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User Guide

Wireless Access Point - AP375

IP-COM
World Wide Wireless

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Preface

Thank you for choosing IP-COM! Please read this user guide before you start with AP255.

Conventions

The typographical elements that may be found in this document are defined as follows.

Item	Presentation	Example
Cascading menus	>	**System** > **Live Users**
Parameter and value	Bold	Set **User Name** to **Tom**.
Variable	Italic	Format: *XX*:*XX*:*XX*:*XX*:*XX*:*XX*
UI control	Bold	On the **Policy** page, click the **OK** button.

The symbols that may be found in this document are defined as follows.

Symbol	Meaning
	This format is used to highlight information of importance or special interest. Ignoring this type of note may result in ineffective configurations, loss of data or damage to device.
	This format is used to highlight a procedure that will save time or resources.

Acronyms and Abbreviations

Acronym or Abbreviation	Full Spelling
AP	Access Point
DDNS	Dynamic Domain Name System
DHCP	Dynamic Host Configuration Protocol
DLNA	Digital Living Network Alliance
DMZ	Demilitarized Zone
DNS	Domain Name System
IPTV	Internet Protocol Television
ISP	Internet Service Provider
L2TP	Layer 2 Tunneling Protocol
MPPE	Microsoft Point-to-Point Encryption
PPP	Point To Point Protocol
PPPoE	Point-to-Point Protocol over Ethernet
PPTP	Point to Point Tunneling Protocol
SSID	Service Set Identifier

Acronym or Abbreviation	Full Spelling
STB	Set Top Box
URL	Uniform Resource Locator
VLAN	Virtual Local Area Network
VPN	Virtual Private Network
WISP	Wireless Internet Service Provider
WPS	WiFi Protected Setup

Additional Information

For more information, search this product model on our website at http://www.ip-com.com.cn.

Technical Support

If you need more help, contact us by any of the following means. We will be glad to assist you as soon as possible.



+86-755-27653089	info@ip-com.com.cn	http://www.ip-com.com.cn

Contents

1 Product Overview

1.1 Introduction

AP375 provides three radio frequency (RF) bands, including one 2.4 GHz band, one 5 GHz band, and one band that be changed between 2.4 GHz and 5 GHz. These bands together offer a total wireless data rate of up to 2100 Mbps.

AP375 also supports IEEE 802.3at PoE power supplies and can be managed using its own web UI or an IP-COM AP controller. It can be mounted onto ceiling, making it perfect for wireless coverage in crowded areas such as meeting rooms, classrooms, exhibition centers.

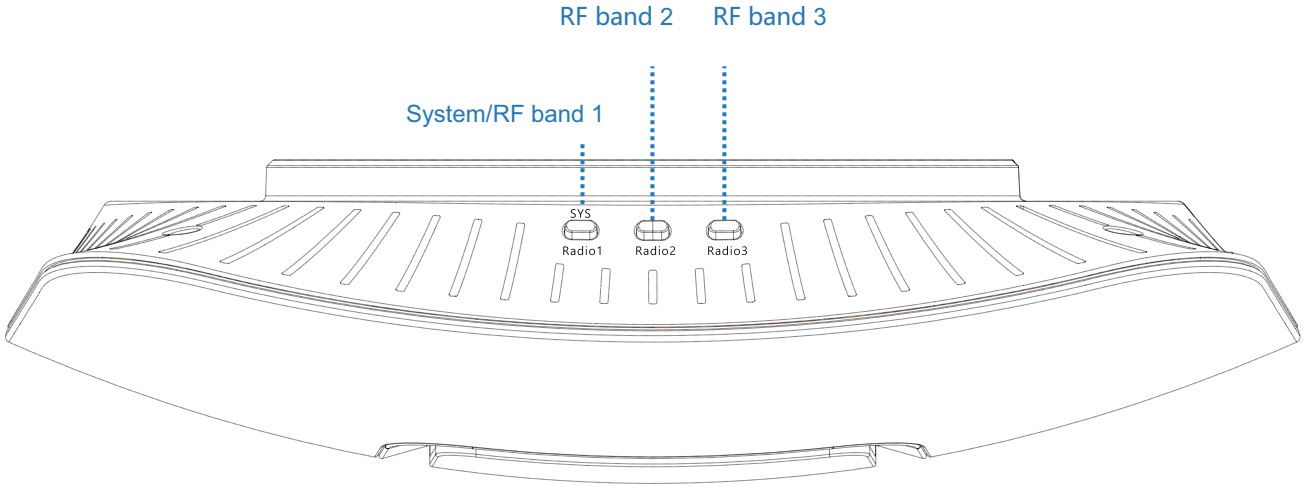
1.2 Features

- Radio 1: 2.4 GHz 300 Mbps
- Radio 2: 5 GHz 867 Mbps
- Radio 3: 2.4 GHz 300 Mbps or 5 GHz 867 Mbps
- Maximum number of users: 384; recommended number of users: 120
- Ceiling-mounted or wall-mounted
- Support PoE 802.3at power supply
- Gigabit LAN ports x 2
- Manageable with IP-COM AP controller AC1000/AC2000/AC3000

1.3 Appearance

This section describes the button, LED indicators, ports, and label of the AP.

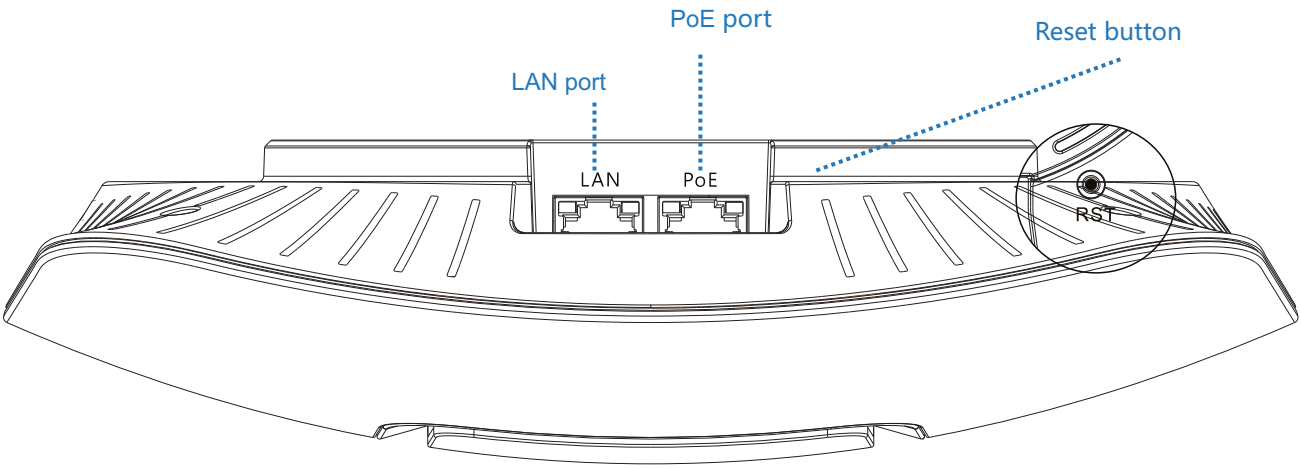
1.3.1 LED Indicators



The following describes the LED indicator states of the AP that has been powered on.

Print	LED Indicator	Description	
SYS Radio1	System/RF band 1 LED indicator	Solid on in orange	The system is booting.
		Solid on in green	RF band 1 is enabled.
		Blinking in green	RF band 1 is transmitting or receiving data.
		Off	The power supply is faulty, RF band 1 is disabled, the LED indicator has been turned off, or the AP is faulty.
Radio2 and Radio3	RF band 2 LED indicator RF band 3 LED indicator	Solid on in green	RF band 2/3 is enabled.
		Blinking in green	RF band 2/3 is transmitting of receiving data.
		Off	RF band 2/3 is disabled, or the LED indictor has been turned off.

1.3.2 Ports and Button



PoE port

This 10/100/1000 Mbps auto-negotiation port is used to connect to a PoE power supply and exchange data. To supply power to the AP, use an Ethernet cable to connect the AP to an injector or a PoE switch compliant with the IEEE 802.3at standard.

LAN port

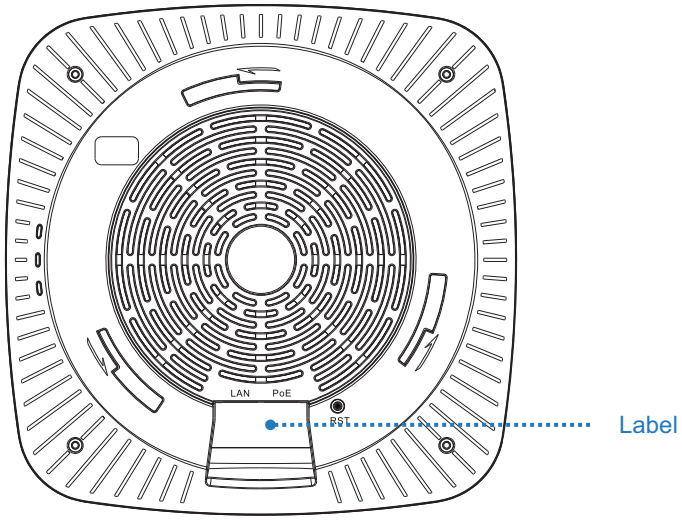
This 10/100/1000 Mbps auto-negotiation port is used to connect to switches, computers and other devices.

Reset button

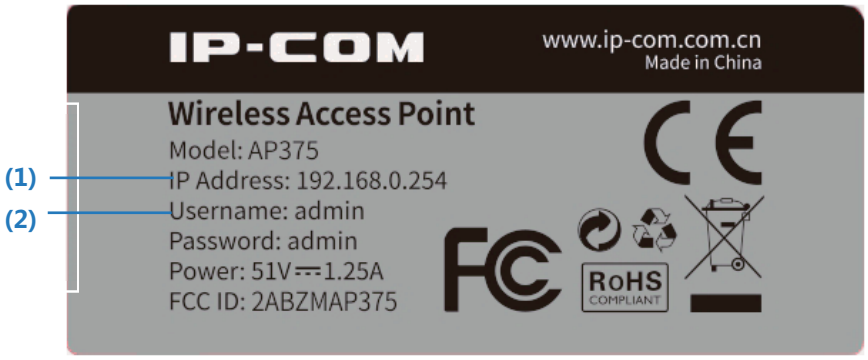
After the AP is powered on, you can hold down this button for 7 seconds to restore the factory settings.

1.3.3 Label

It is attached to the rear panel of the AP. The following figure shows its position.



The label is described as follows:



- (1): Default IP address of the AP. You can use this IP address to log in to the web UI of the AP.
- (2): Default user name and password of the web UI of the AP.

2 Managing the AP

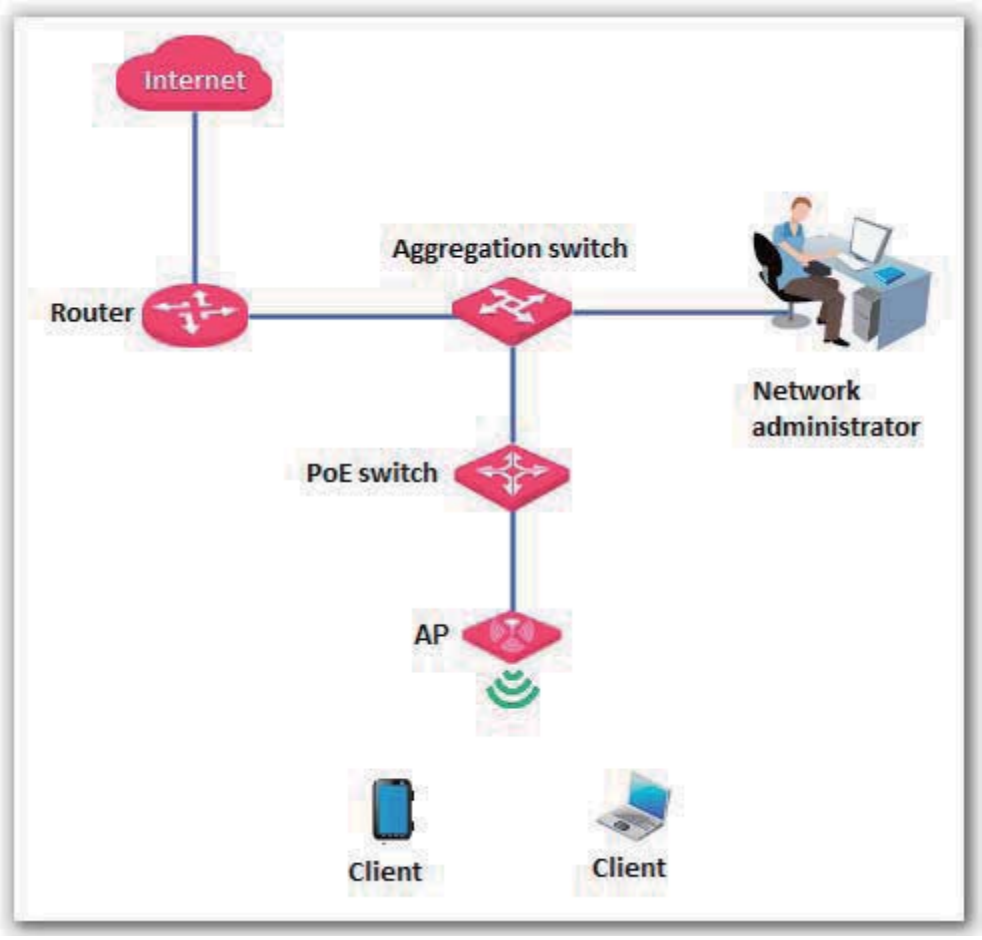
The AP can be managed using the web UI of the AP or an IP-COM AP controller (AC1000/AC2000/AC3000).

- Managing the AP using an AP controller

Refer to Section 10 "Deployment Mode." For details about how to manage the AP using an AP controller, refer to the user guide for the AP controller available at www.ip-com.com.cn.

- Managing the AP using the web UI of the AP

If you need to install only a small number of APs, connect the APs using the following topology and log in to the web UI of each AP to manage the APs.



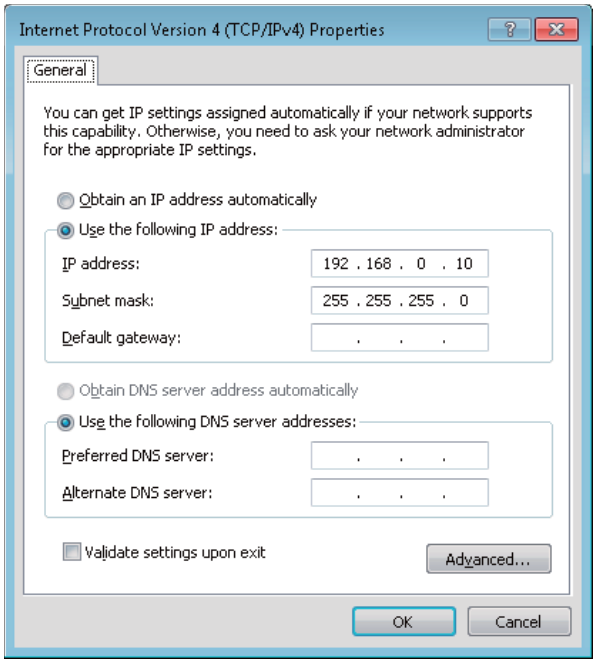
The following sections describe how to manage the AP using the web UI of the AP.

3 Login

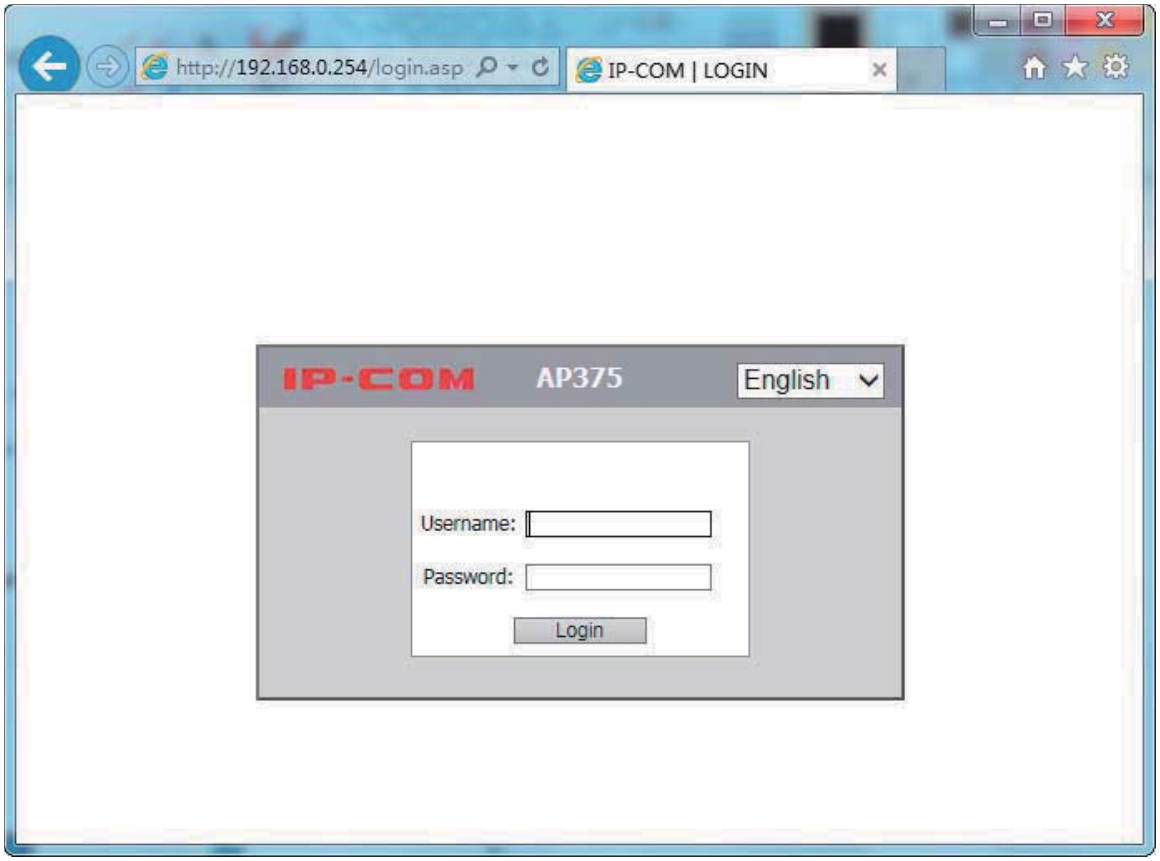
3.1 Logging in to the Web UI of the AP

You can log in to the web UI of the AP using a web browser. The procedure is as follows:

1. Use an Ethernet cable to connect the management computer to the AP or the switch connected to the AP.
2. Set **IP address** of your local area connection to **192.168.0.*X*** (*X*: 2 - 253) and **Subnet mask** to **255.255.255.0**.



3. Start a web browser on the computer, enter the management IP address of the AP (default: 192.168.0.254) in the address bar, and press **Enter**.
4. Enter the user name and password of the AP (default user name and password: **admin**) and click **Login**.



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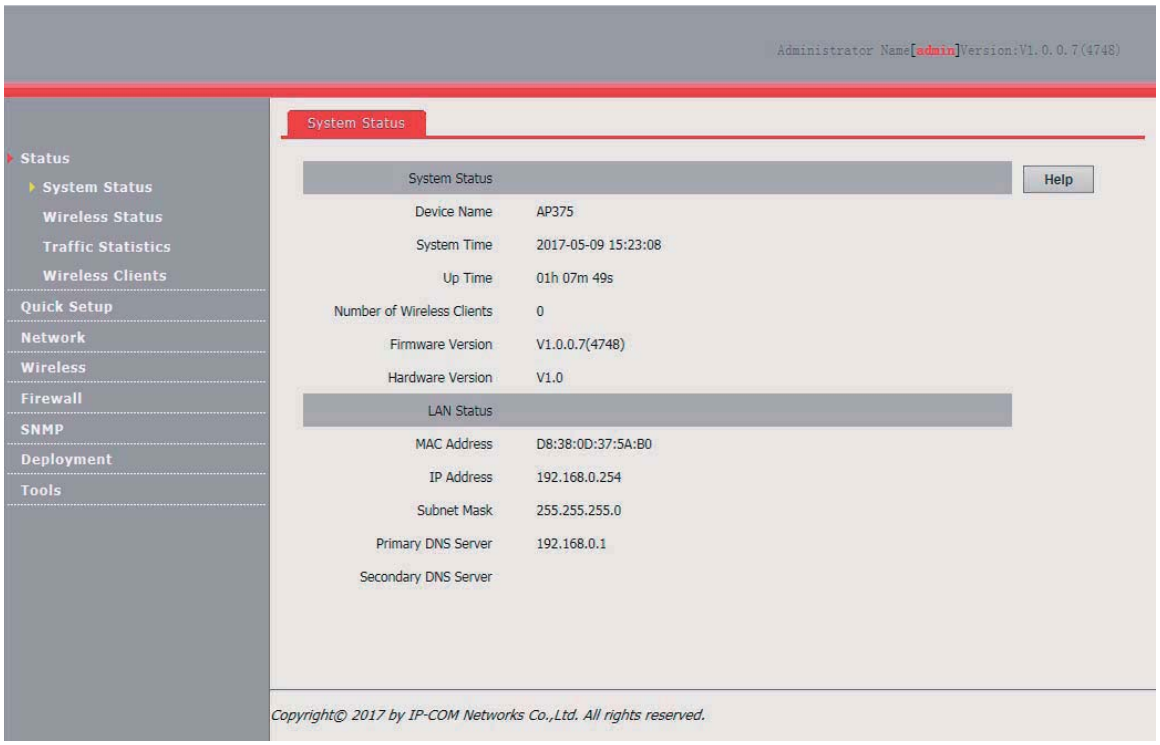
Note

If this page is not displayed, refer to **Q1** in **FAQ**.

You can now start configuring the AP.

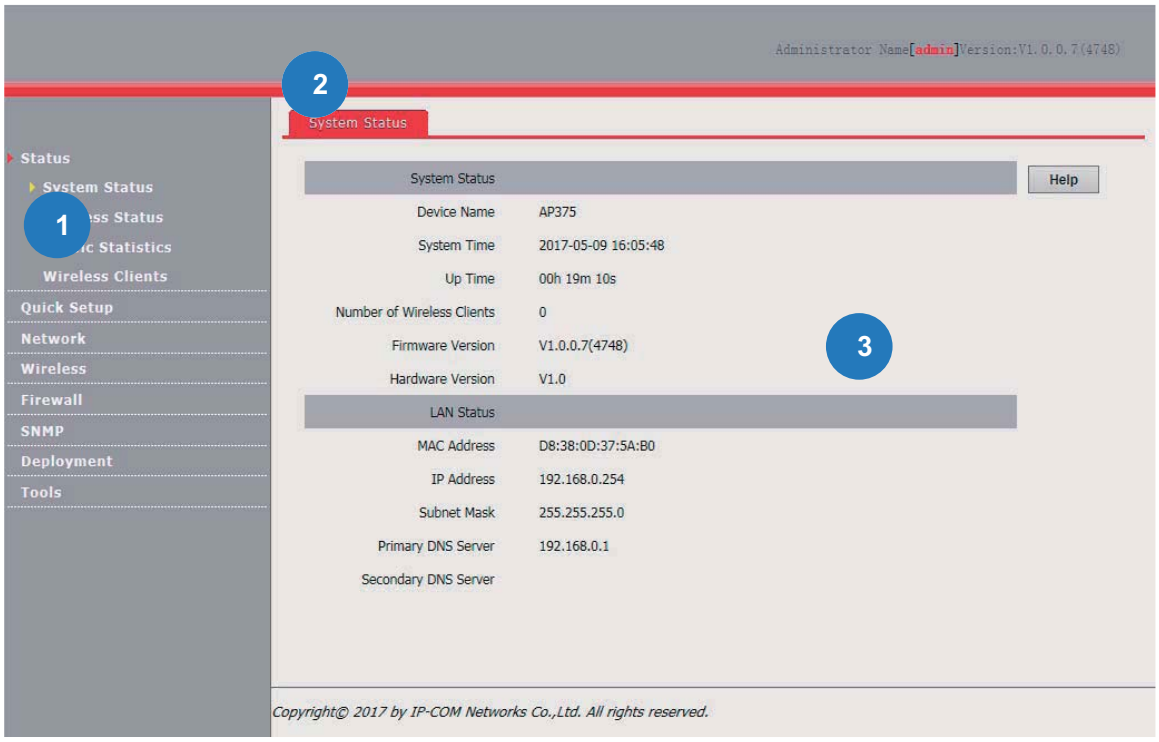


3.2 Logging Out of the Web UI of the AP

If you log in to the web UI of the AP and perform no operation within the login timeout interval, the AP logs you out. When you close the web browser, the system logs you out as well.

3.3 Web UI Layout

The web UI of the AP is composed of three parts, including the 2-level navigation tree, tab page area, and configuration area. See the following figure.



Note

The functions and parameters dimmed on the web UI indicates that they are not supported by the AP or cannot be changed in the current configuration.

No.	Name	Description
1	Level-1 and level-2 navigation bar	The navigation bar displays the function menu of the AP. When you select a function in the navigation bar, the configuration of the function appears in the configuration area.
2	Tab page area	
3	Configuration area	It enables you to view and modify configuration.

3.4 Common Buttons

The following table describes the common buttons available on the web UI of the AP.

Button	Description
Refresh	It is used to update the content of the current page.
Save	It is used to save the configuration on the current page and enable the configuration to take effect.
Restore	It is used to change the current configuration on the current page back to the original configuration.
Help	It is used to view help information corresponding to the settings on the current page.

4 Quick Setup

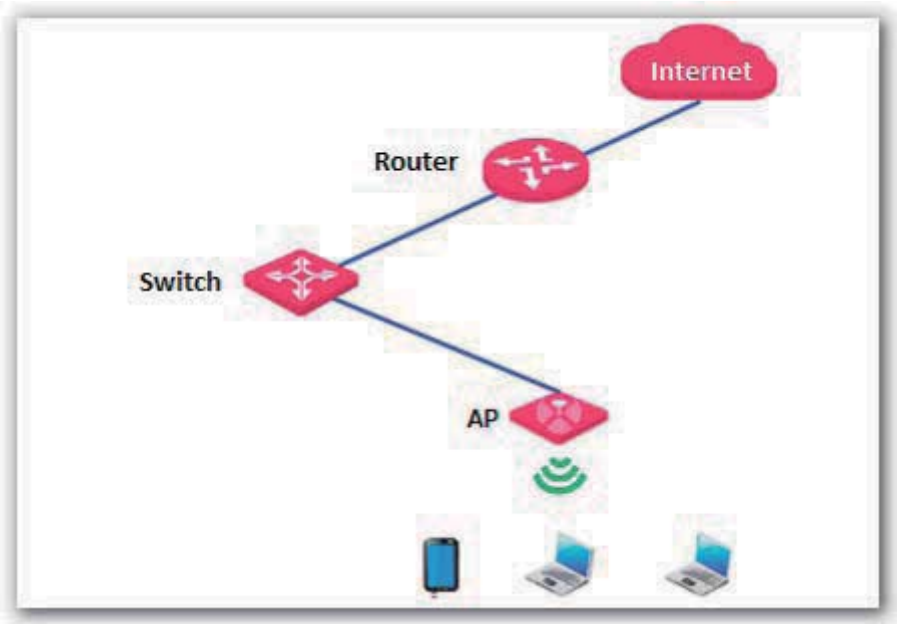
4.1 Overview

This module enables you to quickly configure the AP so that wireless devices such as smart phones and pads can access the internet through the wireless network of the AP.

This AP can work in AP or AP+Client mode.

- AP mode

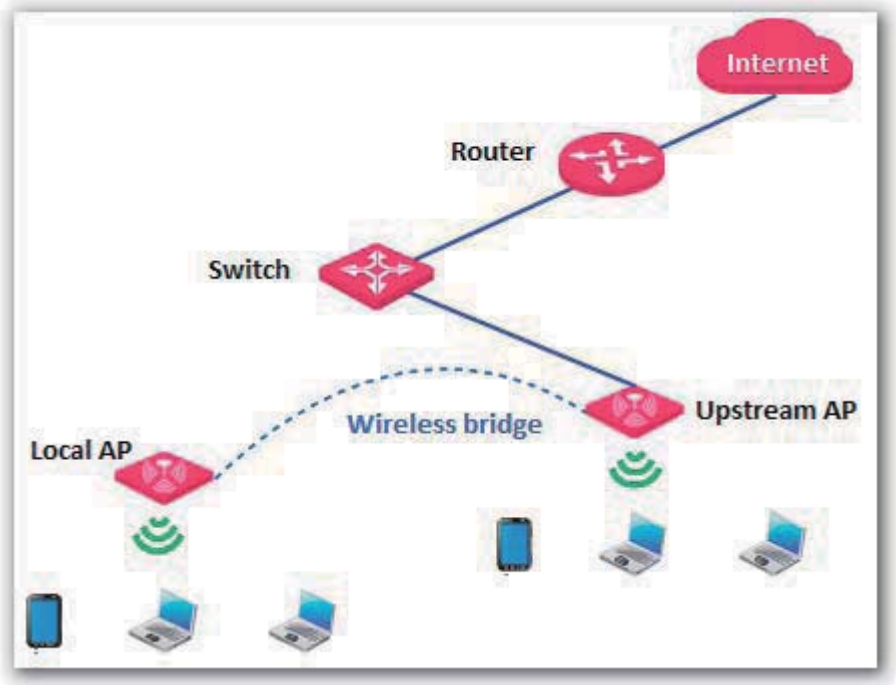
By default, the AP works in this mode. In this mode, the AP connects to the internet using an Ethernet cable and converts wired signals into wireless signals to provide wireless network coverage. See the following topology.



- AP+Client mode

In this mode, the AP is wirelessly bridged to an upstream device (such as a wireless router or AP) to extend the wireless network coverage of the upstream device.

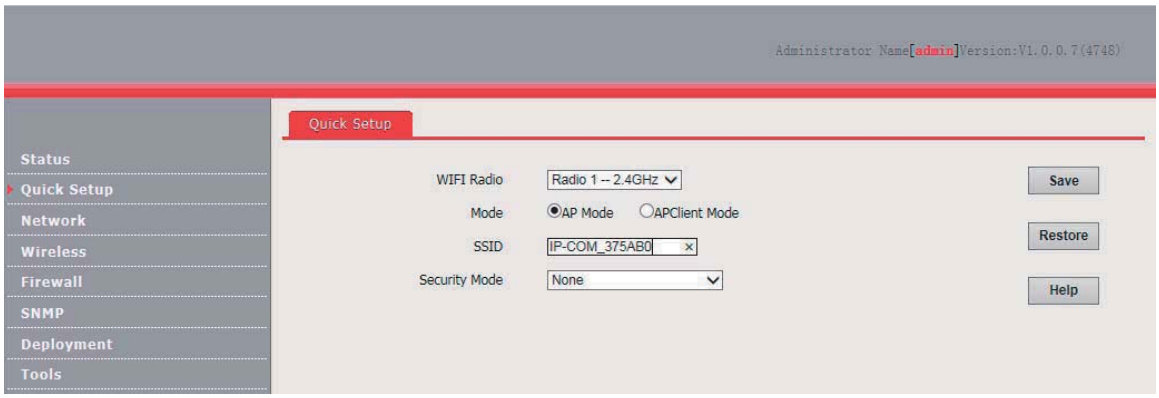
See the following topology.



4.2 Quick Setup

4.2.1 AP Mode

1. Choose **Quick Setup**.
2. Set **WIFI Radio** to the RF band you want to set, such as **Radio 1 – 2.4 GHz**.
3. Set **Mode** to **AP Mode**.
4. Change the primary SSID of the selected RF band in the **SSID** text box.
5. Select a security mode from the **Security Mode** drop-down list box and set the corresponding parameters.
6. Click **Save**.



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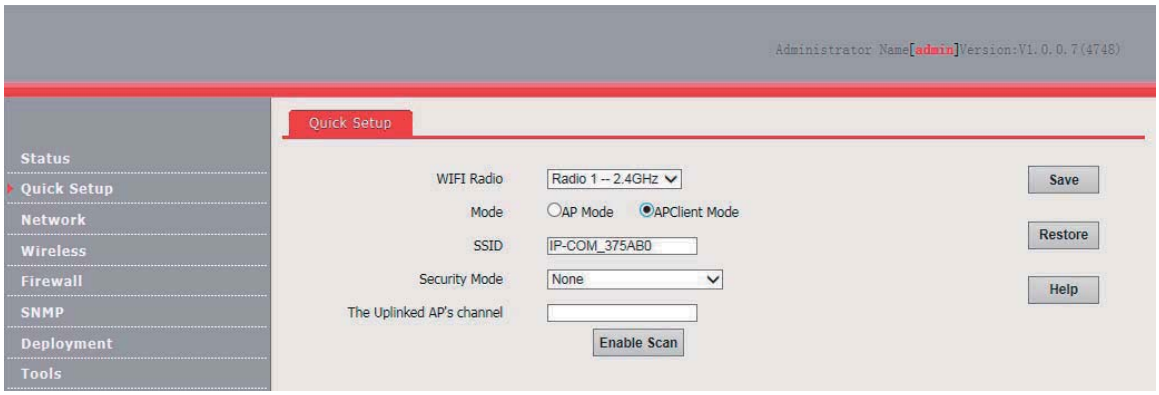
Parameter description

Parameter	Description
WIFI Radio	It specifies the RF band to be configured. This AP provide three RF bands. RF band 1 is a 2.4GHz band, RF band 2 is a 5 GHz band, whereas RF band 3 is a 2.4 GHz or 5 GHz band.
Mode	It specifies the working mode of the AP, including the AP mode and AP+Client mode.
SSID	It enables you to change the primary SSID of the selected RF band.
Security Mode	It specifies the security mode corresponding to the SSID. The options include: None, WEP, WPA-PSK, WPA2-PSK, Mixed WPA/WPA2-PSK, WPA, and WPA2. The option None allows any wireless clients to connect to the AP. This option is not recommended because it affects network security.

After the configuration, you can select the SSID on your wireless devices such as smart phones and enter your wireless network password to connect to the wireless network of the AP and access the internet through the AP.

4.2.2 AP+Client Mode

1. Choose **Quick Setup**.
2. Set **WIFI Radio** to the RF band you want to set, such as **Radio 1 – 2.4 GHz**.
3. Set **Mode** to **APClient Mode**.
4. Click **Enable Scan**.

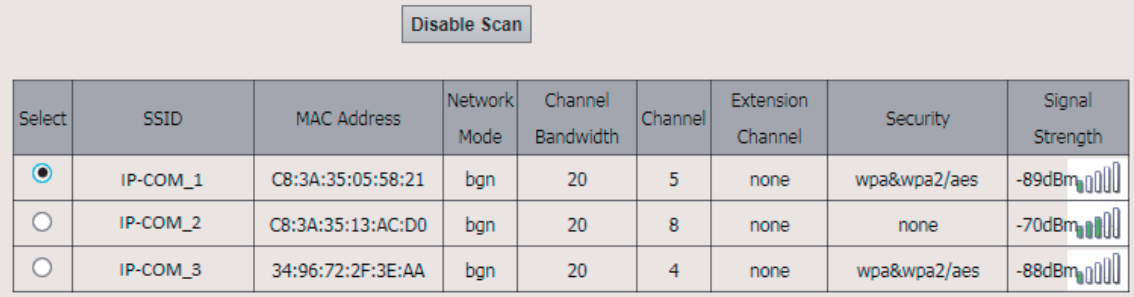


5. Select the wireless network to be extended from the wireless network list that appears.

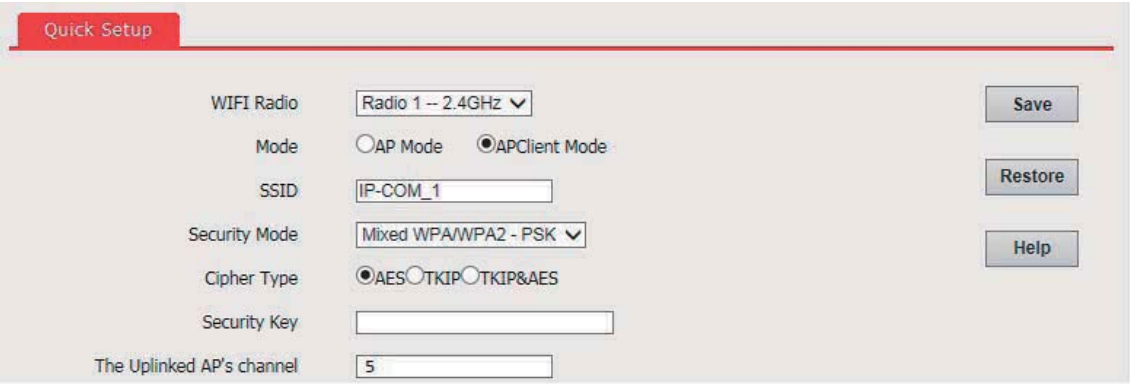
Note

- If no wireless network is found, ensure that the selected RF band is enabled, and try scanning wireless networks again.
- After a wireless network to be extended is selected, the AP identifies the SSID, security mode, and channel of the wireless network and enters them on the page. The other parameters including **Security Key**, **RADIUS Server**, **RADIUS Port**, and **RADIUS Password** must be entered manually.

6. Click **Disable Scan**.



7. If the wireless network of the upstream device is encrypted, set **Security Key** to the wireless network password of the device or set **RADIUS Server**, **RADIUS Port**, and **RADIUS Password** to the IP address, port number, and password of the RADIUS server.
8. Click **Save**.



---End

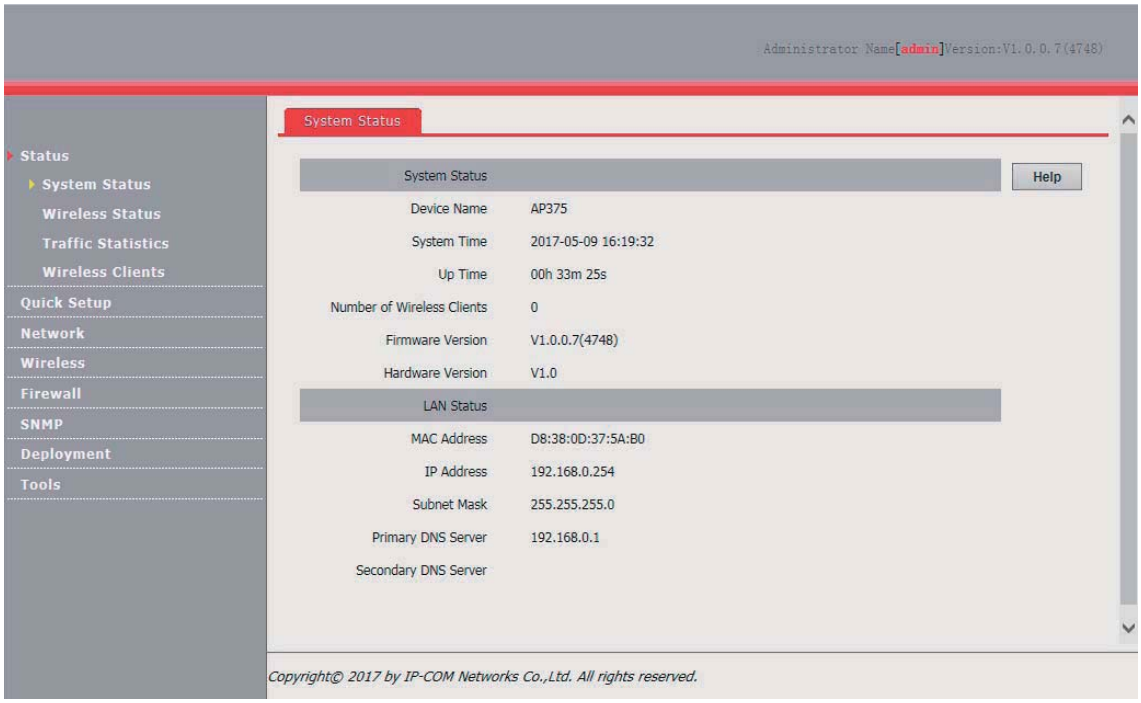
After the configuration, you can select the SSID on your wireless devices such as smart phones and enter your wireless network password to connect to the wireless network of the AP and access the internet through the AP. If you do not know the SSID of the AP, go to the **Wireless** > **SSID Setup** page.

5 Status

5.1 System Status

The access the page, choose **Status** > **System Status**.

The page displays the system and LAN port status of the AP.



Parameter description

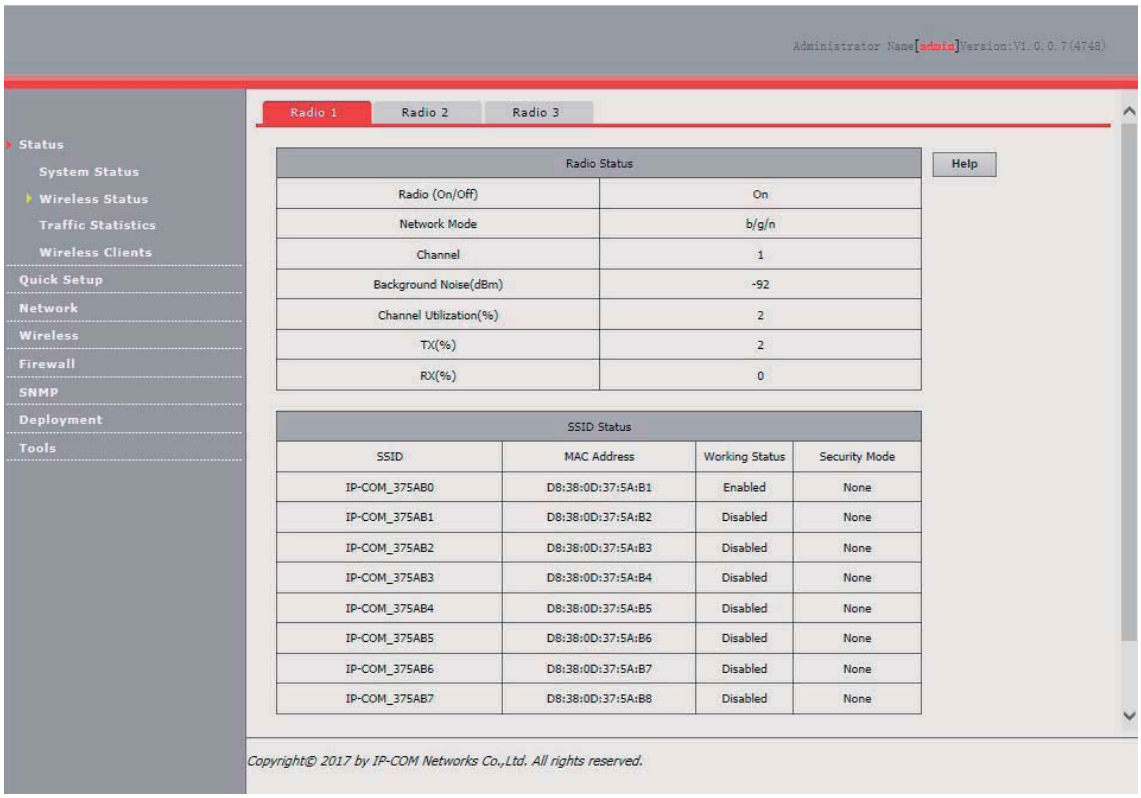
Parameter	Description
Device Name	It specifies the name of the AP. You can change the AP name on the **Network** > **LAN Setup** page or on the **SNMP** page.
System Time	It specifies the current system time of the AP.
Up Time	It specifies the time that has elapsed since the AP was started last time.
Number of Wireless Clients	It specifies the number of wireless clients currently connected to the AP.
Firmware Version	It specifies the firmware version number of the AP.
Hardware Version	It specifies the hardware version number of the AP.
MAC Address	It specifies the physical address of the LAN port of the AP.

Parameter	Description
IP Address	It specifies the IP address of the AP. The web UI of the AP is accessible at this IP address.
Subnet Mask	It specifies the subnet mask of the IP address of the AP.
Primary DNS Server	It specifies the primary DNS server of the AP. If it is blank, the AP does not have a primary DNS server.
Secondary DNS Server	It specifies the secondary DNS server of the it is blank, the AP does not have a secondary DNS server.

5.2 Wireless Status

The access the page, choose **Status** > **Wireless Status**.

This page displays general RF status and SSID status of the AP. By default, the page displays the RF status of RF band 1. To view the RF status of RF bands 2 and 3, click the corresponding tabs.



Parameter description

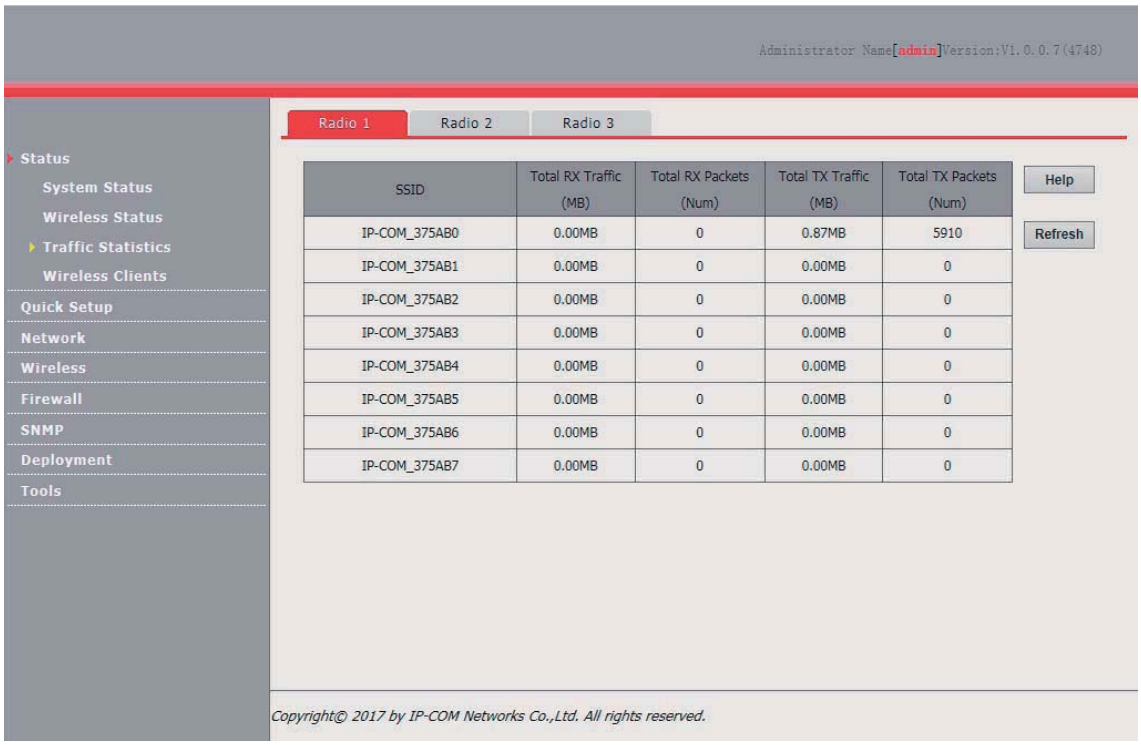
Parameter		Description
Radio Status	Radio (On/Off)	It specifies whether the wireless network corresponding to the RF band is enabled.
	Network Mode	It specifies the network mode of the wireless network.
	Channel	It specifies the current working channel of the wireless network.
	Background Noise (dBm)	It specifies the strength of nearby interference radio signals on the current working channel.

Parameter		Description
	Channel Utilization (%)	It specifies the air interface usage of the current working channel.
	TX (%)	It specifies the proportion of AP-transmitted packets in the current working channel usage.
	RX (%)	It specifies the proportion of AP-received packets in the current working channel usage.
SSID Status	SSID	It specifies all the SSIDs corresponding to the RF band.
	MAC Address	It specifies the physical addresses corresponding to the SSIDs.
	Working Status	It specifies whether an SSID is enabled.
	Security Mode	It specifies the security modes corresponding to SSIDs.

5.3 Traffic Statistics

The access the page, choose **Status** > **Traffic Statistics**.

This page displays the statistics about historical packets of the AP by RF band.

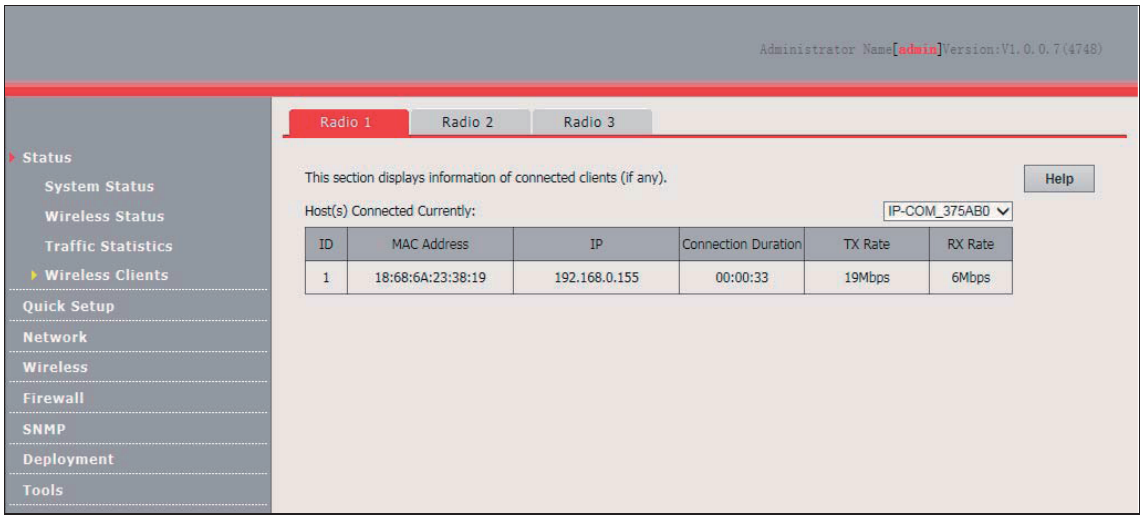


By default, the page displays the traffic statistics for RF band 1. To view the traffic statistics for RF bands 2 and 3, click the corresponding tabs. To view the latest statistics, click **Refresh**.

5.4 Wireless Clients

The access the page, choose **Status** > **Wireless Clients**.

This page displays information about the wireless clients connected to the wireless networks of the AP by RF band.



By default, the page displays information about the wireless clients connected to the wireless network corresponding to the primary SSID of RF band 1 of the AP. To view the wireless client connection information of an SSID of an RF band, perform the following procedure:

1. Choose **Status** > **Wireless Clients**.
2. Select the RF band corresponding to the wireless client connection information to be viewed.
3. Select the SSID corresponding to the wireless client connection information to be viewed from the drop-down list box in the upper-right corner.

---End

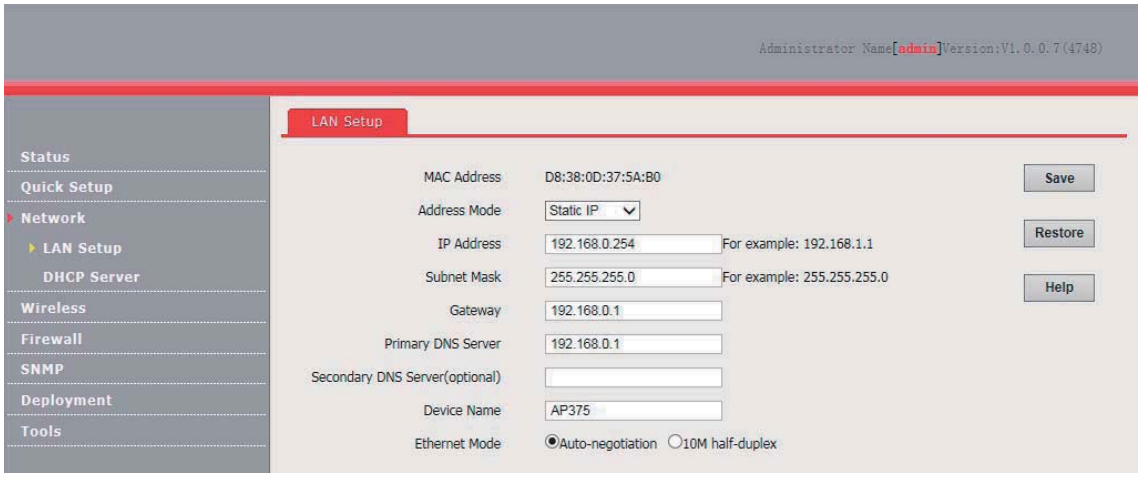
6 Network Settings

6.1 LAN Setup

6.1.1 Overview

To access the page, choose **Network** > **LAN Setup**.

This page enables you to view the MAC address of the LAN port of the AP and set the name, Ethernet mode, IP obtaining method, and other related parameters of the AP.



Parameter description

Parameter	Description
MAC Address	It specifies the MAC address of the LAN port of the AP. The default primary SSID of RF band 1 of the AP is IP-COM_*XXXXXX*, where *XXXXXX* indicates the last 6 characters of this MAC address.
Address Mode	It specifies the IP address obtaining mode of the AP. The default option is **Static IP**. – **Static IP**: It indicates that the IP address, subnet mask, gateway, and DNS server information of the AP is set manually. – **Dynamic IP**: It indicates that the IP address, subnet mask, gateway, and DNS server information of the AP is obtained from a DHCP server on your LAN. Note If **Address Mode** is set to **Dynamic IP**, you can log in to the web UI of the AP only with the IP address assigned to the AP by the DHCP server. The IP address is specified on the client list of the DHCP server.

Parameter	Description
IP Address	It specifies the IP address of the AP. The web UI of the AP is accessible at this IP address. The default IP address is 192.168.0.254. Generally, ensure that this IP address is in the same network segment as the LAN IP address of your LAN router connected to the internet, so that the AP can access the internet.
Subnet Mask	It specifies the subnet mask of the IP address of the AP. The default subnet mask is 255.255.255.0.
Gateway	It specifies the gateway IP address of the AP. Generally, set the gateway IP address to the LAN IP address of your LAN router connected to the internet, so that the AP can access the internet.
Primary DNS Server	It specifies the primary DNS server of the AP. If your LAN router connected to the internet provides the DNS proxy function, this IP address can be the LAN IP address of the router. Otherwise, enter a correct DNS server IP address.
Secondary DNS Server (optional)	It specifies the IP address of the secondary DNS server of the AP. This parameter is optional. If a DNS server IP address in addition to the IP address of the primary DNS server is available, enter the additional IP address in this field.
Device Name	It specifies the name of the AP. The default name is AP375. You are recommended to change the device name so that you can quickly locate the AP when managing the AP remotely.
Ethernet Mode	It specifies the Ethernet mode of the LAN port of the AP. – **Auto-negotiation**: This mode features a high transmission rate but short transmission distance. Generally, this mode is recommended. – **10M half-duplex**: This mode features a long transmission distance but relatively low transmission rate (usually 10 Mbps). This mode is recommended only if the Ethernet cable that connects the LAN port of the AP to a peer device exceeds 100 meters. In this case, the connected LAN port of the peer device must work in auto-negotiation mode. Otherwise, the LAN port of the AP may not be able to properly transmit or receive data.

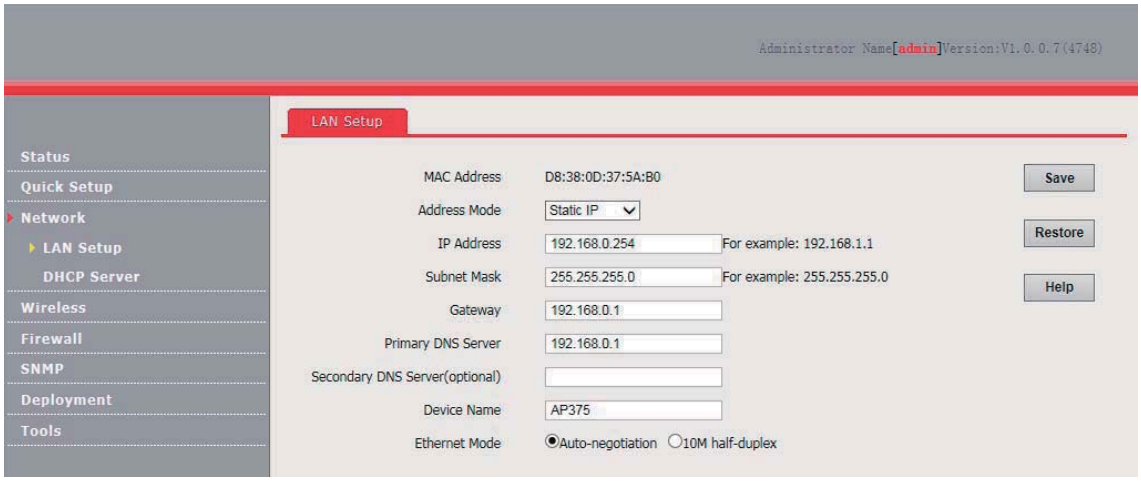
6.1.2 Changing the LAN Settings

Manually Setting the IP Address

This mode enables you to manually set the IP address, subnet mask, gateway IP address, primary DNS server, and secondary DNS server of the AP. It is usually used in a scenario with only one or a few APs.

Procedure:

1. Choose **Network** > **LAN Setup**.
2. Set **Address Mode** to **Static IP**.
3. Set an IP address, a subnet mask, a gateway address, a primary DNS server, and a secondary DNS server.
4. Click **Save**.



---End

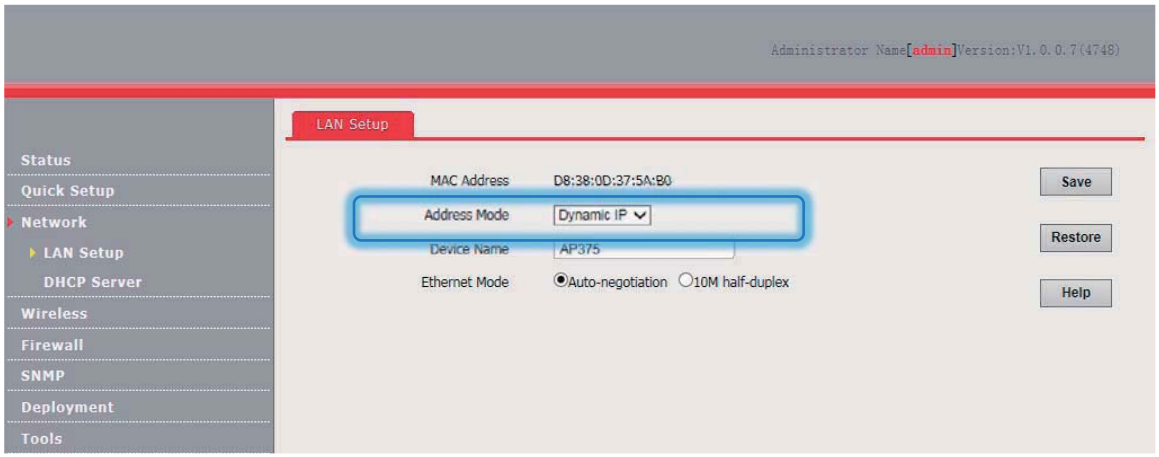
If you change the IP address of the LAN port, change the IP address of your management computer as well so that the two IP addresses belong to the same network segment. Then, you can use the new IP address of the LAN port to log in to the web UI of the AP.

Automatically Obtaining an IP Address

This mode enables the AP to automatically obtain an IP address, subnet mask, gateway IP address, primary DNS server IP address, and secondary DNS server IP address from a DHCP server in the network. If a large number of APs are deployed, you can adopt this mode to prevent IP address conflicts and effectively reduce your workload.

Procedure:

1. Choose **Network** > **LAN Setup**.
2. Set **Address Mode** to **Dynamic IP**.
3. Click **Save**.



---End

After the configuration takes effect, you can log in to the web UI of the AP only with the IP address assigned to the AP by the DHCP server. The IP address is specified on the client list of the DHCP server.

6.2 DHCP Server

6.2.1 Overview

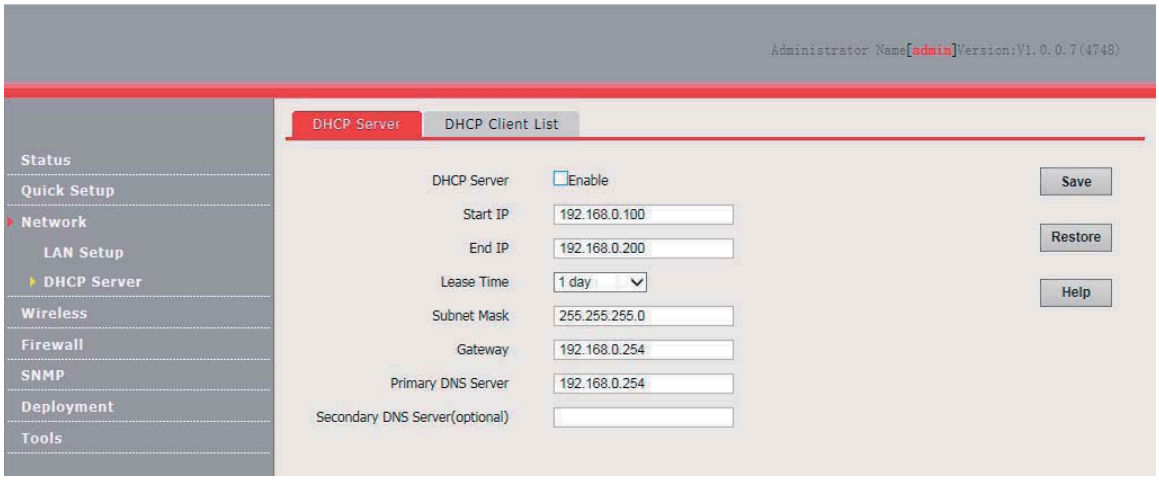
The AP provides a DHCP server function to assign IP addresses to clients on the LAN. By default, the DHCP server function is disabled.

Note

If the new and original IP addresses of the LAN port belong to different network segment, the system changes the IP address pool of the DHCP server function of the AP so that the IP address pool and the new IP address of the LAN port belong to the same network segment.

6.2.2 Configuring the DHCP Server

1. Choose **Network** > **DHCP Server**.
2. Set the parameters.
3. Click **Save**.



---End

Parameter description

Parameter	Description
DHCP Server	It specifies whether to enable the DHCP server function of the default, it is disabled.
Start IP	It specifies the start IP address of the IP address pool of the DHCP server. The default value is **192.168.0.100**.
End IP	It specifies the end IP address of the IP address pool of the DHCP server. The default value is **192.168.0.200**. Note The start and end IP addresses must belong to the same network segment as the IP address of the LAN port of the AP.

Parameter	Description
Lease Time	It specifies the validity period of an IP address assigned by the DHCP server to a client. When the lease time expires: – If the client is still connected to the AP, the client automatically extends the lease time and continues to use this IP address. – If the client has been shut down, the Ethernet cable between the client and the AP has been removed, or the wireless connection between the client and the AP is released, the AP recycles the IP address. The AP can then assign this IP address to any client requesting an IP address. It is recommended that you retain the default value **1 day**.
Subnet Mask	It specifies the subnet mask assigned by the DHCP server to clients. The default value is **255.255.255.0**.
Gateway	It specifies the gateway IP address assigned by the DHCP server to clients. The default value is **192.168.0.254**. Note When a client accesses a server or host located outside the network segment where the client resides, the data from and to the client must be forwarded by a gateway. Generally, the IP address of the gateway is the LAN IP address of the router in your LAN.
Primary DNS Server	It specifies the primary DNS server IP address assigned by the DHCP server to clients. The default value is **192.168.0.254**. Note To enable clients to access the internet, set this parameter to a correct DNS server IP address or DNS proxy IP address.
Secondary DNS Server (optional)	It specifies the secondary DNS server IP address assigned by the DHCP server to clients. This parameter is optional.

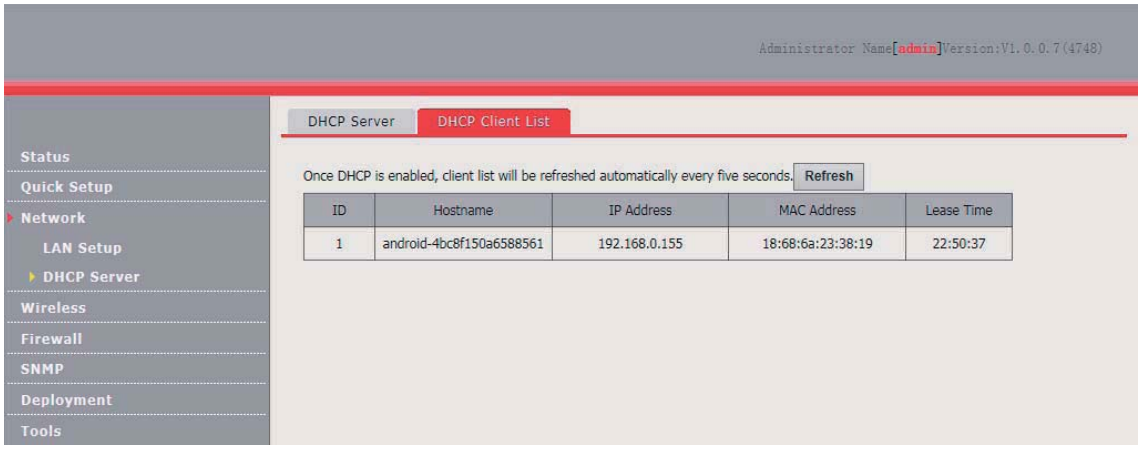
Note

If another DHCP server is available on your LAN, ensure that the IP address pool of the AP does not overlap the IP address pool of that DHCP server. Otherwise, IP address conflicts may occur.

6.2.3 Viewing the DHCP Client List

If the AP functions as a DHCP server, you can view the DHCP client list to understand the details about the clients that obtain IP addresses from the DHCP server. The details include host names, IP addresses, MAC addresses, and lease times.

To access the page, choose **Network** > **DHCP Server** and click **DHCP Client List** tab.



You can click Refresh to view the latest client information.

7 Wireless Settings

7.1 SSID Setup

7.1.1 Overview

This module enables you to set SSID-related parameters of the AP.

Broadcast SSID

When the AP broadcasts an SSID, nearby wireless clients can detect the SSID. When this parameter is set to **Disable**, the AP does not broadcast the SSID and nearby wireless clients cannot detect the SSID. In this case, you need to enter the SSID manually on your wireless client if you want to connect to the wireless network corresponding to the SSID. This to some extent enhances the security of the wireless network.

Note

After **Broadcast SSID** is set to **Disable**, a hacker can still connect to the corresponding wireless network if he/she manages to obtain the SSID by other means. Therefore, disabling this function only ensures low network security.

Client Isolation

This parameter implements a function similar to the VLAN function for wired networks. It isolates the wireless clients connected to the same wireless network corresponding to an SSID, so that the wireless clients can access only the wired network connected to the AP. Applying this function to hotspot setup at public places such as hotels and airports helps increase network security.

WMF

The number of wireless clients keeps increasing currently, but wired and wireless bandwidth resources are limited. Therefore, the multicast technology, which enables single-point data transmission and multi-point data reception, has been widely used in networks to effectively reduce bandwidth requirements and prevent network congestion.

Nevertheless, if a large number of clients are connected to a wireless interface of a wireless network and multicast data is intended for only one of the clients, the data is still sent to all the clients, which unnecessarily increases wireless resource usage and may lead to wireless channel congestion. In addition, multicast stream forwarding over an 802.11 network is not secure.

The WMF function of the AP converts multicast traffic into unicast traffic and forwards the traffic to the multicast traffic destination in the wireless network. This helps save wireless resources, ensure reliable transmission, and reduce delays.

Maximum Clients

This parameter specifies the maximum number of clients that can connect to the wireless network corresponding to an SSID. If the number is reached, the wireless network rejects new connection requests from clients. This limit helps balance load among the SSIDs of the AP.

Security Mode

A wireless network uses radio, which is open to the public, as its data transmission medium. If the wireless network is not protected by necessary measures, any client can connect to the network to use the resources of the network or access unprotected data over the network. To ensure communication security, transmission links of wireless networks must be encrypted for protection.

The AP supports various security modes for network encryption, including None, WEP, WPA-PSK, WPA2-PSK, Mixed WPA/WPA2-PSK, WPA, and WPA2.

- None

It indicates that any wireless client can connect to the wireless network. This option is not recommended because it affects network security.

- WEP

Wired Equivalent Privacy (WEP) uses a static key to encrypt all exchanged data, and ensures that a wireless LAN has the same level of security as a wired LAN. Data encrypted based on WEP can be easily cracked. In addition, WEP supports a maximum wireless network throughput of only 54 Mbps. Therefore, this security mode is not recommended.

- WPA-PSK, WPA2-PSK, and Mixed WPA/WPA2-PSK

Mixed WPA/WPA2-PSK indicates that wireless clients can connect to a wireless network using either WPA-PSK or WPA2-PSK.

In these security modes, an AP adopts a preshared key for authentication, and generates another key for data encryption. This prevents the vulnerability caused by static WEP keys, and makes the security modes suitable for ensuring security of home wireless networks. Nevertheless, because the initial pre-shared key for authentication is manually set and all clients use the same key to connect to the same AP, the key may be disclosed unexpectedly. This makes the security modes not suitable for scenarios where high security is required.

- WPA and WPA2

To address the key management weakness of WPA-PSK and WPA2-PSK, the WiFi Alliance puts forward WPA and WPA2, which use 802.1x to authenticate clients and generate data encryption–oriented root keys. WPA and WPA2 use the root keys to replace the preshared keys that set manually, but adopt the same encryption process as WPA-PSK and WPA2-PSK.

WPA and WPA2 uses 802.1x to authenticate clients and the login information of a client is managed by the client. This effectively reduce the probability of information leakage. In addition, each time a client connects to the AP that adopts the WPA or WPA2 security mode, the RADIUS server generates a data encryption key and assigns it to the client. This makes it difficult for attackers to obtain the key. These features of WPA and WPA2 help significantly increase network security, making WPA and WPA2 the preferred security modes of wireless networks that require high security.

7.1.2 Changing SSID Settings

To change the basic settings of an SSID for an RF band, perform the following procedure:

1. Choose **Wireless** > **SSID Setup**.
2. Select the RF band corresponding to the SSID.
3. Select the SSID from the **SSID** drop-down list box.
4. Change the parameters as required. Generally, you only need to change the **Enable**, **SSID**, and **Security Mode** settings.
5. Click **Save**.

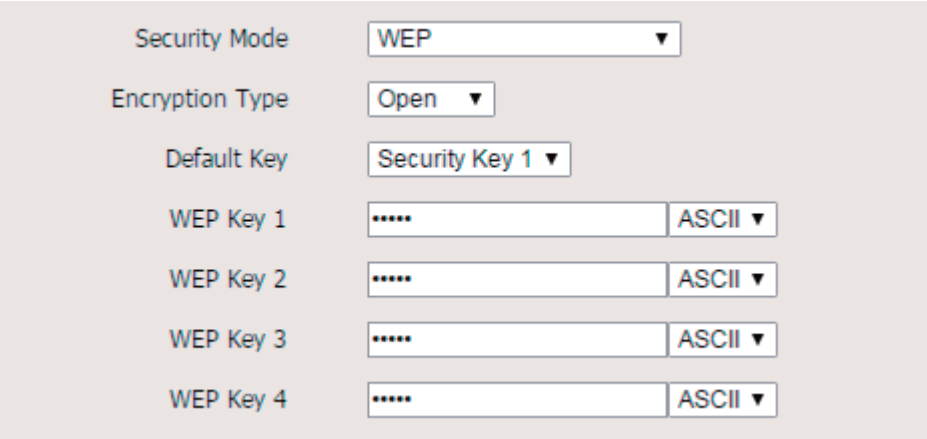
---End

Parameter description

Parameter	Description
SSID	It specifies the SSID to be configured. RF bands 1 and 3 support 8 SSIDs each, whereas RF band 2 supports only 4 SSIDs. The first SSID of each RF band is the primary SSID.
Enable	It specifies whether to enable the selected SSID. By default, the primary SSID is enabled, while the other SSIDs are disabled. You can enable them if needed.
Broadcast SSID	It specifies whether to broadcast the selected SSID. – **Enable**: It indicates that the AP broadcasts the selected SSID. In this case, nearby wireless clients can detect the SSID. – **Disable**: It indicates that the AP does not broadcast the selected SSID. In this case, if you want to connect a wireless client to the wireless network corresponding to the SSID, you must manually enter the SSID on the client. Note This AP can automatically hide its SSID. When the number of clients connected to the AP with an SSID of the AP reaches the upper limit, the AP stops broadcasting the SSID.
Client Isolation	It specifies whether clients connected with the same SSID can communicate with each other. – **Enable**: It indicates that the wireless clients connected to the AP with the selected SSID cannot communicate with each other. This improves wireless network security. – **Disable**: It indicates that the wireless clients connected to the AP with the selected

Parameter	Description
	SSID can communicate with each other.
WMF	It specifies whether to enable the WMF function.
Probe Broadcast Packets Control	By default, all wireless clients are detecting and scanning the nearby wireless networks using the Probe Request frame (including SSID field). After receiving the packets, the device decides whether to join the network and responds to the Probe Response (including all parameters of Beacon frame), consuming massive wireless resources. This function saves wireless resources by enabling the AP not to respond to the probe requests without SSIDs.
Maximum Clients	It specifies the maximum number of clients that can be concurrently connected to the wireless network corresponding to an SSID. After this upper limit is reached, the AP rejects new requests from clients for connecting to the wireless network.
SSID	It enables you to change the selected SSID. Chinese characters are allowed in an SSID.
Chinese SSID Encode	It specifies the encoding format of Chinese characters in an SSID. This parameter takes effect only if the SSID contains Chinese characters. The default value is **UTF8**. If 2 or more SSIDs of the AP are enabled, you are recommended to set this parameter to **UTF-8** for some SSIDs and to **GB2312** for the other SSIDs, so that any wireless client can identify one or both SSIDs that contain Chinese characters.
Security Mode	It specifies the security mode of the selected SSID. The options include: None, WEP, WPA-PSK, WPA2-PSK, Mixed WPA/WPA2-PSK, WPA, and WPA2. Clicking a hyperlink navigates you to the elaborated description of the corresponding security mode. The option **None** allows any wireless clients to connect to the AP. This option is not recommended because it affects network security.

WEP

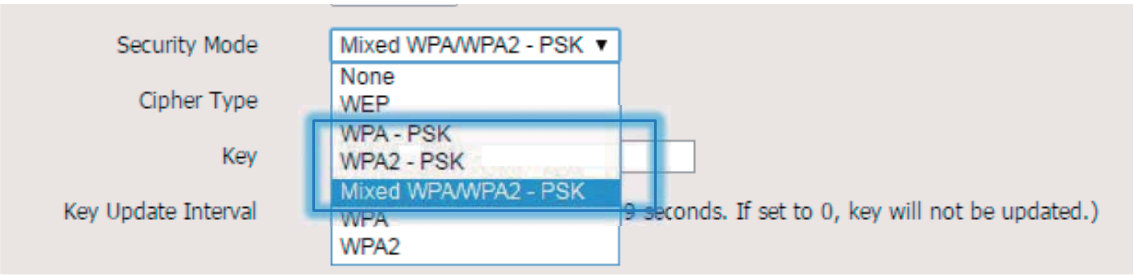


Parameter description

Parameter	Description
Encryption Type	It specifies the authentication type for the WEP security mode. The options include **Open**, **Shared**, and **802.1x**. The options share the same encryption process. – **Open**: It specifies that authentication is not required and data exchanged is encrypted using WEP. In this case, a wireless client can connect to the wireless network

Parameter	Description
	corresponding to the selected SSID without being authenticated, and the data exchanged between the client and the network is encrypted in WEP security mode. – **Shared**: It specifies that a shared key is used for authentication and data exchanged is encrypted using WEP. In this case, a wireless client must use a preset WEP key to connect to the wireless network corresponding to an SSID of the AP. The wireless client can be connected to the AP only if the WEP key is the same as that of the AP. – **802.1x** specifies that 802.1x authentication is required and data exchanged is encrypted using WEP. In this case, ports are enabled when authenticated clients connect to the AP, and disabled when non-authenticated users connect to the AP.
Default Key	It specifies the WEP key for the Open or Shared encryption type. For example, if **Default Key** is set to **Security Key 2**, a wireless client can connect to the wireless network corresponding to the selected SSID only with the password specified by **WEP Key 2**.
ASCII	It is required if the **Open** or **Shared** option is selected. It allows 5 or 13 ASCII characters in a WEP key.
Hex	It is required if the **Open** or **Shared** option is selected. It allows 10 or 26 hexadecimal characters in a WEP key.
RADIUS Server	These parameters are dedicated to the 802.1x authentication type. It specifies the IP address/port number/shared key of the RADIUS server for authentication.
RADIUS Port	
RADIUS Password	

WPA-PSK, WPA2-PSK, and Mixed WPA/WPA2-PSK

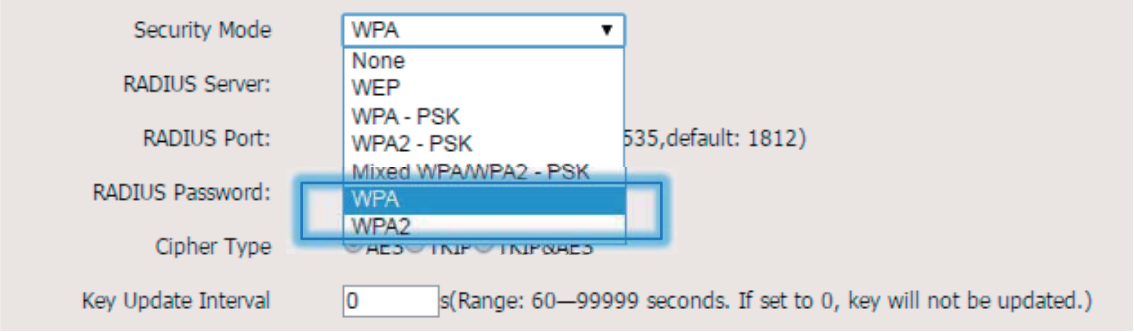


Parameter description

Parameter	Description
Security Mode	The **WPA-PSK**, **WPA2-PSK**, and **Mixed WPA/WPA2-PSK** options are available for network protection with a preshared key. – **WPA-PSK**: It indicates that wireless clients can connect to the wireless network corresponding to the selected SSID using WPA-PSK. – **WPA2-PSK**: It indicates that wireless clients can connect to the wireless network corresponding to the selected SSID using WPA2-PSK. – **Mixed WPA/WPA2-PSK**: It indicates that wireless clients can connect to the wireless network corresponding to the selected SSID using either WPA-PSK or WPA2-PSK.
Cipher Type	It specifies the encryption algorithm corresponding to the selected security mode. If **Security Mode** is set to **WPA-PSK**, this parameter has the **AES** and **TKIP** values. If

Parameter	Description
	Security Mode is set to **WPA2-PSK** or **Mixed WPA/WPA2-PSK**, this parameter has the **AES**, **TKIP**, and **TKIP&AES** values. – **AES**: It indicates the Advanced Encryption Standard. – **TKIP**: It indicates the Temporal Key Integrity Protocol. If this encryption algorithm is used, the AP can reach a maximum wireless transmission rate of 54 Mbps. – **TKIP&AES**: It indicates that both TKIP and AES encryption algorithms are supported. Wireless clients can connect to the wireless network corresponding to the selected SSID using TKIP or AES.
Key	It specifies a preshared WPA key. A WPA key can contain 8 to 63 ASCII characters or 8 to 64 hexadecimal characters.
Key Update Interval	It specifies the automatic update interval of a WPA key for data encryption. A shorter interval results in higher data security. The value **0** indicates that a WAP key is not updated.

WPA and WPA2



Parameter description

Parameter	Description
Security Mode	The **WPA** and **WPA2** options are available for network protection with a RADIUS server. – **WPA**: It indicates that wireless clients can connect to the wireless network corresponding to the selected SSID using WPA. – **WPA2**: It indicates that wireless clients can connect to the wireless network corresponding to the selected SSID using WPA2.
RADIUS Server	It specifies the IP address of the RADIUS server for authentication.
RADIUS Port	It specifies the port number of the RADIUS server for client authentication.
RADIUS Password	It specifies the shared password of the RADIUS server.
Cipher Type	It specifies the encryption algorithm corresponding to the selected security mode. The available options include **AES**, **TKIP**, and **TKIP&AES**. – **AES**: It indicates the Advanced Encryption Standard. – **TKIP**: It indicates the Temporal Key Integrity Protocol. – **TKIP&AES**: It indicates that both TKIP and AES encryption algorithms are supported. Wireless clients can connect to the wireless network corresponding to the selected SSID using TKIP or AES.
Key Update Interval	It specifies the automatic update interval of a WPA key for data encryption. A shorter

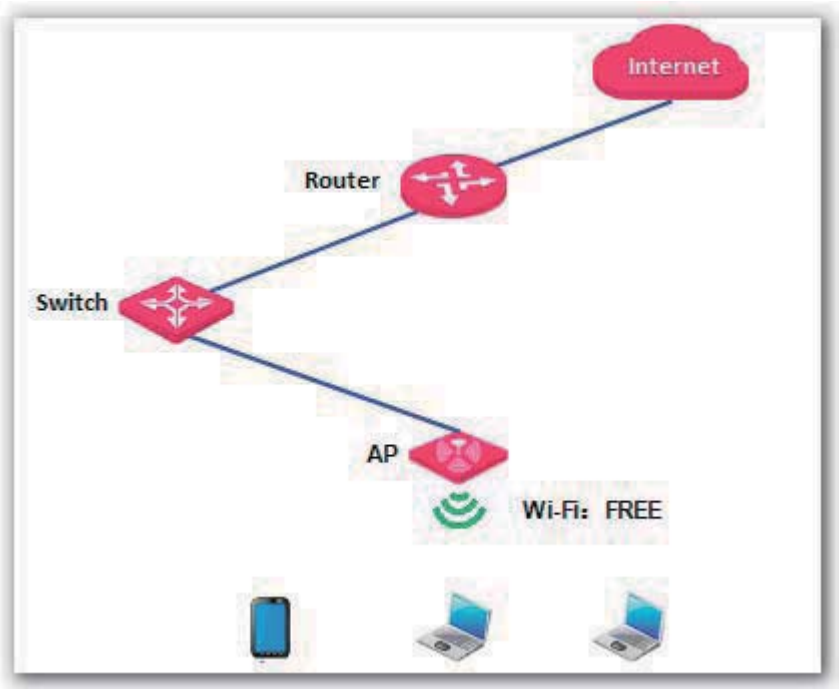
Parameter	Description
	interval results in higher data security. The value **0** indicates that a WAP key is not updated.

7.1.3 SSID Setup Example

Setting up a Non-encrypted Wireless Network

- Networking requirement

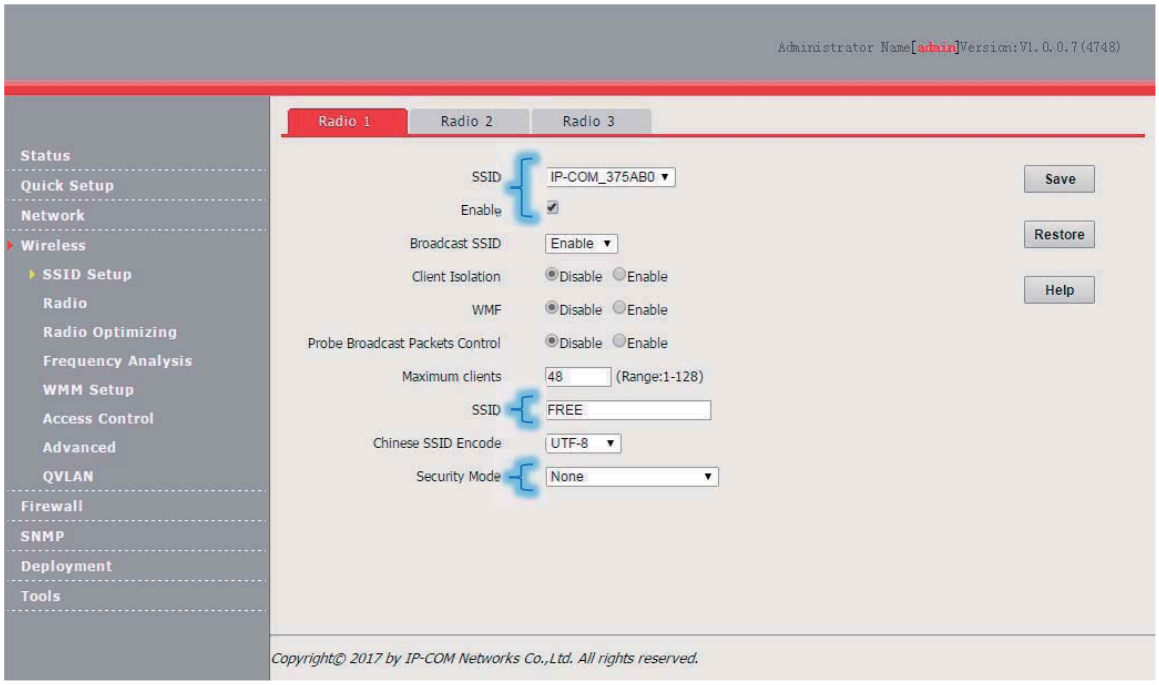
In a hotel lounge, guests can connect to the wireless network without a password and access the internet through the wireless network.



- Configuration procedure

Assume that the second SSID of RF band 1 of the AP is used.

1. Choose **Wireless** > **SSID Setup**.
2. Select the second SSID from the **SSID** drop-down list box.
3. Select the **Enable** check box.
4. Change the value of the **SSID** text box to **FREE**.
5. Set **Security Mode** to **None**.
6. Click **Save**.



---End

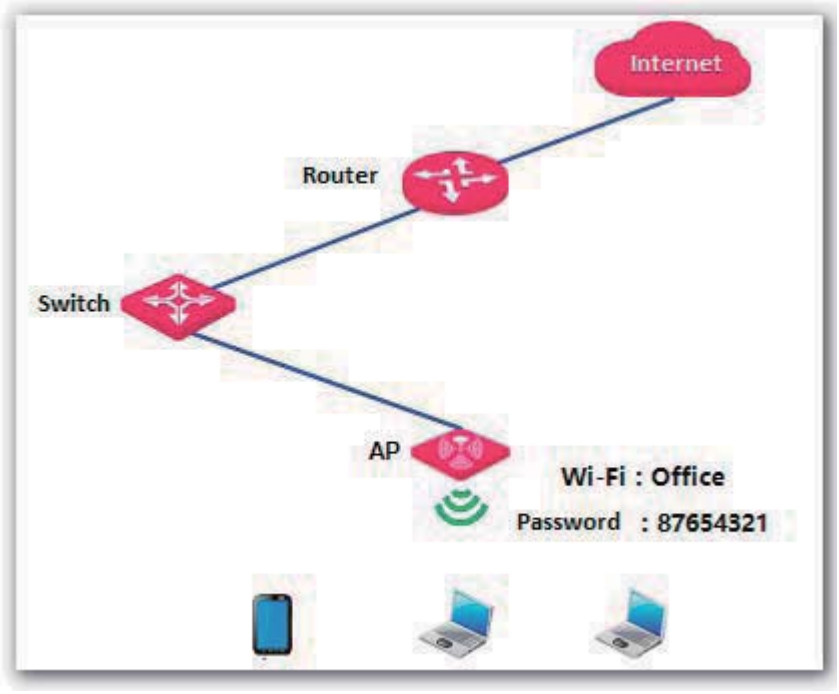
- Verification

Verify that wireless devices can connect to the **FREE** wireless network without a password.

Setting Up a Wireless Network Encrypted Using WPA-PSK, WPA2-PSK, or Mixed WPA/WPA2-PSK

- Networking requirement

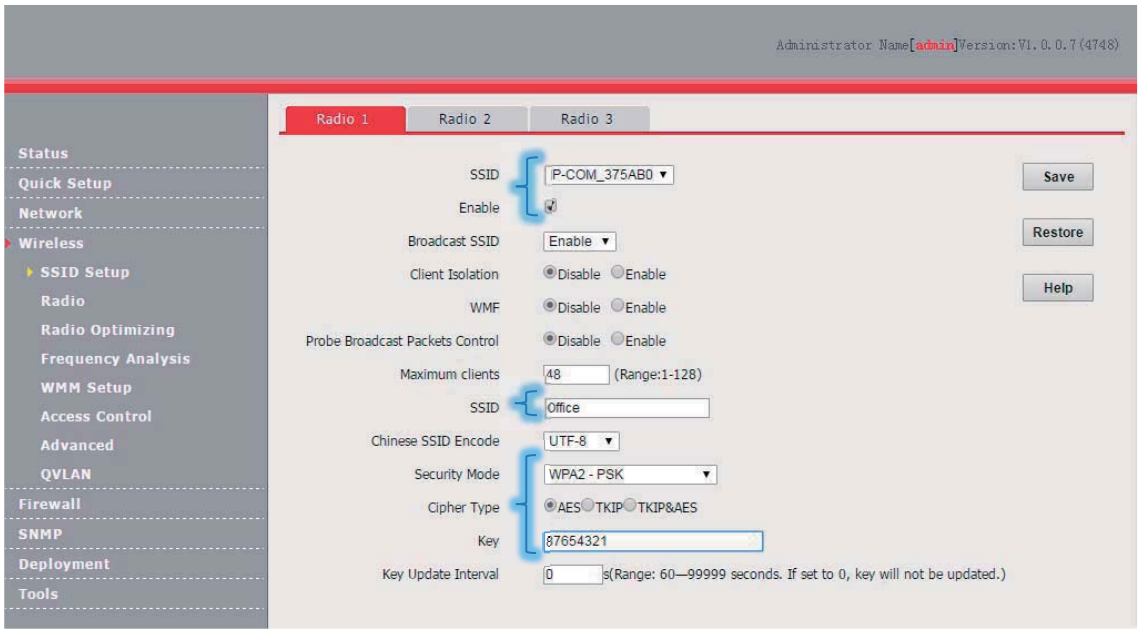
An enterprise wireless network with a certain level of security must be set up through a simply procedure. In this case, WPA-PSK, WPA2-PSK, or Mixed WPA/WPA2-PSK is recommended. See the following figure.



- Configuration procedure

Assume that the second SSID of RF band 1 of the AP is used.

1. Choose **Wireless** > **SSID Setup**.
2. Select the second SSID from the **SSID** drop-down list box.
3. Select the **Enable** check box.
4. Change the value of the **SSID** text box to **Office**.
5. Set **Security Mode** to **WP**A2-PSK and **Cipher Type** to **AES**.
6. Set **Key** to **87654321**.
7. Click **Save**.



---End

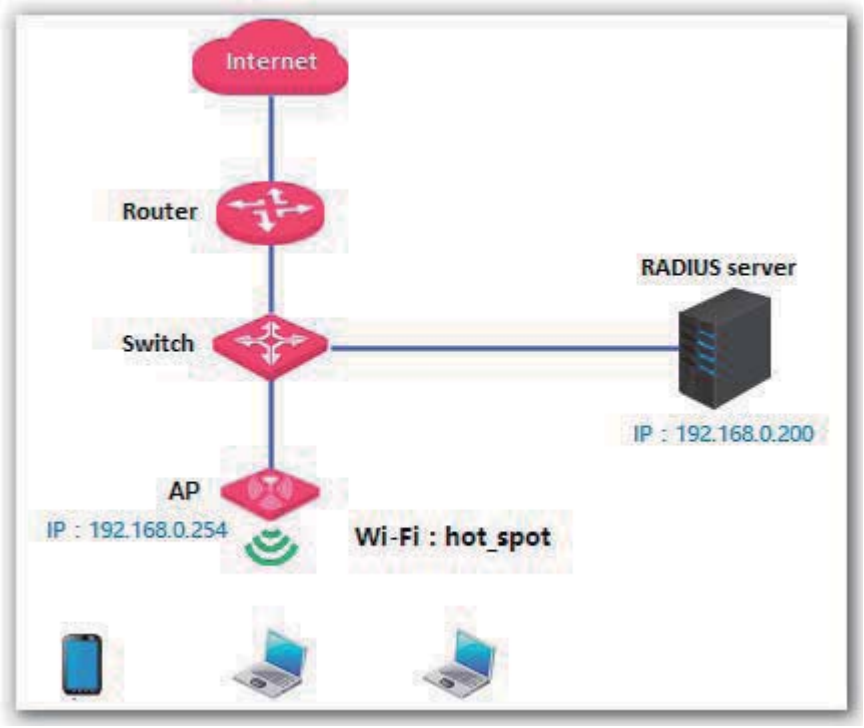
- Verification

Verify that wireless devices can connect to the **Office** wireless network with the password **87654321**.

Setting up a Wireless Network Encrypted Using WPA or WPA2

- Networking requirement

A highly secure wireless network is required and a RADIUS server is available. In this case, WPA or WPA2 pre-shared key mode is recommended. See the following figure.



- Configuration procedure

1. Configure the AP.
   - Assume that the IP address of the RADIUS server is 192.168.0.200, the Key is 12345678, and the port number for authentication is 1812.
   - Assume that the second SSID of RF band 1 of the AP is used.

   (1) Choose **Wireless** > **SSID Setup**.

   (2) Select the second SSID from the **SSID** drop-down list box.

   (3) Select the **Enable** check box.

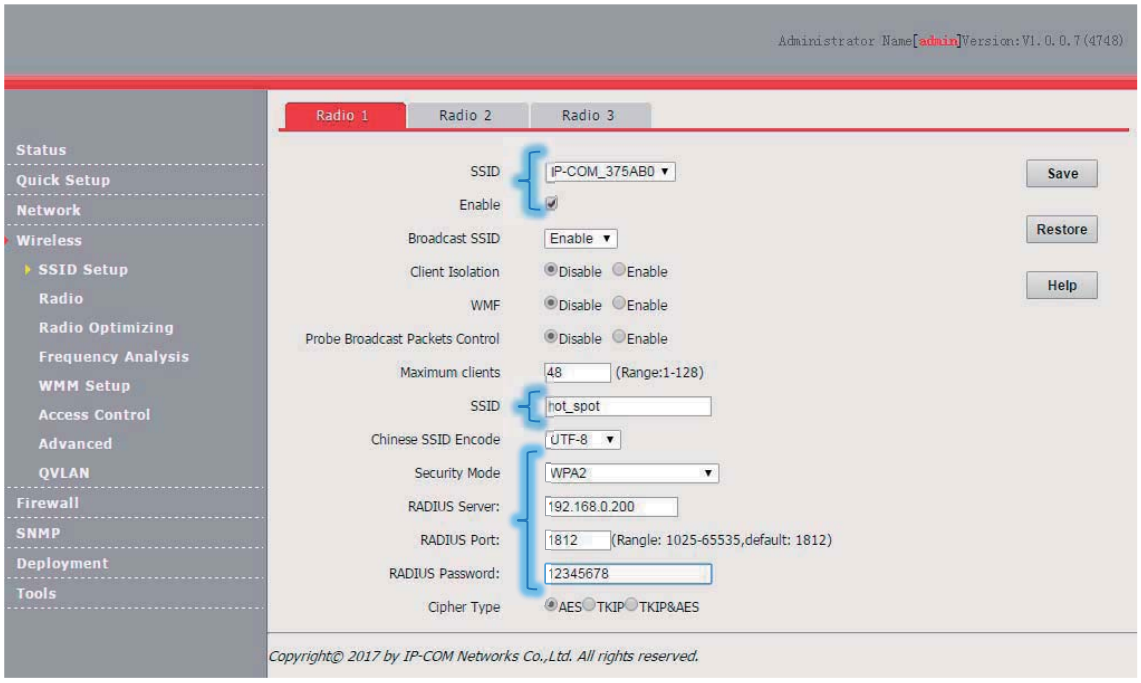
   (4) Change the value of the **SSID** text box to **hot_spot**.

   (5) Set **Security Mode** to **WPA2-PSK**.

   (6) Set **RADIUS Server**, **RADIUS Port**, and **RADIUS Password** to **192.168.0.200**, **1812**, and **12345678** respectively.

   (7) Set **Cipher Type** to **AES**.

   (8) Click **Save**.



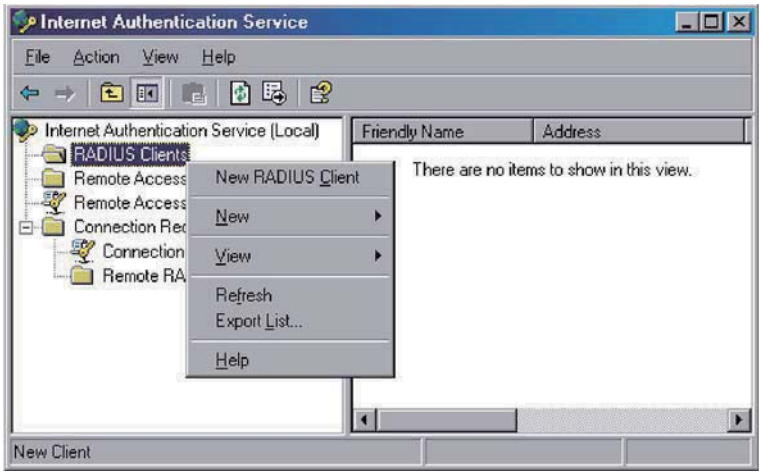
2. Configure the RADIUS server.

Note

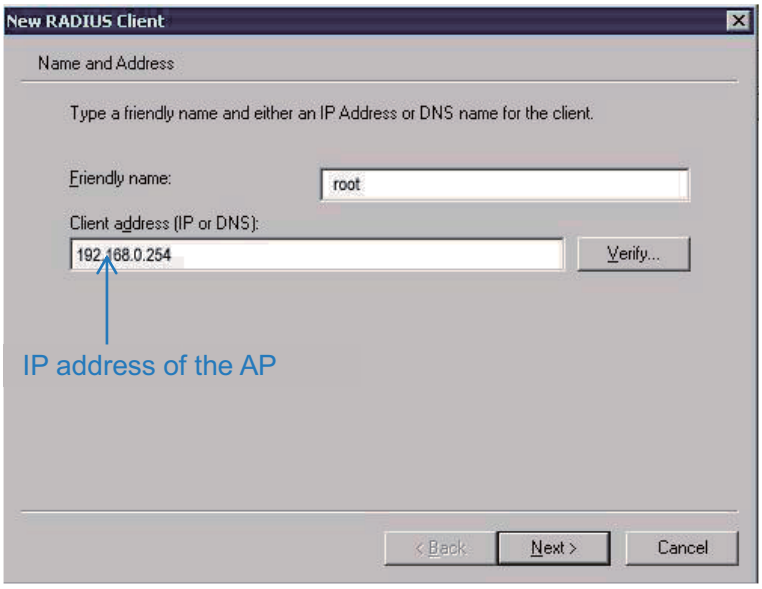
Windows 2003 is used as an example to describe how to configure the RADIUS server.

(1) Configure a RADIUS client.

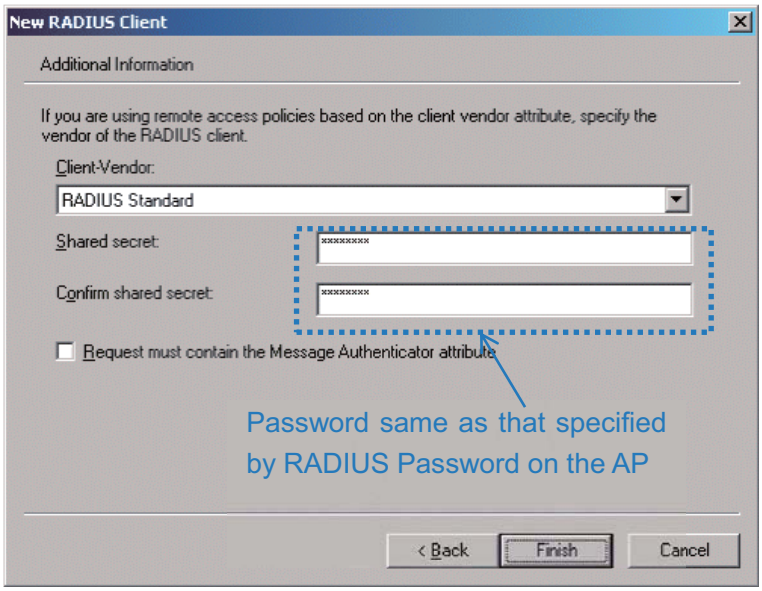
In the **Computer Management** dialog box, double-click **Internet Authentication Service**, right-click **RADIUS Clients**, and choose **New RADIUS Client**.



Enter a RADIUS client name (which can be the name of the AP) and the IP address of the AP, and click **Next**.

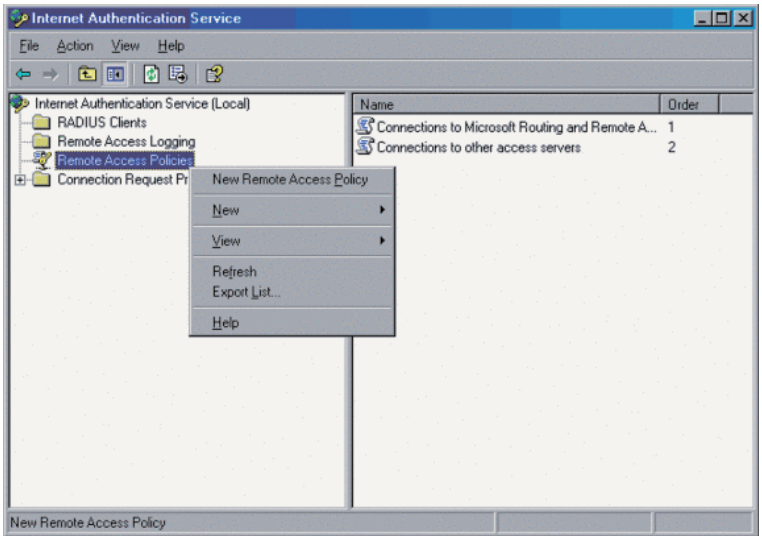


Enter **12345678** in the **Shared secret and Confirm shared secret** text boxes, and click **Finish**.

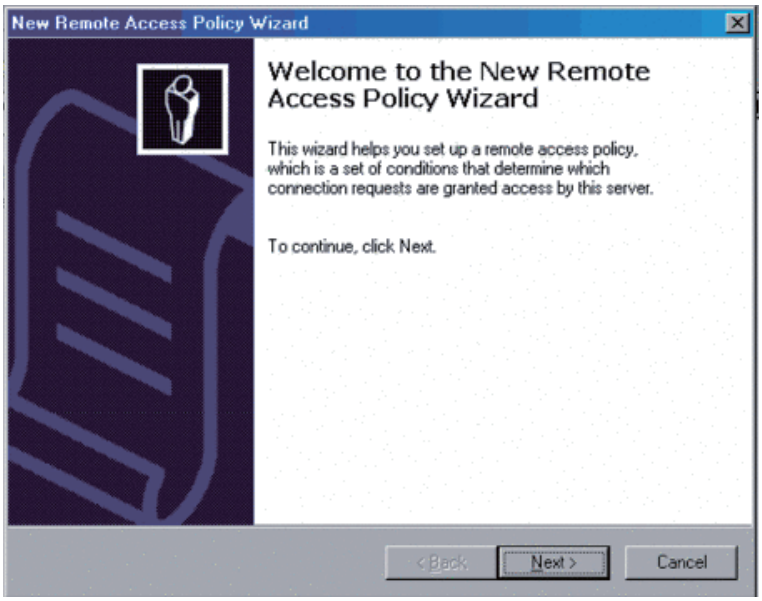


(2) Configure a remote access policy.

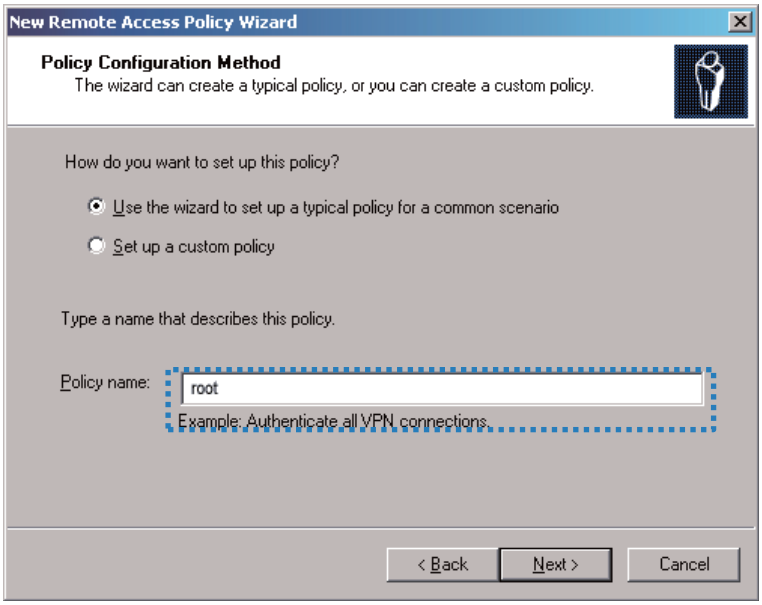
Right-click **Remote Access Policies** and choose **New Remote Access Policy**.



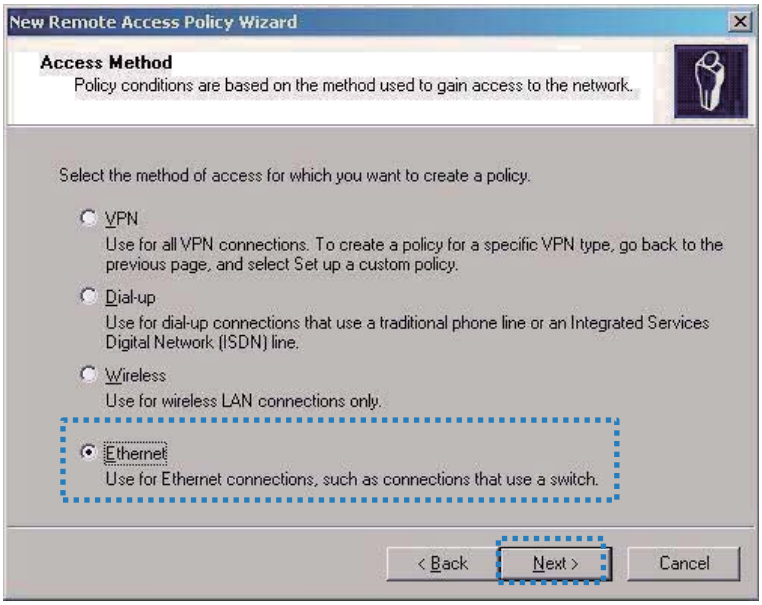
In the **New Remote Access Policy Wizard** dialog box that appears, click **Next**.



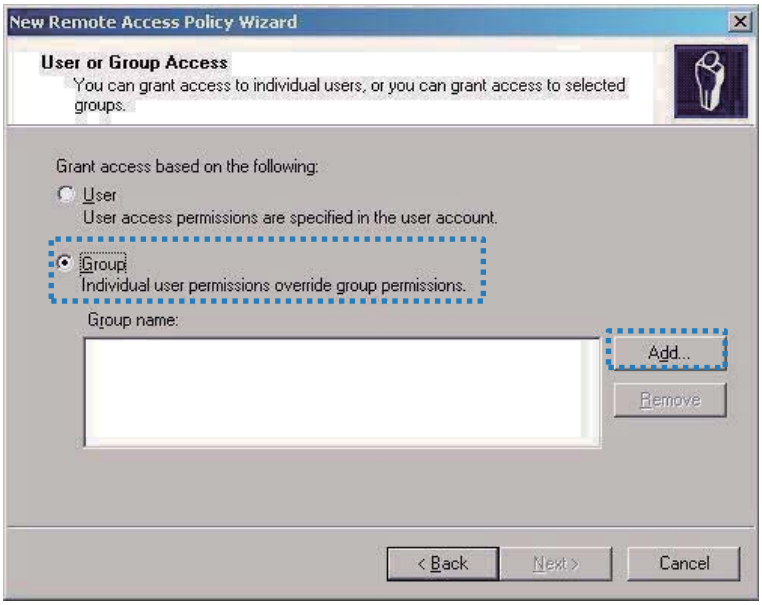
Enter a policy name and click **Next**.



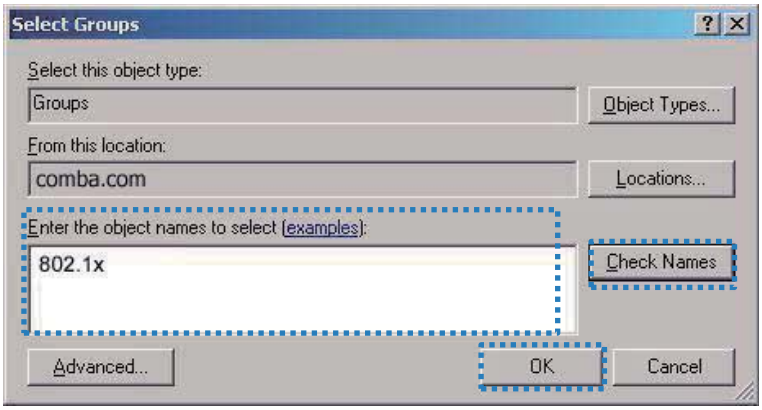
Select **Ethernet** and click **Next**.



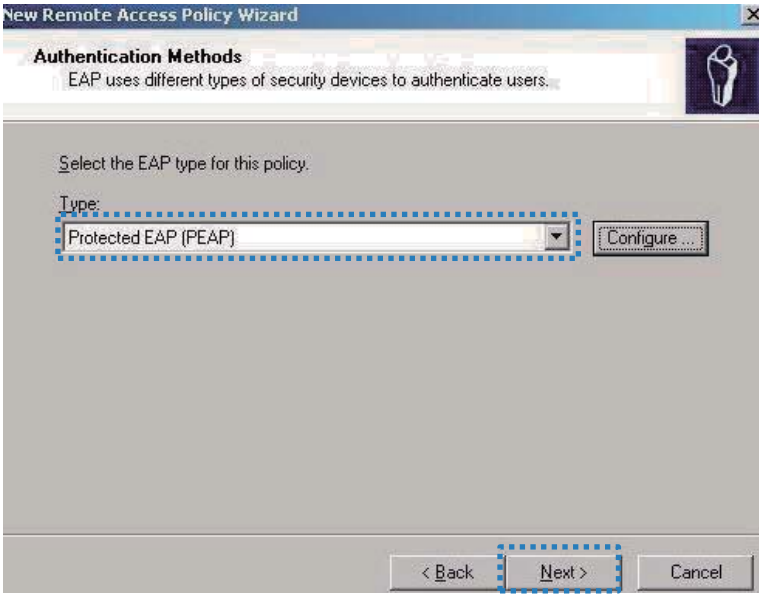
Select **Group** and click **Add**.



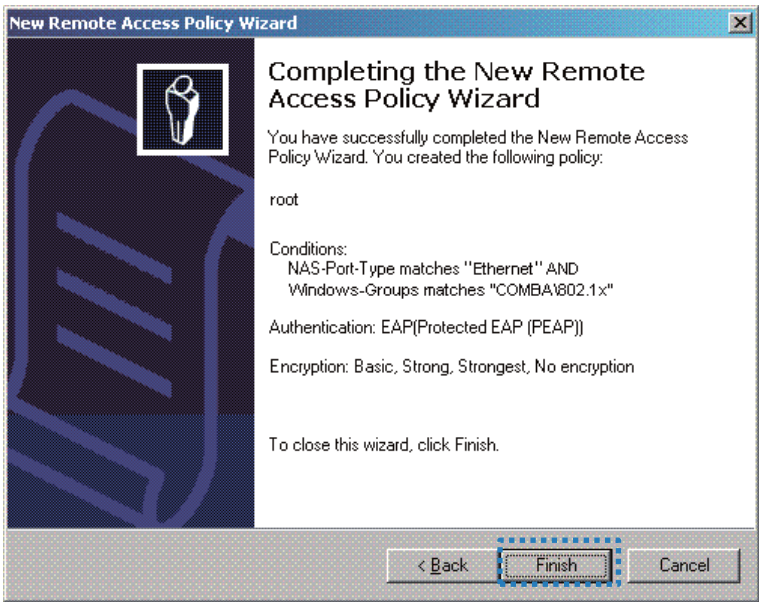
Enter **802.1x** in the **Enter the object names to select** text box, click **Check Names**, and click **OK**.



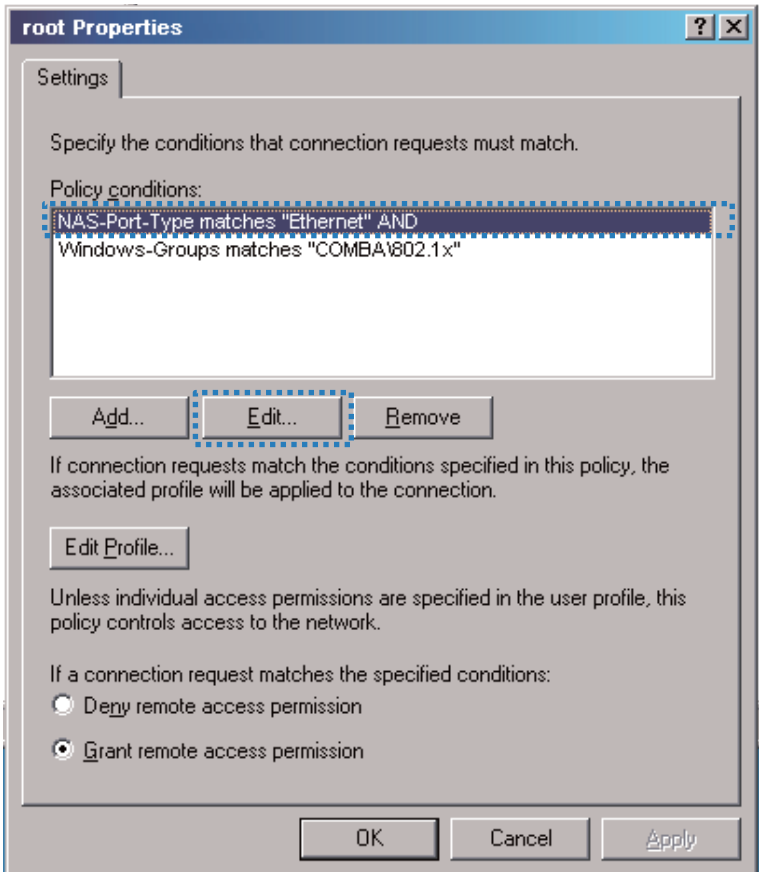
Select **Protected EAP (PEAP)** and click **Next**.



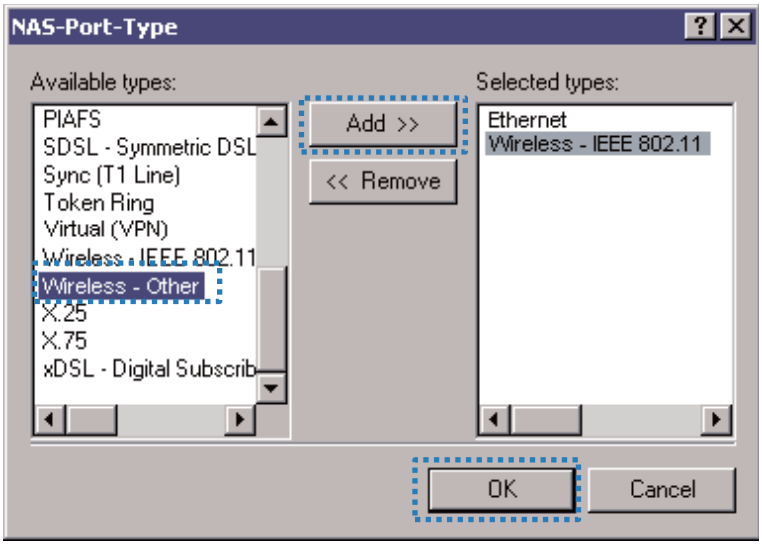
Click **Finish**. The remote access policy is created.



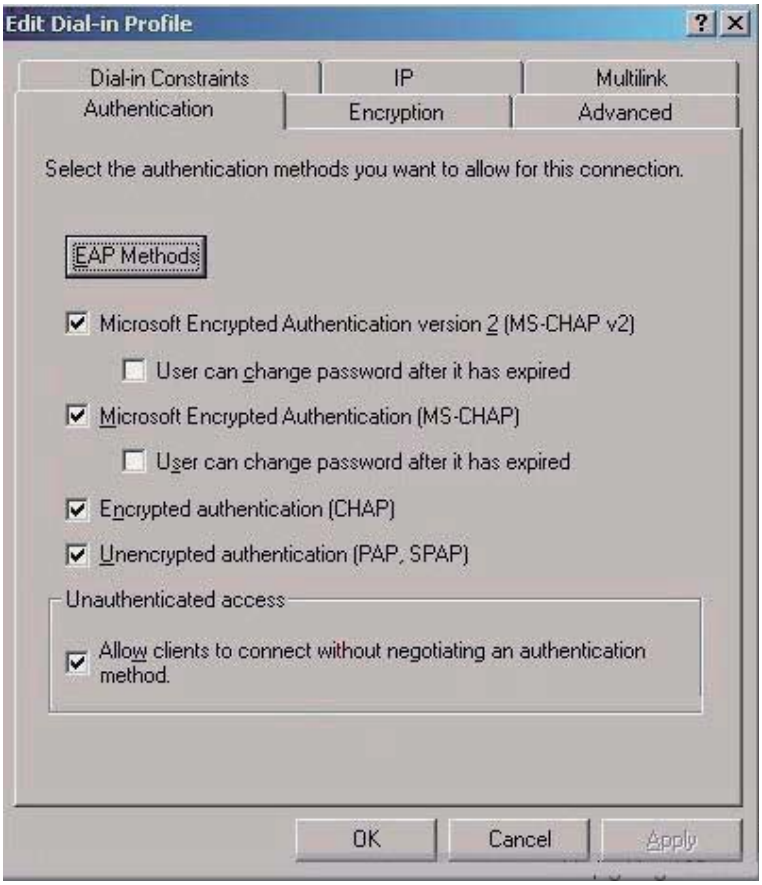
Right-click **root** and choose **Properties**. Select **Grant remote access permission**, select **NAS-Port-Type matches "Ethernet" AND**, and click **Edit**.



Select **Wireless – Other**, click **Add**, and click **OK**.



Click **Edit Profile**, click the **Authentication** tab, configure settings as shown in the following figure, and click **OK**.



When a message appears, click **No**.

(3) Configure user information.

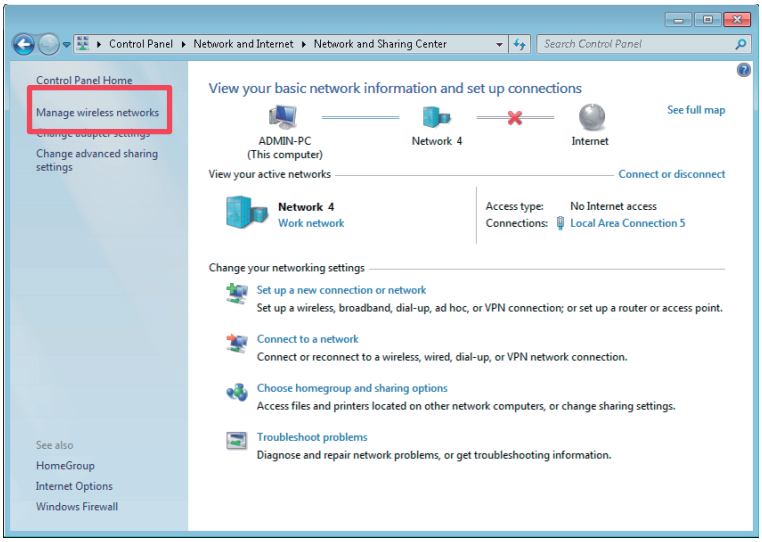
Create a user and add the user to group **802.1x**.

3. Configure your wireless device.

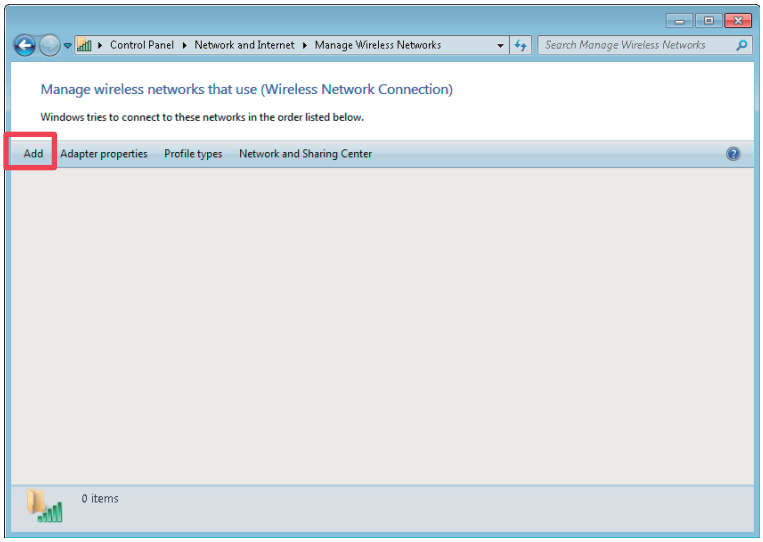
Note

Windows 7 is taken as an example to describe the procedure.

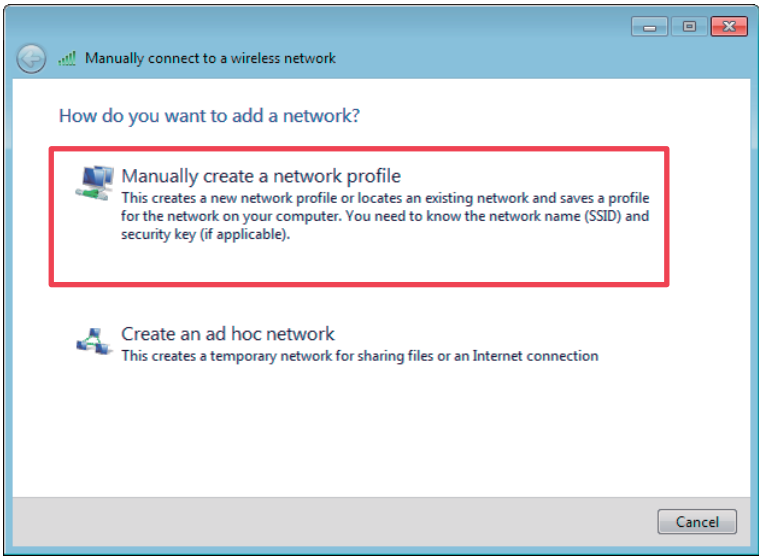
(1) Choose **Start** > **Control Panel**, click **Network and Internet**, click **Network and Sharing Center**, and click **Manage wireless networks**.



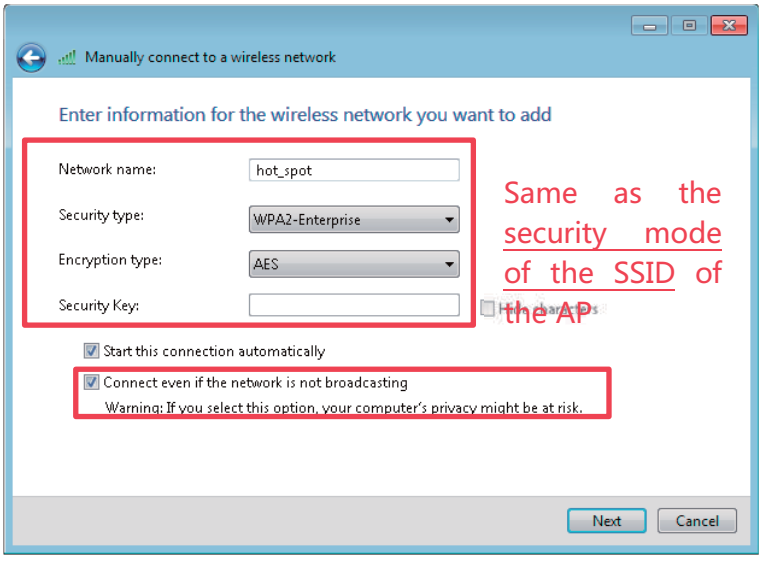
(2) Click **Add**.



(3) Click **Manually create a network profile**.

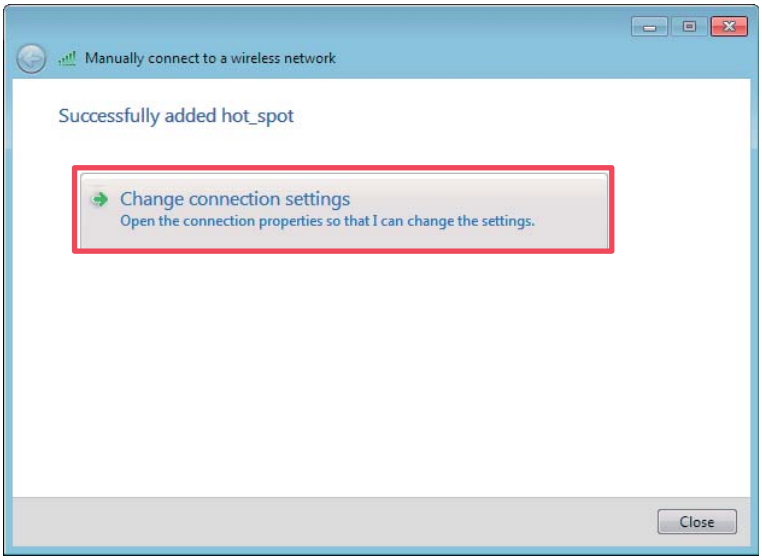


(4) Enter wireless network information, select **Connect even if the network is not broadcasting**, and click **Next**.

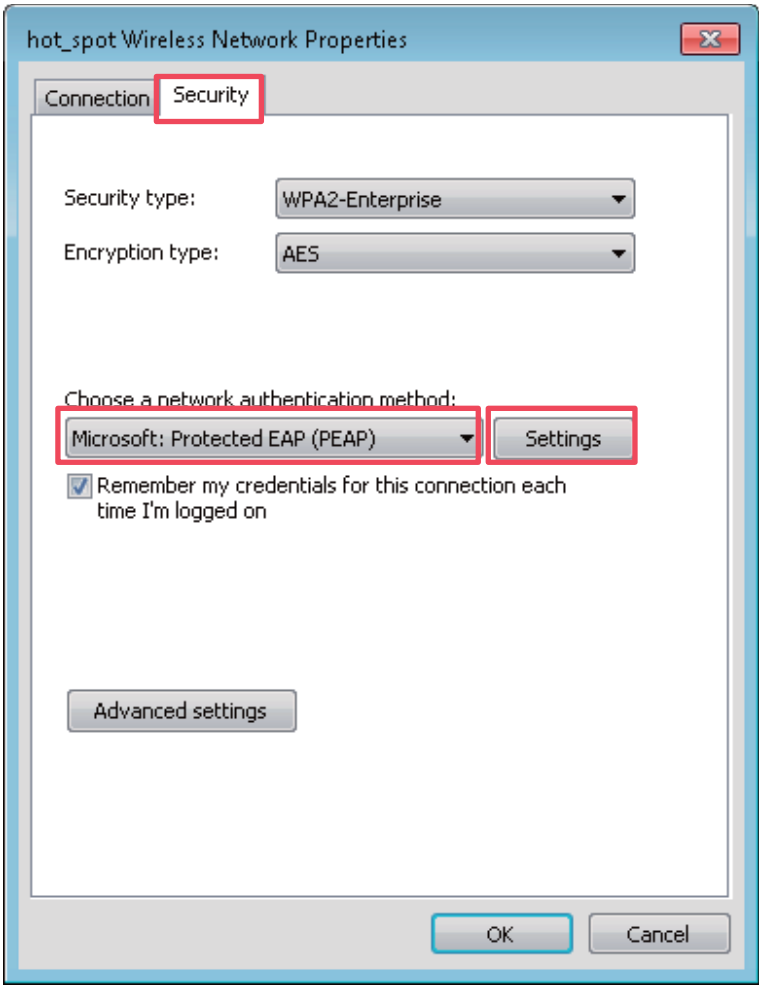


Same as the security mode of the SSID of the AP

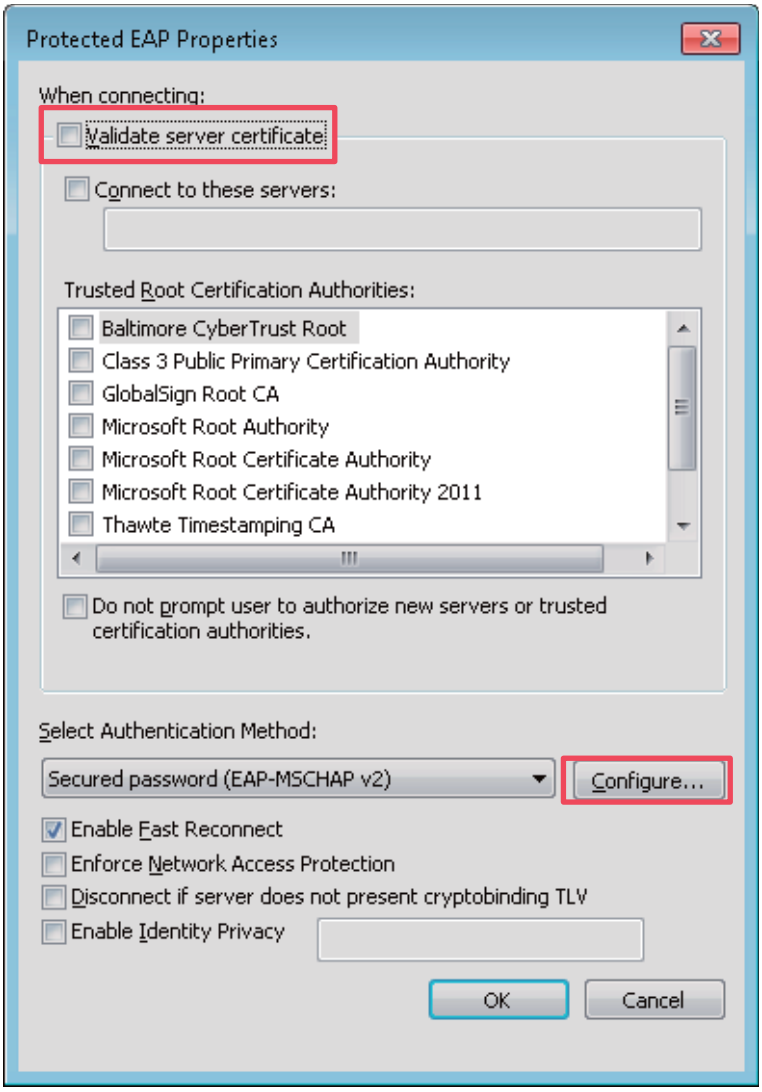
(5) Click **Change connection settings**.



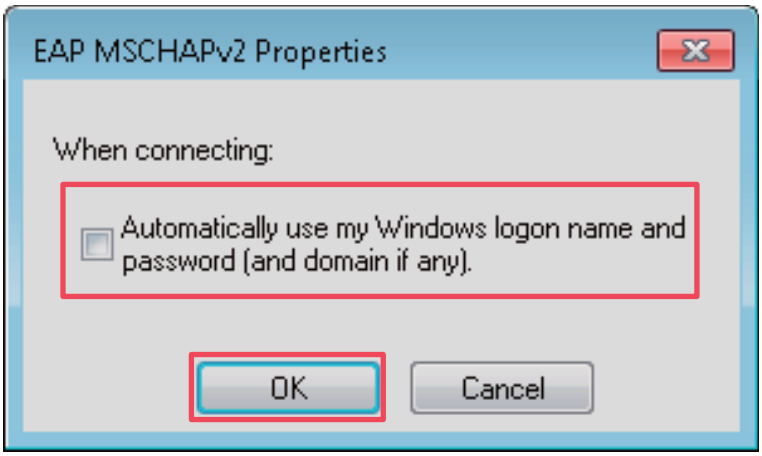
(6) Click the **Security** tab, select **Microsoft: Protected EAP (PEAP)**, and click **Settings**.



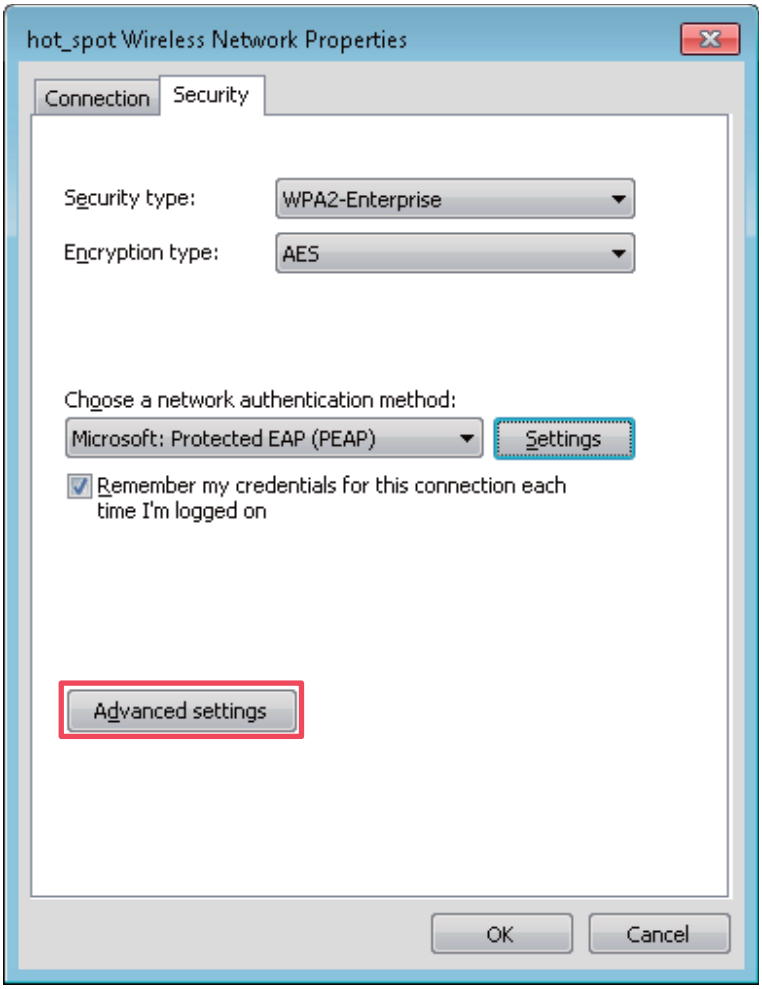
(7) Deselect **Validate server certificate** and click **Configure**.



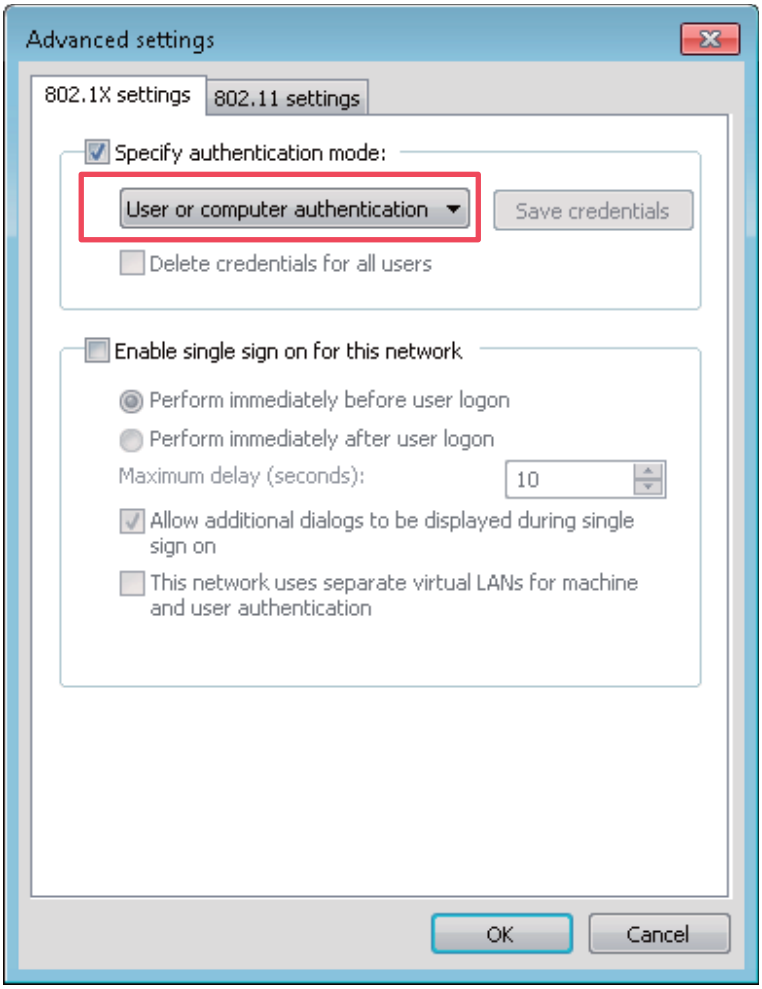
(8) Deselect **Automatically use my Windows logon name and password (and domain if any)** and click **OK**.



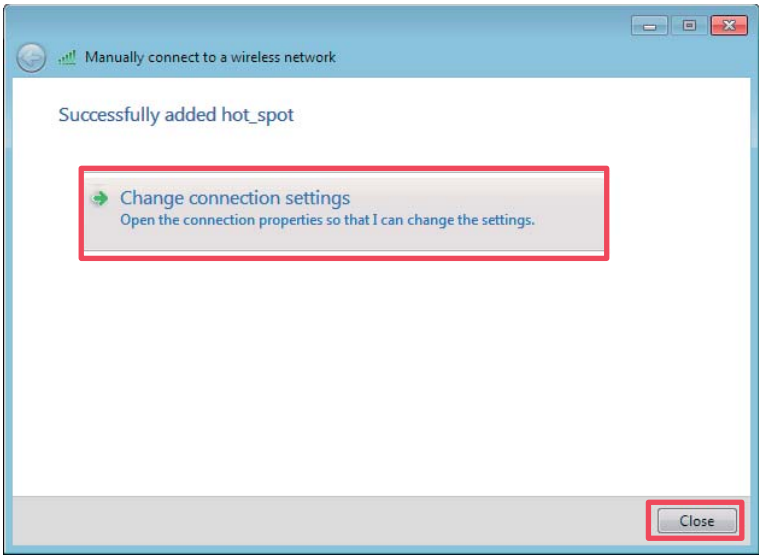
(9) Return to the **Security** tab page and click **Advanced settings**.

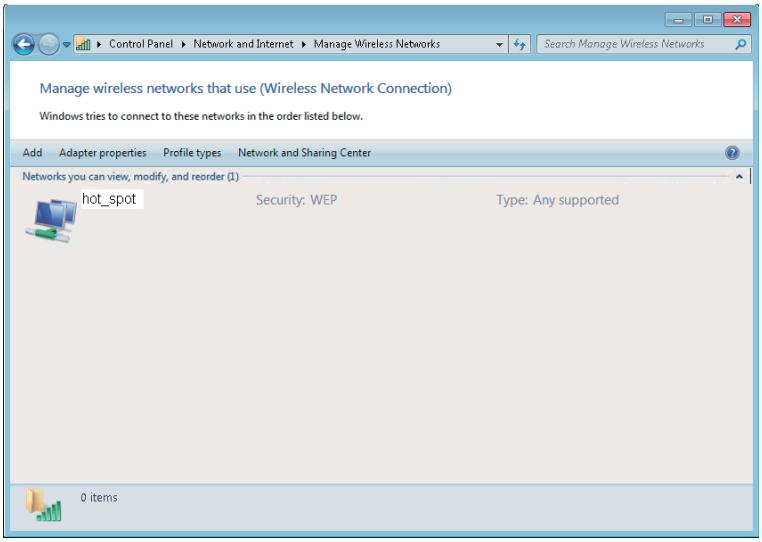


(10) Select **User or computer authentication** and click **OK**.

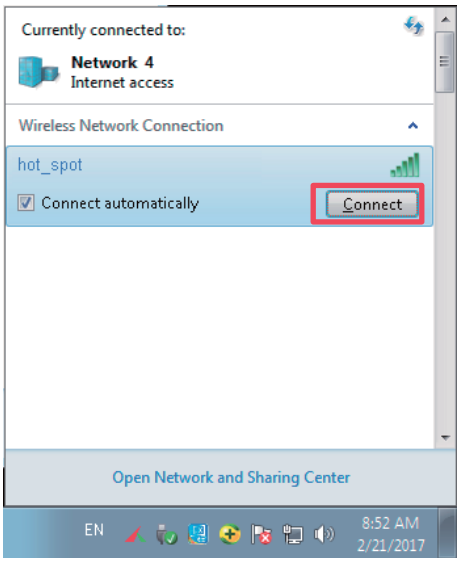


(11) Click **Close**.

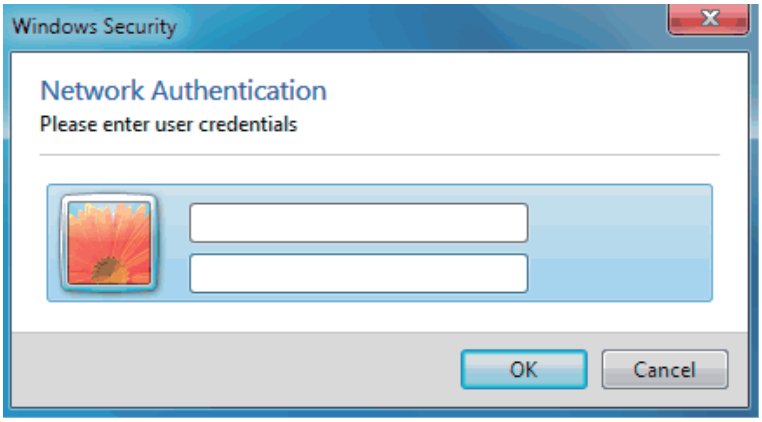




(12) Click the network icon in the lower-right corner of the desktop and choose the wireless network of the AP, such as **hot_spot** in this example.



(13) In the Windows Security dialog box that appears, enter the user name and password set on the RADIUS server and click **OK**.



---End

- Verification

Wireless devices can connect to the wireless network hot_spot.

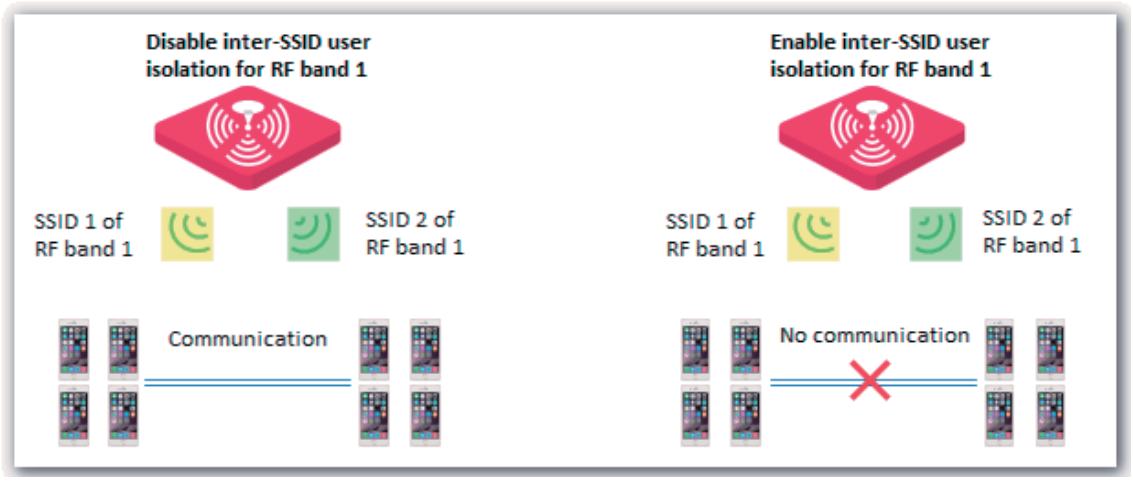
7.2 Radio

7.2.1 Overview

The Radio module is used to set RF parameters of the AP. This section describes some functions of the module.

Inter-SSID User Isolation

This function isolates the wireless clients connected to different wireless networks corresponding to the same RF band. For example, if user 1 connects to the wireless network corresponding to SSID1 of RF band 1, whereas user 2 connects to the wireless network corresponding to SSID2 of RF band 1, the two users cannot communicate with each other after inter-SSID user isolation is implemented for RF band 1.

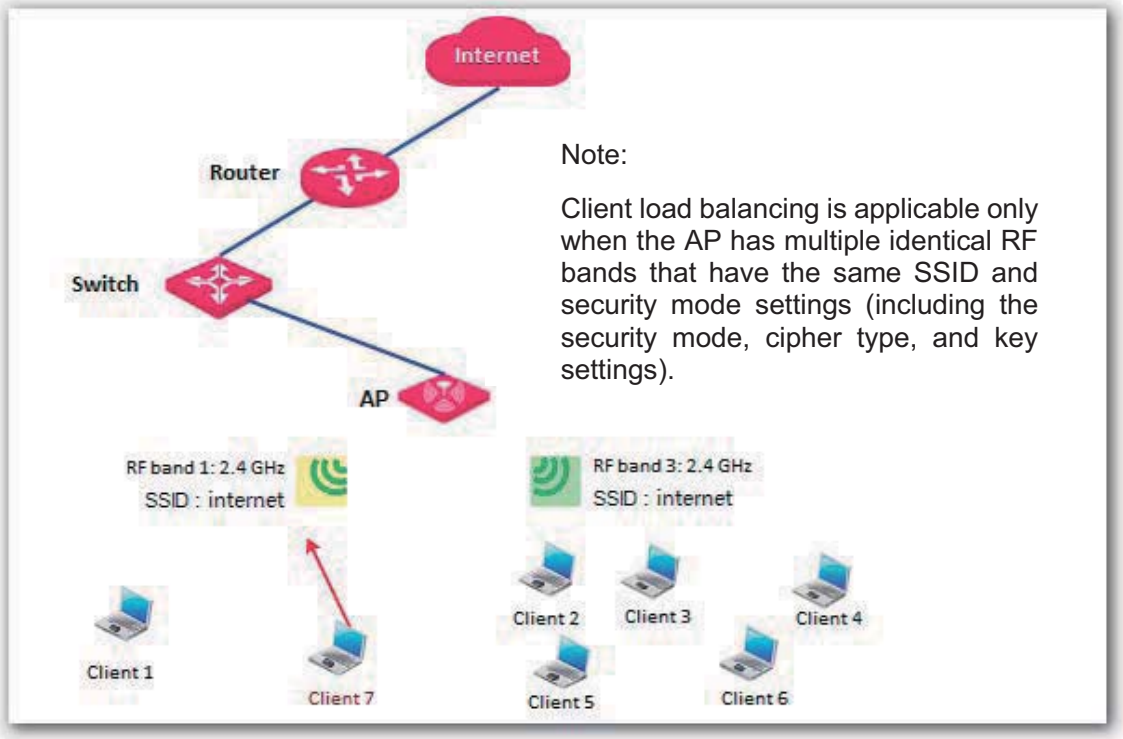


Client Load Balancing

If an AP uses two or more identical RF bands, wireless clients may not be evenly connected to the RF bands, resulting in traffic imbalance between the RF bands. Client load balancing appropriately achieve balance between the RF bands to effectively optimize network resource usage.

When the number of users connected to an RF band of the AP reaches the threshold specified by **Client Load Balancing Threshold**, client load balancing is performed.

The following figure provides an example. RF band 1 and 3 of the AP are 2.4 GHz bands. Client 1 connects to RF band 1, whereas clients 2 to 6 connect to RF band 2. If client load balancing is enabled, the client load balancing threshold is 5, and the client load balancing offset is 4, when client 7 sends a connection request to RF band 2, client 7 is connected to RF band 1 because the threshold and offset of RF band 2 has been reached.

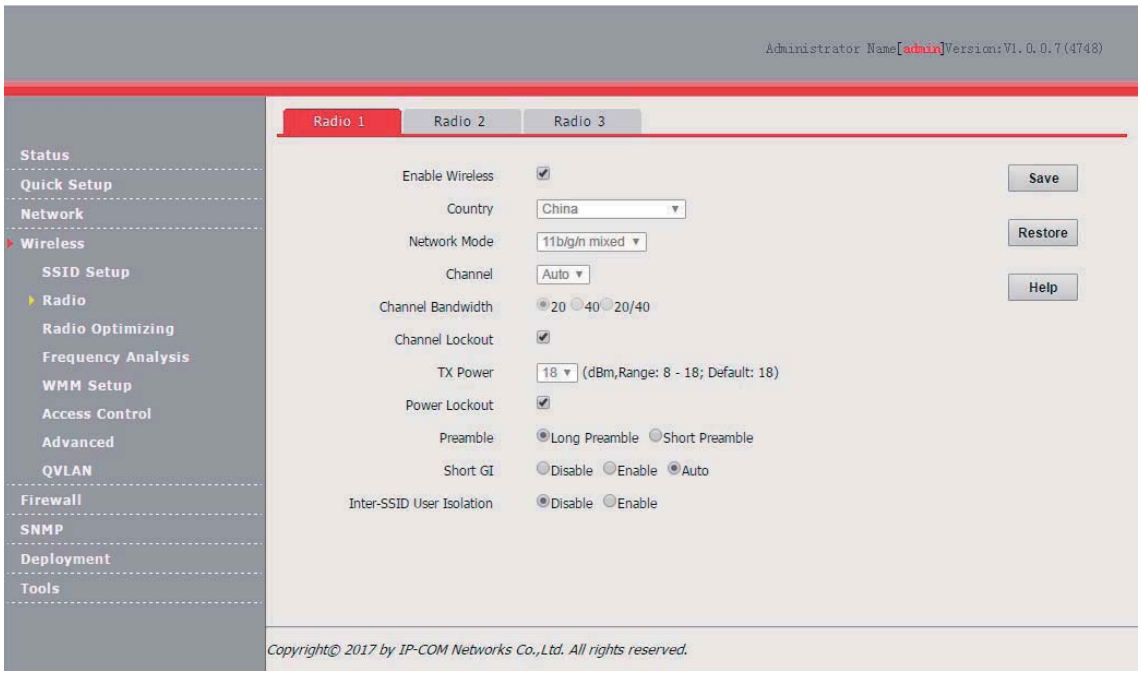


Note:

Client load balancing is applicable only when the AP has multiple identical RF bands that have the same SSID and security mode settings (including the security mode, cipher type, and key settings).

7.2.2 Changing the RF Settings

1. Choose **Wireless** > **Radio**.
2. Select the RF band to be configured.
3. Change the parameters as required. Generally, you only need to change the **Enable Wireless**, **Channel**, and **TX Power** settings.
4. Click **Save**.



---End

Parameter description

Parameter	Description
Enable Wireless	It specifies whether to enable the wireless function corresponding to the selected RF band of the AP.
Country	It specifies the country or region where the AP is used. This parameter helps comply with channel regulations of the country or region.
Network Mode	It specifies the wireless network mode of the AP. The available options for a 2.4 GHz RF band include **11b**, **11g**, **11b/g**, and **11b/g/n**. The available options for a 5 GHz RF band include **11a**, **11ac**, and **11a/n**. – **11b**: The RF band works in 802.11b mode and only wireless devices compliant with 802.11b can connect to the wireless network corresponding to the RF band of the AP. – **11g**: The RF band works in 802.11g mode and only wireless devices compliant with 802.11g can connect to the wireless networks corresponding to the RF band of the AP. – **11b/g**: The RF band works in 802.11b/g mode and only wireless devices compliant with 802.11b or 802.11g can connect to the wireless network corresponding to the RF band of the AP. – **11b/g/n**: The RF band works in 802.11b/g/n mode and only wireless devices compliant with 802.11b, 802.11g, or 802.11n can connect to the wireless network corresponding to the RF band of the AP. – **11a**: The RF band works in 802.11a mode and only wireless devices compliant with 802.11a can connect to the wireless networks corresponding to the RF band of the AP. – **11ac**: The RF band works in 802.11ac mode and only wireless devices compliant with 802.11ac can connect to the wireless networks corresponding to the RF band of the AP. – **11a/n**: The RF band works in 802.11a/n mode and only wireless devices working at 5 GHz and compliant with 802.11a or 802.11n can connect to the wireless networks corresponding to the RF band of the AP.
Channel	It specifies the operating channel of the selected RF band. **Auto**: It indicates that the AP automatically adjusts its operating channel according to the ambient environment.
Channel Bandwidth	It specifies the channel bandwidth of the selected RF band. – **20MHz**: It indicates that the only 20MHz channel bandwidth is available. – **40MHz**: It indicates that the 40MHz channel bandwidth is used first, and changes to 20HMz channel bandwidth if severe channel competition occurs in the ambient environment. – **20/40MHz**: It indicates that the AP automatically adjusts its channel bandwidth to 20 MHz or 40 MHz according to the ambient environment. – **80MHz**: It indicates that the AP automatically adjusts its channel bandwidth to 20 MHz, 40 MHz, or 80 MHz according to the ambient environment.
Extension Channel	It specifies an additional channel used to increase the channel bandwidth if the channel bandwidth is 40 MHz or 20/40 MHz.
Channel Lockout	It is used to lock the channel settings of the selected RF band. After a channel is locked, parameters of the channel cannot be changed, including **Country**, **Network Mode**, **Channel**, **Channel Bandwidth**, and **Expansion Channel**.
TX Power	It specifies the transmit power of the selected RF band. A greater transmit power offers broader network coverage. You can slightly reduce the transmit power to improve the wireless network performance and security.

Parameter	Description
Power Lockout	It specifies whether the current transmit power settings of the selected RF band can be changed. If it is selected, the settings cannot be changed.
Preamble	It specifies whether to use long preamble or short preamble. A preamble is a group of bits located at the beginning of a packet to enable a receiver of the packet to perform synchronization and prepare for receiving data. By default, the **Long Preamble** option is selected for compatibility with old network adapters installed on wireless clients. To achieve better synchronization performance of networks, you can select the **Short Preamble** option.
Short GI	It indicates the short guard interval for preventing data block interference. Propagation delays may occur on the receiver side due to factors such as multipath wireless signal transmission. If a data block is transmitted at an overly high speed, it may interfere with the previous data block. The short GI helps prevent such interference. Enabling the short GI can yield a 10% improvement in data throughput. – **Disable**: The short GI function is disabled. – **Enable**: The short GI function is enabled. – **Auto**: The short GI function is enabled or disabled depending on the actual environment.
Inter-SSID User Isolation	It specifies whether to isolate the wireless clients connected to the selected RF band of the AP with different SSIDs. – **Disable**: It indicates that the wireless clients connected to the AP with different SSIDs can communicate with each other. – **Enable**: It indicates that the wireless clients connected to the AP with different SSID cannot communicate with each other. This improves wireless network security.
Client Load Balancing	If RF band 3 is 2.4 GHz, the 2.4 GHz RF bands (RF bands 1 and 3) of the AP support this function. If RF band 3 is 5 GHz, the 5 GHz RF bands (RF bands 2 and 3) of the AP support this function. – **Enable**: User-based client load balancing is enabled. – **Disable**: User-based client load balancing is disabled. Note Client load balancing requires multiple identical RF bands with identical SSIDs.
Client Load Balancing Threshold	It is required only after **Client Load Balancing** is set to **Enable**. It specifies a threshold for triggering client load balancing. When the number of users connected to the identical RF bands reaches this threshold, client load balancing is performed.
Client Load Balancing Offset	It is required only after **Client Load Balancing** is set to **Enable**. It specifies an offset for the following: – If RF band 3 is 2.4 GHz, when the number of users connected to RF band 3 is greater than the number of users connected to RF band 1 by this offset, new users are connected to RF band 1 with priority. – If RF band 3 is 5 GHz, when the number of users connected to RF band 3 is greater than the number of users connected to RF band 2 by this offset, new users are connected to RF band 2 with priority.

7.3 Radio Optimizing

7.3.1 Overview

Wireless Network Application Scenario

Generally, wireless networks application scenarios include those with a common user density and those with a high user density..

- Application scenario with a common user density

In an office, public building, school, warehouse, or hospital, the wireless network must provide coverage to many users in a large area.

- Application scenario with a high AP density

In a large crowded area with many wireless clients, many APs are deployed to provide coverage (AP/225~500 M^2). The common application scenarios with a high AP density include:

  - Conference hall, theatre, exhibition hall, and dining hall
  - Indoor/outdoor stadium
  - College classroom
  - Airport and railway station

Performance Optimization Parameters

To cater to different requirements for wireless connection in different application scenarios and help customers set up optimum wireless services, IP-COM provides a series of performance optimization parameters.

- 5GHZ SSID priority

The 2.4 GHz band is more widely used for wireless coverage than the 5 GHz band. However, the 2.4 GHz band offers only 3 non-overlapping channels. Therefore, the channels are busy, resulting in great wireless signal interference. Actually, the 5 GHz band can offer more non-overlapping channels. In China, it offers 9 channels. In Some other countries, it offers more than 20 channels.

An increasing number of users are using wireless clients that work at the 2.4 GHz and 5 GHz bands at the same time as wireless network development continues. However, a dual-band client often connects to the 2.4 GHz network by default, increasing the imbalance between the 2.4 GHz network and 5 GHz network.

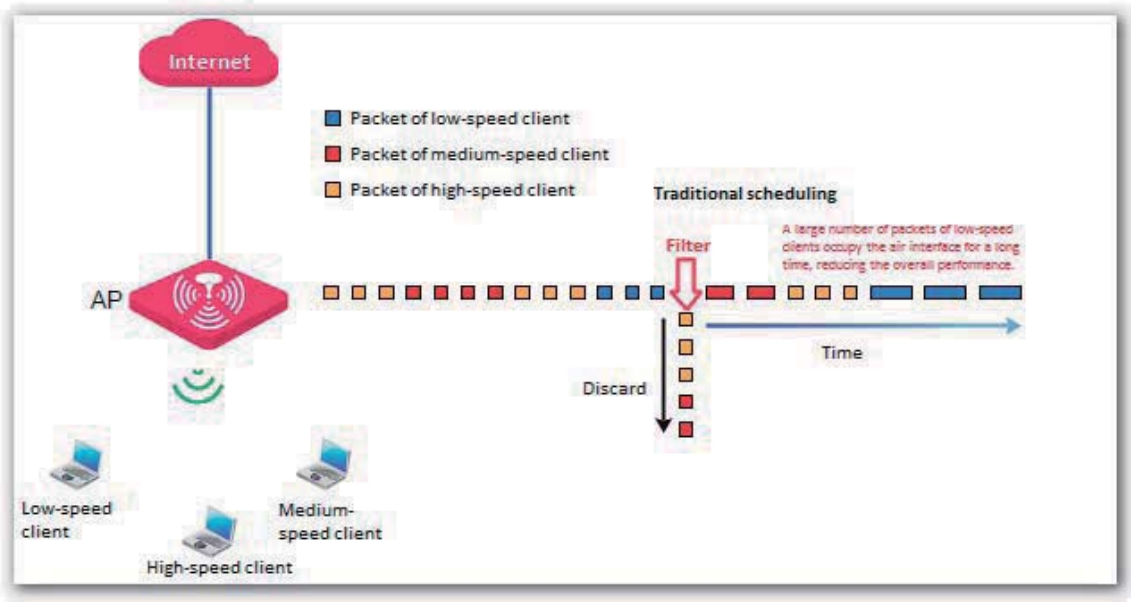
The 5GHZ SSID priority feature makes a dual-band client to connect to the 5 GHz network first to reduce the workload and interference at the 2.4 GHz band for better user experience.

Note

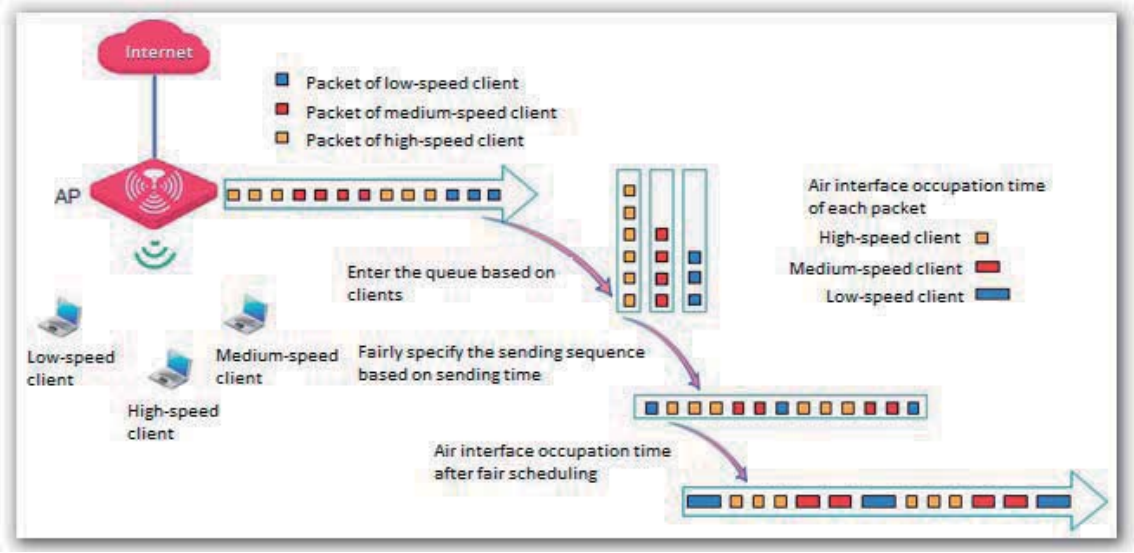
The 5GHZ SSID priority feature is applicable only after both the 2.4 GHz and 5 GHz bands of the AP are enabled and assigned the same SSID, security mode, and password.

- Airtime Scheduling

Traditional packet distribution is performed in FIFO mode. In an environment that involves various wireless data rates, high-speed clients has high transmission capability and high frequency use efficiency but has less time to access the air interface. On the contrary, low-speed clients has low transmission capability and low frequency use efficiency but has more time to access the air interface. This reduces the overall throughput of each AP, resulting in lower system efficiency.



Air interface scheduling assigns the same length of time for high-speed clients and low-speed clients to access the air interface, enabling the high-speed clients to transmit more data. This increases the overall throughput and number of connected users of an AP.



- Signal Transmission

In a scenario with a common AP density, an AP must cover a large area. Therefore, the major WLAN constraint is transmission loss. In a scenario with a high AP density, many users and clients gather in a large area. Many APs must be deployed and they are within the visual distance of most users. In this scenario, the major WLAN constraint is inter-AP interference.

The signal transmission capability can be adjusted together with the transmit power based on scenarios to effectively ease the WLAN constraints. Select **Coverage-oriented** for a scenario with a common AP density, and select **Capacity-oriented** for a scenario with a high AP density.

- Signal Reception

In a scenario with a common AP density, a small number of APs are deployed and successful AP connection by clients must be ensured. In a scenario with a high AP density, a large number of APs are deployed and connection by clients to AP with stronger signals must be ensured.

You can configure signal reception based on the application scenario to adjust the receive signal strength range acceptable to the AP.

7.3.2 Optimizing RF Bands

Note

It is recommended that you change the settings only under the instruction of professional personnel, so as to prevent decreasing the wireless performance of the router.

1. Choose **Wireless** > **Radio Optimizing**.
2. Select the RF band to be configured.
3. Change the parameter settings as required.
4. Click **Save**.

---End

Parameter description

Parameter	Description
Beacon Interval	It specifies the interval for transmitting the Beacon frame. The value range is 20 to 999. The unit is millisecond. The Beacon frame is transmitted at the specified interval to announce the presence of a wireless network. Generally, a smaller interval enables wireless clients to connect to the AP more quickly, while a larger interval ensures higher data transmission efficiency.
Fragment Threshold	It specifies the threshold of a fragment. The value range is 256 to 2346. The unit is byte. Fragmenting is a process that divides a frame into several fragments, which are transmitted and acknowledged separately. If the size of a frame exceeds this threshold, the frame is fragmented. In case of a high error rate, you can reduce the threshold to enable the AP to resend only the fragments that have not been sent successfully, so as to increase the frame throughput. In an environment without interference, you can increase the threshold to reduce the number of acknowledgement times, so as to increase the frame throughput.
RTS Threshold	It specifies the frame length threshold for triggering the RTS/CTS mechanism. If a frame exceeds this threshold, the RTS/CTS mechanism is triggered to reduce conflicts. The value range is 1 to 2347. The unit is byte. Set the RTS threshold based on the actual situation. An excessively small value increases the RTS frame transmission frequency and bandwidth requirement. A higher RTS frame transmission frequency enables a wireless network to recover from conflicts quicker. For a wireless network with high user density, you can reduce this threshold for reducing conflicts. The RTS mechanism requires some network bandwidth. Therefore, it is triggered only when frames exceed this threshold.
DTIM Interval	It specifies the interval for transmitting the Delivery Traffic Indication Message (DTIM) frame. The value range is 1 to 255. The unit is Beacon. A countdown starts from this value. The AP transmits broadcast and multicast frames in its cache only when the countdown reaches zero. For example, if **DTIM Interval** is set to **1**, the AP transmits all cached frames at the Beacon

Parameter	Description
	interval.
Receive Signal Strength	It specifies the minimum strength of received signals acceptable to the AP. If the strength of the signals transmitted by a wireless device is weaker than this threshold, the wireless device cannot connect to the AP. If there are multiple APs, an appropriate value of this parameter ensures that wireless clients connect to the APs with strong signals.
5GHZ SSID Priority	It specifies whether the AP makes a dual-band client to connect to the 5 GHz network first. – **Enable**: The AP makes a dual-band client to connect to the 5 GHz network first. – **Disable**: The AP allows a dual-band client to randomly connect to the 2.4 GHz or 5 GHz network.
Signal Transmission	It specifies the signal transmission mode for a specific scenario. – **Coverage-oriented**: This mode enables the AP to provide broader coverage when the AP is deployed in an area with low AP density, such as an office, a warehouse, or a hospital. – **Capacity-oriented**: This mode reduces inter-AP interference when the AP is deployed in an area with high AP density, such as a venue, an exhibition hall, a banquet hall, a stadium, a college classroom, or a departure lounge. Note This feature is available only to the 2.4 GHz band.
Signal Reception	It specifies the signal reception mode for a specific scenario. – **Coverage-oriented**: This mode enables more wireless devices to connect to the AP in an area with low AP density. – **Capacity-oriented**: This mode ensures that each wireless device in an area with high AP density connects to the AP with the strongest signal. – **Default**: This mode enables the AP to achieve a balance between the other two modes. Note This feature is available only to the 2.4 GHz band.
Airtime Scheduling	It specifies whether to enable the air interface scheduling function of the AP. After it is enabled, clients with different data rates are assigned the same length of time to access the air interface. This offers better user experience to high-speed clients.
APSD	It specifies whether to enable the Automatic Power Save Delivery (APSD) function. It helps reduce power consumption of the default, it is disabled.
Aging Time	It specifies the wireless client disconnection interval of the AP. The AP disconnects from a wireless client if no traffic is transmitted or received by the wireless client within the interval. If the wireless client starts transmitting or receiving traffic within the interval, the countdown is reset.
Basic Rate Sets	It specifies the data rates that a wireless client must support if the wireless client must be connected to the AP.
Supported Rate Sets	It specifies the data rates that the AP supports and are optional to wireless clients.

7.4 Frequency Analysis

7.4.1 Overview

The Frequency Analysis module provides the frequency analysis and rogue AP detection functions.

- Frequency Analysis

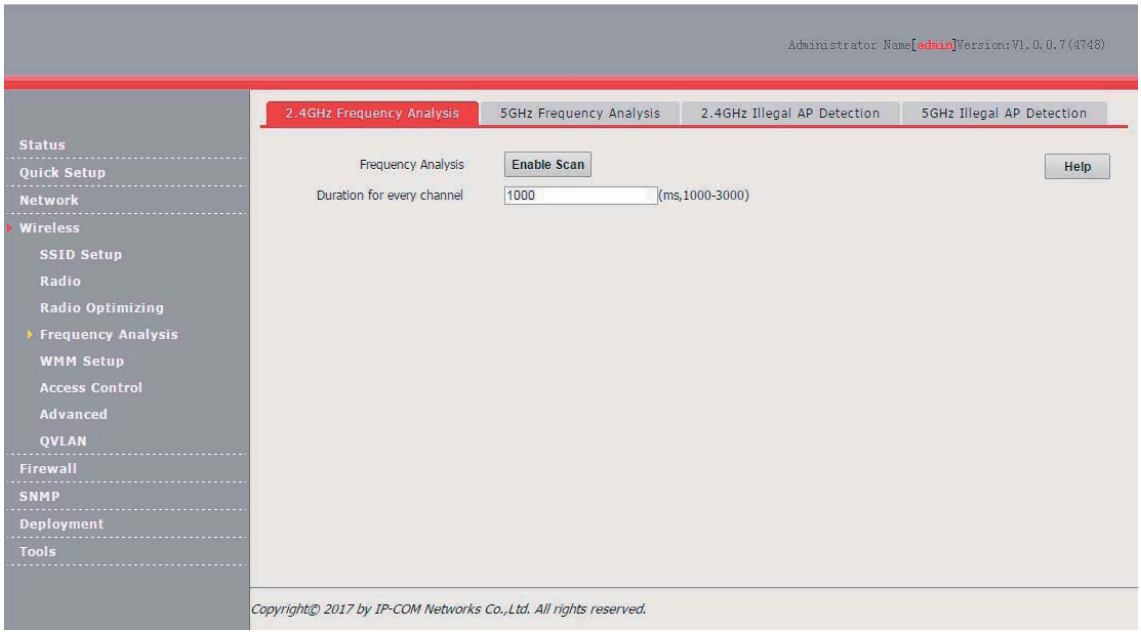
This function enables you to view the noise and usage of each channel, so that you can select a rarely used channel as the operating channel of the AP for better wireless transmission efficiency.

- Rogue AP detection

This function enables you to detect the wireless signals near the AP, including information about SSID, MAC address, channel, and signal strength.

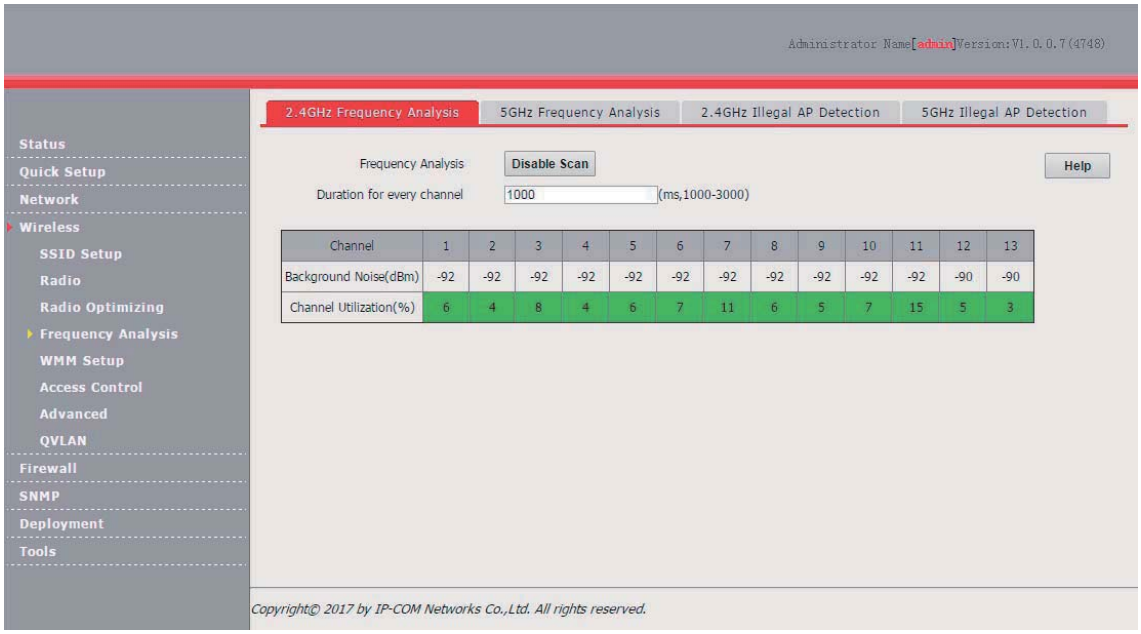
7.4.2 Analyzing Frequencies

1. Choose **Wireless** > **Frequency Analysis**.
2. Click the **2.4GHz Frequency Analysis** or **5GHz Frequency Analysis** tab.
3. Click **Enable Scan**.



---End

The following figure shows a result example.

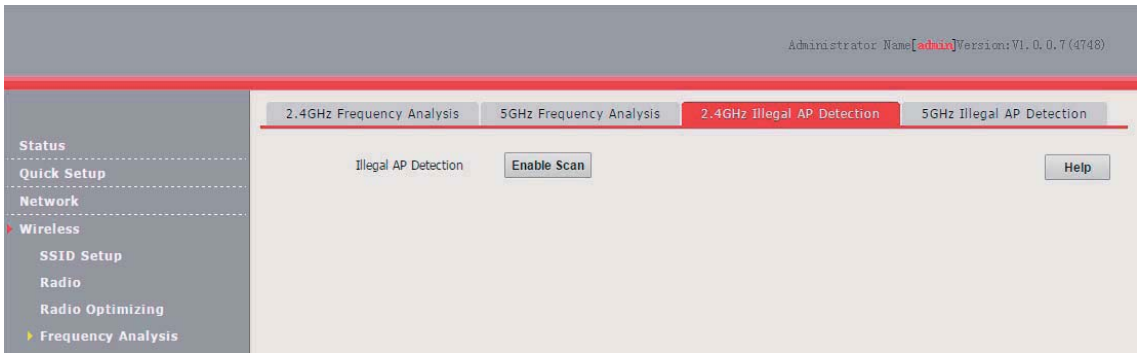


Parameter description

Parameter	Description
Duration for every channel	It specifies the duration for scanning each channel. The default duration is 1000 ms.
Channel	It specifies all the channels corresponding to the selected RF band.
Background Noise (dBm)	It specifies the background noise of a specific channel. The unit is dBm.
Channel Utilization (%)	It specifies the use rate of a specific channel. A channel use rate from 0%~50% is displayed in green, which indicates that the channel is idle. A channel use rate from 50%~80% is displayed in yellow, which indicates that the channel is busy. A channel use rate from 80%~100% is displayed in red, which indicates that the channel is very busy.

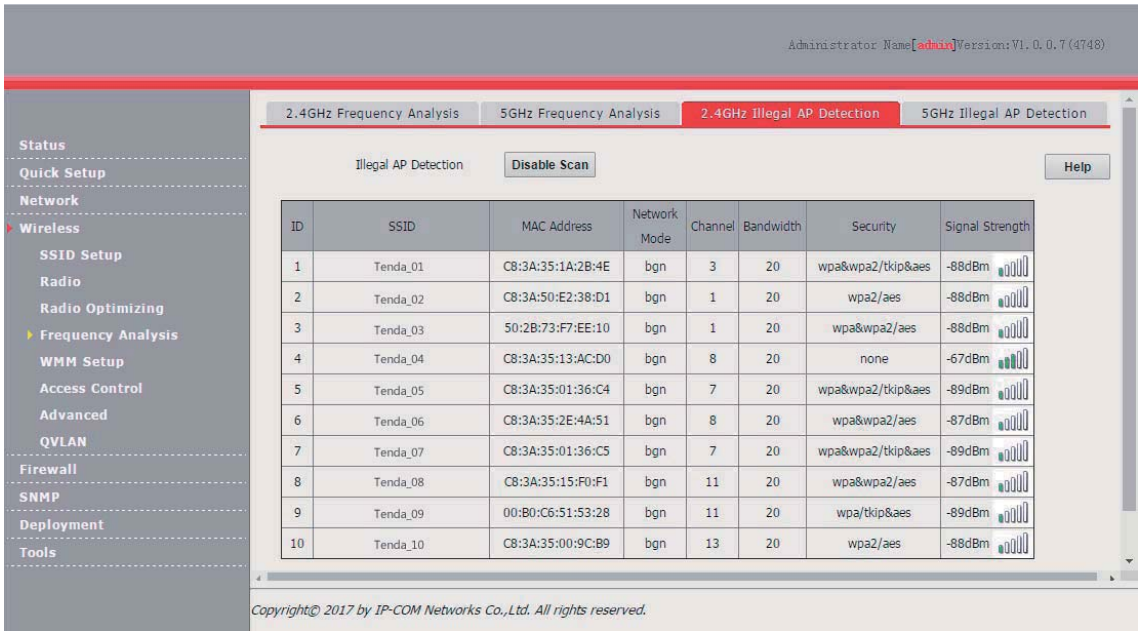
Detecting Rogue APs

1. Choose **Wireless** > **Frequency Analysis**.
2. Click the **2.4GHz Illegal AP Detection** or **5GHz Illegal AP Detection** tab.
3. Click **Enable Scan**.



---End

The following figure shows a result example.



7.5 WMM Setup

7.5.1 Overview

802.11 networks offer wireless access services based on the Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA) channel competition mechanism, which allows all wireless clients to fairly compete for channels. All the services implemented over wireless networks share the same channel competition parameters. Nevertheless, different services usually have different requirements for bandwidth, delay, and jitter. This requires wireless networks to offer accessibility based on the services implemented over the networks.

WMM is a wireless QoS protocol used to ensure that packets with high priorities are transmitted first. This ensures better voice and video service experience over wireless networks.

WMM involves the following terms:

- Enhanced Distributed Channel Access (EDCA): It is a channel competition mechanism to ensure that packets with higher priorities are assigned more bandwidth and transmitted earlier.
- Access Category (AC): AC: The WMM mechanism divides WLAN traffic by priority in descending order into the AC-VO (voice stream), AC-VI (video stream), AC-BE (best effort), and AC-BK (background) access categories. The access categories use queues with different priorities to send packets. The WMM mechanism ensures that packets in queues with higher priorities have more opportunities to access channels.

According to the 802.11 protocol family, all devices listen on a channel before using the channel to send data. If the channel stays idle for or longer than a specified period, the devices wait a random backoff period within the contention window. The device whose backoff period expires first can use the channel. The 802.11 protocol family applies the same backoff period and contention window to all devices across a network to ensure that the devices have the same channel contention opportunity.

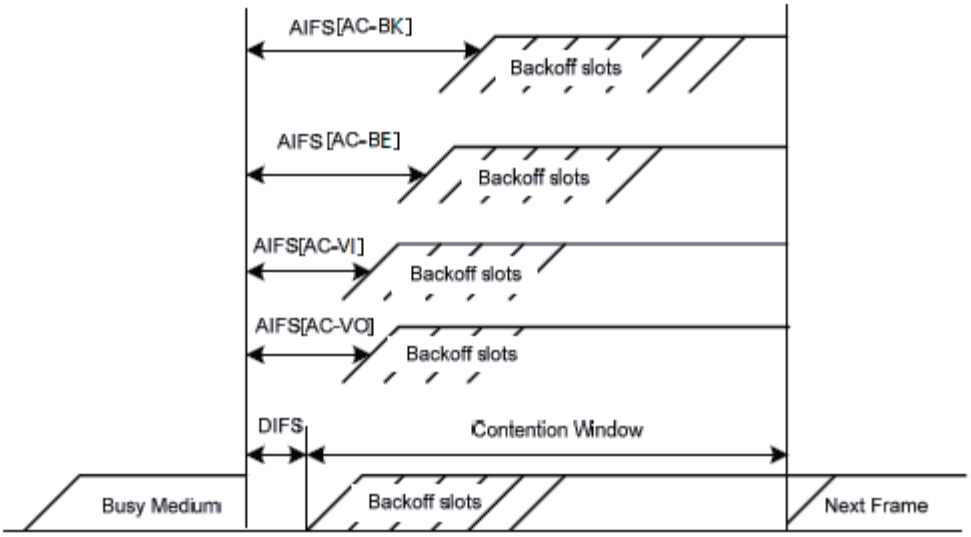
EDCA Parameters

WMM changes the contention mechanism of 802.11 networks by dividing packets into four ACs, among which the ACs with higher priorities have more opportunities to access channels. The ACs help achieve different service levels.

WMM assigns each AC a set of EDCA parameters for channel contention, including:

- Arbitration Inter Frame Spacing Number (AIFSN): Different from the fixed distributed inter-frame spacing (DIFS) specified in the 802.11 protocol family, AIFSN varies across ACs. A greater AIFSN indicates a longer backoff period. See AIFS in the following figure.
- Contention window minimum (CWmin) and contention window maximum (CWmax) specify the average backoff period. The period increases along with these two values. See the backoff slots in the following figure.
- Transmission Opportunity (TXOP): It specifies the maximum channel use duration after successful channel contention. The duration increases along with this value. The value **0** indicates that a device can send only one packet through a channel after winning contention for the channel.

WMM assigns different channel contention parameters to different ACs.



ACK Policies

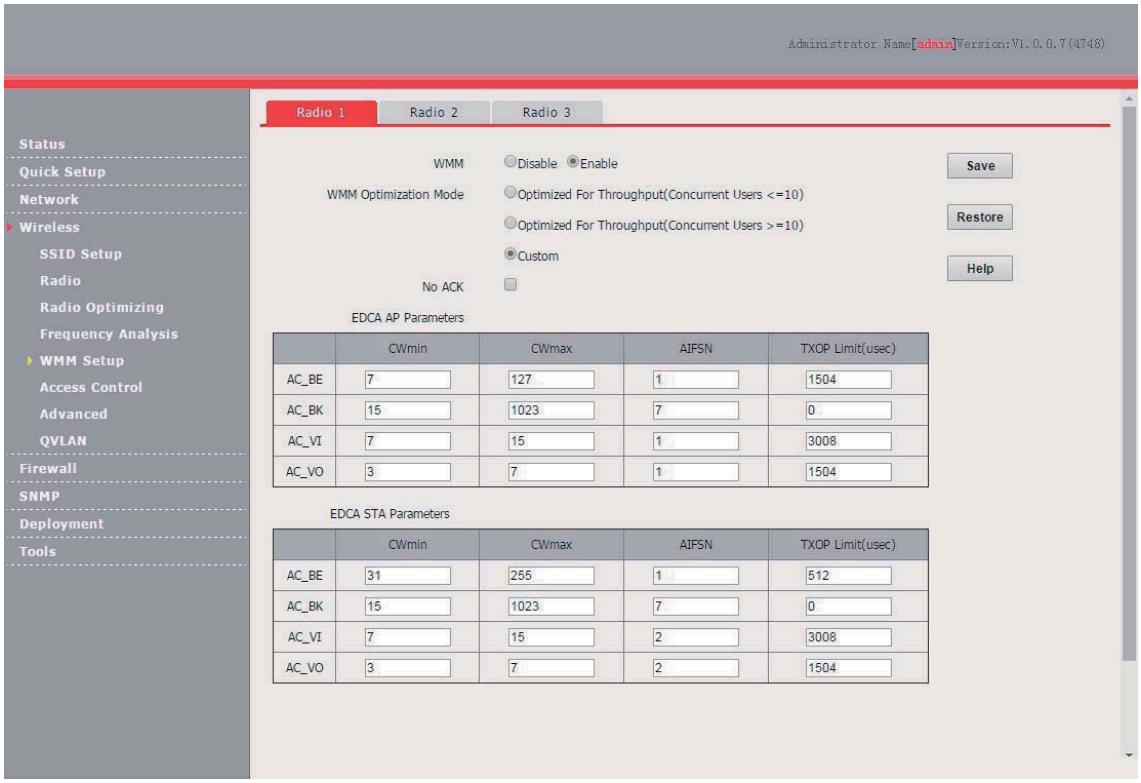
WMM specifies the Normal ACK and No ACK policies.

- According to the No ACK policy, no ACK packet is used during wireless packet transmission to acknowledge packet reception. This policy is applicable to scenarios where interference is mild and can effectively improve transmission efficiency. In case of strong interference, lost packets are not sent again if this policy is adopted. This leads a higher packet loss rate and reduces the overall performance.
- According to the Normal ACK policy, each time a receiver receives a packet, it sends back an ACK packet to acknowledge packet reception.

7.5.2 Changing the WMM Settings

By default, the WMM function is disabled. To enable the function, perform the following procedure:

1. Choose **Wireless** > **WMM Setup**.
2. Select the RF band for which WMM is to be configured.
3. Set **WMM** to **Enable**.
4. Select the required WMM optimization mode.
5. If you select **Custom**, set the WMM parameters as required.
6. Click **Save**.



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Parameter description

Parameter	Description
WMM	It specifies whether to enable the WMM function.
WMM Optimization Mode	It allows you to select a WMM optimization mode or set WMM parameters. AP375 provide the WMM optimization modes. You can select a mode according to the number of users concurrently connected to the AP. – **Optimized For Throughput(Concurrent Users <=10)**: If 10 or less clients are connected to the AP, you are recommended to select this mode to increase client throughput. – **Optimized For Throughput(Concurrent Users >=10)**: If more than 10 clients are connected to the AP, you are recommended to select this mode to ensure client connectivity. – **Custom**: This mode enables you to set the WMM EDCA parameters for manual optimization.
No ACK	– If the check box is selected, the No ACK policy is adopted. – If the check box is deselected, the Normal ACK policy is adopted.
EDCA Parameters	For details, refer to section 5.1.

7.6 Access Control

7.6.1 Overview

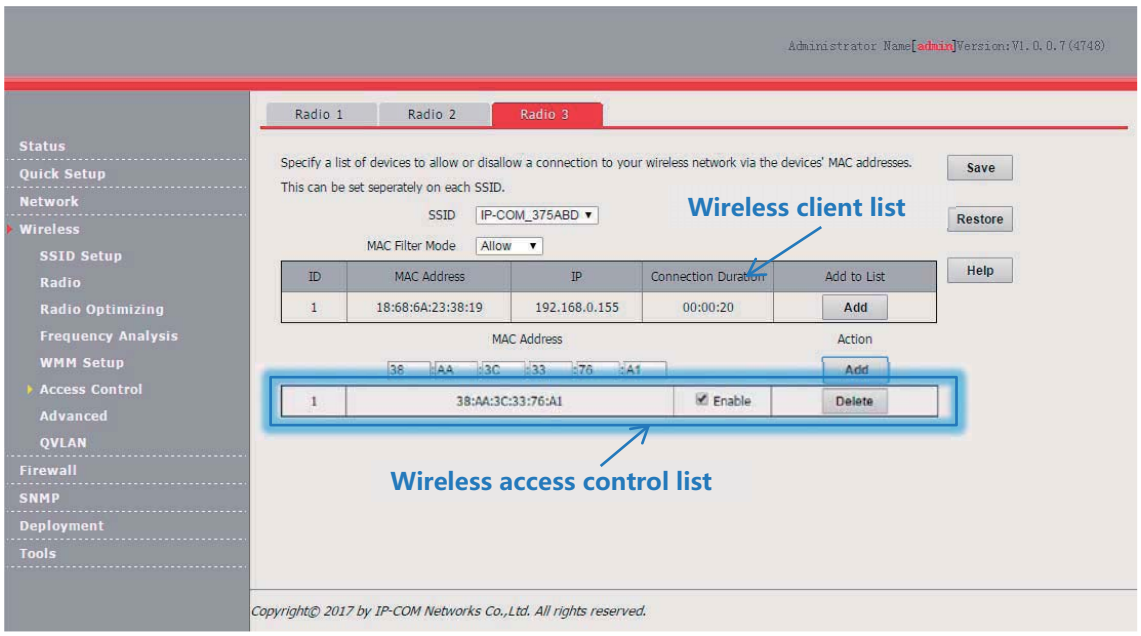
It specifies, based on MAC address filter rules, the wireless devices that can or cannot access the wireless networks of the AP. Devices that have been controlled cannot connect to the corresponding wireless network.

The AP supports the following MAC address filter rules:

- **Disable**: It indicates that access control is disabled. In this case, all wireless devices can access the wireless networks of the AP.
- **Allow**: It indicates that only the wireless devices with the specified MAC addresses can access the wireless networks of the AP.
- **Deny**: It indicates that only the wireless devices with the specified MAC addresses cannot access the wireless networks of the AP.

Configuring Access Control

1. Choose **Wireless** > **Access Control**.
2. Click the tab of the RF band on which access control must be implemented.
3. From the **SSID** drop-down list box, select the SSID of the RF band on which access control must be implemented.
4. Select an access control mode from the **MAC Filter Mode** drop-down list box.
5. If you select **Allow** or **Deny**, enter the MAC addresses to control in the control list and click **Add**.
6. If a wireless device to be controlled has been connected to the AP, you can click **Add** corresponding to the device in the wireless client list to directly add it to the control list.
7. Click **Save**.



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Parameter description

Parameter	Description
SSID	It specifies the SSID that requires wireless client access control.
MAC Filter Mode	It specifies the mode for filtering MAC addresses. – **Disable**: It indicates that access control is disabled. – **Allow**: It indicates that only the wireless clients on the access control list can connect to the AP with the selected SSID. – **Deny**: It indicates that only the wireless clients on the access control list cannot connect to the AP with the selected SSID.

7.6.2 Example of Configuring Access Control

- Networking requirement

A hotel has set up wireless networks and designated the SSID **Ordering** corresponding to RF band 2 for placing orders. The AP must be configured to allow only ordering devices to connect to the wireless network corresponding to the SSID.

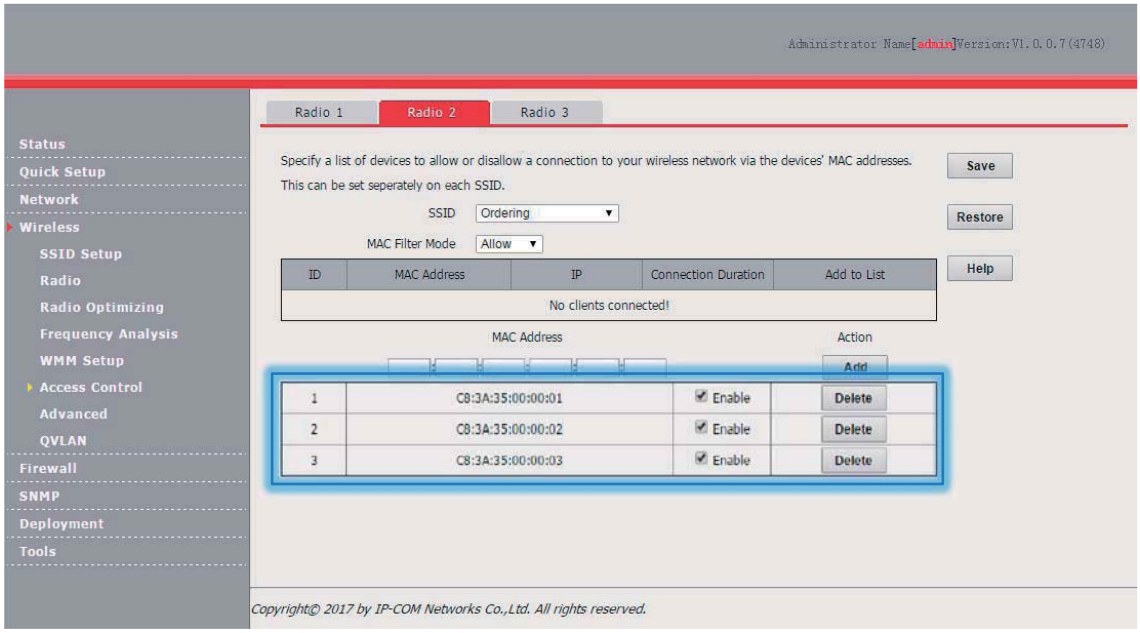
You can use the access control function of the AP to address this requirement. Assume that there are three ordering devices whose MAC addresses are C8:3A:35:00:00:01, C8:3A:35:00:00:02, and C8:3A:35:00:00:03.

- Configuration procedure

1. Choose **Wireless** > **Access Control** and click the **Radio 2** tab.
2. Select **Ordering** from the **SSID** drop-down list box.
3. Select **Allow** from the **MAC Filter Mode** drop-down list box.
4. Enter **C8:3A:35:00:00:01** in the **MAC Address** text box and click **Add**. Repeat this step to add **C8:3A:35:00:00:02** and **C8:3A:35:00:00:03** as well.
5. Click **Save**.

---End

The following figure shows the configuration.



- Verification

Verify that only the ordering devices can connect to the **Ordering** wireless network.

7.7 Advanced

7.7.1 Overview

This module enables you to identify and filter client types and to filter broadcast data.

- Recognize Terminal Type

This function is used to identify the operating system types of wireless clients for efficient wireless network management. The wireless client types that can be identified by the AP include: Android, iOS, WPhone, Windows, MAC, and other.

- Host Type Filter

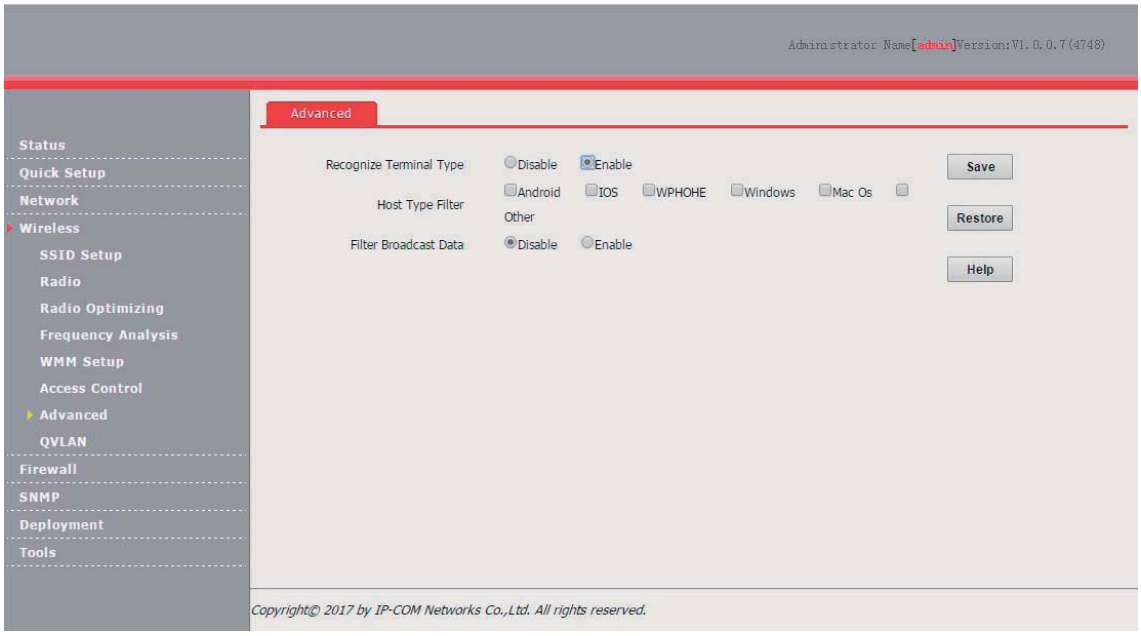
This function enables you to filter wireless clients by type. A filtered client can connect to the wireless network of the AP but cannot access the internet.

- Filter Broadcast Data

By default, the AP forwards many invalid broadcast packets of the wired network, which may affect forwarding of valid service data. This function enables you to filter broadcast packets to be forwarded, so as to reduce air interface resource usage and ensure bandwidth for valid service data.

7.7.2 Configuring the Client Type Filter

1. Choose **Wireless** > **Advanced**.
2. Set **Recognize Terminal Type** to **Enable**.
3. Select the types of wireless clients not allowed to access the internet.
4. Click **Save**.



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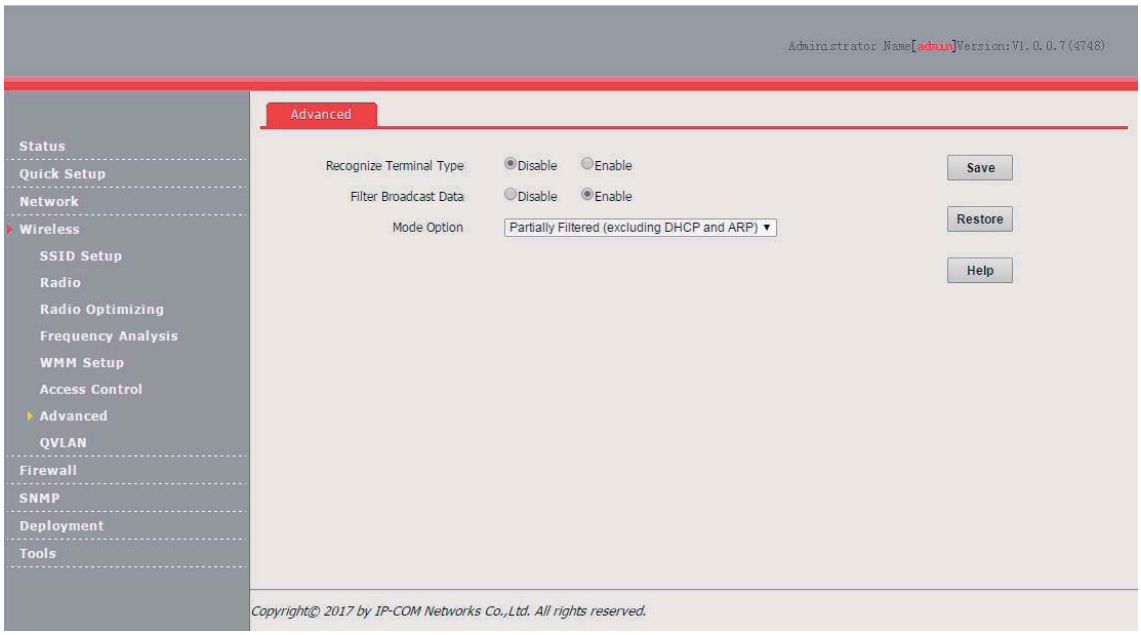
Parameter description

Parameter	Description
Recognize Terminal Type	It specifies whether to identify client types. – **Enable**: It indicates that client types are identified. After enabling the function, you can go to the **Status** > **Wireless Clients** page to view the operating system types of the wireless clients connected to the AP. – **Disable**: It indicates that client types are not identified.
Host Type Filter	It specifies the types of wireless clients not allowed to access the internet. – **Android**: It indicates the wireless clients running an Android operating system. – **IOS**: It indicates the wireless clients running an iOS operation system, such as iPhone, and iPad. – **WPHONE**: It indicates the wireless clients running a WPhone operating system. – **Windows**: It indicates the wireless clients running a Windows operating system. – **Mac Os**: It indicates the wireless clients running a MAC operating system. – **Other**: It indicates the wireless clients running an operating system other than the preceding operating systems.

7.7.3 Configuring the Broadcast Data Filter

1. Choose **Wireless** > **Advanced**.
2. Set **Filter Broadcast Data** to **Enable**.
3. Select a broadcast data filter mode from the **Mode Option** drop-down list box.
4. Click **Save**.



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Parameter description

Parameter	Description
Filter Broadcast Data	It specifies whether to filter broadcast data. – **Enable**: It indicates that broadcast data is filtered to be forwarded, so as to reduce air

Parameter	Description
	interface resource usage and ensure bandwidth for valid service data. – **Disable**: It indicates that broadcast data is not filtered.
Option Mode	It is required if **Filter Broadcast Data** is set to **Enable**. – **Partially Filtered (excluding DHCP and ARP)**: It indicates that all broadcast or multicast data other than DHCP and ARP broadcast data is filtered. – **Partially Filtered (excluding ARP)**: It indicates that all broadcast or multicast data other than ARP broadcast data is filtered.

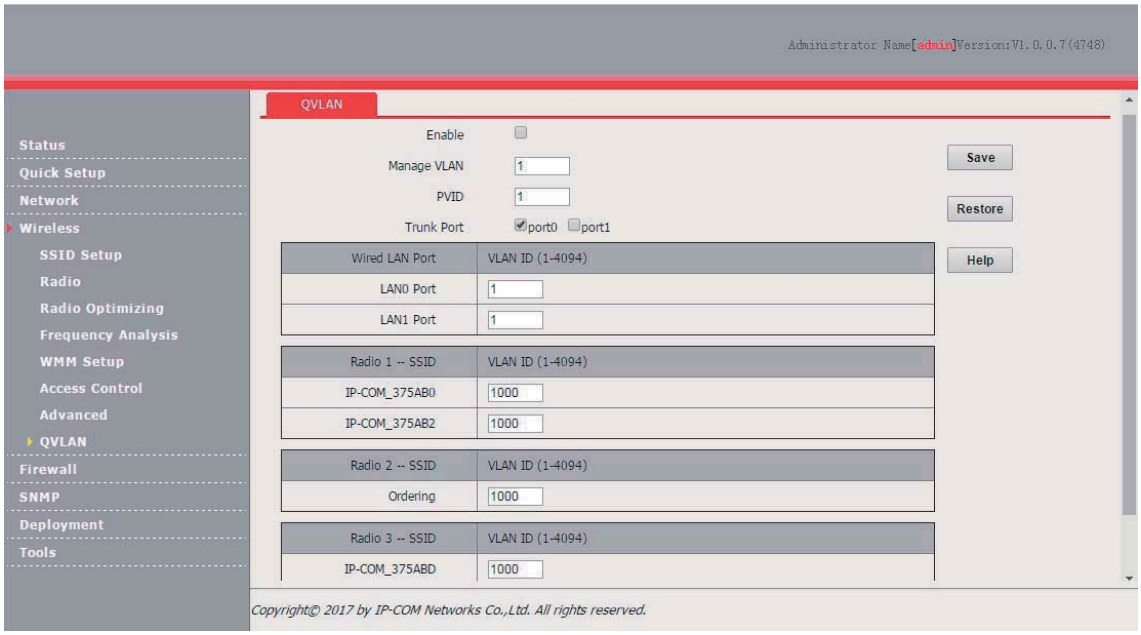
7.8 QVLAN

7.8.1 Overview

The AP supports 802.1Q VLANs and is applicable in a network environment where 802.1Q VLANs have been defined. By default, the QVLAN function is disabled.

7.8.2 Configuring the QVLAN Function

1. Choose **Wireless** > **QVLAN**.
2. Change the parameters as required. Generally, you only need to change the **Enable** option, the VLAN IDs of wired LAN ports, and the SSID VLAN IDs of RF bands.
3. Click **Save**.



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Parameter description

Parameter	Description
Enable	It specifies whether to enable the QVLAN function of the AP. By default, it is disabled.
Manage VLAN	It specifies the ID of the AP management VLAN. The default value is **1**. After changing the management VLAN, you can manage the AP only after connecting your computer to the new management VLAN.
PVID	It specifies the ID of the default native VLAN of the trunk port of the AP. The default value is **1**.
Trunk Port	It specifies the LAN port used as a trunk port of the AP. The default value is **port0**. Traffic of all VLANs can pass through a trunk port. Note If the QVLAN function is enabled, set at least one LAN port as a trunk port. **port0** corresponds to the LAN0 port and non-PoE port of the AP and **port1** corresponds to the LAN1 port and PoE port of the AP.
Wired LAN Port	It specifies the LAN ports of the AP, including LAN0 and LAN1. Note **LAN0 Port** corresponds to the non-PoE port of the AP and **LAN1** corresponds to the PoE port of the AP.
VLAN ID	It specifies the VLAN ID corresponding to a wired LAN port used as an access port.
Radio 1 SSID Radio 2 SSID Radio 3 SSID	It specifies the currently enabled SSIDs corresponding to the RF bands of the AP.
VLAN ID	It specifies VLAN IDs corresponding to SSIDs. The default value is **1000**. The value range is 1 to 4094. After the QVLAN function is enabled, the wireless ports corresponding to SSIDs functions as access ports. The PVID and VLAN ID of an access port are the same.

If the QVLAN function is enabled, tagged data received by a port of the AP is forwarded to the port corresponding to the VLAN ID in the data, whereas untagged data received by a port of the AP is forwarded to the port corresponding to the PVID of the port that receives the data.

The following table describes how ports of different link types process transmitted and received data.

Port	Method to Process Received Data		Method to Process Transmitted Data
	Tagged Data	Untagged Data	
Access	Forward the data to other ports of the VLAN corresponding to the VID in the data.	Forward the data to the other ports of the VLAN corresponding to the PVID of the port that receives the data	Transmit data after removing tags from the data.
Trunk			If the VLAN ID and PVID of a port are the same, transmit data after removing tags from the data. If the VID and PVID of a port are different, transmit data without removing tags from the data.

7.8.3 Example of Configuring QVLAN Settings

Networking Requirement

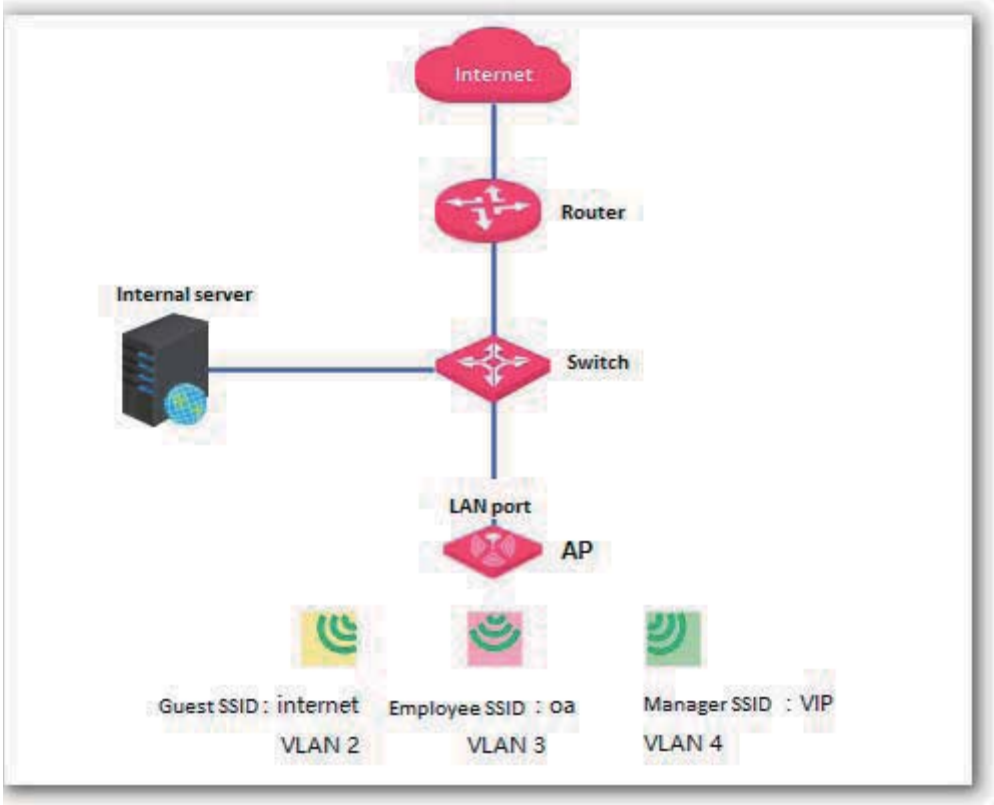
A hotel has the following wireless network coverage requirements:

- Guests are connected to VLAN 2 and can access only the internet.
- Employees are connected to VLAN 3 and can access only the LAN.
- Hotel managers are connected to VLAN 4 and can access both the internet and LAN.

Assumption

Assume that RF band 1 is used, the SSID of the wireless network for guests is **internet**. the SSID of the wireless network for employees is **oa**, and the SSID of the wireless network for managers is **VIP**.

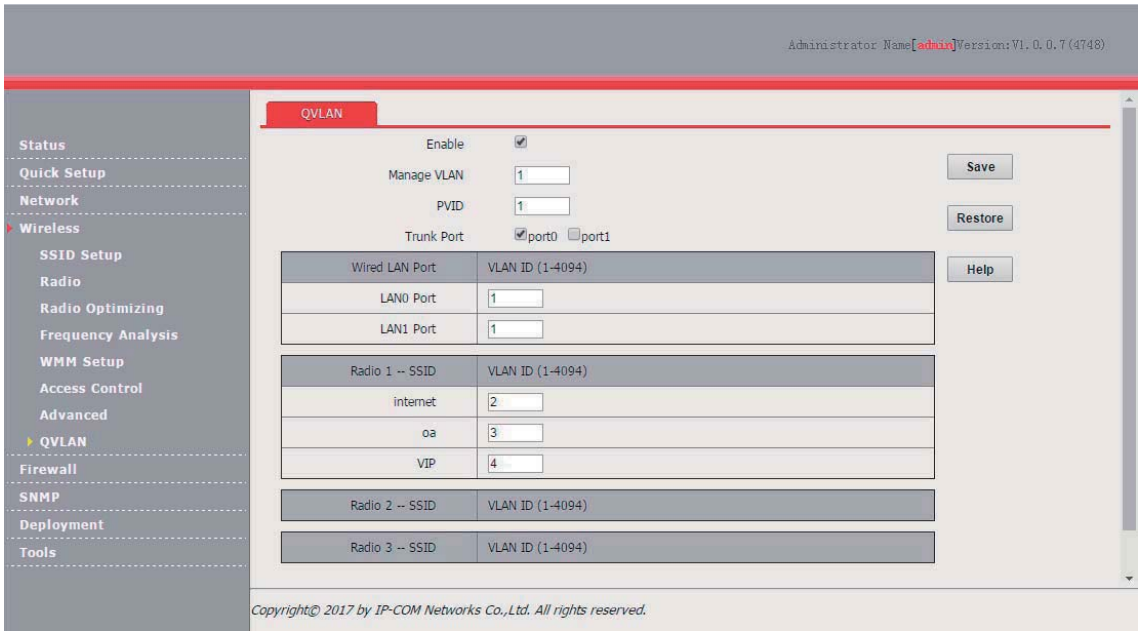
Network Topology



Configuration Procedure

1. Configure the AP.
   (1) Log in to the web UI of the AP and choose **Wireless** > **QVLAN**.
   (2) Select the **Enable** check box.
   (3) In the RF band 1 settings, change the VLAN ID of the SSID **internet** to **2**, the VLAN ID of the SSID **oa** to **3**, and the VLAN ID of the SSID **VIP** to **4**.

(4) Click **Save**.



Wait for the AP to reboot.

2. Configure the switch.

Create IEEE 802.1Q VLANs described in the following table on the switch.

Port Connected To	Accessible VLAN ID	Port Type	PVID
AP	1, 2, 3, and 4	Trunk	1
LAN server	3 and 4	Trunk	1
Router	2 and 4	Trunk	1

Retain the default settings of other ports. For details, refer to the user guide for the switch.

3. Configure the router and internal server.

To ensure that wireless clients connected to the AP can access the internet, the router and internal server must support the QVLAN function and configured with QVLAN settings. The following provides configuration details.

- Router

Port Connected To	Accessible VLAN ID	Port Type	PVID
Switch	2 and 4	Trunk	1

- Internal server

Port Connected To	Accessible VLAN ID	Port Type	PVID
Switch	3 and 4	Trunk	1

For details about how to configure a required device, refer to the user guide for the device.

Verification

Verify that wireless clients connected to the wireless network **internet** can access only the internet, wireless clients connected to the wireless network **oa** can access only the LAN, and wireless clients

connected to the wireless network **VIP** can access both the internet and LAN.

8 Firewall

8.1 URL Filter

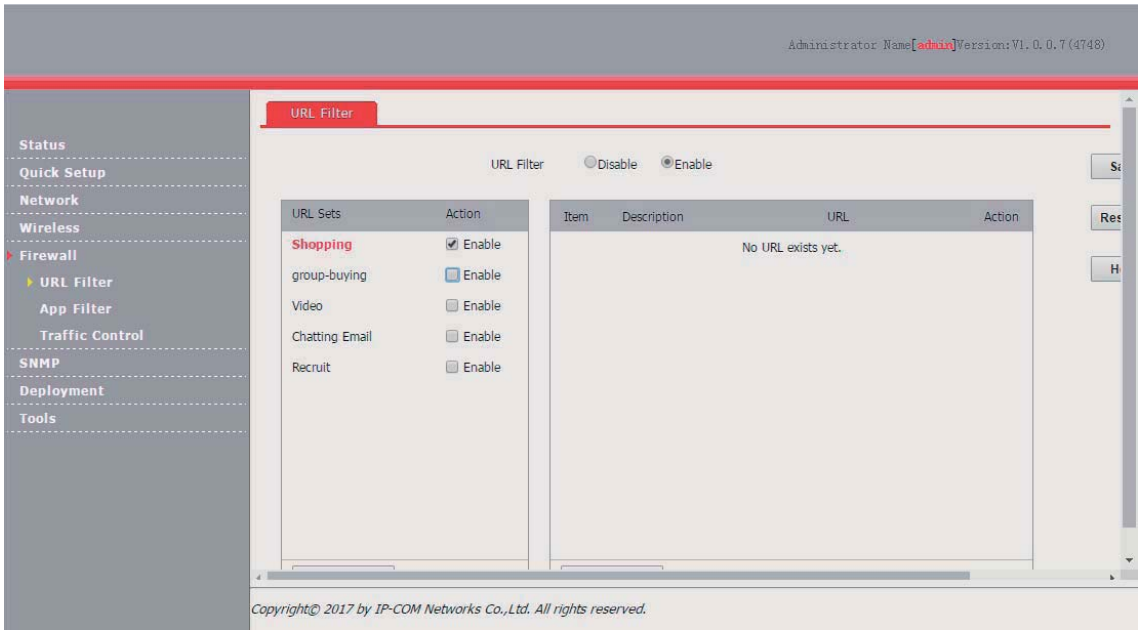
8.1.1 Overview

This function enables you to disallow wireless users to access specified websites. By default, the AP provides five website categories. You can define categories as required.

By default, URL filter function is disabled.

8.1.2 Configuring the URL Filter

1. Choose **Firewall** > **URL Filter**.
2. Set **URL Filter** to **Enable**.
3. Select the category of websites disallowed to be accessed.
4. Click **Save**.



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Parameter description

Parameter		Description
URL Filter		It specifies whether to enable the URL filter function of the default, it is disabled.
URL Sets	URL Sets	It specifies website categories. When you click a category, the URLs in the category appear on the right. By default, the Shopping, Group-Buying, Video, Chatting Email, and Recruit categories are provided.
	Action	**Enable** indicates that wireless client cannot access the corresponding websites. **Disable** indicates that wireless client can access the corresponding websites. –  : It is used to save a new website category. –  : It is used to cancel creation of a website category. –  : It is used to delete a user-defined website category.
	New URL Sets	It is used to create a website category.
Item	Description	It specifies the name of a website.
	URL	It specifies the address of a website.
	Action	–  : It is used to save a new website entry. –  : It is used to cancel creation of a website entry. –  : It is used to delete a website entry.
	New URL	It is used to create a website entry.

8.2 App Filter

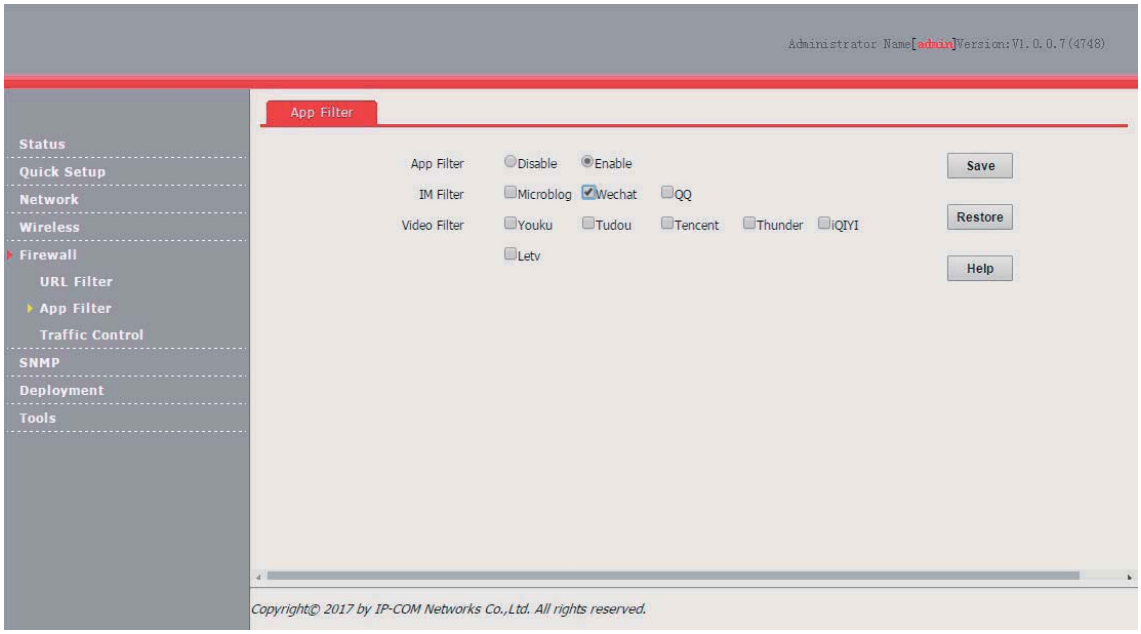
8.2.1 Overview

The AP can filter mainstream apps.

After the app filter is enabled, wireless clients connected to the AP cannot use the services provided by the filtered apps.

8.2.2 Configuring the App Filter

1. Choose **Firewall** > **App Filter**.
2. Set **App Filter** to **Enable**.
3. Select the apps disallowed to be used.
4. Click **Save**.



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8.3 Traffic Control

8.3.1 Overview

Bandwidth control mode enables the network administrator to control the users' traffic so as to make sure that the limited bandwidth resources can be distributed appropriately, improving the internet utilization.

The AP can perform traffic control in the following modes:

- Manual traffic control

You can manually set the maximum upload and download speeds by SSID and client to limit the total bandwidth for SSIDs and evenly allocate bandwidth to clients. After multiple SSIDs are enabled, this function prevents a low-priority network (such as the guest network) or user from using excessive bandwidth, which significantly reduces the bandwidth available to other networks and clients.

- Automatic traffic control

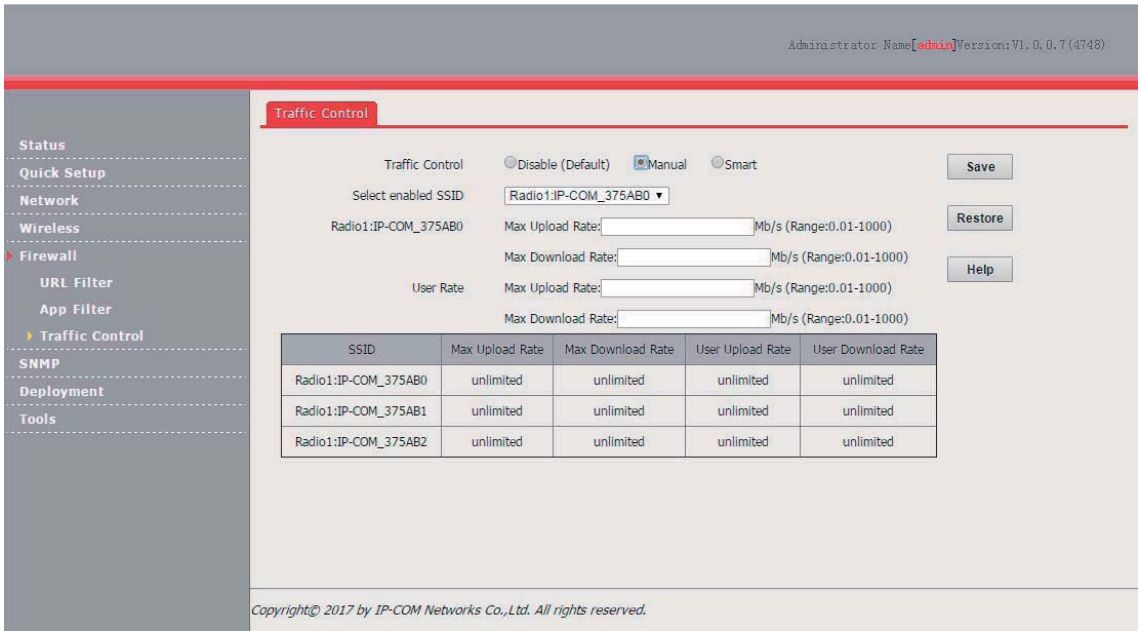
You only need to specified the total AP bandwidth provided by your ISP and set the maximum upload and download speeds by SSID. With the settings, the AP dynamically and evenly allocate the total bandwidth to all the clients connected to the AP, and allocate the SSID-specific bandwidth to all the clients connected with the SSID.

8.3.2 Configuring Traffic Control

By default, the traffic control function is disabled. To use the function, refer to the following configuration procedures:

Configuring Manual Traffic Control

1. Choose **Firewall** > **Traffic Control**.
2. Set **Traffic Control** to **Manual**.
3. Select an enabled SSID from the **Select enabled SSID** drop-down list box for traffic control.
4. Set the SSID-specific maximum upload and download speeds in the **Radio *X*: *Selected SSID*** text boxes.
5. Set the maximum upload and download speeds per user in the **User Rate** text boxes for the SSID.
6. Click **Save**.



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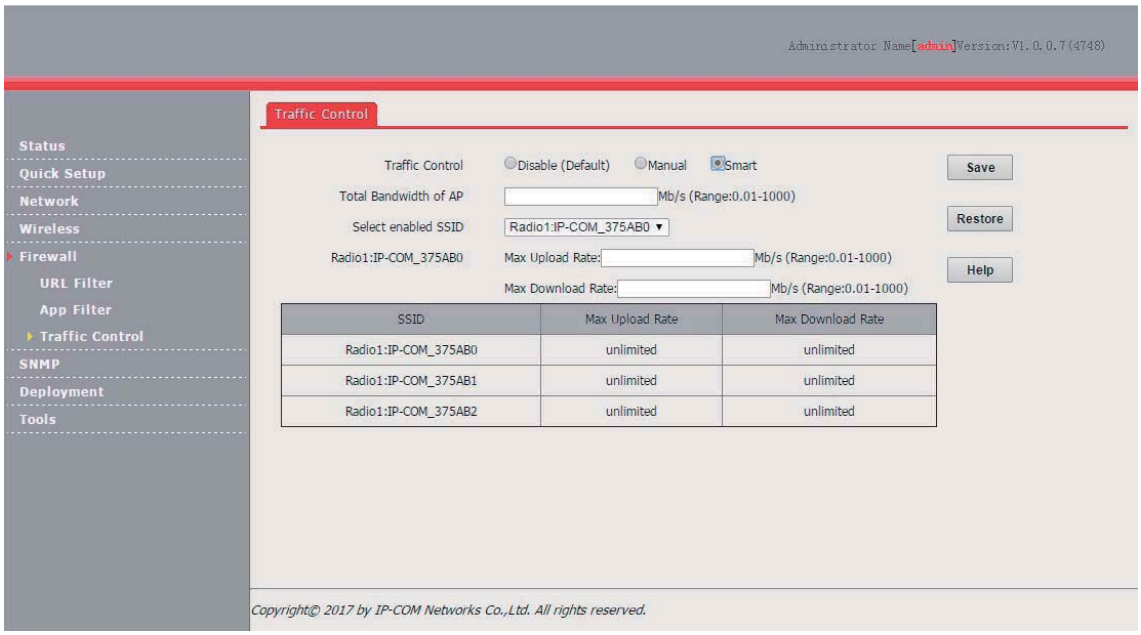
Parameter description

Parameter	Description
Traffic Control	It specifies whether to enable traffic control. – **Disable (Default)**: It indicates that the traffic control function is disabled. – **Manual**: It indicates that manual traffic control is implemented. – **Smart**: It indicates that automatic traffic control is implemented.
Select enabled SSID	It specifies an enabled SSID for which traffic control must be implemented.
Radio *x*:*SSID*	It specifies the maximum upload and download speeds corresponding to the selected SSID. The blank values indicate that the maximum upload and download speeds are not limited.
User Rate	It specifies the maximum per-user upload and download speeds corresponding to the selected SSID. The blank values indicate that the maximum per-user upload and download speeds are not limited.

Configuring Automatic Traffic Control

1. Choose **Firewall** > **Traffic Control**.
2. Set **Traffic Control** to **Smart**.

3. Set **Total Bandwidth of AP** to the total bandwidth provided by your ISP.
4. Select an enabled SSID from the **Select enabled SSID** drop-down list box for traffic control.
5. Set the SSID-specific maximum upload and download speeds in the **Radio *X*: *Selected SSID*** text boxes.
6. Click **Save**.



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Parameter description

Parameter	Description
Total Bandwidth of AP	It specifies the total uplink bandwidth and downlink bandwidth provided by your ISP.

For details about the other parameters, refer to the preceding table.

8.3.3 Example of Configuring Traffic Control

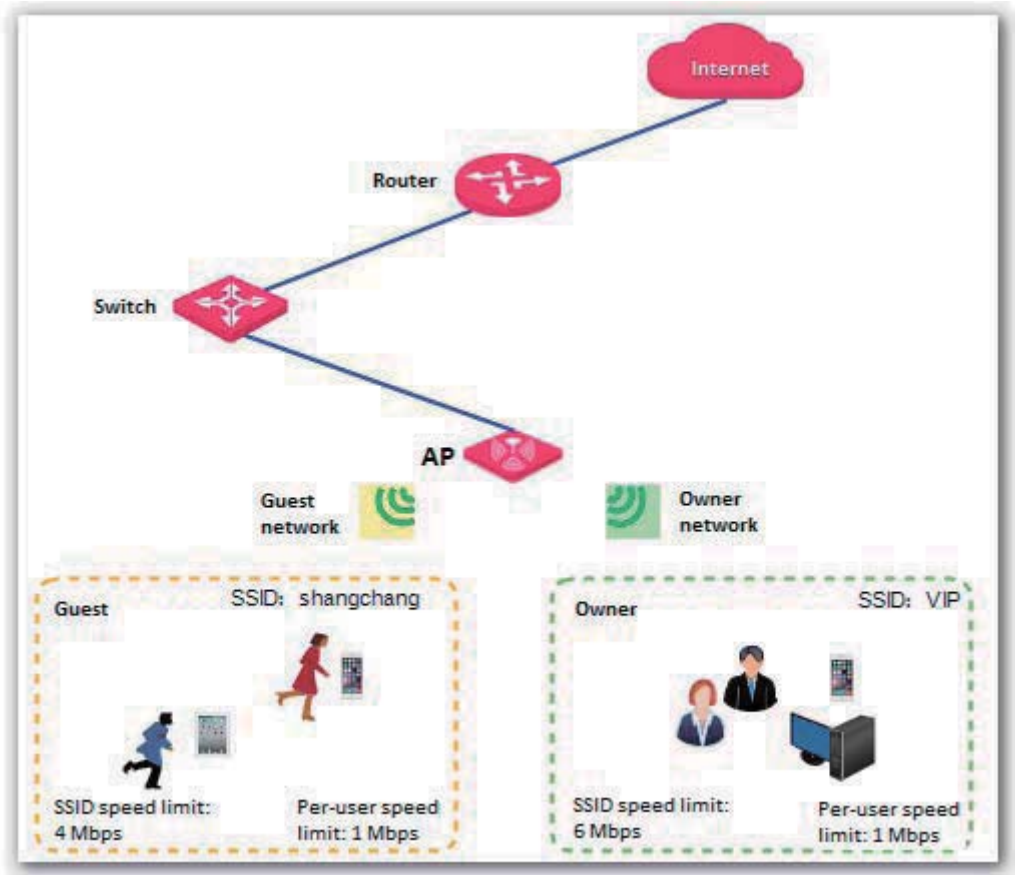
Networking Requirement

A mall has a 100 Mbps optical internet connection. It requires 10 APs for wireless coverage. Each AP is configured with 2 SSIDs. One of the SSID is used for the owner network and named **VIP**, and the other SSID is used for the guest network and named **Mall**.

Each AP has a bandwidth of 10 Mbps. The other requirements are as follows:

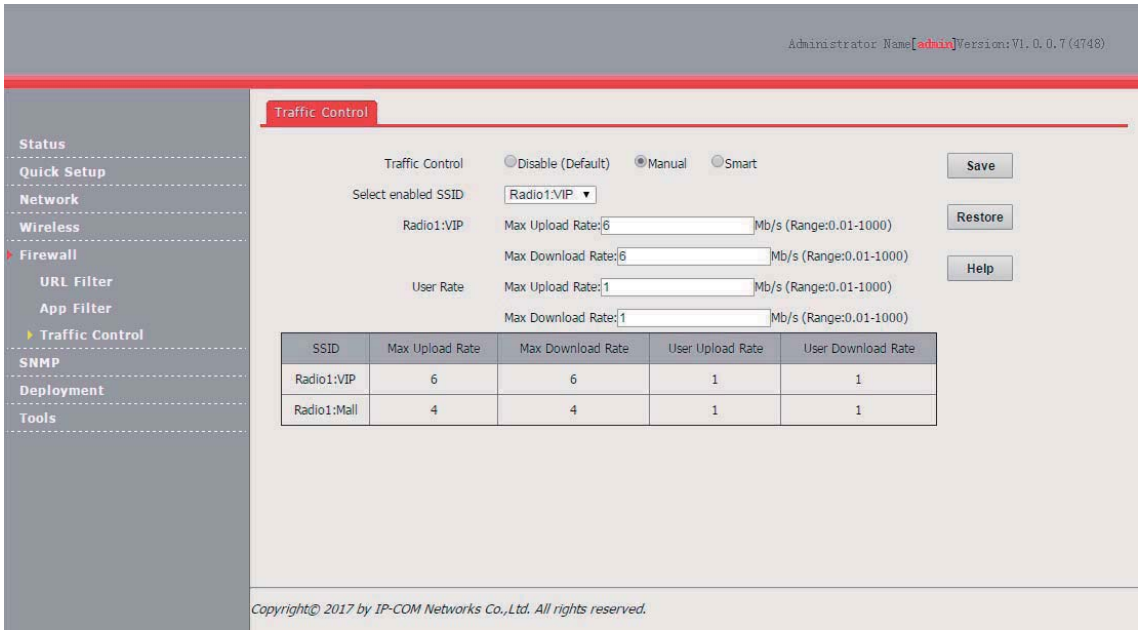
- For each AP, the bandwidth for the owner SSID is limited to 6 Mbps and the bandwidth for the guest SSID is limited to 4 Mbps.
- If some owners use excessive bandwidth to download resources or watch online videos, the internet experience of the other owners will be affected. To prevent this problem, the per-client bandwidth of the owner network is limited to 1 Mbps.
- If some guests use excessive bandwidth to download resources or watch online videos, the internet experience of the other guests will be affected. To prevent this problem, the per-client bandwidth of the guest network is limited to 1 Mbps.

Assume that the **VIP** and **Mall** networks are set up using RF band 1 of the AP.



Configuration Procedure

1. Choose **Firewall** > **Traffic Control**.
2. Set the traffic control rule parameters of the VIP network as follows and click **Save**:
   (1) Set **Traffic Control** to **Manual**.
   (2) Set **Select enabled SSID** to **Radio1:VIP**.
   (3) Set **Max Upload Rate** and **Max Download Rate** of **Radio 1:VIP** to **6 Mb/s**.
   (4) Set **Max Upload Rate** and **Max Download Rate** of **User Rate** to **1 Mb/s**.
3. Set the traffic control rule parameters of the guest network as follows and click **Save**:
   (1) Set **Traffic Control** to **Manual**.
   (2) Set **Select enabled SSID** to **Radio1:Mall**.
   (3) Set **Max Upload Rate** and **Max Download Rate** of **Radio 1:Mall** to **4 Mb/s**.
   (4) Set **Max Upload Rate** and **Max Download Rate** of **User Rate** to **1 Mb/s**.


Administrator Name[admin]Version:V1.0.0.7(4748)
Status
Quick Setup
Network
Wireless
Firewall
URL Filter
App Filter
Traffic Control
SNMP
Deployment
Tools
Traffic Control
Traffic Control
Disable (Default)
Manual
Smart
Save
Select enabled SSID
Radio1:VIP
Restore
Radio1:VIP
Max Upload Rate:6 Mb/s (Range:0.01-1000)
Max Download Rate:6 Mb/s (Range:0.01-1000)
Help
User Rate
Max Upload Rate:1 Mb/s (Range:0.01-1000)
Max Download Rate:1 Mb/s (Range:0.01-1000)
SSID
Max Upload Rate
Max Download Rate
User Upload Rate
User Download Rate
Radio1:VIP
6
6
1
1
Radio1:Mall
4
4
1
1
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9 SNMP

9.1 Overview

The Simple Network Management Protocol (SNMP) is the most widely used network management protocol in TCP/IP networks. SNMP enables you to remotely manage all your network devices compliant with this protocol, such as monitoring the network status, changing network device settings, and receive network event alarms.

SNMP allows automatic management of devices from various vendors regardless of physical differences among the devices.

9.1.1 SNMP Management Framework

The SNMP management framework consists of SNMP manager, SNMP agent, and Management Information Base (MIB).

- SNMP manager: It is a system that controls and monitors network nodes using the SNMP protocol. The SNMP manager most widely used in network environments is Network Management System (NMS). An NMS can be a dedicated network management server, or an application that implements management functions in a network device.
- SNMP agent: It is a software module in a managed device. The module is used to manage data about the device and report the management data to an SNMP manager.
- MIB: It is a collection of managed objects. It defines a series of attributes of managed objects, including names, access permissions, and data types of objects. Each SNMP agent has its MIB. An SNMP manager can read and/or write objects in the MIB based on the permissions assigned to the SNMP manager.

An SNMP manager manages SNMP agents in an SNMP network. The SNMP manager exchanges management information with the SNMP agents using the SNMP protocol.

9.1.2 Basic SNMP Operations

The AP allows the following basic SNMP operations:

- Get: An SNMP manager performs this operation to query the SNMP agent of the AP for values of one or more objects.
- Set: An SNMP manager performs this operation to set values of one or more objects in the MIB of the SNMP agent of the AP .

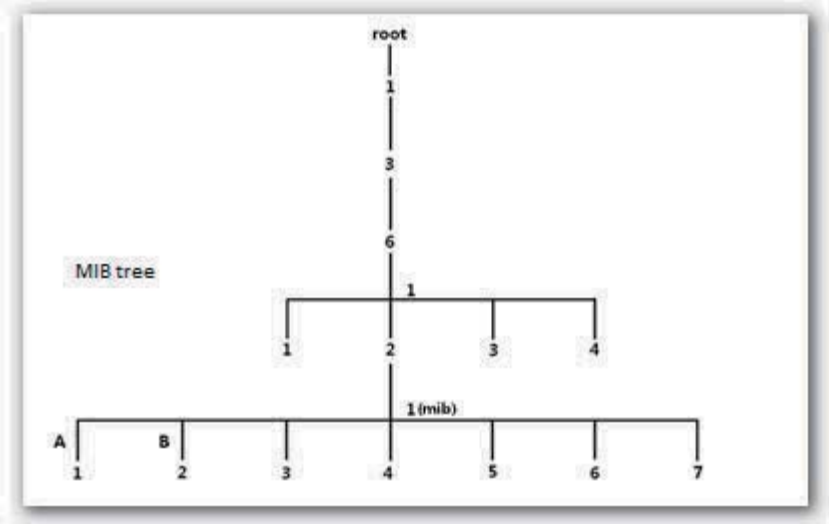
9.1.3 SNMP Protocol Version

The AP is compatible with SNMP V1 and SNMP V2C and adopts the community authentication mechanism. Community name is used to define the relationship between an SNMP agent and an SNMP manager. If the community name contained in an SNMP packet is rejected by a device, the packet is discarded. A community name functions as a password to control SNMP agent access attempts of SNMP managers.

SNMP V2C is compatible with SNMP V1 and provides more functions than SNMP V1. Compared with SNMP V1, SNMP V2C supports more operations (GetBulk and InformRequest) and data types (such as Counter64), and provides more error codes for better distinguishing errors.

9.1.4 MIB Introduction

An MIB adopts a tree structure. The nodes of the tree indicate managed objects. A path consisting of digits and starting from the root can be used to uniquely identify a node. This path is call an object identifier (OID). The following figure shows the structure of an MIB. In the figure, the OID of A is 1.3.6.1.2.1.1, whereas the OID of B is 1.3.6.1.2.1.2.



9.2 Configuring the SNMP Function

1. Choose **SNMP** and set **SNMP** to **Enable**.
2. Set related SNMP parameters.
3. Click **Save**.

---End

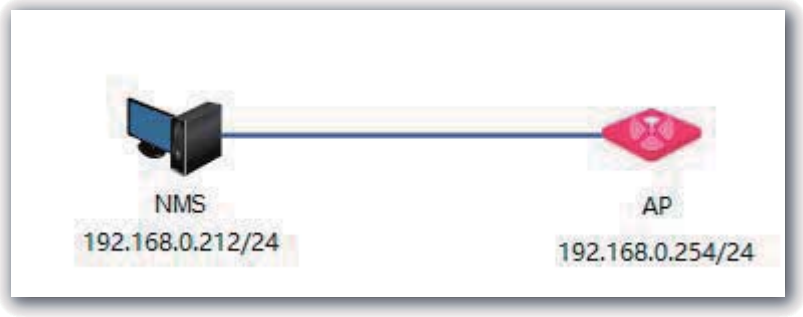
Parameter description

Parameter	Description
SNMP	It specifies whether to enable the SNMP agent function of the default, it is disabled. The SNMP manager and SNMP agent can communicate with each other only if their SNMP versions are the same. Currently, the SNMP agent function of the AP supports SNMP V1 and SNMP V2C.
Administrator Name	It specifies the name of the administrator of the AP. The default name is Administrator.
Device Name	It specifies the device name of the AP. The default device name is the model of the AP. For example, the device name of AP375 is AP375. Note It is recommended that you change the AP name so that you can easily identify the AP when managing the AP using SNMP.
Location	It specifies the location where the AP is used.
Read Community	It specifies the read password shared between SNMP managers and this SNMP agent. The default password is **public**. The SNMP agent function of the AP allows an SNMP manager to use the password to read variables in the MIB of the AP.
Read/Write Community	It specifies the read/write password shared between SNMP managers and this SNMP agent. The default password is **private**. The SNMP agent function of the AP allows an SNMP manager to use the password to read/write variables in the MIB of the AP.

9.3 Example of Configuring the SNMP Function

9.3.1 Networking Requirement

- The AP connects to an NMS over an LAN. This IP address of the AP is 192.168.0.254/24 and the IP address of the NMS is 192.168.0.212/24.
- The NMS use SNMP V1 or SNMP V2C to monitor and manage the AP.



9.3.2 Configuration Procedure

1. Configure the AP.

Assume that the read community is **Tom** and read/write community is **Tom123**.

(1) Log in to the web UI of the AP and choose **SNMP**.

(2) Set **SNMP** to **Enable**.

(3) Set the SNMP parameters.

(4) Click **Save**.

2. Configure the NMS.

On an NMS that uses SNMP V1 or SNMP V2C, set the read community to **Tom** and read/write community to **Tom123**. For details about how to configure the NMS, refer to the configuration guide for the NMS.

---End

9.3.3 Verification

After the configuration, the NMS can connect to the SNMP agent of the AP and can query and set some parameters on the SNMP agent through the MIB.

10 Deployment

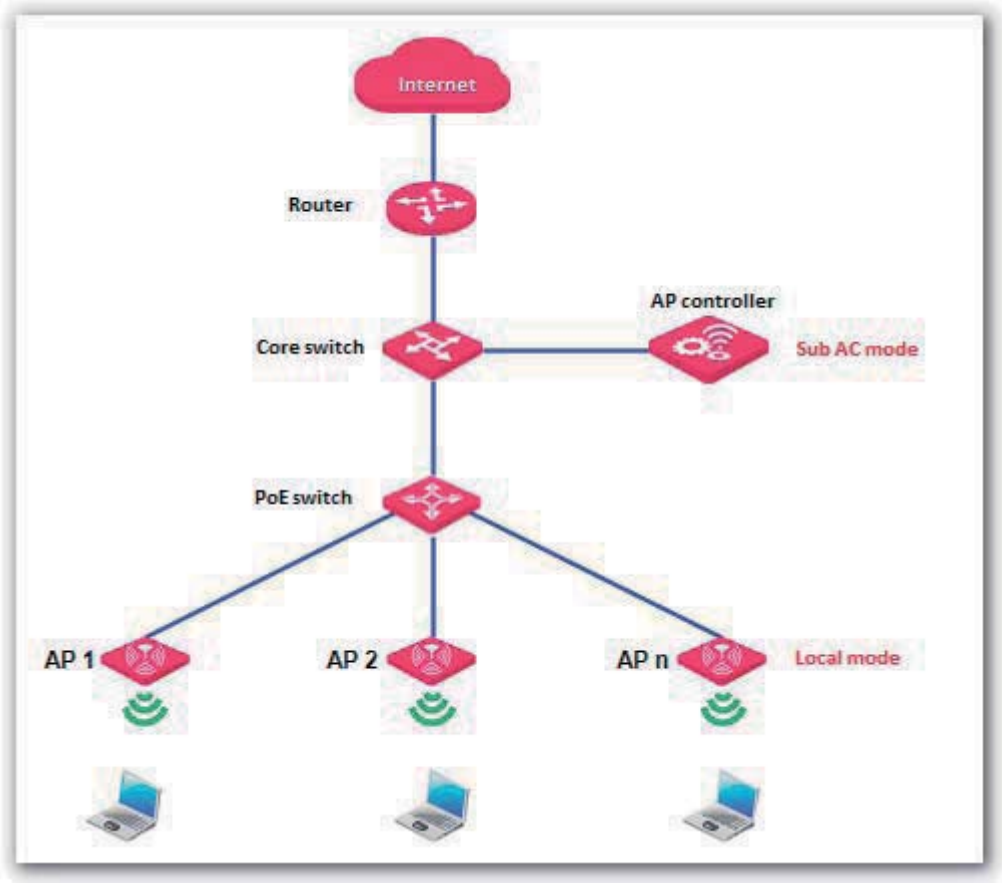
10.1 Overview

If a large number of APs are deployed, you are recommended to adopt an IP-COM AP controller (AC1000/2000/3000; AC2000 is used as an example) to manage the APs in a centralized manner.

In this case, **Local** and **Cloud** deployment modes are supported.

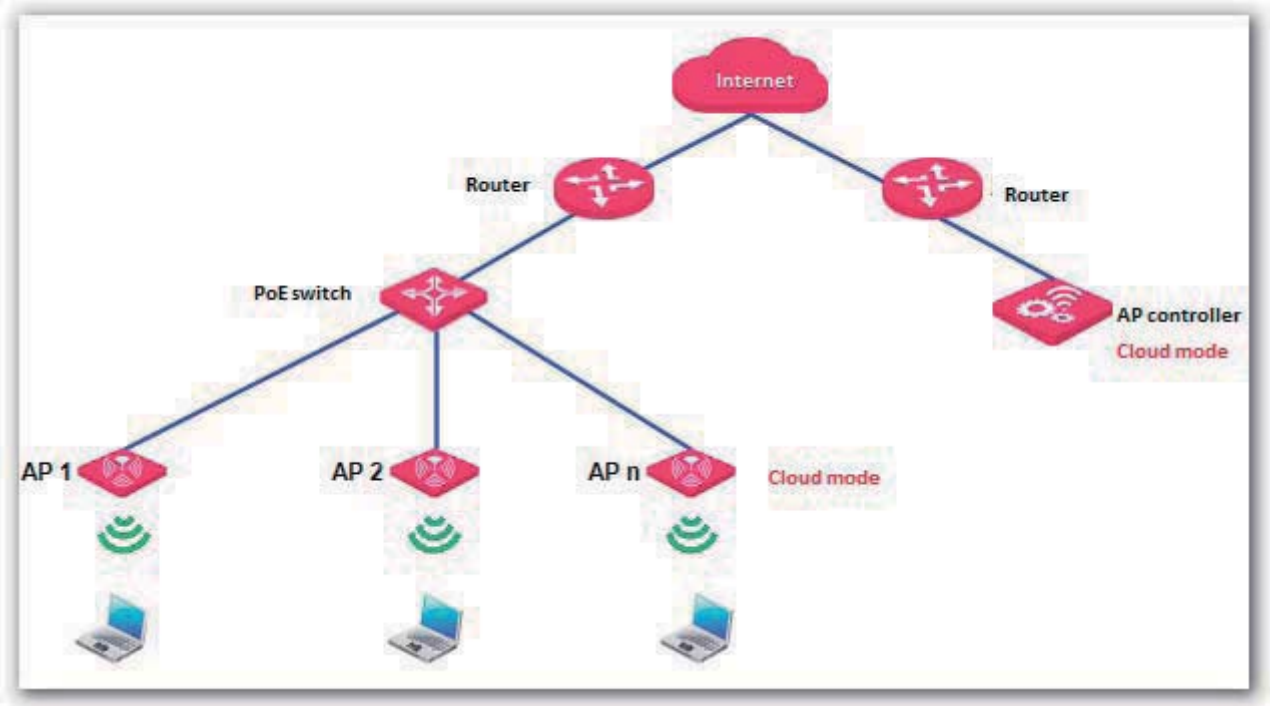
- Local deployment

If you need to deploy many APs in a small area, you are recommended to select the local deployment mode, which uses a local AC (in Sub AC mode) to manage the APs in a centralized manner. The following figure shows the topology for the local deployment mode.



- Cloud deployment

If you need to deploy many APs distributed across a large area, you are recommended to select the cloud deployment mode, which uses an AC (in Cloud AC mode) over the internet to manage the APs in a centralized manner. The following figure shows the topology for the cloud deployment mode.

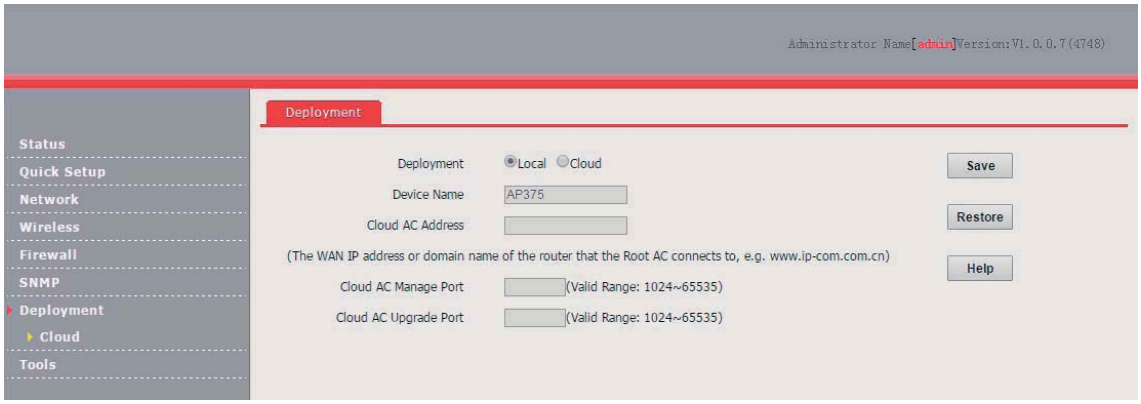


10.2 Configuring the Deployment Mode

By default, the deployment mode of the AP is **Local**.

Configuring Local Deployment Mode

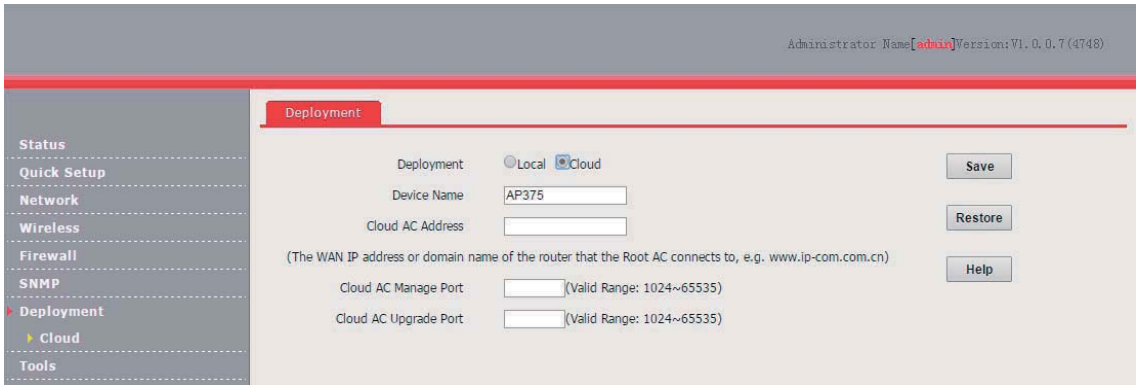
1. Choose **Deployment**, and select **Local**.
2. Click **Save**.



---End

Configuring Cloud Deployment Mode

1. Choose **Deployment**, and select **Cloud**.
2. Set related parameters, including **Device Name**, **Cloud AC Address**, **Cloud AC Manage Port**, and **Cloud AC Upgrade Port**.
3. Click **Save**.



---End

Parameter description

Parameter	Description
Deployment	It specifies the deployment mode of the AP. The default option is **Local**. – **Local**: In this mode, the AP can be managed only by a local AC. – **Cloud**: In this mode, the AP can be managed only by a cloud AC. To use the cloud deployment mode, set the following parameters as well.
Device Name	It specifies the device name of the AP. The default device name is the model of the AP. You are recommended to change the device name so that you can quickly locate the AP when managing the AP remotely.
Cloud AC Address	It specifies the WAN IP address of the router to which the cloud AC connects, or the domain name to which the WAN IP address is bound.
Cloud AC Manage Port	It specifies the port of the router to which the cloud AC connects for managing APs.
Cloud AC Upgrade Port	It specifies the port of the router to which the cloud AC connects for managing APs.

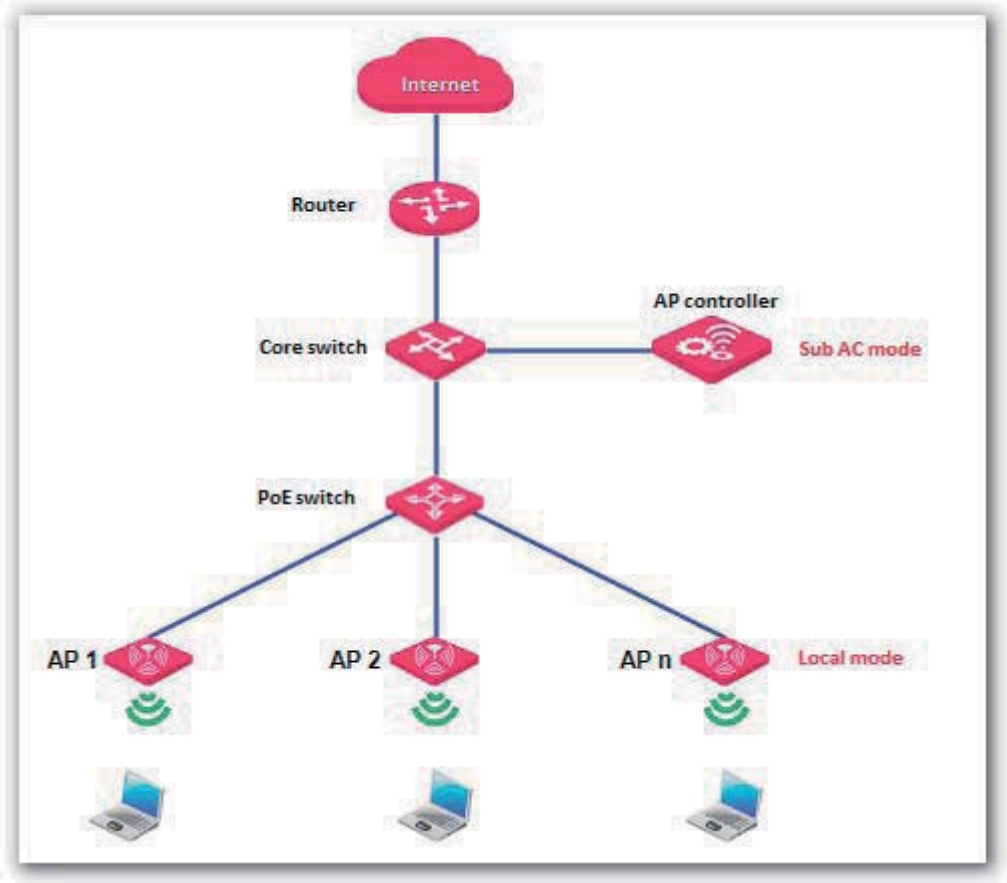
10.3 Exmaple of Configuring the Deployment Mode

10.3.1 Example of Configuring the Local Deployment Mode

Networking Requirement

The meeting room of a hotel is deployed with multiple AP375s for wireless coverage and deployed with AC2000 to manage the APs in a centralized manner.

Assume the that hotel does not set up VLANs. The following figure shows the topology.



Configuration Procedure

1. Configure the AP.

By default, the deployment mode of the AP is **Local**. Use the default configuration.

2. Configuring the AP controller.

By default, AC2000 works in Sub AC mode. Use the default configuration of the AP controller.

---End

Verification

Log in to the web UI of AC2000 and access the **Manage AP** page to verify that all APs are online. You can use AC2000 to manage the APs in a centralized manner.

Note

After the AP controller takes control over the APs, it changes the IP addresses of the APs. To log in to the web UI of an AP, log in to the web UI of the AP controller and click the IP address of the AP.

10.3.2 Example of Configuring the Cloud Deployment Mode

Networking Requirement

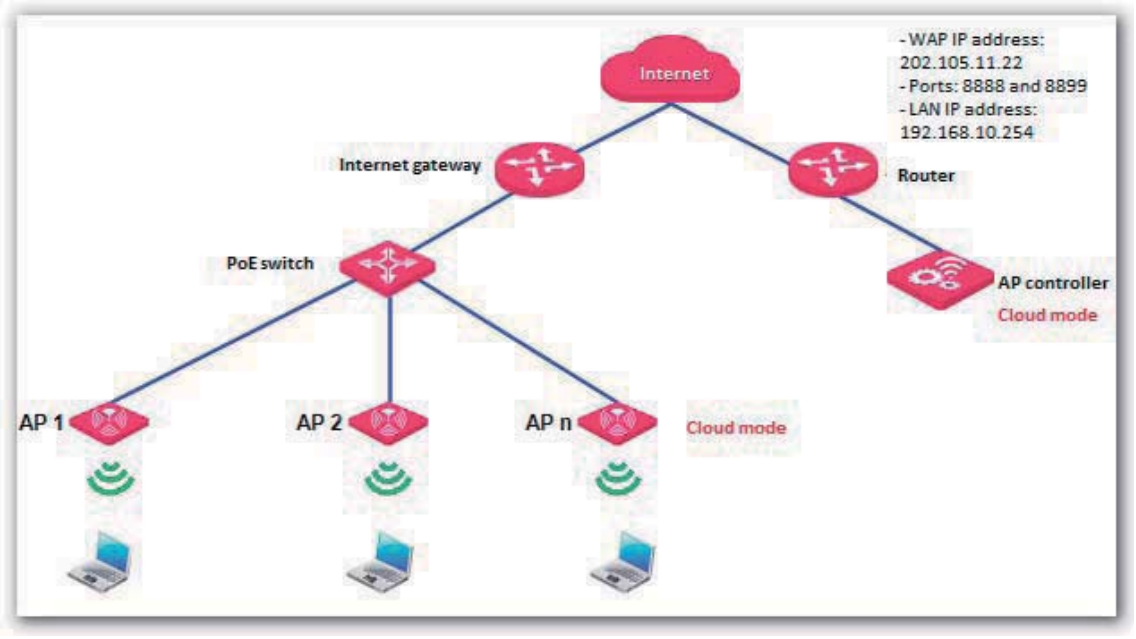
A chain restaurant operator requires that:

- Guests can access internet in the restaurants through WiFi networks.
- The network administrator at the HQ can understand the AP operation conditions of the restaurants any time and deliver configurations to the APs in a centralized manner for remote control and troubleshooting.

Solution

IP-COM AC2000 and AP375 are used to address the requirement as follows:

- The HQ is deployed with one AC2000 working in Cloud AC mode to manage all the APs at the restaurants in a centralized manner.
- The router connected to AC2000 at the HQ provides two ports for managing and upgrade the APs.
- One or more APs working in Cloud mode are deployed at each restaurant and the **Cloud AC Address** is set to the WAN IP address of the router connected to AC2000.



Note

You are recommended to connect only one AP to a POE switch and configure the AP at a time, so as to prevent IP address conflicts.

Assumption

- The internet gateway has a DHCP server that assigns IP address to the APs so that the APs can access the internet.
- The router supports the DNS proxy function.

Configuration Procedure

1. Configure the router.

Map TCP port 8888 and UDP port 8899 of the router connected to AC2000 onto AC2000. For details, refer to the user guide for the router.

2. Configure AC2000.

Log in to the web UI of AC2000 and perform the following procedure:

(1) Set **Working Mode** to **Cloud AC**.

(a) Choose **System Tools** > **Maintain** and locate the **System Mode** module.

(b) Set **Working Mode** to **Cloud AC**.

(c) Set **Manage Port** to the TCP port provided by the router, which is 8888 in this example.

(d) Set **Firmware Upgrade Port** to the UDP port provided by the router, which is 8899 in this example.

(e) Click **OK**.

(f) Wait for AC2000 to reboot.

(2) Configure IP address information for the AP controller to access the internet.

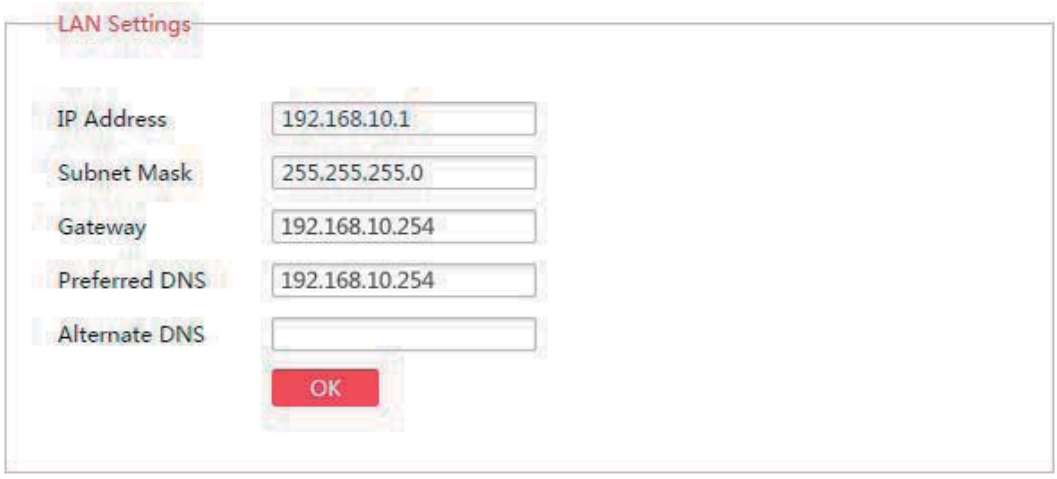
(a) Choose **System Tools** > **Network Setting** and locate the **LAN Settings** module.

(b) Set **IP Address** to an IP address belonging to the same network segment as the IP address of the LAN port of the router. Retain the default IP address 192.168.10.1 in this example.

(c) Set **Gateway** to the IP address of the LAN port of the router. Retain the default IP address 192.168.10.254 in this example

(d) Set **Preferred DNS** to 192.168.10.254 because the router supports the DNS proxy function.

(e) Click **OK**.



3. Configure the APs.

Log in to the web UI of each AP and perform the following procedure:

(1) Set **Deployment** of the AP to **Cloud**.

(a) Choose **Deployment**.

(b) Set **Deployment** to **Cloud**.

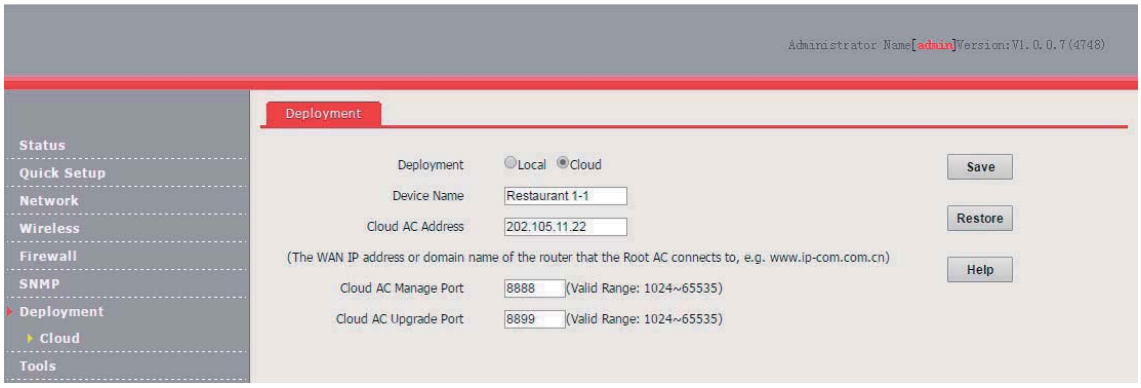
(c) Set **Device Name** to the location of the corresponding restaurant to help identify the AP.

(d) Set **Cloud AC Address** to the WAN IP address of the router connected to AC2000, which is 202.105.11.22 in this example.

(e) Set **Cloud AC Manage Port** to the port number specified by **Manage Port** of AC2000, which is 8888 in this example.

(f) Set **Cloud AC Upgrade Port** to the port number specified by **Firmware Upgrade Port** of AC2000, which is 8899 in this example.

(g) Click **Save**.

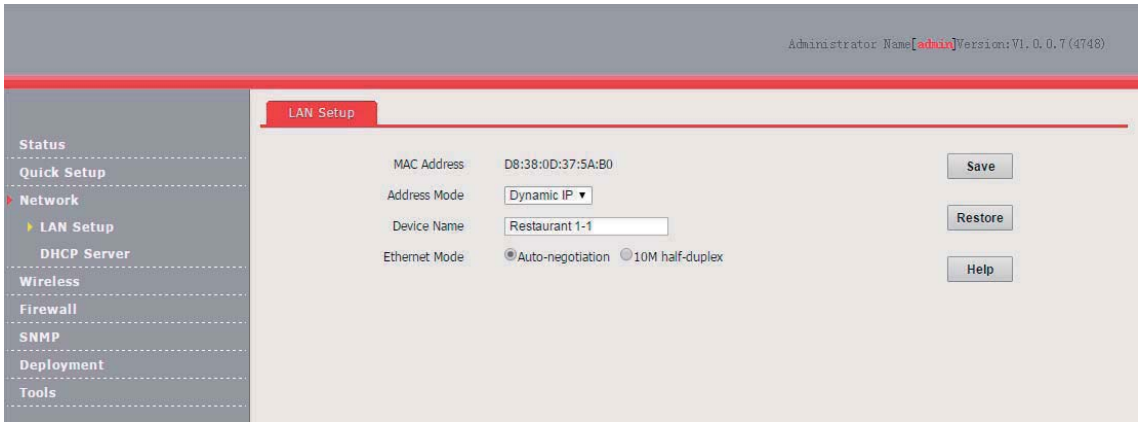


(2) Configure IP address information to enable the AP to access the internet.

(a) Choose **Network** > **LAN Setup**.

(b) Set **Address Mode** to **Dynamic IP**.

(c) Click **Save**.



---End

Verification

Log in to the web UI of AC2000 and access the **Manage AP** page to verify that all APs are online. You can use AC2000 to manage the APs in a centralized manner.

Note

After the AP controller takes control over the APs, it changes the IP addresses of the APs. To log in to the web UI of an AP, log in to the web UI of the AP controller and click the IP address of the AP.

11 Tools

11.1 Firmware Upgrade

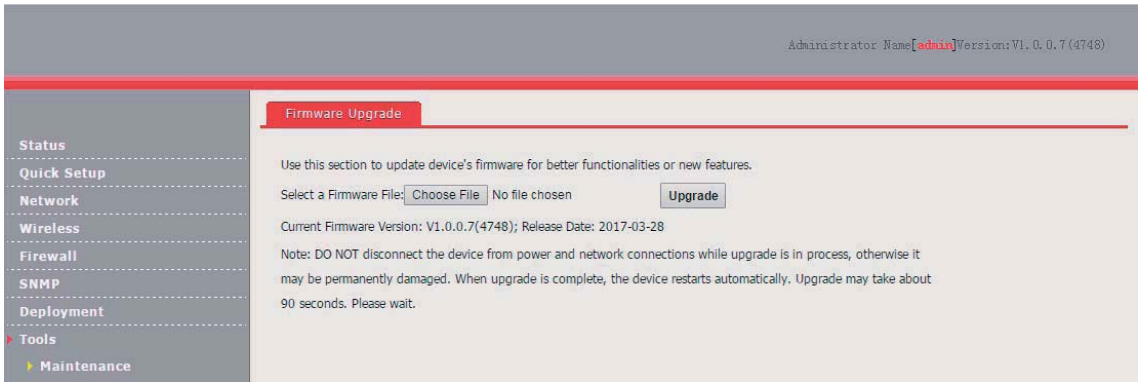
This function upgrades the firmware of the AP for more functions and higher stability.

Note

To prevent damaging the AP, verify that the new firmware version is applicable to the AP before upgrading the firmware and keep the power supply of the AP connected during an upgrade.

Procedure:

1. Download the package of a later firmware version for the AP from http://www.ip-com.com.cn to your local computer, and decompress the package.
2. Log in to the web UI of the AP and choose **Tools** > **Maintenance**.
3. Click **Browse** and choose the AP upgrade file.
4. Click **Upgrade**.



---End

Wait until the progress bar is complete. Log in to the web UI of the AP again. Choose **Status** > **System Status** and check whether the upgrade is successful based on **Firmware Version**.

Note

After the firmware is upgraded, you are recommended to restore the factory settings of the AP and configure the AP again, so as to ensure stability of the AP and proper operation of new functions.

11.2 Time & Date

11.2.1 System Time

Ensure that the system time of the AP is correct, so that logs can be recorded correctly and the reboot schedule can be executed correctly.

To access the page, choose **Tools** > **Time & Date**.

The AP allows you to set the system time by synchronizing the time with the internet or manually setting the time. By default, it is configured to synchronize the system time with the internet.

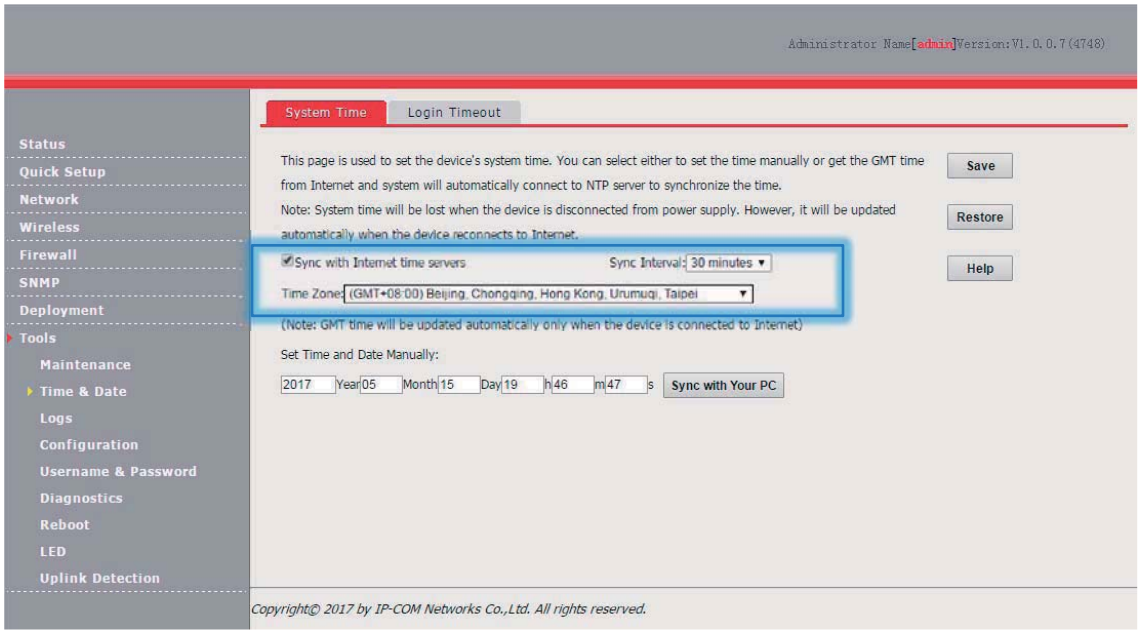
Synchronizing the System Time with the Internet

The AP automatically synchronizes its system time with a time server of the internet. This enables the AP to automatically correct its system time after being connected to the internet.

To connect the AP to the internet, choose **Network** > **LAN Setup** and set the IP address, subnet mask, gateway, and DNS server of the AP.

Procedure for configuring the AP to synchronize its system time with the internet:

1. Choose **Tools** > **Time & Date** and click the **System Time** tab.
2. Select **Sync with Internet time servers**.
3. Set **Sync Interval** to the interval at which the AP synchronizes its system time with a time server of the internet. The default value **30 minutes** is recommended.
4. Set **Time Zone** to your time zone.
5. Click **Save**.

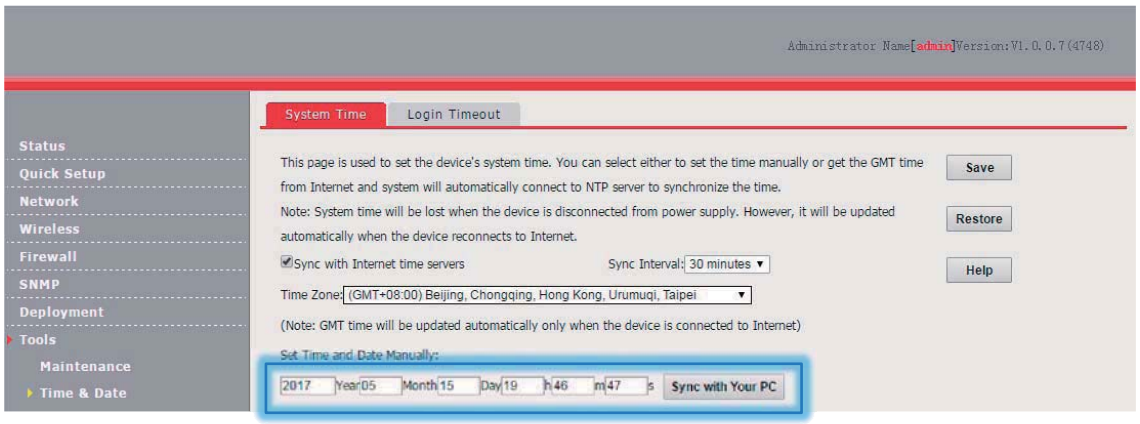


Manually Setting the System Time

You can manually set the system time of the you choose this option, you need to set the system time each time after the AP reboots.

Procedure:

1. Choose **Tools** > **Time & Date** and click the **System Time** tab.
2. Enter a correct date and time, or click **Sync with Your PC** to synchronize the system time of the AP with the system time (ensure that it is correct) of the computer being used to manage the AP.
3. Click **Save**.



---End

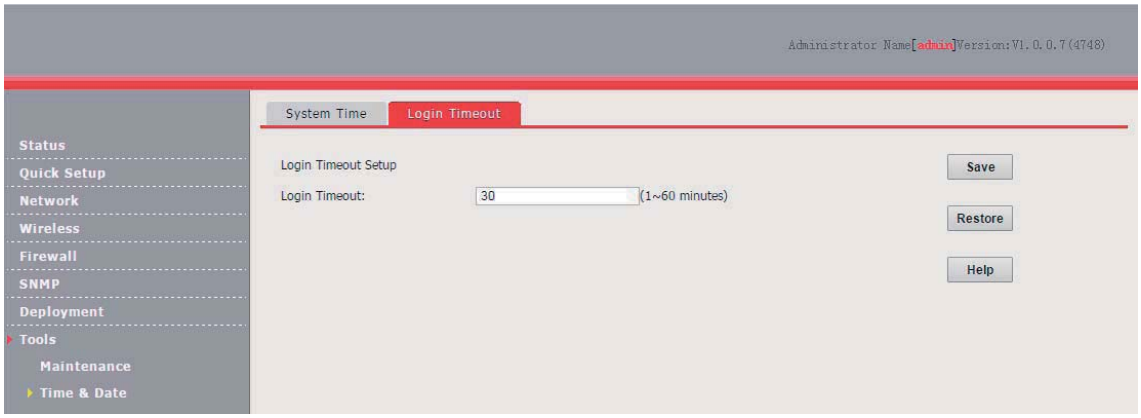
11.2.2 Login Timeout

If you log in to the web UI of the AP and perform no operation within the login timeout interval, the AP logs you out for network security. The default login timeout interval is 5 minutes.

Procedure for setting the login timeout interval:

1. Choose **Tools** > **Time & Date** and click the **Login Timeout** tab.
2. Change the login timeout interval as required.

3. Click **Save**.



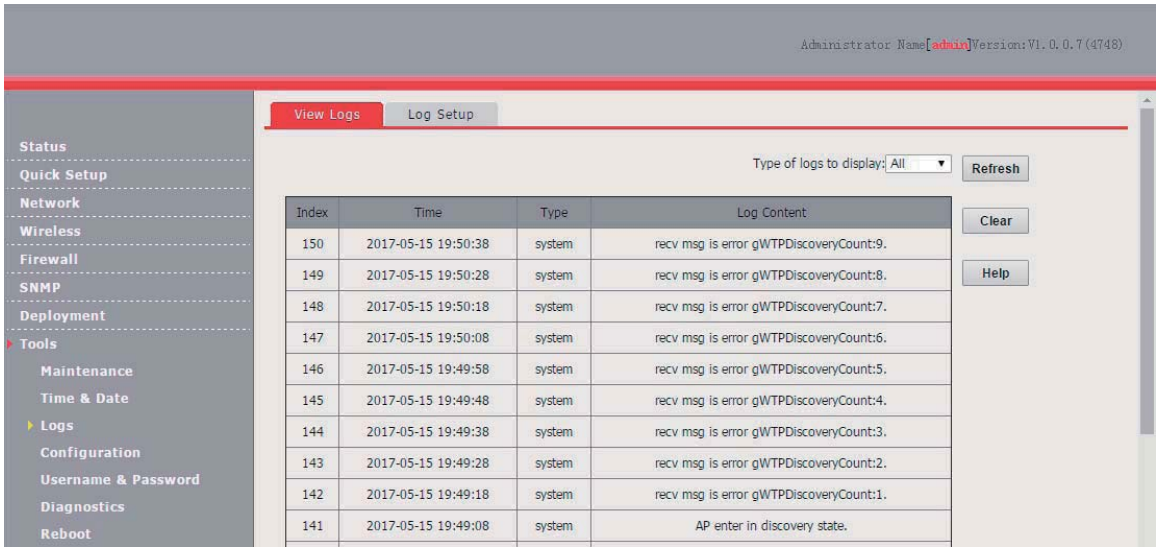
---End

11.3 Logs

11.3.1 View Logs

The logs of the AP record various events that occur and the operations that users perform after the AP starts. In case of a system fault, you can refer to the logs during troubleshooting.

To access the page, choose **Tools** > **Logs**.



To ensure that the logs are recorded correctly, verify the system time of the AP. You can correct the system time of the AP by choosing **Tools** > **Time & Date** > **System Time**.

To view the latest logs of the AP, click **Refresh**. To clear the existing logs of the AP, click **Clear**.

Note

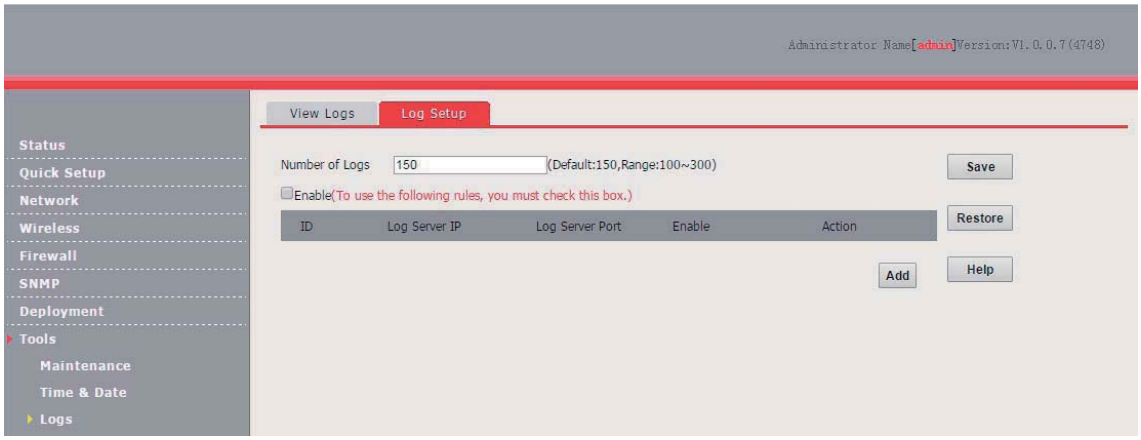
– When the AP reboots, the previous logs are lost.

– The AP reboots when the AP is powered on after a power failure, the QVLAN function is configured, the firmware is upgraded, an AP configuration is backed up or restored, or the factory settings are restored.

11.3.2 Log Setup

To access the page, choose **Tools** > **Logs** and click the **Log Setup** tab.

On this page, you can set the number of logs to be displayed and configure log servers.

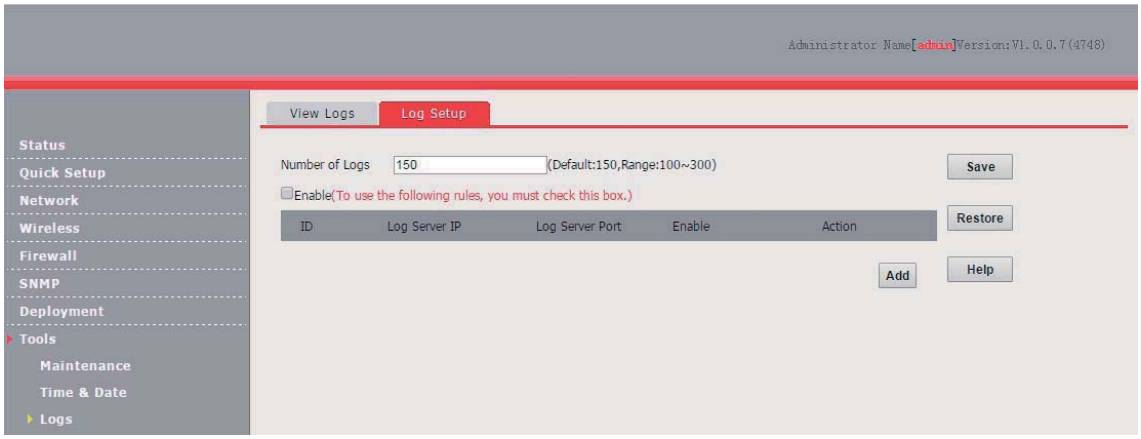


Setting the Number of Logs to Be Displayed

By default, the AP can display a maximum of 150 logs on the **View Logs** page. You can change the number as required.

Procedure:

1. Choose **Tools** > **Logs** and click **Log Setup**.
2. Change the number of logs as required within the range of 100 to 300.
3. Click **Save**.



---End

Configuring Log Server Settings

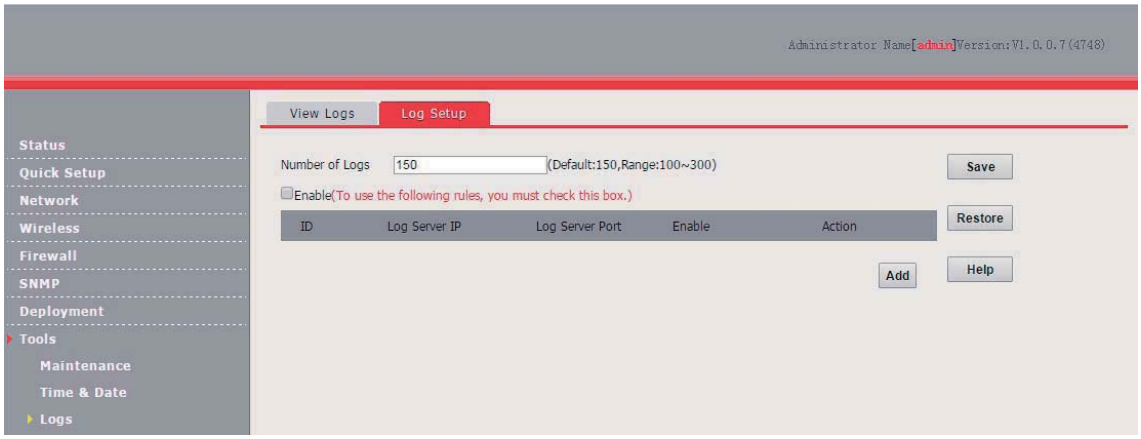
After you specify a log server, the AP sends its logs to the log server. You can view all the historical logs of the AP on the log server.

Note

To ensure that system logs can be sent to a log server, choose **Network** > **LAN Setup** and set the IP address, subnet mask, and gateway of the AP for communicating with the log server.

- Procedure for adding a log server

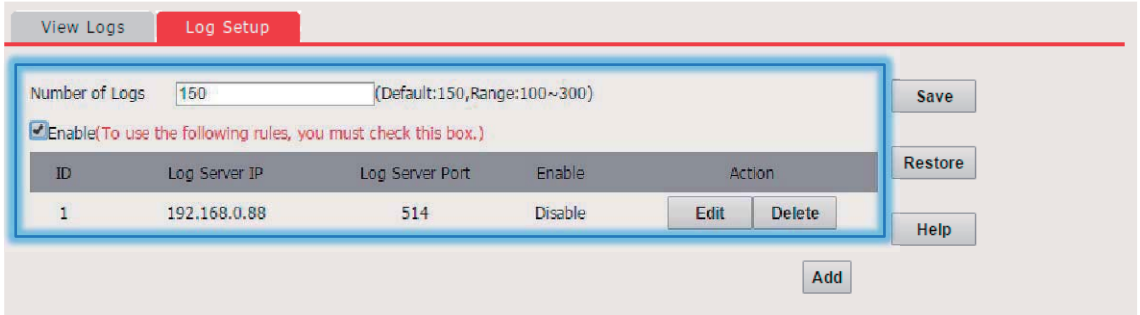
1. Choose **Tools** > **Logs** and click **Log Setup**.
2. Click **Add**.



3. Set parameters as follows:
   (1) Set **Log Server IP** to the IP address of the log server.
   (2) Set **Log Server Port** to the UDP port number used to send and receive system logs. The default port number 514 is recommended.
   (3) Select **Enable** to enable the log server function.
4. Click **Save**.

5. Select **Enable (To use the following rules, you must check this box.)**.
6. Click **Save**.

The following figure shows an example of log server settings.



---End

- Procedure for changing log server settings

1. To access the page, choose **Tools** > **Logs** and click **Log Setup**.
2. Click **Edit** corresponding to the log server settings to be change.

---End

- Procedure for deleting log server settings

1. To access the page, choose **Tools** > **Logs** and click **Log Setup**.
2. Click **Delete** corresponding to the log server settings to be deleted.

---End

11.4 Configuration

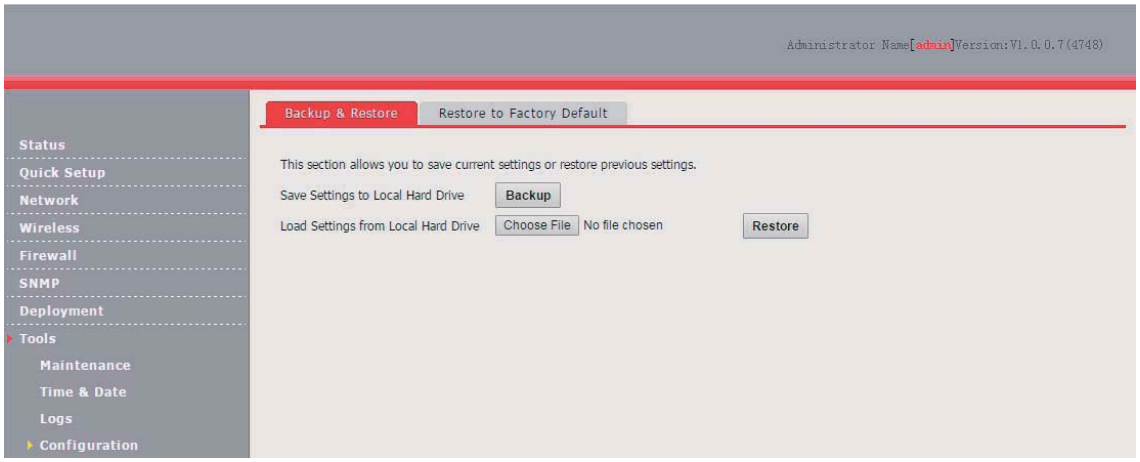
11.4.1 Backup and Restore

The backup function enables you to back up the current configuration of the AP to a local computer. The restoration function enables you to restore the AP to a previous configuration.

If the AP enters the optimum condition after you greatly change the configuration of the AP, you are recommended to back up the new configuration, so that you can restore it after upgrading or resetting the AP.

Backing Up the Current Configuration

1. Choose **Tools** > **Configuration**.
2. Click **Backup** and follow the on-screen instructions to perform operations.



---End

Restoring a Configuration

1. Choose **Tools** > **Configuration**.
2. Click **Browse** and select the file of the configuration to be restored.
3. Click **Restore** and follow the on-screen instructions to perform operations.

---End

11.4.2 Restore to Factory Default

If an computer connected to the AP cannot access the internet for unknown reasons, or you forget the login password, you are recommended to restore the router to factory settings and reconfigure the AP can be reset using software or hardware.

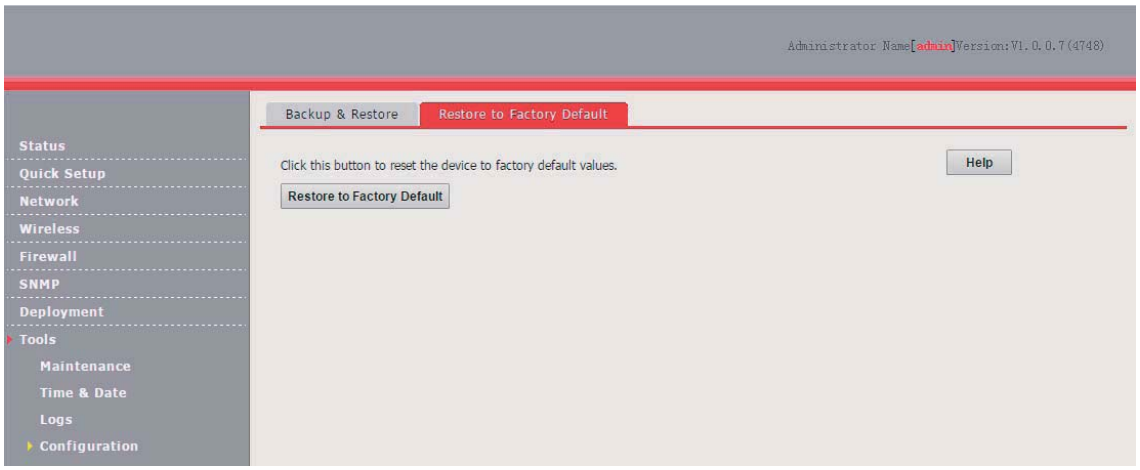
After the factory settings are restored, the login IP address of the AP is changed to **192.168.0.254**, and the user name and password of the AP are changed to **admin**.

Note

- When the factory settings are restored, your configuration is lost. Therefore, you need to reconfigure the AP to connect to the internet. Restore the factory settings of the AP only when necessary.
- To prevent AP damages, ensure that the power supply of the AP is normal when the AP is reset.

Restoring the Factory Settings Using Software

1. Choose **Tools** > **Configuration** and click the **Restore to Factory Default** tab.
2. Click the **Restore to Factory Default** button.



---End

Restoring the Factory Settings Using Hardware

This method enables you to restore the factory settings without logging in to the web UI of the AP.

Procedure:

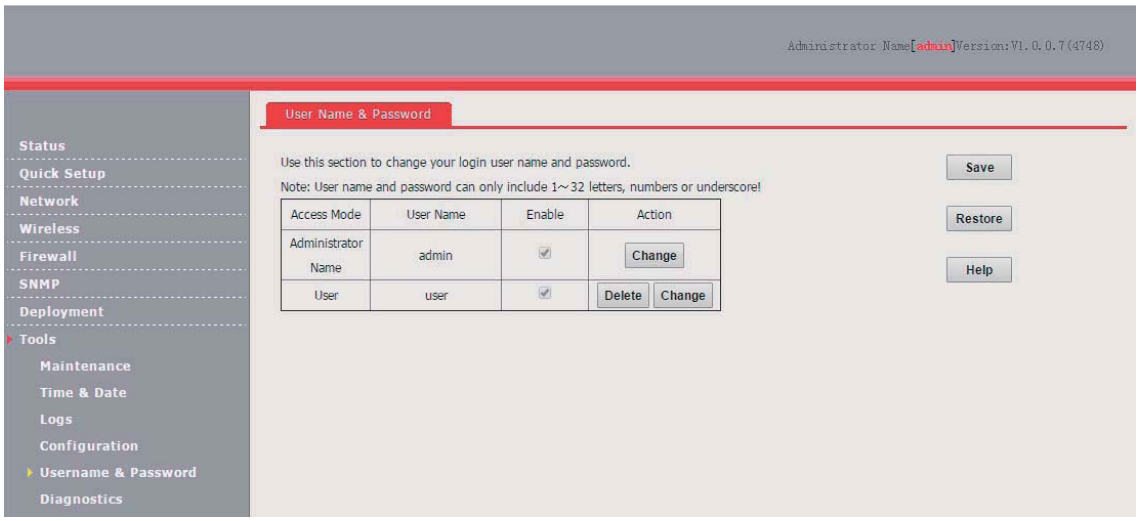
1. After the AP is powered on, use a pin to hold down the **RST** button for 8 seconds.
2. Wait about 45 seconds.

---End

11.5 Username and Password

To access the page, choose **Tools** > **Username & Password**.

On this page, you can change the login account information of the AP to prevent unauthorized login.



Parameter description

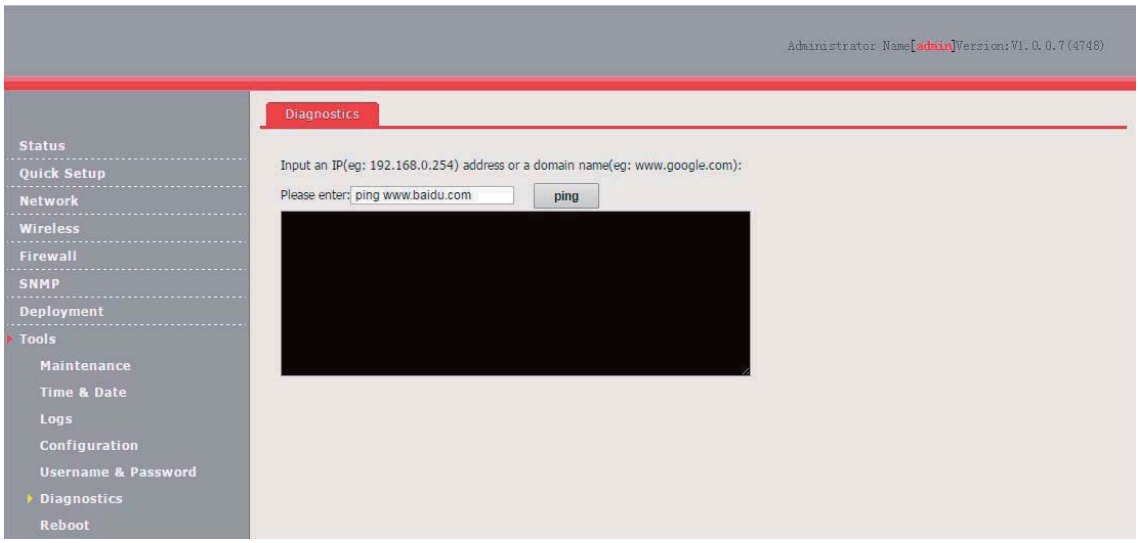
Parameter	Description
Access Mode	It specifies the type of an account. – **Administrator Name**: An account of this type enables you to view and modify settings of the AP. – **User**: An account of this type enables you to view settings of the AP.
User Name	It specifies the user name of an account. By default, both the user name and password of the administrator account are **admin**. Both the user name and password of the user account are **user**.
Enable	It specifies whether an account is enabled. – The administrator account is always enabled. – The user account is enabled by default and can be disabled.
Action	It specifies the operations that can be performed on a specific account. – **Change**: This button is used to change the user name and password of the account corresponding to the button. – **Delete**: This button is used to delete the user account. – **Add**: This button is used to add the user account after the account is deleted. Note After changing, deleting, or adding an account, click **Save**.

11.6 Diagnostics

If the network connection fails, you can use the diagnostics tool included with the AP to locate the faulty node.

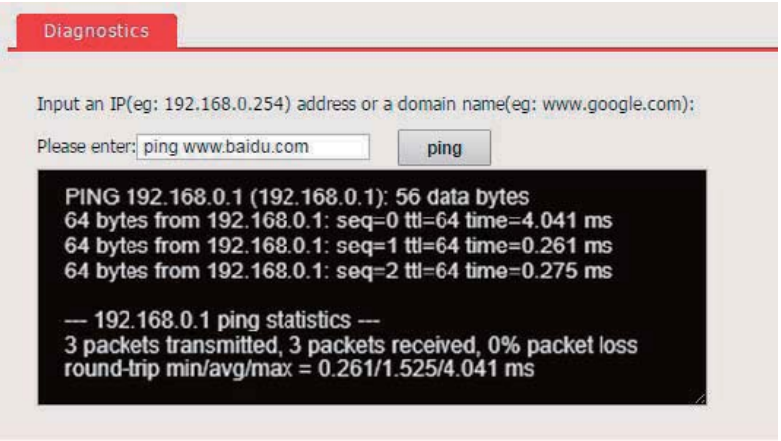
The link to www.baidu.com is used as an example. Perform the following procedure:

1. Choose **Tools** > **Diagnostics**.
2. Enter the IP address or domain name to be pinged in the text box. In this example, enter **ping www.baidu.com**.
3. Click **Ping**.



---End

The diagnosis result will be displayed in a few seconds in the black text box below the **Please enter** text box. See the following figure.



11.7 Reboot

This module enables you to manually reboot the AP or configure the AP to automatically reboot.

Note

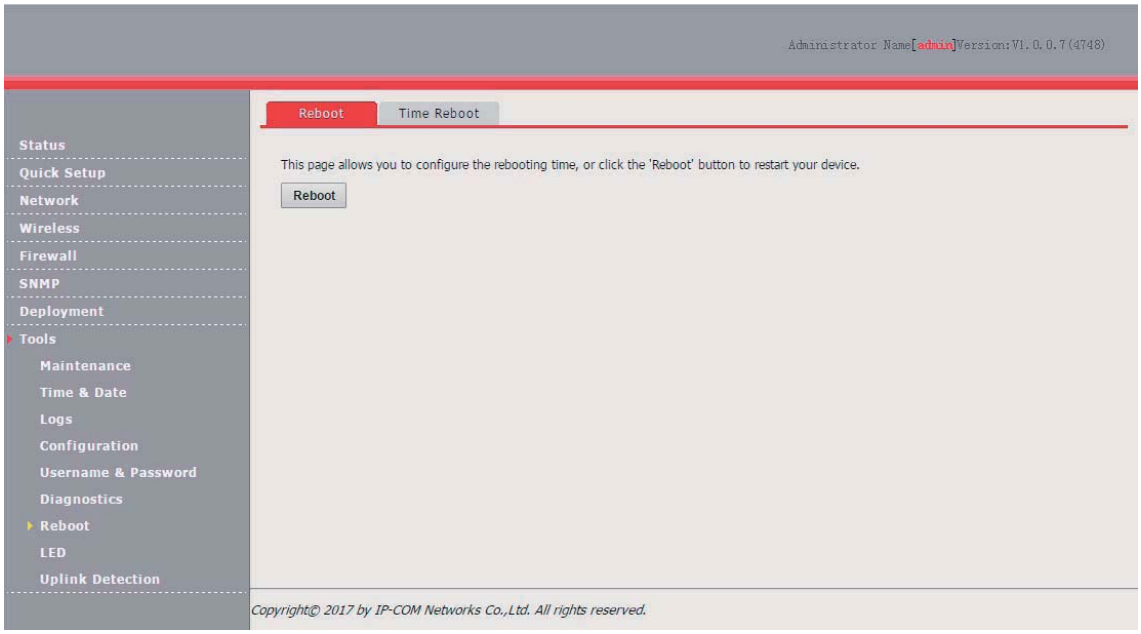
When the AP reboots, all wireless connections are released. You are recommended to reboot the AP at an idle hour.

11.7.1 Reboot

If a setting does not take effect, you can try rebooting the AP to resolve the problem.

Perform the following procedure:

1. Choose **Tools** > **Reboot**.
2. Click **Reboot**.



---End

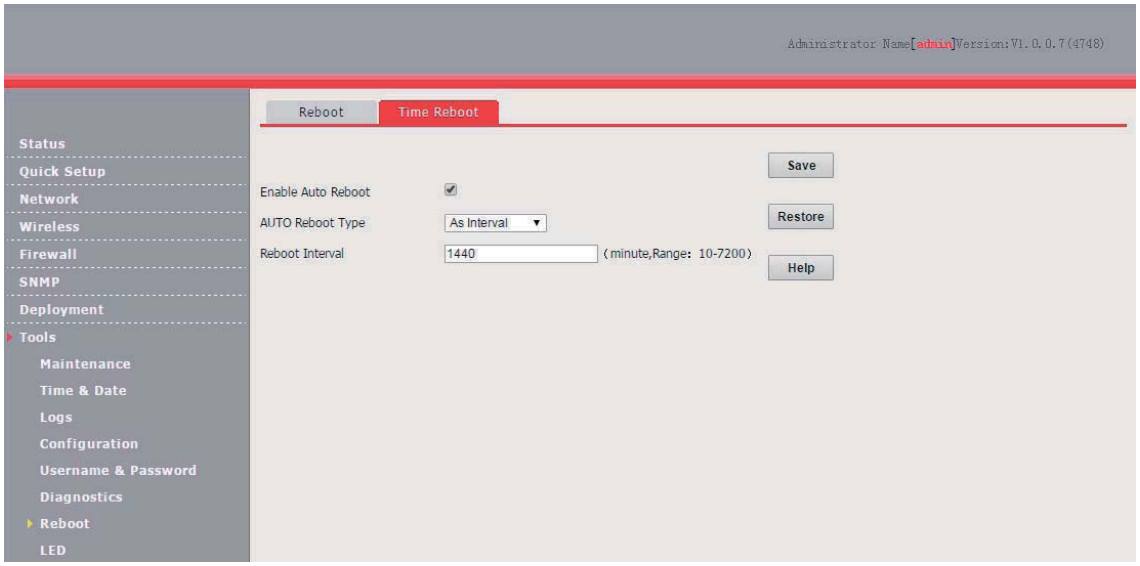
11.7.2 Time Reboot

This function enables the AP to automatically reboot as scheduled. You can use this function to prevent wireless performance degradation or network instability that occurs after a long AP uptime. The AP can reboot:

- As intervals: In this mode, the AP reboots at the interval that you specify. The interval can be less than 24 hours.
- As Scheduled: In this mode, the AP reboots regularly at the time that you specify. The interval must be 24 hours or a period that can be completely divided by 24 hours.

Configuring the AP to Reboot at an Interval

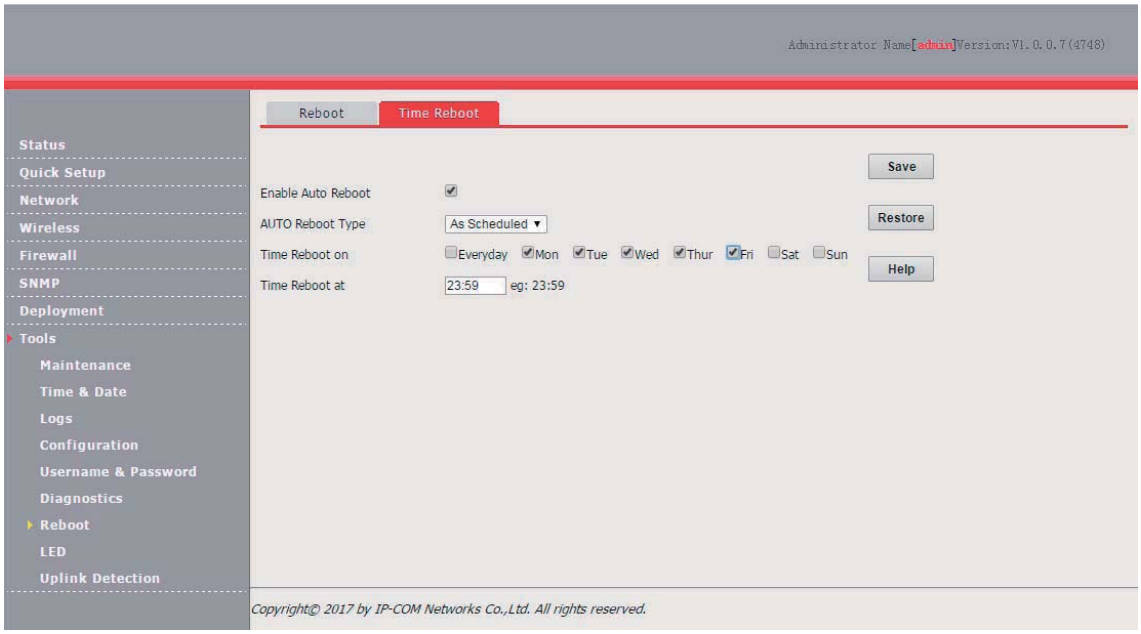
1. Choose **Tools** > **Reboot** and click the **Time Reboot** tab.
2. Select the **Enable Auto Reboot** check box.
3. Set **AUTO Reboot Type** to **As Interval**.
4. Set **Interval** to a value in minutes, such as **1440**.
5. Click **Save**.



---End

Configuring the AP to Reboot as Scheduled

1. Choose **Tools** > **Reboot** and click the **Time Reboot** tab.
2. Select the **Enable Auto Reboot** check box.
3. Set **AUTO Reboot Type** to **As Scheduled**.
4. Select the day or days when the AP reboots.
5. Set the time when the AP reboots, such as **23:59**.
6. Click **Save**.



---End

11.8 LED

This function enables you to turn on/off the LED indicator of the default, the LED indicator is turned on.

- Procedure for turning off the LED indicator:

1. Choose **Tools** > **LED**.
2. Click **Disable all LEDs**.

---End

- Procedure for turning on the LED indicator:

1. Choose **Tools** > **LED**.
2. Click **Enable all LEDs**.

---End

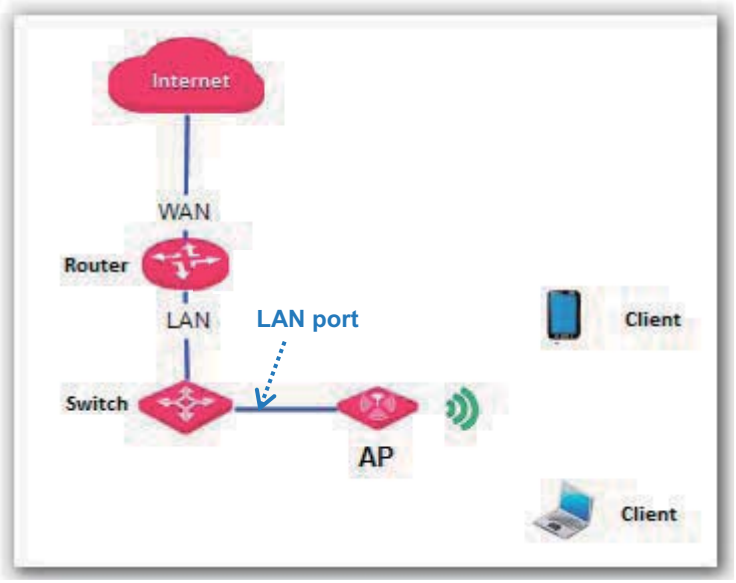
11.9 Uplink Detection

11.9.1 Overview

In AP mode, the AP connects to its upstream network using the LAN0 port. If a critical node between the LAN0 port and the upstream network fails, the AP as well as the wireless clients connected to the AP cannot access the upstream network. If uplink detection is enabled, the AP regularly pings specified hosts through the LAN0 port. If all the hosts are not reachable, the AP stops its wireless service and wireless clients cannot find the SSIDs of the AP. The client can reconnect to the AP only after the connection between the AP and the upstream networks is recovered.

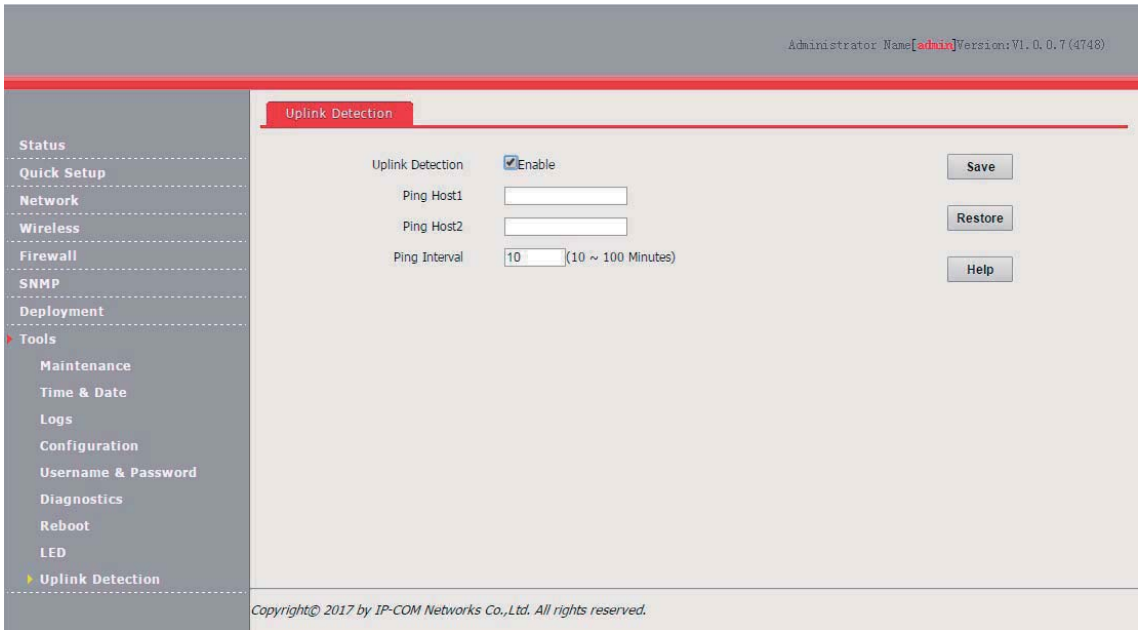
If the uplink of the AP with uplink detection enabled is faulty, wireless clients can connect to the upstream network through another nearby AP that works properly.

The following figure shows the upstream network of the AP.



11.9.2 Configuring Uplink Detection

1. Choose **Tools** > **Uplink Detection**.
2. Select the **Enable** check box of **Uplink Detection**.
3. Set **Ping Host1** or **Ping Host2** to the IP address of the host to be pinged through the AP, such as the IP address of the switch or router directly connected to the AP.
4. Set **Ping Interval** to the interval at which the AP detects its uplink.
5. Click **Save**.



---End

Appendixes

A. FAQ

Q1. I cannot access the web UI of the AP after entering 192.168.0.254. What should I do?

A1. Check the following items:

- Verify that the IP address of your computer is 192.168.0.*X* (*X*: 2~253).
- Clear the cache of your web browser or replace the web browser, and try login again.
- Disable the firewall of your computer or replace the computer, and try login again.
- If two or more APs are connected to your network without an AP controller, connect one of the APs to your PoE switch and change the IP address of the AP. Repeat this procedure to change the IP addresses of the other APs.
- The AP may be being managed by an AP controller and therefore its IP address is no longer 192.168.0.254. In that case, log in to the web UI of the AP controller to view the new IP address of the AP, and log in to the AP using the new IP address.
- If you have manually changed the IP address of the AP, change the IP address of your computer to another IP address that belongs to the same network segment as the new IP address of the AP and log in again using the new IP address of the AP.
- If the problem persists, restore the factory settings of the AP and try login again.

Q2. My wireless AP controller cannot find the AP. What should I do?

A2. Check the following items:

- Verify that the devices are connected properly and the AP has started.
- If VLANs have been defined on your network, verify that the corresponding VLAN has been added to your AP controller.
- Restart the AP or restore the factory settings of the AP, and try scanning the AP again.

Q3. I forget the login user name and password of the AP. What should I do to log in to the web UI of the AP?

A3. Try login with the default IP address **192.168.0.254** and default user name and password **admin**. If login fails, restore the factory settings and use the default login information to try login again.

Q4. I cannot access the web UI of the AP. What should I do to restore the factory settings?

A4. After the AP is powered on, use a pin to hold down the **RST** button for 8 seconds and then wait about 1 second. After the factory settings are restored, configure the AP again.

Q5. What should I do if a computer connected to the AP displays an IP address conflict message?

A5. Check the following items:

- Verify that the IP address of the computer is not used by another device on your LAN. The default IP address of the AP is 192.168.0.254.
- Verify that the static IP addresses assigned to computers on your LAN are not used by other devices.

For more technical assistance, visit our website at http://www.ip-com.com.cn or send your question to info@ip-com.com.cn, or call +86-755-27653089. We will help you resolve your problem as soon as possible.

B. Default Parameter Settings

The following table lists the default parameter values of the AP.

Parameter			Default Value
Login	Management IP address		192.168.0.254
	User Name/Password	Administrator	Admin/admin
		User	user/user
Quick Setup	Mode		AP Mode
	Mode of Radio 3		2.4 GHz
LAN Setup	Address Mode		Static IP
	IP Address		192.168.0.254
	Subnet Mask		255.255.255.0
	Gateway		192.168.0.1
	Primary DNS Server		192.168.0.1
	Secondary DNS Server		None
	Device Name		AP375
DHCP Server			Disabled
SSID Setup	SSID	Radio 1	The AP allows 8 SSIDs. The SSID is Tenda_*XXXXXX*, where *XXXXXX* indicates the last 6 characters of the MAC address of the LAN ports of the AP or the last 6 characters plus 1 to 7. By default, the first SSID is enabled, and the other SSIDs are disabled.
		Radio 2	The AP allows 4 SSIDs. The SSID is Tenda_*XXXXXX*, where *XXXXXX* indicates the last 6 characters of the MAC address of the LAN ports of the AP plus 9 to 12. By default, the first SSID is enabled, and the other SSIDs are disabled.
		Radio 3	The AP allows 8 SSIDs. The SSID of the AP is Tenda_*XXXXXX*, where *XXXXXX* indicates the last 6 characters of the MAC address of the LAN ports of the AP plus 13 to 20. By default, the first SSID is enabled, and the other SSIDs are disabled.
	Broadcast SSID		Enable
	Client Isolation		Disable
	WMF		Disable
	Probe Broadcast Packets Control		Disable
	Maximum Clients		48
	Chinese SSID Encode		UTF-8

Parameter			Default Value
	Security Mode		None
Radio	Enable Wireless		Selected
	Country		China
	Network Mode	Radio 1	11b/g/n mixed
		Radio 2	11ac
		Radio 3	11b/g/n mixed
	Channel		Auto
	Channel Bandwidth	Radio 1	20MHz
		Radio 2	80MHz
		Radio 3	20MHz
	Channel Lockout		Selected
	Power Lockout		Selected
	Preamble		Long Preamble
	Short GI		Auto
	Inter-SSID User Isolation		Disable
	Client Load Balancing		Enable (Client Load Balancing Threshold: 5; Client Load Balancing Offset: 5) *Available only for RF band 3
Radio Optimizing	Beacon Interval		100ms
	Fragment Threshold		2346
	RTS Threshold		2347
	DTIM Interval		1
	Receive Signal Strength		-90dBm
	Signal Transmission		coverage-oriented *Available only for RF bands 1 and 3
	Signal Reception		Default *Available only for RF bands 1 and 3
	Airtime Scheduling		Enable
	APSD		Disable
	Ageing Time		5 minutes
	Basic Rate Sets	Radio 1	1, 2, 5.5, and 11
		Radio 2	6, 12, and 24
		Radio 3	1, 2, 5.5, and 11

Parameter			Default Value
	Supported Rate Sets	Radio 1	6, 9, 12, 18, 24, 36, 48, and 54
		Radio 2	9, 18, 36, 48, and 54
		Radio 3	6, 9, 12, 18, 24, 36, 48, and 54
WMM			Enable Optimized For Throughput(Concurrent Users >=10)
Access Control			Disable
Advanced	Recognize Terminal Type		Disable
	Filter Broadcast Data		Disable
QVLAN	Enable		Deselected
	Manage VLAN		1
	PVID		1
	Trunk Port		port 0
	VLAN ID of Wired LAN Port		1
	VLAN ID of SSID		1000
Firewall	URL Filter		Disable
	App Filter		Disable
	Traffic Control		Disable
SNMP			Disable
Deployment			Local
Tools	Time & Date	System Time	Sync with Internet time servers Time zone: (GMT+08:00) Beijing, Chongqing, Hong Kong, Urumqi, Taipei
		Login Timeout	5 minutes
	Number of Logs		150
	Log Server		None
	Enable Auto Reboot		Deselected
	LED Control		Enable all LEDs
	Uplink Detection		Deselected

Safety and Emission Statement

CE Mark Warning

This is a Class B product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

Operations in the 5.15-5.25GHz band are restricted to indoor use only.

This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

NOTE: (1) The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. (2) To avoid unnecessary radiation interference, it is recommended to use a shielded RJ45 cable.

Declaration of Conformity

Hereby, IP-COM Networks Co., Ltd. declares that the radio equipment type AP375 is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at the following internet address: http://www.ip-com.com.cn/en/ce.html

Software Version: 1.0.0.10

FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the 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:

— Reorient or relocate the receiving antenna.

— Increase the separation between the equipment and receiver.

— Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

— Consult the dealer or an experienced radio/TV technician for help.

This device is restricted to be used in the indoor.

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.

Radiation Exposure Statement

This device complies with FCC radiation exposure limits set forth for an uncontrolled environment and it also complies with Part 15 of the FCC RF Rules.

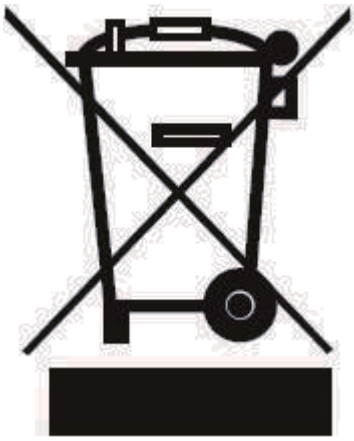
This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Caution:

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

NOTE: (1) The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. (2) To avoid unnecessary radiation interference, it is recommended to use a shielded RJ45 cable.



RECYCLING

This product bears the selective sorting symbol for Waste electrical and electronic equipment (WEEE). This means that this product must be handled pursuant to European directive 2012/19/EU in order to be recycled or dismantled to minimize its impact on the environment.

User has the choice to give his product to a competent recycling organization or to the retailer when he buys new electrical or electronic equipment.