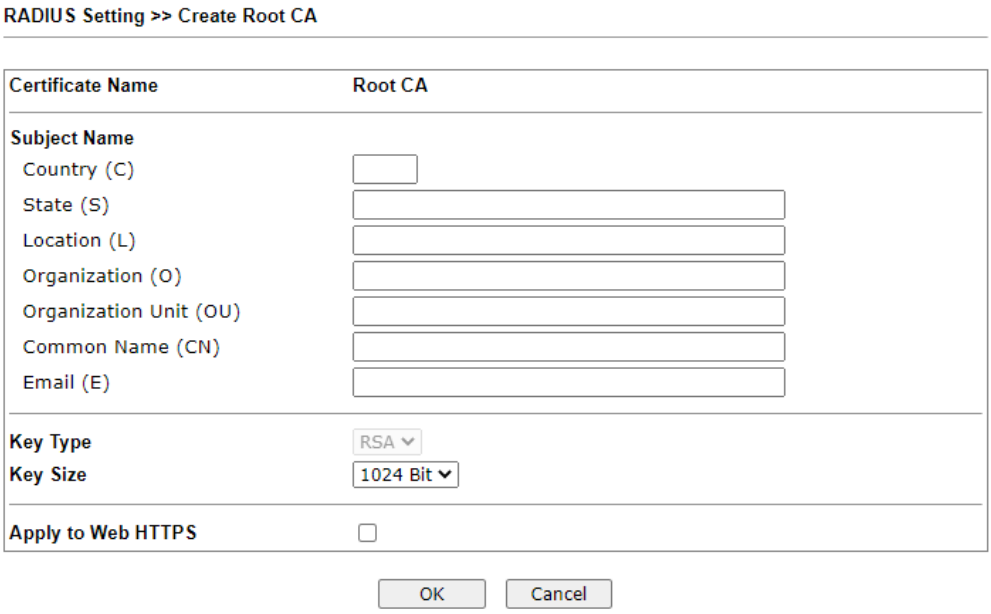
When the local client and remote client are required to make certificate authentication (e.g., IPsec X.509) for data passing through SSL tunnel and avoiding the attack of MITM, a trusted root certificate authority (Root CA) will be used to authenticate the digital certificates offered by both ends.

However, the procedure of applying digital certificate from a trusted root certificate authority is complicated and time-consuming. Therefore, Vigor router offers a mechanism which allows you to generate root CA to save time and provide convenience for general user. Later, such root CA generated by DrayTek server can perform the issuing of local certificate.

In addition, you can build a Root CA certificate by clicking **Create Root CA** if required.



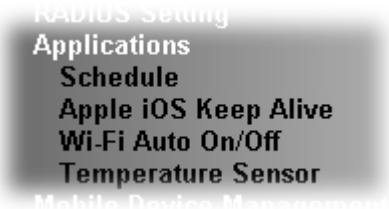
Note that Root CA can be deleted but not edited. If you want to modify the settings for a Root CA, please delete that one and create another one by clicking Create Root CA. After clicking Create Root CA, the web page will be shown as below.



Type in all the information and relational settings. Then click **OK**.

3.11 Applications

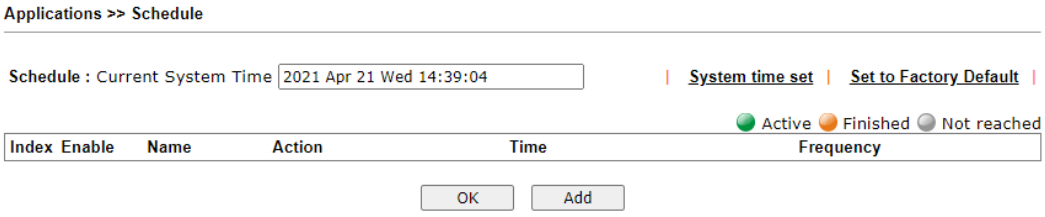
Below shows the menu items for Applications.



3.11.1 Schedule

The Vigor AP has a built-in clock which can update itself manually or automatically by means of Network Time Protocols (NTP). As a result, you can not only schedule the AP to dialup to the Internet at a specified time, but also restrict Internet access to certain hours so that users can connect to the Internet only during certain hours, say, business hours. The schedule is also applicable to other functions.

You have to set your time before set schedule. In **System Maintenance>> Time and Date** menu, press **Inquire Time** button to set the Vigor AP's clock to current time of your PC. The clock will reset once if you power down or reset the AP. There is another way to set up time. You can inquiry an NTP server (a time server) on the Internet to synchronize the AP's clock. This method can only be applied when the WAN connection has been built up.

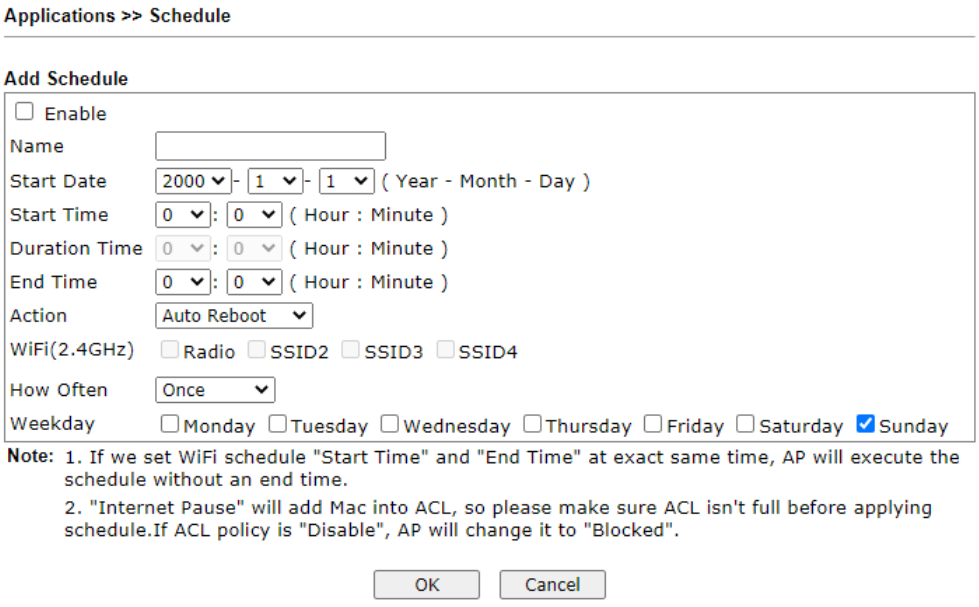


Available settings are explained as follows:

Item	Description
Current System Time	Display current system time.
System time set	Click it to open Time and Date page for configuring the time setting.
Set to Factory Default	Click it to return to the factory default setting and remove all the schedule profiles.
Index	Display the sort number of the schedule profile.
Enable	Check it to enable the function of schedule configuration.
Name	Display the name of the schedule.
Action	Display the action adopted by the schedule profile.
Time	Display the time setting of the schedule.
Frequency	Display the frequency of the time schedule.

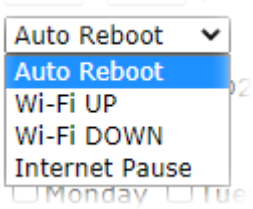
You can set up to **15** schedules. To add a schedule:

1. Check the box of **Enable Schedule**.
2. Click the **Add** button to open the following web page.

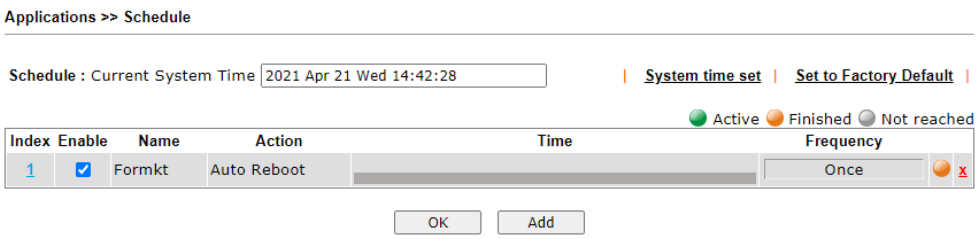


Available settings are explained as follows:

Item	Description

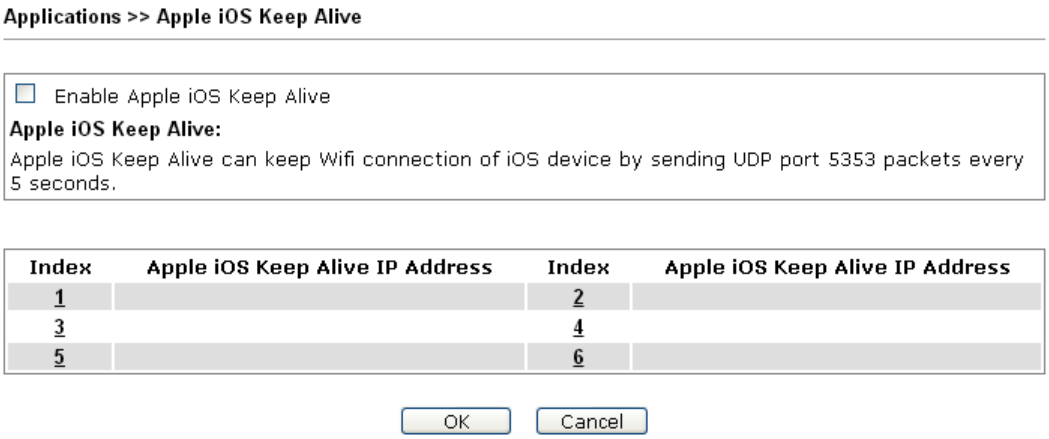
Item	Description
Enable	Check to enable such schedule profile.
Name	Enter the name of the schedule profile.
Start Date	Specify the starting date of the schedule.
Start Time	Specify the starting time of the schedule.
Duration Time	Specify the duration (or period) for the schedule. It is available only for the action set with WIFI UP, WIFI Down, or Internet Pause.
End Time	Specify the ending time of the schedule.
Action	Specify which action should apply the schedule.  In which, you have to specify the device object/device group profile for blocking certain wireless clients when **Internet Pause** is selected as the Action.
WiFi (2.4GHz)	When **Wi-Fi UP** or **Wi-Fi DOWN** is selected as **Action**, you can check the Radio or SSID 2~4 boxes to setup the network based on the schedule profile. **Note**: When Radio is selected, SSID2, SSID3 and SSID4 are not available for choosing, vice versa. Moreover, SSID2, SSID3, and SSID4 are not available for choosing if they are not enabled.
How Often	Specify how often the schedule will be applied. **Once** -The schedule will be applied just once **Weekdays** -Specify which days in one week should perform the schedule.
Weekday	Choose and check the day to perform the schedule. It is available when **Weekdays** is selected as **How Often**.

3. After finishing this web page configuration, please click **OK** to save the settings. A new schedule profile has been created and displayed on the screen.



3.11.2 Apple iOS Keep Alive

To keep the wireless connection (via Wi-Fi) on iOS device in alive, VigorAP 810 will send the UDP packets with 5353 port to the specific IP every five seconds.

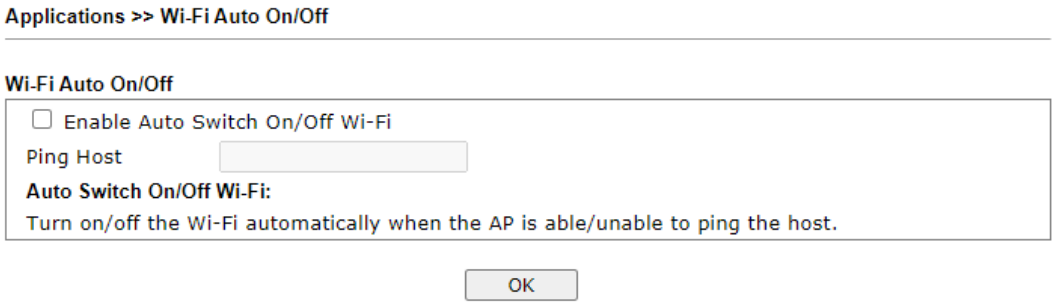


Available settings are explained as follows:

Item	Description
Enable Apple iOS Keep Alive	Check to enable the function.
Index	Display the setting link. Click the index link to open the configuration page for setting the IP address.
Apple iOS Keep Alive IP Address	Display the IP address.

3.11.3 Wi-Fi Auto On/Off

When VigorAP is able or unable to ping the specified host, the Wi-Fi function will be turned on or off automatically. The purpose of such function is to avoid wireless station roaming to an AP which is unable to access Internet.



Available settings are explained as follows:

Item	Description
Enable Auto Switch On/Off Wi-Fi	Check the box to enable such function.
Ping Host	Type an IP address (e.g., 8.8.8.8) or a domain name (e.g., google.com) for testing if the access point is stable or not.

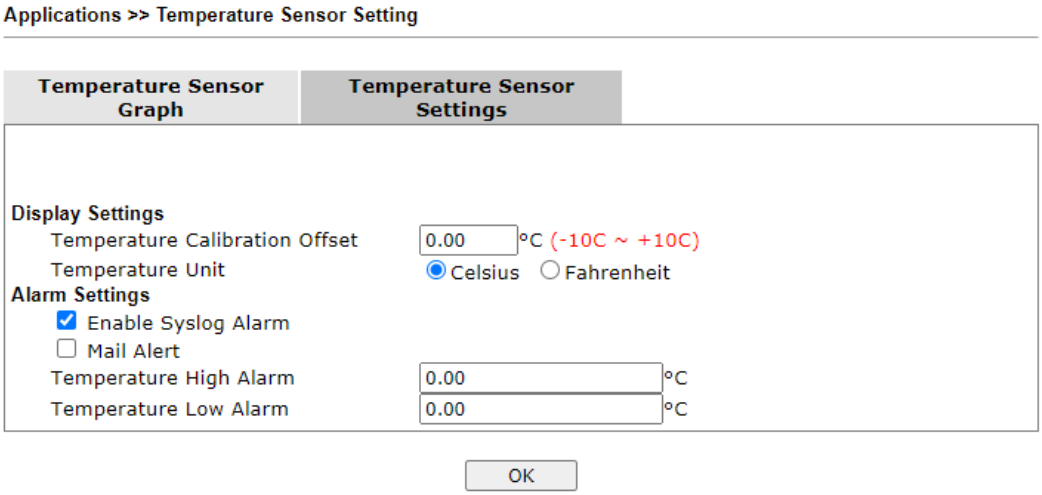
3.11.4 Temperature Sensor

A USB Thermometer is now available that complements your installed DrayTek AP installations that will help you monitor the server or data communications room environment and notify you if the server room or data communications room is overheating.

During summer in particular, it is important to ensure that your server or data communications equipment are not overheating due to cooling system failures.

The inclusion of a USB thermometer in compatible VigorAP will continuously monitor the temperature of its environment. When a pre-determined threshold is reached you will be alerted via Syslog.

Temperature Sensor Settings

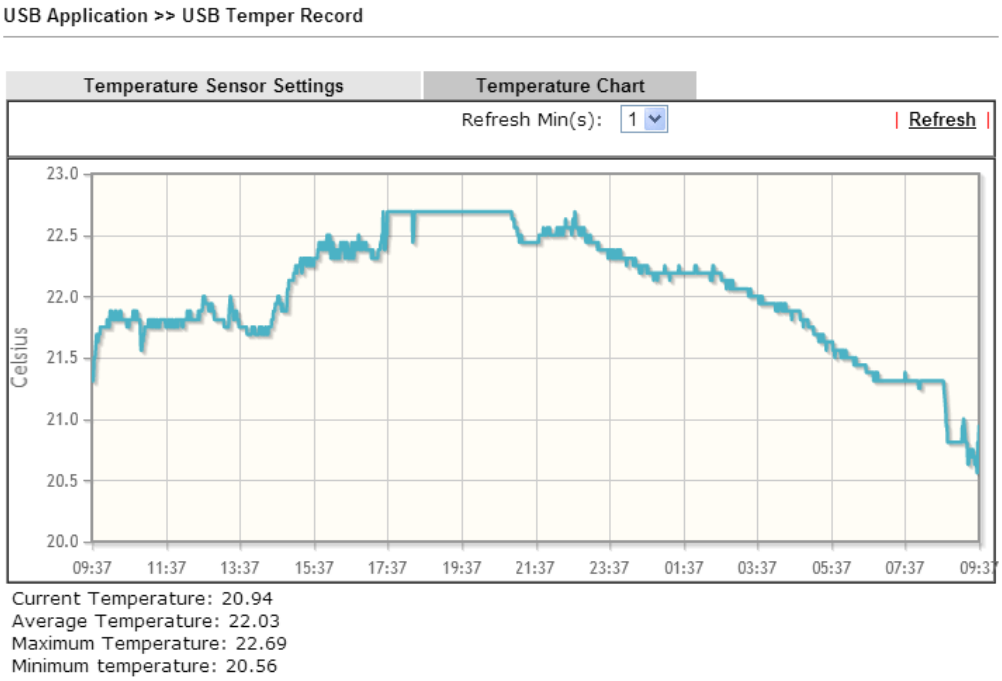


Available settings are explained as follows:

Item	Description
Display Settings	**Temperature Calibration Offset-** Type a value used for correcting the temperature error. **Temperature Unit -** Choose the display unit of the temperature. There are two types for you to choose.
Alarm Settings	**Enable Syslog Alarm** - The temperature log containing the alarm message will be recorded on Syslog if it is enabled. **Mail Alert** - The system will send an alert mail if the temperature over the limit. **Temperature High Alarm/ Temperature Low Alarm** - Type the upper limit and lower limit for the system to send out temperature alert.

Temperature Sensor Graph

Below shows an example of temperature graph:



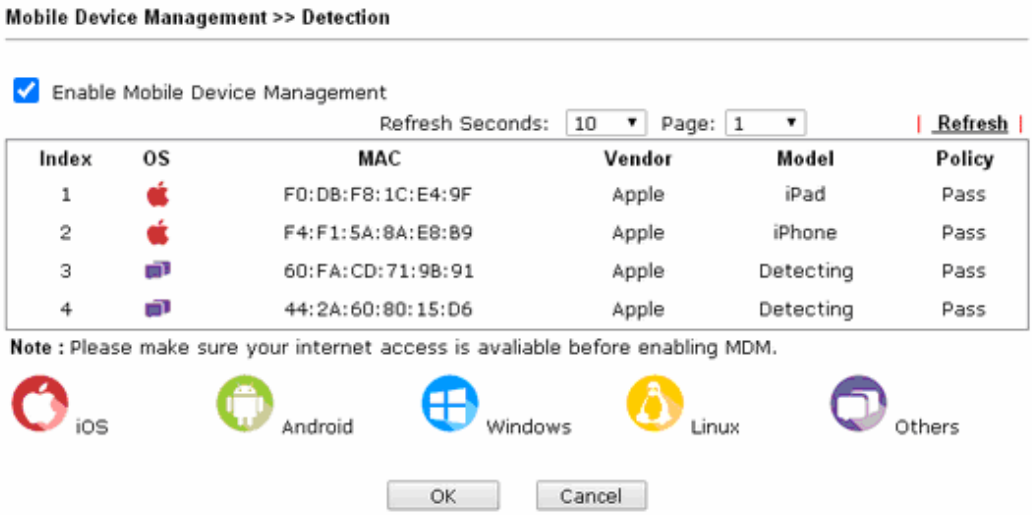
3.12 Mobile Device Management

Such feature can control / manage the mobile devices accessing the wireless network of VigorAP. VigorAP offers wireless LAN service for mobile device(s), PC users, MAC users or other users according to the policy selected.

Below shows the menu items for Mobile Device Management.

3.12.1 Detection

Such page displays mobile device(s) detected by VigorAP Detected device(s) with Policy – **Pass** can access into the wireless LAN offered by VigorAP. Detected device(s) with Policy – **Block** are not allowed to access into Internet via VigorAP's WLAN.



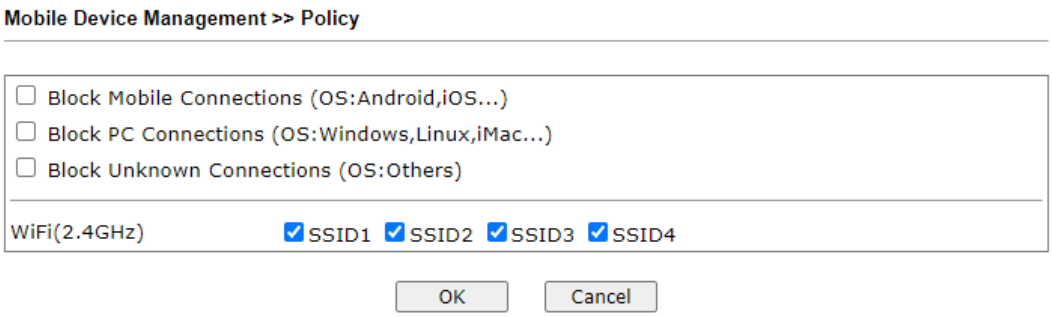
Once you check/uncheck the box of **Enable Mobile Device Management** and click **OK**, VigorAP will reboot automatically to activate MDM.

At present, OS (for mobile device) categories supported by VigorAP include:

- Windows
- Linux
- iOS
- Andorid
- WindowsPhone
- BlackBerry
- Symbian.

3.12.2 Policies

Such page determines which devices (mobile, PC, MAC or others) allowed to make network connections via VigorAP or blocked by VigorAP.



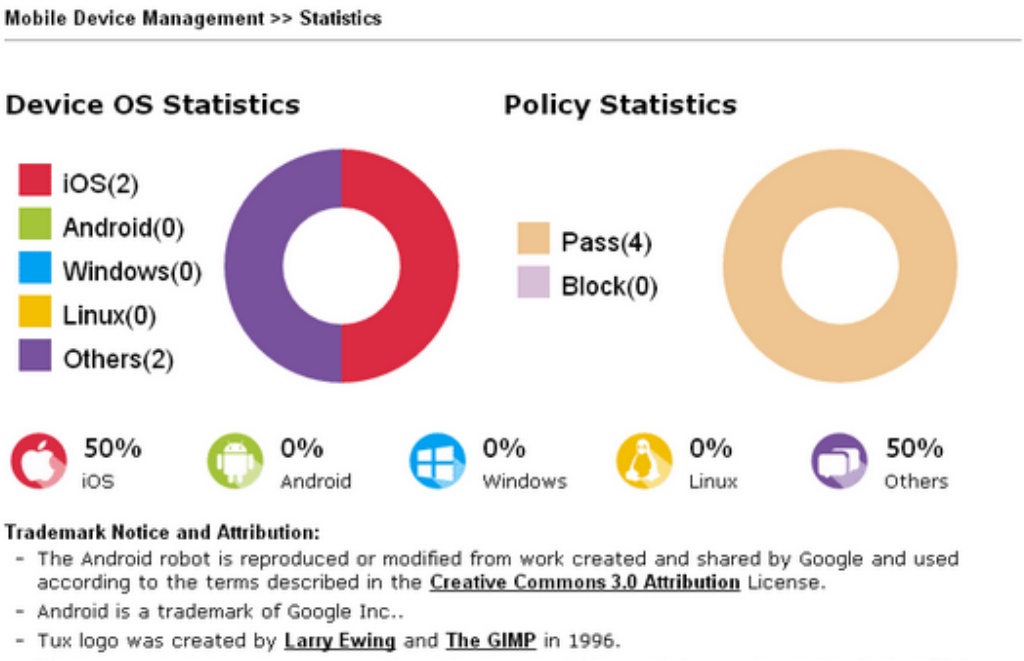
Each item is explained as follows:

Item	Description
Block Mobile Connections	All of mobile devices will be blocked and not allowed to access into Internet via VigorAP.
Block PC Connections	All of network connections based on PC, MAC or Linux platform will be blocked and terminated.
Block Unknown Connections	Only the unknown network connections (unable to be recognized by Vigor router) will be blocked and terminated.
WiFi(2.4GHz)	Specify the SSID(s) to apply such policy.

After finished the policy selection, click **OK**. VigorAP will *reboot* to activate the new policy automatically.

3.12.3 Statistics

The number of detected devices and the number of device(s) passed/blocked according to the policy specified in **Mobile Device Management>>Policy** can be illustrated as doughnut chart.



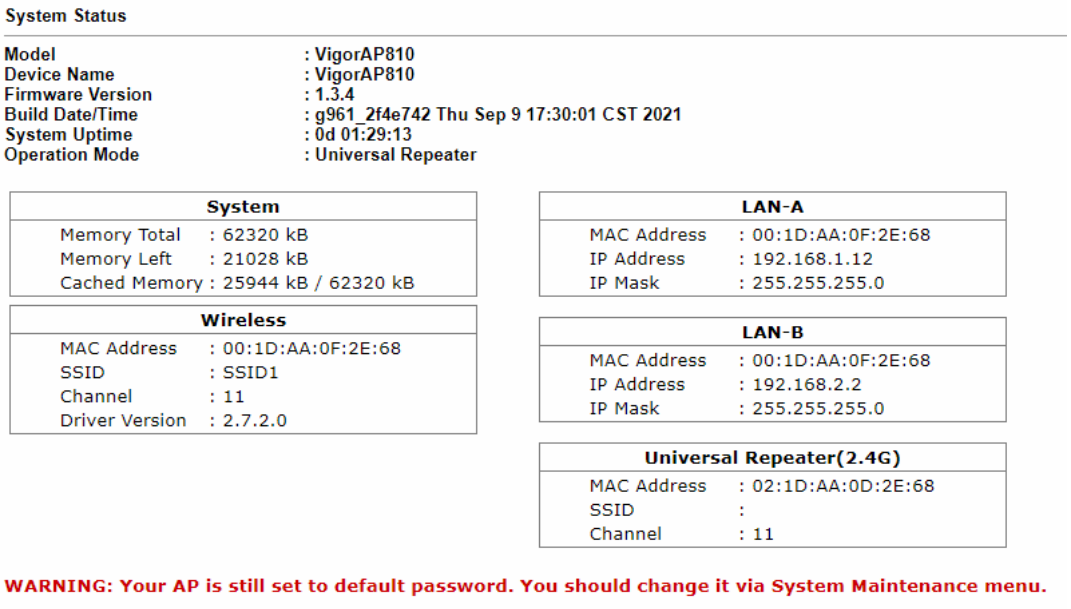
3.13 System Maintenance

For the system setup, there are several items that you have to know the way of configuration: Status, TR-069, Administrator Password, Configuration Backup, Syslog/Mail Alert, Time and Date, Management, Reboot System, and Firmware Upgrade.

Below shows the menu items for System Maintenance.

3.13.1 System Status

The **System Status** provides basic network settings of Vigor modem. It includes LAN and WAN interface information. Also, you could get the current running firmware version or firmware related information from this presentation.



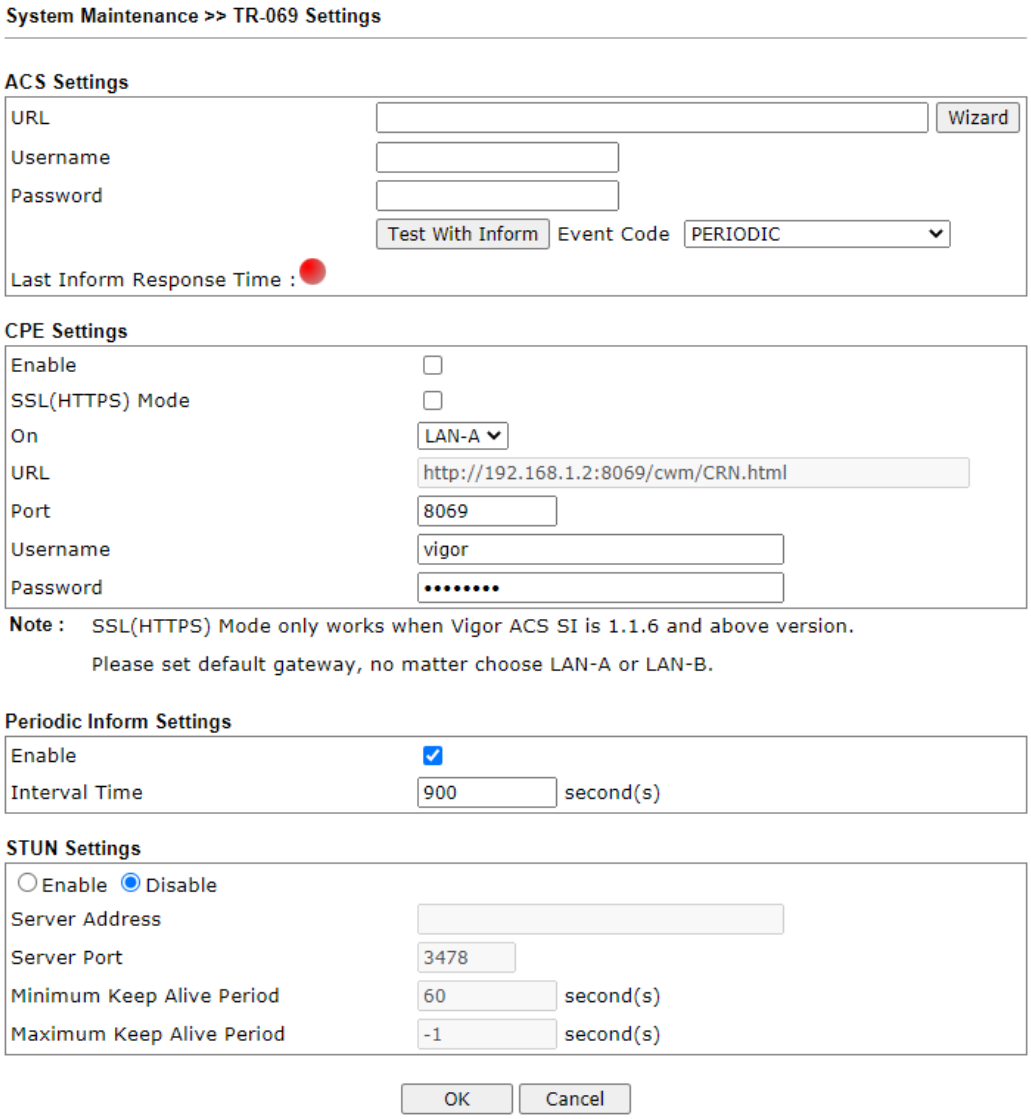
Each item is explained as follows:

Item	Description
Model Name	Display the model name of the modem.
Firmware Version	Display the firmware version of the modem.
Build Date/Time	Display the date and time of the current firmware build.
System Uptime	Display the period that such device connects to Internet.
Operation Mode	Display the operation mode that the device used.

System	
Memory total	Display the total memory of your system.
Memory left	Display the remaining memory of your system.
LAN	
MAC Address	Display the MAC address of the LAN Interface.
IP Address	Display the IP address of the LAN interface.
IP Mask	Display the subnet mask address of the LAN interface.
Wireless	
MAC Address	Display the MAC address of the WAN Interface.
SSID	Display the SSID of the device.
Channel	Display the channel that the station used for connecting with such device.

3.13.2 TR-069

This device supports TR-069 standard. It is very convenient for an administrator to manage a TR-069 device through an Auto Configuration Server, e.g., VigorACS.



Available settings are explained as follows:

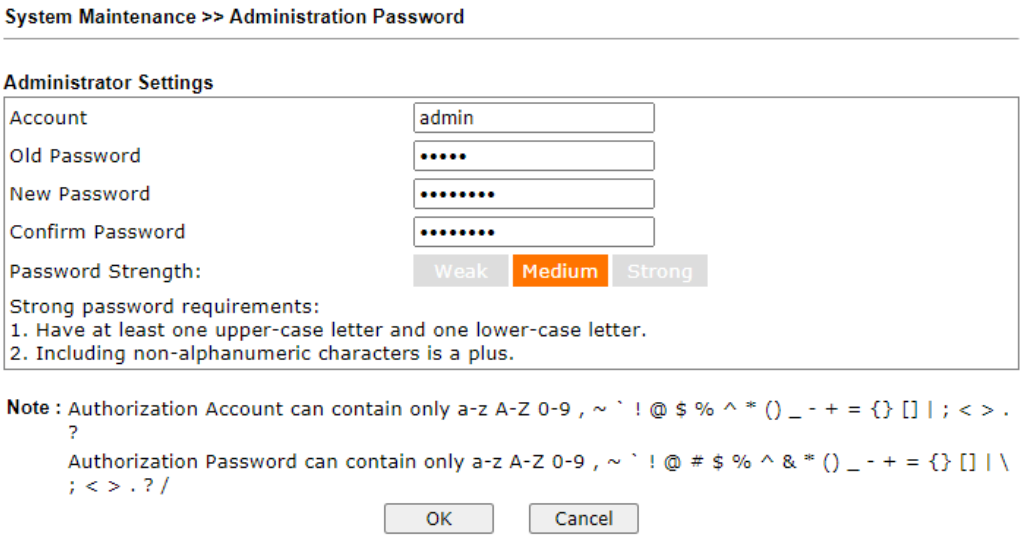
Item	Description
ACS Settings	**URL/Username/Password –** Such data must be typed according to the ACS (Auto Configuration Server) you want to link. Please refer to Auto Configuration Server user's manual for detailed information. **Wizard** – Click it to enter the IP address of VigorACS server, port number and the handler. **Test With Inform** – Click it to send a message based on the event code selection to test if such CPE is able to communicate with VigorACS server. **Event Code** – Use the drop down menu to specify an event to perform the test.

	Last Inform Response Time – Display the time that VigorACS server made a response while receiving Inform message from CPE last time.
CPE Settings	Such information is useful for Auto Configuration Server (ACS). **Enable**– Check the box to allow the CPE Client to connect with Auto Configuration Server. **SSL(HTTPS) Mode** - Check the box to allow the CPE client to connect with ACS through SSL. **On** – Choose the interface (LAN-A or LAN-B) for VigorAP 810 connecting to ACS server. **Port** – Sometimes, port conflict might be occurred. To solve such problem, you might change port number for CPE. **Username/Password –** Type the username and password that VigorACS can use to access into such CPE. **DNS Server IP Address –** Such field is to specify the IP address if a URL is configured with a domain name. ● **Primary IP Address** –You must specify a DNS server IP address here because your ISP should provide you with usually more than one DNS Server. If your ISP does not provide it, the modem will automatically apply default DNS Server IP address: 194.109.6.66 to this field. ● **Secondary IP Address** –You can specify secondary DNS server IP address here because your ISP often provides you more than one DNS Server. If your ISP does not provide it, the modem will automatically apply default secondary DNS Server IP address: 194.98.0.1 to this field.
Periodic Inform Settings	The default setting is **Enable**. Please set interval time or schedule time for the AP to send notification to VigorACS server. Or click **Disable** to close the mechanism of notification. **Interval Time** – Type the value for the interval time setting. The unit is “second”.
STUN Settings	The default is **Disable**. If you click **Enable**, please type the relational settings listed below: **Server Address –** Type the IP address of the STUN server. **Server Port –** Type the port number of the STUN server. **Minimum Keep Alive Period –** If STUN is enabled, the CPE must send binding request to the server for the purpose of maintaining the binding in the Gateway. Please type a number as the minimum period. The default setting is “60 seconds”. **Maximum Keep Alive Period –** If STUN is enabled, the CPE must send binding request to the server for the purpose of maintaining the binding in the Gateway. Please type a number as the maximum period. A value of “-1” indicates that no maximum period is specified.

After finishing this web page configuration, please click **OK** to save the settings.

3.13.3 Administrator Password

This page allows you to set new password for accessing into web user interface of VigorAP.



Available settings are explained as follows:

Item	Description
Account	Type the name for accessing into Web User Interface.
Password	Type in new password in this filed.
Confirm Password	Type the new password again for confirmation.
Password Strength	The system will display the password strength (represented with the word of weak, medium or strong) of the password specified above.

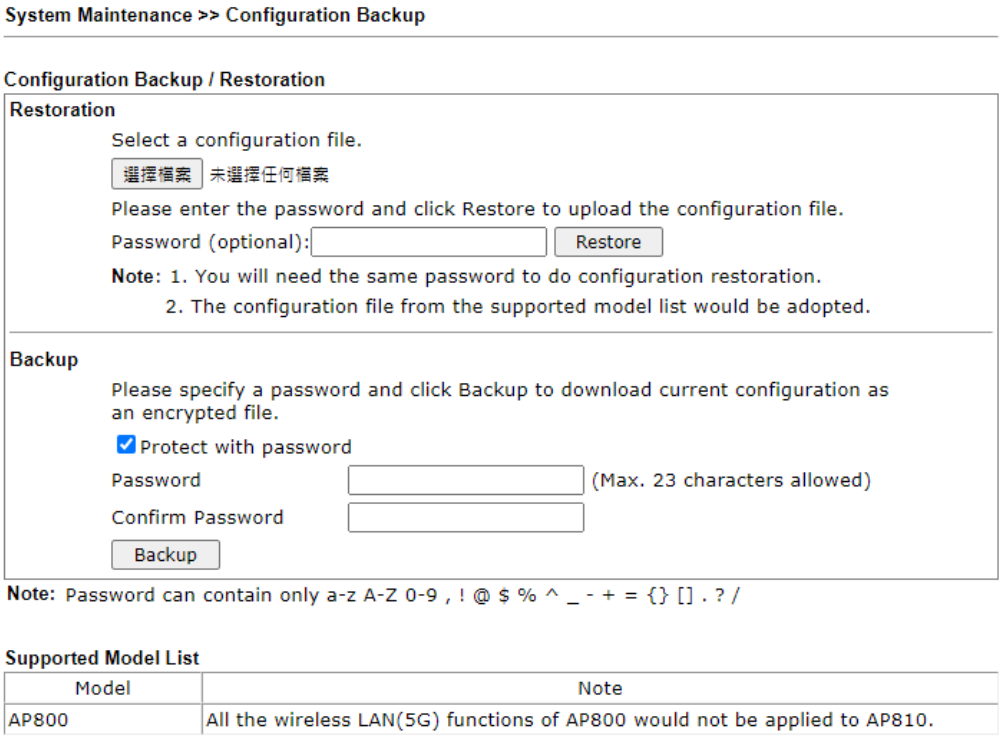
When you click **OK**, the login window will appear. Please use the new password to access into the web user interface again.

3.13.4 Configuration Backup

Backup the Configuration

Follow the steps below to backup your configuration.

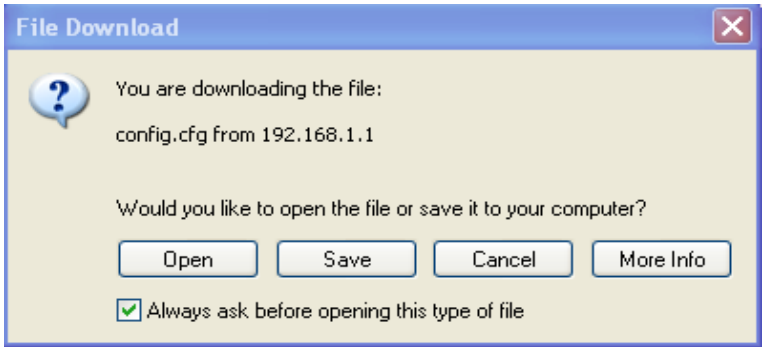
1. Go to **System Maintenance** >> **Configuration Backup**. The following windows will be popped-up, as shown below.



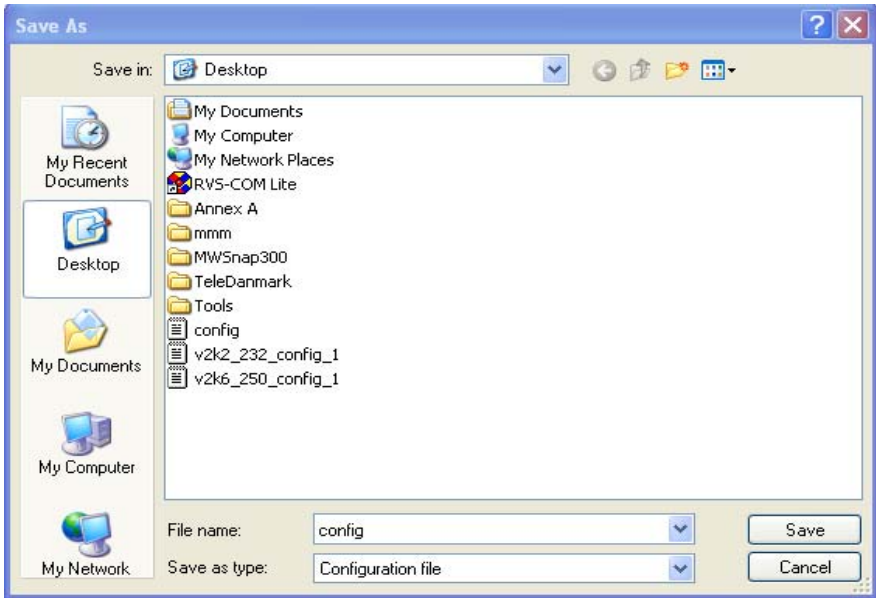
Supported Model List

Model	Note
AP800	All the wireless LAN(5G) functions of AP800 would not be applied to AP810.

2. Click **Backup** button to get into the following dialog. Click **Save** button to open another dialog for saving configuration as a file.



3. In **Save As** dialog, the default filename is **config.cfg**. You could give it another name by yourself.



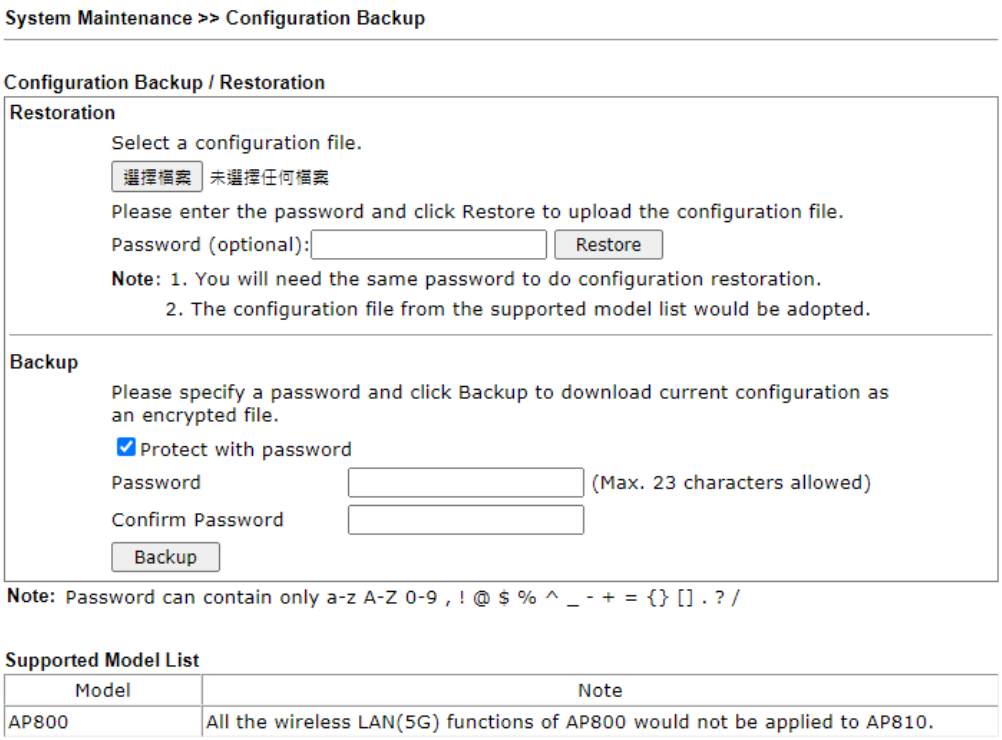
4. Click **Save** button, the configuration will download automatically to your computer as a file named **config.cfg**.

The above example is using **Windows** platform for demonstrating examples. The **Mac** or **Linux** platform will appear different windows, but the backup function is still available.

> **Note:** Backup for Certification must be done independently. The Configuration Backup does not include information of Certificate.

Restore Configuration

1. Go to **System Maintenance** >> **Configuration Backup**. The following windows will be popped-up, as shown below.



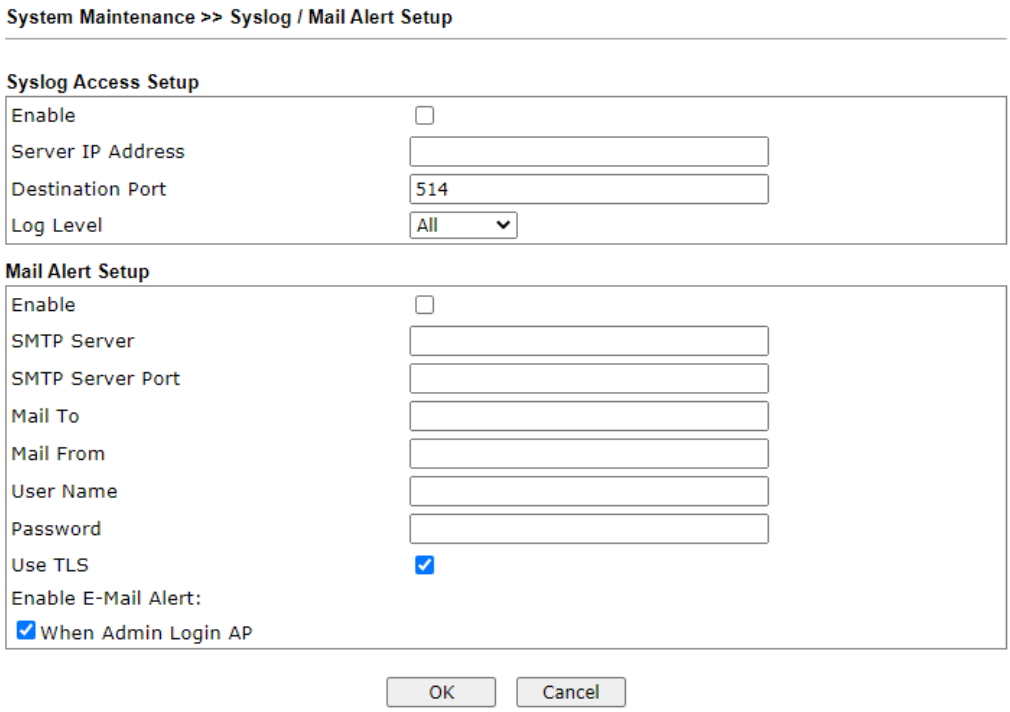
2. Click **Browse** button to choose the correct configuration file for uploading to the

modem.

3. Click **Restore** button and wait for few seconds, the system will tell you that the restoration procedure is successful.

3.13.5 Syslog/Mail Alert

Syslog function is provided for users to monitor router.



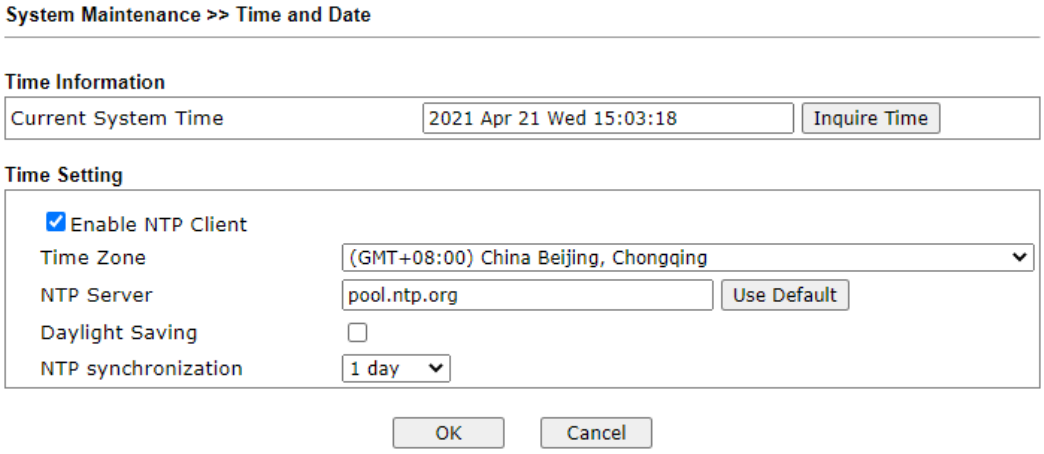
Available parameters are explained as follows:

Item	Description
SysLog Access Setup	**Enable** - Check **Enable** to activate function of Syslog. **Server IP Address** -The IP address of the Syslog server. **Destination Port** - Assign a port for the Syslog protocol. **Log Level** – Specify log type on this web page to send the corresponding message of info, warning, error or all.
Mail Alert Setup	Check **Enable** to activate function of mail alert. **SMTP Server** - The IP address of the SMTP server. **Mail To** - Assign a mail address for sending mails out. **Mail From** - Assign a path for receiving the mail from outside. **User Name** - Type the user name for authentication. **Password** - Type the password for authentication. **Use TLS** – Check this box to encrypt alert mail. However, if the SMTP server specified here does not support TLS protocol, the alert mail with encrypted data will not be received by the receiver.

Item	Description
	Enable E-mail Alert - Check the box to send alert message to the e-mail box while the router detecting the item(s) you specify here.

3.13.6 Time and Date

It allows you to specify where the time of the AP should be inquired from.



Available parameters are explained as follows:

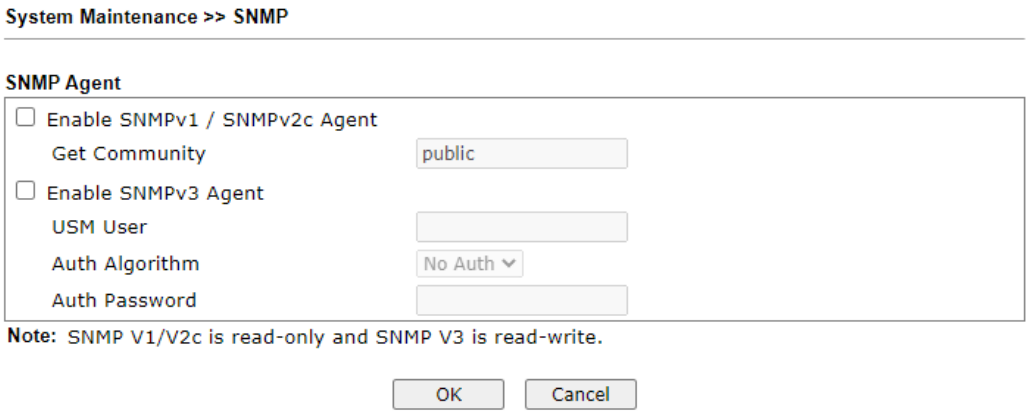
Item	Description
Current System Time	Click **Inquire Time** to get the current time.
Use NTP Client	Select to inquire time information from Time Server on the Internet using assigned protocol. This is default setting.
Time Zone	Select a time protocol.
NTP Server	Type the IP address of the time server. **Use Default** – Click it to choose the default NTP server.
Daylight Saving	Check the box to enable the daylight saving. Such feature is available for certain area.
NTP synchronization	Select a time interval for updating from the NTP server.

Click **OK** to save these settings.

3.13.7 SNMP

This page allows you to configure settings for SNMP and SNMPV3 services.

The SNMPv3 is **more secure than** SNMP through the authentication method (support MD5) for the management needs.



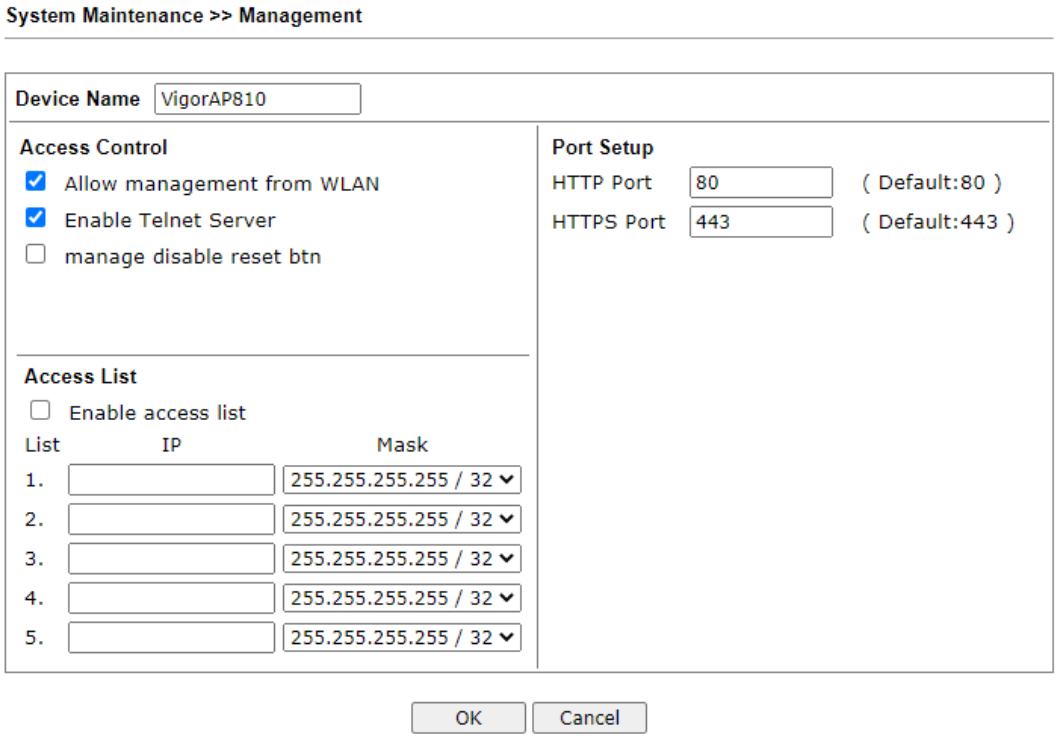
Available settings are explained as follows:

Item	Description
Enable SNMPv1 / SNMPv2c Agent	Check it to enable this function.
Enable SNMPV3 Agent	Check it to enable this function.
USM User	USM means user-based security mode. Type a username which will be used for authentication. The maximum length of the text is limited to 23 characters.
Auth Algorithm	Choose one of the encryption methods listed below as the authentication algorithm.
Auth Password	Type a password for authentication. The maximum length of the text is limited to 23 characters.

Click **OK** to save these settings.

3.13.8 Management

This page allows you to manage the port settings for HTTP and HTTPS.



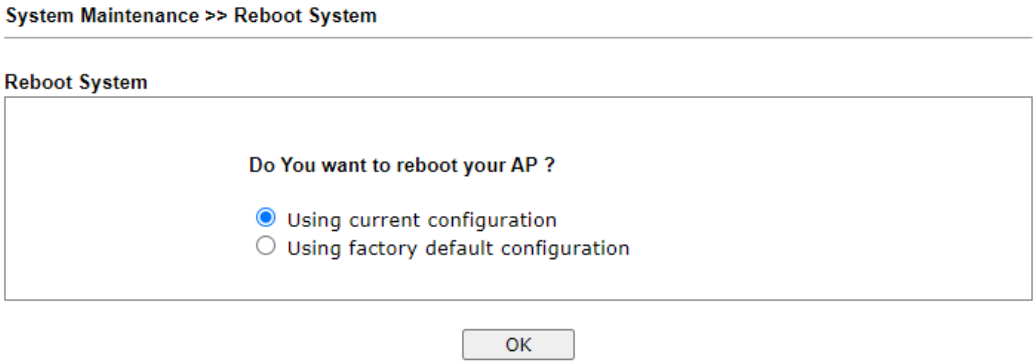
Available parameters are explained as follows:

Item	Description
Device Name	The default setting is VigorAP 1000C. Change the name if required.
Access Control	**Allow management from WLAN** - Enable the checkbox to allow system administrators to login from wireless LAN. **Enable Telnet Server**– The administrator / user can access into the command line interface of VigorAP remotely for configuring settings.
Access List	**Enable access list** – Check the box to specify that the system administrator can only login from a specific host or network defined in the list. A maximum of five IPs/subnet masks is allowed.
Port Setup	**HTTP port/HTTPS port** -Specify user-defined port numbers for the HTTP and HTTPS servers.

Click **OK** to save these settings.

3.13.9 Reboot System

The Web Configurator may be used to restart your modem. Click **Reboot System** from **System Maintenance** to open the following page.



If you want to reboot the modem using the current configuration, check **Using current configuration** and click **OK**. To reset the modem settings to default values, check **Using factory default configuration** and click **OK**. The modem will take 5 seconds to reboot the system.

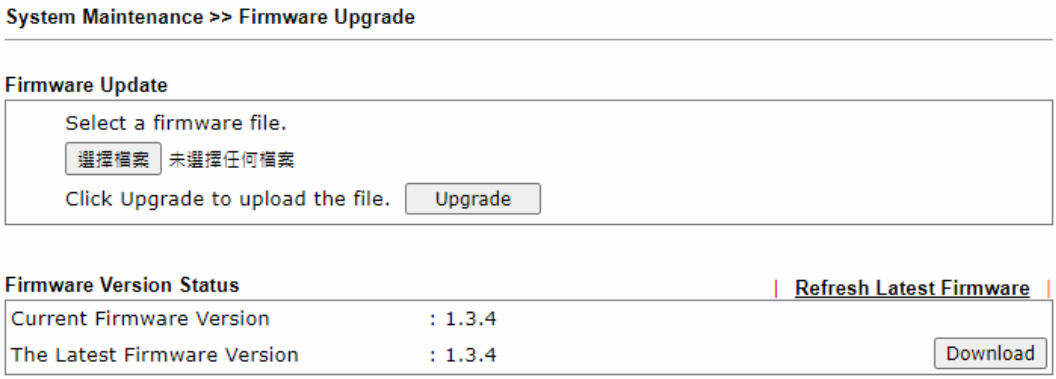
Note: When the system pops up Reboot System web page after you configure web settings, please click **OK** to reboot your modem for ensuring normal operation and preventing unexpected errors of the modem in the future.

3.13.10 Firmware Upgrade

Before upgrading your modem firmware, you need to install the Modem Tools. The **Firmware Upgrade Utility** is included in the tools. The following web page will guide you to upgrade firmware by using an example. Note that this example is running over Windows OS (Operating System).

Download the newest firmware from DrayTek's web site or FTP site. The DrayTek web site is www.draytek.com (or local DrayTek's web site) and FTP site is ftp.draytek.com.

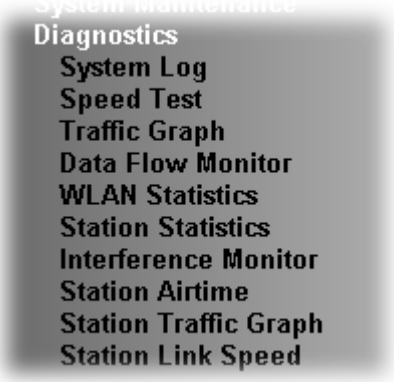
Click **System Maintenance>> Firmware Upgrade** to launch the Firmware Upgrade Utility.



Click **Browse** to locate the newest firmware from your hard disk and click **Upgrade**.

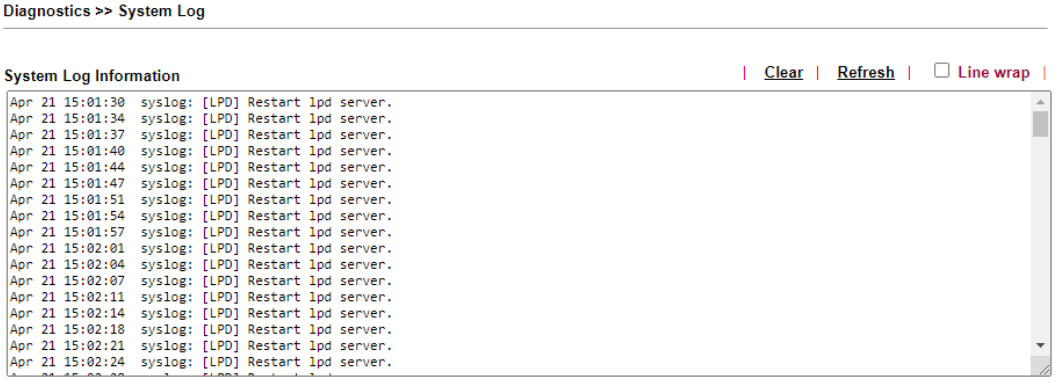
3.14 Diagnostics

Diagnostic Tools provide a useful way to **view** or **diagnose** the status of your VigorAP 810.



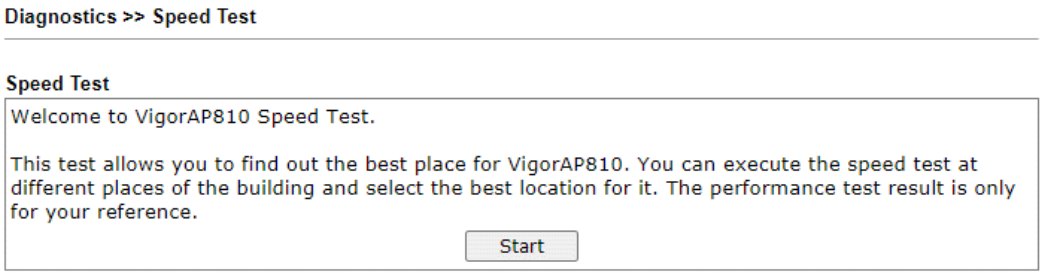
3.14.1 System Log

At present, only **System Log** is offered.



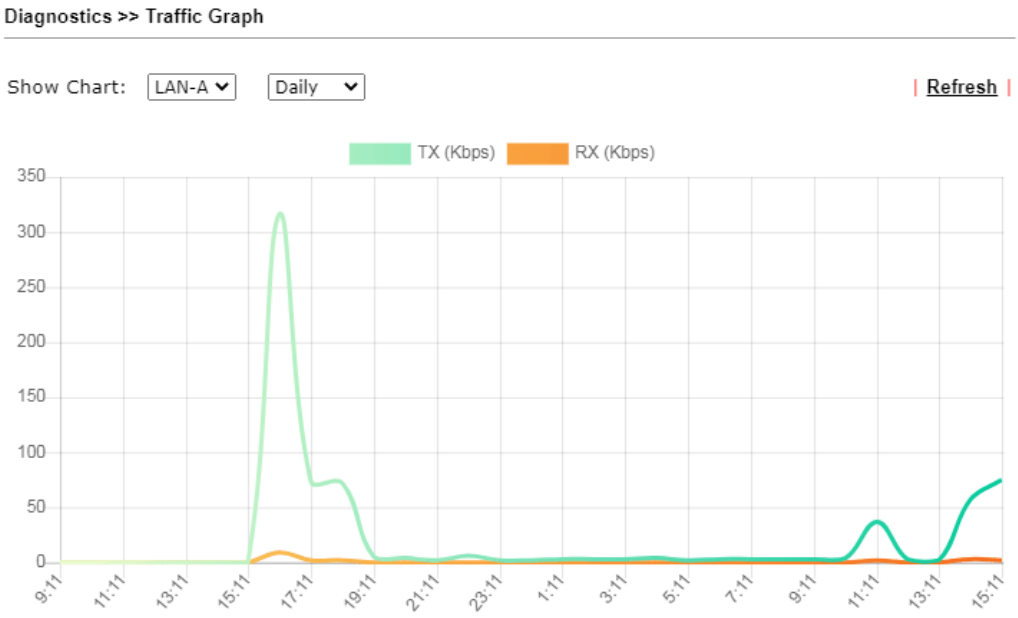
3.14.2 Speed Test

Click the **Start** button on the page to test the speed. Such feature can help you to find the best installation place for Vigor AP.



3.14.3 Traffic Graph

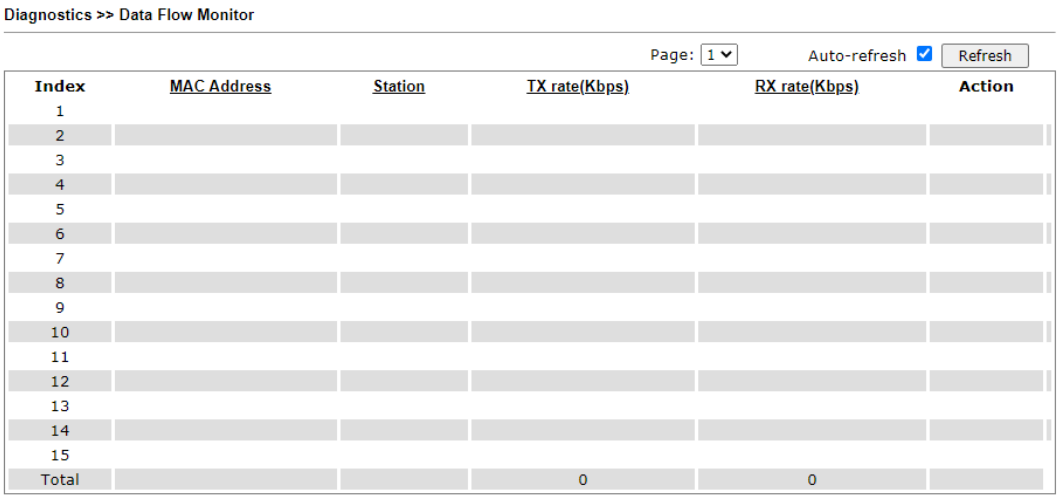
Click **Traffic Graph** to open the web page. Choose one of the managed Access Points, daily or weekly for viewing data transmission chart. Click **Refresh** to renew the graph at any time.



The horizontal axis represents time; the vertical axis represents the transmission rate (in kbps).

3.14.4 Data Flow Monitor

This page displays general information for the client connecting to VigorAP 810.



Available parameters are explained as follows:

Item	Description
Auto-refresh	After checking this box, Vigor system will refresh such page periodically.
Refresh	Click this link to refresh this page immediately.
Index	Display the number of the data flow.
MAC Address	Display the MAC address of the monitored device.
Station	Display the IP address/host name of the wireless client.
TX rate (kbps)	Display the transmission speed of the monitored device.
RX rate (kbps)	Display the receiving speed of the monitored device.
Action	**DeAuth** – Deauthenticate a wireless station.

3.14.5 WLAN Statistics

Such page is used for debug by RD only.

Diagnostics >> WLAN Statistics

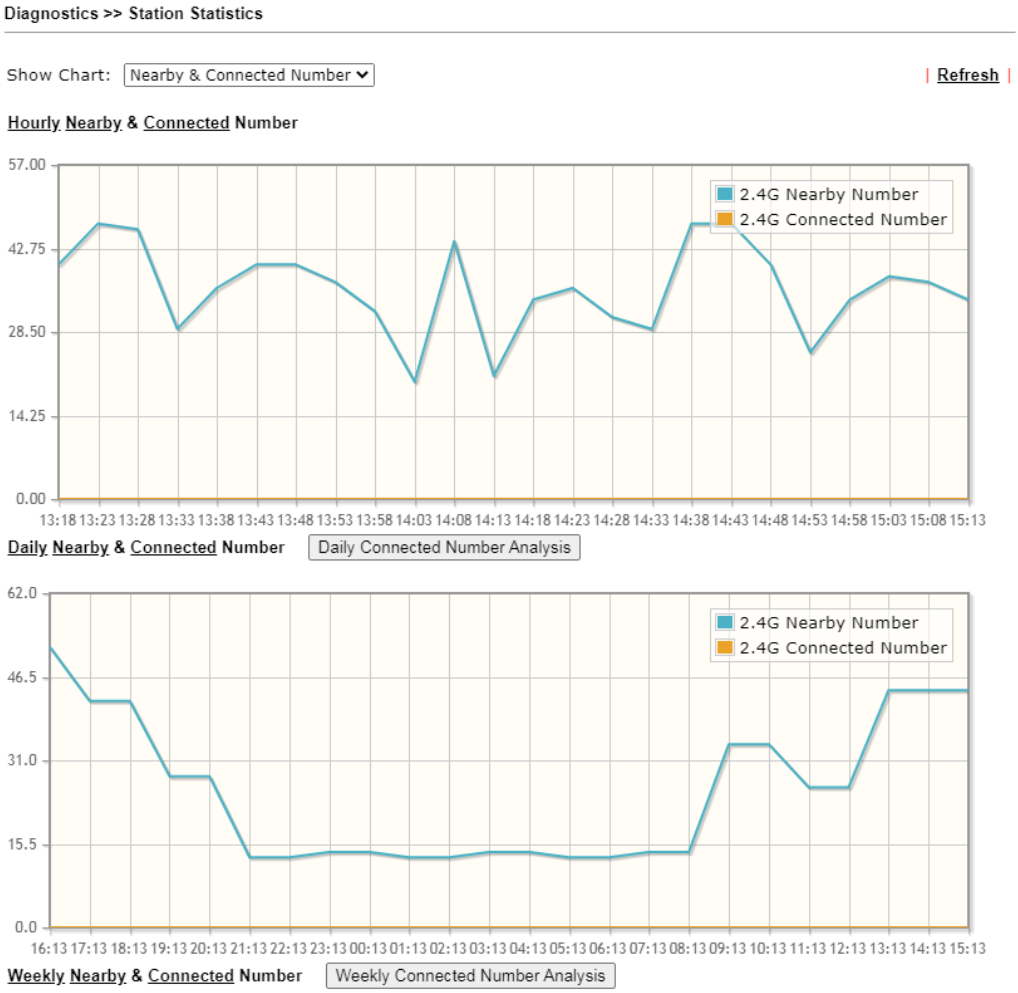
Auto-Refresh | Refresh

Tx success	1662	Rx success	148245
Tx retry count	0	Rx with CRC	300131
Tx fail to Rcv ACK after retry	0	Rx drop due to out of resource	0
RTS Success Rcv CTS	0	Rx duplicate frame	0
RTS Fail Rcv CTS	0	False CCA (one second)	1842
TransmitCountFromOS	415	MulticastReceivedFrameCount	0
TransmittedFragmentCount	1662	RealFcsErrCount	300131
TransmittedFrameCount	1662	WEPUndecryptableCount	0
MulticastTransmittedFrameCount	0	MultipleRetryCount	0
TransmittedAMSDUCount	0	ACKFailureCount	0
TransmittedOctetsInAMSDU	0	ReceivedAMSDUCount	0
TransmittedAMPDUCount	0	ReceivedOctetsInAMSDUCount	0
TransmittedMPDUsInAMPDUCount	0	MPDUInReceivedAMPDUCount	0
TransmittedOctetsInAMPDUCount	0	fAnySta40IntolerantCount	0

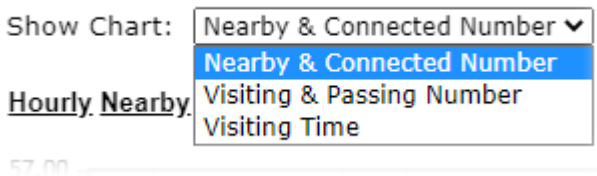
	SSID1 (SSID1)	SSID2 (SSID2)	SSID3 (N/A)	SSID4 (N/A)
Packets Received	0	0	N/A	N/A
Packets Sent	0	0	N/A	N/A
Bytes Received	0	0	N/A	N/A
Byte Sent	0	0	N/A	N/A
Error Packets Received	0	0	N/A	N/A
Drop Received Packets	0	0	N/A	N/A

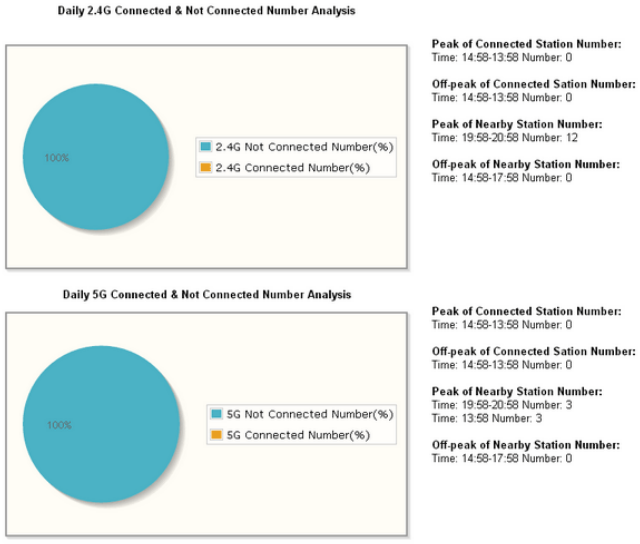
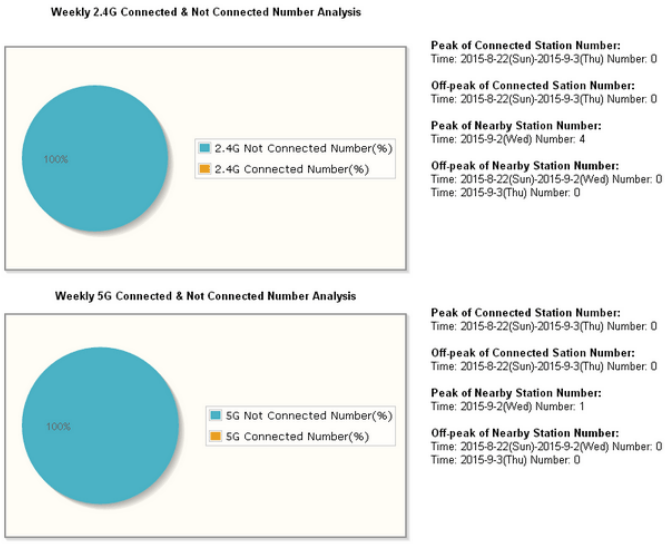
3.14.6 Station Statistics

Such page is used for debug or for the user to observe network traffic and network quality.



Available parameters are explained as follows:

Item	Description
Show Chart	Choose one of the items to display the statistics chart for wireless stations.  **Nearby & Connected Number** – Choose it to have the statistics of the wireless stations which is nearby and connected to VigorAP 810. **Visiting & Passing Number** – Choose it to have the statistics of the wireless stations which is visiting and passing to VigorAP 810. **Visiting Time** - Choose it to have the statistics of the wireless stations which is visiting VigorAP 810.

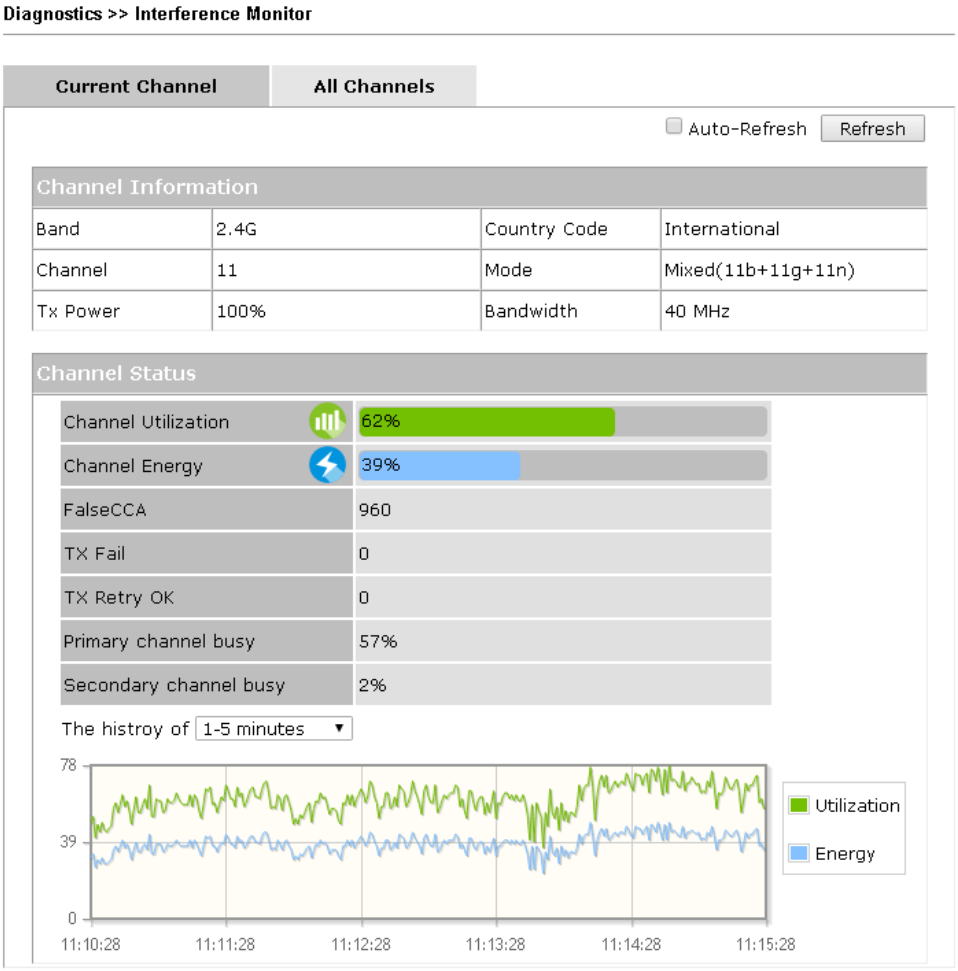
Daily Connected Number Analysis / **Daily Visiting Number Analysis**	Click this button to get analysis pie chart for daily connected wireless stations / daily visiting wireless station. 
Weekly Connected Number Analysis / **Weekly Visiting Number Analysis**	Click this button to get analysis pie chart for weekly connected wireless stations / weekly visiting wireless station. 

3.14.7 Interference Monitor

As an interference detector, VigorAP can detect all of the environmental interference factors for certain channel used or for all of the wireless channels.

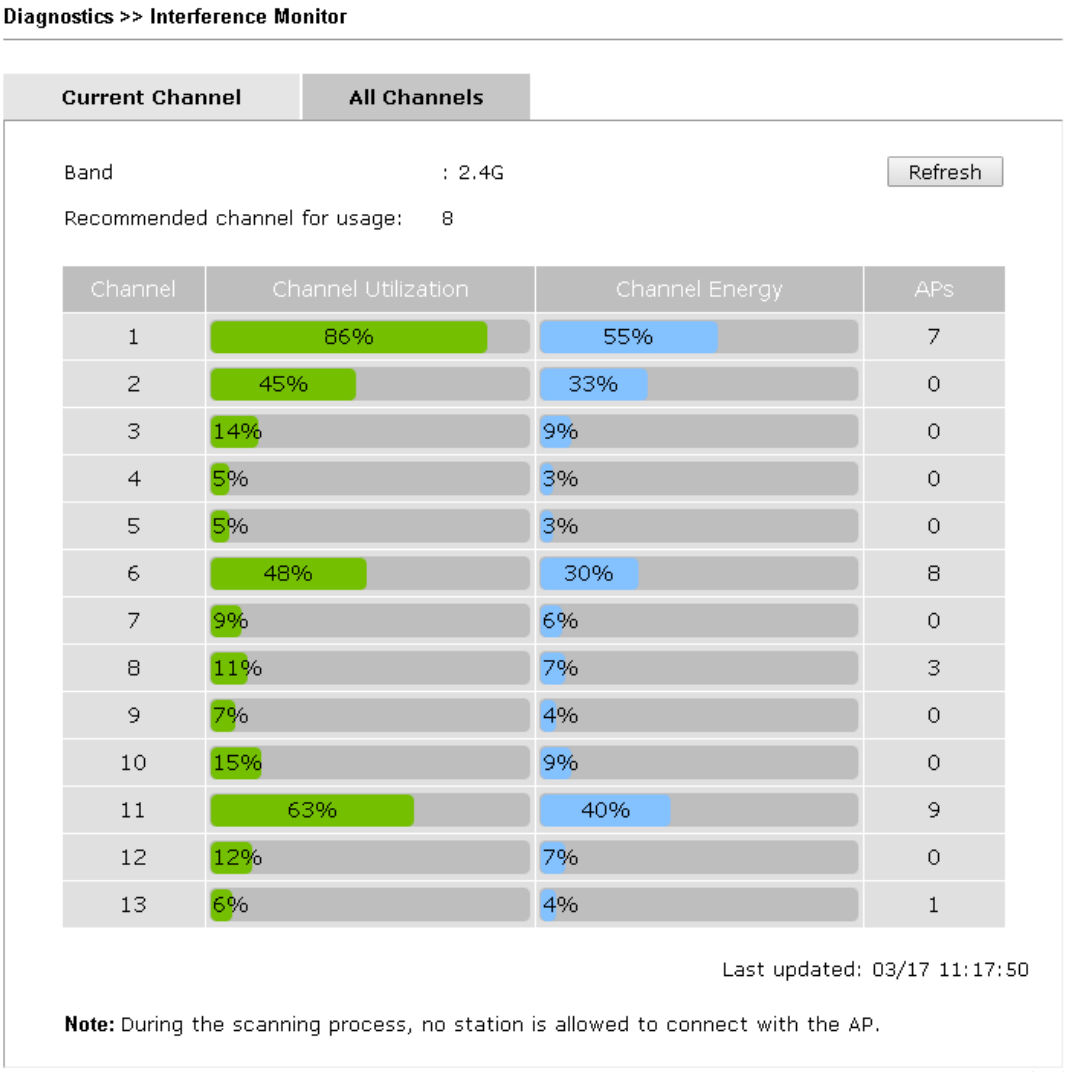
Current Channel

The analysis page with information about wireless band, channel, transmission power, bandwidth, wireless mode, and country code chosen will be displayed on this page. Also, channel status can be seen easily from this page.



All Channels

This page displays the utilization and energy result for all channels. Click **Refresh** to get the newly update interference situation.



3.14.8 Station Airtime

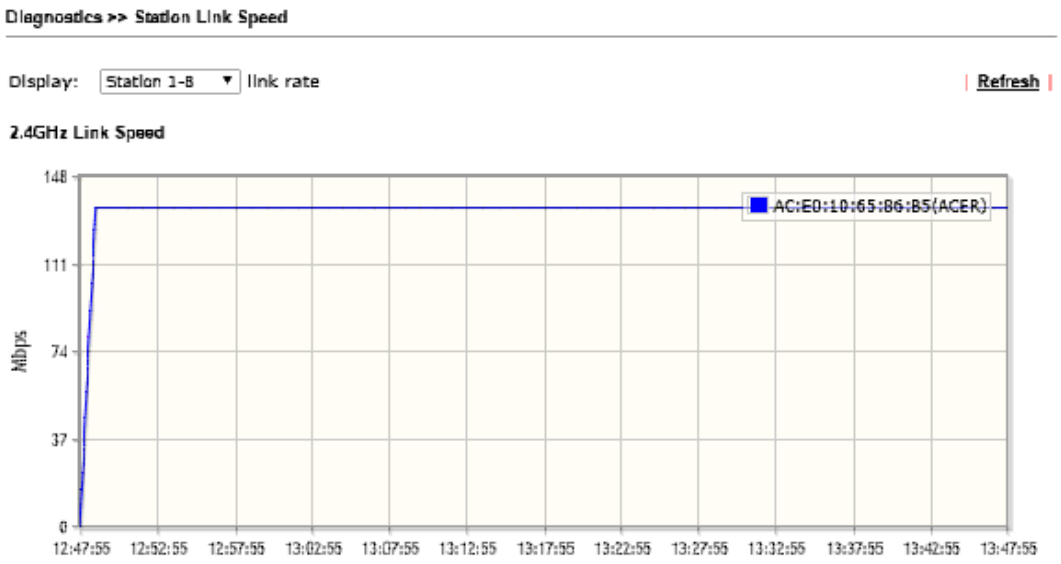
This page displays the operation status for 2.4GHz wireless stations within 30 minutes.

3.14.9 Station Traffic Graph

This page displays the data traffic (receiving/transmitting) status for 2.4GHz wireless stations within 30 minutes with a run chart.

3.14.10 Station Link Speed

This page displays the link rate status for 2.4GHz/5GHz wireless stations within one hour with a run chart.



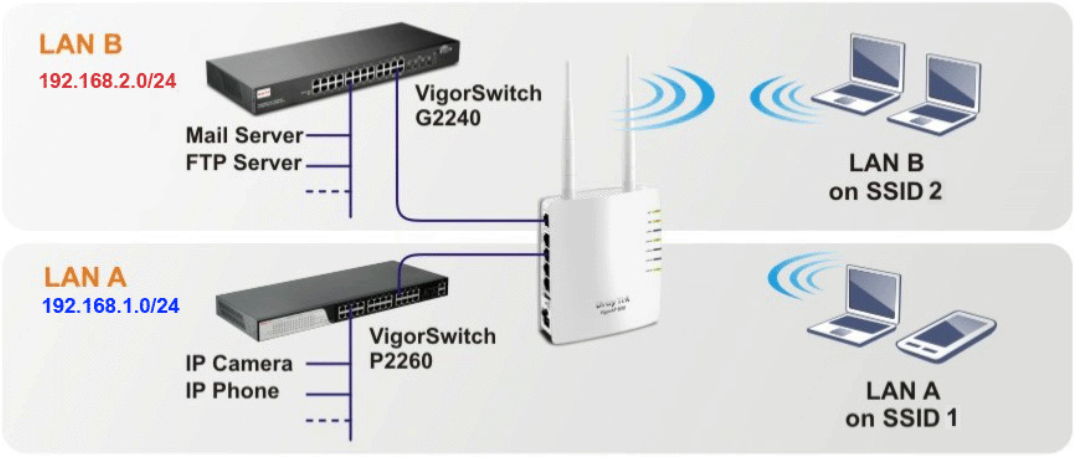
3.15 Support Area

When you click the menu item under **Support Area**, you will be guided to visit www.draytek.com and open the corresponding pages directly.

4 Application and Examples

4.1 How to set different segments for different SSIDs in VigorAP 810

VigorAP 810 supports two network segments, LAN-A and LAN-B for different SSIDs. With such feature, the user can dispatch SSIDs with different network segments for reaching the target of managing wireless network. See the following figure.



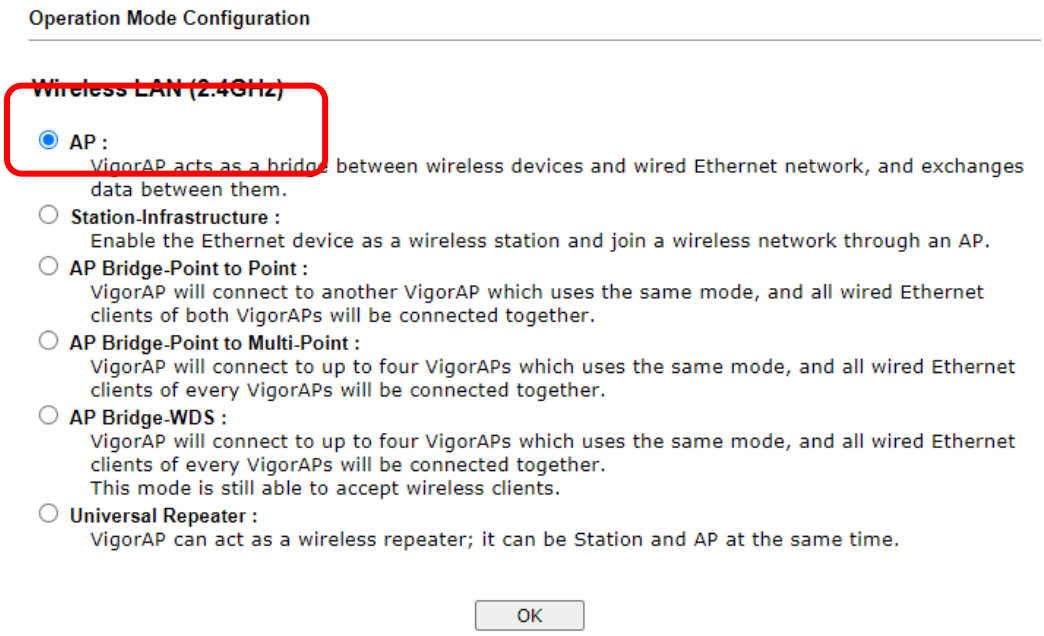
In the above figure, VigorAP 810 is used to control the wireless network connection. It can separate the wireless traffic between accessing internal server and the usage of video. Wireless station connecting to VigorAP 810 with SSID 2 can get the IP address with the network segment of 192.168.1.0/24 (LAN-A); wireless station connecting to VigorAP 810 with SSID 1 can get the IP address with the same network segment of 192.168.2.0/24 (LAN-B).

LAN-B : 192.168.2.0/24 →for internal server

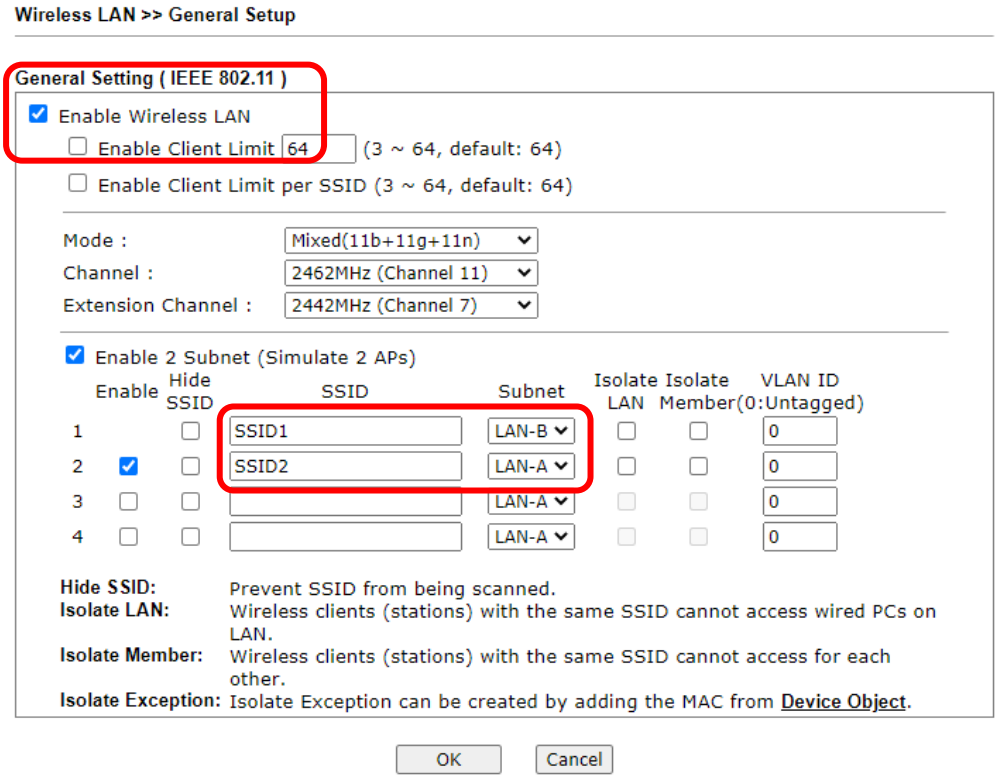
LAN-A : 192.168.1.0/24 →for music, video traffic

Below shows you how to configure the web page for VigorAP 810:

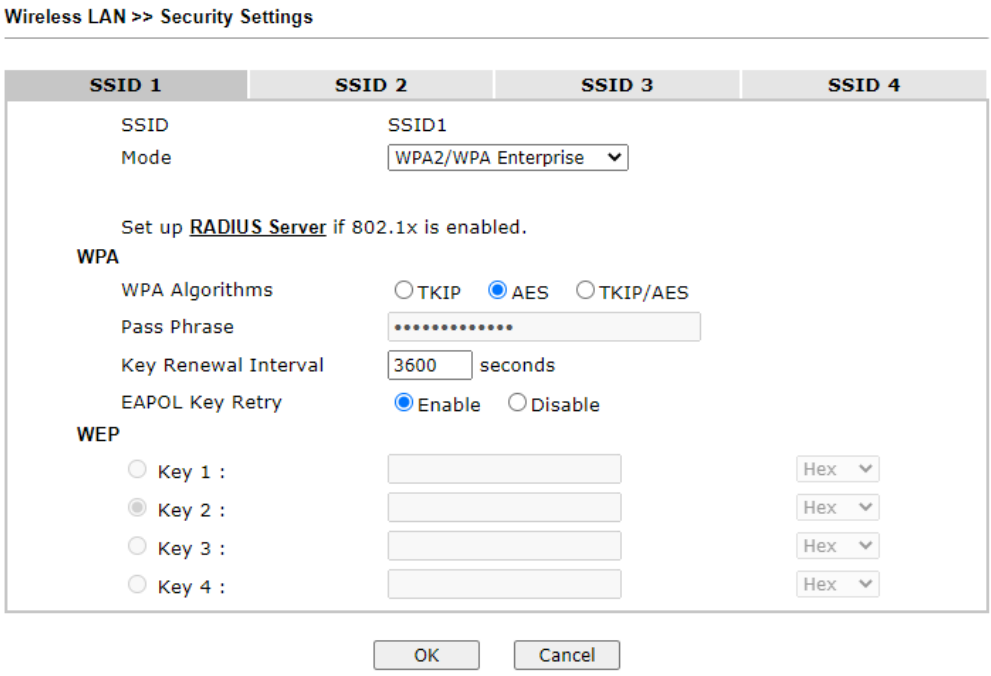
1. In the page of **Operation Mode**, click **AP** mode.



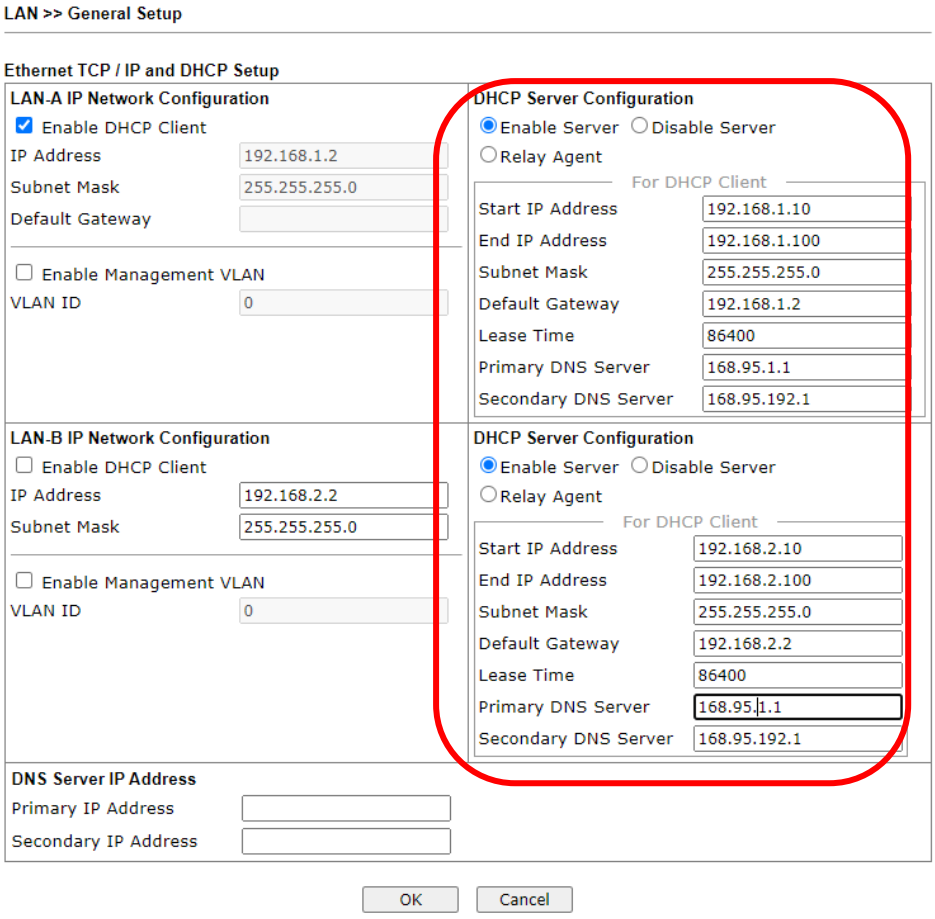
2. Open **Wireless LAN>> General Setup**. Choose the subnet **LAN-B** for SSID 1 and choose **LAN-A** for SSID 2. Specify the wireless channel. Then, click **OK** to save the configuration.



3. Open **Wireless LAN >> Security Settings**. Set the encryption method and set the password for SSID 1 and SSID 2 respectively.



4. Open **LAN>General Setup** to configure the settings for enabling DHCP server on LAN-A/LAN-B. If there is a DHCP server configured in the same network segment, skip this step.



5. After finishing the above settings, the wireless equipment connecting to VigorAP 810 with SSID 1 can get the IP address assigned by LAN-B 192.168.2.0/24 for accessing the internal server. The wireless equipment connecting to VigorAP 810 with SSID 2 can get the IP address assigned by LAN-A 192.168.1.0/24 for using the video/audio uploading and downloading services.

Trouble Shooting

This section will guide you to solve abnormal situations if you cannot access into the Internet after installing the modem and finishing the web configuration. Please follow sections below to check your basic installation status stage by stage.

- Checking if the hardware status is OK or not.
- Checking if the network connection settings on your computer are OK or not.
- Pinging the modem from your computer.
- Checking if the ISP settings are OK or not.
- Backing to factory default setting if necessary.

If all above stages are done and the modem still cannot run normally, it is the time for you to contact your dealer for advanced help.

5.1 Checking If the Hardware Status Is OK or Not

Follow the steps below to verify the hardware status.

1. Check the power line and cable connections.
   Refer to "**1.3 Hardware Installation"** for details.
2. Power on the modem. Make sure the **POWER** LED**, ACT** LED and **LAN** LED are bright.
3. If not, it means that there is something wrong with the hardware status. Simply back to **"1.3 Hardware Installation"** to execute the hardware installation again. And then, try again.

5.2 Checking If the Network Connection Settings on Your Computer Is OK or Not

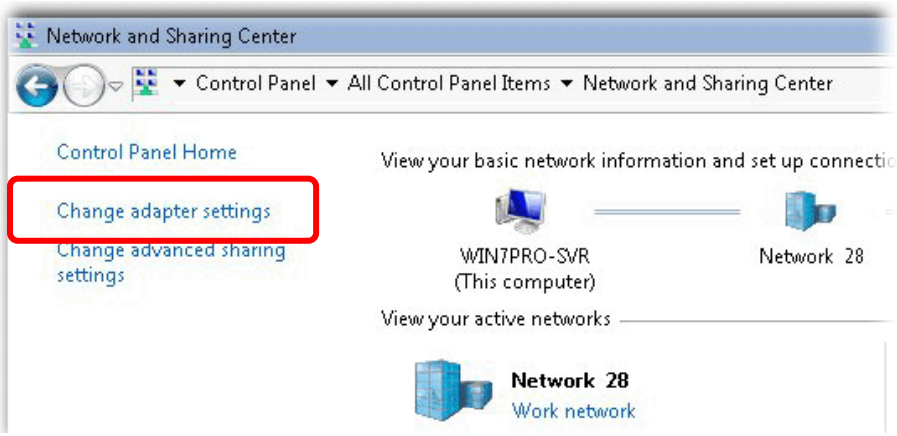
Sometimes the link failure occurs due to the wrong network connection settings. After trying the above section, if the link is stilled failed, please do the steps listed below to make sure the network connection settings is OK.

For Windows

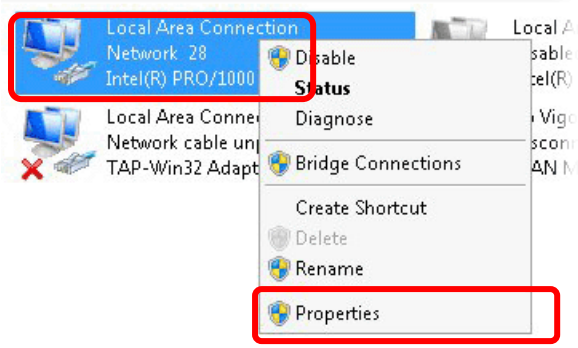
> The example is based on Windows 7 (Professional Edition). As to the examples for other operation systems, please refer to the similar steps or find support notes in **www.draytek.com**.

1. Open **All Programs>>Getting Started>>Control Panel.** Click **Network and Sharing Center.**

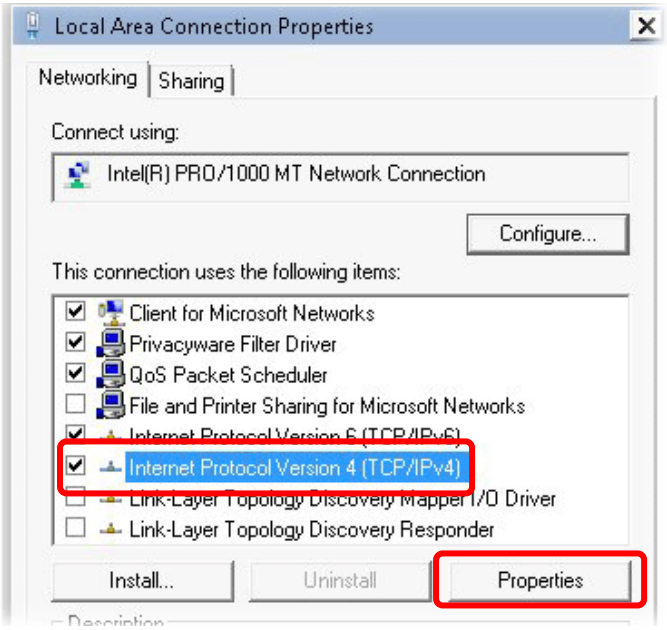
2. In the following window, click **Change adapter settings**.



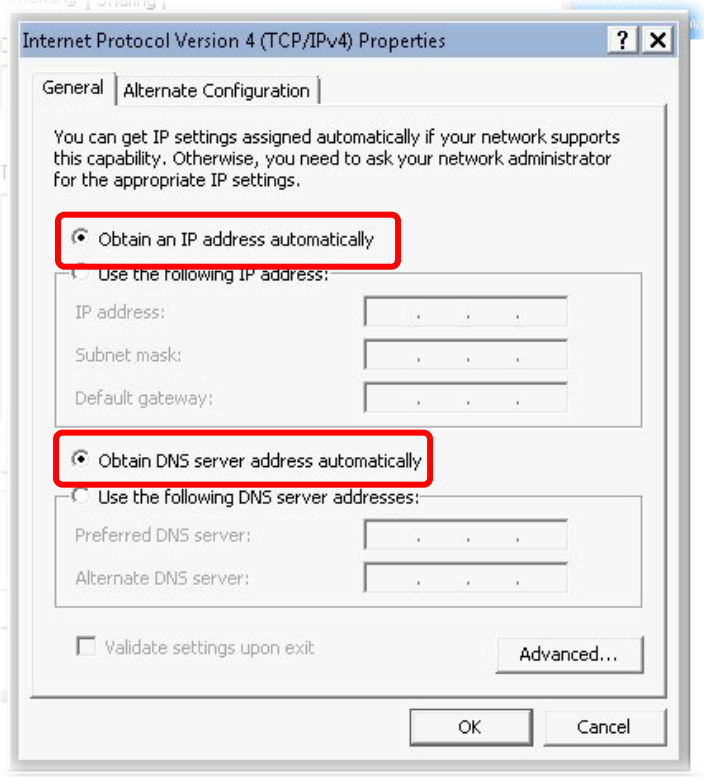
3. Icons of network connection will be shown on the window. Right-click on **Local Area Connection** and click on **Properties**.



4. Select **Internet Protocol Version 4 (TCP/IP)** and then click **Properties**.

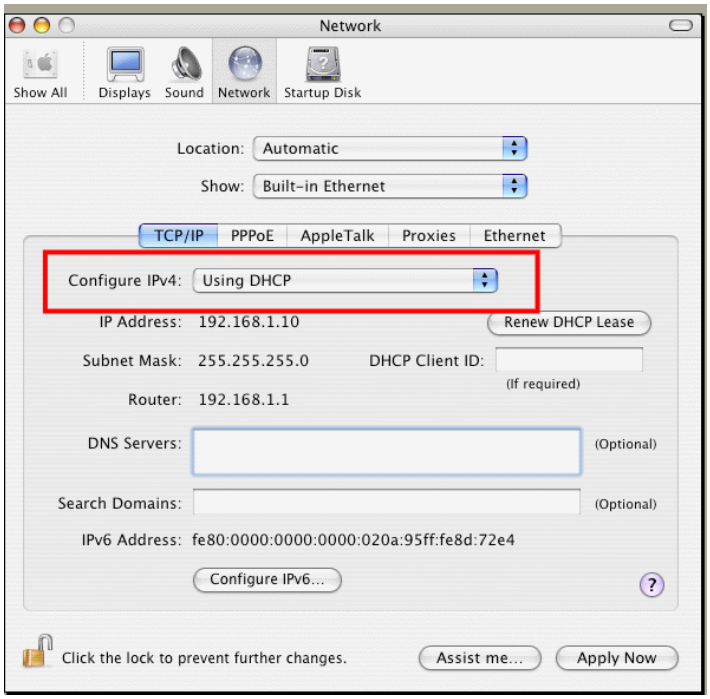


5. Select **Obtain an IP address automatically** and **Obtain DNS server address automatically**. Finally, click **OK**.



For Mac Os

1. Double click on the current used Mac Os on the desktop.
2. Open the **Application** folder and get into **Network**.
3. On the **Network** screen, select **Using DHCP** from the drop down list of Configure IPv4.


Network
Show All
Displays
Sound
Network
Startup Disk
Location: Automatic
Show: Built-in Ethernet
TCP/IP
PPPoE
AppleTalk
Proxies
Ethernet
Configure IPv4: Using DHCP
IP Address: 192.168.1.10
Renew DHCP Lease
Subnet Mask: 255.255.255.0
DHCP Client ID:
(If required)
Router: 192.168.1.1
DNS Servers:
(Optional)
Search Domains:
(Optional)
IPv6 Address: fe80:0000:0000:0000:020a:95ff:fe8d:72e4
Configure IPv6...
Click the lock to prevent further changes.
Assist me...
Apply Now

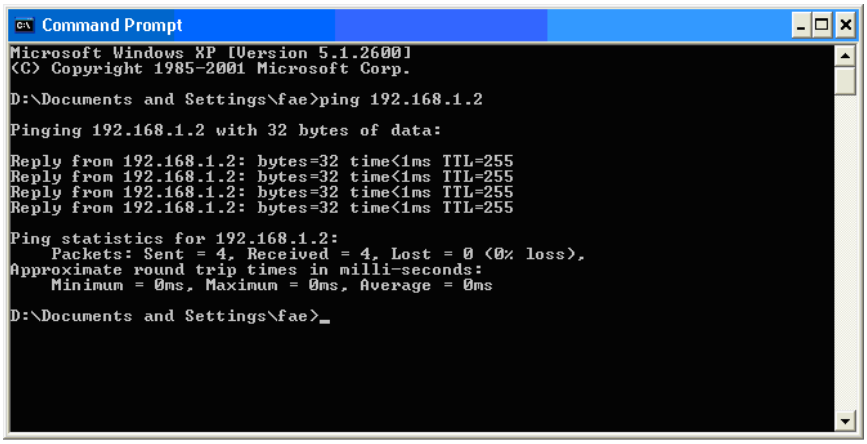
5.3 Pinging the Modem from Your Computer

The default gateway IP address of the modem is 192.168.1.2. For some reason, you might need to use "ping" command to check the link status of the modem. **The most important thing is that the computer will receive a reply from 192.168.1.2.** If not, please check the IP address of your computer. We suggest you setting the network connection as **get IP automatically**. (Please refer to the section 5.2)

Please follow the steps below to ping the modem correctly.

For Windows

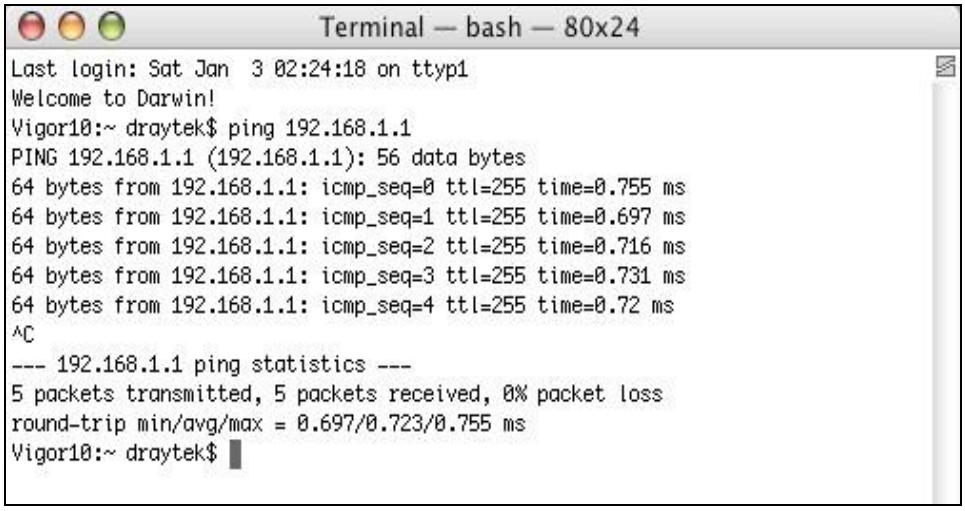
1. Open the **Command** Prompt window (from **Start menu> Run**).
2. Type **command** (for Windows 95/98/ME) or **cmd** (for Windows NT/ 2000/XP/Vista/7). The DOS command dialog will appear.



3. Type ping 192.168.1.2 and press [Enter]. If the link is OK, the line of **"Reply from 192.168.1.2:bytes=32 time<1ms TTL=255"** will appear.
4. If the line does not appear, please check the IP address setting of your computer.

For Mac Os (Terminal)

1. Double click on the current used Mac Os on the desktop.
2. Open the **Application** folder and get into **Utilities**.
3. Double click **Terminal**. The Terminal window will appear.
4. Type **ping 192.168.1.2** and press [Enter]. If the link is OK, the line of **"64 bytes from 192.168.1.2: icmp_seq=0 ttl=255 time=xxxx ms**" will appear.



5.4 Backing to Factory Default Setting If Necessary

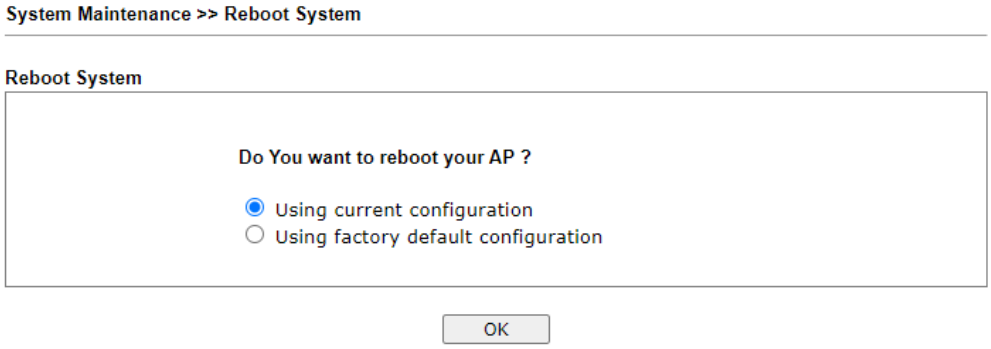
Sometimes, a wrong connection can be improved by returning to the default settings. Try to reset the modem by software or hardware.

Warning: After pressing **factory default setting**, you will loose all settings you did before. Make sure you have recorded all useful settings before you pressing. The password of factory default is null.

Software Reset

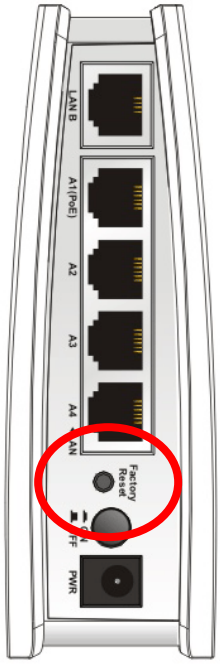
You can reset the modem to factory default via Web page.

Go to **System Maintenance** and choose **Reboot System** on the web page. The following screen will appear. Choose **Using factory default configuration** and click **OK**. After few seconds, the modem will return all the settings to the factory settings.



Hardware Reset

While the modem is running, press the **Factory Reset** button and hold for more than 5 seconds. When you see the **ACT** LED blinks rapidly, please release the button. Then, the modem will restart with the default configuration.



After restore the factory default setting, you can configure the settings for the modem again to fit your personal request.

5.5 Contacting DrayTek

If the modem still cannot work correctly after trying many efforts, please contact your dealer for further help right away. For any questions, please feel free to send e-mail to support@draytek.com.