

# **OAP900**

# User Manual 05-2016 / v1.0

# Edimax Technology Co., Ltd.

No.3, Wu-Chuan 3rd Road, Wu-Gu, New Taipei City 24891, Taiwan Email: support@edimax.com.tw

# **Edimax Technology Europe B.V.**

Fijenhof 2, 5652 AE Eindhoven, The Netherlands Email: support@edimax.nl

# **Edimax Computer Company**

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

Live Tech Support: 1(800) 652-6776

Email: support@edimax.com



# **CONTENTS**

I.	Produc	t Information	
	I-2.	System Requirements	3
	I-3.	Hardware Overview	3
	I-4.	LED Status	4
	I-5.	Reset	4
	I-6.	Mounting	5
	I-7.	Safety Information	7
II.	Quick S	Setup	8
	II-1.	Passive PoE Injector	8
	II-2.	AP Mode	10
	II-3.	Managed AP Mode: Edimax Pro NMS	14
	II-4.	Client Bridge Mode	18
IV.	Browse	er Based Configuration Interface	20
	IV-1.	Information	22
	IV-1-1.	System Information	22
	IV-1-2.	Wireless Clients	26
	IV-1-3.	Wireless Monitor	28
	IV-1-4.	DHCP Client Table	29
	IV-1-5.	Log	30
	IV-2.	Network Settings	32
	IV-2-1.	LAN-Side IP Address	32
	IV-2-2.	LAN Port	34
	IV-2-3.	VLAN	35
	IV-3.	Wireless Settings	36
	IV-3-1.	Wireless Extender	36
	IV-3-2.	Profile List	38
	IV-3-3.	5GHz 11ac 11an	39
	IV-3-3-1.	Basic	39
	IV-3-3-2.	Advanced	41
	IV-3-3-3.	Security	43
	IV-3-3-3-1	No Authentication	44
	IV-3-3-3-2		
	IV-3-3-3	IEEE802.1x/EAP	45
	IV-3-3-3-4		
	IV-3-3-3-5		
	IV-3-3-3-6	Additional Authentication	46



	IV-3-3-4.	WDS	47
	IV-3-3-5.	Guest Network	49
	IV-3-4.	WPS	51
	IV-3-5.	RADIUS	53
	IV-3-5-1.	RADIUS Settings	54
	IV-3-5-2.	Internal Server	55
	IV-3-5-3.	RADIUS Accounts	57
	IV-3-6.	MAC Filter	59
	IV-3-7.	WMM	61
	IV-3-8.	Traffic Shaping	63
	IV-3-9.	Antenna	64
	IV-4.	Management	65
	IV-4-1.	Admin	65
	IV-4-2.	Date and Time	68
	IV-4-3.	Syslog Server	70
	IV-4-4.	Ping Test	71
	IV-5.	Advanced	72
	IV-5-1.	LED Settings	72
	IV-5-2.	Update Firmware	73
	IV-5-3.	Save/Restore Settings	74
	IV-5-4.	Factory Default	76
	IV-5-5.	Reboot	77
	IV-6.	Operation Mode	78
٧.	Appen	dix	79
	V-1.	Configuring your IP address	79
	V-1-1.	Windows XP	80
	V-1-2.	Windows Vista	82
	V-1-3.	Windows 7	84
	V-1-4.	Windows 8	88
	V-1-5.	Mac	92



# **OVERVIEW**

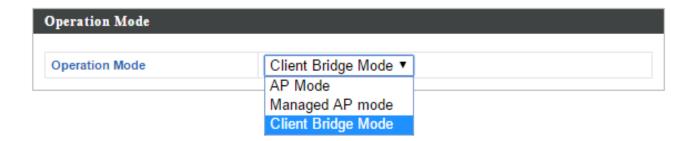
Your access point can function in three different modes.

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

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

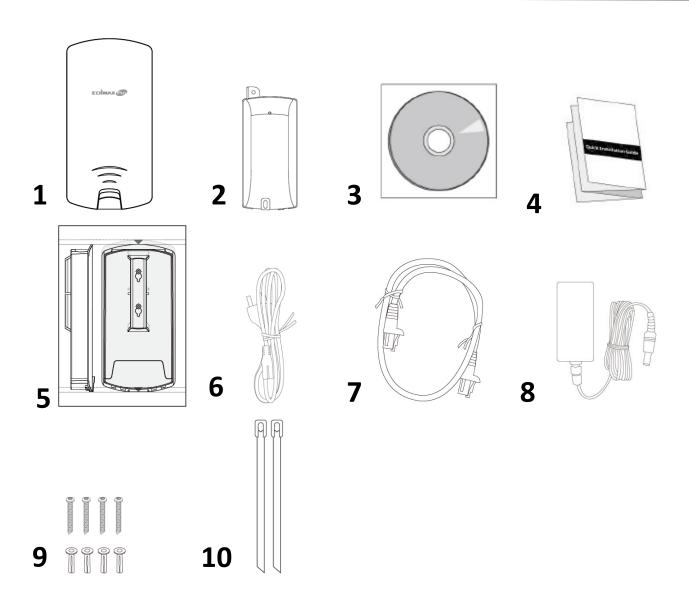
Managed AP mode acts as a "slave" AP within the AP array (controlled by the AP Controller "master").

In **Client Bridge** mode the OAP900 connects wirelessly to an AP's SSID while remaining in the same IP address range as that AP – the WAN and LAN are on the same subnet. This is ideal for last-mile solutions.





# I. Product Information



- 1. Access Point
- 2. PoE Injector
- 3. CD
- 4. Quick Installation Guide
- 5. Wall Mount Screw Template
- 6. Power Cord

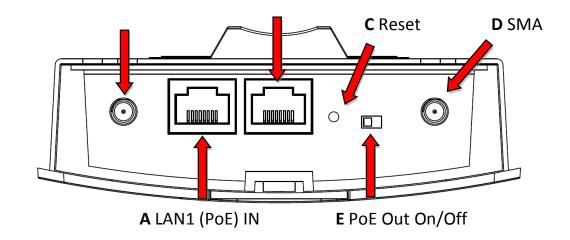
- 7. Ethernet Cable
- 8. Power Adapter
- 9. Wall Mount Screw Set
- 10. Pole Mount Set



# **I-2. System Requirements**

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

# I-3. Hardware Overview



- A. LAN1 port with Power over Ethernet (Passive PoE) IN.
- **B.** LAN2 port with Power over Ethernet (Passive PoE) OUT.
- C. Reset the access point to factory default settings
- **D.** SMA connector for optional antenna.
- **E.** Switch the LAN2 (Passive PoE) OUT on/off.

# **AWARNING**

DC48V Voltage on the LAN2, Turn off the slide switch before use.



### **I-4. LED Status**

LED Behavior			
Power	Blue	The access point is on.	
Powei	Off	The access point is off.	
	Blue	LAN port is connected.	
LAN 1 & 2	Flashing	Activity (transferring and receiving)	
	Off	LAN port is unconnected.	
Minalaga	Blue	Wireless enabled.	
Wireless (Client mode only)	Flashing	Excellent/Good/Medium/Bad for RSSI Signal Strength.	
Offig	Off	Wireless disabled.	

### I-5. Reset

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

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



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

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

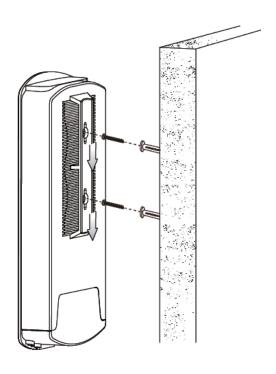


# I-6. Mounting

The access point includes a mount for wall or pole which requires some assembly.

# **Wall Mount**

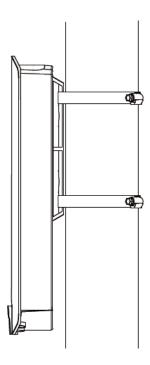
1. Attach the mount and access point to a wall using the included screws and plugs.





# **Pole Mount**

**2.** Fix the mount and access point to a pole using the included pole mount straps.





# I-7. Safety Information

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

- 1. Do not place the access point in or near hot/humid places, such as a kitchen or bathroom.
- 2. Do not pull any connected cable with force; carefully disconnect it from the access point.
- 3. Handle the access point with care. Accidental damage will void the warranty of the access point.
- 4. The device contains small parts which are a danger to small children under 3 years old. Please keep the access point out of reach of children.
- 5. Do not place the access point on paper, cloth, or other flammable materials. The access point may become hot during use.
- 6. There are no user-serviceable parts inside the access point. If you experience problems with the access point, please contact your dealer of purchase and ask for help.
- 7. If you smell burning or see smoke coming from the access point or power adapter, then disconnect the access point and power adapter immediately, as far as it is safely possible to do so. Call your dealer of purchase for help.



# II. Quick Setup

The OAP900 Long Range 802.11ac Outdoor Access Point features a range of powerful functions:

- 802.11ac high-speed wireless technology
- 16 SSIDs for management
- SNMP v1/v2c/v3

Your access point can be up and running in just a few minutes. It can function as a standalone access point (AP mode), as part of an AP array (Managed AP mode), or as a client bridge for WISP last-mile services (Client Bridge mode).

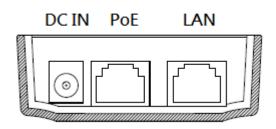
For use as a Managed AP in an AP array, the access point will automatically switch mode when an AP Controller is configured as described in II-3. Managed AP Mode: Edimax Pro NMS.

### II-1. **Passive PoE Injector**



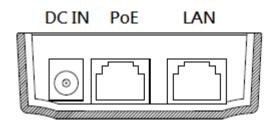
Do not connect a non-PoE device to the access point's LAN2 (PoE Out) port. The LAN2 port outputs 48 V and can damage a non PoE device.

1. Connect the access point's LAN1 (PoE In) port to the PoE injector's PoE port via Ethernet cable.





**2.** Use an Ethernet cable to connect the access point's LAN port to your network: router, access point or switch. If it's more convenient for initial setup, you can connect a computer directly to the access point's LAN port instead.

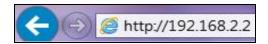


**3.** Connect the PoE injector to a power source using the included power adapter. Wait a moment for the access point to start up. The access point is ready when the LED is **blue**.

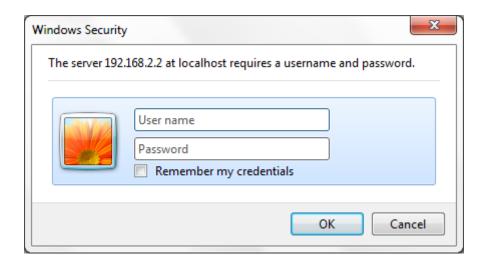


### II-2. AP Mode

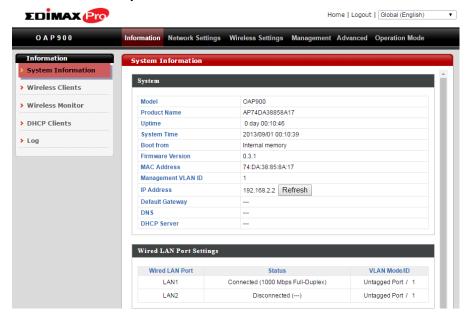
**1.** Enter the access point's IP address into the URL bar of a web browser. The default IP is **192.168.2.2.** If the AP is connected to a DHCP server, ensure you use the correct address.



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



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



The next steps will help you to configure the following basic settings of the access point:

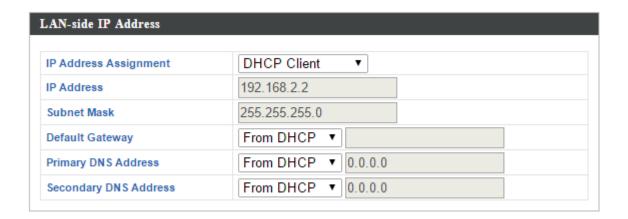


- LAN IP Address
- 5GHz SSID & Security
- Administrator Name & Password
- Time & Date



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

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



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



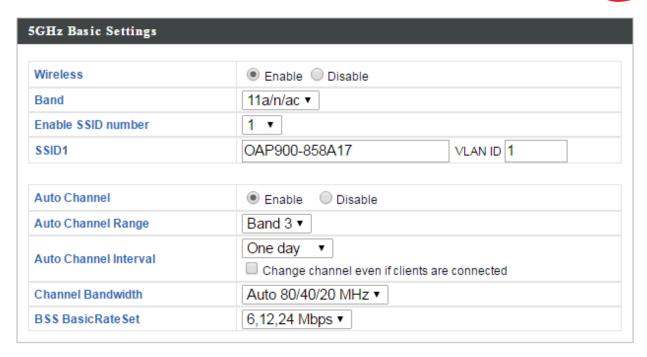
When you change your access point's IP address, you need to use the new IP address to access the browser based configuration interface instead of the default IP 192.168.2.2.

**3.** To change the SSID of your access point's 5GHz wireless network(s), go to "Wireless Settings" > "5GHz 11ac" > "Basic". Enter the new SSID for your 2.4GHz wireless network in the "SSID1" field and click "Apply".



To utilize multiple 5GHz SSIDs, open the drop down menu labelled "Enable SSID number" and select how many SSIDs you require. Then enter a new SSID in the corresponding numbered fields below, before clicking "Apply".

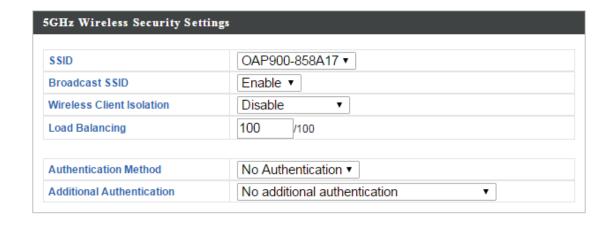




**4.** To configure the security of your access point's 5GHz wireless network(s), go to "Wireless Settings" > "5GHz 11ac 11an" > "Security". Select an "Authentication Method" and enter a "Pre-shared Key" or "Encryption Key" depending on your choice, then click "Apply".

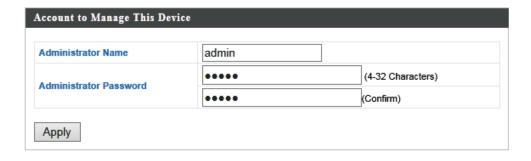


If using multiple SSIDs, specify which SSID to configure using the 🃤 "SSID" drop down menu.

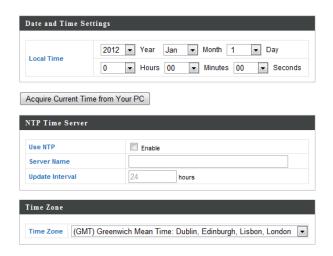


**5.** To change the administrator name and password for the browser based configuration interface, go to "Management" > "Admin".





- **6.** Complete the "Administrator Name" and "Administrator Password" fields and click "Apply".
- 7. To set the correct time for your access point, go to "Management" > "Date and Time Settings".



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



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

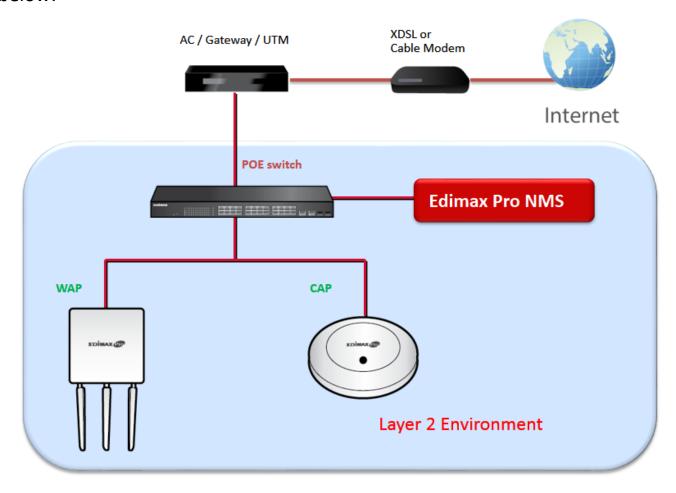
**9.** The basic settings of your access point are now configured.



# II-3. Managed AP Mode: Edimax Pro NMS

Edimax Pro Network Management Suite (NMS) supports the central management of a group of access points, otherwise known as an AP Array. NMS supports up to 16 Edimax Pro access points with no additional wireless controller required or 128 access points with the APC 500 AP controller reducing costs and facilitating efficient remote AP management.

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



One AP (access point) is designated as the AP Controller (master) and other connected Edimax Pro APs are automatically designated as Managed APs (slaves). Using Edimax Pro NMS you can monitor, configure and manage all Managed APs (up to 128) from the single AP Controller.

The OAP900 functions as a Managed AP and cannot act as an AP Controller.

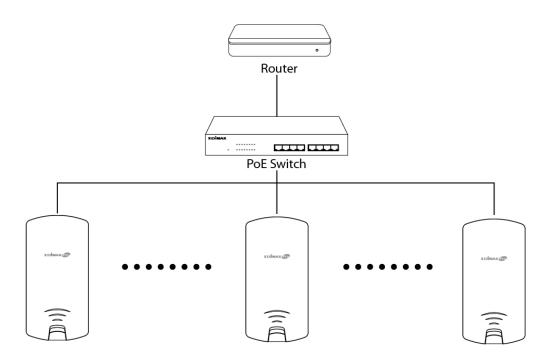


When using an Edimax NMS AP controller, other connected APs are automatically set to Managed APs. In the case that the AP Controller cannot find your OAP900 as a Managed AP, you can configure the setting manually as below:

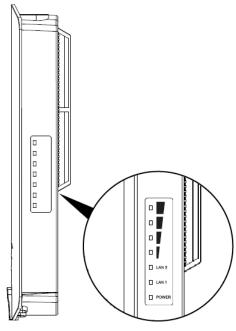
**1.** Ensure all APs including your OAP900 are connected to an Ethernet or PoE switch which is connected to a gateway/router.



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

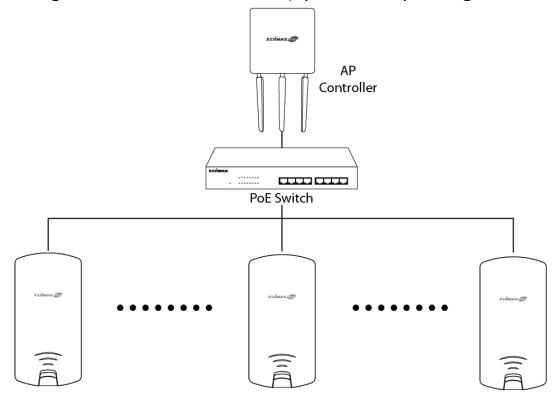


**2.** Ensure all APs are powered on and check LEDs.

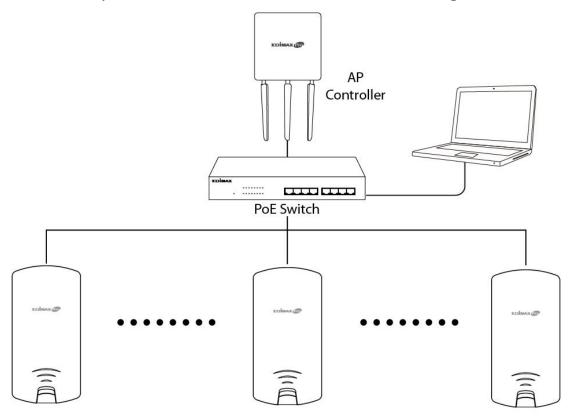




**3.** Ensure you have setup and designated one AP as the AP Controller which will manage all other connected APs (up to 128 depending on model).



**4.** Connect a computer to the OAP900 via PoE switch using an Ethernet cable.

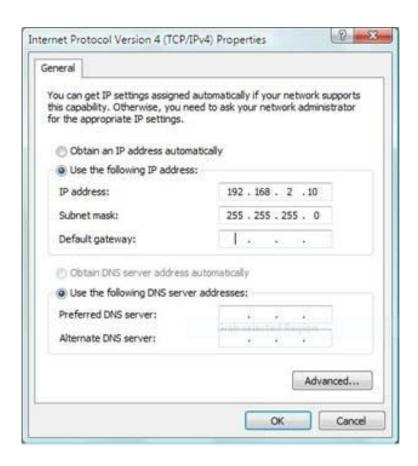


**5.** Open a web browser and enter the OAP900's IP address in the address field. The default IP address is **192.168.2.2** 

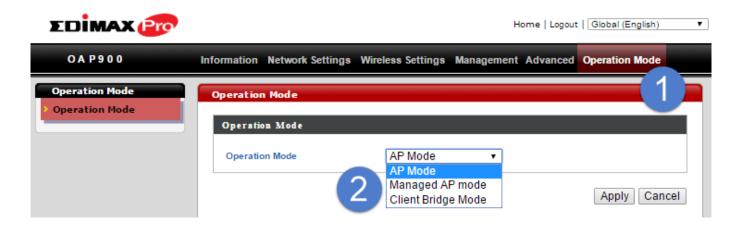




Your computer's IP address must be in the same subnet as the AP Controller. If you changed the AP Controller's IP address, or if your gateway/router uses a DHCP server, ensure you enter the correct IP address.



- **6.** Enter the username & password to login. The default username & password are **admin** & **1234**.
- 7. You will arrive at the Edimax Pro NMS Dashboard. Go to "Operation Mode" and select "Managed AP Mode" from the drop down menu.





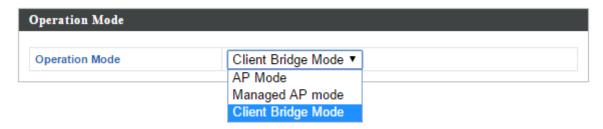
**8.** Click "Apply" to save the settings and your AP Controller & Managed APs should be fully functional. Use Edimax NMS on your AP controller to manage & monitor your Managed APs.



Refer to your AP controller's user manual for help with Edimax NMS.

## II-4. Client Bridge Mode

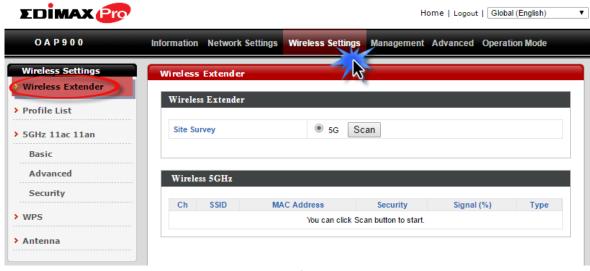
Client Bridge mode enables the OAP900 to wirelessly connect to an AP's SSID while remaining in the same IP address range as that AP – the WAN and LAN are on the same subnet. This is ideal for last-mile solutions. Settings here are saved as **profiles**.



**1.** Enter the access point's IP address into the URL bar of a web browser. The default IP is **192.168.2.2.** If the AP is connected to a DHCP server, ensure you use the correct address.

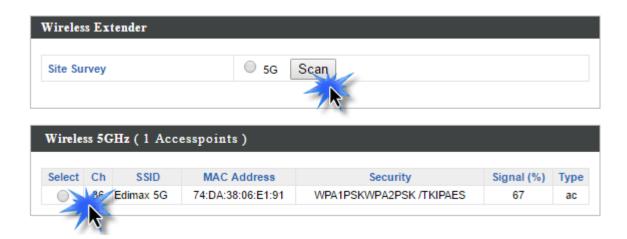


2. Enter the default username "admin" and the default password "1234", and then go to Wireless Settings → Wireless Extender.

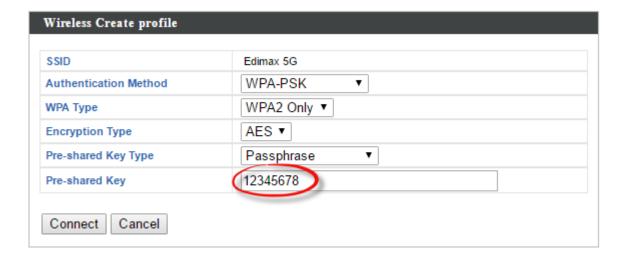




**3.** Click **Scan** to search for and display available SSIDs and click **Select** to connect to an available source SSID.



**4.** Enter the encryption information for the SSID and then click **Connect**.





### IV. **Browser Based Configuration Interface**

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

The browser-based configuration interface enables you to configure the access point's advanced features. The OAP900 features a range of advanced functions such as MAC filtering, MAC RADIUS authentication, VLAN configurations, up to 16 SSIDs and many more. To access the browser based configuration interface:

- 1. Connect a computer to your access point using an Ethernet cable.
- 2. Enter the access point's IP address into the URL bar of a web browser. The default IP is 192.168.2.2. If the AP is connected to a DHCP server, ensure you use the correct address.



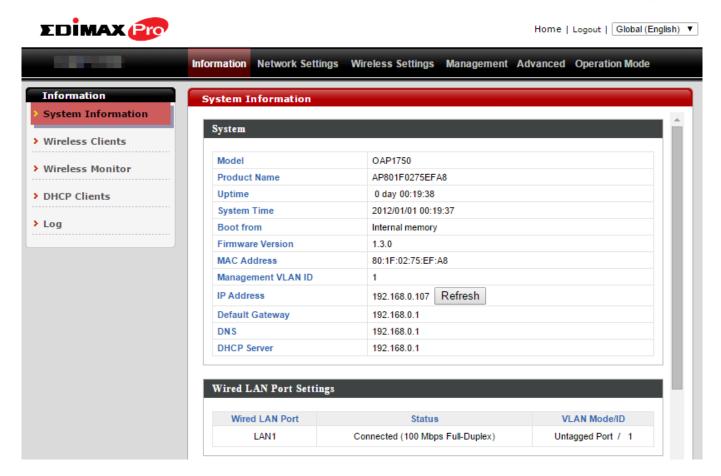
**3.** You will be prompted for a username and password. The default username is "admin" and the default password is "1234", though it was recommended that you change the password during setup.



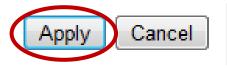
If you cannot remember your password, reset the access point back to its factory default settings. Refer to 1-5. Reset

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





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





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

Configuration is complete. Reloading now... Please wait for 23 seconds.

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



# IV-1. Information

Information Network Settings Wireless Settings Management Advanced Operation Mode



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

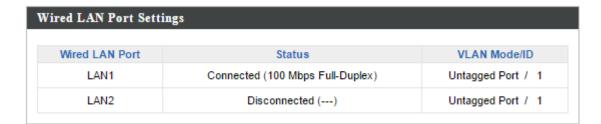
# IV-1-1. System Information

System Information

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

Madal	0.4.04750
Model	OAP1750
Product Name	AP801F0275EFA8
Uptime	0 day 00:38:18
System Time	2012/01/01 00:55:18
Boot from	Internal memory
Firmware Version	1.3.0
MAC Address	80:1F:02:75:EF:A8
Management VLAN ID	1
IP Address	192.168.0.107 Refresh
Default Gateway	192.168.0.1
DNS	192.168.0.1
DHCP Server	192.168.0.1





Wireless 5GHz		
Status	Enabled	
MAC Address	74:DA:38:85:8A:17	
Channel	Ch 36 + 40 + 44 + 48	
Transmit Power	100%	

Wireless 5GHz /SSID					
SSID	Authentication Method	Encryption Type	VLAN ID	Additional Authentication	Wireless Client Isolation
Edimax 5G	WPA2-PSK	AES	1	No additional authentication	Disabled

Wireless 5GHz /WDS Disabled					
Encryption Type	VLAN Mode/ID				
No WDS entries.					

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



Gateway	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.		
Status	Displays the status of the specified LAN port	
	(connected or disconnected).	
VLAN Mode/ID	Displays the VLAN mode (tagged or untagged)	
	and VLAN ID for the specified LAN port. See	
	IV-2-3. VLAN	

Wireless 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.	
<b>Transmit Power</b>	Displays the wireless radio transmit power	
	level as a percentage.	

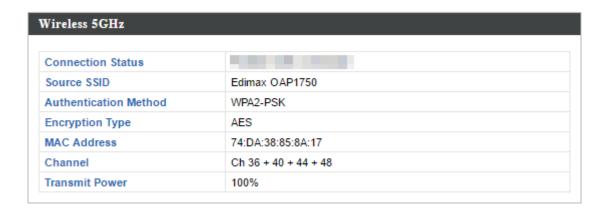
Wireless 5GHz / SSID	
SSID	Displays the SSID name(s) for the specified
	frequency.
Authentication	Displays the authentication method for the
Method	specified SSID. See IV-3. Wireless Settings
<b>Encryption Type</b>	Displays the encryption type for the specified
	SSID. See IV-3. Wireless Settings
VLAN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

Wireless 5GHz / WDS Status	
MAC Address	Displays the peer access point's MAC address.
<b>Encryption Type</b>	Displays the encryption type for the specified
	WDS. See <b>IV-3-1-4. WDS</b>



VLAN Mode/ID	Displays the VLAN ID for the specified WDS.
	See IV-3-1-4. WDS

# **Client Bridge Mode:**



Wireless 2.4GHZ (5GHz) / SSID	
<b>Connection Status</b>	Current status of the repeater's connection.
Source SSID	Displays the SSID name(s) for the repeater's
	source.
Authentication	Displays the authentication method for the
Method	specified SSID. See IV-3. Wireless Settings
<b>Encryption Type</b>	Displays the encryption type for the specified
	SSID. See IV-3. Wireless Settings
MAC Address	Displays the access point's MAC address.
Channel	Displays the channel number the specified
	wireless frequency is using for broadcast.
<b>Transmit Power</b>	Displays the wireless radio transmit power
	level as a percentage.

25



# IV-1-2. Wireless Clients

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



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

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.
<b>Connected Time</b>	Displays the total time the wireless client has
	been connected to the access point.
Idle Time	Client idle time is the time for which the client
	has not transmitted any data packets i.e. is
	idle.

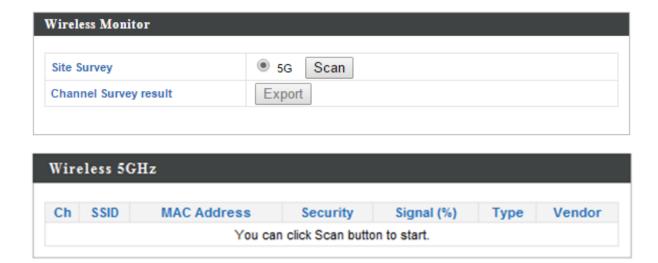


Vendor	The vendor of the client's wireless adapter is
	displayed here.



### IV-1-3. Wireless Monitor

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



Wireless Monitor	
Site Survey	Select which frequency (or both) to scan, and
	click "Scan" to begin.
<b>Channel Survey</b>	After a scan is complete, click "Export" to save
Result	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.
Туре	Displays the 802.11 wireless networking
	standard(s) of the specified SSID.
Vendor	Displays the vendor of the wireless
	router/access point for the specified SSID.



# IV-1-4. DHCP Client Table

DHCP Clients

The DHCP client table displays information about DHCP clients when DHCP server is

enabled.

Client Table		
IP Address	MAC Address	Expiration Time
192.168.2.120	A4:77:33:1E:0C:47	Expired

DHCP Client Table	
IP Address	Displays the IP address of listed DHCP client.
MAC Address	Displays the MAC address of listed DHCP client.
<b>Expiration Time</b>	Displays the expiration time for listed DHCP client.



# IV-1-5. Log

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

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



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



# The following information/events are recorded by the log:

**◆** USB

Mount & unmount

**♦** Wireless Client

Connected & disconnected Key exchange success & fail

**♦** Authentication

Authentication fail or successful.

**♦** Association

Success or fail

**♦** WPS

M1 - M8 messages WPS success

**♦** Change Settings

System Boot

Displays current model name

**♦ NTP Client** 

Wired Link

LAN Port link status and speed status

**♦** Proxy ARP

Proxy ARP module start & stop

Bridge

Bridge start & stop.

**♦** SNMP

SNMP server start & stop.

**♦** HTTP

HTTP start & stop.

**♦** HTTPS

HTTPS start & stop.

**♦** SSH

SSH-client server start & stop.

Telnet

Telnet-client server start or stop.

**♦** WLAN (5G)

WLAN (5G) channel status and country/region status



### IV-2. **Network Settings**

Information **Network Settings** Wireless Settings Management Advanced Operation Mode



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

### IV-2-1. **LAN-Side IP Address**

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



🚹 The access point's default IP address is 192.168.2.2.

IP Address Assignment	DHCP Client ▼
IP Address	192.168.2.2
Subnet Mask	255.255.255.0
Default Gateway	From DHCP ▼
Primary DNS Address	From DHCP ▼ 0.0.0.0
Secondary DNS Address	From DHCP ▼ 0.0.0.0

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



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

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

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

33



#### IV-2-2. LAN Port

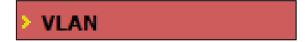
The "LAN Port" page allows you to configure the settings for your access point's two wired LAN (Ethernet) ports.



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



#### IV-2-3. VLAN

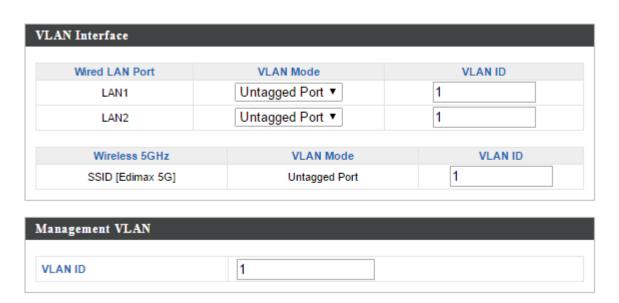


The "VLAN" (Virtual Local Area Network) enables you to configure VLAN settings. A VLAN is a local area network which maps

workstations virtually instead of physically and allows you to group together or isolate users from each other. VLAN IDs 1-4095 are supported.



 $m{4}$  VLAN IDs in the range 1 – 4095 are supported.



VLAN Interface	
Wired LAN	Identifies LAN port number and wireless SSIDs.
Port/Wireless	
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	
	Specify the VLAN ID of the management VLAN. Only the hosts belonging to the same VLAN can manage the device.



# IV-3. Wireless Settings

Information Network Settings Wireless Settings Management Advanced Operation Mode

A

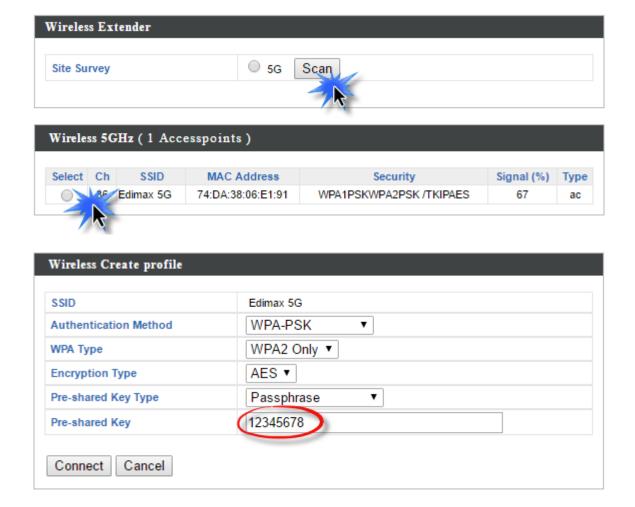
Screenshots displayed are examples. The information shown on your screen will vary depending on your configuration.

#### IV-3-1. Wireless Extender



Only available in Client Bridge Mode

The wireless extender page displays details about the APs wireless connection in client bridge mode and enables you to connect to a source SSID. Settings are saved as **profiles**. Click **Scan** to search for and display available SSIDs and click **Select** to connect to an available SSID.





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

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



#### IV-3-2. Profile List



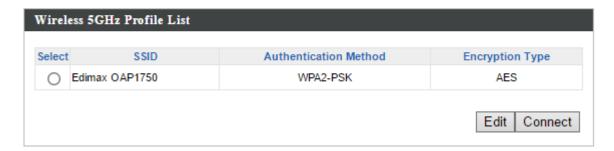
# 🚹 Only available in Client Bridge Mode

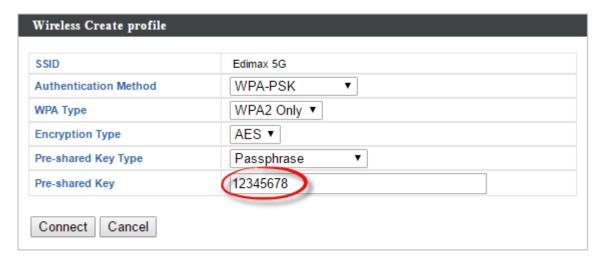
# Profile List

Client bridge mode settings are saved as profiles. Profiles can be edited and multiple profiles can be created to switch between

profiles easily as required. Select an existing profile and click Edit or Connect.







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



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

> 5GHz 11ac 11an

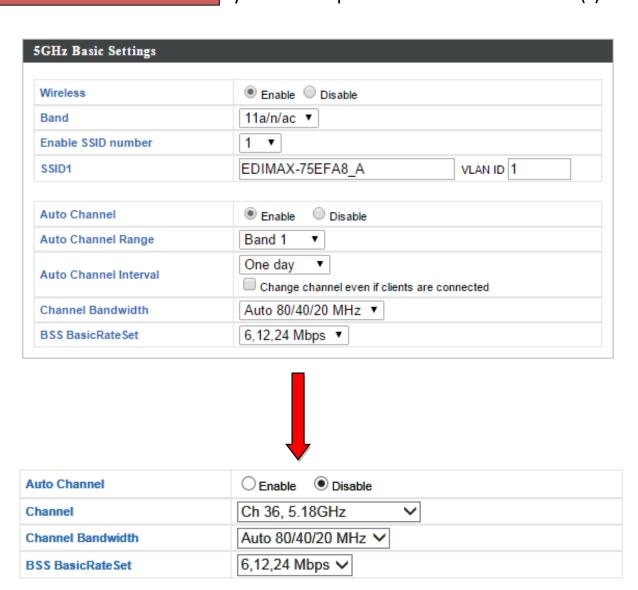
The "5GHz 11ac 11an" menu allows you to view and configure information for your access point's

5GHz wireless network across five categories: Basic, Advanced, Security, WDS & Schedule.

#### IV-3-3-1. Basic

Basic

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



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



	access point. Combinations of 802.11a,
	802.11n & 802.11ac can be selected.
<b>Enable SSID Number</b>	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.
<b>Auto Channel</b>	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.
<b>Auto Channel Range</b>	Select a range from which the auto channel
	setting (above) will choose a channel.
<b>Auto Channel</b>	Specify a frequency for how often the auto
Interval	channel setting will check/reassign the
	wireless channel. Check/uncheck the "Change
	channel even if clients are connected" box
	according to your preference.
<b>Channel Bandwidth</b>	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.
<b>Channel Bandwidth</b>	Set the channel bandwidth: 20MHz (lower
	performance but less interference), Auto
	40/20MHz or Auto 80/40/20MHz
	(automatically select based on interference
	level).



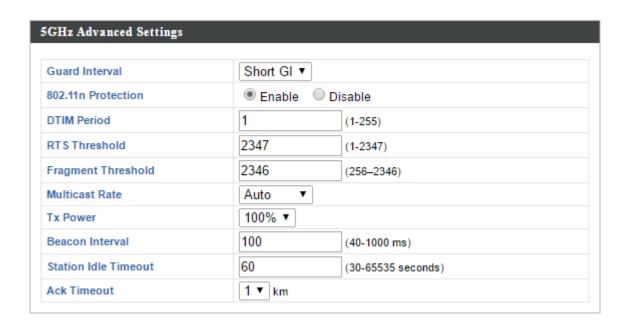
BSS BasicRate Set	Set a Basic Service Set (BSS) rate: this is a
	series of rates to control communication
	frames for wireless clients.

#### IV-3-3-2. Advanced

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



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



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



Fragment	Set the fragment threshold of the wireless
Threshold	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	Set the interval for keepalive messages from
timeout	the access point to a wireless client to verify if
	the station is still alive/active.
Ack Timeout	Adjust ACK timeout distance for optimum
	throughput.



# IV-3-3-3. Security

# Security

The access point provides various security options (wireless data encryption). When data is encrypted, information transmitted wirelessly

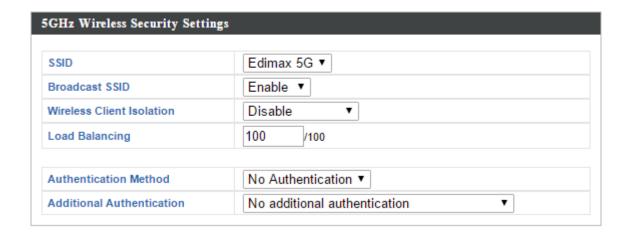
cannot be read by anyone who does not know the correct encryption key.



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



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



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



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

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

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



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

#### IV-3-3-3-2. WEP

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

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



	the default key.
Encryption Key 1 –	Enter your encryption key/password according
4	to the format you selected above.

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

<b>Key Length</b>	Select 64-bit or 128-bit. 128-bit is more secure
	than 64-bit and is recommended.

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

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

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

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

WPA Type	Select from WPA/WPA2 Mixed Mode-EAP, WPA2-EAP or WPA-EAP.
<b>Encryption Type</b>	Select "TKIP/AES Mixed Mode" or "AES" encryption type.
Key Renewal	Specify a frequency for key renewal in



Interval minutes.
-------------------



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

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

Additional wireless authentication methods can also be used:



WPS must be disabled to use additional authentication. See IV-3-4. for WPS settings.

#### **MAC Address Filter**

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



**A See** IV-3-6.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**

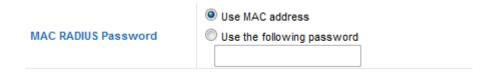
Restrict wireless clients access based on MAC address via a RADIUS server, or password authentication via a RADIUS server.



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



WPS must be disabled to use MAC-RADIUS authentication. See IV-3-4. for WPS settings.



# Password Password Password password authentication via RADIUS server. If you select "Use the following password", enter the password in the field below. The password should match the "Shared Secret" used in IV-3-5. RADIUS.



#### IV-3-3-4. WDS



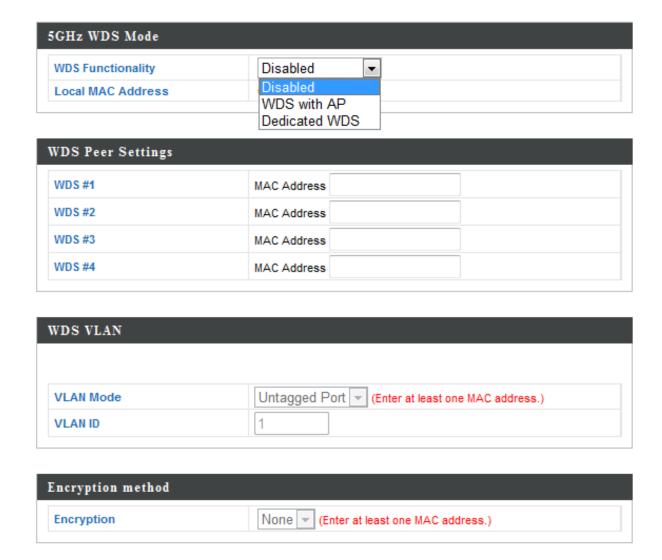
Wireless Distribution System (WDS) can bridge/repeat access points together in an extended network. WDS settings can be

configured as shown below.



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

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





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

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



#### IV-3-3-5. Guest Network

# Guest Network

You can setup an additional "Guest" Wi-Fi network so guest users can enjoy Wi-Fi connectivity without accessing your primary

networks. Enable a guest network and then configure the settings.



raffic Shaping Set	tings				
Traffic Shaping		Disable 1	7		
Downlink		0	Mbps		
Uplink		0	Mbps		
iltaring Sattings					
iltering Settings	Disabl	e ▼			
	Disabl	e ▼		IP/Subnet Mask	
IP Filtering	Disabl			IP/Subnet Mask	
	Disabl				

Guest Network	
5GHz SSID	Displays the guest network name (SSID).
<b>Guest Network</b>	Enable or disable the guest network.

<b>Guest Access Policy</b>	
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.



#### IV-3-4. WPS

# WPS

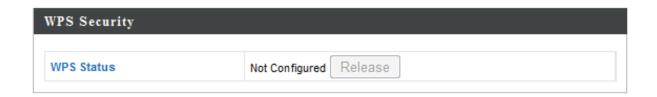
Wi-Fi Protected Setup is a simple way to establish connections between WPS

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



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







WPS	Check/uncheck this box to enable/disable WPS
	functionality. WPS must be disabled when
	using MAC-RADIUS authentication (see



# IV-3-3-3 & IV.3-5).

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

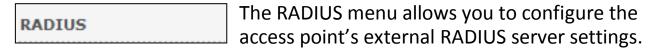
WPS Security	
WPS Status	WPS security status is displayed here. Click
	"Release" to clear the existing status.

Wireless 5GHz	
SSID	Displays the SSID name(s) for the specified frequency.
<b>6</b> '.	
Security	Displays the security for the specified SSID.
Encryption	Displays the encryption type for the specified
	SSID. See IV-3. Wireless Settings

52



#### IV-3-5. RADIUS



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

The access point can utilize both a primary and secondary (backup) external RADIUS server.



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

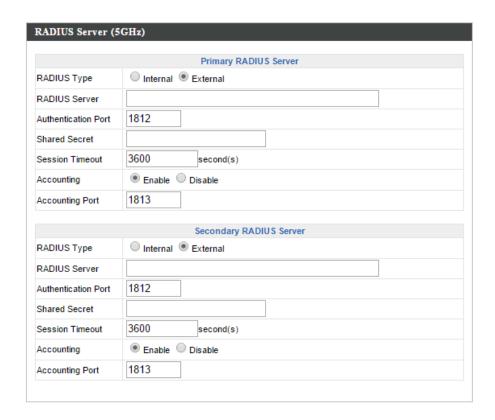


# IV-3-5-1. RADIUS Settings

# **Radius Settings**

Configure the RADIUS server settings for 5GHz. You can use an internal or external RADIUS

server.



RADIUS Type	Select "Internal" to use the access point's built-in RADIUS server or "external" to use an external RADIUS server.
RADIUS Server	Enter the RADIUS server host IP address.
Authentication Port	Set the UDP port used in the authentication p rotocol of the RADIUS server.
Shared Secret	Enter a shared secret/password between 1 – 99 characters in length. This should match the "MAC-RADIUS" password used in IV-3-3-3.
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.
--------------------

#### IV-3-5-2. 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 "Wireless Settings" → "RADIUS" → "RADIUS Settings" menu.



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

Internal Server	Enable	
EAP Internal Authentication	PEAP(MS-PEAP)	
EAP Certificate File Format	PKCS#12(*.pfx/*.p12)	
EAP Certificate File	Upload	
Shared Secret		
Session-Timeout	3600	second(s)
	<ul><li>Reauthenication (RA</li></ul>	DIUS-Request)
Termination-Action	Not-Reauthenication	(Default)
	Not-Send	

Internal Server	Check/uncheck to enable/disable the access
	point's internal RADIUS server.
EAP Internal	Select EAP internal authentication type from
Authentication	the drop down menu.
<b>EAP Certificate File</b>	Displays the EAP certificate file format:
Format	PCK#12(*.pfx/*.p12)
<b>EAP Certificate File</b>	Click "Upload" to open a new window and
	select the location of an EAP certificate file to
	use. If no certificate file is uploaded, the
	internal RADIUS server will use a self-made



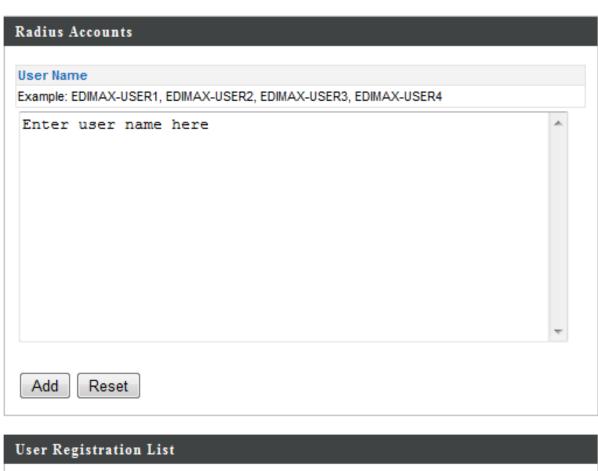
	certificate.
Shared Secret	Enter a shared secret/password for use between the internal RADIUS server and RADIUS client. The shared secret should be 1 – 99 characters in length. This should match the "MAC-RADIUS" password used in IV-3-1-3-6 or IV-3-2-3.
Session Timeout	Set a duration of session timeout in seconds between 0 – 86400.
Termination Action	Select a termination-action attribute: "Reauthentication" sends a RADIUS request to the access point, "Not-Reauthentication" sends a default termination-action attribute to the access point, "Not-Send" no termination-action attribute is sent to the access point.

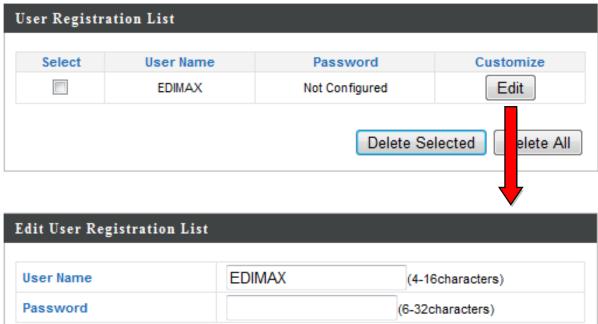


#### IV-3-5-3. RADIUS Accounts

**Radius Accounts**The internal RADIUS server can authenticate up to 256 user accounts. The "RADIUS

Accounts" page allows you to configure and manage users.







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

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

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

# **Edit User Registration List**

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

58



#### IV-3-6. MAC Filter

MAC Filter

Mac filtering is a security feature that can help to prevent unauthorized users from

connecting to your access point.

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



To enable MAC filtering, go to "Wireless Settings" → "5G Hz 11ac 11n" → "Security" → "Additional Authentication" and select "MAC Filter" (see IV-3-3-3).

The MAC address filtering table is displayed below:





	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.	
<b>Delete Selected</b>	Delete the selected MAC address from the	
	list.	
Delete All	Delete all entries from the MAC address	
	filtering table.	
Export	Click "Export" to save a copy of the MAC	
	filtering table. A new window will pop up for	
	you to select a location to save the file.	



#### IV-3-7. WMM



Wi-Fi Multimedia (WMM) is a Wi-Fi Alliance interoperability certification based on the IEEE 802.11e standard, which provides

Quality of Service (QoS) features to IEE 802.11 networks. WMM prioritizes traffic according to four categories: background, best effort, video and voice.

	WMM Parai	meters of Access	s 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 Pa	arameters of Stat	tion	
	CWMin	CWMax	AIFSN	TxOP
Back Ground	4	10	7	0
Best Effort	4	10	3	0
Video	3	4	2	94
			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	High throughput, non time sensitive bulk	
	Priority	data e.g. FTP	
<b>Best Effort</b>	Medium	Traditional IP data, medium throughput and	
	Priority	delay.	
Video	High	Time sensitive video data with minimum	
	Priority	time delay.	
Voice	High	Time sensitive data such as VoIP and	
	Priority	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:



Minimum Contention Window (millicocondo)
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.
Maximum Contention Window (milliseconds):
This value is the upper limit to random
backoff value doubling (see above).
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.
Transmission Opportunity (milliseconds): The
maximum interval of time an AP/client can
transmit. This makes channel access more
efficiently prioritized. A value of 0 means only
one frame per transmission. A greater value
effects higher priority.



# IV-3-8. Traffic Shaping

Traffic Shaping

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

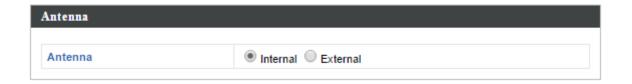
Enable				
nlimited : 0 Mbps				
own Link/Up Link Maximum : 1024 N				
SSID		vn Link		Link
Edimax 5G	0	Mbps	0	Mbps
OAP900-858A17_2	0	Mbps	0	Mbps
OAP900-858A17_3	0	Mbps	0	Mbps
OAP900-858A17_4	0	Mbps	0	Mbps
OAP900-858A17_5	0	Mbps	0	Mbps
OAP900-858A17_6	0	Mbps	0	Mbps
OAP900-858A17_7	0	Mbps	0	Mbps
OAP900-858A17_8	0	Mbps	0	Mbps
OAP900-858A17_9	0	Mbps	0	Mbps
OAP900-858A17_10	0	Mbps	0	Mbps
OAP900-858A17_11	0	Mbps	0	Mbps
OAP900-858A17_12	0	Mbps	0	Mbps
OAP900-858A17_13	0	Mbps	0	Mbps
OAP900-858A17_14	0	Mbps	0	Mbps
OAP900-858A17 15	0	Mbps	0	Mbps

<b>Enable Unlimited: 0</b>	Check/uncheck to enable or disable unlimited	
Mbps	transfer speed.	
Downlink/Uplink	The maximum down/uplink capacity in Mbps.	
Maximum		
Downlink	Enter a downlink limit in MB for the listed	
	SSID.	
Uplink	Enter an uplink limit in MB for the listed SSID.	



#### IV-3-9. Antenna

The access point features a built-in internal antennas. Specify which type of antenna you are using.





### IV-4. Management

Information Network Settings Wireless Settings Management Advanced Operation Mode



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

#### IV-4-1. Admin

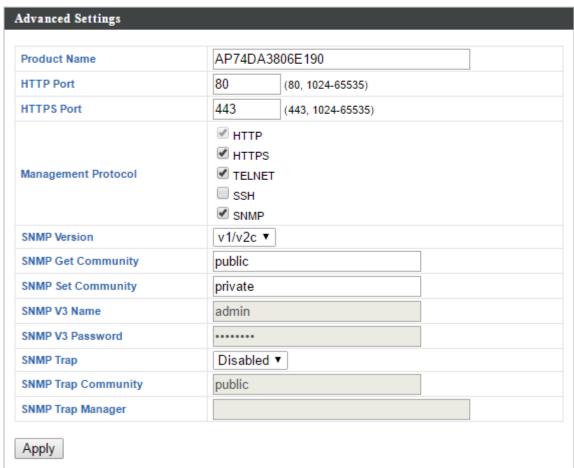
You can change the password used to login to the browser-based configuration interface here. It is advised to do so for security purposes.



If you change the administrator password, please make a note of the new password. In the event that you forget this password and are unable to login to the browser based configuration interface, see 1-5. Reset for how to reset the access point.







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

# Advanced Settings



Product Name  Edit the product name according to your preference consisting of 1-32 alphanumeric characters. This name is used for reference purposes.  HTTP Port  Specify HTTP port number.  Specify HTTPS port number.  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.
characters. This name is used for reference purposes.  HTTP Port Specify HTTP port number.  HTTPS Port Specify HTTPS port number.  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
purposes.  HTTP Port Specify HTTP port number.  HTTPS Port Specify HTTPS port number.  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
HTTP Port Specify HTTP port number. Specify HTTPS port number. 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
HTTPS Port Specify HTTPS port number. 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
Management Protocol SNMP Version  Check/uncheck the boxes to enable/disable specified management interfaces (see below). When SNMP is enabled, complete the SNMP fields below. Select SNMP version appropriate for your
specified management interfaces (see below). When SNMP is enabled, complete the SNMP fields below.  SNMP Version Select SNMP version appropriate for your
When SNMP is enabled, complete the SNMP fields below.  SNMP Version Select SNMP version appropriate for your
fields below.  SNMP Version Select SNMP version appropriate for your
SNMP Version Select SNMP version appropriate for your
SNMP manager
Sitivii illallageli
SNMP Get Enter an SNMP Get Community name for
Community verification with the SNMP manager for
SNMP-GET requests.
SNMP Set Enter an SNMP Set Community name for
Community verification with the SNMP manager for
SNMP-SET requests.
SNMP V3 Name Enter SNMP V3 name.
SNMP V3 Enter SNMP V3 password.
Password
SNMP Trap Enable or disable SNMP Trap to notify SNMP
manager of network errors.
SNMP Trap Enter an SNMP Trap Community name for
Community verification with the SNMP manager for
SNMP-TRAP requests.
SNMP Trap Specify the IP address or sever name (2-128
Manager alphanumeric characters) of the SNMP
manager.

#### HTTP

Internet browser HTTP protocol management interface

# **TELNET**

Client terminal with telnet protocol management interface

## **SNMP**

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



# IV-4-2. Date and Time

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  Acquire Current 1	2012  Year Jan  Month 1  Day  0  Hours 00  Minutes 00  Seconds	
NTP Time Server		
Use NTP	Enable	
Server Name		
Update Interval	24 (Hours)	
Time Zone		
Time Zone (GM	T) Greenwich Mean Time: Dublin, Edinburgh, Lisbon, London 💌	

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

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



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

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



# IV-4-3. Syslog Server

# Syslog Server

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

Syslog Server Settings	
Transfer Logs	Enable Syslog Server
Syslog E-mail Settings	
E-mail Logs	
E-mail Subject	
SMTP Server Address	
SMTP Server Port	
Sender E-mail	
Receiver E-mail	
Authentication	Disable ▼

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.

Syslog E-mail Settings	
E-mail Logs	Check the box to enable/disable e-mail logs.
E-mail Subject	Specify the subject line of log emails.
SMTP Server	Specify the SMTP server address used to send
Address	log emails.
<b>SMTP Server Port</b>	Specify the SMTP server port used to send log
	emails.
Sender E-mail	Specify the sender email address.
Receiver E-mail	Specify the email to receive log emails.
Authentication	Disable or select authentication type: SSL or TLS.
	When using SSL or TLS, enter the username and
	password.



# IV-4-4. Ping Test



The access point includes a built-in ping test function. Ping is a computer

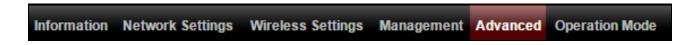
network administration utility used to test whether a particular host is reachable across an IP network and to measure the round-trip time for sent messages.



<b>Destination Address</b>	Enter the address of the host.
Execute	Click execute to ping the host.



#### IV-5. **Advanced**





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

#### IV-5-1. **LED Settings**

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



Power LED	Select on or off.
<b>5GHz Signal Strength</b>	Select on or off. The 5GHz signal strength
LED	LED is only active in <b>Client Bridge</b> mode.

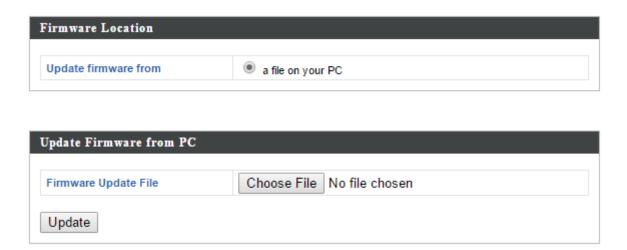


## IV-5-2. Update Firmware

# Update Firmware

The "Firmware" page allows you to update the system firmware to a more recent version. Updated firmware versions often

offer increased performance and security, as well as bug fixes. You can download the latest firmware from the Edimax website.





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

<b>Update Firmware</b>	Select "a file on your PC" to upload firmware
From	from your local computer.
Firmware Update File	Click "Choose File" to open a new window to
	locate and select the firmware file in your
	computer.
Update	Click "Update" to upload the specified
	firmware file to your access point.



# IV-5-3. Save/Restore Settings

**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 Method	
Using Device	Using your PC
Save Settings to PC	
Save Settings	Encrypt the configuration file with a password.
Save	
Restore Settings from PC	
Restore Settings	Choose File No file chosen  Open file with password.
Restore	

Save / Restore Settings	
	Select "Using your PC" to save the access point's settings to your local computer.

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



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



## IV-5-4. Factory Default

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

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-5-5. Reboot

Reboot

If the access point malfunctions or is not responding, then it is recommended that

you reboot the device or reset the access point back to its factory default settings (see **IV-5-4**). You can reboot the access point remotely using this feature.

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-6. Operation Mode

Information Network Settings Wireless Settings Management Advanced Operation Mode



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

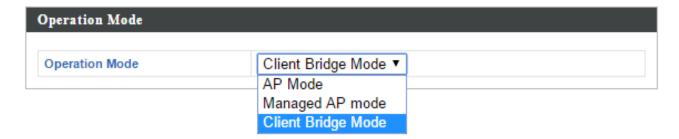
Your access point can function in three different modes.

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

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

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

In **Client Bridge** mode the OAP900 connects wirelessly to an AP's SSID while remaining in the same IP address range as that AP – the WAN and LAN are on the same subnet. This is ideal for last-mile solutions.





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

Operation Mode	AP Mode is a standard access point in a wireless network.  Managed AP mode is an AP which is part of the AP array and is managed by the
	Controller AP.
	Client Bridge mode is ideal for last mile
	solutions.



# V. Appendix

#### **Configuring your IP address** V-1.

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

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

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



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

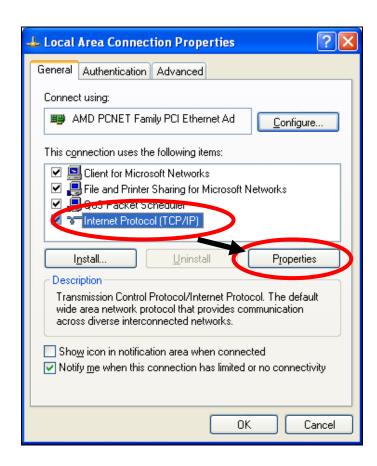


If using a DHCP server on the network, it is advised to use your DHCP server's settings to assign the AP Controller a static IP address.



### V-1-1. Windows XP

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

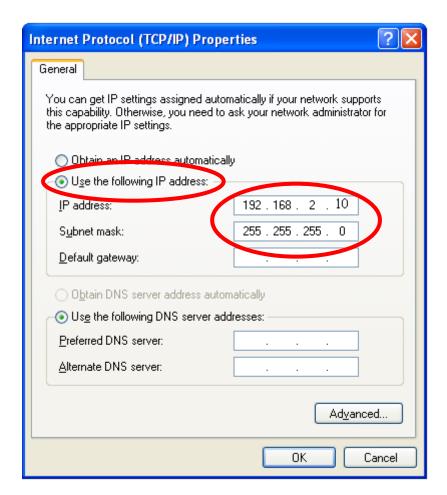


2. Select "Use the following IP address", then input the following values:

IP address: 192.168.2.10 Subnet Mask: 255.255.255.0

Click 'OK' when finished.

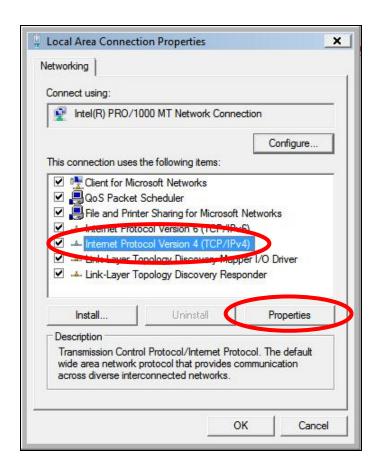






### V-1-2. Windows Vista

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

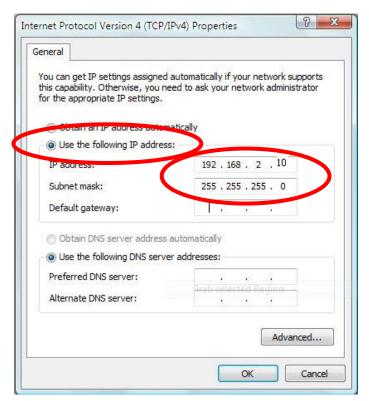


**2.** Select "Use the following IP address", then input the following values:

IP address: 192.168.2.10 Subnet Mask: 255.255.255.0

Click 'OK' when finished.

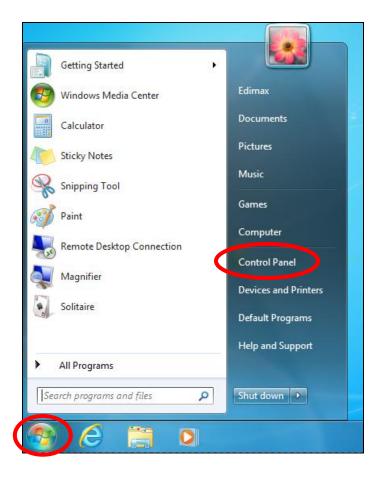






## **V-1-3.** Windows 7

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

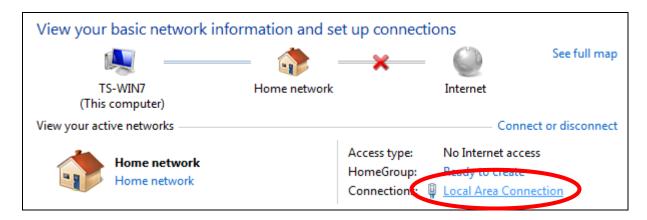


2. Under "Network and Internet" click "View network status and tasks".

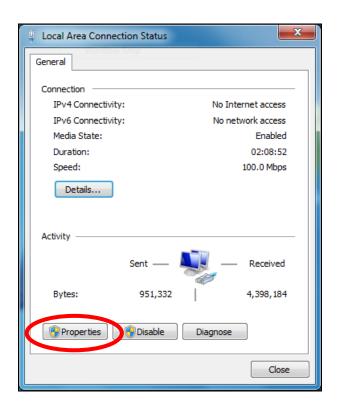


**3.** Click "Local Area Connection".



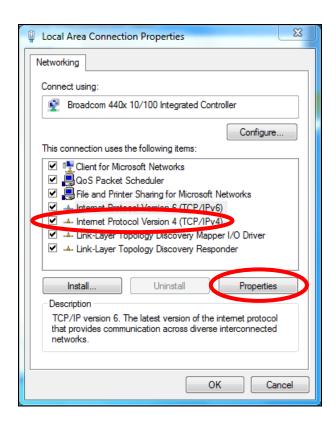


# **4.** Click "Properties".





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



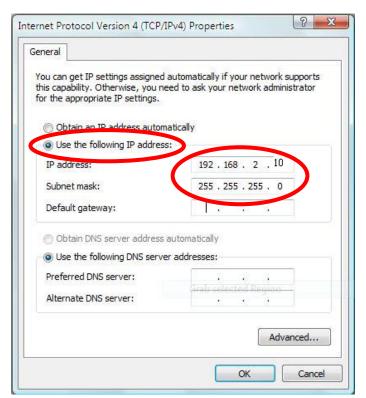
**6.** Select "Use the following IP address", then input the following values:

**IP address**: 192.168.2.10

Subnet Mask: 255.255.255.0

Click 'OK' when finished.

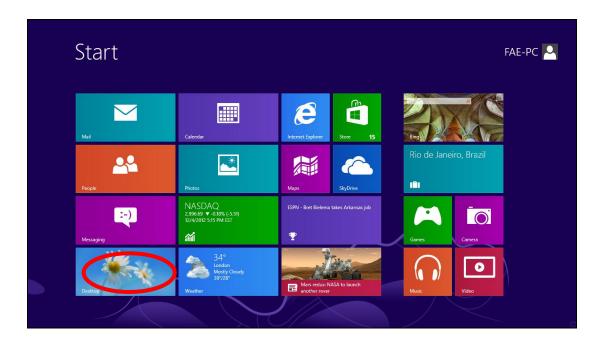




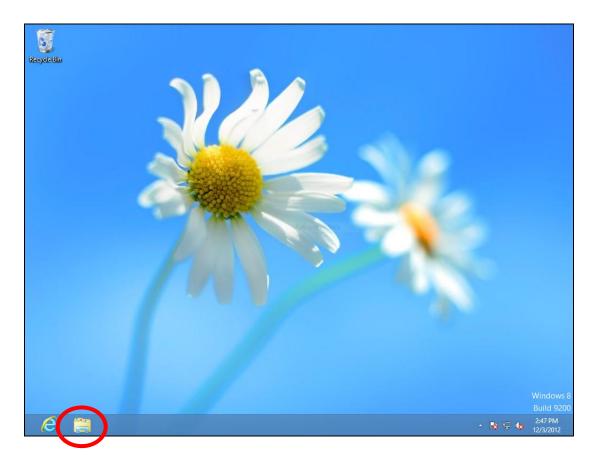


## V-1-4. Windows 8

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

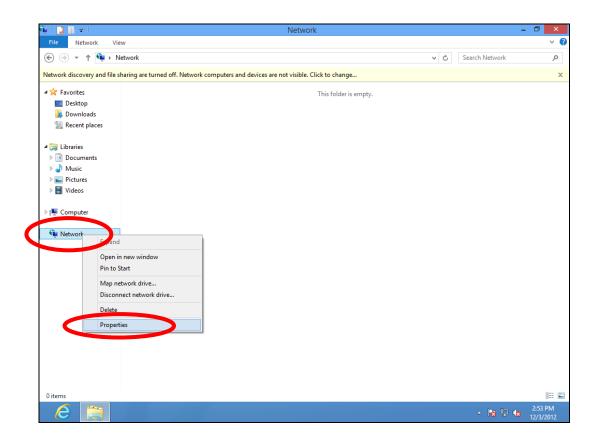


**2.** In desktop mode, click the File Explorer icon in the bottom left of the screen, as shown below.

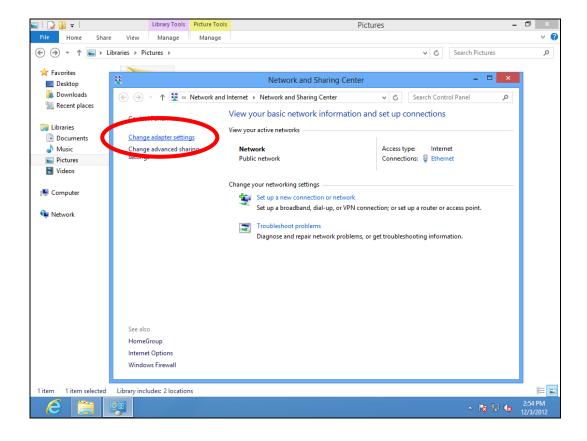




**3.** Right click "Network" and then select "Properties".

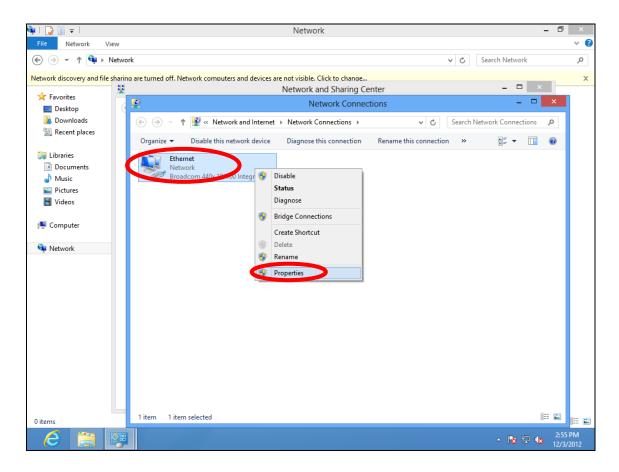


**4.** In the window that opens, select "Change adapter settings" from the left side.

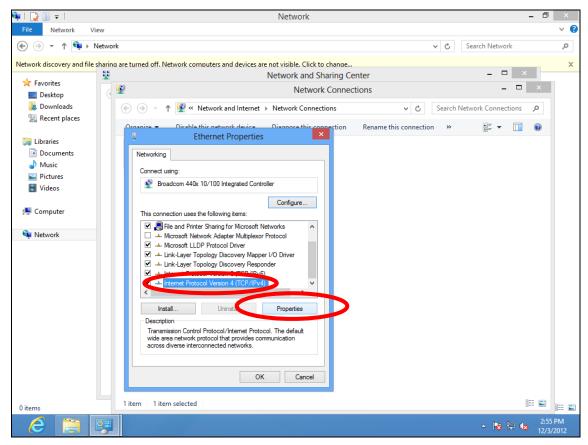




**5.** Choose your connection and right click, then select "Properties".



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





**7.** Select "Use the following IP address", then input the following values:

**IP address**: 192.168.2.10

**Subnet Mask**: 255.255.255.0

Click 'OK' when finished.



## V-1-5. Mac

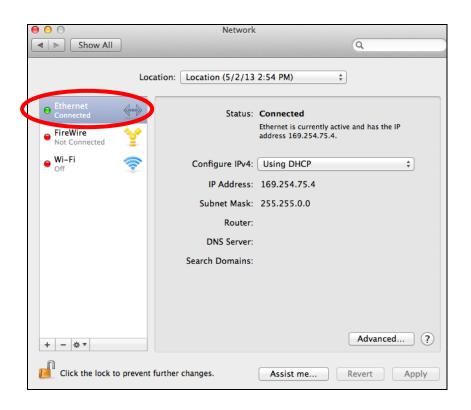
**1.** Have your Macintosh computer operate as usual, and click on "System Preferences"



2. In System Preferences, click on "Network".

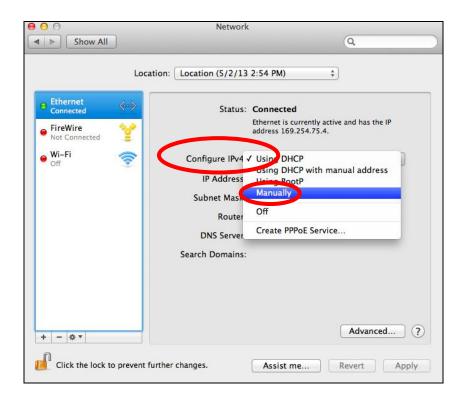


**3.** Click on "Ethernet" in the left panel.

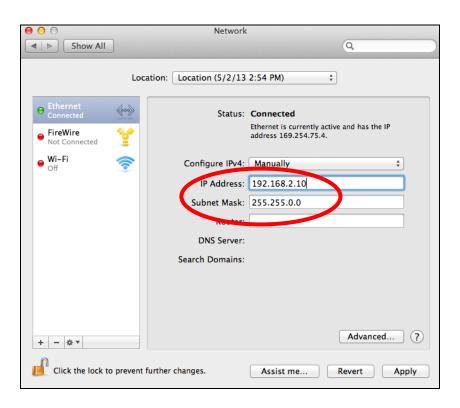


**4.** Open the drop-down menu labeled "Configure IPv4" and select "Manually".





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







#### COPYRIGHT

Copyright © Edimax Technology Co., Ltd. all rights reserved. No part of this publication may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language or computer language, in any form or by any means, electronic, mechanical, magnetic, optical, chemical, manual or otherwise, without the prior written permission from Edimax Technology Co., Ltd.

Edimax Technology Co., Ltd. makes no representations or warranties, either expressed or implied, with respect to the contents hereof and specifically disclaims any warranties, merchantability, or fitness for any particular purpose. Any software described in this manual is sold or licensed as is. Should the programs prove defective following their purchase, the buyer (and not this company, its distributor, or its dealer) assumes the entire cost of all necessary servicing, repair, and any incidental or consequential damages resulting from any defect in the software. Edimax Technology Co., Ltd. reserves the right to revise this publication and to make changes from time to time in the contents hereof without the obligation to notify any person of such revision or changes.

The product you have purchased and the setup screen may appear slightly different from those shown in this QIG. The software and specifications are subject to change without notice. Please visit our website www.edimax.com for updates. All brand and product names mentioned in this manual are trademarks and/or registered trademarks of their respective holders.



### **Federal Communication Commission Interference Statement**

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

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

#### **FCC Caution**

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

### Federal Communications Commission (FCC) Radiation Exposure Statement

This equipment complies with FCC radiation exposure set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 2.5cm (1 inch) during normal operation.

#### Federal Communications Commission (FCC) RF Exposure Requirements

SAR compliance has been established in the laptop computer(s) configurations with PCMCIA slot on the side near the center, as tested in the application for certification, and can be used in laptop computer(s) with substantially similar physical dimensions, construction, and electrical and RF characteristics. Use in other devices such as PDAs or lap pads is not authorized. This transmitter is restricted for use with the specific antenna tested in the application for certification. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

#### **R&TTE Compliance Statement**

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

#### Safety

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

#### **EU Countries Intended for Use**

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

### **EU Countries Not Intended for Use**

None



### **EU Declaration of Conformity**

**English:** This equipment is in compliance with the essential requirements and other relevant

provisions of Directive 1995/5/EC, 2009/125/EC, 2006/95/EC, 2011/65/EC.

Français: Cet équipement est conforme aux exigences essentielles et autres dispositions de la

directive 1995/5/CE, 2009/125/CE, 2006/95/CE, 2011/65/CE.

Čeština: Toto zařízení je v souladu se základními požadavky a ostatními příslušnými ustanoveními

směrnic 1995/5/ES, 2009/125/ES, 2006/95/ES, 2011/65/ES.

Polski: Urządzenie jest zgodne z ogólnymi wymaganiami oraz szczególnymi warunkami

określonymi Dyrektywą UE 1995/5/EC, 2009/125/EC, 2006/95/EC, 2011/65/EC...

Română: Acest echipament este în conformitate cu cerințele esențiale și alte prevederi relevante ale

Directivei 1995/5/CE, 2009/125/CE, 2006/95/CE, 2011/65/CE.

Русский: Это оборудование соответствует основным требованиям и положениям Директивы

1995/5/EC, 2009/125/EC, 2006/95/EC, 2011/65/EC.

Magyar: Ez a berendezés megfelel az alapvető követelményeknek és más vonatkozó irányelveknek

(1995/5/EK, 2009/125/EK, 2006/95/EK, 2011/65/EK).

Türkçe: Bu cihaz 1995/5/EC, 2009/125/EC, 2006/95/EC, 2011/65/EC direktifleri zorunlu istekler ve

diğer hükümlerle ile uyumludur.

Українська: Обладнання відповідає вимогам і умовам директиви 1995/5/ЕС, 2009/125/ЕС,

2006/95/EC, 2011/65/EC.

Slovenčina: Toto zariadenie spĺňa základné požiadavky a ďalšie príslušné ustanovenia smerníc

1995/5/ES, 2009/125/ES, 2006/95/ES, 2011/65/ES.

Deutsch: Dieses Gerät erfüllt die Voraussetzungen gemäß den Richtlinien 1995/5/EC, 2009/125/EC,

2006/95/EC, 2011/65/EC.

El presente equipo cumple los requisitos esenciales de la Directiva 1995/5/EC, **Español:** 

2009/125/EC, 2006/95/EC, 2011/65/EC.

Questo apparecchio è conforme ai requisiti essenziali e alle altre disposizioni applicabili Italiano:

della Direttiva 1995/5/CE, 2009/125/CE, 2006/95/CE, 2011/65/CE.

Nederlands: Dit apparaat voldoet aan de essentiële eisen en andere van toepassing zijnde bepalingen

van richtlijn 1995/5/EC, 2009/125/EC, 2006/95/EC, 2011/65/EC...

Português: Este equipamento cumpre os requesitos essênciais da Directiva 1995/5/EC, 2009/125/EC,

2006/95/EC, 2011/65/EC.

Norsk: Dette utstyret er i samsvar med de viktigste kravene og andre relevante regler i Direktiv

1995/5/EC, 2009/125/EC, 2006/95/EC, 2011/65/EC.

Denna utrustning är i överensstämmelse med de väsentliga kraven och övriga relevanta Svenska:

bestämmelser i direktiv 1995/5/EG, 2009/125/EG, 2006/95/EG, 2011/65/EG.

Dansk: Dette udstyr er i overensstemmelse med de væsentligste krav og andre relevante

forordninger i direktiv 1995/5/EC, 2009/125/EC, 2006/95/EC, 2011/65/EC.

suomen kieli: Tämä laite täyttää direktiivien 1995/5/EY, 2009/125/EY, 2006/95/EY, 2011/65/EY

oleelliset vaatimukset ja muut asiaankuuluvat määräykset.





#### WEEE Directive & Product Disposal



At the end of its serviceable life, this product should not be treated as household or general waste. It should be handed over to the applicable collection point for the recycling of electrical and electronic equipment, or returned to the supplier for disposal.



# **Declaration of Conformity**

We, Edimax Technology Co., Ltd., declare under our sole responsibility, that the equipment described below complies with the requirements of the European R&TTE directives.

**Equipment: Outdoor Access Point** 

Model No.: OAP900

The following European standards for essential requirements have been followed:

Directives 2014/53/EU

Spectrum : ETSI EN 300 328 V1.9.1 (2015-02);

ETSI EN 301 893 V1.8.1(2015-03)

EMC : EN 301 489-1 V1.9.2 (2011-09);

EN301 489-17 V2.2.1(2012-09);

EN 55022:2010/AC:2011

EN 55024:2010

Safety (LVD) : IEC 60950-1:2005 (2nd Edition)+Am 1:2009+Am 2:2013

EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013

Recommendation 2014/53/EU

EMF : EN 62311:2008

Directives 2006/95/EC; 2014/35/EU

Safety (LVD) : IEC 60950-1:2005 (2<sup>nd</sup> Edition);Am 1:2009+Am2:2013

EN 60950-1:2006+A11+A:2010+A12:20+A2:2013

Edimax Technology Co., Ltd.
No. 3, Wu Chuan 3<sup>rd</sup> Road,
Wu-Ku Industrial Park,

New Taipei City, Taiwan

Date of Signature: Jun, 2016
Signature:

Printed Name: Albert Chang

Title: Director

Edimax Technology Co., Ltd.

97



#### Notice According to GNU General Public License Version 2

This product includes software that is subject to the GNU General Public License version 2. The program is free software and distributed without any warranty of the author. We offer, valid for at least three years, to give you, for a charge no more than the costs of physically performing source distribution, a complete machine-readable copy of the corresponding source code.

Das Produkt beinhaltet Software, die den Bedingungen der GNU/GPL-Version 2 unterliegt. Das Programm ist eine sog. "Free Software", der Autor stellt das Programm ohne irgendeine Gewährleistungen zur Verfügung. Wir bieten Ihnen für einen Zeitraum von drei Jahren an, eine vollständige maschinenlesbare Kopie des Quelltextes der Programme zur Verfügung zu stellen – zu nicht höheren Kosten als denen, die durch den physikalischen Kopiervorgang anfallen.

#### **GNU GENERAL PUBLIC LICENSE**

Version 2, June 1991

Copyright (C) 1989, 1991 Free Software Foundation, Inc. 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301, USA Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

#### **Preamble**

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change free software—to make sure the software is free for all its users. This General Public License applies to most of the Free Software Foundation's software and to any other program whose authors commit to using it. (Some other Free Software Foundation software is covered by the GNU Lesser General Public License instead.) You can apply it to your programs, too.

When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things.

To protect your rights, we need to make restrictions that forbid anyone to deny you these rights or to ask you to surrender the rights. These restrictions translate to certain responsibilities for you if you distribute copies of the software, or if you modify it.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must give the recipients all the rights that you have. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights.

We protect your rights with two steps: (1) copyright the software, and (2) offer you this license which gives you legal permission to copy, distribute and/or modify the software.

Also, for each author's protection and ours, we want to make certain that everyone understands that there is no warranty for this free software. If the software is modified by someone else and passed on, we want its recipients to know that what they have is not the original, so that any problems introduced by others will not reflect on the original authors' reputations.

Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that redistributors of a free program will individually obtain patent licenses, in effect making the program proprietary. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all.

The precise terms and conditions for copying, distribution and modification follow.

### TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License applies to any program or other work which contains a notice placed by the copyright holder saying it may be distributed under the terms of this General Public License. The "Program", below, refers to any such program or work, and a "work based on the Program" means either the Program or any derivative work under copyright law: that is to say, a work containing the Program or a portion of it, either verbatim or with modifications and/or translated into another language. (Hereinafter, translation is included without limitation in the term "modification".) Each licensee is addressed as "you".

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running the Program is not restricted, and the output from the Program is covered only if its contents constitute a



work based on the Program (independent of having been made by running the Program). Whether that is true depends on what the Program does.

1. You may copy and distribute verbatim copies of the Program's source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and give any other recipients of the Program a copy of this License along with the Program.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

- 2. You may modify your copy or copies of the Program or any portion of it, thus forming a work based on the Program, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:
  - a) You must cause the modified files to carry prominent notices stating that you changed the files and the date of any change.
  - b) You must cause any work that you distribute or publish, that in whole or in part contains or is derived from the Program or any part thereof, to be licensed as a whole at no charge to all third parties under the terms of this license
  - c) If the modified program normally reads commands interactively when run, you must cause it, when started running for such interactive use in the most ordinary way, to print or display an announcement including an appropriate copyright notice and a notice that there is no warranty (or else, saying that you provide a warranty) and that users may redistribute the program under these conditions, and telling the user how to view a copy of this License. (Exception: if the Program itself is interactive but does not normally print such an announcement, your work based on the Program is not required to print an announcement.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Program, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Program, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Program.

In addition, mere aggregation of another work not based on the Program with the Program (or with a work based on the Program) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

- 3. You may copy and distribute the Program (or a work based on it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you also do one of the following:
  - a) Accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,
  - b) Accompany it with a written offer, valid for at least three years, to give any third party, for a charge no more than your cost of physically performing source distribution, a complete machine-readable copy of the corresponding source code, to be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,
  - c) Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.)

The source code for a work means the preferred form of the work for making modifications to it. For an executable work, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the executable. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

If distribution of executable or object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place counts as distribution of the source code, even though third parties are not compelled to copy the source along with the object code.

4. You may not copy, modify, sublicense, or distribute the Program except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense or distribute the Program is void, and will automatically terminate your rights



under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

- 5. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Program or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Program (or any work based on the Program), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Program or works based on it.
- 6. Each time you redistribute the Program (or any work based on the Program), the recipient automatically receives a license from the original licensor to copy, distribute or modify the Program subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties to this License.
- 7. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Program at all. For example, if a patent license would not permit royalty-free redistribution of the Program by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Program.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system, which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

- 8. If the distribution and/or use of the Program is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Program under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.
- 9. The Free Software Foundation may publish revised and/or new versions of the General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Program specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of this License, you may choose any version ever published by the Free Software Foundation.

10. If you wish to incorporate parts of the Program into other free programs whose distribution conditions are different, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

#### **NO WARRANTY**

- 11. BECAUSE THE PROGRAM IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.
- 12. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

