AC1750 Ceiling Mount AP

User's Manual

Version: 1.0

(January, 2016)

CONTENTS

NMS

OVERVIEW

Your access point can function in four different modes.

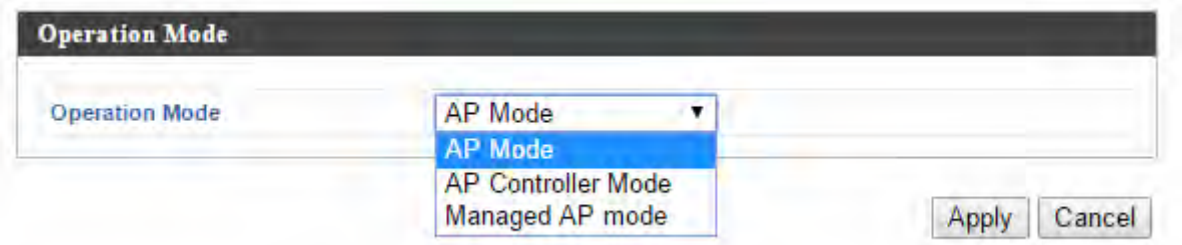
The default mode for your access point is **AP mode**.

AP mode is a regular access point for use in your wireless network.

AP Controller mode acts as the designated master of an AP array (group of linked access points). In **AP Controller** mode the user interface will switch to **NMS**.

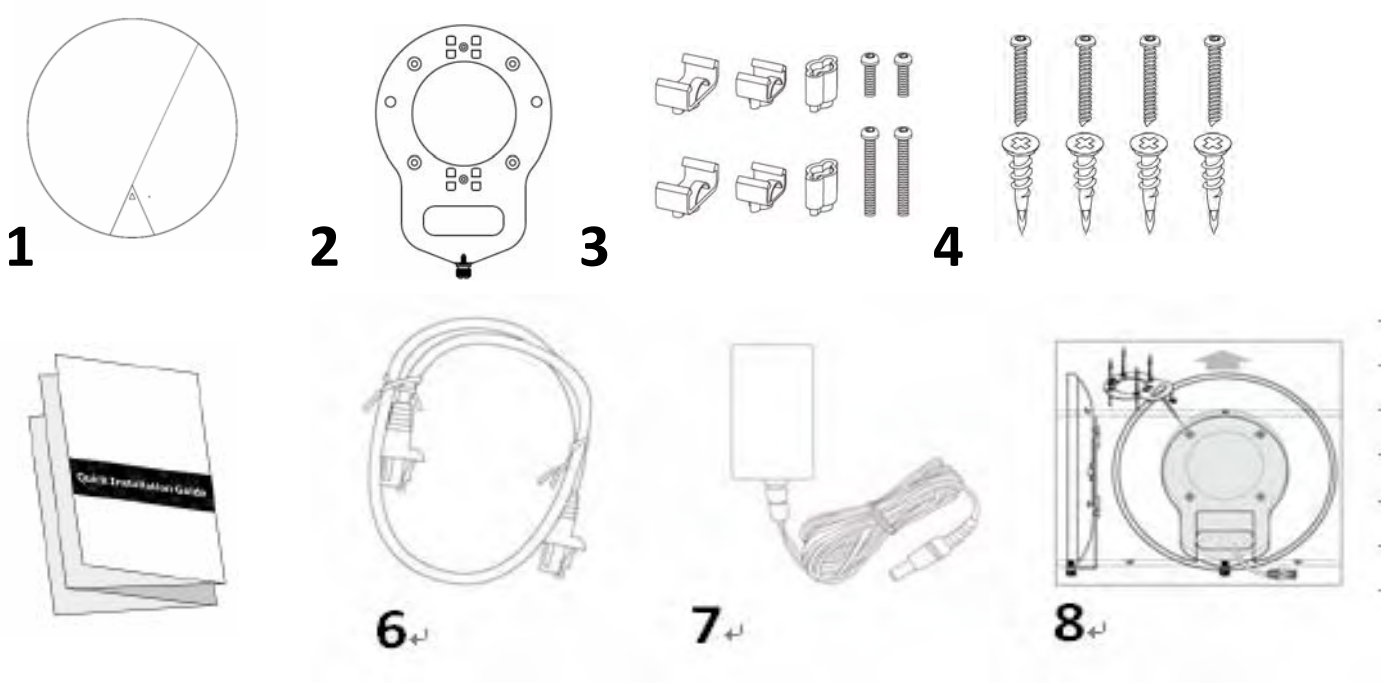
Managed AP mode acts as a "slave" AP within the AP array (controlled by the AP Controller "master").

In **Repeater mode** the access point connects wirelessly to your existing 2.4GHz and/or 5GHz network and repeats the wireless signal(s).



I. Product Information

I-1. Package Contents

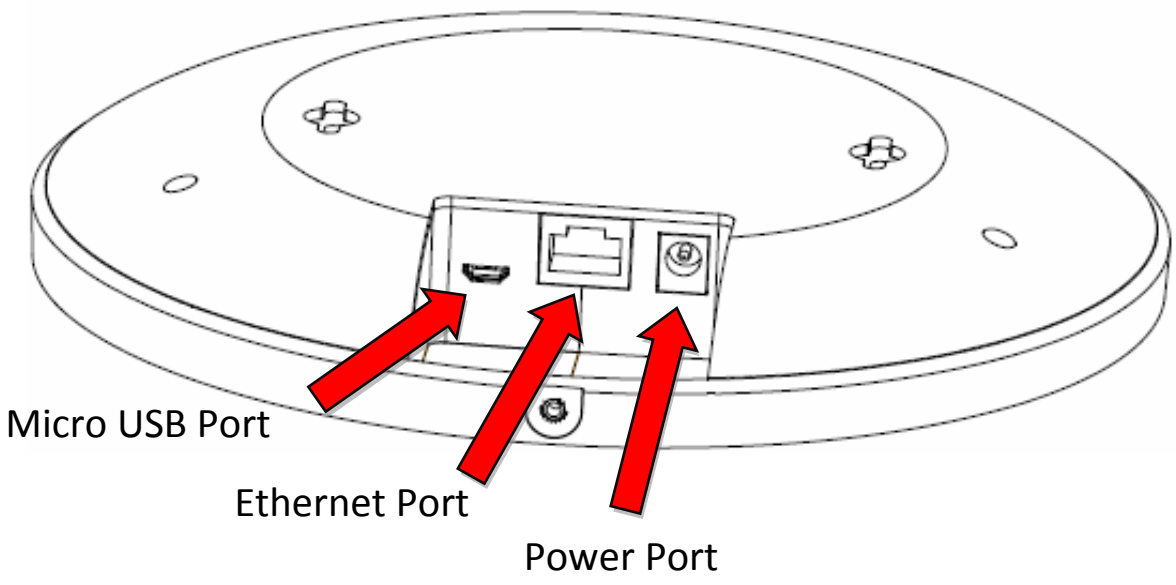


1. AC1750 Access Point
2. Ceiling Mount Bracket
3. T-Rail Mounting Kit & Screws
4. Ceiling Mounting Kit & Screws
5. Quick Installation Guide
6. Ethernet Cable
7. Power Adapter
8. Ceiling Mount Screw Template

I-2. System Requirements

- Existing cable/DSL modem & router
- Computer with web browser for access point configuration

I-3. Hardware Overview



I-4. LED Status

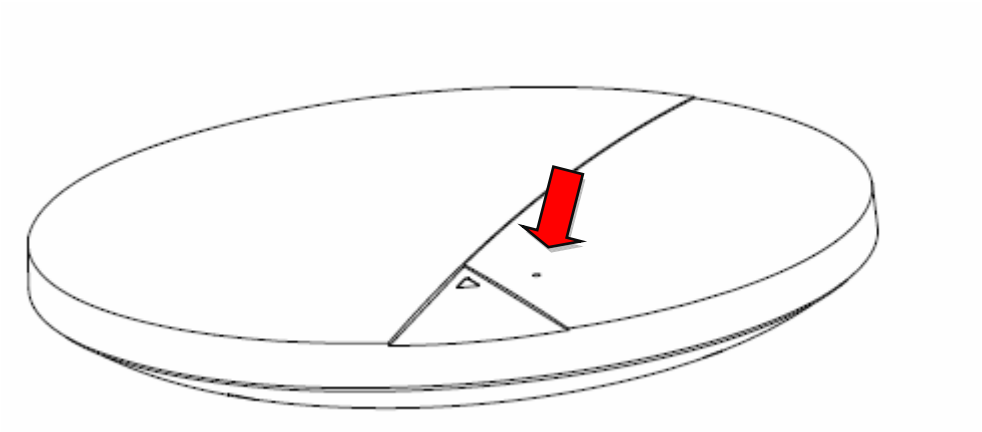
LED Color	LED Status	Description
Blue	**On**	The access point is on.
	Long Flashing	Upgrading firmware.
	Short Flashing	Resetting to factory defaults.
Amber	**On**	Starting up.
	Flashing	Error.
Off	**Off**	The access point is off.

I-5. Reset

If you experience problems with your access point, you can reset the device back to its factory settings. This resets **all** settings back to default.

1. Press and hold the reset button on the access point for at least 10 seconds.

You may need to use a pin or similar sharp object to push the reset button.



2. Wait for the access point to restart. The access point is ready for setup when the LED is **blue**.

I-6. Safety Information

In order to ensure the safe operation of the device and its users, please read and act in accordance with the following safety instructions.

1. The access point is designed for indoor use only; do not place the access point outdoors.

2. Do not place the access point in or near hot/humid places, such as a kitchen or bathroom.

3. Do not pull any connected cable with force; carefully disconnect it from the access point.

4. Handle the access point with care. Accidental damage will void the warranty of the access point.

5. The device contains small parts which are a danger to small children under 3 years old. Please keep the access point out of reach of children.

6. Do not place the access point on paper, cloth, or other flammable materials. The access point may become hot during use.

7. There are no user-serviceable parts inside the access point. If you experience problems with the access point, please contact your dealer of purchase and ask for help.

8. The access point is an electrical device and as such, if it becomes wet for any reason, do not attempt to touch it without switching the power supply off. Contact an experienced electrical technician for further help.

9. If you smell burning or see smoke coming from the access point or power adapter, then disconnect the access point and power adapter immediately, as far as it is safely possible to do so. Call your dealer of purchase for help.

10. This device requires professional installation.

II. Quick Setup

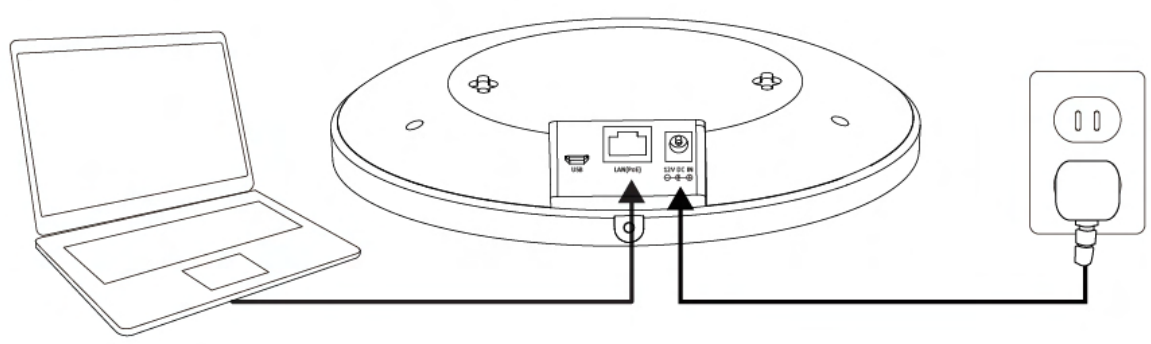
Your access point can be up and running in just a few minutes. It can function as a standalone access point (AP mode), as part of an AP array (Managed AP mode) or as a wireless repeater (repeater mode).

For use a Managed AP in an AP array, the access point will automatically switch mode when an AP Controller is configured as described in **NMS.**

II-1. Initial Setup

1. Connect the access point to a computer via Ethernet cable.

2. Connect the power adapter to the access point's 12V DC port and plug the power adapter into a power supply using the included cable.



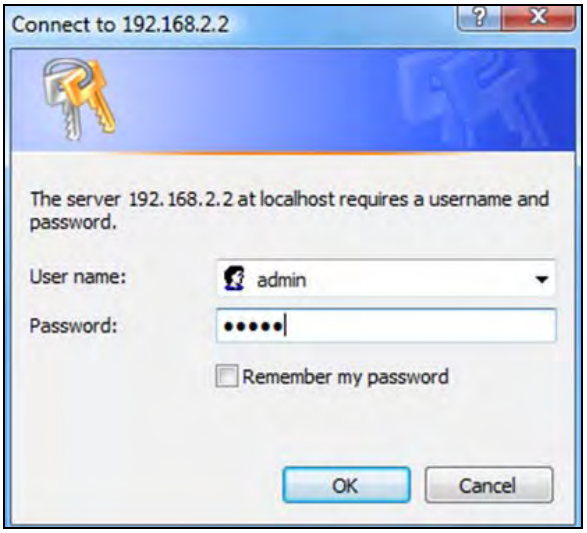
3. Please wait a moment for the access point to start up. The access point is ready when the LED is **blue**.

4. Set your computer's IP address to **192.168.2.x** where **x** is a number in the range **3 – 100**. If you are unsure how to do this, please refer to the user manual for more information.

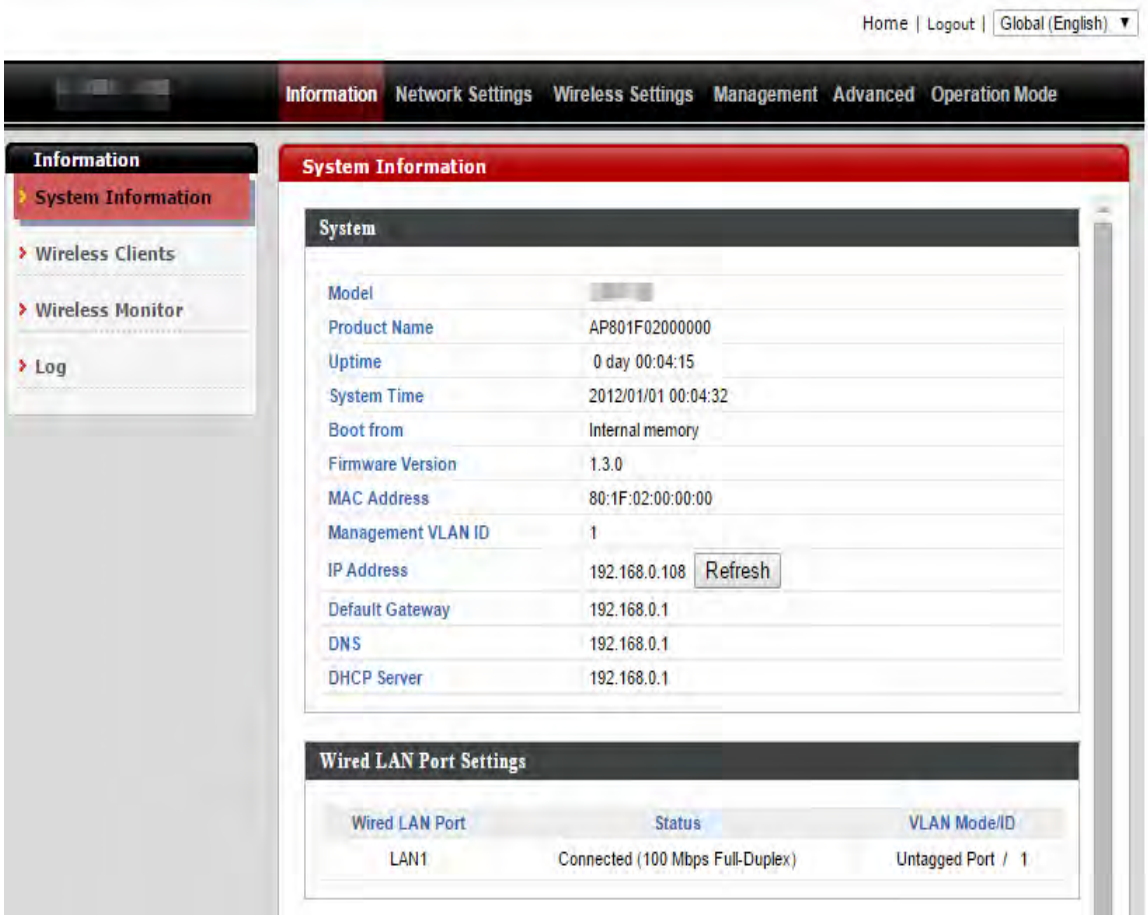
Please ensure there are no other active network connections on your computer (disconnect Wi-Fi connections and Ethernet cables).

5. Enter the access point's default IP address **192.168.2.2** into the URL bar of a web browser.

6. You will be prompted for a username and password. Enter the default username “admin” and the default password “1234”.



7. You will arrive the “System Information” screen shown below.



8. Please follow the instructions below in **II-2. Basic Settings** to configure the access point's basic settings for use as a standalone AP in AP mode.

For use a Managed AP in an AP array, the access point will automatically switch mode when an AP Controller is configured as described in **NMS.**

To use the AP as an AP Controller (master) in an AP array, refer to **NMS.**

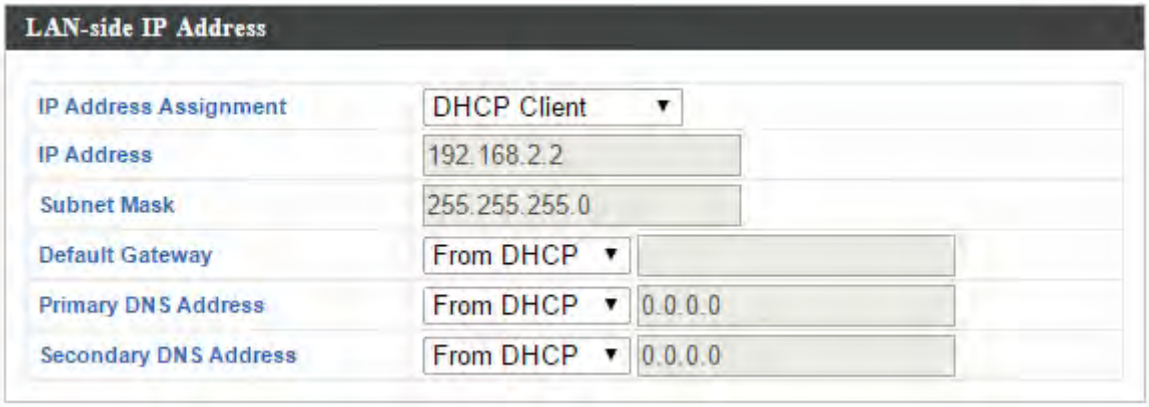
II-2. AP Mode: Basic Settings

The instructions below will help you to configure the following basic settings of the access point:

- ***LAN IP Address***
- ***2.4GHz & 5GHz SSID & Security***
- ***Administrator Name & Password***
- ***Time & Date***

It is recommended you configure these settings before using the access point.

1. To change the access point's LAN IP address, go to **"Network Settings" > "LAN-side IP Address"** and you will see the screen below.

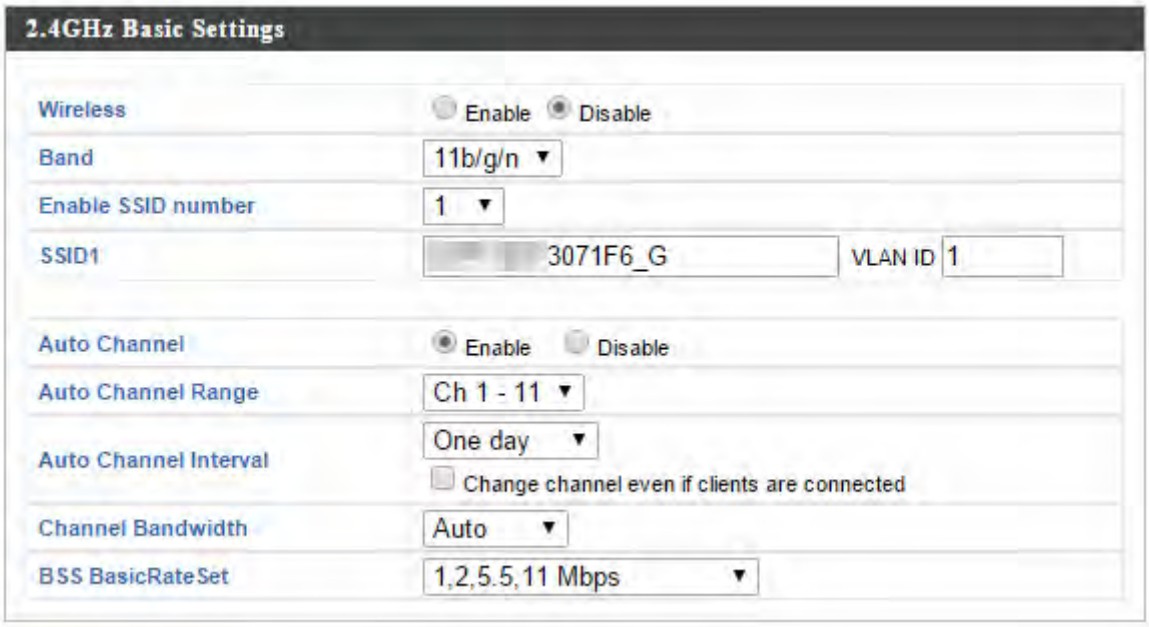


2. Enter the IP address settings you wish to use for your access point. You can use a dynamic (DHCP) or static IP address, depending on your network environment. Click "Apply" to save the changes and wait a few moments for the access point to reload.

When you change your access point's IP address, you need to use the new IP address to access the browser based configuration interface instead of the default IP *192.168.2.2.*

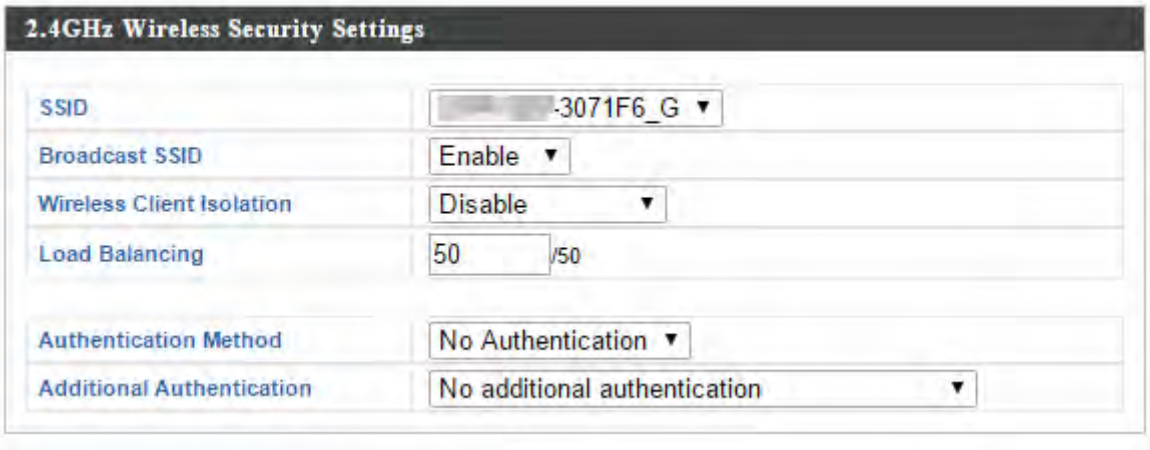
3. To change the SSID of your access point's 2.4GHz wireless network(s), go to **"Wireless Setting" > "2.4GHz 11bgn" > "Basic"**. Enter the new SSID for your 2.4GHz wireless network in the "SSID1" field and click "Apply".

To utilize multiple 2.4GHz SSIDs, open the drop down menu labelled *"Enable SSID number"* ***and select how many SSIDs you require. Then enter a new SSID in the corresponding numbered fields below, before clicking "Apply".***



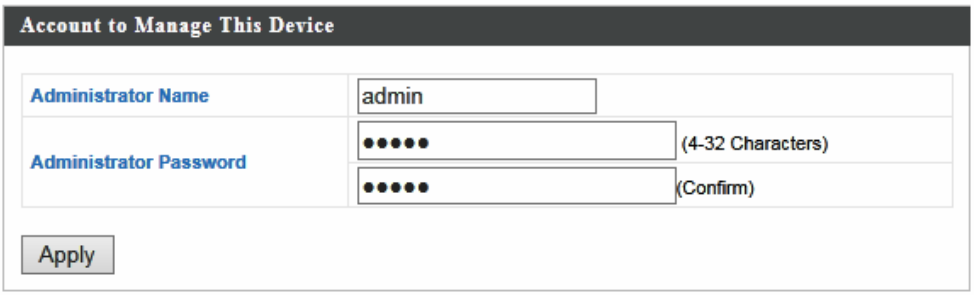
4. To configure the security of your access point's 2.4GHz wireless network(s), go to **"Wireless Setting" > "2.4GHz 11bgn" > "Security"**. Select an "Authentication Method" and enter a "Pre-shared Key" or "Encryption Key" depending on your choice, then click "Apply".

If using multiple SSIDs, specify which SSID to configure using the "SSID" drop down menu.



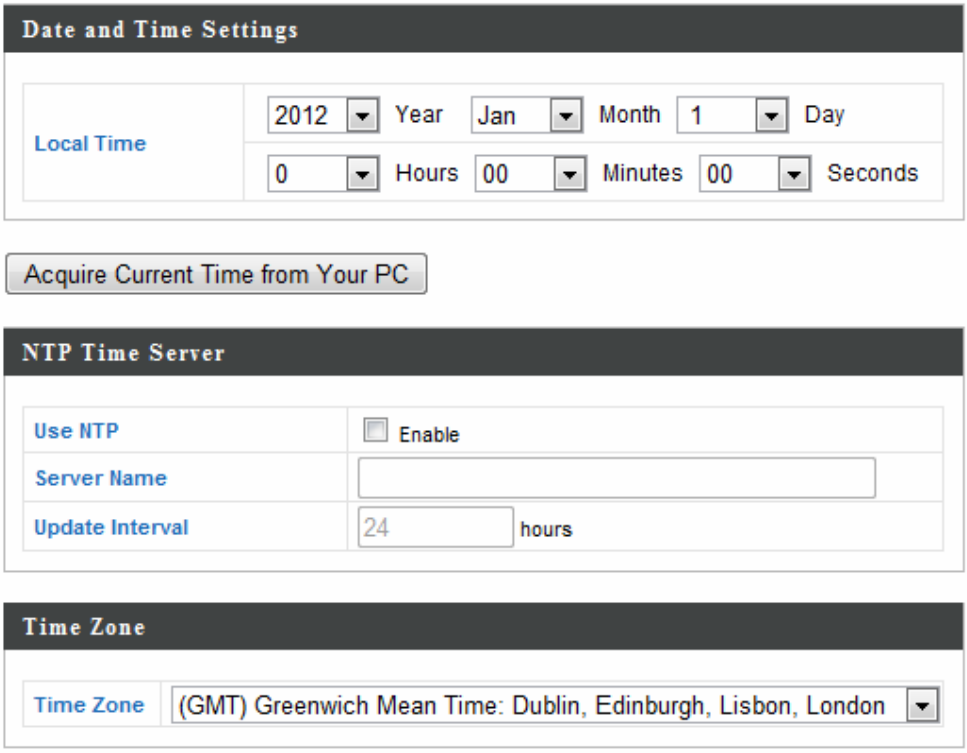
5. Go to **"Wireless Settings" > "5GHz 11ac 11an"** and repeat steps **3 & 4** for the access point's 5GHz wireless network.

6. To change the administrator name and password for the browser based configuration interface, go to **"Management" > "Admin"**.



7. Complete the "Administrator Name" and "Administrator Password" fields and click "Apply".

8. To set the correct time for your access point, go to **"Management" > "Date and Time"**.



9. Set the correct time and time zone for your access point using the drop down menus. The access point also supports NTP (Network Time Protocol) so alternatively you can enter the host name or IP address of a time server. Click “Apply” when you are finished.

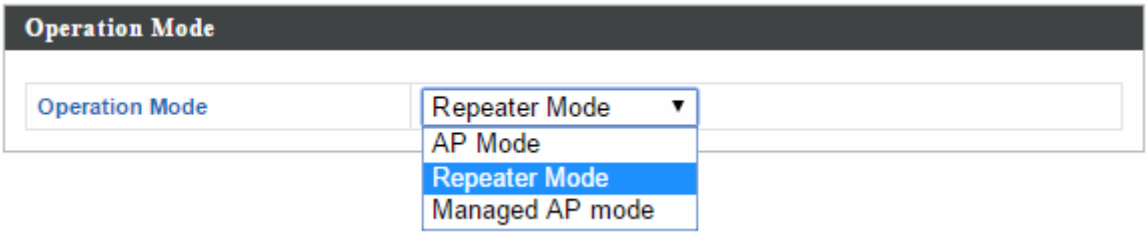
You can use the “Acquire Current Time from your PC” button if you wish to set the access point to the same time as your PC.

10. The basic settings of your access point are now configured. Please refer to **IV. Hardware Installation** for guidance on connecting your access point to a router or PoE switch.

II-3. Repeater Mode

When you set the **operation mode** to **repeater mode**, the AP will not get an IP address from the router/root AP. You will need to set your computer's IP address and use the APs default IP address to access the UI for the first time, refer to **Appendix** for more help.

Wireless Settings → Wireless Extender displays details about the APs wireless connection in repeater mode and enables you to connect to a source SSID and configure the new (repeater) SSID. Settings are saved as **profiles**.



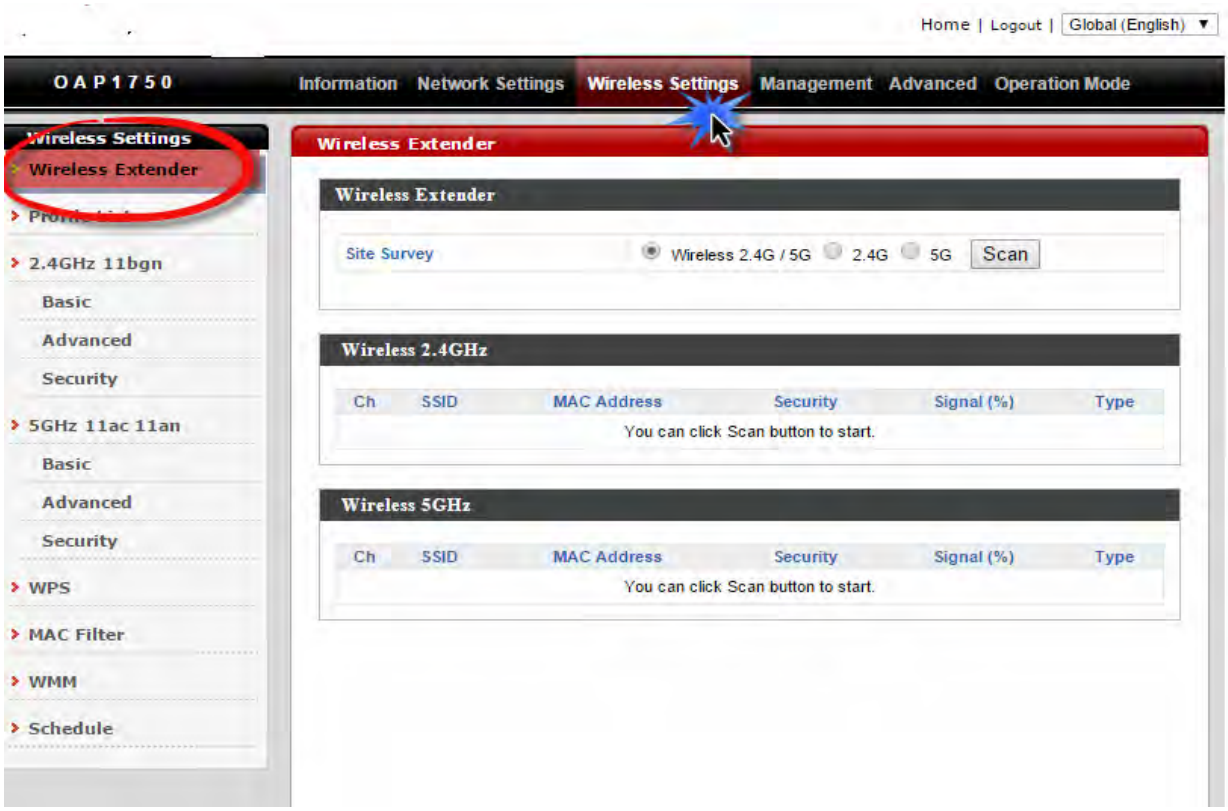
1. Set your computer's IP address to **192.168.2.x** where **x** is a number in the range **3 – 100**.

Please ensure there are no other active network connections on your computer (disconnect Wi-Fi connections and Ethernet cables).

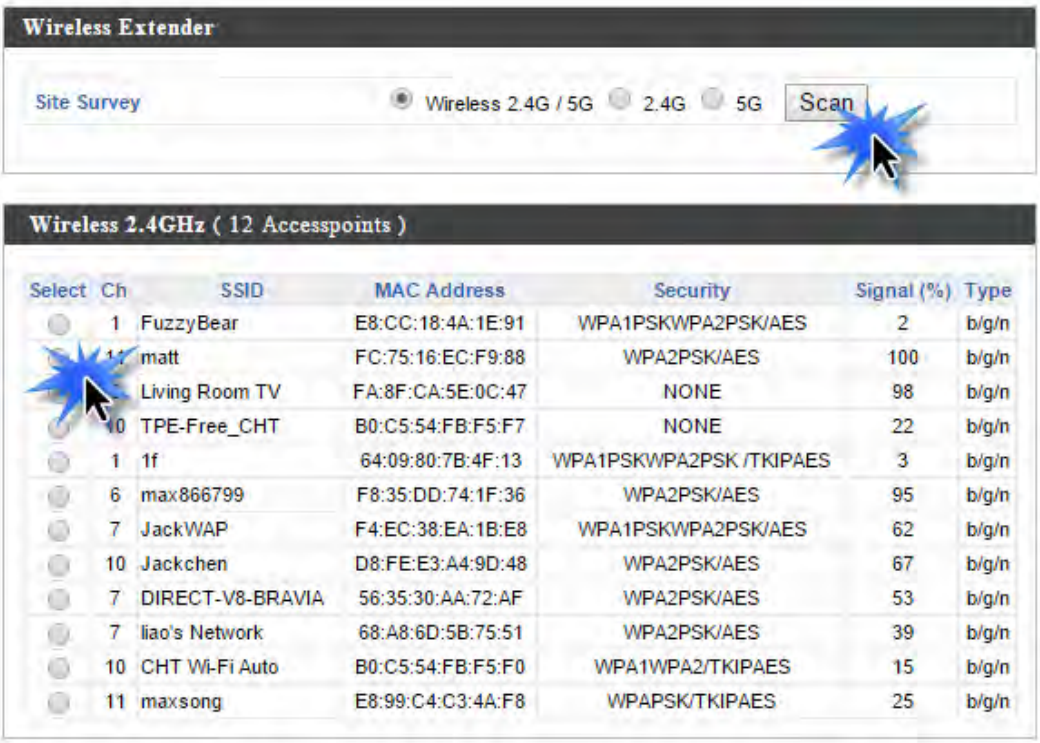
2. Enter the access point's default IP address **192.168.2.2** into the URL bar of a web browser.

3. You will be prompted for a user name and password. Enter the default username "admin" and the default password "1234".

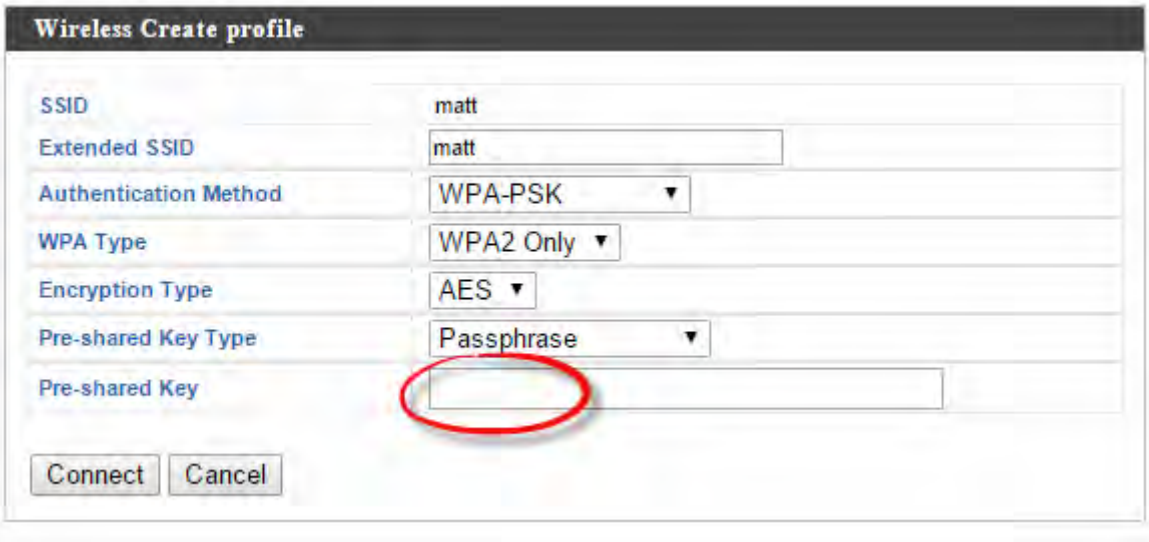
4. Go to **Wireless Settings → Wireless Extender.**



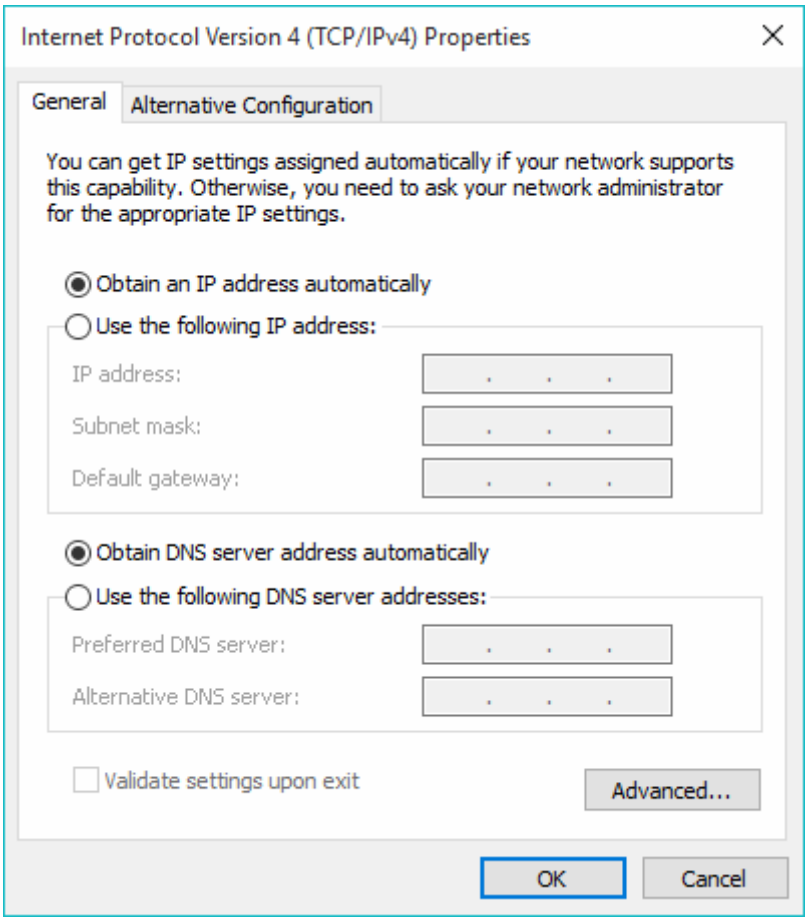
5. Click **Scan** to search for and display available SSIDs and click **Select** to connect to an available source SSID. SSIDs can be configured independently for each frequency 2.4GHz & 5GHz.



6. Edit the new **extended** SSID according to your preference and enter the security details for the source SSID, and then click **Connect**.



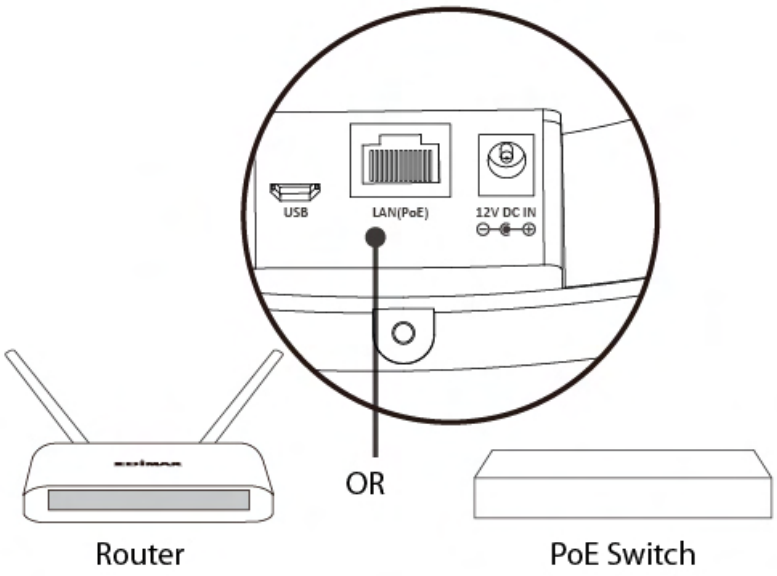
7. The AP in repeater mode will establish a connection to the source SSID and repeat the extended SSID. The repeater AP will become a DHCP client of the router/root AP. Switch your computer back to a dynamic IP address.



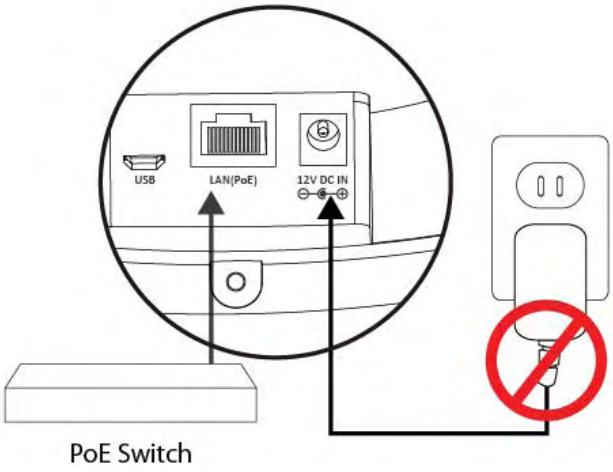
III. Hardware Installation

III-1. Connecting the access point to a router or PoE switch

1. Connect a router or PoE switch to the access point's **LAN** port using an Ethernet cable.



2. If you are using a router, then connect the power adapter to the access point's 12V DC port and plug the power adapter into a power supply.



Do not use the power adapter if you are using a PoE switch.

III-2. Mounting the access point to a ceiling

To mount the access point to a ceiling, please follow the instructions below and refer to diagram **A** & **B**.

For Wooden Ceilings (refer to diagram A):

1. Place the ceiling mount bracket to a ceiling in your desired location and use the included screws x 4 to fix it into place (**i**).

2. Attach the access point to the ceiling mount bracket by aligning the grooves in the access point to the ceiling mount, as shown in **ii**.

3. Secure the access point firmly in place using the included screw as shown in **iii**.

For Other Ceilings (refer to diagram B):

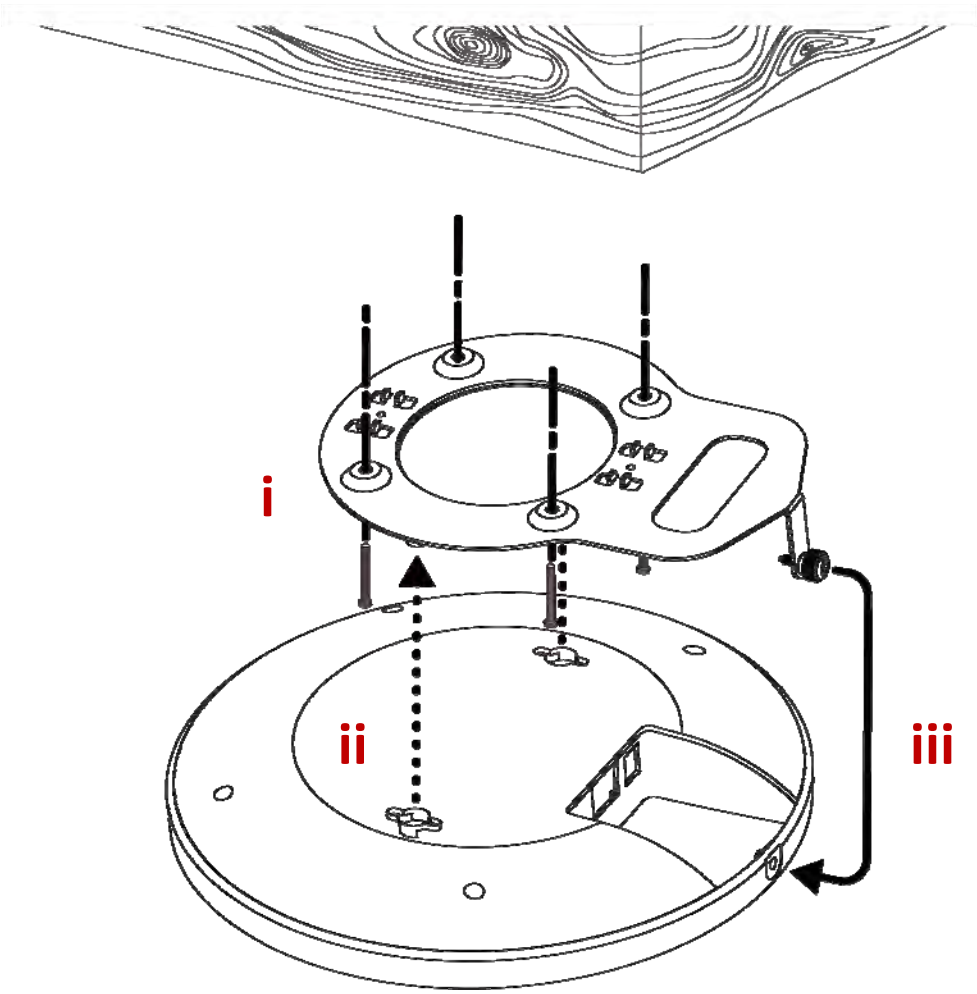
1. Drill four holes in your ceiling using the ceiling mount bracket as a guide, and insert the four included wall plugs/screw anchors (**i**).

2. Align the ceiling mount bracket with your wall plugs/screw anchors and use the included screws x 4 to fix it into place (**ii**).

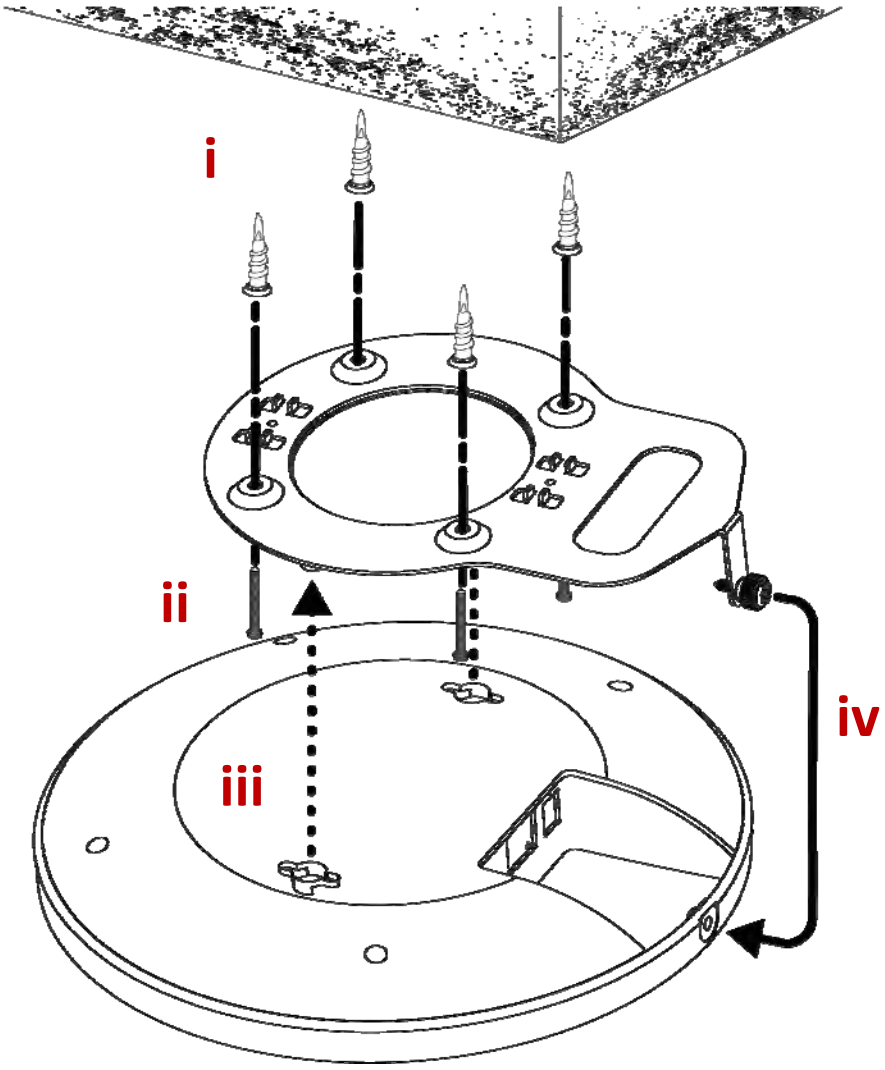
3. Attach the access point to the ceiling mount bracket by aligning the grooves in the access point to the ceiling mount, as shown in **iii**.

4. Secure the access point firmly in place using the included screw as shown in **iv**.

A



B



III-3. T-Rail Mount

To mount the access point to a T-Rail, please follow the instructions below and refer to diagram **C, D** & **E**.

1. Select the correct size T-Rail bracket from the two sizes which are included in the package contents.

2. Attach the T-Rail bracket to the ceiling mount using the included screw**s** x 2 as shown in **i.**

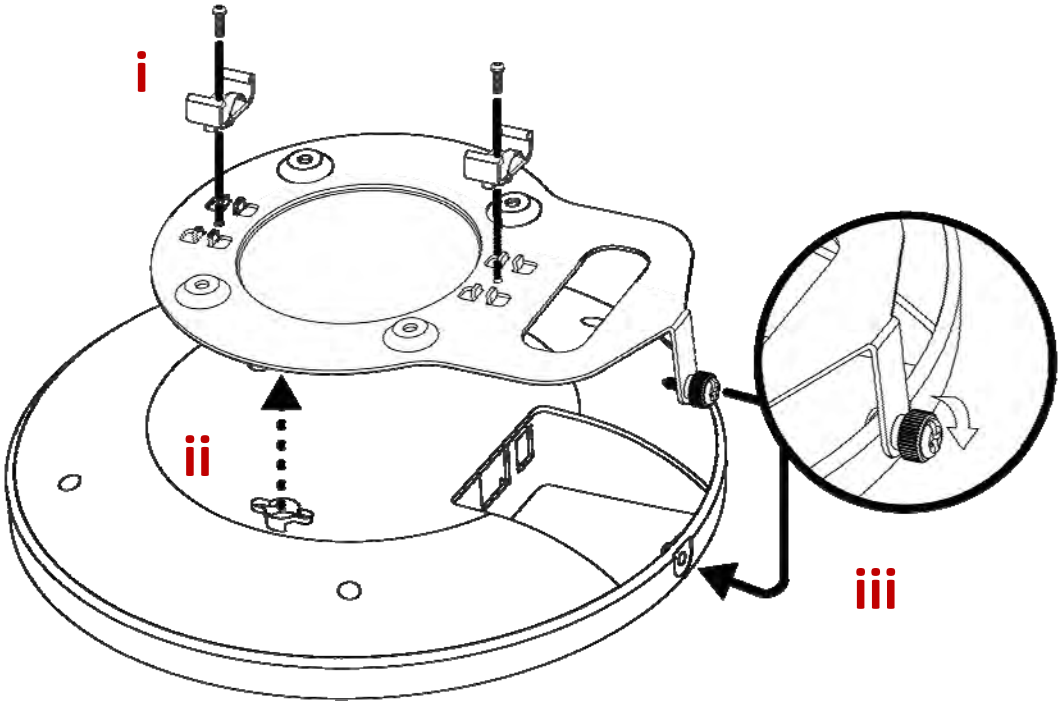
You can use the included bracket and longer screws If you need more space between the access point and the T-Rail.

3. Attach the access point to the ceiling mount bracket by aligning the grooves in the access point to the ceiling mount, as shown in **ii**.

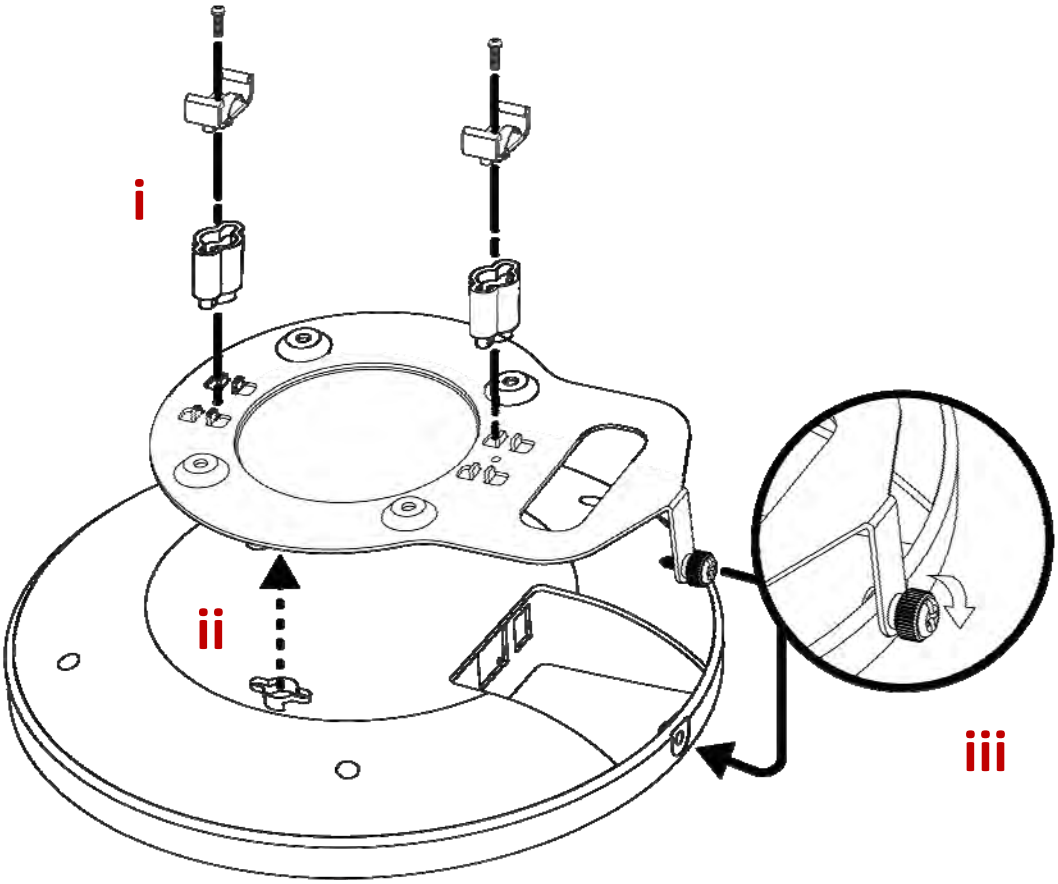
4. Secure the access point firmly in place using the included screw as shown in **iii**.

5. Clip the access point onto your T-Rail using the now attached T-Rail bracket.

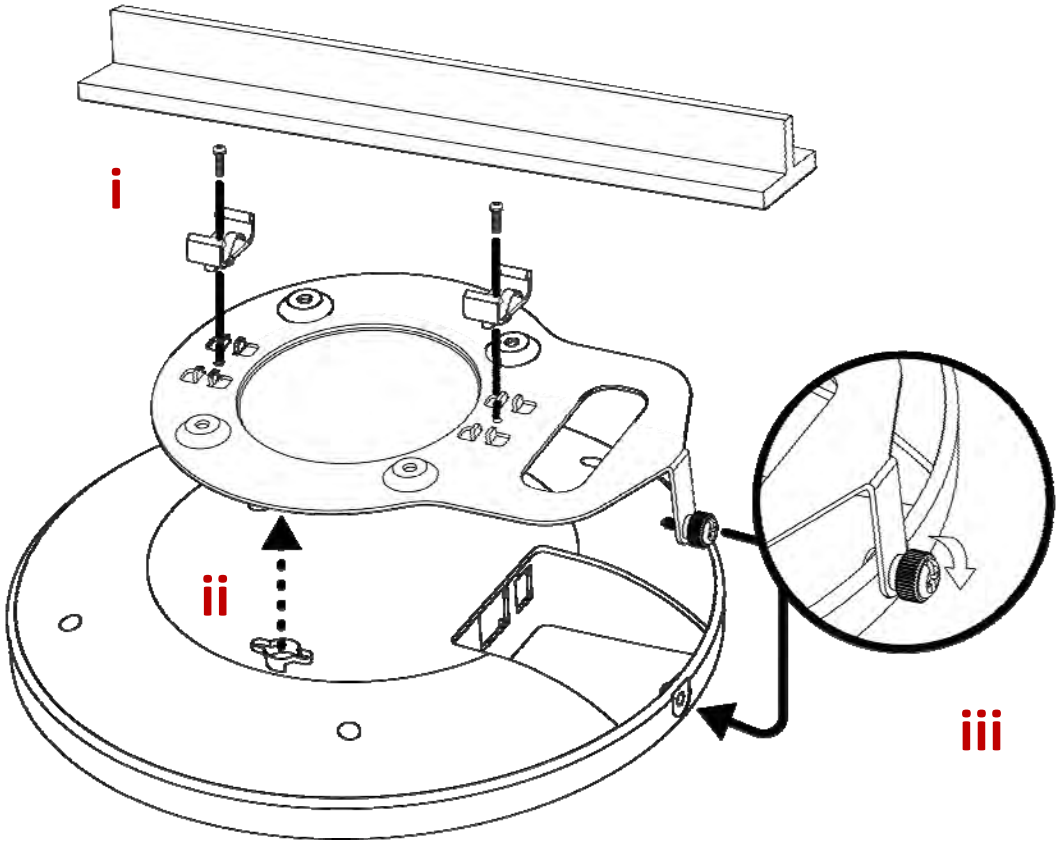
C



D



E



IV. Browser Based Configuration Interface

In Managed AP mode some functions of the browser based configuration interface are disabled. Please use NMS on your Controller AP to configure your Managed AP(s).

The browser-based configuration interface enables you to configure the access point's advanced features. The AC1750 features a range of advanced functions such as MAC filtering, MAC RADIUS authentication, VLAN configurations, up to 32 SSIDs and many more. To access the browser based configuration interface:

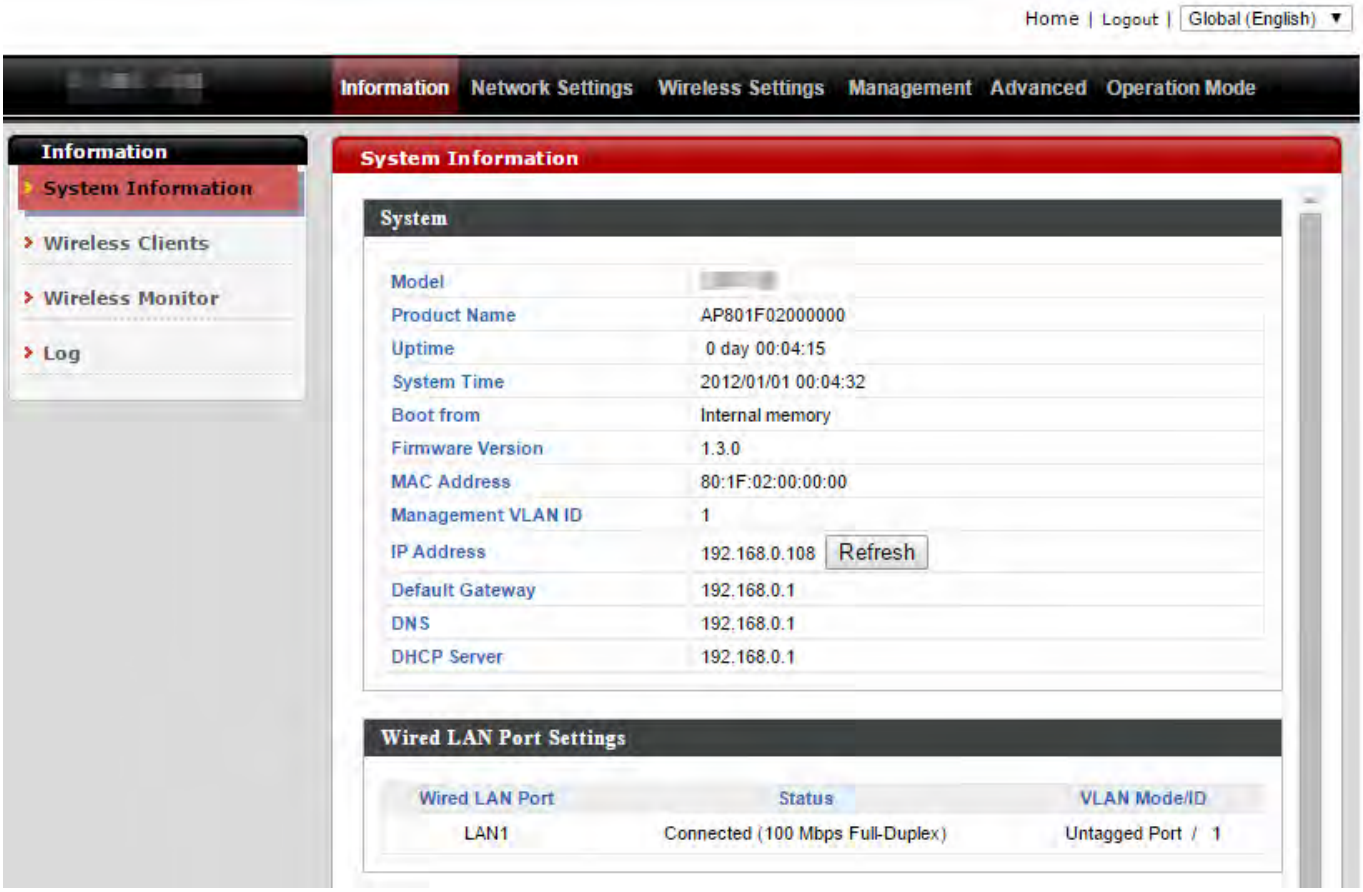
1. Connect a computer to your access point using an Ethernet cable.

2. Enter your access point's IP address in the URL bar of a web browser. The access point's default IP address is **192.168.2.2.**

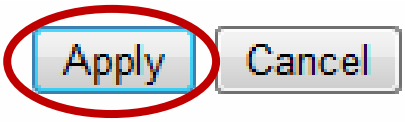
3. You will be prompted for a username and password. The default username is "admin" and the default password is "1234", though it was recommended that you change the password during setup (see **III-2. Basic Settings**).

If you cannot remember your password, reset the access point back to its factory default settings. Refer to *I-5. Reset*

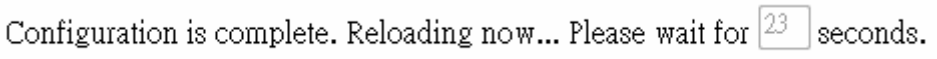
4. You will arrive at the "System Information" screen shown below.



5. Use the menu across the top and down the left side to navigate. Click "Apply" to save changes and reload the access point, or "Cancel" to cancel changes.

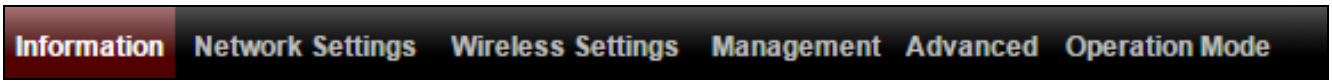


Please wait a few seconds for the access point to reload after you "Apply" changes, as shown below.



6. Please refer to the following chapters for full descriptions of the browser based configuration interface features.

IV-1. Information



Screenshots displayed are examples. The information shown on your screen will vary depending on your configuration.

IV-1-1. System Information

The “System Information” page displays basic system information about the access point.

Wired LAN Port Settings

Wired LAN Port	Status	VLAN Mode/ID
LAN1	Connected (100 Mbps Full-Duplex)	Untagged Port / 1
USB net	Disconnected (---)	Untagged Port / 1

Wireless 2.4GHz

Status	Enabled
MAC Address	80:1F:02:75:EF:A8
Channel	Ch 2 (Auto)
Transmit Power	100%
RSSI	-91/-83/-80

Wireless 2.4GHz /SSID

SSID	Authentication Method	Encryption Type	VLAN ID	Additional Authentication	Wireless Client Isolation
EDIMAX-75EFA 8_G	No Authentication	No Encryption	1	No additional authentication	Disabled

Wireless 2.4GHz /WDS Disabled

MAC Address	Encryption Type	VLAN Mode/ID
No WDS entries.		

Wireless 5GHz

Status	Enabled
MAC Address	80:1F:02:75:EF:A9
Channel	Ch 36 + 40 + 44 + 48 (Auto)
Transmit Power	100%
RSSI	0/0

Wireless 5GHz /SSID

SSID	Authentication Method	Encryption Type	VLAN ID	Additional Authentication	Wireless Client Isolation
EDIMAX-75EFA 8_A	No Authentication	No Encryption	1	No additional authentication	Disabled

Wireless 5GHz /WDS Disabled

MAC Address	Encryption Type	VLAN Mode/ID
No WDS entries.		

System	
Model	Displays the model number of the access point.
Product Name	Displays the product name for reference, which consists of “AP” plus the MAC address.
Uptime	Displays the total time since the device was turned on.
Boot From	Displays information for the booted hardware, booted from either USB or internal memory.
Firmware Version	Displays the firmware version.
MAC Address	Displays the access point’s MAC address.
Management VLAN ID	Displays the management VLAN ID.
IP Address	Displays the IP address of this device. Click “Refresh” to update this value.
Default Gateway	Displays the IP address of the default gateway.
DNS	IP address of DNS (Domain Name Server)
DHCP Server	IP address of DHCP Server.

Wired LAN Port Settings	
Wired LAN Port	Specifies which LAN port. USB is the LAN port attached via mini USB adapter.
Status	Displays the status of the specified LAN port (connected or disconnected).
VLAN Mode/ID	Displays the VLAN mode (tagged or untagged) and VLAN ID for the specified LAN port. See **IV-2-3. VLAN**

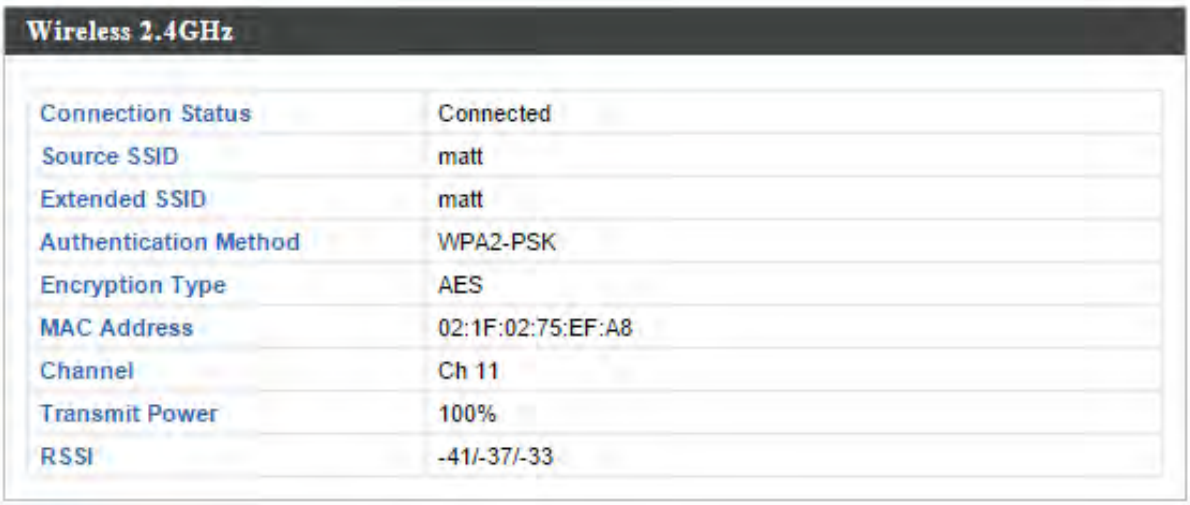
Wireless 2.4GHz (5GHz)	
Status	Displays the status of the 2.4GHz or 5GHz wireless (enabled or disabled).
MAC Address	Displays the access point’s MAC address.
Channel	Displays the channel number the specified wireless frequency is using for broadcast.
Transmit Power	Displays the wireless radio transmit power level as a percentage.
RSSI	Displays Received Signal Strength Indicator.

Wireless 2.4GHZ (5GHz) / SSID	
SSID	Displays the SSID name(s) for the specified frequency.
Authentication Method	Displays the authentication method for the specified SSID. See **IV-3. Wireless Settings**
Encryption Type	Displays the encryption type for the specified SSID. See **IV-3. Wireless Settings**
VLAN ID	Displays the VLAN ID for the specified SSID. See **IV-2-3. VLAN**
Additional Authentication	Displays the additional authentication type for the specified SSID. See **IV-3. Wireless Settings**
Wireless Client Isolation	Displays whether wireless client isolation is in use for the specified SSID. See **IV-2-3. VLAN**

Wireless 2.4GHZ (5GHz) / WDS Status	
MAC Address	Displays the peer access point's MAC address.
Encryption Type	Displays the encryption type for the specified WDS. See **IV-3-1-4. WDS**
VLAN Mode/ID	Displays the VLAN ID for the specified WDS. See **IV-3-1-4. WDS**

Refresh	Click to refresh all information.

Extender Mode:



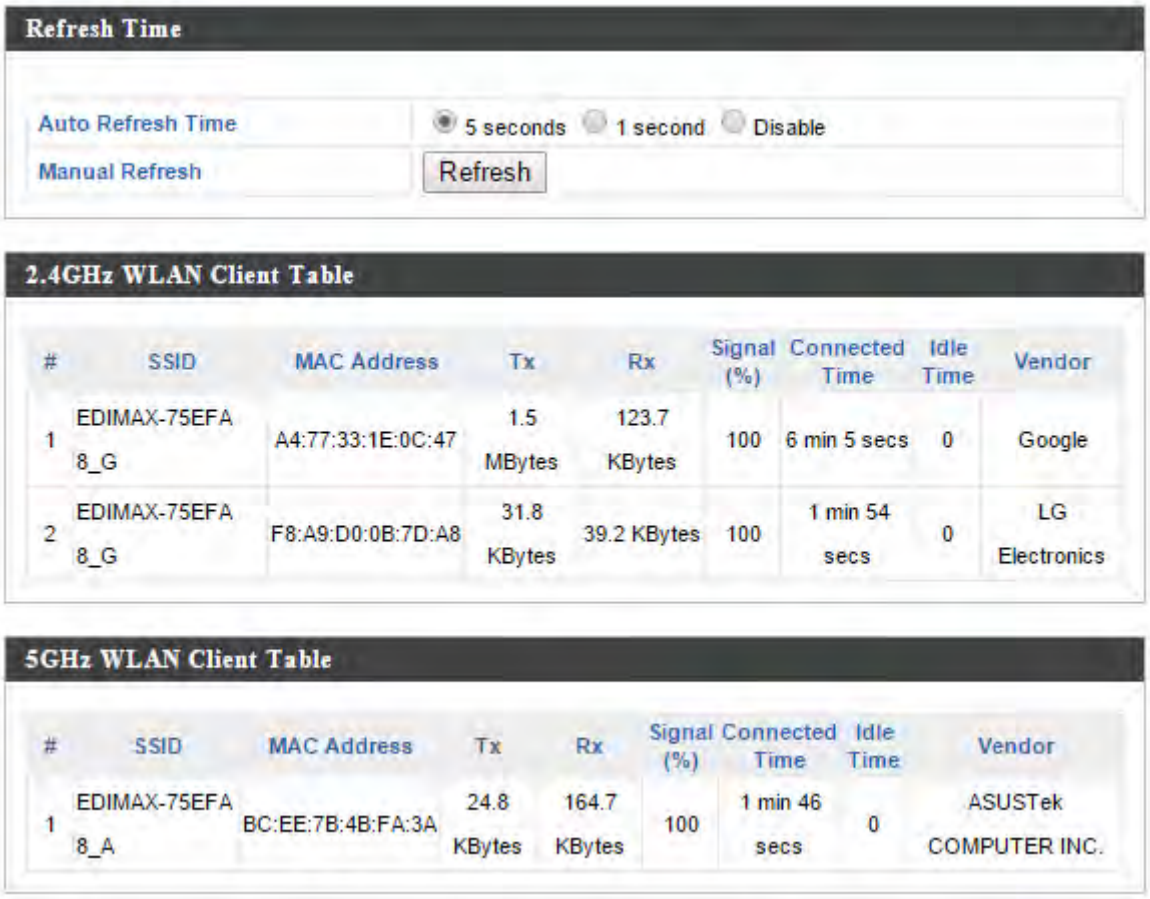
Wireless 2.4GHZ (5GHz) / SSID	
Connection Status	Current status of the repeater's connection.
Source SSID	Displays the SSID name(s) for the repeater's

	source.
Extended SSID	Displays the SSID name(s) of the repeater.
Authentication Method	Displays the authentication method for the specified SSID. See **IV-3. Wireless Settings**
Encryption Type	Displays the encryption type for the specified SSID. See **IV-3. Wireless Settings**
MAC Address	Displays the access point's MAC address.
Channel	Displays the channel number the specified wireless frequency is using for broadcast.
Transmit Power	Displays the wireless radio transmit power level as a percentage.
RSSI	Displays Received Signal Strength Indicator.

IV-1-2. Wireless Clients

Wireless Clients

The “Wireless Clients” page displays information about all wireless clients connected to the access point on the 2.4GHz or 5GHz frequency.



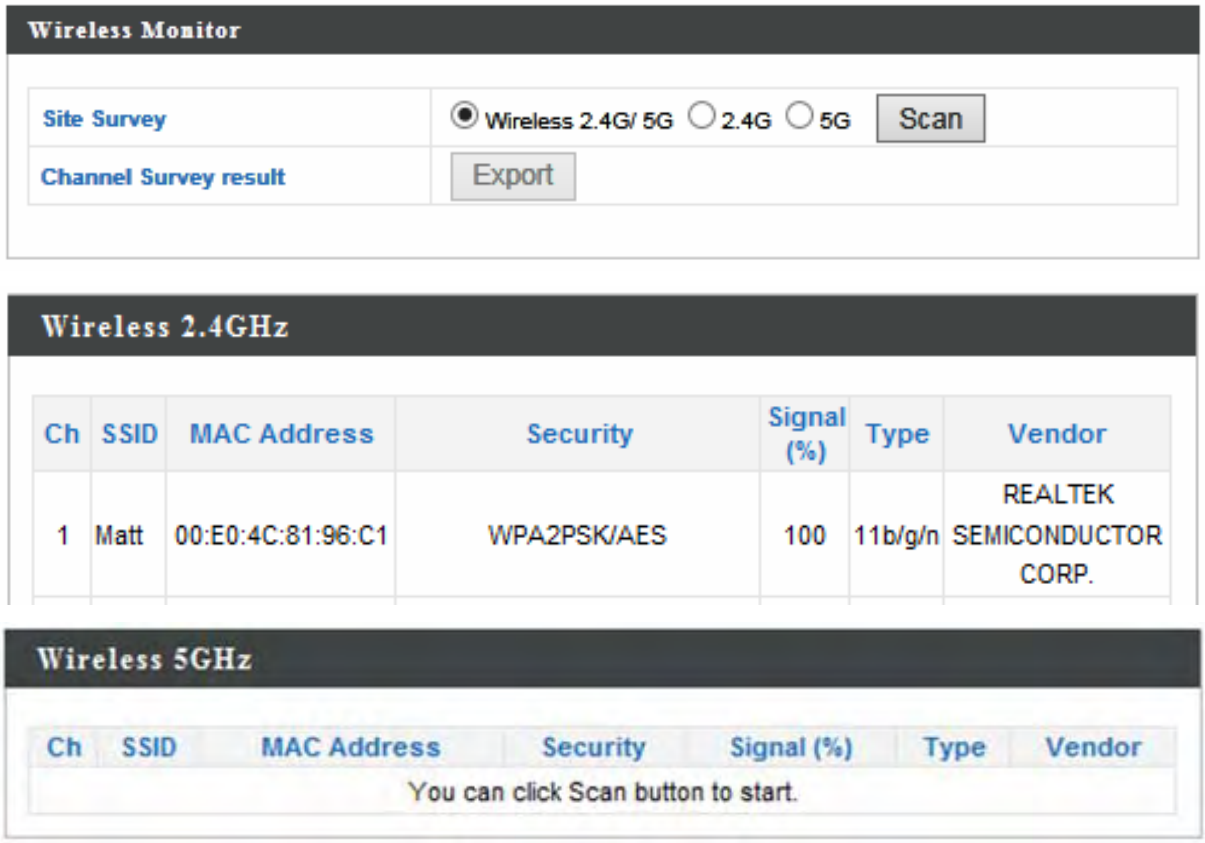
Refresh time	
Auto Refresh Time	Select a time interval for the client table list to automatically refresh.
Manual Refresh	Click refresh to manually refresh the client table.

2.4GHz (5GHz) WLAN Client Table	
SSID	Displays the SSID which the client is connected to.
MAC Address	Displays the MAC address of the client.
Tx	Displays the total data packets transmitted by the specified client.
Rx	Displays the total data packets received by the specified client.

Signal (%)	Displays the wireless signal strength for the specified client.
Connected Time	Displays the total time the wireless client has been connected to the access point.
Idle Time	Client idle time is the time for which the client has not transmitted any data packets i.e. is idle.
Vendor	The vendor of the client's wireless adapter is displayed here.

IV-1-3. Wireless Monitor

Wireless Monitor is a tool built into the access point to scan and monitor the surrounding wireless environment. Select a frequency and click “Scan” to display a list of all SSIDs within range along with relevant details for each SSID.



Wireless Monitor	
Site Survey	Select which frequency (or both) to scan, and click “Scan” to begin.
Channel Survey Result	After a scan is complete, click “Export” to save the results to local storage.

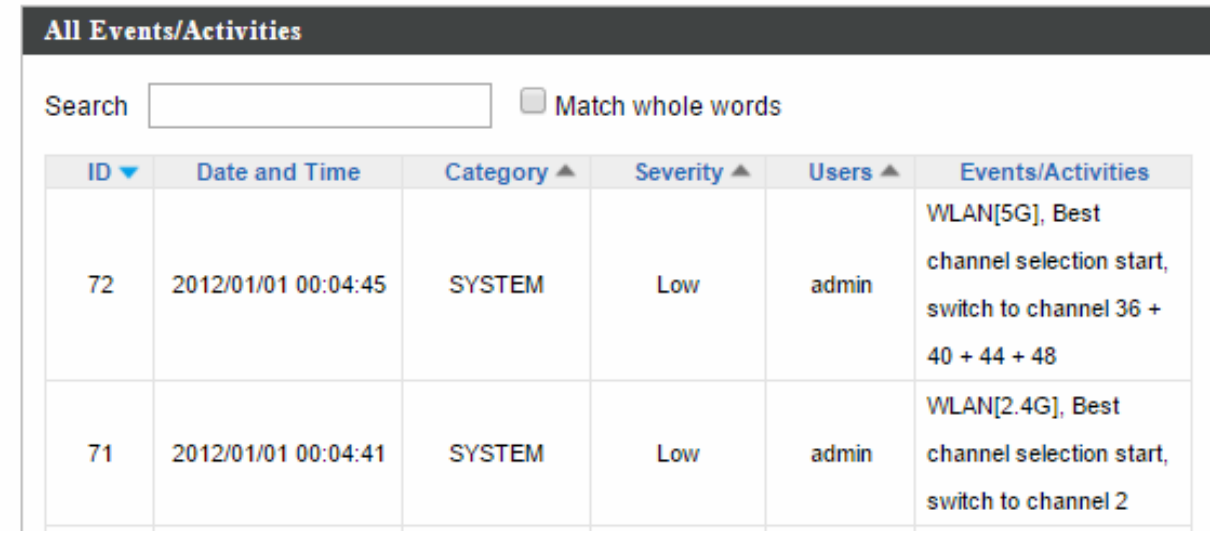
Site Survey Results	
Ch	Displays the channel number used by the specified SSID.
SSID	Displays the SSID identified by the scan.
MAC Address	Displays the MAC address of the wireless router/access point for the specified SSID.
Security	Displays the authentication/encryption type of the specified SSID.

Signal (%)	Displays the current signal strength of the SSID.
Type	Displays the 802.11 wireless networking standard(s) of the specified SSID.
Vendor	Displays the vendor of the wireless router/access point for the specified SSID.

IV-1-4. Log

The system log displays system operation information such as up time and connection processes. This information is useful for network administrators.

When the log is full, old entries are overwritten. Use the Search function to quickly locate log entries.

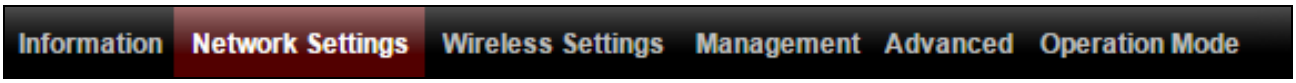


Save	Click to save the log as a file on your local computer.
Clear	Clear all log entries.
Refresh	Refresh the current log.

The following information/events are recorded by the log:

- **USB**
  Mount & unmount
- **Wireless Client**
  Connected & disconnected
  Key exchange success & fail
- **Authentication**
  Authentication fail or successful.
- **Association**
  Success or fail
- **WPS**
  M1 - M8 messages
  WPS success
- **Change Settings**
- **System Boot**
  Displays current model name
- **NTP Client**
- **Wired Link**
  LAN Port link status and speed status
- **Proxy ARP**
  Proxy ARP module start & stop
- **Bridge**
  Bridge start & stop.
- **SNMP**
  SNMP server start & stop.
- **HTTP**
  HTTP start & stop.
- **HTTPS**
  HTTPS start & stop.
- **SSH**
  SSH-client server start & stop.
- **Telnet**
  Telnet-client server start or stop.
- **WLAN (2.4G)**
  WLAN (2.4G] channel status and country/region status
- **WLAN (5G)**
  WLAN (5G) channel status and country/region status

IV-2. Network Settings

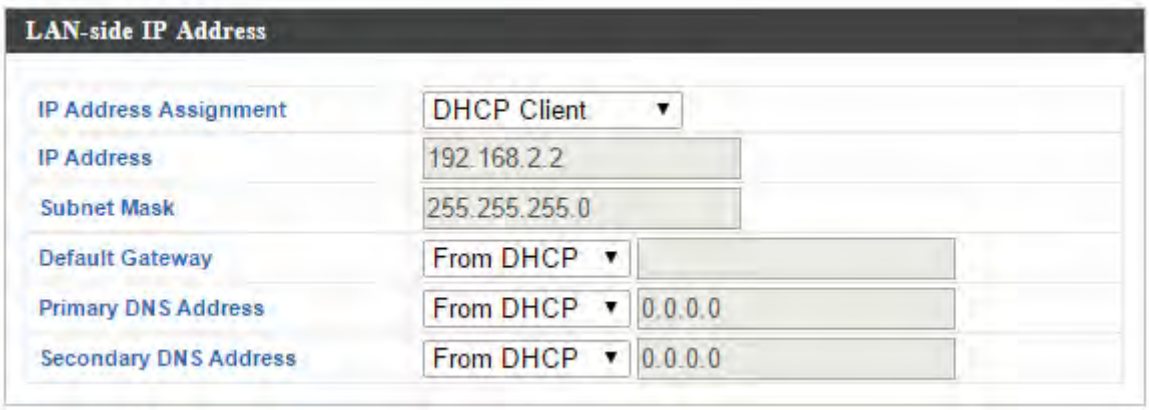


Screenshots displayed are examples. The information shown on your screen will vary depending on your configuration.

IV-2-1. LAN-Side IP Address

The "LAN-side IP address" page allows you to configure your access point on your Local Area Network (LAN). You can enable the access point to dynamically receive an IP address from your router's DHCP server or you can specify a static IP address for your access point, as well as configure DNS servers.

The access point's default IP address is 192.168.2.2.



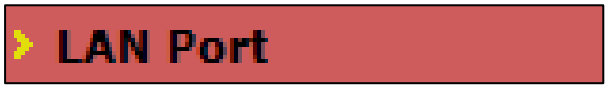
LAN-side IP Address	
IP Address Assignment	Select "DHCP Client" for your access point to be assigned a dynamic IP address from your router's DHCP server, or select "Static IP" to manually specify a static/fixed IP address for your access point (below).
IP Address	Specify the IP address here. This IP address will be assigned to your access point and will replace the default IP address.
Subnet Mask	Specify a subnet mask. The default value is 255.255.255.0

Default Gateway	For DHCP users, select “From DHCP” to get default gateway from your DHCP server or “User-Defined” to enter a gateway manually. For static IP users, the default value is blank.

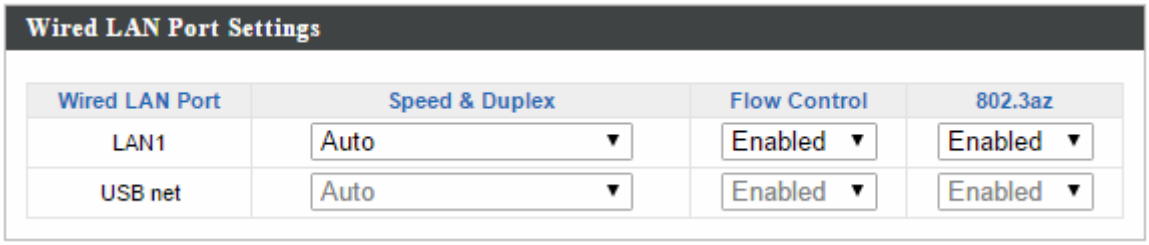
DHCP users can select to get DNS servers’ IP address from DHCP or manually enter a value. For static IP users, the default value is blank.

Primary Address	DHCP users can select “From DHCP” to get primary DNS server’s IP address from DHCP or “User-Defined” to manually enter a value. For static IP users, the default value is blank.
Secondary Address	Users can manually enter a value when DNS server’s primary address is set to “User-Defined”.

IV-2-2. LAN Port



The “LAN Port” page allows you to configure the settings for your access point’s two wired LAN (Ethernet) ports.

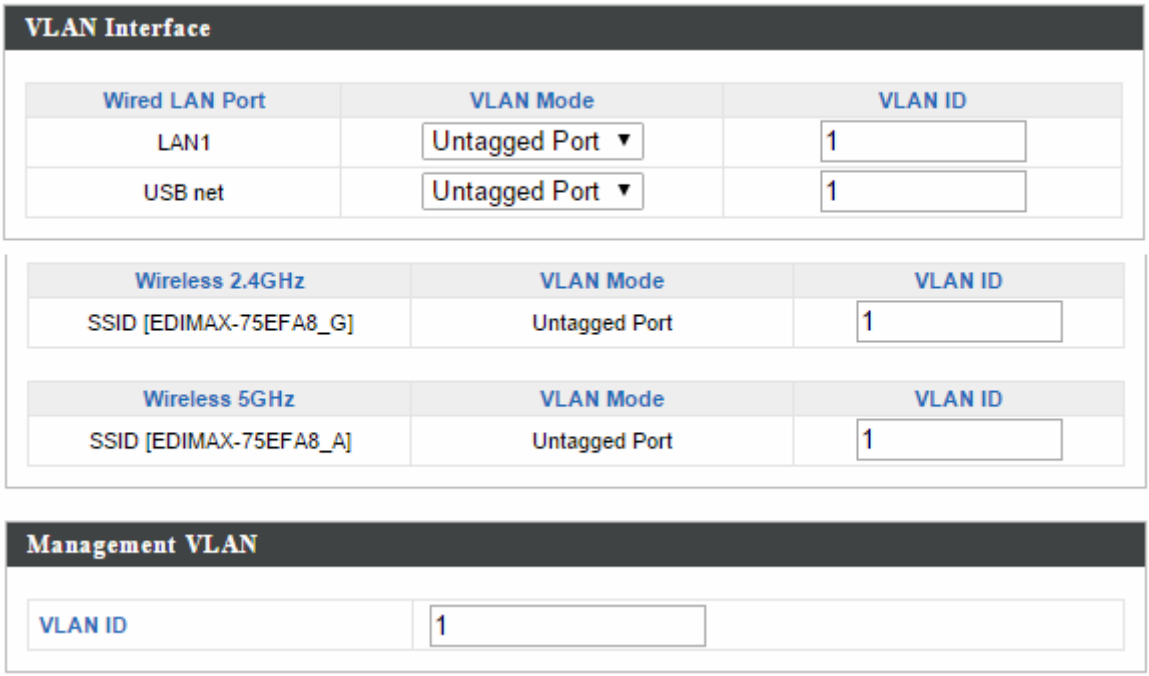


Wired LAN Port	Identifies LAN port. USB is the LAN port attached via mini USB adapter.
Enable	Enable/disable specified LAN port.
Speed & Duplex	Select a speed & duplex type for specified LAN port, or use the “Auto” value. LAN ports can operate up to 1000Mbps and full-duplex enables simultaneous data packets transfer/receive.
Flow Control	Enable/disable flow control. Flow control can pause new session request until current data processing is complete, in order to avoid device overloads under heavy traffic.
802.3az	Enable/disable 802.3az. 802.3az is an Energy Efficient Ethernet feature which disables unused interfaces to reduce power usage.

IV-2-3. VLAN

The “VLAN” (Virtual Local Area Network) enables you to configure VLAN settings. A VLAN is a local area network which maps workstations virtually instead of physically and allows you to group together or isolate users from each other. VLAN IDs 1 – 4095 are supported.

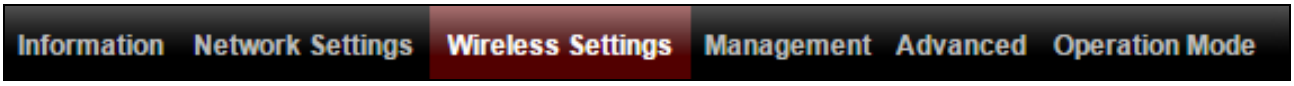
VLAN IDs in the range 1 – 4095 are supported.



VLAN Interface	
Wired LAN Port/Wireless	Identifies LAN port number and wireless SSIDs. USB is the LAN port attached via mini USB adapter.
VLAN Mode	Select “Tagged Port” or “Untagged Port” for specified LAN interface.
VLAN ID	Set a VLAN ID for specified interface, if “Untagged Port” is selected.

Management VLAN	
VLAN ID	Specify the VLAN ID of the management VLAN. Only the hosts belonging to the same VLAN can manage the device.

IV-3. Wireless Settings



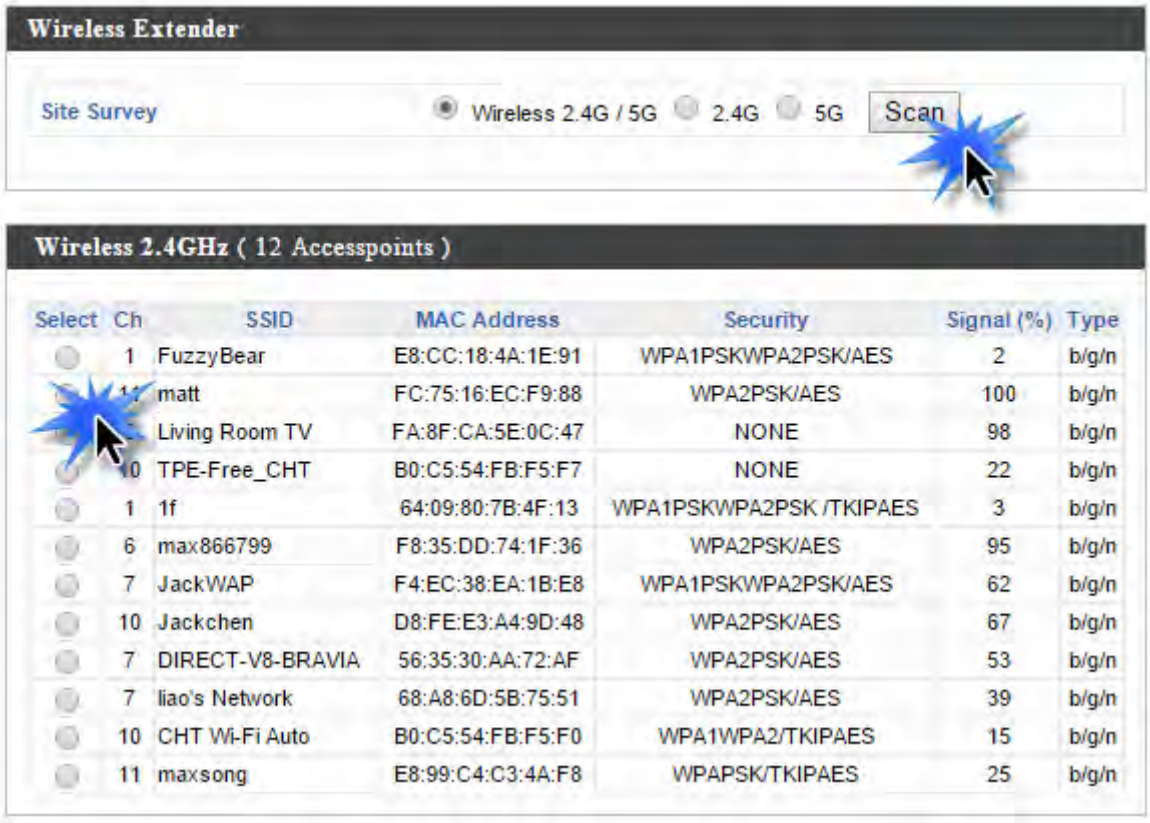
Screenshots displayed are examples. The information shown on your screen will vary depending on your configuration.

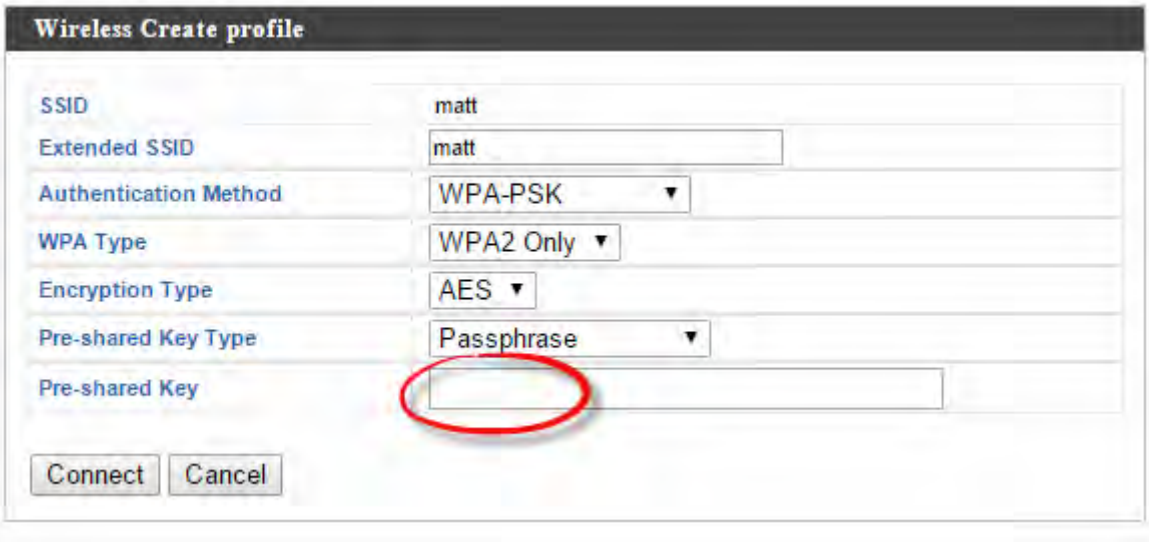
IV-3-1. Wireless Extender

Only available in Repeater Mode

Wireless Extender

The wireless extender page displays details about the APs wireless connection in repeater mode and enables you to connect to a source SSID and configure the new (repeater) SSID. Settings are saved as **profiles**. Click **Scan** to search for and display available SSIDs and click **Select** to connect to an available SSID. SSIDs can be configured independently for each frequency 2.4GHz & 5GHz.





Wireless 2.4GHz/5GHz	
Select	Click to select an SSID and display a new **Create Profile** window to enter security information (below).
Channel	Displays the channel number of listed SSID.
SSID	Displays the SSID.
MAC Address	Displays the MAC address of specified SSID.
Security	Displays the existing security type for listed SSID.
Signal (%)	Displays the available signal strength for listed SSID.
Type	Displays the wireless 802.11 standard for each SSID.

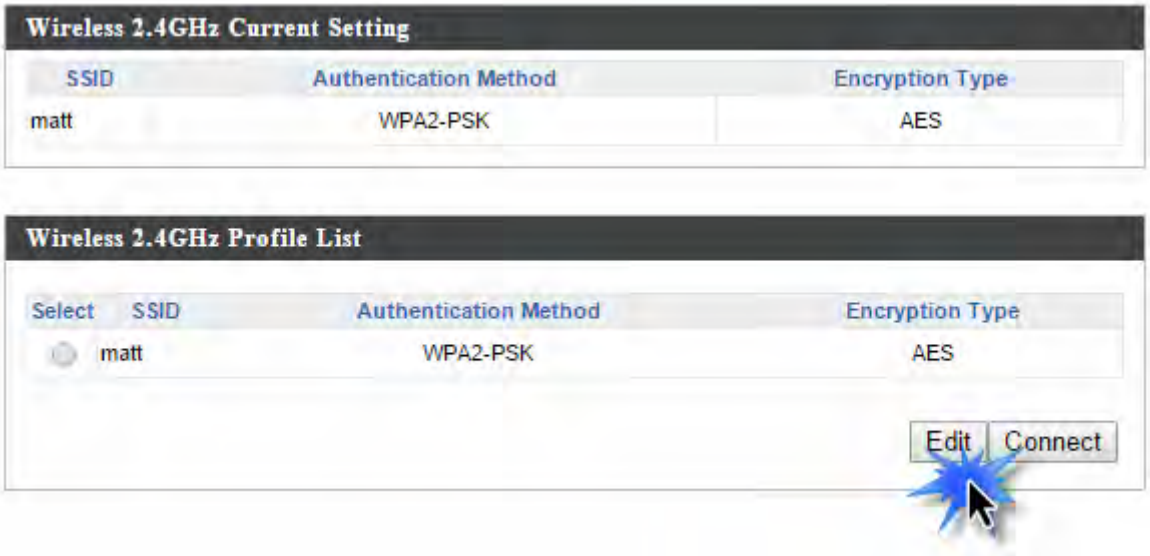
Wireless Create Profile	
SSID	Displays the selected source SSID for this profile.
Extended SSID	Edit the new SSID for this profile.
Authentication Method	Select the source SSIDs authentication method and enter encryption key/pre-shared key.

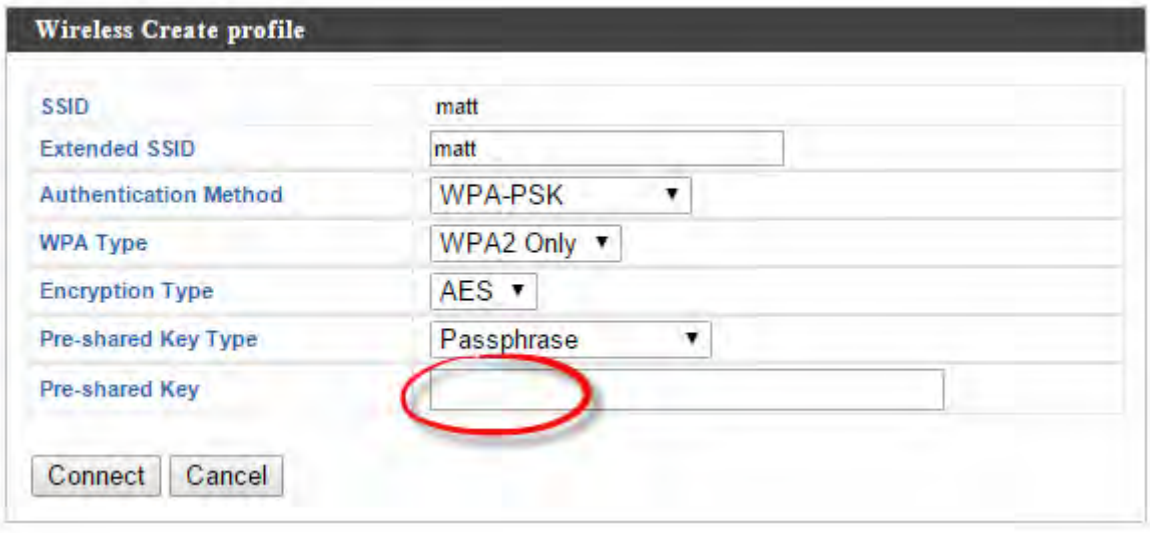
IV-3-2. Profile List

Only available in Repeater Mode

Profile List

Repeater mode settings are saved as profiles. Profiles can be edited and multiple profiles can be created to switch between profiles easily as required. Select an existing profile and click **Edit** or **Connect**.





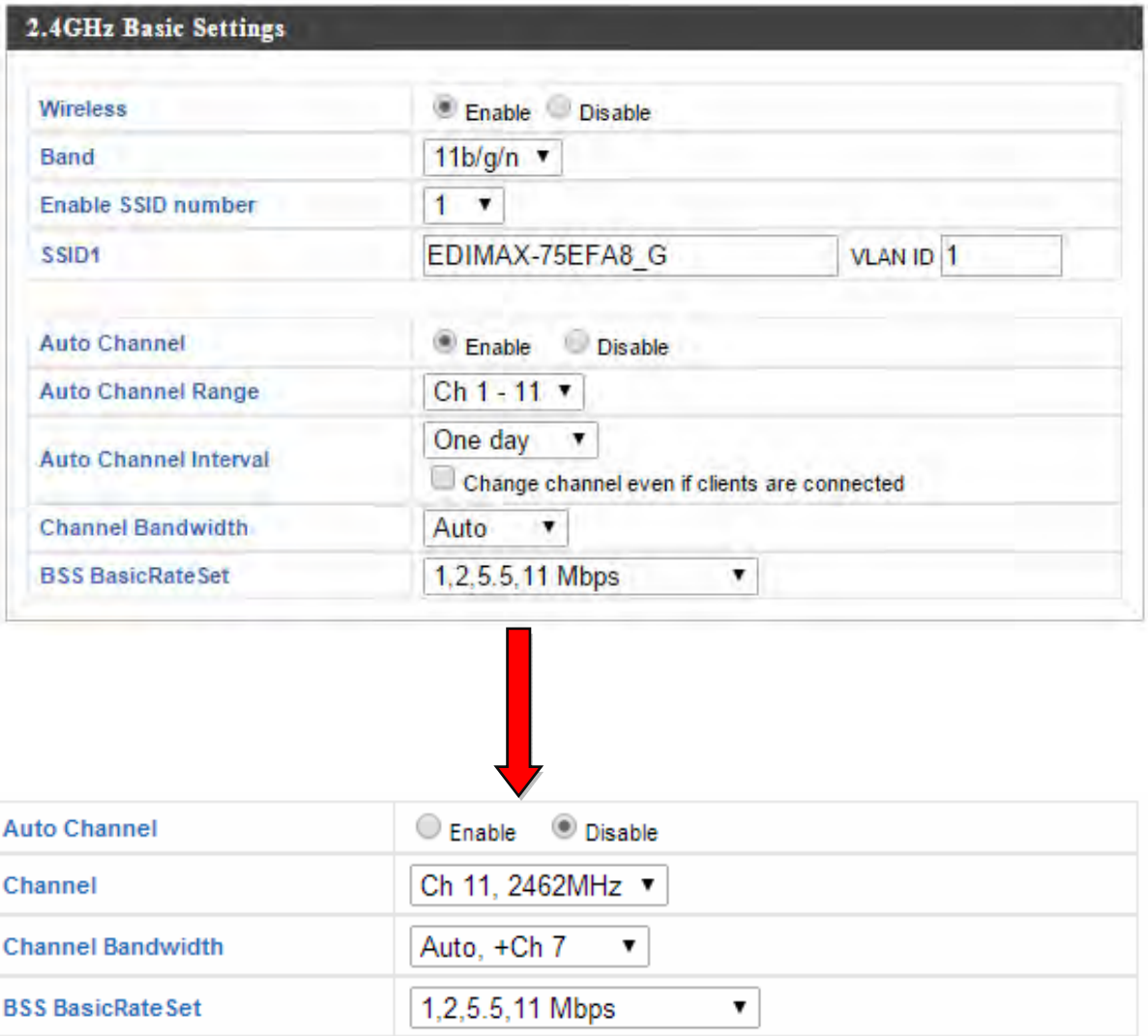
Wireless Create Profile	
SSID	Displays the selected source SSID for this profile.
Extended SSID	Edit the new SSID for this profile.
Authentication Method	Select the source SSIDs authentication method and enter encryption key/pre-shared key.

IV-3-3. 2.4GHz 11bgn

The “2.4GHz 11bgn” menu allows you to view and configure information for your access point’s 2.4GHz wireless network across five categories: Basic, Advanced, Security, WDS & Schedule.

IV-3-3-1. Basic

The “Basic” screen displays basic settings for your access point’s 2.4GHz Wi-Fi network (s).



Wireless	Enable or disable the access point's 2.4GHz wireless radio. When disabled, no 2.4GHz SSIDs will be active.
Band	Select the wireless standard used for the access point. Combinations of 802.11b, 802.11g & 802.11n can be selected.
Enable SSID Number	Select how many SSIDs to enable for the 2.4GHz frequency from the drop down menu. A maximum of 16 can be enabled.
SSID#	Enter the SSID name for the specified SSID (up to 16). The SSID can consist of any combination of up to 32 alphanumeric characters.
VLAN ID	Specify a VLAN ID for each SSID.
Auto Channel	Enable/disable auto channel selection. Auto channel selection will automatically set the wireless channel for the access point's 2.4GHz frequency based on availability and potential interference. When disabled, select a channel manually as shown in the next table.
Auto Channel Range	Select a range from which the auto channel setting (above) will choose a channel.
Auto Channel Interval	Specify a frequency for how often the auto channel setting will check/reassign the wireless channel. Check/uncheck the "Change channel even if clients are connected" box according to your preference.
Channel Bandwidth	Set the channel bandwidth: 20MHz (lower performance but less interference), 40MHz (higher performance but potentially higher interference) or Auto (automatically select based on interference level).
BSS BasicRateSet	Set a Basic Service Set (BSS) rate: this is a series of rates to control communication frames for wireless clients.

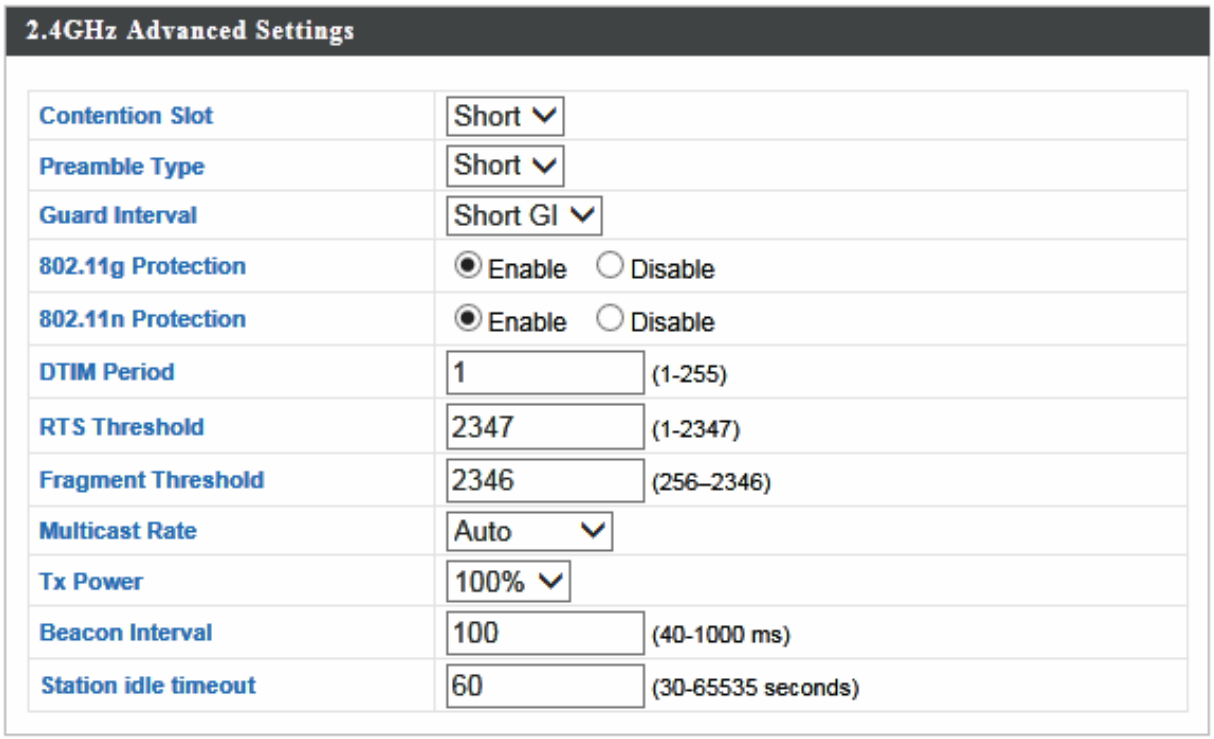
When auto channel is disabled, select a wireless channel manually:

Channel	Select a wireless channel from 1 – 11.
Channel Bandwidth	Set the channel bandwidth: 20MHz (lower performance but less interference), 40MHz (higher performance but potentially higher interference) or Auto (automatically select based on interference level).
BSS BasicRate Set	Set a Basic Service Set (BSS) rate: this is a series of rates to control communication frames for wireless clients.

IV-3-3-2. Advanced

These settings are for experienced users only. Please do not change any of the values on this page unless you are already familiar with these functions.

Changing these settings can adversely affect the performance of your access point.



Contention Slot	Select “Short” or “Long” – this value is used for contention windows in WMM (see **IV-3-6. WMM**).
Preamble Type	Set the wireless radio preamble type. The preamble type in 802.11 based wireless communication defines the length of the CRC (Cyclic Redundancy Check) block for communication between the access point and roaming wireless adapters. The default value is “Short Preamble”.
Guard Interval	Set the guard interval. A shorter interval can improve performance.

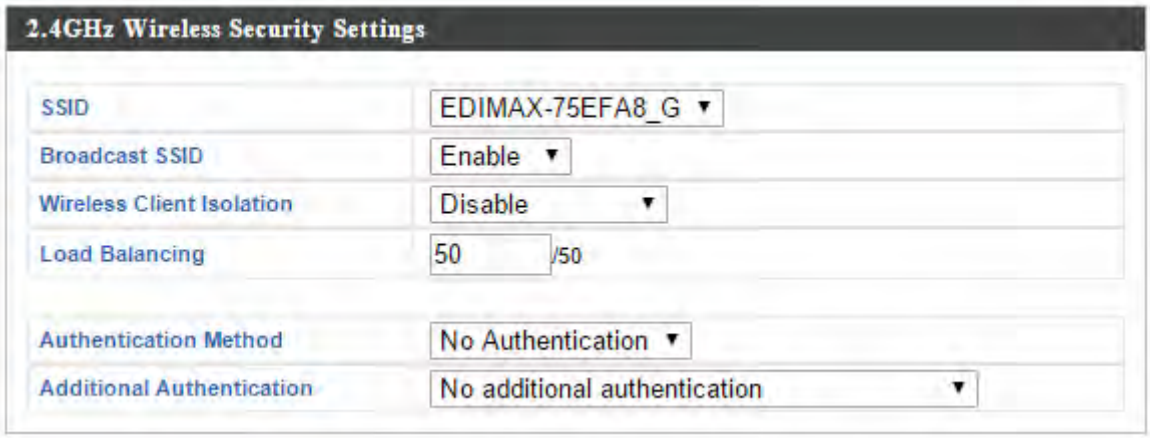
802.11g Protection	Enable/disable 802.11g protection, which increases reliability but reduces bandwidth (clients will send Request to Send (RTS) to access point, and access point will broadcast Clear to Send (CTS), before a packet is sent from client.)
802.11n Protection	Enable/disable 802.11n protection, which increases reliability but reduces bandwidth (clients will send Request to Send (RTS) to access point, and access point will broadcast Clear to Send (CTS), before a packet is sent from client.)
DTIM Period	Set the DTIM (delivery traffic indication message) period value of the wireless radio. The default value is 1.
RTS Threshold	Set the RTS threshold of the wireless radio. The default value is 2347.
Fragment Threshold	Set the fragment threshold of the wireless radio. The default value is 2346.
Multicast Rate	Set the transfer rate for multicast packets or use the “Auto” setting.
Tx Power	Set the power output of the wireless radio. You may not require 100% output power. Setting a lower power output can enhance security since potentially malicious/unknown users in distant areas will not be able to access your signal.
Beacon Interval	Set the beacon interval of the wireless radio. The default value is 100.
Station idle timeout	Set the interval for keepalive messages from the access point to a wireless client to verify if the station is still alive/active.

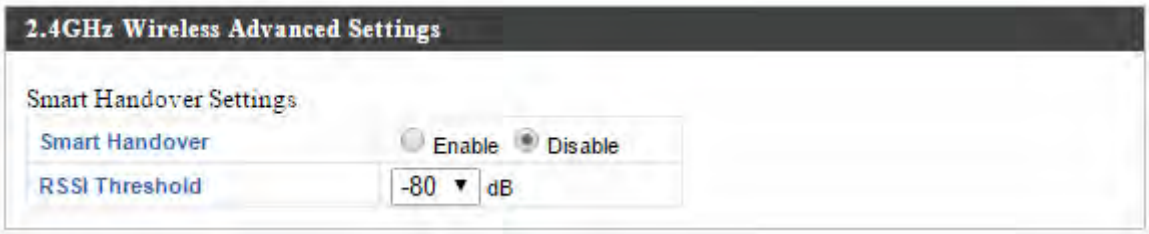
IV-3-3-3. Security

The access point provides various security options (wireless data encryption). When data is encrypted, information transmitted wirelessly cannot be read by anyone who does not know the correct encryption key.

It's essential to configure wireless security in order to prevent unauthorised access to your network.

Select hard-to-guess passwords which include combinations of numbers, letters and symbols, and change your password regularly.





2.4GHz Wireless Security Settings	
SSID Selection	Select which SSID to configure security settings for.
Broadcast SSID	Enable or disable SSID broadcast. When enabled, the SSID will be visible to clients as an available Wi-Fi network. When disabled, the SSID will not be visible as an available Wi-Fi network to clients – clients must manually enter the SSID in order to connect. A hidden (disabled) SSID is typically more secure than a visible (enabled) SSID.
Wireless Client Isolation	Enable or disable wireless client isolation. Wireless client isolation prevents clients connected to the access point from communicating with each other and improves security. Typically, this function is useful for corporate environments or public hot spots and can prevent brute force attacks on clients' usernames and passwords.
Load Balancing	Load balancing limits the number of wireless clients connected to an SSID. Set a load balancing value (maximum 50).
Authentication Method	Select an authentication method from the drop down menu and refer to the information below appropriate for your method.
Additional Authentication	Select an additional authentication method from the drop down menu and refer to the information below (**IV-3-1-3-6.**) appropriate for your method.

2.4GHz Wireless Advanced Settings	
Smart Handover	Enable or disable smart handover.
RSSI Threshold	Set the Received Signal Strength Indicator (RSSI) threshold to maintain quality connection speeds (minimum receiver sensitivity required for a connection).

IV-3-3-3-1. No Authentication

Authentication is disabled and no password/key is required to connect to the access point.

Disabling wireless authentication is not recommended. When disabled, anybody within range can connect to your device's SSID.

IV-3-3-3-2. WEP

WEP (Wired Equivalent Privacy) is a basic encryption type. For a higher level of security consider using WPA encryption.

Key Length	Select 64-bit or 128-bit. 128-bit is more secure than 64-bit and is recommended.
Key Type	Choose from "ASCII" (any alphanumerical character 0-9, a-z and A-Z) or "Hex" (any characters from 0-9, a-f and A-F).
Default Key	Select which encryption key (1 – 4 below) is the default key. For security purposes, you can set up to four keys (below) and change which is the default key.
Encryption Key 1 – 4	Enter your encryption key/password according to the format you selected above.

IV-3-3-3-3. IEEE802.1x/EAP

Key Length	Select 64-bit or 128-bit. 128-bit is more secure than 64-bit and is recommended.

IV-3-3-3-4. WPA-PSK

WPA-PSK is a secure wireless encryption type with strong data protection and user authentication, utilizing 128-bit encryption keys.

WPA Type	Select from WPA/WPA2 Mixed Mode-PSK, WPA2 or WPA only. WPA2 is safer than WPA only, but not supported by all wireless clients. Please make sure your wireless client supports

	your selection.
Encryption	Select “TKIP/AES Mixed Mode” or “AES” encryption type.
Key Renewal Interval	Specify a frequency for key renewal in minutes.
Pre-Shared Key Type	Choose from “Passphrase” (8 – 63 alphanumeric characters) or “Hex” (up to 64 characters from 0-9, a-f and A-F).
Pre-Shared Key	Please enter a security key/password according to the format you selected above.

IV-3-3-3-5. WPA-EAP

WPA Type	Select from WPA/WPA2 Mixed Mode-EAP, WPA2-EAP or WPA-EAP.
Encryption Type	Select “TKIP/AES Mixed Mode” or “AES” encryption type.
Key Renewal Interval	Specify a frequency for key renewal in minutes.

WPA-EAP must be disabled to use MAC-RADIUS authentication.

IV-3-3-3-6. Additional Authentication

Additional wireless authentication methods can also be used:

WPS must be disabled to use additional authentication. See *IV-3-3.* ***for WPS settings.***

MAC Address Filter
Restrict wireless clients access based on MAC address specified in the MAC filter table.

See *IV-3-5.MAC Filter* ***to configure MAC filtering.***

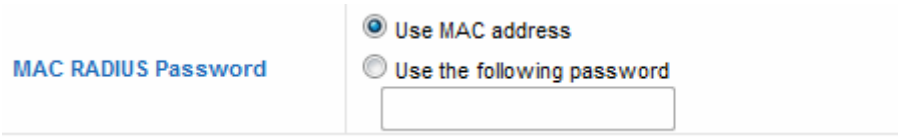
MAC Filter & MAC-RADIUS Authentication
Restrict wireless clients access using both of the above MAC filtering & RADIUS authentication methods.

MAC-RADIUS Authentication

Restrict wireless clients access based on MAC address via a RADIUS server, or password authentication via a RADIUS server.

See** IV-3-4.RADIUS **to configure RADIUS servers.

WPS must be disabled to use MAC-RADIUS authentication. See** IV-3-3**. for WPS settings.



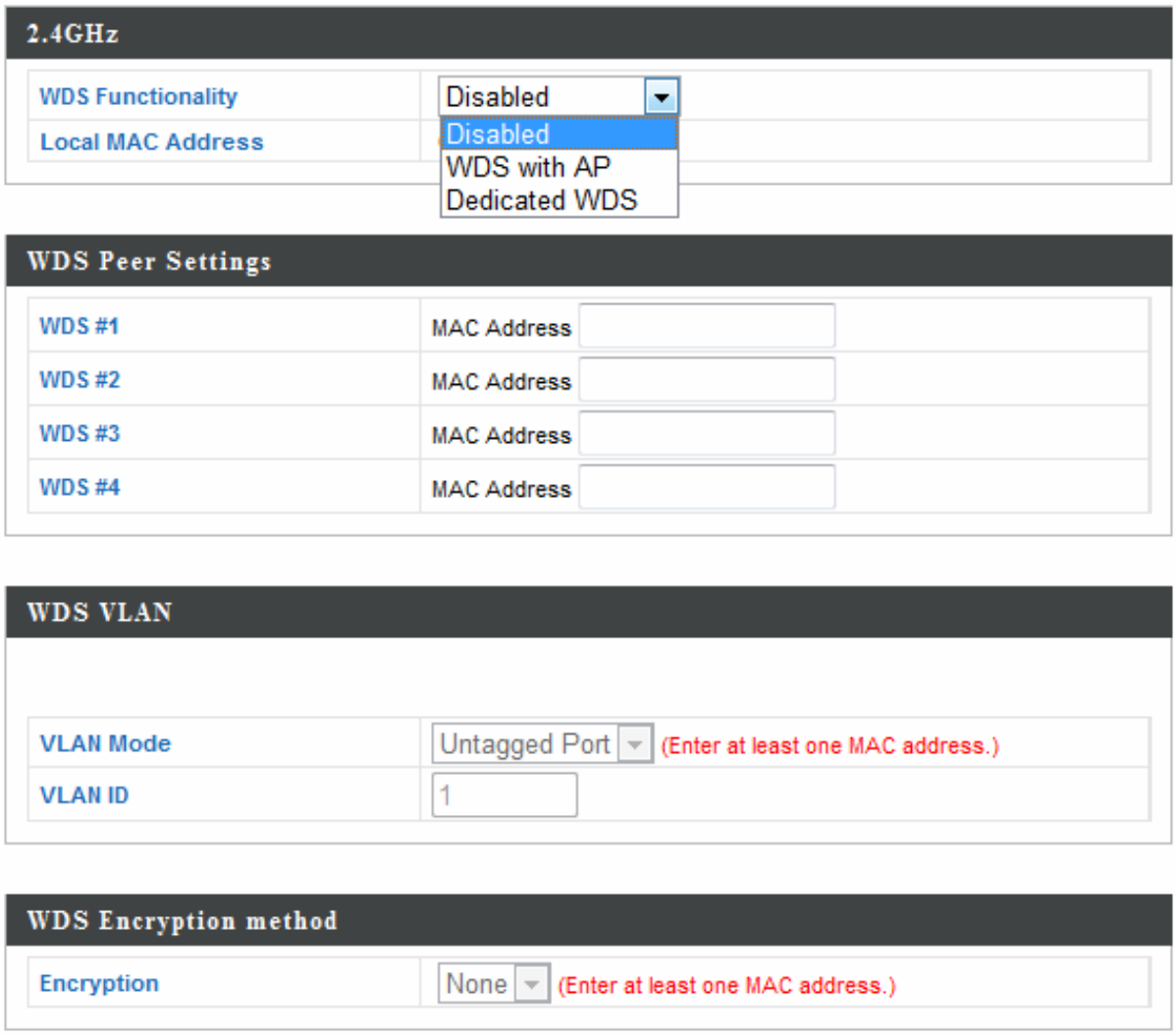
MAC RADIUS Password	Select whether to use MAC address or password authentication via RADIUS server. If you select “Use the following password”, enter the password in the field below. The password should match the “Shared Secret” used in **IV-3-4. RADIUS**.

IV-3-3-4. WDS

Wireless Distribution System (WDS) can bridge/repeat access points together in an extended network. WDS settings can be configured as shown below.

When using WDS, configure the IP address of each access point to be in the same subnet and ensure there is only one active DHCP server among connected access points, preferably on the WAN side.

WDS must be configured on each access point, using correct MAC addresses. All access points should use the same wireless channel and encryption method.



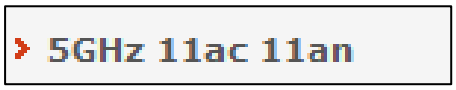
2.4GHz	
WDS Functionality	Select “WDS with AP” to use WDS with access point or “WDS Dedicated Mode” to use WDS and also block communication with regular wireless clients. When WDS is used, each access point should be configured with corresponding MAC addresses, wireless channel and wireless encryption method.
Local MAC Address	Displays the MAC address of your access point.

WDS Peer Settings	
WDS #	Enter the MAC address for up to four other WDS devices you wish to connect.

WDS VLAN	
VLAN Mode	Specify the WDS VLAN mode to “Untagged Port” or “Tagged Port”.
VLAN ID	Specify the WDS VLAN ID when “Untagged Port” is selected above.

WDS Encryption method	
Encryption	Select whether to use “None” or “AES” encryption and enter a pre-shared key for AES consisting of 8-63 alphanumeric characters.

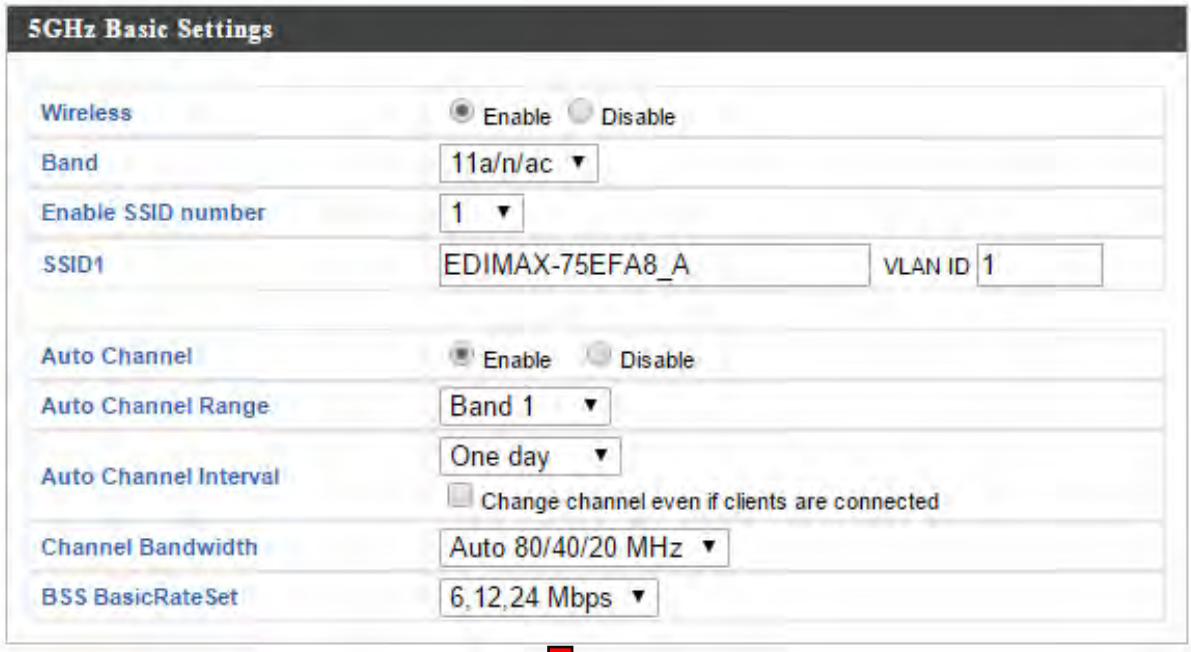
IV-3-4. 5GHz 11ac 11an

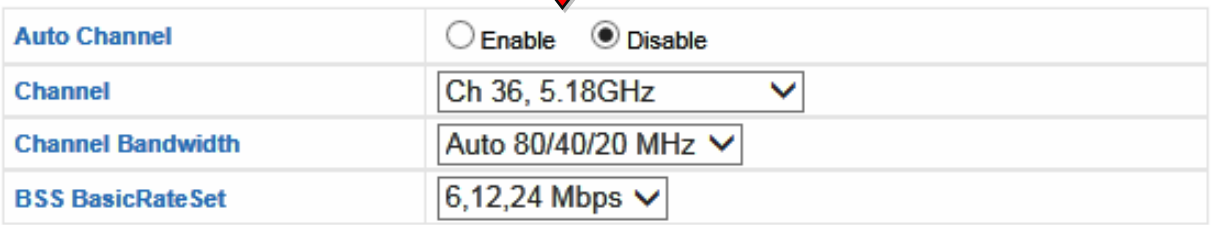


The “5GHz 11ac 11an” menu allows you to view and configure information for your access point’s 5GHz wireless network across five categories: Basic, Advanced, Security, WDS & Schedule.

IV-3-4-1. Basic

The “Basic” screen displays basic settings for your access point’s 5GHz Wi-Fi network (s).





Wireless	Enable or disable the access point’s 5GHz wireless radio. When disabled, no 5GHz SSIDs will be active.
Band	Select the wireless standard used for the access point. Combinations of 802.11a,

	802.11n & 802.11ac can be selected.
Enable SSID Number	Select how many SSIDs to enable for the 5GHz frequency from the drop down menu. A maximum of 16 can be enabled.
SSID#	Enter the SSID name for the specified SSID (up to 16). The SSID can consist of any combination of up to 32 alphanumeric characters.
VLAN ID	Specify a VLAN ID for each SSID.
Auto Channel	Enable/disable auto channel selection. Auto channel selection will automatically set the wireless channel for the access point's 5GHz frequency based on availability and potential interference. When disabled, select a channel manually as shown in the next table.
Auto Channel Range	Select a range from which the auto channel setting (above) will choose a channel.
Auto Channel Interval	Specify a frequency for how often the auto channel setting will check/reassign the wireless channel. Check/uncheck the "Change channel even if clients are connected" box according to your preference.
Channel Bandwidth	Set the channel bandwidth: 20MHz (lower performance but less interference), Auto 40/20MHz or Auto 80/40/20MHz (automatically select based on interference level).
BSS BasicRate Set	Set a Basic Service Set (BSS) rate: this is a series of rates to control communication frames for wireless clients.

When auto channel is disabled, select a wireless channel manually:

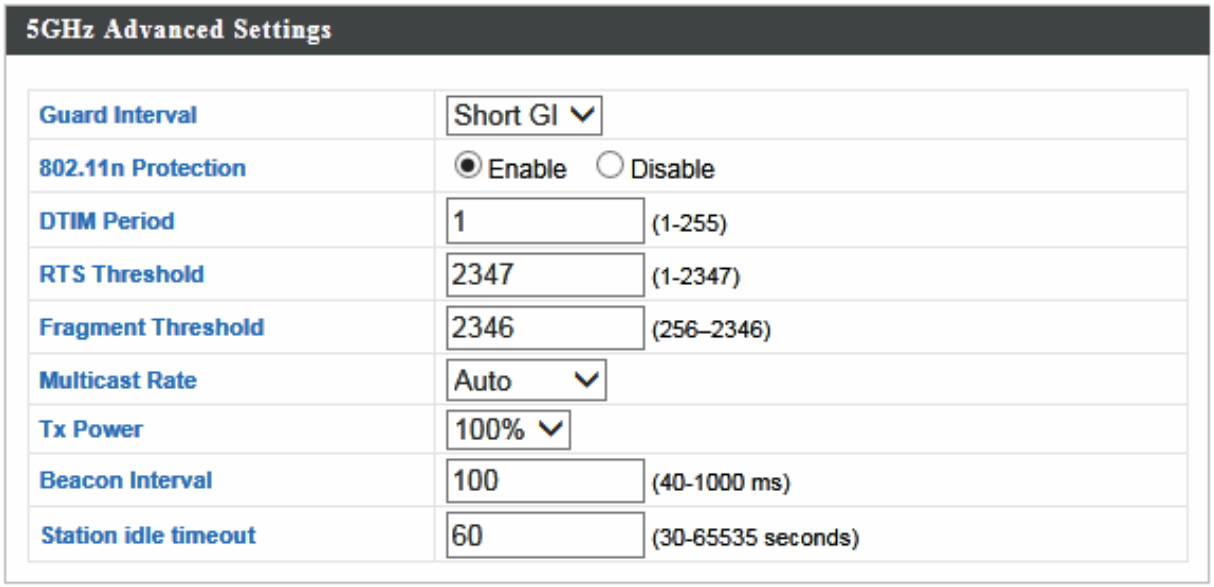
Channel	Select a wireless channel.
Channel Bandwidth	Set the channel bandwidth: 20MHz (lower performance but less interference), Auto 40/20MHz or Auto 80/40/20MHz (automatically select based on interference level).
BSS BasicRate Set	Set a Basic Service Set (BSS) rate: this is a series of rates to control communication

	frames for wireless clients.

IV-3-4-2. Advanced

These settings are for experienced users only. Please do not change any of the values on this page unless you are already familiar with these functions.

Changing these settings can adversely affect the performance of your access point.



Guard Interval	Set the guard interval. A shorter interval can improve performance.
802.11n Protection	Enable/disable 802.11n protection, which increases reliability but reduces bandwidth (clients will send Request to Send (RTS) to access point, and access point will broadcast Clear to Send (CTS), before a packet is sent from client.)
DTIM Period	Set the DTIM (delivery traffic indication message) period value of the wireless radio. The default value is 1.
RTS Threshold	Set the RTS threshold of the wireless radio. The default value is 2347.
Fragment Threshold	Set the fragment threshold of the wireless radio. The default value is 2346.

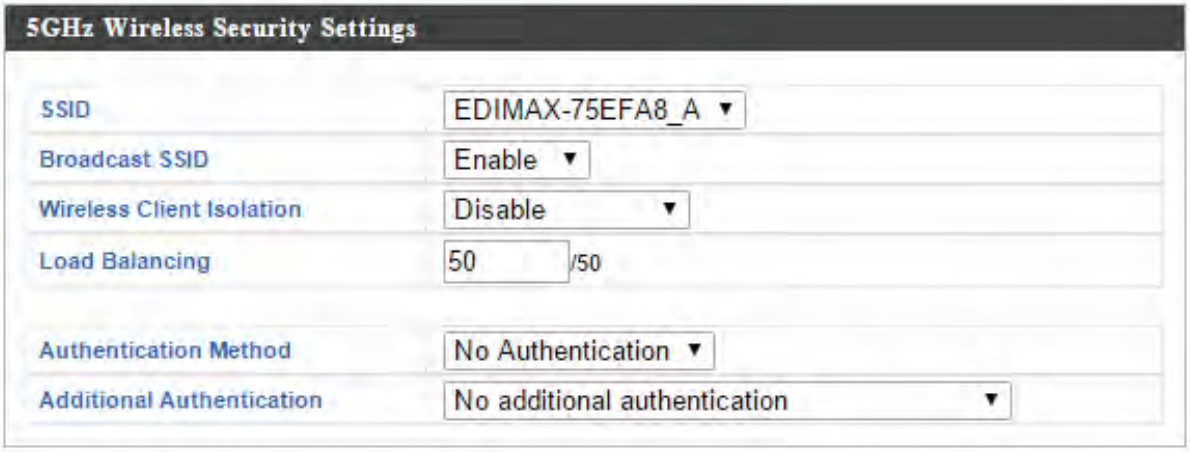
Multicast Rate	Set the transfer rate for multicast packets or use the “Auto” setting.
Tx Power	Set the power output of the wireless radio. You may not require 100% output power. Setting a lower power output can enhance security since potentially malicious/unknown users in distant areas will not be able to access your signal.
Beacon Interval	Set the beacon interval of the wireless radio. The default value is 100.
Station idle timeout	Set the interval for keepalive messages from the access point to a wireless client to verify if the station is still alive/active.

IV-3-4-3. Security

The access point provides various security options (wireless data encryption). When data is encrypted, information transmitted wirelessly cannot be read by anyone who does not know the correct encryption key.

It's essential to configure wireless security in order to prevent unauthorised access to your network.

Select hard-to-guess passwords which include combinations of numbers, letters and symbols, and change your password regularly.



SSID Selection	Select which SSID to configure security settings for.
Broadcast SSID	Enable or disable SSID broadcast. When enabled, the SSID will be visible to clients as an available Wi-Fi network. When disabled, the SSID will not be visible as an available Wi-Fi network to clients – clients must manually enter the SSID in order to connect. A hidden (disabled) SSID is typically more secure than a visible (enabled) SSID.

Wireless Client Isolation	Enable or disable wireless client isolation. Wireless client isolation prevents clients connected to the access point from communicating with each other and improves security. Typically, this function is useful for corporate environments or public hot spots and can prevent brute force attacks on clients' usernames and passwords.
Load Balancing	Load balancing limits the number of wireless clients connected to an SSID. Set a load balancing value (maximum 50).
Authentication Method	Select an authentication method from the drop down menu and refer to the information below appropriate for your method.
Additional Authentication	Select an additional authentication method from the drop down menu and refer to the information below appropriate for your method.

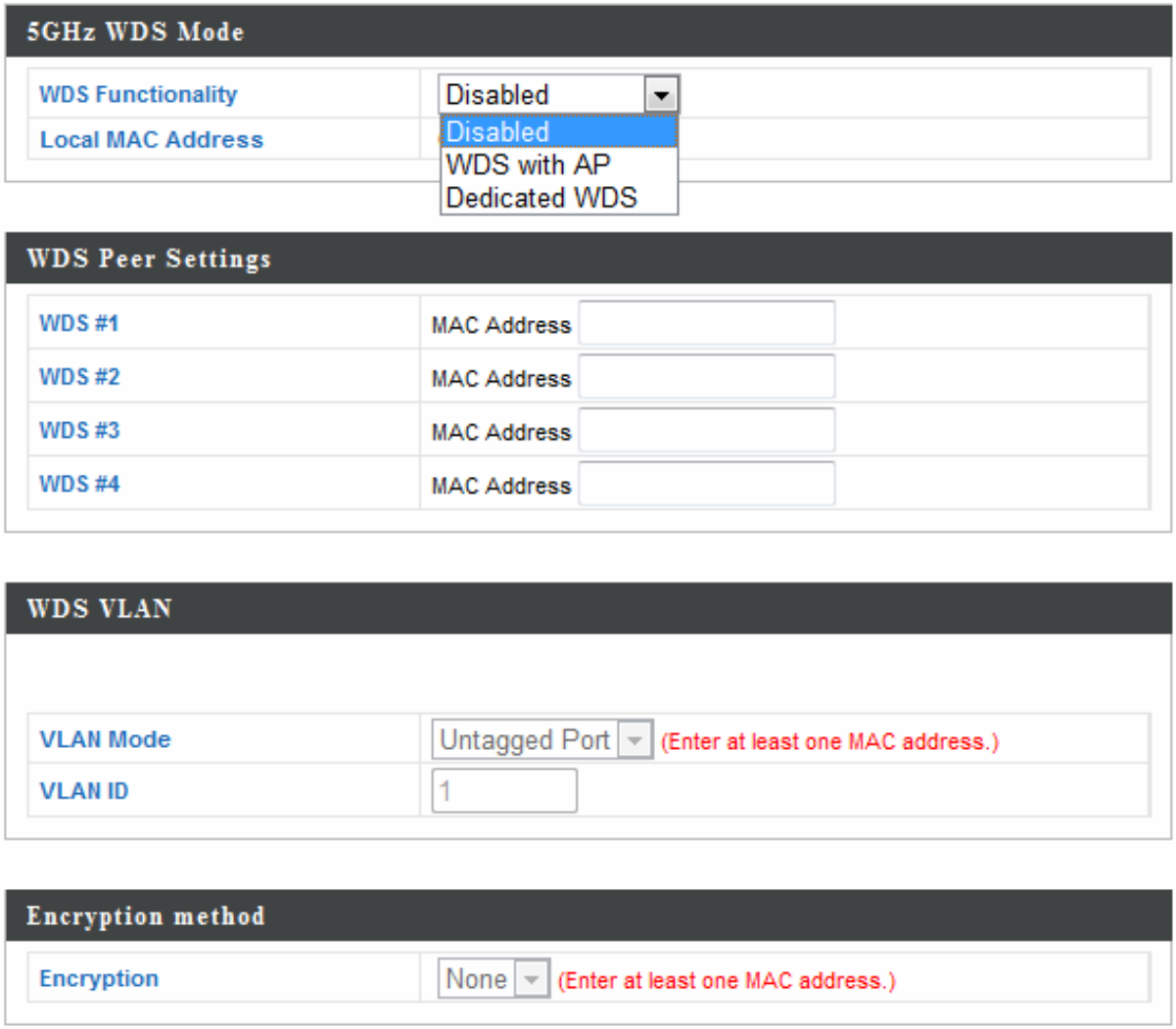
Please refer back to **IV-3-1-3. Security** for more information on authentication and additional authentication types.

IV-3-4-4. WDS

Wireless Distribution System (WDS) can bridge/repeat access points together in an extended network. WDS settings can be configured as shown below.

When using WDS, configure the IP address of each access point to be in the same subnet and ensure there is only one active DHCP server among connected access points, preferably on the WAN side.

WDS must be configured on each access point, using correct MAC addresses. All access points should use the same wireless channel and encryption method.



5GHz WDS Mode	
WDS Functionality	Select “WDS with AP” to use WDS with access point or “WDS Dedicated Mode” to use WDS and also block communication with regular wireless clients. When WDS is used, each access point should be configured with corresponding MAC addresses, wireless channel and wireless encryption method.
Local MAC Address	Displays the MAC address of your access point.

WDS Peer Settings	
WDS #	Enter the MAC address for up to four other WDA devices you wish to connect.

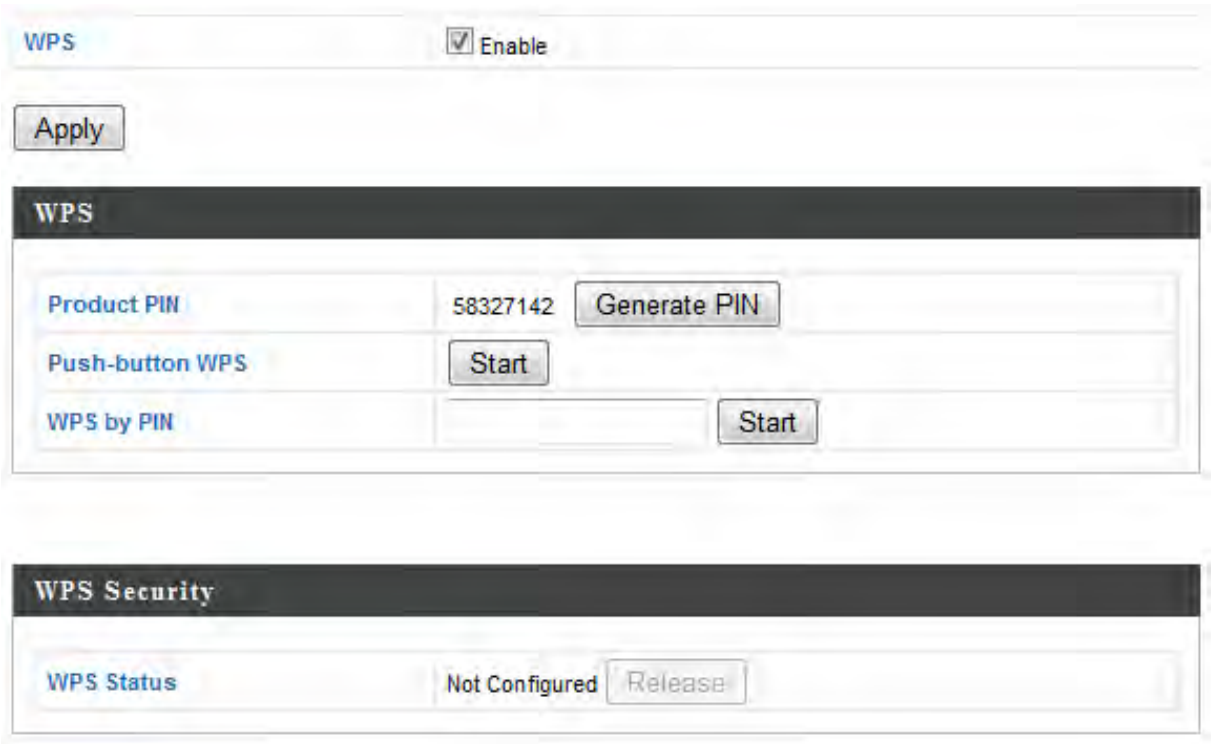
WDS VLAN	
VLAN Mode	Specify the WDS VLAN mode to “Untagged Port” or “Tagged Port”.
VLAN ID	Specify the WDS VLAN ID when “Untagged Port” is selected above.

WDS Encryption	
Encryption	Select whether to use “None” or “AES” encryption and enter a pre-shared key for AES with 8-63 alphanumeric characters.

IV-3-5. WPS

Wi-Fi Protected Setup is a simple way to establish connections between WPS compatible devices. WPS can be activated on compatible devices by pushing a WPS button on the device or from within the device's firmware/configuration interface (known as PBC or "Push Button Configuration"). When WPS is activated in the correct manner and at the correct time for two compatible devices, they will automatically connect. "PIN code WPS" is a variation of PBC which includes the additional use of a PIN code between the two devices for verification.

Please refer to manufacturer's instructions for your other WPS device.



WPS	Check/uncheck this box to enable/disable WPS functionality. WPS must be disabled when using MAC-RADIUS authentication (see **IV-3-1-3-6 & IV-3-4**).

WPS	
Product PIN	Displays the WPS PIN code of the device, used for PIN code WPS. You will be required to enter this PIN code into another WPS device for PIN code WPS. Click “Generate PIN” to generate a new WPS PIN code.
Push-Button WPS	Click “Start” to activate WPS on the access point for approximately 2 minutes. This has the same effect as physically pushing the access point’s WPS button.
WPS by PIN	Enter the PIN code of another WPS device and click “Start” to attempt to establish a WPS connection for approximately 2 minutes.

WPS Security	
WPS Status	WPS security status is displayed here. Click “Release” to clear the existing status.

Wireless 2.4GHz/5GHz	
SSID	Displays the SSID name(s) for the specified frequency.
Security	Displays the security for the specified SSID.
Encryption	Displays the encryption type for the specified SSID. See **IV-3. Wireless Settings**

IV-3-6. RADIUS

The RADIUS menu allows you to configure the access point's external RADIUS server settings.

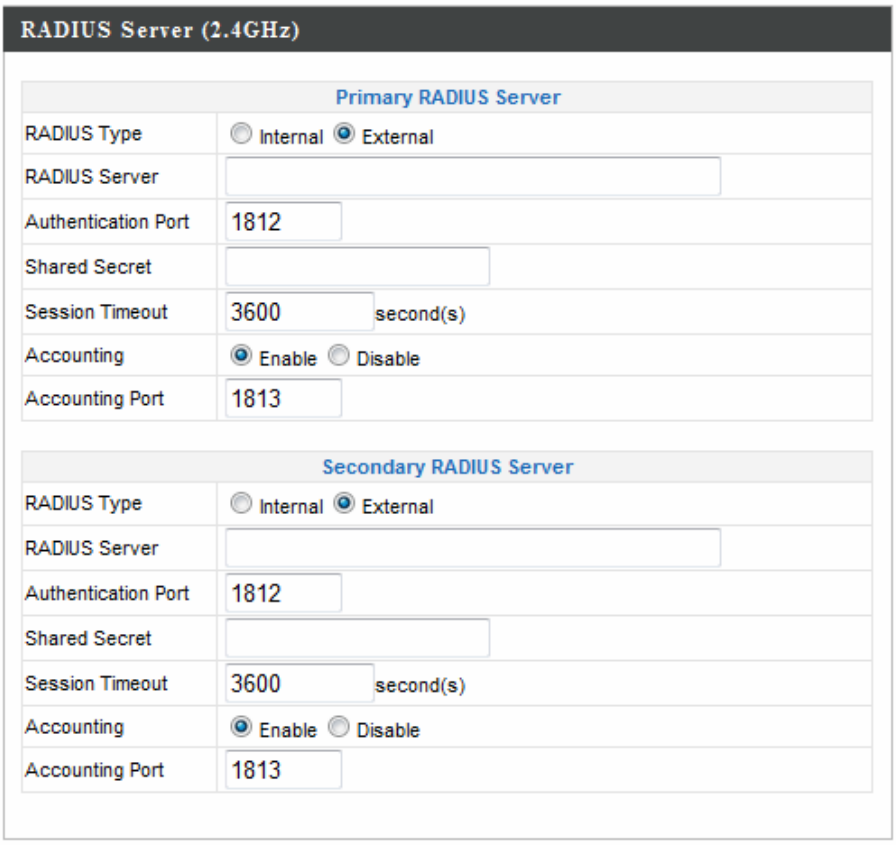
A RADIUS server provides user-based authentication to improve security and offer wireless client control – users can be authenticated before gaining access to a network.

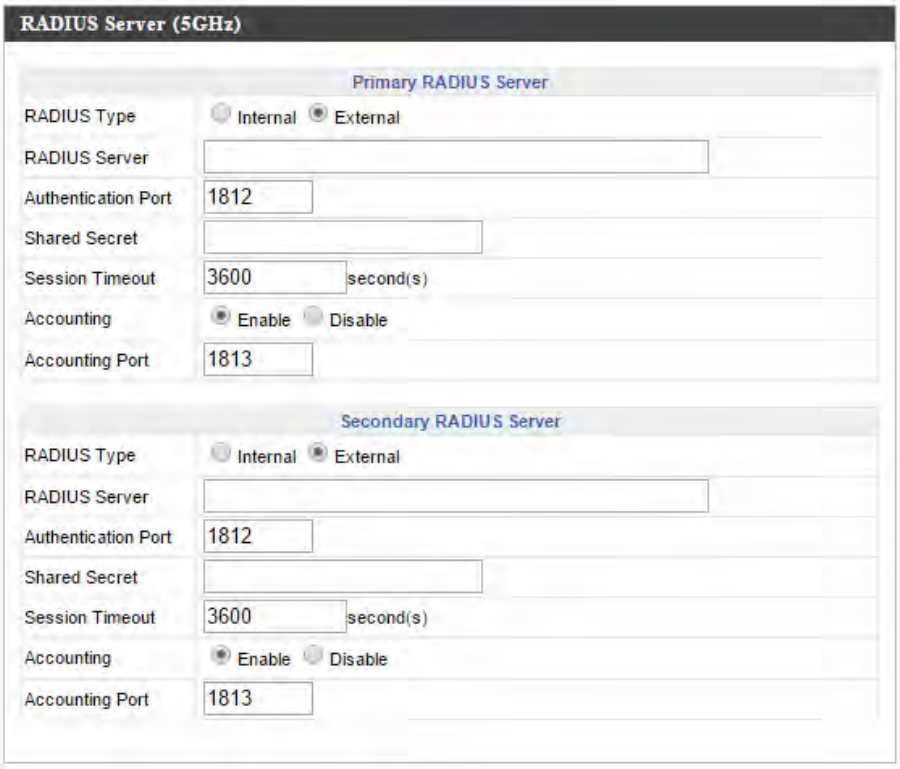
The access point can utilize both a primary and secondary (backup) external RADIUS server for each of its wireless frequencies (2.4GHz & 5GHz)..

To use RADIUS servers, go to *"Wireless Settings"* → *"Security"* ***and select*** *"MAC RADIUS Authentication"* → *"Additional Authentication"* ***and select*** *"MAC RADIUS Authentication"* ***(see*** *IV-3-1-3.* ***&*** *IV-3-2-3****).***

IV-3-6-1. RADIUS Settings

Radius Settings Configure the RADIUS server settings for 2.4GHz. Each frequency can use an internal or external RADIUS server.



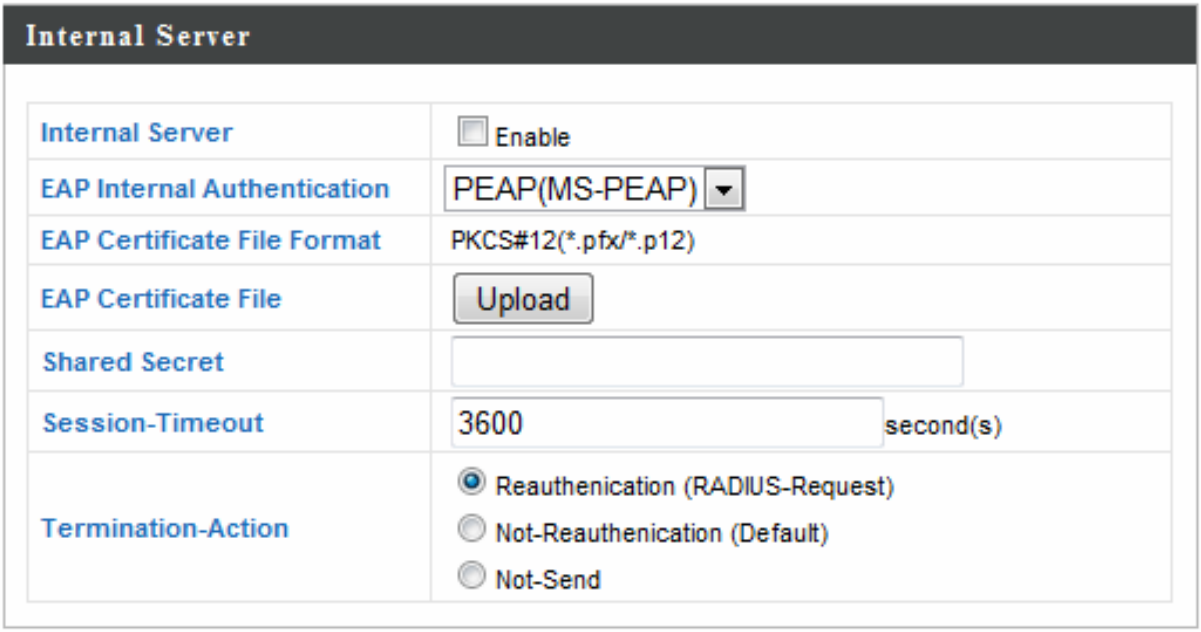


RADIUS Type	Select “Internal” to use the access point’s built-in RADIUS server or “external” to use an external RADIUS server.
RADIUS Server	Enter the RADIUS server host IP address.
Authentication Port	Set the UDP port used in the authentication protocol of the RADIUS server. Value must be between 1 – 65535.
Shared Secret	Enter a shared secret/password between 1 – 99 characters in length. This should match the “MAC-RADIUS” password used in **IV-3-1-3-6** or **IV-3-2-3**.
Session Timeout	Set a duration of session timeout in seconds between 0 – 86400.
Accounting	Enable or disable RADIUS accounting.
Accounting Port	When accounting is enabled (above), set the UDP port used in the accounting protocol of the RADIUS server. Value must be between 1 – 65535.

IV-3-6-2. Internal Server

The access point features a built-in RADIUS server which can be configured as shown below used when “Internal” is selected for “RADIUS Type” in the “Wireless Settings” → “RADIUS” → “RADIUS Settings” menu.

To use RADIUS servers, go to** “Wireless Settings” → “Security” **and select** “MAC RADIUS Authentication” → “Additional Authentication” **and select** “MAC RADIUS Authentication” **(see** IV-3-1-3. **&** IV-3-2-3**).

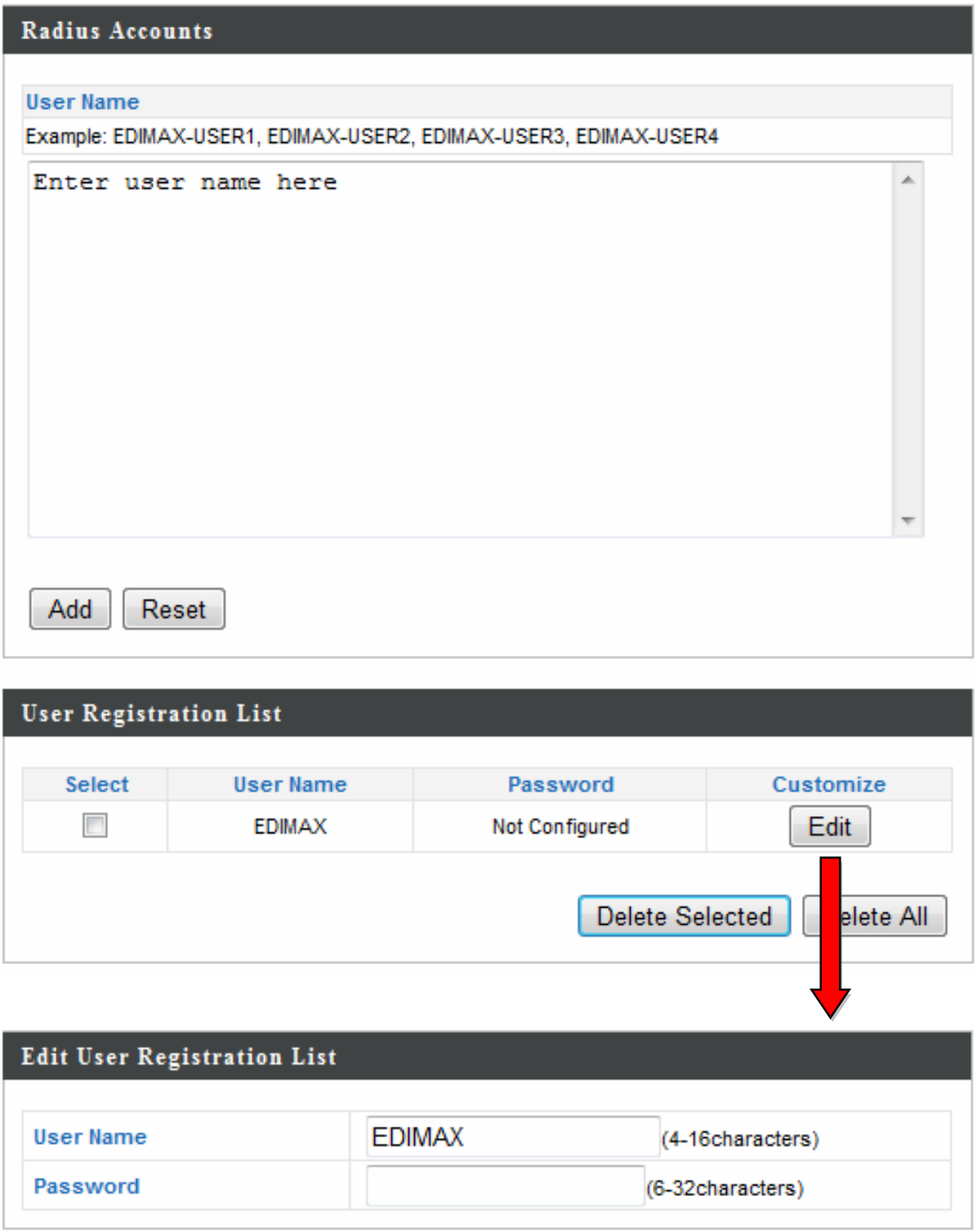


Internal Server	Check/uncheck to enable/disable the access point’s internal RADIUS server.
EAP Internal Authentication	Select EAP internal authentication type from the drop down menu.
EAP Certificate File Format	Displays the EAP certificate file format: PCK#12(*.pfx/*.p12)
EAP Certificate File	Click “Upload” to open a new window and select the location of an EAP certificate file to use. If no certificate file is uploaded, the internal RADIUS server will use a self-made certificate.
Shared Secret	Enter a shared secret/password for use between the internal RADIUS server and RADIUS client. The shared secret should be 1 –

	99 characters in length. This should match the “MAC-RADIUS” password used in **IV-3-1-3-6** or **IV-3-2-3**.
Session Timeout	Set a duration of session timeout in seconds between 0 – 86400.
Termination Action	Select a termination-action attribute: “Reauthentication” sends a RADIUS request to the access point, “Not-Reathentication” sends a default termination-action attribute to the access point, “Not-Send” no termination-action attribute is sent to the access point.

IV-3-6-3. RADIUS Accounts

The internal RADIUS server can authenticate up to 256 user accounts. The "RADIUS Accounts" page allows you to configure and manage users.



User Name	Enter the user names here, separated by commas.
Add	Click “Add” to add the user to the user registration list.
Reset	Clear text from the user name box.

Select	Check the box to select a user.
User Name	Displays the user name.
Password	Displays if specified user name has a password (configured) or not (not configured).
Customize	Click “Edit” to open a new field to set/edit a password for the specified user name (below).

Delete Selected	Delete selected user from the user registration list.
Delete All	Delete all users from the user registration list.

Edit User Registration List

User Name	Existing user name is displayed here and can be edited according to your preference.
Password	Enter or edit a password for the specified user.

IV-3-7. MAC Filter

Mac filtering is a security feature that can help to prevent unauthorized users from connecting to your access point.

This function allows you to define a list of network devices permitted to connect to the access point. Devices are each identified by their unique MAC address. If a device which is not on the list of permitted MAC addresses attempts to connect to the access point, it will be denied.

> ***To enable MAC filtering, go to*** *"Wireless Settings"* → *"2.4G Hz 11bgn"* → *"Security"* → *"Additional Authentication"* ***and select*** *"MAC Filter"* ***(see*** *IV-3-1-3****).***

The MAC address filtering table is displayed below:

Add MAC Address	Enter a MAC address of computer or network device manually e.g. 'aa-bb-cc-dd-ee-ff' or enter multiple MAC addresses separated with

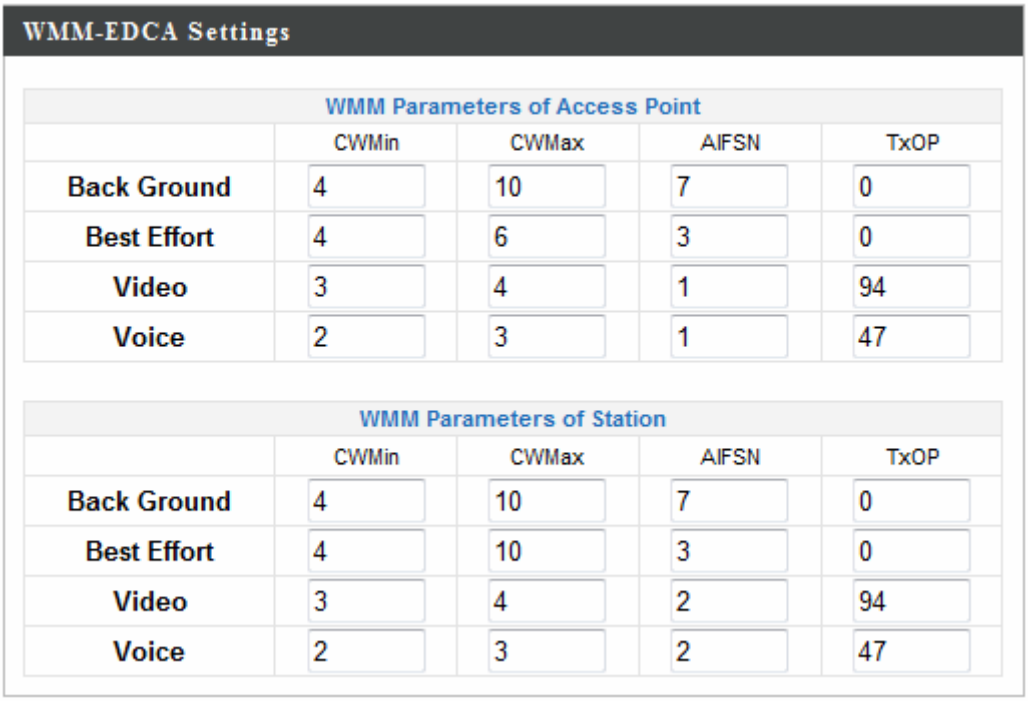
	commas, e.g. 'aa-bb-cc-dd-ee-ff,aa-bb-cc-dd-ee-gg'
Add	Click "Add" to add the MAC address to the MAC address filtering table.
Reset	Clear all fields.

MAC address entries will be listed in the "MAC Address Filtering Table". Select an entry using the "Select" checkbox.

Select	Delete selected or all entries from the table.
MAC Address	The MAC address is listed here.
Delete Selected	Delete the selected MAC address from the list.
Delete All	Delete all entries from the MAC address filtering table.
Export	Click "Export" to save a copy of the MAC filtering table. A new window will pop up for you to select a location to save the file.

IV-3-8. WMM

Wi-Fi Multimedia (WMM) is a Wi-Fi Alliance interoperability certification based on the IEEE 802.11e standard, which provides Quality of Service (QoS) features to IEE 802.11 networks. WMM prioritizes traffic according to four categories: background, best effort, video and voice.



Configuring WMM consists of adjusting parameters on queues for different categories of wireless traffic. Traffic is sent to the following queues:

Background	Low Priority	High throughput, non time sensitive bulk data e.g. FTP
Best Effort	Medium Priority	Traditional IP data, medium throughput and delay.
Video	High Priority	Time sensitive video data with minimum time delay.
Voice	High Priority	Time sensitive data such as VoIP and streaming media with minimum time delay.

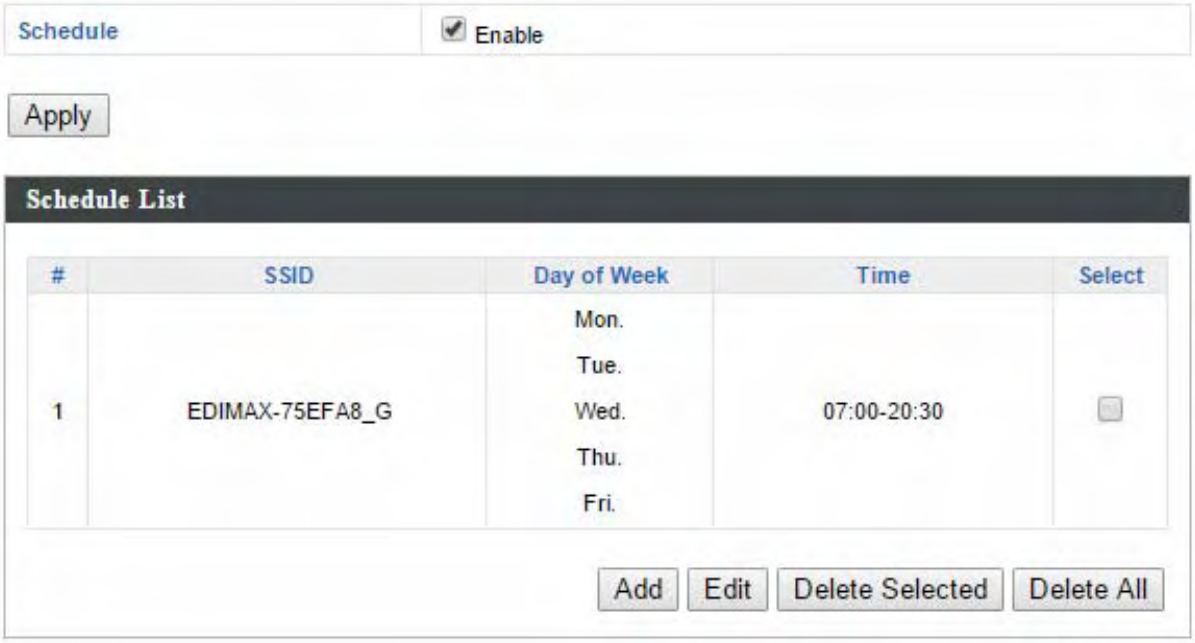
Queues automatically provide minimum transmission delays for video, voice, multimedia and critical applications. The values can further be adjusted manually:

CWMin	Minimum Contention Window (milliseconds): This value is input to the initial random backoff wait time algorithm for retry of a data frame transmission. The backoff wait time will be generated between 0 and this value. If the frame is not sent, the random backoff value is doubled until the value reaches the number defined by CWMax (below). The CWMin value must be lower than the CWMax value. The contention window scheme helps to avoid frame collisions and determine priority of frame transmission. A shorter window has a higher probability (priority) of transmission.
CWMax	Maximum Contention Window (milliseconds): This value is the upper limit to random backoff value doubling (see above).
AIFSN	Arbitration Inter-Frame Space (milliseconds): Specifies additional time between when a channel goes idle and the AP/client sends data frames. Traffic with a lower AIFSN value has a higher priority.
TxOP	Transmission Opportunity (milliseconds): The maximum interval of time an AP/client can transmit. This makes channel access more efficiently prioritized. A value of 0 means only one frame per transmission. A greater value effects higher priority.

IV-3-9. Schedule

The schedule feature allows you to automate the wireless network for specified times. Check/uncheck the box “Enable Wireless Schedule” to enable/disable the wireless scheduling function.

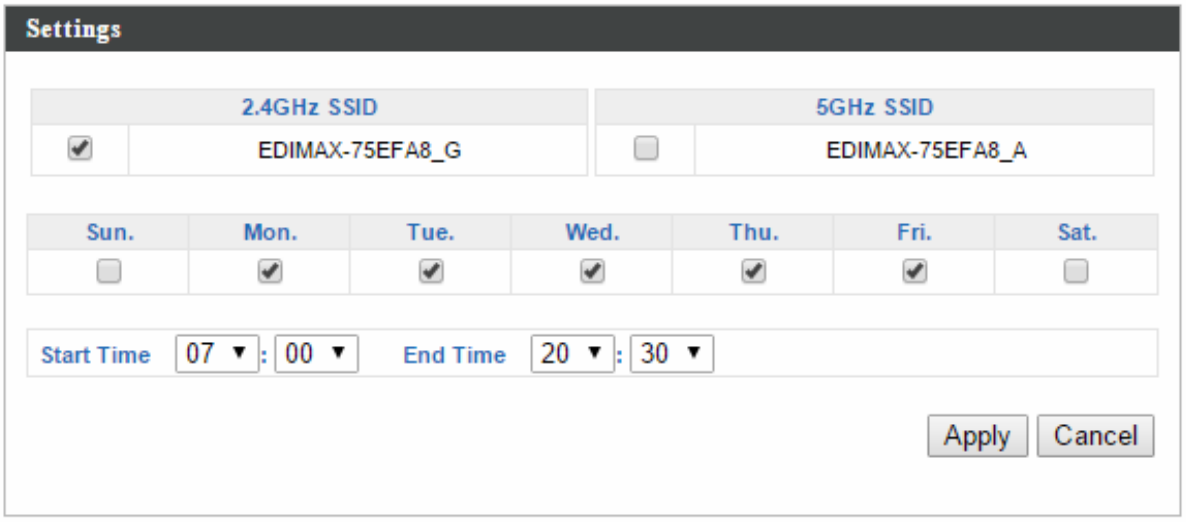
The access point’s time and date settings must be set in order to use this function.



Wireless scheduling can save energy and increase the security of your network.

1. Check **Enable** and use the **Select**, **Add**, **Edit** or **Delete** checkboxes to select and modify schedule(s).

2. When you click **Add**, specify day(s), start time and end time for the schedule using the drop-down menus and click **Apply**.

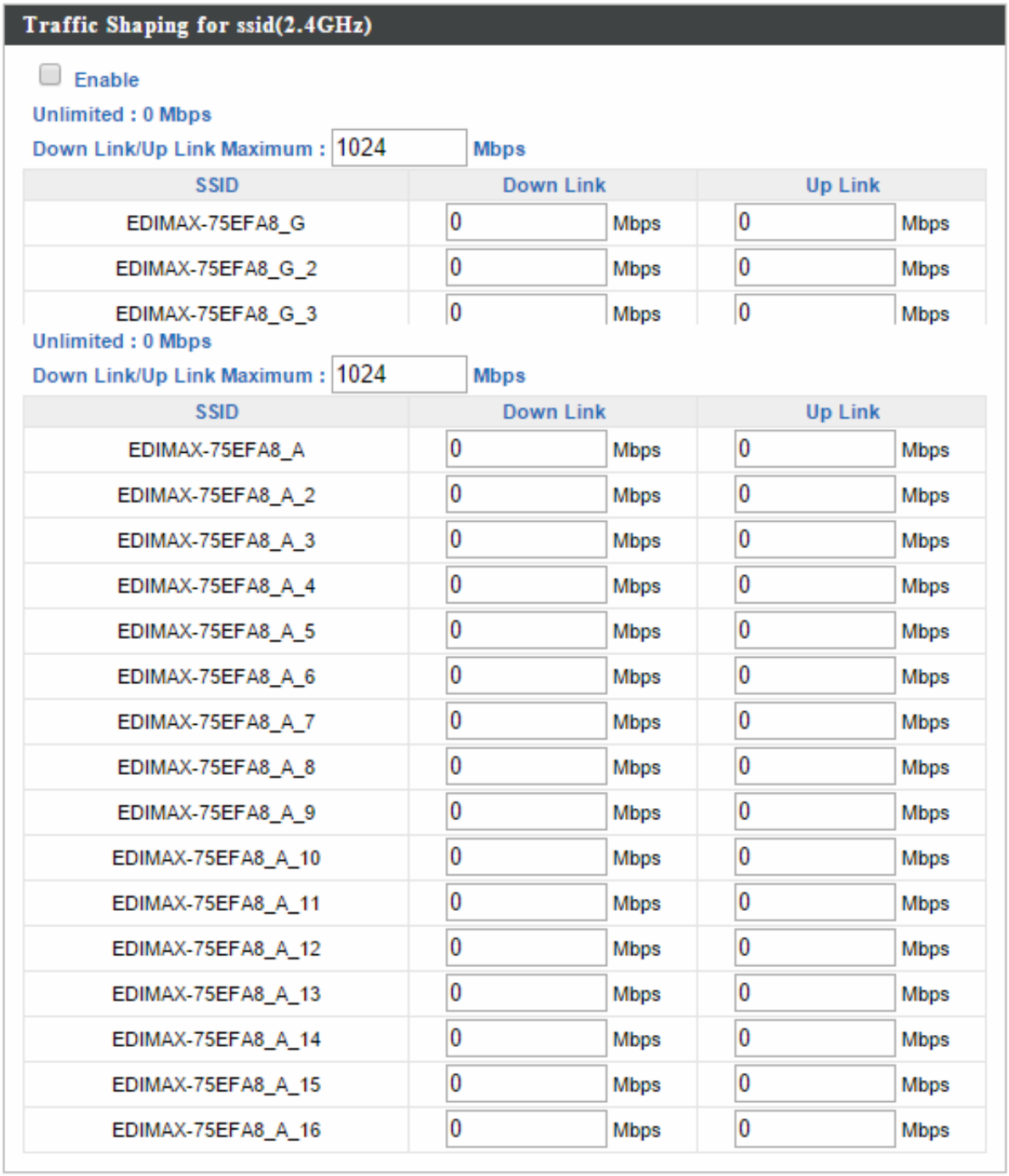


3. Remember to **Apply** your changes and make sure **Enable** is checked.

IV-3-10. Traffic Shaping

Traffic Shaping

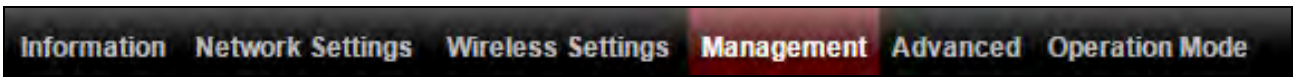
The traffic shaping function allows you to regulate network data transfer to ensure or prioritize performance by limiting uplink and downlink speeds according to SSID.



Enable Unlimited: 0 Mbps	Check/uncheck to enable or disable unlimited transfer speed.
Downlink/Uplink	Specify the maximum down/uplink capacity in

Maximum	Mbps.
Downlink	Enter a downlink limit in MB for the listed SSID.
Uplink	Enter an uplink limit in MB for the listed SSID.

IV-4. Management

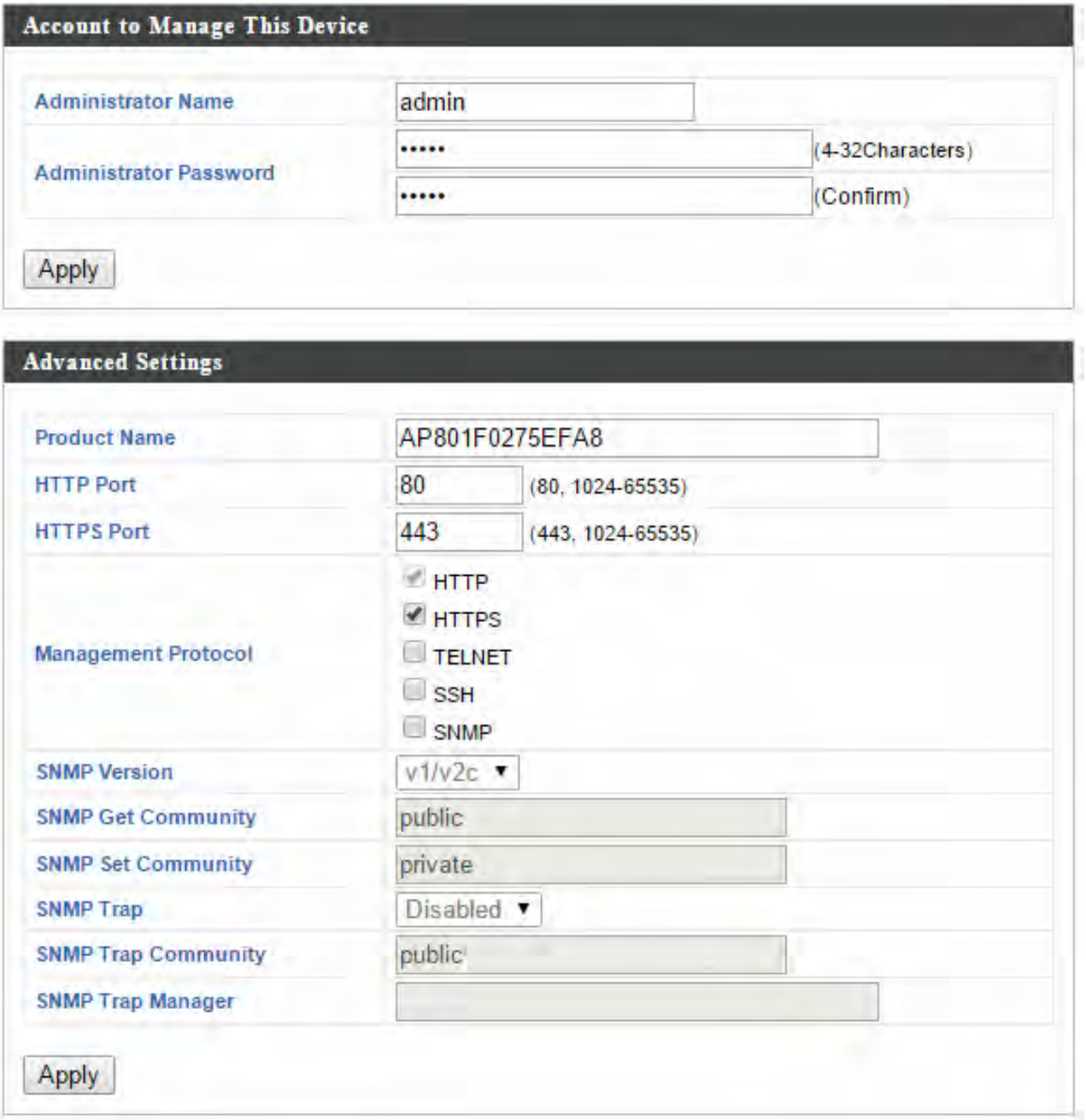


Screenshots displayed are examples. The information shown on your screen will vary depending on your configuration.

IV-4-1. Admin

You can change the password used to login to the browser-based configuration interface here. It is advised to do so for security purposes.

If you change the administrator password, please make a note of the new password. In the event that you forget this password and are unable to login to the browser based configuration interface, see *I-5. Reset* ***for how to reset the access point.***



Account to Manage This Device	
Administrator Name	Set the access point's administrator name. This is used to log in to the browser based configuration interface and must be between 4-16 alphanumeric characters (case sensitive).
Administrator Password	Set the access point's administrator password. This is used to log in to the browser based configuration interface and must be between 4-32 alphanumeric characters (case sensitive).

Advanced Settings	
Product Name	Edit the product name according to your

	preference consisting of 1-32 alphanumeric characters. This name is used for reference purposes.
HTTP Port	Specify HTTP port number.
HTTPS Port	Specify HTTPS port number.
Management Protocol	Check/uncheck the boxes to enable/disable specified management interfaces (see below). When SNMP is enabled, complete the SNMP fields below.
SNMP Version	Select SNMP version appropriate for your SNMP manager.
SNMP Get Community	Enter an SNMP Get Community name for verification with the SNMP manager for SNMP-GET requests.
SNMP Set Community	Enter an SNMP Set Community name for verification with the SNMP manager for SNMP-SET requests.
SNMP Trap	Enable or disable SNMP Trap to notify SNMP manager of network errors.
SNMP Trap Community	Enter an SNMP Trap Community name for verification with the SNMP manager for SNMP-TRAP requests.
SNMP Trap Manager	Specify the IP address or sever name (2-128 alphanumeric characters) of the SNMP manager.

HTTP

Internet browser HTTP protocol management interface

TELNET

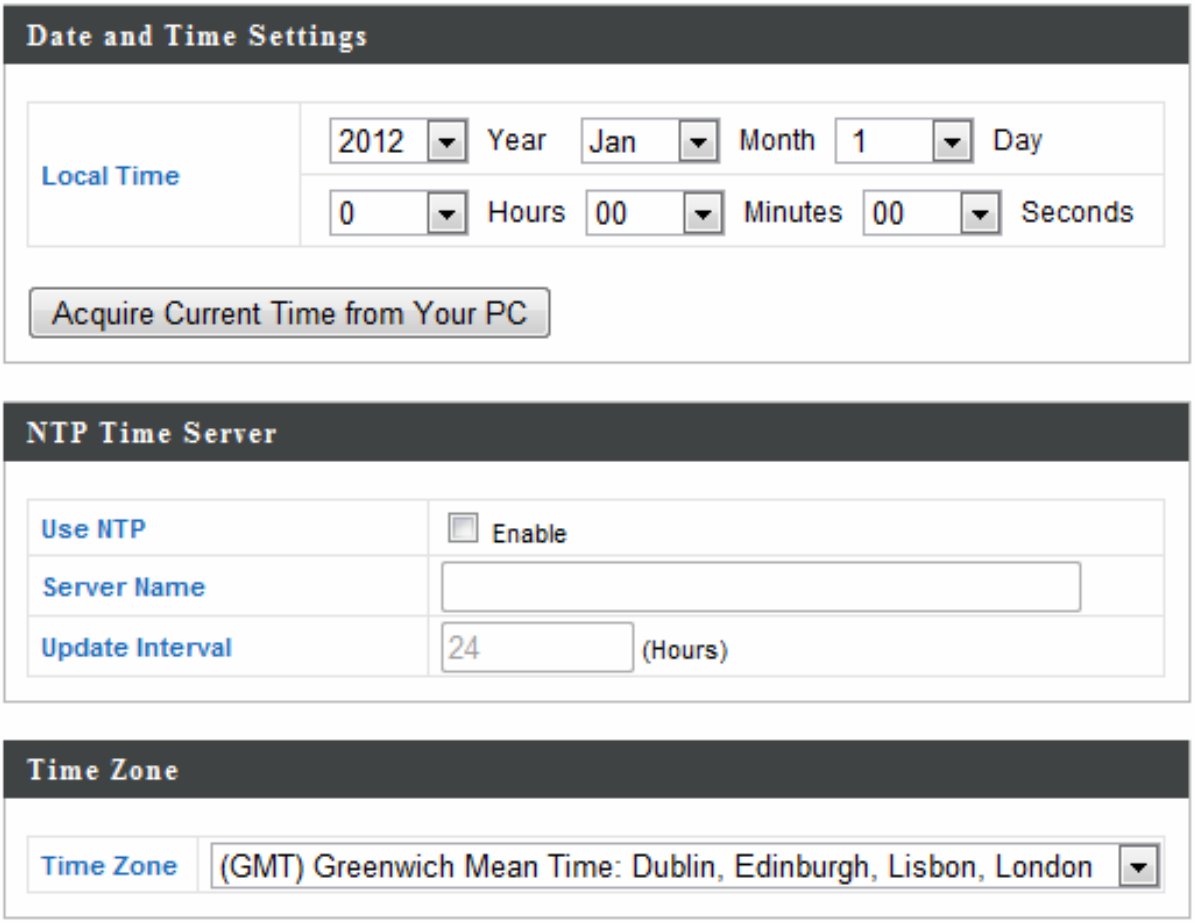
Client terminal with telnet protocol management interface

SNMP

Simple Network Management Protocol. SNMPv1, v2 & v3 protocol supported. SNMPv2 can be used with community based authentication. SNMPv3 uses user-based security model (USM) architecture.

IV-4-2. Date and Time

Date and Time You can configure the time zone settings of your access point here. The date and time of the device can be configured manually or can be synchronized with a time server.



Date and Time Settings	
Local Time	Set the access point's date and time manually using the drop down menus.
Acquire Current Time from your PC	Click "Acquire Current Time from Your PC" to enter the required values automatically according to your computer's current time and date.

NTP Time Server	
Use NTP	The access point also supports NTP (Network Time Protocol) for automatic time and date setup.

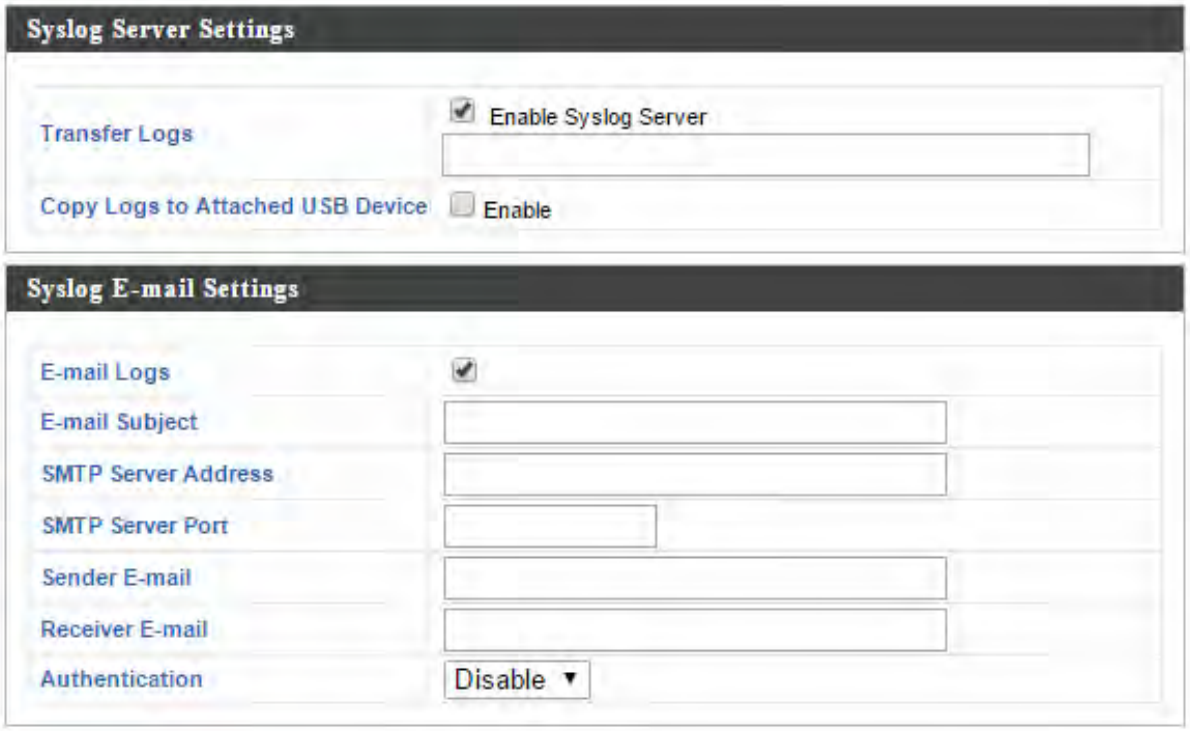
Server Name	Enter the host name or IP address of the time server if you wish.
Update Interval	Specify a frequency (in hours) for the access point to update/synchronize with the NTP server.

Time Zone	
Time Zone	Select the time zone of your country/ region. If your country/region is not listed, please select another country/region whose time zone is the same as yours.

IV-4-3. Syslog Server

Syslog Server

The system log can be sent to a server or to attached USB storage.



Syslog Server Settings	
Transfer Logs	Check/uncheck the box to enable/disable the use of a syslog server, and enter a host name, domain or IP address for the server, consisting of up to 128 alphanumeric characters.
Copy Logs to Attached USB Device	Check/uncheck the box to enable/disable copying logs to attached USB storage.

Syslog E-mail Settings	
E-mail Logs	Check the box to enable/disable e-mail logs.
E-mail Subject	Specify the subject line of log emails.
SMTP Server Address	Specify the SMTP server address used to send log emails.
SMTP Server Port	Specify the SMTP server port used to send log emails.
Sender E-mail	Specify the sender email address.
Receiver E-mail	Specify the email to receive log emails.

Authentication	Disable or select authentication type: SSL or TLS. When using SSL or TLS, enter the username and password.

IV-4-4. Ping Test

The access point includes a built-in ping test function. Ping is a computer network administration utility used to test whether a particular host is reachable across an IP network and to measure the round-trip time for sent messages.

Destination Address	Enter the address of the host.
Execute	Click execute to ping the host.

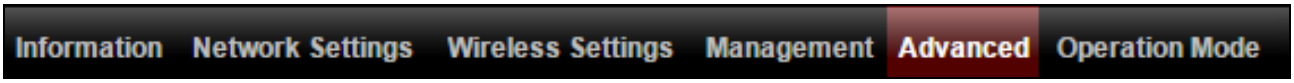
IV-4-5. I’m Here

The access point features a built-in buzzer which can sound on command using the “I’m Here” page. This is useful for network administrators and engineers working in complex network environments to locate the access point.

The buzzer is loud!

Duration of Sound	Set the duration for which the buzzer will sound when the “Sound Buzzer” button is clicked.
Sound Buzzer	Activate the buzzer sound for the above specified duration of time.

IV-5. Advanced



Screenshots displayed are examples. The information shown on your screen will vary depending on your configuration.

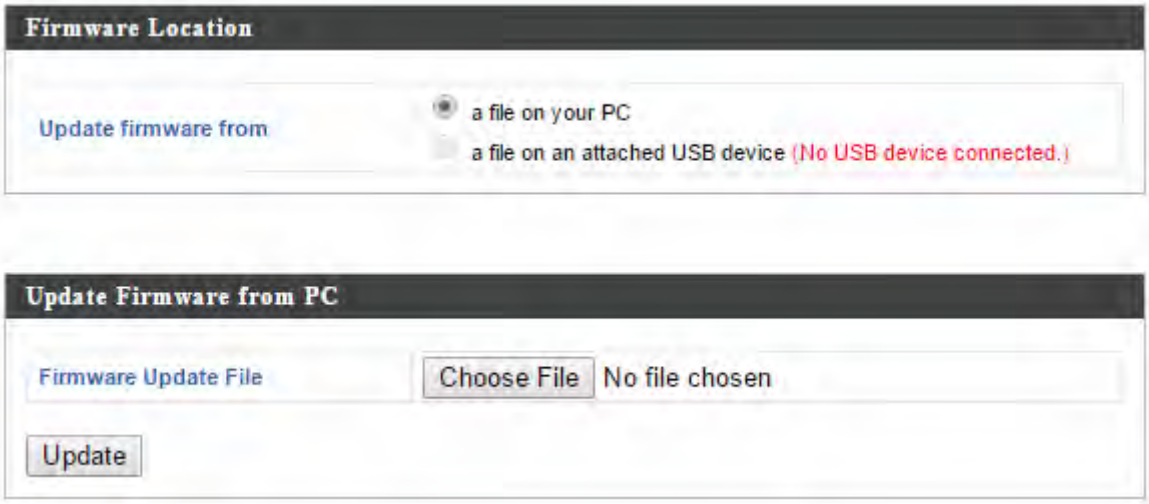
IV-5-1. LED Settings

The access point's LEDs can be manually enabled or disabled according to your preference.

Power/Diag LED	Select on or off.

IV-5-2. Update Firmware

The “Firmware” page allows you to update the system firmware to a more recent version. Updated firmware versions often offer increased performance and security, as well as bug fixes. You can download the latest firmware from the website.

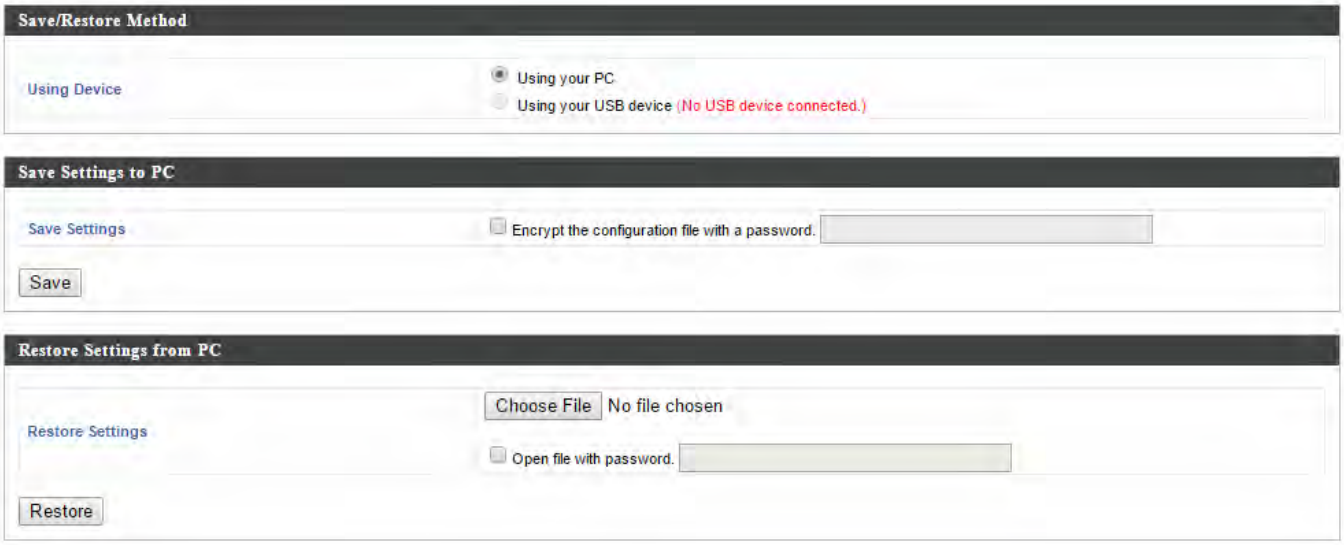


Do not switch off or disconnect the access point during a firmware upgrade, as this could damage the device.

Update Firmware From	Select “a file on your PC” to upload firmware from your local computer or from an attached USB device.
Firmware Update File	Click “Choose File” to open a new window to locate and select the firmware file in your computer.
Update	Click “Update” to upload the specified firmware file to your access point.

IV-5-3. Save/Restore Settings

The access point's "Save/Restore Settings" page enables you to save/backup the access point's current settings as a file to your local computer or a USB device attached to the access point, and restore the access point to previously saved settings.



Save / Restore Settings	
Using Device	Select "Using your PC" to save the access point's settings to your local computer or to an attached USB device.

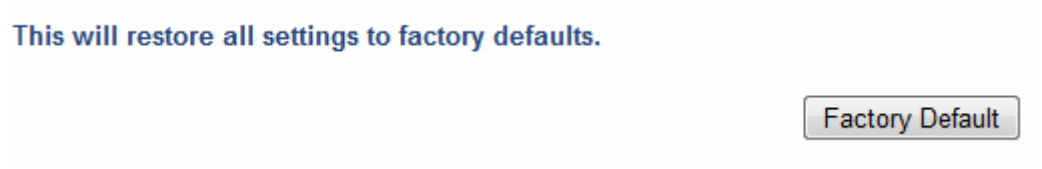
Save Settings to PC	
Save Settings	Click "Save" to save settings and a new window will open to specify a location to save the settings file. You can also check the "Encrypt the configuration file with a password" box and enter a password to protect the file in the field underneath, if you wish.

Restore Settings from PC	
Restore Settings	Click the browse button to find a previously saved settings file on your computer, then click "Restore" to replace your current settings. If your settings file is encrypted with

	a password, check the “Open file with password” box and enter the password in the field underneath.

IV-5-4. Factory Default

If the access point malfunctions or is not responding, then it is recommended that you reboot the device (see **IV-5.5**) or reset the device back to its factory default settings. You can reset the access point back to its default settings using this feature if the location of the access point is not convenient to access the reset button.

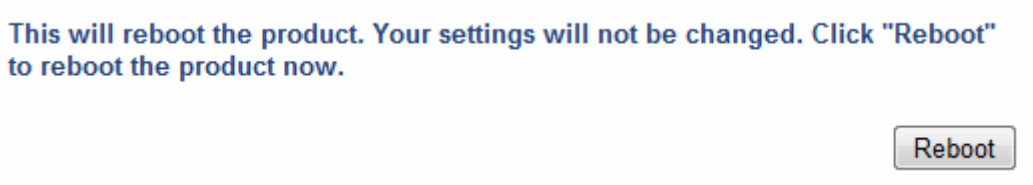


Factory Default	Click “Factory Default” to restore settings to the factory default. A pop-up window will appear and ask you to confirm.

After resetting to factory defaults, please wait for the access point to reset and restart.

IV-5-5. Reboot

If the access point malfunctions or is not responding, then it is recommended that you reboot the device or reset the access point back to its factory default settings (see **IV-5-4**). You can reboot the access point remotely using this feature.



Reboot	Click “Reboot” to reboot the device. A countdown will indicate the progress of the reboot.

IV-6. Operation Mode

Screenshots displayed are examples. The information shown on your screen will vary depending on your configuration.

The access point can function in three different modes. Set the operation mode of the access point here.

Your access point can function in three different modes.

The default mode for your access point is **AP mode**.

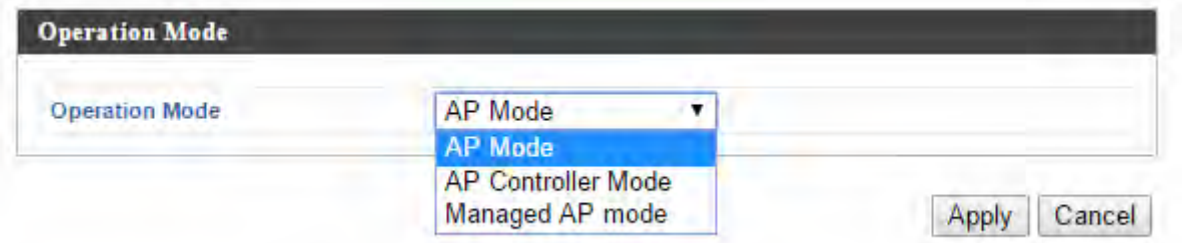
AP mode is a regular access point for use in your wireless network.

AP Controller mode acts as the designated master of an AP array (group of linked access points). In **AP Controller** mode the user interface will switch to **NMS**.

Managed AP mode acts as a "slave" AP within the AP array (controlled by the AP Controller "master").

In **Repeater mode** the access point connects wirelessly to your existing 2.4GHz and/or 5GHz network and repeats the wireless signal(s).

In Managed AP mode some functions of the access point will be disabled in this user interface and must be set using NMS on the AP Controller.



Operation Mode	AP Mode is a standard access point in a wireless network. AP Controller Mode is the master of an AP array and controls all other managed APs (below) using NMS. Managed AP mode is an AP which is part of the AP array and is managed by the Controller AP.

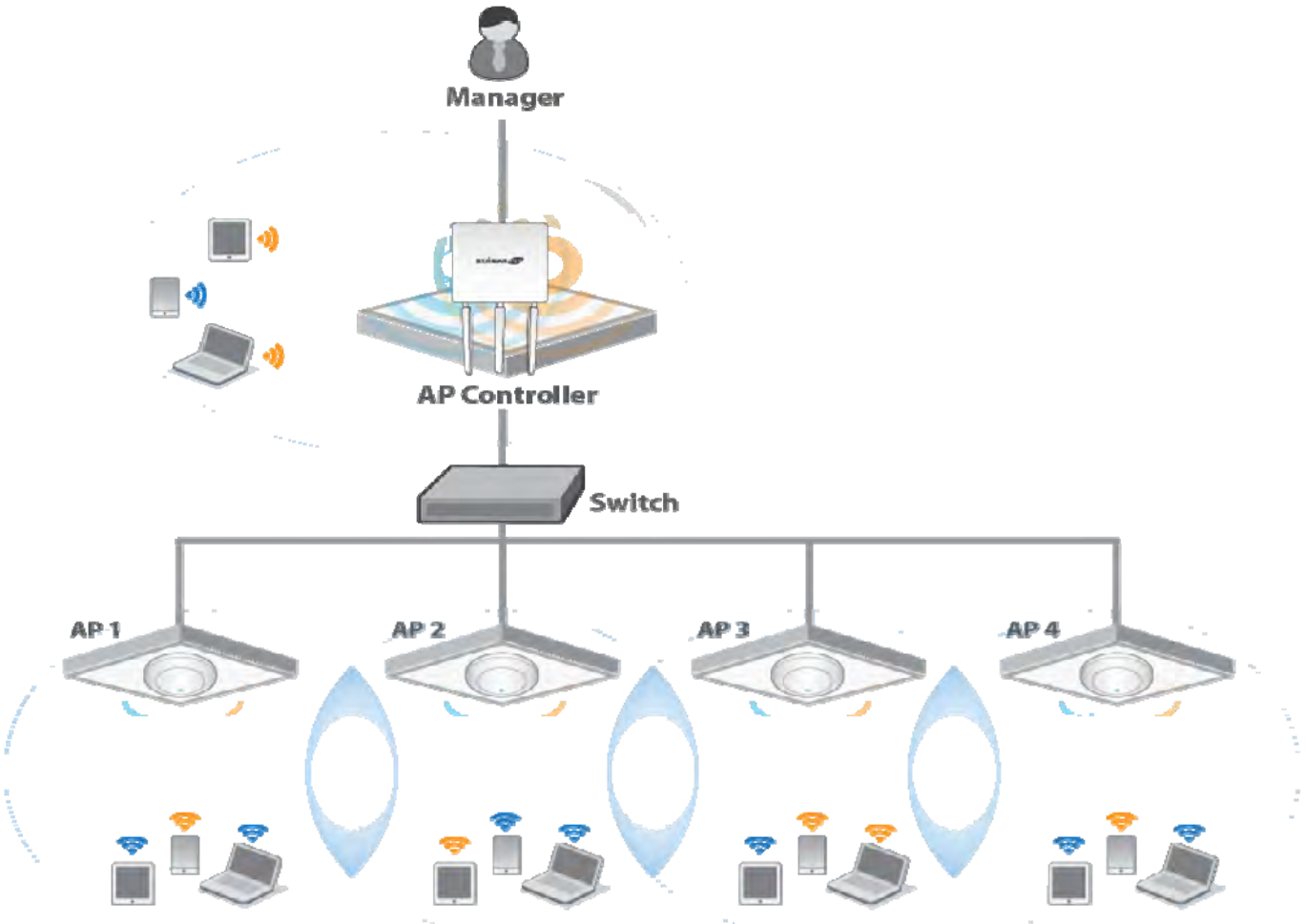
When you set the operation mode to** repeater mode**, the AP will not get an IP address from the router/root AP. You will need to set your computer's IP address and use the APs default IP address to access the UI for the first time, refer to** Appendix **for more help.

NMS

I. Product Information

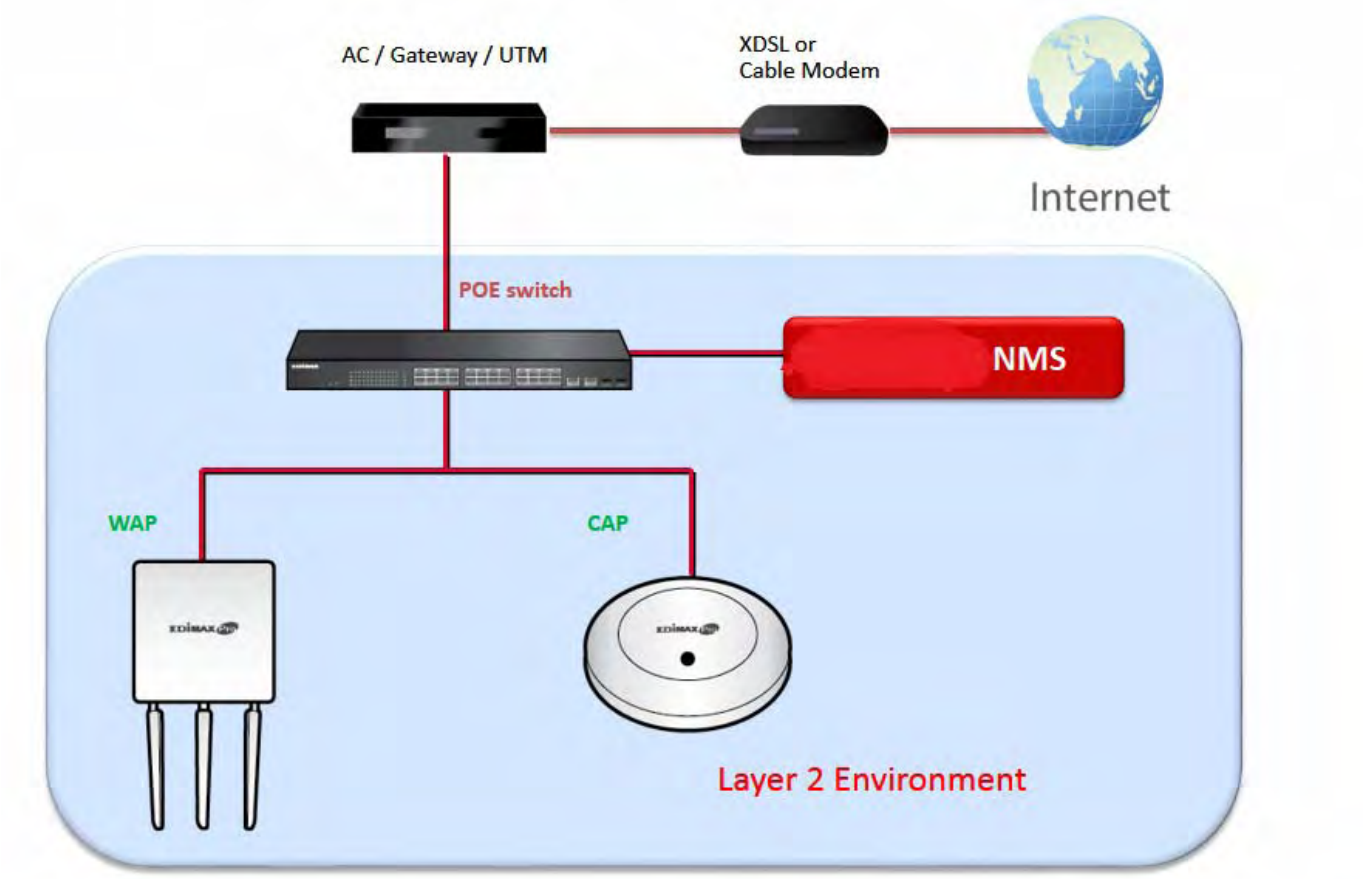
Network Management Suite (NMS) supports the central management of a group of access points, otherwise known as an AP Array. AC1750 NMS supports up to 7 access points with no additional wireless controller required, reducing costs and facilitating efficient remote AP management.

Access points can be deployed and configured according to requirements, creating a powerful network architecture which can be easily managed and expanded in the future, with an easy to use interface and a full range of functionality – ideal for small and mid-sized office environments. A secure WLAN can be deployed and administered from a single point, minimizing cost and complexity.



II. Quick Setup

NMS is simple to setup. An overview of the system is shown below:



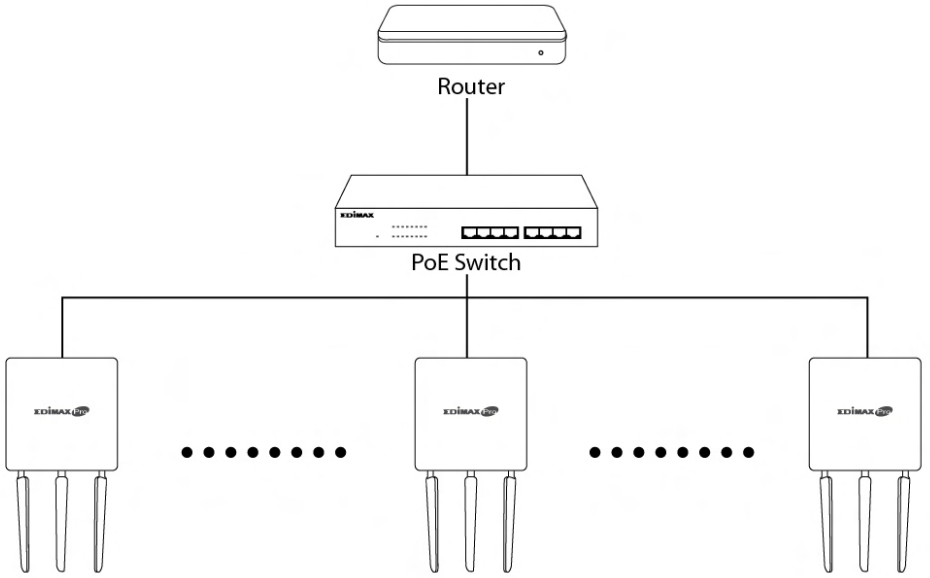
One AP (access point) is designated as the AP Controller (master) and other connected APs are automatically designated as Managed APs (slaves). Using NMS you can monitor, configure and manage all Managed APs (up to 32) from the single AP Controller.

When using an NMS AP controller, other connected APs are automatically set to Managed APs.

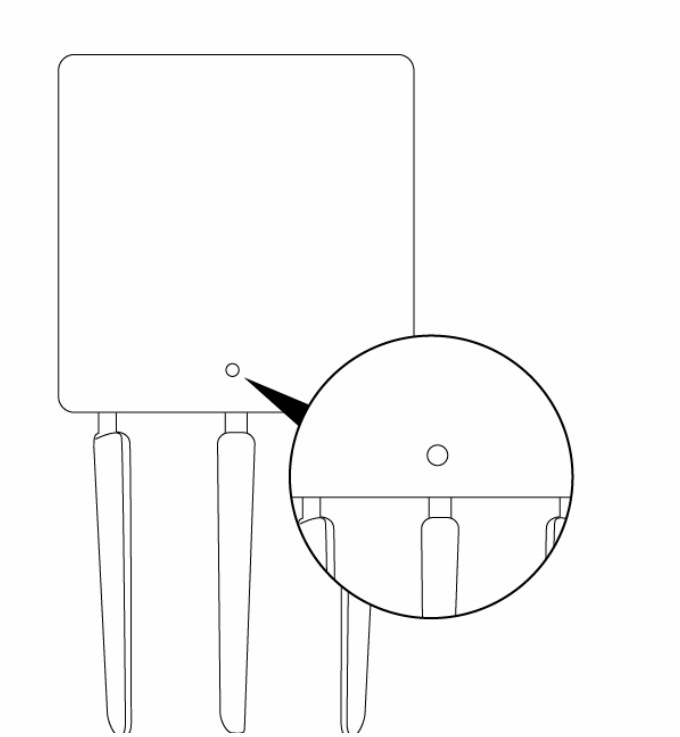
Ensure you have the latest firmware from the website for your products.

1. Connect all APs to an Ethernet or PoE switch which is connected to a gateway/router.

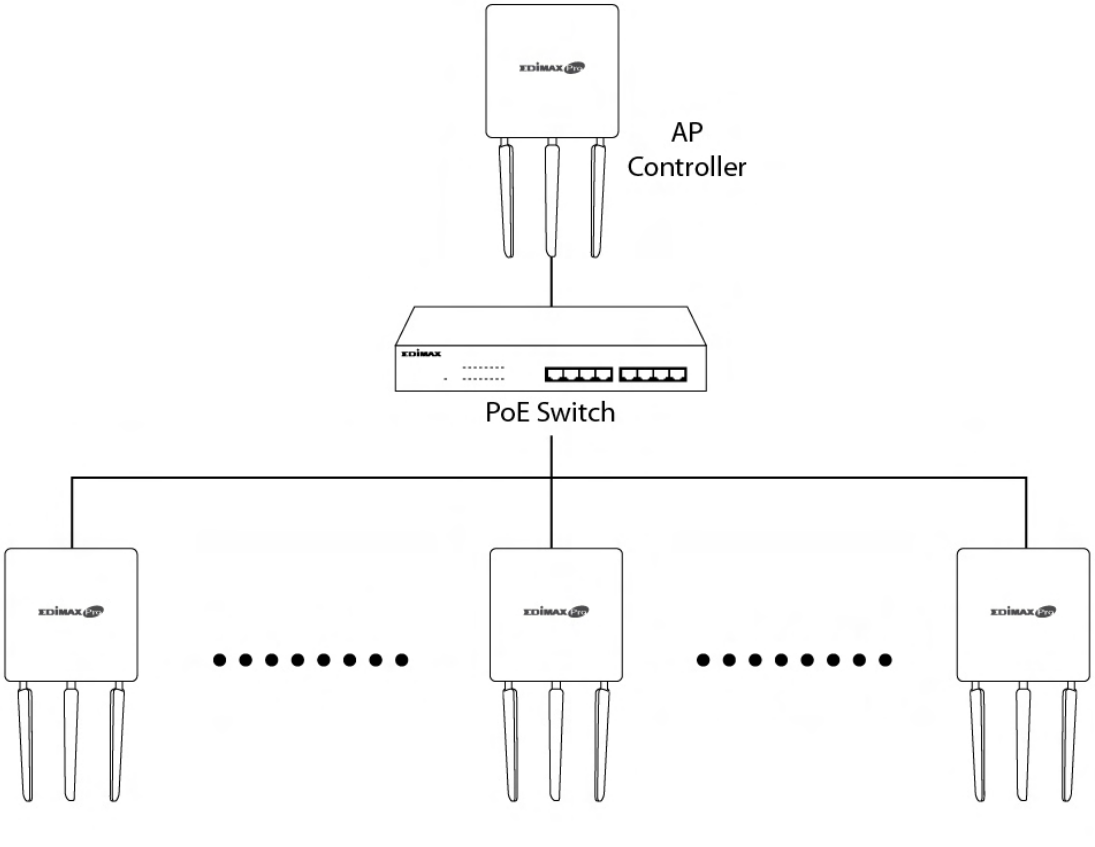
You can use your router as a DHCP server or you can later configure your AP Controller as a DHCP server.



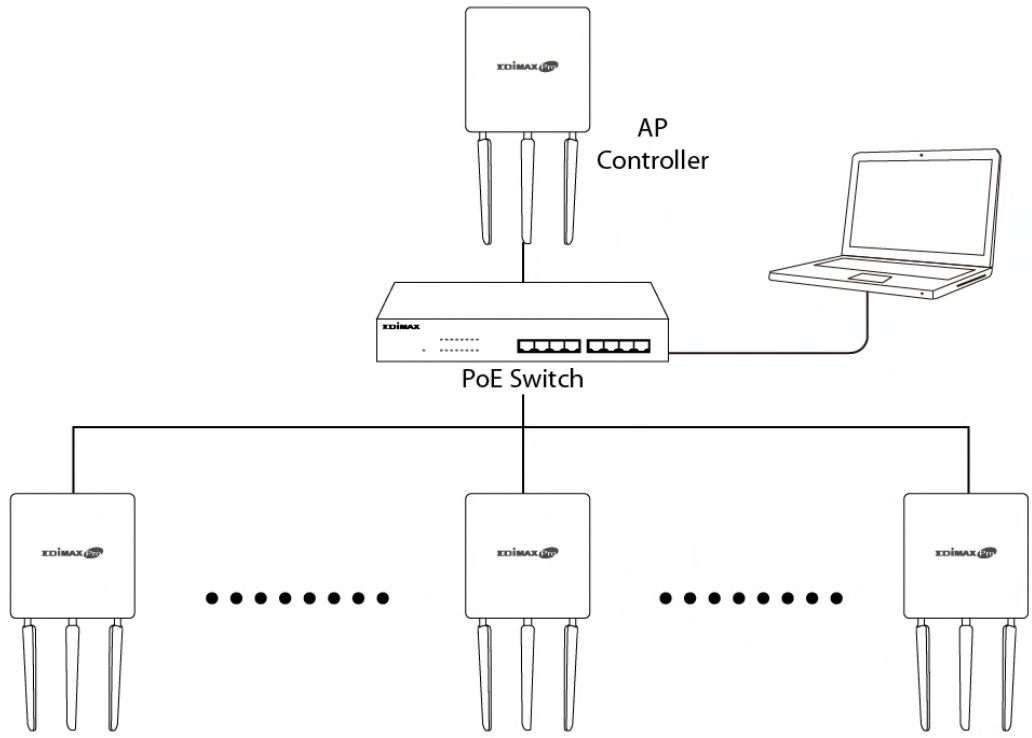
2. Ensure all APs are powered on and check LEDs.



3. Designate one AP as the AP Controller which will manage all other connected APs (up to 8).



4. Connect a computer to the designated AP Controller using an Ethernet cable.



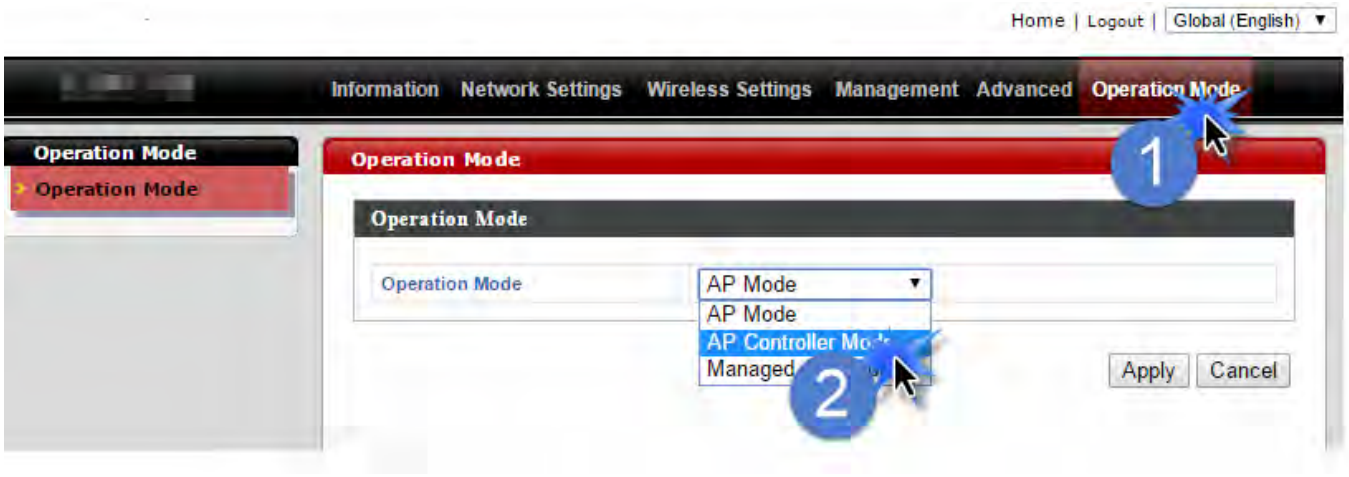
5. Open a web browser and enter the AP Controller's IP address in the address field. The default IP address is **192.168.2.2**

Your computer's IP address must be in the same subnet as the AP Controller. Refer to the user manual for more help.

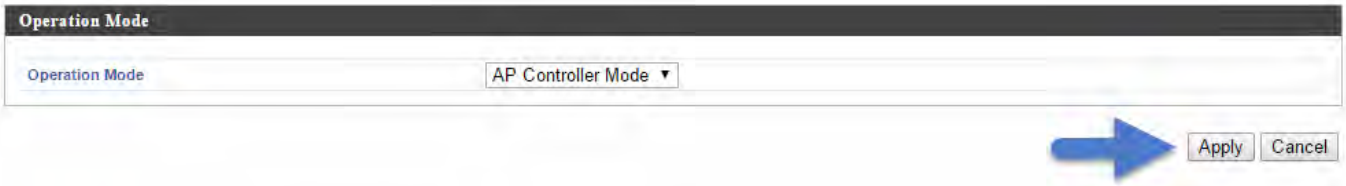
If you changed the AP Controller's IP address, or if your gateway/router uses a DHCP server, ensure you enter the correct IP address. Refer to your gateway/router's settings.

6. Enter the username & password to login. The default username & password are **admin** & **1234**.

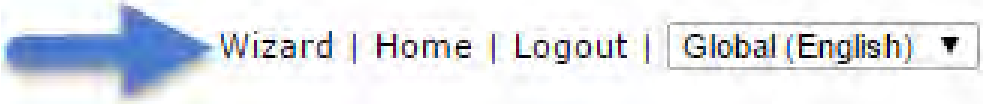
7. You will arrive at the NMS Dashboard. Go to **"Operation Mode"** and select **"AP Controller Mode"** from the drop down menu.



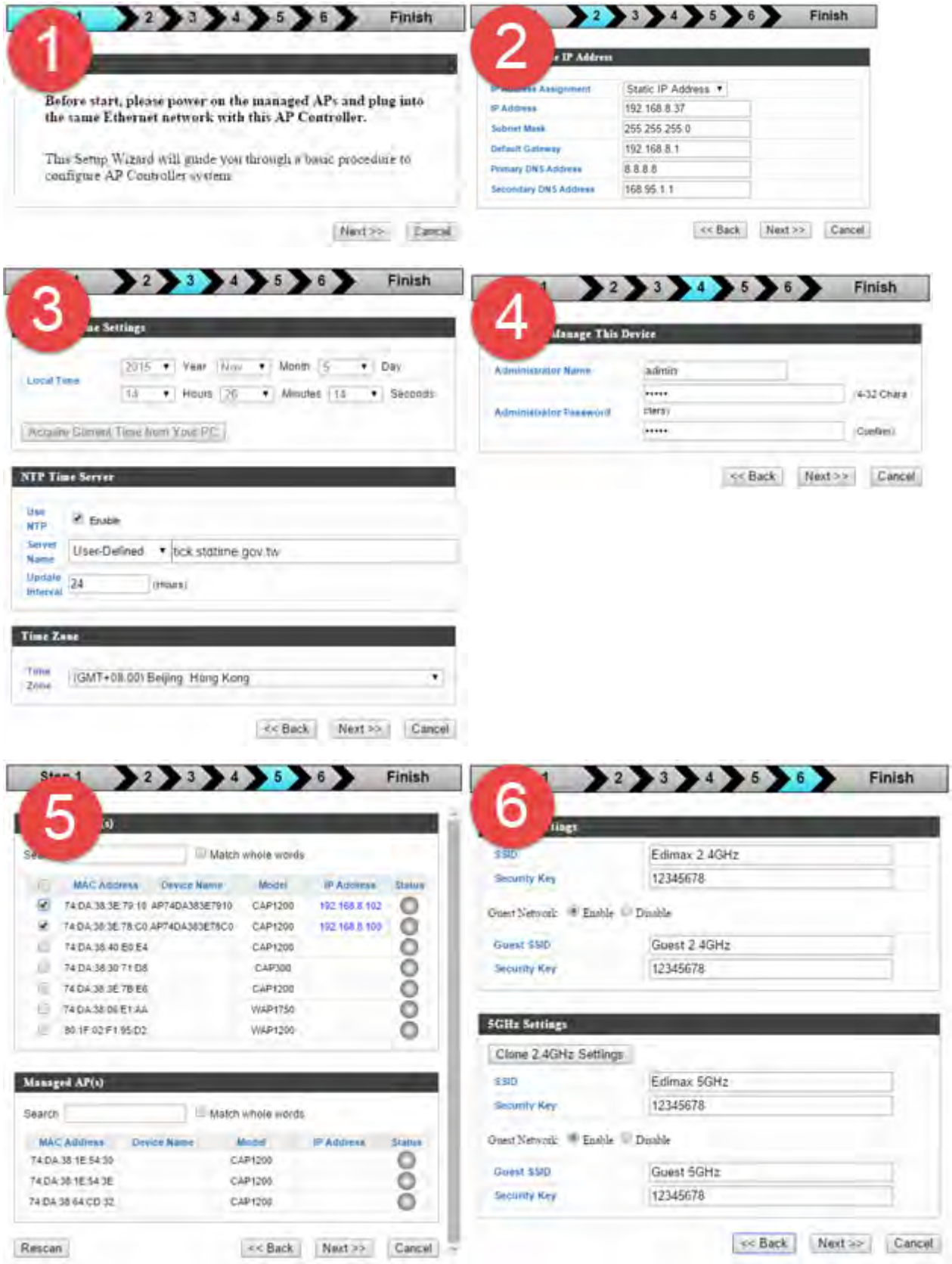
8. Click “Apply” to save the settings.

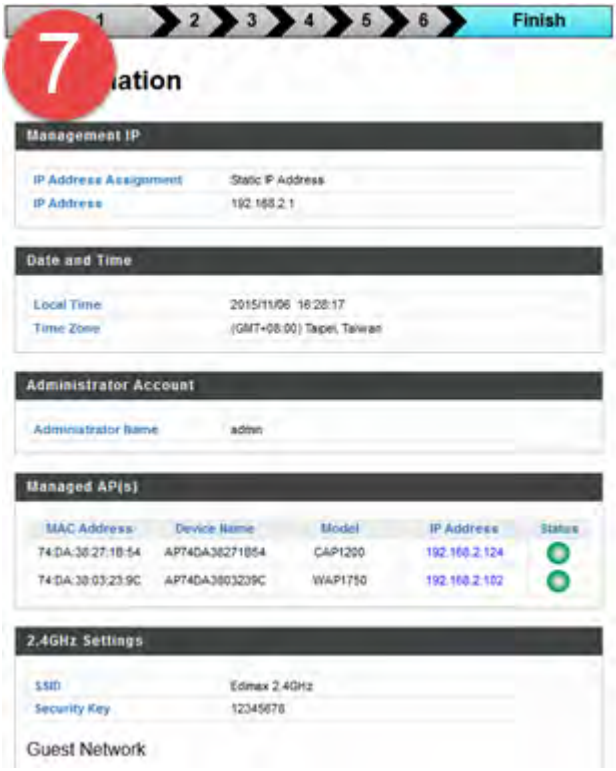


9. NMS includes a wizard to quickly setup the SSID & security for Managed APs. Click “Wizard” in the top right corner to begin.



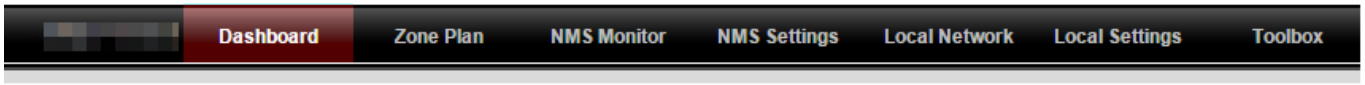
10. Follow the instructions complete **Steps 1 - 6** and click **“Finish”** to save the settings. The wizard will help you set up LAN IP address, 2.4GHz & 5GHz SSID and security, administrator name & password, time & date settings and Managed APs.


1
Finish
Before start, please power on the managed APs and plug into the same Ethernet network with this AP Controller.
This Setup Wizard will guide you through a basic procedure to configure AP Controller system.
Next >>
Cancel
2
Finish
Static IP Address
IP Address
192.168.8.37
Subnet Mask
255.255.255.0
Default Gateway
192.168.8.1
Primary DNS Address
8.8.8.8
Secondary DNS Address
168.95.1.1
<< Back
Next >>
Cancel
3
Finish
Local Time
2015 Year
Nov Month
5 Day
13 Hours
26 Minutes
14 Seconds
Acquire Current Time from Your PC
NTP Time Server
Use NTP
Enable
Server Name
User-Defined
tick.stdtime.gov.tw
Update Interval
24
(Hours)
Time Zone
Time Zone
(GMT+08:00) Beijing, Hong Kong
<< Back
Next >>
Cancel
4
Finish
Manage This Device
Administrator Name
admin
Administrator Password
(4-32 Characters)
Confirm
<< Back
Next >>
Cancel
5
Finish
Match whole words
MAC Address
Device Name
Model
IP Address
Status
74:DA:38:3E:79:10 AP74DA383E7910 CAP1200 192.168.8.102
74:DA:38:3E:78:C0 AP74DA383E78C0 CAP1200 192.168.8.109
74:DA:38:40:E6:E4 CAP1200
74:DA:38:30:71:D8 CAP300
74:DA:38:3E:7B:E6 CAP1200
74:DA:38:06:E1:AA WAP1750
80:1F:02:F1:95:D2 WAP1200
Managed AP(s)
Search
Match whole words
MAC Address
Device Name
Model
IP Address
Status
74:DA:38:1E:54:30 CAP1200
74:DA:38:1E:54:3E CAP1200
74:DA:38:64:CD:32 CAP1200
Rescan
<< Back
Next >>
Cancel
6
Finish
SSID
Edimax 2.4GHz
Security Key
12345678
Guest Network
Enable
Disable
Guest SSID
Guest 2.4GHz
Security Key
12345678
5GHz Settings
Clone 2.4GHz Settings
SSID
Edimax 5GHz
Security Key
12345678
Guest Network
Enable
Disable
Guest SSID
Guest 5GHz
Security Key
12345678
<< Back
Next >>
Cancel



If any of your Managed APs are not found during *Step 5 Select Free APs****, reset the Managed AP to its factory default settings. Refer to the AP's user manual for help.***

11. Your Controller AP & Managed APs should be fully functional. Use the top menu to navigate around NMS.



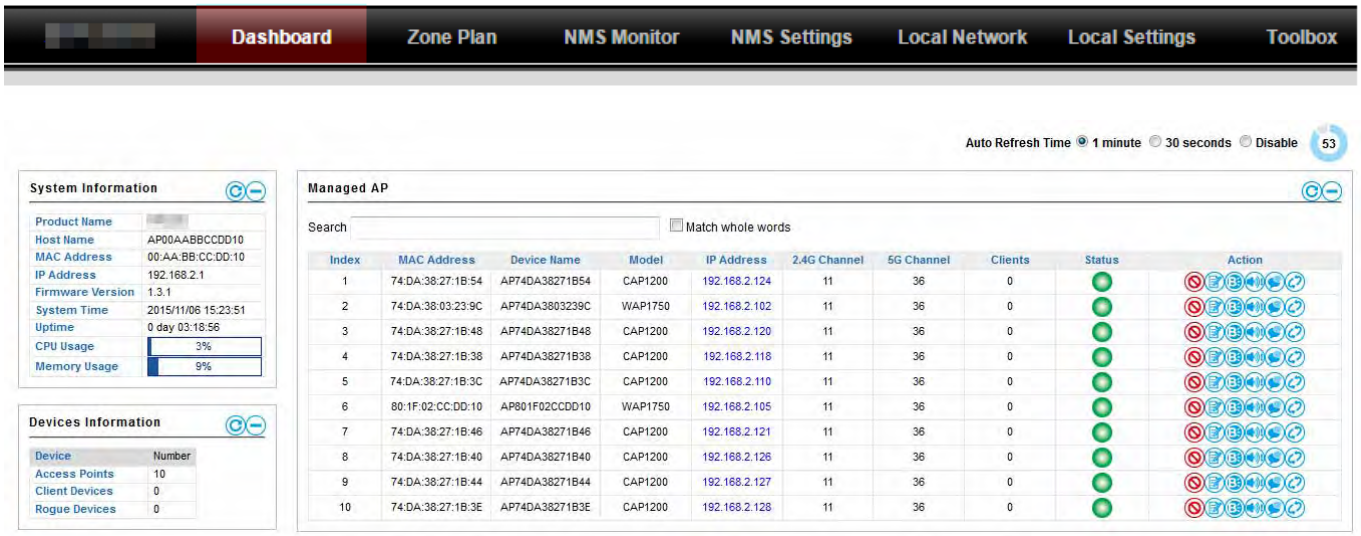
Use ***Dashboard***, ***Zone Plan***, ***NMS Monitor*** & ***NMS Settings*** to configure Managed APs.

Use ***Local Network & Local Settings*** to configure your Controller AP.

III. Software Layout

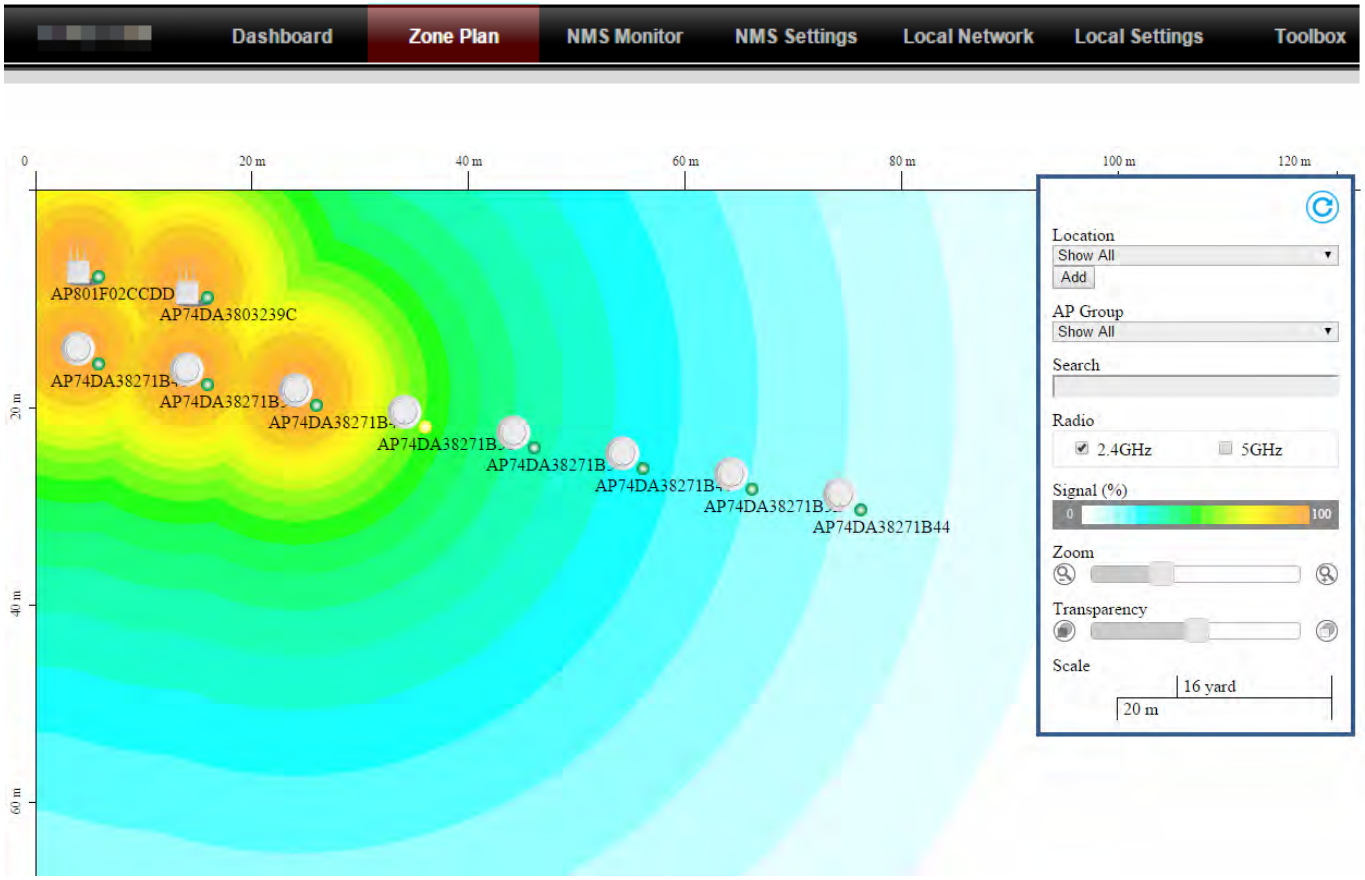
The top menu features 7 panels: *Dashboard, Zone Plan, NMS Monitor, NMS Settings, Local Network, Local Settings & Toolbox.*

Dashboard



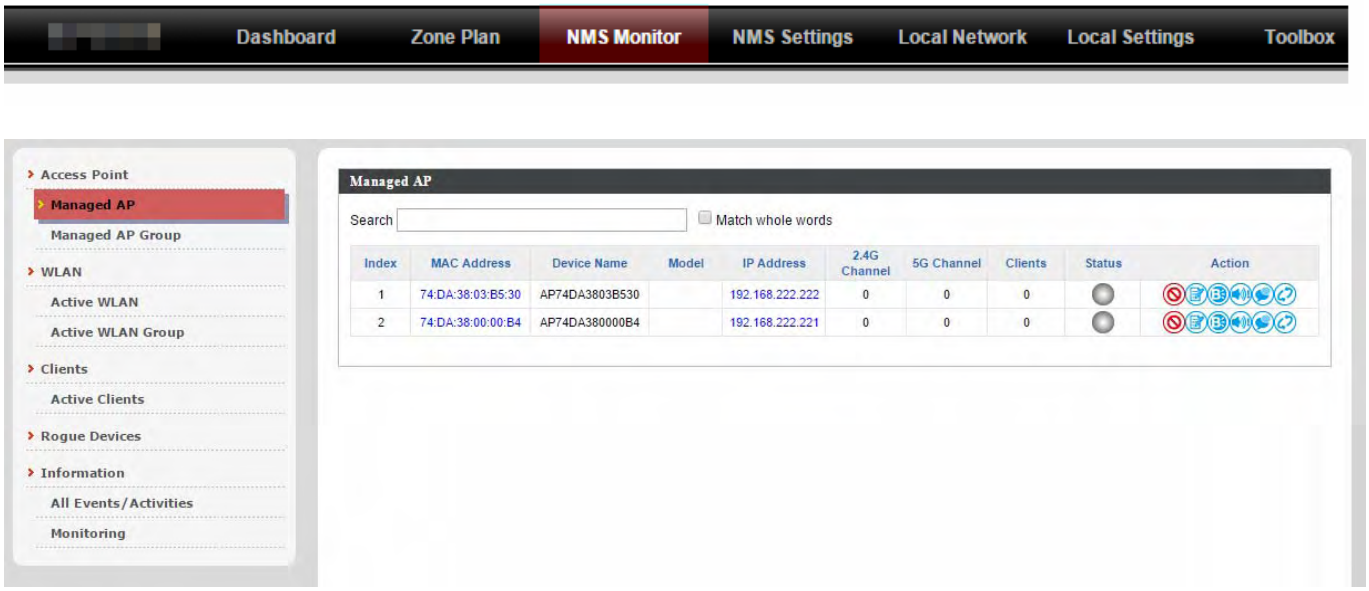
The **Dashboard** panel displays an overview of your network and key system information, with quick links to access configuration options for Managed APs and Managed AP groups. Each panel can be refreshed, collapsed or moved according to your preference.

Zone Plan



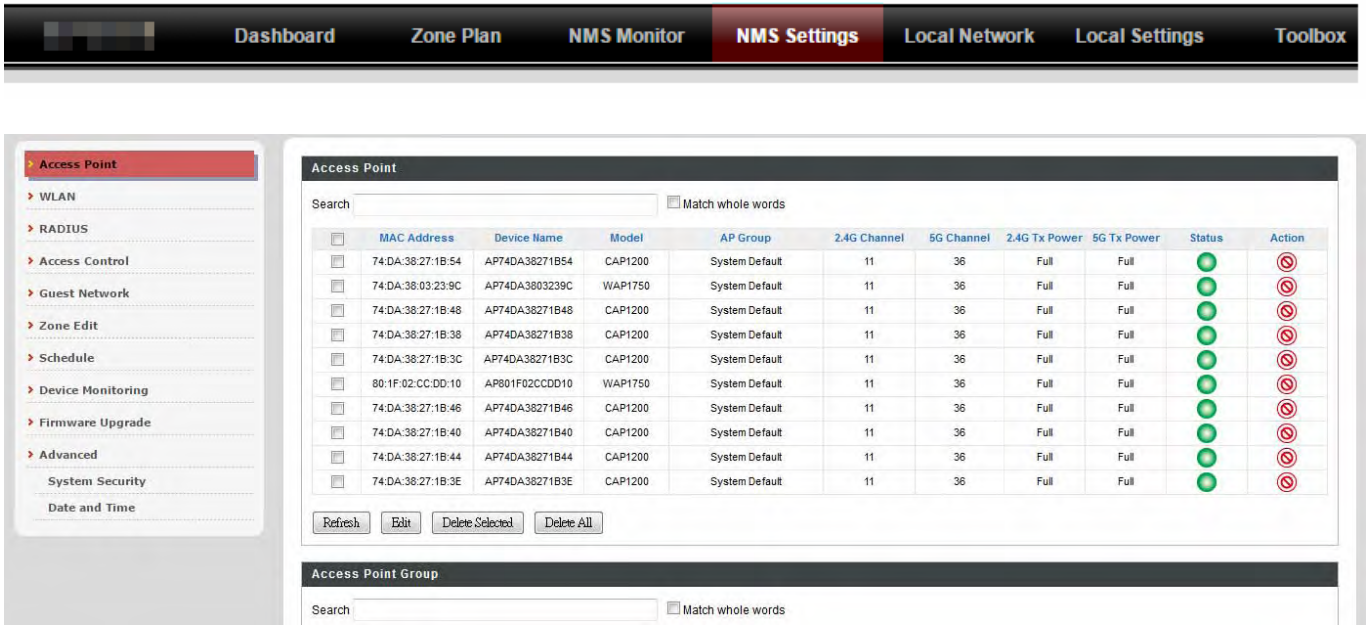
Zone Plan displays a customizable live map of Managed APs for a visual representation of your network coverage. Each AP icon can be moved around the map, and a background image can be uploaded for user-defined location profiles using **NMS Settings → Zone Edit**. Options can be configured using the menu on the right side and signal strength is displayed for each AP.

NMS Monitor



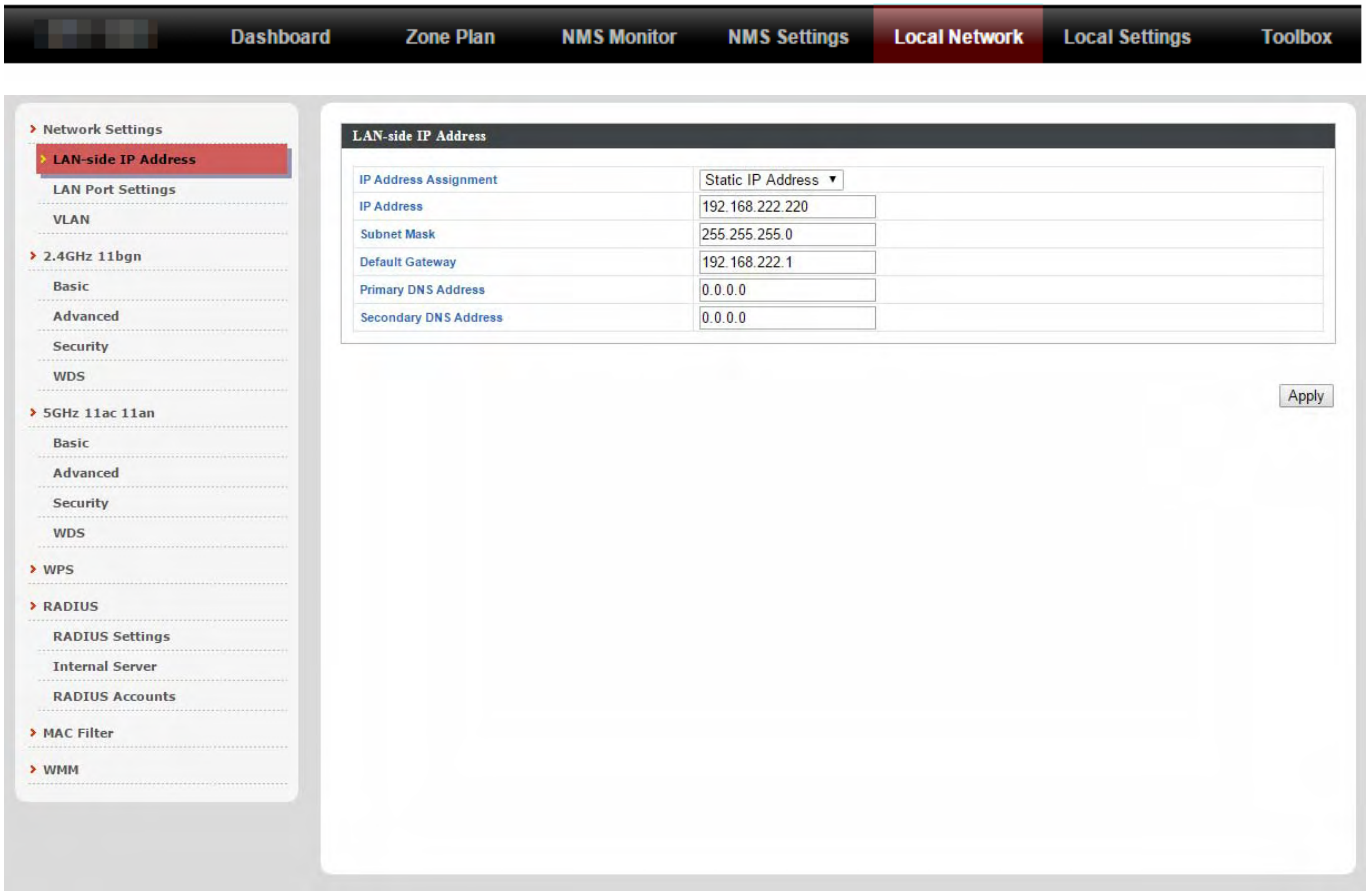
The **NMS Monitor** panel provides more detailed monitoring information about the AP Array than found on the Dashboard, grouped according to categories in the menu down the left side.

NMS Settings



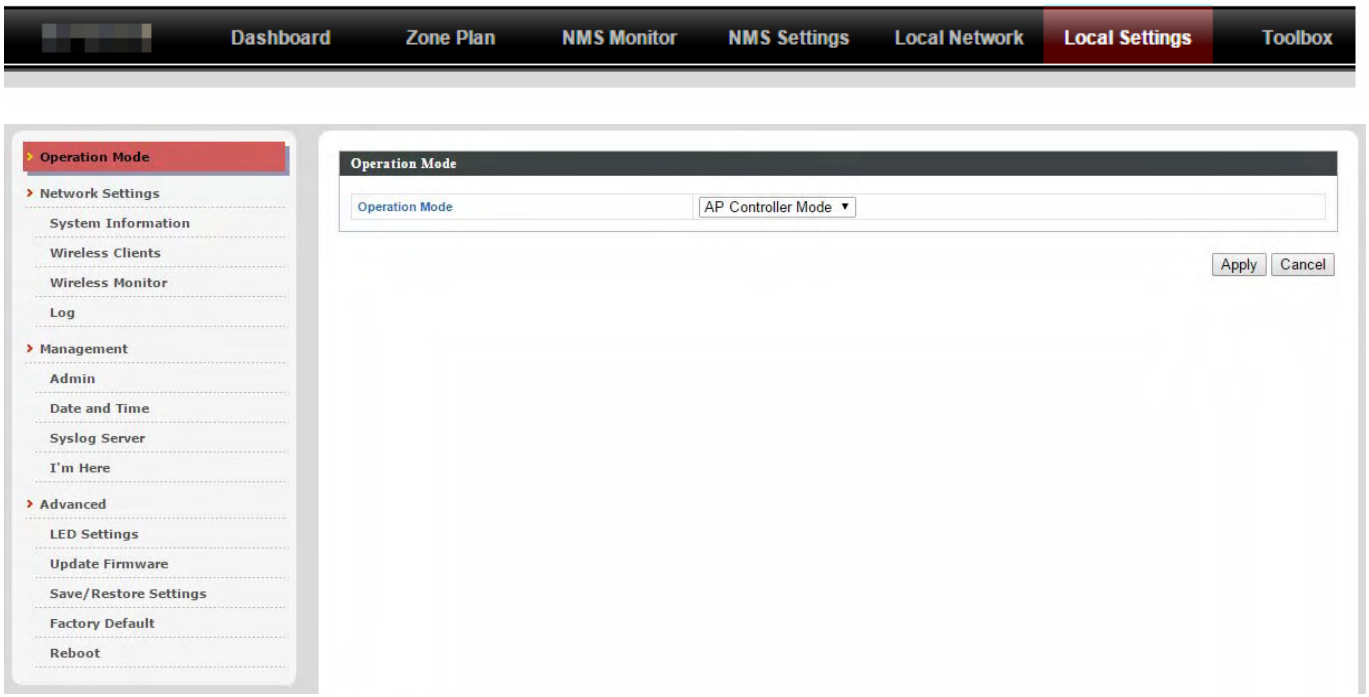
NMS Settings provides extensive configuration options for the AP Array. You can manage each access point, assign access points into groups, manage WLAN, RADIUS, guest network, guest network, users and scheduling settings as well as upgrade firmware across multiple access points. The Zone Plan can also be configured using “Zone Edit”.

Local Network



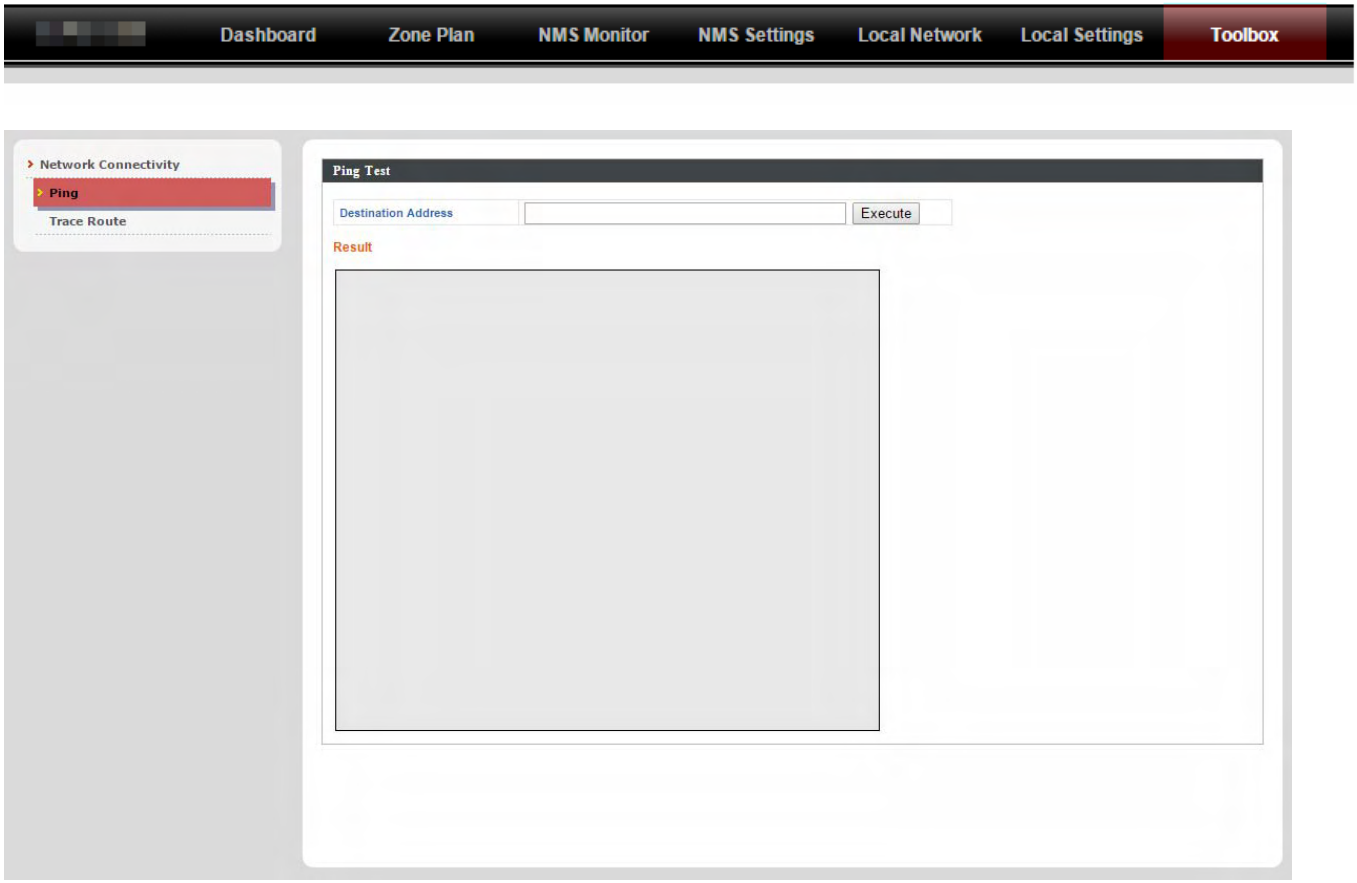
Local Network settings are for your AP Controller. You can configure the IP address and DHCP server of the AP Controller in addition to LAN Port and VLAN settings.

Local Settings



Local Settings are for your AP Controller. You can view basic system settings and logs specifically for the AP Controller, as well as other management settings such as date/time, admin accounts, firmware and reset.

Toolbox



The Toolbox panel provides a network diagnostic tools: *ping* and *traceroute*.

IV. Features

Descriptions of the functions of each main panel *Dashboard, Zone Plan, NMS Monitor, NMS Settings, Local Network, Local Settings & Toolbox* can be found below. When using NMS, click “Apply” to save changes:

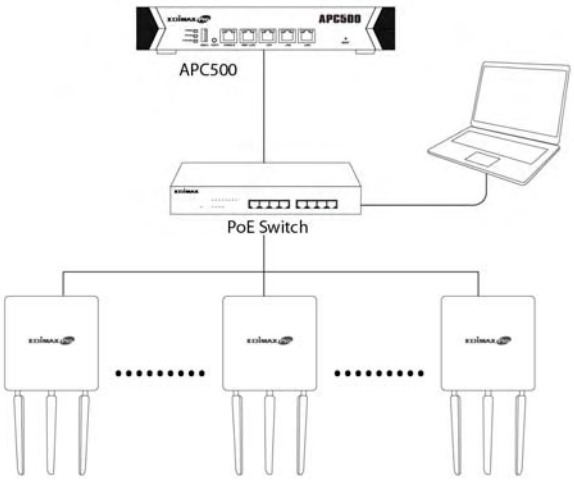
Screenshots displayed are examples. The information shown on your screen will vary depending on your configuration.

IV-1. LOGIN, LOGOUT & RESTART

It is recommended that you login to the AP Controller to make configurations to Managed APs.

LOGIN

1. Connect a computer to the designated AP Controller using an Ethernet cable:



2. Open a web browser and enter the AP Controller’s IP address in the address field. The default IP address is **192.168.2.1**

Your computer's IP address must be in the same subnet as the AP Controller. Refer to** VI-1. Configuring your IP Address **for more help.

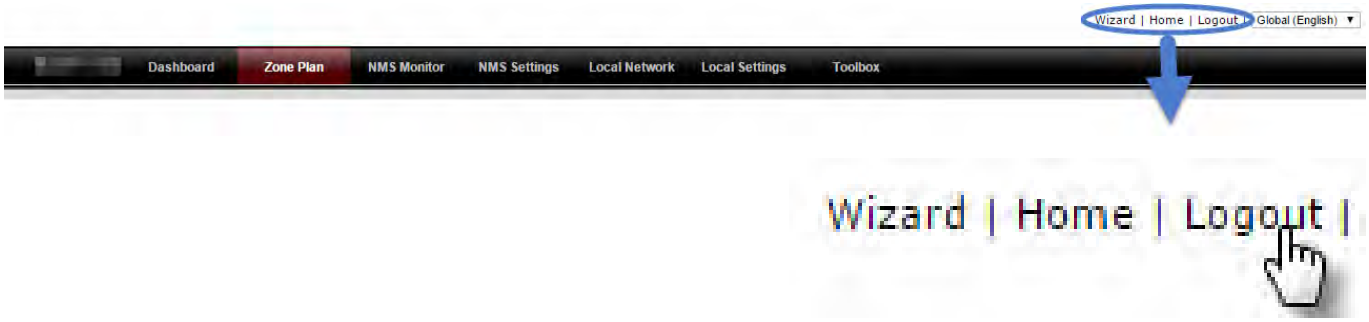
If you changed the AP Controller's IP address, or if your gateway/router uses a DHCP server, ensure you enter the correct IP address. Refer to your gateway/router's settings.

If using a DHCP server on the network, it is advised to use your DHCP server's settings to assign the AP Controller a static IP address.

3. Enter the username & password to login. The default username & password are **admin** & **1234**.

LOGOUT

To logout from NMS, click "Logout" in the top right corner:



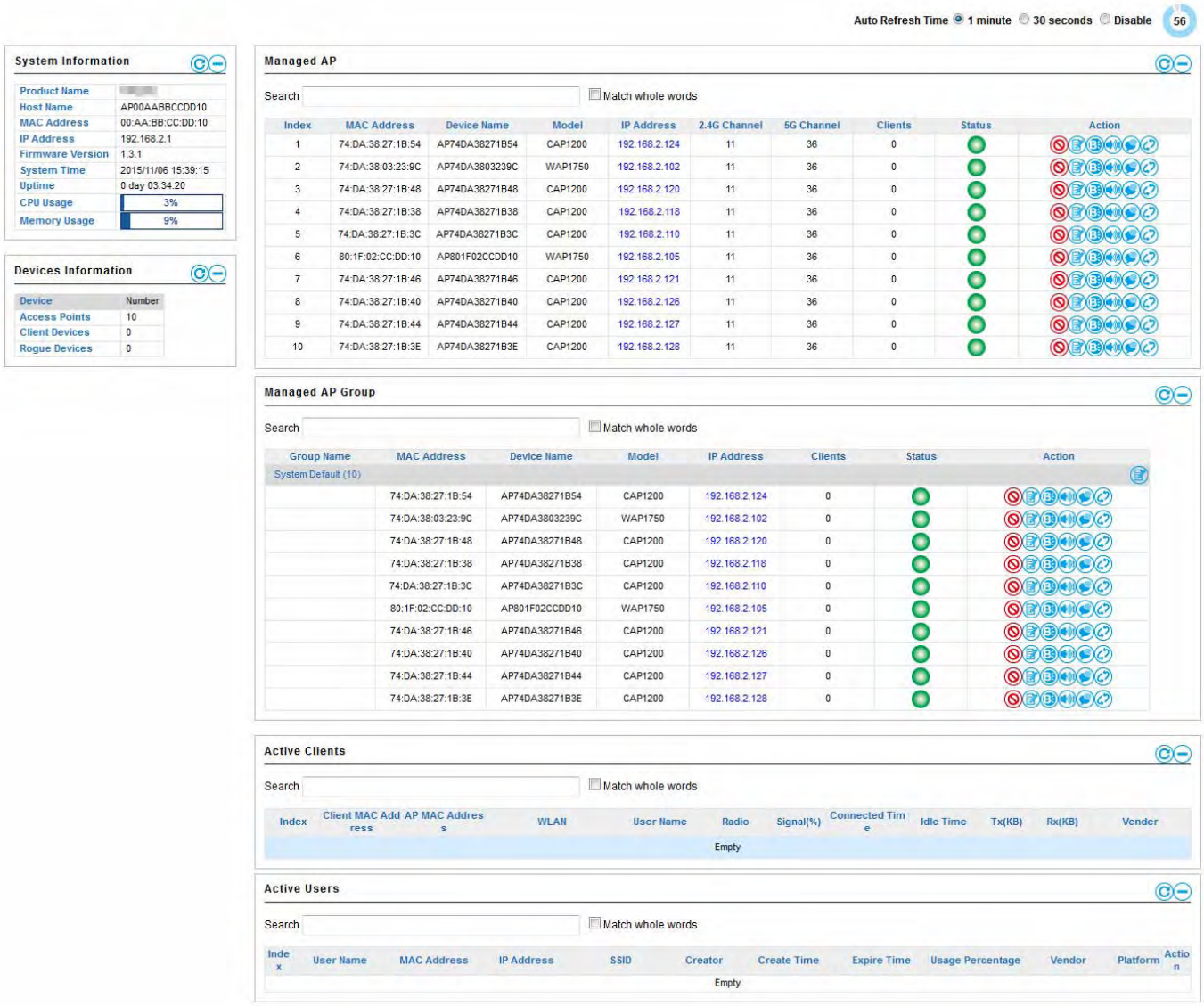
RESTART

You can restart your AP Controller or any Managed AP using NMS. To restart your AP Controller go to **Local Settings → Advanced → Reboot** and click "Reboot".

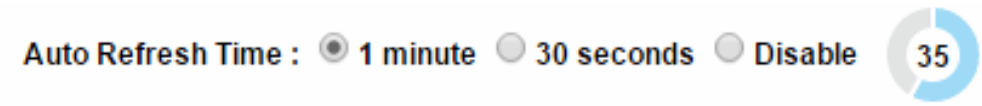
To restart Managed APs click the Restart icon for the specified AP on the Dashboard:

IV-2. DASHBOARD

The dashboard displays an overview of your AP array:

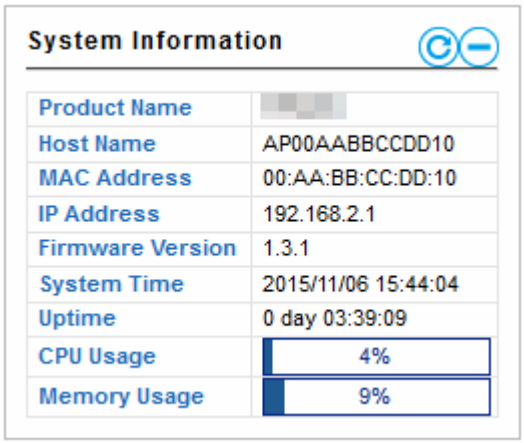


Use the blue icons above to refresh or collapse each panel in the dashboard. Click and drag to move a panel to suit your preference. You can set the dashboard to auto-refresh every 1 minute, 30 seconds or disable auto-refresh:



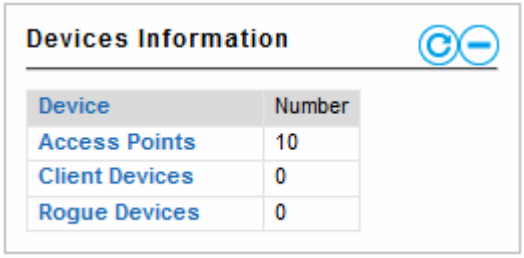
IV-2-1. System Information

System Information displays information about the AP Controller: *Product Name (model), Host Name, MAC Address, IP Address, Firmware Version, System Time and Uptime (time the access point has been on), CPU Usage & Memory Usage.*



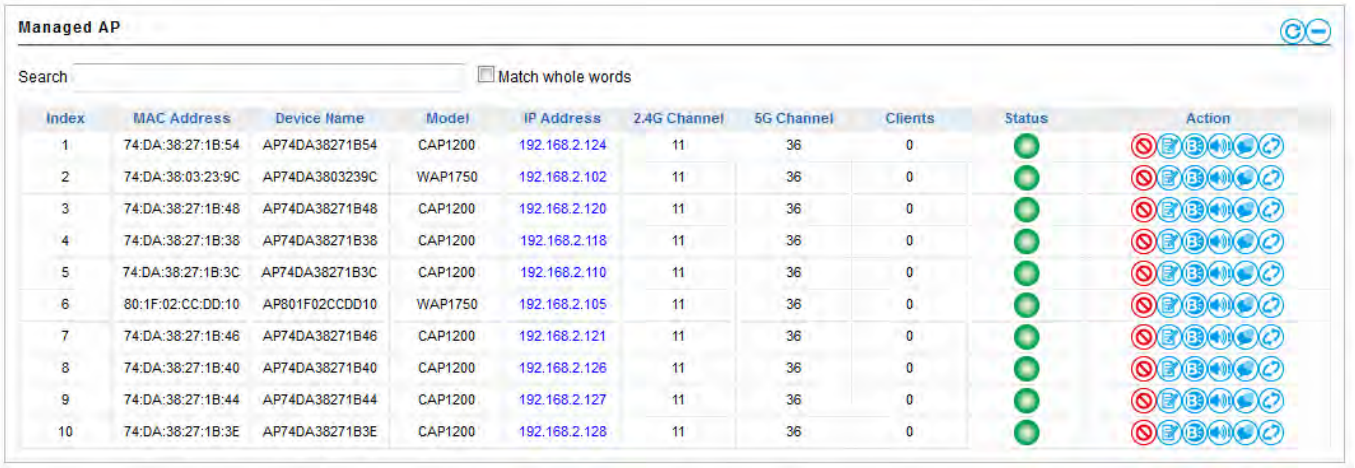
IV-2-2. Devices Information

Devices Information is a summary of the number of all devices in the local network: *Access Points, Clients Connected, and Rogue (unidentified) Devices.*



IV-2-3. Managed AP

Managed AP displays information about each Managed AP in the local network: *Index (reference number), MAC Address, Device Name, Model, IP Address, 2.4GHz & 5GHz Wireless Channel Number, No. of Clients connected to each access point, and Status (connected, connecting or disconnected).*



The **search** function can be used to locate a specific Managed AP. Type in the search box and the list will update:

The **Status** icon displays *grey* (disconnected), *yellow* (connecting) or *green* (connected) for each Managed AP.

Each Managed AP has "**Action**" icons with the following functions:

1. **Disallow**
   Remove the Managed AP from the AP array and disable connectivity.

2. **Edit**
   *Edit various settings for the Managed AP (refer to **IV-5-1. Access Point**).*

3. **Blink LED**
   The Managed AP's LED will flash temporarily to help identify & locate access points.

4. **Buzzer**
   The Managed AP's buzzer will sound temporarily to help identify & locate access points.

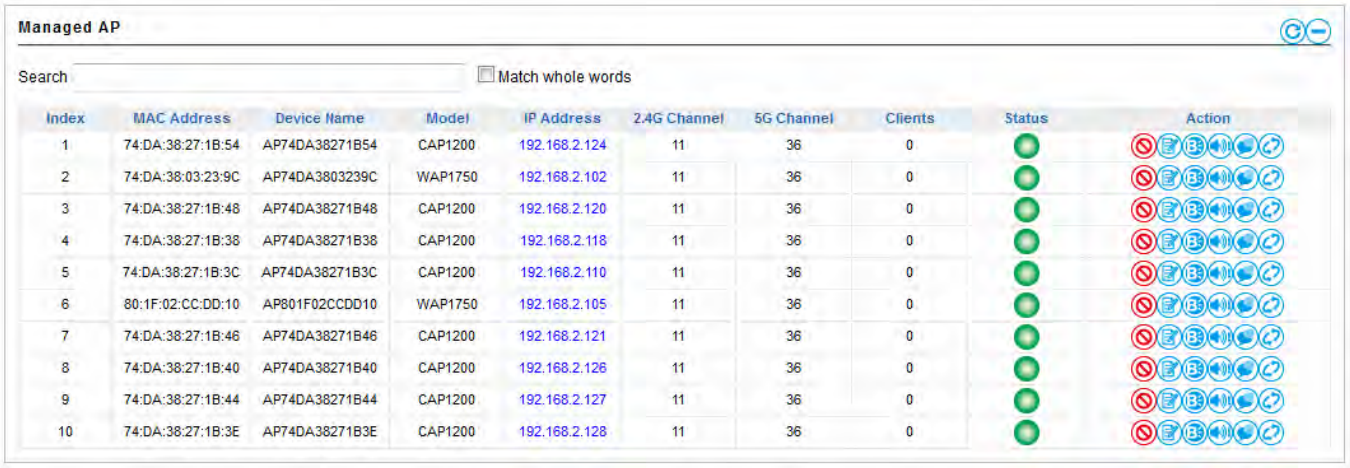
5. **Network Connectivity**
   Go to the "Network Connectivity" panel to perform a ping or traceroute.

6. **Restart**
   Restarts the Managed AP.

IV-2-4. Managed AP Group

Managed APs can be grouped according to your requirements. **Managed AP Group** displays information about each Managed AP group in the local network: *Group Name, MAC Address, Device Name, Model, IP Address, No. of Clients connected to each access point, and Status (connected or disconnected).*

To edit Managed AP Groups go to **NMS Settings → Access Point** (refer to **IV-5-1. Access Point**).



The search function can be used to locate a specific Managed AP Group. Type in the search box and the list will update:

The **Status** icon displays *grey* (disconnected), *yellow* (connecting) or *green* (connected) for each individual Managed AP.
Each Managed AP has "**Action**" icons with the following functions:

1. **Disallow**
   Remove the Managed AP from the AP array and disable connectivity.

2. **Edit**
   *Edit various settings for the Managed AP (refer to **IV-5-1. Access Point**)*

3. **Blink LED**
   The Managed AP's LED will flash temporarily to help identify & locate access points.

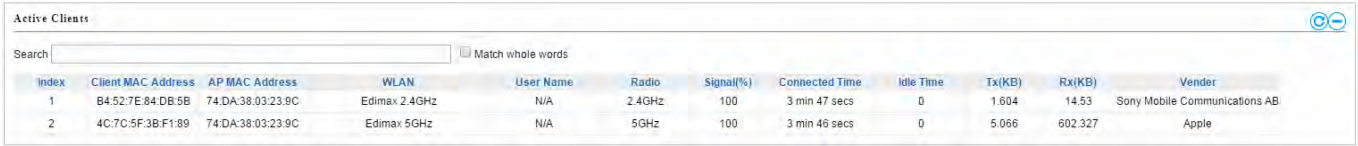
4. **Buzzer**
   The Managed AP's buzzer will sound temporarily to help identify & locate access points.

5. **Network Connectivity**
   Go to the "Network Connectivity" panel to perform a ping or traceroute.

6. **Restart**
   Restarts the Managed AP.

IV-2-5. Active Clients

Active Clients displays information about each client in the local network: *Index (reference number), Client MAC Address, AP MAC Address, WLAN, User Name, Radio (frequency), Signal Strength, Connected Time, Idle Time, Tx & Rx (data transmitted and received) and Vendor of the client device.*



The search function can be used to locate a specific client. Type in the search box and the list will update:

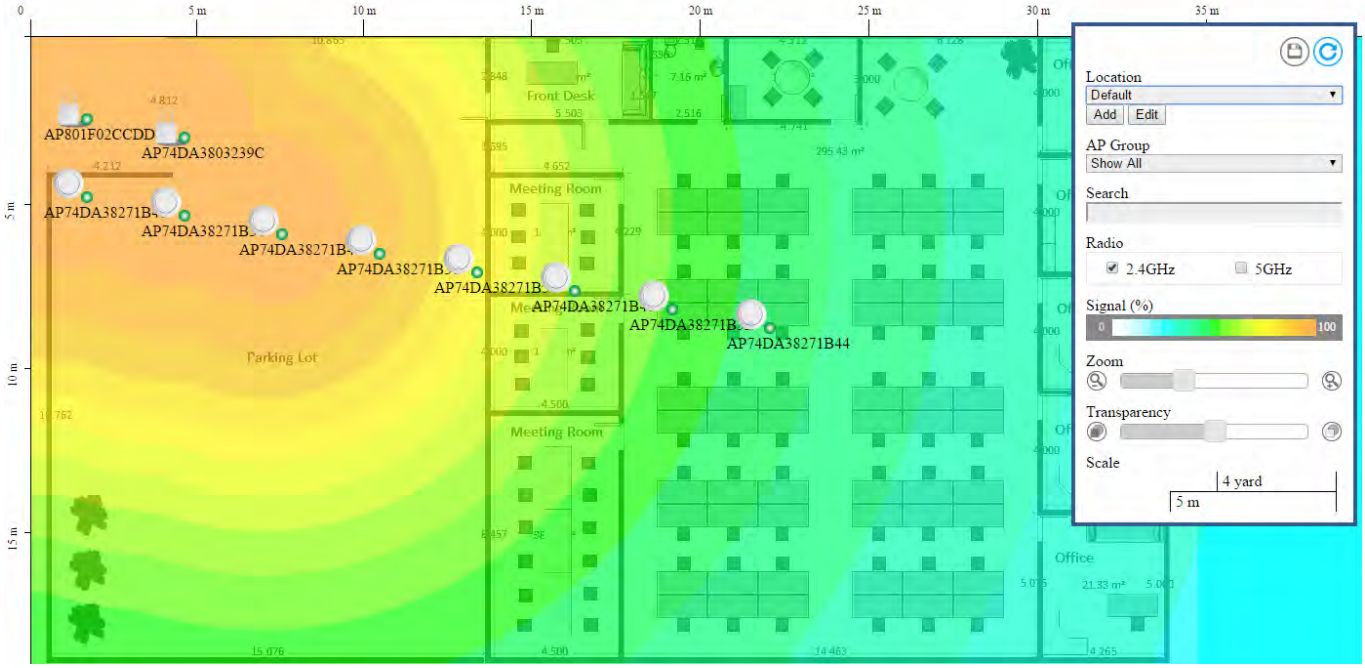
IV-2-6. Active Users

Active Users displays information about each user in the local network via guest portals: *Index (reference number), User Name, MAC Address, IP Address, SSID, Creator, Create Time, Expire Time, Usage Percentage, Vendor & Platform of the user device.*

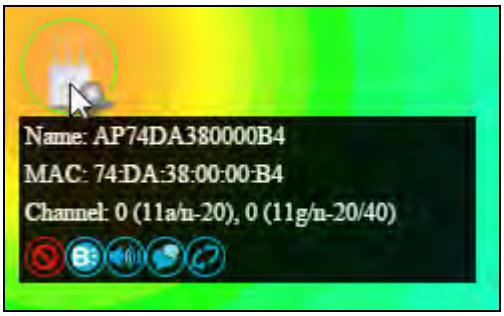
The search function can be used to locate a specific client. Type in the search box and the list will update:

IV-3. ZONE PLAN

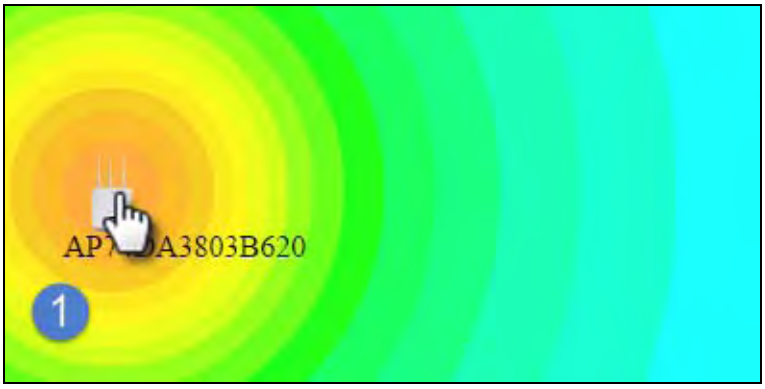
The Zone Plan can be fully customized to match your network environment. You can move the AP icons and select different location images (upload location images in **NMS Settings → Zone Edit**) to create a visual map of your AP array.

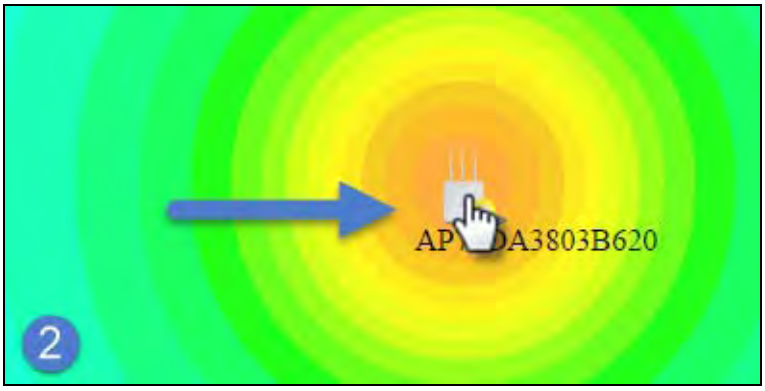


Use the menu on the right side to make adjustments and mouse-over an AP icon in the zone map to see more information. Click an AP icon in the zone map to select it and display action icons:



Click and drag an AP icon to move the icon around the zone map. The signal strength for each AP is displayed according to the “Signal” key in the menu on the right side:





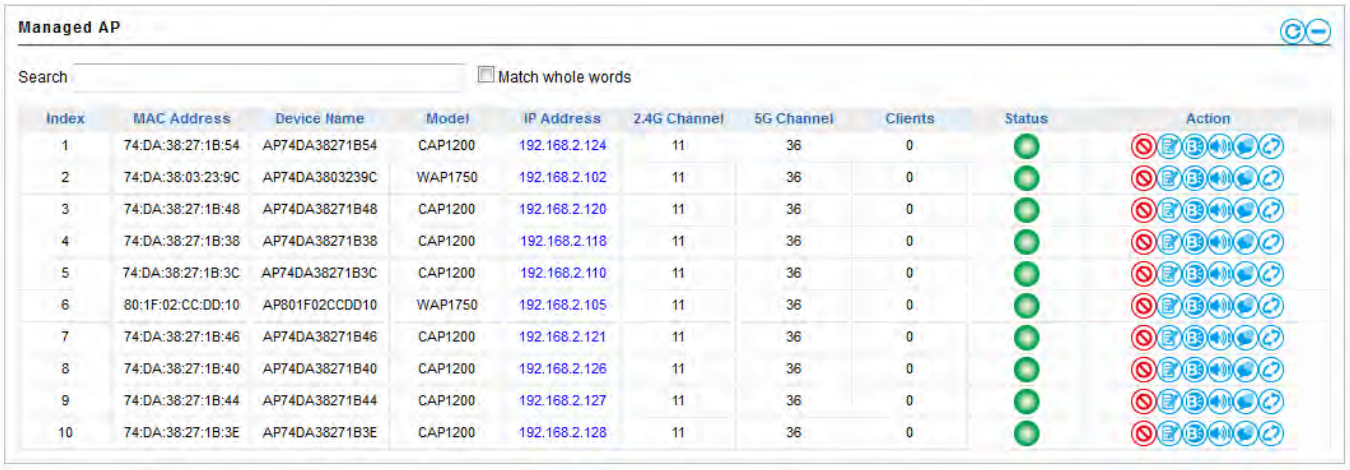
Location	Select a pre-defined location from the drop down menu. When you upload a location image in **NMS Settings → Zone Edit**, it will be available for selection here.
AP Group	You can select an AP Group to display in the zone map. Edit AP Groups in **NMS Settings → Access Point.**
Search	Use the search box to quickly locate an AP.
Radio	Use the checkboxes to display APs according to 2.4GHz or 5GHz wireless radio frequency.
Signal	Signal strength key for the signal strength display around each AP in the zone map.
Zoom	Use the slider to adjust the zoom level of the map.
Transparency	Use the slider to adjust the transparency of location images.
Scale	Zone map scale.
Device/Number	Displays number and type of devices in the zone map.

IV-4. NMS MONITOR

IV-4-1. Access Point

IV-4-1-1. Managed AP

Displays information about each Managed AP in the local network: *Index (reference number), MAC Address, Device Name, Model, IP Address, 2.4GHz & 5GHz Wireless Channel Number, No. of Clients connected to each access point, and Status (connected, connecting or disconnected).*



The **search** function can be used to locate a specific Managed AP. Type in the search box and the list will update:

The **Status** icon displays the status of each Managed AP.

Status Icons			
Icon	**Color**	**Status**	**Definition**
	Grey	Disconnected	Managed AP is disconnected. *Please check the network connection and ensure the Managed AP is in the same IP subnet as the AP Controller.*
	Red	Authentication Failed	System security must be the same for all access points in the AP array. *Please check security settings (refer to **IV-5-8-1.***

		Or Incompatible NMS Version	***System Security***). Access points must use the same version of NMS: the managed AP will not be able to make configurations. *Please use the AP Controller's firmware upgrade function (refer to **IV-5-7. Firmware Upgrade**).*
	Orange	Configuring or Upgrading	*Please wait while the Managed AP makes configurations or while the firmware is upgrading.*
	Yellow	Connecting	*Please wait while Managed AP is connecting.*
	Green	Connected	*Managed AP is connected.*
	Blue	Waiting for Approval	Managed AP is waiting for approval. *Refer to **IV-5-1. Access Point: Auto Approval**. Note: 32 Managed APs are supported. Additional APs will display this status until an existing Managed AP is removed.*

Each Managed AP has "**Action**" icons with the following functions:

1. **Disallow**
   Remove the Managed AP from the AP array and disable connectivity.

1. **Edit**
   *Edit various settings for the Managed AP (refer to **IV-5-1. Access Point**).*

2. **Blink LED**
   The Managed AP's LED will flash temporarily to help identify & locate access points.

3. **Buzzer**

The Managed AP's buzzer will sound temporarily to help identify & locate access points.

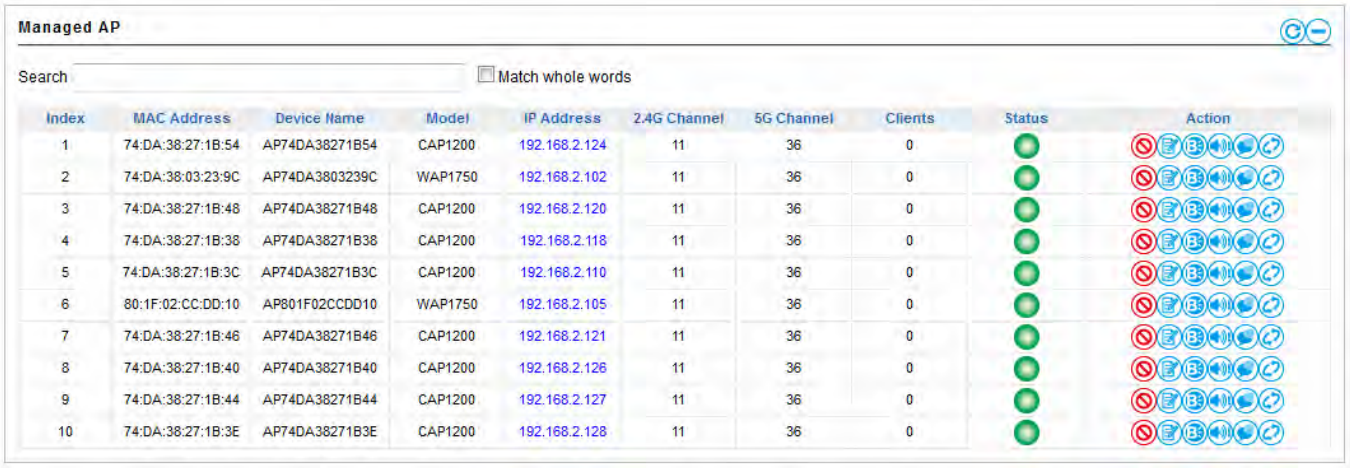
4. **Network Connectivity**
   Go to the "Network Connectivity" panel to perform a ping or traceroute.

5. **Restart**
   Restarts the Managed AP.

IV-4-1-2. Managed AP Group

Managed APs can be grouped according to your requirements. Managed AP displays information about each Managed AP in the local network: *Index (reference number), MAC Address, Device Name, Model, IP Address, 2.4GHz & 5GHz Wireless Channel Number, No. of Clients connected to each access point, and Status (connected, connecting or disconnected).*

To edit Managed AP Groups go to **NMS Settings → Access Point** (refer to **IV-5-1. Access Point**).



The search function can be used to locate a specific Managed AP Group. Type in the search box and the list will update:

The **Status** icon displays *grey* (disconnected), *red* (authentication failed/incompatible NMS version), *orange* (upgrading firmware), *yellow* (connecting), *green* (connected) or *blue* (waiting for approval) for each

individual Managed AP. Refer **to IV-4-1-1. Managed AP:** *Status Icons* for full descriptions.

Each Managed AP has "**Action**" icons with the following functions:

2. **Disallow**
   Remove the Managed AP from the AP array and disable connectivity.

3. **Edit**
   *Edit various settings for the Managed AP (refer to **IV-5-1. Access Point**).*

4. **Blink LED**
   The Managed AP's LED will flash temporarily to help identify & locate access points.

5. **Buzzer**
   The Managed AP's buzzer will sound temporarily to help identify & locate access points.

6. **Network Connectivity**
   Go to the "Network Connectivity" panel to perform a ping or traceroute.

7. **Restart**
   Restarts the Managed AP.

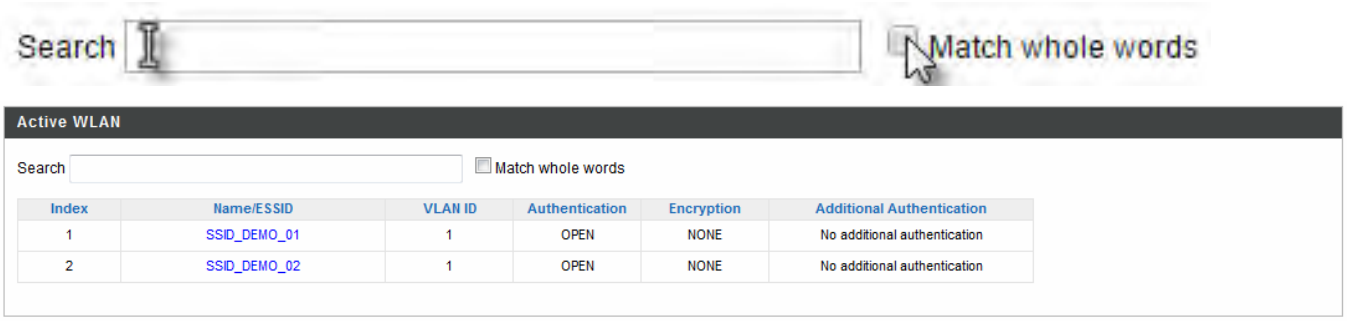
IV-4-2. WLAN

IV-4-2-1. Active WLAN

Displays information about each SSID in the AP Array: *Index (reference number), Name/SSID, VLAN ID, Authentication, Encryption, IP Address and Additional Authentication.*

To configure encryption and VLANs for Managed APs go to **NMS Settings → WLAN**.

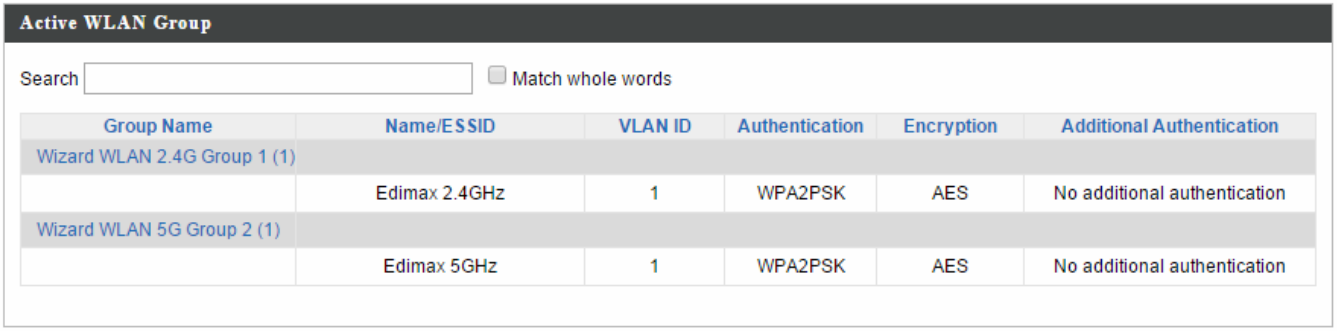
The search function can be used to locate a specific SSID. Type in the search box and the list will update:



IV-4-2-2. Active WLAN Group

WLAN groups can be created according to your preference. Active WLAN Group displays information about WLAN group: *Group Name, Name/SSID, VLAN ID, Authentication, Encryption, IP Address and Additional Authentication.*

The search function can be used to locate a specific Active WLAN Group. Type in the search box and the list will update:



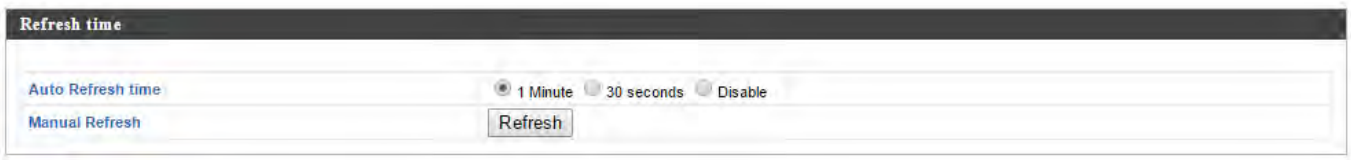
IV-4-3. Clients

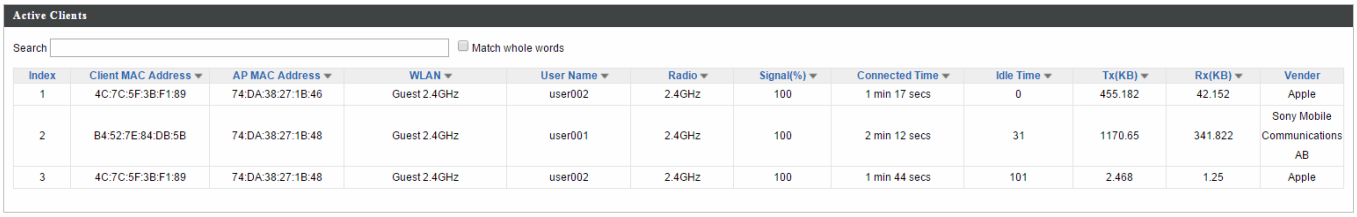
IV-4-3-1. Active Clients

Displays information about clients currently connected to the AP Array: *Index (reference number), Client MAC Address, AP MAC Address, WLAN (SSID), User Name, Radio (2.4GHz or 5GHz), Signal Strength received by Client, Connected Time, Idle Time, Tx & Rx (Data transmitted and received by Client in KB)..*

You can set or disable the auto-refresh time for the client list or click “Refresh” to manually refresh.

The search function can be used to locate a specific client. Type in the search box and the list will update:





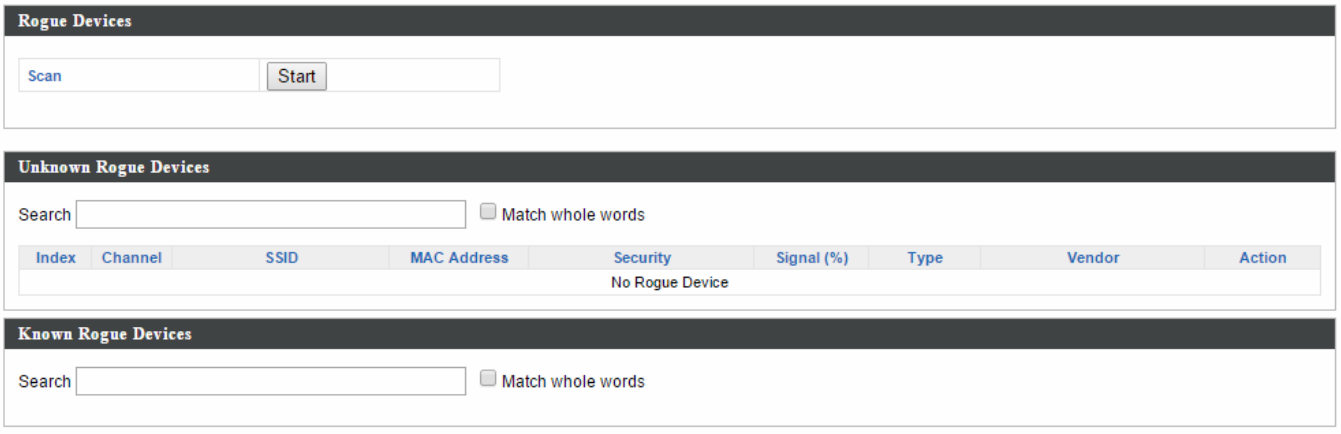
IV-4-4. Rogue Devices

Rogue access point detection can identify any unauthorized access points which may have been installed in the network.

Click “Start” to scan for rogue devices:

Unknown Rogue Devices displays information about rogue devices discovered during the scan*: Index (reference number), Channel, SSID, MAC Address, Security, Signal Strength, Type, Vendor and Action.*

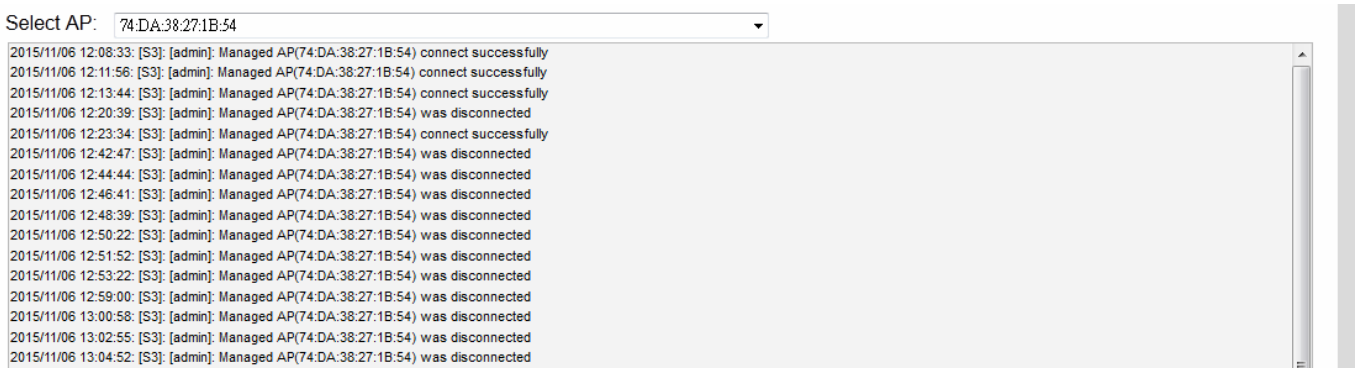
The search function can be used to locate a known rogue device. Type in the search box and the list will update:



IV-4-5. Information

IV-4-5-1. All Events/Activities

Displays a log of time-stamped events for each access point in the Array – use the drop down menu to select an access point and view the log.

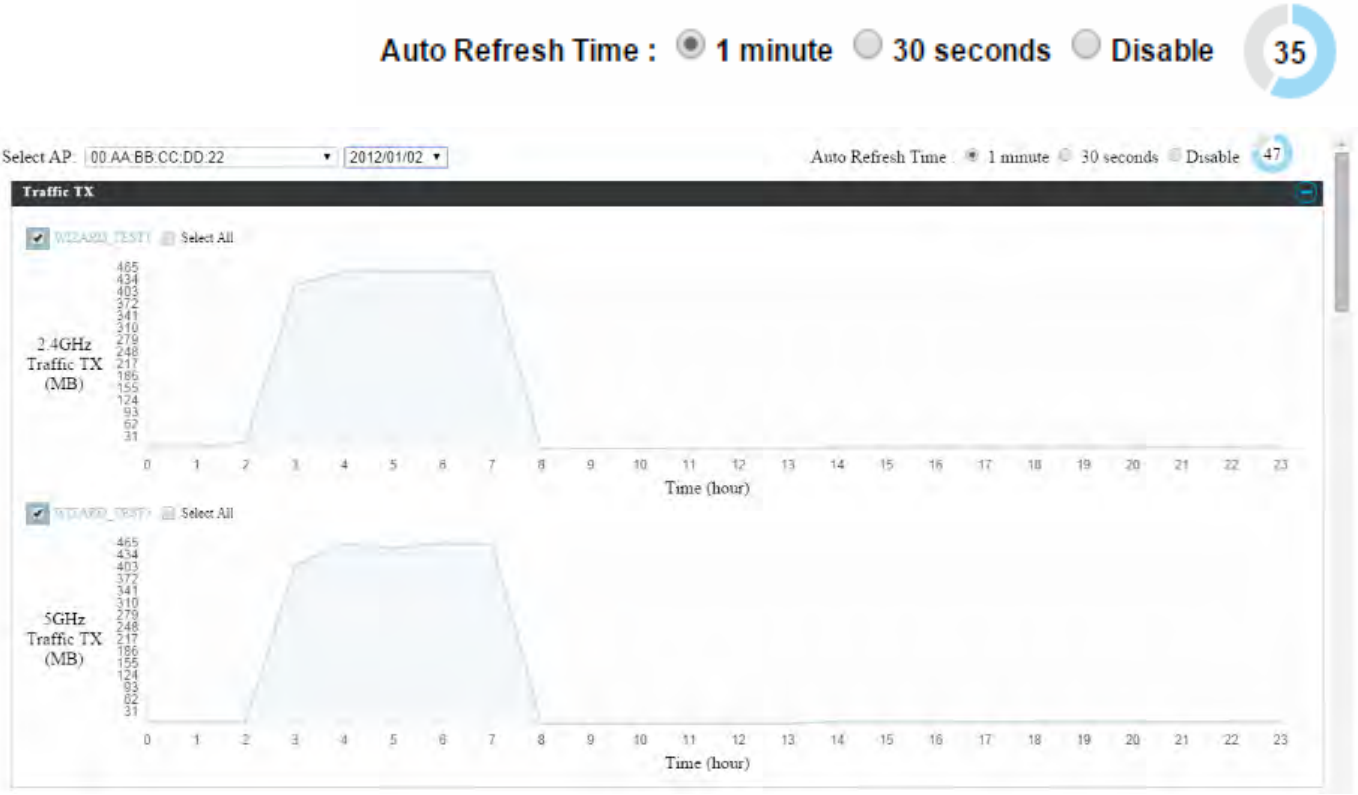


IV-4-5-2. Monitoring

Displays graphical monitoring information about access points in the Array for 2.4GHz & 5GHz: *Traffic Tx (data transmitted in MB), Traffic Rx (data received in MB), No. of Clients, Wireless Channel, Tx Power (wireless radio power), CPU Usage and Memory Usage.*

Use the drop down menus to select an access point and date.

You can set or disable the auto-refresh time for the data:

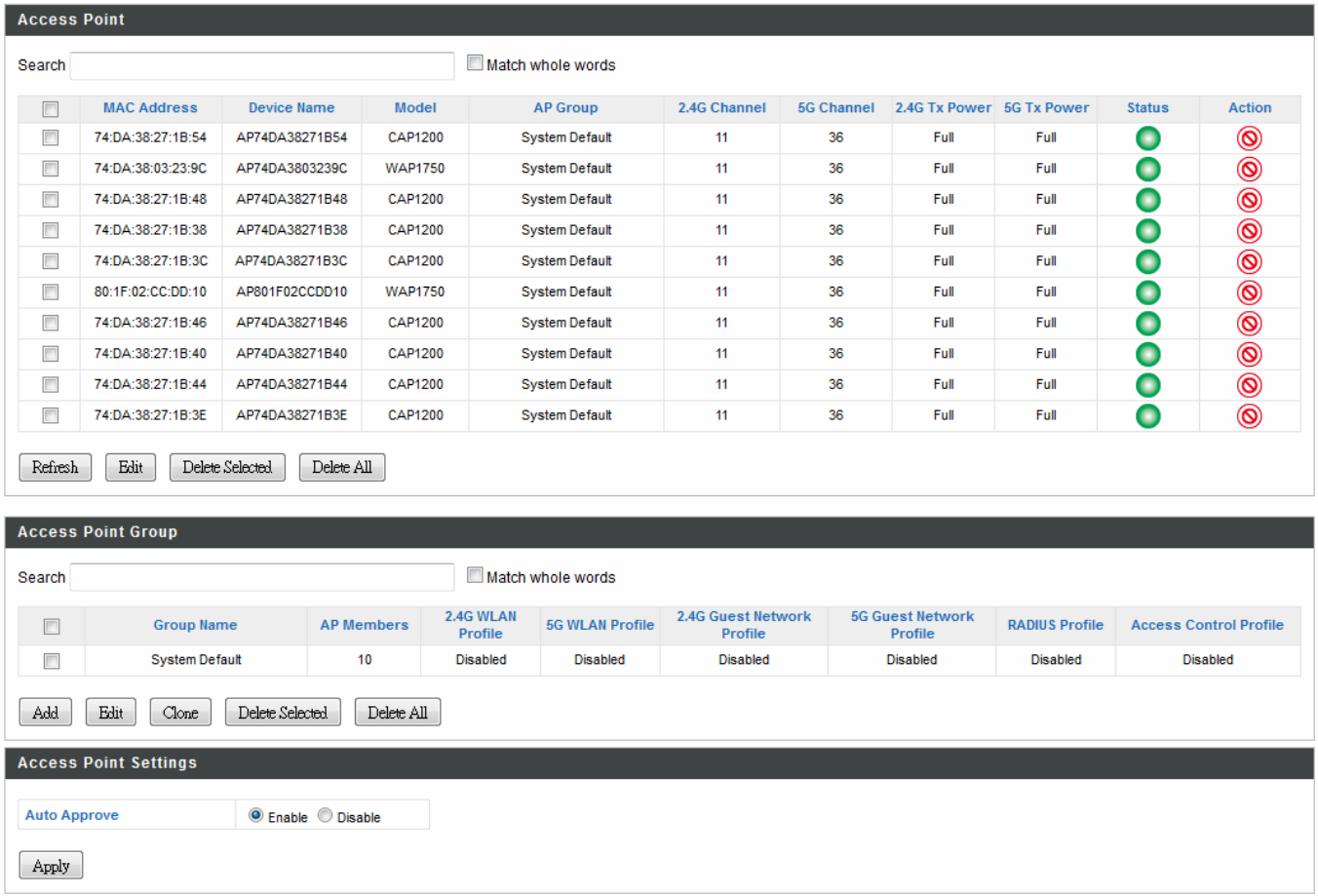


IV-5. NMS Settings

IV-5-1. Access Point

Displays information about each access point and access point group in the local network and allows you to edit access points and edit or add access point groups.

The **search** function can be used to locate an access point or access point group. Type in the search box and the list will update:



The **Status** icon displays *grey* (disconnected), *red* (authentication failed/incompatible NMS version), *orange* (upgrading firmware), *yellow* (connecting), *green* (connected) or *blue* (waiting for approval) for each individual Managed AP. Refer **to IV-4-1-1. Managed AP:** *Status Icons* for full descriptions.

The **"Action"** icons enable you to allow or disallow an access point:

Select an access point or access point group using the check-boxes and click "**Edit**" to make configurations, or click "**Add**" to add a new access point group:

The **Access Point Settings** panel can enable or disable Auto Approve for all Managed APs. When enabled, Managed APs will automatically join the AP Array with the Controller AP. When disabled, Managed APs must be manually approved to join the AP Array with the Controller AP.

Access Point Settings	
Auto Approve	Enable or disable Auto Approve for all Managed APs.

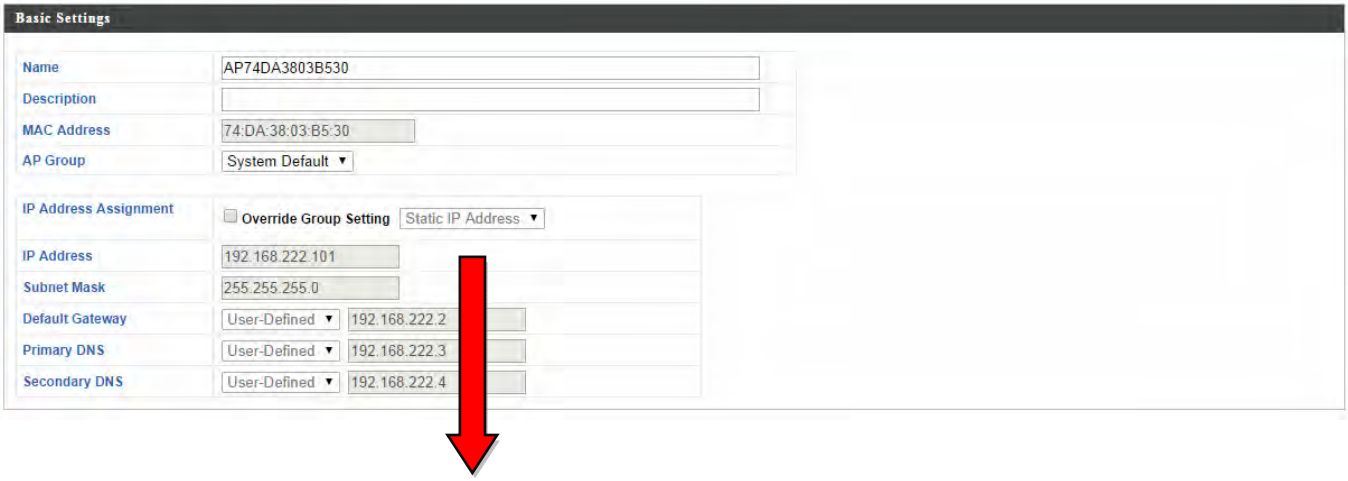
To manually approve a Managed AP, use the *allow* "Action" icon for the specified access point:

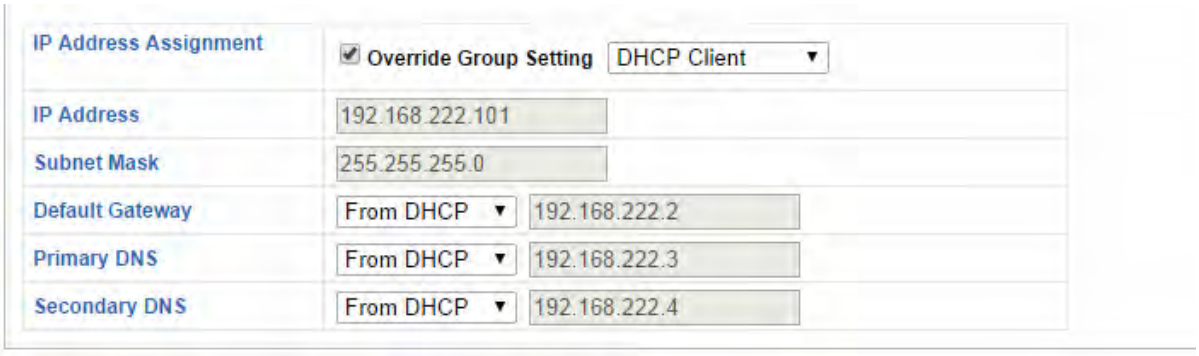
Edit Access Point

Configure your selected access point on your LAN. You can set the access point as a DHCP client or specify a static IP address for your access point, and assign the access point to an AP group, as well as edit 2.4GHz & 5GHz wireless radio settings. An events log is displayed at the bottom of the page.

You can also use **Profile Settings** to assign the access point to WLAN, Guest Network, RADIUS and Access Control groups independently from Access Point Group settings.

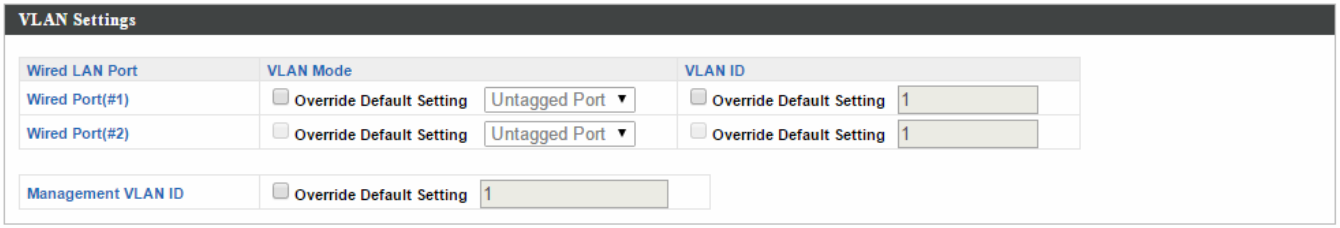
Check the "**Override Group Settings**" box to use different individual settings for access points assigned to AP Groups:



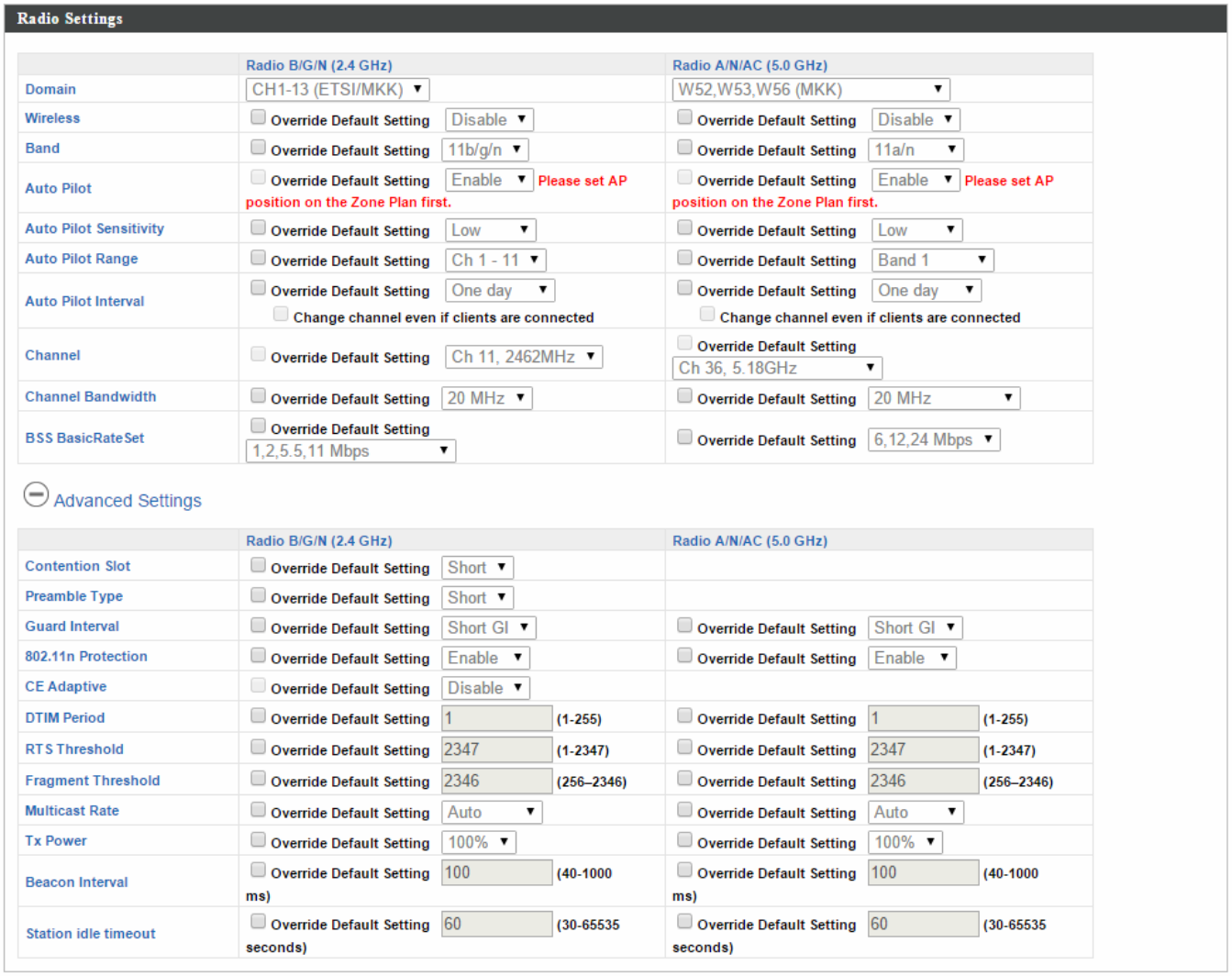


Basic Settings	
Name	Edit the access point name. The default name is AP + MAC address.
Description	Enter a description of the access point for reference e.g. 2nd Floor Office.
MAC Address	Displays MAC address.
AP Group	Use the drop down menu to assign the AP to an AP Group. You can edit AP Groups from the **NMS Settings → Access Point** page.
IP Address Assignment	Select "DHCP Client" for your access point to be assigned a dynamic IP address from your router's DHCP server, or select "Static IP" to manually specify a static/fixed IP address for your access point (below). Check the box "Override Group Setting" if the AP is a member of an AP Group and you wish to use a different setting than the AP Group setting.
IP Address	Specify the IP address here. This IP address will be assigned to your access point and will replace the default IP address.
Subnet Mask	Specify a subnet mask. The default value is

	255.255.255.0
Default Gateway	For DHCP users, select “From DHCP” to get default gateway from your DHCP server or “User-Defined” to enter a gateway manually. For static IP users, the default value is blank.
Primary DNS	DHCP users can select “From DHCP” to get primary DNS server’s IP address from DHCP or “User-Defined” to manually enter a value. For static IP users, the default value is blank.
Secondary DNS	DHCP users can select “From DHCP” to get secondary DNS server’s IP address from DHCP or “User-Defined” to manually enter a value. For static IP users, the default value is blank.



VLAN Settings	
Wired LAN Port	Identifies LAN port 1 or 2.
VLAN Mode	Select “Tagged Port” or “Untagged Port” for specified LAN interface.
VLAN ID	Set a VLAN ID for specified interface, if “Untagged Port” is selected.
Management VLAN	
VLAN ID	Check ‘Override Default Setting’ to specify the VLAN ID of the management VLAN. Only the hosts belonging to the same VLAN can manage the device.



Radio Settings	
Domain	Set the regulatory domain for the access point's wireless channels for each frequency.
Wireless	Enable or disable the access point's 2.4GHz or 5GHz wireless radio. When disabled, no SSIDs on that frequency will be active.
Band	Select the wireless standard used for the access point. Combinations of 802.11b, 802.11g, 802.11n & 802.11ac can be selected.
Auto Pilot	Enable/disable auto channel selection. Auto channel selection will automatically set the wireless channel for the access point's 2.4GHz or 5GHz frequency based on availability and potential interference. When disabled, select a channel manually.
Auto Pilot Range	Select a range from which the auto channel setting (above) will choose a channel.

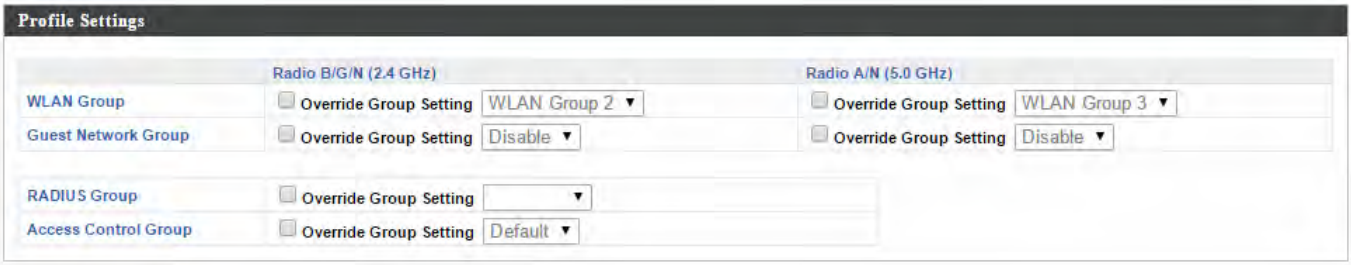
Auto Pilot Interval	Specify a frequency for how often the auto channel setting will check/reassign the wireless channel. Check/uncheck the “Change channel even if clients are connected” box according to your preference.
Channel Bandwidth	Set the channel bandwidth or use Auto (automatically select based on interference level).
BSS BasicRateSet	Set a Basic Service Set (BSS) rate: this is a series of rates to control communication frames for wireless clients.

These settings are for experienced users only. Please do not change any of the values on this page unless you are already familiar with these functions.

Changing these settings can adversely affect the performance of your access point.

Advanced Settings	
Contention Slot	Select “Short” or “Long” – this value is used for contention windows in WMM (see **IV-6-7. WMM**).
Preamble Type	Set the wireless radio preamble type. The preamble type in 802.11 based wireless communication defines the length of the CRC (Cyclic Redundancy Check) block for communication between the access point and roaming wireless adapters. The default value is “Short Preamble”.
Guard Interval	Set the guard interval. A shorter interval can improve performance.
802.11g Protection	Enable/disable 802.11g protection, which increases reliability but reduces bandwidth (clients will send Request to Send (RTS) to access point, and access point will broadcast Clear to Send (CTS), before a packet is sent from client.)

802.11n Protection	Enable/disable 802.11n protection, which increases reliability but reduces bandwidth (clients will send Request to Send (RTS) to access point, and access point will broadcast Clear to Send (CTS), before a packet is sent from client.)
DTIM Period	Set the DTIM (delivery traffic indication message) period value of the wireless radio. The default value is 1.
RTS Threshold	Set the RTS threshold of the wireless radio. The default value is 2347.
Fragment Threshold	Set the fragment threshold of the wireless radio. The default value is 2346.
Multicast Rate	Set the transfer rate for multicast packets or use the “Auto” setting.
Tx Power	Set the power output of the wireless radio. You may not require 100% output power. Setting a lower power output can enhance security since potentially malicious/unknown users in distant areas will not be able to access your signal.
Beacon Interval	Set the beacon interval of the wireless radio. The default value is 100.
Station idle timeout	Set the interval for keepalive messages from the access point to a wireless client to verify if the station is still alive/active.



Profile Settings	
WLAN Group	Assign the access point’s 2.4GHz or 5GHz SSID(s) to a WLAN Group. You can edit WLAN groups in **NMS Settings → WLAN**.
Guest Network Group	Assign the access point’s 2.4GHz or 5GHz SSID(s) to a Guest Network Group. You can edit Guest Network groups in **NMS Settings**

	→ **Guest Network**.
RADIUS Group	Assign the access point's 2.4GHz SSID(s) to a RADIUS group. You can edit RADIUS groups in **NMS Settings → RADIUS**.
Access Control Group	Assign the access point's 2.4GHz SSID(s) to a RADIUS group. You can edit RADIUS groups in **NMS Settings → Access Control**

Add/Edit Access Point Group

Configure your selected access point group. Access point group settings apply to all access points in the group, unless individually set to override group settings.

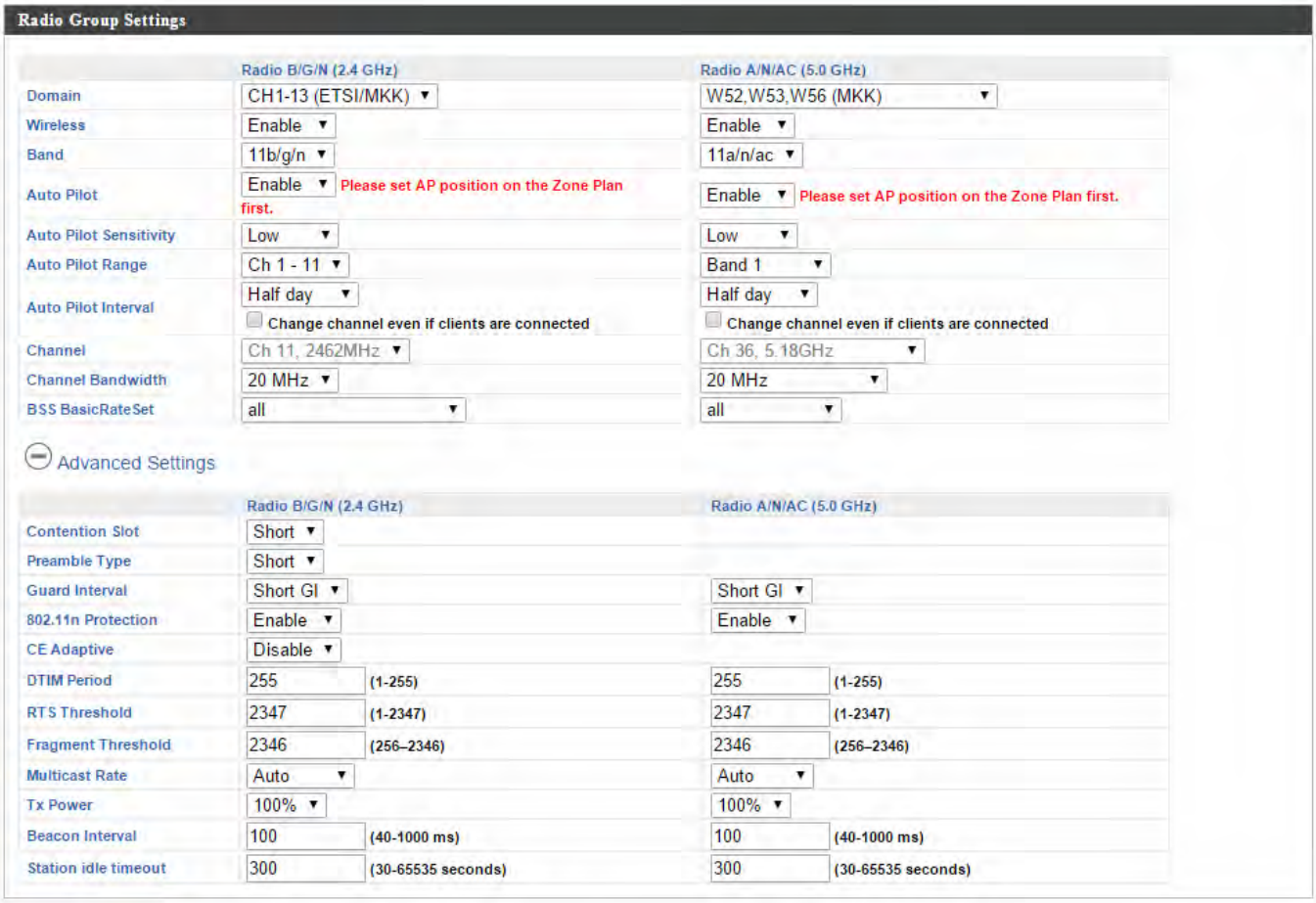
You can use **Profile Group Settings** to assign the access point group to WLAN, Guest Network, RADIUS and Access Control groups.

The **Group Settings** panel can be used to quickly move access points between existing groups: select an access point and use the drop down menu or search to select access point groups and use << and >> arrows to move APs between groups.

Basic Group Settings	
Name	Edit the access point group name.
Description	Enter a description of the access point group for reference e.g. 2nd Floor Office Group.

VLAN Group Settings	
Wired LAN Port	Identifies LAN port 1 or 2.
VLAN Mode	Select “Tagged Port” or “Untagged Port” for specified LAN interface.
VLAN ID	Set a VLAN ID for specified interface, if “Untagged Port” is selected.
Management VLAN	
VLAN ID	Check ‘Override Default Setting’ to specify the VLAN ID of the management VLAN. Only the hosts belonging to the same VLAN can manage

	the device.



Radio Group Settings	
Domain	Set the regulatory domain for the access point's wireless channels for each frequency.
Wireless	Enable or disable the access point group's 2.4GHz or 5GHz wireless radio. When disabled, no SSIDs on that frequency will be active.
Band	Select the wireless standard used for the access point group. Combinations of 802.11b, 802.11g, 802.11n & 802.11ac can be selected.
Auto Pilot	Enable/disable auto channel selection. Auto channel selection will automatically set the wireless channel for the access point group's 2.4GHz or 5GHz frequency based on availability and potential interference. When disabled, select a channel manually.
Auto Pilot Range	Select a range from which the auto channel

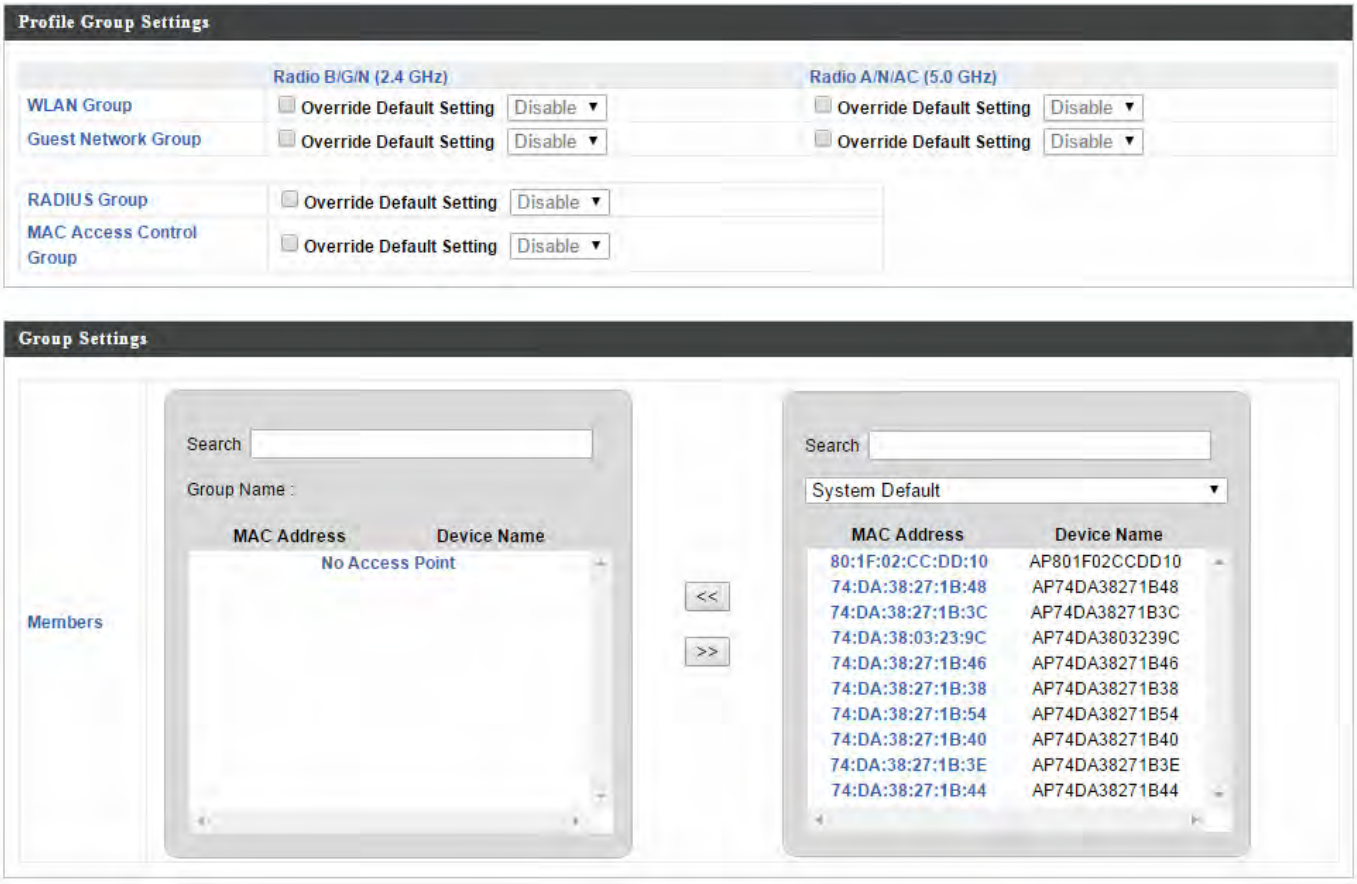
	setting (above) will choose a channel.
Auto Pilot Interval	Specify a frequency for how often the auto channel setting will check/reassign the wireless channel. Check/uncheck the “Change channel even if clients are connected” box according to your preference.
Channel Bandwidth	Set the channel bandwidth or use Auto (automatically select based on interference level).
BSS BasicRateSet	Set a Basic Service Set (BSS) rate: this is a series of rates to control communication frames for wireless clients.

These settings are for experienced users only. Please do not change any of the values on this page unless you are already familiar with these functions.

Changing these settings can adversely affect the performance of your access points.

Advanced Settings	
Contention Slot	Select “Short” or “Long” – this value is used for contention windows in WMM (see **IV-6-7. WMM**).
Preamble Type	Set the wireless radio preamble type. The preamble type in 802.11 based wireless communication defines the length of the CRC (Cyclic Redundancy Check) block for communication between the access point and roaming wireless adapters. The default value is “Short Preamble”.
Guard Interval	Set the guard interval. A shorter interval can improve performance.
802.11g Protection	Enable/disable 802.11g protection, which increases reliability but reduces bandwidth (clients will send Request to Send (RTS) to access point, and access point will broadcast Clear to Send (CTS), before a packet is sent from client.)

802.11n Protection	Enable/disable 802.11n protection, which increases reliability but reduces bandwidth (clients will send Request to Send (RTS) to access point, and access point will broadcast Clear to Send (CTS), before a packet is sent from client.)
DTIM Period	Set the DTIM (delivery traffic indication message) period value of the wireless radio. The default value is 1.
RTS Threshold	Set the RTS threshold of the wireless radio. The default value is 2347.
Fragment Threshold	Set the fragment threshold of the wireless radio. The default value is 2346.
Multicast Rate	Set the transfer rate for multicast packets or use the “Auto” setting.
Tx Power	Set the power output of the wireless radio. You may not require 100% output power. Setting a lower power output can enhance security since potentially malicious/unknown users in distant areas will not be able to access your signal.
Beacon Interval	Set the beacon interval of the wireless radio. The default value is 100.
Station idle timeout	Set the interval for keepalive messages from the access point to a wireless client to verify if the station is still alive/active.

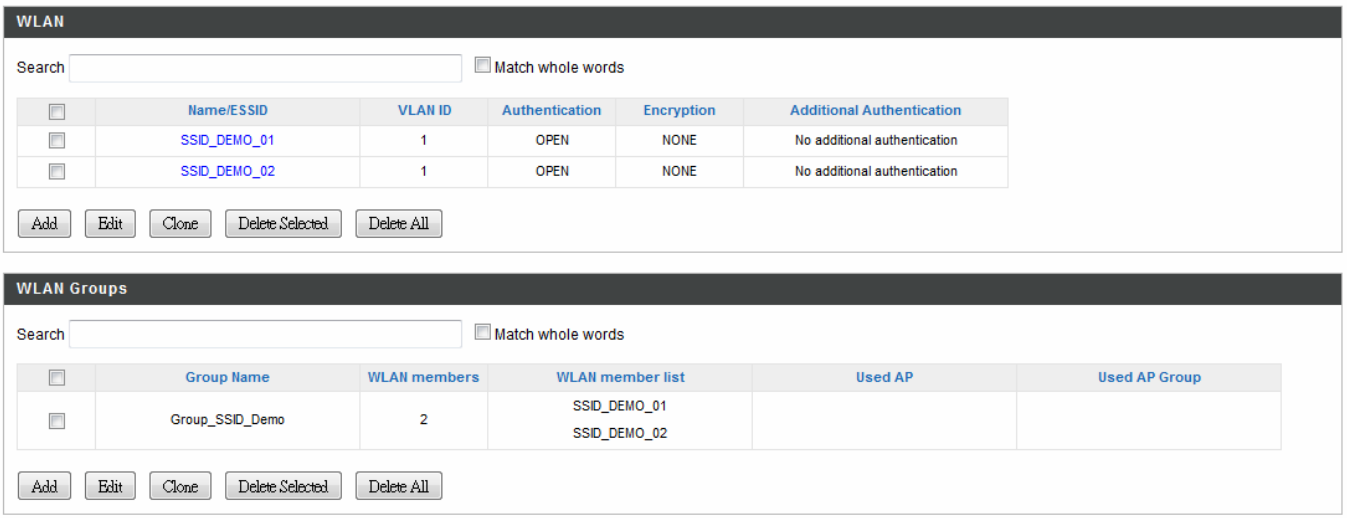


Profile Group Settings	
WLAN Group	Assign the access point group's 2.4GHz or 5GHz SSIDs to a WLAN Group. You can edit WLAN groups in **NMS Settings → WLAN**.
Guest Network Group	Assign the access point group's 2.4GHz or 5GHz SSIDs to a Guest Network Group. You can edit Guest Network groups in **NMS Settings → Guest Network**.
RADIUS Group	Assign the access point group's 2.4GHz SSIDs to a RADIUS group. You can edit RADIUS groups in **NMS Settings → RADIUS**.
Access Control Group	Assign the access point's 2.4GHz SSIDs to a RADIUS group. You can edit RADIUS groups in **NMS Settings → Access Control.**

IV-5-2. WLAN

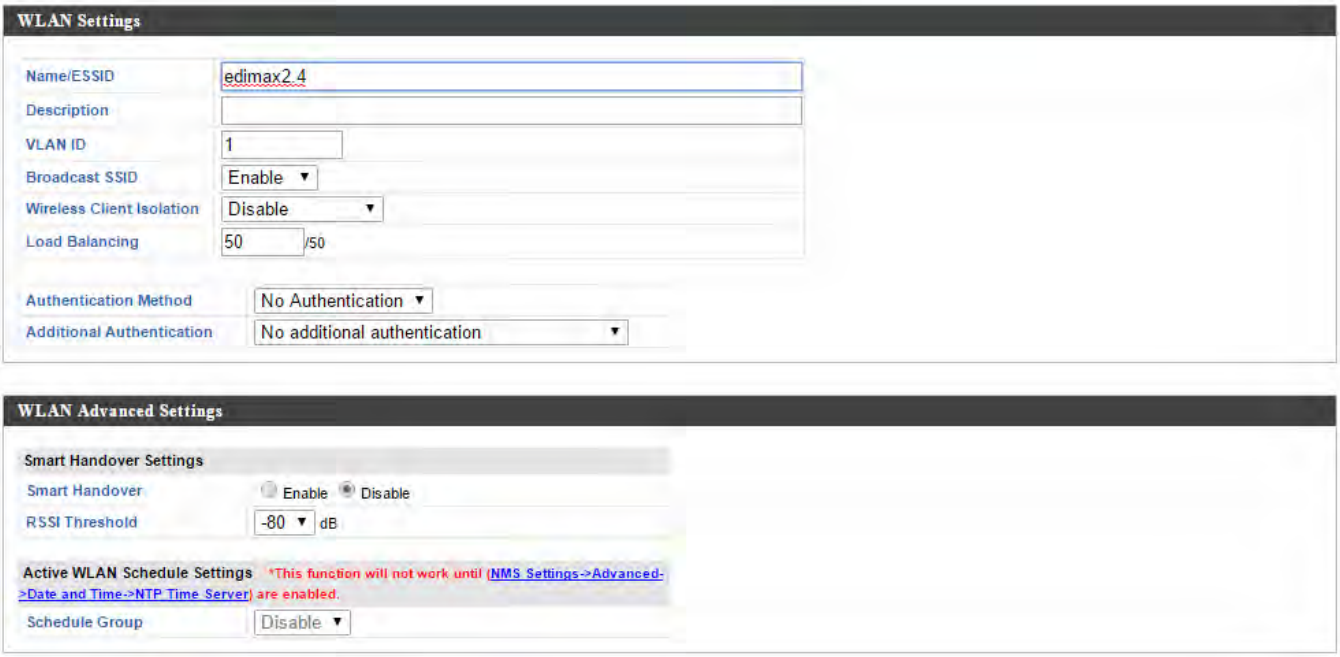
Displays information about each WLAN and WLAN group in the local network and allows you to add or edit WLANs & WLAN Groups. When you add a WLAN Group, it will be available for selection in **NMS Settings → Access Point** access point **Profile Settings** & access point group **Profile Group Settings** (**IV-5-1.**)

The **search** function can be used to locate a WLAN or WLAN Group. Type in the search box and the list will update:



Select a WLAN or WLAN Group using the check-boxes and click "**Edit**" or click "**Add**" to add a new WLAN or WLAN Group:

Add/Edit WLAN



WLAN Settings	
Name/ESSID	Edit the WLAN name (SSID).
Description	Enter a description of the SSID for reference e.g. 2nd Floor Office HR.
SSID	Select which SSID to configure security settings for.
VLAN ID	Specify the VLAN ID.
Broadcast SSID	Enable or disable SSID broadcast. When enabled, the SSID will be visible to clients as an available Wi-Fi network. When disabled, the SSID will not be visible as an available Wi-Fi network to clients – clients must manually enter the SSID in order to connect. A hidden (disabled) SSID is typically more secure than a visible (enabled) SSID.
Wireless Client Isolation	Enable or disable wireless client isolation. Wireless client isolation prevents clients connected to the access point from communicating with each other and improves security. Typically, this function is useful for corporate environments or public hot spots and can prevent brute force attacks on clients' usernames and passwords.

Load Balancing	Load balancing limits the number of wireless clients connected to an SSID. Set a load balancing value (maximum 50).
Authentication Method	Select an authentication method from the drop down menu.
Additional Authentication	Select an additional authentication method from the drop down menu.

Various security options (wireless data encryption) are available. When data is encrypted, information transmitted wirelessly cannot be read by anyone who does not know the correct encryption key.

It's essential to configure wireless security in order to prevent unauthorised access to your network.

Select hard-to-guess passwords which include combinations of numbers, letters and symbols, and change your password regularly.

Please refer to **IV-5-2-1. No Authentication** and onwards below for more information on authentication and additional authentication types.

WLAN Advanced Settings	
Smart Handover	Enable or disable Smart Handover.
RSSI Threshold	Set a RSSI Threshold level.
Schedule Group	Assign to a specified schedule (schedule must be pre-configured in **NMS Settings → Schedule**.)

IV-5-2-1. No Authentication

Authentication is disabled and no password/key is required to connect to the access point.

Disabling wireless authentication is not recommended. When disabled, anybody within range can connect to your device's SSID.

IV-5-2-2. WEP

WEP (Wired Equivalent Privacy) is a basic encryption type. For a higher level of security consider using WPA encryption.

Key Length	Select 64-bit or 128-bit. 128-bit is more secure than 64-bit and is recommended.
Key Type	Choose from “ASCII” (any alphanumerical character 0-9, a-z and A-Z) or “Hex” (any characters from 0-9, a-f and A-F).
Default Key	Select which encryption key (1 – 4 below) is the default key. For security purposes, you can set up to four keys (below) and change which is the default key.
Encryption Key 1 – 4	Enter your encryption key/password according to the format you selected above.

IV-5-2-3. IEEE802.1x/EAP

Key Length	Select 64-bit or 128-bit. 128-bit is more secure than 64-bit and is recommended.

IV-5-2-4. WPA-PSK

WPA-PSK is a secure wireless encryption type with strong data protection and user authentication, utilizing 128-bit encryption keys.

WPA Type	Select from WPA/WPA2 Mixed Mode-PSK, WPA2 or WPA only. WPA2 is safer than WPA only, but not supported by all wireless clients. Please make sure your wireless client supports your selection.
Encryption	Select “TKIP/AES Mixed Mode” or “AES” encryption type.
Key Renewal Interval	Specify a frequency for key renewal in minutes.
Pre-Shared Key Type	Choose from “Passphrase” (8 – 63 alphanumeric characters) or “Hex” (up to 64 characters from 0-9, a-f and A-F).
Pre-Shared Key	Please enter a security key/password according

	to the format you selected above.

IV-5-2-5. WPA-EAP

WPA Type	Select from WPA/WPA2 Mixed Mode-EAP, WPA2-EAP or WPA-EAP.
Encryption	Select “TKIP/AES Mixed Mode” or “AES” encryption type.
Key Renewal Interval	Specify a frequency for key renewal in minutes.

WPA-EAP must be disabled to use MAC-RADIUS authentication.

IV-5-2-6. Additional Authentication

Additional wireless authentication methods can also be used:

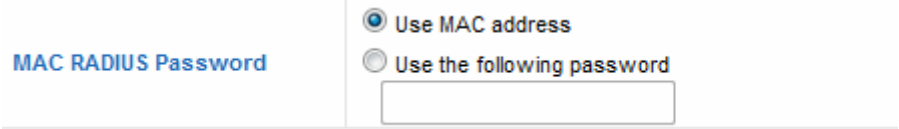
MAC Address Filter
Restrict wireless clients access based on MAC address specified in the MAC filter table.

See** IV-5-4. MAC Filter **to configure MAC filtering.

MAC Filter & MAC-RADIUS Authentication
Restrict wireless clients access using both of the above MAC filtering & RADIUS authentication methods.

MAC-RADIUS Authentication
Restrict wireless clients access based on MAC address via a RADIUS server, or password authentication via a RADIUS server.

See** IV-5-3. RADIUS **to configure RADIUS servers.

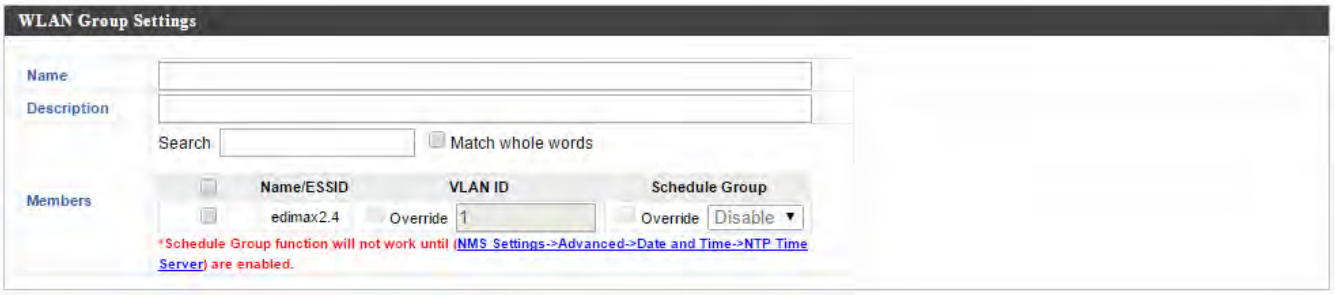


MAC RADIUS Password	Select whether to use MAC address or password authentication via RADIUS server. If you select “Use the following password”, enter

	the password in the field below. The password should match the “Shared Secret” used in **IV-5-3. RADIUS**.

Add/Edit WLAN Group

When you add a WLAN Group, it will be available for selection in **NMS Settings → Access Point** access point **Profile Settings** & access point group **Profile Group Settings** (**IV-5-1.**)



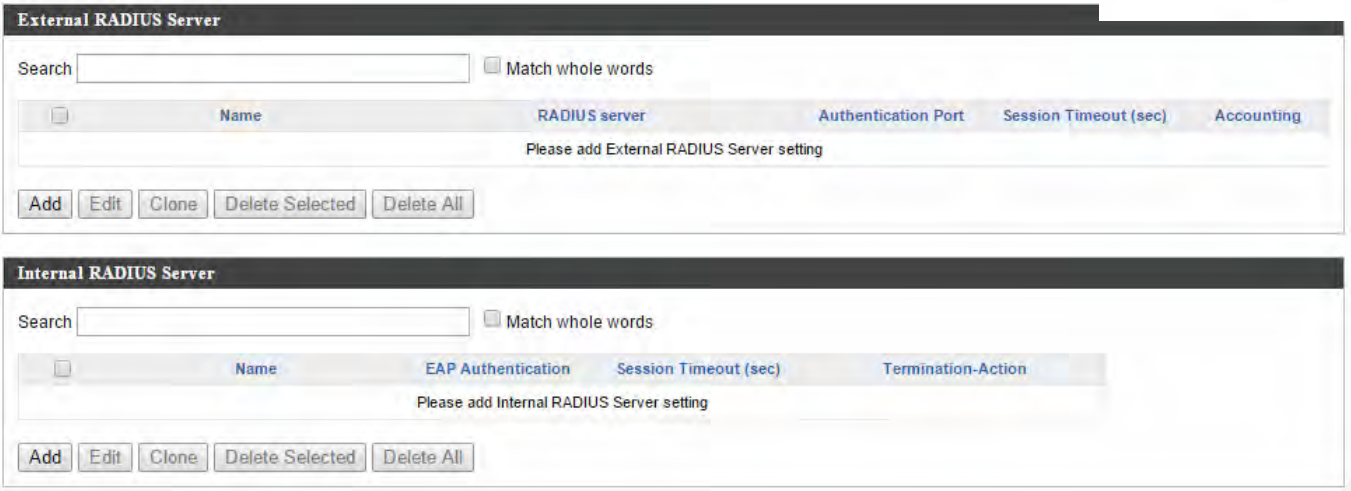
WLAN Group Settings	
Name	Edit the WLAN Group name.
Description	Enter a description of the WLAN Group for reference e.g. 2nd Floor Office HR Group.
Members	Select SSIDs to include in the group using the checkboxes and assign VLAN IDs. You can override individual schedule settings and assign a different schedule.

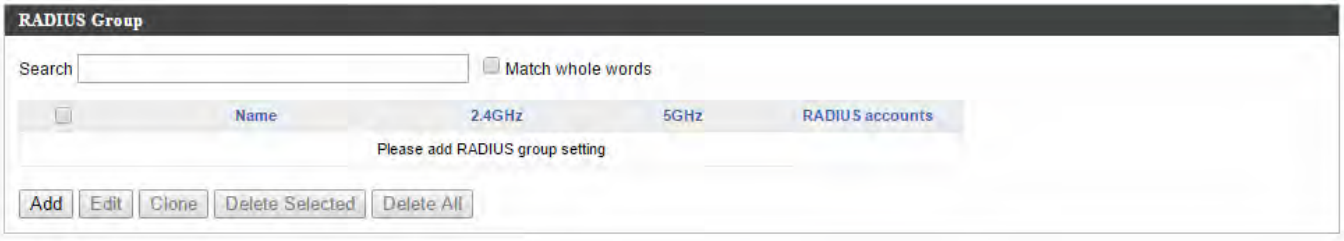
IV-5-3. RADIUS

Displays information about External & Internal RADIUS Servers, Accounts and Groups and allows you to add or edit RADIUS Servers, Accounts & Groups. When you add a RADIUS Group, it will be available for selection in **NMS Settings → Access Point** access point **Profile Settings** & access point group **Profile Group Settings** (**IV-5-1.**)

The **search** function can be used to locate a RADIUS Server, Account or Group. Type in the search box and the list will update:

Make a selection using the check-boxes and click "**Edit**" or click "**Add**" to add a new WLAN or WLAN Group:





Add/Edit External RADIUS Server

Name	Enter a name for the RADIUS Server.
Description	Enter a description of the RADIUS Server for reference.
RADIUS Server	Enter the RADIUS server host IP address.
Authentication Port	Set the UDP port used in the authentication protocol of the RADIUS server. Value must be between 1 – 65535.
Shared Secret	Enter a shared secret/password between 1 – 99 characters in length. This should match the "MAC-RADIUS" password used in **IV-3-1-3-6** or **IV-3-2-3**.
Session Timeout	Set a duration of session timeout in seconds between 0 – 86400.
Accounting	Enable or disable RADIUS accounting.
Accounting Port	When accounting is enabled (above), set the UDP port used in the accounting protocol of the RADIUS server. Value must be between 1 – 65535.

Add/Edit Internal RADIUS Server

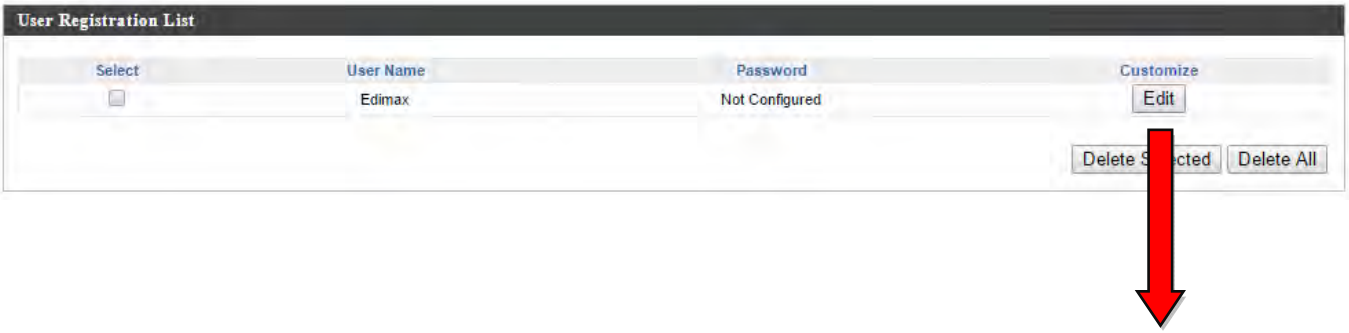
Upload EAP Certificate File	
EAP Certificate File Format	Displays the EAP certificate file format: PCK#12(*.pfx/*.p12)
EAP Certificate File	Click “Upload” to open a new window and select the location of an EAP certificate file to use. If no certificate file is uploaded, the internal RADIUS server will use a self-made certificate.

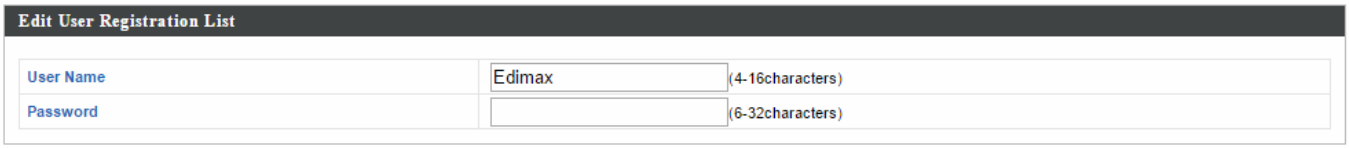
Internal RADIUS Server	
Name	Enter a name for the Internal RADIUS Server.
Description	Enter a description of the Internal RADIUS Server for reference.
EAP Certificate File Format	Displays the EAP certificate file format: PCK#12(*.pfx/*.p12)
EAP Certificate File	Click “Upload” to open a new window and select the location of an EAP certificate file to use. If no certificate file is uploaded, the internal RADIUS server will use a self-made certificate.

EAP Internal Authentication	Select EAP internal authentication type from the drop down menu.
Shared Secret	Enter a shared secret/password for use between the internal RADIUS server and RADIUS client. The shared secret should be 1 – 99 characters in length.
Session Timeout	Set a duration of session timeout in seconds between 0 – 86400.
Termination Action	Select a termination-action attribute: "Reauthentication" sends a RADIUS request to the access point, "Not-Reathentication" sends a default termination-action attribute to the access point, "Not-Send" no termination-action attribute is sent to the access point.

Add/Edit RADIUS Accounts

The internal RADIUS server can authenticate up to 256 user accounts. The "RADIUS Accounts" page allows you to configure and manage users.





RADIUS Accounts	
User Name	Enter the user names here, separated by commas.
Add	Click “Add” to add the user to the user registration list.
Reset	Clear text from the user name box.

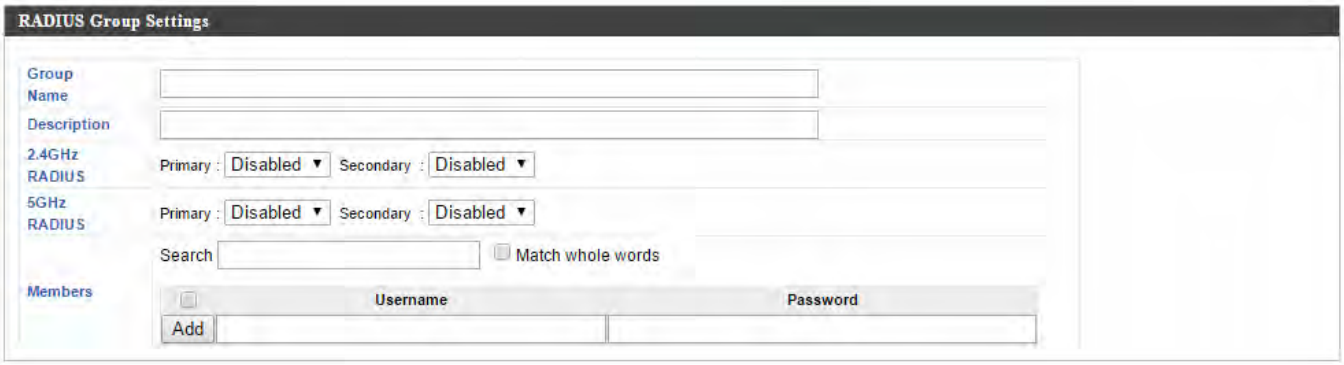
User Registration List	
Select	Check the box to select a user.
User Name	Displays the user name.
Password	Displays if specified user name has a password (configured) or not (not configured).
Customize	Click “Edit” to open a new field to set/edit a password for the specified user name (below).

Delete Selected	Delete selected user from the user registration list.
Delete All	Delete all users from the user registration list.

Edit User Registration List	
User Name	Existing user name is displayed here and can be edited according to your preference.
Password	Enter or edit a password for the specified user.

Add/Edit RADIUS Group

When you add a RADIUS Group, it will be available for selection in **NMS Settings → Access Point** access point **Profile Settings** & access point group **Profile Group Settings** (**IV-5-1.**)



RADIUS Group Settings	
Group Name	Edit the RADIUS Group name.
Description	Enter a description of the RADIUS Group for reference.
2.4GHz RADIUS	Enable/Disable primary & secondary RADIUS servers for 2.4GHz.
5GHz RADIUS	Enable/Disable primary & secondary RADIUS servers for 5GHz.
Members	Add RADIUS user accounts to the RADIUS group.

IV-5-4. Access Control

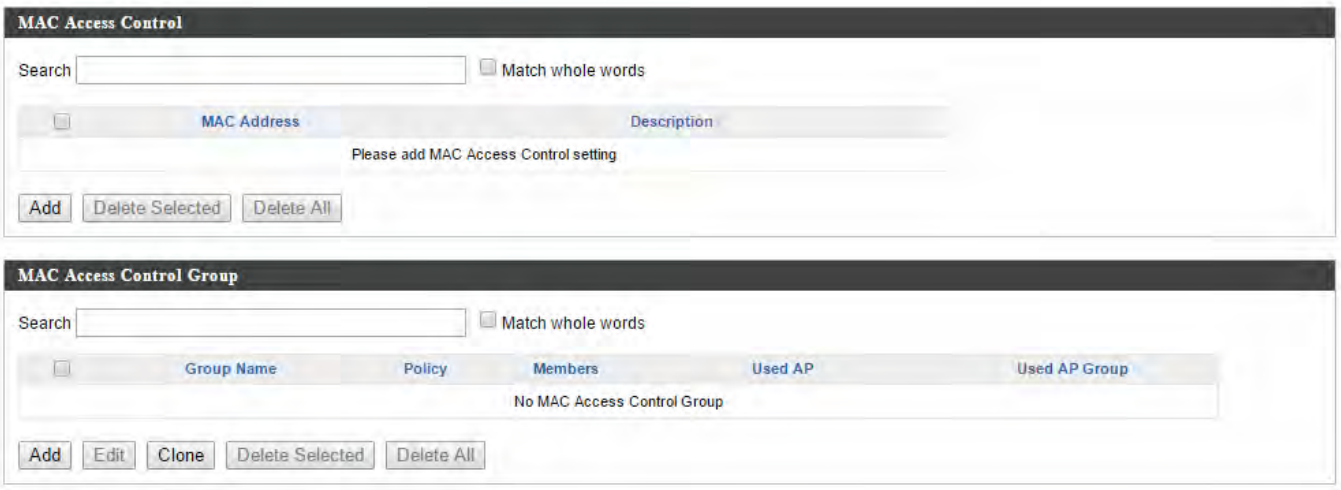
MAC Access Control is a security feature that can help to prevent unauthorized users from connecting to your access point.

This function allows you to define a list of network devices permitted to connect to the access point. Devices are each identified by their unique MAC address. If a device which is not on the list of permitted MAC addresses attempts to connect to the access point, it will be denied.

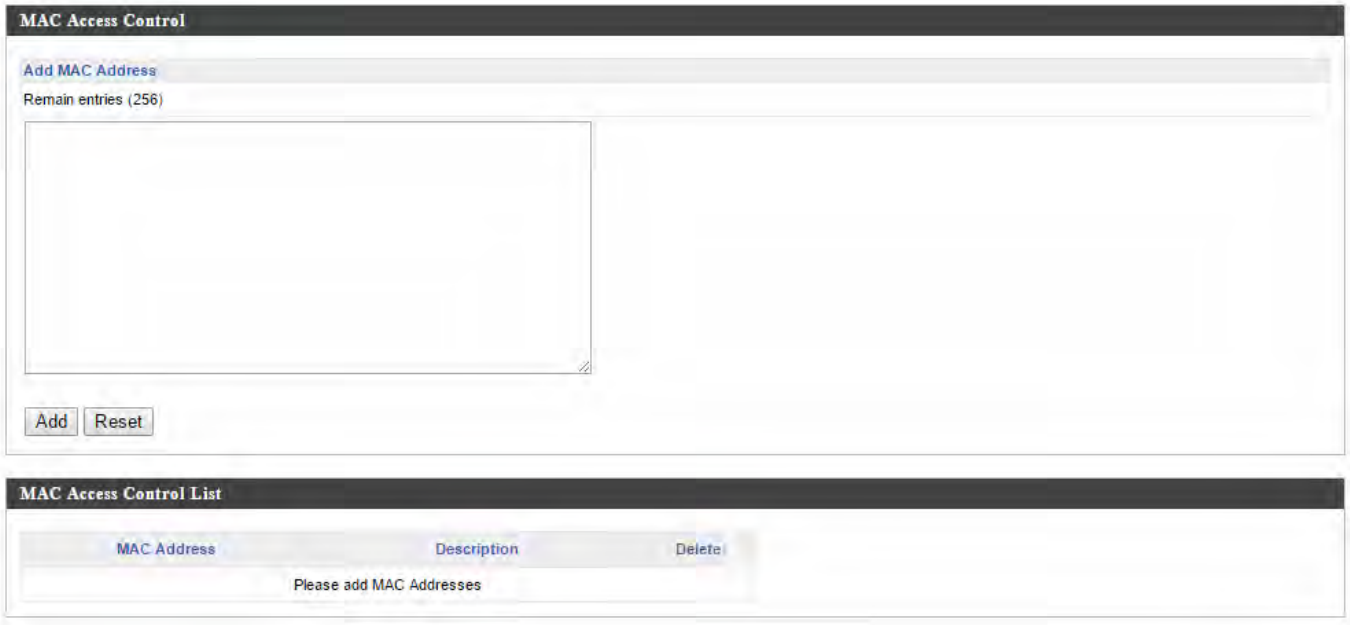
The Access Control panel displays information about MAC Access Control & MAC Access Control Groups and Groups and allows you to add or edit MAC Access Control & MAC Access Control Group settings. When you add an Access Control Group, it will be available for selection in **NMS Settings → Access Point** access point **Profile Settings** & access point group **Profile Group Settings** (**IV-5-1.**)

The **search** function can be used to locate a MAC address or MAC Access Control Group. Type in the search box and the list will update:

Make a selection using the check-boxes and click "**Edit**" or click "**Add**" to add a new MAC Address or MAC Access Control Group:



Add/Edit MAC Access Control



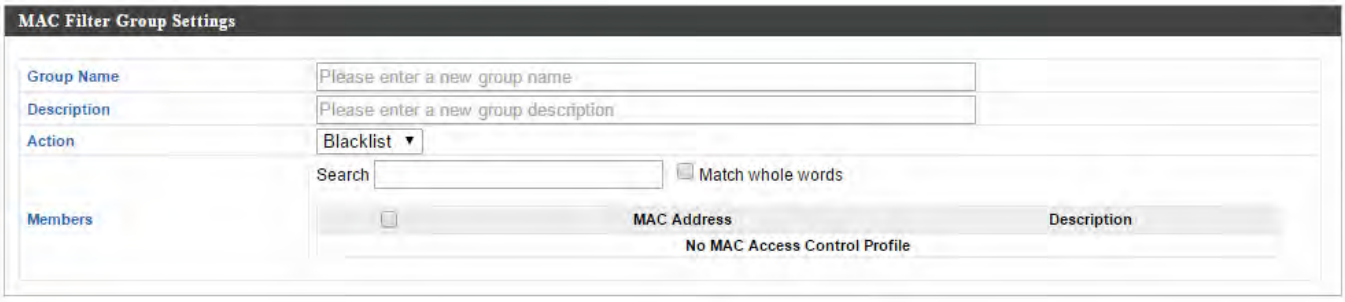
Add MAC Address	Enter a MAC address of computer or network device manually e.g. 'aa-bb-cc-dd-ee-ff' or enter multiple MAC addresses separated with commas, e.g. 'aa-bb-cc-dd-ee-ff,aa-bb-cc-dd-ee-gg'
Add	Click "Add" to add the MAC address to the MAC address filtering table.
Reset	Clear all fields.

MAC address entries will be listed in the "MAC Address Filtering Table". Select an entry using the "Select" checkbox.

Select	Delete selected or all entries from the table.
MAC Address	The MAC address is listed here.
Delete Selected	Delete the selected MAC address from the list.
Delete All	Delete all entries from the MAC address filtering table.
Export	Click "Export" to save a copy of the MAC filtering table. A new window will pop up for you to select a location to save the file.

Add/Edit MAC Access Control Group

When you add an Access Control Group, it will be available for selection in **NMS Settings → Access Point** access point **Profile Settings** & access point group **Profile Group Settings** (**IV-5-1.**)



MAC Filter Group Settings	
Group Name	Edit the MAC Access Control Group name.
Description	Enter a description of the MAC Access Control Group for reference.
Action	Select “Blacklist” to deny access to specified MAC addresses in the group, and select “Whitelist” to permit access to specified MAC address in the group.
Members	Add MAC addresses to the group.

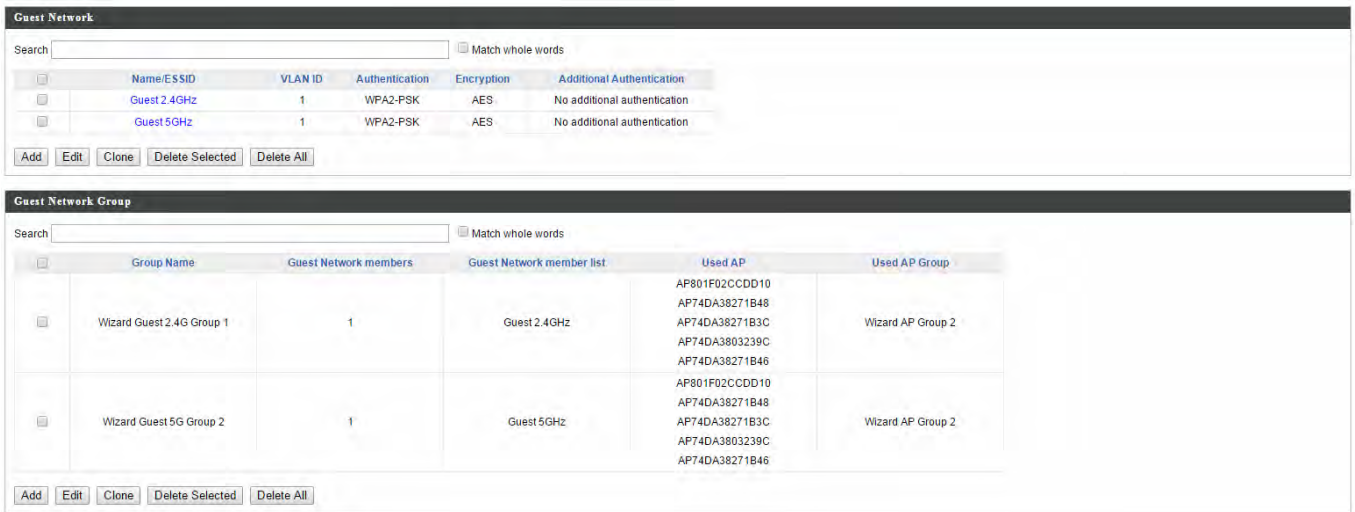
IV-5-5. Guest Network

You can setup an additional “Guest” Wi-Fi network so guest users can enjoy Wi-Fi connectivity without accessing your primary networks. The “Guest” screen displays settings for your guest Wi-Fi network.

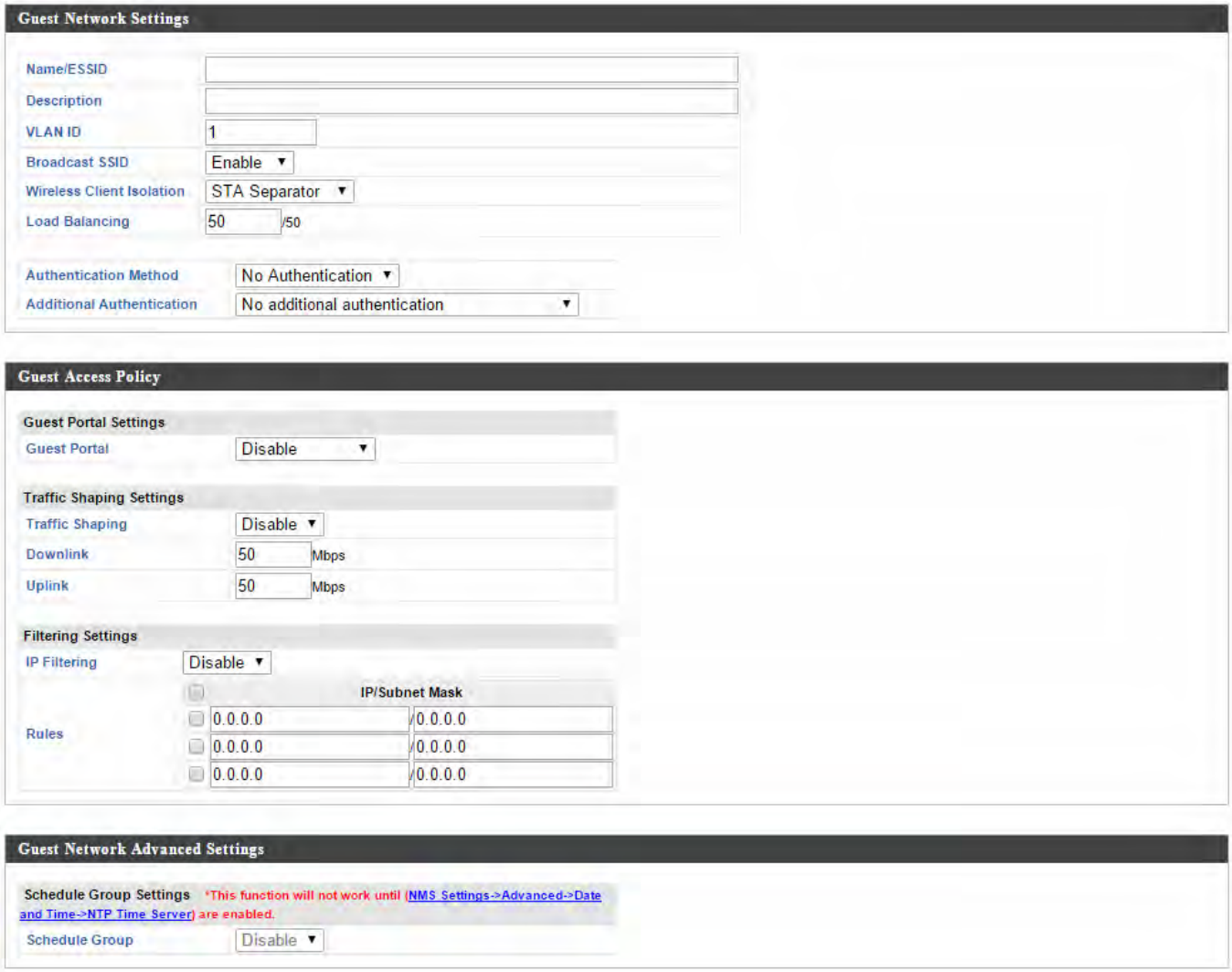
The Guest Network panel displays information about Guest Networks and Guest Network Groups and allows you to add or edit Guest Network and Guest Network Group settings. When you add a Guest Network Group, it will be available for selection in **NMS Settings → Access Point** access point **Profile Settings** & access point group **Profile Group Settings** (**IV-5-1.**)

The **search** function can be used to locate a Guest Network or Guest Network Group. Type in the search box and the list will update:

Make a selection using the check-boxes and click “**Edit**” or click “**Add**” to add a new Guest Network or Guest Network Group.



Add/Edit Guest Network



Guest Network Settings	
Name/ESSID	Edit the Guest Network name (SSID).
Description	Enter a description of the Guest Network for reference e.g. 2nd Floor Office HR.
VLAN ID	Specify the VLAN ID.
Broadcast SSID	Enable or disable SSID broadcast. When enabled, the SSID will be visible to clients as an available Wi-Fi network. When disabled, the SSID will not be visible as an available Wi-Fi network to clients – clients must manually enter the SSID in order to connect. A hidden (disabled) SSID is typically more secure than a visible (enabled) SSID.
Wireless Client Isolation	Enable or disable wireless client isolation. Wireless client isolation prevents clients

	connected to the access point from communicating with each other and improves security. Typically, this function is useful for corporate environments or public hot spots and can prevent brute force attacks on clients' usernames and passwords.
Load Balancing	Load balancing limits the number of wireless clients connected to an SSID. Set a load balancing value (maximum 50).
WMM	Enable or disable WMM (Wi-Fi Multimedia) traffic prioritizing.
Authentication Method	Select an authentication method from the drop down menu.
Additional Authentication	Select an additional authentication method from the drop down menu.

Various security options (wireless data encryption) are available. When data is encrypted, information transmitted wirelessly cannot be read by anyone who does not know the correct encryption key.

It's essential to configure wireless security in order to prevent unauthorised access to your network.

Select hard-to-guess passwords which include combinations of numbers, letters and symbols, and change your password regularly.

Please refer to **IV-6-2-3.Security** for more information on authentication and additional authentication types.

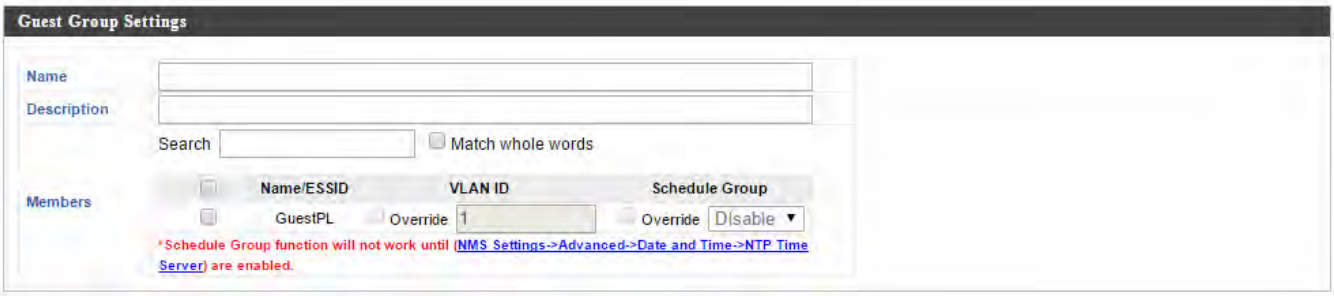
Guest Access Policy	
Guest Portal	Select a guest portal to use for this guest SSID. Guest portals can be configured in **NMS Settings → Guest Portal.**
Traffic Shaping	Enable or disable traffic shaping for the guest network.
Downlink	Enter a downlink limit in MB.
Uplink	Enter an uplink limit in MB.
IP Filtering	Select "Deny" or "Allow" to deny or allow specified IP addresses to access the guest network. Select "Disable" to disable IP

	filtering.
Rules	Enter IP addresses to be filtered according to the Deny or Allow rule specified above and check the box for each IP address to be filtered.

Guest Network Advanced Settings	
Schedule Group	Assign guest SSID to a specified schedule (schedule must be pre-configured in **NMS Settings → Schedule**.)

Add/Edit Guest Network Group

When you add a Guest Network Group, it will be available for selection in **NMS Settings → Access Point** access point **Profile Settings** & access point group **Profile Group Settings** (**IV-5-1.**)



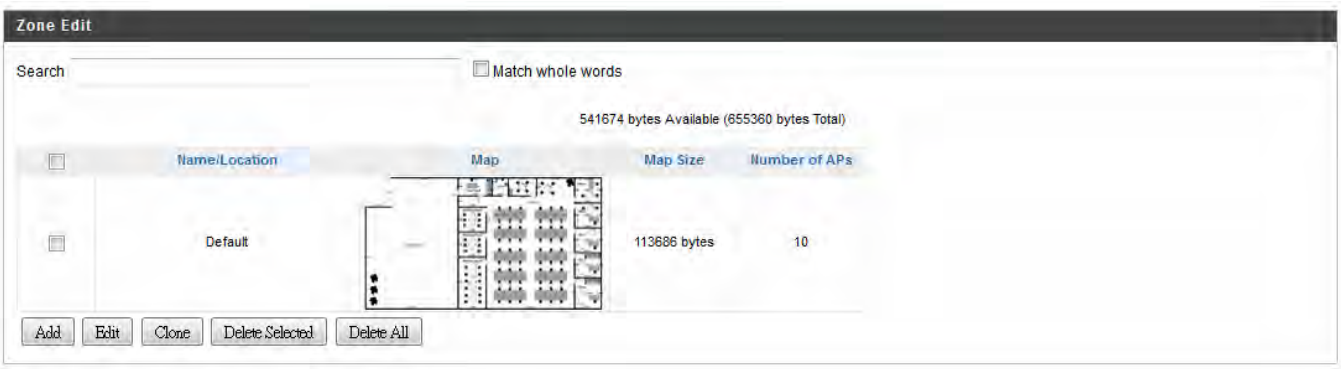
Guest Network Group Settings	
Group Name	Edit the Guest Network Group name.
Description	Enter a description of the Guest Network for reference.
Members	Add SSIDs to the Guest Network group. You can override individual VLAN ID & schedule settings and assign a different VLAN ID or schedule.

IV-5-6. Zone Edit

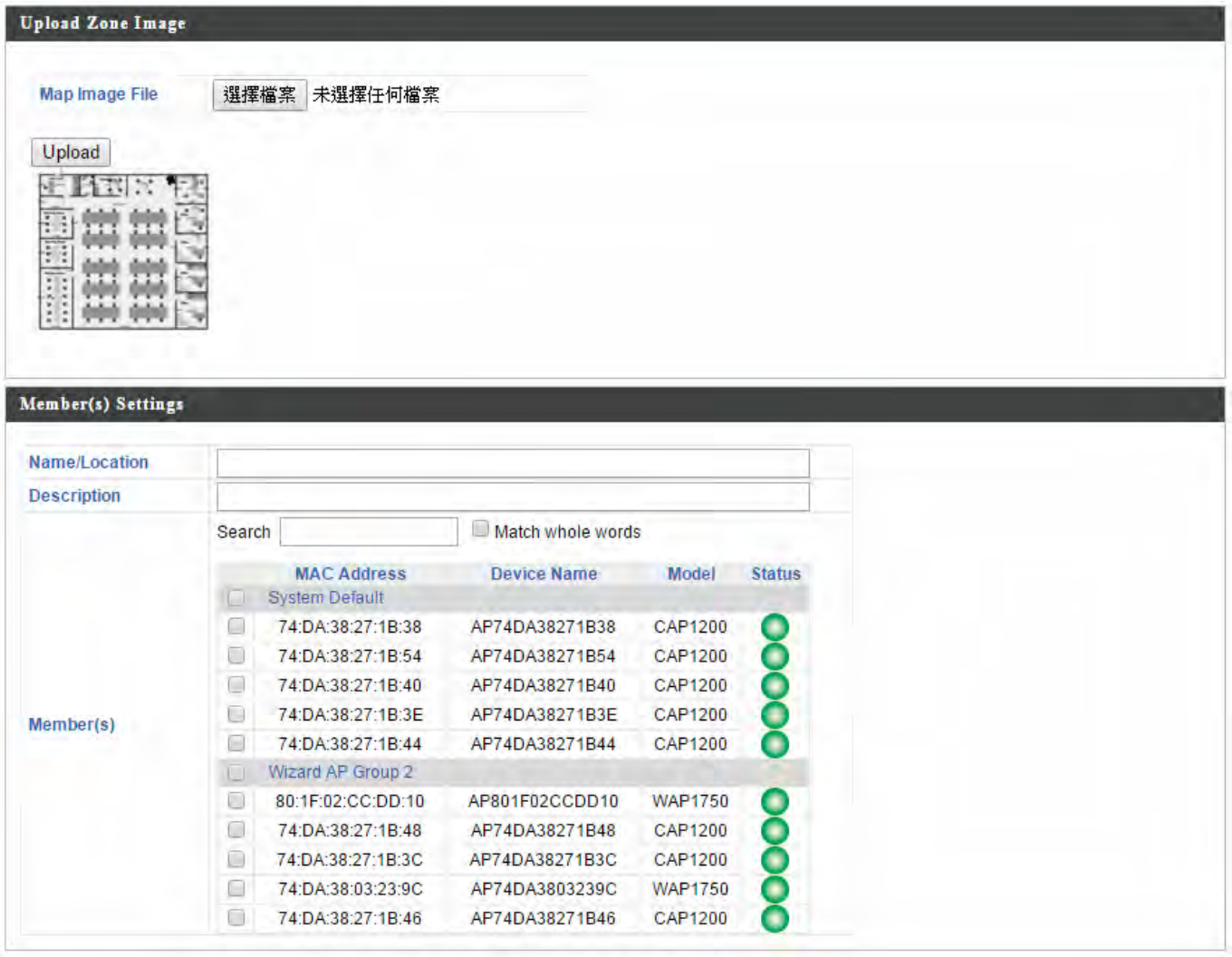
Zone Edit displays information about zones for use with the Zone Plan feature and allows you to add or edit zones.

The **search** function can be used to find existing zones. Type in the search box and the list will update:

Make a selection using the check-boxes and click "**Edit**" or click "**Add**" to add a new zone.



Add/Edit Zone

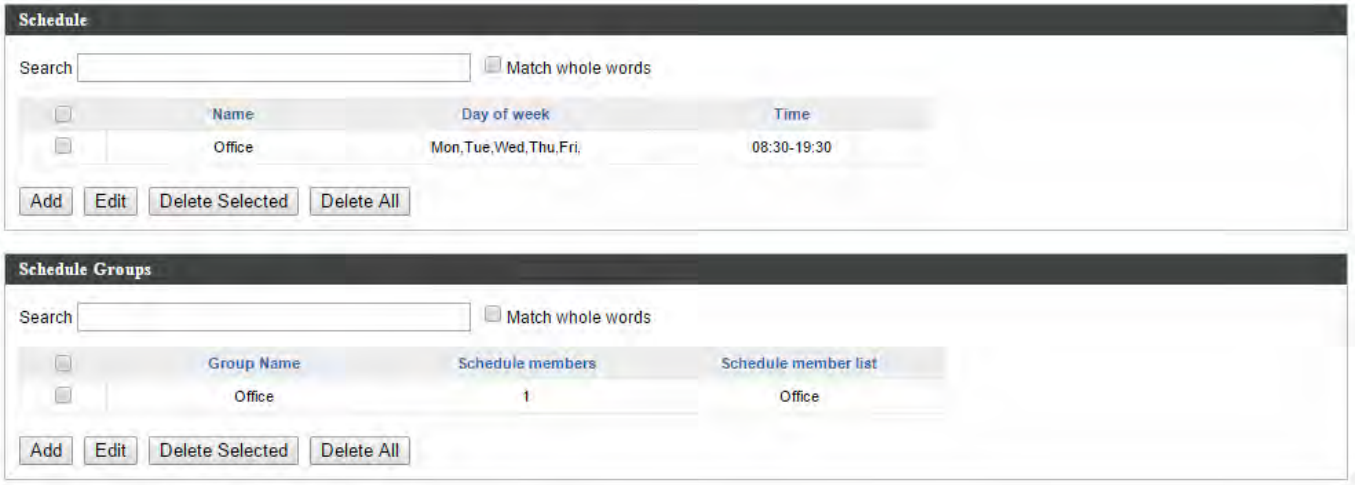


Upload Zone Image	
Choose File	Click to locate an image file to be displayed as a map in the Zone Plan feature. Typically a floor plan image is useful.
Zone Setting	
Name/Location	Enter a name of the zone/location.
Description	Enter a description of the zone/location for reference.
Members	Assign access points to the specified zone/location for use with the Zone Plan feature.

IV-5-7. Schedule

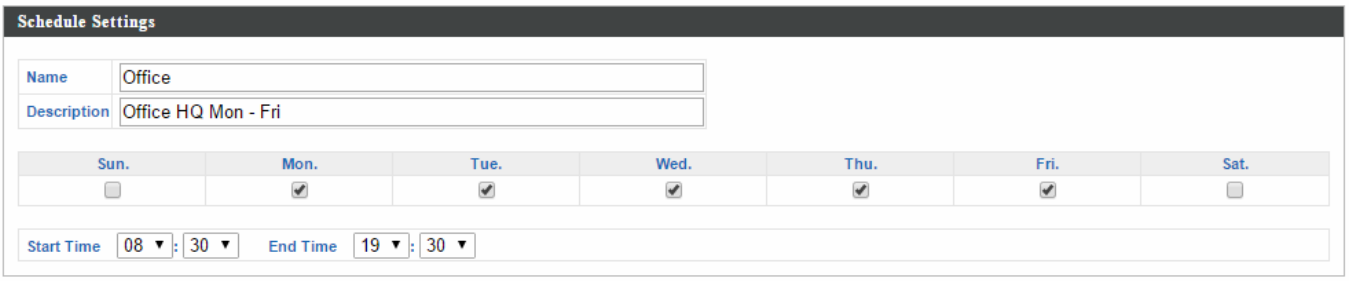
You can define schedules according to day, start time and end time - and group multiple schedules together into schedule groups.

Schedule groups can be assigned to **WLANs**, **WLAN Groups** & **Guest Network** at **NMS Settings → WLAN** and **NMS Settings → Guest Network**.

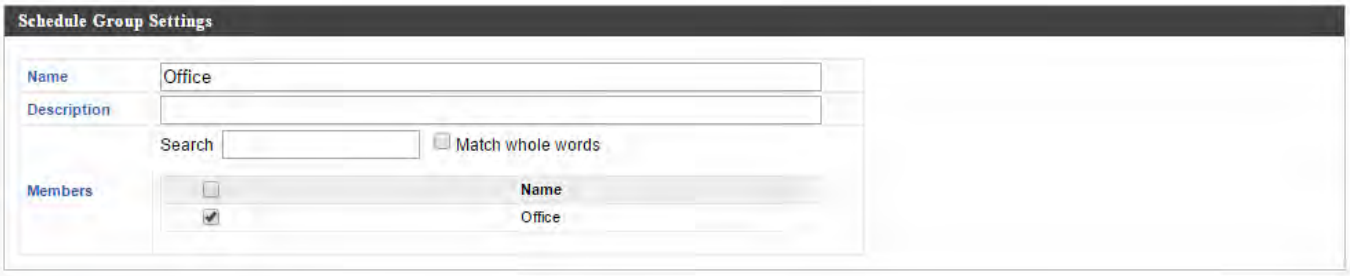


Add/Edit Schedule

Use the checkboxes and drop-down menus to setup your schedule.



Add/Edit Schedule Group



WLAN Group Settings	
Name	Edit the schedule group name.
Description	Enter a description of the schedule group for reference.
Members	Select individual schedules to include in the schedule group using the checkboxes.

IV-5-8. Device Monitoring

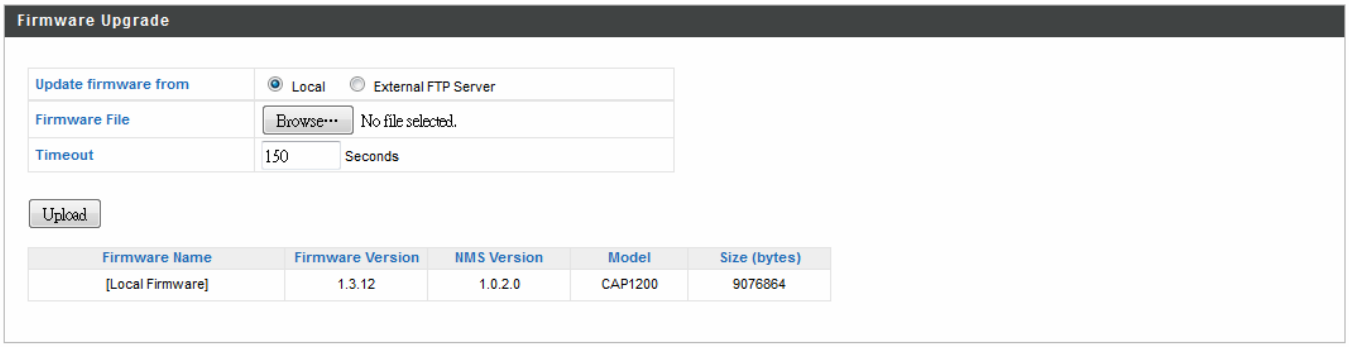
Device monitoring enables you to specify and monitor the status any IP devices on the network such as IP cameras. The description and status of each device is displayed in the table.

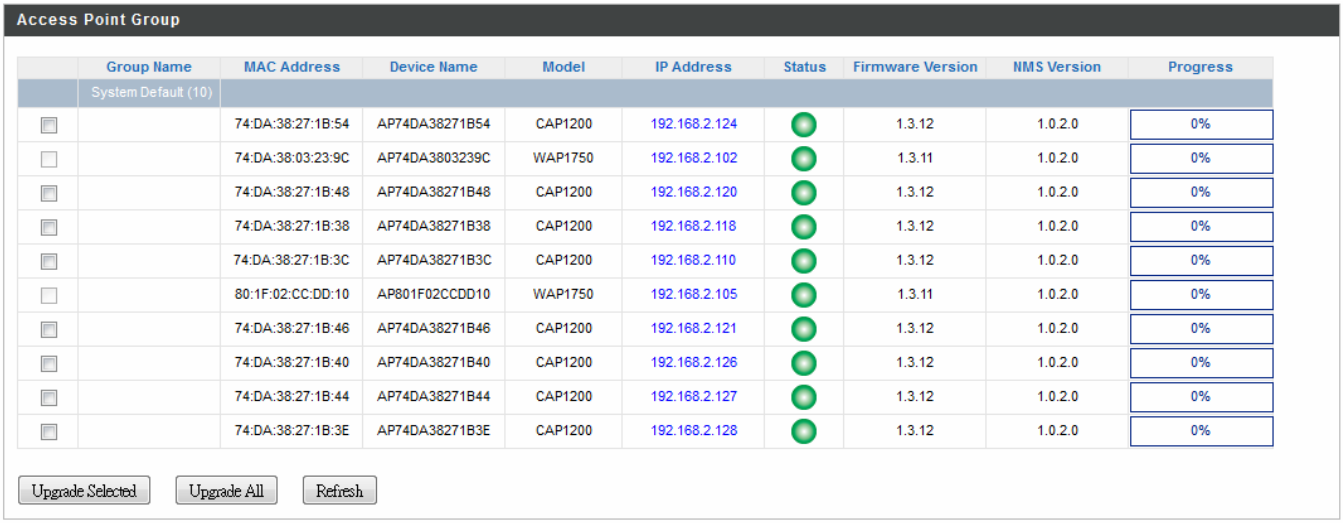
Add or **Edit** IP devices by entering the IP address.

IV-5-9. Firmware Upgrade

Firmware Upgrade allows you to upgrade firmware to Access Point Groups. First, upload the firmware file from a local disk or external FTP server: locate the file and click “Upload” – you can set a timeout limit for the upload as desired. The table below will display the *Firmware Name, Firmware Version, NMS Version, Model and Size*.

Then click “Upgrade All” to upgrade all access points in the Array or select Access Point groups from the list using check-boxes and click “Upgrade Selected” to upgrade only selected access points.





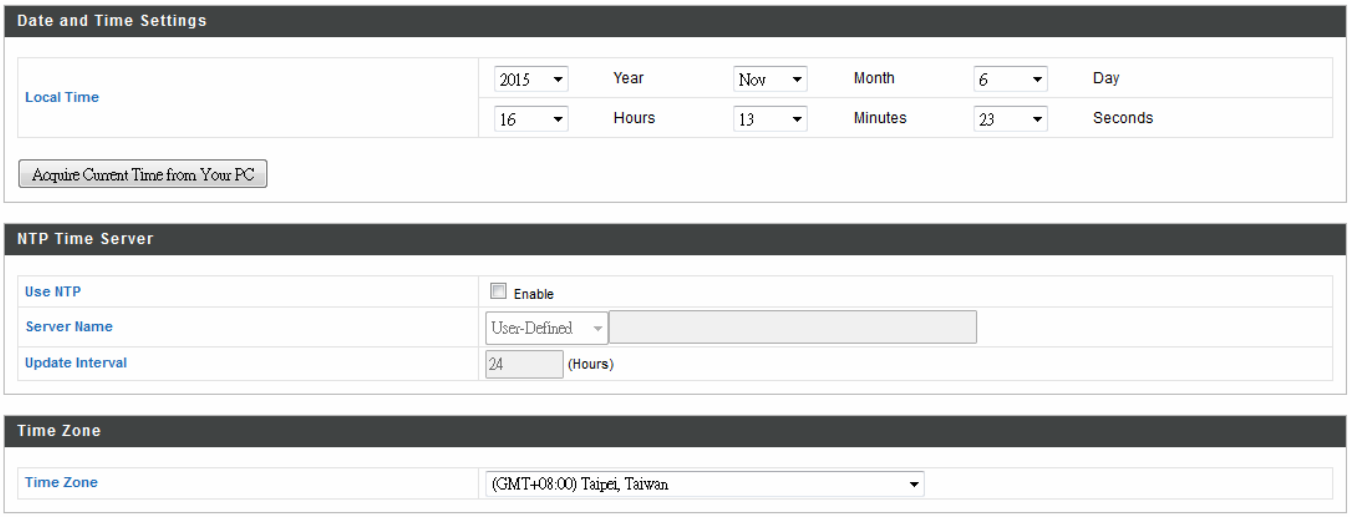
IV-5-10. Advanced

IV-5-10-1. System Security

Configure the NMS system login name and password.

IV-5-10-2. Date & Time

Configure the date & time settings of the AP Array. The date and time of the access points can be configured manually or can be synchronized with a time server.



Date and Time Settings	
Local Time	Set the access point's date and time manually using the drop down menus.
Acquire Current Time from your PC	Click "Acquire Current Time from Your PC" to enter the required values automatically according to your computer's current time and date.

NTP Time Server

Use NTP	The access point also supports NTP (Network Time Protocol) for automatic time and date setup.
Server Name	Enter the host name or IP address of the time server if you wish.
Update Interval	Specify a frequency (in hours) for the access point to update/synchronize with the NTP server.

Time Zone	
Time Zone	Select the time zone of your country/ region. If your country/region is not listed, please select another country/region whose time zone is the same as yours.

IV-6. Local Network

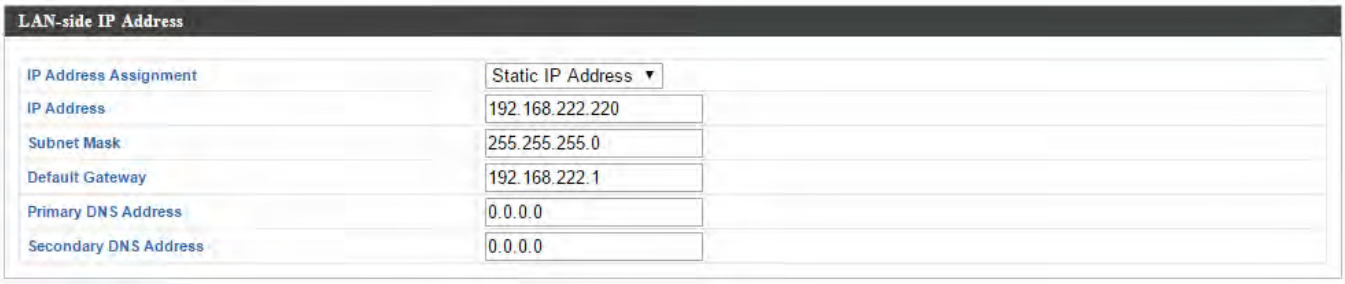
IV-6-1. Network Settings

IV-6-1-1. LAN-Side IP Address

The “LAN-side IP address” page allows you to configure your AP Controller on your Local Area Network (LAN). You can enable the access point to dynamically receive an IP address from your router’s DHCP server or you can specify a static IP address for your access point, as well as configure DNS servers. You can also set your AP Controller as a DHCP server to assign IP addresses to other devices on your LAN.

The access point’s default IP address is 192.168.2.2

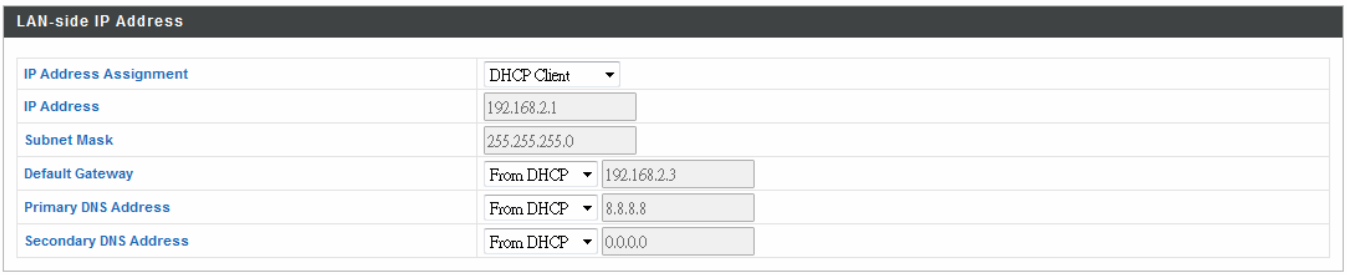
Disable other DHCP servers on the LAN if using AP Controllers DHCP Server.



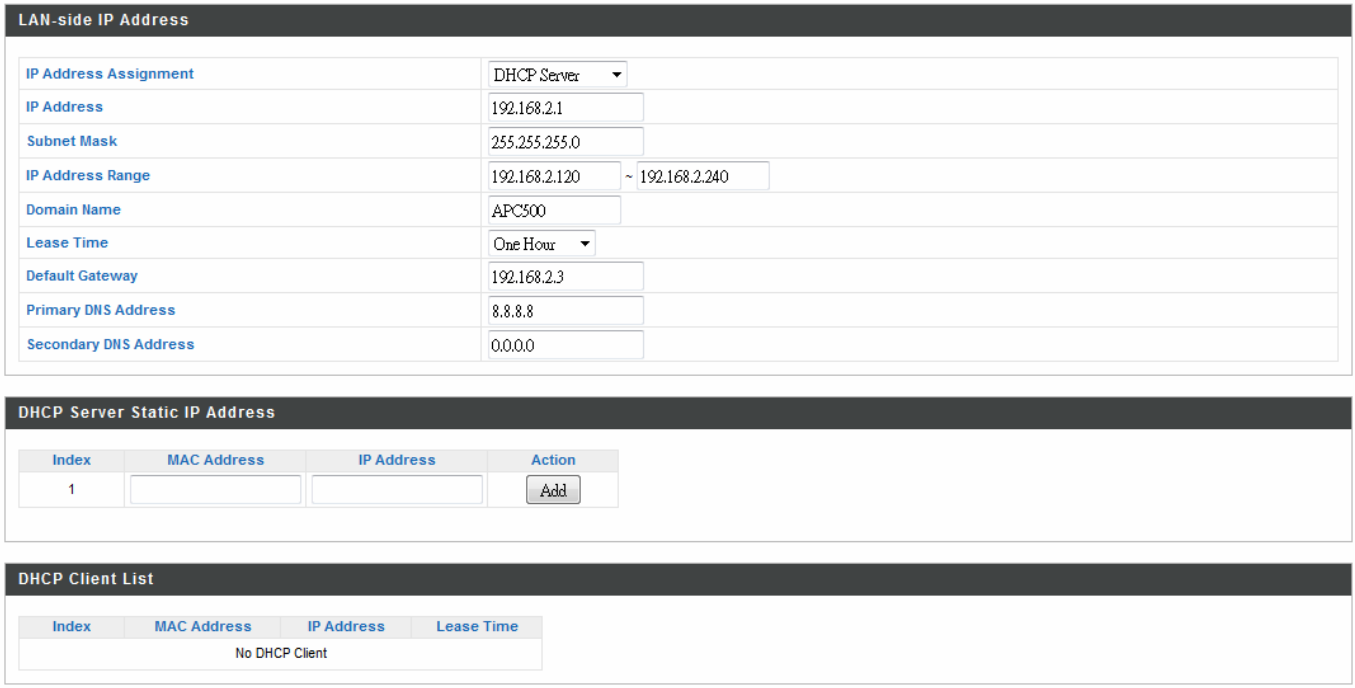
LAN-side IP Address	
IP Address Assignment	Select “Static IP” to manually specify a static/fixed IP address for your access point. Select “DHCP Client” for your access point to be assigned a dynamic IP address from your router’s DHCP server, or select “DHCP Server” for your access point to act as a DHCP server and assign IP addresses on your LAN.

Static IP Address	
IP Address	Specify the IP address here. This IP address will be assigned to your access point and will

	replace the default IP address.
Subnet Mask	Specify a subnet mask. The default value is 255.255.255.0
Default Gateway	For DHCP users, select “From DHCP” to get default gateway from your DHCP server or “User-Defined” to enter a gateway manually. For static IP users, the default value is blank.
Primary DNS Address	For static IP users, the default value is blank.
Secondary DNS Address	For static IP users, the default value is blank.



DHCP Client	
IP Address	When “DHCP Client” is selected this value cannot be modified.
Subnet Mask	When “DHCP Client” is selected this value cannot be modified.
Default Gateway	Select “From DHCP” or select “User-Defined” and enter a default gateway.
Primary DNS Address	Select “From DHCP” or select “User-Defined” and enter a primary DNS address.
Secondary DNS Address	Select “From DHCP” or select “User-Defined” and enter a secondary DNS address.



DHCP Server	
IP Address	Specify the IP address here. This IP address will be assigned to your access point and will replace the default IP address.
Subnet Mask	Specify a subnet mask. The default value is 255.255.255.0
IP Address Range	Enter the start and end IP address of the IP address range which your access point's DHCP server will assign to devices on the network.
Domain Name	Enter a domain name.
Lease Time	Select a lease time from the drop down menu. IP addresses will be assigned for this period of time.
Default Gateway	Enter a default gateway.
Primary DNS Address	Enter a primary DNS address.
Secondary DNS Address	Enter a secondary DNS address.

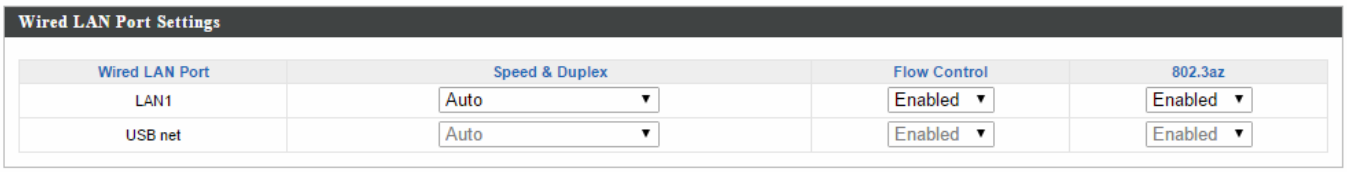
Your access point's DHCP server can be configured to assign static (fixed) IP addresses to specified network devices, identified by their unique MAC address:

DHCP Server Static IP Address	
MAC Address	Enter the MAC address of the network device

	to be assigned a static IP address.
IP Address	Specify the IP address to assign the device.
Add	Click to assign the IP address to the device.

IV-6-1-2. LAN Port Settings

The “LAN Port” page allows you to configure the settings for your AP Controllers wired LAN (Ethernet) ports.

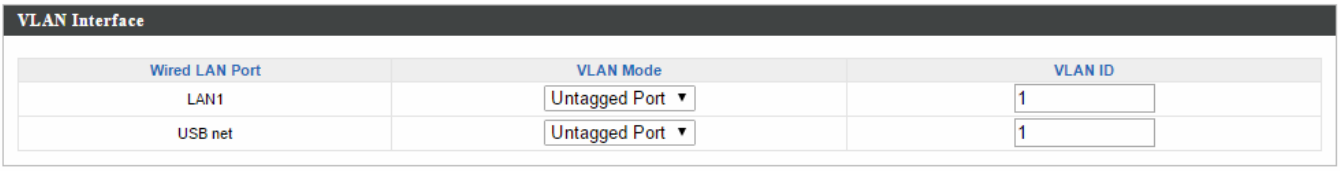


Wired LAN Port	Identifies LAN port. USB is the LAN port attached via mini USB adapter.
Speed & Duplex	Select a speed & duplex type for specified LAN port, or use the “Auto” value. LAN ports can operate up to 1000Mbps and full-duplex enables simultaneous data packets transfer/receive.
Flow Control	Enable/disable flow control. Flow control can pause new session request until current data processing is complete, in order to avoid device overloads under heavy traffic.
802.3az	Enable/disable 802.3az. 802.3az is an Energy Efficient Ethernet feature which disables unused interfaces to reduce power usage.

IV-6-1-3.VLAN

The “VLAN” (Virtual Local Area Network) page enables you to configure VLAN settings. A VLAN is a local area network which maps workstations virtually instead of physically and allows you to group together or isolate users from each other. VLAN IDs 1 – 4095 are supported.

VLAN IDs in the range 1 – 4095 are supported.



VLAN Interface	
Wired LAN Port	Identifies LAN port. USB is the LAN port attached via mini USB adapter.
VLAN Mode	Select “Tagged Port” or “Untagged Port” for specified LAN interface.
VLAN ID	Set a VLAN ID for specified interface, if “Untagged Port” is selected.

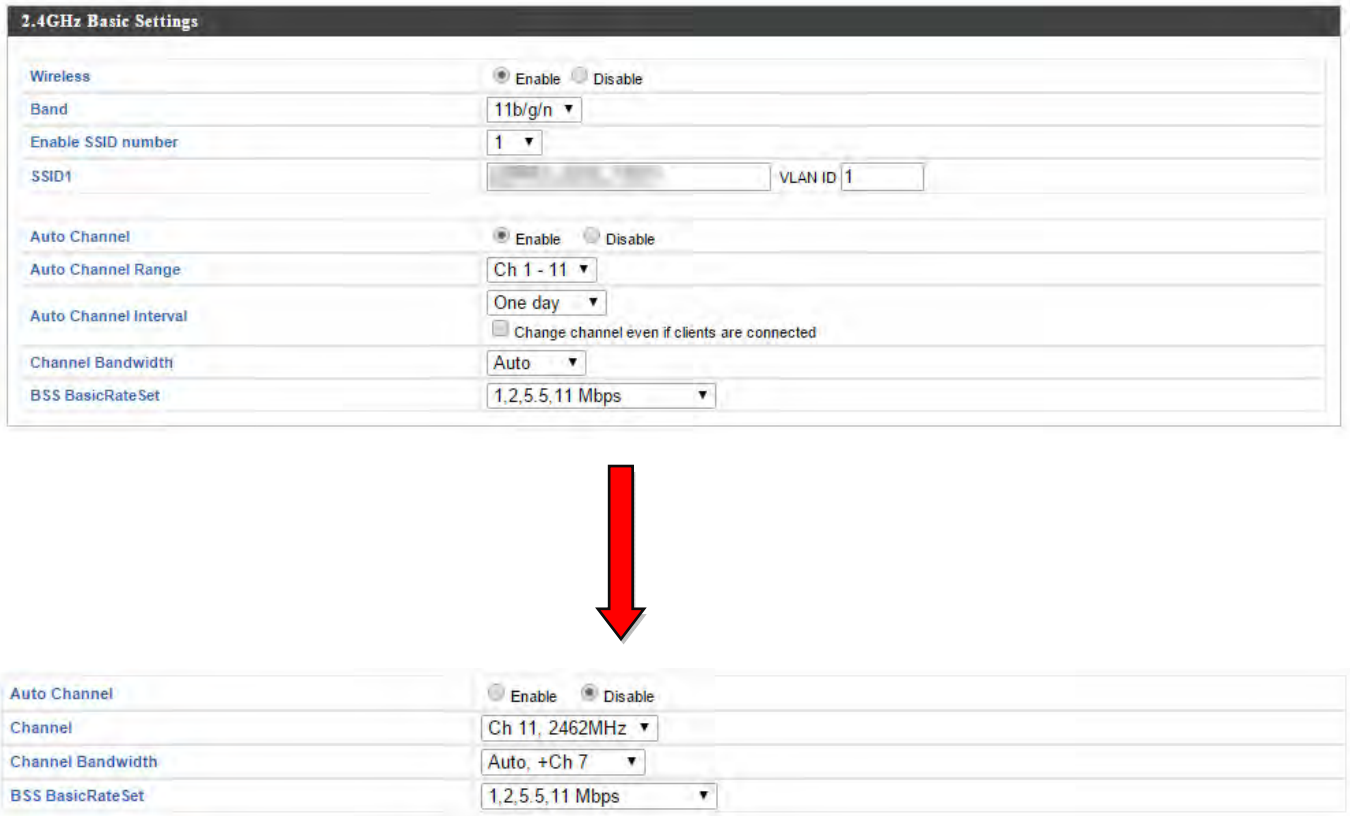
Management VLAN	
VLAN ID	Specify the VLAN ID of the management VLAN. Only the hosts belonging to the same VLAN can manage the device.

IV-6-2. 2.4GHz 11bgn

The “2.4GHz 11bgn” menu allows you to view and configure information for your access point’s 2.4GHz wireless network across four categories: Basic, Advanced, Security and WDS.

IV-6-2-1. Basic

The “Basic” screen displays basic settings for your access point’s 2.4GHz Wi-Fi network(s).



Wireless	Enable or disable the access point’s 2.4GHz wireless radio. When disabled, no 2.4GHz SSIDs will be active.
Band	Select the wireless standard used for the access point. Combinations of 802.11b, 802.11g & 802.11n can be selected.
Enable SSID Number	Select how many SSIDs to enable for the 2.4GHz frequency from the drop down menu. A maximum of 16 can be enabled.
SSID#	Enter the SSID name for the specified SSID (up

	to 16). The SSID can consist of any combination of up to 32 alphanumeric characters.
VLAN ID	Specify a VLAN ID for each SSID.
Auto Channel	Enable/disable auto channel selection. Auto channel selection will automatically set the wireless channel for the access point's 2.4GHz frequency based on availability and potential interference. When disabled, select a channel manually as shown in the next table.
Auto Channel Range	Select a range from which the auto channel setting (above) will choose a channel.
Auto Channel Interval	Specify a frequency for how often the auto channel setting will check/reassign the wireless channel. Check/uncheck the "Change channel even if clients are connected" box according to your preference.
Channel Bandwidth	Set the channel bandwidth: 20MHz (lower performance but less interference), 40MHz (higher performance but potentially higher interference) or Auto (automatically select based on interference level).
BSS BasicRateSet	Set a Basic Service Set (BSS) rate: this is a series of rates to control communication frames for wireless clients.

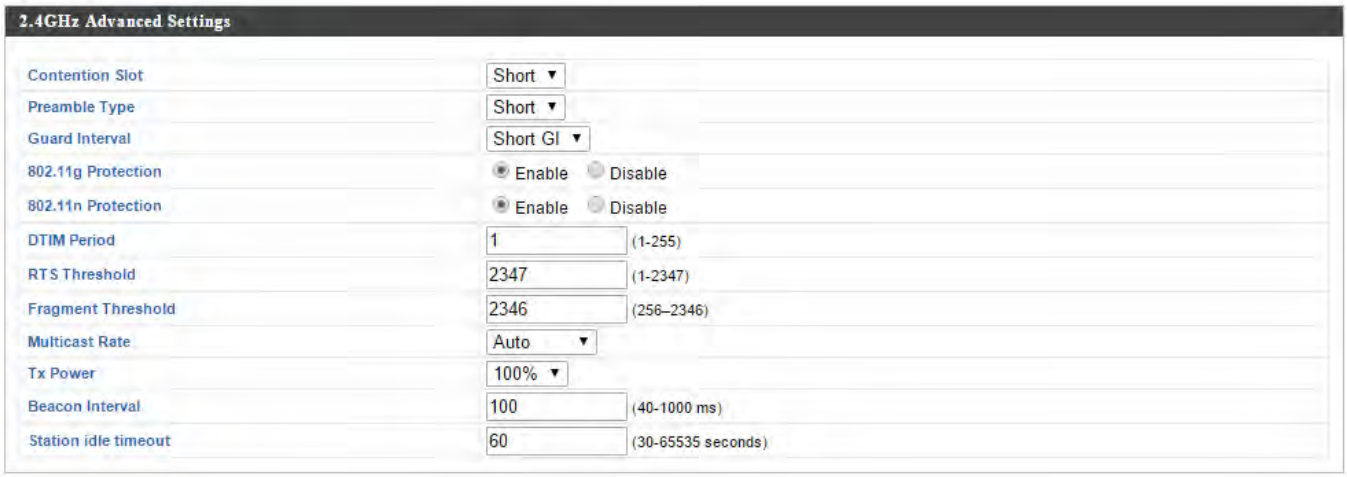
When auto channel is disabled, select a wireless channel manually:

Channel	Select a wireless channel from 1 – 11.
Channel Bandwidth	Set the channel bandwidth: 20MHz (lower performance but less interference), 40MHz (higher performance but potentially higher interference) or Auto (automatically select based on interference level).
BSS BasicRate Set	Set a Basic Service Set (BSS) rate: this is a series of rates to control communication frames for wireless clients.

IV-6-2-2. Advanced

These settings are for experienced users only. Please do not change any of the values on this page unless you are already familiar with these functions.

Changing these settings can adversely affect the performance of your access point.



Contention Slot	Select “Short” or “Long” – this value is used for contention windows in WMM (see **IV-6-7. WMM**).
Preamble Type	Set the wireless radio preamble type. The preamble type in 802.11 based wireless communication defines the length of the CRC (Cyclic Redundancy Check) block for communication between the access point and roaming wireless adapters. The default value is “Short Preamble”.
Guard Interval	Set the guard interval. A shorter interval can improve performance.
802.11g Protection	Enable/disable 802.11g protection, which increases reliability but reduces bandwidth (clients will send Request to Send (RTS) to access point, and access point will broadcast Clear to Send (CTS), before a packet is sent from client.)

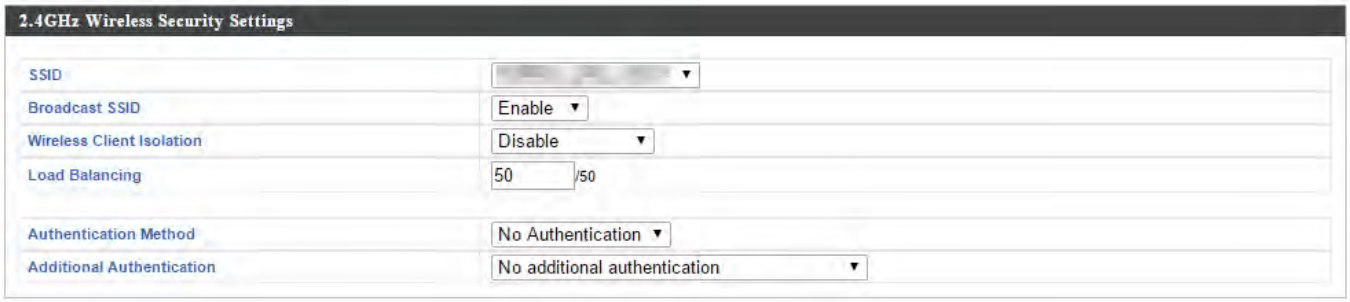
802.11n Protection	Enable/disable 802.11n protection, which increases reliability but reduces bandwidth (clients will send Request to Send (RTS) to access point, and access point will broadcast Clear to Send (CTS), before a packet is sent from client.)
DTIM Period	Set the DTIM (delivery traffic indication message) period value of the wireless radio. The default value is 1.
RTS Threshold	Set the RTS threshold of the wireless radio. The default value is 2347.
Fragment Threshold	Set the fragment threshold of the wireless radio. The default value is 2346.
Multicast Rate	Set the transfer rate for multicast packets or use the “Auto” setting.
Tx Power	Set the power output of the wireless radio. You may not require 100% output power. Setting a lower power output can enhance security since potentially malicious/unknown users in distant areas will not be able to access your signal.
Beacon Interval	Set the beacon interval of the wireless radio. The default value is 100.
Station idle timeout	Set the interval for keepalive messages from the access point to a wireless client to verify if the station is still alive/active.

IV-6-2-3.Security

The access point provides various security options (wireless data encryption). When data is encrypted, information transmitted wirelessly cannot be read by anyone who does not know the correct encryption key.

It's essential to configure wireless security in order to prevent unauthorised access to your network.

Select hard-to-guess passwords which include combinations of numbers, letters and symbols, and change your password regularly.



SSID	Select which SSID to configure security settings for.
Broadcast SSID	Enable or disable SSID broadcast. When enabled, the SSID will be visible to clients as an available Wi-Fi network. When disabled, the SSID will not be visible as an available Wi-Fi network to clients – clients must manually enter the SSID in order to connect. A hidden (disabled) SSID is typically more secure than a visible (enabled) SSID.
Wireless Client Isolation	Enable or disable wireless client isolation. Wireless client isolation prevents clients connected to the access point from communicating with each other and improves security. Typically, this function is useful for corporate environments or public hot spots and can prevent brute force attacks on clients' usernames and passwords.

Load Balancing	Load balancing limits the number of wireless clients connected to an SSID. Set a load balancing value (maximum 50).
Authentication Method	Select an authentication method from the drop down menu and refer to the information below appropriate for your method.
Additional Authentication	Select an additional authentication method from the drop down menu and refer to the information below (**IV-6-2-3-6.**) appropriate for your method.

IV-6-2-3-1. No Authentication

Authentication is disabled and no password/key is required to connect to the access point.

Disabling wireless authentication is not recommended. When disabled, anybody within range can connect to your device's SSID.

IV-6-2-3-2. WEP

WEP (Wired Equivalent Privacy) is a basic encryption type. For a higher level of security consider using WPA encryption.

Key Length	Select 64-bit or 128-bit. 128-bit is more secure than 64-bit and is recommended.
Key Type	Choose from "ASCII" (any alphanumerical character 0-9, a-z and A-Z) or "Hex" (any characters from 0-9, a-f and A-F).
Default Key	Select which encryption key (1 – 4 below) is the default key. For security purposes, you can set up to four keys (below) and change which is the default key.
Encryption Key 1 – 4	Enter your encryption key/password according to the format you selected above.

IV-6-2-3-3. IEEE802.1x/EAP

Key Length	Select 64-bit or 128-bit. 128-bit is more secure than 64-bit and is recommended.

IV-6-2-3-4. WPA-PSK

WPA-PSK is a secure wireless encryption type with strong data protection and user authentication, utilizing 128-bit encryption keys.

WPA Type	Select from WPA/WPA2 Mixed Mode-PSK, WPA2 or WPA only. WPA2 is safer than WPA only, but not supported by all wireless clients. Please make sure your wireless client supports your selection.
Encryption	Select “TKIP/AES Mixed Mode” or “AES” encryption type.
Key Renewal Interval	Specify a frequency for key renewal in minutes.
Pre-Shared Key Type	Choose from “Passphrase” (8 – 63 alphanumeric characters) or “Hex” (up to 64 characters from 0-9, a-f and A-F).
Pre-Shared Key	Please enter a security key/password according to the format you selected above.

IV-6-2-3-5. WPA-EAP

WPA Type	Select from WPA/WPA2 Mixed Mode-EAP, WPA2-EAP or WPA-EAP.
Encryption	Select “TKIP/AES Mixed Mode” or “AES” encryption type.
Key Renewal Interval	Specify a frequency for key renewal in minutes.

WPA-EAP must be disabled to use MAC-RADIUS authentication.

IV-6-2-3-6. Additional Authentication

Additional wireless authentication methods can also be used:

MAC Address Filter
Restrict wireless clients access based on MAC address specified in the MAC filter table.

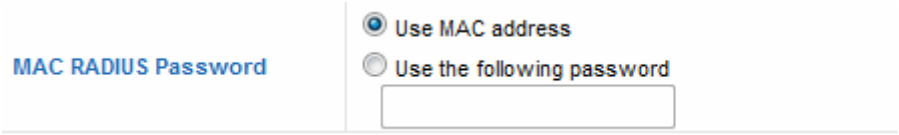
See** IV-6-6.MAC Filter **to configure MAC filtering.

MAC Filter & MAC-RADIUS Authentication
Restrict wireless clients access using both of the above MAC filtering & RADIUS authentication methods.

MAC-RADIUS Authentication
Restrict wireless clients access based on MAC address via a RADIUS server, or password authentication via a RADIUS server.

See** IV-6-5.RADIUS **to configure RADIUS servers.

WPS must be disabled to use MAC-RADIUS authentication. See** IV-6-4**. for WPS settings.



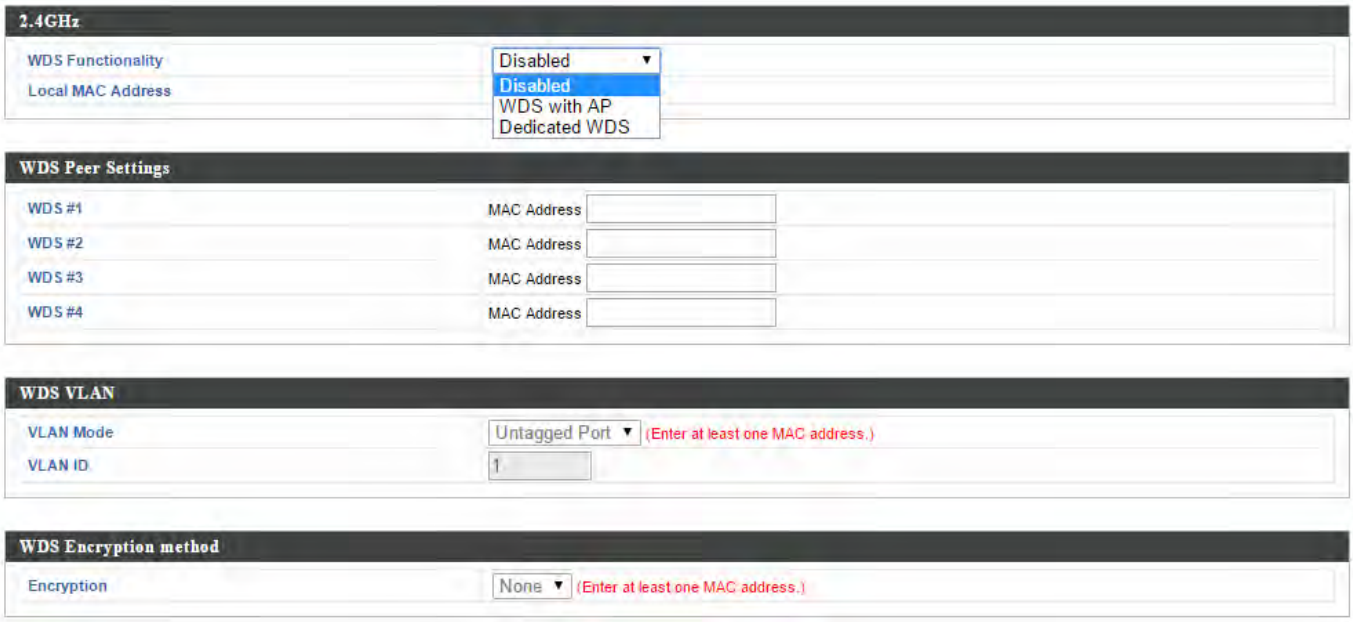
MAC RADIUS Password	Select whether to use MAC address or password authentication via RADIUS server. If you select “Use the following password”, enter the password in the field below. The password should match the “Shared Secret” used in **IV-6-5. RADIUS**.

IV-6-2-4.WDS

Wireless Distribution System (WDS) can bridge/repeat access points together in an extended network. WDS settings can be configured as shown below.

When using WDS, configure the IP address of each access point to be in the same subnet and ensure there is only one active DHCP server among connected access points, preferably on the WAN side.

WDS must be configured on each access point, using correct MAC addresses. All access points should use the same wireless channel and encryption method.



2.4GHz	
WDS Functionality	Select “WDS with AP” to use WDS with access point or “WDS Dedicated Mode” to use WDS and also block communication with regular wireless clients. When WDS is used, each access point should be configured with corresponding MAC addresses, wireless channel and wireless encryption method.
Local MAC Address	Displays the MAC address of your access point.

WDS Peer Settings	
WDS #	Enter the MAC address for up to four other WDS devices you wish to connect.

WDS VLAN	
VLAN Mode	Specify the WDS VLAN mode to “Untagged Port” or “Tagged Port”.
VLAN ID	Specify the WDS VLAN ID when “Untagged Port” is selected above.

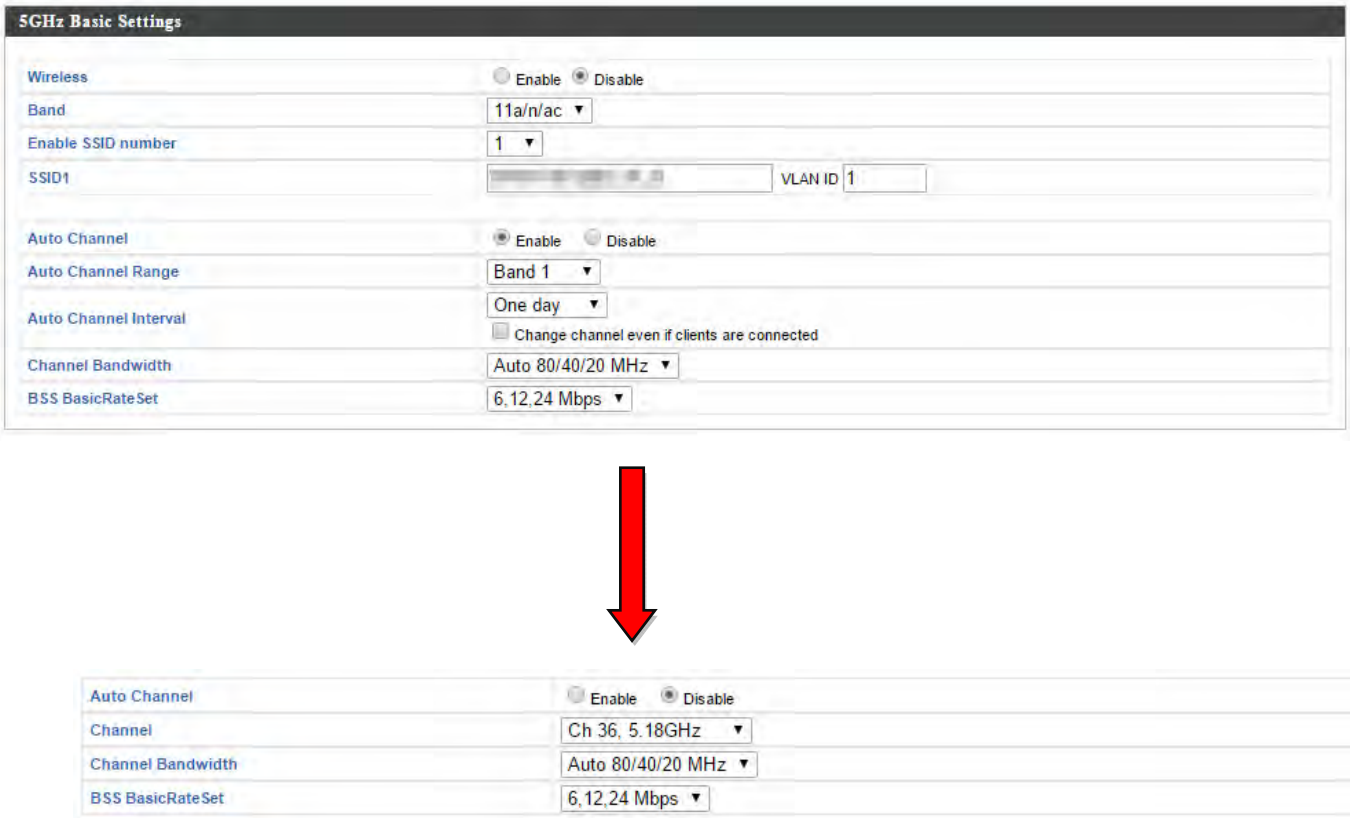
WDS Encryption method	
Encryption	Select whether to use “None” or “AES” encryption and enter a pre-shared key for AES consisting of 8-63 alphanumeric characters.

IV-6-3. 5GHz 11ac 11an

The “5GHz 11ac 11an” menu allows you to view and configure information for your access point’s 5GHz wireless network across four categories: Basic, Advanced, Security and WDS.

IV-6-3-1. Basic

The “Basic” screen displays basic settings for your access point’s 5GHz Wi-Fi network (s).



Wireless	Enable or disable the access point’s 5GHz wireless radio. When disabled, no 5GHz SSIDs will be active.
Band	Select the wireless standard used for the access point. Combinations of 802.11a, 802.11n & 802.11ac can be selected.
Enable SSID Number	Select how many SSIDs to enable for the 5GHz frequency from the drop down menu. A maximum of 16 can be enabled.

SSID#	Enter the SSID name for the specified SSID (up to 16). The SSID can consist of any combination of up to 32 alphanumeric characters.
VLAN ID	Specify a VLAN ID for each SSID.
Auto Channel	Enable/disable auto channel selection. Auto channel selection will automatically set the wireless channel for the access point's 5GHz frequency based on availability and potential interference. When disabled, select a channel manually as shown in the next table.
Auto Channel Range	Select a range from which the auto channel setting (above) will choose a channel.
Auto Channel Interval	Specify a frequency for how often the auto channel setting will check/reassign the wireless channel. Check/uncheck the "Change channel even if clients are connected" box according to your preference.
Channel Bandwidth	Set the channel bandwidth: 20MHz (lower performance but less interference), Auto 40/20MHz or Auto 80/40/20MHz (automatically select based on interference level).
BSS BasicRate Set	Set a Basic Service Set (BSS) rate: this is a series of rates to control communication frames for wireless clients.

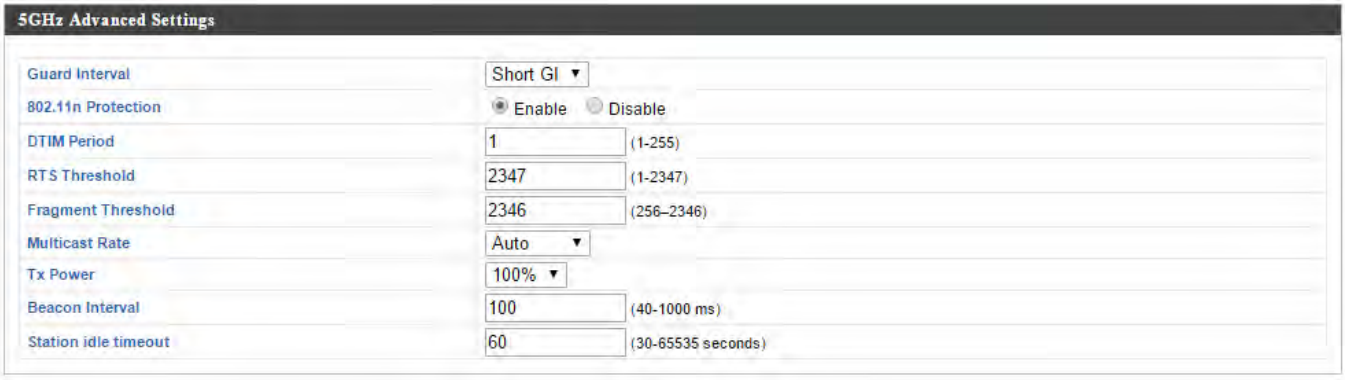
When auto channel is disabled, select a wireless channel manually:

Channel	Select a wireless channel.
Channel Bandwidth	Set the channel bandwidth: 20MHz (lower performance but less interference), Auto 40/20MHz or Auto 80/40/20MHz (automatically select based on interference level).
BSS BasicRate Set	Set a Basic Service Set (BSS) rate: this is a series of rates to control communication frames for wireless clients.

IV-6-3-2. Advanced

These settings are for experienced users only. Please do not change any of the values on this page unless you are already familiar with these functions.

Changing these settings can adversely affect the performance of your access point.



Guard Interval	Set the guard interval. A shorter interval can improve performance.
802.11n Protection	Enable/disable 802.11n protection, which increases reliability but reduces bandwidth (clients will send Request to Send (RTS) to access point, and access point will broadcast Clear to Send (CTS), before a packet is sent from client.)
DTIM Period	Set the DTIM (delivery traffic indication message) period value of the wireless radio. The default value is 1.
RTS Threshold	Set the RTS threshold of the wireless radio. The default value is 2347.
Fragment Threshold	Set the fragment threshold of the wireless radio. The default value is 2346.
Multicast Rate	Set the transfer rate for multicast packets or use the “Auto” setting.
Tx Power	Set the power output of the wireless radio. You may not require 100% output power. Setting a lower power output can enhance security since potentially malicious/unknown users in distant areas will not be able to access your signal.

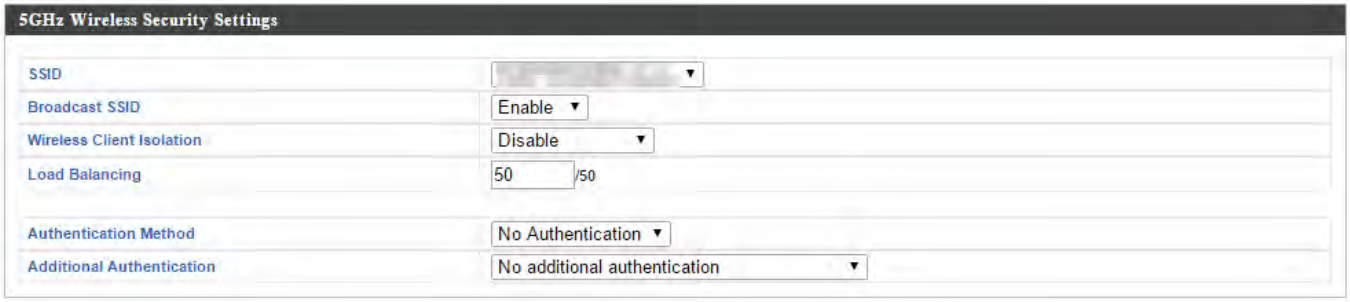
Beacon Interval	Set the beacon interval of the wireless radio. The default value is 100.
Station idle timeout	Set the interval for keepalive messages from the access point to a wireless client to verify if the station is still alive/active.

IV-6-3-3. Security

The access point provides various security options (wireless data encryption). When data is encrypted, information transmitted wirelessly cannot be read by anyone who does not know the correct encryption key.

It's essential to configure wireless security in order to prevent unauthorised access to your network.

Select hard-to-guess passwords which include combinations of numbers, letters and symbols, and change your password regularly.



SSID	Select which SSID to configure security settings for.
Broadcast SSID	Enable or disable SSID broadcast. When enabled, the SSID will be visible to clients as an available Wi-Fi network. When disabled, the SSID will not be visible as an available Wi-Fi network to clients – clients must manually enter the SSID in order to connect. A hidden (disabled) SSID is typically more secure than a visible (enabled) SSID.
Wireless Client Isolation	Enable or disable wireless client isolation. Wireless client isolation prevents clients connected to the access point from communicating with each other and improves security. Typically, this function is useful for corporate environments or public hot spots and can prevent brute force attacks on clients' usernames and passwords.

Load Balancing	Load balancing limits the number of wireless clients connected to an SSID. Set a load balancing value (maximum 50).
Authentication Method	Select an authentication method from the drop down menu and refer to the information below appropriate for your method.
Additional Authentication	Select an additional authentication method from the drop down menu and refer to the information below appropriate for your method.

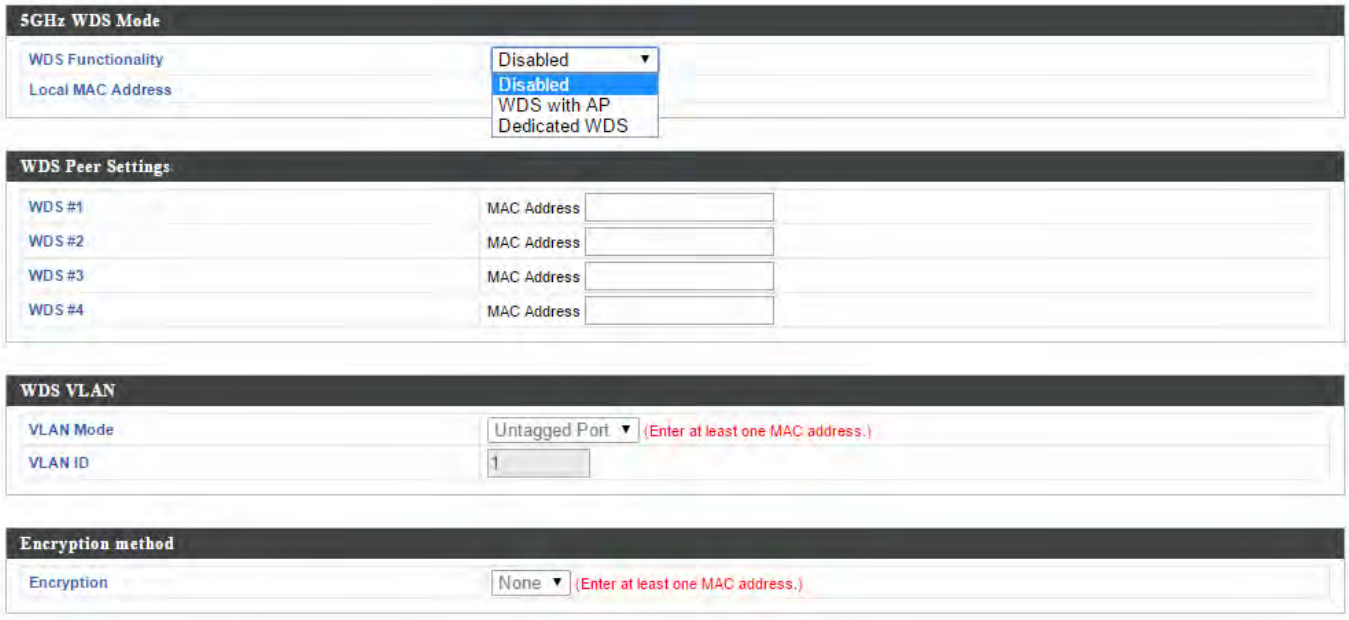
Please refer back to **IV-6-2-3. Security** for more information on authentication and additional authentication types.

IV-6-3-4.WDS

Wireless Distribution System (WDS) can bridge/repeat access points together in an extended network. WDS settings can be configured as shown below.

When using WDS, configure the IP address of each access point to be in the same subnet and ensure there is only one active DHCP server among connected access points, preferably on the WAN side.

WDS must be configured on each access point, using correct MAC addresses. All access points should use the same wireless channel and encryption method.



5GHz WDS Mode	
WDS Functionality	Select “WDS with AP” to use WDS with access point or “WDS Dedicated Mode” to use WDS and also block communication with regular wireless clients. When WDS is used, each access point should be configured with corresponding MAC addresses, wireless channel and wireless encryption method.
Local MAC Address	Displays the MAC address of your access point.

WDS Peer Settings

WDS #	Enter the MAC address for up to four other WDA devices you wish to connect.

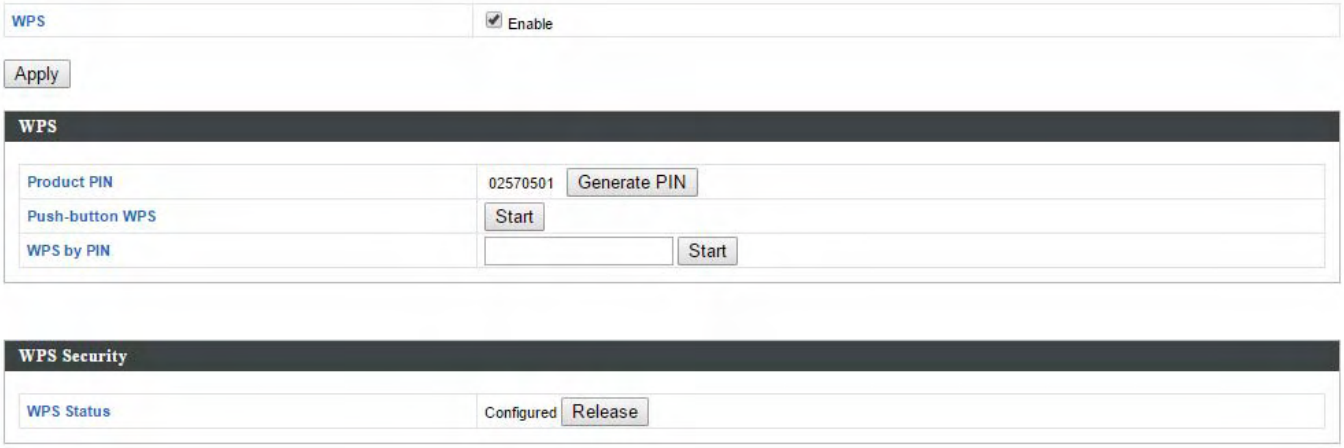
WDS VLAN	
VLAN Mode	Specify the WDS VLAN mode to “Untagged Port” or “Tagged Port”.
VLAN ID	Specify the WDS VLAN ID when “Untagged Port” is selected above.

WDS Encryption	
Encryption	Select whether to use “None” or “AES” encryption and enter a pre-shared key for AES with 8-63 alphanumeric characters.

IV-6-4. WPS

Wi-Fi Protected Setup is a simple way to establish connections between WPS compatible devices. WPS can be activated on compatible devices by pushing a WPS button on the device or from within the device's firmware/configuration interface (known as PBC or "Push Button Configuration"). When WPS is activated in the correct manner and at the correct time for two compatible devices, they will automatically connect. "PIN code WPS" is a variation of PBC which includes the additional use of a PIN code between the two devices for verification.

Please refer to manufacturer's instructions for your other WPS device.



WPS	Check/uncheck this box to enable/disable WPS functionality. WPS must be disabled when using MAC-RADIUS authentication (see **IV-6-2-3-6. & IV-6-5**).

Product PIN	Displays the WPS PIN code of the device, used for PIN code WPS. You will be required to enter this PIN code into another WPS device for PIN code WPS. Click "Generate PIN" to generate a new WPS PIN code.
Push-Button WPS	Click "Start" to activate WPS on the access point for approximately 2 minutes. This has the same effect as physically pushing the access point's WPS button.
WPS by PIN	Enter the PIN code of another WPS device and click "Start" to attempt to establish a WPS connection for approximately 2 minutes.

WPS Status	WPS security status is displayed here. Click "Release" to clear the existing status.

IV-6-5. RADIUS

The RADIUS sub menu allows you to configure the access point's RADIUS server settings, categorized into three submenus: RADIUS settings, Internal Server and RADIUS accounts.

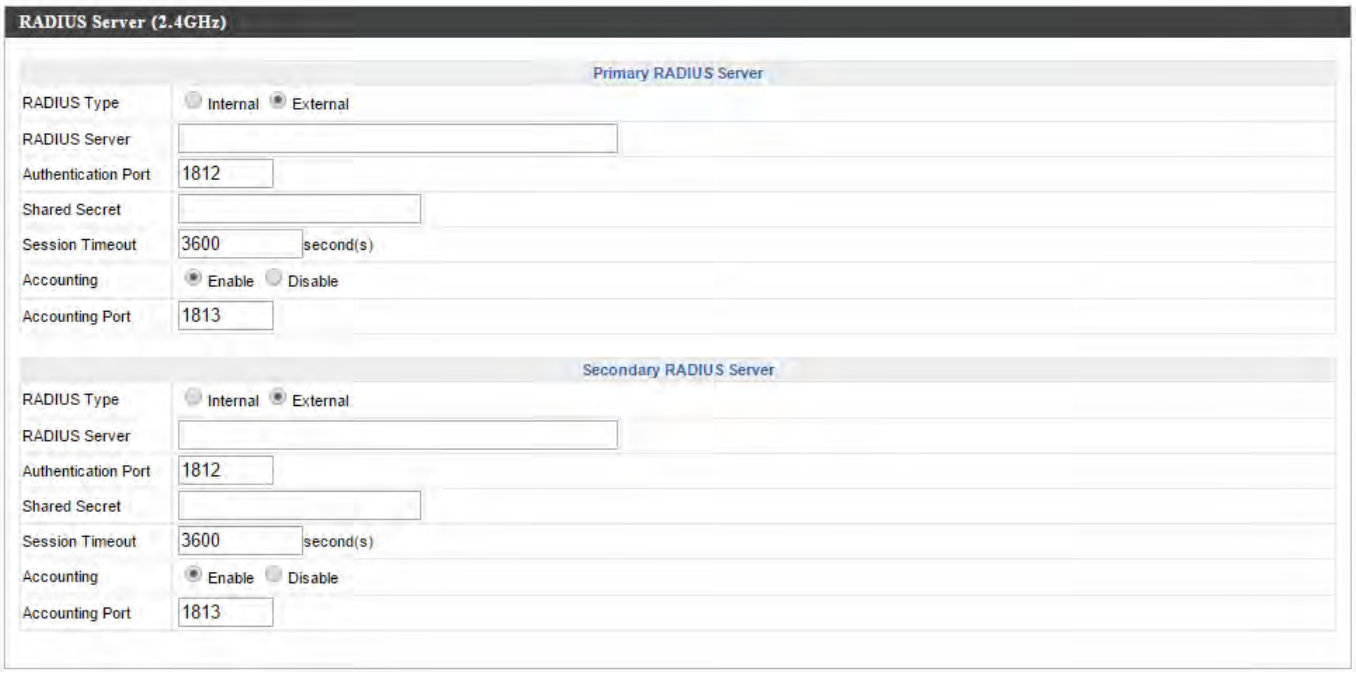
A RADIUS server provides user-based authentication to improve security and offer wireless client control – users can be authenticated before gaining access to a network.

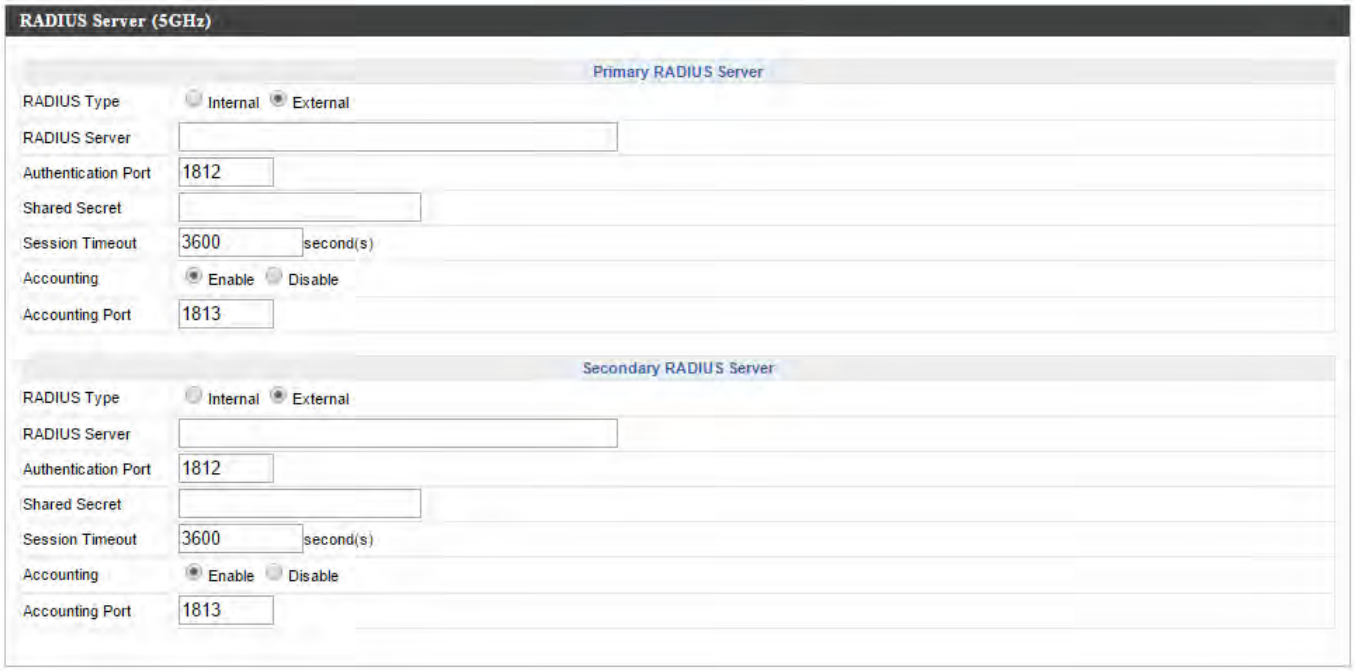
The access point can utilize both a primary and secondary (backup) RADIUS server for each of its wireless frequencies (2.4GHz & 5GHz). External RADIUS servers can be used or the access point's internal RADIUS server can be used.

To use RADIUS servers, go to *"Local Network"* → *"Security"* → *"Additional Authentication"* ***and select*** *"MAC RADIUS Authentication"* ***(see*** *IV-6-2-3.* ***&*** *IV-6-3-3****).***

IV-6-5-1. RADIUS Settings

Configure the RADIUS server settings for 2.4GHz & 5GHz. Each frequency can use an internal or external RADIUS server.



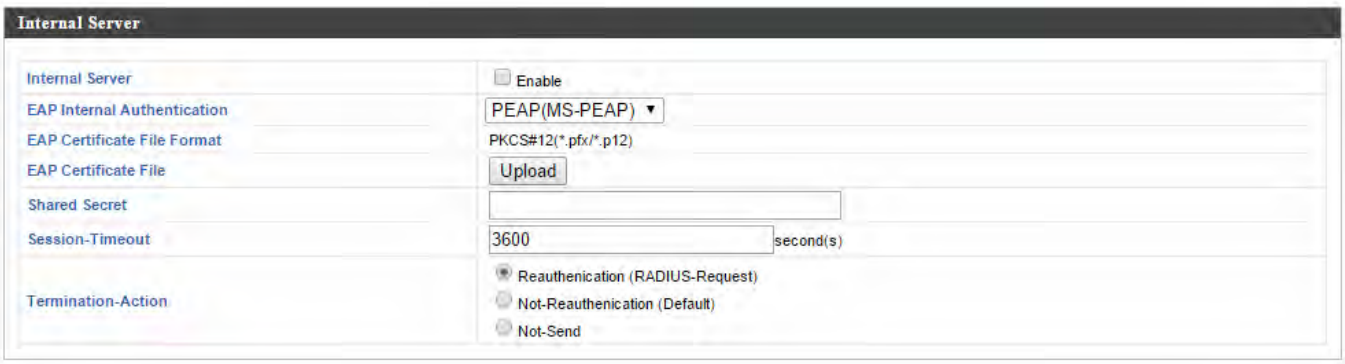


RADIUS Type	Select “Internal” to use the access point’s built-in RADIUS server or “external” to use an external RADIUS server.
RADIUS Server	Enter the RADIUS server host IP address.
Authentication Port	Set the UDP port used in the authentication protocol of the RADIUS server. Value must be between 1 – 65535.
Shared Secret	Enter a shared secret/password between 1 – 99 characters in length. This should match the “MAC-RADIUS” password used in **IV-3-1-3-6** or **IV-3-2-3**.
Session Timeout	Set a duration of session timeout in seconds between 0 – 86400.
Accounting	Enable or disable RADIUS accounting.
Accounting Port	When accounting is enabled (above), set the UDP port used in the accounting protocol of the RADIUS server. Value must be between 1 – 65535.

IV-6-5-2.Internal Server

The access point features a built-in RADIUS server which can be configured as shown below used when “Internal” is selected for “RADIUS Type” in the “Local Network” → “RADIUS Settings” menu.

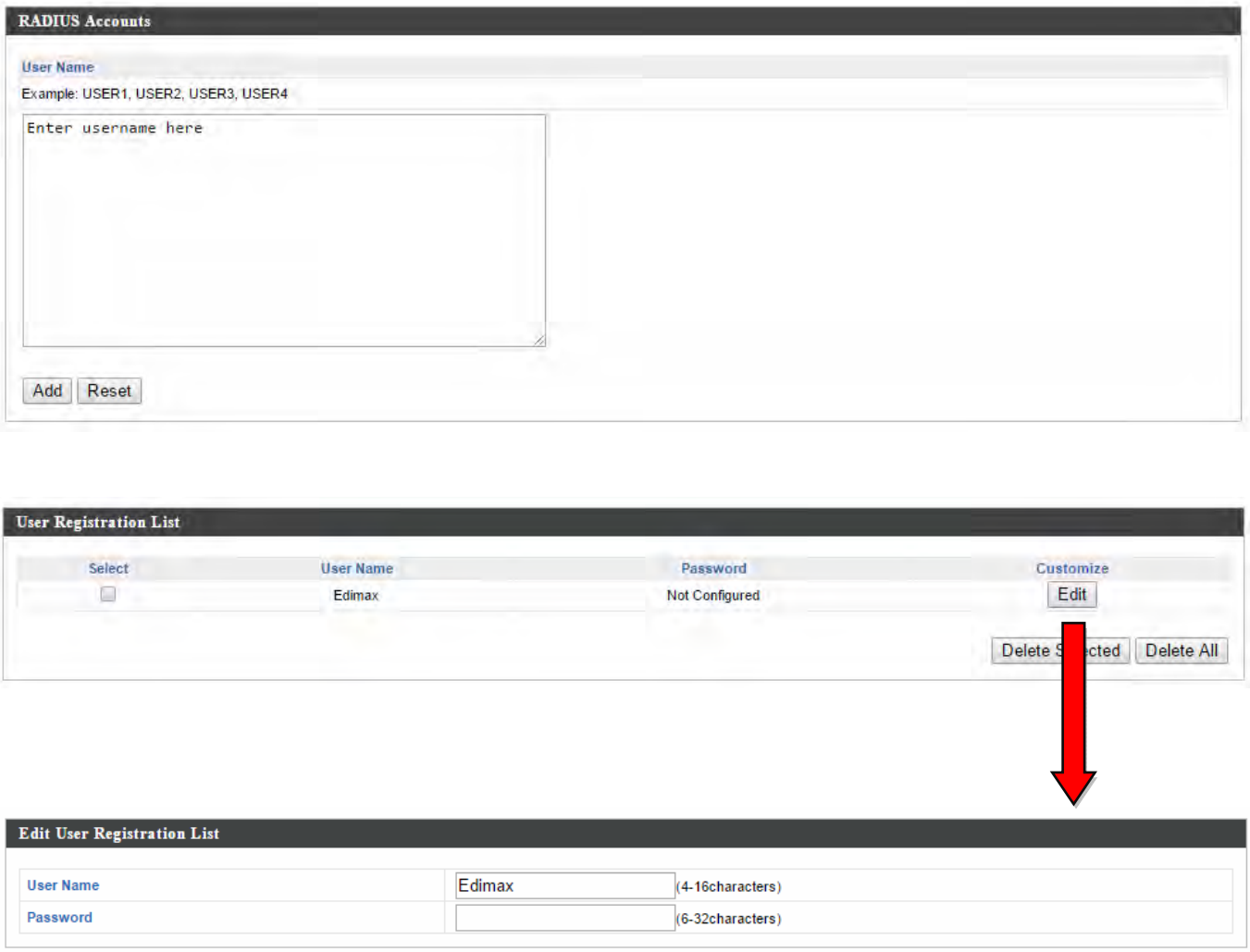
To use RADIUS servers, go to** “Wireless Settings” → “Security” “Additional Authentication” **and select** “MAC RADIUS Authentication” **(see** IV-6-2-3. **&** IV-6-3-3**).



Internal Server	Check/uncheck to enable/disable the access point's internal RADIUS server.
EAP Internal Authentication	Select EAP internal authentication type from the drop down menu.
EAP Certificate File Format	Displays the EAP certificate file format: PCK#12(*.pfx/*.p12)
EAP Certificate File	Click "Upload" to open a new window and select the location of an EAP certificate file to use. If no certificate file is uploaded, the internal RADIUS server will use a self-made certificate.
Shared Secret	Enter a shared secret/password for use between the internal RADIUS server and RADIUS client. The shared secret should be 1 – 99 characters in length. This should match the "MAC-RADIUS" password used in **IV-6-2-3-6** or **IV-6-3-3**.
Session Timeout	Set a duration of session timeout in seconds between 0 – 86400.
Termination Action	Select a termination-action attribute: "Reauthentication" sends a RADIUS request to the access point, "Not-Reathentication" sends a default termination-action attribute to the access point, "Not-Send" no termination-action attribute is sent to the access point.

IV-6-5-3. RADIUS Accounts

The internal RADIUS server can authenticate up to 256 user accounts. The "RADIUS Accounts" page allows you to configure and manage users.



User Name	Enter the user names here, separated by commas.
Add	Click "Add" to add the user to the user registration list.
Reset	Clear text from the user name box.

Select	Check the box to select a user.
User Name	Displays the user name.
Password	Displays if specified user name has a password (configured) or not (not configured).
Customize	Click "Edit" to open a new field to set/edit a password for the specified user name (below).

Delete Selected	Delete selected user from the user registration list.
Delete All	Delete all users from the user registration list.

Edit User Registration List

User Name	Existing user name is displayed here and can be edited according to your preference.
Password	Enter or edit a password for the specified user.

IV-6-6. MAC Filter

Mac filtering is a security feature that can help to prevent unauthorized users from connecting to your access point.

This function allows you to define a list of network devices permitted to connect to the access point. Devices are each identified by their unique MAC address. If a device which is not on the list of permitted MAC addresses attempts to connect to the access point, it will be denied.

To enable MAC filtering, go to *"Local Settings"* → *"Security"* → *"Additional Authentication"* ***and select*** *"MAC Filter"* ***(see*** *IV-6-2-3.* ***&*** *IV-6-3-3****).***

The MAC address filtering table is displayed below:

Add MAC Address	Enter a MAC address of computer or network device manually e.g. 'aa-bb-cc-dd-ee-ff' or enter multiple MAC addresses separated with

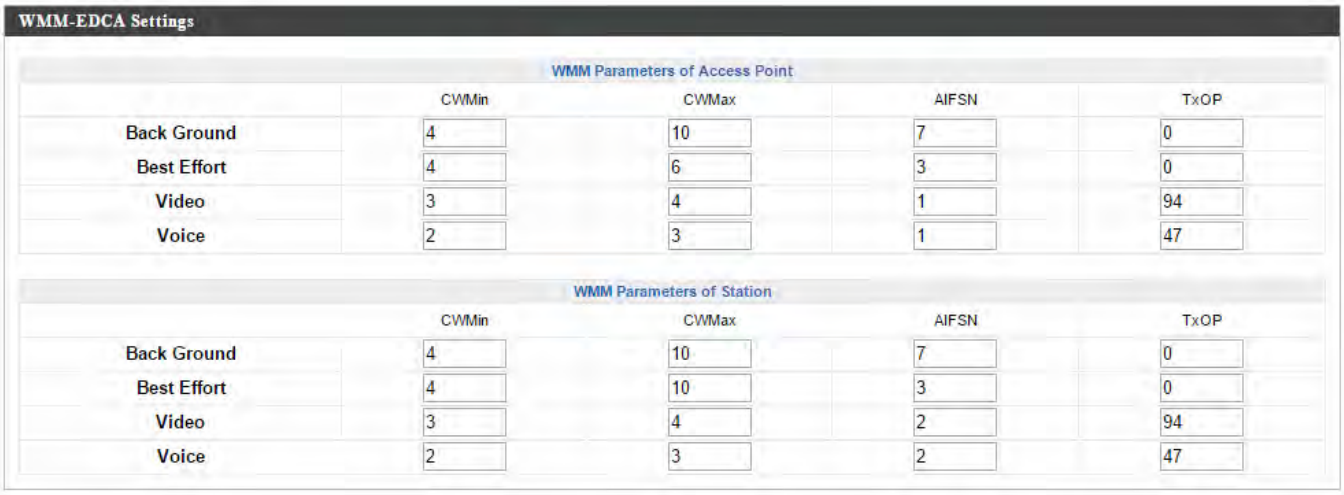
	commas, e.g. 'aa-bb-cc-dd-ee-ff,aa-bb-cc-dd-ee-gg'
Add	Click "Add" to add the MAC address to the MAC address filtering table.
Reset	Clear all fields.

MAC address entries will be listed in the "MAC Address Filtering Table". Select an entry using the "Select" checkbox.

Select	Delete selected or all entries from the table.
MAC Address	The MAC address is listed here.
Delete Selected	Delete the selected MAC address from the list.
Delete All	Delete all entries from the MAC address filtering table.
Export	Click "Export" to save a copy of the MAC filtering table. A new window will pop up for you to select a location to save the file.

IV-6-7. WMM

Wi-Fi Multimedia (WMM) is a Wi-Fi Alliance interoperability certification based on the IEEE 802.11e standard, which provides Quality of Service (QoS) features to IEE 802.11 networks. WMM prioritizes traffic according to four categories: background, best effort, video and voice.



Configuring WMM consists of adjusting parameters on queues for different categories of wireless traffic. Traffic is sent to the following queues:

Background	Low Priority	High throughput, non time sensitive bulk data e.g. FTP
Best Effort	Medium Priority	Traditional IP data, medium throughput and delay.
Video	High Priority	Time sensitive video data with minimum time delay.
Voice	High Priority	Time sensitive data such as VoIP and streaming media with minimum time delay.

Queues automatically provide minimum transmission delays for video, voice, multimedia and critical applications. The values can further be adjusted manually:

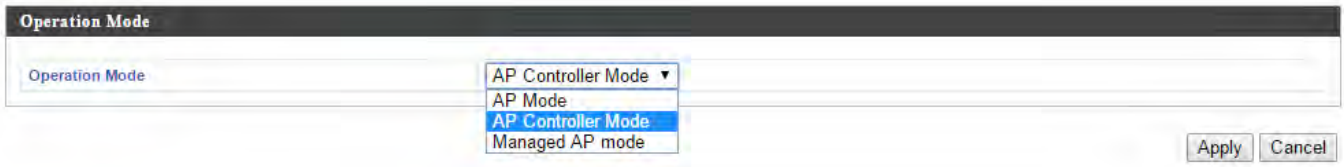
CWMin	Minimum Contention Window (milliseconds): This value is input to the initial random backoff wait time algorithm for retry of a data frame transmission. The backoff wait time will be generated between 0 and this value. If the

	frame is not sent, the random backoff value is doubled until the value reaches the number defined by CWMax (below). The CWMin value must be lower than the CWMax value. The contention window scheme helps to avoid frame collisions and determine priority of frame transmission. A shorter window has a higher probability (priority) of transmission.
CWMax	Maximum Contention Window (milliseconds): This value is the upper limit to random backoff value doubling (see above).
AIFSN	Arbitration Inter-Frame Space (milliseconds): Specifies additional time between when a channel goes idle and the AP/client sends data frames. Traffic with a lower AIFSN value has a higher priority.
TxOP	Transmission Opportunity (milliseconds): The maximum interval of time an AP/client can transmit. This makes channel access more efficiently prioritized. A value of 0 means only one frame per transmission. A greater value effects higher priority.

IV-7. Local Settings

IV-7-1. Operation Mode

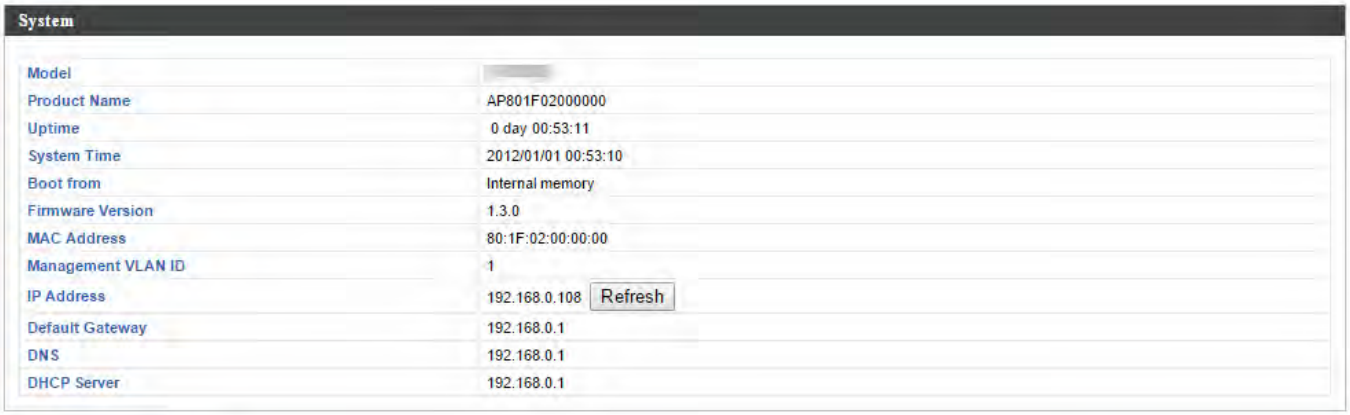
Set the operation mode of the access point. AP mode is a standalone access point, AP controller mode acts as the designated master of the AP array, and Managed AP mode acts as a slave AP within the AP array. Repeater mode acts as a wireless repeater.

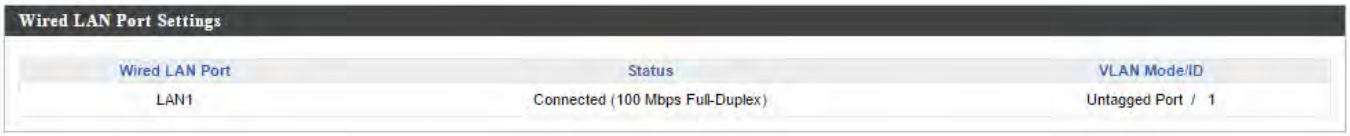


IV-7-2. System Settings

IV-7-2-1. System Information

The “System Information” page displays basic system information about the access point.





System	
Model	Displays the model number of the access point.
Product Name	Displays the product name for reference, which consists of “AP” plus the MAC address.
Uptime	Displays the total time since the device was turned on.

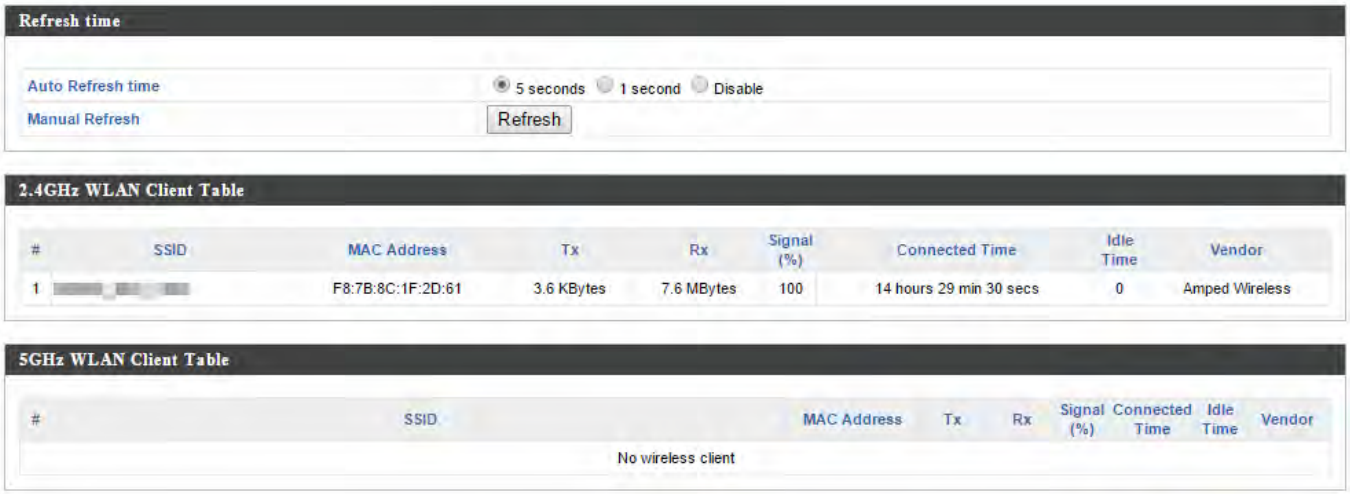
Boot From	Displays information for the booted hardware, booted from either USB or internal memory.
Version	Displays the firmware version.
MAC Address	Displays the access point's MAC address.
Management VLAN ID	Displays the management VLAN ID.
IP Address	Displays the IP address of this device. Click "Refresh" to update this value.
Default Gateway	Displays the IP address of the default gateway.
DNS	IP address of DNS (Domain Name Server)
DHCP Server	IP address of DHCP Server.

Wired LAN Port Settings	
Wired LAN Port	Specifies which LAN port (1 or 2).
Status	Displays the status of the specified LAN port (connected or disconnected).
VLAN Mode/ID	Displays the VLAN mode (tagged or untagged) and VLAN ID for the specified LAN port. See **IV-6-1-3. VLAN**

Refresh	Click to refresh all information.

IV-7-2-2. Wireless Clients

The “Wireless Clients” page displays information about all wireless clients connected to the access point on the 2.4GHz or 5GHz frequency.

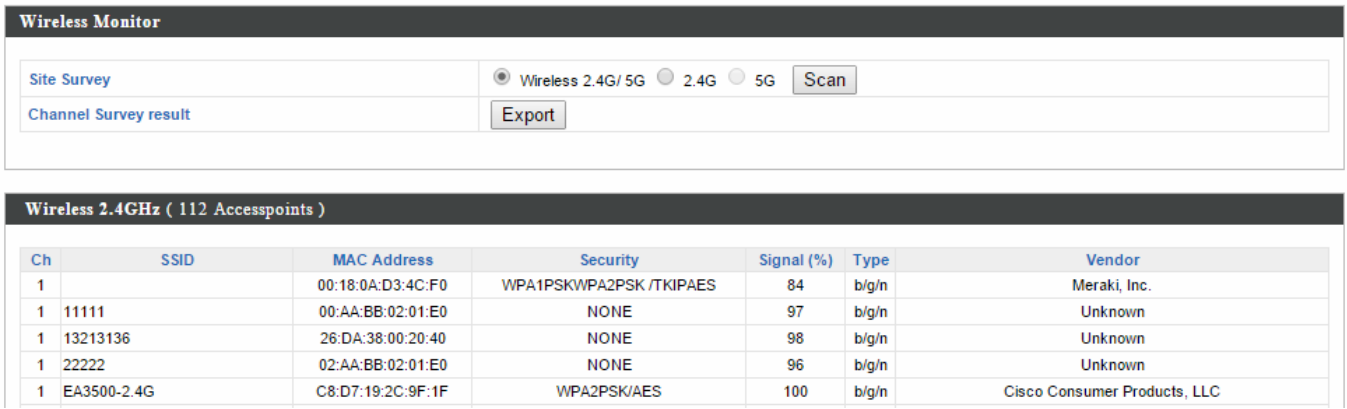


Refresh time	
Auto Refresh Time	Select a time interval for the client table list to automatically refresh.
Manual Refresh	Click refresh to manually refresh the client table.

2.4GHz (5GHz) WLAN Client Table	
SSID	Displays the SSID which the client is connected to.
MAC Address	Displays the MAC address of the client.
Tx	Displays the total data packets transmitted by the specified client.
Rx	Displays the total data packets received by the specified client.
Signal (%)	Displays the wireless signal strength for the specified client.
Connected Time	Displays the total time the wireless client has been connected to the access point.
Idle Time	Client idle time is the time for which the client has not transmitted any data packets i.e. is idle.
Vendor	The vendor of the client’s wireless adapter is displayed here.

IV-7-2-3. Wireless Monitor

Wireless Monitor is a tool built into the access point to scan and monitor the surrounding wireless environment. Select a frequency and click “Scan” to display a list of all SSIDs within range along with relevant details for each SSID.



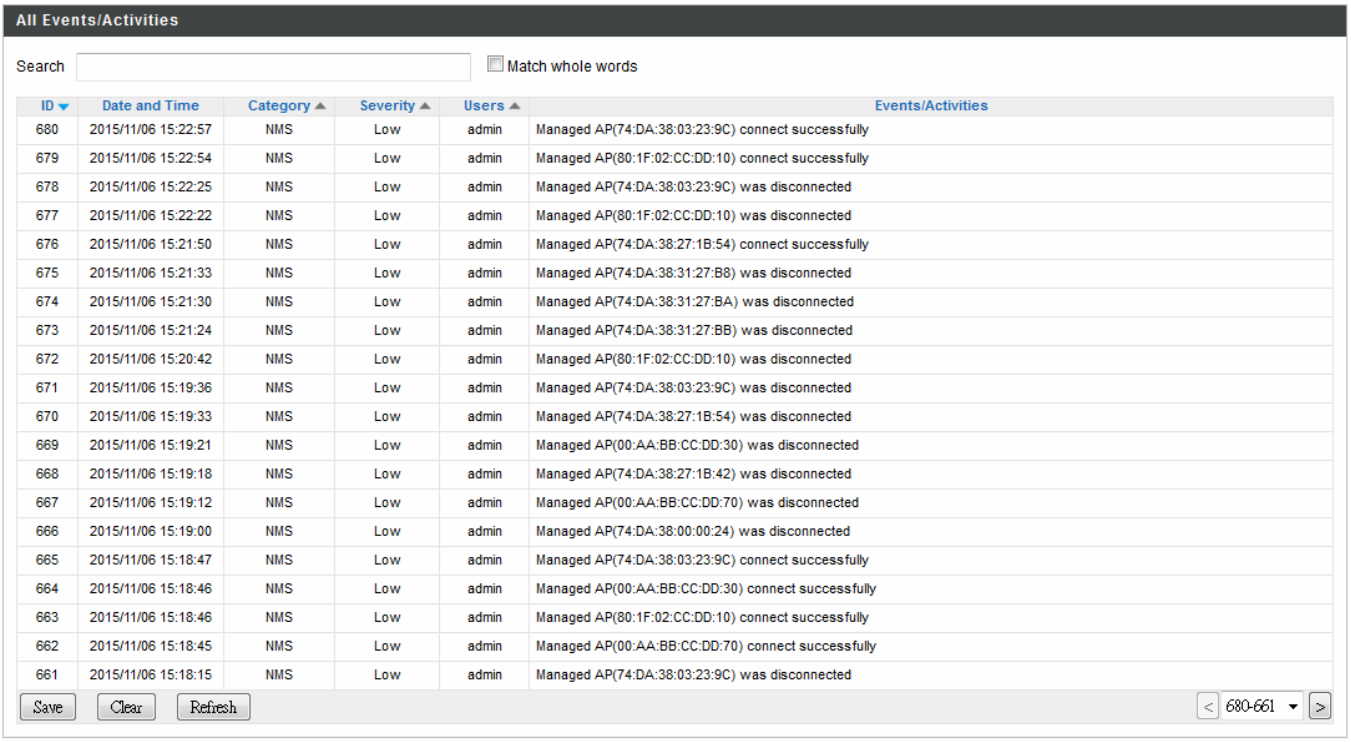
Wireless Monitor	
Site Survey	Select which frequency (or both) to scan, and click “Scan” to begin.
Channel Survey Result	After a scan is complete, click “Export” to save the results to local storage.

Site Survey Results	
Ch	Displays the channel number used by the specified SSID.
SSID	Displays the SSID identified by the scan.
MAC Address	Displays the MAC address of the wireless router/access point for the specified SSID.
Security	Displays the authentication/encryption type of the specified SSID.
Signal (%)	Displays the current signal strength of the SSID.
Type	Displays the 802.11 wireless networking standard(s) of the specified SSID.
Vendor	Displays the vendor of the wireless router/access point for the specified SSID.

IV-7-2-4. Log

This information is useful for network administrators. Displays a detailed information log of users and activity on the network: *ID, Date and Time of entry, Category of entry, Severity, Users, Event/Activities details.*

When the log is full, old entries are overwritten.



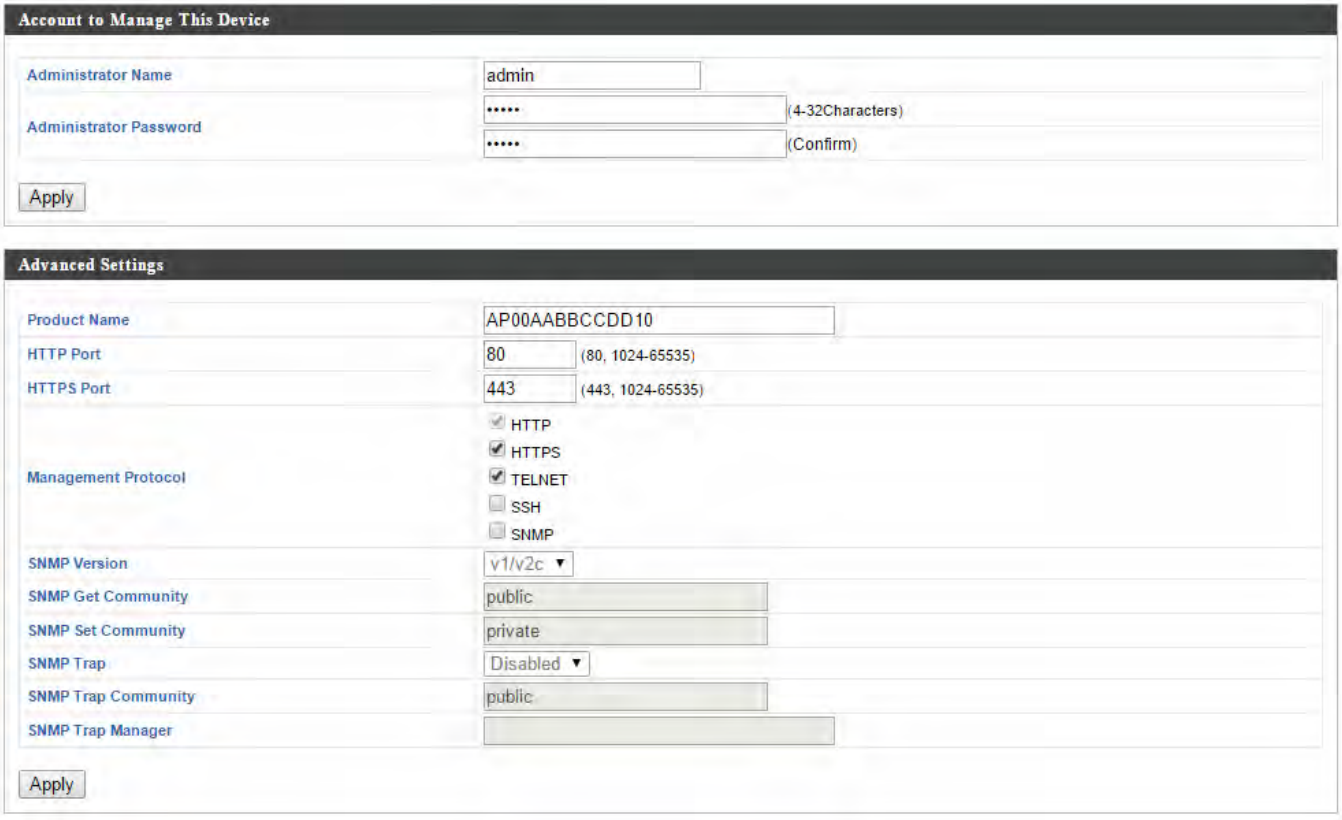
Save	Click to save the log as a file on your local computer.
Clear	Clear all log entries.
Refresh	Refresh the current log.

IV-7-3. Management

IV-7-3-1. Admin

You can change the password used to login to the browser-based configuration interface here. It is advised to do so for security purposes.

If you change the administrator password, please make a note of the new password. In the event that you forget this password and are unable to login to the browser based configuration interface, see *IV-7-4-4. Factory Default* ***for how to reset the access point.***



Account to Manage This Device	
Administrator Name	Set the access point's administrator name. This is used to log in to the browser based configuration interface and must be between 4-16 alphanumeric characters (case sensitive).
Administrator Password	Set the access point's administrator password. This is used to log in to the browser based

	configuration interface and must be between 4-32 alphanumeric characters (case sensitive).

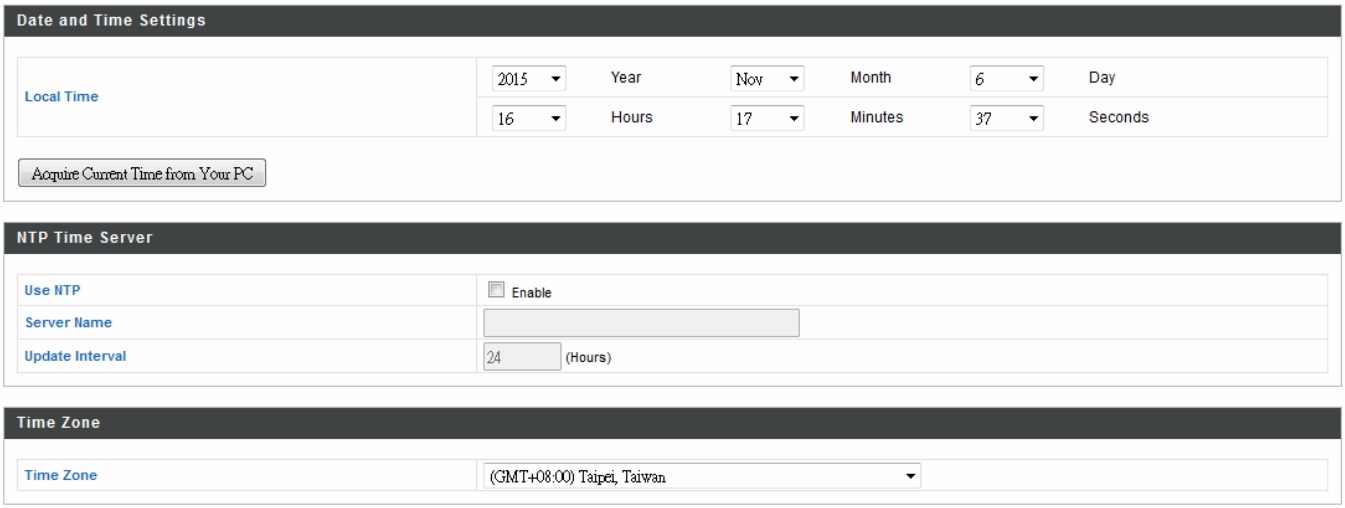
Advanced Settings	
Product Name	Edit the product name according to your preference consisting of 1-32 alphanumeric characters. This name is used for reference purposes.
HTTP Port	Specify a HTTP port for management.
HTTPS Port	Specify a HTTPS port for management.
Management Protocol	Check/uncheck the boxes to enable/disable specified management interfaces (see below). When SNMP is enabled, complete the SNMP fields below.
SNMP Version	Select SNMP version appropriate for your SNMP manager.
SNMP Get Community	Enter an SNMP Get Community name for verification with the SNMP manager for SNMP-GET requests.
SNMP Set Community	Enter an SNMP Set Community name for verification with the SNMP manager for SNMP-SET requests.
SNMP Trap	Enable or disable SNMP Trap to notify SNMP manager of network errors.
SNMP Trap Community	Enter an SNMP Trap Community name for verification with the SNMP manager for SNMP-TRAP requests.
SNMP Trap Manager	Specify the IP address or sever name (2-128 alphanumeric characters) of the SNMP manager.

HTTP
Internet browser HTTP protocol management interface
HTTPS
Internet browser HTTPS protocol management interface
TELNET
Client terminal with telnet protocol management interface
SSH
Client terminal with SSH protocol version 1 or 2 management interface
SNMP

Simple Network Management Protocol. SNMPv1, v2 & v3 protocol supported. SNMPv2 can be used with community based authentication. SNMPv3 uses user-based security model (USM) architecture.

IV-7-3-2. Date and Time

You can configure the time zone settings of your access point here. The date and time of the device can be configured manually or can be synchronized with a time server.



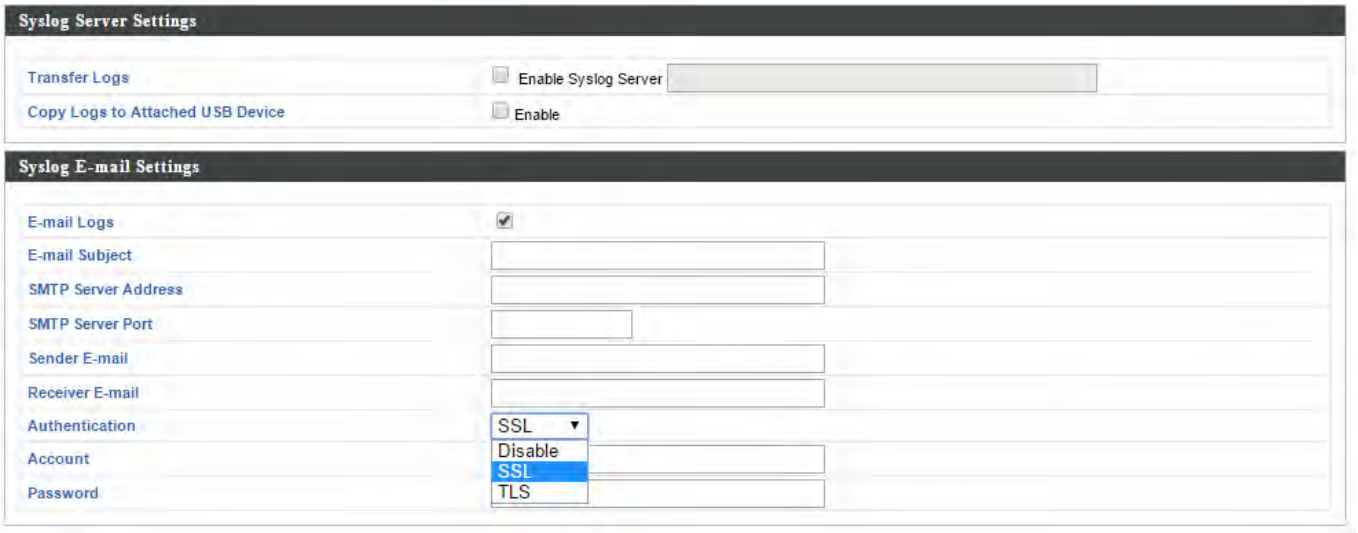
Date and Time Settings	
Local Time	Set the access point's date and time manually using the drop down menus.
Acquire Current Time from your PC	Click "Acquire Current Time from Your PC" to enter the required values automatically according to your computer's current time and date.

NTP Time Server	
Use NTP	The access point also supports NTP (Network Time Protocol) for automatic time and date setup.
Server Name	Enter the host name or IP address of the time server if you wish.
Update Interval	Specify a frequency (in hours) for the access point to update/synchronize with the NTP server.

Time Zone	
Time Zone	Select the time zone of your country/ region. If your country/region is not listed, please select another country/region whose time zone is the same as yours.

IV-7-3-3. Syslog Server

The system log can be sent to a server, attached to USB storage or sent via email.



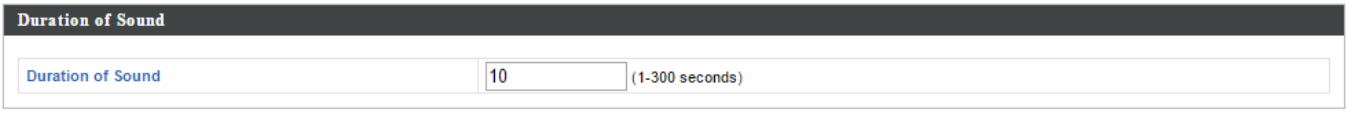
Syslog Server Settings	
Transfer Logs	Check/uncheck the box to enable/disable the use of a syslog server, and enter a host name, domain or IP address for the server, consisting of up to 128 alphanumeric characters.
Copy Logs to Attached USB Device	Check/uncheck the box to enable/disable copying logs to attached USB storage.

Syslog Email Settings	
Email Logs	Check/uncheck the box to enable/disable email logs. When enabled, the log will be emailed according to the settings below.
Email Subject	Enter the subject line of the email which will be sent containing the log.
SMTP Server Address	Specify the SMTP server address for the sender email account.
SMTP Server Port	Specify the SMTP server port for the sender email account.
Sender Email	Enter the sender's email address.
Receiver Email	Specify the email recipient of the log.
Authentication	Select "Disable", "SSL" or "TLS" according to

	your email authentication.
Account	When authentication is used above, enter the account name.
Password	When authentication is used above, enter the password.

IV-7-3-4. I'm Here

The access point features a built-in buzzer which can sound on command using the "I'm Here" page. This is useful for network administrators and engineers working in complex network environments to locate the access point.



The buzzer is loud!

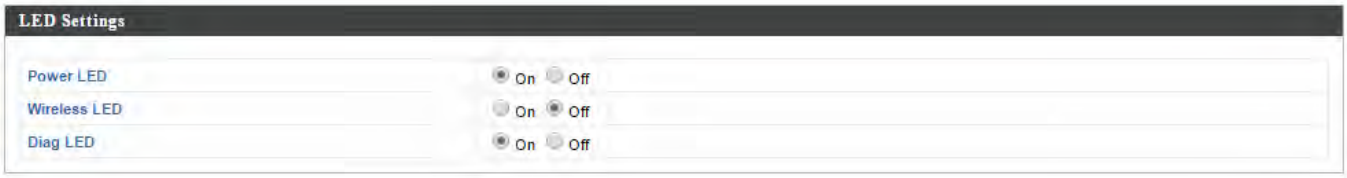
Duration of Sound	Set the duration for which the buzzer will sound when the "Sound Buzzer" button is clicked.
Sound Buzzer	Activate the buzzer sound for the above specified duration of time.

IV-7-4. Advanced

Wi-Fi Multimedia (WMM) is a Wi-Fi Alliance interoperability certification based on the IEEE 802.11e standard, which provides Quality of Service (QoS) features to IEE 802.11 networks. WMM prioritizes traffic according to four categories: background, best effort, video and voice.

IV-7-4-1. LED Settings

The access point's LEDs can be manually enabled or disabled according to your preference.



LED	Select on or off.

IV-7-4-2. Update Firmware

The “Firmware” page allows you to update the system firmware to a more recent version. Updated firmware versions often offer increased performance and security, as well as bug fixes. You can download the latest firmware from the website.

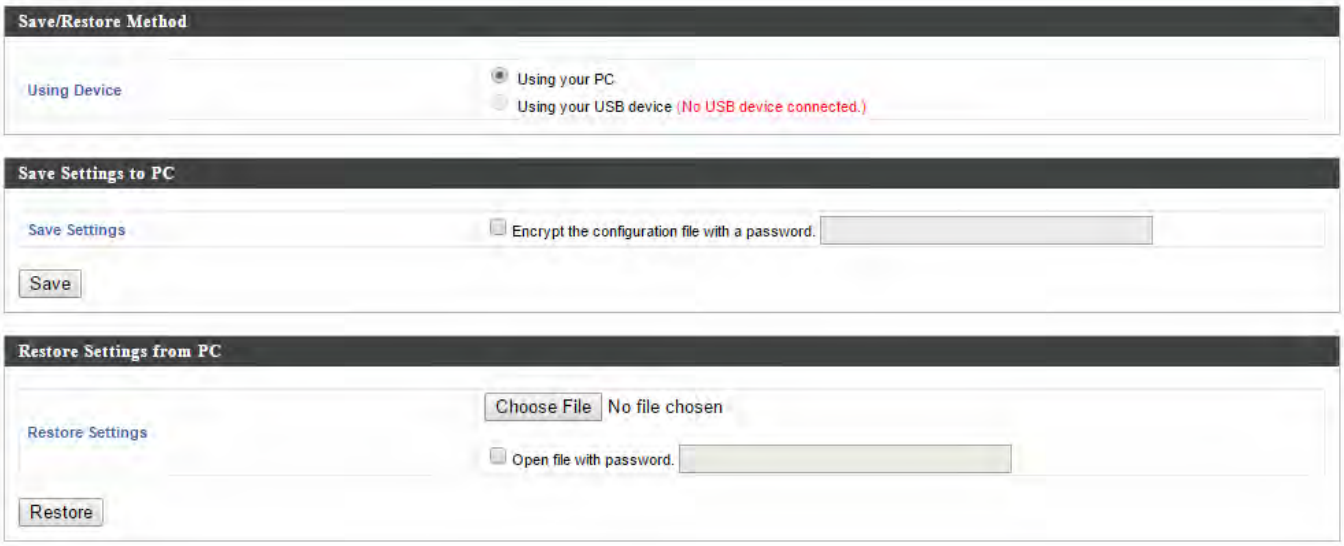
This firmware update is for an individual access point. To update firmware for multiple access points in the AP array, go to NMS Settings → Firmware Upgrade.

Do not switch off or disconnect the access point during a firmware upgrade, as this could damage the device.

Update Firmware From	Select “a file on your PC” to upload firmware from your local computer or from an attached USB device.
Firmware Update File	Click “Browse” to open a new window to locate and select the firmware file in your computer.
Update	Click “Update” to upload the specified firmware file to your access point.

IV-7-4-3. Save/Restore Settings

The access point's "Save/Restore Settings" page enables you to save/backup the access point's current settings as a file to your local computer or a USB device attached to the access point, and restore the access point to previously saved settings.



Save / Restore Settings	
Using Device	Select "Using your PC" to save the access point's settings to your local computer or to an attached USB device.

Save Settings to PC	
Save Settings	Click "Save" to save settings and a new window will open to specify a location to save the settings file. You can also check the "Encrypt the configuration file with a password" box and enter a password to protect the file in the field underneath, if you wish.

Restore Settings from PC	
Restore Settings	Click the browse button to find a previously saved settings file on your computer, then click "Restore" to replace your current settings. If your settings file is encrypted with a password, check the "Open file with

	password” box and enter the password in the field underneath.

IV-7-4-4. Factory Default

If the access point malfunctions or is not responding, then it is recommended that you reboot the device (see **IV-7-4-5.**) or reset the device back to its factory default settings. You can reset the access point back to its default settings using this feature if the location of the access point is not convenient to access the reset button.

Factory Default	Click “Factory Default” to restore settings to the factory default. A pop-up window will appear and ask you to confirm.

After resetting to factory defaults, please wait for the access point to reset and restart.

IV-7-4-5. Reboot

If the access point malfunctions or is not responding, then it is recommended that you reboot the device or reset the access point back to its factory default settings (see **IV-7-4-4**). You can reboot the access point remotely using this feature.

Reboot	Click “Reboot” to reboot the device. A countdown will indicate the progress of the reboot.

IV-8. Toolbox

IV-8-1. Network Connectivity

IV-8-1-1. Ping

Ping is a computer network administration utility used to test whether a particular host is reachable across an IP network and to measure the round-trip time for sent messages.

Destination Address	Enter the address of the host.
Execute	Click execute to ping the host.

IV-8-1-2. Trace Route

Traceroute is a diagnostic tool for displaying the route (path) and measuring transit delays of packets across an IP network.

Destination Address	Enter the address of the host.
Execute	Click execute to execute the traceroute command.

V. Appendix

V-1. Configuring your IP address

The access point uses the default IP address **192.168.2.2**. In order to access the browser based configuration interface, you need to modify the IP address of your computer to be in the same IP address subnet e.g. **192.168.2.x (x = 3 – 254).**

The procedure for modifying your IP address varies across different operating systems; please follow the guide appropriate for your operating system.

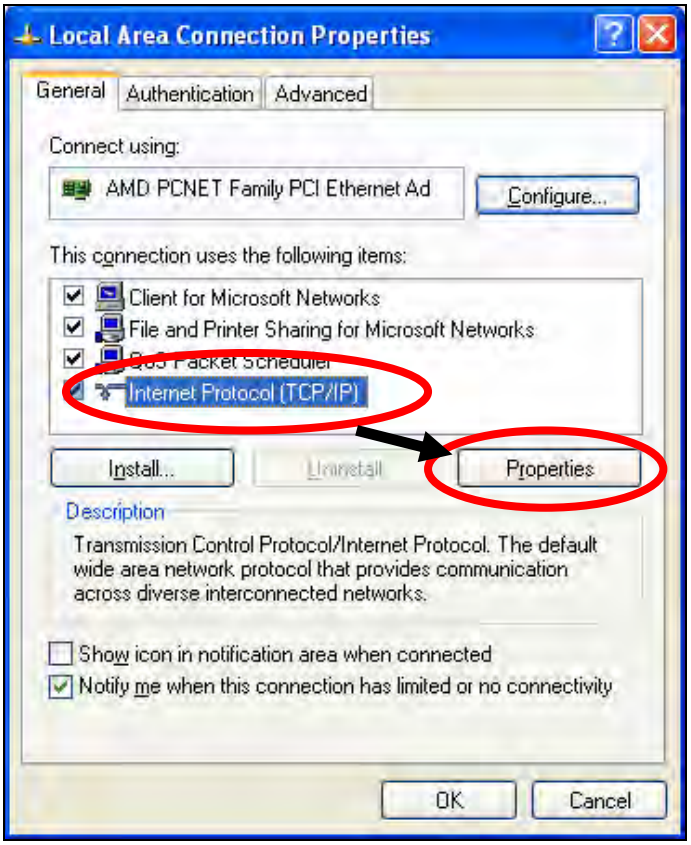
In the following examples we use the IP address **192.168.2.10** though you can use any IP address in the range **192.168.2.x (x = 3 – 254).**

If you changed the AP's IP address, or if your gateway/router uses a DHCP server, ensure you enter the correct IP address. Refer to your gateway/router's settings. Your computer's IP address must be in the same subnet as the AP Controller.

If using a DHCP server on the network, it is advised to use your DHCP server's settings to assign the AP a static IP address.

V-1-1. Windows XP

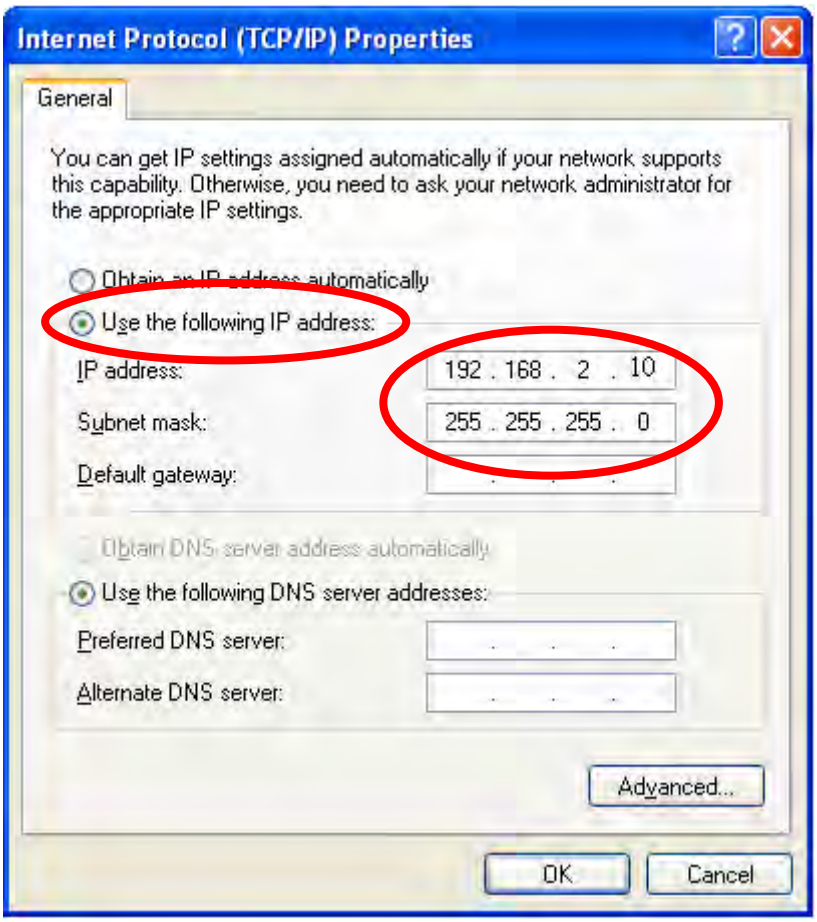
1. Click the “Start” button (it should be located in the lower-left corner of your computer), then click “Control Panel”. Double-click the “Network and Internet Connections” icon, click “Network Connections”, and then double-click “Local Area Connection”. The “Local Area Connection Status” window will then appear, click “Properties”.



2. Select “Use the following IP address”, then input the following values:

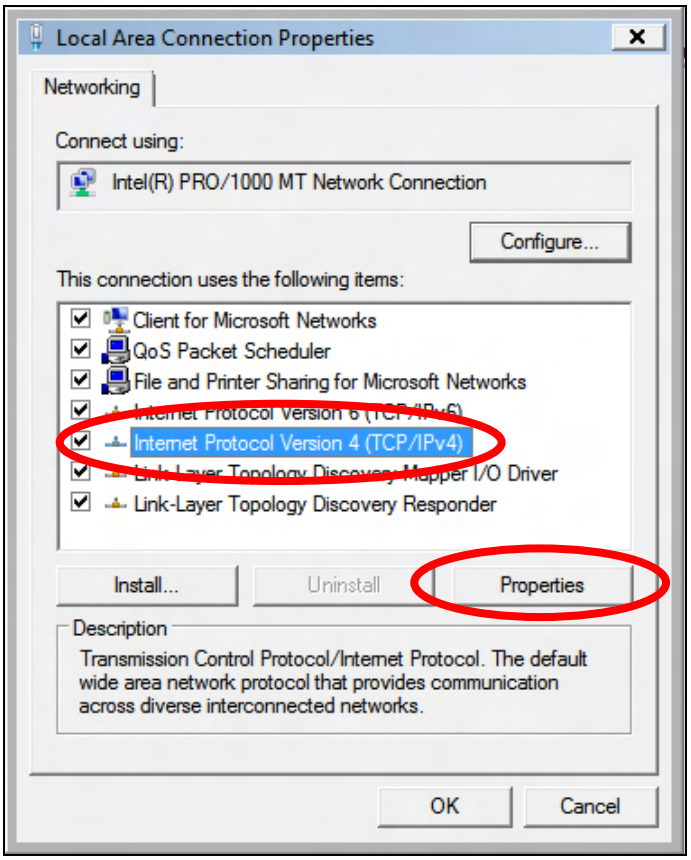
IP address: 192.168.2.10
Subnet Mask: 255.255.255.0

Click ‘OK’ when finished.



V-1-2. Windows Vista

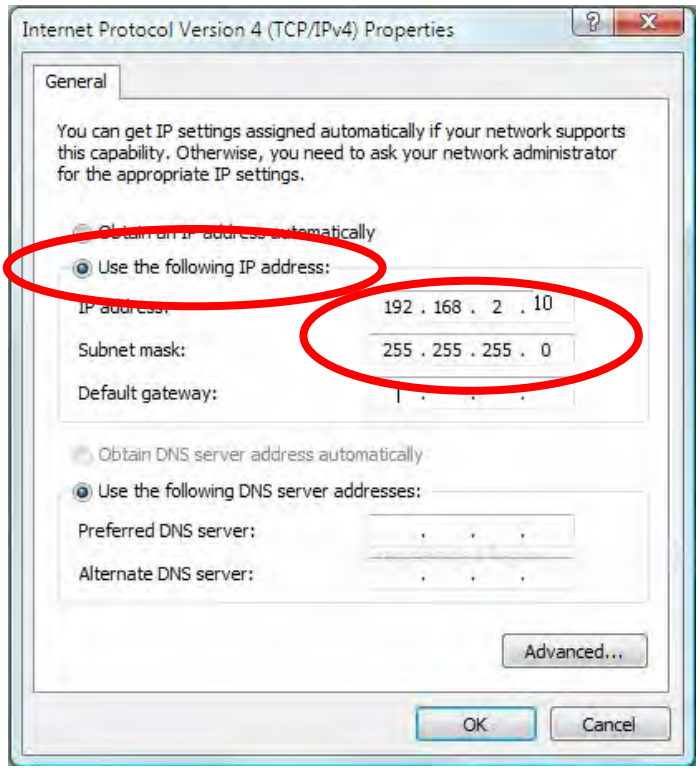
1. Click the “Start” button (it should be located in the lower-left corner of your computer), then click “Control Panel”. Click “View Network Status and Tasks”, then click “Manage Network Connections”. Right-click “Local Area Network”, then select “Properties”. The “Local Area Connection Properties” window will then appear, select “Internet Protocol Version 4 (TCP / IPv4)”, and then click “Properties”.



2. Select “Use the following IP address”, then input the following values:

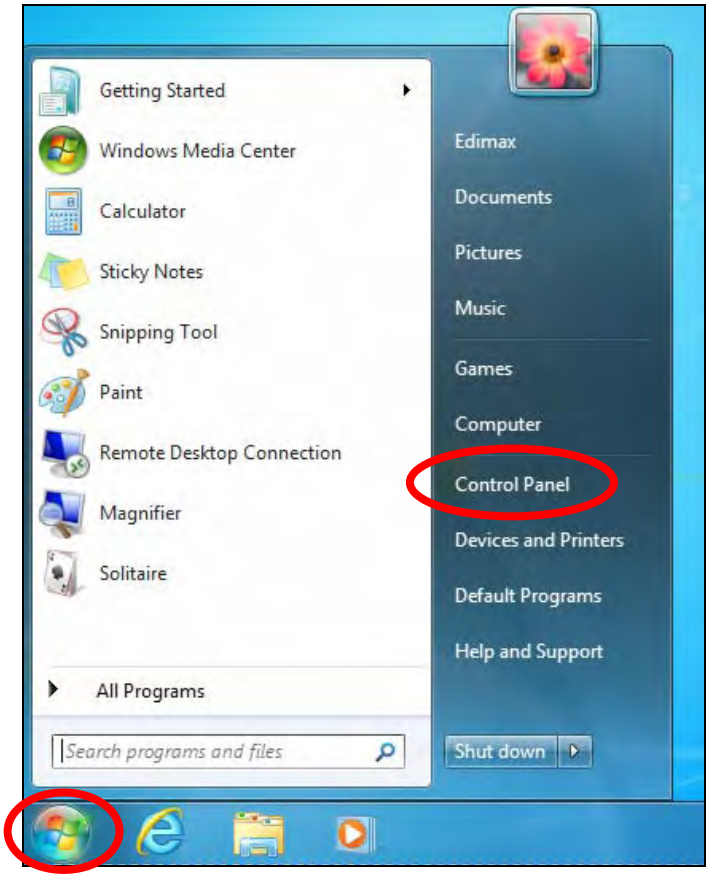
IP address: 192.168.2.10
Subnet Mask: 255.255.255.0

Click ‘OK’ when finished.

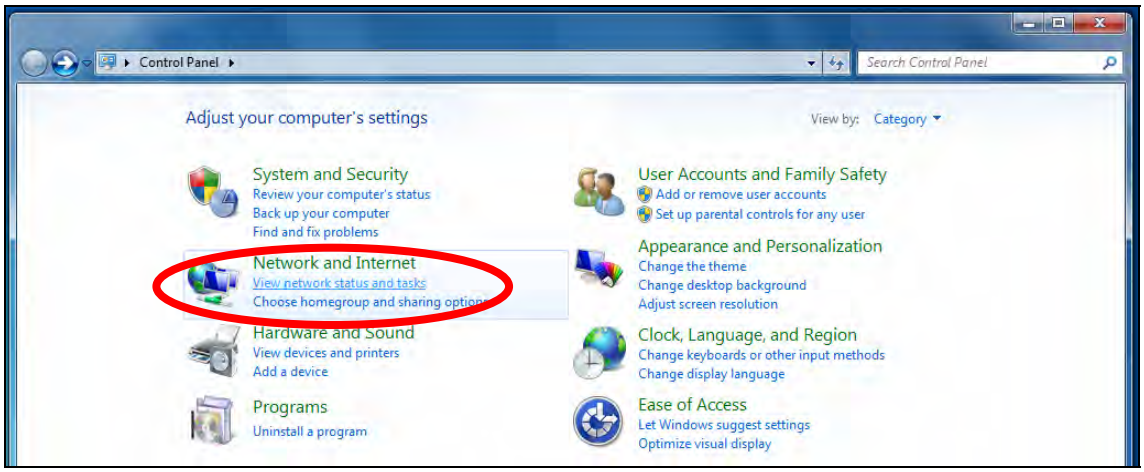


V-1-3. Windows 7

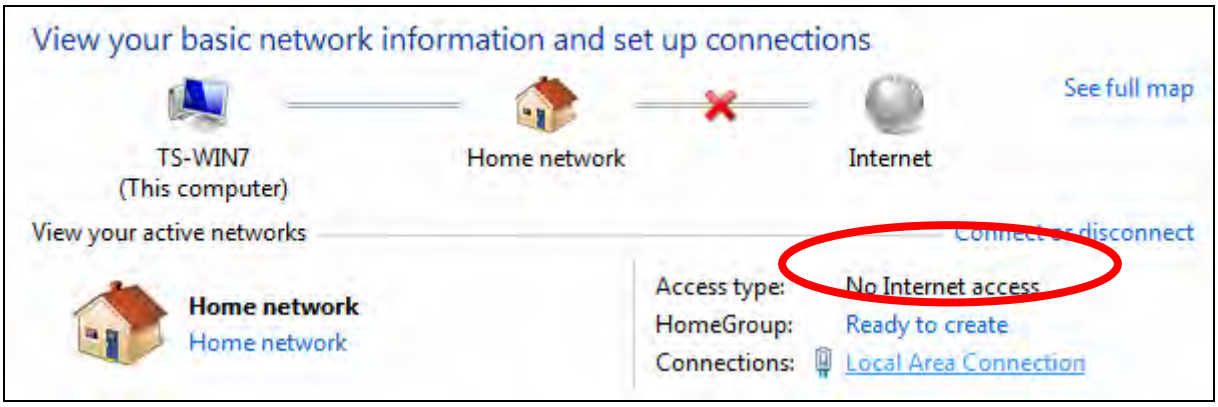
1. Click the “Start” button (it should be located in the lower-left corner of your computer), then click “Control Panel”.



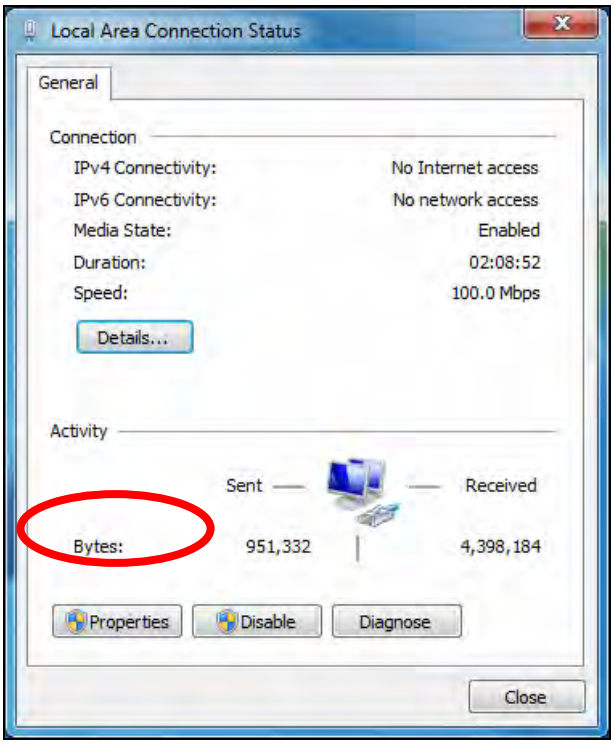
2. Under “Network and Internet” click “View network status and tasks”.



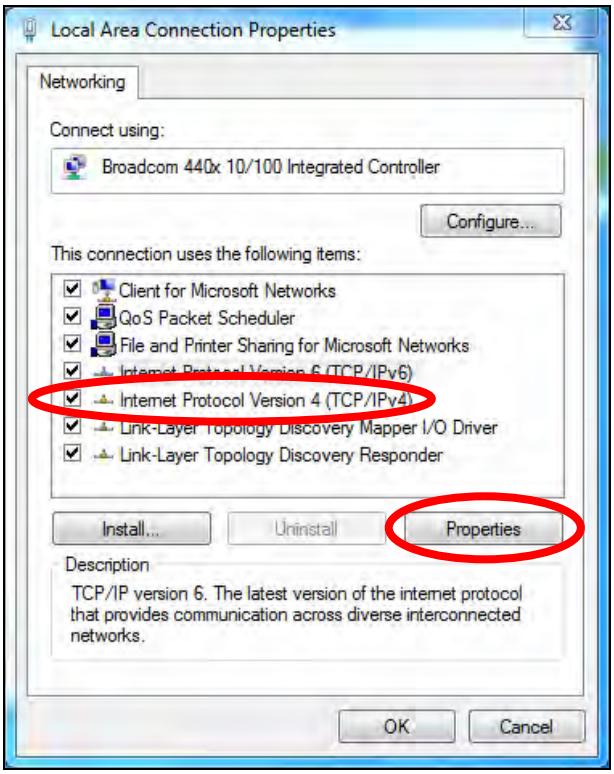
3. Click “Local Area Connection”.



4. Click “Properties”.



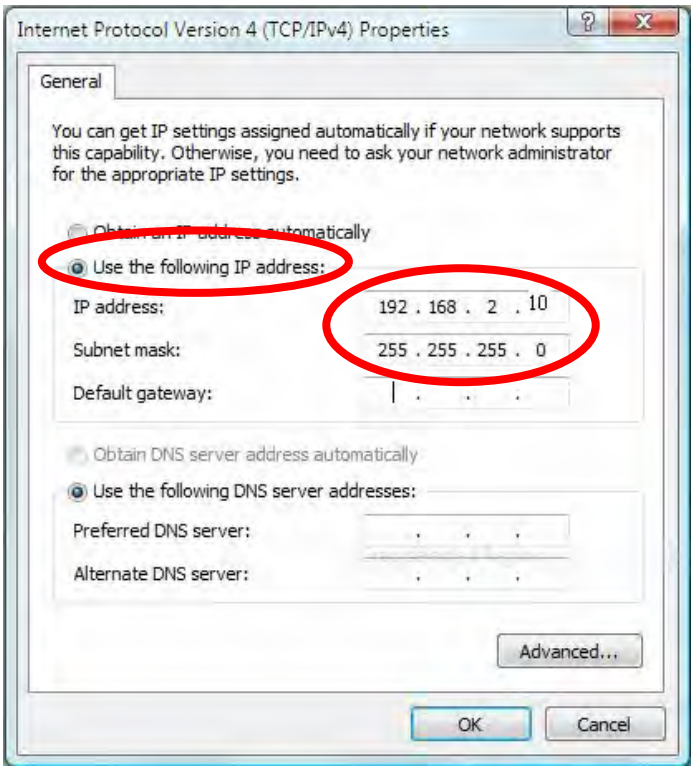
5. Select “Internet Protocol Version 4 (TCP/IPv4) and then click “Properties”.



6. Select “Use the following IP address”, then input the following values:

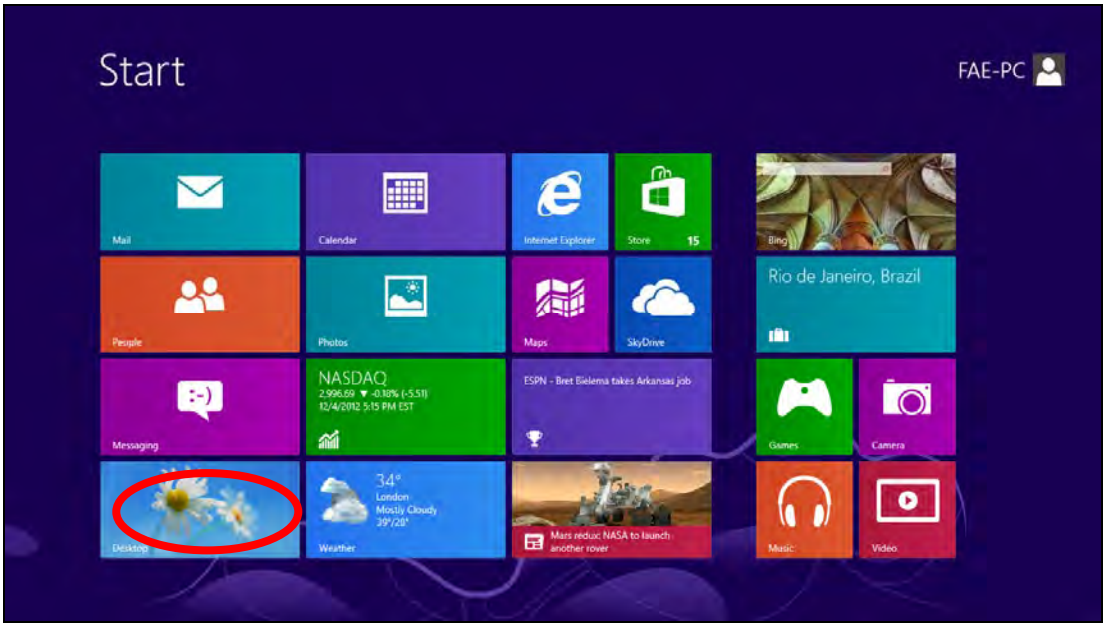
IP address: 192.168.2.10
Subnet Mask: 255.255.255.0

Click ‘OK’ when finished.

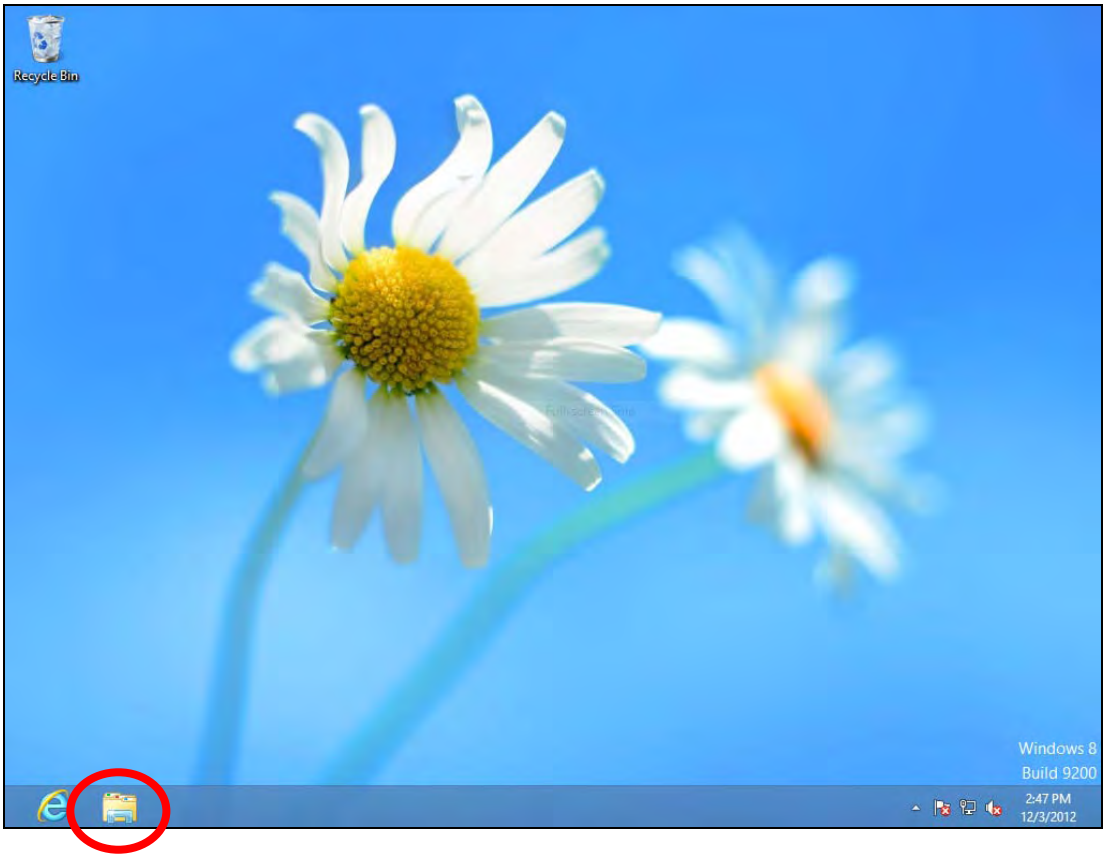


V-1-4. Windows 8

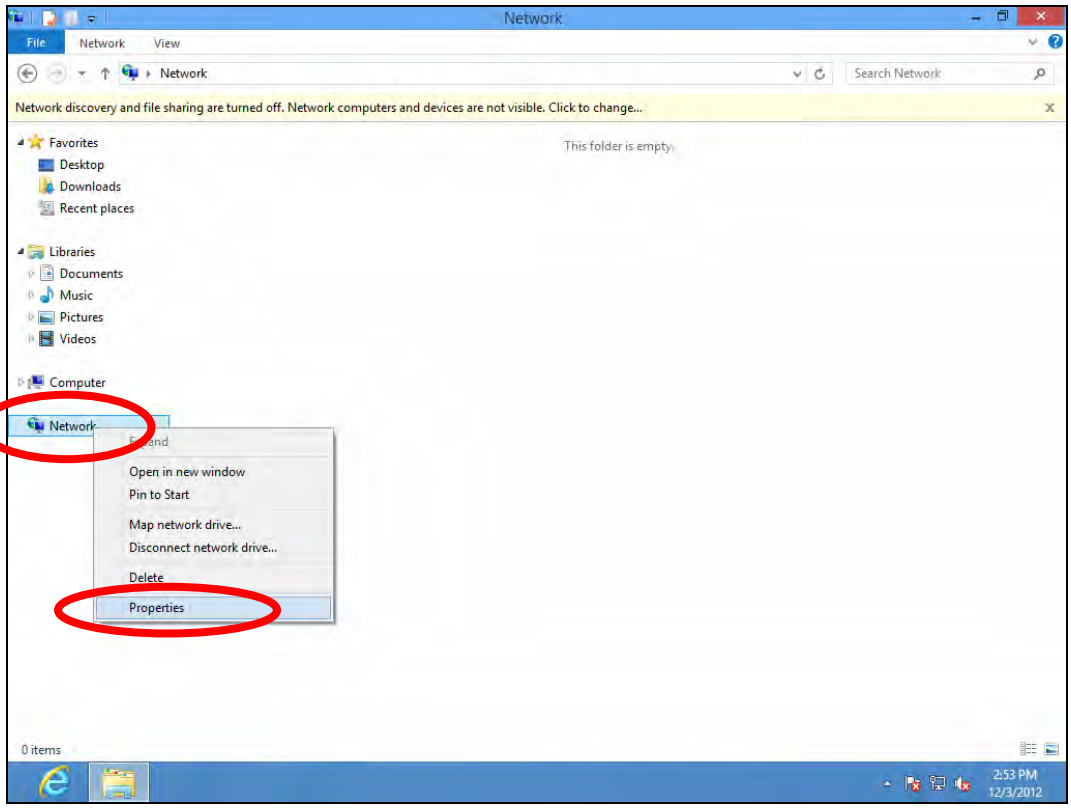
1. From the Windows 8 Start screen, you need to switch to desktop mode. Move your curser to the bottom left of the screen and click.



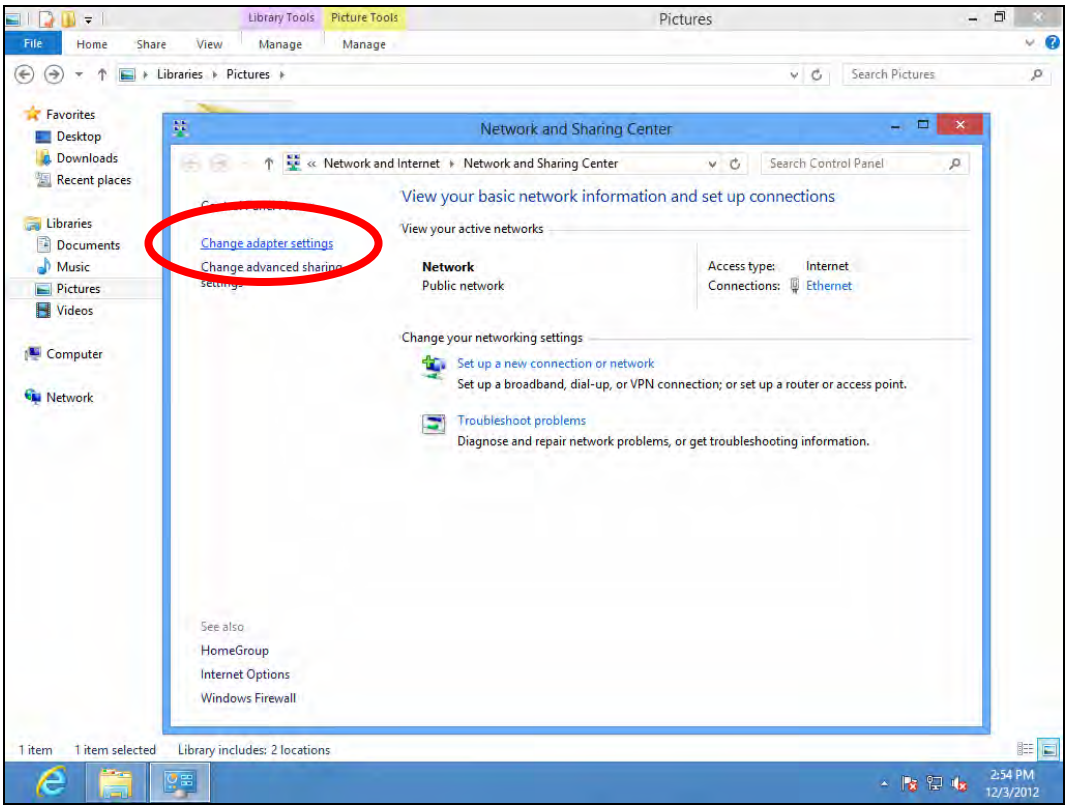
2. In desktop mode, click the File Explorer icon in the bottom left of the screen, as shown below.



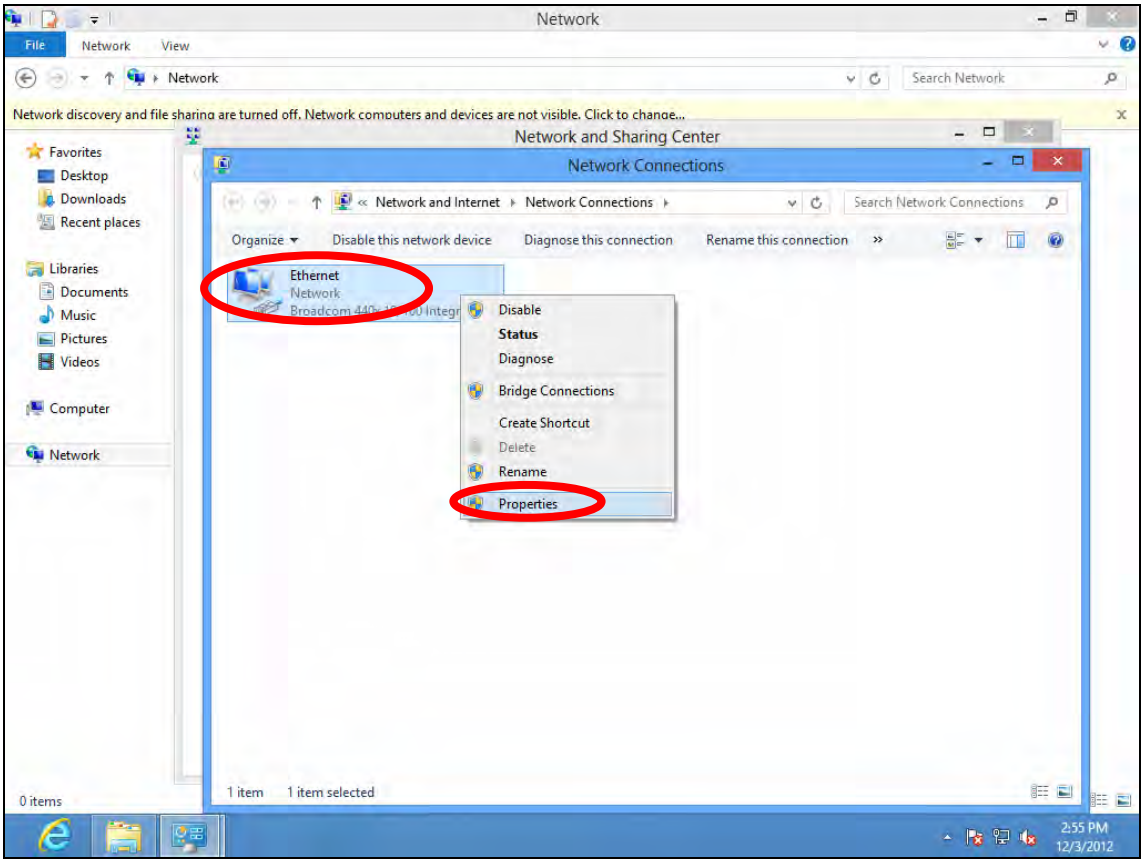
3. Right click “Network” and then select “Properties”.



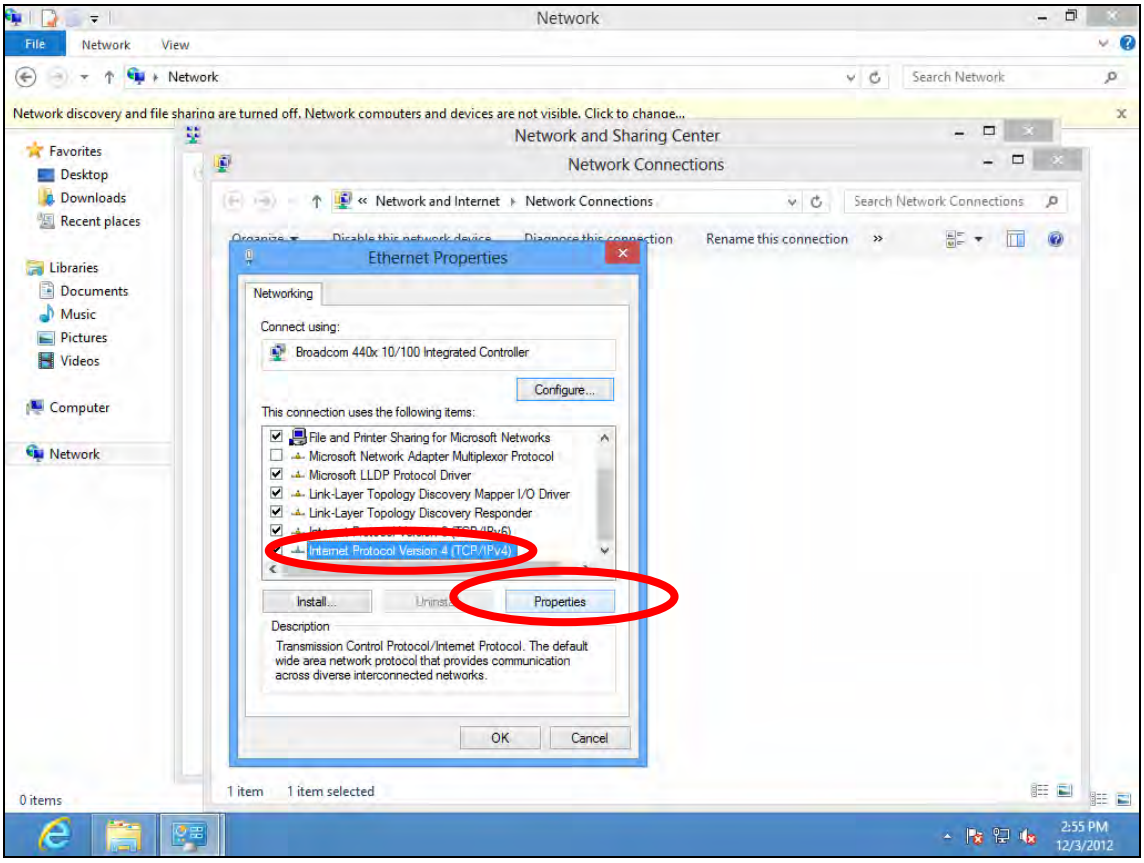
4. In the window that opens, select “Change adapter settings” from the left side.



5. Choose your connection and right click, then select “Properties”.



6. Select “Internet Protocol Version 4 (TCP/IPv4) and then click “Properties”.



7. Select “Use the following IP address”, then input the following values:

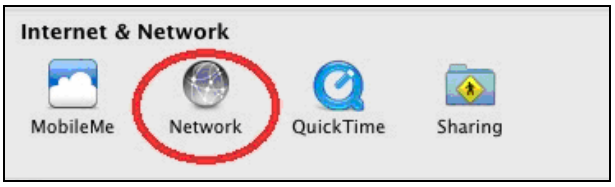
IP address: 192.168.2.10
Subnet Mask: 255.255.255.0

Click ‘OK’ when finished.

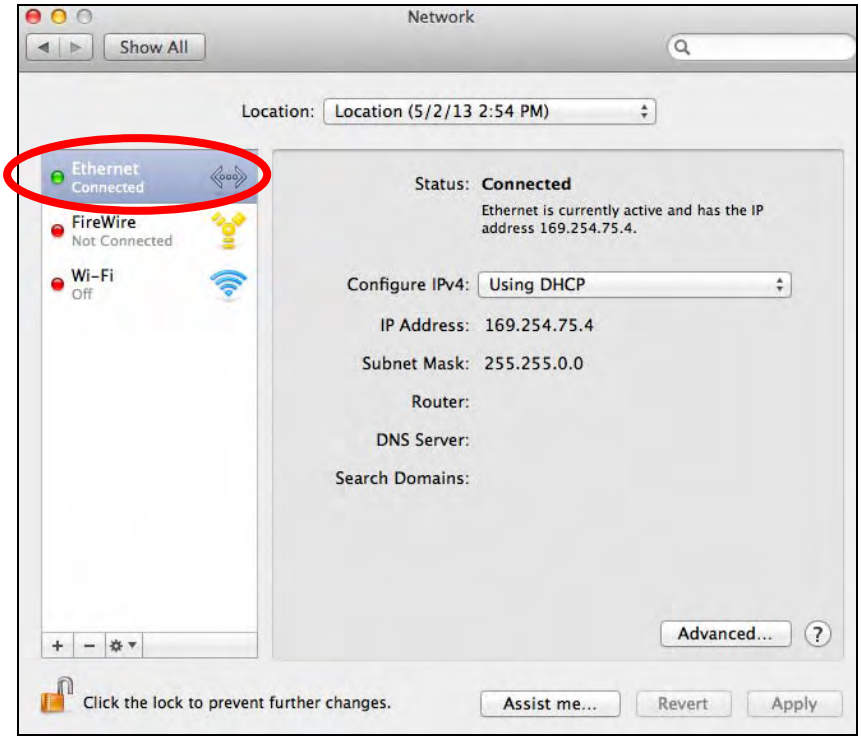
V-1-5. Mac

1. Have your Macintosh computer operate as usual, and click on “System Preferences”

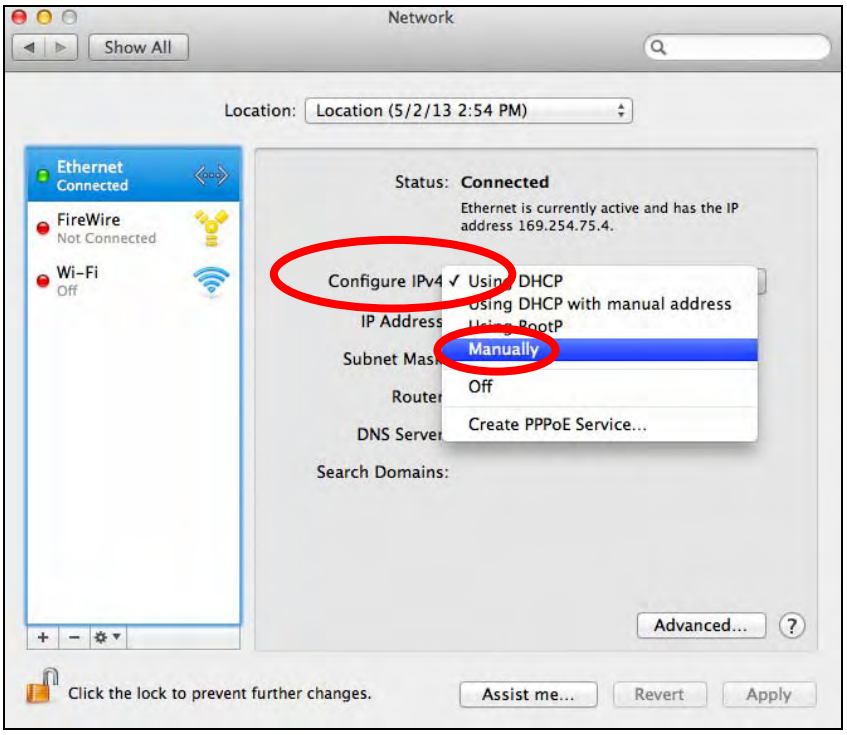
2. In System Preferences, click on “Network”.



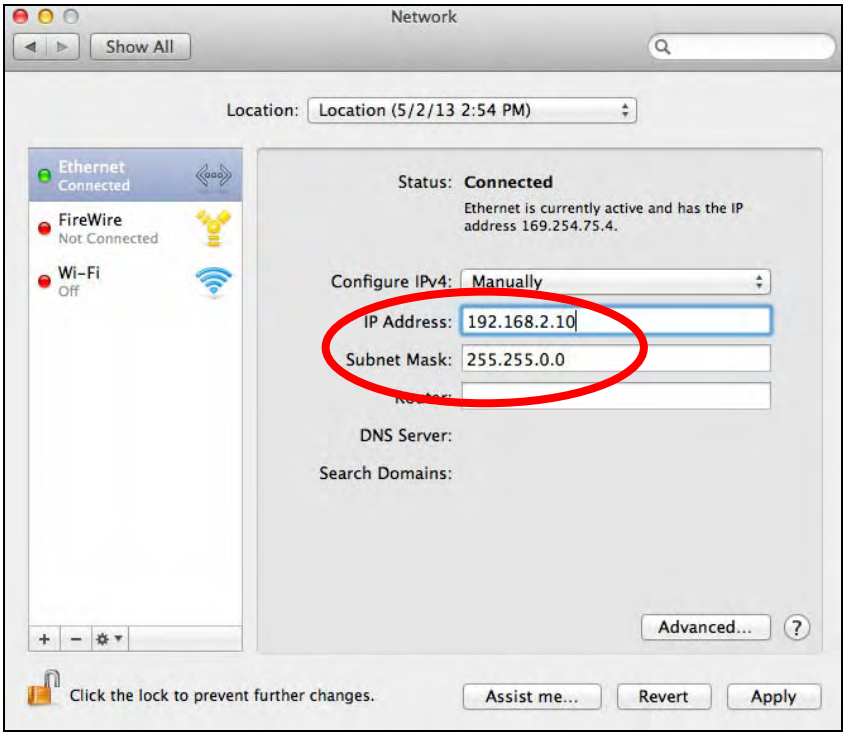
3. Click on “Ethernet” in the left panel.



4. Open the drop-down menu labeled “Configure IPv4” and select “Manually”.



5. Enter the IP address 192.168.2.10 and subnet mask 255.255.255.0. Click on “Apply” to save the changes.



V-2. Hardware Specification

MCU/RF	Qualcomm Atheros QCA9558 (2.4GHz) + QCA9880 (5GHz)
PHY	Qualcomm Atheros AR8035
Memory	DDR2 128MB
Flash	16MB
Physical Interface	-LAN : 1 x 10/100/1000 Gigabit Ethernet with 802.3at PoE support - Reset Button -USB2.0 interface -DC Power Jack
Power Requirement	Power over Ethernet, IEEE 802.3at DC : 12V / 2A
Antenna	Internal PIFA Antenna (2.4GHz x 3, 5GHz x 3)
Others	Internal Buzzer (Find me)

V-3. ENVIRONMENT & PHYSICAL

Temperature Range	Use PoE Switch: Operation : 0 to 50℃ (32℉ to 122℉) Storage : -20 to 60℃ (-4℉ to 140℉) Use Power Adapter: Operation : 0 to 40℃ (32℉ to 104℉) Storage : -20 to 60℃ (-4℉ to 140℉)
Humidity	90% or less – Operating, 90% or less - Storage
Certifications	FCC, CE
Dimensions	208(D) x 32.1(H)mm
Weight	590g

VI. Best Practice

VI-1. How to Create and Link WLAN & Access Point Groups

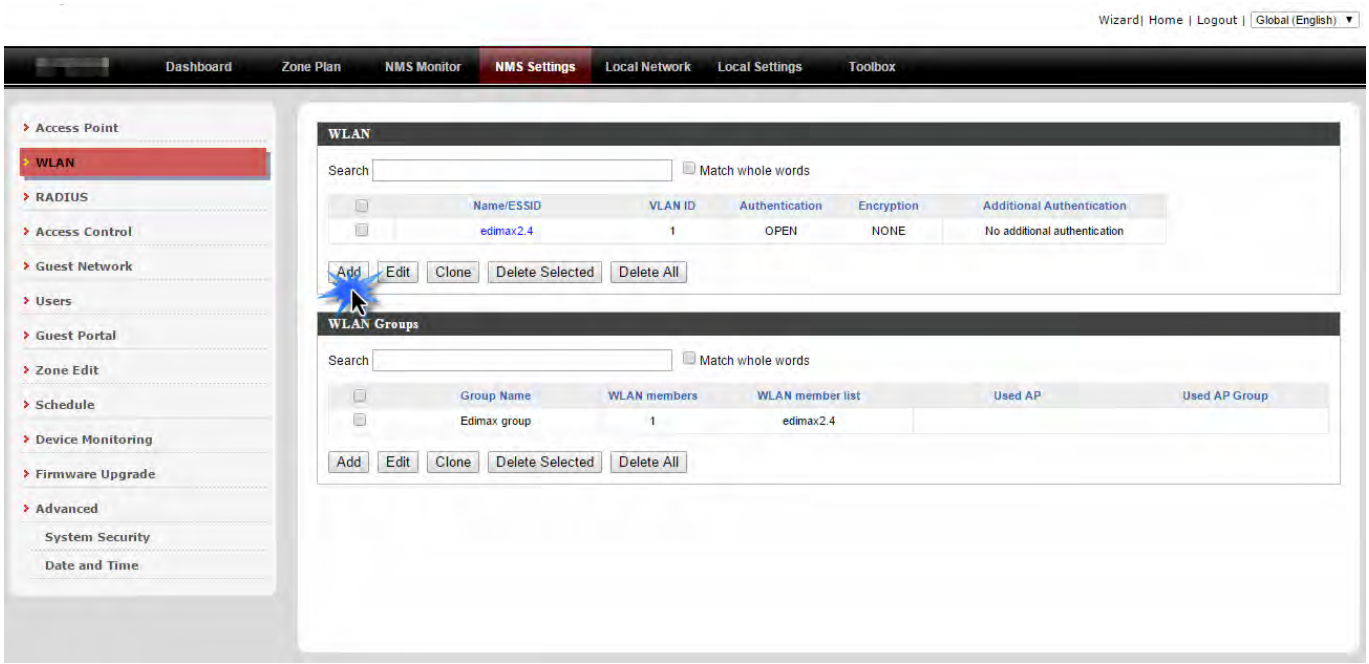
You can use NMS to create individual SSIDs and group multiple SSIDs together into WLAN groups. You can then assign individual access points to use those WLAN group settings and/or group multiple access points together into access point groups, which you can also assign to use WLAN group settings.

Follow the example below to:

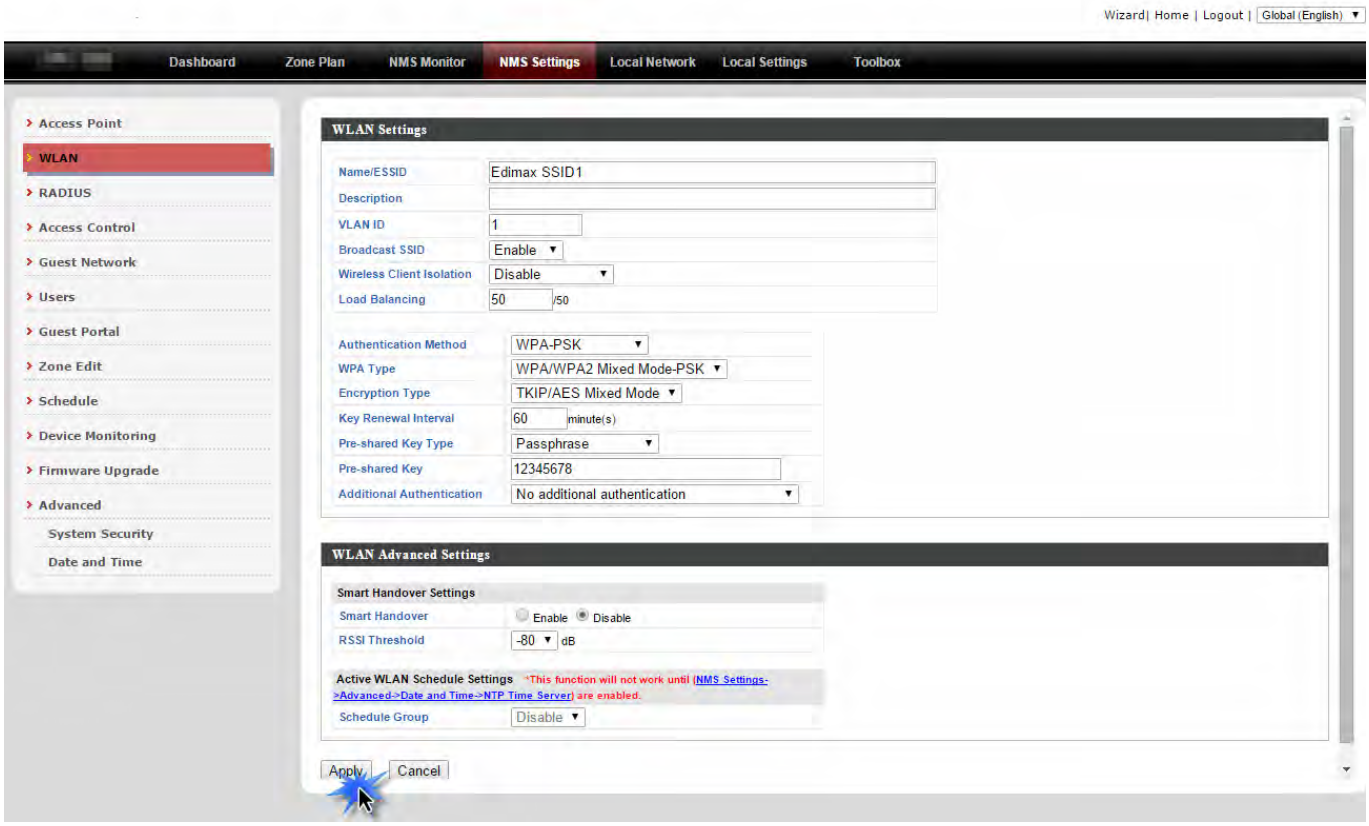
A. Create a WLAN group.
B. Create an access point group.
C. Assign the access point group to use the SSID group settings.

A.

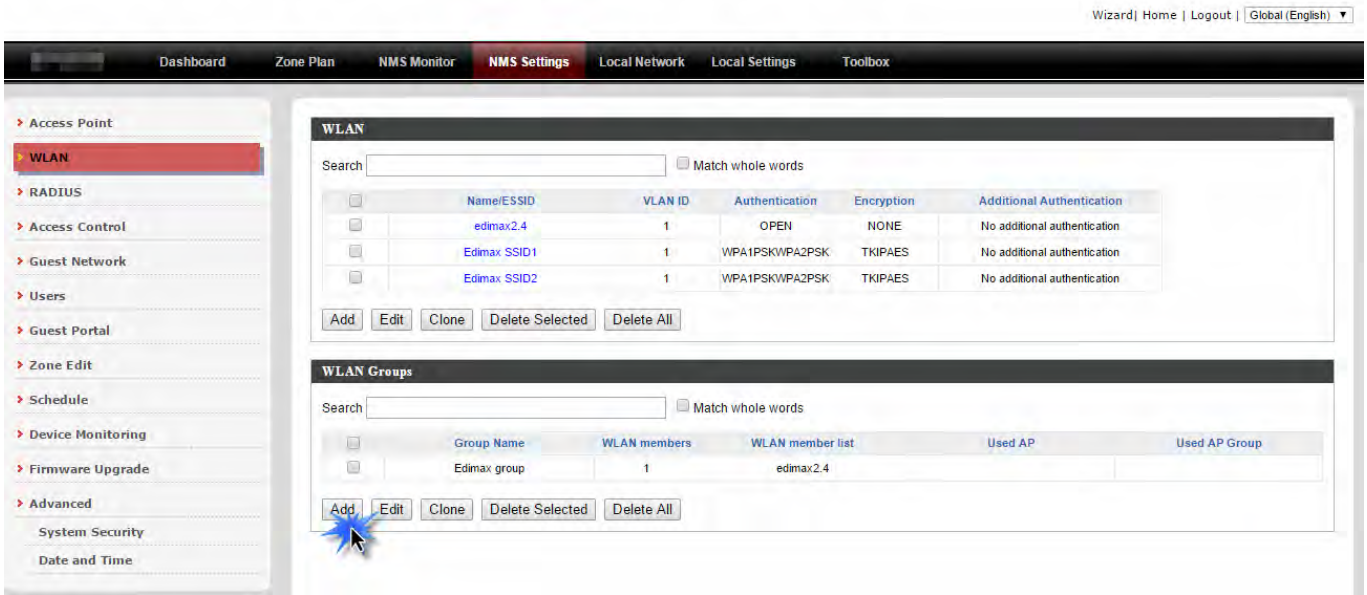
1. Go to **NMS Settings → WLAN** and click **"Add"** in the **WLAN** panel:



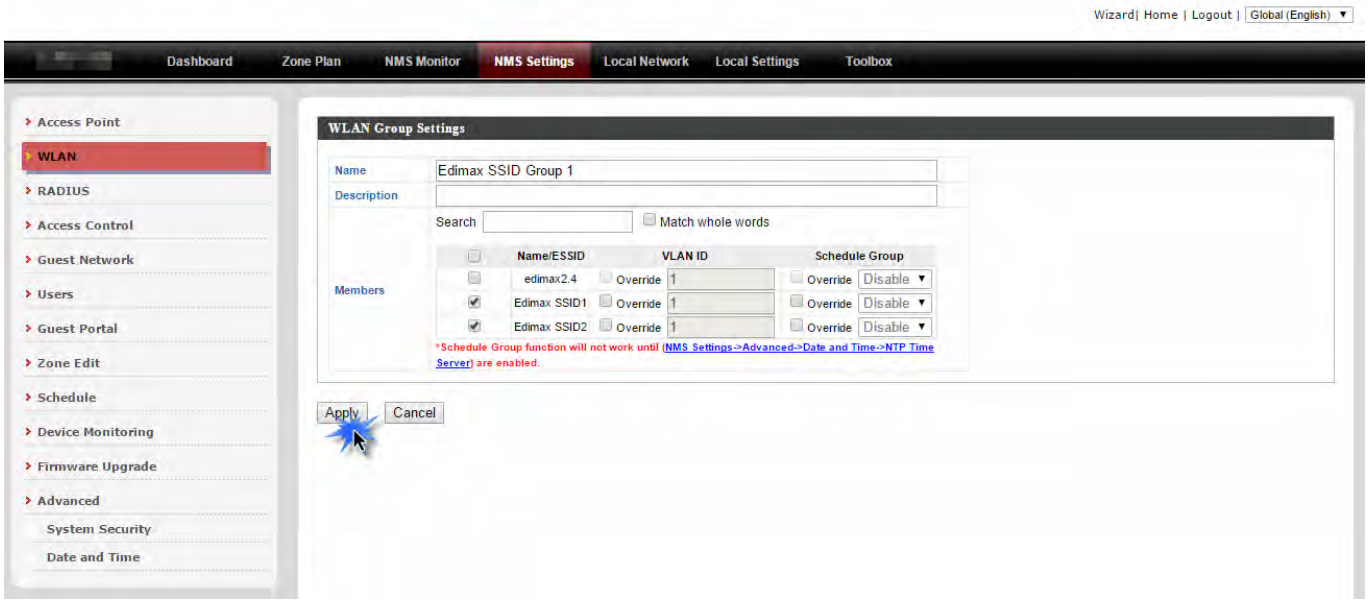
2. Enter an SSID **name** and set **authentication/encryption** and click **“Apply”**:



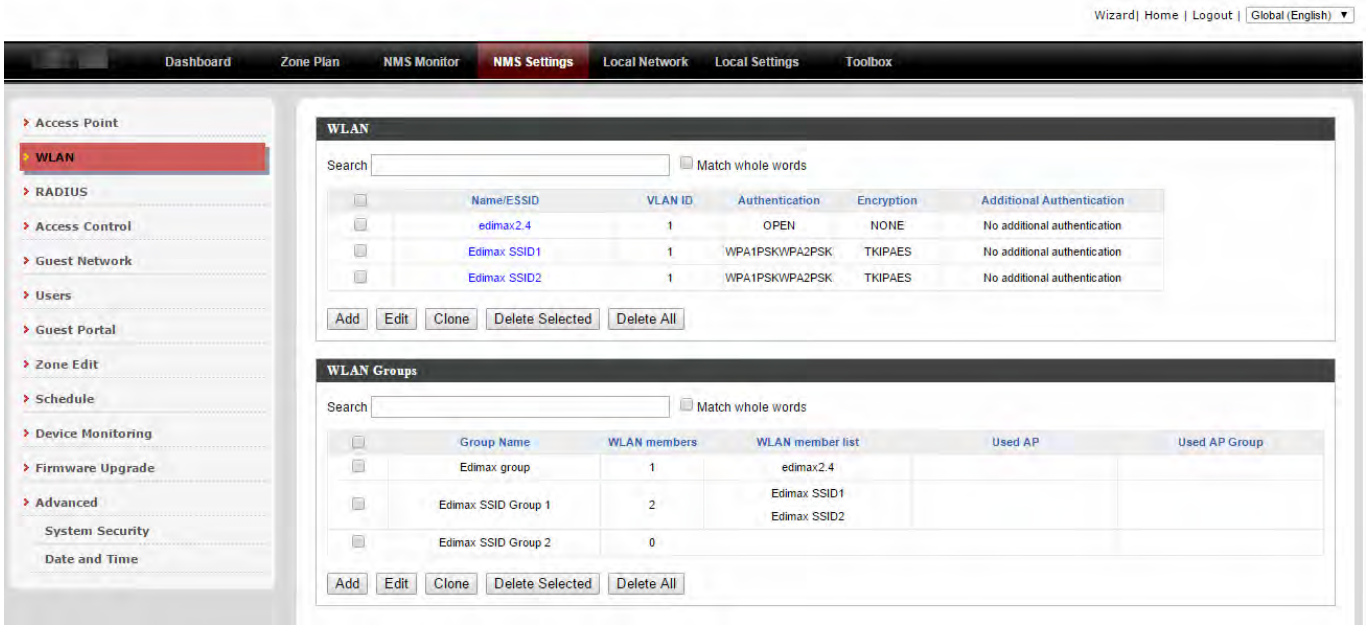
3. The new SSID will be displayed in the **WLAN** panel. **Repeat** to add additional SSIDs according to your preference, and then click **“Add”** in the **WLAN Group** panel:



4. Enter a **name** for the **SSID group** and **check the boxes** to select which SSIDs to include within the group. Click "**Apply**" when done.

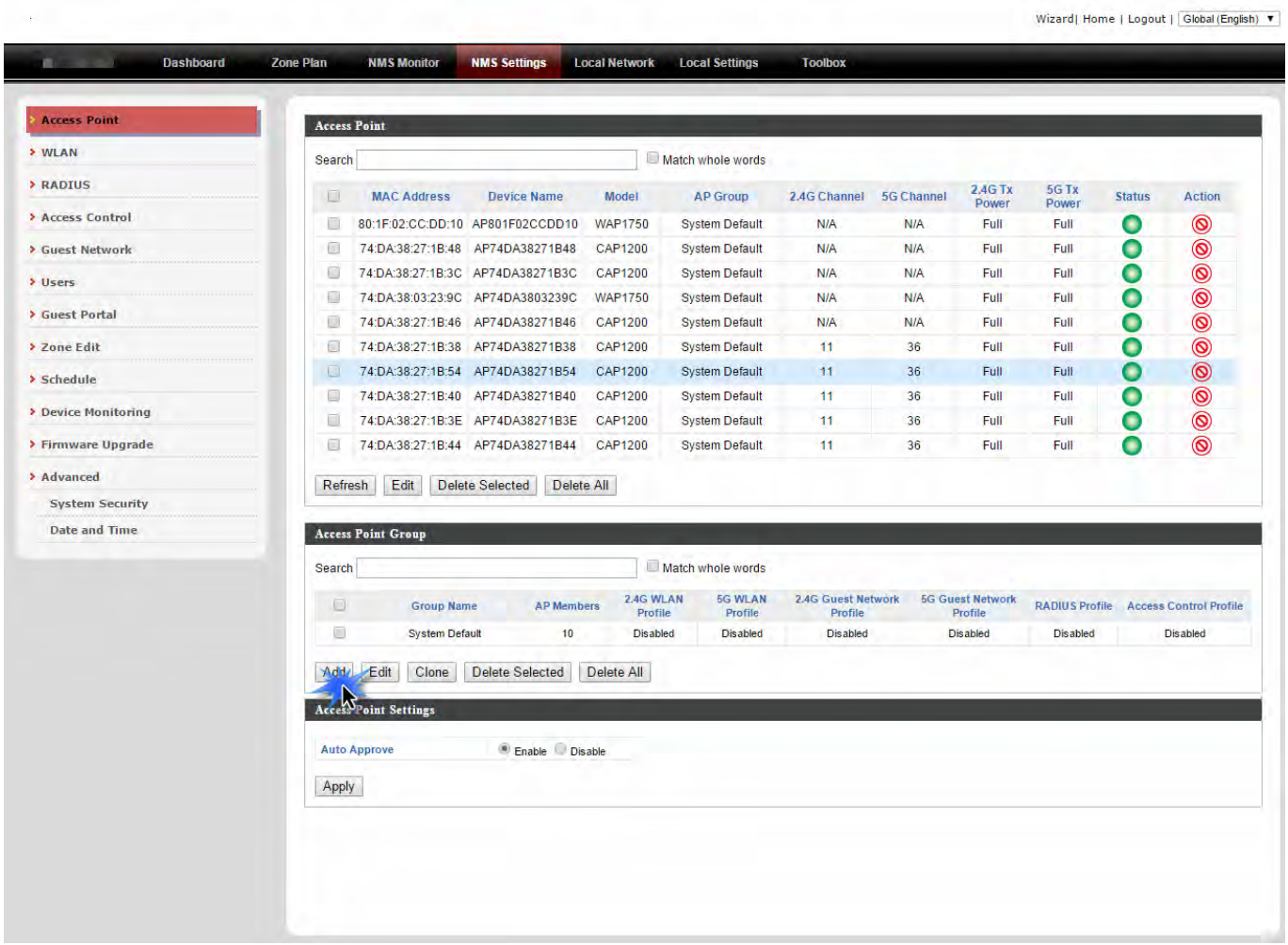


5. The new **WLAN group** will be displayed in the **WLAN Group** panel. **Repeat** to add additional WLAN groups according to your preference:

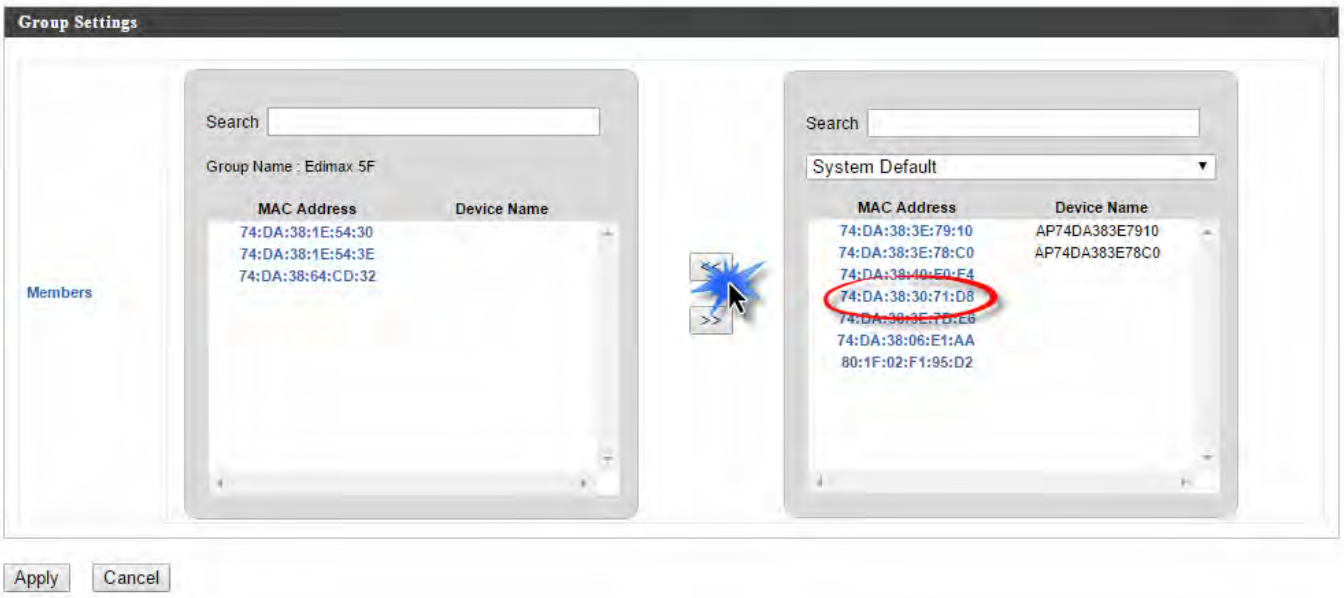


B.

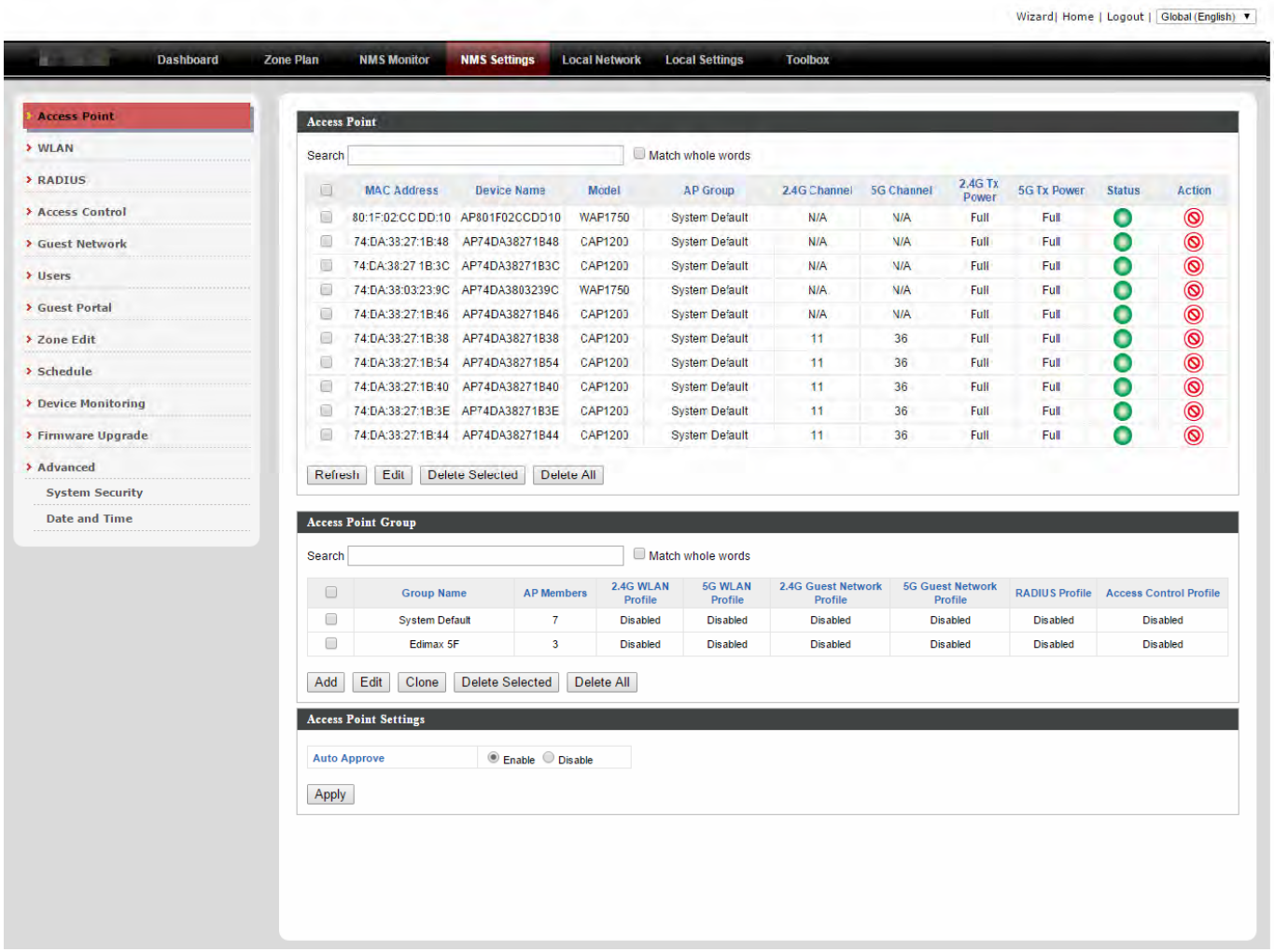
1. Go to **NMS Settings → Access Point** and click “Add” in the Access Point Group Panel:



2. Enter a **Name** and then scroll down to the **Group Settings** panel and use the **<<** button to **add** selected access points into your group from the box on the right side. Click **“Apply”** when done.

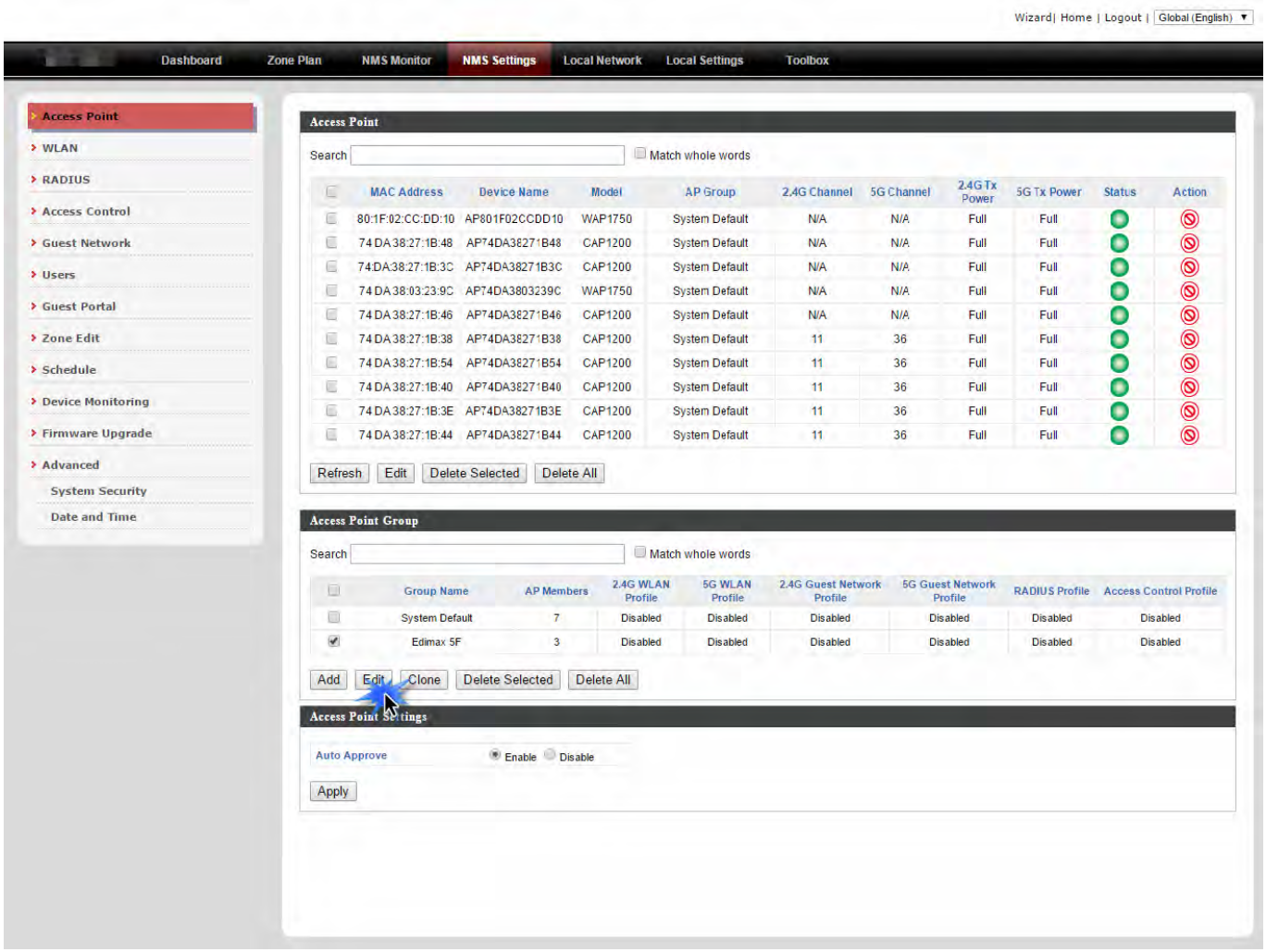


3. The new **access point group** will be displayed in the **Access Point Group** panel. **Repeat** to add additional access point groups according to your preference:

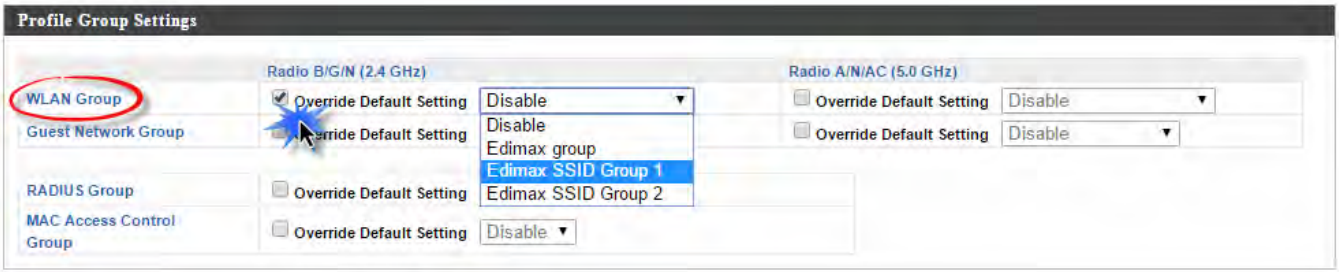


C.

1. Go to **NMS Settings → Access Point** and select an access point group using the checkboxes in the **Access Point Group** panel. Click "**Edit**":



2. Scroll down to the **Profile Group Settings** panel and check the "**Override Group Settings**" box for **WLAN Group (2.4GHz and/or 5GHz).** Select your **WLAN group** from the drop-down menu and click "**Apply**":



3. Repeat for other access point groups according to your preference.
4.

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Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio technician for help.

FCC Caution

This device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Any changes or modifications not expressly approved by the party responsible for compliance could void the authority to operate equipment.

Federal Communications Commission (FCC) Radiation Exposure Statement

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

R&TTE Compliance Statement

This equipment complies with all the requirements of DIRECTIVE 1999/5/EC OF THE EUROPEAN PARLIAMENT AND THE COUNCIL of March 9, 1999 on radio equipment and telecommunication terminal equipment and the mutual recognition of their conformity (R&TTE). The R&TTE Directive repeals and replaces in the directive 98/13/EEC (Telecommunications Terminal Equipment and Satellite Earth Station Equipment) As of April 8, 2000.

Safety

This equipment is designed with the utmost care for the safety of those who install and use it. However, special attention must be paid to the dangers of electric shock and static electricity when working with electrical equipment. All guidelines of this and of the computer manufacture must therefore be allowed at all times to ensure the safe use of the equipment.

EU Countries Intended for Use

The ETSI version of this device is intended for home and office use in Austria, Belgium, Bulgaria, Cyprus, Czech, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Turkey, and United Kingdom. The ETSI version of this device is also authorized for use in EFTA member states: Iceland, Liechtenstein, Norway, and Switzerland.

EU Countries Not Intended for Use

None