PLANET
Networking & Communication

User's Manual

5GHz 802.11ac 900Mbps TDMA

Outdoor Long Range Wireless CPE

WBS-900AC

www.PLANET.com.tw

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Federal Communication Commission Interference Statement

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

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

FCC Caution

To assure continued compliance, use only shielded interface cables when connecting to computer or peripheral devices. Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference

(2) This device must accept any interference received, including interference that may cause undesired operation.

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 26cm between the radiator & your body.

CE Compliance Statement

This device meets the RED 2014/53/EU requirements on the limitation of exposure of the general public to electromagnetic fields by way of health protection. The device complies with RF specifications when it is used at a safe distance of 20 cm from your body.

Safety

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

National Restrictions

This device is intended for home and office use in all EU countries (and other countries following the EU directive 1999/5/EC) without any limitation except for the countries mentioned below:

Country	Restriction	Reasons/remarks
Bulgaria	None	General authorization required for outdoor use and public service
France	Outdoor use; limited to 10 mW e.i.r.p. within the band 2454-2483.5 MHz	Military Radiolocation use. Refarming of the 2.4 GHz band has been ongoing in recent years to allow current relaxed regulation. Full implementation planned 2012
Italy	None	If used outside of own premises, general authorization is required
Luxembourg	None	General authorization required for network and service supply(not for spectrum)
Norway	Implemented	This subsection does not apply for the geographical area within a radius of 20 km from the centre of Ny-Ålesund
Russian Federation	None	Only for indoor applications

Note: Please don't use the product outdoors in France.

WEEE regulation

To avoid the potential effects on the environment and human health as a result of the presence of hazardous substances in electrical and electronic equipment, end users of electrical and electronic equipment should understand the meaning of the crossed-out wheeled bin symbol. Do not dispose of WEEE as unsorted municipal waste and have to collect such WEEE separately.

Revision

User Manual of 5GHz 802.11ac 900Mbps TDMA Outdoor Long Range Wireless CPE

Model: WBS-900AC

Rev: 2.0 (May, 2024)

Part No. EM- WBS-900AC_v2.0

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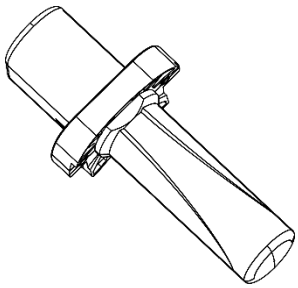
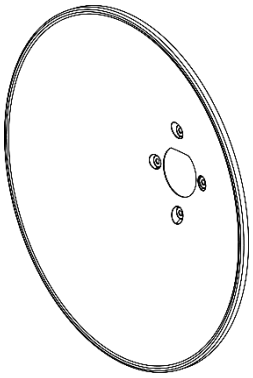
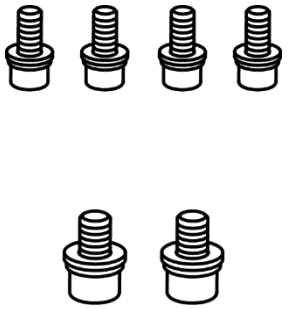
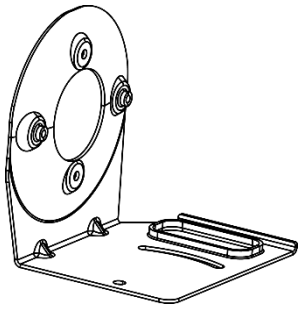
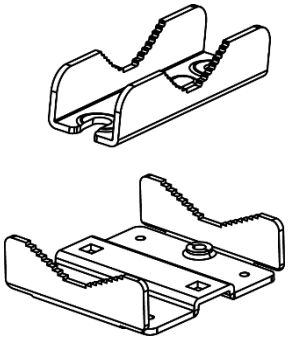
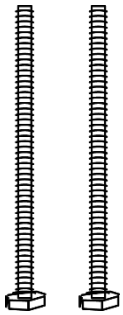
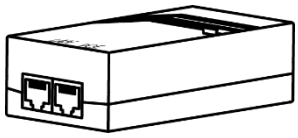
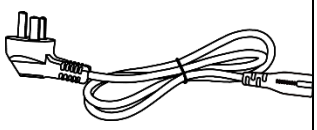
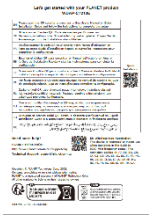
FIGURE

Chapter 1. Product Introduction

1.1 Package Contents

Thank you for choosing PLANET WBS-900AC. Please verify the contents inside the package box.

① WBS-900AC x1	② Parabolic Reflector x 1	③ Screw x 6
		
④ L Clip x 1	⑤ Clip x 2	⑥ Hex Nut x 2
		
⑦ Nut x 2	⑧ PoE Power Adapter x 1	⑨ Power Cable x 1
		
⑩ QR Code Sheet		
		

Note

If there is any item missing or damaged, please contact the seller immediately.

1.2 Product Description

Stable and Reliable Long-range Outdoor Wireless Solution with Superior Performance

PLANET's newly-revised WBS-900AC 5GHz 802.11ac 900Mbps TDMA Outdoor Long-range Wireless CPE offers a long-range and excellent throughput better than those of traditional wireless devices. One of its standout features is its seamless design, making installation easy. With the standard IEEE 802.3at Power over Ethernet (PoE), the WBS-900AC CPE can be easily installed in areas where power outlets are not available, further enhancing its versatility and ease of deployment. Its PoE capability is designed for both end-span and mid-span configurations, providing flexibility in deployment options.

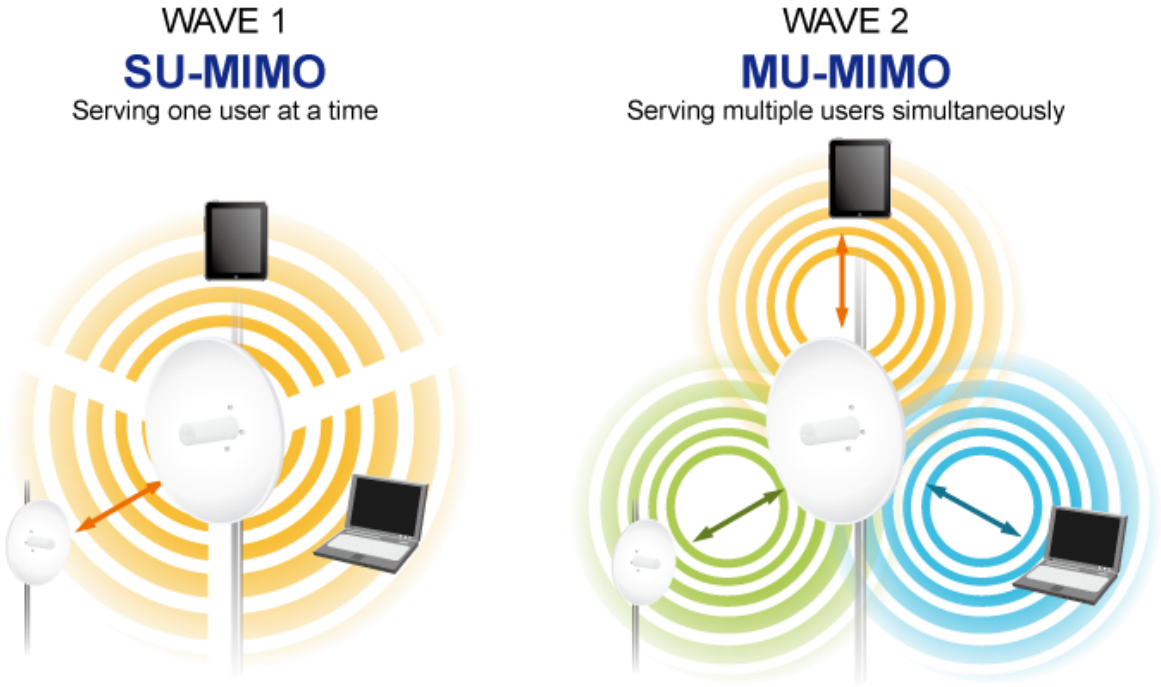
Whether connecting directly to an end-span PoE switch or through a mid-span PoE injector, the WBS-900AC CPE ensures seamless integration into the existing network infrastructure. The WBS-900AC excels in providing wireless long-distance city-to-city connectivity for all applications. Leveraging TDMA (Time division multiple access) and ATPC (Automatic Transmit Power Control) technologies, it allows multiple users to share the same frequency band without interference, thanks to its intelligent scheduling that assigns different time slots for transmission. This ensures efficient spectrum utilization and reliable performance even in congested environments. Moreover, the WBS-900AC boasts an IP65-rated outdoor enclosure, making it resilient against rigorous weather conditions. Its rugged construction enables it to withstand harsh outdoor environments, ensuring uninterrupted operation in any situation. Overall, the WBS-900AC combines seamless integration, long-range connectivity, and robust weather resistance, making it an ideal choice for various outdoor wireless applications

Benefits of TDMA and ATPC

TDMA is a channel access method for shared-medium networks. It allows several users to share the same frequency channel by dividing the signal into different time slots. The users transmit in rapid succession, one after the other, each using its own time slot. This allows multiple stations to share the same transmission medium while using only a part of its channel capacity. With the TDMA technology, the WBS-900AC reduces interference between users by allowing them to transmit at different times. It provides a better quality data transmission compared to other techniques because it reduces interference and allows for more efficient use of the available frequency spectrum. The ATPC, providing automatic wireless signal adjustment in accordance with the environment, reduces mutual interference between the CPEs, and improves the stability of data transmission.

Benefits of MU-MIMO under 802.11ac Wave 2

With the MU-MIMO Wave 2 technology, the WBS-900AC, installed in public areas such as hotspots, airports and conferences, reduces the frustration that Wi-Fi users often experience in downloading web pages, e-mail file attachments and media contents. For cellular operators, the WBS-900AC provides a better Wi-Fi user experience, reducing the likelihood of users turning off Wi-Fi and putting more load on the cellular network. For enterprises, this technology also can solve Wi-Fi congestion issues in open work spaces and conference rooms.



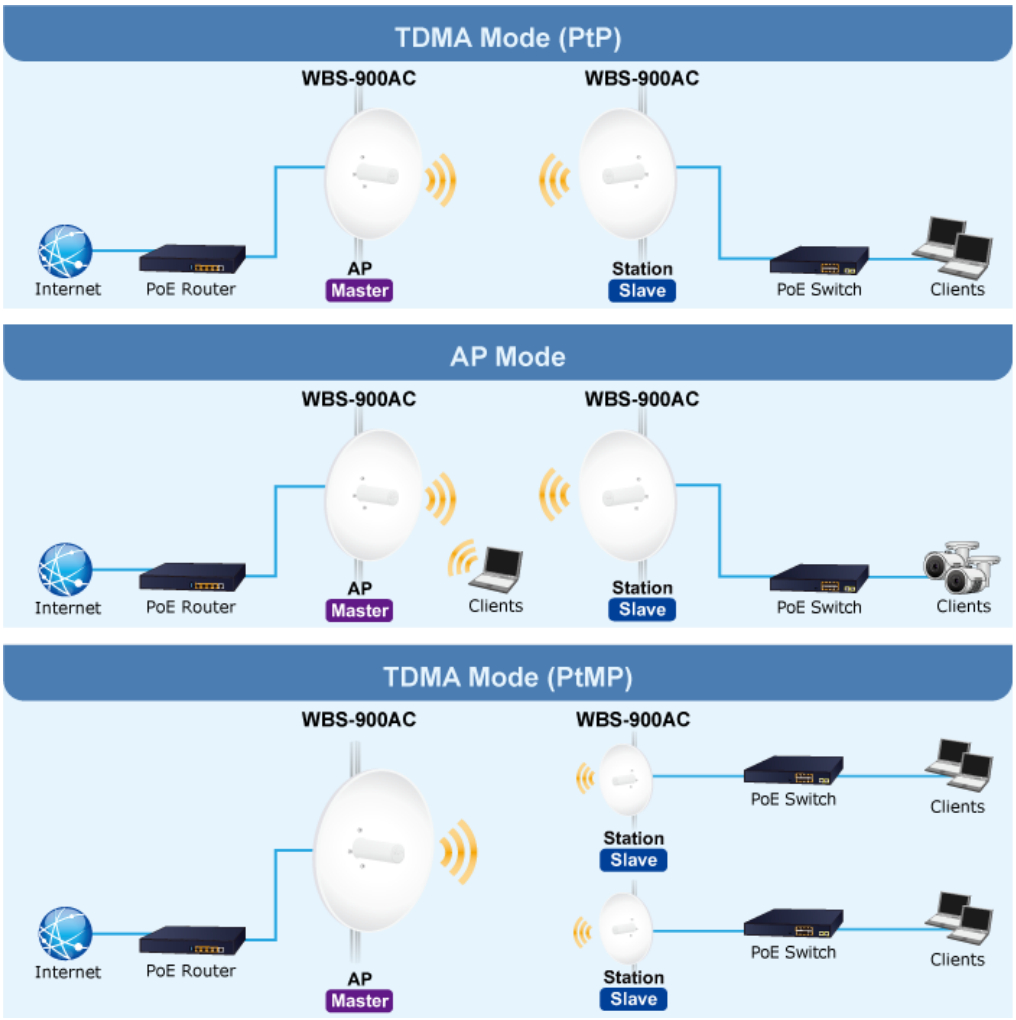
Flexible, Durable and Reliable Outdoor Characteristics

To reach maximum reliability in the harsh environment, the **WBS-900AC** not only comes with **IP65-rated casing**, but also adopts the Qualcomm Chipset Solution, capable of withstanding wide temperature ranging from **-40 to 70** degrees C. Designed with the **IEEE 802.3at PoE+** (**P**ower **o**ver **E**thernet) power scheme, the **WBS-900AC** can be easily installed in the areas where power outlets are not available. Furthermore, it is also suitable to be integrated with PLANET Renewable Powered PoE System to offer farther wireless service in remote areas.

Environmental Adaptations in Outdoor Area

Designed for Various Requirements

The WBS-900AC is specially designed for long-distance outdoor wireless solutions that are capable of establishing stable bridge connection with 25dBi high gain dish antenna. To provide long range and maximum performance., the WBS-900AC can implement 3 operation modes and is easy to use where a multitude of applications in communities, warehouses, campuses, harbors, etc. can be made.



1.3 Product Features

- **Industrial Compliant Wireless LAN and LAN**
  - Compliant with time-division multiple access (TDMA) wireless technology
  - Compliant with the IEEE 802.11a/n/ac WAVE2 MU-MIMO wireless technology
  - 2T2R architecture with data rate of up to 900Mbps
  - Equipped with two 10/100/1000Mbps RJ45 ports with auto MDI/MDI-X supported

- **RF Interface Characteristics**
  - 25dBi dual-polarization antenna
  - High output power with multiply-adjustable transmit power control
  - Supports Automatic Transmit Power Control (ATPC)

- **Outdoor Environmental Characteristics**
  - IP65 rating; built-in TVS lightning protection
  - IEEE 802.3 at Power over Ethernet design
  - Operating temperature: -40~70 degrees C

- **Multiple Operation Modes and Wireless Features**
  - Multiple operation modes: AP (auto WDS), AP (TDMA), Station (WDS/TDMA) and Station (ARPNAT)
  - Supports ATPC function to reduce mutual interference between the CPEs
  - WMM (Wi-Fi multimedia) provides higher priority to multimedia transmitting over wireless
  - Coverage threshold to limit the weak signal of clients occupying session
  - Real-time Wi-Fi channel analysis chart and client limit control for better performance
  - Supports Terminal Fast Roaming with 802.11k, 802.11v, and 802.11r

- **Secure Network Connection**
  - Full encryption supported: WPA/WPA2, WPA-PSK/WPA2-PSK authentication
  - Supports 802.1Q tagged VLAN over WDS/TDMA
  - Supports MAC address filtering

1.4 Product Specifications

Product		**WBS-900AC** 5GHz 802.11ac 900Mbps TDMA Outdoor Long Range Wireless CPE
Hardware		
Standard Support		IEEE 802.11a/n/ac IEEE 802.11i IEEE 802.3 10BASE-T IEEE 802.3u 100BASE-TX IEEE 802.3x flow control IEEE 802.11k, 802.11v, and 802.11r
WBS-900AC	**Dimensions**	120 x 260 x 85 mm (W x D x H)
	Weight	333 g
Antenna	**Dimensions**	Φ466 × 260 mm
	Weight	1560 g
Power Requirements		Passive 48V DC inject (package included) or IEEE 802.3 at PoE+ or 12V DC IN
Power Consumption (max.)		< 15W per device
MTBF (hrs.)		50,000
Interface		2 x RP-SMA PoE: 1 x 10/100/1000BASE-TX, auto-MDI/MDIX, 802.3 at PoE In LAN: 1 x 10/100/1000BASE-TX, auto-MDI/MDIX
Button		Reset button
Data Rate		IEEE 802.11a: up to 54Mbps IEEE 802.11n (20MHz): up to 150Mbps IEEE 802.11n (40MHz): up to 300Mbps IEEE 802.11ac (80MHz): up to 867Mbps
Media Access Control		CSMA/CA
Modulation		802.11 a/n/ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Frequency Band		5150~5850MHz
Operating Channels		5GHz channel: 36, 40, 44, 48, 52, 56, 60, 64, 100, 104, 108, 112, 116, 120, 124, 128, 132, 136,140, 149, 153, 157, 161 * 5GHz channel list will vary in different countries according to their regulations.

Max. Transmit Power (dBm)	Up to 25 dBm (depending on country)		
Receiver Sensitivity (dBm)	**Network Mode**	**Data Rate**	**Receive Sensitivity (dBm)**
	802.11a	6M	-87
		54M	-69
	802.11n HT20	MCS0	-87
		MCS7	-68
	802.11n HT40	MCS0	-85
		MCS7	-65
	802.11ac	MCS0	-87
		MCS9	-64
Antenna	Dual polarization dish antenna		
	Gain	25 dBi	
	Frequency range	5180 -5850 MHz	
	Polarization	±45°	
	Cross-polarization	30 dBi	
	VSWR	< 1.8	
	Azimuth beam width (H pol)	6°	
	Azimuth beam width (V pol）	6°	
	Elevation beam width	6°	
Environment & Certification			
Operating Temperature	-40 ~ 70 degrees C		
Operating Humidity	5 ~ 95% (non-condensing)		
IP Level	IP65		
ESD Protection	± 6KV		
Surge Protection	± 4kV		
Regulatory	CE, RoHS		
Software			
LAN	Static IP/DHCP		
	Supports Secondary IP		
Wireless Modes	■ Access Point (auto WDS) ■ Access Point (TDMA3) ■ Station (WDS/TDMA3) ■ Station (ARPNAT)		
Channel Width	20MHz, 40MHz, 80MHz		

Encryption Type	WPA, WPA-PSK, WPA2, WPA2-PSK
Wireless Security	Enable/Disable SSID Broadcast
	Wireless Max. 32 MAC address filtering
	User Isolation
Max. SSIDs	1
Max. Wireless Clients	128 (depending on usage)
Wireless QoS	Supports Wi-Fi Multimedia (WMM), 4 queues prioritization on TDMA
Wireless Advanced	Auto Channel Selection
	Transmit Power: 3 - 30 dBm
	Client Limit Control, Coverage Threshold
	Wi-Fi channel analysis chart
	Fast Roaming (IEEE 802.11k, 802.11r, 802.11v)
Status Monitoring	Device status, wireless client List
	DHCP client table
	System Log supports remote syslog server
VLAN	IEEE 802.1Q VLAN (VID: 2~4094)
Management	Remote management through HTTPS
	Configuration backup and restoration
	Supports Bonjour (mDNS), CDP/LLDP, SSDP
	Supports GRE tunnel
	SNMP v1/v2c/v3 support

Chapter 2. Hardware Installation

2.1 Product Outlook

WBS-900AC

- **Dimensions**: Φ466 × 260 mm

Figure 2-1 WBS-900AC

WBS-900AC CPE

- **Dimensions**: 120 x 260 x 85mm

Front Side

Figure 2-2 WBS-900AC CPE

2.1.1 Port and Button

It provides a simple interface monitoring the CPE. Figure 2-5 shows the hardware-based interface of the WBS-900AC.

WBS-900AC CPE Hardware-based Interface:

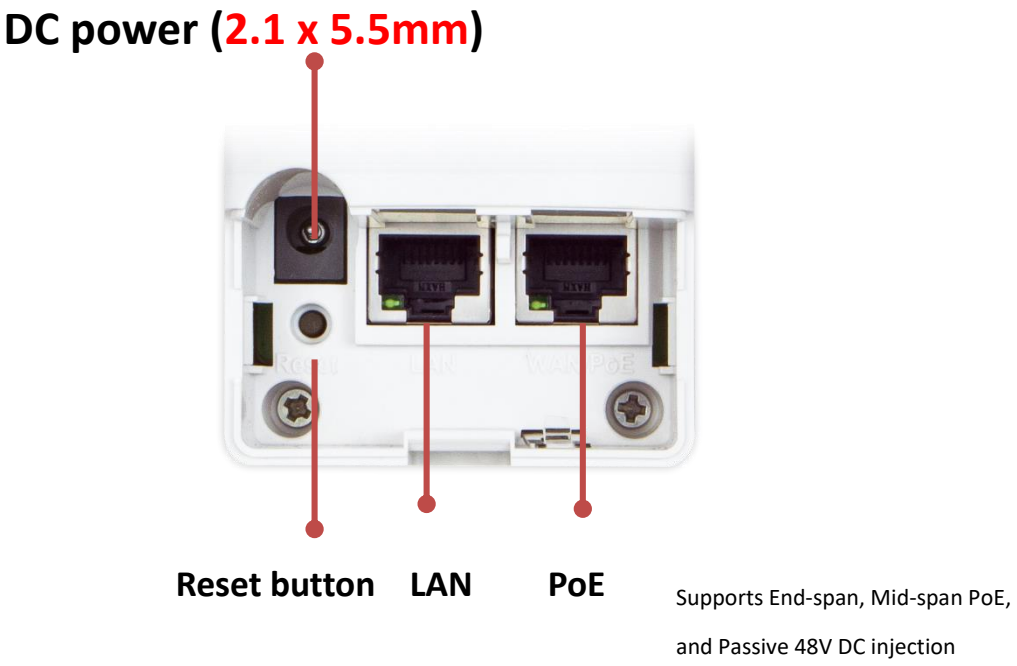


Figure 2-3 WBS-900AC CPE Interface

2.1.2 Hardware Description

Hardware Interface Definition

Object	Description
12V DC	12V DC port for the power adapter (DC-Jack 5.5 x 2.1 mm)
PoE LAN Port	10/100/1000Mbps RJ45 port, auto MDI/MDI-X with IEEE 802.3 at Power over Ethernet
LAN Port	10/100/1000Mbps RJ45 port, auto MDI/MDI-X
Reset Button	Press and hold the Reset button on the device for over 10 seconds to return to the factory default setting.

Chapter 3. Connecting to the CPE

3.1 System Requirements

- Broadband Internet Access Service (Cable/xDSL/Ethernet connection)
- IEEE 802.3at PoE switches (supply power to the WBS-900AC CPE)
- PCs with a working Ethernet adapter and an Ethernet cable with RJ45 connectors
- PCs running Windows 10/11, MAC OS 10 or later, Linux, UNIX or other platforms compatible with **TCP/IP** protocols

Note

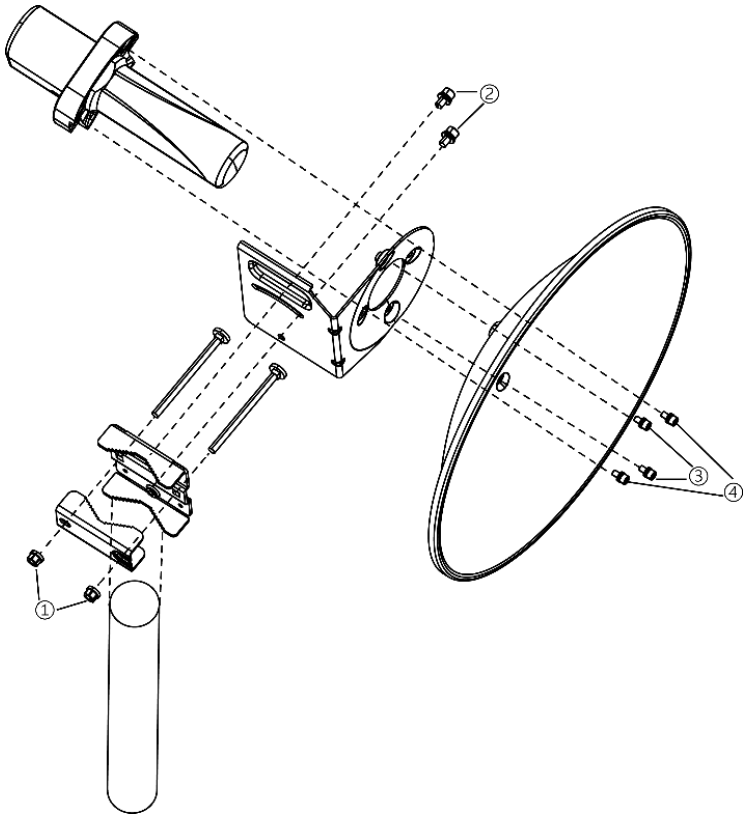
1. The CPE in the following instructions refers to PLANET WBS-900AC.
2. It is recommended to use Microsoft Edge, Firefox or Chrome to access the CPE.

3.2 Installing the WBS-900AC

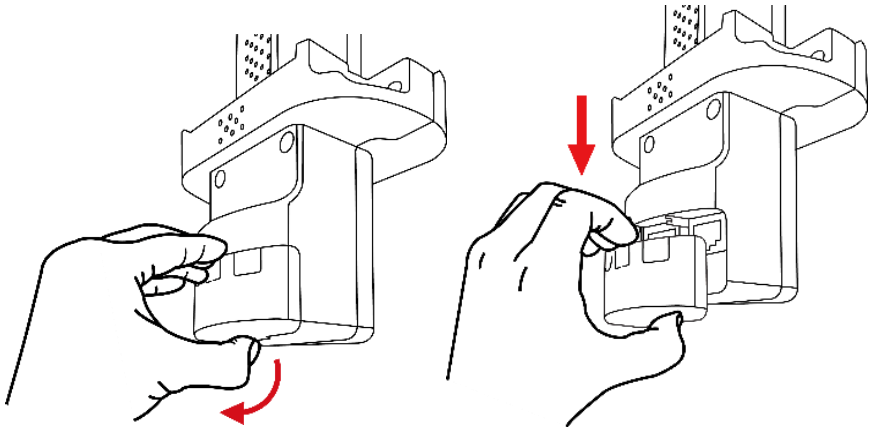
Before installing the CPE, make sure your PoE switch is connected to the Internet through the broadband service successfully at this moment. If there is any problem, please contact your local ISP.

Please install the AP according to the following steps. Don't forget to pull out the power plug and keep your hands dry for safety's sake.

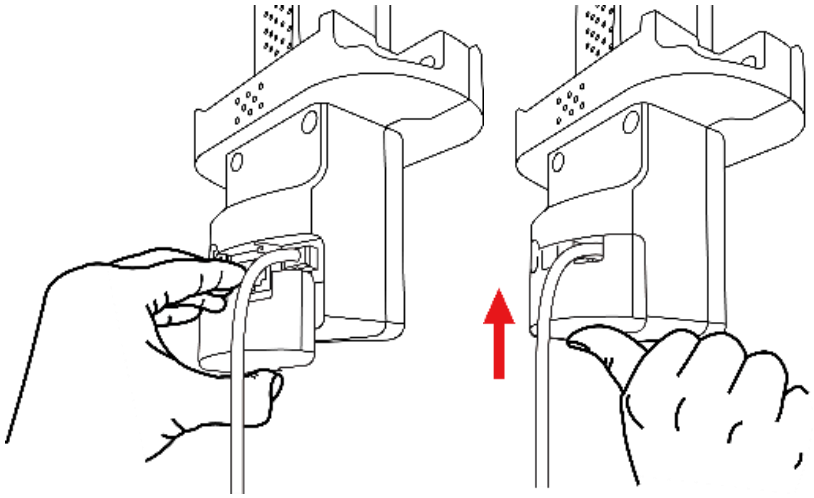
Step 1: Installing Antenna Set and AP Stand



Step 2: Push the latch on the bottom of the Outdoor Wireless CPE to remove the sliding cover.



Step 3: Plug the RJ45 Ethernet cable into the PoE Port of the Outdoor Wireless CPE. Then, slide back the cover to finish the installation.



Chapter 4. Quick Installation Guide

This chapter will show you how to configure the basic functions of your CPE within minutes.

A computer with wired Ethernet connection to the Wireless CPE is required for the first-time configuration.

4.1 Manual Network Setup -- TCP/IP Configuration

The default Master IP address of the WBS-900AC is **192.168.1.253**. And the default Subnet Mask is 255.255.255.0. These values can be changed as you want. In this guide, we use all the default values for description.

Connect the WBS-900AC with your PC by an Ethernet cable plugging in LAN port on one side and in LAN port of PC on the other side. Please power on the WBS-900AC by PoE switch through the PoE port.

In the following sections, we'll introduce how to install and configure the TCP/IP correctly in **Windows 10**. And the procedures in other operating systems are similar. First, make sure your Ethernet Adapter is working, and refer to the Ethernet adapter manual if needed.

4.1.1 Configuring the IP Address Manually

Summary:

- Set up the TCP/IP Protocol for your PC.
- Configure the network parameters. The IP address is 192.168.1.xxx (If the default IP address of the WBS-900AC is 192.168.1.253, and the DSL router is 192.168.1.254, the "xxx" can be configured to any number from 1 to 252.) and subnet mask is 255.255.255.0.

1 Select **Use the following IP address**, and then configure the IP address of the PC.

2 For example, as the default IP address of the WBS-900AC is 192.168.1.253 and the DSL router is 192.168.1.254, you may choose from 192.168.1.1 to 192.168.1.252.

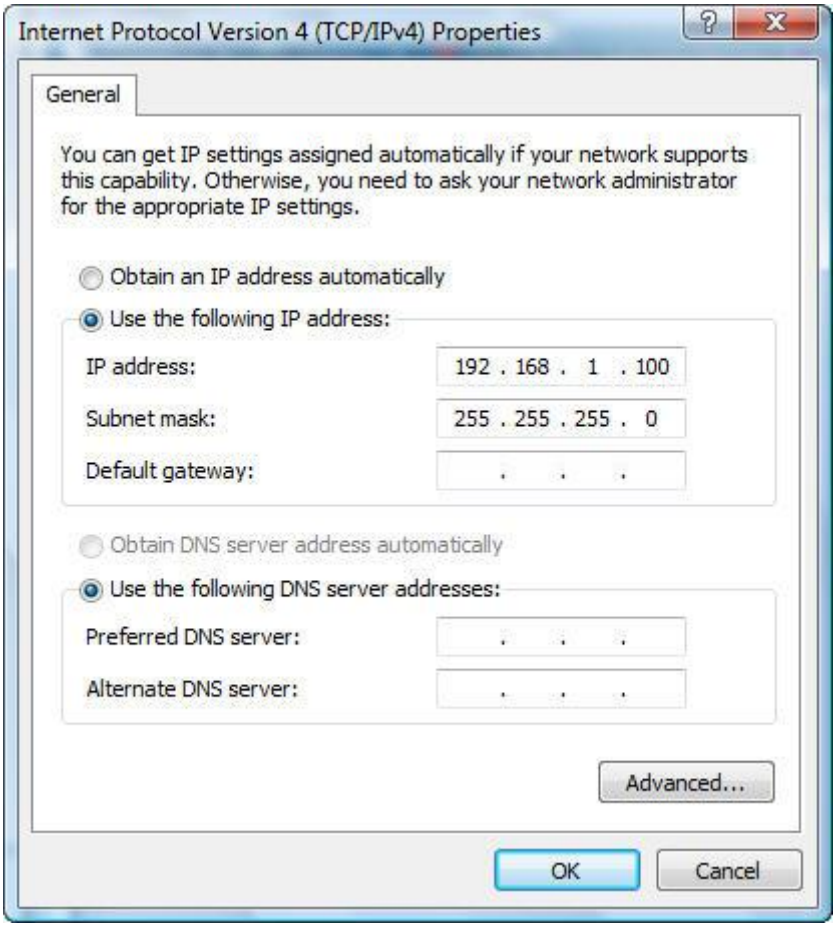


Figure 4-1 TCP/IP Setting

Now click **OK** to save your settings.

Now, you can run the ping command in the **command prompt** to verify the network connection between your PC and the AP. The following example is in **Windows 10** OS. Please follow the steps below:

1. Click on **Start > Run**.
2. Type "**cmd**" in the Search box.

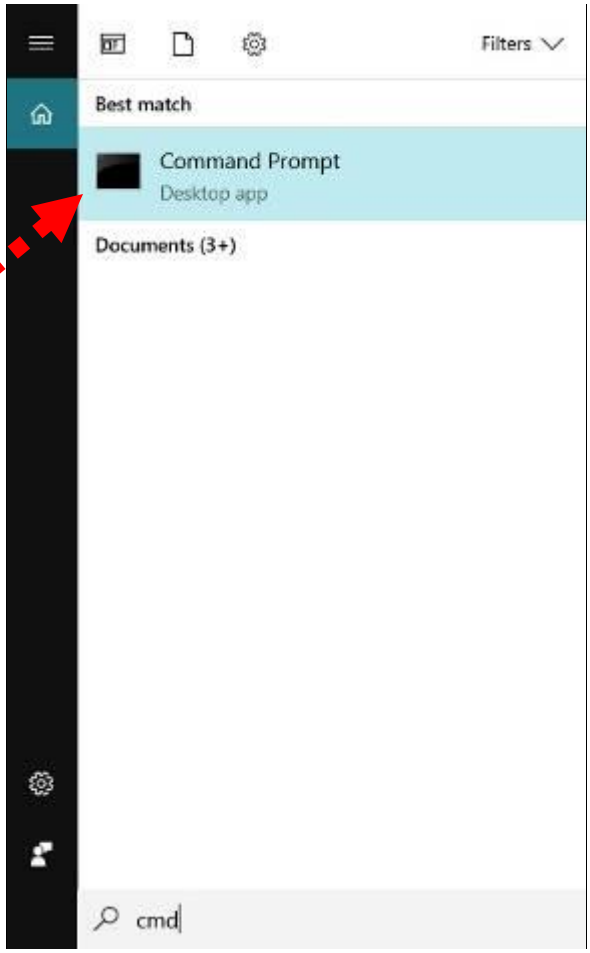


Figure 4-2 Windows Start Menu

3. Open a command prompt, type ping **192.168.1.253** and then press **Enter**.

- If the result displayed is similar to **Figure 4-3**, it means the connection between your PC and the AP has been established well.

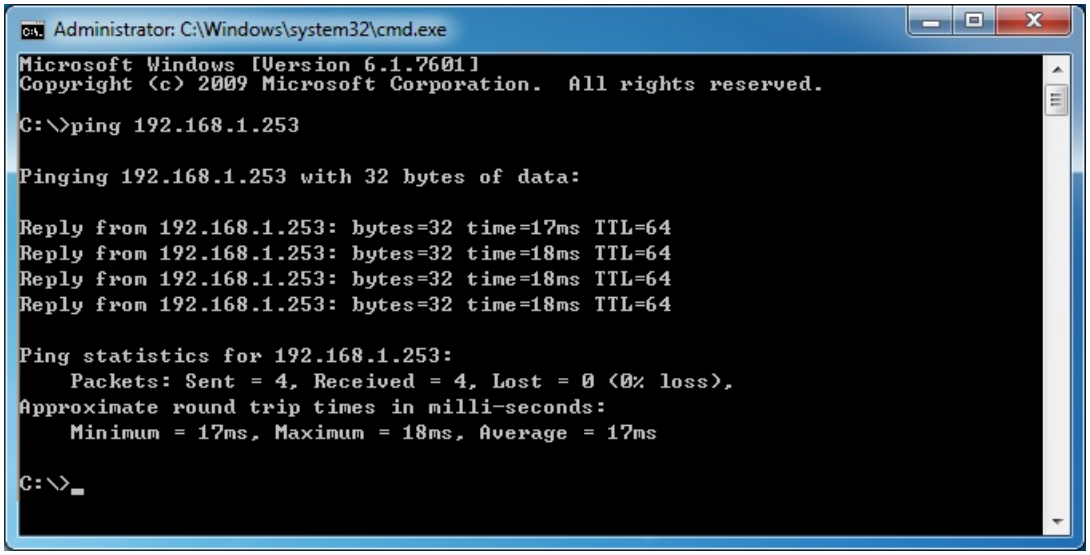


Figure 4-3 Successful Result of Ping Command

- If the result displayed is similar to **Figure 4-4**, it means the connection between your PC and the AP has failed.

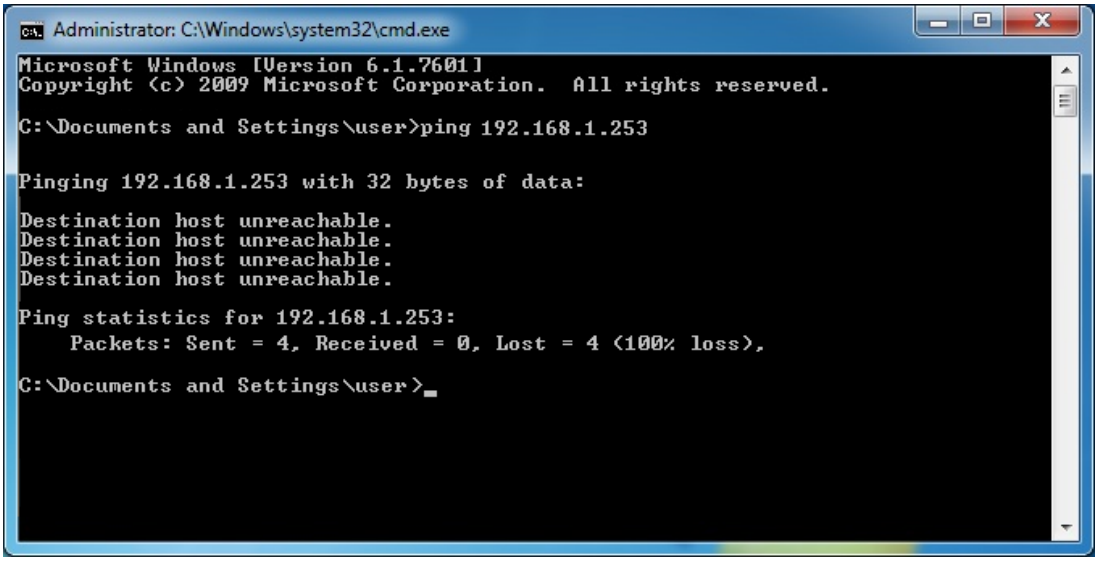


Figure 4-4 Failed Result of Ping Command

If the address is 0.0.0.0, check your adapter installation, security settings, and the settings on your AP. Some firewall software programs may block a DHCP request on newly installed adapters.

4.2 Starting Setup in the Web UI

It is easy to configure and manage the CPE with the web browser.

Step 1. To access the configuration utility, open a web-browser and enter the default IP address https://192.168.1.253 in the web address field of the browser.

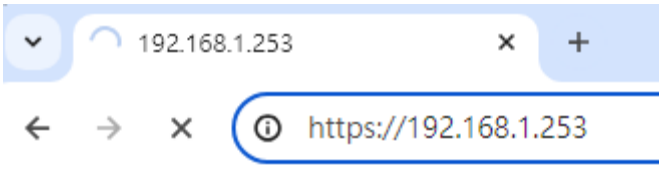


Figure 4-5 Login by Default IP Address

After a moment, a login window will appear. Enter **admin** for the username and password in lower case letters. Then click **LOGIN** or press the **Enter** key.

Figure 4-6 Login Window

Default IP Address: **192.168.1.253**

Default Username: **admin**

Default Password: **admin**

Note

If the above screen does not pop up, it may mean that your web browser has been set to a proxy. Go to Tools menu> Internet Options> Connections> LAN Settings on the screen that appears, uncheck **Using Proxy** and click **OK** to finish it.

Chapter 5. Configuring the CPE

This chapter delivers a detailed presentation of CPE's functionalities and features 3 main items below, allowing you to manage the CPE with ease.

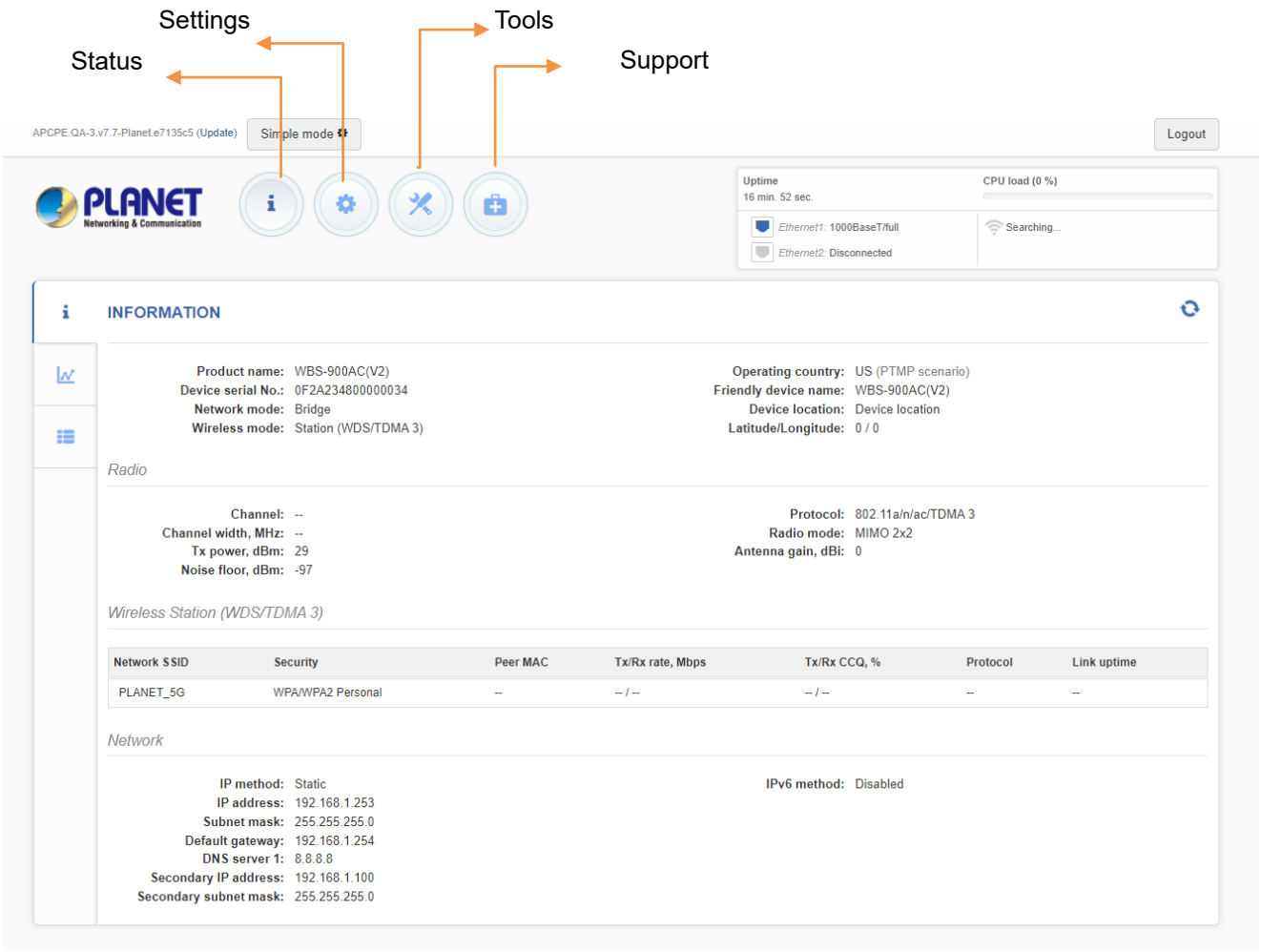


Figure 5-1 Main Menu

The page includes the following fields:

Object	Description
Version	It shows the firmware version (Click “Update” to update a firmware.).
Status	It shows the current mode status.
Settings	It shows the settings of Wireless, Network or other Services.
Tools	It provides some tools to check wireless connection status or link test.
Support	It shows the system log and download setting for troubleshooting.
Uptime	It shows time during the CPE is in operation.
CPU loading	It shows the current loading of CPU
Ethernet	It shows the Ethernet connection status and the connected speed
Wi-Fi connection	It shows how many clients are currently connected with.
Product information	It shows the CPE information and wireless mode status.
Radio status	It shows the current radio setting of the CPE.
Wi-Fi information	It shows the current wireless setting of the CPE.
Network information	It shows the current network port stats of the CPE.

5.1 CPE Configuration

5.1.1 Apply Configuration

On the Web interface, you will find a button located in the upper-right corner that provides access to three device configuration management options.

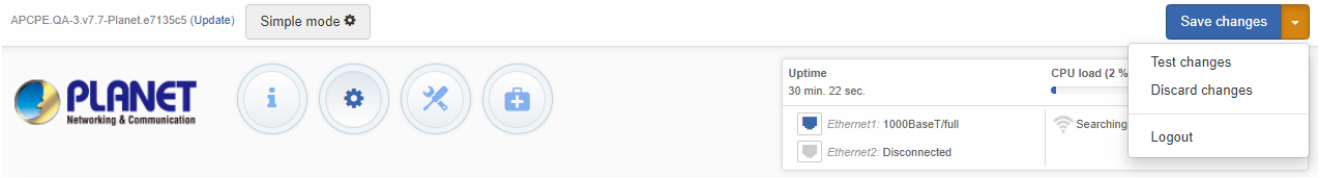


Figure 5-2 Save changes

The page includes the following fields:

Object	Description
Save changes	By pressing the "Save Changes" button, any modified settings will be saved and applied.
Test changes	When you press the "Test Changes" button, any modified settings will be applied within 3 minutes. During the testing period, you can evaluate whether the changes are working correctly, and then save the settings. If the changes result in failure or loss of connection, the settings will automatically roll back.
Discard changes	By pressing the "Discard Changes" button, it will discard any modified settings.

5.1.2 Status

After logging in, the Web management interface displays the status information page. The top of the Web management interface displays the device's main information, including firmware version, product name, normal running time, CPU load, Ethernet port status, and client connection count.

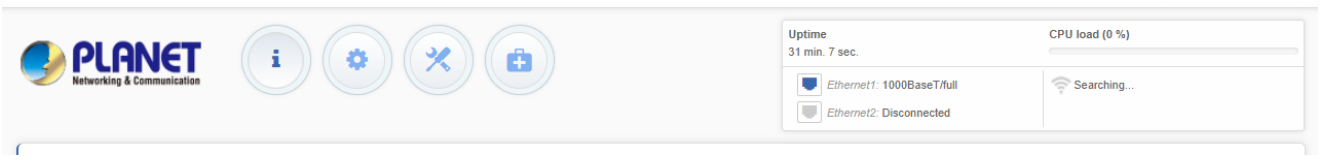


Figure 5-3 Status

5.1.2.1. Information

The information page displays a summary of the device's status information, showing important details related to the CPE operation mode, wireless and network settings.

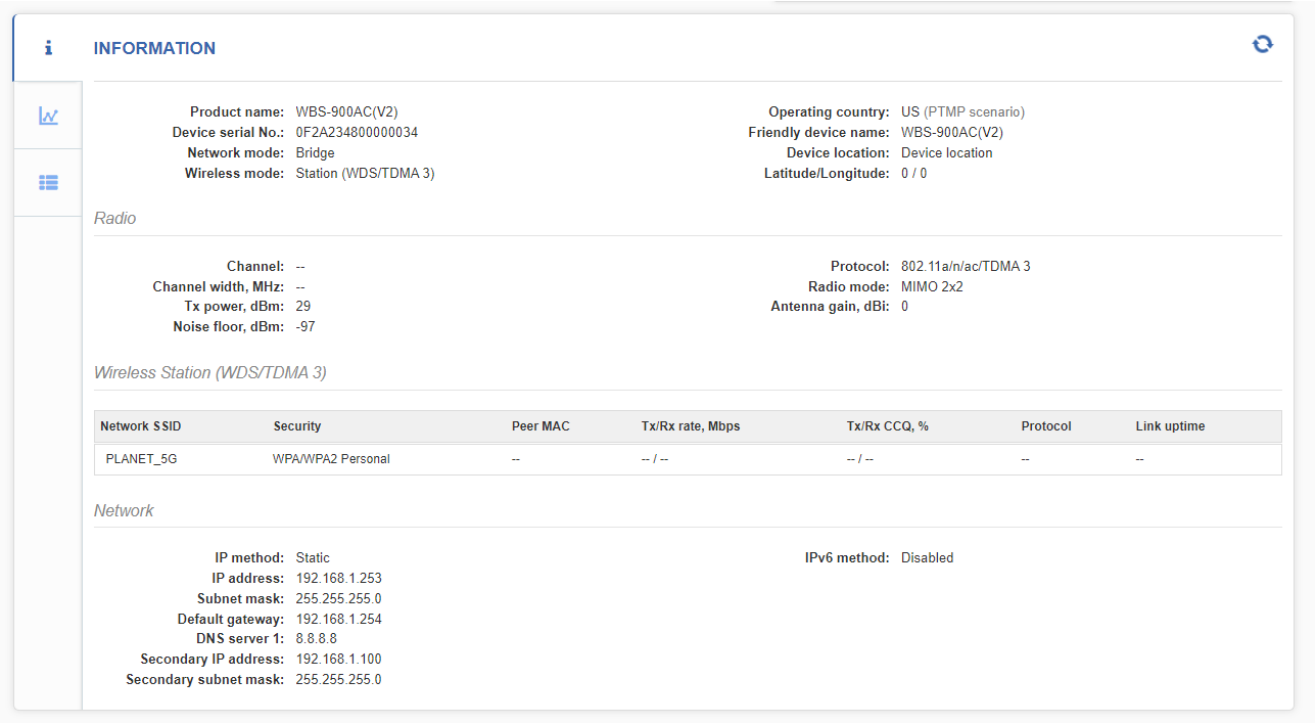


Figure 5-4 Status – Information

5.1.2.2. STATISTICS

The statistics section is divided into two parts, which display network interface counters and traffic graphs for wired and wireless interfaces.

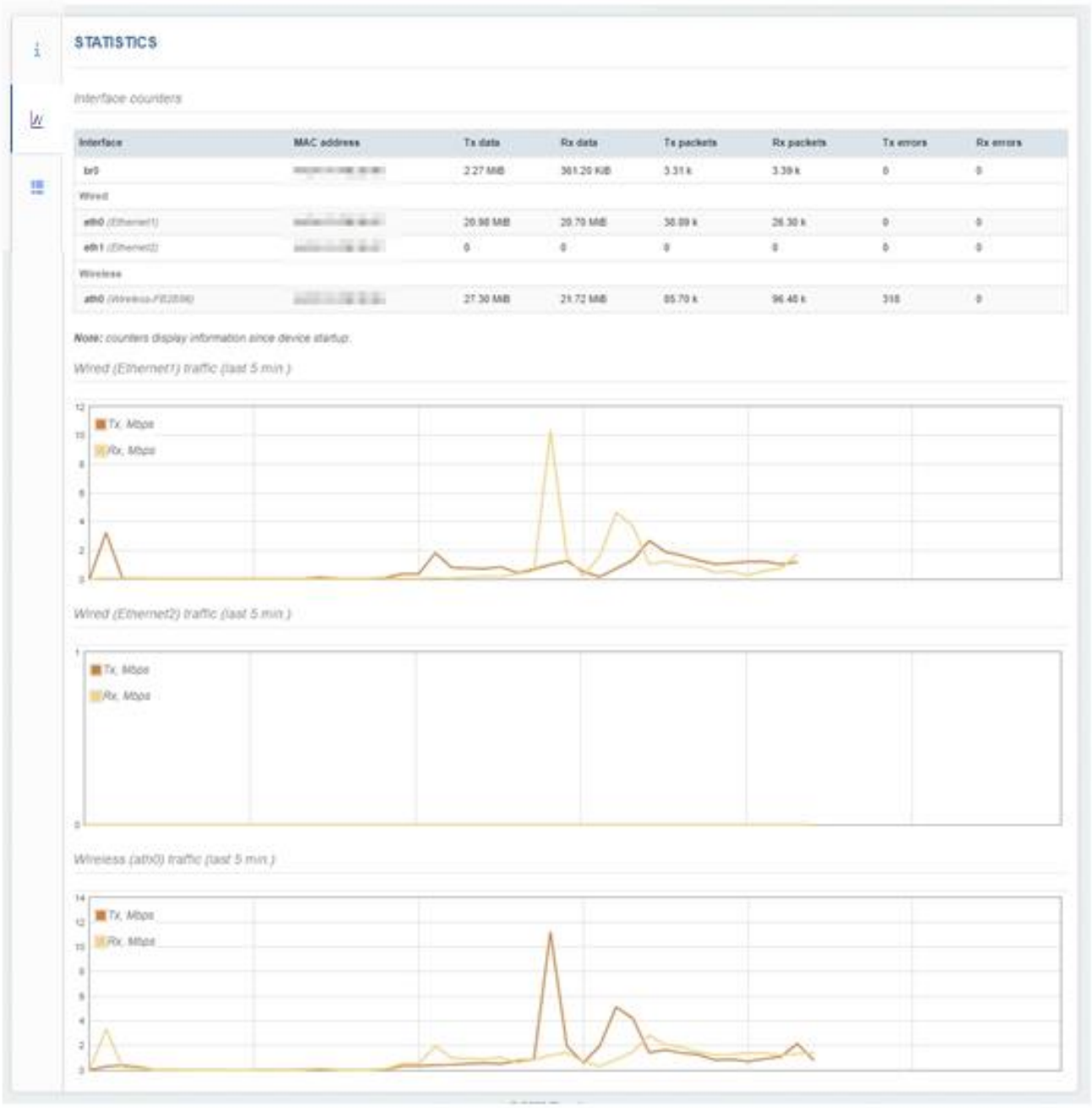


Figure 5-5 Status – Statistics

The SSID name is displayed in parentheses next to the wireless interface (and VAPs).

The MAC address displays the MAC address of the specified interface.

Tx Sent Data displays the amount of data sent.

Rx Received Data displays the amount of data received.

Tx Packets displays the number of packets sent.

Rx Packets displays the number of packets received.

Tx Errors displays the number of errors that occurred while sending.

Rx Errors displays the number of errors that occurred while receiving.

The wired and wireless interface graphs display real-time data traffic.

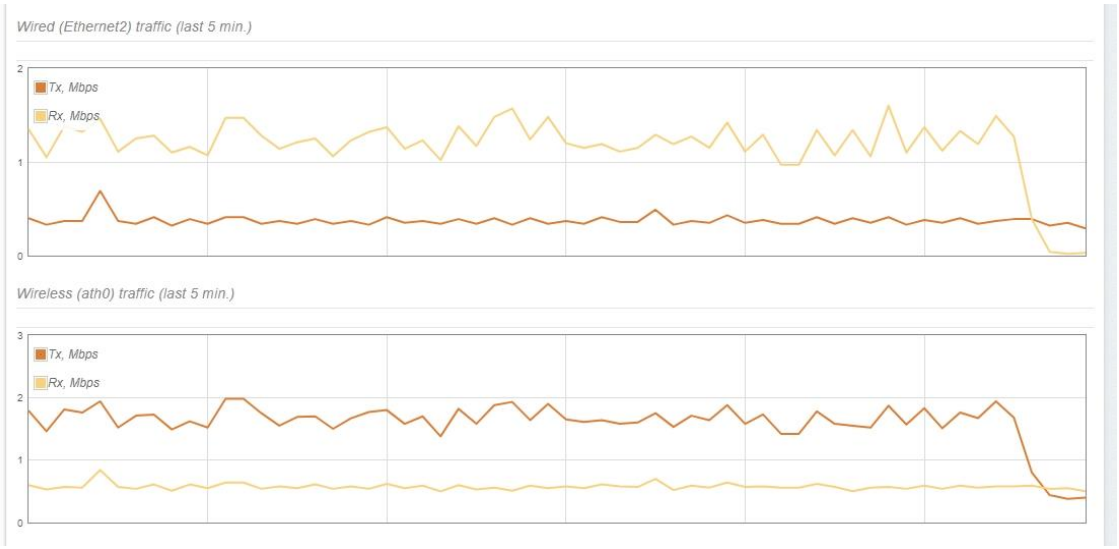


Figure 5-6 Wired and Wireless Interface Graphs

5.1.2.3. Network

In the Network page, you can view the network information, including the routing table and DHCP leases.

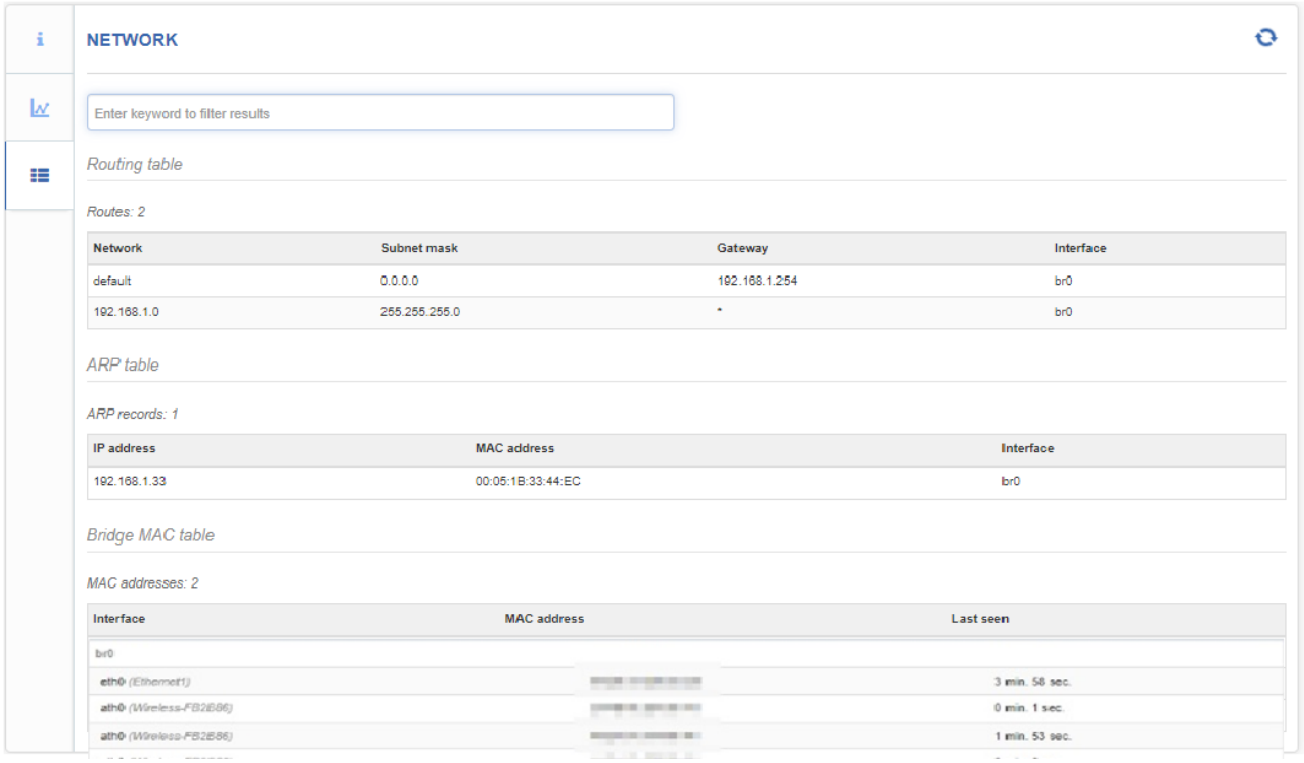


Figure 5-7 Status - Network

5.1.3 Settings

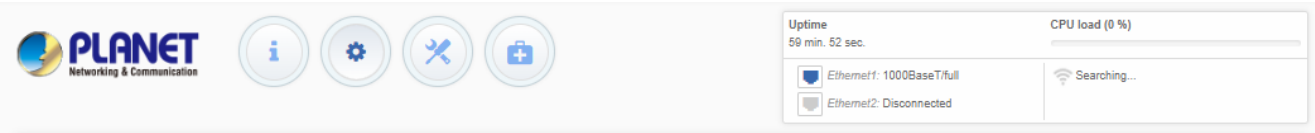


Figure 5-8 Setting

5.1.3.1. Wireless Configuration

The CPE device has two wireless modes: Access Point (TDMA3) and Station (WDS/TDMA3). The TDMA3 wireless mode is a proprietary protocol designed for point-to-multipoint wireless solutions. It uses a polling mode to effectively counter interference and improve wireless transmission performance.

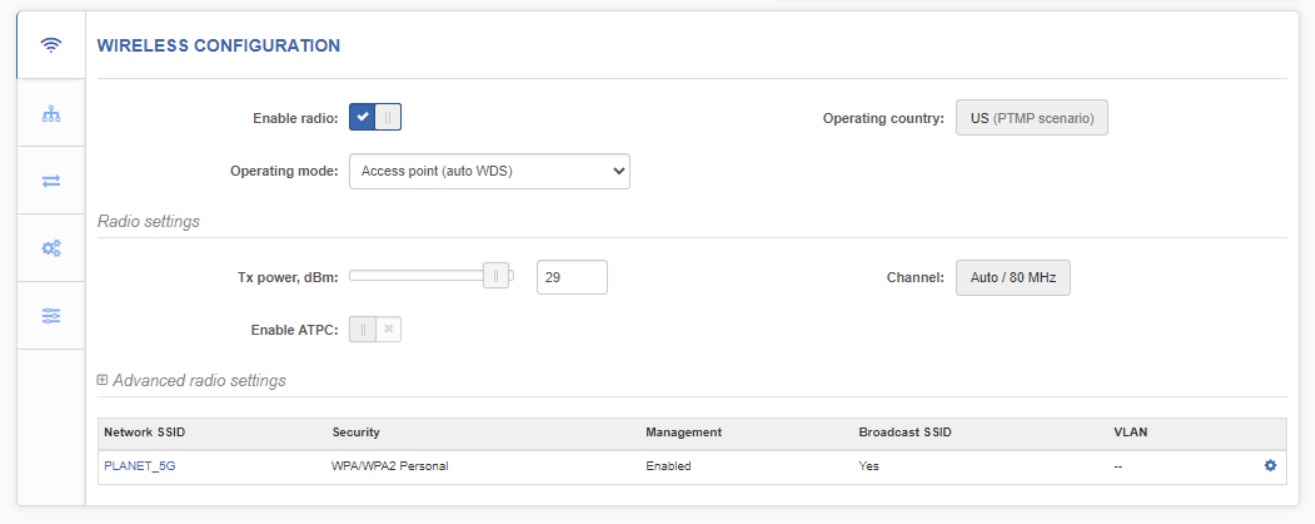


Figure 5-9 Settings - Wireless Configuration

Wireless mode: Access Point

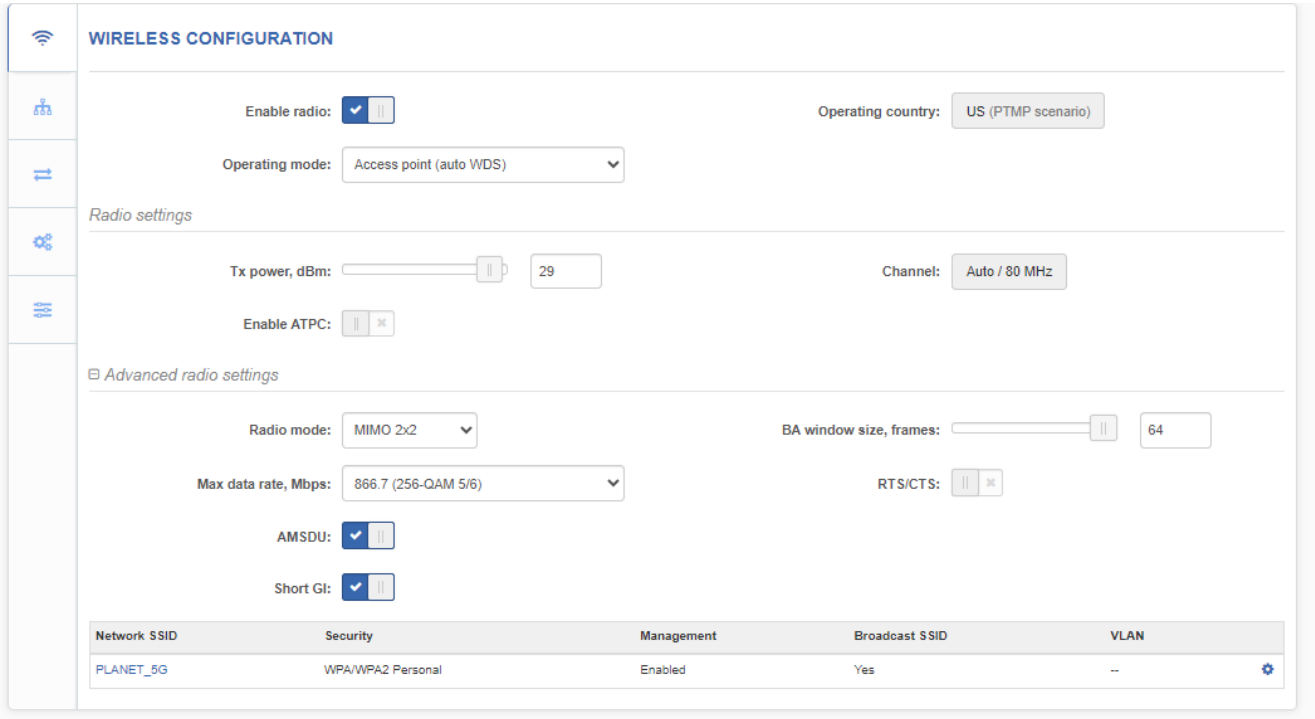


Figure 5-10 Access Point Configuration

The page includes the following fields:

Object	Description
Enable Radio	Enables or disables the CPE wireless switch.
Country	Displays the country in which the CPE bridge is operating. The country selection determines the available channels, frequencies, and transmission power levels based on regulatory restrictions in the operating country. The country is selected during the initial CPE device installation, but can be updated if necessary.
Tx power (dBm)	Sets the transmission power level when the device transmits data. The farther the distance is, the more transmission power is required. Use the slider or enter a value manually to set the transmission power level. When a value is entered manually, the slider position changes based on the input value. The maximum transmission power level is limited to the value allowed by the regulatory agency in the country where the device is operating.
ATPC	Selects whether to enable automatic transmit power control (ATPC). If enabled, the CPE wireless will continually communicate with the remote device to automatically adjust the best transmission power.
Channel	Displays the channel on which the AP is operating, or click to use the automatic channel function. Clicking the button displays the channel selection window. (See figure 5-14)
Max data rate, Mbps	Select the maximum data rate at which the AP should transmit data packets (in Mbps). The AP will attempt to transmit data at the set maximum data rate. If interference occurs, the CPE will fall back to the highest rate at which data transmission is allowed. Only applicable to 802.11a or 802.11a/n IEEE mode.
AMSDU	Enable AMSDU packet aggregation. If enabled, the maximum size of the 802.11 MAC frame will be increased. Only applicable to 802.11n or 802.11a/n IEEE mode.

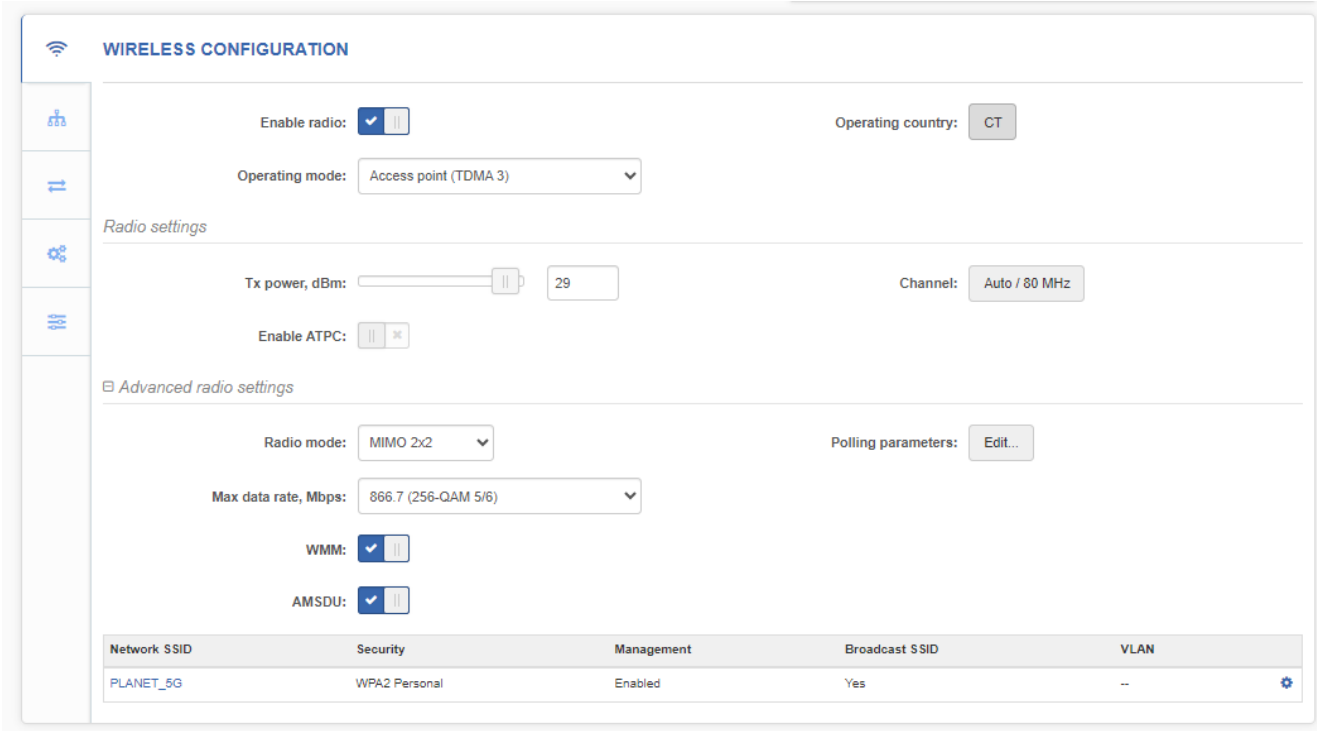


Figure 5-11 Channel Table

The page includes the following fields:

Object	Description
Channel Width	Select the width of the wireless channel. CPE supports 20, 40, and 80 MHz channel widths.
Hide Indoor Channels	Use switching to display only outdoor channels.

Wireless AP Settings

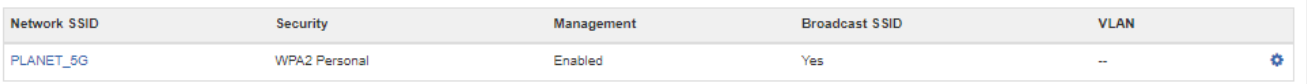


Figure 5-12 Wireless setting

Click the icon to edit AP wireless settings:

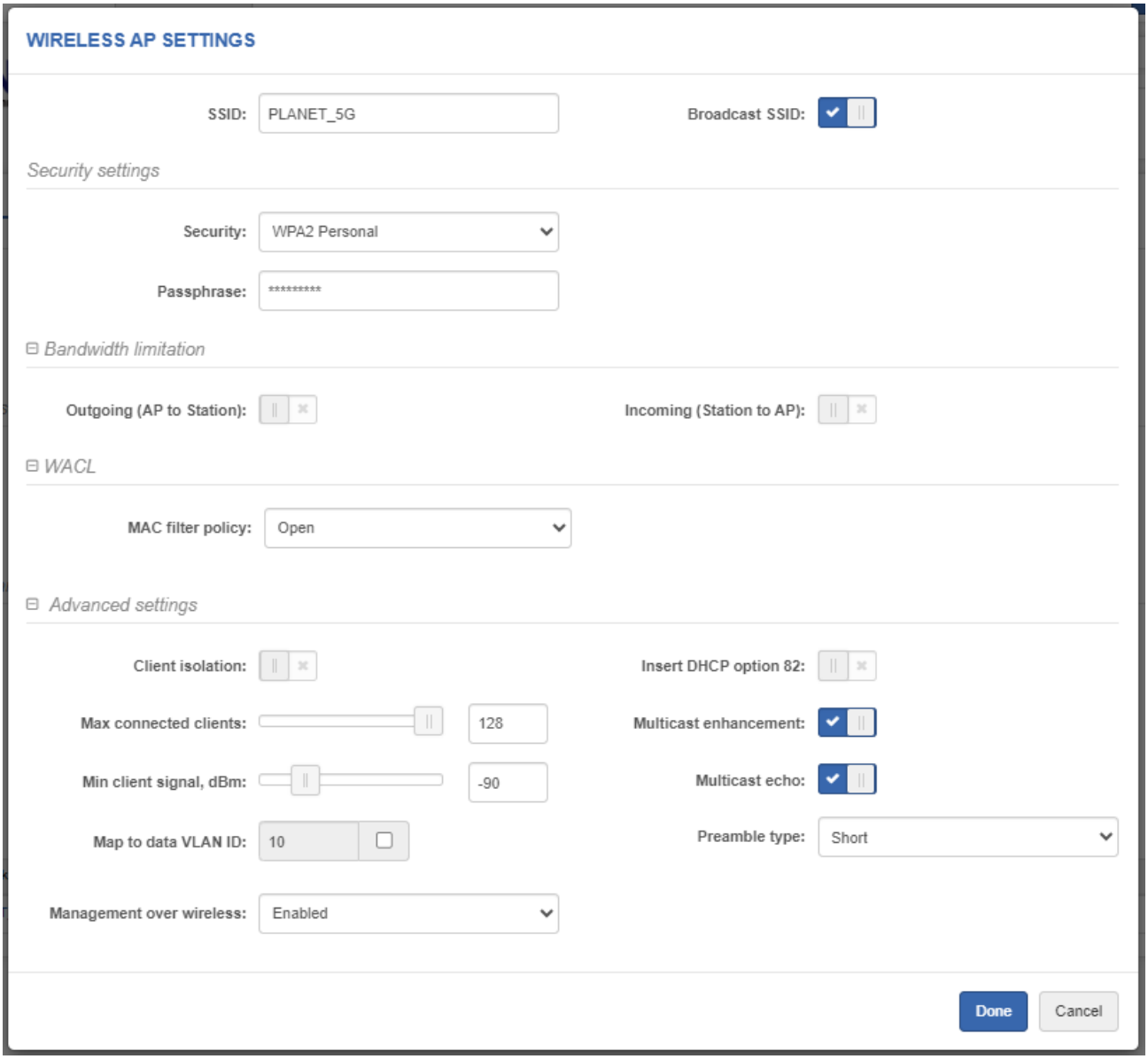


Figure 5-13 Wireless AP Settings

The page includes the following fields:

Object	Description
SSID	Specify the unique name of the wireless network device. The device will broadcast this SSID message to all radios within range, promoting it.
Broadcast SSID	If this option is disabled, the CPE device will not broadcast its SSID to workstation devices.
User isolation	Select Layer 2 isolation to prevent client-to-client communication.
Business VLAN ID	Specify the VLAN ID that traffic is tagged for on a specific VAP interface. Devices associated with a specific SSID will be grouped into this VLAN. Mapping to the data VLAN ID is not available if the device is running in router network mode.
Maximum client connection number	Specify the maximum number of wireless clients associated with the AP radio.
Minimum client signal, dBm	If enabled, the AP will disconnect clients with a signal lower than the configured threshold.
Management over wireless	Control wireless management access. For security reasons, it is recommended to disable wireless access and use Ethernet cable for physical network connection to manage CPE access. Wireless management is not available if the device is running in router network mode.
Multicast enhancement	If clients do not send IGMP (Internet Group Management Protocol) messages, they will not register as recipients of multicast traffic. With IGMP listening, the multicast enhancement option isolates multicast traffic from unregistered clients and allows devices to send multicast traffic to registered clients at higher data rates. This reduces the risk of traffic overload on PtMP links and increases the reliability of multicast traffic as packets are retransmitted if the initial transmission fails. If clients do not send IGMP messages but should receive multicast traffic, you may need to disable multicast enhancement. This option is enabled by default.

Wireless Mode: Station (WDS/TDMA3)

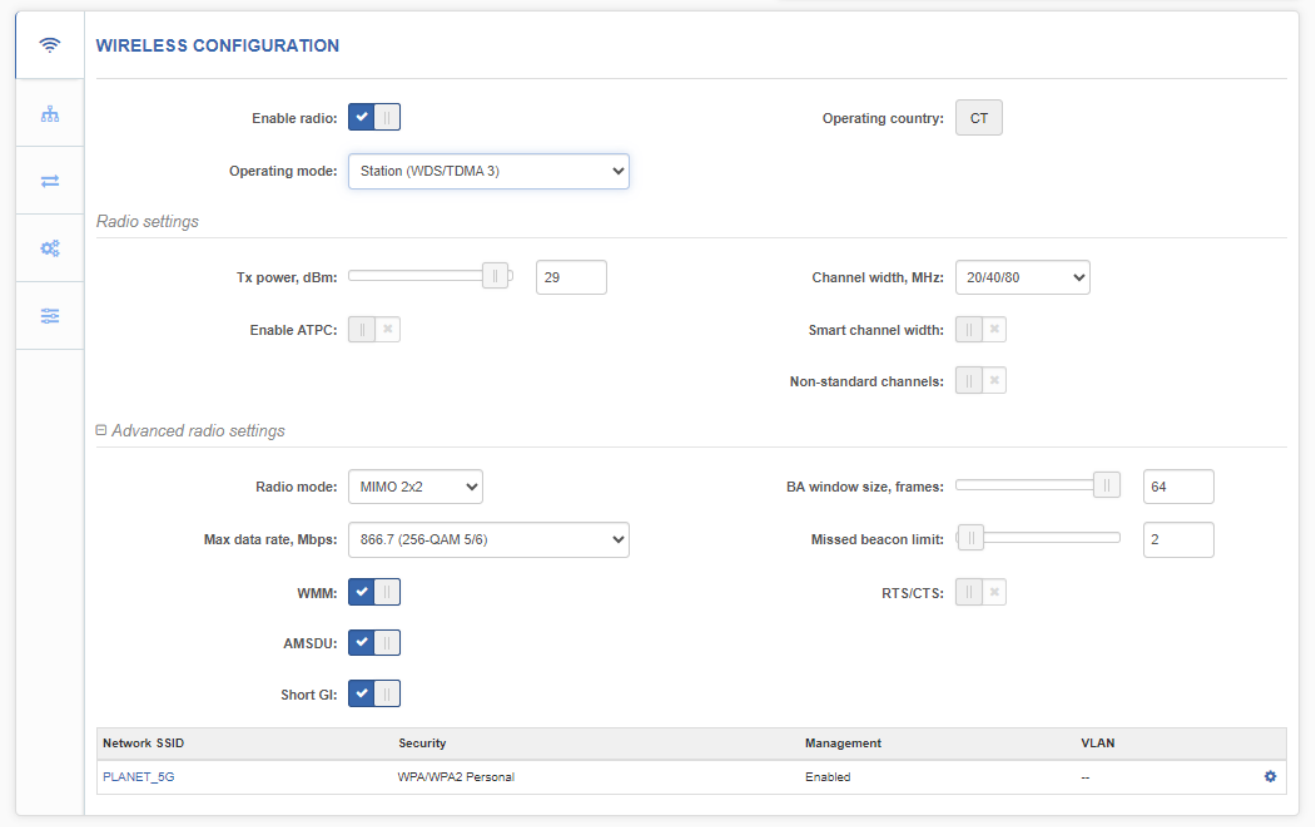


Figure 5-14 Wireless Station Configuration

The page includes the following fields:

Object	Description
Enable Radio	Enable or disable the CPE wireless switch.
Country	Display the country in which the CPE bridge is operating. The country selection determines the available channels, frequencies, and transmission power levels based on regulatory restrictions in the operating country. The country is selected during the initial CPE device installation, but can be updated if necessary.
Tx power (dBm)	Set the transmission power level when the device transmits data. The farther the distance is, the more transmission power is required. Use the slider or enter a value manually to set the transmission power level. When a value is entered manually, the slider position changes based on the input value. The maximum transmission power level is limited to the value allowed by the regulatory agency in the country where the device is operating.
ATPC	Select whether to enable automatic transmit power control (ATPC). If enabled, the CPE wireless will continually communicate with the remote device to automatically adjust the best transmission power.
Channel	Display the channel on which the AP is operating, or click to use the automatic channel function. Clicking the button displays the channel selection window.

Max data rate, Mbps	Select the maximum data rate at which the AP should transmit data packets (in Mbps). The AP will attempt to transmit data at the set maximum data rate. If interference occurs, the CPE will fall back to the highest rate at which data transmission is allowed. Only applicable to 802.11a or 802.11a/n IEEE modes.
AMSDU	Enable AMSDU packet aggregation. If enabled, the maximum size of the 802.11 MAC frame is increased. Only applicable to 802.11n or 802.11a/n IEEE modes.

Wireless Station Settings

Figure 5-15 Wireless Station Setting

Click the icon to edit Station wireless settings:

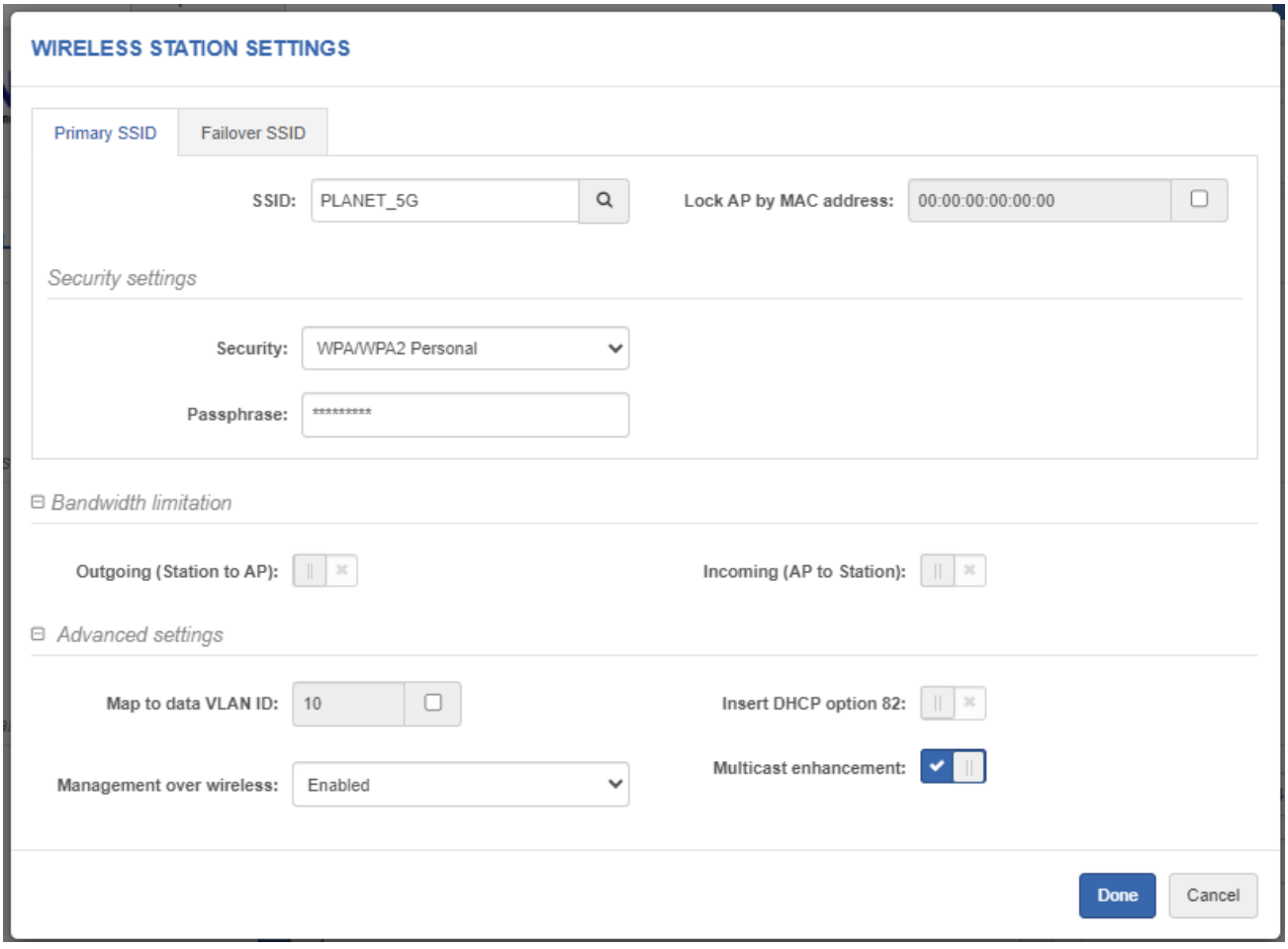


Figure 5-16 Wireless Station Settings

The page includes the following fields:

Object	Description
SSID	Manually specify the SSID for the wireless network device, or automatically scan for access points.
Business VLAN ID	Specify the VLAN ID that traffic is tagged for on a specific VAP interface. Devices associated with a specific SSID will be grouped into this VLAN. Mapping to the data VLAN ID is not available if the device is running in router network mode.
Management over wireless	Control wireless management access. For security reasons, it is recommended to disable wireless access and use Ethernet cable for physical network connection to manage CPE access. Wireless management is not available if the device is running in router network mode.
Multicast enhancement	If clients do not send IGMP (Internet Group Management Protocol) messages, they will not register as recipients of multicast traffic. With IGMP listening, the multicast enhancement option isolates multicast traffic from unregistered clients and allows devices to send multicast traffic to registered clients at higher data rates. This reduces the risk of traffic overload on PtMP links and increases the reliability of multicast traffic as packets are retransmitted if the initial transmission fails. If clients do not send IGMP messages but should receive multicast traffic, you may need to disable multicast enhancement. This option is enabled by default.

5.1.3.2. Network Configuration

By using the network configuration interface in the settings, you can control the network configuration of the device.

Using the Ethernet configuration table, you can configure the Ethernet interface.

Figure 5-17 Network Settings

Click on the desired Ethernet interface name and configure the parameters:

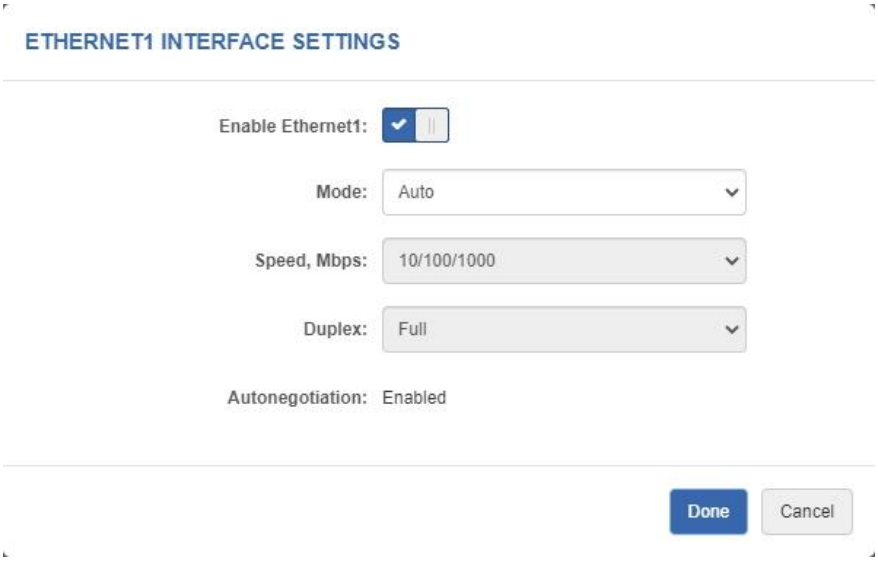


Figure 5-18 Ethernet Interface Settings

The page includes the following fields:

Object	Description
Mode	Select the configuration mode of the Ethernet port: auto, fixed, advanced.
Speed, Mbps	Select the Ethernet link speed for a specific Ethernet port.
Duplex	Select the duplex mode for a specific Ethernet port in the country where the device is operating.
Auto-negotiation	Select the automatic negotiation to advertise and negotiate the Ethernet link duplex configuration (half/full) to obtain the highest possible data rate.

Network Mode: Bridge

When configuring the device in bridge mode, you only need to configure the device's LAN settings on the "Network Configuration" page:

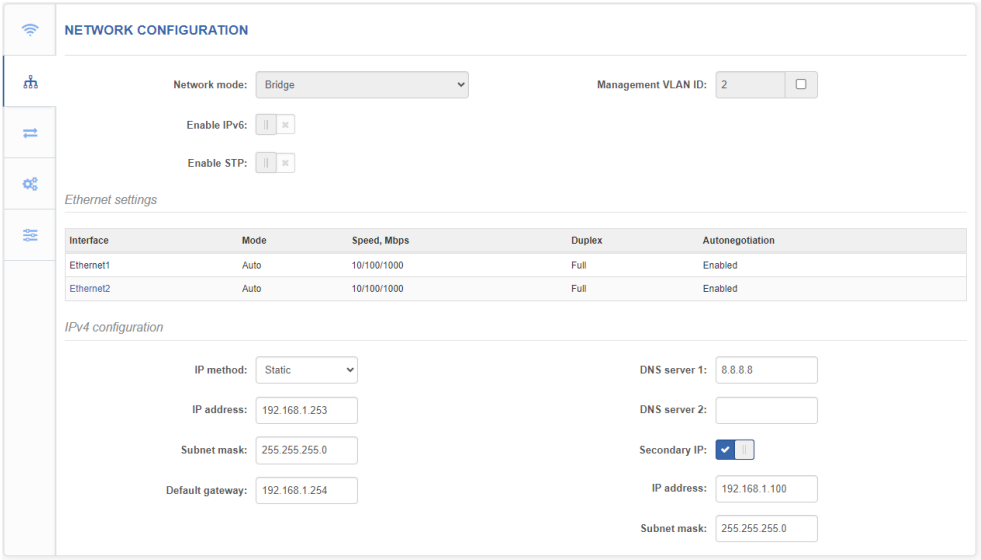


Figure 5-19 Bridge Mode Settings

The page includes the following fields:

IPv4 configuration.

Object	Description
IP method	**Static** - the IP address must be manually configured. **Dynamic** - the IP address of this device will be assigned by the DHCP server.
IP address	The device's IP address.
Subnet mask	Specify the device's subnet mask.
Default gateway	Specify the device's gateway IP address.
DNS server	Specify the domain name server.
Secondary IP	Specify the backup IP address and subnet mask managed by the CPE.

Click the "Enabled IPv6" tab to enable IPv6 configuration. The IPv6 settings will appear in the IPv6 configuration section:

IPv6 configuration.

Object	Description
IPv6 method	**Static** - the DHCPv6 client only obtains network parameters other than the IPv6 address. **Dynamic** - the DHCPv6 client requires both the IPv6 address and other network parameters (such as DNS server, domain name, etc.).
IPv6 address	Configure the IPv6 address of the interface.
IPv6 prefix length	Enter the prefix length of the address.
IPv6 default gateway	Specify the IPv6 address of the default gateway.
IPv6 DNS server	Specify the IPv6 address of the domain name server.

5.1.3.3. Traffic Management

View and choose traffic optimization solutions

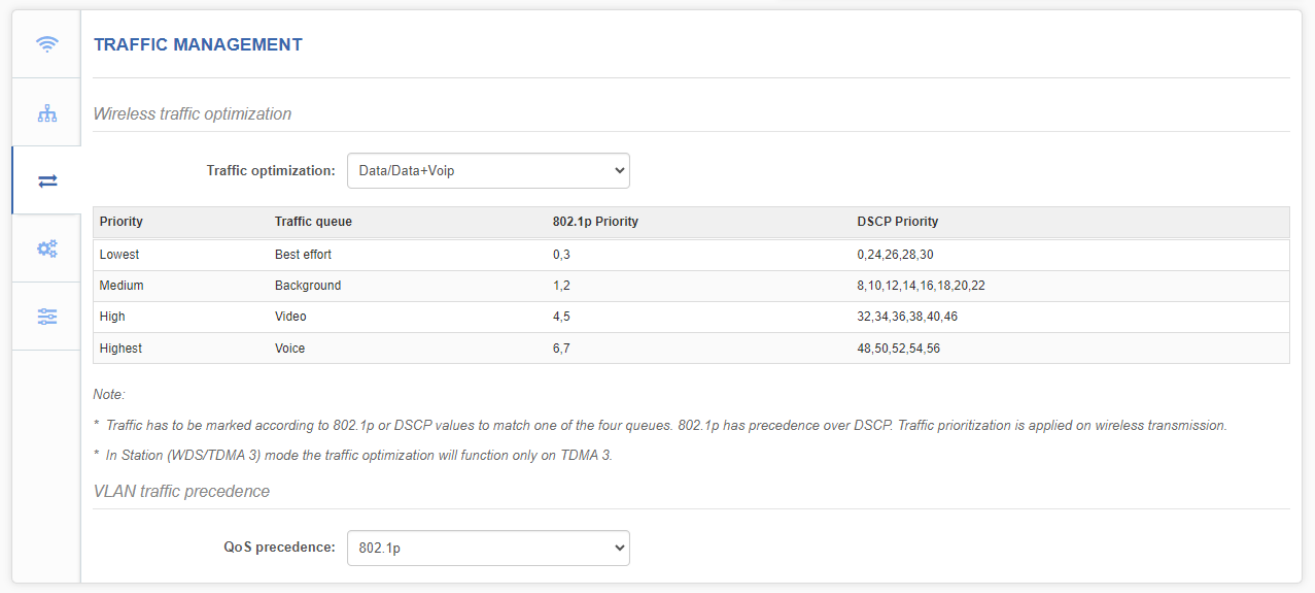


Figure 5-20 Traffic Management

5.1.3.4. Services Configuration

The service menu is further divided into eleven parts:

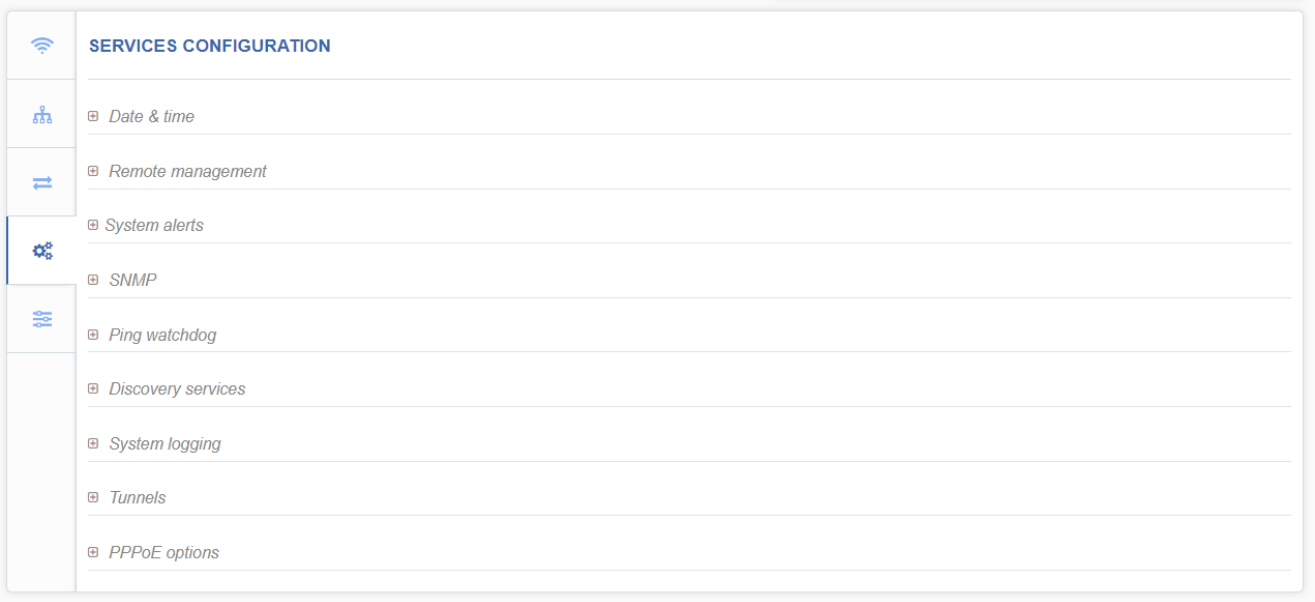


Figure 5-21 Setting - Services Configuration

Date and Time

This section can be used to automatically manage the system time and date on the device using the Network Time Protocol (NTP), or manually manage the system time and date by setting the time and date on the device. An NTP (Network Time Protocol) client synchronizes the device's clock with the defined time server. To use the NTP service, select NTP from the configuration menu, select your time zone, and enter the NTP server.

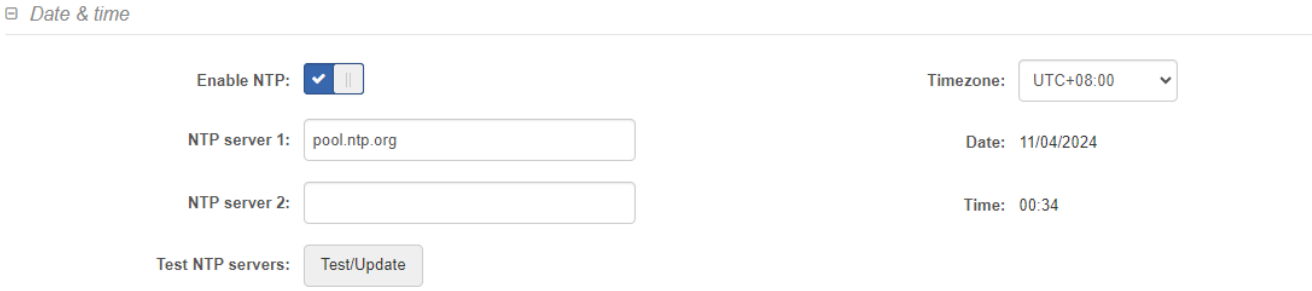


Figure 5-22 Date and Time: NTP Configuration

Object	Description
Enable NTP	Select this option to enable NTP configuration.
Time zone	Select time zone. The time zone should be specified as the difference between local time and GMT.
NTP server	Specify the trusted NTP server IP or hostname for time synchronization.
Test NTP server	Click this button to check if the specified server responds successfully.
IPv6 DNS server	Specify the IPv6 address of the domain name server.

Remote Management

Use this menu to manage access to the CPE through SSH, Telnet, and HTTP:

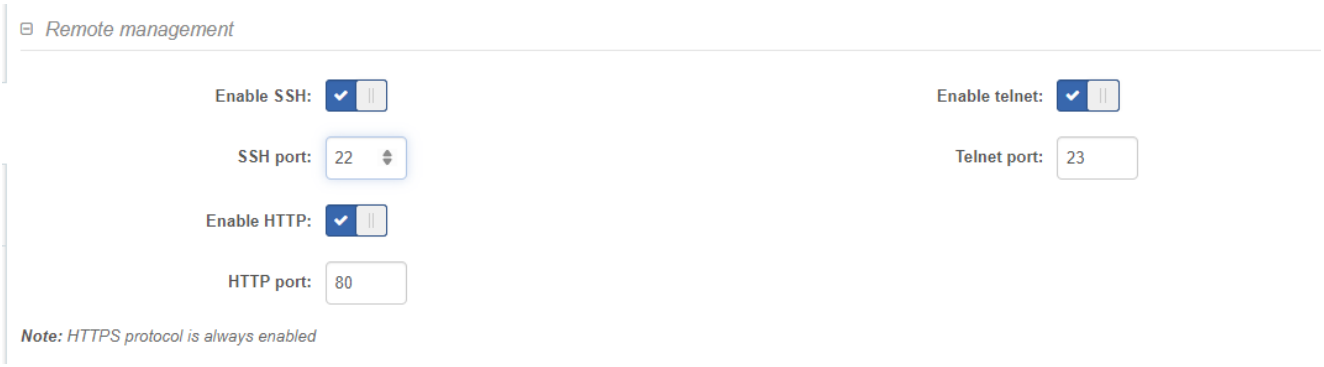


Figure 5-23 Remote Management Configuration

Object	Description
Enable SSH	Enable or disable access to the device through SSH.
SSH port	Specify the SSH service port. The default SSH port is 22.
Enable Telnet	Enable or disable access to the device through Telnet (factory default is disabled).
Telnet port	Specify the remote login port. The default Telnet port is 23.
Enable HTTP	Select the switch to enable or disable HTTP access to device management.
HTTP port	Specify the HTTP port. The standard HTTP port is 80.

Note: HTTPS is always enabled through the standard port 8080 connection.

SNMP

SNMP is a standard protocol widely used for remote network management over the Internet. After enabling SNMP, the CPE device will act as an SNMP agent. The SNMP agent provides a device monitoring interface using the Simple Network Management Protocol, allowing network administrators to monitor network performance, detect and resolve network problems.

Figure 5-24 SNMP Configuration

Object	Description
Enable SNMP	Specify the SNMP service status.
R/O community	Specify the read-only community name for SNMP version 1 and version 2c. The read-only community allows CPE unit administrators to read values but denies any attempts to change them. Ping Watchdog.
Enable Telnet	Enable or disable access to the device through Telnet (factory default is disabled).
Telnet port	Specify the remote login port. The default Telnet port is 23.
Enable HTTP	Select the switch to enable or disable HTTP access to device management.
HTTP port	Specify the HTTP port. The standard HTTP port is 80.

Ping Watchdog

Enable Ping Watchdog to continuously monitor the network connection between the CPE unit and a specified trusted host. If enabled, the CPE unit will periodically send Ping requests to the host, and if there is no response within a specified time frame, the Ping watchdog will restart the CPE unit.

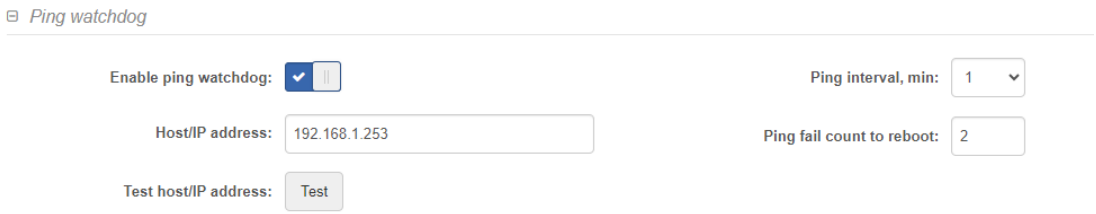


Figure 5-25 Ping Watchdog Configuration

Object	Description
Enable Ping Watchdog	Click to enable Ping Watchdog functionality.
Host/IP address	Specify the host to which Ping requests will be sent.
Test Host/IP address	Click this button to check if the specified host responds successfully.
Ping interval	Specify the time interval between Ping requests in minutes.
Ping fail count to reboot	Specify the count of Ping reply failures. After the specified Ping failure count, the CPE unit will automatically restart.
HTTP port	Specify the HTTP port. The standard HTTP port is 80.

Discovery Service

The corresponding automatic discovery service is enabled by default.

Figure 5-26 Discovery Service Configuration

System Logging

By default, the corresponding logs are selected and displayed in the supported system logs, where Debug is the most detailed log level.

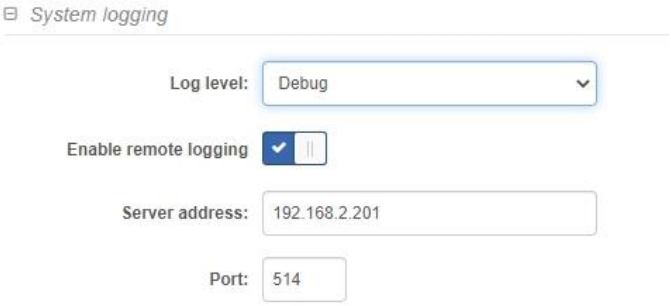


Figure 5-27 System Logging Configuration

Tunnels

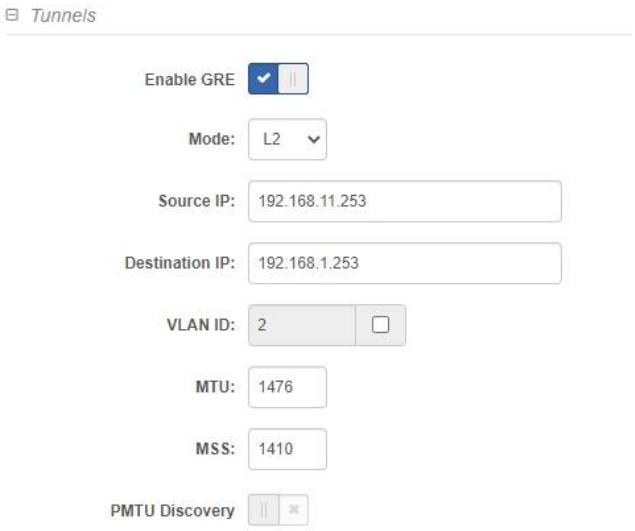


Figure 5-28 Tunnels Configuration

PPPoE options

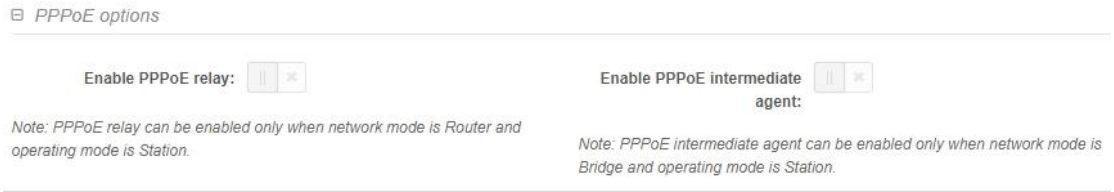


Figure 5-29 PPPoE Relay Configuration

5.1.3.5. System Configuration

The system menu allows you to manage the main CPE settings and perform major system operations (such as restart and restore configuration). This section is further divided into four parts:

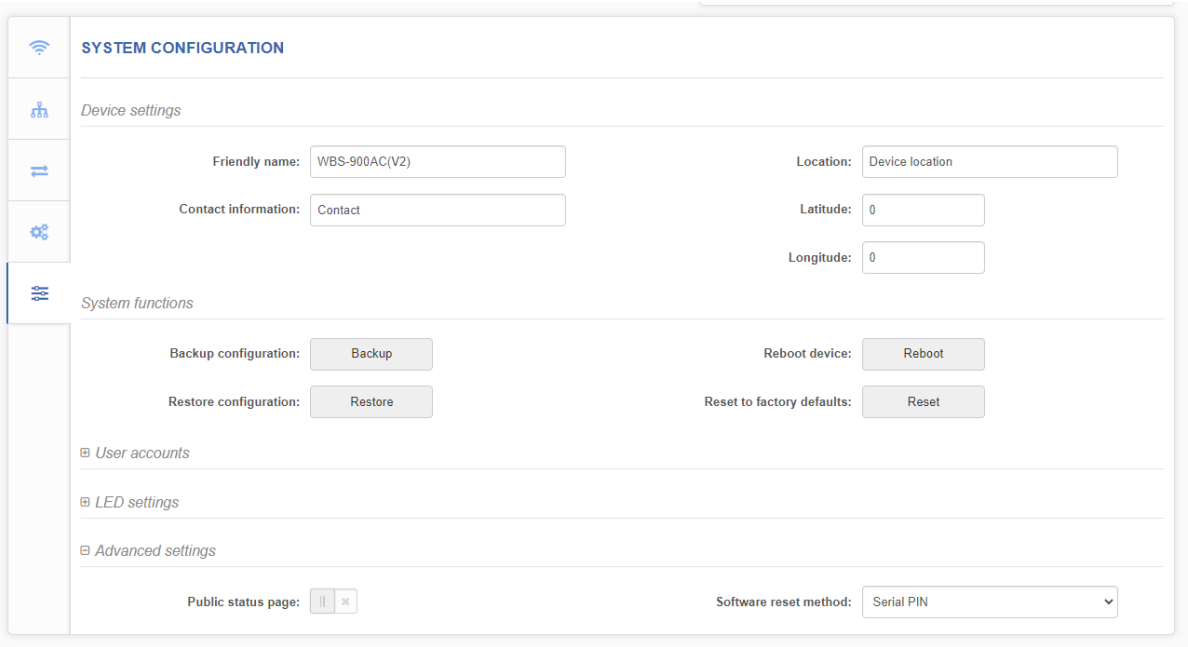


Figure 5-30 System Configuration

Device settings

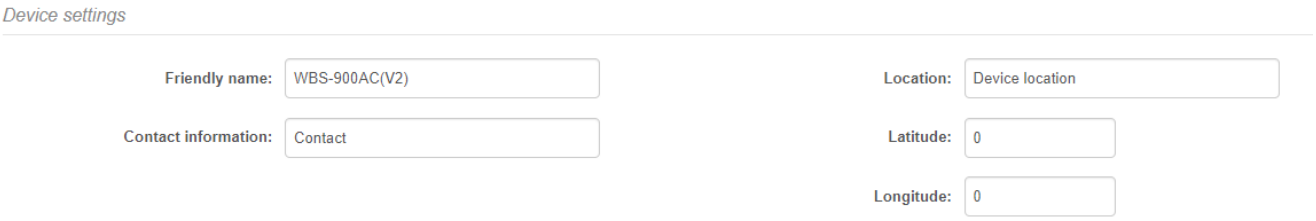


Figure 5-31 Device Settings

Object	Description
Friendly name	Specify the name of the CPE that will be used to identify the device.
Contact information	Specify the name of the contact person for the CPE, such as the network administrator.
Location	Describe the physical location of the device.
Latitude	Specify the longitude coordinates of the device [in a specific decimal format, such as 121.53]
Longitude	Specify the latitude coordinates of the device [in a specific decimal format, such as 24.98].

System functions

Figure 5-32 System functions

Object	Description
Backup configuration	Click to save the current configuration file. The saved configuration file can be used to restore the configuration in case of device configuration errors or to upload standard configurations to multiple devices without manually configuring each device through the web interface
Restore configuration	Click to upload an existing configuration file to the device. After the configuration file is uploaded, the new configuration will take effect when the Save Changes button is clicked.
Reboot device	Restart the device with the last saved configuration.
Reset to factory defaults	Click to restore the device to its factory default settings.

User accounts

Use this section to modify the user access credentials for the CPE device to prevent unauthorized device configuration.

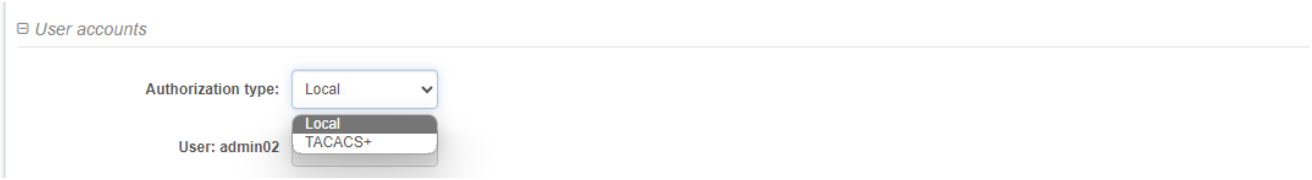


Figure 5-33 User Accounts Authorization type

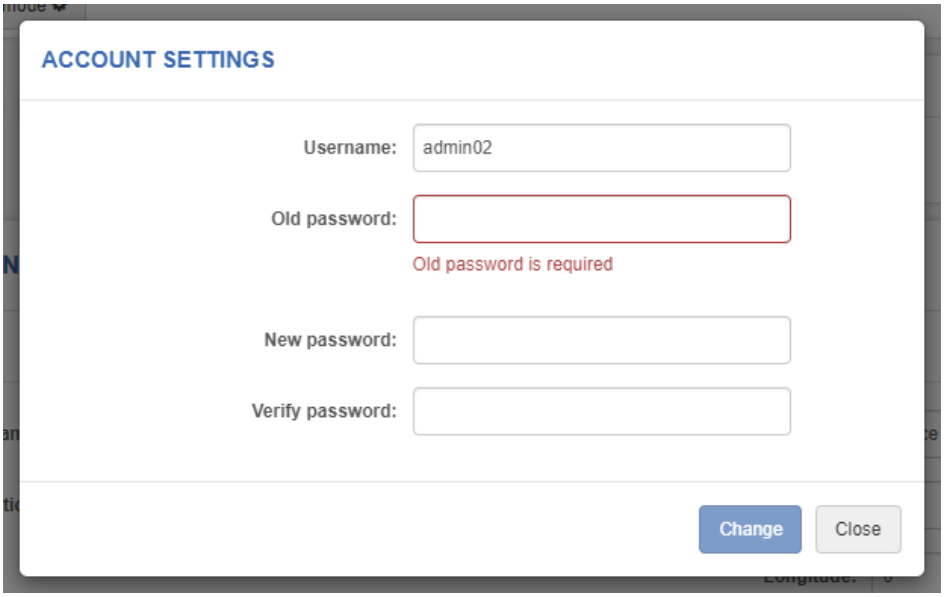


Figure 5-34 Account Settings

Object	Description
Username	Change the username of the administrator.
Old password	Enter the current administrator password.
New password	Enter the new administrator password for the user account.
Verify password	Re-enter the new password to verify its accuracy.

Advanced settings

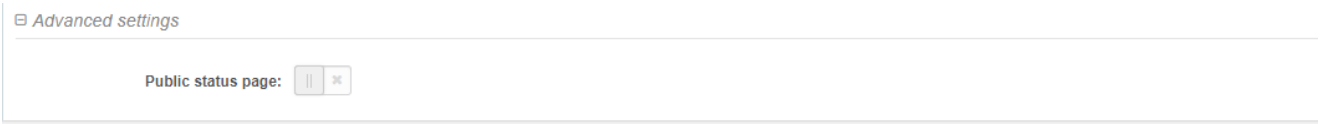


Figure 5-35 Advanced settings of System

Object	Description
Public status page	Enable or disable the permission for non-logged-in users to view the status page.

5.1.4 Firmware Update

The current version of the device firmware is displayed in the top left corner of the Web interface.

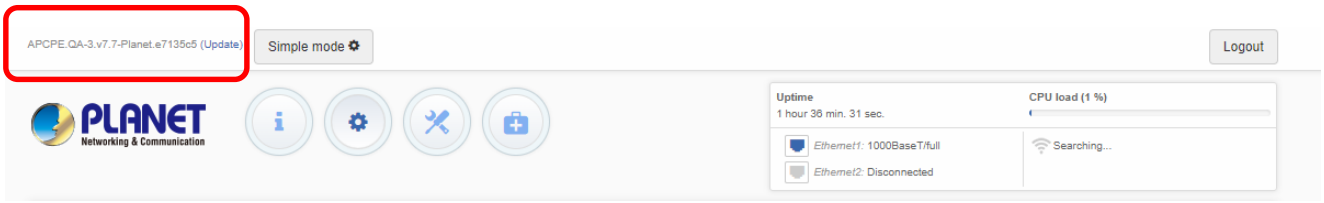


Figure 5-36 Firmware Update

Click the (Update) link next to the running firmware name, select the correct firmware image in the firmware update pop-up window, and then click the Upload button:

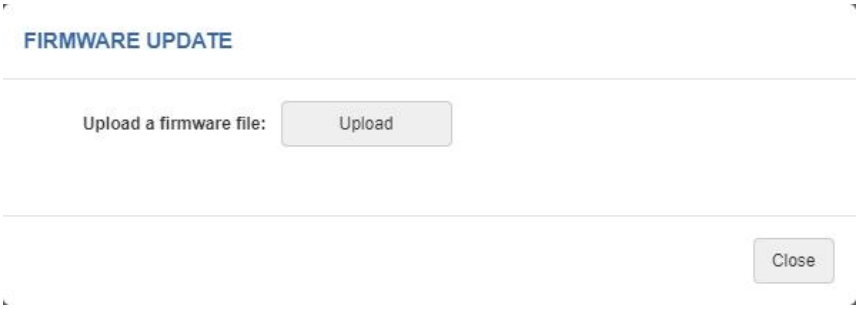
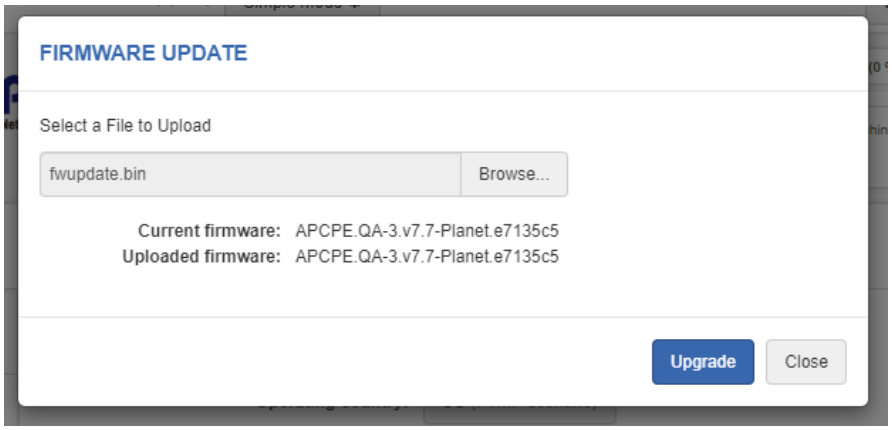


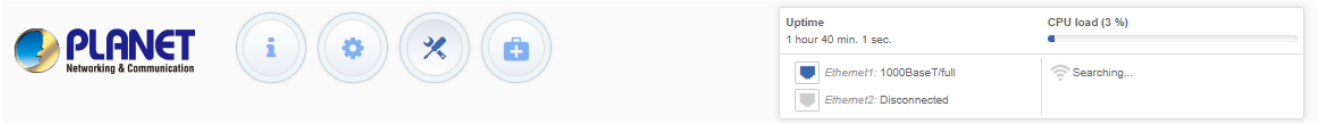
Figure 5-37 Uploading Firmware

The new firmware image will be uploaded to the controller's temporary storage. The next step is to save the firmware to the device's permanent storage. Click the Upgrade button:



Note: During the firmware upgrade process, do not turn off the device or disconnect the device from the power source, otherwise the device may be damaged.

5.1.5 Tools



5.1.5.1. Site Survey

The site survey tool displays at-a-glance information about wireless networks in the local geographic area. Using this test, administrators can scan for working wireless devices, check their operating channels, and encrypt and view signal/noise levels.

To currently perform a site investigation test, click **Start scan**:

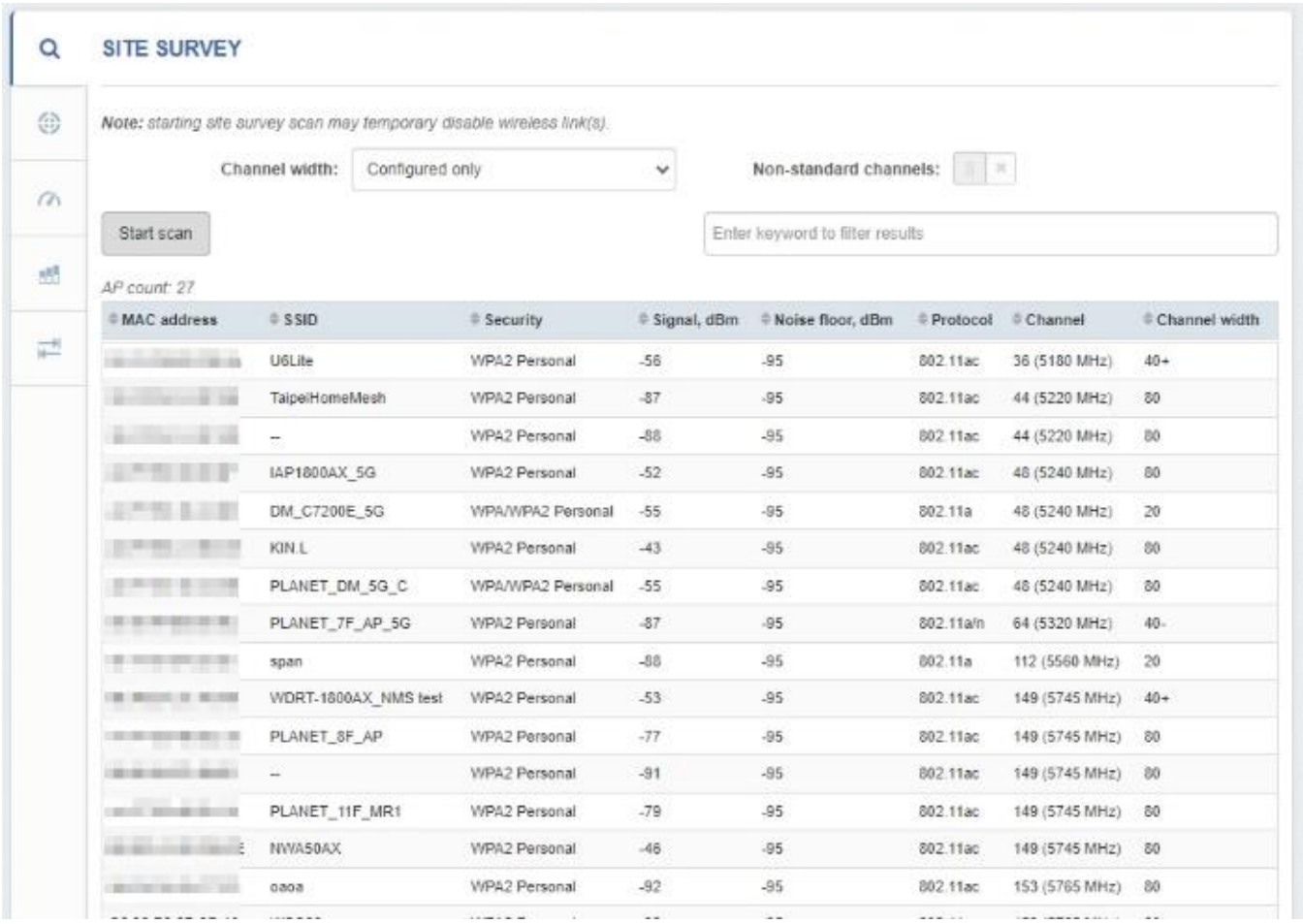


Figure 5-38 The Result of Site Survey

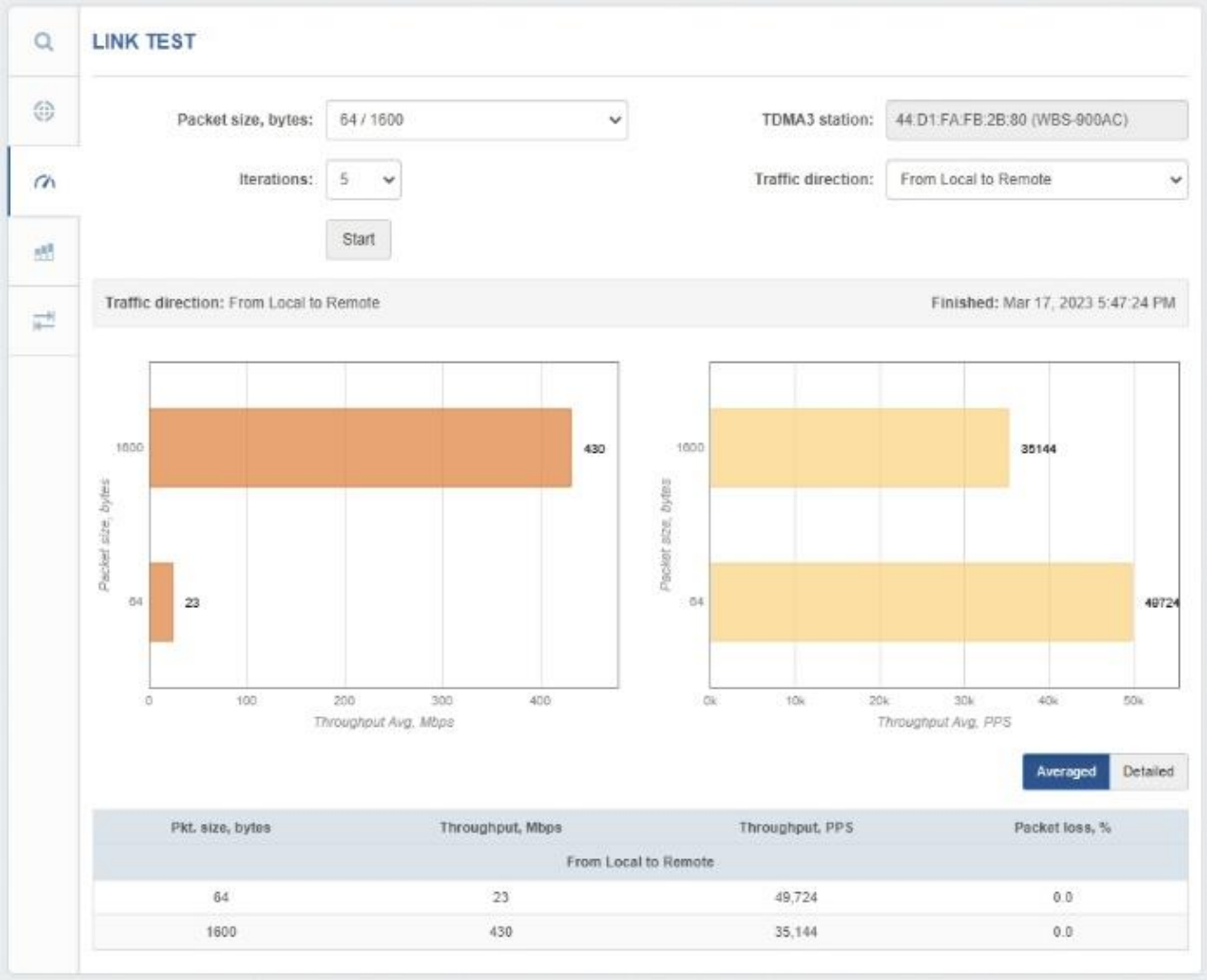
5.1.5.2. Antenna Alignment

The Antenna Alignment Tool measures the signal quality between the base station and the AP. For best results during the antenna alignment test, turn off all wireless networking devices in range of the device except the one you are trying to align the antenna on. Keep an eye out for the constantly updating display as you adjust the antenna.

Figure 5-39 Antenna Alignment

5.1.5.3. Link Test

Use the link test tool to check the quality of the established TDMA3 link. The tool tests throughput at selected packet sizes and iterations.



Pkt. size, bytes	Throughput, Mbps	Throughput, PPS	Packet loss, %
From Local to Remote			
64	23	49,724	0.0
1600	430	35,144	0.0

Figure 5-40 The Test Result of Link Test

5.1.5.4. Spectrum Analyzer

The Spectrum Analyzer test shows details of the signal level of each CPE unit antenna on every available frequency. This enables administrators to select the best available frequency/channel for equipment operation. The frequency list depends on the country the device is operating in and the channel width selected.

Click the **Start** button to test:

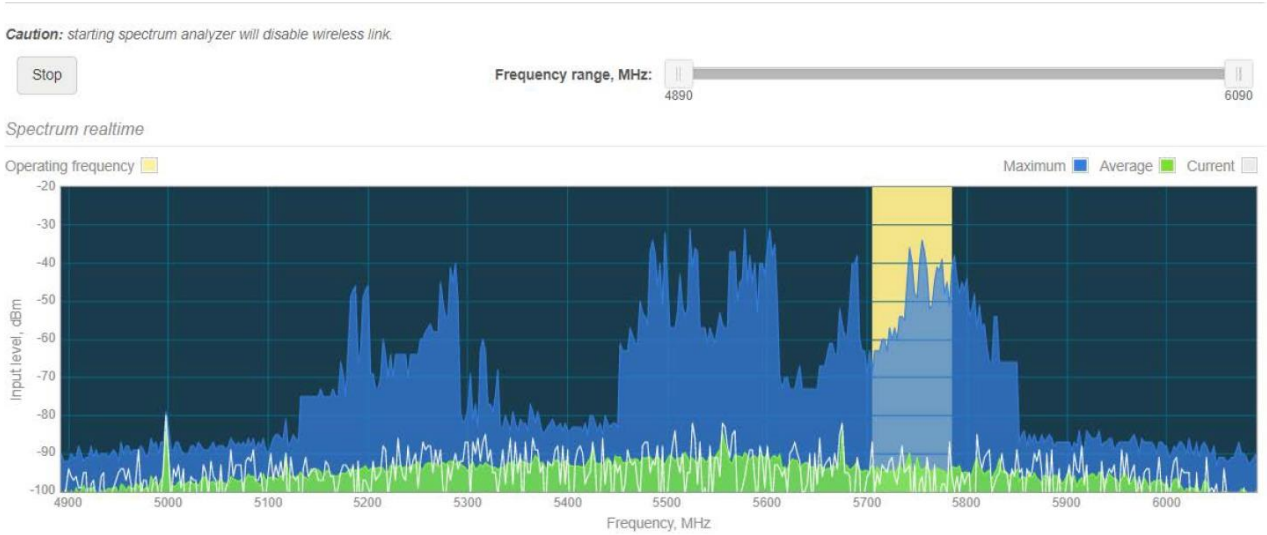


Figure 5-41 The Result of Spectrum Analyzer Test

The blue color of the graph indicates the current signal level on the appropriate frequency.

The yellow bands in the graph show the channel frequency range in which the CPE unit is currently operating.

5.1.5.5. Ping and Trace

Use the PING tool to discover how long it takes for packets to reach a specified trusted host. PING results are displayed in a table and graphically:

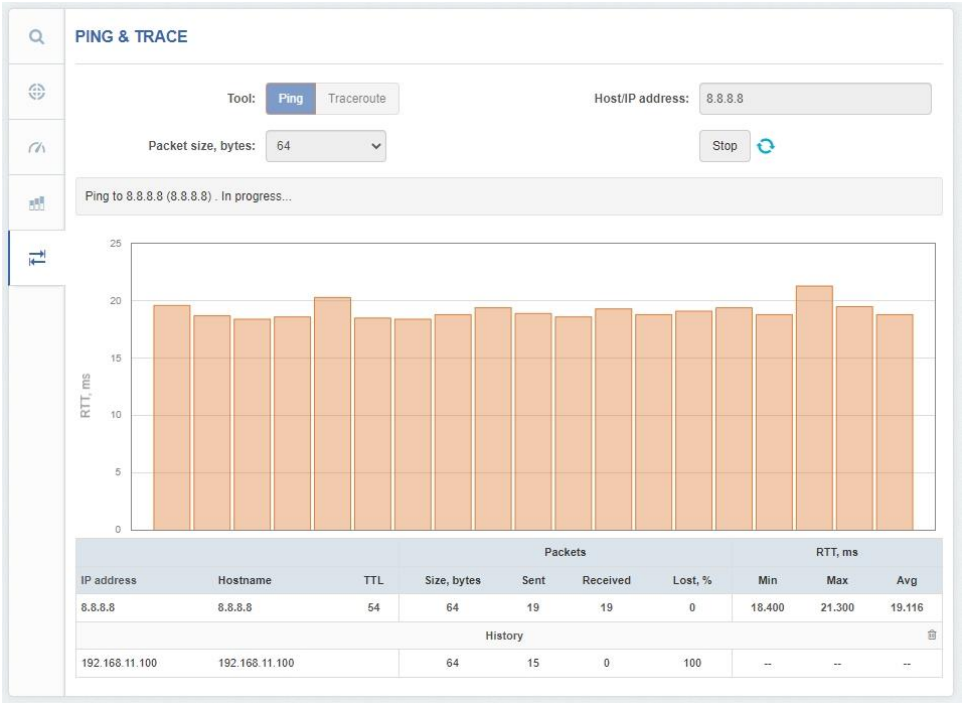


Figure 5-42 Ping Tool

Object	Description
Host/IP address	Specify the host to which the ping request will be sent.
Packet size, bytes	Specify the size in bytes of the data packet.
Start/Stop	Click to start or stop the ping tool.

Use the traceroute tool to trace the route of packets from the CPE unit to the destination host. This is useful when trying to figure out why you can't reach your destination, since you'll be able to see where the connection failed.

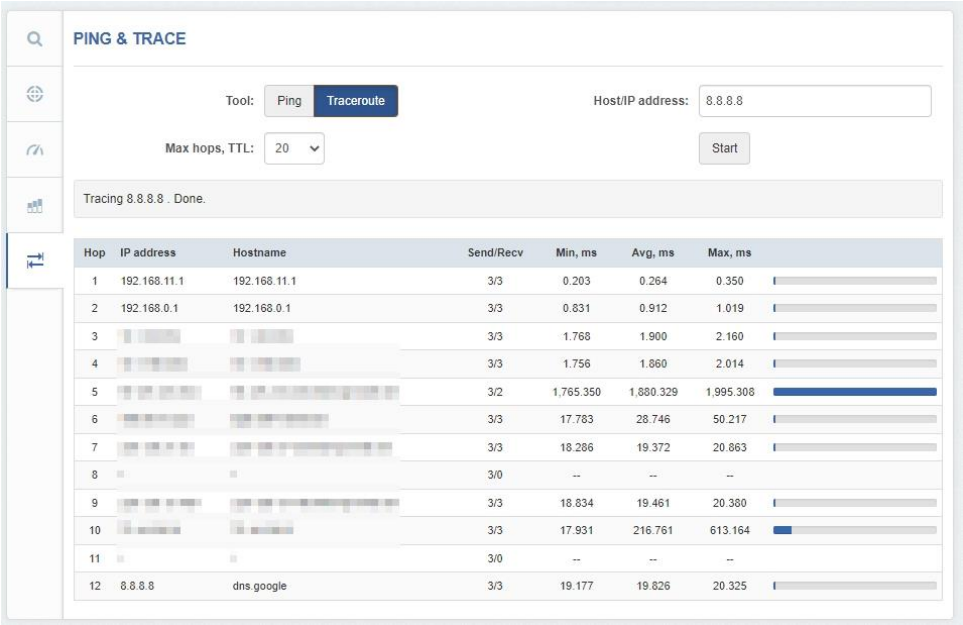


Figure 5-43 Trace Tool

Object	Description
Host/IP address	Specify the hostname or IP address of the target host.
Max hops, TTL	Specify the maximum number of hops to search for a target.
Start/Stop	Click to start or stop the trace tool.

5.1.6 Support

5.1.6.1. Troubleshooting

Troubleshooting files contain valuable information about device configuration, routing, log files, command output, and more. When using a troubleshooting file, the device can quickly and automatically collect troubleshooting information without requiring you to manually collect each piece of information. This helps in submitting issues to the support team.

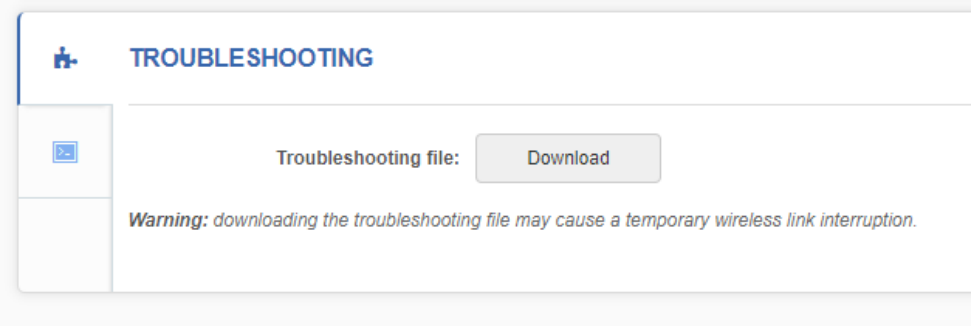


Figure 5-44 Troubleshooting

Click to **Download** the troubleshooting file. This may take a few minutes to gather information and complete the download.

5.1.6.2. System Log

The System Log Viewer utility provides debug information about system services and protocols. If a device fails, logged messages can help operators locate misconfigurations and system errors.

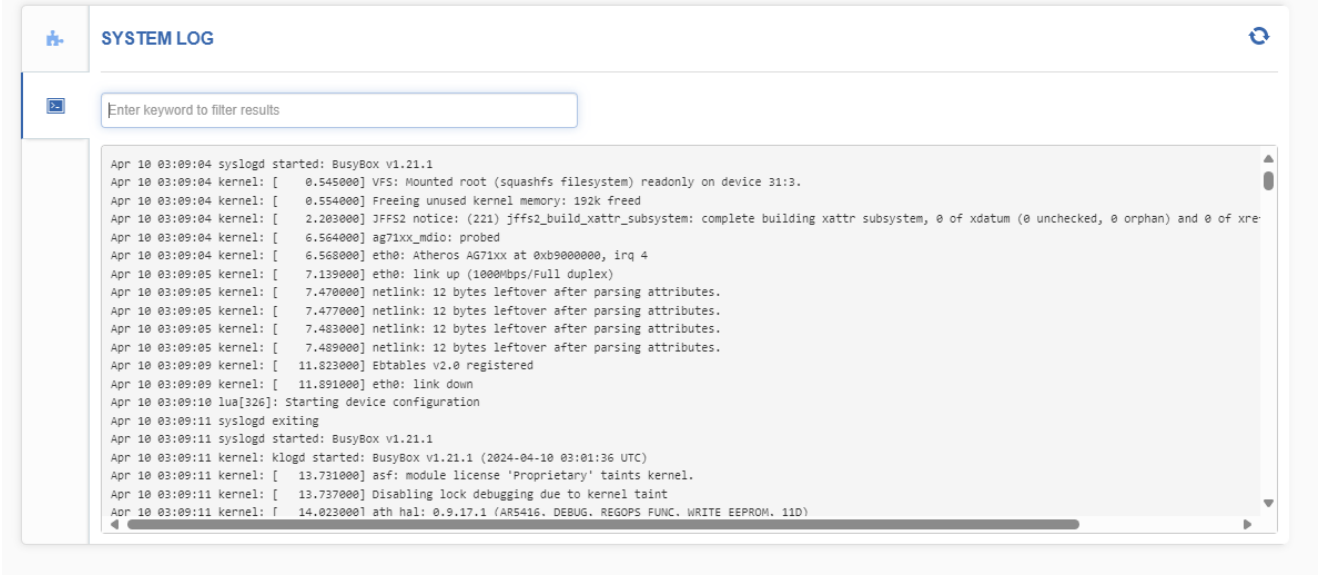


Figure 5-45 System Log

Click the Refresh icon in the upper right corner to view current system messages.

Chapter 6. Quick Connection to a Wireless Network

In the following sections, the **default SSID** of the WBS-900AC is configured to "**default**".

6.1 Windows XP (Wireless Zero Configuration)

Step 1: Right-click on the **wireless network icon** displayed in the system tray

Figure 6-1 System Tray – Wireless Network Icon

Step 2: Select [**View Available Wireless Networks**]

Step 3: Highlight and select the wireless network (SSID) to connect

(1) Select SSID [default]

(2) Click the [**Connect**] button

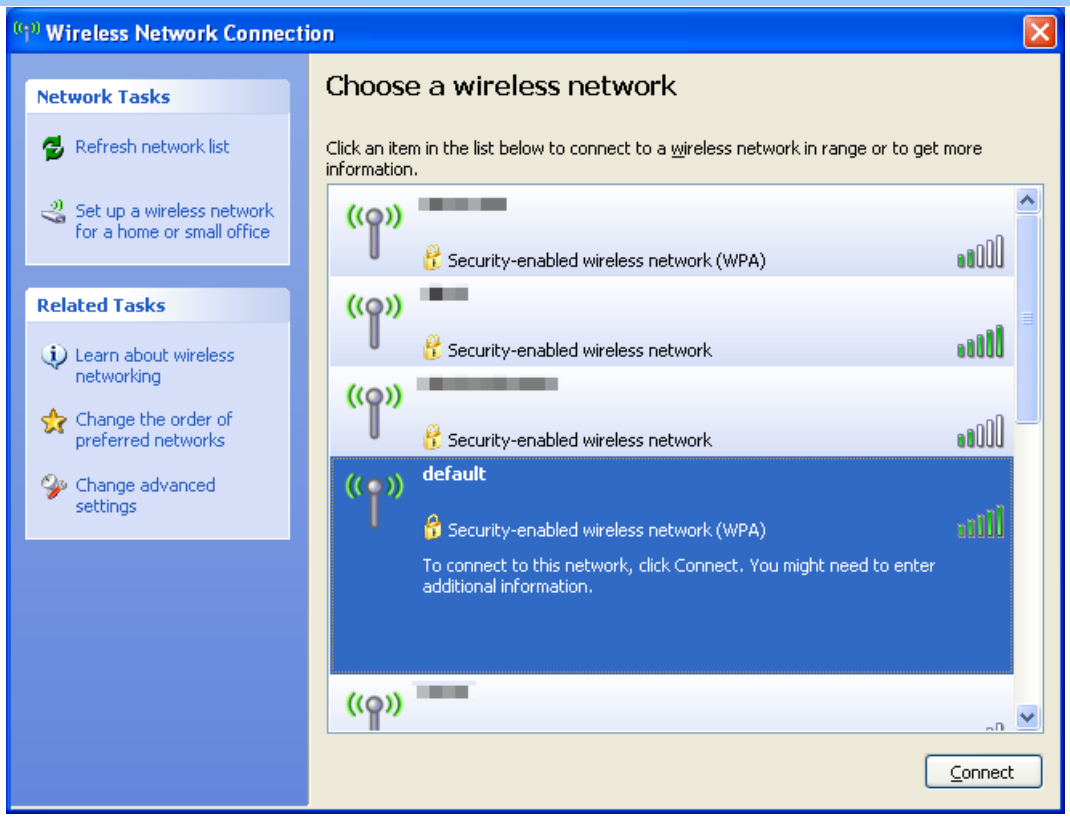


Figure 6-2 Choosing a Wireless Network

Step 4: Enter the **encryption key** of the wireless AP

(1) The Wireless Network Connection box will appear

(2) Enter the encryption key that is configured in section 5.7.1.1

(3) Click the [Connect] button

Figure 6-3 Entering the Network Key

Step 5: Check if "**Connected**" is displayed

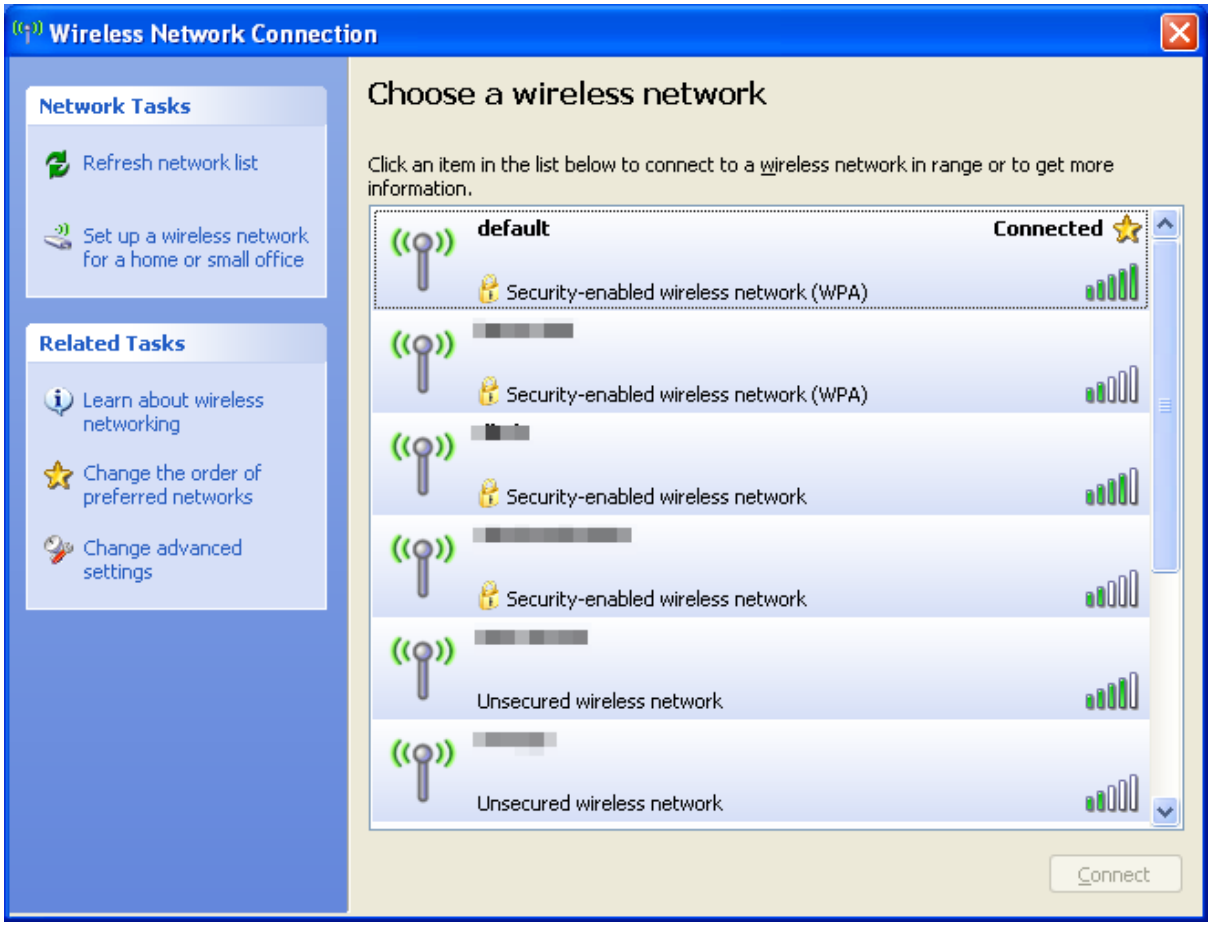


Figure 6-4 Choosing a Wireless Network -- Connected

Note

Some laptops are equipped with a "Wireless ON/OFF" switch for the internal wireless LAN. Make sure the hardware-based wireless switch is switched to "ON" position.

6.2 Windows 7 (WLAN AutoConfig)

WLAN AutoConfig service is built-in in Windows 7 that can be used to detect and connect to wireless network. This built-in wireless network connection tool is similar to wireless zero configuration tool in Windows XP.

Step 1: Right-click on the **network icon** displayed in the system tray

Figure 6-5 Network Icon

Step 2: Highlight and select the wireless network (SSID) to connect

(1) Select SSID [**default**]

(2) Click the [**Connect**] button

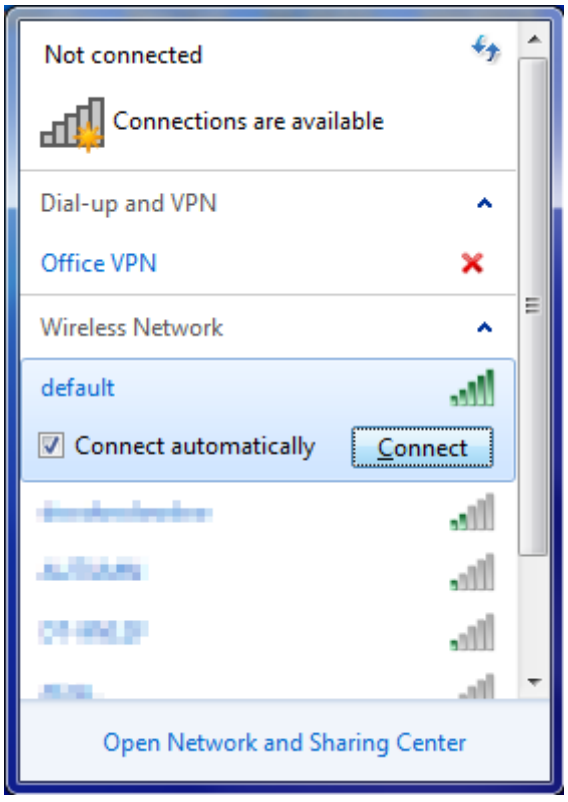


Figure 6-6 WLAN AutoConfig

Note

If you will be connecting to this Wireless AP in the future, check [**Connect automatically**].

Step 3: Enter the **encryption key** of the wireless AP

(1) The Connect to a Network box will appear

(2) Enter the encryption key that is configured in section 5.7.1.1

(3) Click the [OK] button

Figure 6-7 Typing the Network Key

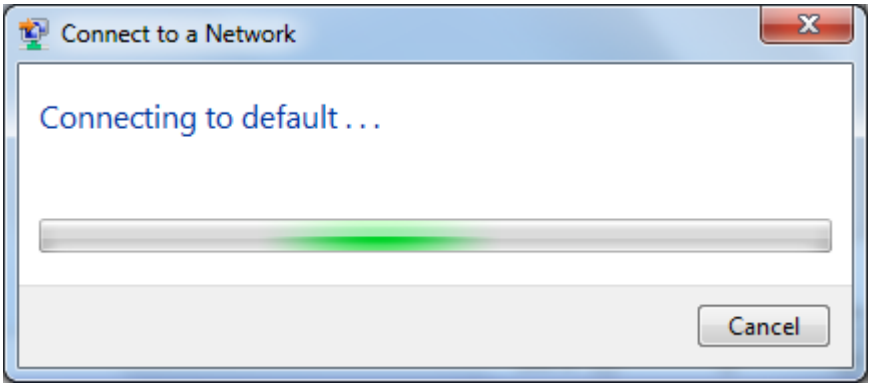


Figure 6-8 Connecting to a Network

Step 4: Check if "**Connected**" is displayed

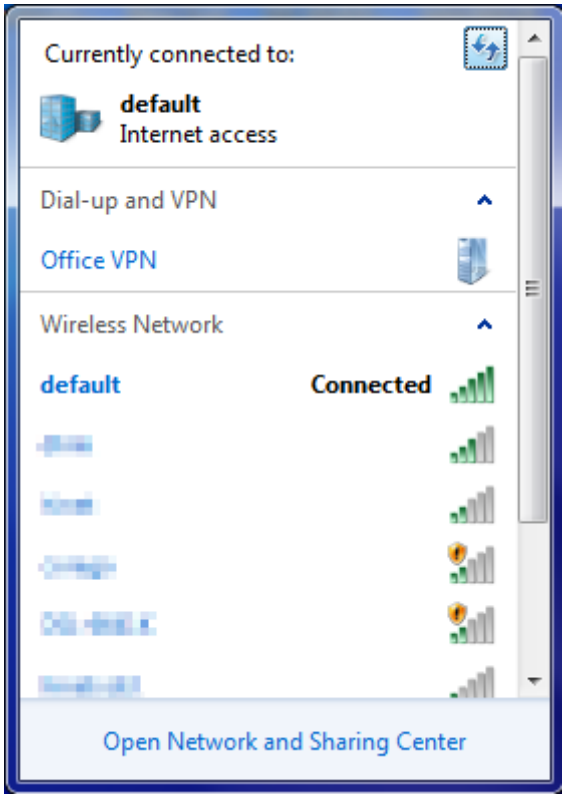


Figure 6-9 Connected to a Network

6.3 Mac OS X 10.x

In the following sections, the default SSID of the WBS-900AC is configured to “default”.

Step 1: Right-click on the **network icon** displayed in the system tray

The AirPort Network Connection menu will appear

Figure 6-10 Mac OS – Network Icon

Step 2: Highlight and select the wireless network (SSID) to connect

(1) Select and SSID [**default**]

(2) Double-click on the selected SSID

Figure 6-11 Highlighting and Selecting the Wireless Network

Step 3: Enter the **encryption key** of the wireless AP

(1) Enter the encryption key that is configured in section 5.7.1.1

(2) Click the [OK] button

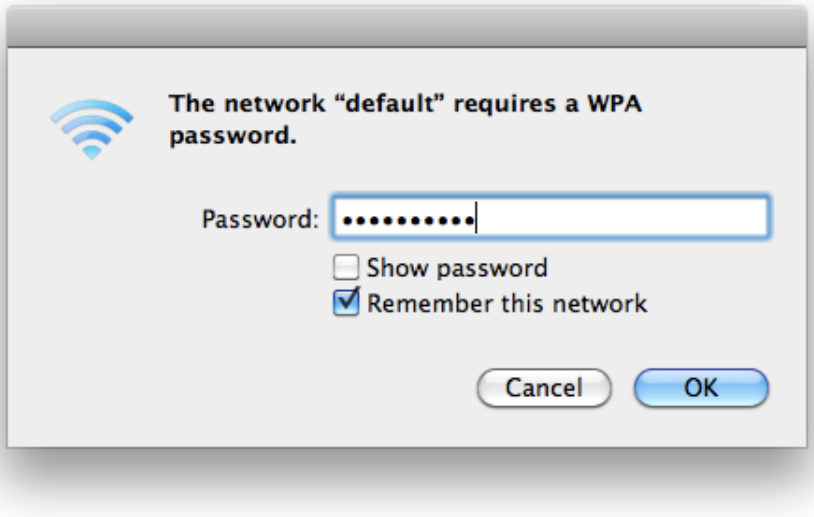


Figure 6-12 Enter the Password

Note

If you will be connecting to this Wireless AP in the future, check [**Remember this network**].

Step 4: Check if the AirPort is connected to the selected wireless network.

If "Yes", then there will be a "check" symbol in front of the SSID.

Figure 6-13 Connected to the Network

There is another way to configure the MAC OS X wireless settings:

Step 1: Click and open the [**System Preferences**] by going to **Apple** > **System Preference** or **Applications**

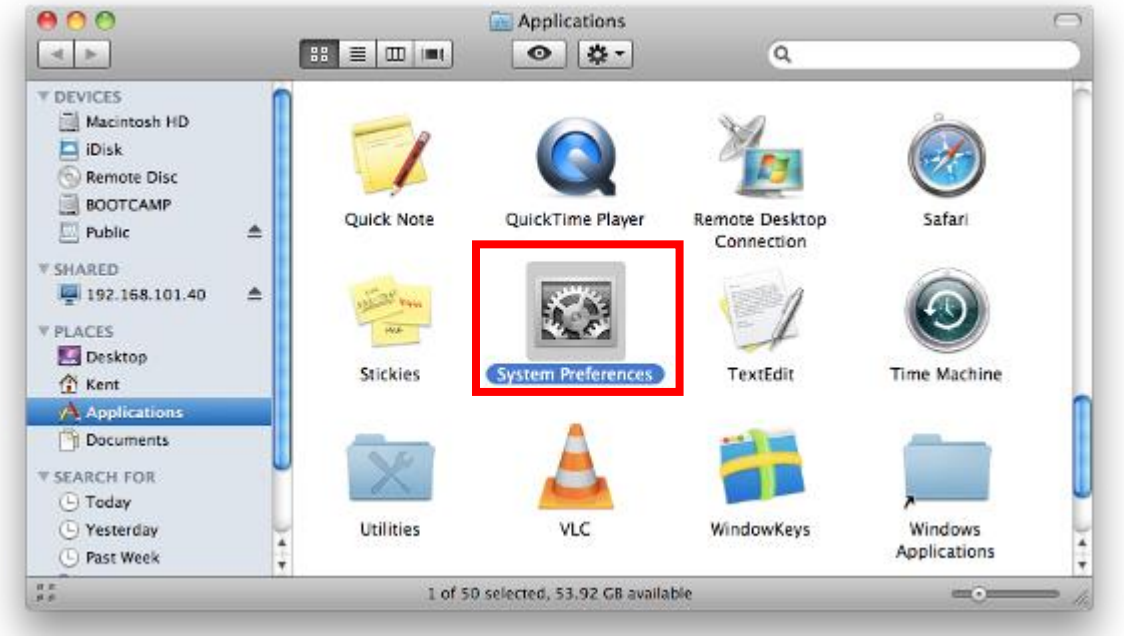


Figure 6-14 System Preferences

Step 2: Open **Network Preference** by clicking on the [**Network**] icon

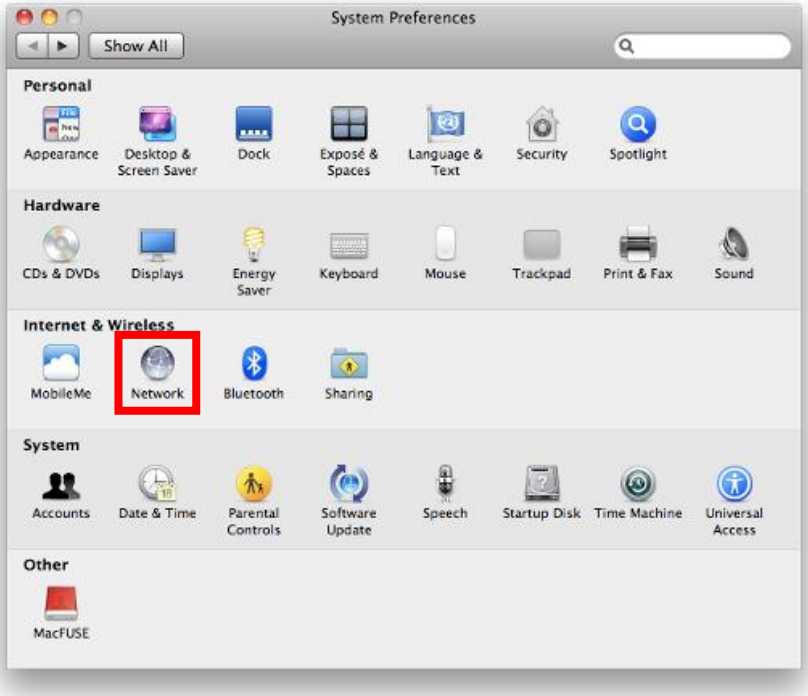


Figure 6-15 System Preferences -- Network

Step 3: Check Wi-Fi setting and select the available wireless network

(1) Choose the **AirPort** on the left menu (make sure it is ON)

(2) Select Network Name [**default**] here

If this is the first time to connect to the Wireless AP, it should show “No network selected”.

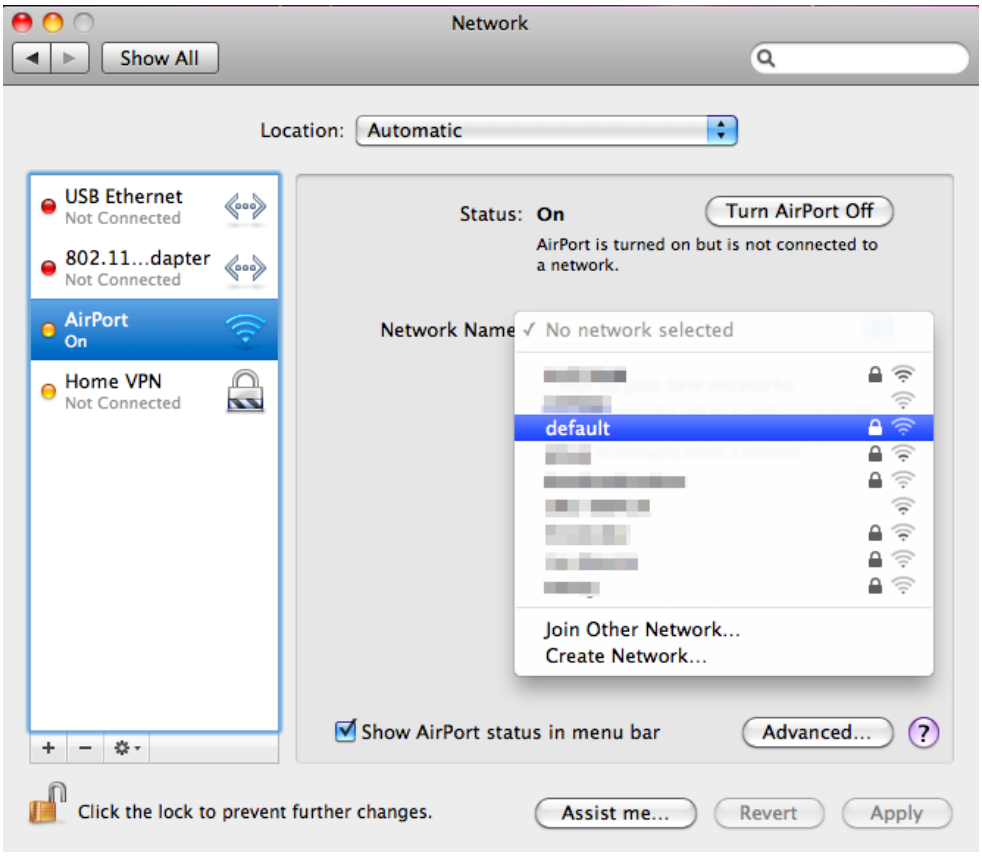


Figure 6-16 Selecting the Wireless Network

6.4 iPhone/iPod Touch/iPad

In the following sections, the **default SSID** of the WBS-900AC is configured to "**default**".

Step 1: Tap the [**Settings**] icon displayed in the home screen

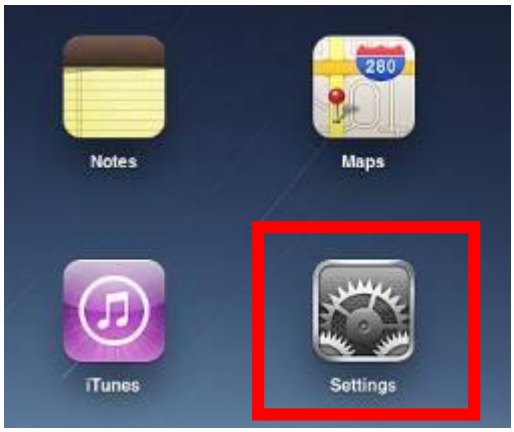


Figure 6-17 iPhone – Settings icon

Step 2: Check Wi-Fi setting and select the available wireless network

(1) Tap [**General**] \ [**Network**]

(2) Tap [**Wi-Fi**]

If this is the first time to connect to the Wireless AP, it should show "Not Connected".

Figure 6-18 Wi-Fi Setting

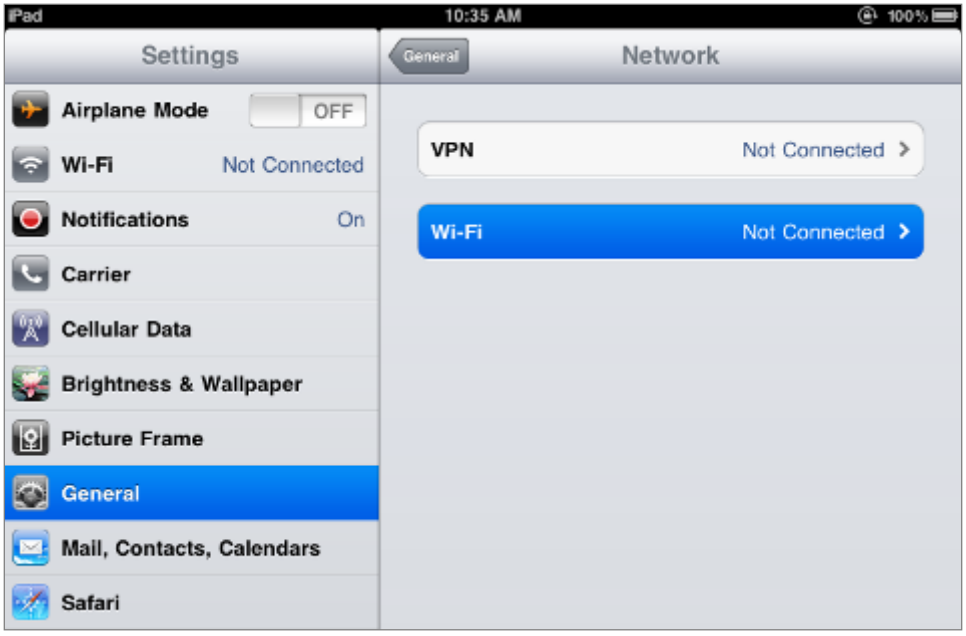


Figure 6-19 Wi-Fi Setting – Not Connected

Step 3: Tap the target wireless network (SSID) in "**Choose a Network…**"

(1) Turn on Wi-Fi by tapping "**Wi-Fi**"

(2) Select SSID [**default**]

Figure 6-20 Turning on Wi-Fi

Step 4: Enter the **encryption key** of the Wireless AP

(1) The password input screen will be displayed

(2) Enter the encryption key that is configured in section 5.7.1.1

(3) Tap the [**Join**] button

Figure 6-21 iPhone -- Entering the Password

Step 5: Check if the device is connected to the selected wireless network.

If “Yes”, then there will be a “check” symbol in front of the SSID.

Figure 6-22 iPhone -- Connected to the Network

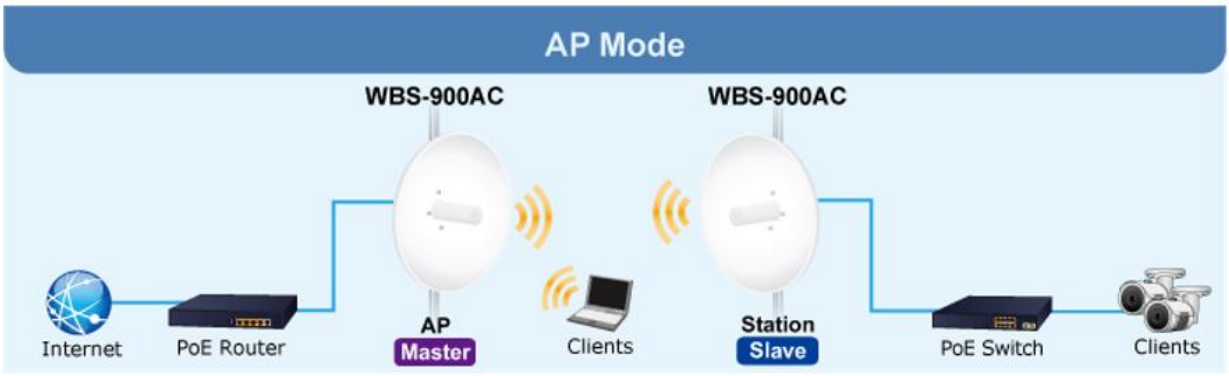
Note

The fields in white background can be modified directly and then you can apply the new setting by clicking “**Update Device**”.

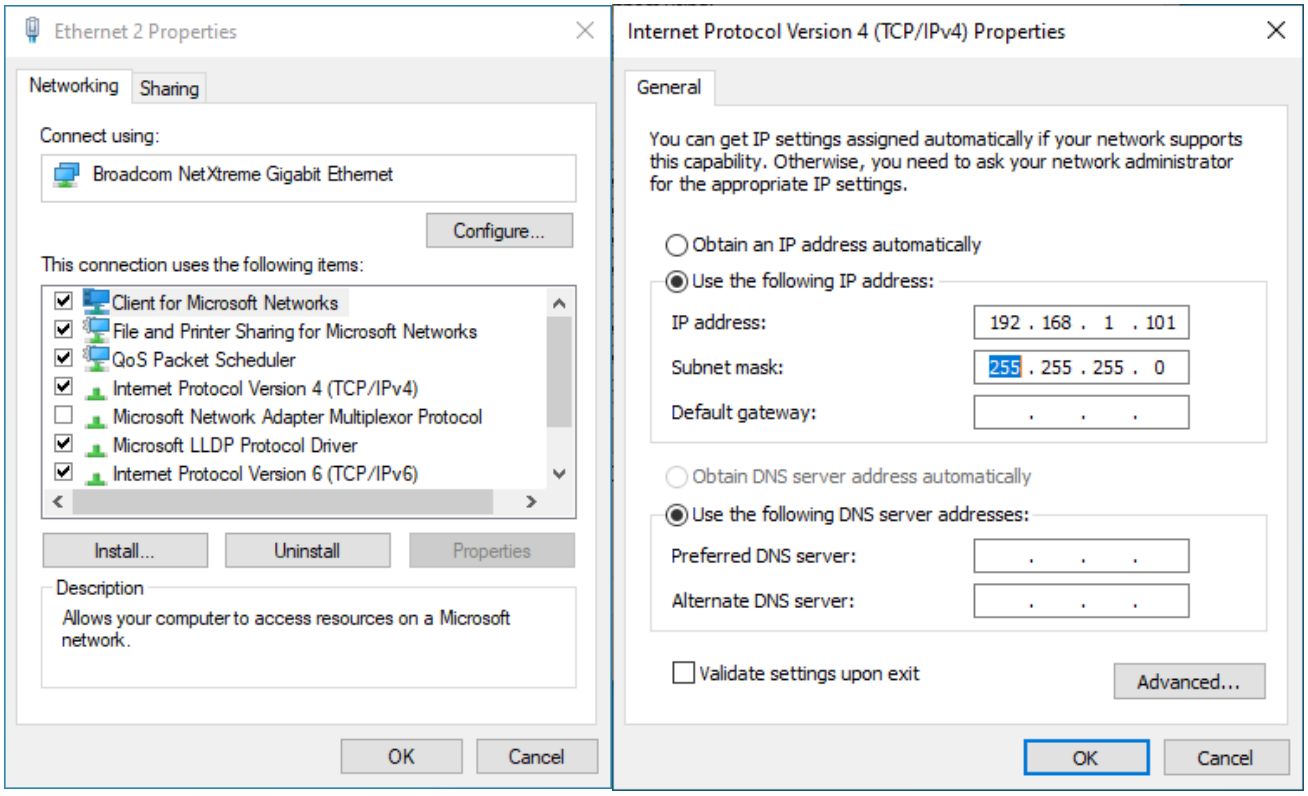
Appendix A: FAQs

Q: How to set up the AP Client Connection

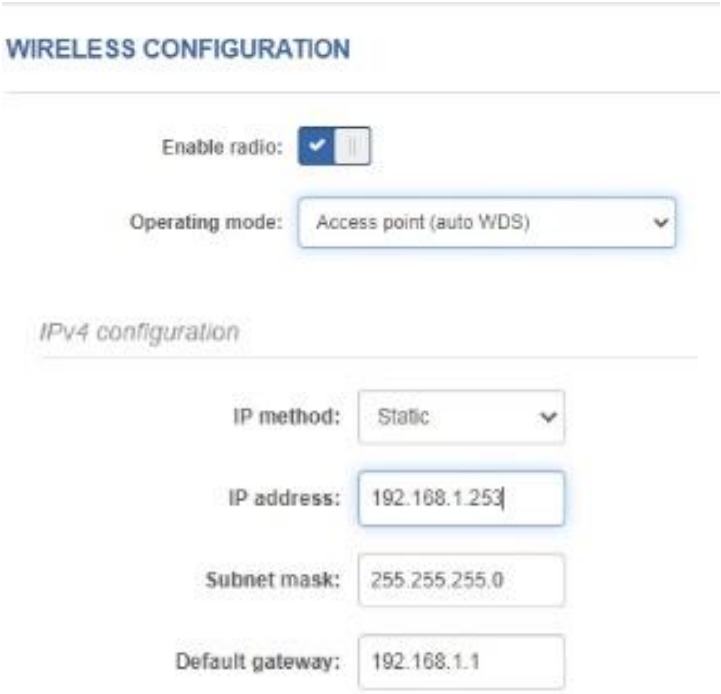
Topology:



Step 1 Use static IP in the PCs that are connected with AP-1 (Site-1) and AP-2 (Site-2). In this case, Site-1 is "**192.168.1.101**", and Site-2 is "**192.168.1.201**".



Step 2. In AP-1, change Operating mode to **Access point (Auto WDS)** and set the IP to **192.168.1.253**.



Step 3. In AP-2, change Operating mode to **Station (WDS/TDMP3)** and set the IP to **192.168.1.100**.

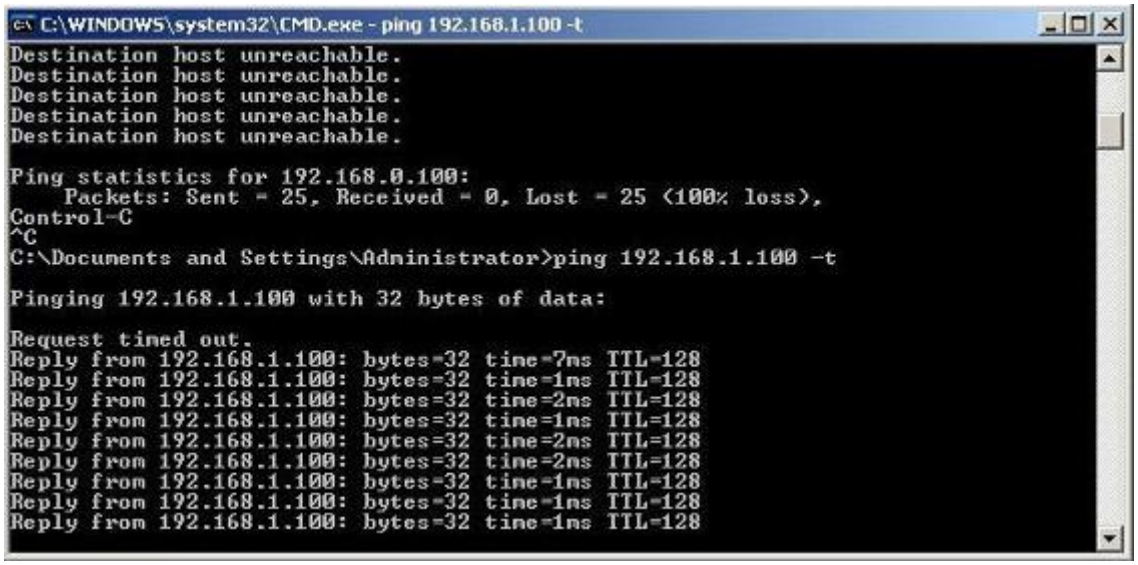
Step 4. In AP-2, Click the icon  to edit Station wireless settings .

Step 5. Click the Search button or input the SSID of AP-1 to finish the setting.

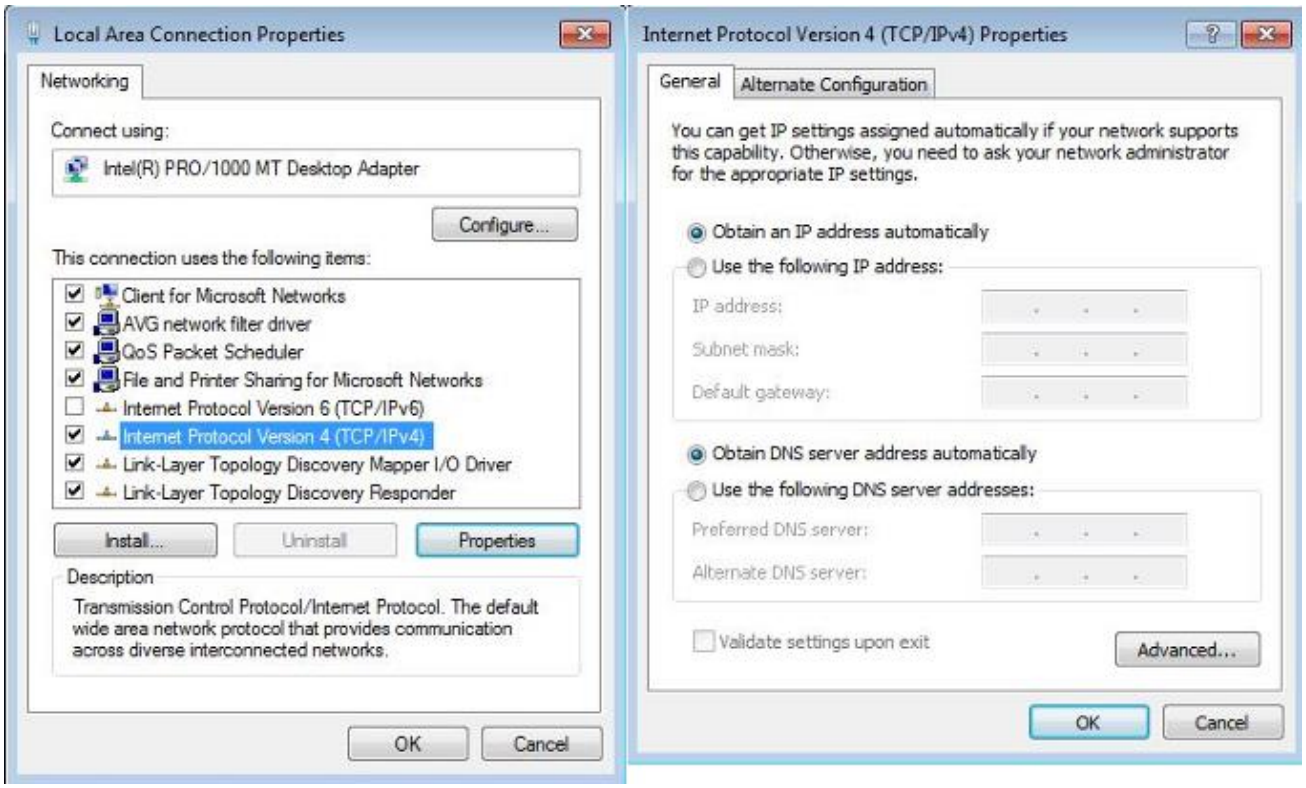
Step 6. Go to check the LED of wireless signal if it lights up or not.

Step 7. Use command line tool to ping each other to ensure the link is successfully established.

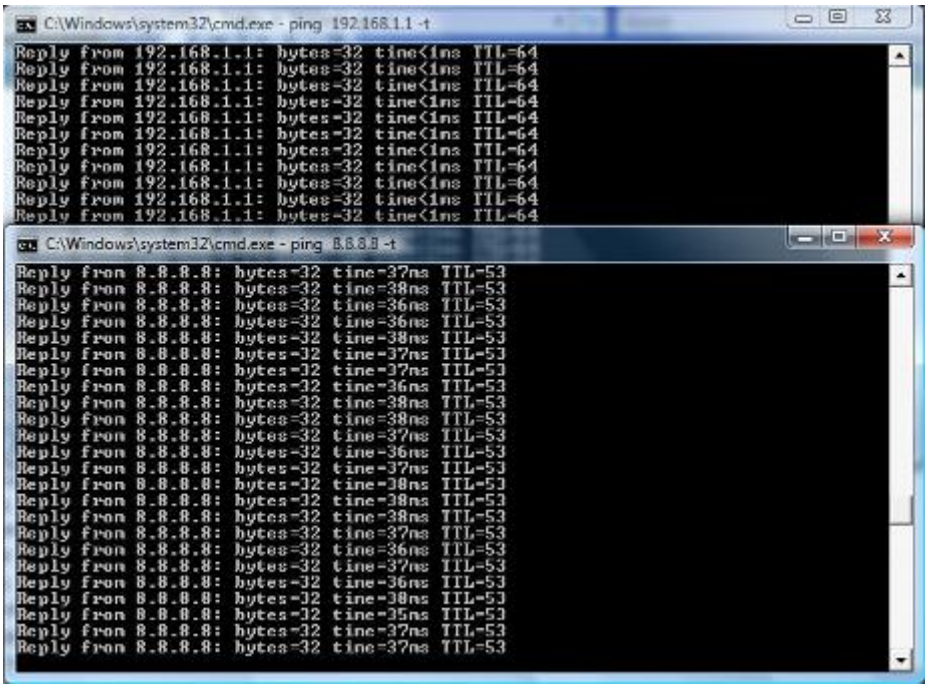
In Site-1, the ping is 192.168.1.200 and in Site-2, the ping is 192.168.1.100.



Step 9. Configure the TCP/IP settings of Site-2 to "**Obtain an IP address automatically**".



Step 10. Use command line tool to ping the DNS (e.g., Google) to ensure Site-2 can access internet through the wireless connection.



Note

The following hints should be noted:

1) The encryption method must be the same as that of both sites if configured.
2) Both sites should be Line-of-Sight.
3) For the short distance connection less than 1km, please reduce the "RF Output Power" of both sites.
4) For the long distance connection over 1km, please adjust the "Distance" to the actual distance or double the actual distance.

Appendix B: Troubleshooting

If you find the AP is working improperly or stops responding to you, please read this troubleshooting first before contacting the dealer for help. Some problems can be solved by yourself within a very short time.

Scenario	Solution
The AP is not responding to me when I want to access it by Web browser.	a. Please check the connection of the power cord and the Ethernet cable of this AP. All cords and cables should be correctly and firmly inserted into the AP. b. If all LEDs on this AP are off, please check the status of power adapter, and make sure it is correctly powered. c. You must use the same IP address section where AP uses. d. Are you using MAC or IP address filter? Try to connect the AP with another computer and see if it works; if not, please reset the AP to the factory default settings by pressing the 'reset' button for over 7 seconds. e. Use the Smart Discovery Tool to see if you can find the AP or not. f. If you did a firmware upgrade and this happens, contact your dealer for help. g. If all the solutions above don't work, contact the dealer for help.
I can't locate my AP by my wireless device.	a. 'Broadcast ESSID' set to off? b. Both two antennas are properly secured. c. Are you too far from your AP? Try to get closer. d. Please remember that you have to input ESSID on your wireless client manually, if ESSID broadcast is disabled.
File downloading is very slow or breaks frequently.	a. Are you using QoS function? Try to disable it and try again. b. Internet is slow sometimes. Please be patient. c. Try to reset the AP and see if it's better after that. d. Try to know what computers do on your local network. If someone's transferring big files, other users may experience slow Internet usage. e. If the above are not the problems, call you Internet service provider to check if there is something wrong with their network.
I can't log into the web	a. Make sure you're connecting to the correct IP address of the AP!

management interface; the password is wrong.	b. Password is case-sensitive. Make sure the 'Caps Lock' light is not illuminated. c. If you really forget the password, do a reset.
The AP becomes hot	a. This is not a malfunction, if you can keep your hand on the AP's case. b. If you smell something wrong or see the smoke coming out from AP, please disconnect the AP and power source from utility power (make sure it's safe before you're doing this!), and call your dealer for help.

Appendix C: Glossary

- **802.11ac** - 802.11ac is a wireless networking standard in the 802.11 family (which is marketed under the brand name Wi-Fi), developed in the IEEE Standards Association process, providing high-throughput wireless local area networks (WLANs) on the 5 GHz band.
- **802.11n -** 802.11n builds upon previous 802.11 standards by adding MIMO (multiple-input multiple-output). MIMO uses multiple transmitter and receiver antennas to allow for increased data throughput via spatial multiplexing and increased range by exploiting the spatial diversity, perhaps through coding schemes like Alamouti coding. The Enhanced Wireless Consortium (EWC) [3] was formed to help accelerate the IEEE 802.11n development process and promote a technology specification for interoperability of next-generation wireless local area networking (WLAN) products.
- **802.11a** - 802.11a was an amendment to the IEEE 802.11 wireless local network specifications that defined requirements for an orthogonal frequency division multiplexing (OFDM) communication system. It was originally designed to support wireless communication in the unlicensed national information infrastructure (U-NII) bands (in the 5–6 GHz frequency range) as regulated in the United States by the Code of Federal Regulations, Title 47, Section 15.407.
- **802.11b -** The 802.11b standard specifies a wireless networking at 11 Mbps using direct-sequence spread-spectrum (DSSS) technology and operating in the unlicensed radio spectrum at 2.4GHz, and WEP encryption for security. 802.11b networks are also referred to as Wi-Fi networks.
- **802.11g -** specification for wireless networking at 54 Mbps using direct-sequence spread-spectrum (DSSS) technology, using OFDM modulation and operating in the unlicensed radio spectrum at 2.4GHz, and backward compatibility with IEEE 802.11b devices, and WEP encryption for security.
- **DDNS** (**D**ynamic **D**omain **N**ame **S**ystem) **-** The capability of assigning a fixed host and domain name to a dynamic Internet IP Address.
- **DHCP** (**D**ynamic **H**ost **C**onfiguration **P**rotocol) **-** A protocol that automatically configure the TCP/IP parameters for the all the PC(s) that are connected to a DHCP server.
- **DMZ** (**De**militarized **Z**one) **-** A Demilitarized Zone allows one local host to be exposed to the Internet for a special-purpose service such as Internet gaming or videoconferencing.
- **DNS** (**D**omain **N**ame **S**ystem) **-** An Internet Service that translates the names of websites into IP addresses.
- **Domain Name -** A descriptive name for an address or group of addresses on the Internet.
- **DSL** (**D**igital **S**ubscriber **L**ine) **-** A technology that allows data to be sent or received over existing traditional phone lines.
- **ISP** (**I**nternet **S**ervice **P**rovider) **-** A company that provides access to the Internet.

- **MTU** (**Maximum Transmission Unit**) **-** The size in bytes of the largest packet that can be transmitted.
- **NAT** (**N**etwork **A**ddress **T**ranslation) **-** NAT technology translates IP addresses of a local area network to a different IP address for the Internet.
- **PPPoE** (**P**oint to **P**oint **P**rotocol **o**ver **E**thernet) **-** PPPoE is a protocol for connecting remote hosts to the Internet over an always-on connection by simulating a dial-up connection.
- **SSID -** A **S**ervice **S**et **Id**entification is a thirty-two character (maximum) alphanumeric key identifying a wireless local area network. For the wireless devices in a network to communicate with each other, all devices must be configured with the same SSID. This is typically the configuration parameter for a wireless PC card. It corresponds to the ESSID in the wireless Access Point and to the wireless network name.
- **WEP** (**W**ired **E**quivalent **P**rivacy) **-** A data privacy mechanism based on a 64-bit or 128-bit or 152-bit shared key algorithm, as described in the IEEE 802.11 standard.
- **Wi-Fi -** A trade name for the 802.11b wireless networking standard, given by the Wireless Ethernet Compatibility Alliance (WECA, see http://www.wi-fi.net), an industry standards group promoting interoperability among 802.11b devices.
- **WLAN** (**W**ireless **L**ocal **A**rea **N**etwork) **-** A group of computers and associated devices communicate with each other wirelessly, which network serving users are limited in a local area.

EC Declaration of Conformity

English	Hereby, **PLANET Technology Corporation,** declares that this **900Mbps 802.11ac Wireless Outdoor CPE** is in compliance with the essential requirements and other relevant provisions of Directive **2014/53/EU**.	**Lietuviškai**	Šiuo **PLANET Technology Corporation,**, skelbia, kad **900Mbps 802.11ac Wireless Outdoor CPE** tenkina visus svarbiausius **2014/53/EU** direktyvos reikalavimus ir kitas svarbias nuostatas.
Česky	Společnost **PLANET Technology Corporation,** tímto prohlašuje, že tato **900Mbps 802.11ac Wireless Outdoor CPE** splňuje základní požadavky a další příslušná ustanovení směrnice **2014/53/EU**.	**Magyar**	A gyártó **PLANET Technology Corporation**, kijelenti, hogy ez a **900Mbps 802.11ac Wireless Outdoor CPE** megfelel az **2014/53/EK** irányelv alapkövetelményeinek és a kapcsolódó rendelkezéseknek.
Dansk	**PLANET Technology Corporation,** erklærer herved, at følgende udstyr **900Mbps 802.11ac Wireless Outdoor CPE** overholder de væsentlige krav og øvrige relevante krav i direktiv **2014/53/EU**	**Malti**	Hawnhekk, **PLANET Technology Corporation,** jiddikjara li dan **900Mbps 802.11ac Wireless Outdoor CPE** jikkonforma mal-ħtiġijiet essenzjali u ma provvedimenti oħrajn relevanti li hemm fid-Dirrettiva **2014/53/EU**
Deutsch	Hiermit erklärt **PLANET Technology Corporation,** dass sich dieses Gerät **900Mbps 802.11ac Wireless Outdoor CPE** in Übereinstimmung mit den grundlegenden Anforderungen und den anderen relevanten Vorschriften der Richtlinie **2014/53/EU** befindet". (BMWi)	**Nederlands**	Hierbij verklaart , **PLANET Technology orporation,** dat **900Mbps 802.11ac Wireless Outdoor CPE** in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn **2014/53/EU**
Eestikeeles	Käesolevaga kinnitab **PLANET Technology Corporation,** et see **900Mbps 802.11ac Wireless Outdoor CPE** vastab Euroopa Nõukogu direktiivi **2014/53/EU** põhinõuetele ja muudele olulistele tingimustele.	**Polski**	Niniejszym firma **PLANET Technology Corporation,** oświadcza, że 900Mbps 802.11ac Wireless Outdoor CPE spełnia wszystkie istotne wymogi i klauzule zawarte w dokumencie „Directive **2014/53/EU**”.
Ελληνικά	*ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ* , **PLANET Technology Corporation,** *ΔΗΛΩΝΕΙ ΟΤΙ ΑΥΤΟ* **900Mbps 802.11ac Wireless Outdoor CPE***ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ* *ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ* **2014/53/EU**	**Português**	**PLANET Technology Corporation**, declara que este **900Mbps 802.11ac Wireless Outdoor CPE** está conforme com os requisitos essenciais e outras disposições da Directiva **2014/53/EU.**
Español	Por medio de la presente, **PLANET Technology Corporation,** declara que **900Mbps 802.11ac Wireless Outdoor CPE** cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva **2014/53/EU**	**Slovensky**	Výrobca **PLANET Technology Corporation,** týmto deklaruje, že táto **900Mbps 802.11ac Wireless Outdoor CPE** je v súlade so základnými požiadavkami a ďalšími relevantnými predpismi smernice **2014/53/EU**.
Français	Par la présente, **PLANET Technology Corporation,** déclare que les appareils du **900Mbps 802.11ac Wireless Outdoor CPE** sont conformes aux exigences essentielles et aux autres dispositions pertinentes de la directive **2014/53/EU**	**Slovensko**	**PLANET Technology Corporation**, **s tem potrjuje,** da je ta **900Mbps 802.11ac Wireless Outdoor CPE** skladen/a z osnovnimi zahtevami in ustreznimi določili Direktive **2014/53/EU.**
Italiano	Con la presente , **PLANET Technology Corporation,** dichiara che questo **900Mbps 802.11ac Wireless Outdoor CPE** è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva **2014/53/EU**.	**Suomi**	**PLANET Technology Corporation,** vakuuttaa täten että **900Mbps 802.11ac Wireless Outdoor CPE** tyyppinen laite on direktiivin **2014/53/EU** oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.
Latviski	Ar šo **PLANET Technology Corporation,** apliecina, ka šī **900Mbps 802.11ac Wireless Outdoor CPE** atbilst Direktīvas **2014/53/EU** pamatprasībām un citiem atbilstošiem noteikumiem.	**Svenska**	Härmed intygar, **PLANET Technology Corporation,** att denna **900Mbps 802.11ac Wireless Outdoor CPE** står i överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv **2014/53/EU.**