EKSELANS BY ITS

USER MANUAL

AX 3000 OLP

331021

Outdoor WiFi Access Point
WiFi6 (802.11ax) 3000Mbps
1G PoE IN port + 1G/2,5G SFP uplink port
1 Console Port PoE IN / DC-IN

ITS Partner O.B.S S.L · Av. Cerdanyola 79-81 Local C
08172 Sant Cugat del Vallés · Barcelona (Spain)
Phone:+34935839543 · info@ek.plus · www.ek.plus

Disclaimer

The products, services, or features you purchase are subject to commercial contracts and terms. Some or all of the products, services or features described in this document may not be within the scope of your purchase or use. Unless otherwise agreed in the contract, Ekselans by ITS does not make any express or implied statementor guarantee for the content of this document.

Due to product version upgrades or other reasons, the content of this document will be updated from time to time. Ekselans by ITS reserves the right to modify the content of the document without any notice or prompt.

This manual is for reference only. Ekselans by ITS endeavors to ensure content accuracy and will not shoulder any responsibility for losses and damages caused due to content omissions, inaccuracies or error

Preface

Intended Audience

This document is intended for:

- Network engineers
- Technical support and servicing engineers
- Network administrators

Technical Support

- Company Website: https://www.ek.plus/
- Consult Website: https://www.ek.plus/contacto/
- Support Email: soporte@ek.plus

Conventions

1. Signs

The signs used in this document are described as follows:

Warning

An alert that calls attention to important rules and information that if not understood or followed can result in data loss or equipment damage.

Caution

An alert that calls attention to essential information that if not understood or followed can result in function failure or performance degradation.

Note

An alert that contains additional or supplementary information that if not understood or followed will not lead to serious consequences.

Specification

An alert that contains a description of product or version support.

2. Note

The manual offers configuration information (including model, port type and command line interface) for indicative purpose only. In case of any discrepancy or inconsistency between the manual and the actual version, the actual version prevails.

1 Product Overview

1.1 About the AX 3000 OLP Access Point

The AX 3000 OLP is a dual-radio and dual-stream access point designed to cover outdoor areas. Compliant with the IEEE 802.11ax standard, the access point delivers a combined data rate of 2.976 Gbps, with up to 574 Mbps in the 2.4 GHz band and 2.402 Gbps in the 5 GHz band. The access point provides one 2.5 GE SFP port and one 1GE electrical port.

1.2 Hardware Features

The AX 3000 OLP access point provides two radio frequency (RF) connectors, one 10/100/1000 BASE-T Ethernet port with auto-negotiation, one 2.5GE SFP port, one Console port, and one DC connector. The access point can be powered by either PoE or DC power supply.

Figure 1-1 Appearance

Figure 1-2 Front View of Access Point

Figure 1-3 Side View of Access Point

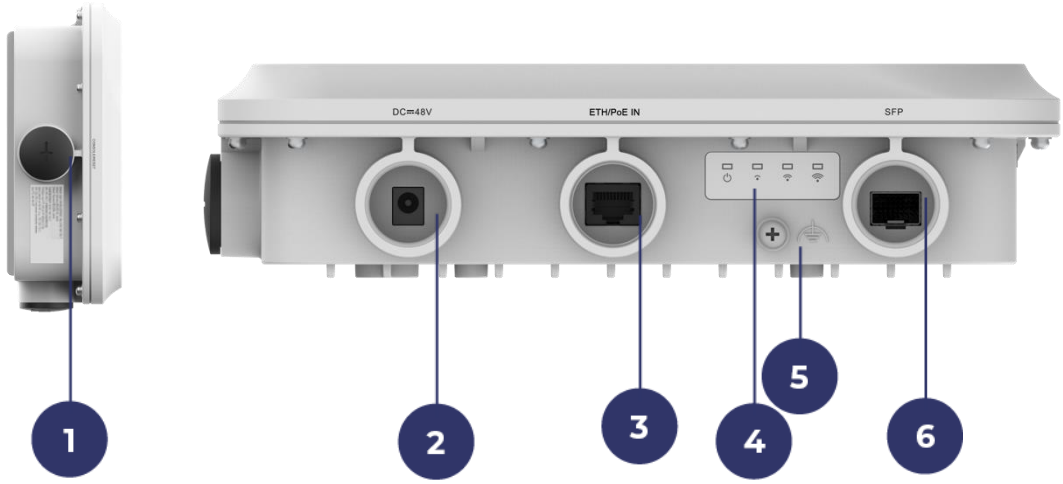


Table 1-1 Button and Ports

No.	Item	Description
1	Console/Reset	The console port is used to manage devices. The reset button is used to restart the access point or restore the access point to factory settings.

No.	Item	Description
2	DC Connector	Connected to the DC power supply
3	Ethernet/PoE Port	Uplink service port for data transmission, in compliance with the IEEE 802.3af/at standard
4	LED	Indicates the system status, including one system status LED and three RSSI LEDs
5	Grounding Screw	Secures the grounding cable
6	SFP Port	Uplink service port for data transmission

Note

The nameplate is at the bottom of the access point.

1.3 Package Contents

Table 1-2 Package Contents

Item	Quantity
AX 3000 OLP Access Point	1
Mounting Plate Assembly (Including a mounting plate and a mounting arm)	1
Mounting Bracket	1
M5 Screw	4
M8 Screw	2
M6 x 50 mm Expansion Anchor	4
Hose Clamp	2
Cable Gland for Ethernet Cable	2
Cable Gland for Fiber-Optic Cable	1
Dust Cap	3
Grounding Cable	1

Item	Quantity
Warranty Card	1
Hardware Installation and Reference Guide	1

1.4 Technical Specifications

1.4.1 Dimensions and Weight

Table 1-3 Dimensions and Weight

Dimensions and Weight	AX 3000 OLP
Physical Dimensions (W × D × H)	Access point: 251 mm × 168 mm × 64 mm (9.88 in. x 6.61 in. x 2.52 in.) Mounting plate assembly: 130 mm × 231 mm × 39 mm (5.12 in. x 9.09 in. x 1.54 in.) Mounting bracket: 120 mm × 124 mm × 43 mm (4.72 in. x 4.88 in. x 1.69 in.)
Weight	Access point: 1.0 kg (2.20 lbs.) Mounting plate assembly: 0.6 kg (1.32 lbs.) Mounting bracket: 0.3 kg (0.66 lbs.)
Installation	Ceiling/Wall/Pole-mount
Lock Option	Not supported
Mounting Bracket Dimensions (W × D × H)	Mounting plate assembly: 100 mm × 100 mm (3.94 in. x 3.94 in.) Mounting bracket: 65 mm × 105 mm (2.56 in. x 4.13 in.)
Mounting Hole Diameter	Mounting plate assembly: 7 mm (0.28 in.) Mounting bracket: 9 mm (0.35 in.)
Mounting Pole Pattern	50 mm to 140 mm (1.97 in. x 5.51 in.)

1.4.2 Radio Specifications

Table 1-4 Radio Specifications

Radio Specifications	AX 3000 OLP
Radio Design	Dual-radio Up to four spatial streams Radio 1: 2.4 GHz, 2 spatial streams: 2 x 2, MU-MIMO Radio 2: 5 GHz, 2 spatial streams: 2 x 2, MU-MIMO
Operating Radio	Radio1: 802.11b/g/n/ax, 2.400 GHz to 2.4835 GHz Radio2: 802.11a/n/ac/ax, 5.150 GHz to 5.350 GHz, 5.470GHz ~ 5.850GHz Note: The operating radio is country-specific.
Max. Data Rate	2.4 GHz: 574 Mbps 5 GHz: 2.402 Gbps Combined: 2.976 Gbps
Antenna Type	Built-in smart antennas
Antenna Gain	2.4 GHz: 4 dBi 5 GHz: 6 dBi
Max. Transmit Power	28 dBm Note: The transmit power is country-specific.
Power Adjustment	Configurable in increments of 1 dBm
Modulation	802.11b: BPSK, QPSK, CCK 802.11a/g/n: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM 802.11ac: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM 802.11ax: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM
Receive Sensitivity	802.11b: –91 dBm (1 Mbps), –88 dBm (5 Mbps), –85 dBm (11 Mbps) 802.11a/g: –89 dBm (6Mbps), –80 dBm (24Mbps), –76 dBm (36Mbps), –71 dBm (54Mbps) 802.11n: –83 dBm@MCS0, –65 dBm@MCS7, –83 dBm@MCS8, –65 dBm@MCS15 802.11ac HT20: –83 dBm (MCS0), –57 dBm (MCS9) 802.11ac HT40: –79 dBm (MCS0), –57 dBm (MCS9) 802.11ac HT80: –76 dBm (MCS0), –51 dBm (MCS9)

Radio Specifications	AX 3000 OLP
	802.11ax HE80: –76 dBm (MCS0), –49 dBm (MCS11) 802.11ax HE160: –45 dBm (MCS10), –43 dBm (MCS11)

1.4.3 Port Specifications

Table 1-5 Port Specifications

Port Specifications	AX 3000 OLP
Bluetooth	Bluetooth 5.0
Fixed Service Port	Uplink: One 10/100/1000Base-T Ethernet port with auto-negotiation, IEEE 802.3af/at-compliant One 2.5GE SFP port, conformity to 1GE SFP
Fixed Management Port	One RJ45 console port
Status LED	One system status LED Three RSSI LEDs
Button	One Reset button

1.4.4 Power Supply and Consumption

Table 1-6 Power Supply and Consumption

Power Supply and Consumption	AX 3000 OLP
Input Power Supply	1. DC power supply (48 V/0.35 A) 2. PoE/PoE+ power supply (IEEE 802.3af/at-compliant)
Max. Power Consumption	12.95 W

Caution

- If the access point is powered by PoE power supply, make sure that the power sourcing equipment (PSE) is 802.3af-capable.

- The access point adopts a fan-free design. Therefore, maintain sufficient clearance around the access point for air circulation.

1.4.5 Environment and Reliability

Table 1-7 Standard Compliance

Environment and Reliability	AX 3000 OLP
Temperature	Working temperature: –10°C to +65°C (14°F to 149°F) Storage temperature: –40°C to +85°C (–40°F to +185°F) At an altitude ranging from 3000 m to 5000 m (9842.52 ft. to 16404.20 ft.), every time the altitude increases by 166 m (546 ft.), the maximum temperature decreases by 1°C (1.8°F).
Humidity	Operating humidity: 0% to 100% RH (non-condensing) Storage humidity: 0% to 100% RH (non-condensing)
IP Rating	IP68
Anti-corrosion Rating	24 Days
Regulatory compliance	EN 55032, EN 55035, EN 61000-3-3, EN IEC 61000-3-2, EN 301 489-1, EN 301 489-3, EN 301 489-17, EN 300 328, EN 301 893, EN 300 440, FCC Part 15, EN IEC 62311, IEC 62368-1, EN 62368-1, and IEC 60950-22

1.5 LED and Button

Note

The LED description applies to both fit and fat modes unless otherwise specified.

Table 1-8 LED Status

Status	Frequency	Description
Off	N/A	The access point is not powered on. The access point is powered on, but the LED is manually turned off.
Steady green	N/A	The software system of the access point is being initialized.

Status	Frequency	Description
Steady red	N/A	The system is running properly, but the uplink service port is linked down.
Blinking red at an interval of 1s	On for 3s Off for 1s	In fit mode, the setup of a CAPWAP tunnel between the access point and wireless controller timed out.
Blinking blue at an interval of 0.2s	On for 0.2s Off for 0.2s	In fit or cloud mode, the software system of the AP is being updated.
Steady blue	N/A	The system is running properly, but there is no STA online.
Blinking blue at an interval of 1s	On for 1s Off for 1s	The system is running properly and there are one or more STAs online.
Blinking red at an interval of 0.2s	On for 0.2s Off for 0.2s	In fit mode, the access point is being located.

Table 1-9 Reset Button

Button	Operation	Result
Reset button	Press and hold the button for less than 2 seconds.	Restart the access point.
	Press and hold the button for more than 5 seconds.	Restore the access point to factory settings.

Table 1-10 RSSI LEDs

LED Color	No. of Steady-on LEDs	Description
N/A	N/A	The bridge function is disabled on the access point. The bridge function is disabled on the access point, but bridging fails.
Green	1	Bridging is successful, and the strength of the wireless signals dedicated for bridging is smaller than –70 dBm.

LED Color	No. of Steady-on LEDs	Description
Green	1, 2	Bridging is successful, and the strength of the wireless signals dedicated for bridging ranges from –70 dBm to –50 dBm.
Green	1, 2, 3	Bridging is successful, and the strength of the wireless signals dedicated for bridging is greater than –50 dBm.

1.6 Optical Module

The type of the port on the device directly connected with the 2.5GE SFP port on the access point can be an optical port or electrical port. However, the negotiation rate is subject to the port rate or optical module used on both devices. For details, see Table 1-11 and Table 1-12.

Table 1-11 Rate Negotiation for an Optical Port on the Peer Device

Optical Port Rate of Access Point	Optical Module Rate	Negotiation Rate Supported by the Port on the Peer Device		
		1 Gbps	1 Gbps/10 Gbps/Auto Negotiation	1 Gbps/2.5 Gbps/10 Gbps/Auto Negotiation
2.5 Gbps	2.5 Gbps	Not supported	Not supported	2.5 Gbps
1 Gbps	1 Gbps	1 Gbps	1 Gbps	1 Gbps

Table 1-12 Rate Negotiation for an Electrical Port on the Peer Device

Optical Port Rate of Access Point	O/E Conversion Module Rate	Negotiation Rate Supported by the Port on the Peer Device		
		1 Gbps	1 Gbps/10 Gbps/Auto Negotiation	1 Gbps/2.5 Gbps/10 Gbps/Auto Negotiation
1 Gbps	1 Gbps	1 Gbps	1 Gbps	1 Gbps
2.5 Gbps	10 Gbps	1 Gbps	1 Gbps	2.5 Gbps

2 Preparing for Installation

2.1 Safety Precautions

Note

- To avoid personal injury and device damage, carefully read the safety precautions before you install the device.
- The following safety precautions may not cover all possible dangers.

2.1.1 General Safety Precautions

- Do not expose the access point to high temperature, dusts, or harmful gases. Do not install the access point in an inflammable or explosive environment. Keep the access point away from EMI sources such as large radar stations, radio stations, and substations. Do not subject the access point to unstable voltage, vibration, and noises.
- The installation site should be free from water flooding, seepage, dripping, or condensation. The installation site should be selected according to network planning, communications equipment features, and considerations such as climate, hydrology, geology, earthquake, electrical power, and transportation.
- The installation site should be dry. It is not recommended that the access point be installed in a place near the sea. Keep the device at least 500 meters away from the ocean and do not face it towards the sea breeze.
- Do not place the device in walking areas.
- During the installation and maintenance, do not wear loose clothes, ornaments, or any other things that may be hooked by the chassis.
- Keep tools and components away from walking areas.

2.1.2 Handling Safety

- Prevent the access point from being frequently handled.
- Cut off all the power supplies and unplug all power cords before moving or handling the device.

2.1.3 Electric Safety

Warning

- Improper or incorrect electric operations may cause a fire, electric shock, and other accidents, and lead to severe and fatal personal injury and device damage.
- Direct or indirect contact with high voltage or mains power supply via wet objects may cause fatal dangers.

- Observe local regulations and specifications during electric operations. Only personnel with relevant qualifications can perform such operations.

- Check whether there are potential risks in the work area. For example, check whether the ground is wet.
- Find the position of the indoor emergency power switch before installation. Cut off the power switch in case of accidents.
- Check the access point carefully for confirmation before shutting down the power supply.
- Do not place the device in a damp/wet location. Do not let any liquid enter the chassis.
- Keep the access point far away from grounding or lightning protection devices for power equipment.
- Keep the access point away from radio stations, radar stations, high-frequency high-current devices, and microwave ovens.

2.1.4 Storage Security

For proper working of the access point, the access point must be stored in an environment based on the storage temperature/humidity requirements in Specifications.

Caution

If the access point is stored for more than 18 months, power on the access point and run it for consecutive 24 hours to activate the access point.

2.2 Installation Environment Requirements

2.2.1 Bearing Requirements

Evaluate the weight of the device and its accessories (such as the bracket, pole and power supply module), and ensure that the ground of the installation site meets the requirements.

2.2.2 Ventilation Requirements

Reserve sufficient space in front of the air vents to ensure normal heat dissipation. After various cables are connected, bundle the cables or place them in the cable management bracket to avoid blocking air inlets.

2.2.3 Space Requirements

Maintain a minimum clearance of 0.4 m (15.75 in.) around the device to ensure proper cooling and ventilation.

2.2.4 Temperature/Humidity Requirements

To ensure normal operation and a prolonged service life of the access point, maintain an appropriate temperature and humidity in the installation environment.
The installation environment with too high or too low temperature and humidity for a long period of time may damage the access point.

- In an environment with high relative humidity, the insulating material may have bad insulation or even leak electricity.

- In an environment with low relative humidity, the insulating strip may dry and shrink, loosening screws.
- In a dry environment, static electricity is prone to occur and damage the internal circuits of the access point.
- Too high temperatures can accelerate the aging of insulation materials, greatly reducing the reliability of the access point and severely affecting its service life.

Note

The ambient temperature and humidity of the device are measured at the point that is 1.5 m (59.06 in.) above the floor and 0.4 m (15.75 in.) before the device when there is no protective plate in front or at the back of the device.

2.2.5 Cleanness Requirements

Dust poses the top threat to the running of the device. The indoor dust falling on the device may be adhered by the static electricity, causing poor contact of the metallic joint. Such electrostatic adherence may occur more easily when the relative humidity is low, not only affecting the service life of the device, but also causing communication faults. The following table shows the requirements for the dust content and granularity in the equipment room.

Table 2-1 Requirements for Dust

Dust	Unit	Content
Dust particles (diameter ≤ 0.5 μm)	Particles/m^3	≤ 1.4×10^7
Dust particles (0.5 μm ≤ diameter ≤ 1 μm)	Particles/m^3	≤ 7×10^5
Dust particles (1 μm ≤ diameter ≤ 3 μm)	Particles/m^3	≤ 2.4×10^5
Dust particles (3 μm ≤ diameter ≤ 5 μm)	Particles/m^3	≤ 1.3×10^5

Apart from dust, the salt, acid and sulfide in the air in the equipment room must also meet strict requirements as such poisonous substances may accelerate the corrosion of the metal and the aging of some parts. The equipment room should be protected from the intrusion of harmful gases (for example, SO_2, H_2S, NO_2, NH_3, and Cl_2), whose requirements are listed in the following table.

Table 2-2 Requirements for Gases

Gas	Average (mg/m^3)	Maximum (mg/m^3)
Sulfur dioxide (SO_2)	0.2	1.5

Gas	Average (mg/m³)	Maximum (mg/m³)
Hydrogen sulfide (H_2S)	0.006	0.03
Nitrogen dioxide (NO_2)	0.04	0.15
Ammonia gas (NH_3)	0.05	0.15
Chlorine gas (Cl_2)	0.01	0.3

Note

The **Average** refers to the average value of harmful gas in one week. The **Maximum** value is the upper limit of the harmful gas in one week, and maximum value can last for up to 30 minutes every day.

2.2.6 Anti-interference Requirements

- Take interference prevention measures for the power supply system.
- Keep the access point away from the grounding equipment or lightning and grounding equipment of the power device as much as possible.
- Keep the access point far away from high-frequency current devices such as the high-power radio transmitting station and radar launcher.
- Take electromagnetic shielding measures when necessary.

2.2.7 Lightning Protection Requirements

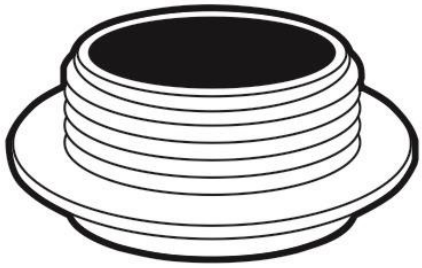
The AX 3000 OLP can guard against lightning strikes. As an electric device, too strong lightning strikes may still damage the device. Take the following lightning protection measures:

- Ensure that the neutral point of the AC power socket is in good contact with the ground.
- It is recommended that you install a power lightning arrester in front of the power input end to enhance the lightning prevention for the power supply.

2.2.8 Waterproof Requirements

Cap unused ports to ensure waterproof.

Figure 2-1 Dust Cap



Connect the network cable, optical fiber jumper, and DC power cable to the access point after they pass through the corresponding waterproof plugs to ensure waterproof.

2.2.9 Other Requirements

Regardless of whether the device is installed on the wall or pole, the following conditions must be met:

- Sufficient space is reserved at the air inlet and air vents of the device, to facilitate heat dissipation of the device.
- The installation site allows for proper cooling and ventilation.
- The installation side is sturdy enough to support the weight of the device and its accessories.
- The access point is properly grounded.

2.3 Tools

Table 2-3 Tools

Common tools	Cross screwdriver, Ethernet cables and optical fibers, screws, diagonal plier, and cable ties
Special tools	Anti-static wrist strap, stripping plier, crimping plier, and wire cutter
Meters	Multimeter and bit error rate tester (BERT)
Other tools	PC, display, and keyboard

Note

The AX 3000 OLP is delivered without a tool kit. The tool kit is customer-supplied.

3 Installing the Access Point

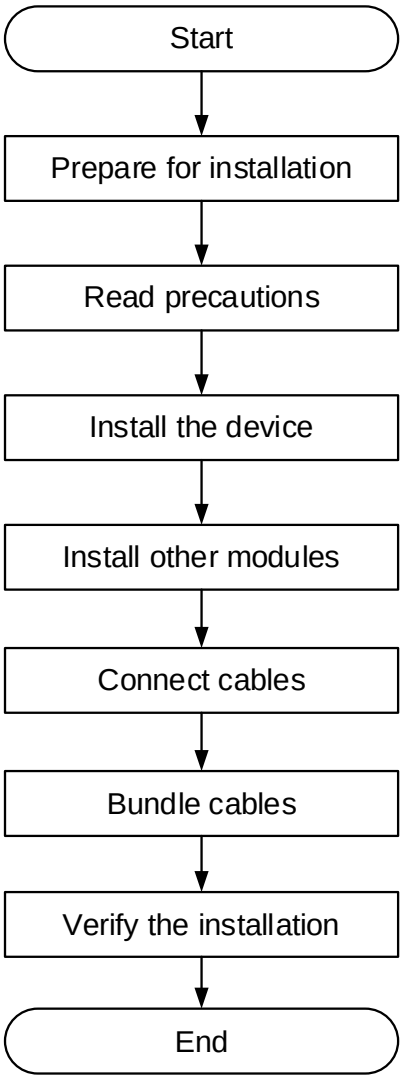
The AX 3000 OLP access point must be installed at a fixed position.

Caution

Before installing the device, make sure that you have carefully read the requirements described in Chapter 2.

3.1 Installation Flowchart

Figure 3-1 Installation Flowchart



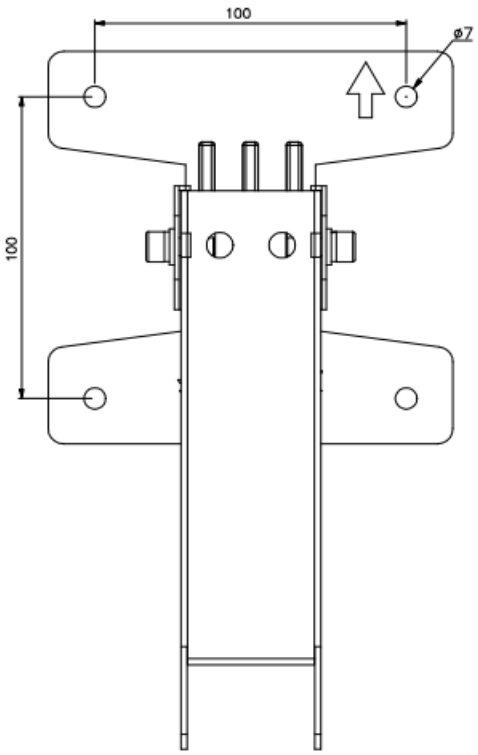
3.2 Before You Begin

Carefully plan and arrange the installation location, networking mode, power supply, and cabling before installing the device.

Confirm the following requirements before installation:

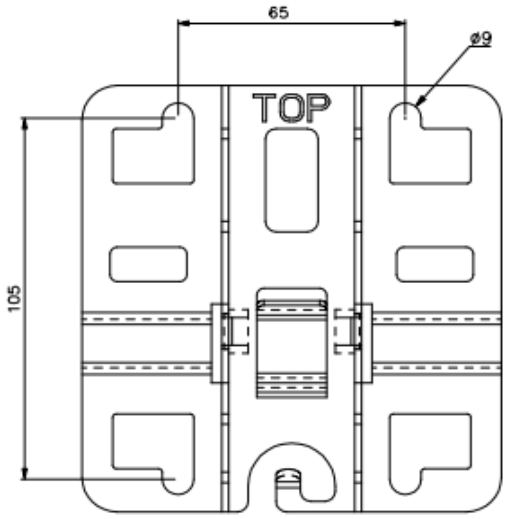
- The installation location provides sufficient space for heat dissipation.
- The installation location meets the temperature and humidity requirements of the device.
- The power supply and required current are available in the installation location.
- The Ethernet cables have been deployed in the installation location.
- The selected power supply meets the system power requirements.
- The position of the emergency power switch is found before installation, so that the power switch can be cut off in case of accidents.
- The diameter range of the pole to which the device is to be mounted meets the parameter value requirements in the specifications.
- For the ceiling-mounted access point, the mounting bracket dimensions, mounting hole pattern, and mounting hole diameter should meet the requirements in the following figure.

Figure 3-2 Dimensions of Mounting Plate Assembly



- For the pole-mounted access point, the pole diameter should meet the specified requirement.

Figure 3-3 Dimensions of Mounting Bracket



3.3 Precautions

To ensure the normal operation and prolonged service life of the access point, observe the following safety precautions:

- Do not power on the device during installation.
- Place the device in a well-ventilated environment.
- Do not subject the device to high temperatures.
- Keep the device away from high-voltage power cables.
- Install the access point indoors.
- Do not expose the device in a thunderstorm or strong electric field.
- Keep the device clean and dust-free.
- Cut off the power switch before cleaning the device.
- Do not wipe the device with a damp cloth.
- Do not wash the device with liquid.
- Do not open the enclosure when the device is working.
- Fasten the device tightly.

3.4 Installing the Access Point

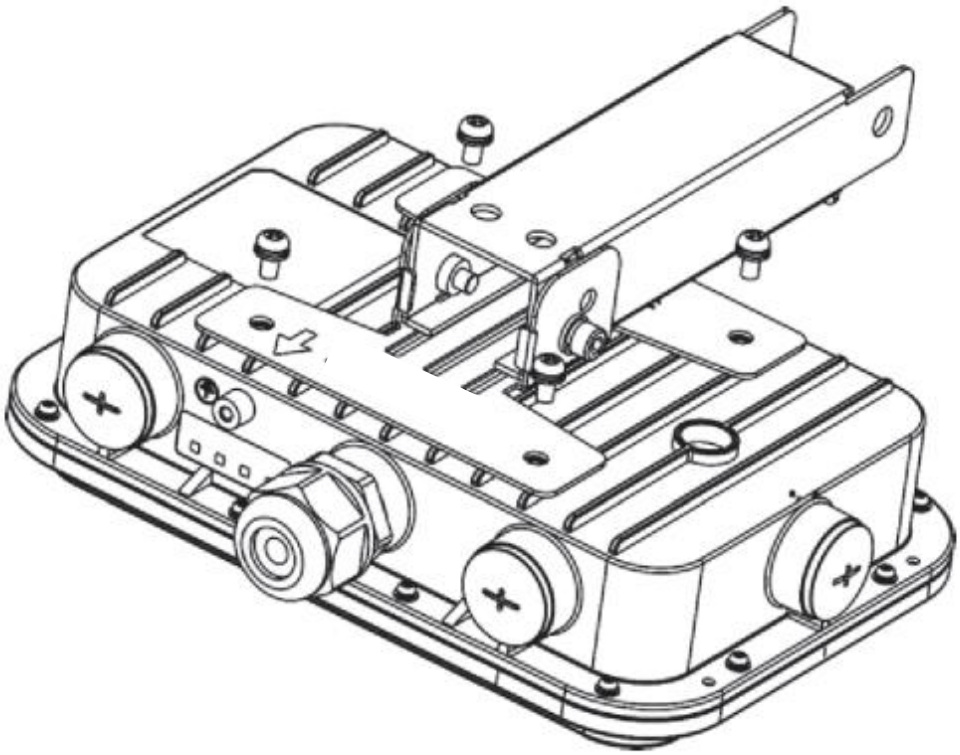
The access point can be installed on a pole or ceiling. To get the optimal Wi-Fi coverage, keep the front panel of the access point parallel to the ground. You are advised to mount the access point horizontally at a height ranging from 3 m (9.84 ft.) to 5 m (16.40 ft.) above the ground. In an ideal environment, the coverage area of the access point is elliptical, with a major axis of 100 m (328.08 ft.) and a minor axis of 50 m (164.04 ft.). The deployment of the access point is subject to the

actual environment. For areas with severe environmental interference, you are advised to reduce the distance between the two access points to improve the Wi-Fi coverage in the edge area.

3.4.1 Mounting the Access Point on a Pole

(1) Secure the mounting plate assembly to the bottom of the AX 3000 OLP access point using four M5 screws.

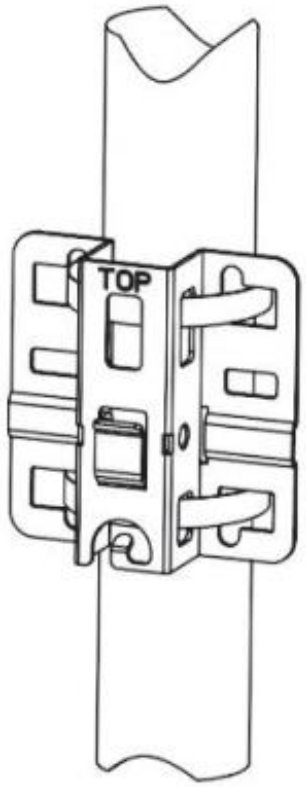
Figure 3-4 Securing Mounting Plate Assembly to Access Point



(2) Secure the mounting bracket to a pole.

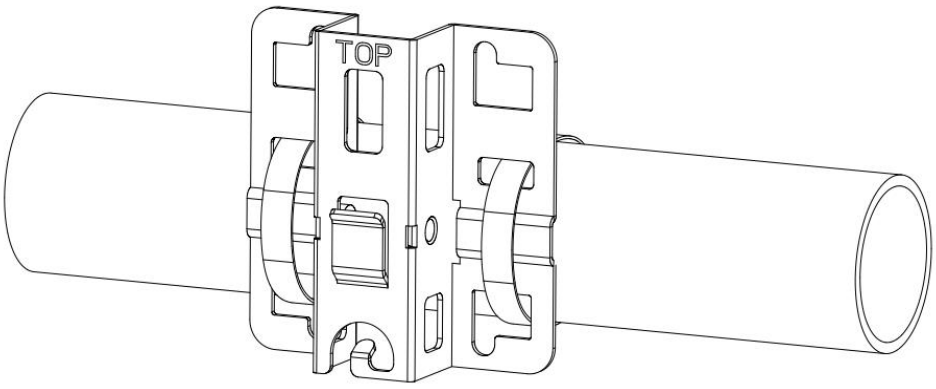
- Vertical pole mounting: Secure the mounting bracket to a vertical pole by threading two hose clamps through the square holes of the mounting bracket. Keep the part of the bracket noted by **TOP** on top.

Figure 3-5 Securing Mounting Bracket to Vertical Pole



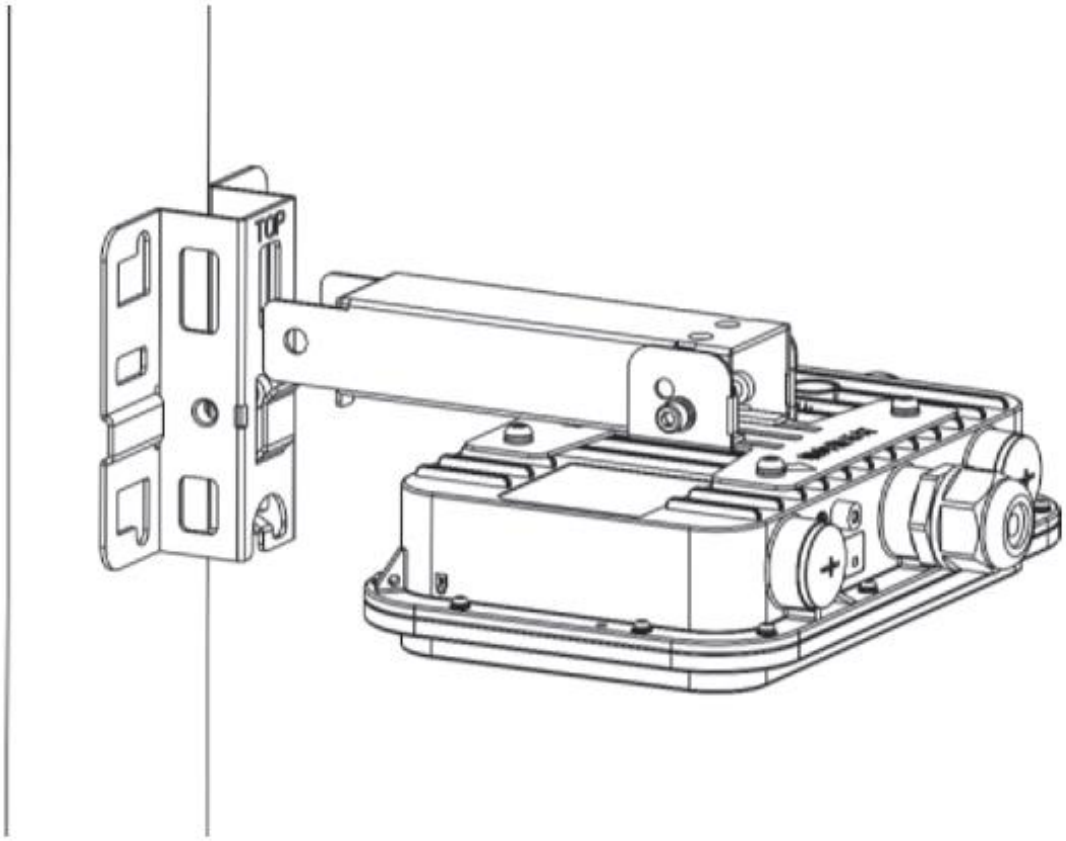
- Horizontal pole mounting: Secure the mounting bracket to a horizontal pole by threading two hose clamps through the square holes of the mounting bracket. Keep the part of the bracket noted by **TOP** on top.

Figure 3-6 Securing Mounting Bracket to Horizontal Pole



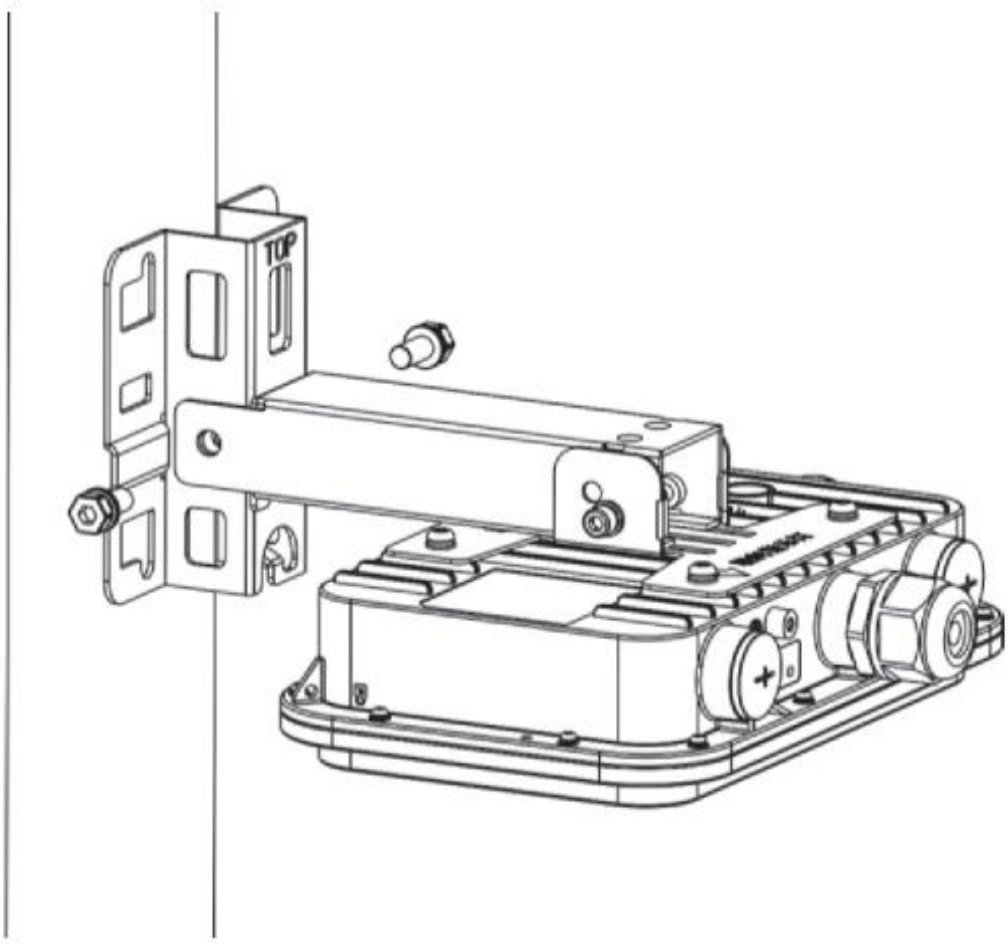
(3) Position the mounting arm on the mounting bracket with its two holes aligned to the screw holes on the mounting bracket.

Figure 3-7 Positioning Mounting Arm on Mounting Bracket



(4) Use two M8 screws to secure the mounting arm to the mounting bracket.

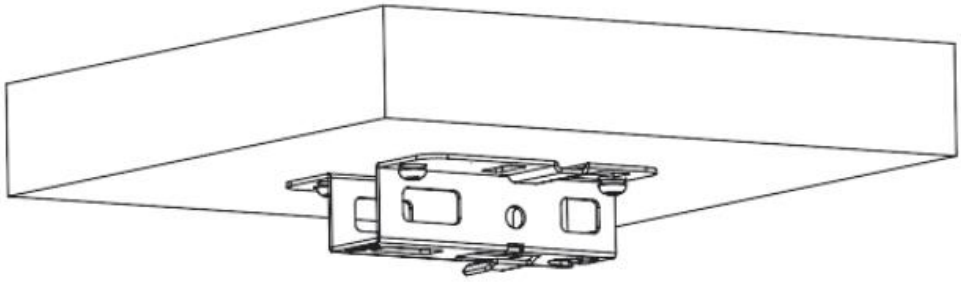
Figure 3-8 **Securing Mounting Arm to Mounting Bracket**



3.4.2 Mounting the Access Point on a Ceiling or Wall

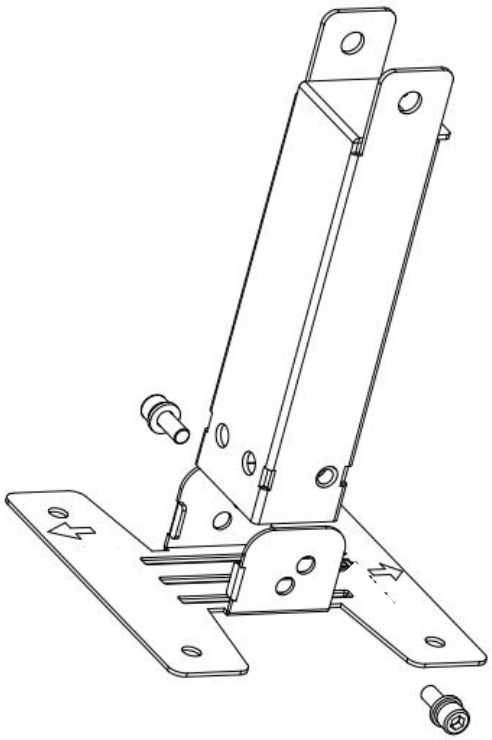
(1) Secure the mounting bracket to a ceiling or wall using four M6 expansion anchors.

Figure 3-9 **Securing Mounting Bracket to Ceiling**



(2) Loosen the two M6 screws on the mounting plate assembly to remove the mounting arm. Rotate the mounting arm by 90 degrees clockwise until it is upright. Tighten two M6 screws to secure the mounting arm to the mounting plate.

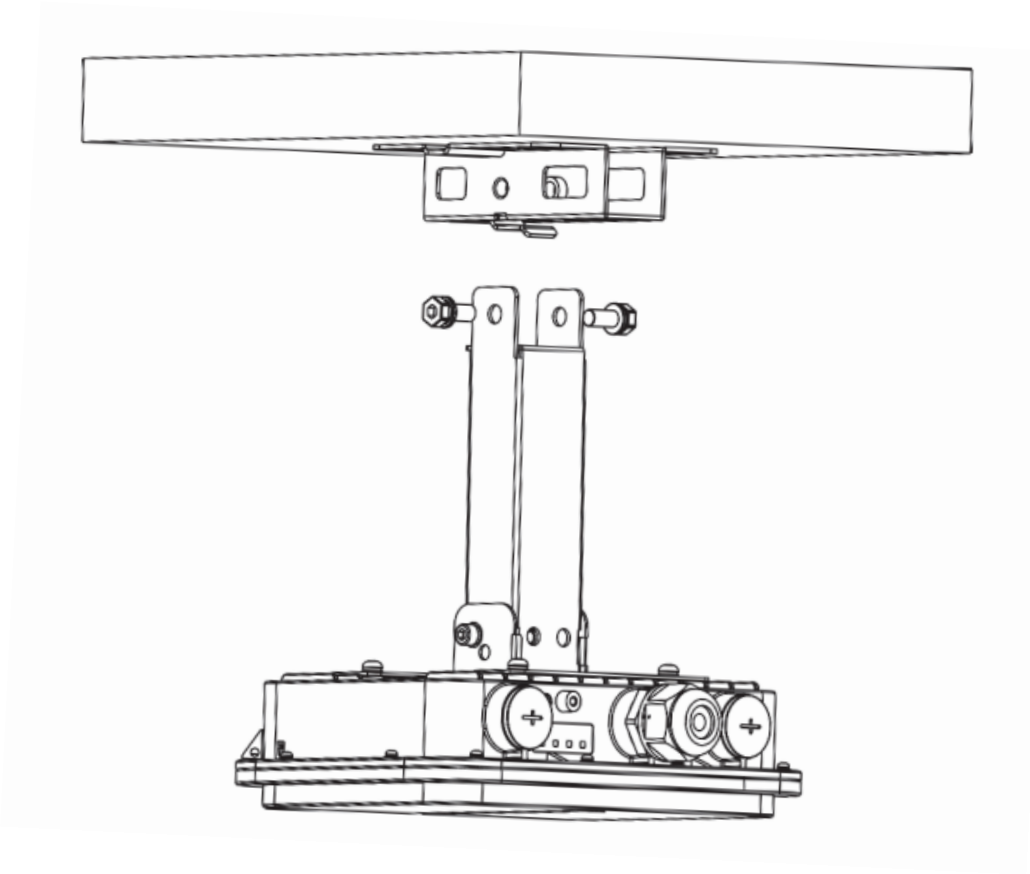
Figure 3-10 Rotating Mounting Arm by 90 Degrees Clockwise



(3) Secure the mounting plate assembly to the bottom of the AX 3000 OLP access point using four M5 screws.

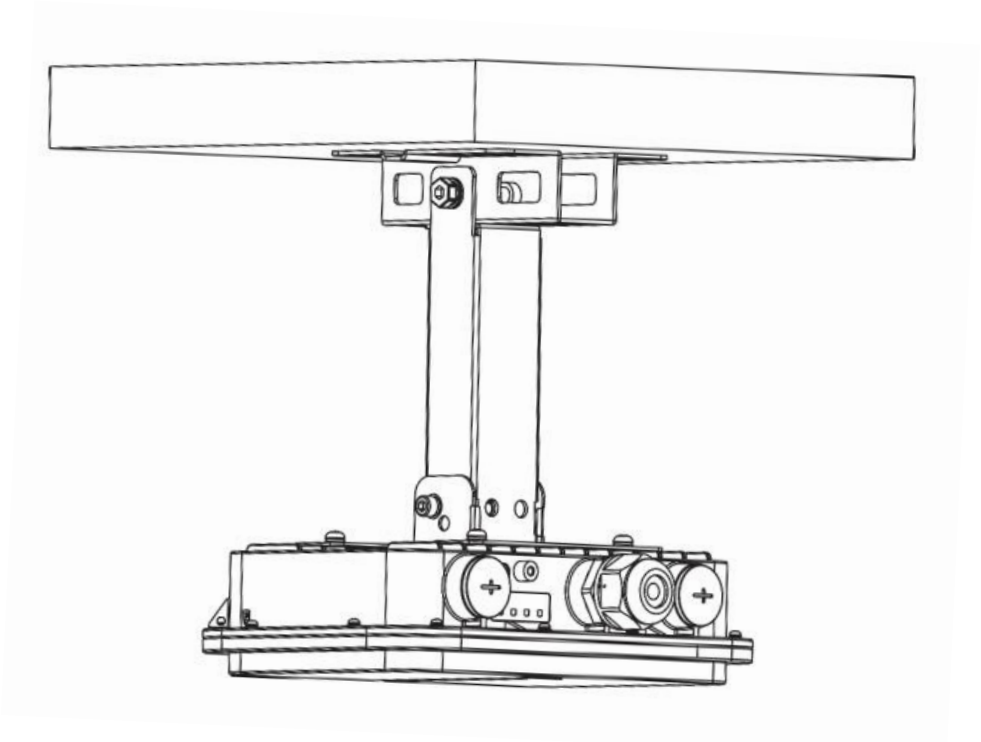
(4) Position the mounting arm on the mounting bracket with its two holes aligned to the screw holes on the mounting bracket.

Figure 3-11 Positioning Mounting Arm on Mounting Bracket



(5) Use two M8 screws to secure the mounting arm to the mounting bracket.

Figure 3-12 Securing Mounting Arm to Mounting Bracket



Caution

- Use matching screws for the screw holes and tighten the structural parts in different installation links.
- Tighten all fastening screws. If any screw is not installed, the device may vibrate violently, shift, or fall down.
- After installation, check that all screws are tightened to prevent the device from falling down.

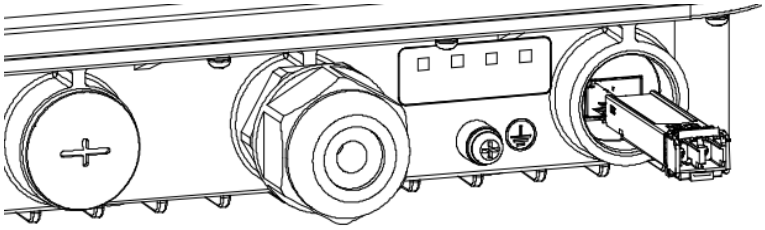
3.4.3 Removing the Access Point

Proceed in the reverse order of the installation to remove the access point.

3.5 Installing an Optical Module

Insert an optical module into the SFP port on the access point and ensure that the optical module is properly installed.

Figure 3-13 Installing an Optical Module

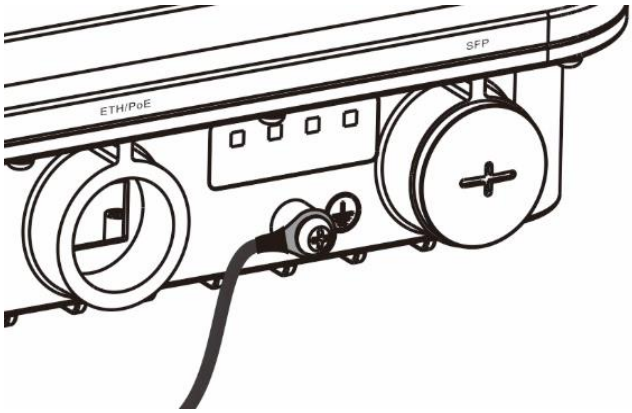


3.6 Installing the Cables

3.6.1 Installing the Grounding Cable

The grounding cable needs to be made on site. Connect one end of the grounding cable delivered with the device to the ground hole of the device through an OT terminal and the other end to the ground through another OT terminal. The cable length can be trimmed based on the on-site situation to avoid waste.

Figure 3-14 Installing Grounding Cable



3.6.2 Installing the Ethernet Cable

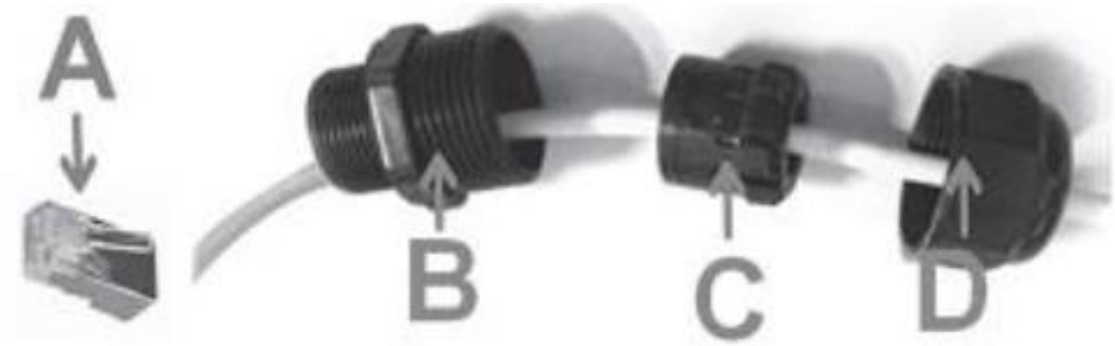
Caution

- Make sure that the RJ45 connector is inserted into the access point correctly. Otherwise, the RJ45 connector will be damaged when you tighten the cable gland.
- When removing the Ethernet cable, remove the cable gland first and then the RJ45 connector connecting to the access point.

(1) Trim an Ethernet cable according to the distance between the access point and the power supply.

(2) Insert the unterminated end of the Ethernet cable through part D (compression cap), C (grommet) and B (split gasket) in sequence.

Figure 3-15 Exploded View of Cable Gland Assembly



(3) Install an RJ45 connector on the unterminated end of the Ethernet cable using an Ethernet cable installation tool. Wrap waterproof materials around the Ethernet cable between part B (split gasket) and C (grommet).

Figure 3-16 Wrapping Waterproof Materials Around Ethernet Cable

(4) Insert the RJ45 connector into the Ethernet/PoE port of the access point and tighten the cable gland assembly in sequence of part B, C and D to complete the installation.

3.6.3 Installing the Fiber-Optic Cable

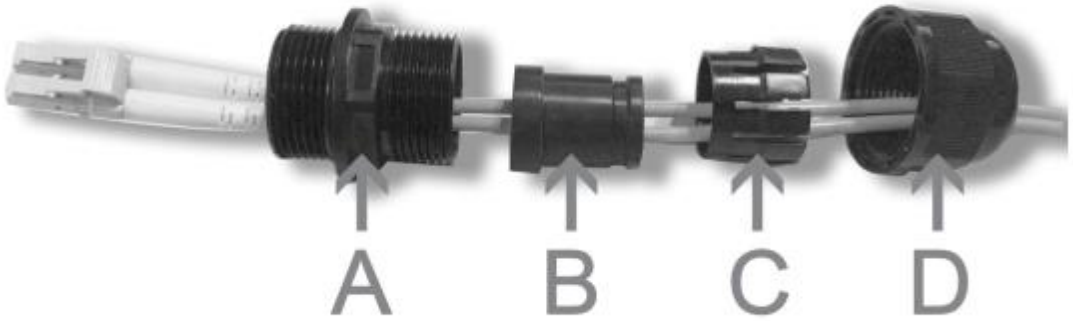
Note

- The cable gland can only hold the LC to LC fiber-optic cable with a diameter ranging from 2.5 mm to 2.9 mm (0.10 in. to 0.11 in.).
- Connect or remove the LC to LC fiber-optic cable based on the guide. Otherwise, the fiber-optic cable may be damaged.

(1) Select an LC-LC fiber-optic cable with a diameter ranging from 2.5 mm to 2.9 mm (0.10 in. to 0.11 in.).

(2) A cable gland assembly includes four components: A (adapter base), B (split gasket), C (grommet), and D (compression cap). B (split gasket) can be pressed into C (grommet) and also can be removed from C (grommet). Insert the unterminated end of a fiber-optic cable through part D, C, B and A in sequence.

Figure 3-17 Exploded View of Cable Gland Assembly



(3) Install an RJ-45 connector on the unterminated end of the fiber-optic cable. Carefully insert the RJ-45 connector into the SFP port of the access point. Thread A (adapter base) into the SFP port.

(4) Slide B (split gasket) and C (grommet) along the cable, pressing firmly to seat B (gasket) completely into C (grommet).

(5) Tighten D (compression cap) until C (grommet) and B (gasket) compress on to the cable and provide cable strain relief. Use a waterproof tape to tighten the cable gland.

Caution

When removing the cable gland, proceed in the reverse order of the installation. Start by loosening D (compression cap). Otherwise, the fiber-optic cable may be damaged.

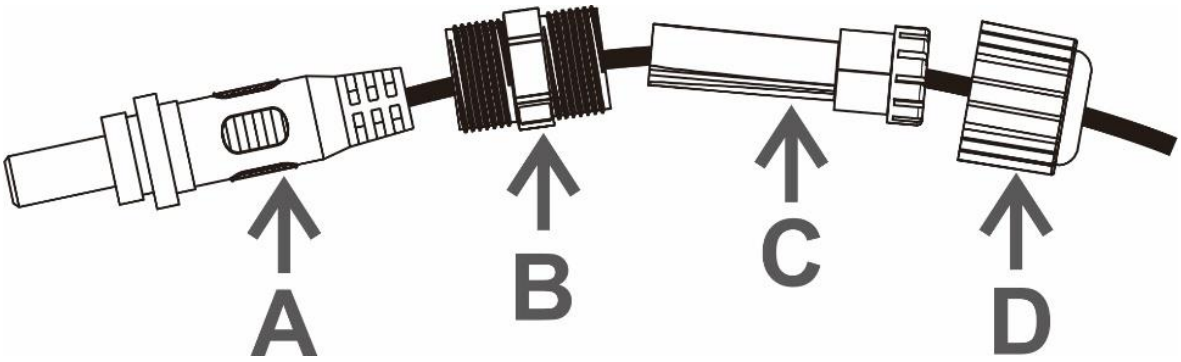
3.6.4 Installing the Power Cord

Note

When the access point is powered by the DC power supply, keep the ports facing downward. In this case, the access point can be protected against only splashing water.

The DC power cord should be used in combination with the cable gland. Paint waterproof cement and wrap the waterproof tapes around the DC power cord between B (split gasket) and C (grommet). The waterproof power cord should be at least 5 mm (0.20 in.) in diameter.

Figure 3-18 Installing DC Power Cord



3.7 Bundling Cables

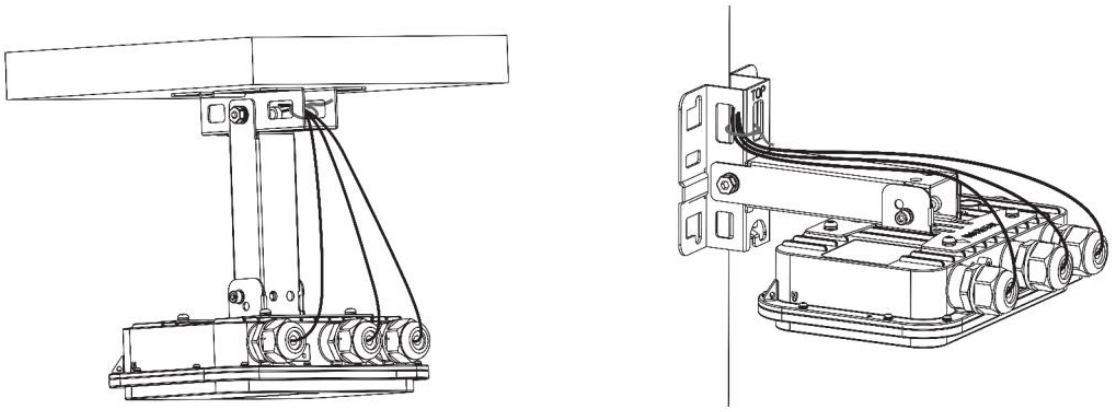
3.7.1 Precautions

- Bundle cables neatly to ensure aesthetics.
- Bend twisted pairs naturally or to a large radius close to the connector.
- Do not over tighten twisted pair bundle as it may reduce the cable life and performance.

3.7.2 Bundling Description

After the cables are connected with the device through the waterproof plugs and power-on is normal, use a cable tie to bundle the cables on the mounting plate and then fix the cables neatly.

Figure 3-19 Bundling Cables on Mounting Bracket Using Cable Tie



Caution

After the cables are bundled, check whether waterproof measures are taken properly.

3.8 Checklist After Installation

3.8.1 Checking the Access Point

- Verify that the external power supply matches with the requirement of the access point.
- Verify that the access point is securely fastened.

3.8.2 Checking Cable Connection

- Verify that the UTP/STP cable or the fiber-optic cable matches with the port type.
- Verify that cables are properly bundled.

3.8.3 Checking the Power Supply

- Verify that the power cord is properly connected and compliant with safety requirements.
- Verify that the access point is operational after power-on.

4 Verifying Operating Status

4.1 Setting up Configuration Environment

The access point can be powered by PoE or local power .

- When the access point is powered by using DC or PoE, verify that the power supply functions properly and meets safety requirements.
- Connect the access point to an access controller through a twisted pair cable.
- When the serial port of the access point is connected to a PC for debugging, verify that the PC and PoE switch are properly grounded.

4.2 Powering on the Access Point

4.2.1 Checklist Before Power-on

- Verify that the power cord is properly connected.
- Verify that the input voltage meets with the requirement of the access point.

4.2.2 Checklist After Power-on (Recommended)

After power-on, check the following items:

- Verify that there are system logs printed on the terminal interface.
- Verify the LED status of the access point.

5 Monitoring and Maintenance

5.1 Monitoring

5.1.1 LED

You can observe the LEDs to monitor the device status.

5.1.2 CLI Commands

You can run related commands on the CLI to remotely monitor the device, including:

- Port configuration and status
- System logs

Note

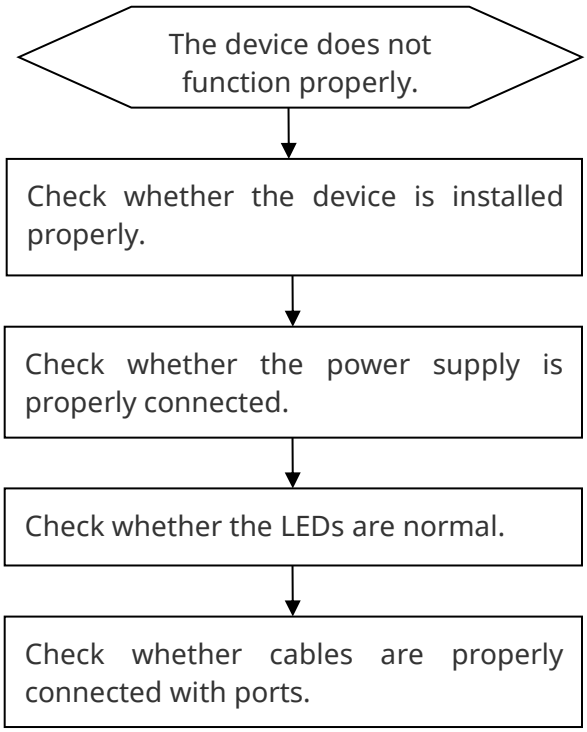
- You can log in to the AP via Telnet and use monitoring related commands to maintain the AP.

5.2 Remote Maintenance

- If the access point works in the fat mode, you can log in to the access point for remote maintenance.
- If the access point works in the fit mode, you can use a wireless controller to manage and maintain the access point uniformly.

6 Troubleshooting

6.1 Troubleshooting Flowchart



6.2 Common Faults

6.2.1 Ethernet Port Is Not Working After the Ethernet Cable Is Plugged In

Verify that the peer device is working properly. And verify that the Ethernet cable is capable of providing the required data rate and is properly connected.

6.2.2 LED Is Off for a Long Time

- PoE power feeding: Check whether the other end of the PoE cable supports 802.11af or higher PoE standards, and then check whether the Ethernet cable is properly connected.
- DC power supply: Check whether there is power supply, and whether the power supply unit works normally.

6.2.3 LED Is Steady Red

The LED keeps steady red for a long time, indicating that the Ethernet port is not connected. Verify the Ethernet connection.

6.2.4 LED Is Steady Green

The device performs initialization after power-on. During this period, the LED keeps steady green and does not turn normal blue until the initialization is completed. Note: If the steady green persists for an hour, the device initialization fails, and the device is faulty.

6.2.5 LED Keeps Blinking Blue at an Interval of 0.2s (in Fit Mode)

Sometimes the access point performs software upgrade after power-on. During this period, the LED keeps blinking blue at an interval of 0.2s and does not turn steady blue until the upgrade is completed. Note: Do not plug or unplug the power cord when the LED is blinking as software upgrade takes time. If the blinking persists for 10 minutes, the device fails to complete software upgrade and is faulty.

6.2.6 LED Does Not Turn Steady Blue or Blinking Blue

If the LED does not turn steady blue or blinking blue after the system starts, the access point probably has not established a proper CAPWAP connection with the wireless controller. Verify that the wireless controller is operational and configured properly.

6.2.7 Clients Can Not Find the Access Point

(1) Verify that the access point is properly powered.

(2) Verify that the Ethernet port is correctly connected.

(3) Verify that the access point is correctly configured.

(4) Move the client endpoint to adjust the distance between the client and the access point.

7 Appendix

7.1 Connectors and Media

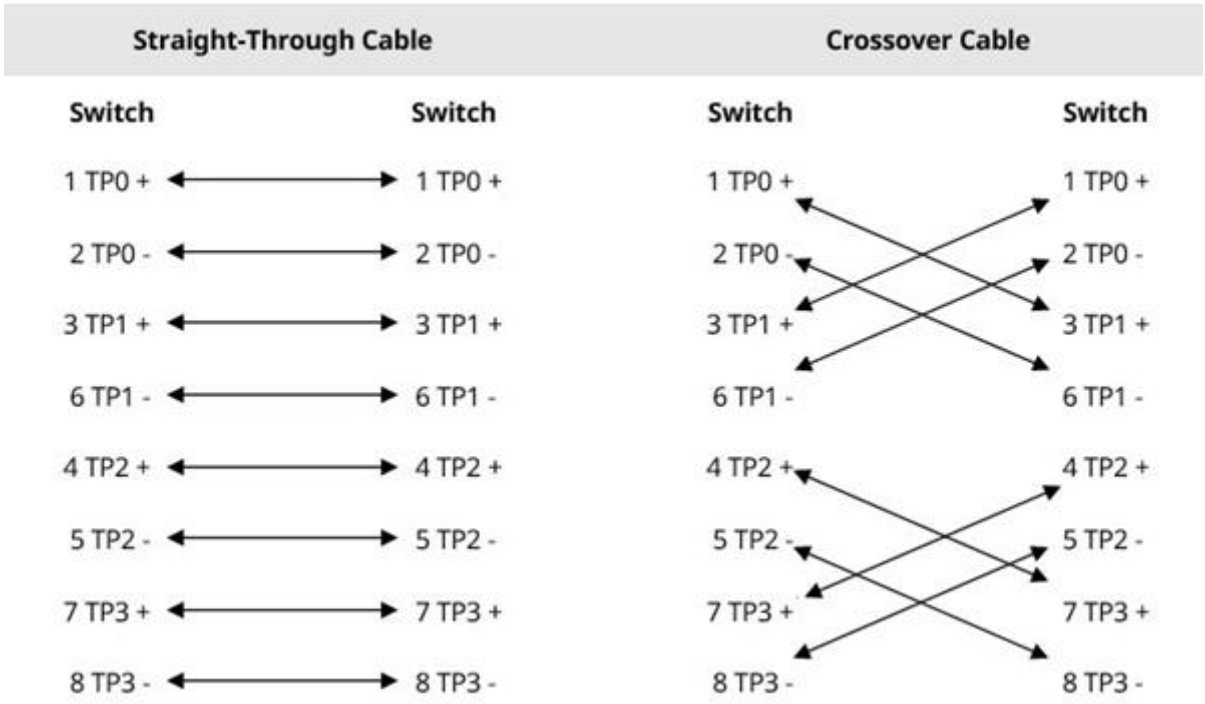
- 1000BASE-T/100BASE-TX/10BASE-T port

The 1000BASE-T/100BASE-TX/10BASE-T is a 10/100/1000 Mbps port that supports auto-negotiation and auto MDI/MDIX Crossover.

Compliant with IEEE 802.3ab, the 1000BASE-T port requires 100-ohm Category 5/5e UTP or STP with a maximum distance of 100 meters (328.08 feet).

The 1000BASE-T port uses four twisted pairs for data transmission. Twisted pairs for the 1000BASE-T port are connected as shown in the following figure.

Figure 7-1 1000BASE-T Twisted Pairs Connection



100BASE-TX/10BASE-T port can also be connected by cables of the preceding specifications. Besides, the 10BASE-T port can be connected by 100-ohm Category 3, Category 4, and Category 5 cables with a maximum distance of 100 meters (328.08 feet). 100BASE-TX port can be connected by 100-ohm Category 5 cables with a maximum distance of 100 meters (328.08 feet). The following figure lists definitions of pin signals for the 100BASE-TX/10BASE-T port.

Figure 7-2 100BASE-TX/10BASE-T Pin Assignments

Pin	Socket	Plug
1	Input Receive Data+	Output Transmit Data+
2	Input Receive Data-	Output Transmit Data-
3	Output Transmit Data+	Input Receive Data+
6	Output Transmit Data-	Input Receive Data-
4, 5, 7, 8	Not Used	Not Used

The following figure shows feasible connections of the straight-through and crossover twisted pairs for a 100BASE-TX/10BASE-T port.

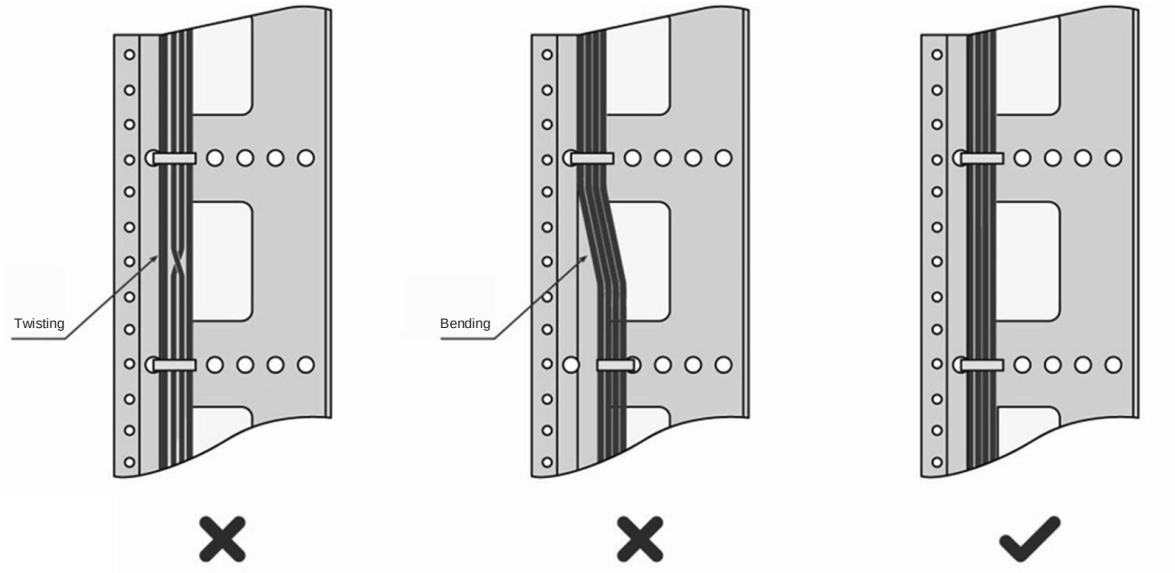
Figure 7-3 100BASE-TX/10BASE-T Twisted Pairs Connection

7.2 Cabling

During installation, route cable bundles upward or downward along the sides of the rack depending on the actual situation in the equipment room. All cable connectors should be placed at the bottom of the cabinet rather than be exposed outside of the cabinet. Power cords are routed beside the cabinet, and top cabling or bottom cabling is adopted according to the actual situation in the equipment room, such as the positions of the DC power distribution box, AC socket, or lightning protection box.

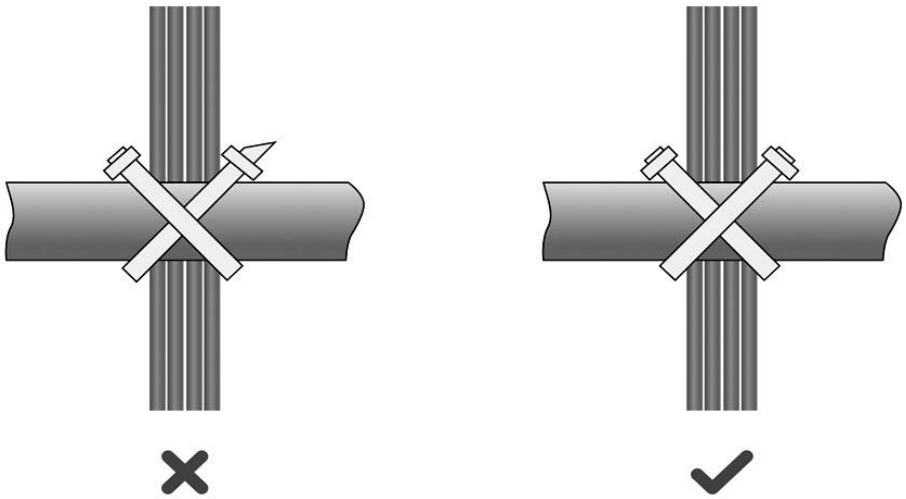
- Requirement for the Minimum Cable Bend Radius
  - The bend radius of a power cable, communication cable, or flat cable should be over five times greater than their respective diameters. The bend radius of these cables that is often bent or plugged or unplugged should be over seven times greater than their respective diameters.
  - The bend radius of a fixed common coaxial cable should be over seven times greater than its diameter. The bend radius of the common coaxial cable that is often bent or plugged should be over 10 times greater than its diameter.
  - The minimum bend radius of a high-speed cable, such as an SFP cable should be over five times the overall diameter of the cable. If the cable is frequently bent, plugged or unplugged, the bend radius should be over 10 times the overall diameter.
- Precautions for Cable Bundling
  - Before cables are bundled, mark labels and stick the labels to cables wherever appropriate.
  - Cables should be neatly and properly bundled in the cabinet without twisting or bending, as shown in Figure 7-4.

Figure 7-4 Bundling Cables



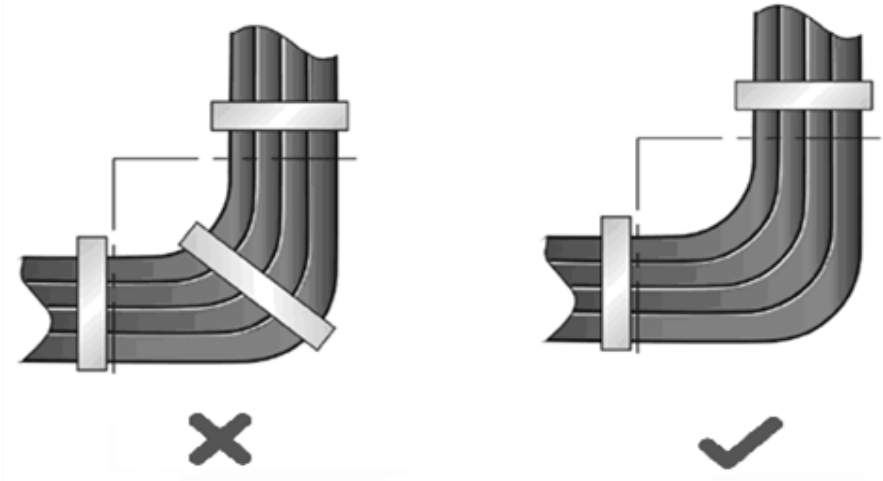
- Cables of different types (such as power cables, signal cables, and grounding cables) should be separated in cabling and bundling. Mixed bundling is not allowed. When they are close to each other, it is recommended that crossover cabling be adopted. In the case of parallel cabling, maintain a minimum distance of 30 mm between power cords and signal cables.
- The cable management brackets and cabling troughs inside and outside the cabinet should be smooth without sharp corners.
- The metal hole traversed by cables should have a smooth and fully rounding surface or an insulated lining.
- Proper cable ties should be selected to bundle up cables. It is forbidden to connect two or more cable ties to bundle up cables.
- After bundling up cables with cable ties, cut off the remaining part. The cut should be smooth and trim, without sharp corners, as shown in Figure 7-5.

Figure 7-5 Cutting off Excess Cable Tie



- When cables need to be bent, bind them first but do not tie cable ties within the bend. Otherwise, considerable stress may be generated in cables, breaking cable cores, as shown in Figure 7-6.

Figure 7-6 Binding Cables

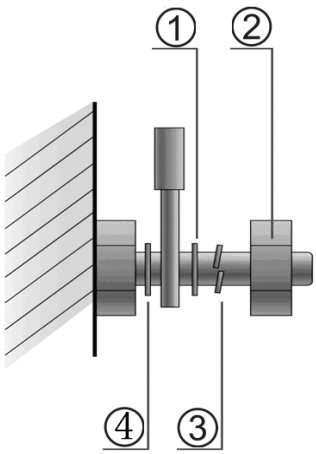


- Cables not to be assembled or remaining parts of cables should be folded and placed in a proper position of the cabinet or cable trough. The proper position indicates a position that will not affect device running or cause device damage or cable damage during debugging.
- 220 V and –48 V power cables must not be bundled on the guide rails of moving parts.
- The power cables connecting moving parts such as door grounding wires should be reserved with some access after being assembled to avoid suffering tension or stress. When a moving part reaches the installation position, the remaining cable part should not touch heat sources, sharp corners, or sharp edges. If heat sources cannot be avoided, high-temperature cables should be

used.

- When screw threads are used to fasten cable terminals, the bolt or screw must be tightly fastened, and anti-loosening measures should be taken, as shown in Figure 7-7.

Figure 7-7 Fastening Cable Lugs



① Flat washer	③ Spring washer
② Nut	④ Flat washer

- Hard power cords should be fastened in the terminal connection area to prevent stress on terminal connection and cable.
- Do not use self-tapping screws to fasten terminals.
- Power cables of the same type and in the same cabling direction should be bundled up into cable bunches, with cables in cable bunches clean and straight.
- Bundle up cables using cable ties based on the following table.

Cable Bunch Diameter	Distance Between Every Binding Point
10 mm (0.39 in.)	80 mm to 150 mm (3.15 in. to 5.91 in.)
10 mm to 30 mm (0.39 in. x 1.18 in.)	150 mm to 200 mm (5.91 in. x 7.87 in.)
30 mm (1.18 in.)	200 mm to 300 mm (7.87 in. x 11.81 in.)

- No knot is allowed in cabling or bundling.
- For wiring terminal blocks (such as circuit breakers) with cord end terminals,

the metal part of the cord end terminal should not be exposed outside the terminal block when assembled.

7.3 Optical Modules and Specifications

Use appropriate optical modules according to the port types. You can select the module to suit your specific needs. The optical module types and corresponding specifications are provided for reference.

Table 7-1 SFP Modules and Specifications

Wavelength (nm)	Fiber Type	DDM	Intensity of Transmitted Light (dBm)		Intensity of Received Light (dBm)	
			Min.	Max.	Min.	Max.
850 Tx/850 Rx	MMF	Supported	N/A	–4	N/A	–17
1310 Tx/1310 Rx	SMF	Supported	N/A	3	N/A	–3

Table 7-2 SFP Module Cabling Specifications

Interface Type	Fiber Type	Core Specifications (μm)	Max. Cabling Distance
LC	MMF	50/125, 62.5/125	0.3 km (984.25 ft.)
LC	SMF	9/125	40 km (131233.60 ft.)

Caution

- For optical modules with a maximum cabling distance of over 40 km (24.85 miles), install an optical attenuator to avoid overload when using short-distance SMFs.
- The optical module is a laser device. Please do not look into the laser beam directly.
- To keep the optical module clean, make sure that the unused ports remain capped.

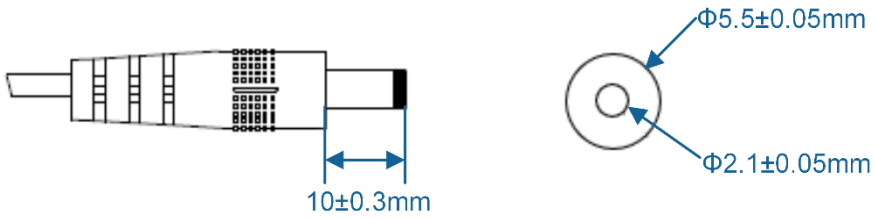
7.4 DC Connector Specifications

- Input voltage: 48 V DC; rated current: 0.35 A

Table 7-3 DC Connector Specifications

Inner Diameter	Outer Diameter	Depth	Polarity
2.1 mm (0.09 in.)	5.5 mm (0.22 in.)	10 mm (0.40 in.)	Inner Positive, Outer Negative

Figure 7-8 DC Connector Specifications



EKSELANS BY ITS

USER MANUAL

AX Series Access Points Web-based

ITS Partner O.B.S S.L · Av. Cerdanyola 79-81 Local C
08172 Sant Cugat del Vallés · Barcelona (Spain)
Phone:+34935839543 · info@ek.plus · www.ek.plus

Copyright

Disclaimer

The products, services, or features you purchase are subject to commercial contracts and terms. Some or all ofthe products, services or features described in this document may not be within the scope of your purchase or use. Unless otherwise agreed in the contract, Ekselans by ITS does not make any express or implied statementor guarantee for the content of this document.

Due to product version upgrades or other reasons, the content of this document will be updated from time to time. Ekselans by ITS reserves the right to modify the content of the document without any notice or prompt.

This manual is for reference only. Ekselans by ITS endeavors to ensure content accuracy and will not shoulder any responsibility for losses and damages caused due to content omissions, inaccuracies or errors.

Preface

Intended Audience

This document is intended for:

- Network engineers
- Technical support and servicing engineers
- Network administrators

Technical Support

- Company Website: https://www.ek.plus/
- Consult Website: https://www.ek.plus/contacto/
- Support Email: soporte@ek.plus

Conventions

1. Signs

The signs used in this document are described as follows:

Warning

An alert that calls attention to important rules and information that if not understood or followed can result in data loss or equipment damage.

Caution

An alert that calls attention to essential information that if not understood or followed can result in function failure or performance degradation.

Note

An alert that contains additional or supplementary information that if not understood or followed will not lead to serious consequences.

Specification

An alert that contains a description of product or version support.

2. Note

The manual provides configuration information, including models, port types, and command line interfaces, for reference purposes only. In the event of any discrepancy or inconsistency between the manual and the actual version, the actual version shall take precedence.

1 Operating Environment

1.1 Overview

You can access the web management system through a web browser such as Internet Explorer and Google Chrome to manage access points (APs).

The web management system involves two parts: web server and web client. A web server is integrated into the device to receive and process requests from a client, and return the processing result to the client. Typically, a web client refers to a web browser, such as Internet Explorer and Google Chrome.

1.2 Connecting to the Device

The web management system involves two parts: web server and web client. A web server is integrated into the device to receive and process requests from a client, and return the processing result to the client.

As shown in the following figure, an administrator can access and configure the device on the web management system through the web browser. The web management system integrates configuration commands and sends them to the device through Asynchronous JavaScript and XML (AJAX) requests. The web service is enabled on the device to process basic HTTP requests and return requested data based on the commands.

Figure 1-1 Application Topology

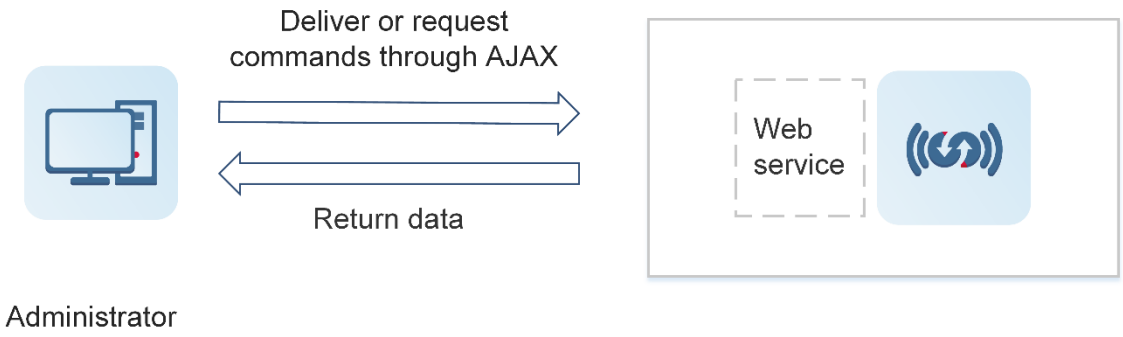
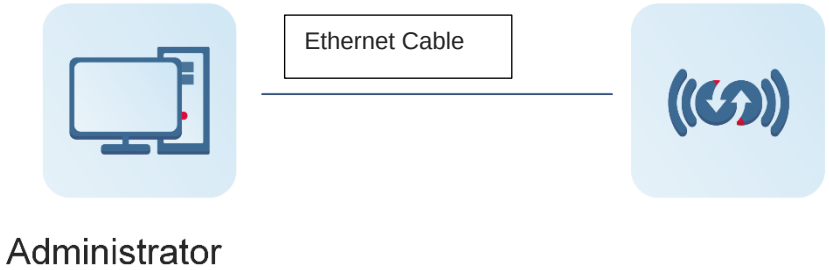


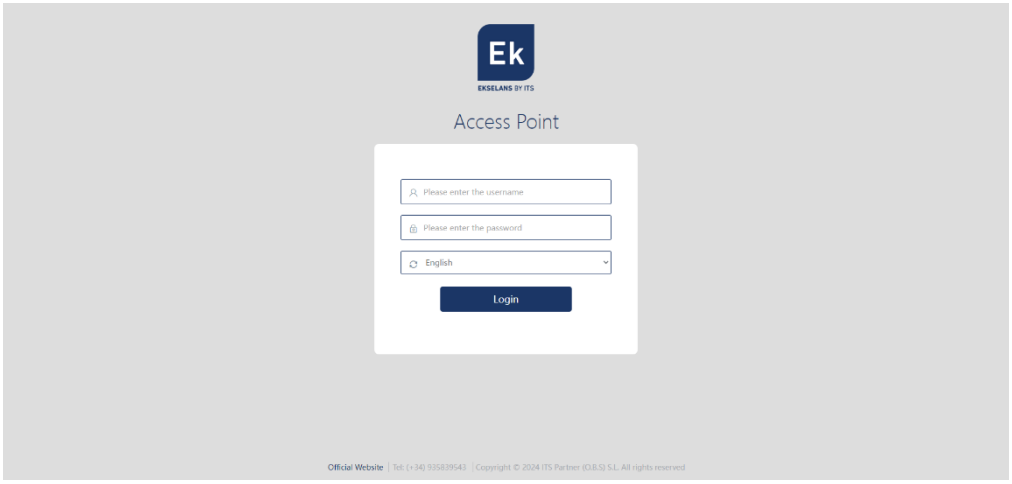
Figure 1-2 Simplified Topology



1.3 Configuration Environment for PC Clients

- An administrator logs in to the web management system to manage the device through the web browser on a client. Typically, a client refers to a PC. It may also be other mobile terminal such as a laptop or iPad. Mobile phones are not supported.
- Web browser: Google Chrome is recommended. Internet Explorer 11 and 360 Secure Browser are also supported. Exceptions such as garbled characters or format errors may occur when other browsers are used.
- Resolution: You are advised to set the resolution to 1280 pixels x 1024 pixels, 1920 pixels x 1080 pixels, or 1440 pixels x 960 pixels. Exceptions such as font alignment error and format error may occur when other resolutions are selected.

1.4 Web Service Environment for an AP



Enter the username and password and click **Login**. The following table provides the default username and password.

Default Username/Password	Description
admin/admin	Super administrator with all permissions.

1.5 Enabling the Web Server

The AP is enabled with the web service and configured with IP address 192.168.110.1 by default. The following describes how to enable the web service using the command line interface (CLI).

Configuration	Command	
Configuring the Web Server	**enable service web-server**	Enables the web service.
	ip address	(Optional) Configures an IP address.
	webmaster level username password	(Optional) Configures the username and password for logging in to the web management system.

1.5.1 Configuration Steps

Enabling the Web Service

- Mandatory.
- Enable the web service on the AP.

Configuring an IP Address

- Optional.

Configuring the Username and Password for Logging In to the Web Management System

- Optional.
- When the web service is enabled, the administrator username and password are **admin** and **admin** respectively, and the guest username and password are **guest** and **guest** respectively by default. Users can create other accounts.

1.5.2 Verification

Log in to the web management system using the configured IP address, username, and password to check whether you can log in successfully.

1.5.3 Related Command

Enabling the Web Service

Command	**enable service web-server** [**http** | **https** | **all**]
Parameter Description	**http** | **https** | **all**: Enables a corresponding service. **http**: Enables the HTTP service. **https**: Enables the HTTPS service. **all**: Enables both HTTP and HTTPS services. Both HTTP and HTTPS services are enabled by default.
Command Mode	Global configuration mode

Configuring an IP Address

Command	**ip address** *ip-address ip-mask*
Parameter Description	*ip-address*: Indicates the IP address. *mask*: Indicates the subnet mask.
Command Mode	Interface configuration mode

Configuring the Username and Password for Logging In to the Web Management System

Command	**webmaster level** *privilege-level* **username** *name* **password** { *password* | [**0 | 7**] *encrypted-password*
Parameter Description	*privilege-level*: Indicates the privilege level of users., including privilege levels 0, 1, and 2. Default administrator account **admin** and guest account **guest** have permissions of privilege levels 0 and 2 respectively. Other manually created accounts have permissions of privilege level 1. *name*: Indicates the username. *password*: Indicates the password. **0 | 7**: Indicates the password encryption types, **0** for no encryption, and **7** for simple encryption. The default value is **0**. *encrypted-password*: Indicates the password text.
Command Mode	Global configuration mode
Usage Guide	N/A

1.5.4 Configuration Examples

Configuring the Web Server

Configuration Steps	Enable the web service. Configure a management IP address for the device. The default management VLAN is VLAN 1. Configure an IP address for VLAN 1 and ensure that users can ping the management IP address successfully from their PCs.
	Hostname# configure terminal Hostname(config)# enable service web-server Hostname(config)# webmaster level 0 username test password test Hostname(config)#interface vlan 1 Hostname(config-if-VLAN 1)#ip address 192.168.1.200 255.255.255.0 Hostname(config)# end
Verification	Run the **show running-config** command to display the configuration.
	Hostname(config)#show running-config Building configuration... Current configuration : 6312 bytes ! hostname Hostname ! ! webmaster level 0 username test password test //Username and password for web management authentication http update mode auto-detect ! ! interface VLAN 1 Ip address 192.168.1.200 255.255.255.0 //Management IP address of the device no shutdown ! line con 0 line vty 0 4 login ! ! End

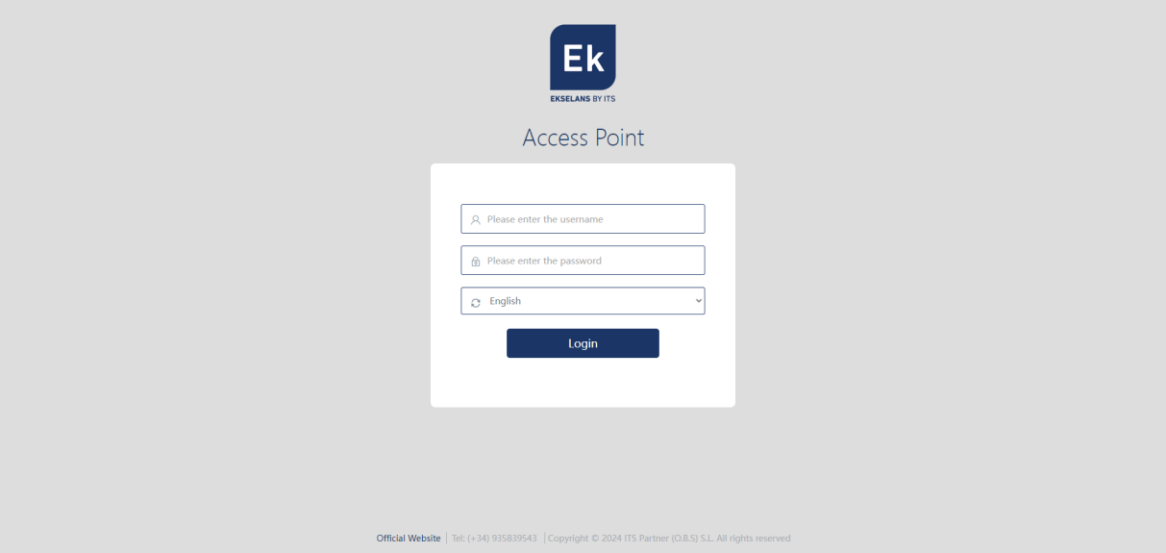
2 Quick Setup

2.1 Logging In to the Web Management System

You will be prompted to change the password upon your first login to the web management system. You are advised to set a complex password. Use the new password upon next login.

Caution

If there are five consecutive failed login attempts within 10 minutes, your account will be locked for 10 minutes.



2.2 Config Wizard

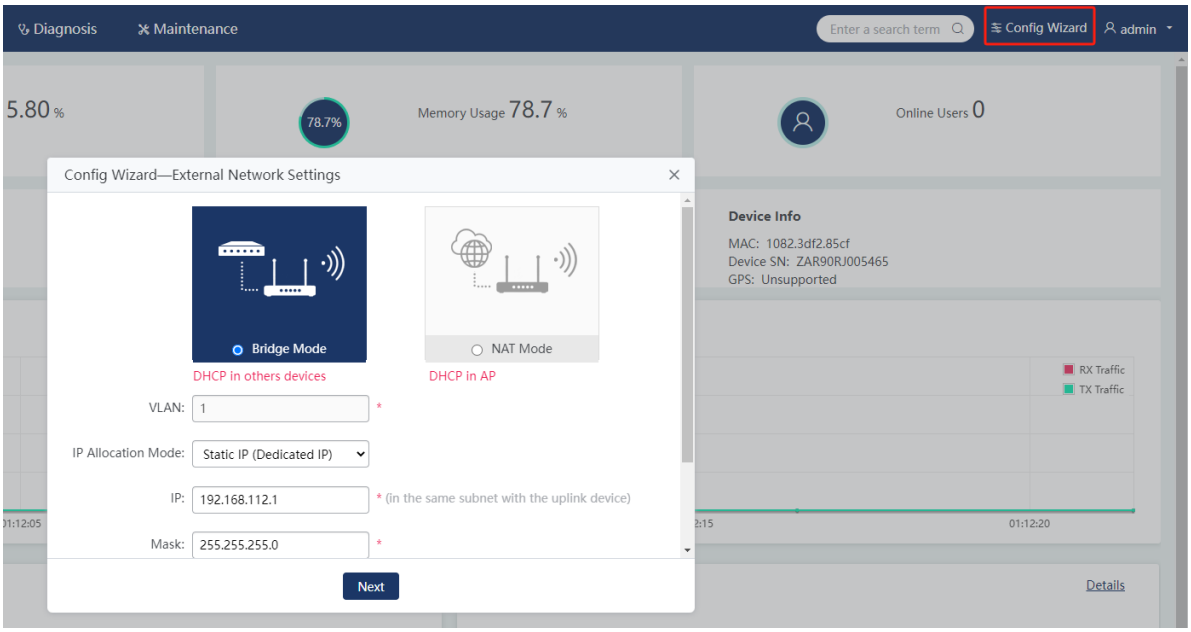
The configuration wizard provides some common scenario-based configurations. It is typically used for first setup. Click **Config Wizard** in the navigation bar.

1. When you log in to the web management system, the system will automatically identify whether the current device is configured. If not (no config.text file is found), the **Config Wizard** window will pop up to guide you through configuration.
2. The **Config Wizard** allows the configuration of only one or two WLANs for setting up a Wi-Fi network.
3. Once the **Config Wizard** is completed, the existing configurations of the device will be overwritten.

The **Config Wizard** includes external network settings and Wi-Fi settings.

2.2.1 External Network Settings

Set the working mode of the device to **Bridge Mode** or **NAT Mode**.

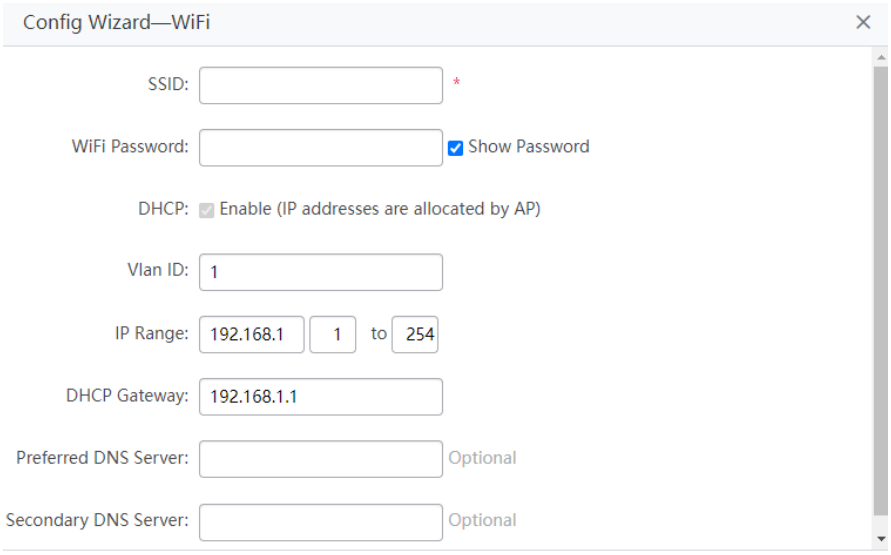


Working Mode	Parameter	Description		
Bridge Mode	**Note** In bridge mode, the gateway and DHCP server are deployed on the uplink device of the AP.			
	VLAN	Enter the VLAN for the AP to communicate with an external network.		
	IP Allocation Mode	Static IP (Dedicated IP)	IP	Enter a static IP address.
			Mask	Enter the subnet mask for the static IP address.
		DHCP (Dynamic IP)	DHCP IP	Display the obtained DHCP IP address.
	Default Gateway	(Optional) Enter the gateway address of the AP.		
NAT Mode	**Note** In NAT mode, the gateway and DHCP server are configured on the AP.			
	WAN Port	Enter the WAN port for the AP to communicate with an external network.		
	IP Allocation	Static IP	IP	Enter a static IP address.

Working Mode	Parameter	Description		
	Mode	(Dedicated IP)	IP Mask	Enter the subnet mask for the static IP address.
			Default Gateway	Enter the gateway address of the AP.
		PPPoE (ADSL Line)	Account	Enter the PPPoE username for Internet access.
			Password	Enter the PPPoE password for Internet access.
			PPPoE IP	Display the obtained PPPoE IP address.
		DHCP (Dynamic IP)	Default Gateway	(Optional) Enter the gateway address of the AP.
			DHCP IP	Display the obtained DHCP IP address.
	NAT	Enable this function when all internal IP addresses need to be translated into external IP addresses.		

2.2.2 Wi-Fi

Set the Wi-Fi parameters and click **Finish**.

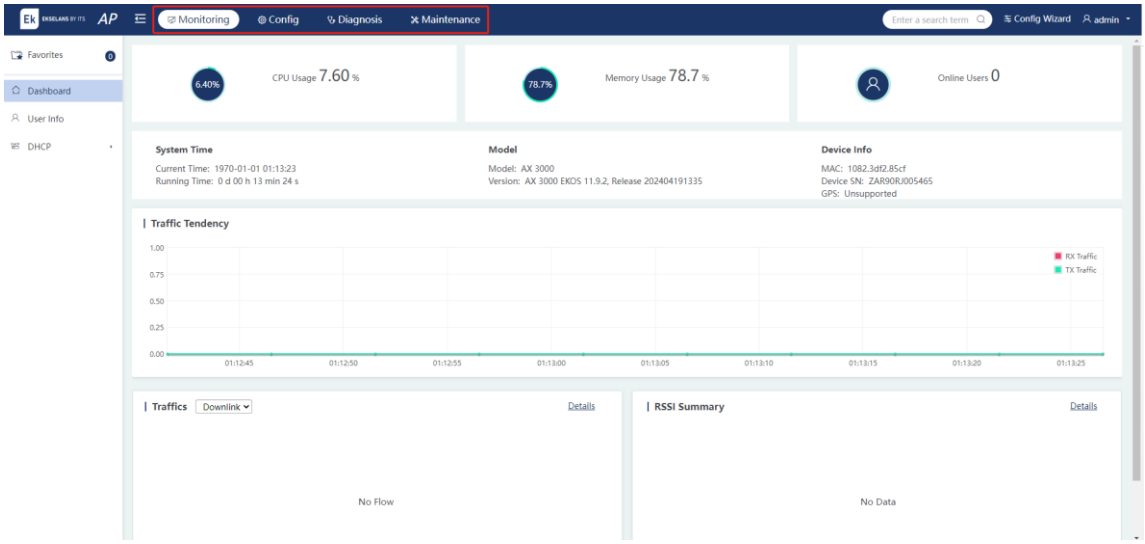


Parameter	Description
SSID	Set the Service Set Identifier (SSID), that is, Wi-Fi name.
Wi-F Password	Set the Wi-Fi password.
DHCP	After this option is selected, the DHCP service is enabled on the device.
Vlan ID	Enter the VLAN associated with the user.
IP Range	Enter the range of the address pool used by the user.
DHCP Gateway	Enter the gateway address of the address pool used by the user.
Preferred DNS Server	Enter the primary DNS server address of the address pool used by the user.
Secondary DNS Server	Enter the secondary DNS server address of the address pool used by the user.

3 Web GUI

3.1 Home Page

The Web GUI includes four main modules: **Monitoring**, **Config**, **Diagnostics**, and **Maintenance**. Click these modules in the navigation bar to view configurations in each module.



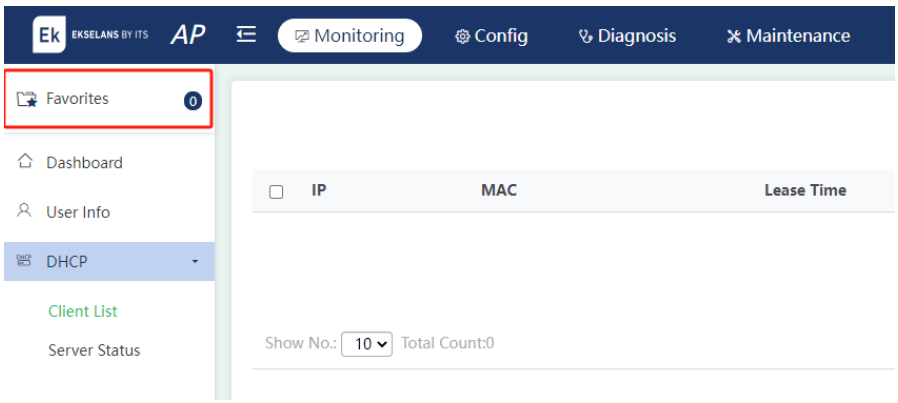
3.2 Favorites

This feature allows you to bookmark frequently used functions. Click **Favorites** to expand the list of bookmarked items and quickly enter the configuration page.

Note

Up to 10 configuration items can be added to **Favorites**.

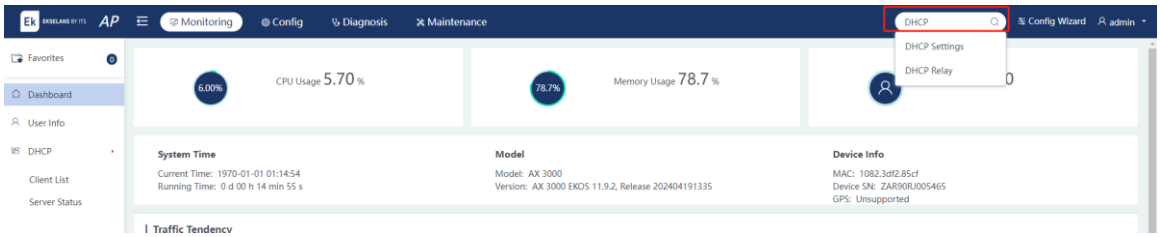
(1) Adding to Favorites: Click and drag an item form the menu to **Favorites**.



(2) Removing from Favorites: Select an item and click the × icon. Click **OK** to remove the item from **Favorites**.

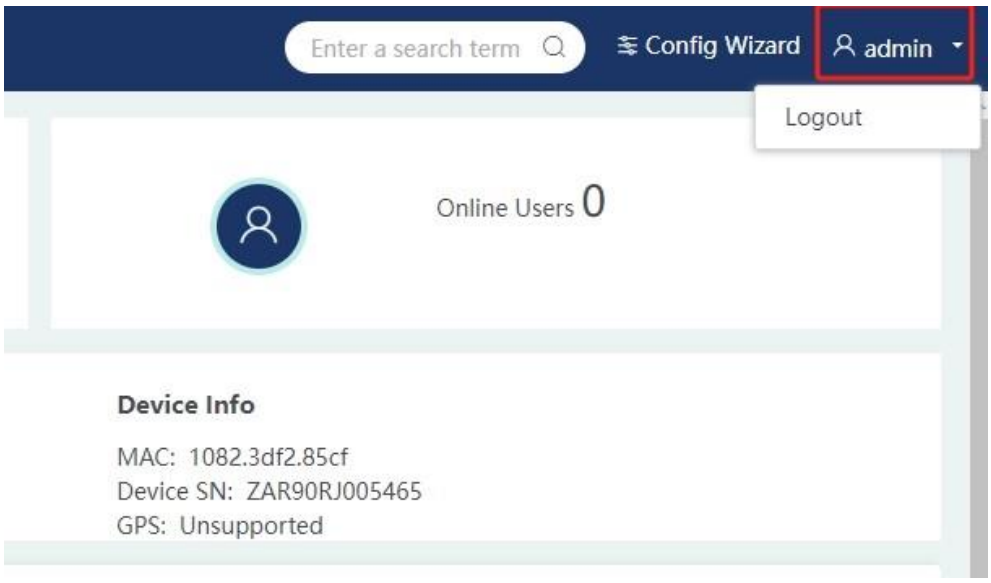
3.3 Search Bar

Given the extensive features in the system, you may find it hard to locate a specific configuration item. Enter keywords in the search bar to search for the configuration items and enter the configuration page quickly.



3.4 Other Functions

(1) Displaying the current account.



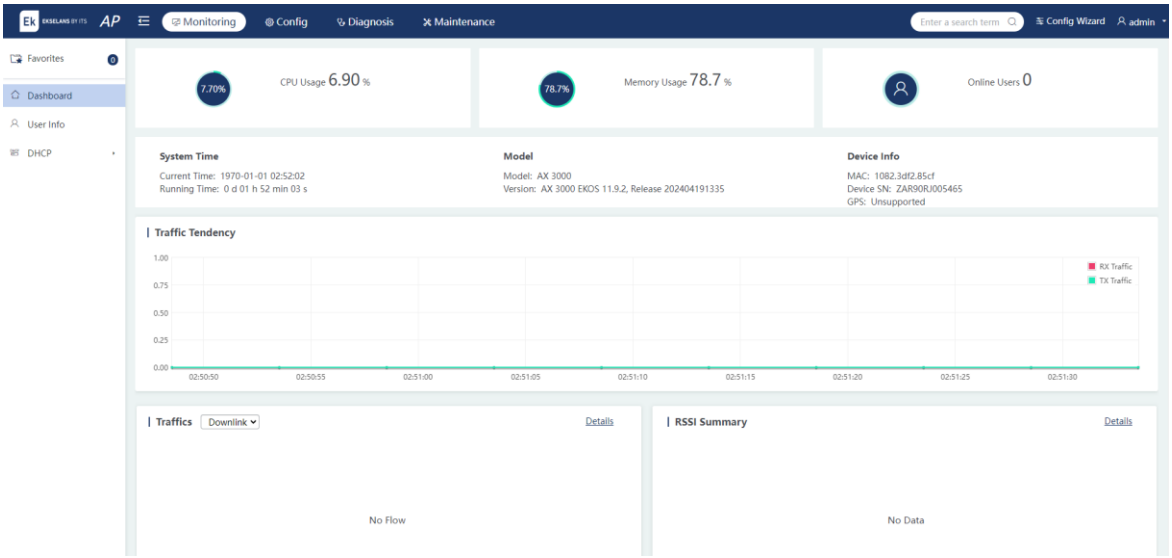
(2) Logout: Click **Logout** after expanding the account menu to log out of the web management system.

4 Monitoring

4.1 Dashboard

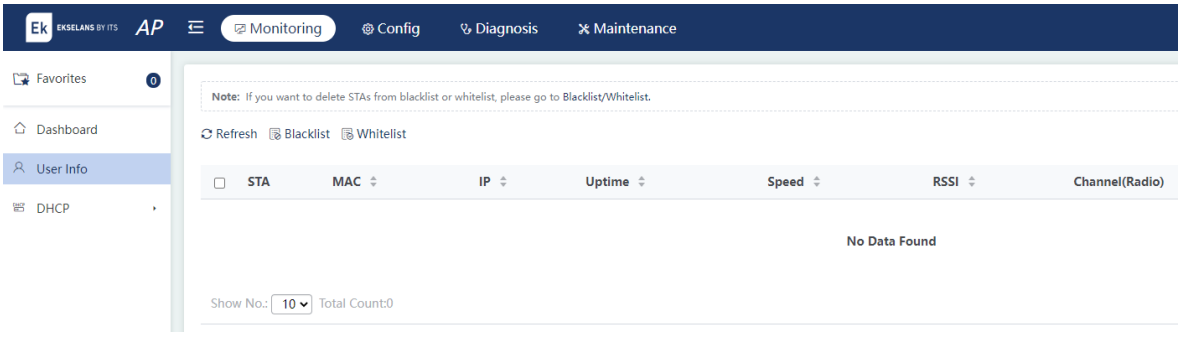
Choose **Monitoring** > **Dashboard**.

On the **Dashboard** page, you can view the basic information about the AP, including CPU usage, memory usage, number of online STAs, system time, model and version, device information, traffic tendency, user traffic, and Received Signal Strength Indicator (RSSI) summary.



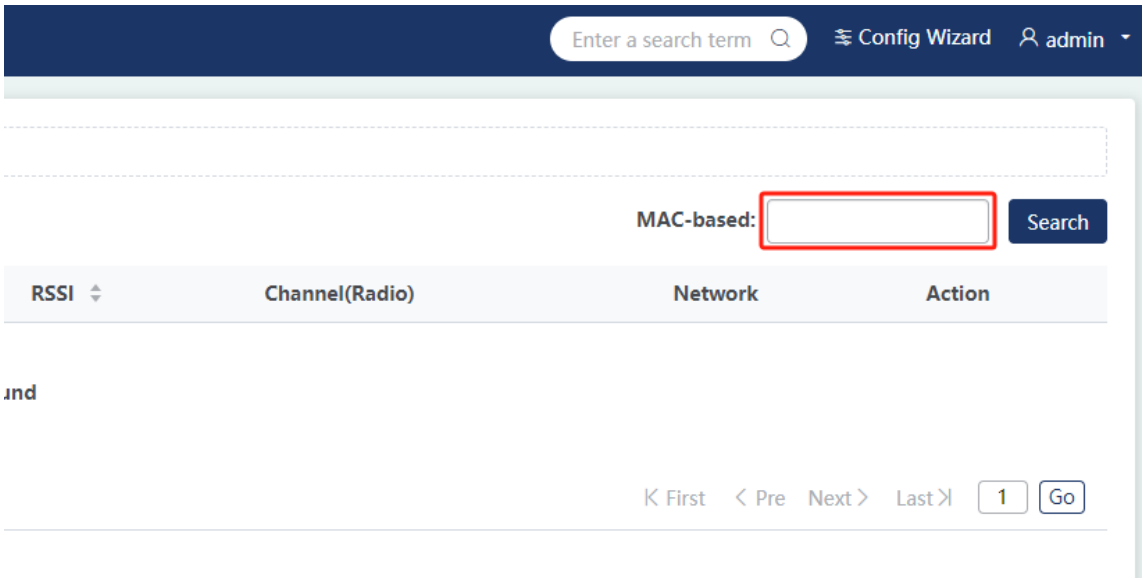
4.2 User Info

Choose **Monitoring** > **User Info**.



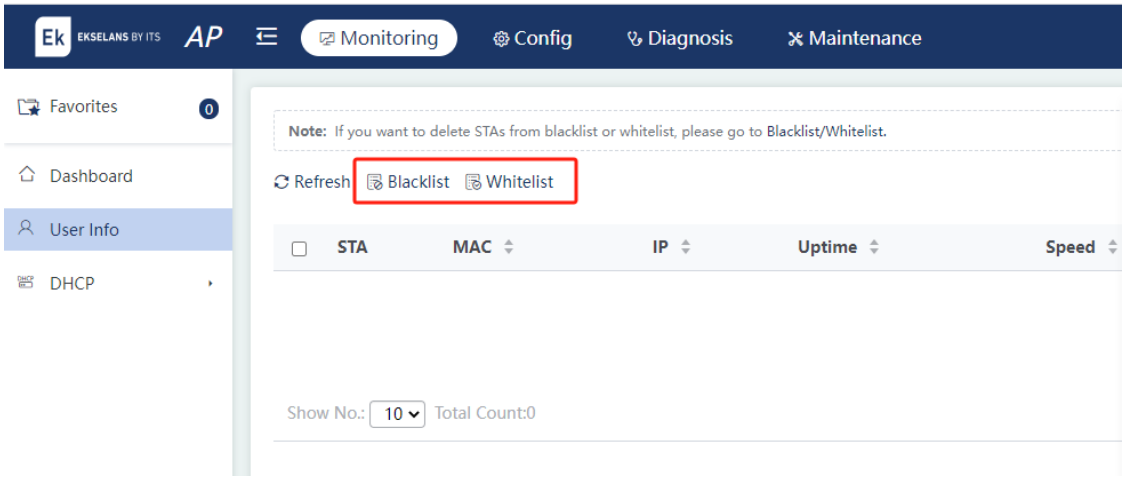
(1) Searching for STAs

If there are numerous STAs, enter a MAC address in the search box and click **Search** to search for a specific STA. To display all STA lists, clear the MAC address in the search box and click **Refresh**.



(2) Adding to the Blacklist or Whitelist

Select the STAs to be added to the blacklist or whitelist. Click **Blacklist** or **Whitelist**.

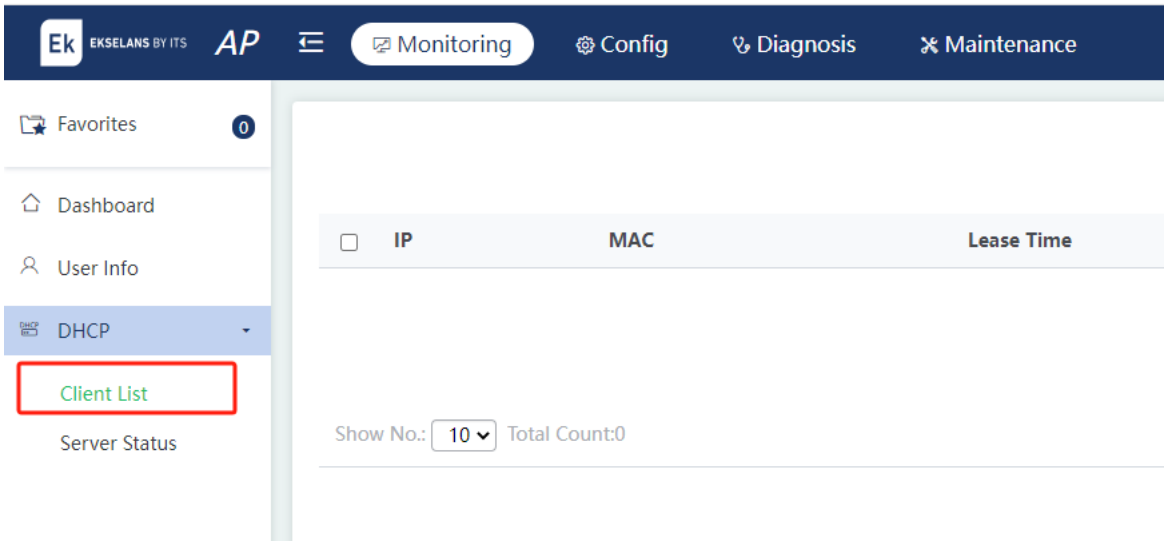


4.3 DHCP

4.3.1 Client List

Choose **Monitoring** > **DHCP** > **Client List**.

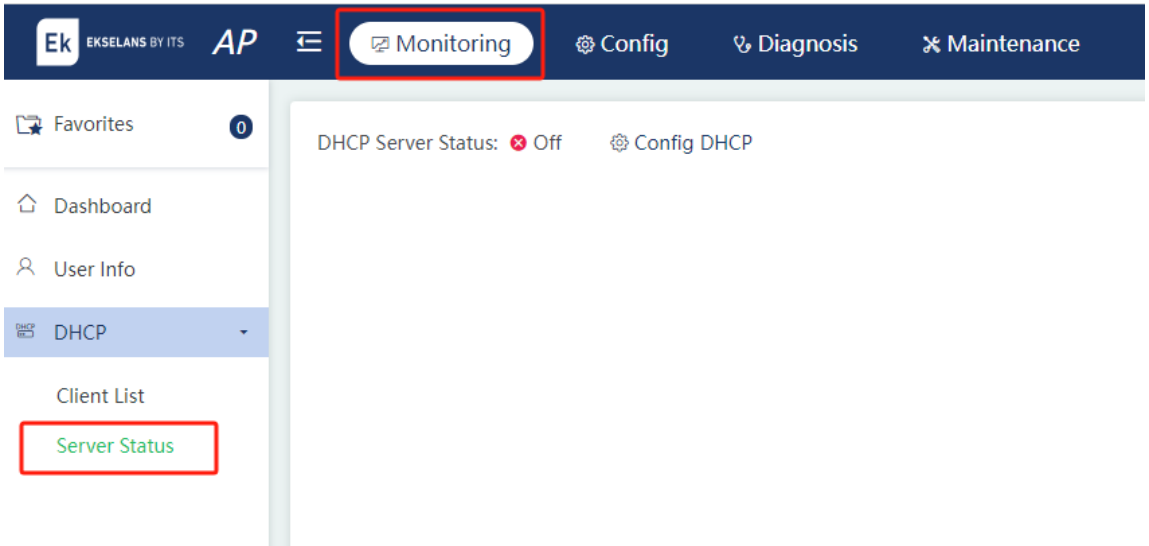
The **Client List** page displays the clients allocated with addresses from the address pool.



4.3.2 DHCP Server Status

Choose **Monitoring** > **DHCP** > **Server Status**.

The **Server Status** page displays the DHCP server status and the usage of the address pool.



5 Configuration

5.1 Wireless Configuration

5.1.1 Adding Wi-Fi

Choose **Config** > **Wireless** > **WiFi/WLAN**.

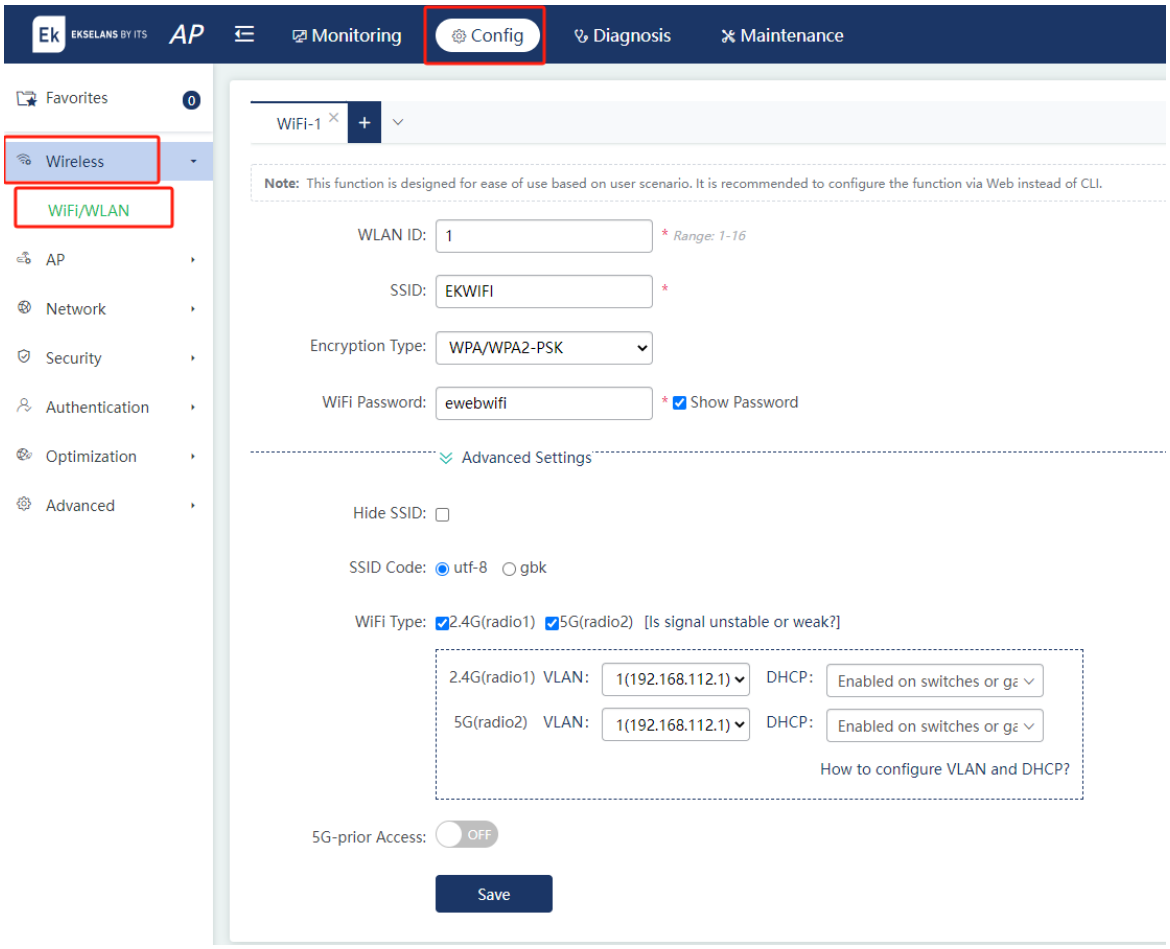
A Wi-Fi network allows wireless STAs to be associated with the AP for network access. Multiple Wi-Fi networks can be added or deleted.

Note

The maximum number of Wi-Fi networks is subject to device models.

1. Adding a Wi-Fi Network

Click **+** to add a Wi-Fi network. After the Wi-Fi parameters are set, click **Save**.



Parameter	Description
WLAN ID	Enter the WLAN ID.
SSID	Enter the Wi-Fi name.
Encryption Type	**Open**: No encryption type is configured. No password is required when a STA associates with the Wi-Fi network. **WPA/WPA2-PSK**: WPA mode with a pre-shared key featuring high security and easy setup, applicable to homes and small-sized enterprises. **WPA/WPA2-802.1X**: WPA or WPA2 mode that uses a RADIUS server for authentication and key acquisition. Ordinary users are not advised to adopt this mode as it requires an exclusive authentication server. **WPA2-802.1X**: WPA2 mode that uses a RADIUS server for authentication and key acquisition. **WPA3-PERSONAL**: Compared with WPA2, it is more secure and can effectively prevent dictionary attacks. **WPA3-ENTERPRISE-GCMP256**: WPA3-Enterprise is configured with GCMP-256 encryption, providing additional protection for networks where sensitive data is transmitted. It is applicable to data-sensitive networks like government or financial systems. **WPA3-ENTERPRISE-CCMP128**: WPA3-Enterprise is configured with CCMP-128 encryption, providing additional protection for networks where sensitive data is transmitted. It is applicable to data-sensitive networks like government or financial systems. **WPA2/WPA3**: WPA2/WPA3 transition mode, which is determined by a STA.
WiFi Password	Enter the Wi-Fi password.
Hide SSID	If you enable **Hide SSID**, the SSID is not displayed in the Wi-Fi list of a STA. You can only manually search for the SSID.
SSID Code	**UTF-8**: You are advised to select **utf-8**, as most STAs support UTF-8 encoding by default. **GBK**: Some STAs, PCs, and network interface cards (NICs) support GBK encoding. You can specify the encoding mode as required.

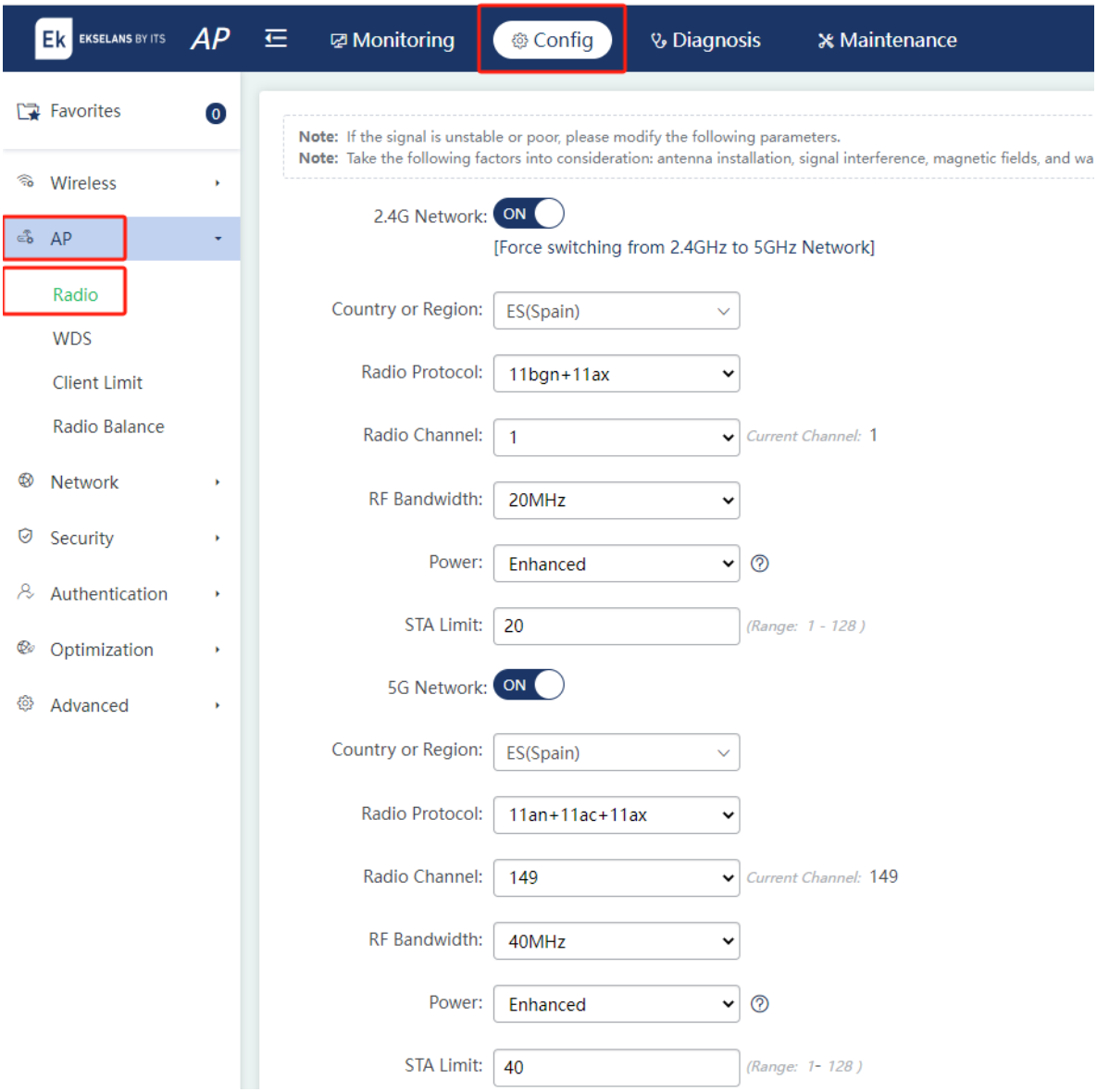
Parameter	Description
WiFi Type	Specify the network types supported by the Wi-Fi network. You can select multiple network types. **Note** ● Click **Is signal unstable or weak?** to go to the **Radio** page, where you can configure a radio. ● Click **VLAN** to add a VLAN on the **VLAN** page. VLAN determines whether the AP can communicate with the uplink switch or egress device, and whether STAs connected to the Wi-Fi network of the AP can access the Internet. The IP address of the VLAN can be used as the management address of the AP. ● Click **DHCP** to go to the **DHCP Settings** page. On this page, you can add a DHCP address pool for the AP to assign IP addresses to STAs connected to the AP (it is required when the AP works in NAT mode). If the AP works in bridge mode, you do not need to configure DHCP because the DHCP service is configured on the uplink switch or egress. In this case, the AP only plays a wireless role and does not function as a gateway or allocate IP addresses.
Rate Limit	If you do not set a rate limit, the rate is not limited by default. To set the maximum upload and download rates, click **Rate Limit Settings**.
5G-prior Access	If this function is enabled, STAs will preferentially access the 5 GHz radio. It is disabled by default.

5.2 AP

5.2.1 Radio

Choose **Config** > **AP** > **Radio**.

If the signal is unstable or the signal strength is low, you can manually modify the radio parameters to adjust the signal strength of the Wi-Fi broadcast by the device.



Parameter	Description
Wireless Interface	Radio of the device. If the device supports dual radios, that is, **dot11radio 1/0** and **dot11radio 2/0**, the **Wireless Interface** field is not displayed. If the device supports three radios, that is, **dot11radio 1/0**, **dot11radio 2/0**, and **dot11radio 3/0**, the **Wireless Interface** field will be displayed.
2.4G Network 5G Network	Enable or disable the 2.4 GHz or 5 GHz radio.
Country or Region	Select the country or region code configured for the radio.
Radio Protocol	Select 802.11 protocols configured for the radio.

Parameter	Description
	● The protocol options available on the 2.4 GHz radio include: o **11bgn** indicates 802.11b, 802.11g, and 802.11n protocols. o **11bgn+11ax** indicates 802.11b, 802.11g, 802.11n, and 802.11ax protocols. ● The protocol options available on the 5 GHz radio include: o **11an** indicates 802.11a and 802.11n protocols. o **11an+11ac** indicates 802.11a, 802.11n, and 802.11ac protocols. o **11an+11ac+11ax** indicates 802.11a, 802.11n, 802.11ac, and 802.11ax protocols.
Radio Channel	Select the channel configured for the radio.
RF Bandwidth	Select the channel width configured for the radio.
Power	Select the power for the radio. ● Power Saving: 30 dBm. ● Standard: 80 dBm. ● Enhanced: 100 dBm. ● Custom: You can set the power for the radio.
STA Limit	Enter the maximum number of STAs associated with the radio. **Note** The maximum number of STAs supported varies with the device model. The actual range displayed on the page shall prevail.

5.2.2 WDS

Note

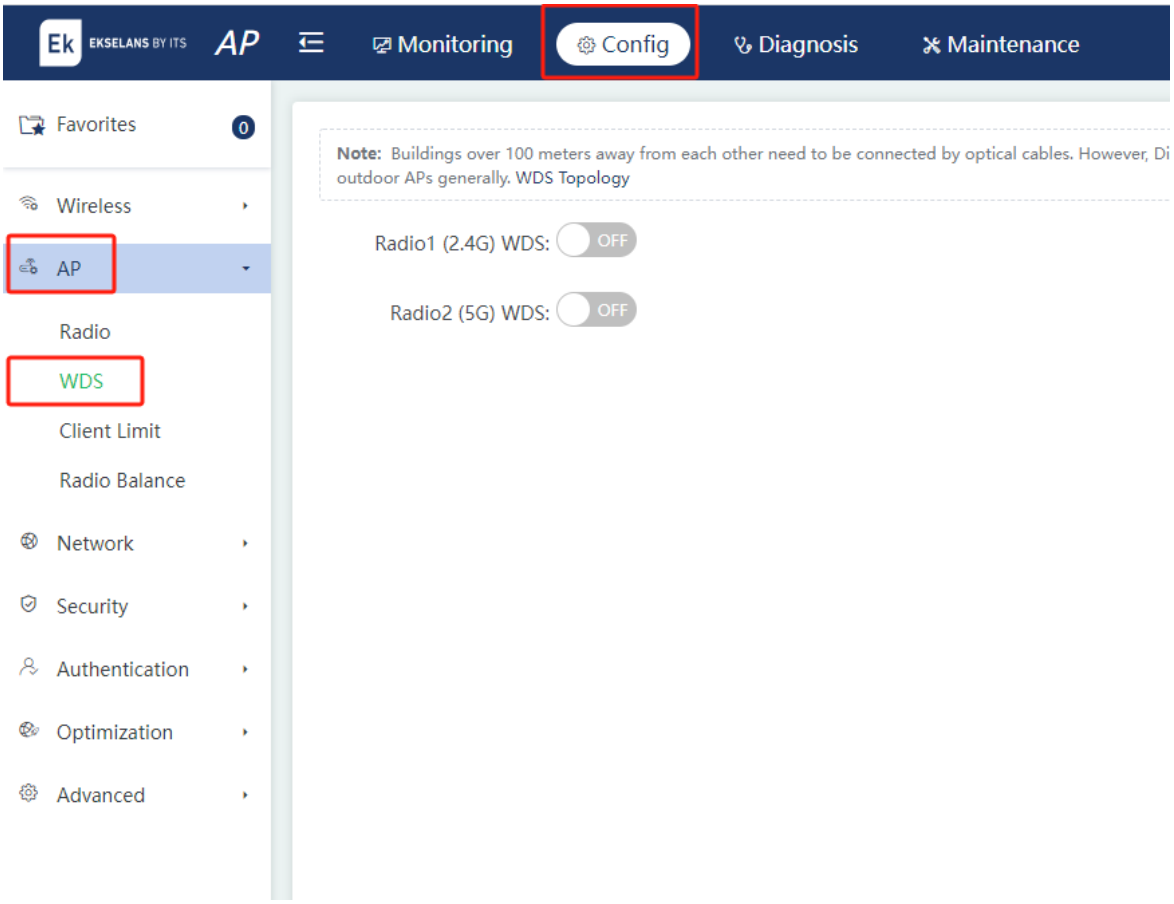
Some APs may not support this function. The actual menu shall prevail.

Choose **Config** > **AP** > **WDS**.

If the distance between buildings is more than 100 meters (328.08 feet), optical cables need to be deployed. For some buildings that have been built, digging roads or installing overhead lines will cause high construction difficulty and cost, such as between the high-rise buildings, or between two buildings separated by a river. In this case, Wireless Distribution System (WDS) is used to implement network interconnection, enabling cost-effective and effort-saving deployment. Multiple APs are interconnected through WDS or wireless bridge/repeater mode to connect to distributed networks and extend wireless signals. An AP can function as a repeater to extend the

range of the front-end network and the Wi-Fi signals, allowing users at a great distance to connect to the network. WDS supports bridging on the 2.4 GHz and 5 GHz radios.

Enable the bridging function on the 2.4 GHz or 5 GHz radio as required. Select the operating mode and configure the parameters. Click **Save**.



Operating Mode	Parameter	Description
Root Bridge	Root Bridge Network	Select the network where wireless signals need to be extended.
	Distance	Enter the distance between two wireless bridge devices (root bridge and non-root bridge).
Non-root Bridge	Root-bridge Election	Elect the root bridge based on the MAC address or SSID.
	Root Bridge MAC	Enter the MAC address of the root bridge.
	Bridge WiFi Password	Set the password of the root bridge Wi-Fi.

Operating Mode	Parameter	Description
	Distance	Enter the distance between two wireless bridge devices (root bridge and non-root bridge).
	Other WiFi Allowed	The radio can be used as a bridge or to broadcast Wi-Fi signals.

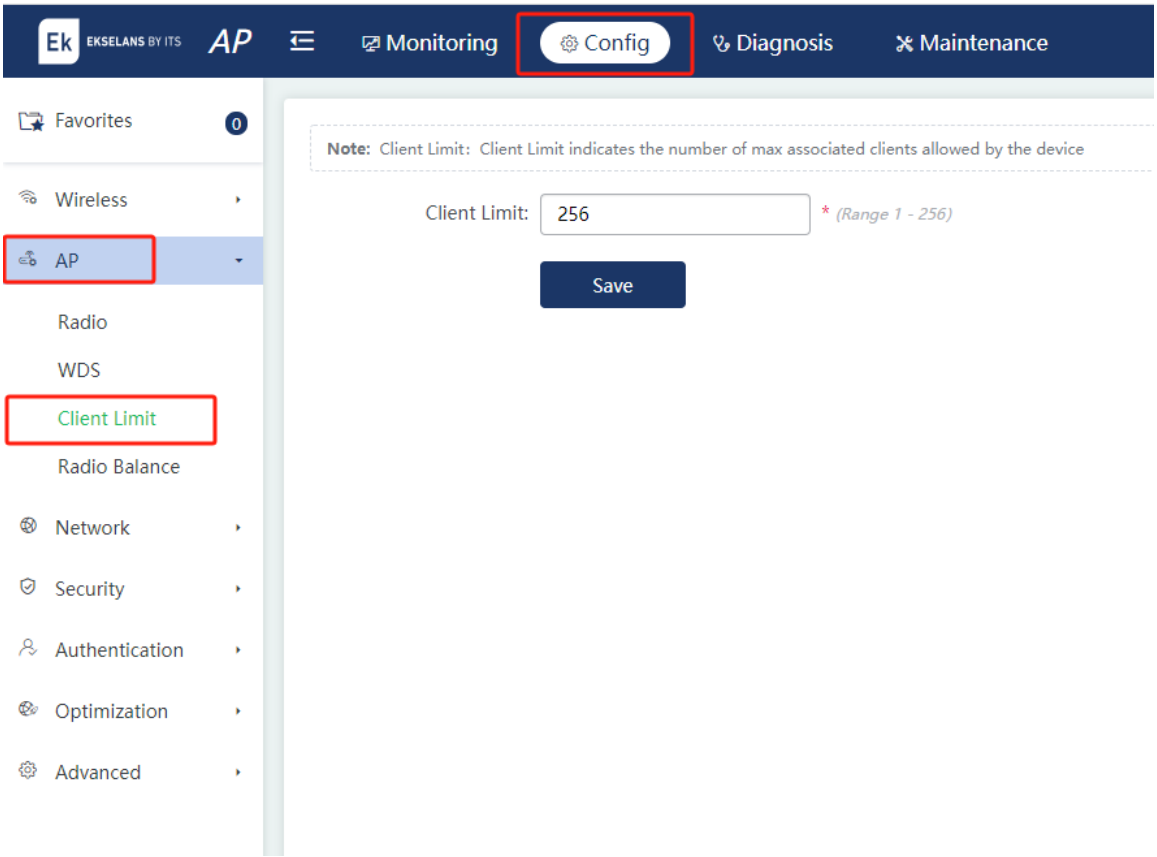
5.2.3 Client Limit

Choose **Config** > **AP** > **Client Limit**.

This function is used to configure the maximum number of clients associated with the AP.

Note

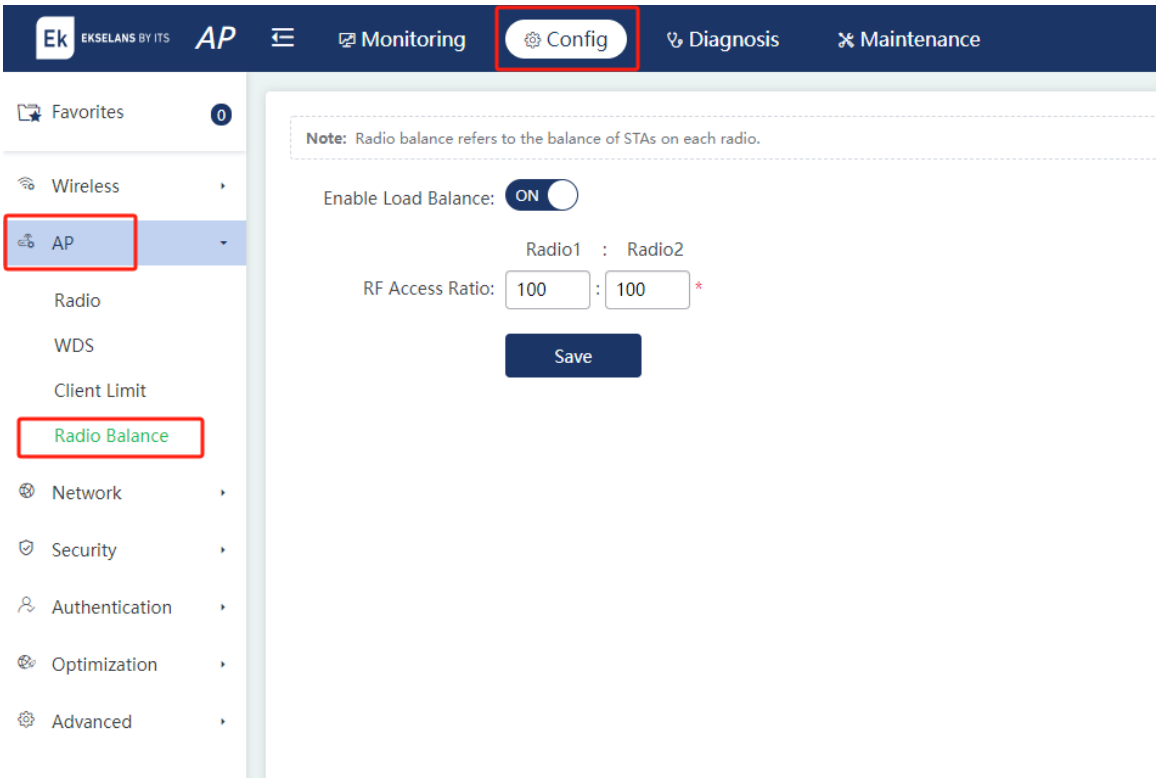
The maximum number of associated clients varies with the device model. The value displayed on the page shall prevail.



5.2.4 Radio Balance

Choose **Config** > **AP** > **Radio Balance**.

Currently, load balancing on radios is implemented only based on the number of STAs. After the load balancing function is enabled, you can set the ratio of STAs connected to different radios.



5.3 Network

5.3.1 External Network

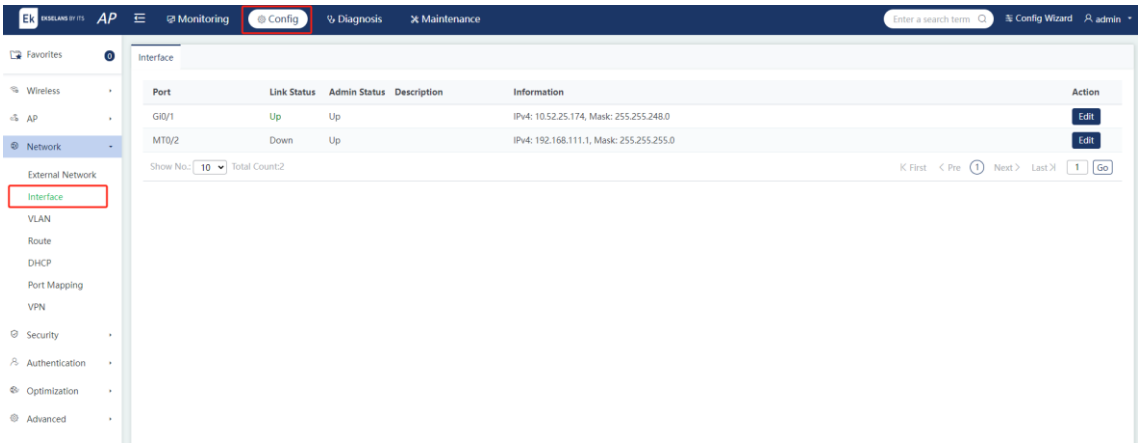
Choose **Config** > **Network** > **External Network**.

Set the working mode of the AP to **Bridge Mode** or **NAT Mode**. The settings are the same as those in the external network settings in Chapter 2. For details, see2.2.1 External Network .

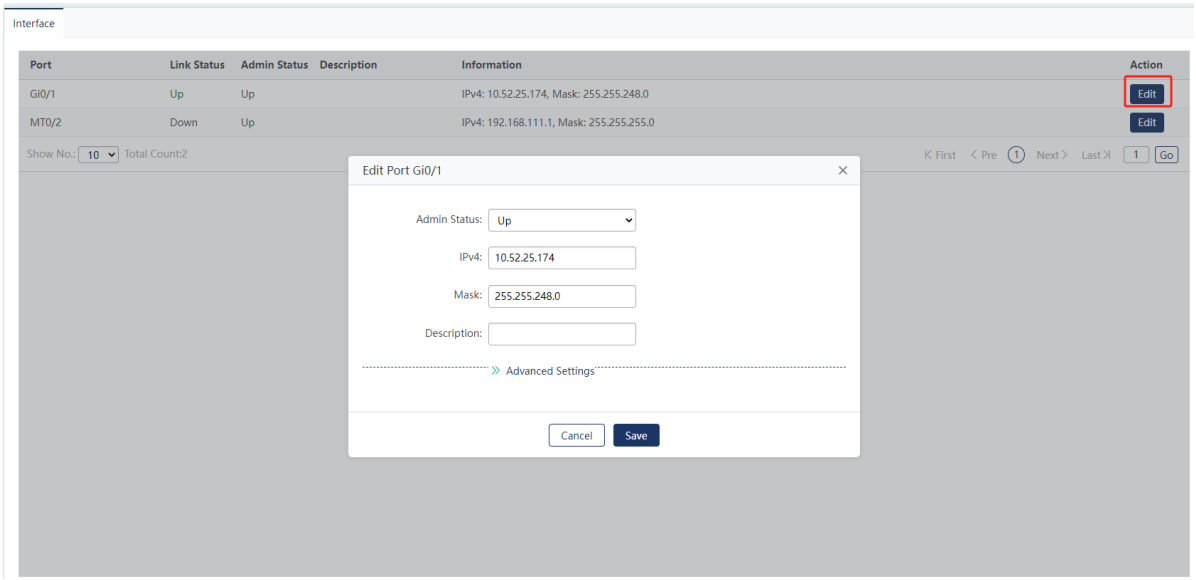
5.3.2 Interface

Choose **Config** > **Network** > **Interface** > **Interface**.

On the **Interface** page, the ports and related information are displayed.



Click **Edit** in the **Action** column to edit information about a specific port.



Parameter	Description
Admin Status	Select the management status of the port.
IPv4	Enter the IPv4 address of the port.
Mask	Enter the IPv4 subnet mask of the port.
Description	Enter the description and alias of the port.
Copper/Fiber Port	The options including **Copper Port** and **Fiber Port** are displayed based on the hardware capability.
IPv6	Enter the IPv6 address of the port.
Speed	Configure the rate of the port.
Working Mode	Configure the working mode of the port, including auto-negotiation, duplex,

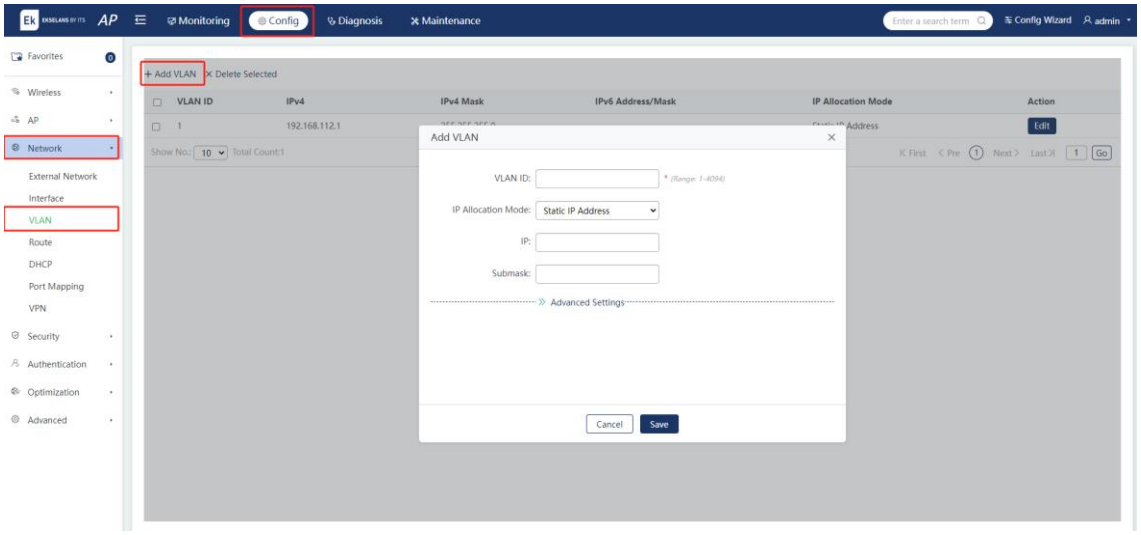
Parameter	Description
	and half-duplex.

5.3.3 VLAN

Choose **Config** > **Network** > **VLAN**.

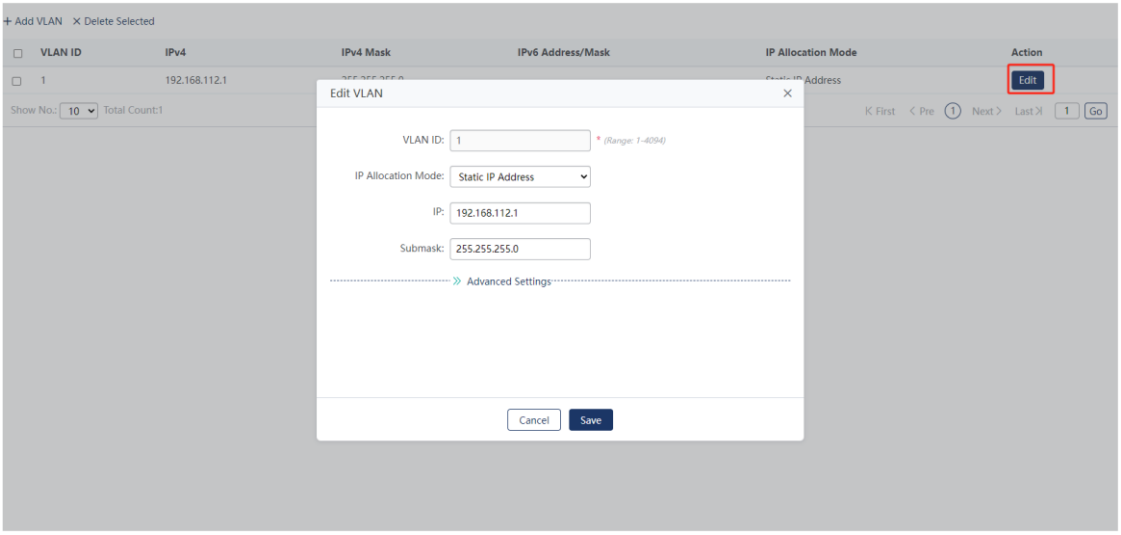
(1) Adding a VLAN

Click **Add VLAN** and edit the fields in the pop-up window. Click **Save** and a message indicating operation success is displayed. The added VLAN is displayed in the VLAN list.



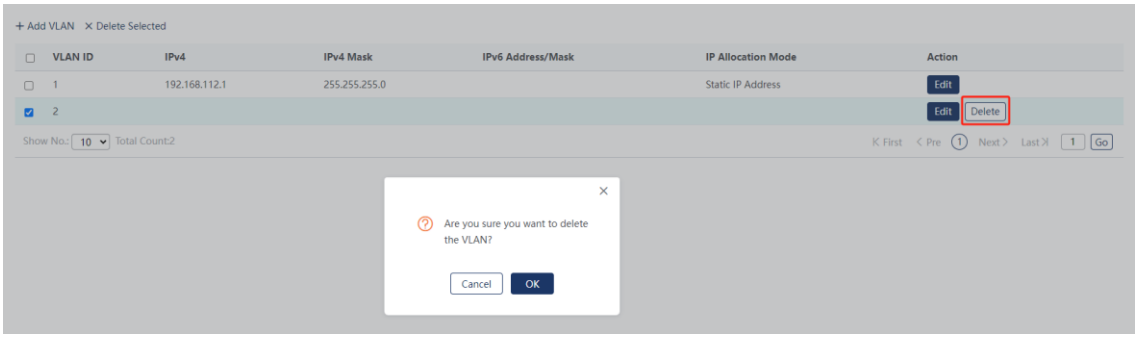
(2) Editing a VLAN

Click **Edit** in the **Action** column and a window pops up displaying information about the VLAN. Edit the fields in the window. Click **Save** and a message indicating operation success is displayed.



(3) Deleting a VLAN

Click **Delete** in the **Action** column and click **OK** in the pop-up window to delete a VLAN. If multiple VLANs need to be deleted, select the target VLANs in the list. Click **Delete Selected** and a window pops up. Click **OK** to batch delete the VLANs.

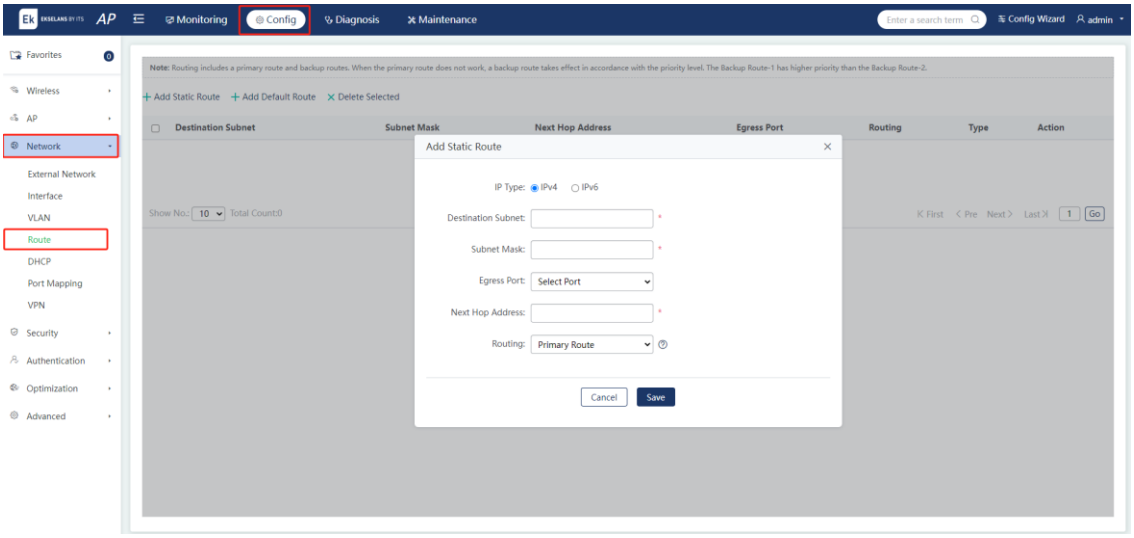


5.3.4 Route

Choose **Config** > **Network** > **Route**.

(1) Adding a Static Route

Click **Add Static Route**. Edit the fields in the pop-up window. Click **Save** and a message indicating operation success is displayed. The added static route will be displayed in the route list. The type is **Static Route**.

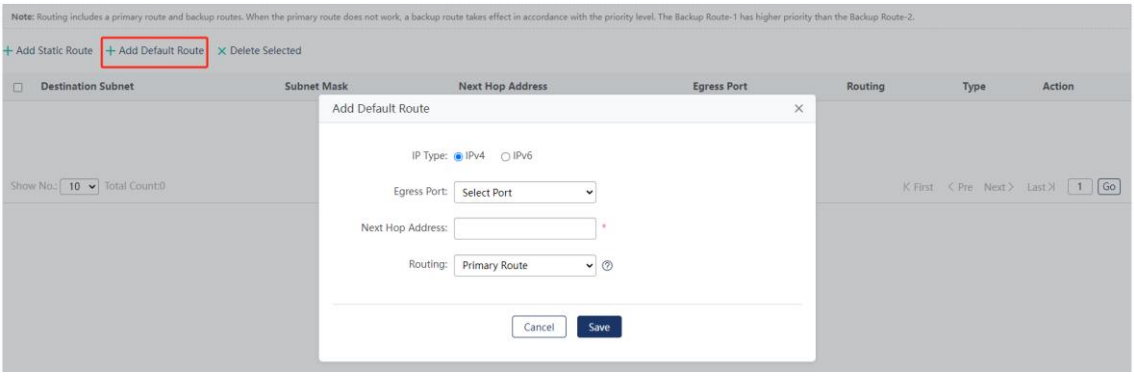


(2) Adding a Default Route

Click **Add Default Route**. Edit the fields in the pop-up window. Click **Save** and a message indicating operation success is displayed. The added default route will be displayed in the route list. The type is **Default Route**.

Note

Route selection involves a primary route and backup routes. When the primary route is unavailable, for example, the interface of the primary route is inactive, the backup route will be adopted. The selection of the backup route is also determined by the priority levels. For instance, backup route 1 has a higher priority than backup route 2.



(3) Editing a Route

Click **Edit** in the **Action** column, and a window pops up displaying information about the route. Edit the fields in the window. Click **Save** and a message indicating operation success is displayed.

(4) Deleting a Route

Click **Delete** in the **Action** column and click **OK** in the pop-up window to delete a route. To delete multiple routes, select the routes to be deleted in the list. Click **Delete Selected**. Click **OK** in the pop-up window to batch delete the routes.

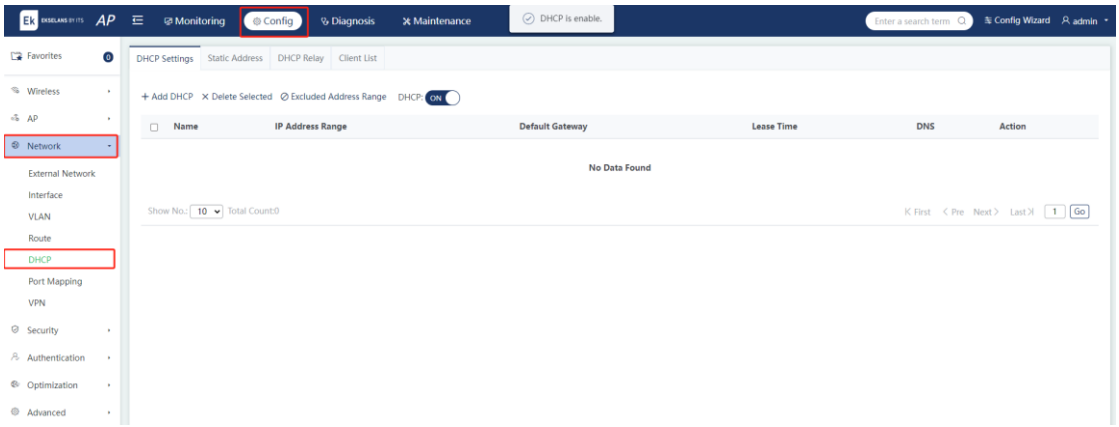
5.3.5 DHCP

1. DHCP Settings

Choose **Config** > **Network** > **DHCP** > **DHCP Settings**.

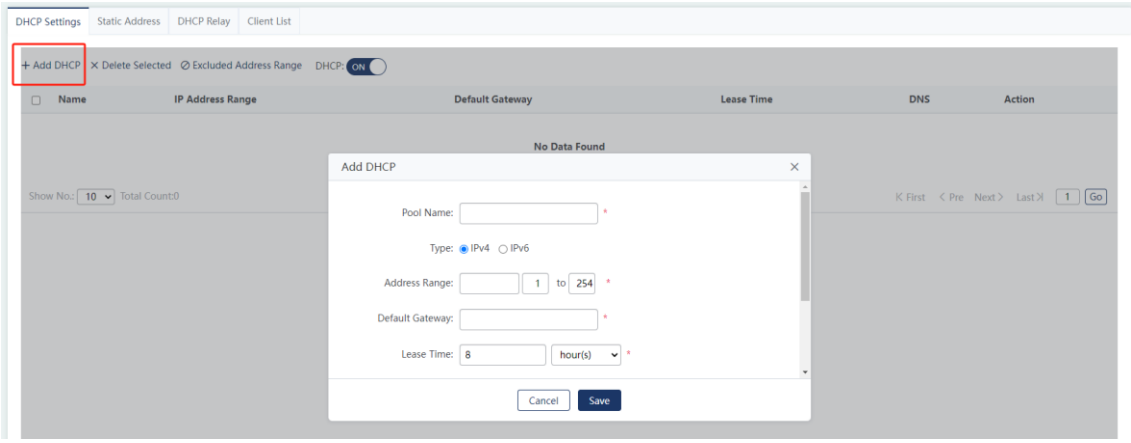
(1) Enabling the DHCP Service

Toggle on the **DHCP** switch to enable the DHCP service.



(2) Adding a DHCP Address Pool

Click **Add DHCP** and edit the fields in the pop-up window. Click **Save** and a message indicating operation success is displayed. The DHCP address pool will be displayed in the list.



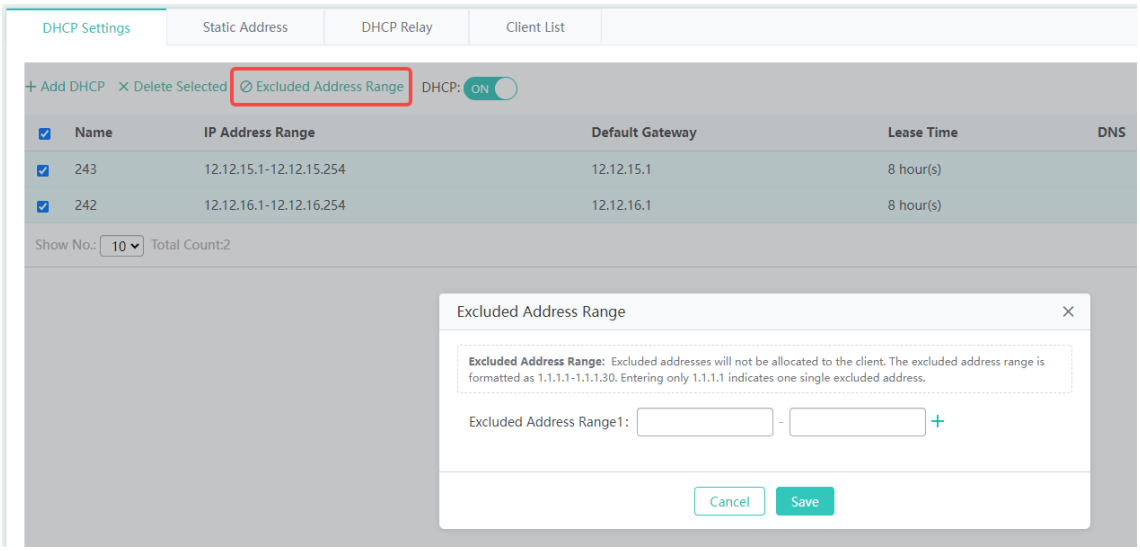
Parameter	Description
Pool Name	Enter the name of the DHCP address pool.
Type	The options include **IPv4** and **IPv6**.
Address Range	Configure the range of the DHCP address pool.
Default Gateway	Configure the default gateway for the DHCP address pool.
Lease Time	Configure the lease time for the DHCP address pool, either a limited time span or no time limit.
Preferred DNS Server	Configure the preferred DNS server for the clients using the DHCP address pool.
Secondary DNS Server	Configure the secondary DNS server for the clients using the DHCP address pool.

(3) Deleting a DHCP Address Pool

Click **Delete** in the **Action** column and click **OK** in the pop-up window to delete a DHCP address pool. To delete multiple DHCP address pools, select the target DHCP address pools in the list. Click **Delete Selected**. Click **OK** in the pop-up window to batch delete the DHCP address pools.

(4) Configuring an Excluded IP Address Range

Click **Excluded Address Range**. Configure the range of IP addresses that will not be allocated to clients in the pop-up window. You can configure multiple excluded address ranges. Click **Save** and a message indicating operation success is displayed. The excluded address range will be displayed in the list.



(5) Editing a DHCP Address pool

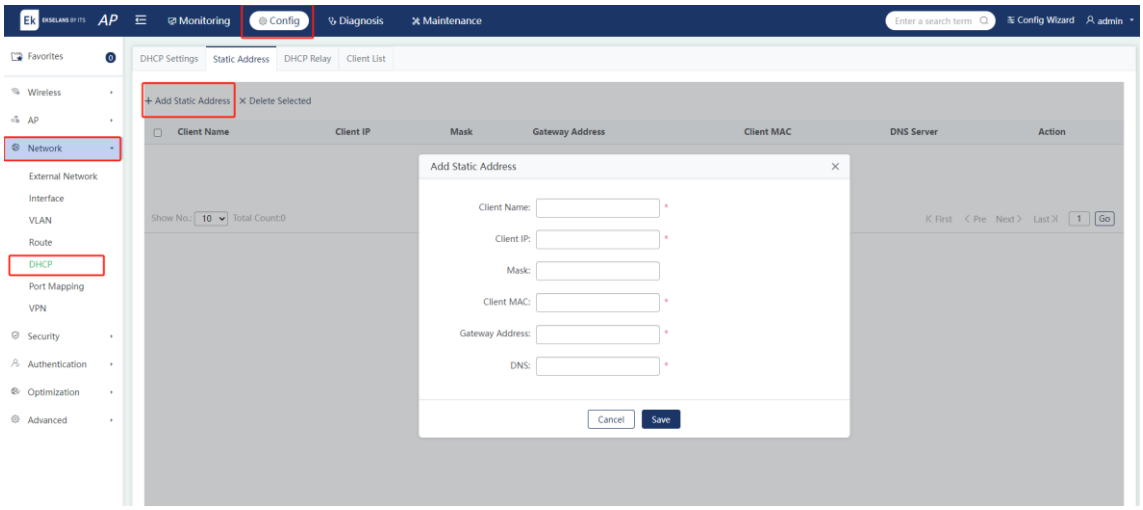
Click **Edit** in the **Action** column and a window pops up displaying information about the DHCP address pool. Edit the fields in the window. Click **Save** and a message indicating operation success is displayed.

2. Static Address

Choose **Config** > **Network** > **DHCP** > **Static Address**.

(1) Add a Static IP Address

Click **Add Static Address** and edit the fields in the pop-up window. Click **Save** and a message indicating operation success is displayed.



Parameter	Description
Client Name	Enter the name of the static address pool.
Client IP	Configure the IP address.
Mask	Configure the subnet mask.
Client MAC	Enter the MAC address of the client.
Gateway Address	Configure the IP address of the egress gateway. This field is mandatory.
DNS	Configure the DNS server address. This field is mandatory.

(2) Deleting a Static IP Address

Click **Delete** in the **Action** column and click **OK** in the pop-up window to delete a static IP address. To delete multiple static IP addresses, select the target static IP addresses in the list. Click **Delete Selected**. Click **OK** in the pop-up window to batch delete the static IP addresses.

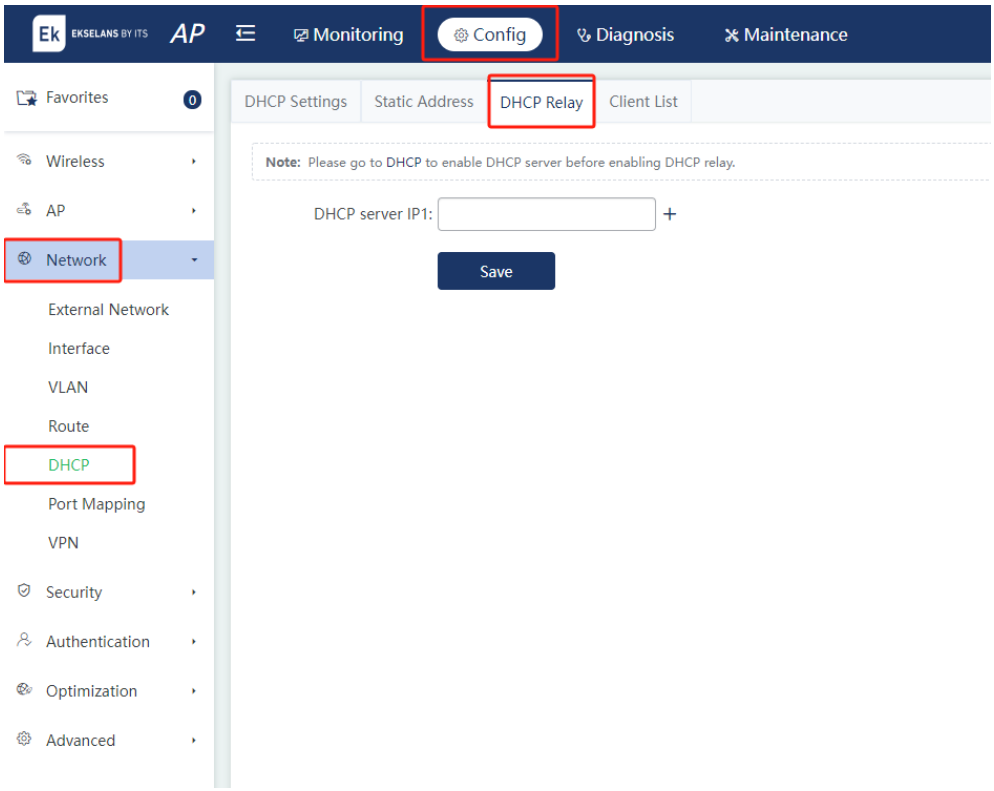
(3) Editing a Static IP Address

Click **Edit** in the **Action** column and a window pops up displaying information about the static IP address. Edit the fields in the window. Click **Save** and a message indicating operation success is displayed.

3. DHCP Relay

Choose **Config** > **Network** > **DHCP** > **DHCP Relay**.

Enter the IP address of the DHCP relay and click **Save**.

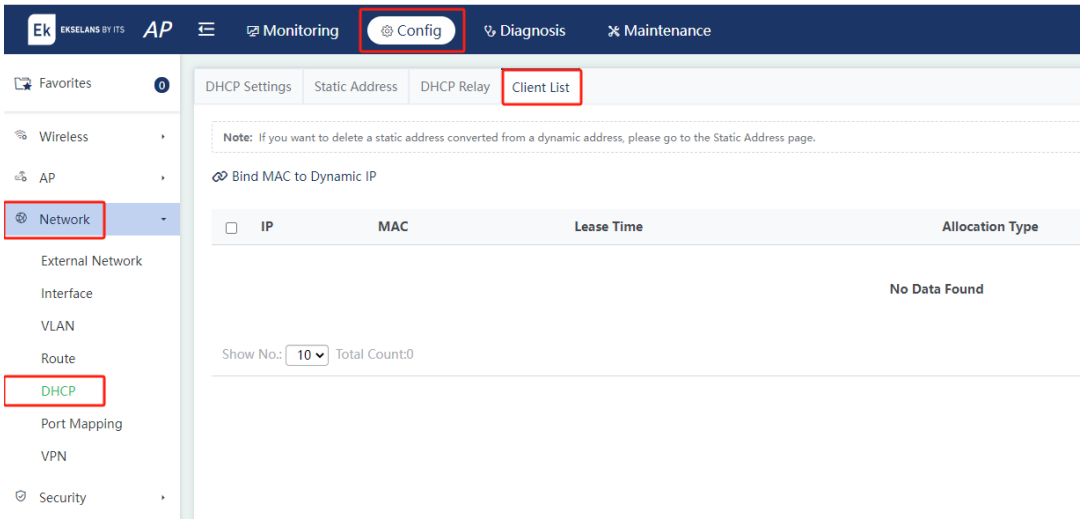


4. Client List

Choose **Config** > **Network** > **DHCP** > **Client List**.

(1) Binding a MAC Address to a Dynamic IP Address

Select a MAC address in the list and click **Bind MAC to Dynamic IP**. Click **OK** in the pop-up window to bind the MAC address with the dynamic IP address.

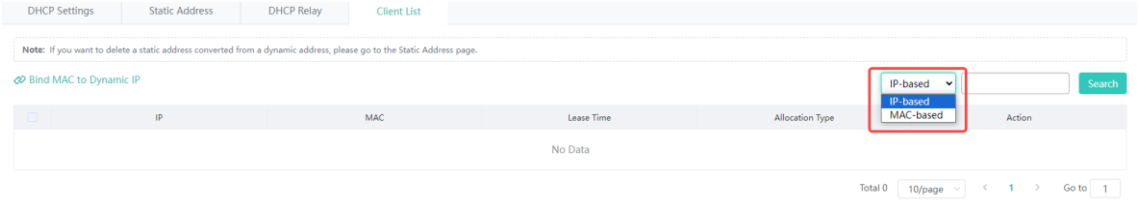


(2) Unbinding the MAC Address from the Dynamic IP Address

Click **Delete** in the **Action** column and a window pops up. Click **OK** to unbind the MAC address.

(3) Searching for Clients by IP Address or MAC Address

Enter the IP address or MAC address in the search box. Click **Search** and the result is displayed in the list.



5.3.6 Port Mapping

Choose **Config** > **Network** > **Port Mapping**.

Note

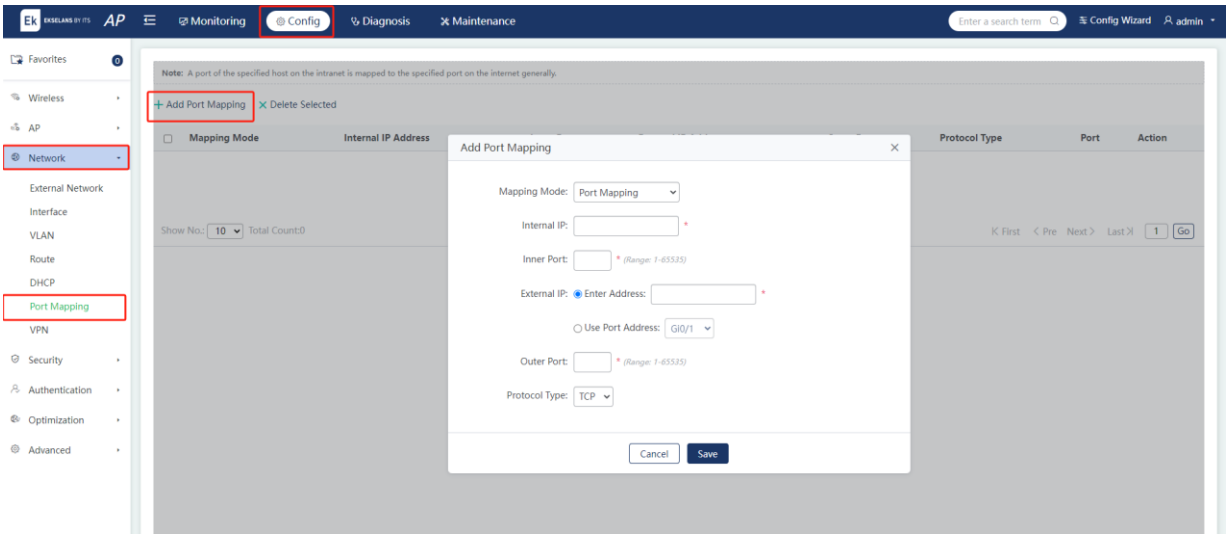
Some APs may not support this function. The actual menu shall prevail.

The port mapping function maps a specified port of a specified host on the intranet to a specified port on the extranet.

The mapping modes includes **Port Mapping** and **DMZ Host Mapping**.

1. Adding a Port Mapping Rule

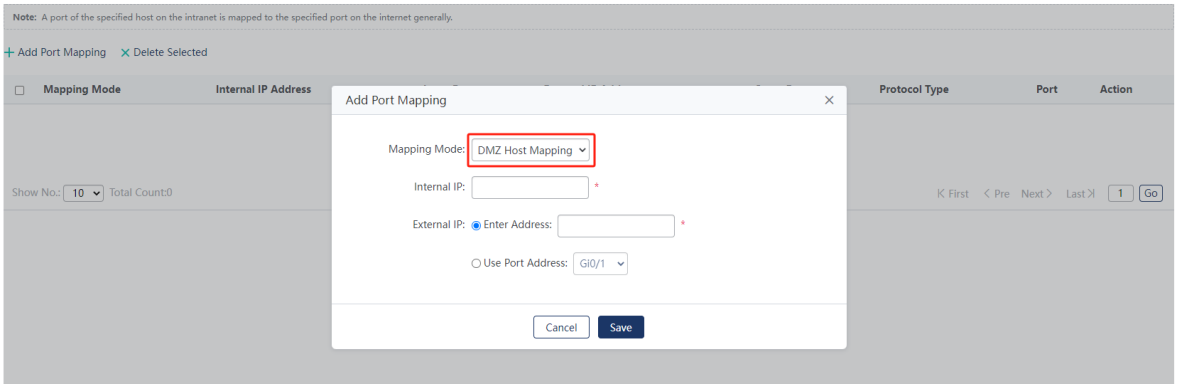
Click **Add Port Mapping**. Set the mapping mode to **Port Mapping**, and edit the fields in the pop-up window. Click **Save**.



Parameter	Description
Mapping Mode	The mapping modes includes **Port Mapping** and **DMZ Host Mapping**.
Internal IP	Enter the internal IP address to be mapped to the extranet, which is typically the IP address of the server.
Inner Port	Enter the port to be mapped to the extranet.
External IP	Enter the IP address of the Wide Area Network (WAN). If **Use Port Address** is selected, all IP addresses on the WAN port are mapped.
Outer Port	Enter the WAN port number. The value range is from 1 to 65535.
Protocol Type	Select TCP or UDP as required.

2. Adding a DMZ Host Mapping Rule

Click **Add Port Mapping**. Set the mapping mode to **DMZ Host Mapping**. Enter the internal server IP address and external IP address or port where the rule takes effect. Then click **Save**. When an incoming data packet does not hit any port mapping rule, the packet is redirected to the internal server according to the Demilitarized Zone (DMZ) rule. That is, all data packets actively sent from the Internet to the device are forwarded to the specified DMZ host.



3. Editing a Port Mapping Rule

Click **Edit** in the **Action** column and a window pops up displaying information about the port mapping rule. Edit the fields in the window. Click **Save**.

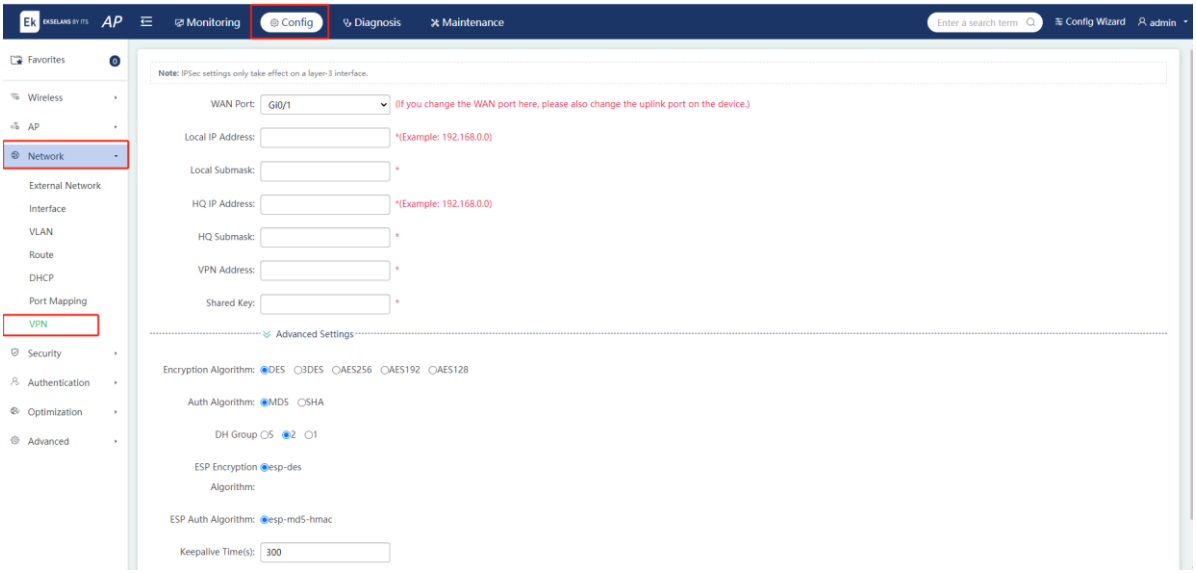
4. Deleting a Port Mapping Rule

Click **Delete** in the **Action** column and click **OK** in the pop-up window to delete a port mapping rule. To delete multiple port mapping rules, select the target port mapping rules in the list. Click **Delete Selected**. Click **OK** in the pop-up window to batch delete the port mapping rules.

5.3.7 VPN

Choose **Config** > **Network** > **VPN**.

You can configure VPN for only one WAN port. Enter the local IP address, local subnet mask, headquarters (HQ) IP address, HQ subnet mask, VPN address, and shared key. Click **Advanced Settings** to configure the algorithms. You are advised to use the default settings.



5.4 Security

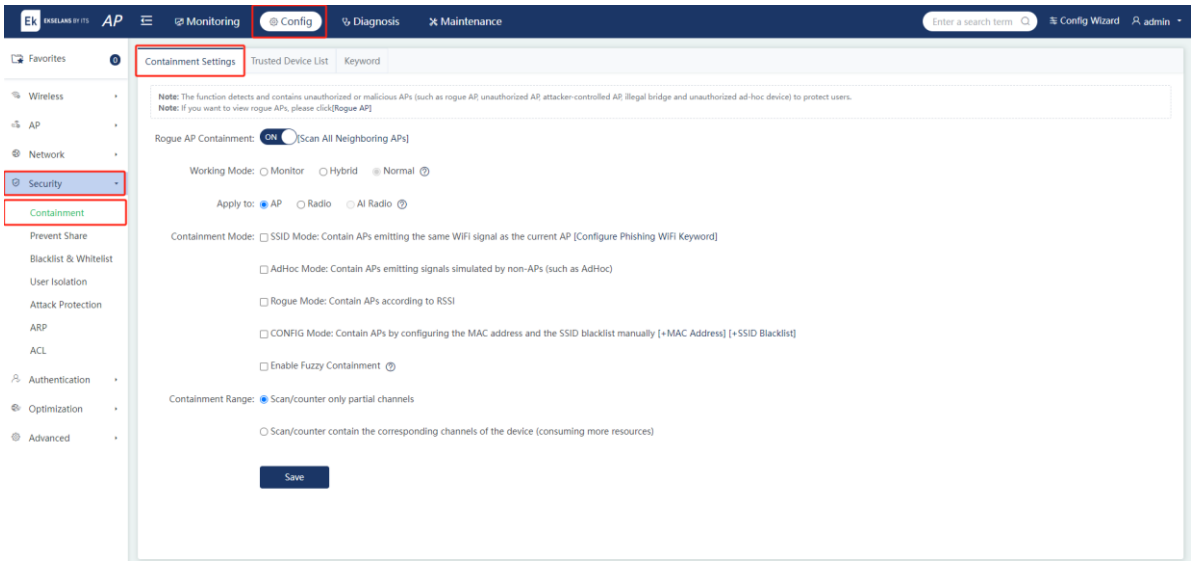
5.4.1 Containment

Choose **Config** > **Security** > **Containment**.

Rogue APs may exist on a wireless network. They may have security vulnerabilities or be controlled by attackers, posing great threat to network security. Enable the containment feature on the AP to proactively detect unauthorized or malicious APs on the network (such as rogue APs, unconfigured APs, APs controlled by attackers, rogue bridges, or unauthorized Ad-hoc devices), and implement containment on them to prevent wireless STAs from associating with unauthorized APs.

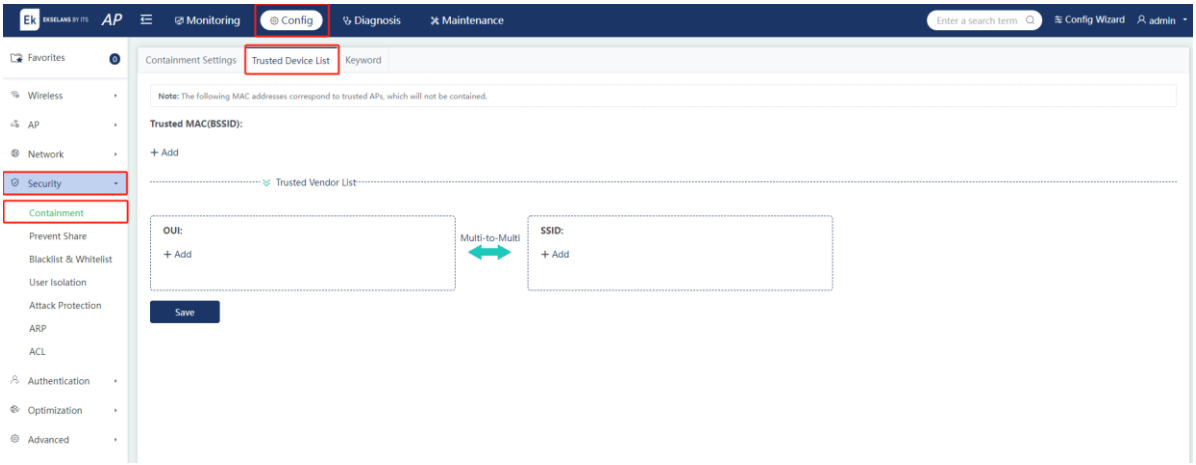
1. Containment Settings

When **Rogue AP Containment** is enabled, you need to set the working mode to **Monitor** or **Hybrid**. The **Hybrid** mode is applied to the AP only, while the Monitor mode can be applied to the AP or selected radios. Click **Configure Phishing WiFi Keyword** to access the **Keyword** page and configure the keyword.



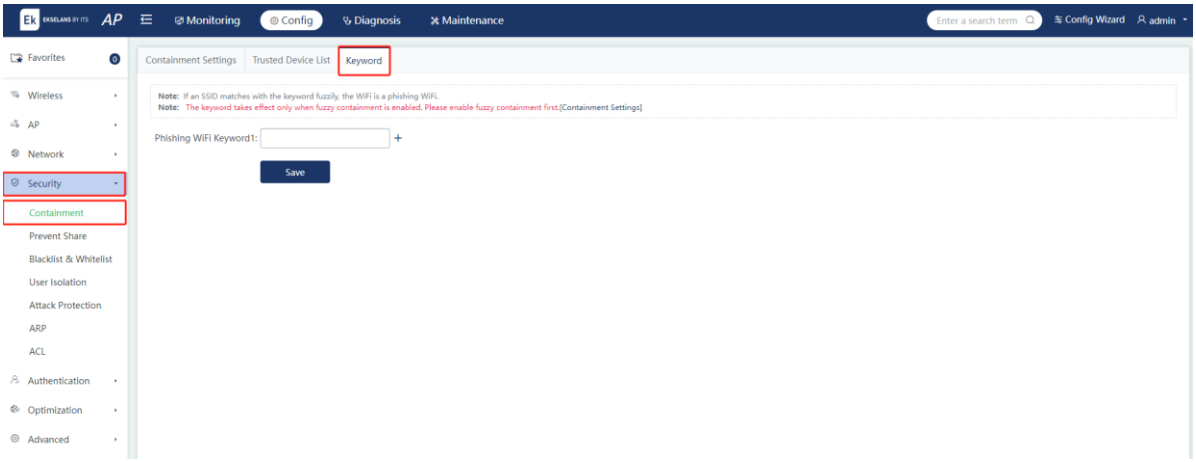
2. Trusted Device List

When **Rogue AP Containment** is enabled, unauthorized APs will be contained. However, some devices are trusted devices. You can configure the MAC address of a trusted device or the MAC address of a trusted manufacturer. If an AP is configured as a trusted device, it will not be contained.



3. Phishing Wi-Fi Keyword

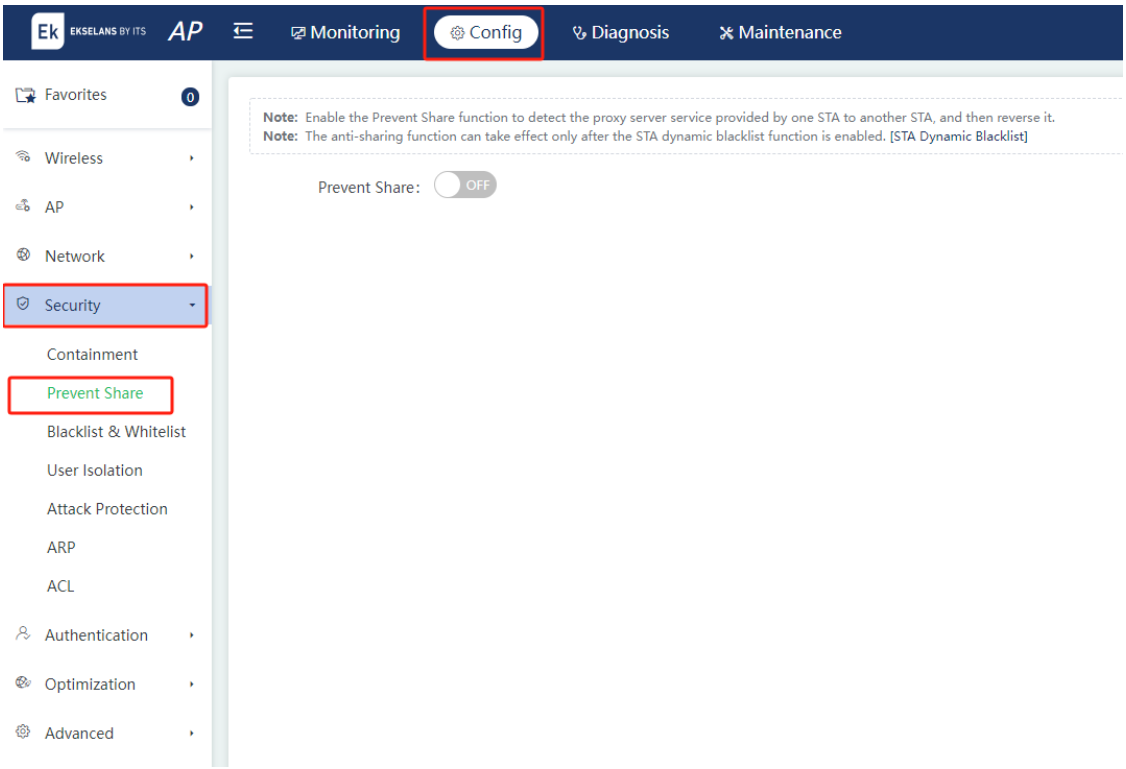
Phishing Wi-Fi keywords are obtained by scanning SSIDs on the network. Match the scanned SSIDs against the configured keywords. If an SSID matches the keyword fuzzily, the Wi-Fi is considered as a phishing Wi-Fi.



5.4.2 Sharing Prevention

Choose **Config** > **Security** > **Prevent Share**.

When **Prevent Share** is enabled, the system can detect whether one STA provides the proxy service to another and adds the STA providing the proxy service into the containment list.



5.4.3 Blacklist & Whitelist

Choose **Config** > **Security** > **Blacklist & Whitelist**.

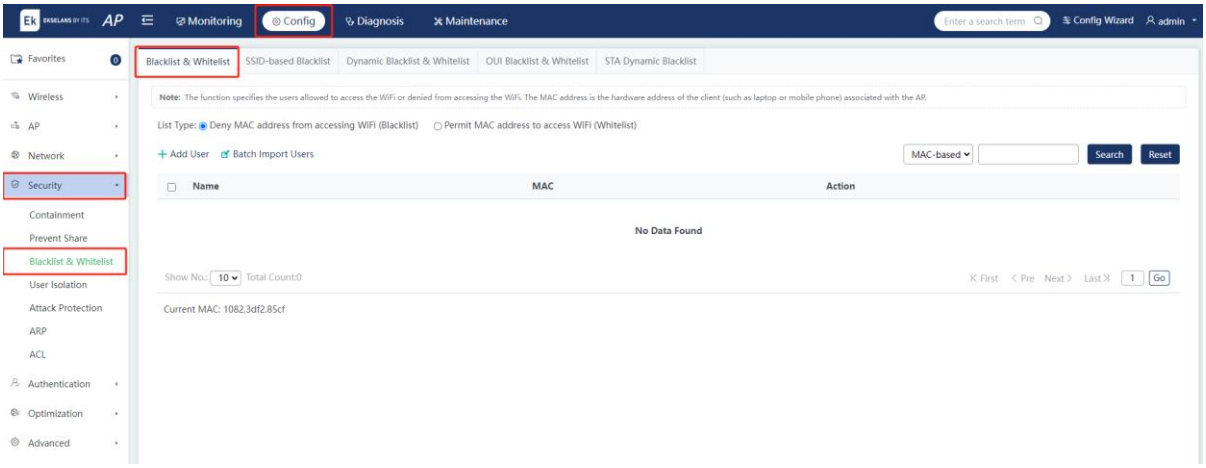
To enhance wireless security, you can configure a blacklist (users in the blacklist are denied from accessing the Wi-Fi network) and a whitelist (only users in the whitelist are allowed to access the Wi-Fi network) to control the access of wireless users. A fat AP supports the global blacklist and whitelist, SSID-based blacklist and whitelist, dynamic blacklist and whitelist, Organizationally Unique Identifier (OUI)-based blacklist and whitelist, and STA-based dynamic blacklist.

Note

- The number of users that are denied or permitted to access the Wi-Fi network varies with devices. The value displayed on the page shall prevail.
- The configurations of the blacklist and whitelist are the same. The following takes the blacklist configuration as an example.

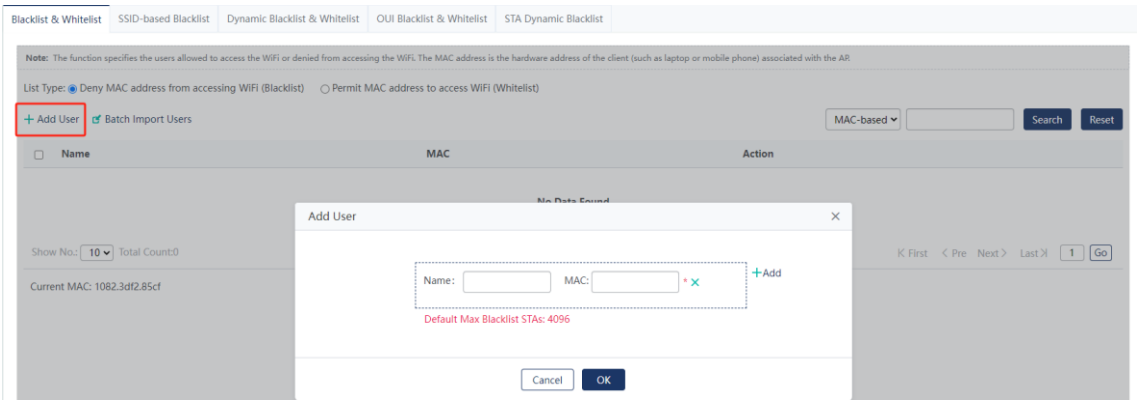
1. Configuring the Global Blacklist or Whitelist

The wireless users in the global blacklist are denied from accessing any Wi-Fi network of the AP. However, only the wireless users in the global whitelist are permitted to access any Wi-Fi network of the AP.



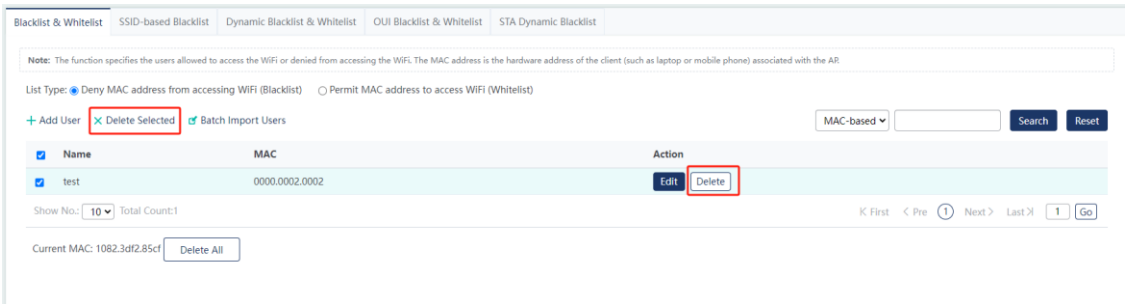
(1) Adding a User

Click **Add User** to add the MAC address of a user. Multiple addresses can be added.



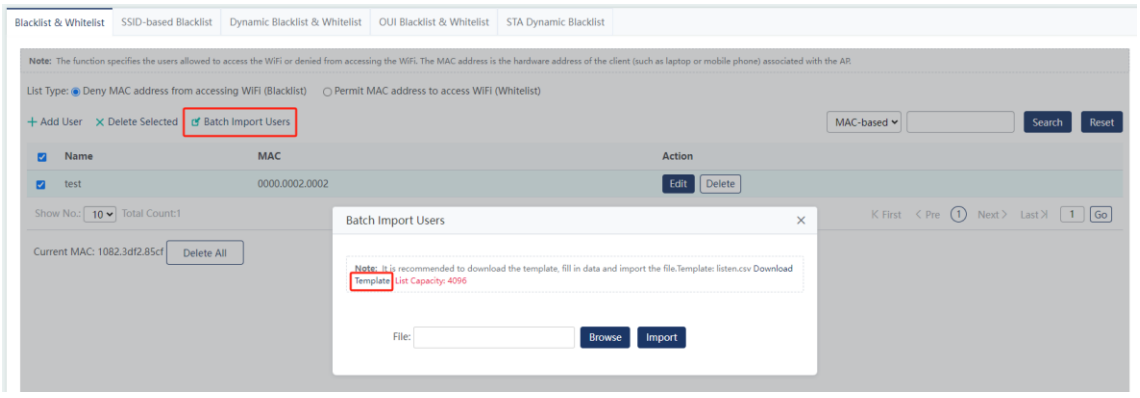
(2) Deleting a User

Click **Delete** in the **Action** column and click **OK** in the pop-up window to delete a user. To delete multiple users, select the target users in the list. Click **Delete Selected**. Click **OK** in the pop-up window to batch delete the users.



(3) Batch Importing Users

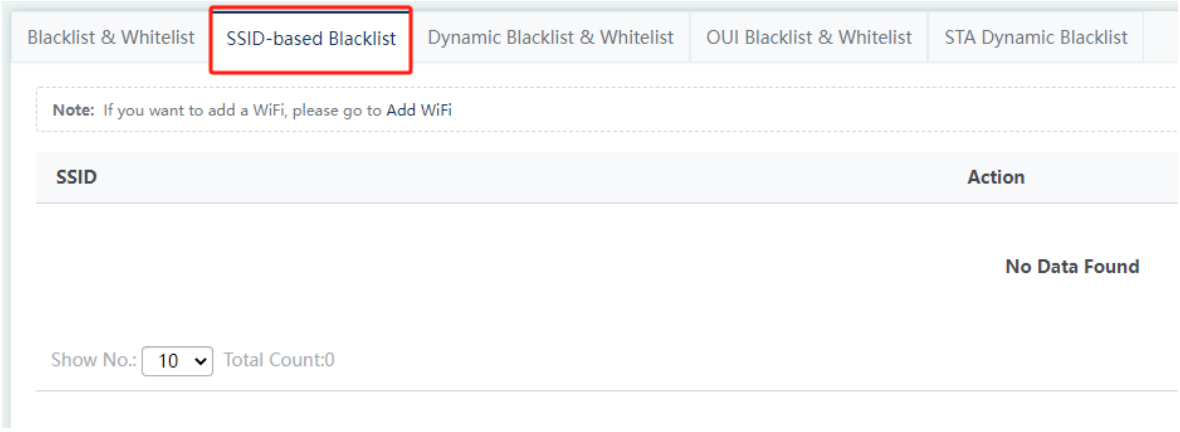
Click **Batch Import Users**. Download and fill in the template. Import the template file.



2. Configuring the SSID-based Blacklist or Whitelist

The wireless users in the SSID-based blacklist are denied from accessing a specified Wi-Fi network. However, only the wireless users in the SSID-based whitelist are permitted to access a specified Wi-Fi network.

Click **Blacklist/Whitelist** for a specified SSID to access the configuration page. Select one list type.



(1) Adding a User

Click **Add User** to add the MAC address of a user. Click **OK**.

(2) Deleting a User

Click **Delete** in the **Action** column and click **OK** in the pop-up window to delete a user. To delete multiple users, select the target users in the list. Click **Delete Selected**. Click **OK** in the pop-up window to batch delete the users.

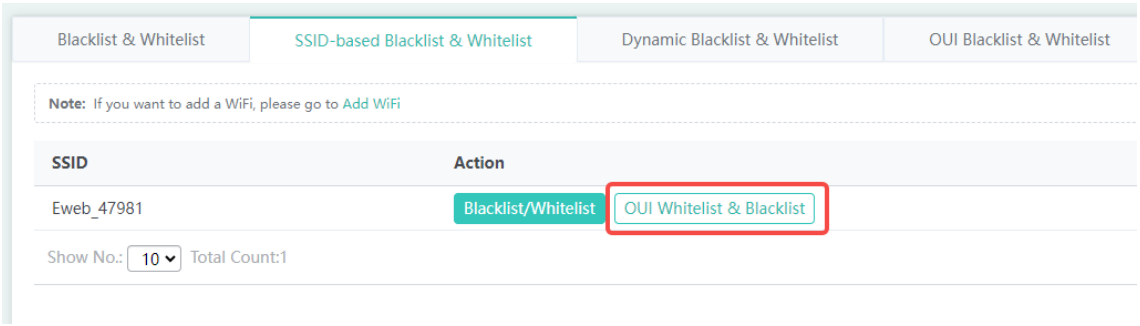
(3) Batch Importing Users

Click **Batch Import Users**. Download the template. Fill in the template and save it. Click **Browse**. Select the template file. Click **Import**.

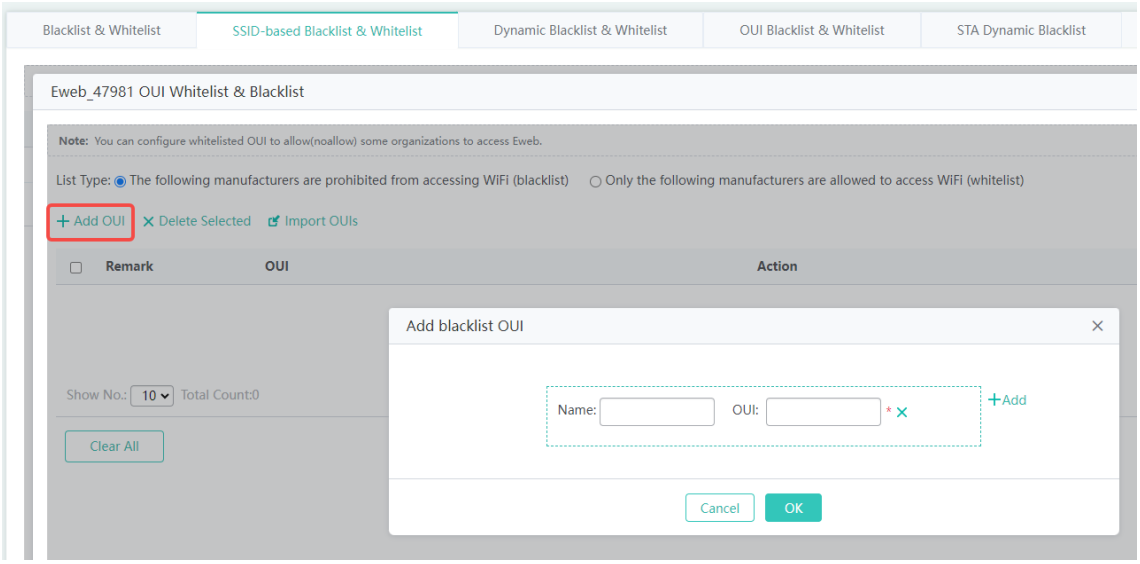
(4) Configuring an OUI

An OUI is the first 8 bits of the MAC address of a device. If devices to be added to the blacklist or whitelist belong to the same manufacturer, add their OUI to the list directly, eliminating the need to add the MAC address of each device one by one.

Click **OUI Whitelist & Blacklist** to enter the configuration page.



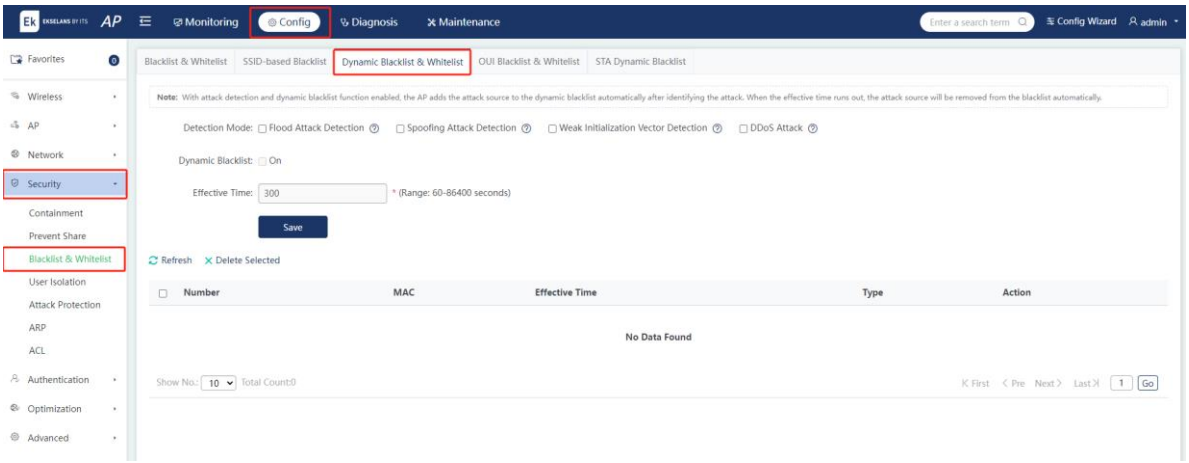
Click **Add OUI**. Enter the name and OUI of a manufacturer. Click **OK**.



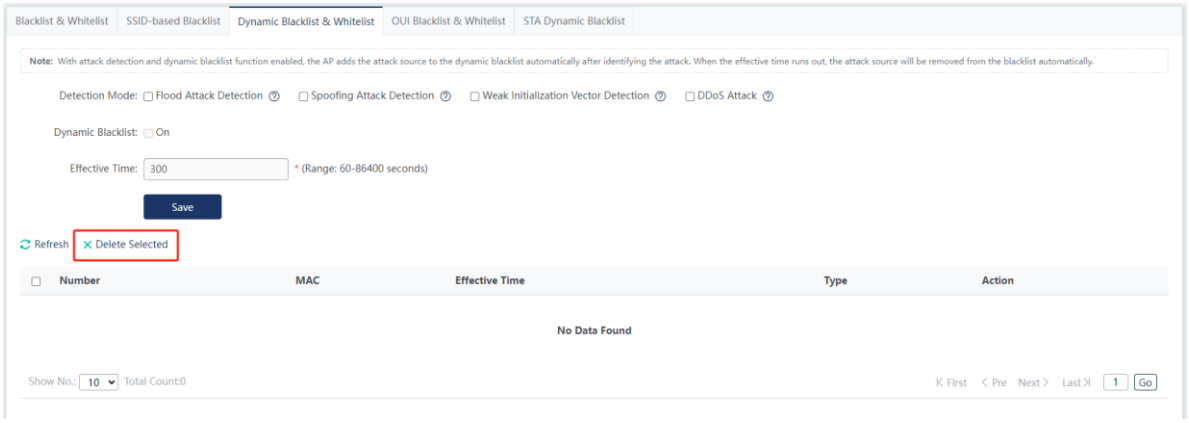
3. Configuring the Dynamic Blacklist or Whitelist

Dynamic blacklist: Add malicious attack sources to the dynamic blacklist to prevent their access. After a detection mode is configured and dynamic blacklist is enabled, the device will automatically add the attack source to the dynamic blacklist when an attack is detected. After the effective time expires, the attack source will be automatically deleted from the blacklist.

Configuring a dynamic blacklist: Select a detection mode, enable dynamic blacklist, and configure the effective time. Click **Save**.



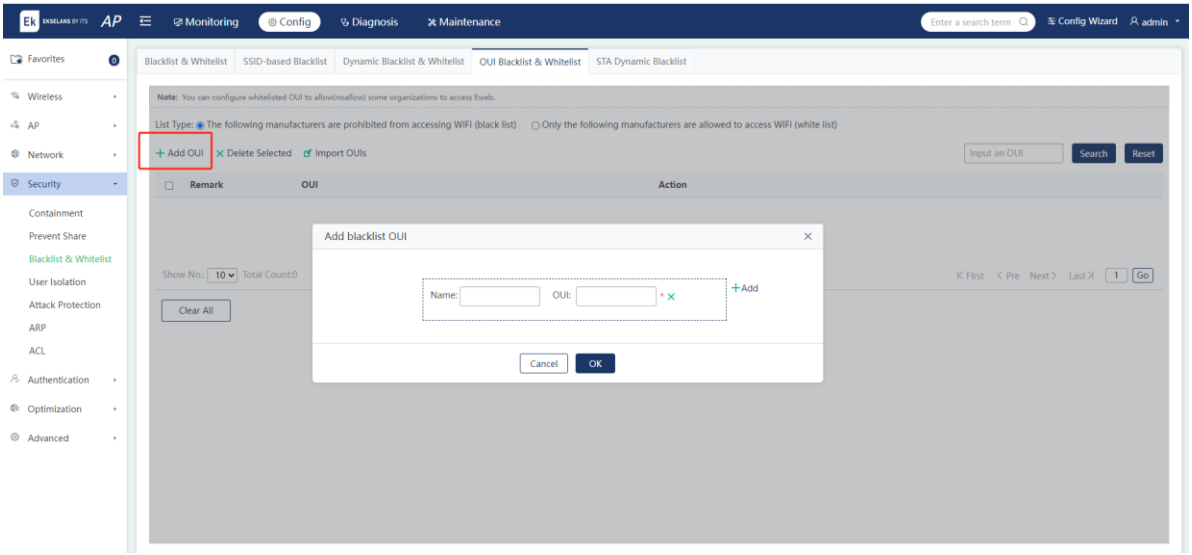
Deleting a dynamic blacklist: Click **Delete** in the **Action** column and click **OK** in the pop-up window to delete a dynamic blacklist. To delete multiple dynamic blacklists, select the target dynamic blacklists. Click **Delete Selected**. Click **OK** in the pop-up window to batch delete the dynamic blacklists.



4. Configuring the OUI Blacklist or Whitelist for the AP

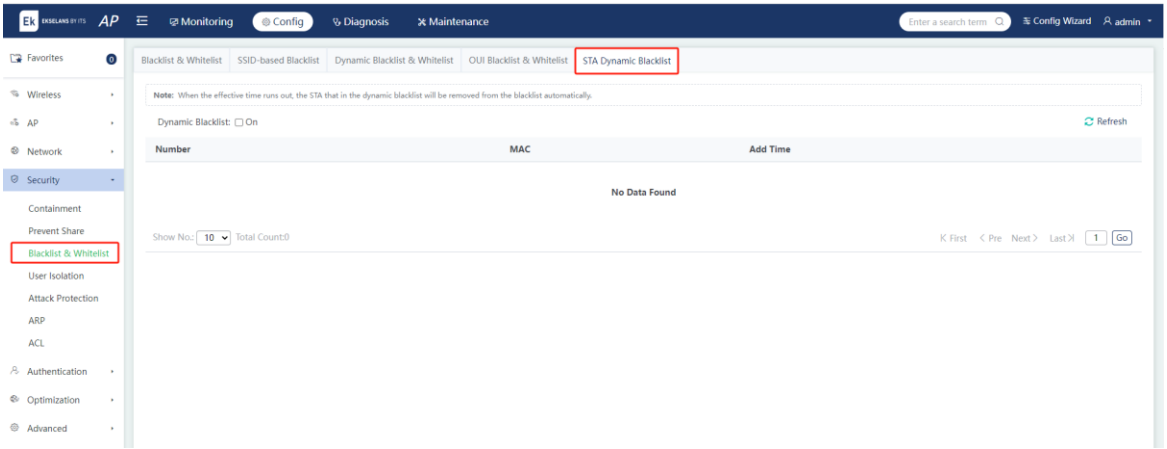
The manufacturers in the OUI blacklist are denied from accessing any Wi-Fi network of the AP, while only the manufacturers in the OUI whitelist are allowed to access any Wi-Fi network of the AP.

Configuring manufacturer information: Click **Add OUI**. Enter the name and OUI of a manufacturer. Click **OK**.



5. Configuring the STA Dynamic Blacklist

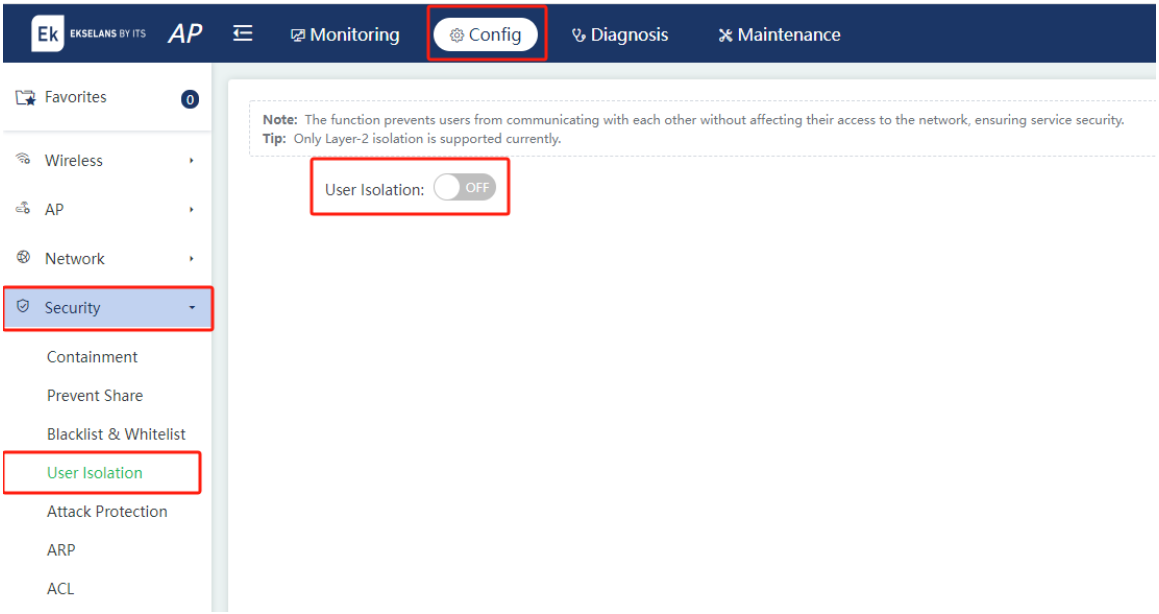
Add STAs from malicious attack sources to the STA dynamic blacklist to prevent them from accessing the network.



5.4.4 User Isolation

Choose **Config** > **Security** > **User Isolation**.

To ensure network security and information confidentiality, enable **User Isolation** so that intranet users cannot communicate with each other. Some special users (users who can access each other) can be identified by user name and MAC address. Click **Add** to add MAC addresses of users to **Whitelisted MAC** for mutual access.

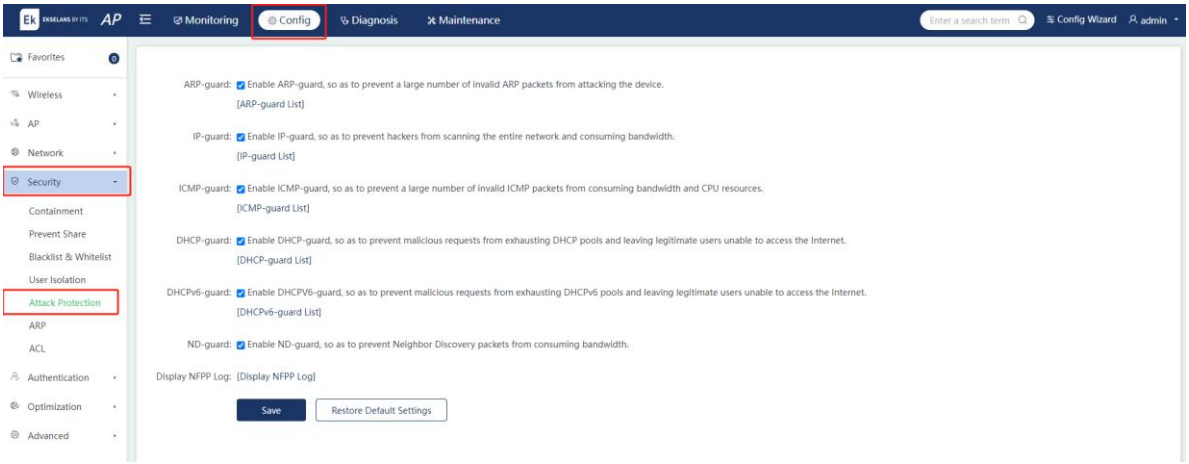


5.4.5 Attack Prevention

Choose **Config** > **Security** > **Attack Protection**.

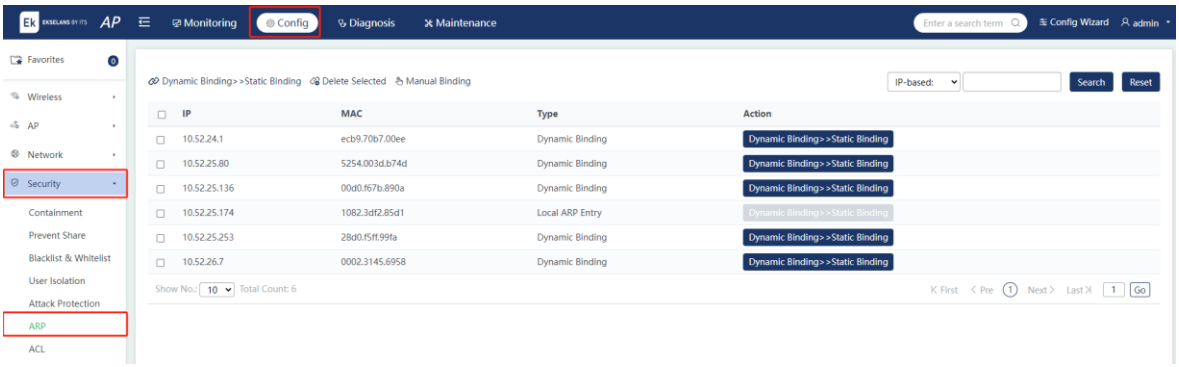
Malicious attacks often occur in a network environment. These attacks overload the device, resulting in high CPU usage and an operation failure of the device.

Select attack prevention types and click **Save**. Click the text within square brackets ([]) to display the list.



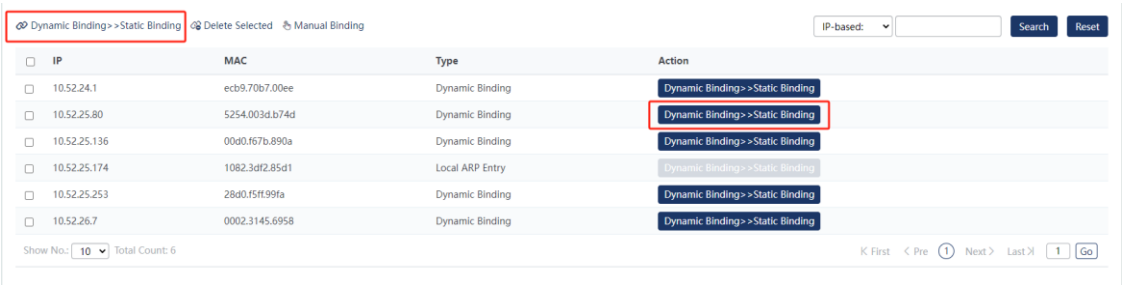
5.4.6 ARP Entry Binding

Choose **Config** > **Security** > **ARP**.



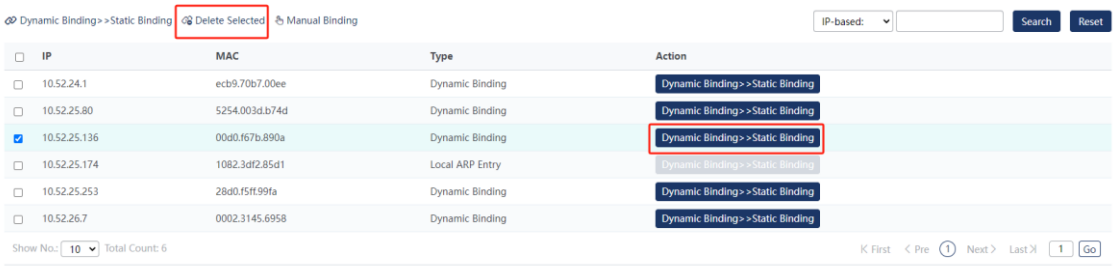
(1) Switching a Dynamic Binding to a Static Binding

Select one entry in the ARP list. Click **Dynamic Binding >> Static Binding** in the **Action** column to switch the dynamic binding to the static binding. You can also select more entries in the ARP list and click **Dynamic Binding >> Static Binding** next to **Delete Selected** to batch switch the dynamic bindings to the static bindings.



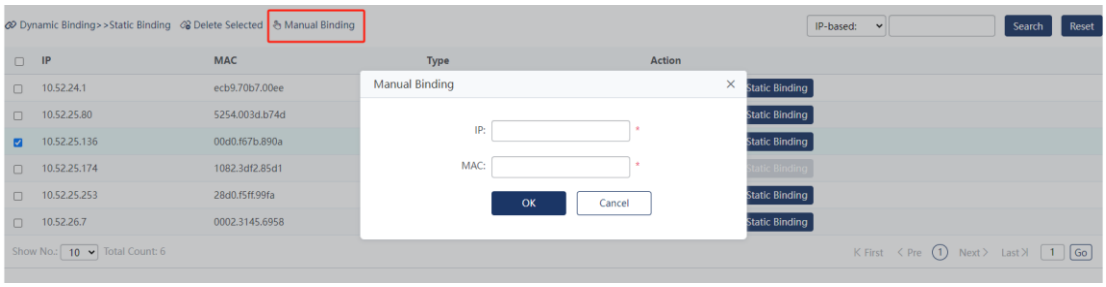
(2) Deleting a Static Binding

Select one entry in the ARP list. Click **Static Binding >> Dynamic Binding** in the **Action** column to switch the static binding to the dynamic binding. To delete multiple static bindings, select the target IP addresses in the ARP list. Click **Delete Selected** to batch delete the static bindings.



(3) Manual Binding

Click **Manual Binding**. Enter the IP and MAC addresses. Click **OK** and a message indicating operation success is displayed. The new entry is displayed in the ARP list.



5.4.7 ACL

Choose **Config** > **Security** > **ACL**.

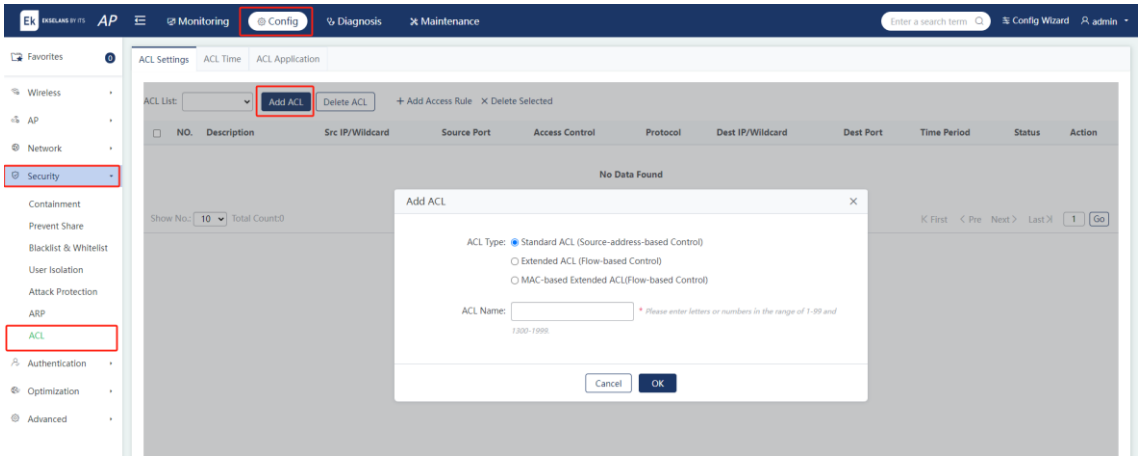
When receiving a packet, a device interface on which an ingress ACL is configured checks whether the packet matches an access control entry (ACE) in the ingress ACL. When sending a packet, a device interface on which an egress ACL is configured checks whether the packet matches an ACE in the egress ACL.

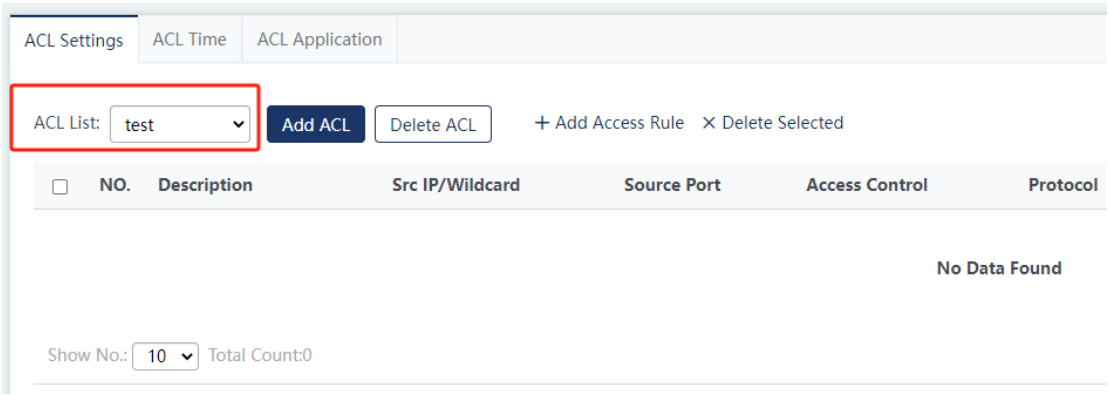
When different ACEs are configured, multiple ACEs may be applied at the same time, or only some ACEs are applied. Packets are processed according to the first matched ACE (permit or deny).

1. ACL Settings

(1) Adding an ACL

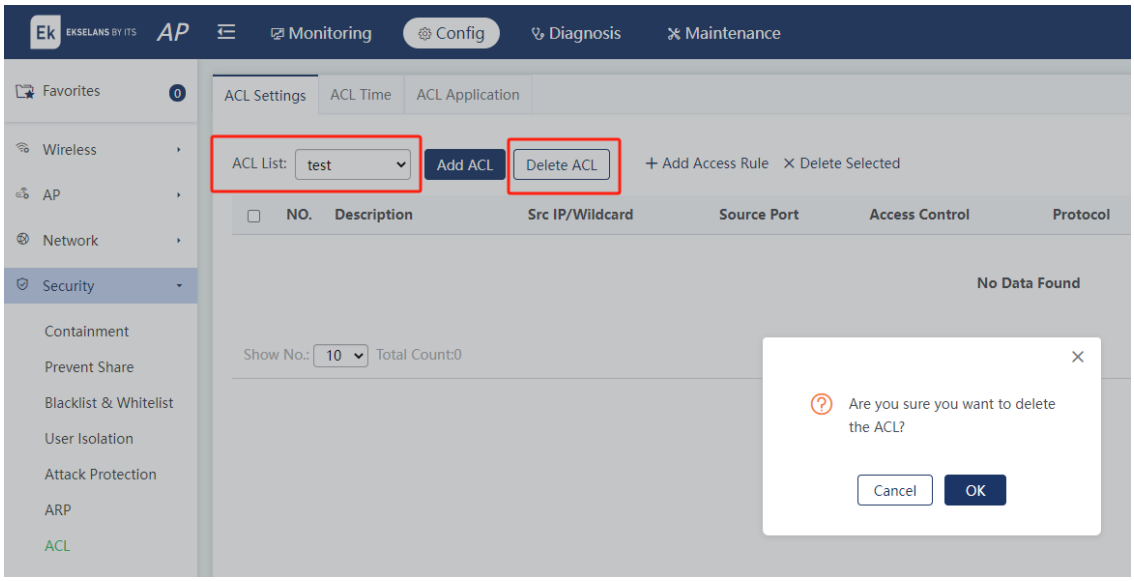
Click **Add ACL**. Enter the fields in the pop-up window. Click **OK** and a message indicating operation success is displayed. The new entry is displayed in the drop-down ACL list in the upper left corner.





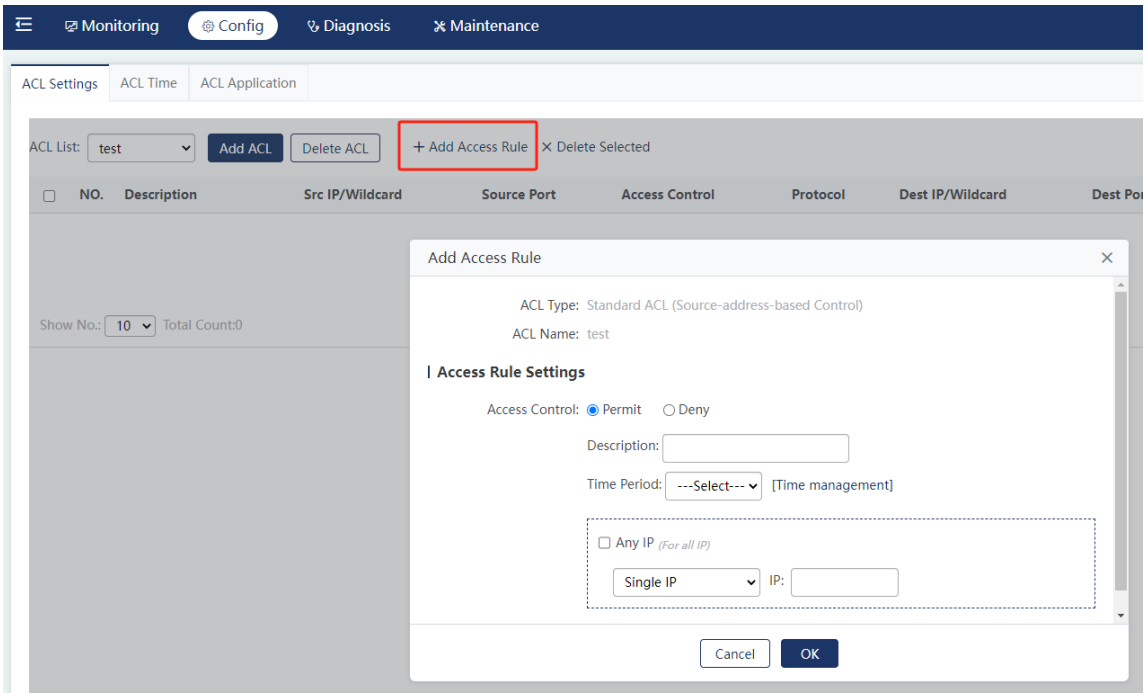
(2) Deleting an ACL

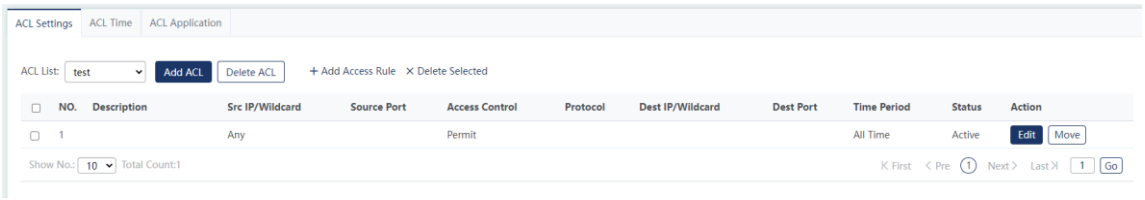
Select the ACL to be deleted from the drop-down ACL list. Click **Delete ACL**. Click **OK** in the pop-up window to delete the ACL.



(3) Adding an ACE

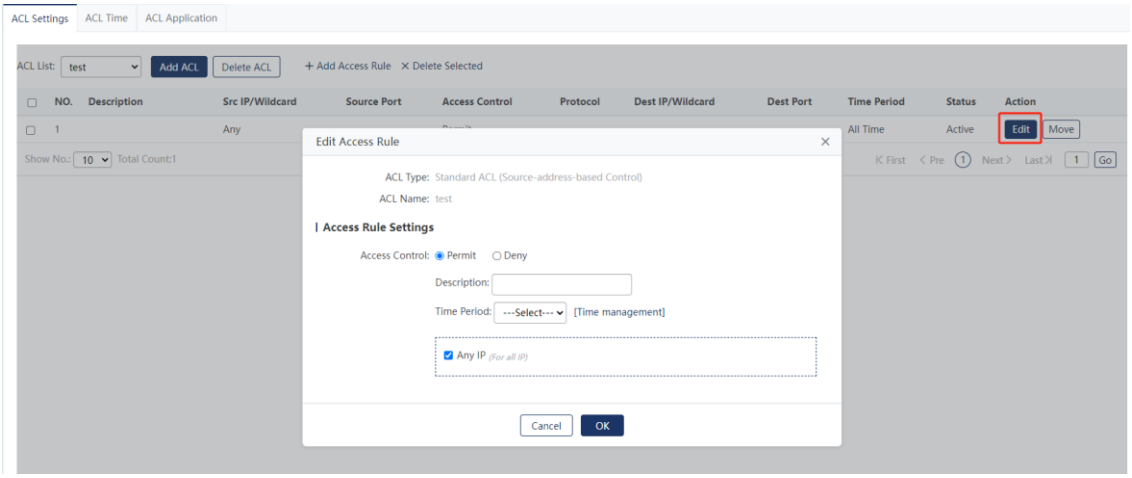
Select an ACL to which an ACE needs to be added from the drop-down ACL list. Click **Add Access Rule**. Enter the fields in the pop-up window. Click **OK** and a message indicating operation success is displayed. The new entry is displayed in the ACL list.





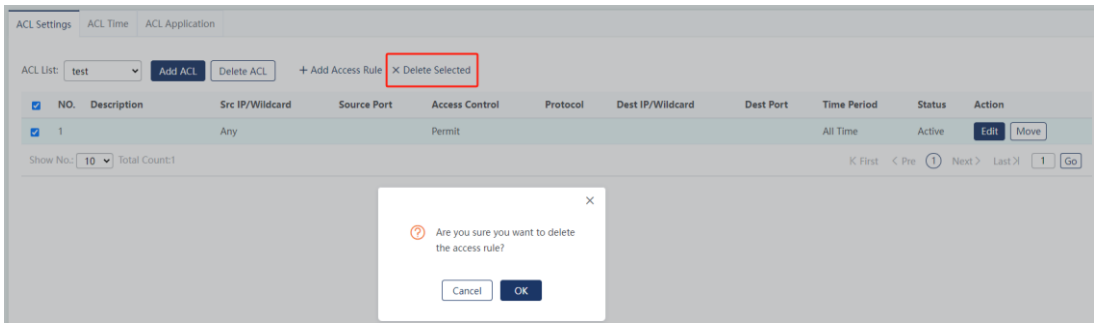
(4) Editing an ACE

Click **Edit** in the **Action** column of an ACE in the ACL list. Edit the fields in the pop-up window. Click **OK** and a message indicating operation success is displayed.



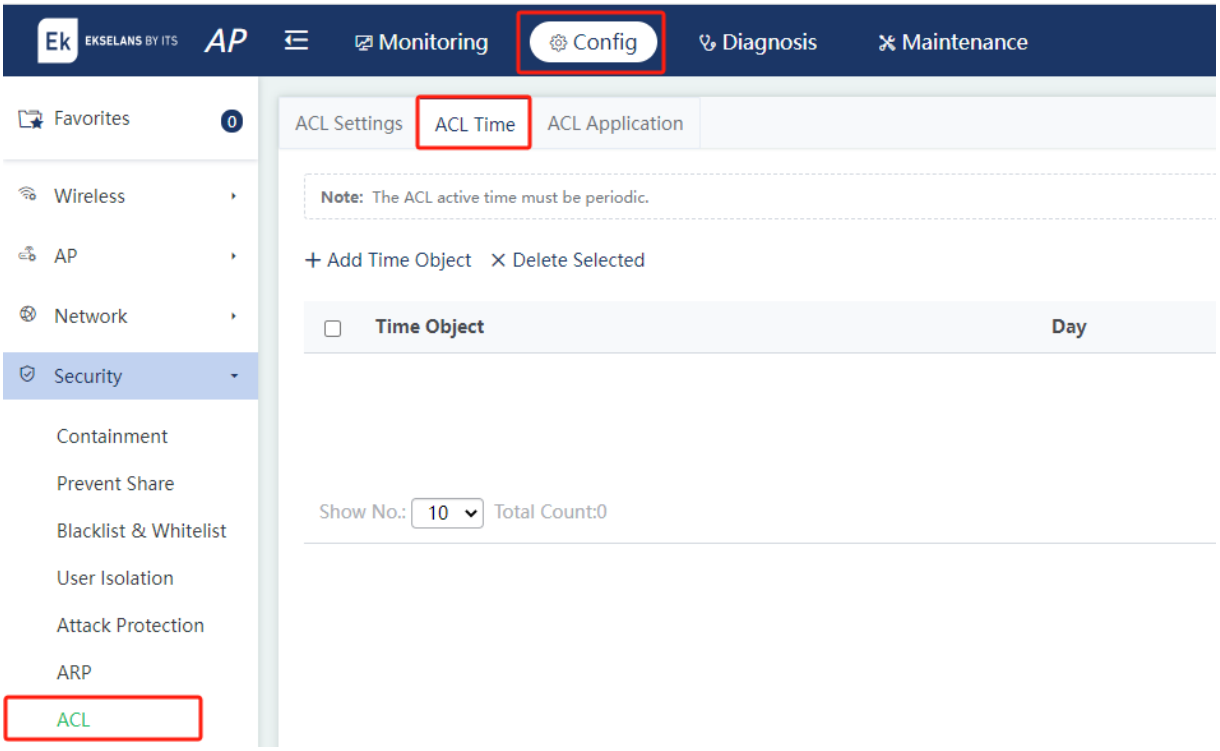
(5) Deleting an ACE

Select one or more entries in the ACL list. Click **Delete Selected**. Click **OK** in the pop-up window to delete the ACE(s).



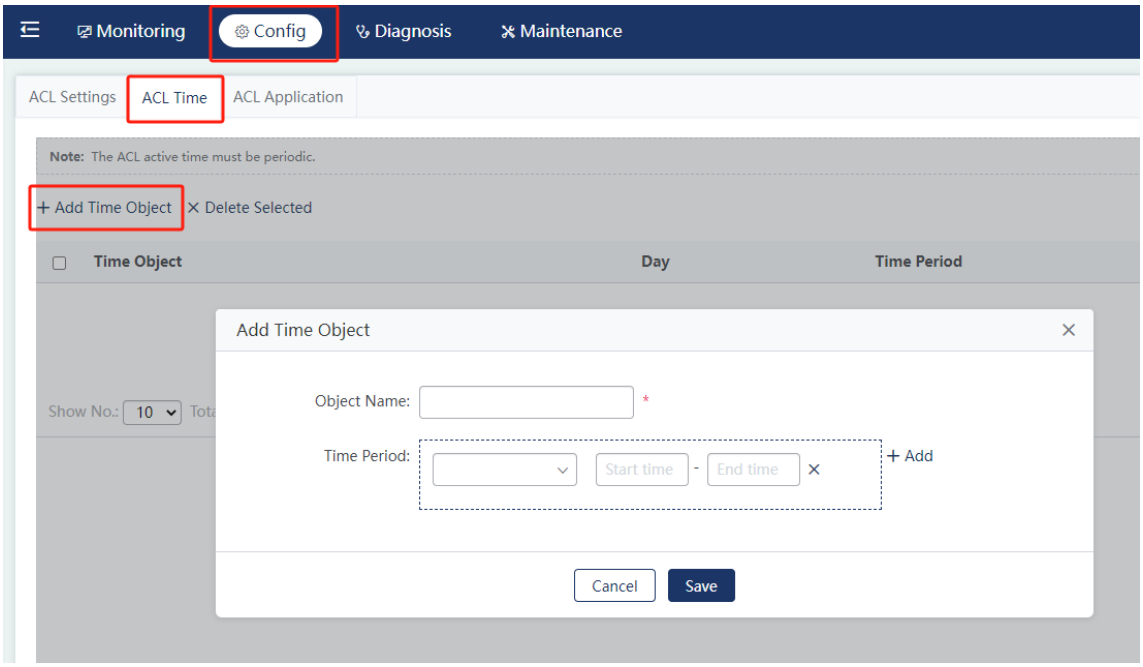
2. ACL Time

An ACL can be configured to take effect based on time, for example, in some time periods of a week. To meet this requirement, you need to configure a time object.



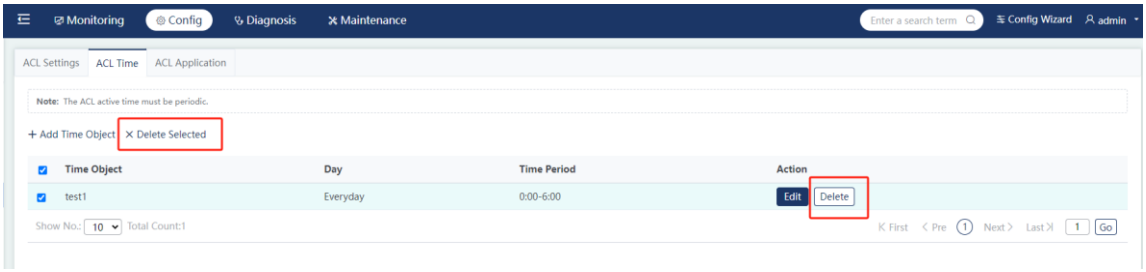
(1) Adding a Time Object

Click **Add Time Object**. Edit the fields in the pop-up window. Click **Save** and a message indicating operation success is displayed.



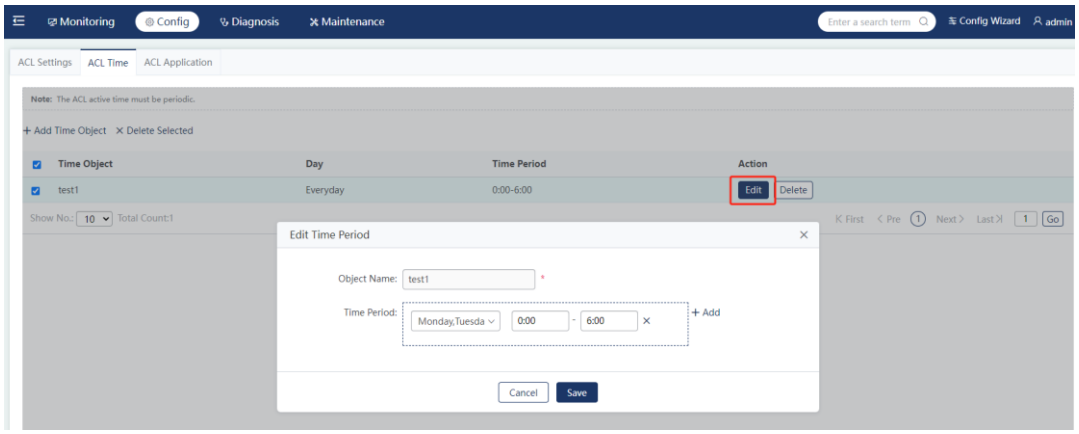
(2) Deleting a Time Object

Click **Delete** in the **Action** column and click **OK** in the pop-up window to delete a time object. To delete multiple time objects, select the target time objects in the list. Click **Delete Selected**. Click **OK** in the pop-up window to batch the time objects.



(3) Editing a Time Object

Click **Edit** in the **Action** column of a time object. Edit the fields in the pop-up window. Click **Save** and a message indicating operation success is displayed.

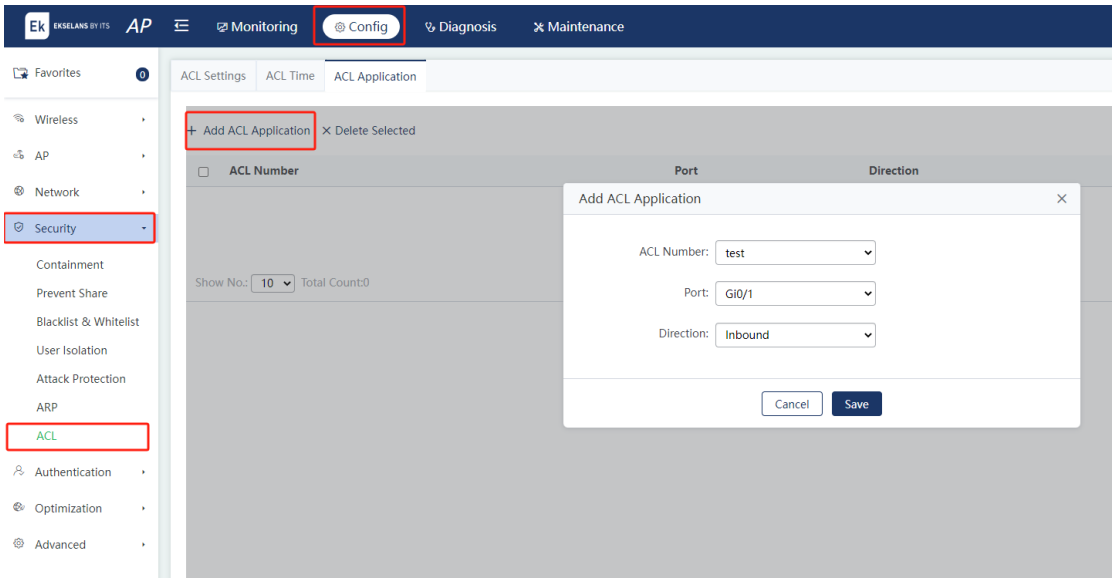


3. ACL Application

You can configure ACEs and apply them to interfaces or Wi-Fi networks to restrict the access of specified users or allow users to access specified networks.

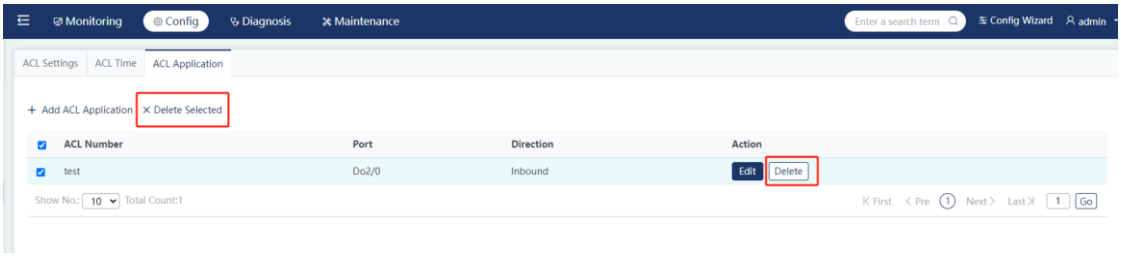
(1) Adding an ACL Application

Click **Add ACL Application**. Enter the fields in the pop-up window. Click **Save** and a message indicating operation success is displayed. The new entry is displayed in the list.



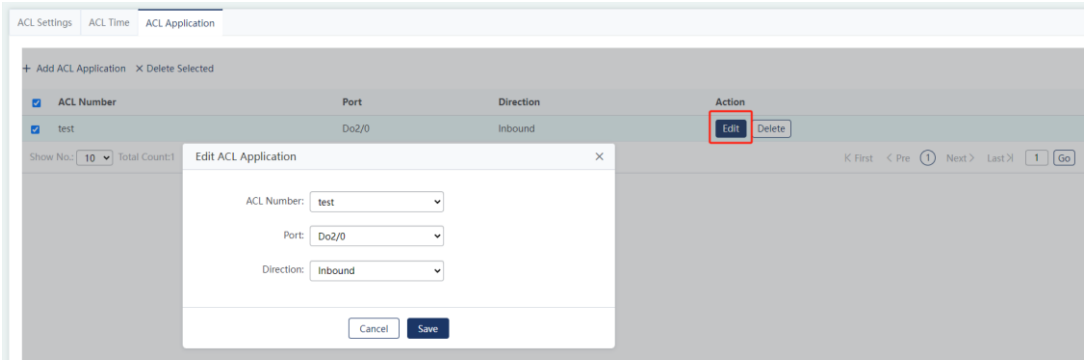
(2) Deleting an ACL Application

Click **Delete** in the **Action** column and click **OK** in the pop-up window to delete an ACL application. To delete multiple ACL applications, select the target ACL applications in the list. Click **Delete Selected**. Click **OK** in the pop-up window to batch the ACL applications.



(3) Editing an ACL Application

Click **Edit** in the **Action** column of an ACL application. Edit the fields in the pop-up window. Click **Save** and a message indicating operation success is displayed.



5.5 Authentication

5.5.1 Web-based Authentication

Choose **Config** > **Authentication** > **Web Auth**.

Web-based authentication allows you to control user access to the network. After web-based authentication is enabled, when a client needs to access the network, the device will steer the client to access a specific website (portal server) for authentication. Network access is granted to the client only upon successful authentication.

Web-based authentication has the following advantages:

- Ease of use: Users do not need to install dedicated client software and can perform authentication through a browser.
- Custom services and service expansion: Through interaction between the browser and the portal server, users can customize services such as advertisements, notifications, and business links on the portal server page.

Web-based authentication is classified into **ePortal Authentication** and **iPortal Authentication**. If **iPortal Authentication** is selected, no additional server is required, but users need to be configured locally for authentication. If **ePortal Authentication** is selected, the ePortal server and RADIUS server are required.

1. ePortal Authentication

ePortal authentication is classified into **ePortalv1** and **ePortalv2**:

- **ePortalv1**: The authentication and accounting functions are implemented by the ePortal server.

  Process: Users submit authentication information on the authentication page provided by the ePortal software. The ePortal server directly requests authentication from the corresponding RADIUS server. After successful authentication, the ePortal server advertises user information to the device through SNMP, and the device performs access control for users.

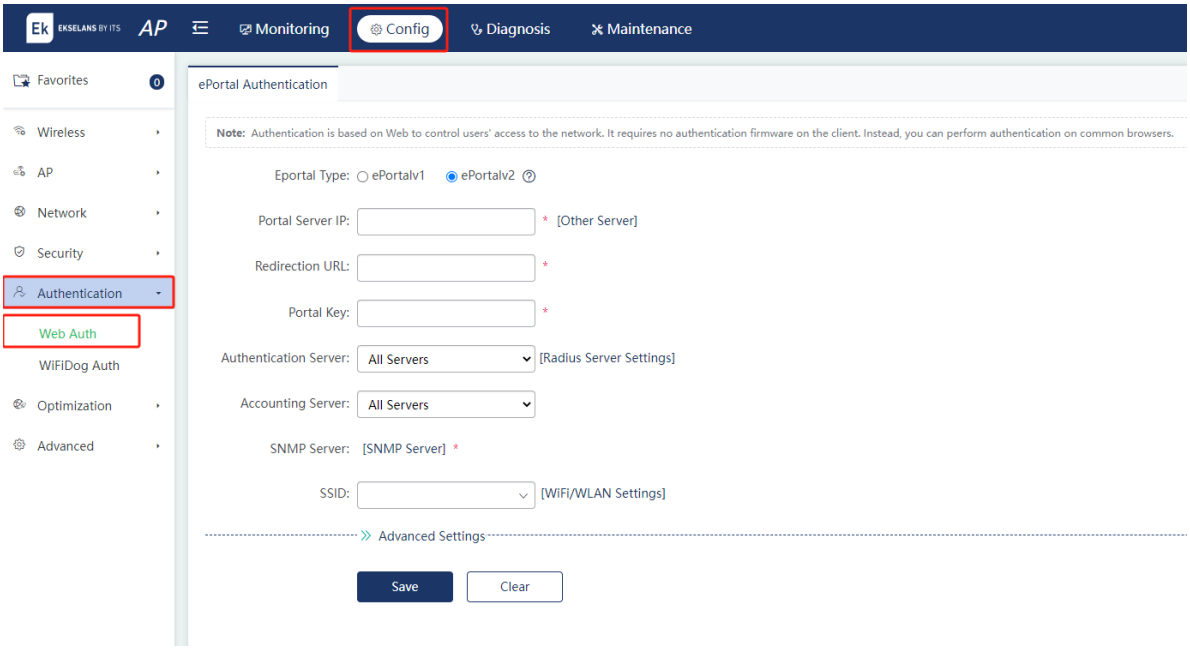
- **ePortalv2**: The portal server is responsible only for user page interaction, and the main authentication process is completed on the device.

  Users submit authentication information on the authentication page provided by the portal server, and the portal server sends the obtained identity information of users to the device through the portal protocol. The device initiates an authentication request to the RADIUS server using the identity information, assigns access permissions to authenticated users, and returns authentication results to the portal server.

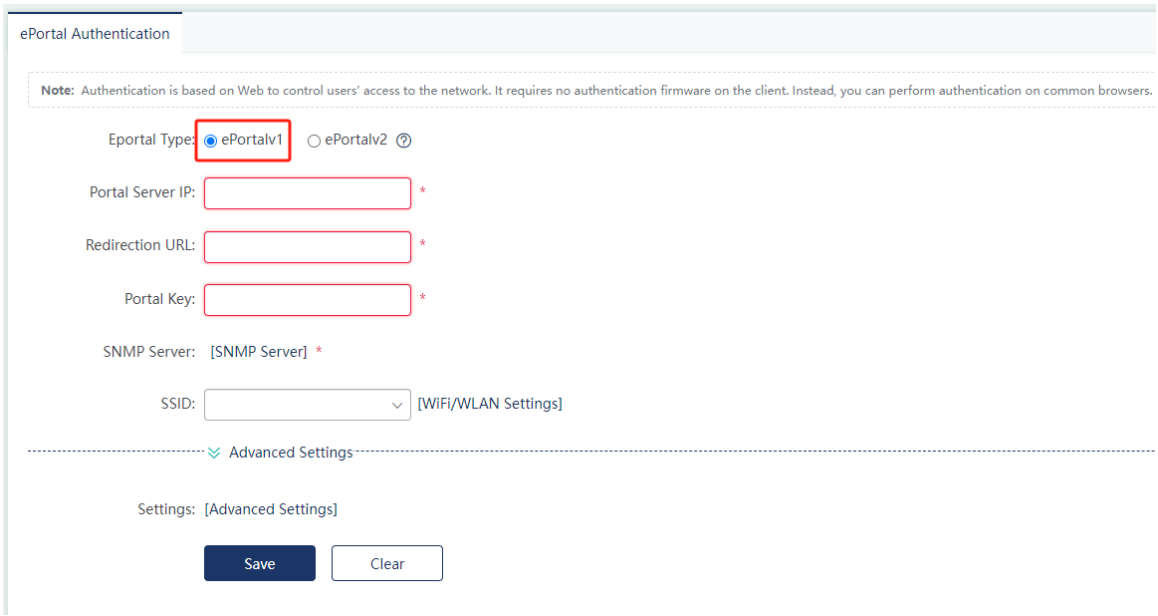
Whether **ePortalv1** or **ePortalv2** is selected depends on the portal server used.

Caution

Before configuring ePortal authentication, you need to set up an ePortal authentication server, including the deployment of the ePortal server and the configuration of authorized users on the RADIUS server.

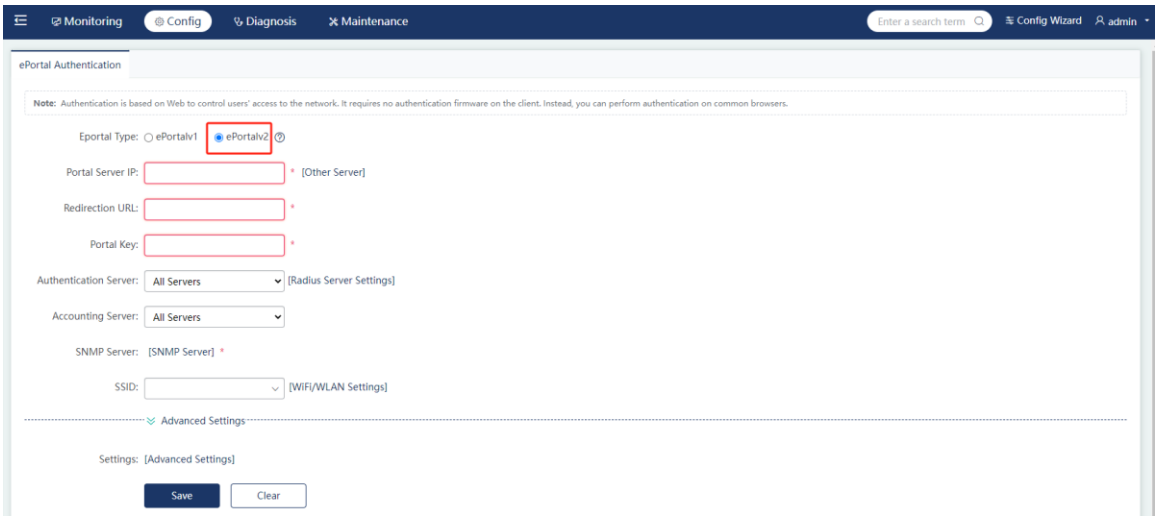


(1) **ePortalv1**:



Parameter	Description
Portal Server IP	Enter the IP address of the ePortal server. Typically, the authentication page is provided by the ePortal server.
Redirection URL	Enter the URL of the authentication page. When an unauthenticated user accesses network resources, the user is automatically redirected to this page for authentication.
Portal Key	Configure a key used for the communication between the device and the authentication server.
SNMP Server	Users of the SNMP server exchange configuration information with the portal server. When the device detects that a user goes offline, it notifies the portal server. The portal server configures the device to delete user information through SNMP. Then, the portal server returns the offline page to the user.
SSID	Specify the Wi-Fi network to be configured with the ePortalv1. Note: Only global authentication mode is supported currently. WLAN-based authentication mode is not available.

(2) **ePortalv2**:



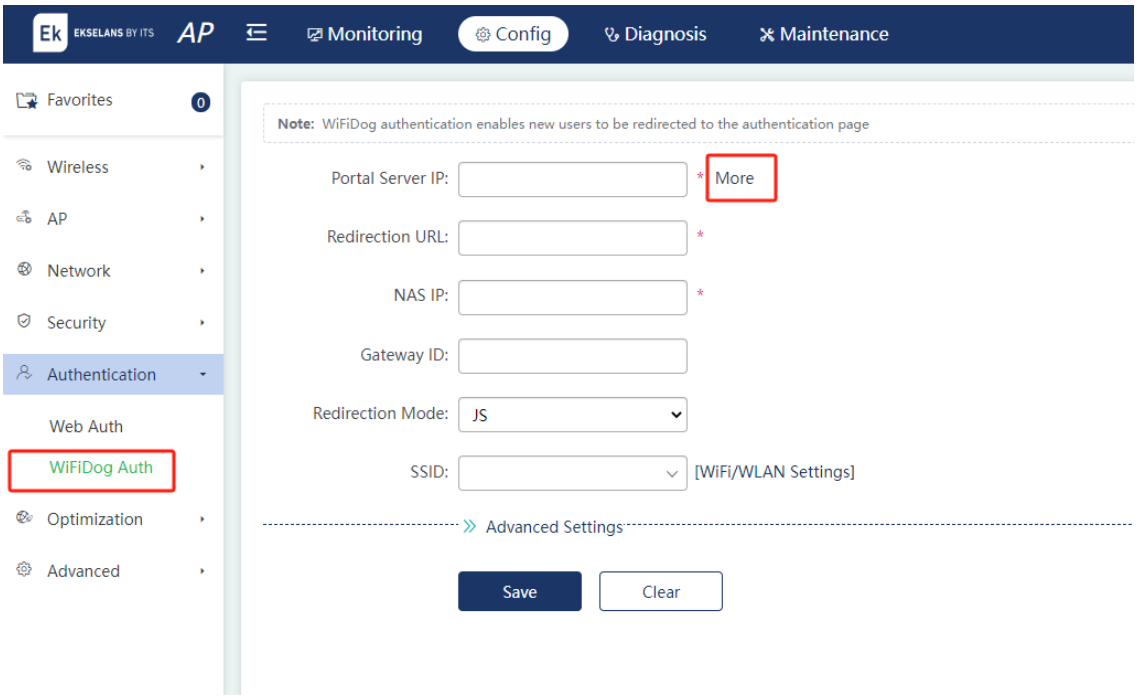
Parameter	Description
Portal Server IP	In template configuration mode, run the **ip { *ip-address* }** command to configure the server IP address. Server access requests are permitted by the device and rate limiting can be performed on requests transmitted to the server.

Parameter	Description
Redirection URL	Enter the URL that users will be redirected to, typically the URL of the portal authentication page.
Portal Key	Configure a key used for the communication between the device and the authentication server.
Authentication Server	To successfully apply ePortalv2, users need to configure authentication, authorization, and accounting (AAA) authentication. The authentication method list associates web-based authentication requests with the RADIUS server. The device selects the authentication method and server based on the authentication method list.
Accounting Server	(Mandatory) To successfully apply ePortalv2, users need to configure AAA accounting. Accounting is used to associate an accounting method with the server. In web-based authentication, accounting is implemented to record user information or fees.
SNMP Server	Users of the SNMP server exchange configuration information with the portal server. When the device detects that a user goes offline, it notifies the portal server. The portal server configures the device to delete user information through SNMP. Then, the portal server returns the offline page to the user.
SSID	Specify the Wi-Fi network to be configured with the ePortalv2.

5.5.2 WiFiDog Authentication

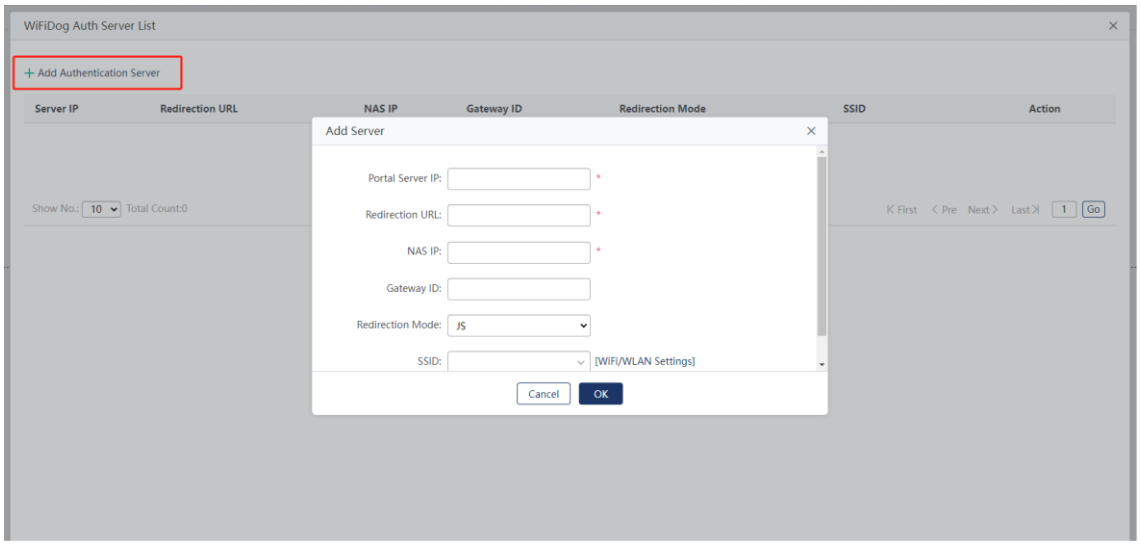
Choose **Config** > **Authentication** > **WiFiDog Auth**.

WiFiDog authentication enables unauthenticated users to be redirected to the authentication page for authentication. Click **More** to access the **WiFiDog Auth Server List** page.



(1) Adding a WiFiDog Authentication Server

Click **Add Authentication Server**. Enter the fields in the pop-up window. Click **OK** and a message indicating operation success is displayed. The new entry is displayed in the list



Parameter	Description
Portal Server IP	Enter the IP address of the portal server.
Redirection URL	Enter the URL of the authentication page of the portal server.
NAS IP	Enter the IP address of the device to be managed by WiFiDog, which is

	used for communication with the server.
Gateway ID	Enter the ID of a gateway used by WiFiDog, which is the gateway SN by default.
Redirection Mode	Enter HTTP redirection or JavaScript redirection. JavaScript redirection is employed by default.
SSID	Enter a Wi-Fi network to be configured with WiFiDog authentication.

(2) Deleting a WiFiDog Authentication Server

Click **Delete** in the **Action** column and click **OK** in the pop-up window to delete a WiFiDog authentication server.

(3) Edit a WiFiDog Authentication Server

Click **Edit** in the **Action** column of a WiFiDog authentication server. Edit the fields in the pop-up window. Click **OK** and a message indicating operation success is displayed. The modified server is displayed in the server list.

5.6 Network Optimization

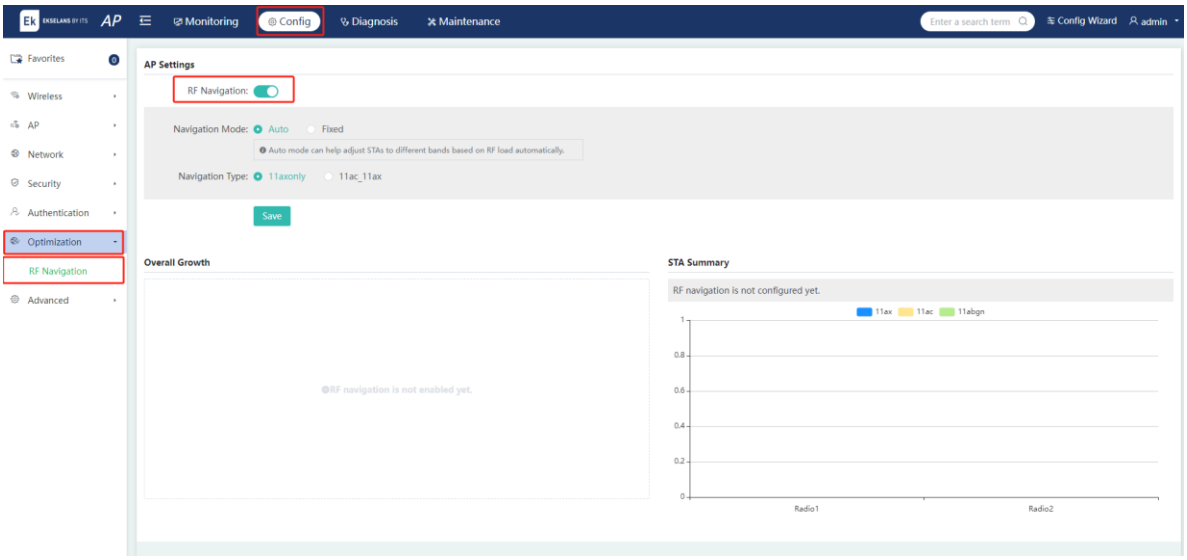
5.6.1 RF Navigation

Choose **Config** > **Optimization** > **RF Navigation**

Note

Some APs may not support this function. The actual menu shall prevail.

Enable **RF Navigation** and configure the **Navigation Mode** and **Navigation Type** to optimize RF performance.



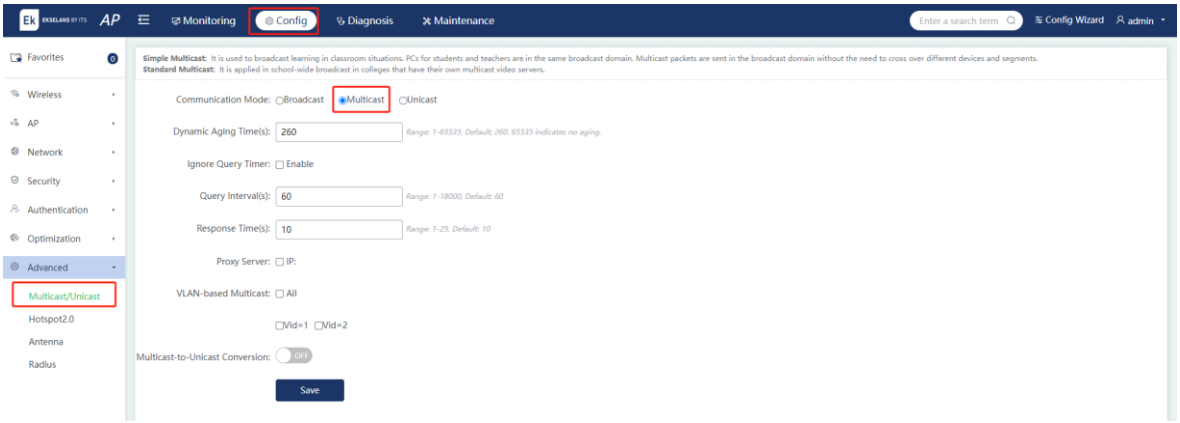
Parameter	Description	
Navigation Mode	Auto	In this mode, the AP can automatically steer a STA to the optimal radio based on the radio load utilization.
	Fixed	In this mode, the AP steers a STA to the corresponding radio, which remains unchanged despite differences in radio environments.
Navigation Type	You can enable the 802.11ax protocol only, or enable both 802.11ac and 802.11ax protocols.	

5.7 Advanced

5.7.1 Multicast/Unicast

Choose **Config** > **Advanced** > **Multicast/Unicast**.

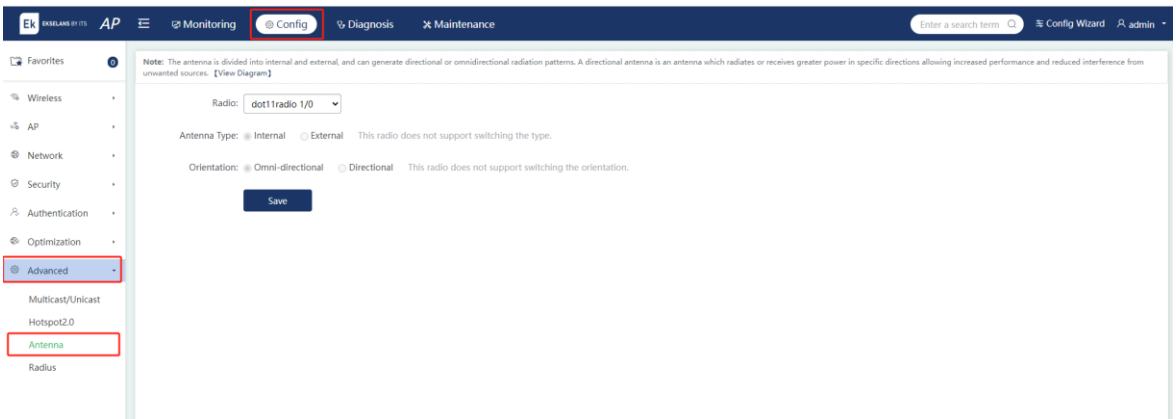
This function is used to configure the communication mode of a device as broadcast, multicast, or unicast.



5.7.2 Antenna

Choose **Config** > **Advanced** > **Antenna**.

RF antennas are categorized into built-in antennas and external antennas. Antenna orientations include directional and omnidirectional options. Directional antennas radiate the signal within a specific angle range, creating a cone-like radiation pattern. The type and direction of the RF connector can be adjusted based on the capability of the RF connector.



5.7.3 RADIUS

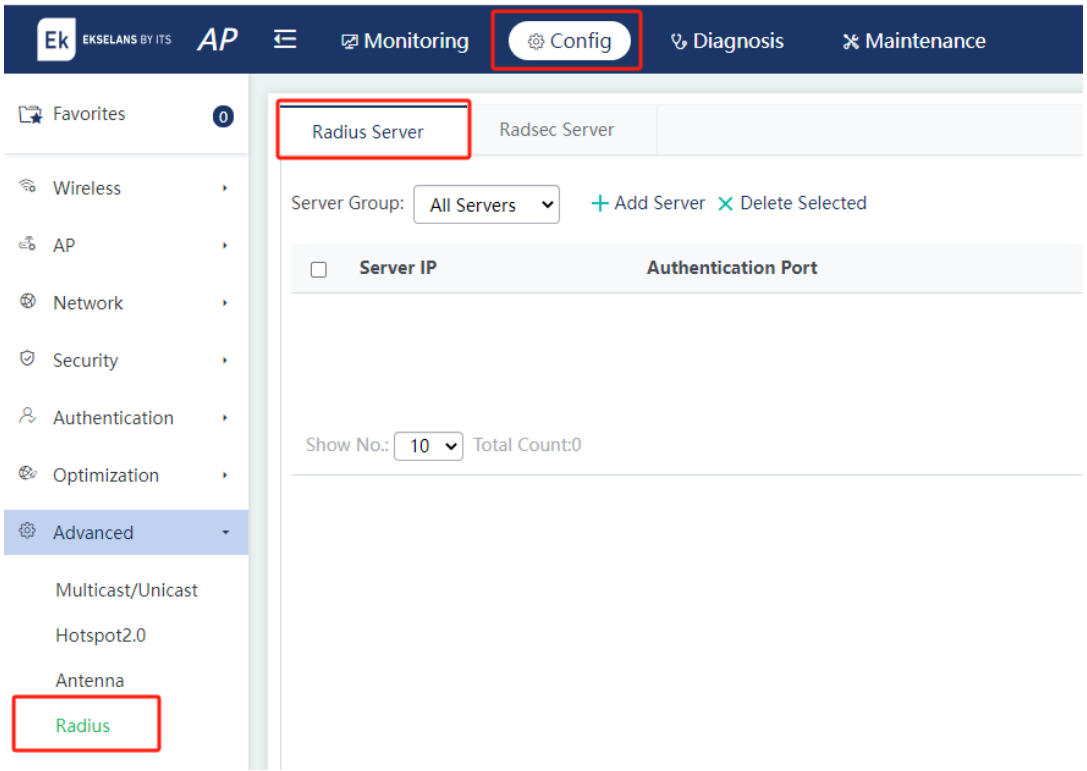
Choose **Config** > **Advanced** > **Radius**.

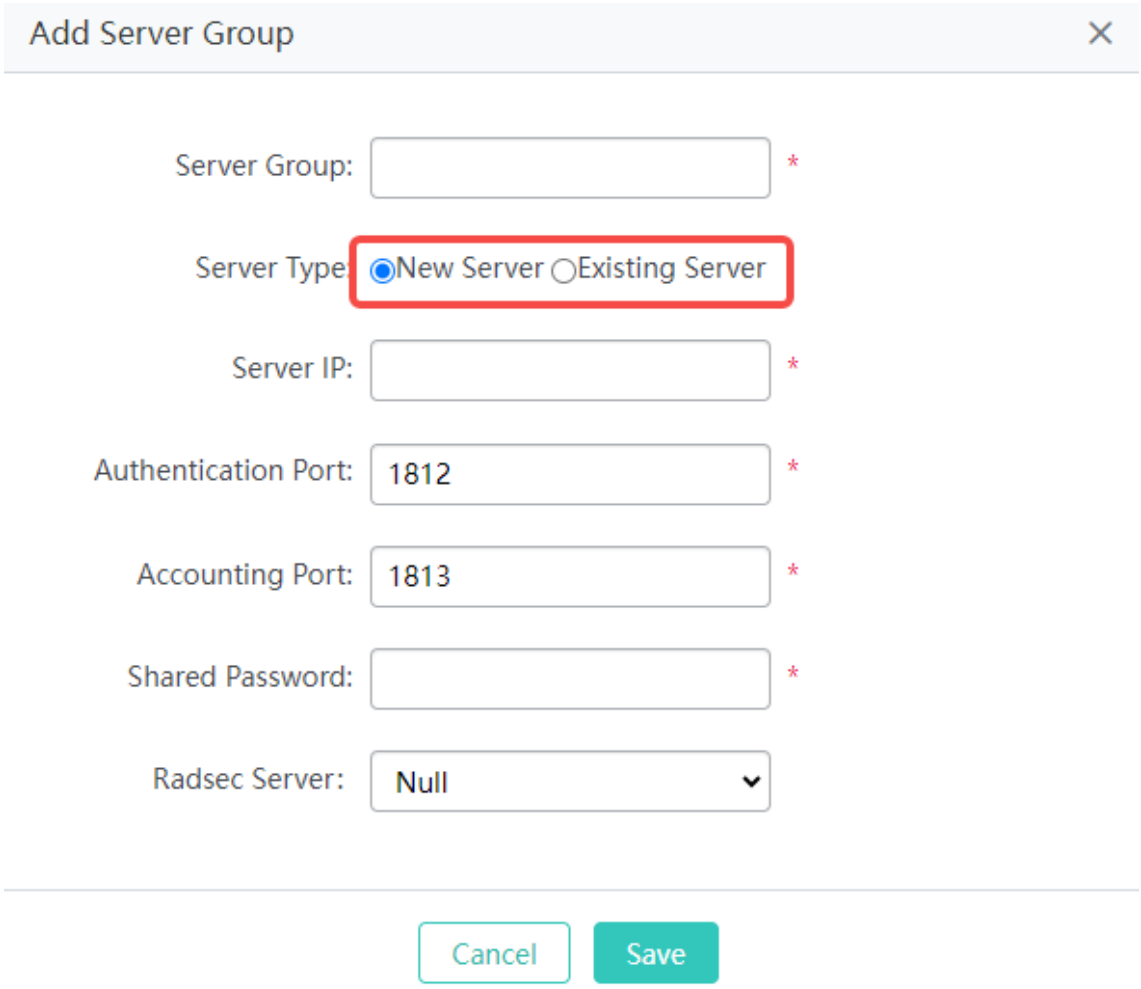
1. RADIUS Server

The Remote Authentication Dial-In User Service (RADIUS) server conducts authentication and accounting on access users to safeguard the network and facilitate management for network administrators.

(1) Adding a Server Group

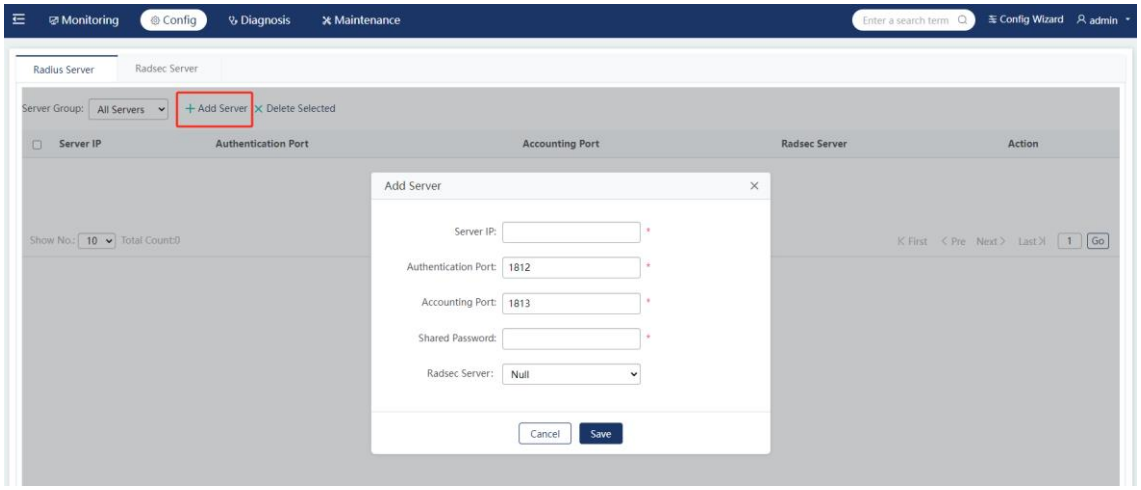
Click **Add Server Group** in the drop-down list. Enter the fields in the pop-up window. If you select **New Server** for the **Server Type** filed, one server group and one server will be added and the server belongs to the server group. If you select **Existing Server**, an existing server will be added to the server group.





(2) Adding a Server

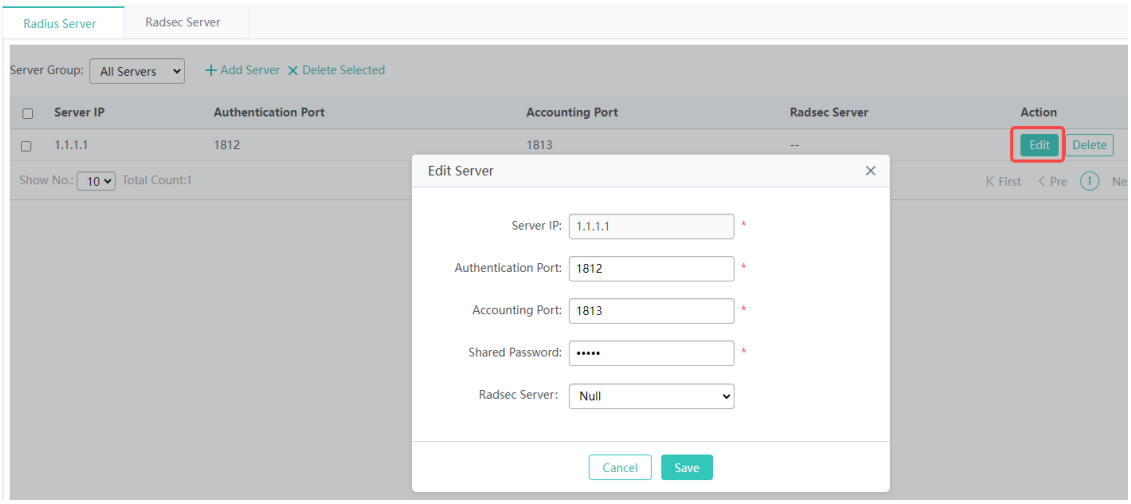
Select **All Servers** for the **Server Group** field. Click **Add Server**. Enter the fields in the pop-up window. Click **Save** and a message indicating operation success is displayed.



Parameter	Description
Server IP	Enter the IP address of a RADIUS server.
Authentication Port	Enter the UDP port number for RADIUS authentication. The value range is from 0 to 65535. The value 0 indicates that the host does not perform authentication.
Accounting Port	Enter the UDP port number for RADIUS accounting. The value range is from 0 to 65535. The value 0 indicates that the host does not perform accounting.
Shared Password	Enter the shared password for the communication between the network access server (routing device) and the RADIUS server.
Radsec Server	(Optional) Select the ID of the RadSec server, to which traffic is redirected from the RADIUS server. **Note** This field is not displayed if the device does not support the RadSec function.

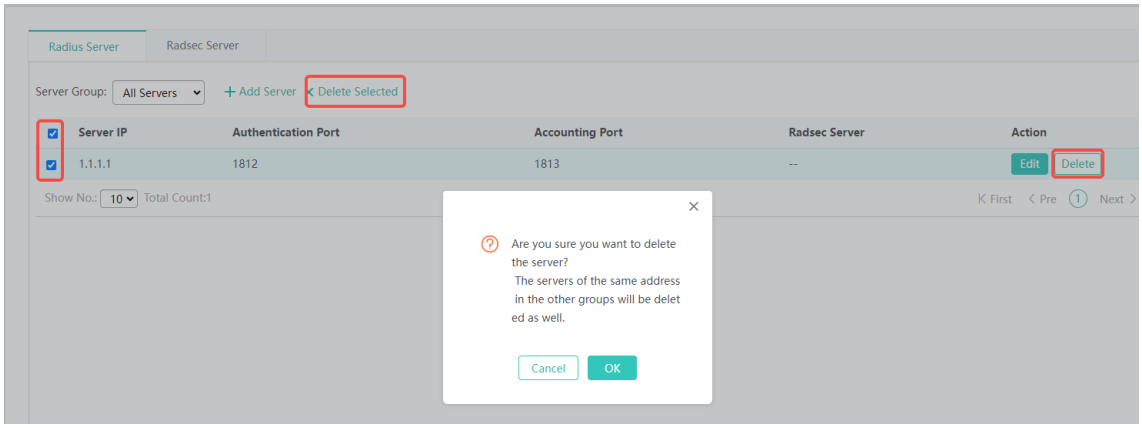
(3) Editing a Server

Click **Edit** in the **Action** column. Edit the parameters in the pop-up window. Click **Save**.



(4) Deleting a Server

Click **Delete** in the **Action** column and click **OK** in the pop-up window to delete a server. To delete multiple servers, select the target servers in the list. Click **Delete Selected**. Click **OK** in the pop-up window to batch the servers.

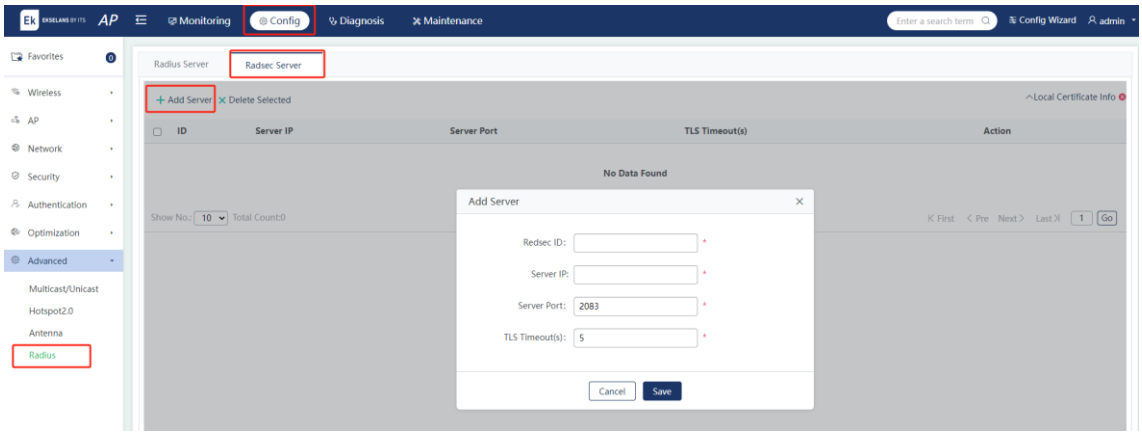


2. RadSec Server

RadSec provides secure communication for RADIUS requests by using the Transport Layer Security (TLS) protocol and allows RADIUS authentication, authorization, and accounting data to be securely transmitted over untrusted networks.

(1) Adding a Server

Click **Add Server**. Enter the fields in the pop-up window. Click **Save** and a message indicating operation success is displayed.

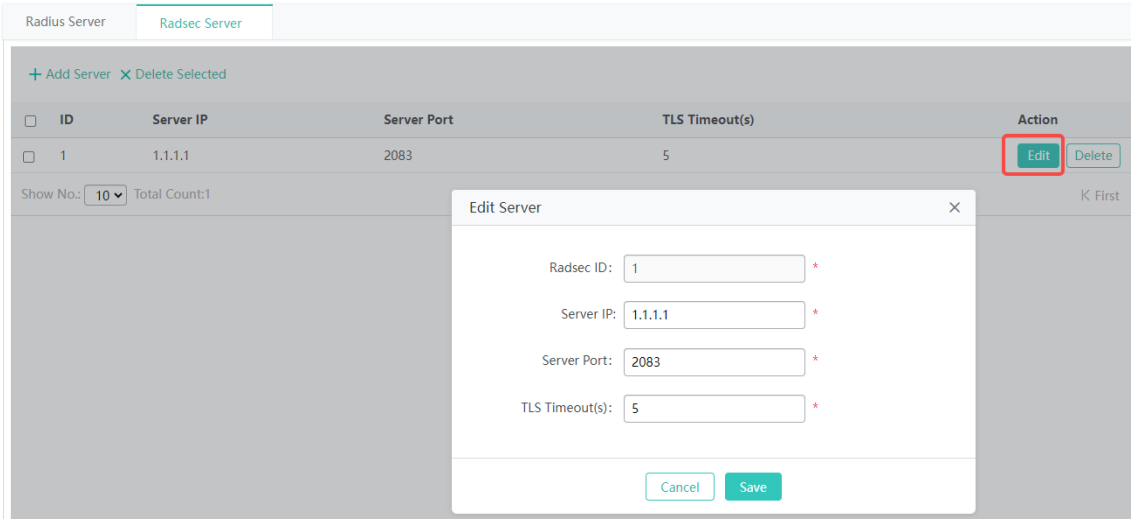


Parameter	Description
Radsec ID	Enter the unique ID of a RadSec server. The value is an integer in the range from 1 to 255.
Server IP	Enter the IP address of the RadSec server.
Server Port	Enter the port number of the RadSec server. The value range is from

	1 to 65535. The default value is 2083.
TLS Timeout(s)	Enter the TLS connection timeout. The value range is from 1 to 1000. The default value is 5.

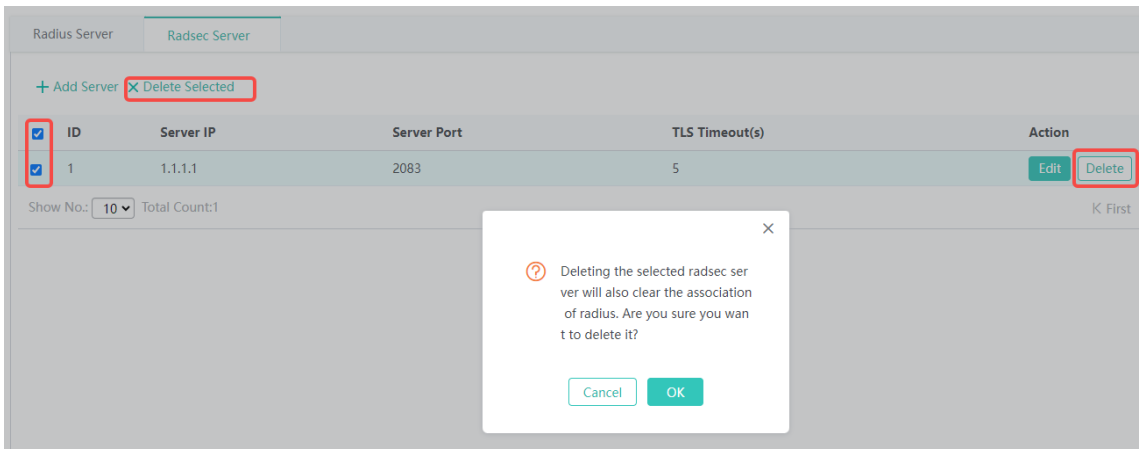
(2) Editing a Server

Click **Edit** in the **Action** column. Edit the parameters in the pop-up window. Click **Save**.



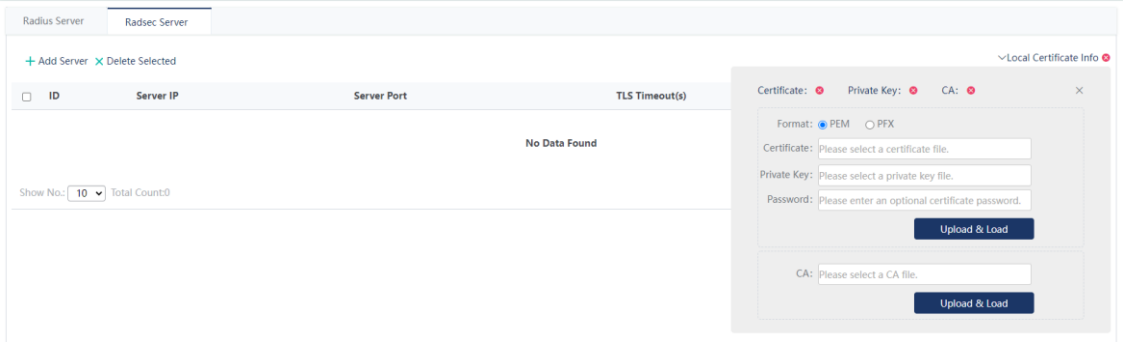
(3) Deleting a Server

Click **Delete** in the **Action** column and click **OK** in the pop-up window to delete a server. To delete multiple servers, select the target servers in the list. Click **Delete Selected**. Click **OK** in the pop-up window to batch the servers.



(4) Local Certificate Management

Click **Local Certificate Info**. The local certificate management window pops up. The icon on the right of **Local Certificate Info** shows the certificate loading status. Select a certificate file and private key file. Enter the certificate password (if any). Click **Upload & Load**. A message indicating operation success is displayed. The PEM and PFX formats are supported. If the certificate file does not contain CA information, select a CA file and click **Upload & Load**.



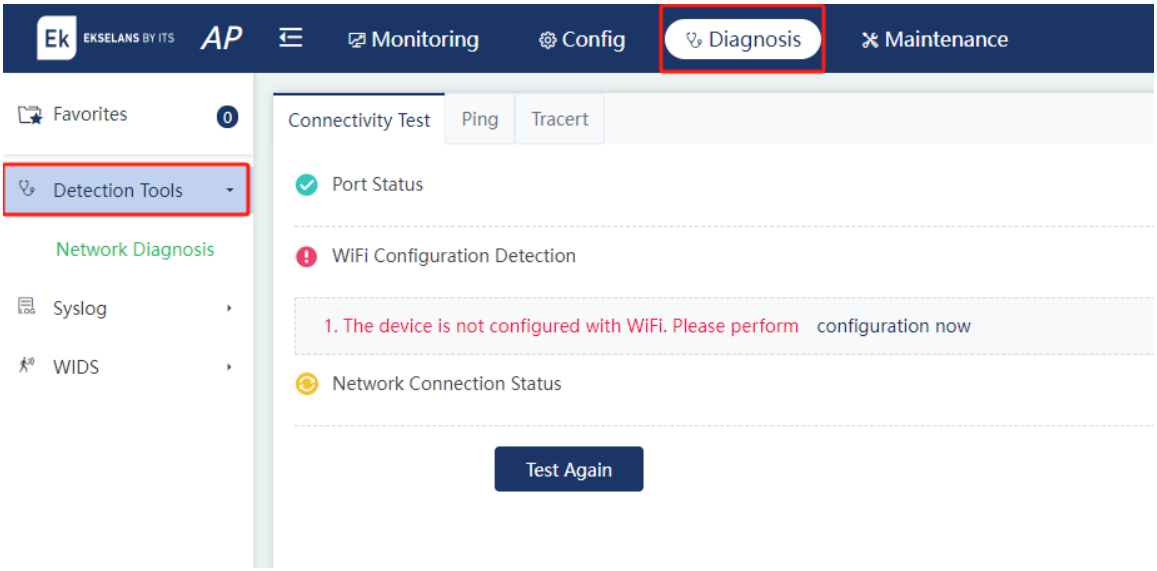
6 Diagnosis

6.1 Detection Tools

6.1.1 Network Diagnosis

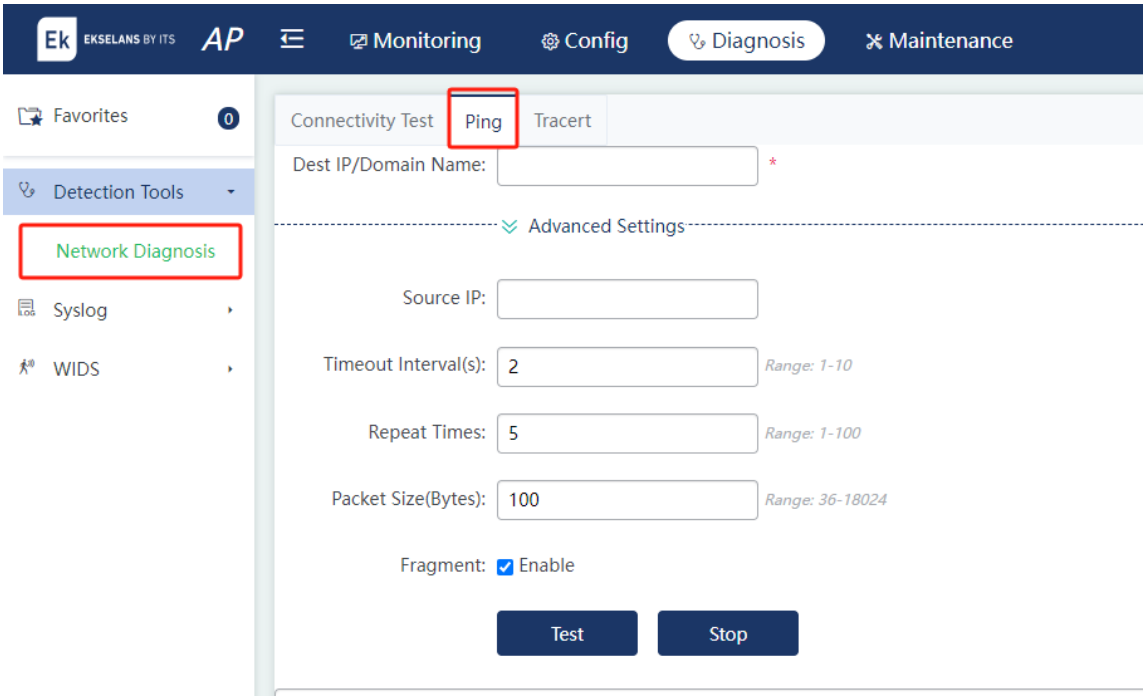
Choose **Diagnosis** > **Detection Tools** > **Network Diagnosis**.

1. Connectivity Test



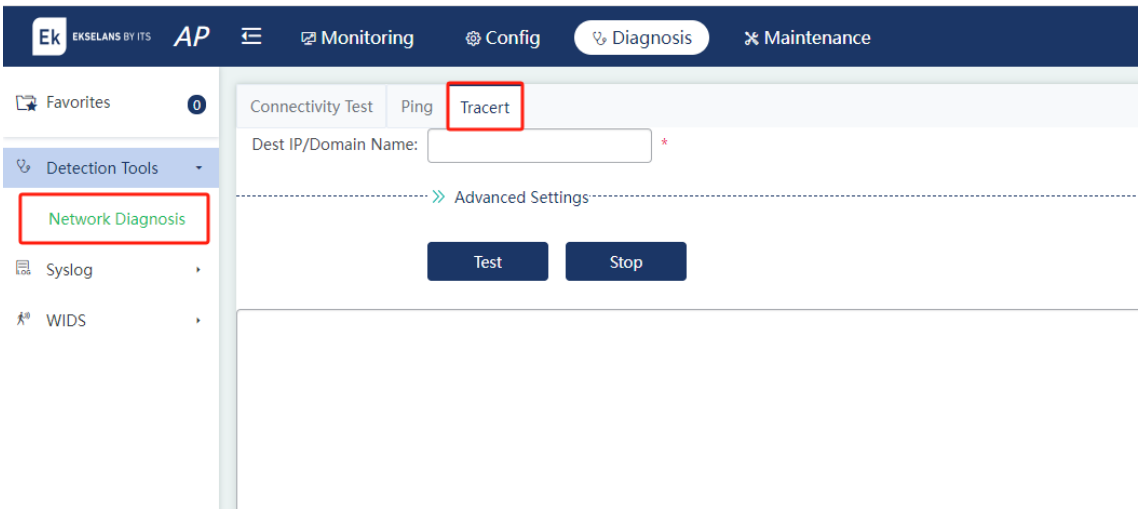
Detection Item	Description
Port Status	Check whether a port on the AP is Up.
WiFi Configuration Detection	Check whether a Wi-Fi network is configured on the AP.
Network Connection Status	Check whether the AP can communicate with an external network.

2. Ping



Parameter	Description
Dest IP/Domain Name	Enter the destination IP address or domain name to be pinged.
Source IP	Enter the source IP address of ping packets, that is, the local interface address of the device.
Timeout Interval(s)	Enter the timeout interval.
Repeat Times	Enter the number of data packets to be transmitted.
Packet Size(Bytes)	Enter the length of the data padding section in a data packet to be transmitted.
Fragment	Enter the DF flag bit of an IP address. When the DF flag bit is set to 1, data packets are not fragmented. The default DF flag bit is 0.

3. Tracert



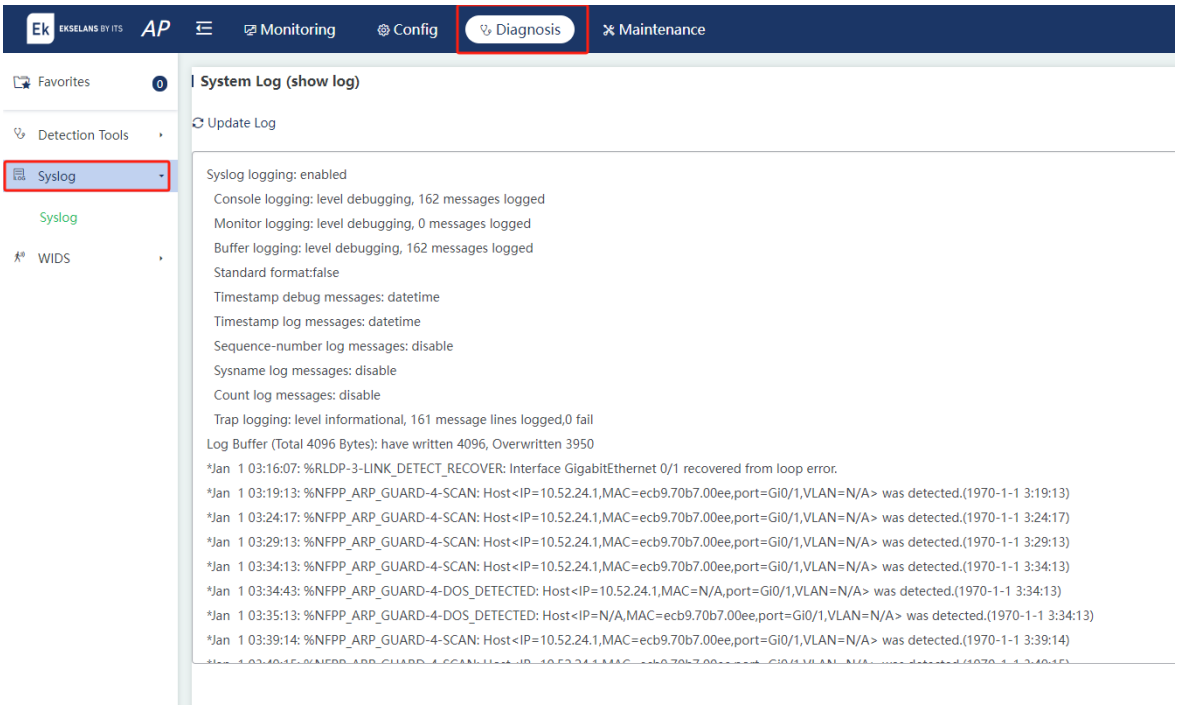
Parameter	Description
Dest IP/Domain name	Enter the Tracert destination address or domain name.
Source IP	Enter the Tracert source address, that is, the local interface address of the device.
Timeout Interval(s)	Enter the timeout interval.

6.2 Log

6.2.1 Syslog

Choose **Diagnosis** > **Syslog** > **Syslog**.

System logs can be used to help after-sales and R&D personnel locate problems. Click **Export Syslog** to download the syslog to the computer.



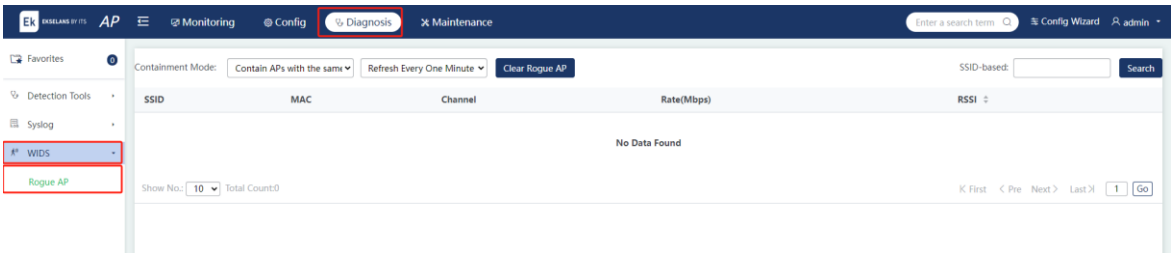
6.3 Wireless Intrusion Detection System

6.3.1 Rogue AP

Choose **Diagnosis** > **WIDS** > **Rogue AP**.

Rogue APs may exist on a wireless network. They may have security vulnerabilities or be controlled by attackers, posing great threat to network security.

The following page displays potential rogue APs that are identified when rogue AP containment is enabled.



7 Maintenance

7.1 Settings

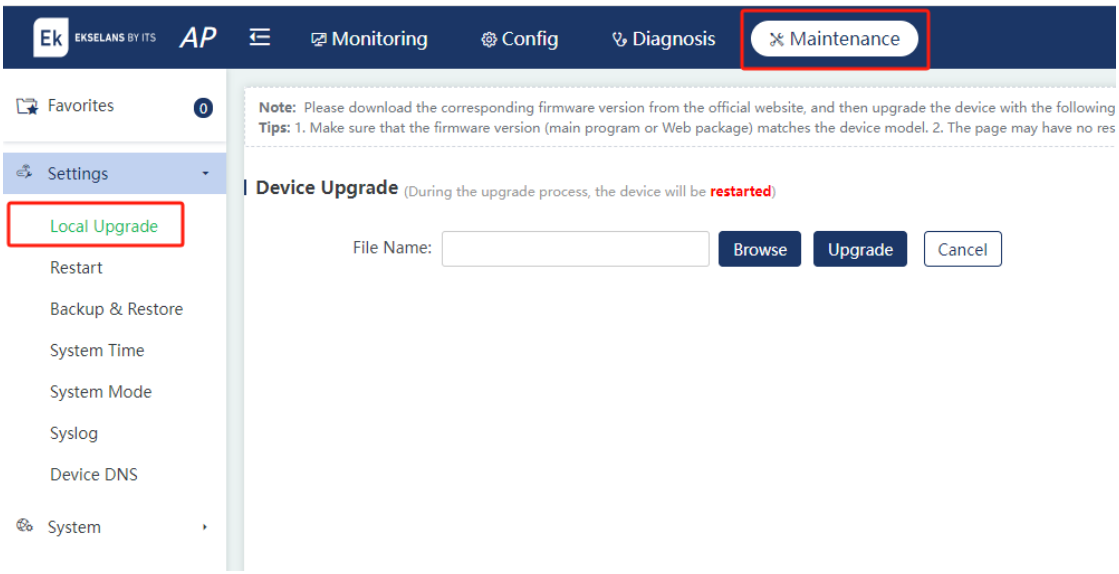
7.1.1 Local Update

Choose **Maintenance** > **Settings** > **Local Upgrade**.

Click **Browse** to select the downloaded .bin file. Click **Upgrade**.

Caution

- During the upgrade, the device will be restarted, causing network disconnection and service disruption. Therefore, upgrade the device when services are not affected or during off-peak hours.
- The upgrade process takes some time. During the upgrade, avoid performing any operation on the web page. Otherwise, the upgrade process will be interrupted.
- During the upgrade, the web page may not respond temporarily. In this case, do not power off or restart the device until the upgrade is successful.



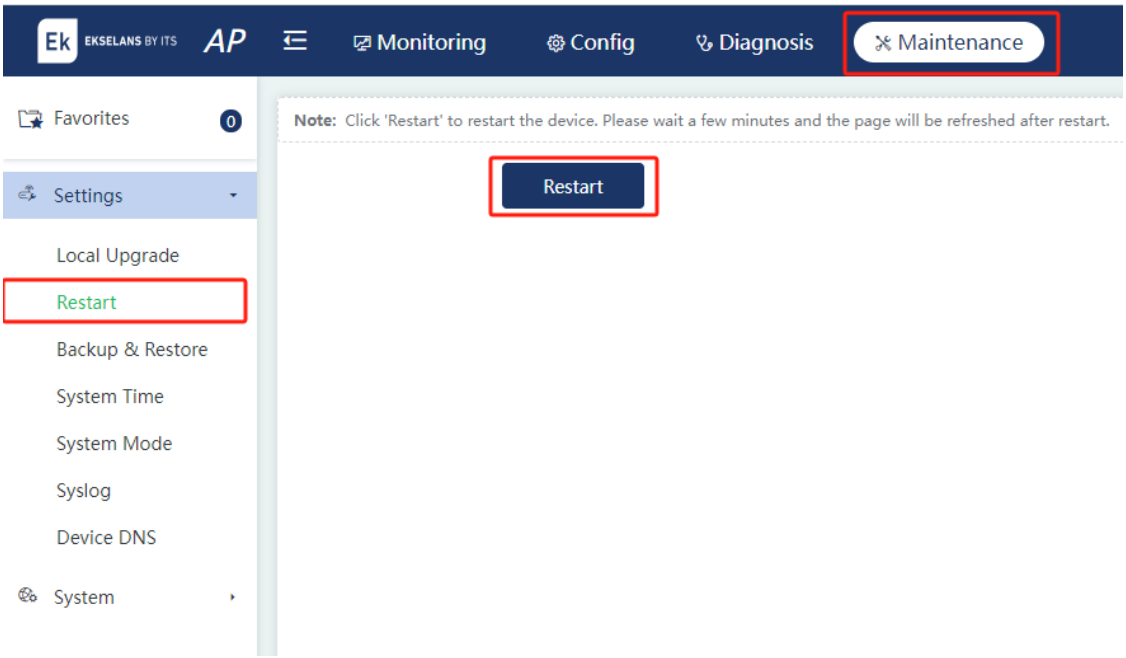
7.1.2 Restart

Choose **Maintenance** > **Settings** > **Restart**.

Click **Restart** to restart the AP.

Caution

Restarting the device will cause network disconnection and service disruption. Therefore, upgrade the device when services are not affected or during off-peak hours.

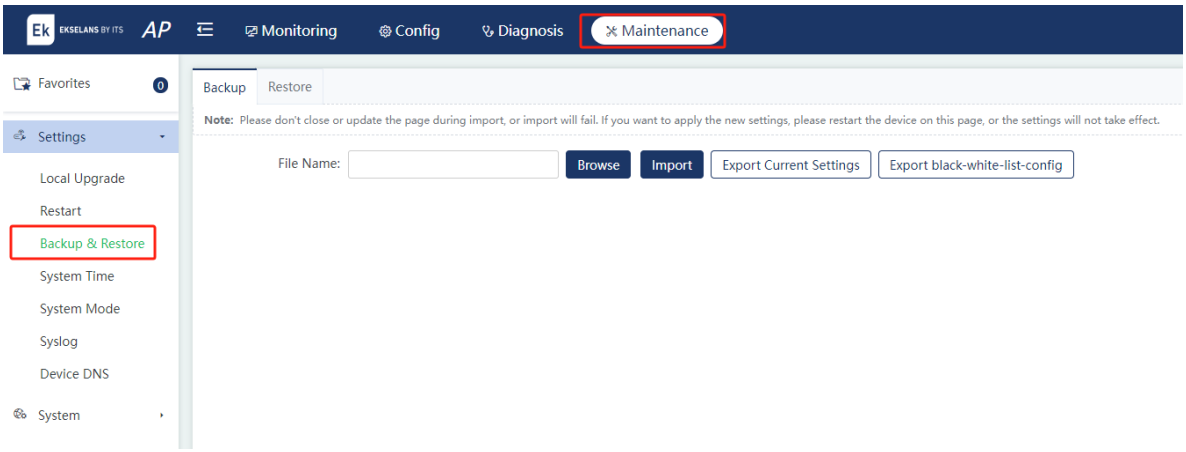


7.1.3 Configuration Management

Choose **Maintenance** > **Settings** > **Backup & Restore**.

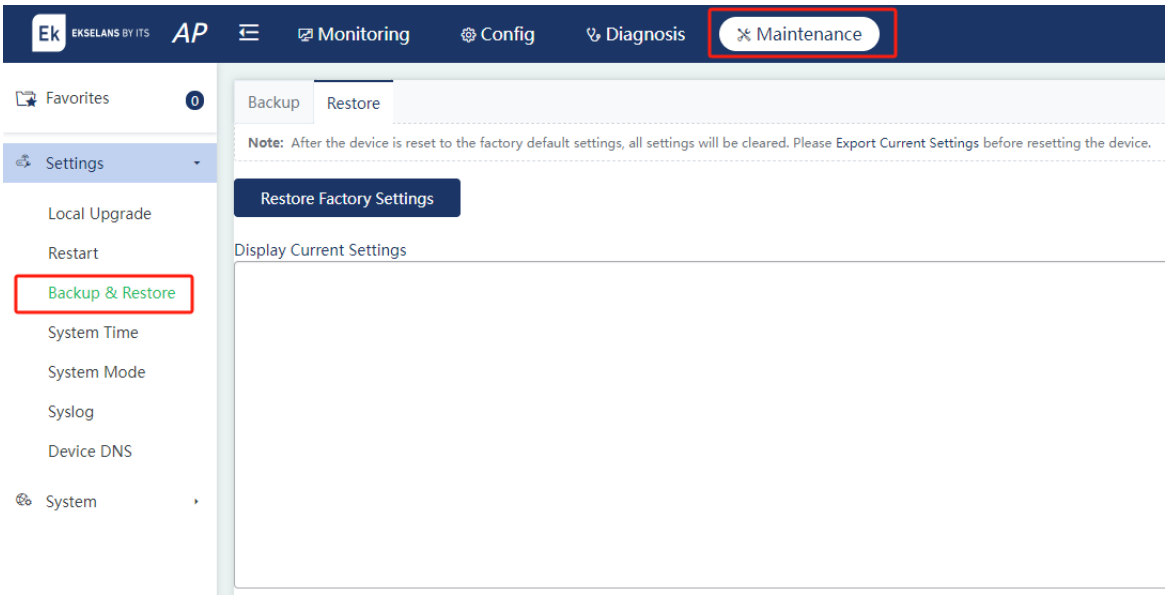
1. Backup

Back up the configuration file on the device. You can import or export configurations to perform batch operations, facilitating configuration management.



2. Restore

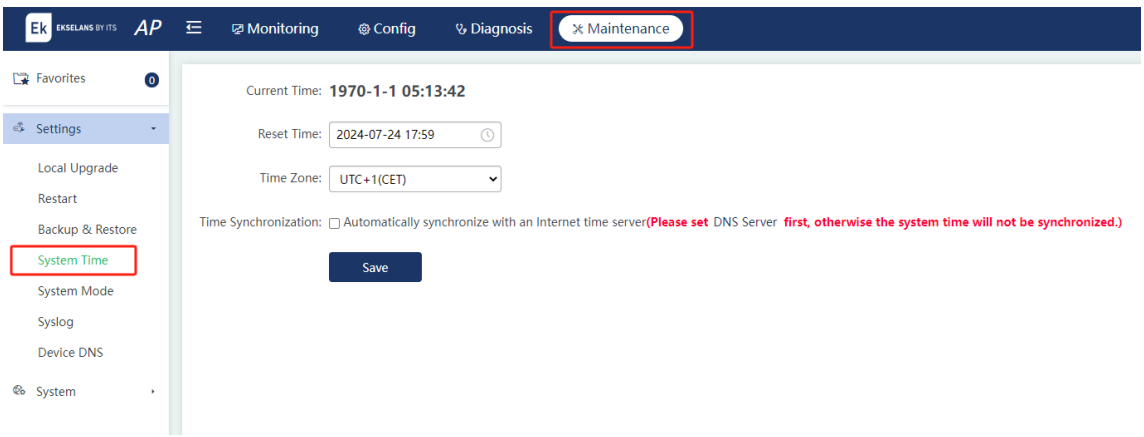
After restoring the device to factory settings, use the default IP address to access web. Restoring the device to factory settings will clear all configurations. Therefore, exercise with caution.



7.1.4 System Time

Choose **Maintenance** > **Settings** > **System Time**.

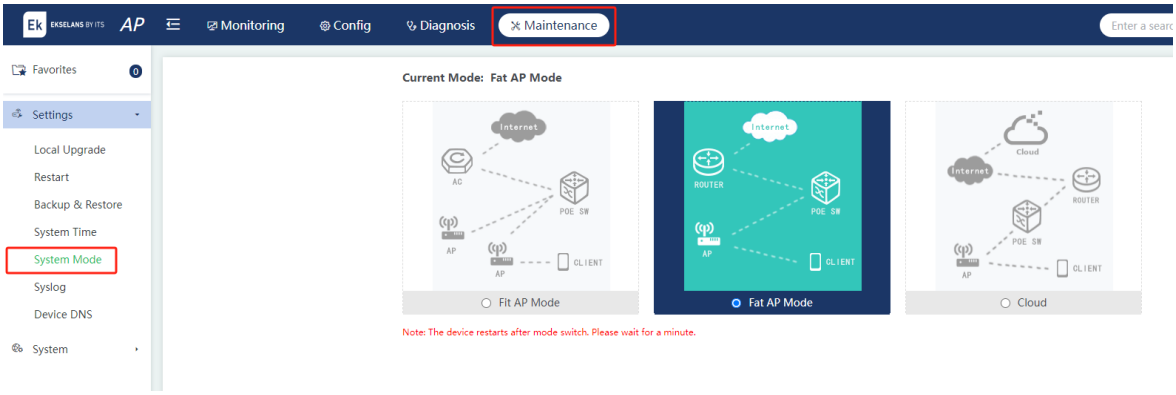
Set the system time based on the time zone where the device is located to ensure accurate device information.



7.1.5 System Mode

Choose **Maintenance** > **Settings** > **System Mode**.

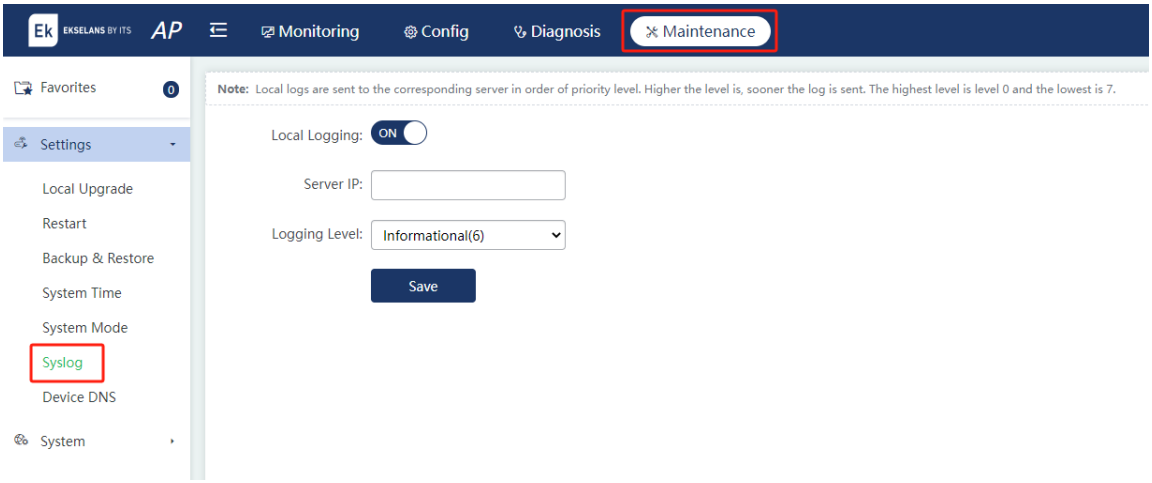
Select the system mode of the AP. **Fit AP Mode**, **Fat AP Mode**, and **Cloud Mode** are supported.



7.1.6 Log Server

Choose **Maintenance** > **Settings** > **Syslog**.

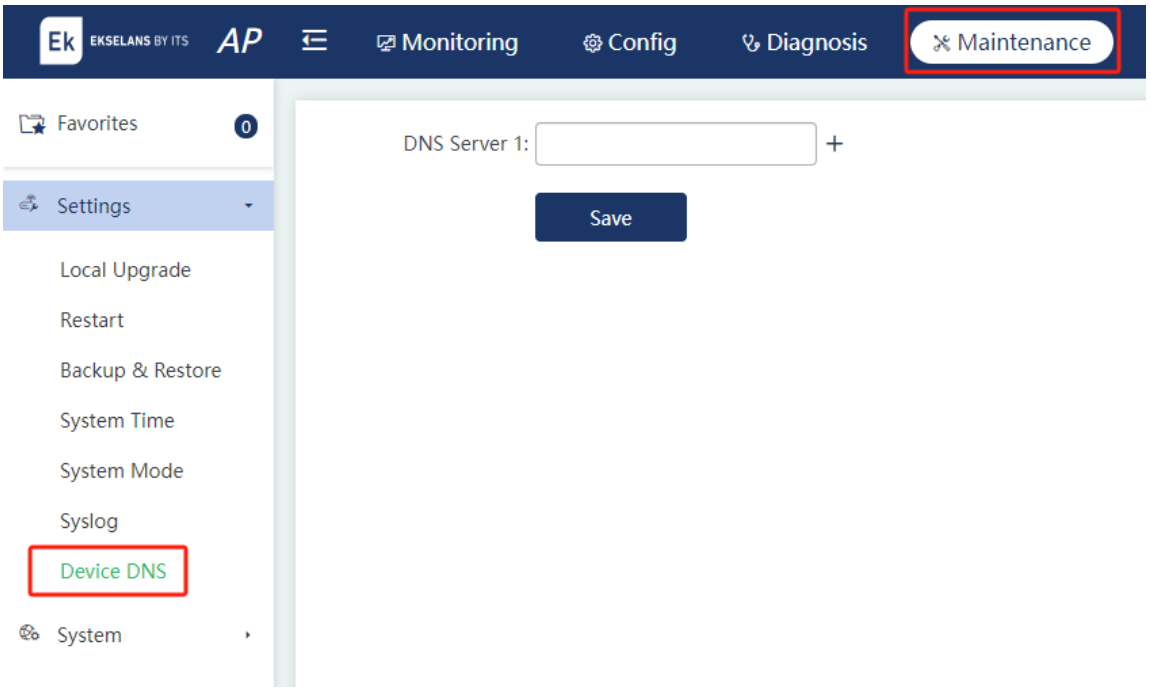
The device sends local logs to the server for storage. Historical logs are stored for ease of query.



7.1.7 DNS

Choose **Maintenance** > **Settings** > **Device DNS**.

To implement dynamic domain name resolution, a DNS server must be configured.



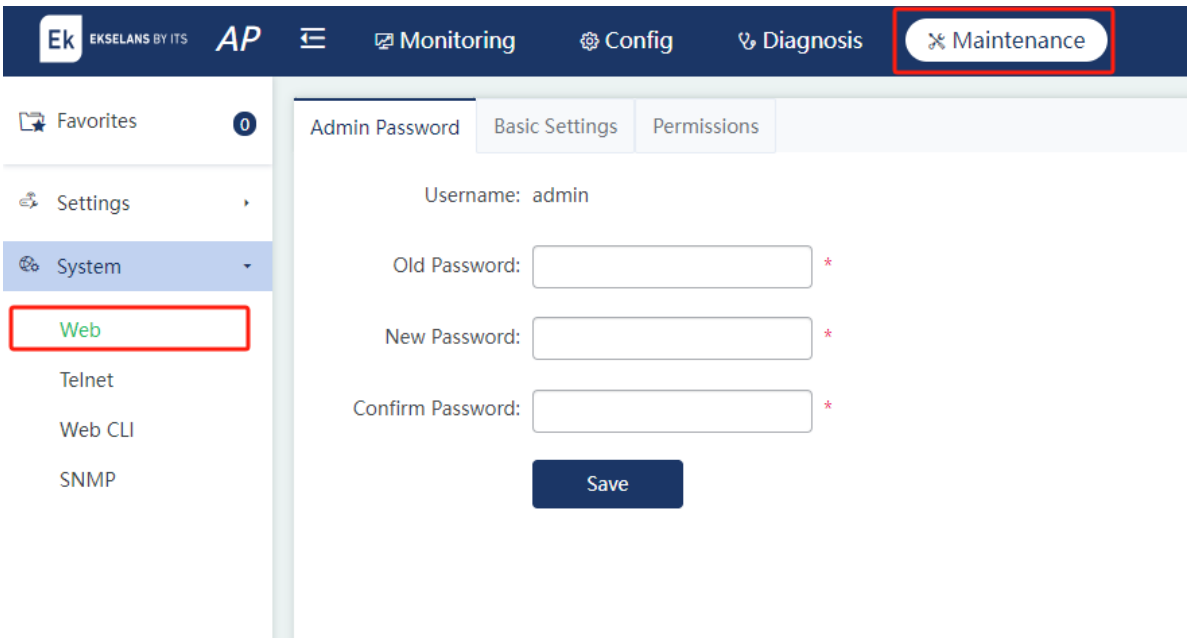
7.2 System

7.2.1 Web Management

Choose **Maintenance** > **System** > **Web**.

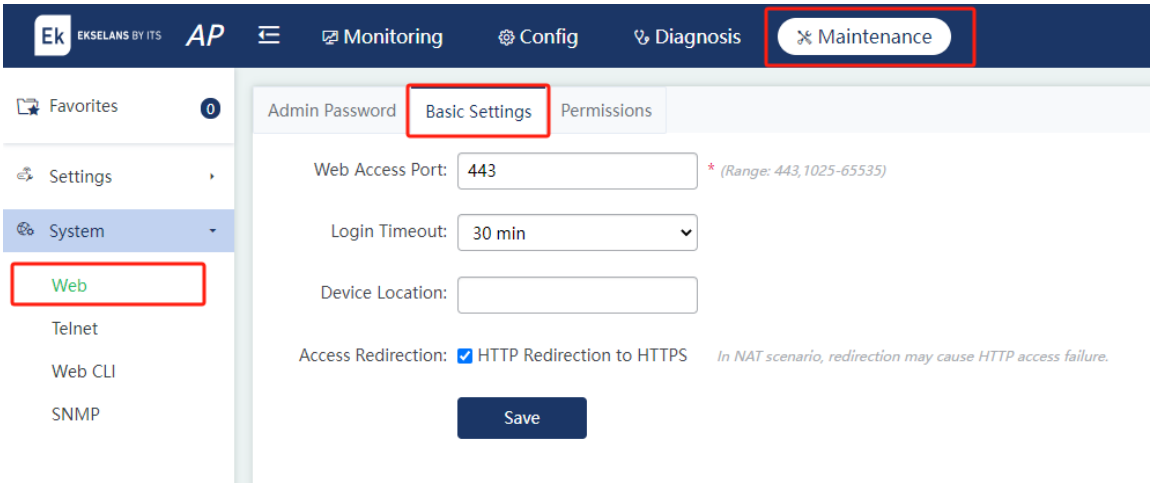
1. Admin Password

To enhance the system security and ensure secure information exchange, you are advised to change the default password of the system.



2. Basic Settings

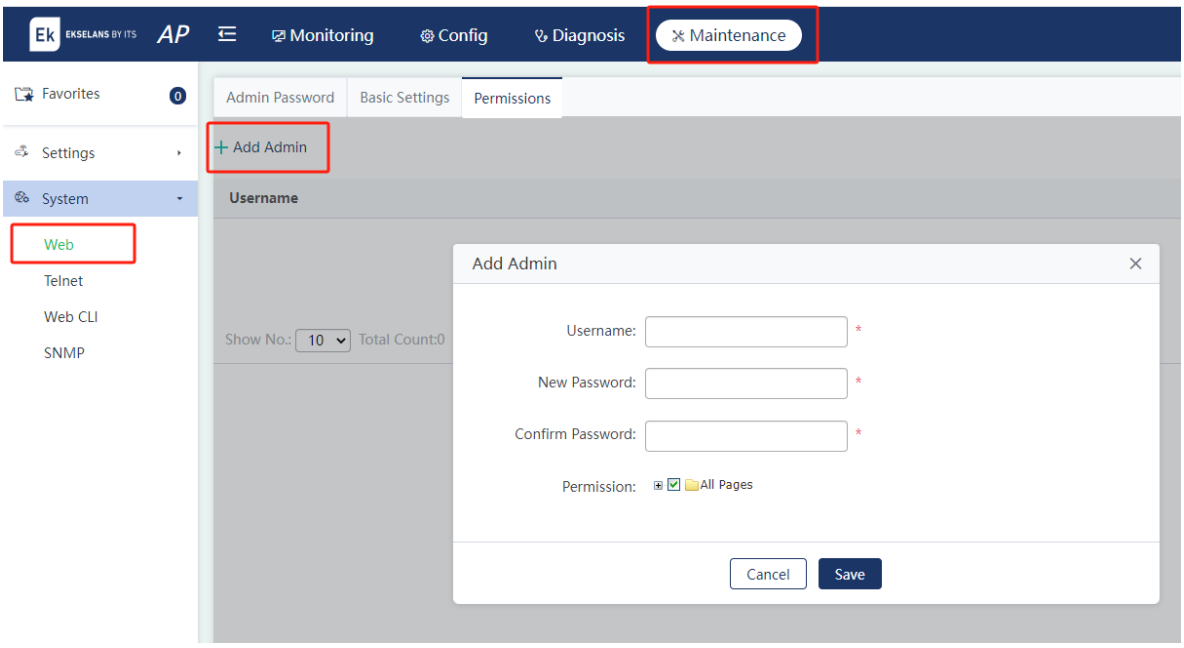
To facilitate device management, configure the device location on the **Basic Settings** page. Set the web access port and login timeout. When the login timeout expires, the web system automatically exits to ensure system security. If the device supports the configuration of **Limit logins**, set the maximum number of users who can log in to the device simultaneously using the same account (the default value is 10).



3. Permissions

There can be multiple administrators on the web management system. Administrators at different levels have different management permissions. You can assign the management permission of a specified page to a specified administrator. The default user of the system is admin.

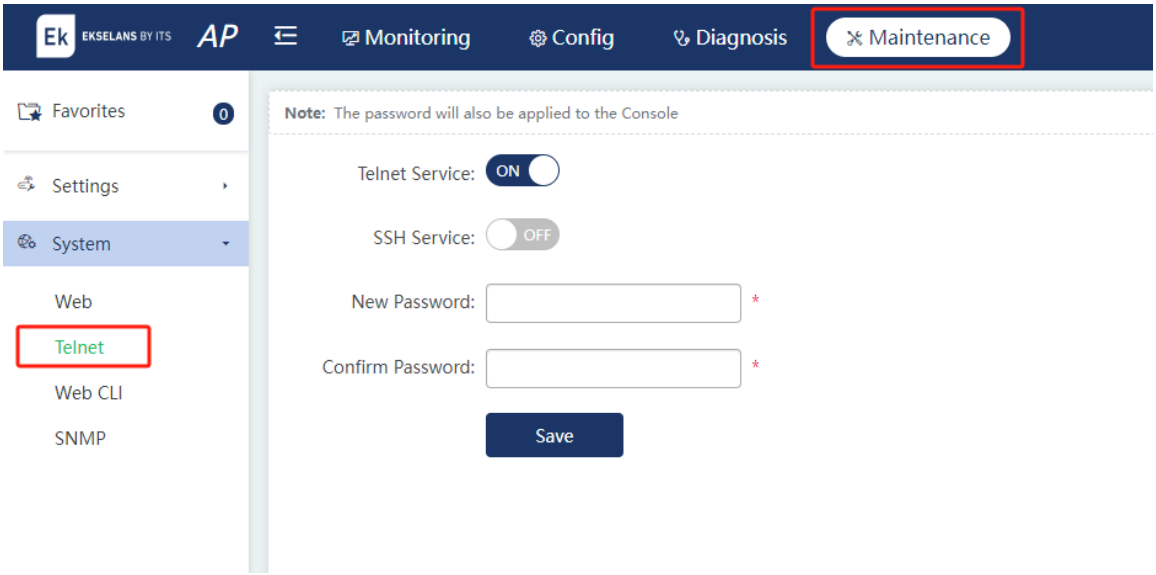
Click **Add Admin**. Set the fields for an administrator in the pop-up window, including the username, password, and permissions. Click **Save**.



7.2.2 Telnet

Choose **Maintenance** > **System** > **Telnet**.

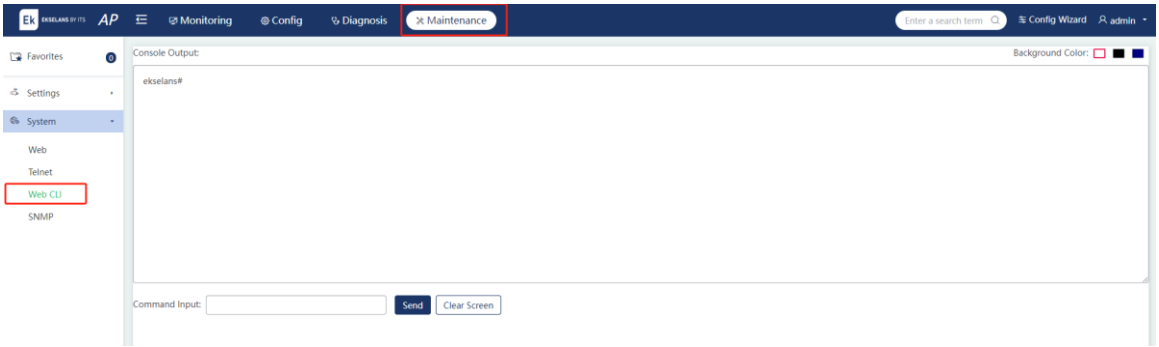
The Telnet feature enhances the system security and ensures secure information exchange. On the **Telnet** page, **Telnet Service** and **SSH Service** can be enabled or disabled, and the password can be configured.



7.2.3 Web CLI

Choose **Maintenance** > **System** > **Web CLI**.

CLI commands can be delivered through the web CLI.



7.2.4 SNMP

Choose **Maintenance** > **System** > **SNMP**.

Simple Network Management Protocol (SNMP) provides a method for collecting network management information from devices on the network. SNMP can be used to manage numerous network devices.