



NMS USER MANUAL

WAP-EN Series

Wireless Access Points

Version 1.2, June 2017



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NOTE: This document is subject to change without notice.

I. Product Information

The Network Management Suite (NMS) supports the central management of a group of access points, otherwise known as an AP Array. NMS can be installed on one access point and support up to 5 access points or on a Wireless LAN Controller (WLC) and support up to 50 access points.

Access points can be deployed and configured according to your requirements. This flexibility creates a powerful network architecture which can be easily managed and expanded in the future. The easy to use interface and a full range of functionality make the NMS system ideal for small and mid-sized office environments.

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II. Quick Setup

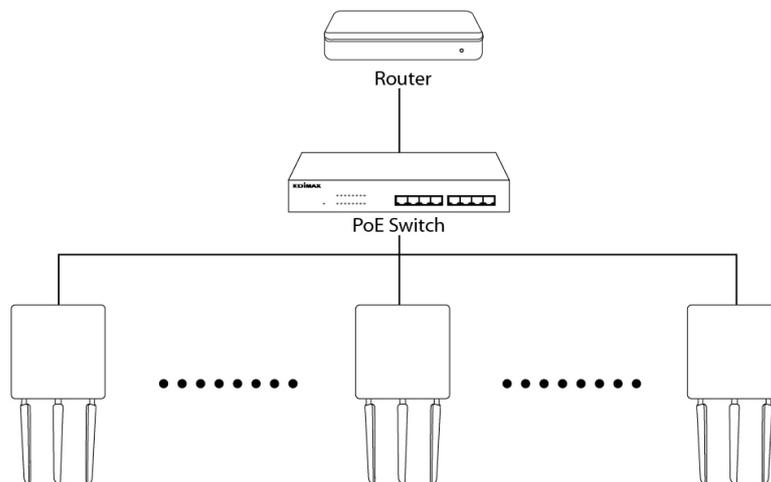
One device is designated as the AP Controller (master) and other connected APs are designated as Managed APs (slaves). Using the NMS you can monitor, configure and manage all Managed APs. Up to 5 APs can be managed from an EN-Series Wireless Access Point in AP Controller Mode or 50 APs can be managed from a dedicated WLC-6404 Wireless Access Point Controller.

Follow the steps below:

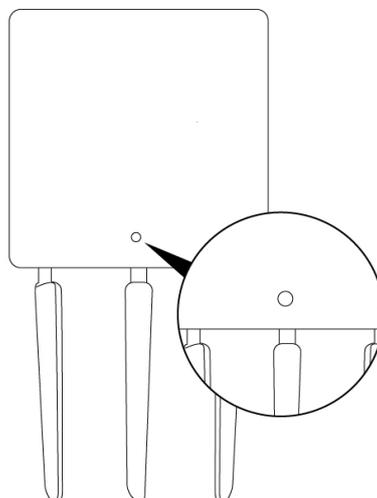
1. Connect all APs to an Ethernet or PoE switch which is connected to a gateway/router.



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 the LED status.



3. Connect the AP Controller, which will manage all other connected APs, to power and turn the device on.
4. Connect a computer to the 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 listed in the User Manual for your controller. Typically it is either **192.168.2.1** or **192.168.2.2**.

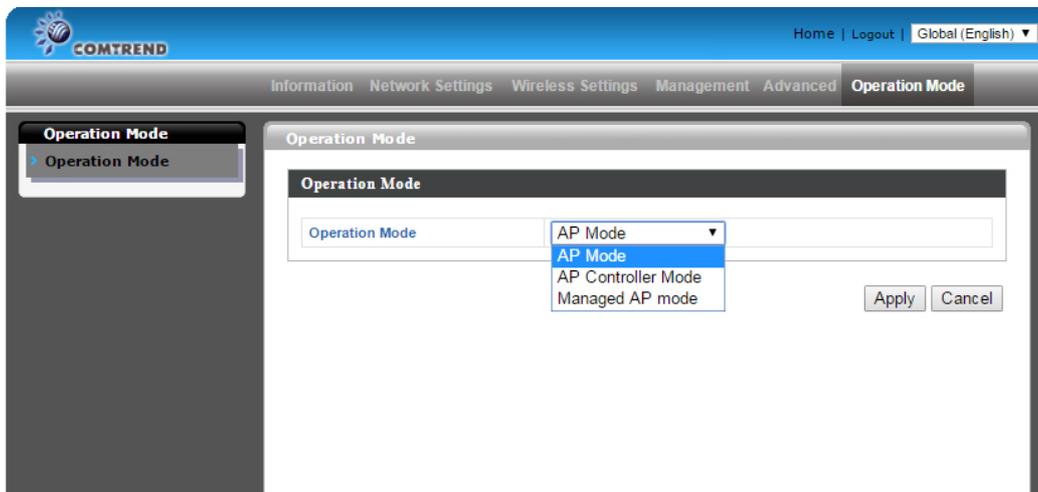
 ***DHCP is enabled on the access point by default. Consult the DHCP Table of your network for the Controller's IP Address. If no DHCP Service is found, the access point will default to the default IP address listed in the User Manual. Typical default IP addresses are either 192.168.2.1 or 192.168.2.2.***

 ***Your computer's IP address must be in the same subnet as the AP Controller. 192.168.2.10 is being used in this example.***



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

7. If using an EN-Series AP as a controller, you will arrive at the Access Point Information screen. Go to →“**Operation Mode**” and select “**AP Controller Mode**” from the drop down menu to initiate Controller Mode.



8. Click “Apply” to save the settings.



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



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

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

Use **Toolbox** to diagnose connection issues.

III. Software Layout

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



Screenshots displayed are examples. The information shown on your screen will vary depending on your configuration and device being used as a controller.

Dashboard

Auto Refresh Time 1 minute 30 seconds Disable 35

System Information

Product Name	WAP-EH1750W
Host Name	APController
MAC Address	D8 B6 B7 07 DE A0
IP Address	192.168.0.4
Firmware Version	1.0.0
NMS Version	1.0.2.0
System Time	2015/11/16 16:01:27
Uptime	0 day 00:03:32

Managed AP

Index	MAC Address	Device Name	Model	IP Address	2.4G Channel	5G Channel	Clients	Status	Action
1	00:1D:20:FF:C8:71	AP Node #1	WAP-EH1750W	192.168.0.2	6	36	4	●	[X] [Refresh] [Move] [Delete]
2	00:1D:20:FF:C8:7B	AP Node #2		192.168.0.6	N/A	N/A	0	●	[X] [Refresh] [Move] [Delete]

Managed AP Group

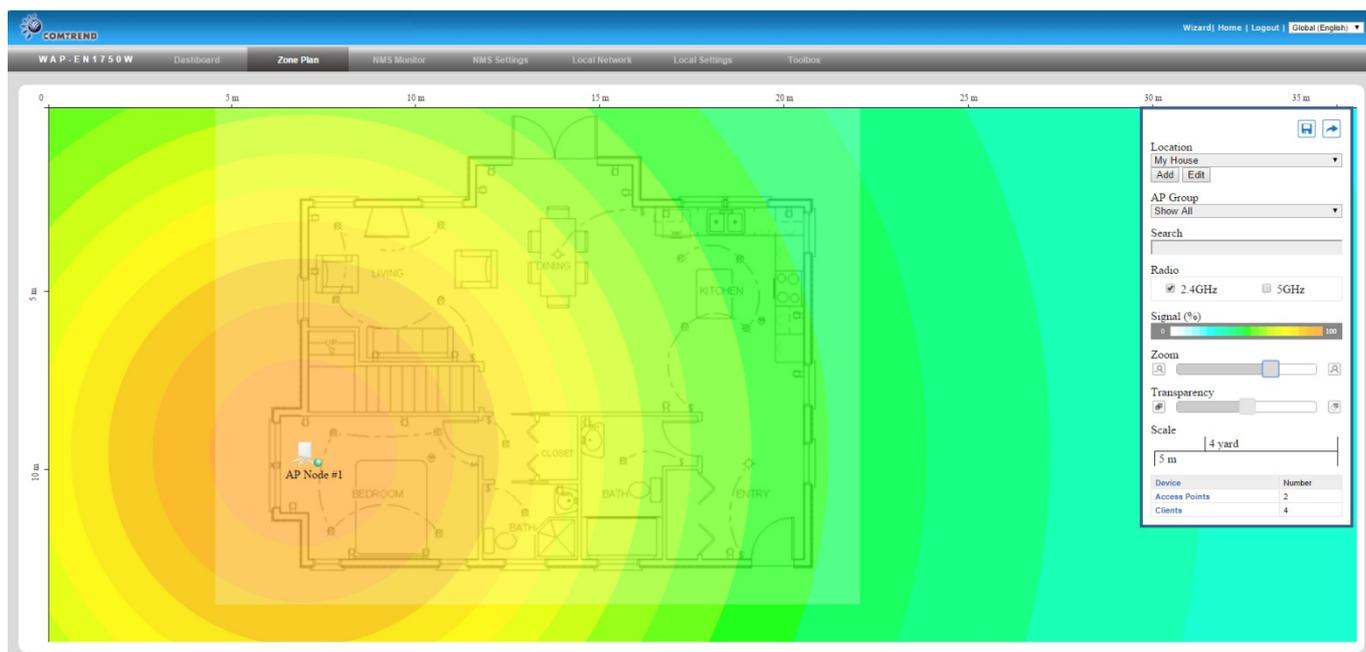
Group Name	MAC Address	Device Name	Model	IP Address	Clients	Status	Action
System Default (0)							
Empty							
Wizard AP Group 02 (2)							
	00:1D:20:FF:C8:71	AP Node #1	WAP-EH1750W	192.168.0.2	4	●	[X] [Refresh] [Move] [Delete]
	00:1D:20:FF:C8:7B	AP Node #2		192.168.0.6	0	●	[X] [Refresh] [Move] [Delete]

Active Clients

Index	Client MAC Address	AP MAC Address	WLAN	Radio	Signal(%)	Connected Time	Idle Time	Tx(KB)	Rx(KB)	Vendor
1	7C:7A:91:AD:A5:66	00:1D:20:FF:C8:71	Comtrend-2.4g	2.4GHz	100	2 hours 48 min 21 secs	0	91844.599	69551.059	Intel Corporate
2	00:23:14:17:47:E4	00:1D:20:FF:C8:71	Comtrend-2.4g	2.4GHz	100	2 hours 48 min 21 secs	0	67905.911	24026.257	Intel Corporate
3	E4:D5:3D:BD:E3:33	00:1D:20:FF:C8:71	Comtrend-2.4g	2.4GHz	73	2 hours 48 min 20 secs	0	1831.254	2351.644	Hon Hai Precision Ind. Co. Ltd.
4	F0:27:65:FB:4F:80	00:1D:20:FF:C8:71	Comtrend-2.4g	2.4GHz	100	56 secs	0	4044.222	319.571	Murata Manufacturing Co. Ltd.

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. (Available settings will vary depending on the device being used as an AP Controller.)

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. (Available settings will vary depending on the device being used as an AP Controller.)

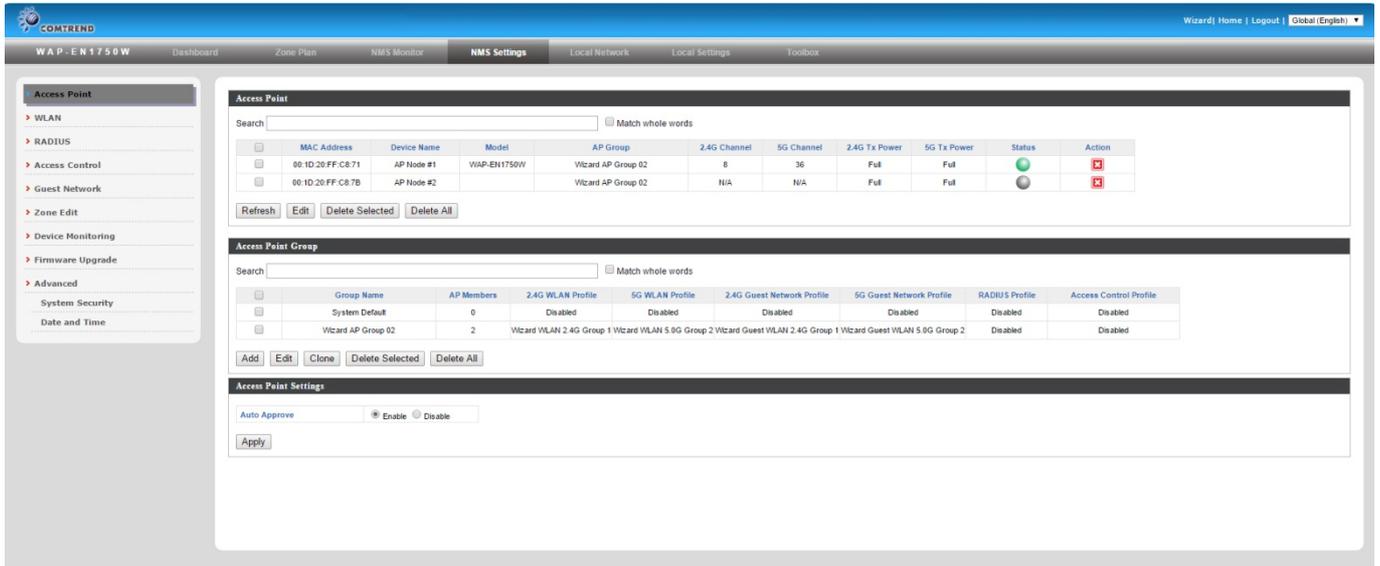
NMS Monitor

The screenshot shows the 'NMS Monitor' interface. On the left is a navigation menu with categories: Access Point (Managed AP), WLAN (Active WLAN, Active WLAN Group), Clients (Active Clients, Rogue Devices), and Information (All Events/Activities, Monitoring). The main area displays a 'Managed AP' table with a search bar and a 'Match whole words' checkbox.

Index	MAC Address	Device Name	Model	IP Address	2.4G Channel	5G Channel	Clients	Status	Action
1	00:1D:20:FF:C8:71	AP Node #1	WAP-EN1750W	192.168.0.2	8	36	4	●	[Stop] [Refresh] [Move] [Zoom In] [Zoom Out]
2	00:1D:20:FF:C8:7B	AP Node #2		192.168.0.6	N/A	N/A	0	●	[Stop] [Refresh] [Move] [Zoom In] [Zoom Out]

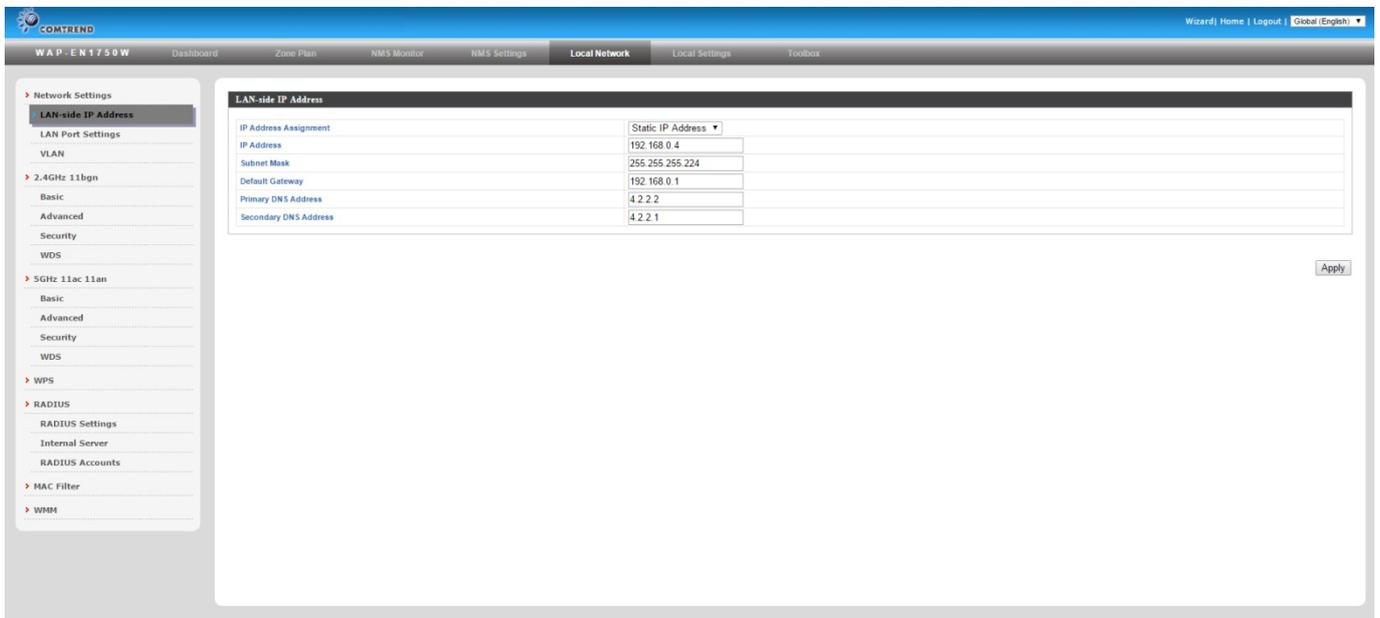
The **NMS Monitor** panel provides more detailed monitoring information about the AP Array than found on the Dashboard, grouped according to categories in the menu down the left side. (Available settings will vary depending on the device being used as an AP Controller.)

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 as well as upgrade firmware across multiple access points. The Zone Plan can also be configured using “Zone Edit”. (Available settings will vary depending on the device being used as an AP Controller.)

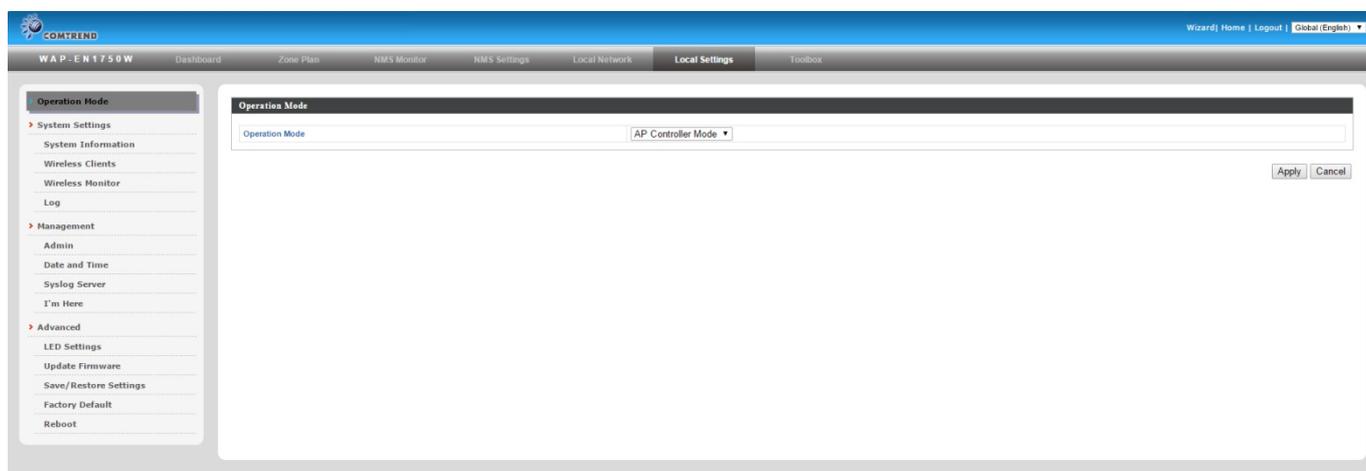
Local Network



Local Network settings are for your AP Controller. You can configure the IP address and DHCP server of the AP Controller in addition to 2.4GHz & 5Ghz Wi-Fi and security, with WPS, RADIUS server, MAC filtering and WMM settings

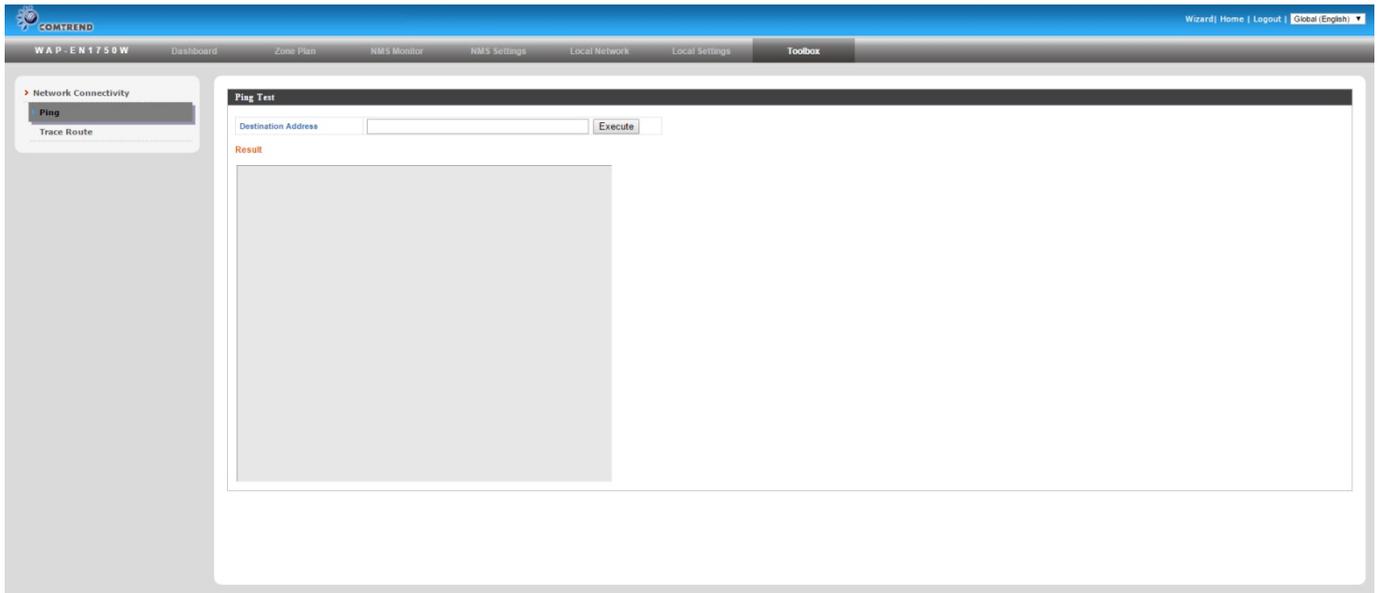
also available. (Available settings will vary depending on the device being used as an AP Controller.)

Local Settings



Local Settings are for your AP Controller. You can set the operation mode and view network settings (clients and logs) specifically for the AP Controller, as well as other management settings such as date/time, admin accounts, firmware and reset. (Available settings will vary depending on the device being used as an AP Controller.)

Toolbox



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

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. (Available settings will vary depending on the device being used as an AP Controller.) When using the NMS, click “Apply” to save changes:



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

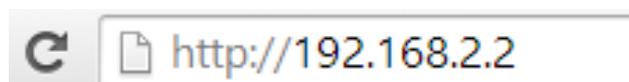
IV-1. LOGIN, LOGOUT & RESTART



It is recommended that you login to the AP Controller to make configuration changes 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 listed in the User Manual for your controller. Typically it is either **192.168.2.1** or **192.168.2.2**.



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



DHCP is enabled on the access point by default. Consult the DHCP Table of your network for the Controller’s IP Address. If no DHCP Service is found, the access point will default to the default IP address listed in the User Manual. Typical default IP addresses are either 192.168.2.1 or 192.168.2.2.



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**.

RESTART

You can restart your AP Controller or any Managed AP using the 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:

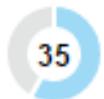
The dashboard displays an overview of your AP array. It consists of several panels:

- APs Information:** Shows counts for Managed (0), Active (0), Offline (0), and Discovered (0).
- System Information:** Displays system details such as Product Name (WAP-EN1750W), Host Name (WAP-EN1750W-15), MAC Address (D8 B6 B7 07 DE AD), IP Address (192.168.0.15), Firmware Version (1.2.0), System Time (20170516 13:46:26), Uptime (0 day 01:27:16), CPU Usage (6%), and Memory / Cache Usage (56%).
- Devices Information:** Shows counts for Access Points (0), Client Devices (0), and Rogue Devices (0).
- Managed AP:** A table with columns: Index, MAC Address, Device Name, Model, IP Address, 2.4G Channel, 5G Channel, Clients, Status, and Action. It is currently empty.
- Managed AP Group:** A table with columns: Group Name, MAC Address, Device Name, Model, IP Address, Clients, Status, and Action. It is currently empty.
- Active Clients:** A table with columns: Index, Client MAC Address, AP MAC Address, WLAN, User Name, Radio, Signal(%), Connected Time, Idle Time, Tx(KB), Rx(KB), and Vendor. It is currently empty.
- Active Users:** A table with columns: Index, User Name, MAC Address, IP Address, SSID, Creator, Create Time, Expire Time, Usage Percentage, Vendor, Platform, and Action. It is currently empty.



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:

Auto Refresh Time : 1 minute 30 seconds Disable



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, Uptime, CPU Usage and Memory Usage.*

System Information	
Product Name	WAP-EN1750W
Host Name	WAP-EN1750W-15
MAC Address	D8:B6:B7:07:DE:A0
IP Address	192.168.0.15
Firmware Version	1.2.0
System Time	2017/05/16 13:32:56
Uptime	0 day 01:13:45
CPU Usage	6%
Memory / Cache Usage	55%

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.*

Devices Information

Device	Number
Access Points	2
Client Devices	0
Rogue Devices	0

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, Device Name, Model, IP Address, 2.4GHz & 5GHz Wireless Channel Number, No. of Clients connected to each access point, and Status (on or off).*



Active Clients

Search Match whole words

Index	Client MAC Address	AP MAC Address	WLAN	User Name	Radio	Signal(%)	Connected Time	Idle Time	Tx(KB)	Rx(KB)	Vendor
Empty											

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



Search Match whole words

IV-2-6. Active Users

Active Users displays information about each user in the local network: *Index (reference number), User Name, MAC Address, IP Address, SSID, Creator, Creation Time, Expire Time, Usage Percentage, Vendor, Platform and Action.*



Active Users

Search Match whole words

Index	User Name	MAC Address	IP Address	SSID	Creator	Create Time	Expire Time	Usage Percentage	Vendor	Platform	Action
Empty											

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



Search Match whole words

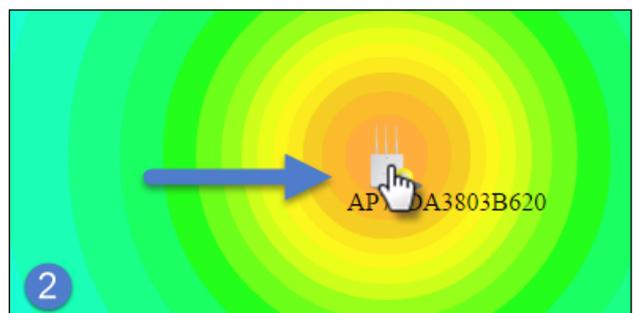
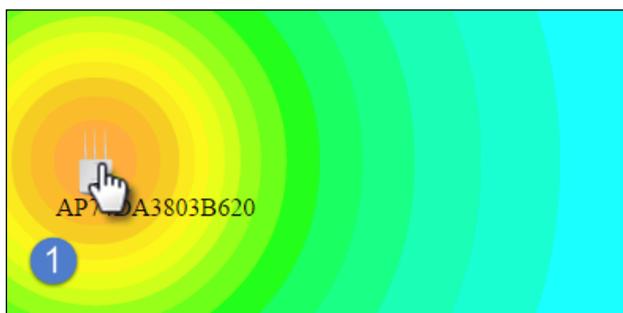
IV-3. ZONE PLAN

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 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).*

Index	MAC Address	Device Name	Model	IP Address	2.4G Channel	5G Channel	Clients	Status	Action
1	00:1D:20:FF:C8:71	AP Node #1	WAP-EN1750W	192.168.0.2	11	36	2		
2	00:1D:20:FF:C8:7B	AP Node #2		192.168.0.6	N/A	N/A	0		

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

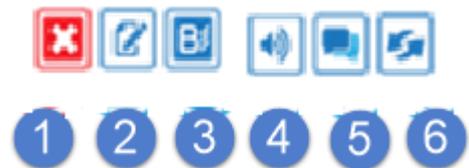


The **Status** icon displays the status of each Managed AP.

Status Icons			
Icon	Color	Status	Definition
	Grey	Disconnected	Managed AP is disconnected. <i>Check the network connection and ensure the Managed AP is in the same IP subnet as the AP Controller.</i>
	Red	Authentication Failed Or Incompatible NMS Version	System security must be the same for all access points in the AP array. <i>Please check security settings (refer to IV-5-12-1. System Security).</i> Access points must use the same version of NMS as the Controller. <i>Use the AP Controller's firmware upgrade function (refer to IV-5-11. Firmware Upgrade) to synchronize the NMS version.</i>

	Orange	Configuring or Upgrading	<i>Managed AP is making configuration changes or upgrading the firmware.</i>
	Yellow	Connecting	<i>Managed AP is connecting.</i>
	Green	Connected	<i>Managed AP is connected.</i>
	Blue	Waiting for Approval	<i>Managed AP is waiting for approval.</i>

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 Group displays information about each Managed AP group in the local network: *Group Name, MAC Address, Device Name, Model, IP Address, 2.4GHz & 5GHz Wireless Channel Number, 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**).

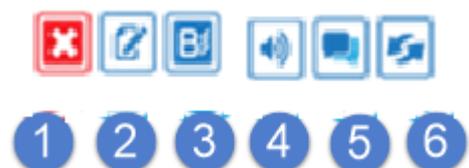
Group Name	MAC Address	Device Name	Model	IP Address	Clients	Status	Action
System Default (0)							
Empty							
Wizard AP Group 02 (2)							
	00:1D:20:FF:C8:71	AP Node #1	WAP-EN1750W	192.168.0.2	2		
	00:1D:20:FF:C8:7B	AP Node #2		192.168.0.6	0		

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:

Search Match whole words

Active WLAN					
Index	Name/ESSID	VLAN ID	Authentication	Encryption	Additional Authentication
1	mat2.4	1	WPA2PSK	WPAPSK	No additional authentication
2	mat5	1	WPA2PSK	WPAPSK	No additional authentication

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:

Search Match whole words

Group Name	Name/ESSID	VLAN ID	Authentication	Encryption	Additional Authentication
Default (0)					
Empty					
WLAN Group 2 (1)					
	matt2.4	1	WPA2PSK	AES	No additional authentication
WLAN Group 3 (1)					
	matt5	1	WPA2PSK	AES	No additional authentication

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), and the Vendor of the client device.*

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:

Search Match whole words



IV-4-4. Users

IV-4-4-1. 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, Traffic Progress, Vendor and 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-4-4-2. Users Log

Displays a detailed information log of users and activity on the network via guest portals: *ID, Date and Time of entry, Category of entry, Severity, Users, Event/Activities details.*



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



IV-4-5. 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:



Rogue Devices

Scan

Unknown Rogue Devices

Search Match whole words

Index	Channel	SSID	MAC Address	Security	Signal (%)	Type	Vendor	Action
No Rogue Device								

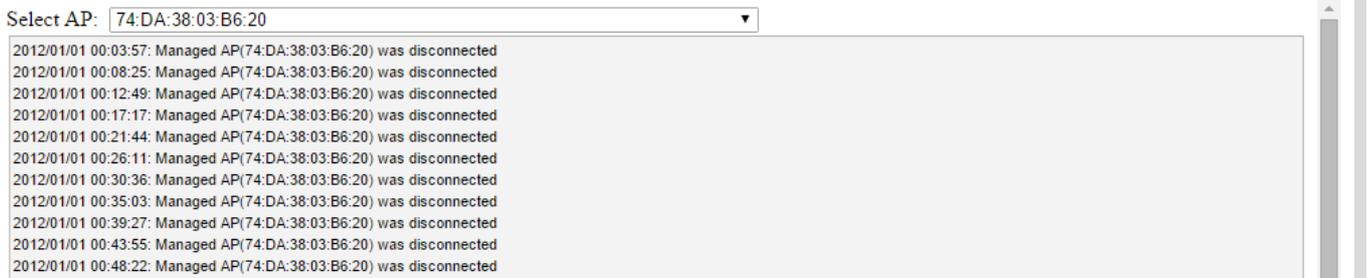
Known Rogue Devices

Search Match whole words

IV-4-6. Information

IV-4-6-1. 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.

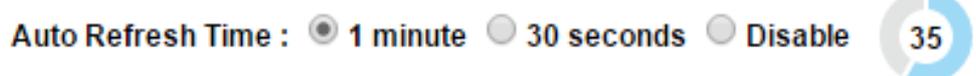


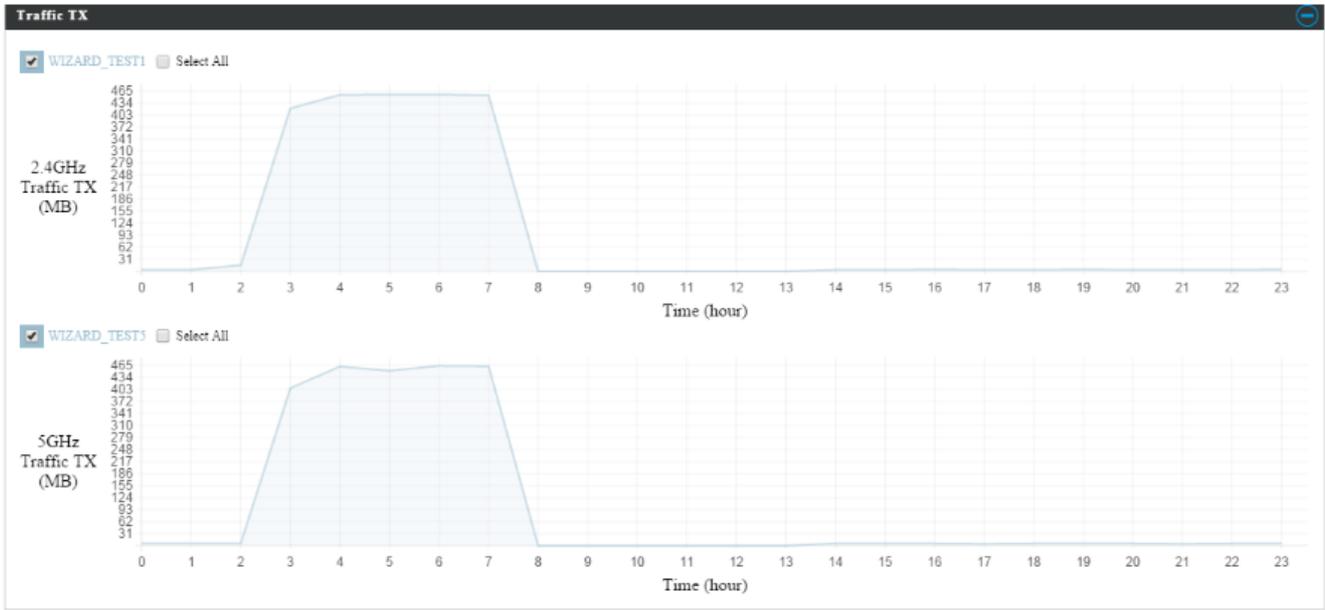
IV-4-6-2. AP Monitoring

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-4-6-3. SSID Overview

Displays graphical monitoring information about different SSIDs for 2.4GHz & 5GHz, including *Traffic Tx* (data transmitted in Kbps), *Traffic Rx* (data received in Kbps), and also the *Client Number* for each SSID.

You can use *Refresh* to run the manual refresh:

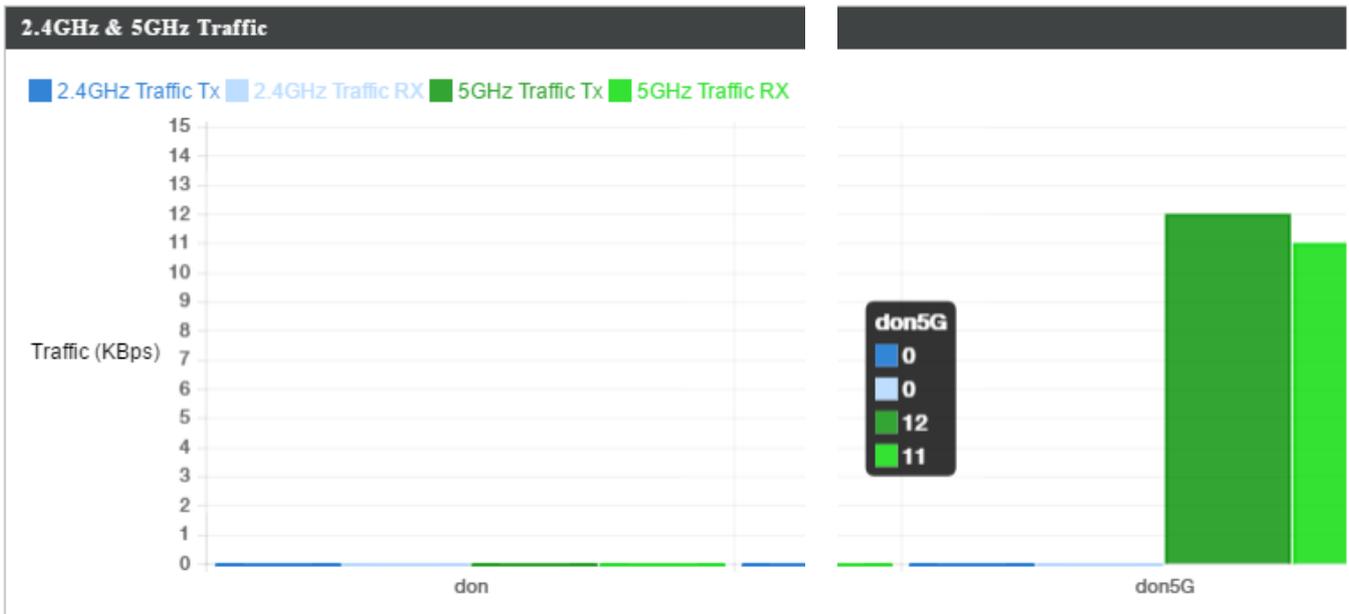
SSID Overview

Manual Refresh

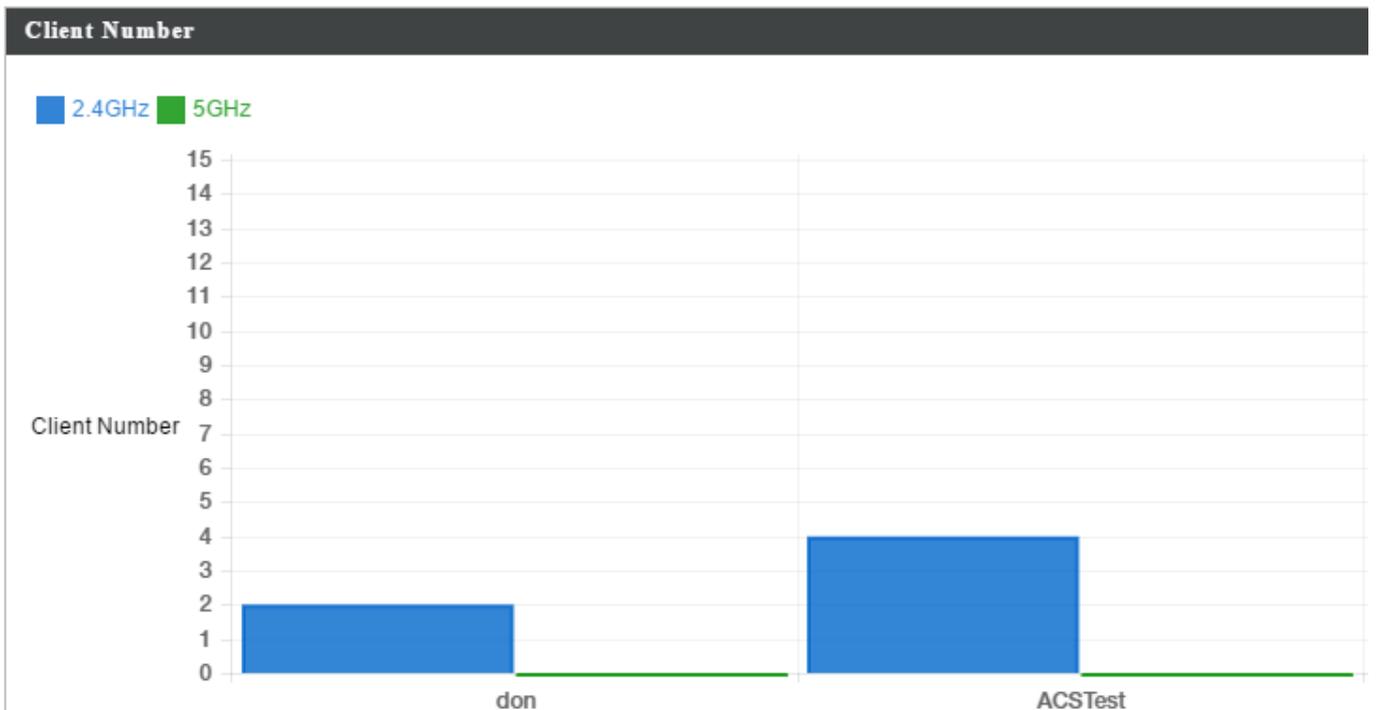
Please wait...



2.4GHz & 5GHz Traffic shows currently how much Tx/Rx traffic (in KBps) utilized in each SSID. The blue diagram represents the 2.4GHz radio band, and the green diagram represents the 5GHz radio band.



Client Number shows currently how many current users on each SSID. The blue diagram represents the 2.4GHz radio band, and the green diagram represents the 5GHz radio band.



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 screenshot shows three sections of the NMS interface:

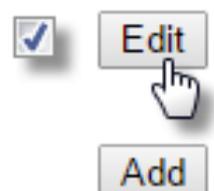
- Access Point:** A search box, a "Match whole words" checkbox, a table with columns: Index, MAC Address, Device Name, Model, AP Group, 2.4G Channel, 5G Channel, 2.4G Tx Power, 5G Tx Power, Status, and Action. Below the table is the text "No Access Point List" and buttons for Refresh, Edit, Delete Selected, and Delete All.
- Access Point Group:** A search box, a "Match whole words" checkbox, a table with columns: Group Name, AP Members, 2.4G WLAN Profile, 5G WLAN Profile, 2.4G Guest Network Profile, 5G Guest Network Profile, RADIUS Profile, and Access Control Profile. Below the table are buttons for Add, Edit, Clone, Delete Selected, and Delete All.
- Access Point Settings:** A section with "Auto Approve" set to "Enable" (radio button selected) and "Disable" (radio button unselected), and an "Apply" button.

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.



The screenshot shows a web interface titled "Access Point Settings". It features a section for "Auto Approve" with two radio buttons: "Enable" (which is selected) and "Disable". Below this section is an "Apply" button.

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

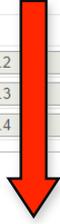
Configure your selected access point on your LAN. You can set the access point as a DHCP client or specify a static IP address for your access point, and assign the access point to an AP group, as well as edit 2.4GHz & 5GHz wireless radio settings. An events log is displayed at the bottom of the page.

You can also use **Profile Settings** to assign the access point to WLAN, 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:

Override Group Setting

Basic Settings	
Name	AP74DA3803B530
Description	
MAC Address	74:DA:38:03:B5:30
AP Group	System Default
IP Address Assignment	
	<input type="checkbox"/> Override Group Setting Static IP Address
IP Address	192.168.222.101
Subnet Mask	255.255.255.0
Default Gateway	User-Defined 192.168.222.2
Primary DNS	User-Defined 192.168.222.3
Secondary DNS	User-Defined 192.168.222.4



IP Address Assignment	<input checked="" type="checkbox"/> Override Group Setting DHCP Client
IP Address	192.168.222.101
Subnet Mask	255.255.255.0
Default Gateway	From DHCP 192.168.222.2
Primary DNS	From DHCP 192.168.222.3
Secondary DNS	From DHCP 192.168.222.4

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. 2 nd 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.

Radio Settings

	Radio B/G/N (2.4 GHz)	Radio A/N (5.0 GHz)
Wireless	<input type="checkbox"/> Override Group Setting Enable	<input type="checkbox"/> Override Group Setting Enable
Band	<input type="checkbox"/> Override Group Setting 11b/g/n	<input type="checkbox"/> Override Group Setting 11a/n/ac
Auto Pilot	<input type="checkbox"/> Override Group Setting Enable	<input type="checkbox"/> Override Group Setting Enable
Auto Pilot Range	<input type="checkbox"/> Override Group Setting Ch 1 - 11	<input type="checkbox"/> Override Group Setting
Auto Pilot Interval	<input type="checkbox"/> Override Group Setting Half day <input type="checkbox"/> Change channel even if clients are connected	<input type="checkbox"/> Override Group Setting Half day <input type="checkbox"/> Change channel even if clients are connected
Channel Bandwidth	<input type="checkbox"/> Override Group Setting Auto	<input type="checkbox"/> Override Group Setting Auto 80/40/20 MHz
BSS BasicRateSet	<input type="checkbox"/> Override Group Setting all	<input type="checkbox"/> Override Group Setting all

Advanced Settings

	Radio B/G/N (2.4 GHz)	Radio A/N (5.0 GHz)
Contention Slot	<input type="checkbox"/> Override Group Setting Short	<input type="checkbox"/> Override Group Setting Short
Preamble Type	<input type="checkbox"/> Override Group Setting Short	<input type="checkbox"/> Override Group Setting Short
Guard Interval	<input type="checkbox"/> Override Group Setting Short GI	<input type="checkbox"/> Override Group Setting Short GI
802.11n Protection	<input type="checkbox"/> Override Group Setting Enable	<input type="checkbox"/> Override Group Setting Enable
DTIM Period	<input type="checkbox"/> Override Group Setting 255 (1-255)	<input type="checkbox"/> Override Group Setting 255 (1-255)
RTS Threshold	<input type="checkbox"/> Override Group Setting 2347 (1-2347)	<input type="checkbox"/> Override Group Setting 2347 (1-2347)
Fragment Threshold	<input type="checkbox"/> Override Group Setting 2346 (256-2346)	<input type="checkbox"/> Override Group Setting 2346 (256-2346)
Multicast Rate	<input type="checkbox"/> Override Group Setting Auto	<input type="checkbox"/> Override Group Setting Auto
Tx Power	<input type="checkbox"/> Override Group Setting 100%	<input type="checkbox"/> Override Group Setting 100%
Beacon Interval	<input type="checkbox"/> Override Group Setting 100 (40-1000 ms)	<input type="checkbox"/> Override Group Setting 100 (40-1000 ms)
Station idle timeout	<input type="checkbox"/> Override Group Setting 300 (30-65535 seconds)	<input type="checkbox"/> Override Group Setting 300 (30-65535 seconds)

Radio Settings	
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 keep alive messages from the access point to a wireless client to verify if the station is still alive/active.

Profile Settings			
	Radio B/G/N (2.4 GHz)	Radio A/N (5.0 GHz)	
WLAN Group	<input type="checkbox"/> Override Group Setting WLAN Group 2 ▼	<input type="checkbox"/> Override Group Setting	WLAN Group 3 ▼
Guest Network Group	<input type="checkbox"/> Override Group Setting Disable ▼	<input type="checkbox"/> Override Group Setting	Disable ▼
RADIUS Group	<input type="checkbox"/> Override Group Setting ▼		
Access Control Group	<input type="checkbox"/> Override Group Setting Default ▼		

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 .
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, 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	System Default
Description	System default group for APs

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

Radio Group Settings

	Radio B/G/N (2.4 GHz)	Radio A/N (5.0 GHz)
Wireless	Enable ▾	Enable ▾
Band	11b/g/n ▾	11a/n/ac ▾
Auto Pilot	Enable ▾	Enable ▾
Auto Pilot Range	Ch 1 - 11 ▾	▾
Auto Pilot Interval	Half day ▾ <input type="checkbox"/> Change channel even if clients are connected	Half day ▾ <input type="checkbox"/> Change channel even if clients are connected
Channel Bandwidth	Auto ▾	Auto 80/40/20 MHz ▾
BSS BasicRateSet	all ▾	all ▾

Advanced Settings

	Radio B/G/N (2.4 GHz)	Radio A/N (5.0 GHz)
Contention Slot	Short ▾	Short ▾
Preamble Type	Short ▾	Short ▾
Guard Interval	Short GI ▾	Short GI ▾
802.11n Protection	Enable ▾	Enable ▾
DTIM Period	255 (1-255)	255 (1-255)
RTS Threshold	2347 (1-2347)	2347 (1-2347)
Fragment Threshold	2346 (256-2346)	2346 (256-2346)
Multicast Rate	Auto ▾	Auto ▾
Tx Power	100% ▾	100% ▾
Beacon Interval	100 (40-1000 ms)	100 (40-1000 ms)
Station idle timeout	300 (30-65535 seconds)	300 (30-65535 seconds)

Radio Group Settings

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 keep alive messages from the access point to a wireless client to verify if the station is still alive/active.

Profile Group Settings

	Radio B/G/N (2.4 GHz)	Radio A/N (5.0 GHz)
WLAN Group	Default ▾	Default ▾
Guest Network Group	Disable ▾	Disable ▾
RADIUS Group	▾	
Access Control Group	Default ▾	

Group Settings

Members

Search

Group Name: System Default

MAC Address	Device Name
No Access Point.	

Search

AP Group 02 ▾

MAC Address	Device Name
74:DA:38:03:B6:20	AP74DA3803B620

<<

>>

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.
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**.

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

Search Match whole words

WLAN

Search Match whole words

<input type="checkbox"/>	Name/ESSID	VLAN ID	Authentication	Encryption	Additional Authentication
Please add WLAN setting					

WLAN Groups

Search Match whole words

<input type="checkbox"/>	Group Name	WLAN members	WLAN member list	Used AP	Used AP Group
Please add WLAN Group setting					

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	<input type="text" value="matt2.4"/>
Description	<input type="text" value="Created by Wizard"/>
VLAN ID	<input type="text" value="1"/>
Broadcast SSID	<input type="button" value="Enable"/>
Wireless Client Isolation	<input type="button" value="Disable"/>
Load Balancing	<input type="text" value="50"/> /50
Authentication Method	<input type="button" value="WPA-PSK"/>
WPA Type	<input type="button" value="WPA2 Only"/>
Encryption Type	<input type="button" value="AES"/>
Key Renewal Interval	<input type="text" value="60"/> minute(s)
Pre-shared Key Type	<input type="button" value="Passphrase"/>
Pre-shared Key	<input type="text" value="abcd1234"/>
Additional Authentication	<input type="button" value="No additional authentication"/>

WLAN Advanced Settings	
Smart Handover Settings	
Smart Handover	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
RSSI Threshold	<input type="text" value="-80"/> dB

WLAN Settings	
Name/ESSID	Edit the WLAN name (SSID).
Description	Enter a description of the SSID for reference e.g. 2 nd 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-6-2-3. Security** for more information on authentication and additional authentication types.

WLAN Advanced Settings	
RSSI Threshold	Set a RSSI Threshold level.

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**.

WLAN Group Settings			
Name	WLAN Group 2		
Description	Created by Wizard		
	Search	<input type="text"/>	<input type="checkbox"/> Match whole words
Members	<input type="checkbox"/>	Name/ESSID	VLAN ID
	<input checked="" type="checkbox"/>	matt2.4	<input type="checkbox"/> Override 1
	<input type="checkbox"/>	matt5	<input type="checkbox"/> Override 1

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

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**.

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:



External RADIUS Server

Search Match whole words

<input type="checkbox"/>	Name	RADIUS Server	Authentication Port	Session Timeout (sec)	Accounting
Please add External RADIUS Server setting					

Internal RADIUS Server

Search Match whole words

<input type="checkbox"/>	Name	EAP Authentication	Session Timeout (sec)	Termination-Action
Please add Internal RADIUS Server setting				

RADIUS Accounts

Search Match whole words

<input type="checkbox"/>	Name	Password	Description
Please add User Account			

RADIUS Group

Search Match whole words

<input type="checkbox"/>	Name	2.4GHz	5GHz	RADIUS Accounts	Used AP	Used AP Group
Please add RADIUS group setting						

Add/Edit External RADIUS Server

External RADIUS Server	
Name	<input type="text"/>
Description	<input type="text"/>
RADIUS Server	<input type="text"/>
Authentication Port	<input type="text" value="1812"/>
Shared Secret	<input type="text"/>
Session Timeout	<input type="text" value="3600"/> Seconds
Accounting	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Accounting Port	<input type="text" value="1813"/>

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.
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.

Upload EAP Certificate File	
EAP Certificate File Format	PKCS#12(*.pfx/*p12)
Upload EAP Certificate File	<input type="button" value="Choose File"/> No file chosen
Password of EAP Certificate File	<input type="text"/>
<input type="button" value="Upload"/>	

Internal RADIUS Server	
Name	<input type="text"/>
Description	<input type="text"/>
EAP Internal Authentication	PEAP(MS-PEAP) ▾
Shared Secret	<input type="text"/>
Session-Timeout	3600 <input type="text"/> Seconds
Termination-Action	<input checked="" type="radio"/> Reauthentication (RADIUS-Request) <input type="radio"/> Not-Reauthentication (Default) <input type="radio"/> Not-Send

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-Reauthentication” 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

Example: USER1, USER2, USER3, USER4

Enter username here

User Registration List

Select	User Name	Password	Customize
<input type="checkbox"/>	Edimax	Not Configured	<input type="button" value="Edit"/>

Edit User Registration List

User Name	Edimax	(4-16characters)
Password		(6-32characters)

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**.

RADIUS Group Settings

Group Name	<input type="text"/>	
Description	<input type="text"/>	
2.4GHz RADIUS	Primary : <input type="text" value="Disabled"/>	Secondary : <input type="text" value="Disabled"/>
5GHz RADIUS	Primary : <input type="text" value="Disabled"/>	Secondary : <input type="text" value="Disabled"/>
Members	Search <input type="text"/> <input type="checkbox"/> Match whole words	
	<input type="checkbox"/>	<input type="checkbox"/>
	Username	Password
	<input type="button" value="Add"/>	<input type="text"/>

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 (Maximum 5).

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.

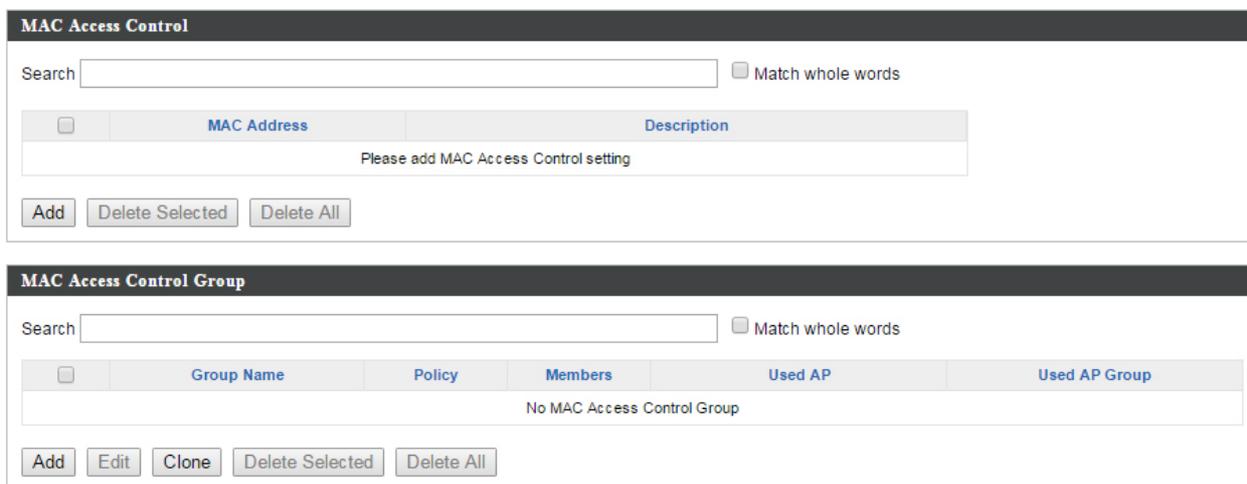
This function allows you to define a list of network devices permitted to connect to the access point. Devices are each identified by their unique MAC address. If a device which is not on the list of permitted MAC addresses attempts to connect to the access point, it will be denied.

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**.

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:



The screenshot displays two configuration panels. The top panel is titled "MAC Access Control" and features a search box, a "Match whole words" checkbox, and a table with columns for "MAC Address" and "Description". The table is currently empty, with the text "Please add MAC Access Control setting" centered below it. Below the table are buttons for "Add", "Delete Selected", and "Delete All".

The bottom panel is titled "MAC Access Control Group" and also features a search box and a "Match whole words" checkbox. Its table has columns for "Group Name", "Policy", "Members", "Used AP", and "Used AP Group". The table is empty, with the text "No MAC Access Control Group" centered below it. Below the table are buttons for "Add", "Edit", "Clone", "Delete Selected", and "Delete All".

Add/Edit MAC Access Control

MAC Access Control

Add MAC Address

Remain entries (256)

MAC Access Control List

MAC Address	Description	Delete
Please add MAC Addresses		

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**.

MAC Filter Group Settings

Group Name	<input type="text" value="Please enter a new group name"/>						
Description	<input type="text" value="Please enter a new group description"/>						
Action	<input type="text" value="Blacklist"/>						
Members	<input type="text" value="Search"/> <input type="checkbox"/> Match whole words <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 5%;"></th> <th style="width: 70%;">MAC Address</th> <th style="width: 25%;">Description</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/></td> <td colspan="2">No MAC Access Control Profile</td> </tr> </tbody> </table>		MAC Address	Description	<input type="checkbox"/>	No MAC Access Control Profile	
	MAC Address	Description					
<input type="checkbox"/>	No MAC Access Control Profile						

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

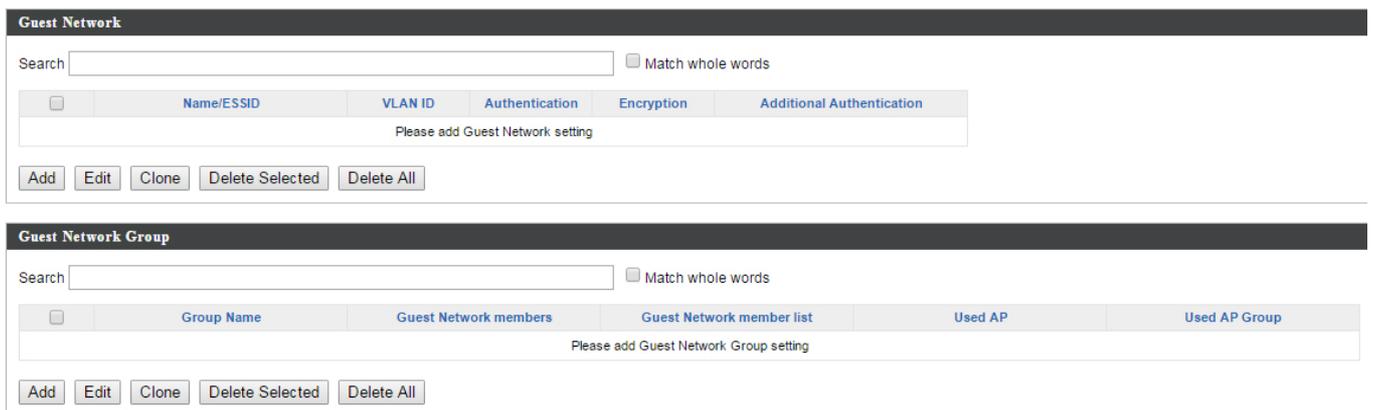
You can setup an additional “Guest” Wi-Fi network so guest users can enjoy Wi-Fi connectivity without accessing your primary networks. The “Guest” screen displays settings for your guest Wi-Fi network.

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**.

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.



The screenshot shows two panels for managing Guest Networks and Guest Network Groups. Each panel includes a search box, a 'Match whole words' checkbox, a table with columns for configuration details, and a set of action buttons (Add, Edit, Clone, Delete Selected, Delete All).

Guest Network Panel:

	Name/ESSID	VLAN ID	Authentication	Encryption	Additional Authentication
<input type="checkbox"/>	Please add Guest Network setting				

Guest Network Group Panel:

	Group Name	Guest Network members	Guest Network member list	Used AP	Used AP Group
<input type="checkbox"/>	Please add Guest Network Group setting				

Add/Edit Guest Network

Guest Network Settings	
Name/ESSID	<input type="text"/>
Description	<input type="text"/>
VLAN ID	<input type="text" value="1"/>
Broadcast SSID	Enable ▾
Wireless Client Isolation	STA Separator ▾
Load Balancing	<input type="text" value="50"/> /50
Authentication Method	No Authentication ▾
Additional Authentication	No additional authentication ▾

Guest Access Policy													
Guest Portal Settings													
Guest Portal	Disable ▾												
Traffic Shaping Settings													
Traffic Shaping	Disable ▾												
Downlink	<input type="text" value="50"/> Mbps												
Uplink	<input type="text" value="50"/> Mbps												
Filtering Settings													
IP Filtering	Disable ▾												
Rules	<table border="1"> <thead> <tr> <th><input type="checkbox"/></th> <th colspan="2">IP/Subnet Mask</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/></td> <td>0.0.0.0</td> <td>/0.0.0.0</td> </tr> <tr> <td><input type="checkbox"/></td> <td>0.0.0.0</td> <td>/0.0.0.0</td> </tr> <tr> <td><input type="checkbox"/></td> <td>0.0.0.0</td> <td>/0.0.0.0</td> </tr> </tbody> </table>	<input type="checkbox"/>	IP/Subnet Mask		<input type="checkbox"/>	0.0.0.0	/0.0.0.0	<input type="checkbox"/>	0.0.0.0	/0.0.0.0	<input type="checkbox"/>	0.0.0.0	/0.0.0.0
<input type="checkbox"/>	IP/Subnet Mask												
<input type="checkbox"/>	0.0.0.0	/0.0.0.0											
<input type="checkbox"/>	0.0.0.0	/0.0.0.0											
<input type="checkbox"/>	0.0.0.0	/0.0.0.0											

Guest Network Advanced Settings	
Schedule Group Settings <small>*This function will not work until NMS Settings->Advanced->Date and Time->NTP Time Server are enabled.</small>	
Schedule Group	Disable ▾

Guest Network Settings	
Name/ESSID	Edit the Guest Network name (SSID).
Description	Enter a description of the Guest Network for reference e.g. 2 nd 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	Enable or disable wireless client isolation.

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.

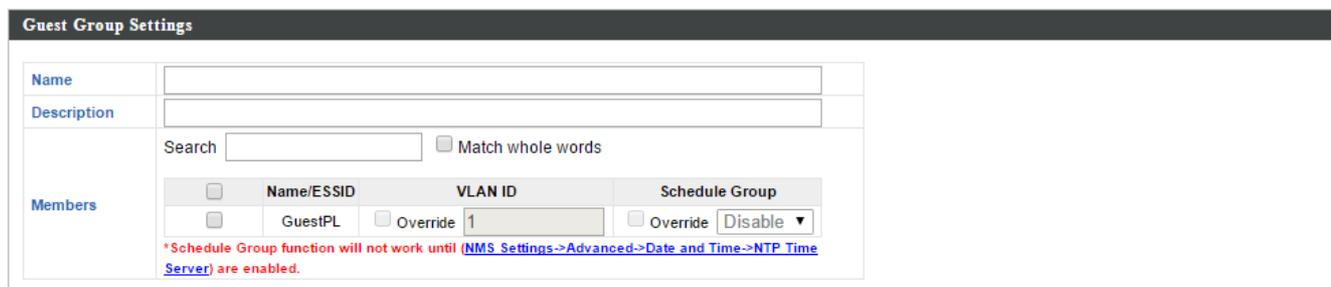
Guest Access Policy	
Guest Portal	Select a guest portal to use for this guest SSID. Guest portals can be configured in NMS Settings → Guest Portal .
Traffic Shaping	Enable or disable traffic shaping for the guest network.
Downlink	Enter a downlink limit in MB.
Uplink	Enter an uplink limit in MB.
IP Filtering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



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. Users

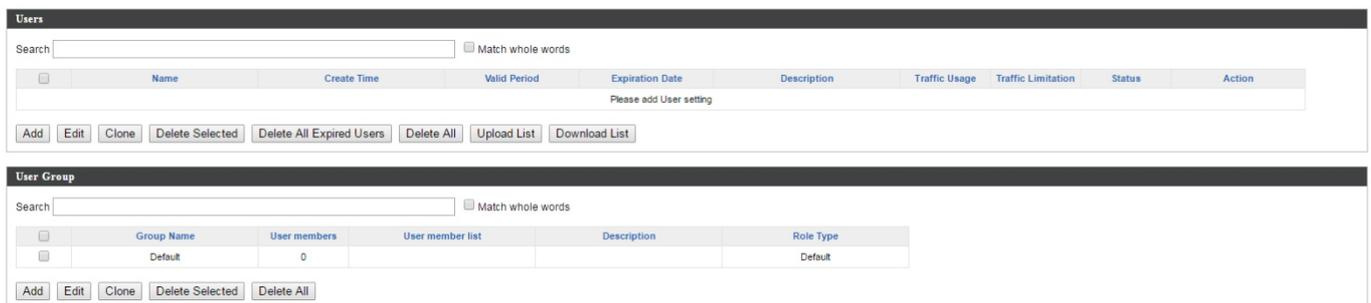
User accounts can be created, monitored and managed for use with the controller's guest portal function. Guest portal settings can be found at **IV-5-7. Guest Portal** (NMS Settings → Guest Portal).

When a guest portal is enabled, users who connect to the Guest SSID will automatically arrive at the customizable guest portal page. From there a user account login is required to access the network. These user accounts are created and grouped here, and then selected as the **Authentication User Group** at **NMS Settings → Guest Portal**.

The guest portal also generates a Front Desk URL which allows staff/admins to login and quickly create/manage user accounts and expiry times, and generate & print tickets with login credentials to give to guest users. These staff/admin accounts are created and grouped here, and selected as the **Front Desk User Group** at **NMS Settings → Guest Portal**.

Information on the Users page is displayed about each user account and user account group.

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



The **Status** icon displays *grey* (logged out), *yellow* (expired), *red* (locked) or *green* (active) for each user.

The **Action** icons can lock/unlock or revive (an expired) user account.



Select a user or user group using the check-boxes and click **“Edit”** to make configurations, or click **“Add”** to add new users and groups:



Add/Edit User

User Settings	
Name	manager
Description	managerOfGuestPortalPL
Password
Confirm Password
User Group	managerPL ▼

User Settings	
Name	Edit the user account name.
Description	Enter a description of the user account name e.g. Guest Portal 1
Password	Specify a password for the account.
Confirm Password	Confirm the password for the account.
User Group	Assign the user account to a user group so it can be utilized by the guest portal.

Add/Edit User Group

User Group Settings													
Name	Group_Static_Users												
Description													
Role Type	Guest Portal user ▼												
	Search <input type="text"/> <input type="checkbox"/> Match whole words												
Members	<table border="1"> <thead> <tr> <th><input type="checkbox"/></th> <th>Name</th> <th>User Group</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><input checked="" type="checkbox"/></td> <td>user001</td> <td>Group_Static_Users</td> <td></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>user002</td> <td>Group_Static_Users</td> <td></td> </tr> </tbody> </table>	<input type="checkbox"/>	Name	User Group	Description	<input checked="" type="checkbox"/>	user001	Group_Static_Users		<input checked="" type="checkbox"/>	user002	Group_Static_Users	
<input type="checkbox"/>	Name	User Group	Description										
<input checked="" type="checkbox"/>	user001	Group_Static_Users											
<input checked="" type="checkbox"/>	user002	Group_Static_Users											

User Group Settings	
Name	Edit the user group name.
Description	Enter a description of the user group name e.g. Front Desk or Guest Users.
Role Type	Select whether the group is for Guest Portal users or Front Desk managers.
Members	Select which user accounts to include in the group.

IV-5-7. Guest Portal

Displays information about guest portals and allows you to edit guest portal settings. Guest portals require **users** to be created at **NMS Settings → Users**.

When a guest portal is enabled, users who connect to the Guest SSID will automatically arrive at the customizable guest portal page. From there a user account login is required to access the network. These user accounts are created and grouped at **NMS Settings → Users**, and then selected as the **Authentication User Group** here.

The guest portal also generates a Front Desk URL which allows staff/admins to login and quickly create/manage user accounts and expiry times, and generate & print tickets with login credentials to give to guest users. These staff/admin accounts are created and grouped at **NMS Settings → Users** and then selected as the **Front Desk User Group** here.

Guest Portal

Search Match whole words

<input type="checkbox"/>	Name	Guest Portal Type	Used Guest Network
<input type="checkbox"/>	Guest_Portal_Static_Users	Static Users	Guest 2.4GHz Guest 5GHz

Guest Portal Settings

Idle Timeout	<input type="text" value="5"/> minutes
Login Password Retry Lockout	<input type="text" value="5"/> (1-30 times)

Guest Portal Settings	
Idle Timeout	Specify a duration of idle time after which the guest portal will timeout.
Login Password Retry Lockout	Specify number of incorrect login attempts before the user account is locked.

IV-5-7-1. Add/Edit Guest Portal

Add a guest portal or edit an existing guest portal for use with the guest network.

Guest Portal Settings	
Name	GuestPortalPL
Description	PLOfficeTestGuestPortal
Guest Portal Type	Dynamic Users ▼
Authentication Server	Local Database ▼
Front Desk User Group	managerPL ▼
Front Desk Generation URL	http://192.168.8.37/frontdesk.html
Front Desk Printout Message	Edit
Authentication User Group	guestGroupPL ▼
Landing Page	<input type="radio"/> Redirect to the original URL <input checked="" type="radio"/> Promotion URL http:// ▼ www.edimax.pl

Guest Portal Settings	
Name	Edit the name of the guest portal for reference.
Description	Enter a description of the guest portal for reference.
Guest Portal Type	Select a guest portal type. Refer below for more information about available types.
Authentication Server	Select an authentication server: Local Database is the default setting.
Front Desk User Group	Select a user group for front desk access.
Front Desk Generation URL	Displays the URL of your Front Desk page. See below for more information.
Front Desk Printout Message	Edit the content of Front Desk printout ticket. Refer below for more information.
Authentication User Group	Select a user group for login to the guest network.
Landing Page	Specify a landing page for users after successful login.

IV-5-7-1-1. Front Desk URL

Go to this URL in a web browser and members of the **Front Desk User Group** can login to create guest accounts, set expiry limits and printout tickets.



Guest Portal Type Dynamic must be selected to use Front Desk.

Guest Portal Settings	
Name	<input type="text"/>
Description	<input type="text"/>
Guest Portal Type	Dynamic Users ▼
Authentication Server	Local Database ▼
Authentication User Group	Please Select ▼ <small>Please create the first Guest Portal user group in NMS_Settings->Users</small>
Landing Page	<input checked="" type="radio"/> Redirect to the original URL <input type="radio"/> Promotion URL <input type="text" value="http://"/>
Default Language	Global (English) ▼

Front Desk Settings	
User Group	Please Select ▼ <small>Please create the first Front Desk user group in NMS_Settings->Users</small>
Generation URL	http://192.168.0.15/frontdesk.html
Guest Account Creation	<input type="checkbox"/> Replace expired user, when user table is full
Printout Message	<input type="button" value="Edit"/>
Notification Method	<input checked="" type="checkbox"/> Printout

1. Login with an account from the **Front Desk User Group (NMS Settings → Users)**.

Front Desk Login

Username	<input type="text" value="admin"/>
Password	<input type="password" value="....."/>
<input type="button" value="Login"/>	

2. The **Guest Account Wizard** allows you to setup a new user account and configure the valid period & SSID, or upload a bulk guest list in .csv format. Click **Next** to continue.

COMTREND		Logout Global (English) ▼	
W.L.C. - 6494		Guest Account Wizard	Guest Account Monitor
Accounts Usage	<input type="text" value="2 / 512"/>		
Generate Method	<input checked="" type="radio"/> Manual <input type="radio"/> Profile		
Valid Period	<input type="text" value="1"/> Days ▼		
SSID	<input type="text" value="2nd Floor Guest WLC-5g"/>		
Account Number	<input type="text" value="1"/>		
Guest #1	Name <input type="text" value="Guest_3"/>	Password <input type="text" value="MEZWEOOQPE"/>	
Description	<input type="text"/>		
			<input type="button" value="Next >>"/>

3. A summary of the new account(s) is displayed with quick links to print tickets for individual or all new accounts.

W L C - 6 4 0 4 Guest Account Wizard Guest Account Monitor Logout | Global (English)

Valid Period: 1 Days
 Create Time: 2017/05/16 15:17:34
 Description: Test Account

S/N	User Name	Password	Action
3	Guest_3	MEZWEOQPE	

Print All

4. The **Guest Account Monitor** displays all guest accounts along with status and quick action icons to print, revive expired accounts or lock/unlock (disable/enable) accounts.

Yellow: Expired
Red: Locked
Grey: Logged out
Green: Active

W L C - 6 4 0 4 Guest Account Wizard Guest Account Monitor Logout | Global (English)

Search: Match whole words

<input type="checkbox"/>	S/N	User Name	Description	Status	Action
<input type="checkbox"/>	3	Guest_3	Test Account		

Edit | Delete Selected Page 1 Print All

Mouseover a status or action icon for a description, and use the arrows to reorder the list according to S/N or Status.

Anytime you choose to print account(s) your browser will open a print dialog box where you can select your print destination and configure print settings as usual:

Print
 Total: 5 sheets of paper
 Print Cancel

Destination: Adobe PDF
 Change...

Pages: All
 e.g. 1-5, 8, 11-13

Layout: Portrait

Color: Color

+ More settings
 Print using system dialog... (Ctrl+Shift+P)

WELCOME!

EDIMAX Technology Co., Ltd
 Guest Internet Service
 Username: PIGuest
 Password: M25SPVQY
 Valid Period: 1 days
 Expire Time: 2015/10/06 15:44:54
 Create Time: 2015/10/05 15:44:54
 S/N: 2
 Thank you very much !

WELCOME!

EDIMAX Technology Co., Ltd
 Guest Internet Service
 Username: Guest_3
 Password: AMWEXG0V
 Valid Period: 1 days
 Expire Time: 2015/10/06 16:28:44
 Create Time: 2015/10/05 16:28:44
 S/N: 3
 Thank you very much !

WELCOME!

EDIMAX Technology Co., Ltd
 Guest Internet Service
 Username: Guest_4
 Password: G5VASPPFD
 Valid Period: 1 days
 Expire Time: 2015/11/06 14:59:38
 Create Time: 2015/11/05 14:59:38
 S/N: 4
 Thank you very much !

IV-5-7-1-2. Front Desk Printout

Edit and preview the content of the Front Desk printout in the text box using the variables listed in the Definition Table. E.g. (USERNAME) will display on the printout as the specified username.

 **Guest Portal Type Dynamic must be selected to use Front Desk.**

Front Desk User Group	managerPL ▼
Front Desk Generation URL	http://192.168.8.37/frontdesk.html
Front Desk Printout Message	<input type="button" value="Edit"/>
Authentication User Group	guest_groupPL ▼
Landing Page	<input type="radio"/> Redirect to the original URL <input checked="" type="radio"/> Promotion URL <input type="text" value="http://"/> ▼

Definition Table	
Symbol	Description
{SSID}	The SSID for Guest Portal user
{USERNAME}	The Name of Guest Portal user
{PASSWORD}	The Password of Guest Portal user
{PERIOD}	The valid access time of Network Service.
{EXPIRETIME}	The expire time of user account
{CREATETIME}	The create time of user account
{SN}	The Serial number of user account

* While printing the user data in Front Desk page, the "Symbol" will be replaced by the value in Users database.

Printout Content
Welcome! Comtrend Products ----- Guest Internet Service ----- SSID: {SSID} Username: {USERNAME} Password: {PASSWORD} Valid Period: {PERIOD} Expire Time: {EXPIRETIME} ----- Create Time: {CREATETIME} S/N: {SN} ----- Thank you very much !
<input type="button" value="Preview"/> <input type="button" value="Apply"/> <input type="button" value="Cancel"/>

IV-5-7-1-3. Guest Portal Type

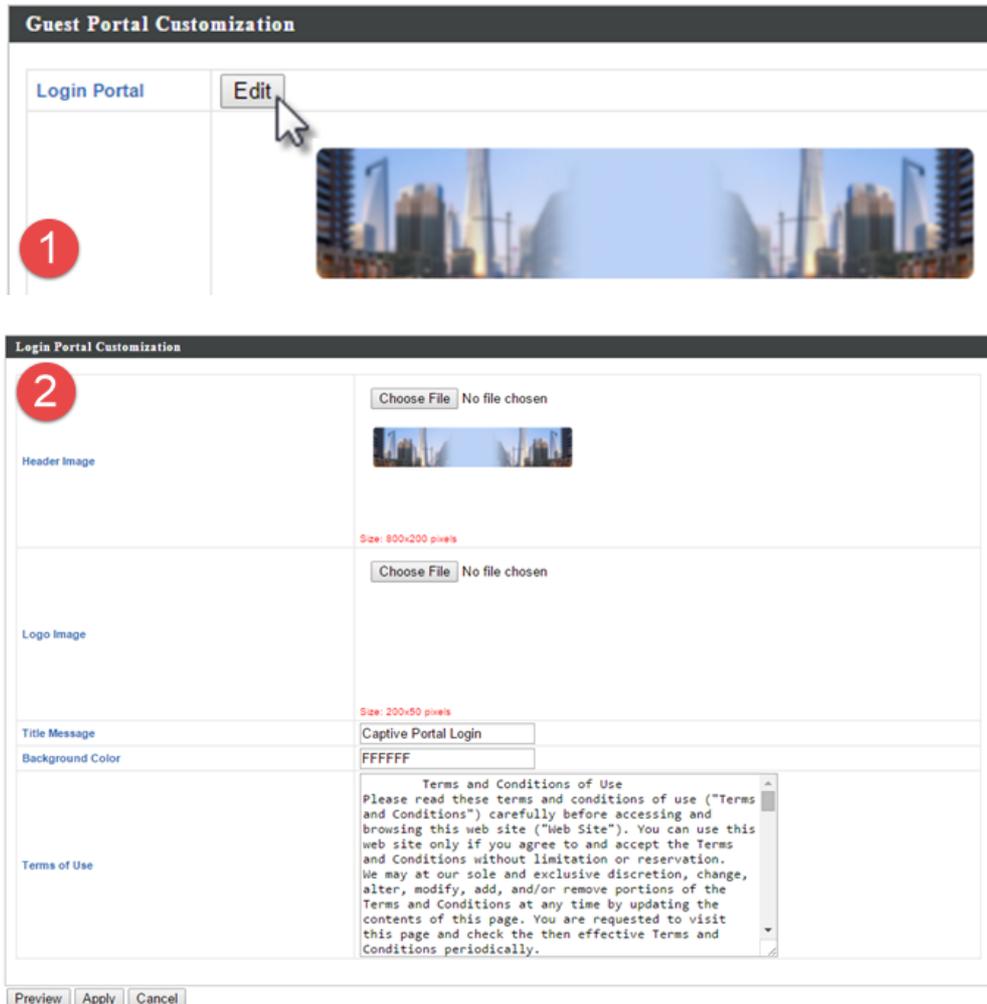
Four types of guest portal are available from the drop down menu:

Name	GuestPortalPL
Description	PLOfficeTestGuestPortal
Guest Portal Type	Dynamic Users ▼
Authentication Server	Free
Front Desk User Group	Service Level Agreement
Front Desk Generation URL	Static Users
	Dynamic Users

- Free** Redirects users to the specified landing page, with no user login required.
- Service Level Agreement** Requires users to accept terms and conditions, with no user login required.
- Static Users** Requires user login and accept terms and conditions. Users must be created in NMS at **NMS Settings → Users**. Front Desk is **not** used.
- Dynamic Users** Requires user login and accept terms and conditions. Allows Front Desk to create user accounts in addition to NMS.

IV-5-7-1-4. Guest Portal Customization

Guest portal customization varies according to guest portal type. Click **Edit** to make changes.



Login Portal Settings	
Header Image	Select an 800 x 200 header image.
Logo Image	Select a 200 x 50 logo image.
Title Message	Enter a title message for the guest portal page.
Background Color	Specify a background color as a HEX value.
Terms of Use	Enter your terms of use.

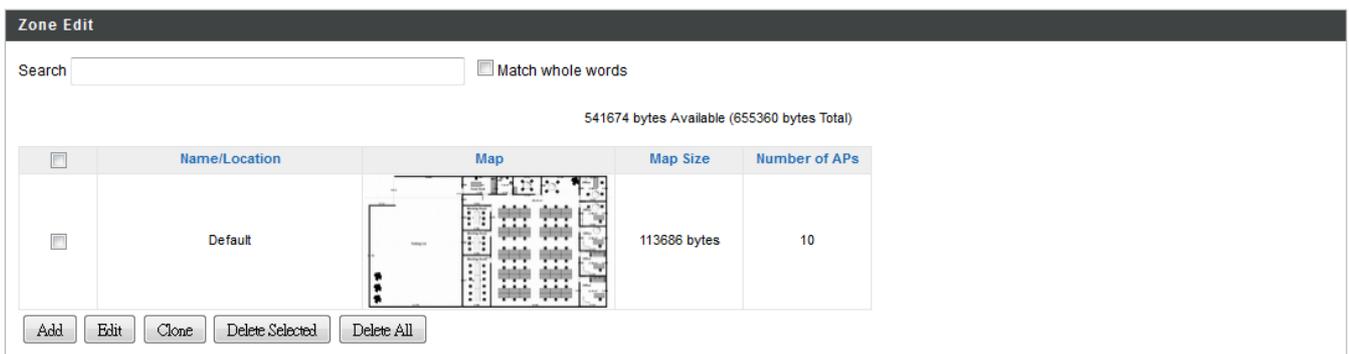
IV-5-8. Zone Edit

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.



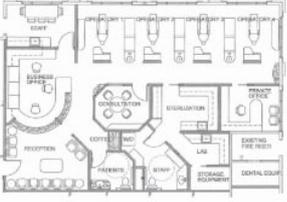
The screenshot shows the "Zone Edit" interface. At the top, there is a search bar and a "Match whole words" checkbox. Below this, a status bar indicates "541674 bytes Available (655360 bytes Total)". The main area contains a table with the following columns: Name/Location, Map, Map Size, and Number of APs. A single row is visible with the name "Default", a map thumbnail, "113686 bytes", and "10". At the bottom of the interface are buttons for "Add", "Edit", "Clone", "Delete Selected", and "Delete All".

<input type="checkbox"/>	Name/Location	Map	Map Size	Number of APs
<input type="checkbox"/>	Default		113686 bytes	10

Add/Edit Zone

Upload Zone Image

Map Image File No file chosen



Member(s) Settings

Name/Location	<input type="text"/>										
Description	<input type="text"/>										
Member(s)	Search <input type="text"/> <input type="checkbox"/> Match whole words <table border="1" style="width: 100%; border-collapse: collapse; text-align: left;"> <thead> <tr> <th style="width: 5%;"></th> <th style="width: 35%;">MAC Address</th> <th style="width: 30%;">Device Name</th> <th style="width: 15%;">Model</th> <th style="width: 15%;">Status</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/></td> <td>System Default</td> <td></td> <td></td> <td>Empty</td> </tr> </tbody> </table>		MAC Address	Device Name	Model	Status	<input type="checkbox"/>	System Default			Empty
	MAC Address	Device Name	Model	Status							
<input type="checkbox"/>	System Default			Empty							

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-5-9. 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**.

Schedule

Search Match whole words

<input type="checkbox"/>	Name	Description	Day of week	Time
Please add Schedule setting				

Schedule Groups

Search Match whole words

<input type="checkbox"/>	Group Name	Schedule members	Schedule member list
Please add Schedule group setting			

Add/Edit Schedule

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

Schedule Settings

Name

Description

Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				

Start Time : End Time :

Add/Edit Schedule Group

Schedule Group Settings					
Name	<input type="text" value="Office"/>				
Description	<input type="text"/>				
	Search <input type="text"/> <input type="checkbox"/> Match whole words				
Members	<table border="1"><thead><tr><th><input type="checkbox"/></th><th>Name</th></tr></thead><tbody><tr><td><input checked="" type="checkbox"/></td><td>Office</td></tr></tbody></table>	<input type="checkbox"/>	Name	<input checked="" type="checkbox"/>	Office
<input type="checkbox"/>	Name				
<input checked="" type="checkbox"/>	Office				

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-5-10. Smart Roaming

Smart Roaming enables you to setup the Roaming groups and the Used WLAN SSID, WAN Group and AP Number.

Before setup the roaming group, the WLAN Settings need to be configured first. For example, please click NMS Settings >> WLAN, check 2.4GHz SSID, and then click Edit.

The screenshot shows the NMS Settings interface. On the left is a navigation menu with options like Access Point, WLAN, RADIUS, Access Control, Guest Network, Users, Guest Portal, Zone Edit, Schedule, Smart Roaming, Device Monitoring, and Firmware Upgrade. The main area is titled 'WLAN' and contains a search bar, a table of WLAN configurations, and buttons for 'Add', 'Edit', 'Clone', 'Delete Selected', and 'Delete All'. The 'Edit' button is highlighted with a red box. Below this is the 'WLAN Groups' section, also with a search bar, a table of group configurations, and similar control buttons.

Name/ESSID	VLAN ID	Authentication	Encryption	Additional Authentication
<input checked="" type="checkbox"/> WAP-1750_24	1	WPA2PSK	AES	No additional authentication
<input type="checkbox"/> don5G	1	WPA2PSK	AES	No additional authentication
<input type="checkbox"/> ACSTest	1	AUTO	WEP	No additional authentication

Group Name	WLAN members	WLAN member list	Used AP
24G	2	don ACSTest	APD8B6B707E14E
5G	1	don5G	APD8B6B707E14E

Configure 802.11k as Enable. Please note, don't configure the Authentication as OPEN. Then click Save and Apply. Please wait about 3 minutes.

WLAN Settings

Name/ESSID	WAP1750_24
Description	
VLAN ID	1
Broadcast SSID	Enable ▾
Wireless Client Isolation	Disable ▾
802.11k	Enable ▾
Load Balancing	50 /50

Authentication Method	WPA-PSK ▾
WPA Type	WPA/WPA2 Mixed Mode-PSK ▾
Encryption Type	TKIP/AES Mixed Mode ▾
Key Renewal Interval	60 minute(s)
Pre-shared Key Type	Passphrase ▾
Pre-shared Key	1234567890
Additional Authentication	No additional authentication ▾

Roaming Group Setting Procedure:

- (1) Enter Name of this setting.
- (2) Enter 4 characteristics on Mobility Domain.
- (3) Enter 32 characteristics on Encryption Key.
- (4) Select WLAN Group, and select WLAN.
- (5) It will display APs using this WLAN Setting.
- (6) Click Edit icon on 1st AP.
- (7) Enter 2nd AP MAC Address, click Save and Close.
- (8) Click Edit icon on 2nd AP.
- (9) Enter 1st AP MAC Address, click Save and Close.

Roaming Group Settings

Name	Roaming
Description	
Mobility Domain	ABCD
Encryption Key	12345678901234567890123456789012
Over the DS	<input type="radio"/> Enable <input checked="" type="radio"/> Disable

WLAN SSID	WLAN Group: WAP1750_24 ▼	WLAN: WAP1750_24 ▼
-----------	--------------------------	--------------------

Index	MAC Address	Device Name	Model Name	IP Address	2.4G Channel	5G Channel	Clients	Status	Action
1	74:DA:38:06:E1:8C	AP74DA3806E18C	WAP1750	192.168.2.114	11	36	0	●	
2	80:1F:02:E6:D5:6E	AP801F02E6D56E	WAP1750	192.168.2.115	11	36	0	●	

Roaming Group Settings

AP #1 MAC Address	80:1F:02:E6:D5:6E
AP #2 MAC Address	
AP #3 MAC Address	
AP #4 MAC Address	
AP #5 MAC Address	

Save Close

Roaming Group Settings

AP #1 MAC Address	74:DA:38:06:E1:8C
AP #2 MAC Address	
AP #3 MAC Address	
AP #4 MAC Address	
AP #5 MAC Address	

Save Close

Then, click Save and Apply, and wait about 3 minutes. Congratulations, you have configured 802.11r and 802.11k successfully.

IV-5-11. 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.

Device Monitoring

Search Match whole words

<input type="checkbox"/>	Device IP	Description	Status
<input type="checkbox"/>	192.168.8.47	IR-113E	

Add or Edit IP devices by entering the IP address.

Device Monitoring

[Add IP Address](#)

Devices List

Device IP	Description	Delete
192.168.8.47	IR-113E	

IV-5-12. 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” or “Check”. 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.

Firmware Upgrade

Update firmware from	<input checked="" type="radio"/> Local <input type="radio"/> External FTP Server
Firmware File	<input type="button" value="Choose File"/> No file chosen
Timeout	<input type="text" value="150"/> Seconds

Firmware Name	Firmware Version	NMS Version	Model	Size (bytes)

Access Point Group

<input type="checkbox"/>	Group Name	Index	MAC Address	Device Name	Model	IP Address	Status	Firmware Version	NMS Version	Progress
<input checked="" type="checkbox"/>	System Default (0)									

No Access Point in this group.

IV-5-13. Advanced

IV-5-13-1. System Security

Configure the NMS system name and security key for communication between AP Controller and Managed APs.

System Security

NMS Security Name	administrator
NMS Security Key	1234567890123456 (8~16 Characters)
Sync NMS Security with Active Managed APs	<input checked="" type="checkbox"/> Enable

*Before changing NMS Security Name and Key, please make sure all Managed APs are connected; all other configuration update is complete, and status color is green.

Apply

V-5-13-2. 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

2015	Year	Nov	Month	6	Day
16	Hours	13	Minutes	23	Seconds

Acquire Current Time from Your PC

NTP Time Server

Use NTP	<input checked="" type="checkbox"/> Enable
Server Name	User-Defined
Update Interval	24 (Hours)

Time Zone

Time Zone: (GMT+08:00) Taipei, Taiwan

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.

V-5-13-3. System Accounts

Import the API Key which was received Google Developers. This is for the *Online Map* feature in *Zone Plan* page. Graphical zone plans with Google Maps integration and setup wizards are available for expanding and managing large networks with multiple access points

Note:

Please go to

https://console.developers.google.com/flows/enableapi?apiid=maps_backend&keyType=CLIENT_SIDE&reusekey=true to apply for an API key first to utilize this feature set.

Google Maps

API Key

(Please go to https://console.developers.google.com/flows/enableapi?apiid=maps_backend&keyType=CLIENT_SIDE&reusekey=true to apply for an API key.)

Apply

Cancel

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.

LAN-side IP Address	
IP Address Assignment	Static IP Address ▼
IP Address	192.168.222.220
Subnet Mask	255.255.255.0
Default Gateway	192.168.222.1
Primary DNS Address	0.0.0.0
Secondary DNS Address	0.0.0.0

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.

LAN-side IP Address	
IP Address Assignment	DHCP Client ▼
IP Address	192.168.222.220
Subnet Mask	255.255.255.0
Default Gateway	From DHCP ▼ 192.168.222.1
Primary DNS Address	From DHCP ▼ 0.0.0.0
Secondary DNS Address	From DHCP ▼ 0.0.0.0

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.

LAN-side IP Address	
IP Address Assignment	DHCP Server ▾
IP Address	192.168.222.220
Subnet Mask	255.255.255.0
IP Address Range	192.168.222.120 ~ 192.168.222.140
Domain Name	WAP1750
Lease Time	Forever ▾
Default Gateway	192.168.222.1
Primary DNS Address	0.0.0.0
Secondary DNS Address	0.0.0.0

DHCP Server Static IP Address			
Index	MAC Address	IP Address	Action
1	<input type="text"/>	<input type="text"/>	Add

DHCP Client List			
Index	MAC Address	IP Address	Lease Time
No DHCP Client			

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 Settings				
Wired LAN Port	Enable	Speed & Duplex	Flow Control	802.3az
Wired Port (#1)	Enabled ▾	Auto ▾	Enabled ▾	Enabled ▾
Wired Port (#2)	Enabled ▾	Auto ▾	Enabled ▾	Enabled ▾

Wired LAN Port	Identifies LAN port 1 or 2.
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-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 – 4094 are supported.

 **VLAN IDs in the range 1 – 4094 are supported.**

VLAN Interface		
Wired LAN Port	VLAN Mode	VLAN ID
Wired Port (#1)	Untagged Port ▾	1 <input type="text"/>
Wired Port (#2)	Untagged Port ▾	1 <input type="text"/>
Wireless 2.4GHz	VLAN Mode	VLAN ID
SSID [AMPED_DNS_TEST]	Untagged Port	1 <input type="text"/>

Management VLAN	
VLAN ID	1 <input type="text"/>

VLAN Interface	
Wired LAN Port/Wireless	Identifies LAN port 1 or 2 and wireless SSIDs (2.4GHz or 5GHz).
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 (Not available on the WLC-6404)

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).

2.4GHz Basic Settings	
Wireless	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Band	11b/g/n ▼
Enable SSID number	1 ▼
SSID1	AMPED_DNS_TEST <input type="text"/> VLAN ID <input type="text" value="1"/>
Auto Channel	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Auto Channel Range	Ch 1 - 11 ▼
Auto Channel Interval	One day ▼ <input type="checkbox"/> Change channel even if clients are connected
Channel Bandwidth	Auto ▼
BSS BasicRateSet	1,2,5,5,11 Mbps ▼



Auto Channel	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
Channel	Ch 11, 2462MHz ▼
Channel Bandwidth	Auto, +Ch 7 ▼
BSS BasicRateSet	1,2,5,5,11 Mbps ▼

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.

2.4GHz Advanced Settings	
Contention Slot	Short ▾
Preamble Type	Short ▾
Guard Interval	Short GI ▾
802.11g Protection	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
802.11n Protection	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
DTIM Period	1 (1-255)
RTS Threshold	2347 (1-2347)
Fragment Threshold	2346 (256-2346)
Multicast Rate	Auto ▾
Tx Power	100% ▾
Beacon Interval	100 (40-1000 ms)
Station idle timeout	60 (30-65535 seconds)

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 keep alive 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.***

2.4GHz Wireless Security Settings	
SSID	AMPED_DNS_TEST ▾
Broadcast SSID	Enable ▾
Wireless Client Isolation	Disable ▾
Load Balancing	50 /50
Authentication Method	No Authentication ▾
Additional Authentication	No additional authentication ▾

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 alphanumeric 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

Use MAC address

Use the following password

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	Disabled
Local MAC Address	Disabled WDS with AP Dedicated WDS

WDS Peer Settings	
WDS #1	MAC Address
WDS #2	MAC Address
WDS #3	MAC Address
WDS #4	MAC Address

WDS VLAN	
VLAN Mode	Untagged Port (Enter at least one MAC address.)
VLAN ID	1

WDS Encryption method	
Encryption	None (Enter at least one MAC address.)

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 (Not available on the WLC-6404)

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).

5GHz Basic Settings	
Wireless	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
Band	11a/n/ac ▼
Enable SSID number	1 ▼
SSID1	WAP1750-03EC1A_A VLAN ID 1
Auto Channel	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Auto Channel Range	Band 1 ▼
Auto Channel Interval	One day ▼ <input type="checkbox"/> Change channel even if clients are connected
Channel Bandwidth	Auto 80/40/20 MHz ▼
BSS BasicRateSet	6,12,24 Mbps ▼



Auto Channel	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
Channel	Ch 36, 5.18GHz ▼
Channel Bandwidth	Auto 80/40/20 MHz ▼
BSS BasicRateSet	6,12,24 Mbps ▼

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.

5GHz Advanced Settings	
Guard Interval	Short GI ▾
802.11n Protection	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
DTIM Period	1 (1-255)
RTS Threshold	2347 (1-2347)
Fragment Threshold	2346 (256-2346)
Multicast Rate	Auto ▾
Tx Power	100% ▾
Beacon Interval	100 (40-1000 ms)
Station idle timeout	60 (30-65535 seconds)

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 keep alive 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.

5GHz Wireless Security Settings	
SSID	WAP1750-03EC1A_A ▾
Broadcast SSID	Enable ▾
Wireless Client Isolation	Disable ▾
Load Balancing	50 /50
Authentication Method	No Authentication ▾
Additional Authentication	No additional authentication ▾

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	Disabled ▼
Local MAC Address	Disabled WDS with AP Dedicated WDS
WDS Peer Settings	
WDS #1	MAC Address <input type="text"/>
WDS #2	MAC Address <input type="text"/>
WDS #3	MAC Address <input type="text"/>
WDS #4	MAC Address <input type="text"/>
WDS VLAN	
VLAN Mode	Untagged Port ▼ (Enter at least one MAC address.)
VLAN ID	1
Encryption method	
Encryption	None ▼ (Enter at least one MAC address.)

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 (Not available on the WLC-6404)

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 Enable

Apply

WPS

Product PIN: 02570501

Push-button WPS

WPS by PIN:

WPS Security

WPS Status:

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.
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IV-6-5. RADIUS (Not available on the WLC-6404)

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 Server (2.4GHz)	
Primary RADIUS Server	
RADIUS Type	<input type="radio"/> Internal <input checked="" type="radio"/> External
RADIUS Server	<input type="text"/>
Authentication Port	<input type="text" value="1812"/>
Shared Secret	<input type="text"/>
Session Timeout	<input type="text" value="3600"/> second(s)
Accounting	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Accounting Port	<input type="text" value="1813"/>
Secondary RADIUS Server	
RADIUS Type	<input type="radio"/> Internal <input checked="" type="radio"/> External
RADIUS Server	<input type="text"/>
Authentication Port	<input type="text" value="1812"/>
Shared Secret	<input type="text"/>
Session Timeout	<input type="text" value="3600"/> second(s)
Accounting	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Accounting Port	<input type="text" value="1813"/>

RADIUS Server (5GHz)	
Primary RADIUS Server	
RADIUS Type	<input type="radio"/> Internal <input checked="" type="radio"/> External
RADIUS Server	<input type="text"/>
Authentication Port	<input type="text" value="1812"/>
Shared Secret	<input type="text"/>
Session Timeout	<input type="text" value="3600"/> second(s)
Accounting	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Accounting Port	<input type="text" value="1813"/>
Secondary RADIUS Server	
RADIUS Type	<input type="radio"/> Internal <input checked="" type="radio"/> External
RADIUS Server	<input type="text"/>
Authentication Port	<input type="text" value="1812"/>
Shared Secret	<input type="text"/>
Session Timeout	<input type="text" value="3600"/> second(s)
Accounting	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Accounting Port	<input type="text" value="1813"/>

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	
Internal Server	<input type="checkbox"/> Enable
EAP Internal Authentication	PEAP(MS-PEAP) ▼
EAP Certificate File Format	PKCS#12(*.pfx/* .p12)
EAP Certificate File	<input type="button" value="Upload"/>
Shared Secret	<input type="text"/>
Session-Timeout	3600 <small>second(s)</small>
Termination-Action	<input checked="" type="radio"/> Reauthentication (RADIUS-Request) <input type="radio"/> Not-Reauthentication (Default) <input type="radio"/> Not-Send

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-Reauthentication" 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.

Select	User Name	Password	Customize
<input type="checkbox"/>	Edimax	Not Configured	Edit

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 (Not available on the WLC-6404)

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 Addresses

AddReset

MAC Address Filtering Table

Select	MAC Address
<input type="checkbox"/>	FC:F8:AE:43:43:7E

Delete Selected Delete All Export

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 (Not available on the WLC-6404)

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 IEEE 802.11 networks. WMM prioritizes traffic according to four categories: background, best effort, video and voice.

WMM-EDCA Settings				
WMM Parameters of Access Point				
	CWMin	CWMax	AIFSN	TxOP
Back Ground	4	10	7	0
Best Effort	4	6	3	0
Video	3	4	1	94
Voice	2	3	1	47
WMM Parameters of Station				
	CWMin	CWMax	AIFSN	TxOP
Back Ground	4	10	7	0
Best Effort	4	10	3	0
Video	3	4	2	94
Voice	2	3	2	47

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-6-8. Internal Server

IV-6-8-1. Internal RADIUS Server

The controller 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	
Internal Server	<input type="checkbox"/> Enable
EAP Internal Authentication	PEAP(MS-PEAP) ▼
EAP Certificate File Format	PKCS#12(*.pfx/* .p12)
EAP Certificate File	<input type="button" value="Upload"/>
Shared Secret	<input type="text"/>
Session-Timeout	3600 <small>second(s)</small>
Termination-Action	<input checked="" type="radio"/> Reauthentication (RADIUS-Request) <input type="radio"/> Not-Reauthentication (Default) <input type="radio"/> Not-Send

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: PKCS#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-Reauthentication" sends a default termination-action attribute to the access point, "Not-Send" no termination-action attribute is sent to the access point.

IV-6-8-2. 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
 Example: USER1, USER2, USER3, USER4

Enter username here

Select	User Name	Password	Customize
<input type="checkbox"/>	Edimax	Not Configured	<input type="button" value="Edit"/>
			<input type="button" value="Delete Selected"/> <input type="button" value="Delete All"/>

Edit User Registration List

User Name	Edimax	(4-16characters)
Password		(6-32characters)

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-6-9. Schedule

Schedule allows the user to configure specific times and dates when the radio of the wireless account will be disabled. This is designed to prevent unwanted access during non-application hours.

Enable the wireless network during the following schedules.

Schedule Enable

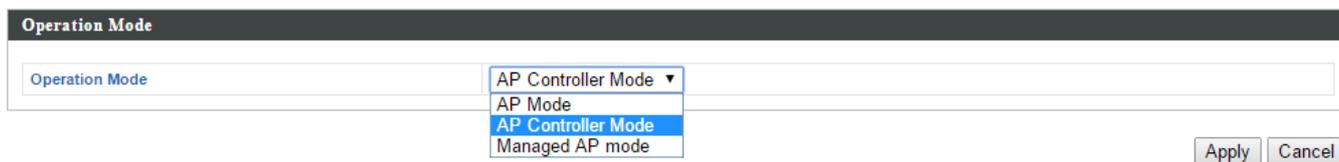
Apply

Schedule List				
#	SSID	Day of Week	Time	Select
No schedule entries				

IV-7. Local Settings

IV-7-1. Operation Mode (Not available on the WLC-6404)

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.



Operation Mode

Operation Mode

AP Controller Mode ▾

AP Mode

AP Controller Mode

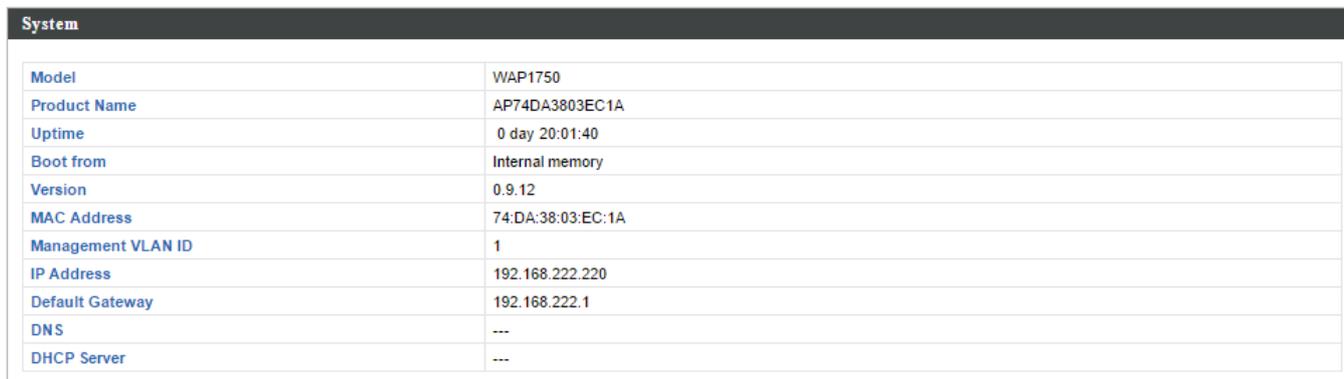
Managed AP mode

Apply Cancel

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	WAP1750
Product Name	AP74DA3803EC1A
Uptime	0 day 20:01:40
Boot from	Internal memory
Version	0.9.12
MAC Address	74:DA:38:03:EC:1A
Management VLAN ID	1
IP Address	192.168.222.220
Default Gateway	192.168.222.1
DNS	---
DHCP Server	---

Wired LAN Port Settings

Wired LAN Port	Status	VLAN Mode/ID
Wired Port (#1)	Connected (1000 Mbps Full-Duplex)	Untagged Port / 1
Wired Port (#2)	Disconnected (---)	Untagged Port / 1

Wireless 2.4GHz

Status	Enabled
MAC Address	74:DA:38:03:EC:1A
Channel	Ch 6 (Auto)
Transmit Power	100%

Wireless 2.4GHz /SSID

SSID	Authentication Method	Encryption Type	VLAN ID	Additional Authentication	Wireless Client Isolation
AMPED_DNS_TEST	WPA/WPA2-PSK	TKIP/AES Mixed Mode	1	No additional authentication	Disabled

Wireless 2.4GHz /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.
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

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.

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-6. Wireless Settings
Encryption Type	Displays the encryption type for the specified SSID. See IV-6. Wireless Settings
VLAN ID	Displays the VLAN ID for the specified SSID. See IV-6-1-3. VLAN
Additional Authentication	Displays the additional authentication type for the specified SSID. See IV-6. Wireless Settings
Wireless Client Isolation	Displays whether wireless client isolation is in use for the specified SSID. See IV-6-1-3. 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-6-2-4. WDS
VLAN Mode/ID	Displays the VLAN ID for the specified WDS. See IV-6-2-4. WDS

Refresh	Click to refresh all information.
----------------	-----------------------------------

IV-7-2-2. Wireless Clients (Not available on the WLC-6404)

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 5 seconds 1 second Disable

Manual Refresh

2.4GHz WLAN Client Table

#	SSID	MAC Address	Tx	Rx	Signal (%)	Connected Time	Idle Time	Vendor
1	AMPED_DNS_TEST	F8:7B:8C:1F:2D:61	3.6 KBytes	7.6 MBytes	100	14 hours 29 min 30 secs	0	Amped Wireless

5GHz WLAN Client Table

#	SSID	MAC Address	Tx	Rx	Signal (%)	Connected Time	Idle Time	Vendor
No wireless client								

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 (Not available on the WLC-6404)

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 Wireless 2.4G/ 5G 2.4G 5G Scan

Channel Survey result Export

Wireless 2.4GHz (112 Accesspoints)						
Ch	SSID	MAC Address	Security	Signal (%)	Type	Vendor
1		00:18:0A:D3:4C:F0	WPA1PSKWPA2PSK /TKIPAES	84	b/g/n	Meraki, Inc.
1	11111	00:AA:BB:02:01:E0	NONE	97	b/g/n	Unknown
1	13213136	26:DA:38:00:20:40	NONE	98	b/g/n	Unknown
1	22222	02:AA:BB:02:01:E0	NONE	96	b/g/n	Unknown
1	EA3500-2.4G	C8:D7:19:2C:9F:1F	WPA2PSK/AES	100	b/g/n	Cisco Consumer Products, LLC

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

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.

```
Jan 1 00:00:51 [SYSTEM]: WLAN[2.4G], Best channel selection start, switch to channel 6
Jan 1 00:00:47 [SYSTEM]: WLAN[2.4G], Best channel selection start, switch to channel 6
Jan 1 00:00:15 [NMS]: start AP Controller successfully
Jan 1 00:00:14 [NMS]: NMS version: 0.9.12.1
Jan 1 00:00:14 [SYSTEM]: Auto Pilot, Stopping
Jan 1 00:00:14 [SYSTEM]: FTP Server, start
Jan 1 00:00:14 [SYSTEM]: TELNETD, start Telnet-cli Server
Jan 1 00:00:14 [SYSTEM]: HTTPS, start
Jan 1 00:00:14 [SYSTEM]: HTTP, start
Jan 1 00:00:13 [SYSTEM]: LAN, Firewall Disabled
Jan 1 00:00:13 [SYSTEM]: LAN, NAT Disabled
Jan 1 00:00:13 [SYSTEM]: NET, Firewall Disabled
Jan 1 00:00:13 [SYSTEM]: NET, NAT Disabled
Jan 1 00:00:13 [SYSTEM]: LEDs, light on specific LEDs
Jan 1 00:00:11 [SYSTEM]: WLAN[5G], Channel = AutoSelect
Jan 1 00:00:11 [SYSTEM]: WLAN[5G], Wireless Mode = 11ACVHT80
Jan 1 00:00:03 [SYSTEM]: WLAN[2.4G], Channel = AutoSelect
Jan 1 00:00:03 [SYSTEM]: WLAN[2.4G], Wireless Mode = 11NGHT40MINUS
Jan 1 00:00:03 [SYSTEM]: LAN, IP address=192.168.222.220
Jan 1 00:00:03 [SYSTEM]: LAN, start
Jan 1 00:00:02 [SYSTEM]: Bridge, start
Jan 1 00:00:02 [SYSTEM]: Bridge, start
Jan 1 00:00:00 [SYSTEM]: SYS, Model Name: Wireless Gigabit Router
Jan 1 00:00:00 [SYSTEM]: SYS, Application Version: 0.9.12
Jan 1 00:00:00 [SYSTEM]: BOOT, WAP1750
```

Save

Clear

Refresh

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
- ◆ **ADT**

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	<input type="text" value="admin"/>
Administrator Password	<input type="password" value="....."/> (4-32 Characters)
	<input type="password" value="....."/> (Confirm)
<input type="button" value="Apply"/>	

Advanced Settings	
Product Name	<input type="text" value="AP74DA3803EC1A"/>
Management Protocol	<input checked="" type="checkbox"/> HTTP <input checked="" type="checkbox"/> HTTPS <input checked="" type="checkbox"/> TELNET <input type="checkbox"/> SSH <input type="checkbox"/> SNMP
SNMP Version	<input type="text" value="v1/v2c"/>
SNMP Get Community	<input type="text" value="public"/>
SNMP Set Community	<input type="text" value="private"/>
SNMP Trap	<input type="text" value="Disabled"/>
SNMP Trap Community	<input type="text" value="public"/>
SNMP Trap Manager	<input type="text"/>
<input type="button" value="Apply"/>	

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.
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	<input type="checkbox"/> Enable Syslog Server <input style="width: 150px;" type="text"/>
Copy Logs to Attached USB Device	<input type="checkbox"/> Enable

Syslog E-mail Settings

E-mail Logs	<input checked="" type="checkbox"/>
E-mail Subject	<input style="width: 150px;" type="text"/>
SMTP Server Address	<input style="width: 150px;" type="text"/>
SMTP Server Port	<input style="width: 50px;" type="text"/>
Sender E-mail	<input style="width: 150px;" type="text"/>
Receiver E-mail	<input style="width: 150px;" type="text"/>
Authentication	SSL ▼
Account	Disable SSL TLS
Password	<input style="width: 150px;" type="text"/>

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.

Duration of Sound

Duration of Sound (1-300 seconds)



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 IEEE 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 Settings	
Power LED	<input checked="" type="radio"/> On <input type="radio"/> Off
Diag LED	<input checked="" type="radio"/> On <input type="radio"/> Off

Power LED	Select on or off.
Diag 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.



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.

Firmware Location	
Update firmware from	<input checked="" type="radio"/> a file on your PC <input type="radio"/> a file on an attached USB device (No USB device connected.)

Update firmware from PC	
Firmware Update File	<input type="button" value="Choose File"/> No file chosen
<input type="button" value="Update"/>	



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.

This will restore all settings to factory defaults.

Factory Default

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.

This will reboot the product. Your settings will not be changed. Click “Reboot” to reboot the product now.

Reboot

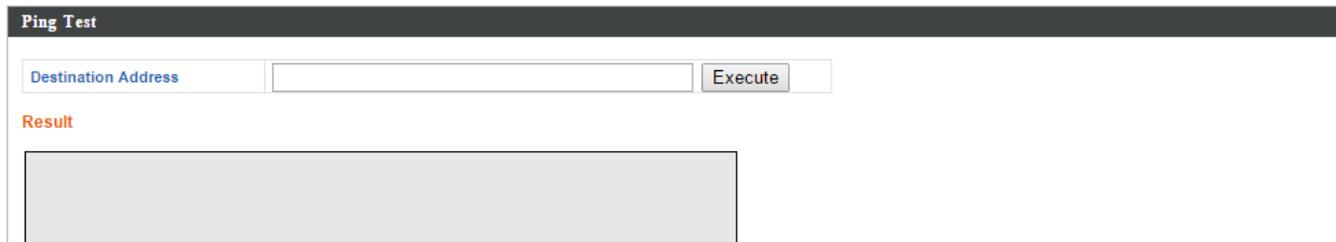
Reboot	Click “Reboot” to reboot the device. A countdown will indicate the progress of the reboot.
---------------	--

IV-8. Toolbox

IV-8-1. Network Connectivity

IV-8-1-1. Ping

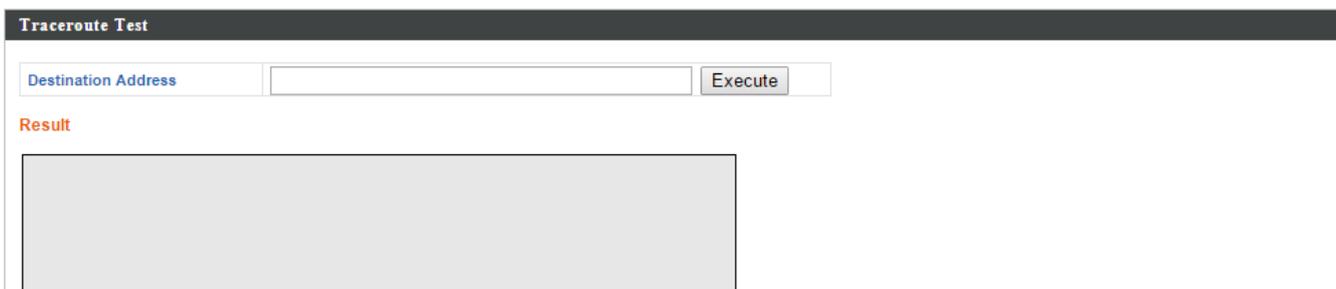
Ping is a computer network administration utility used to test whether a particular host is reachable across an IP network and to measure the round-trip time for sent messages.



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. Best Practice

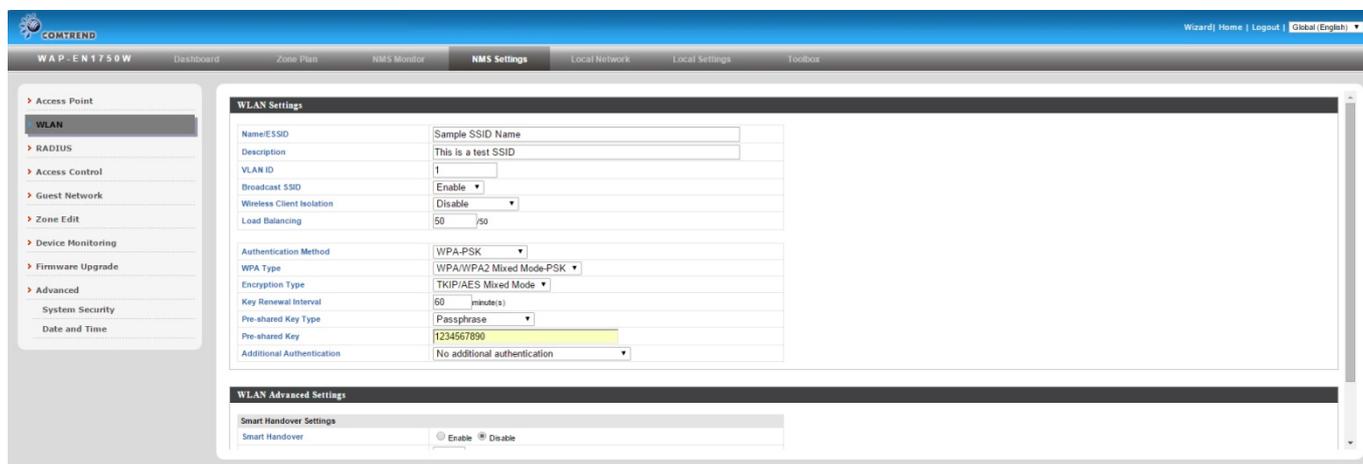
How to Create and Link WLAN & Access Point Groups

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.

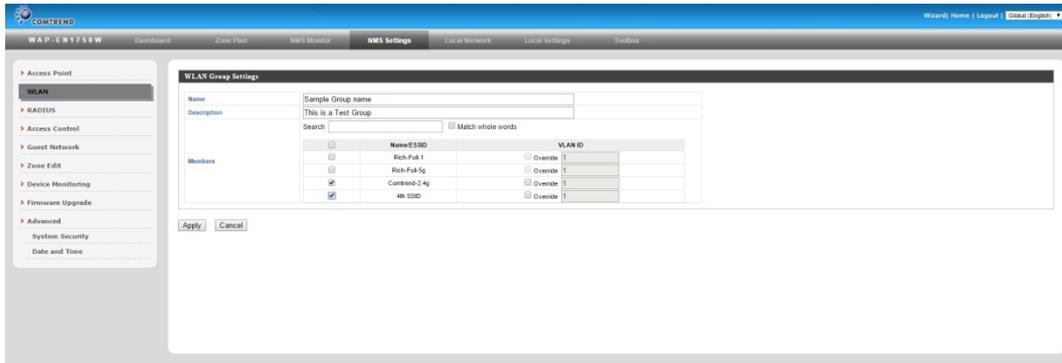
Follow the example below to:

- 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”**:

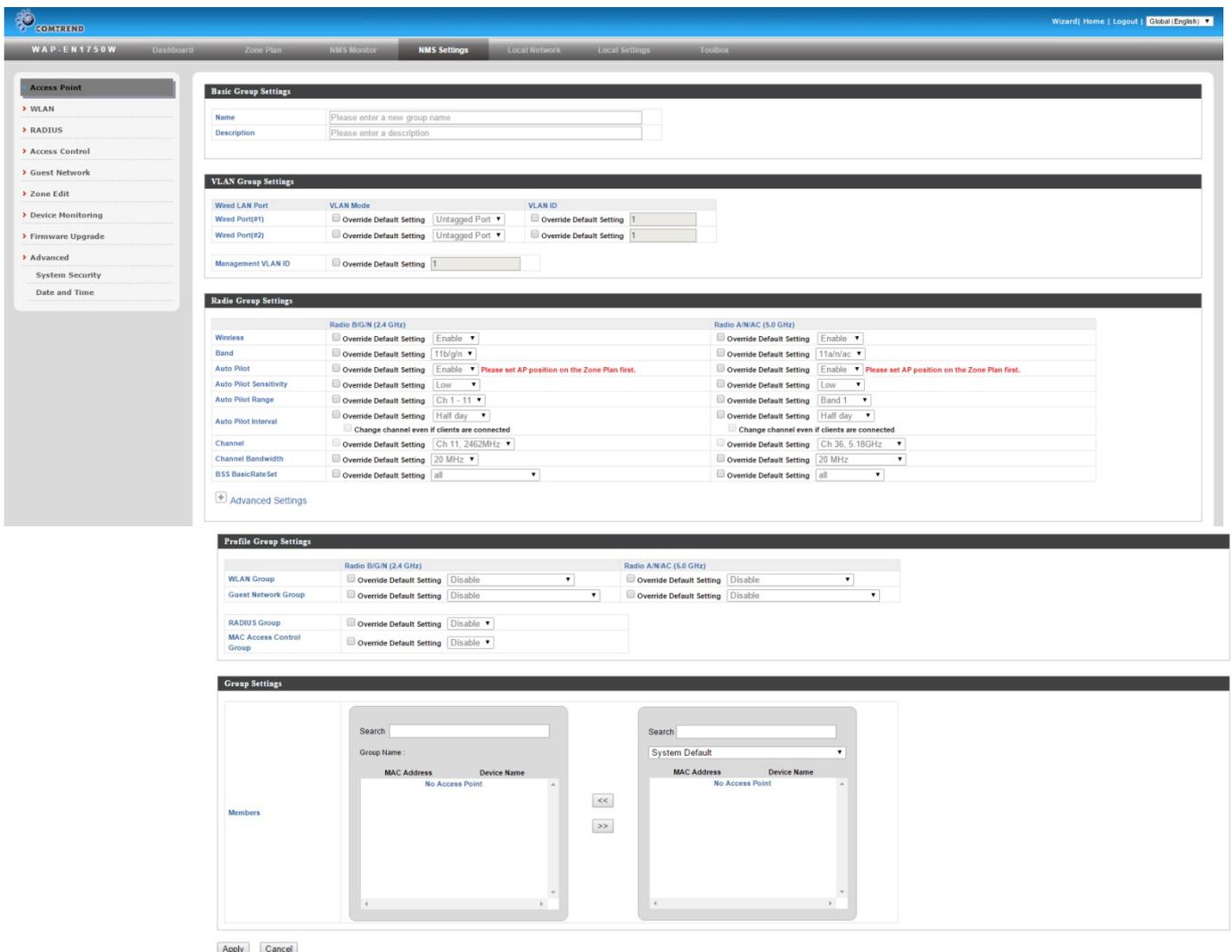


- 3. The new SSID will be displayed in the **WLAN** panel. **Repeat** to add additional SSIDs according to your preference, and then click **“Add”** in the **WLAN Group** panel:
- 4. Enter a **name** for the **SSIDgroup** and **check the boxes** to select which SSIDs to include within the group. Click **“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.

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