5G CPE BOX
User Manual

Controlled Version Number: V1.0

Release Date: 2021/03/03

Revision History

Version Number	Date	Reason for Revision
V1.0	2021-03-03	First Edition

Contents

1 Product Description

1.1 Product Overview

5G CPE BOX is a 5G BOX product designed for in-vehicle applications. It can convert 5G wireless signals into Gigabit Ethernet, USB 3.1 and Wi-Fi 6 signals, providing stable and high-speed 5G access for in-vehicle devices and passengers.

The product integrates the latest generation Qualcomm Snapdragon SDX55 baseband chip, complies with 3GPP Release 15 standard, and can support independent networking (SA) and non-independent networking (NSA) network deployments. Covering the 5G commercial network frequency bands of major global regions and operators, it is compatible with the 3G/4G multiple networks to meet Mobile scenario requirements. The product also integrates the latest generation Qualcomm Wi-Fi 6 chip QCA6391, adopts 2x2 MIMO, and supports 2.4G and 5G working simultaneously. The maximum Wi-Fi download rate can reach 1.8Gbps, effectively improve the multi-user access experience.

The product supports hardware and software watchdogs, which can adapt to input voltage fluctuations of 8V~16V. 5G CPE BOX uses a dedicated in-vehicle Ethernet port, which is more reliable and stable in a vibration environment and can be installed by screwing, fixing with adhesive, or sticking on the glass. 5G CPE BOX adopts a built-in radiator design, it can work normally at -30℃ ~ 70℃ and can work stably for a long time in the complex environment of the vehicle.

1.2 Key Technical Features

5G Wireless Network; Super high-speed; Super Low latency; Reliable Performance

- **Support Latest 5G Network**
  Built-in Qualcomm Snapdragon SDX55 baseband chip, and complies with 3GPP Release 15 standard;
  Support two network deployments independent networking (SA) and non-independent networking (NSA);
  5G NR has a maximum downlink rate of 2.1Gbps and a maximum uplink rate of 900Mbps;*
  LTE can support up to Cat20, the maximum downlink rate is up to 2Gbps, and the maximum uplink rate is up to 200Mbps;*
  Support RF MIMO and receive diversity technology to improve communication quality and optimize data transmission speed;

***Note:**
The above rate refers to the theoretical maximum rate in the instrument environment, and the actual rate is related to the network environment.

- **Full Networks connection which also supports with 3G/4G**
  5G CPE BOX can support two network deployments independent networking (SA) and non-independent networking (NSA). Covering the 5G commercial network frequency bands of major

global regions and operators, it is compatible with the 3G/4G network and supports 3/4/5G automatic switching to meet Mobile scenario requirements.

- **Power on automatically, automatic dialing, and zero configuration**

The latest generation of Wi-Fi 6, higher speed, and lower latency

QCA6391 is Qualcomm's latest generation Wi-Fi 6 AP chip. It adopts 2x2 MIMO and can support uplink and downlink MU-MIMO, OFDMA technology, TWT (target wake-up time), BSS Coloring, and other new technologies. The maximum download rate can reach 1.8Gbps and it supports Wi-Fi 2.4G and 5G working simultaneously, supporting 32 users to access at the same time, and effectively improving the multi-user access experience.

In-vehicle Gigabit Ethernet port, USB 3.1 Type-C interface, rich interfaces, and higher reliability

- **Dedicated in-vehicle Gigabit Ethernet interface**
  5G CPE BOX uses a dedicated in-vehicle Gigabit Ethernet interface, using a 10 PIN connection method, all around the Ethernet port is shielded by metal, which can better prevent electromagnetic interference. At the same time, a metal elastic buckle is added to the Ethernet port connector, which can be effectively fixed to ensure the reliable and stable operation of the Ethernet interface in a vibration environment such as a vehicle.
- **USB3.1 Type-C interface**
  Supports USB3.1 Type-C interface, the highest rate of the physical layer can reach 10Gbps, meeting the highest rate requirements of 5G products.
- **Reserve 4 PIN BMW head interface**
  Reserve 4 PIN BMW head interface, which can realize power supply and USB2.0 data communication at the same time.

Support software and hardware watchdogs, multiple guarantees, and high availability

Support hardware and software watchdogs, which can realize fault self-recovery, and double guarantee the high availability of device.

Friendly WEB UI Page

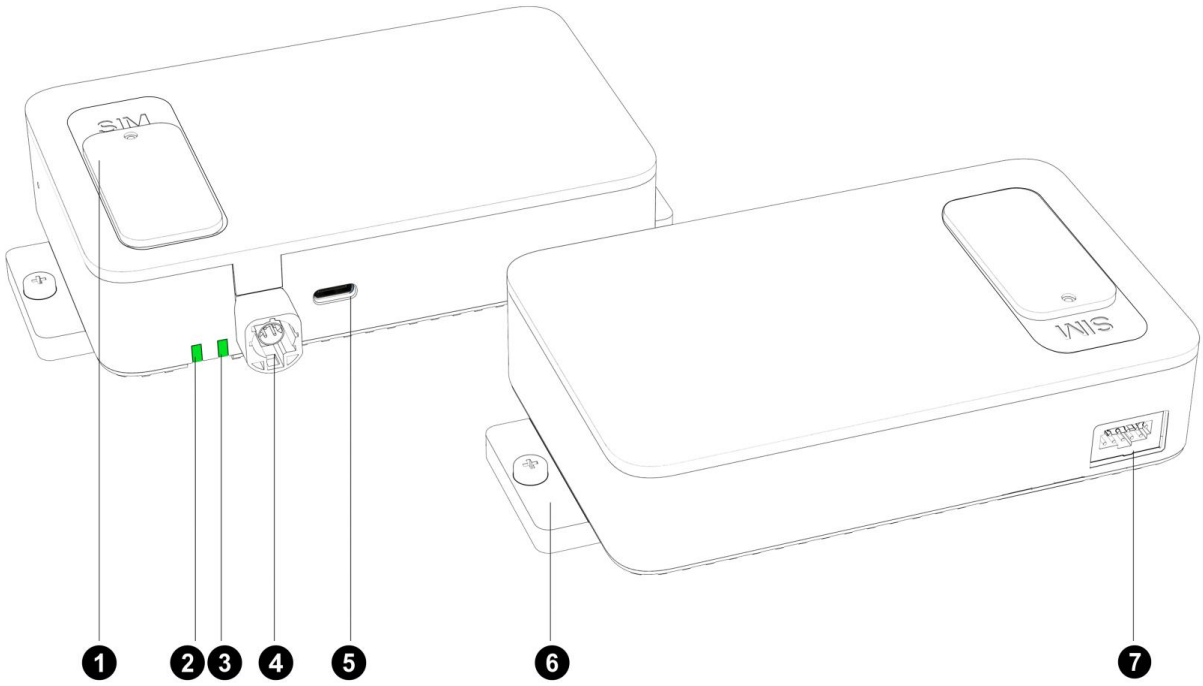
5G CPE BOX provides WEB UI page for network parameter display and network/security settings, which is convenient and simple.

Multiple Fixture Methods

5G CPE BOX provides installation accessories, which can support fixing with screws or adhesive on both sides, and can also support fixing methods such as pasting glass on the front.

2 Appearance

2.1 Product Interfaces



Interface	Description
①	SIM card cover
②	Status indicator: Indicate the status of power on, network, etc.
③	Interface indicator: Indicate the status of Wi-Fi, network port, etc.
④	BMW head interface (reserved interface, not exposed by default)
⑤	USB Interface
⑥	Install fixed accessories
⑦	Gigabit vehicle network port connector

2.2 LED

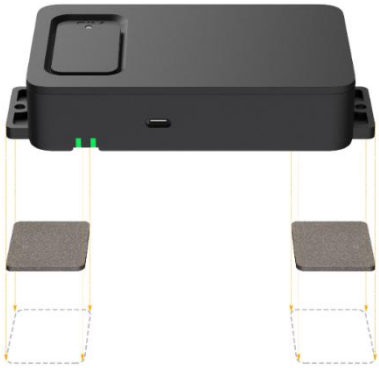
Indicator	Status
Status Indicator	After the device is powered on, the red is always on, and it will be displayed according to the following status after booting: 1) Register 5G network, strong signal, steady blue; 2) Register 5G network, weak signal, blue blinking; 3) Register 4G network, strong signal, steady green; 4) Register 4G network, weak signal, green blinking; 5) Register 3G network, strong signal, steady yellow; 6) Register 3G network, weak signal, yellow blinking; 7) Unregistered network, no network connection, SIM card error or locked, red blinking; 8) When the software is upgraded, the purple blinking;
Interface indicator	1) The network port is connected, steady blue; 2) Wi-Fi is connected, steady green; 3) The Ethernet cable and Wi-Fi are connected at the same time, steady yellow; 4) The Ethernet cable and Wi-Fi are unconnected, and the LED is off.

3 Installation diagram

5G CPE BOX provides installation accessories, which can be installed by screwing or fixing with adhesive.

1) Install the accessories on both sides of the device

2) Fixed with screws on both sides



3) Fixed with adhesive on both sides

4) Fixed with adhesive on the front

4 Product Features

4.1 First boot

1. Open the SIM card cover, after installing the SIM card, close the SIM card cover;
2. Connect the power adapter, the device will power on automatically;
3. Check the status of the device through the LED;
4. The terminal connects to the device by Ethernet cable or Wi-Fi;
5. The terminal can access the Internet, also can log in to the web UI to check and setup the device;

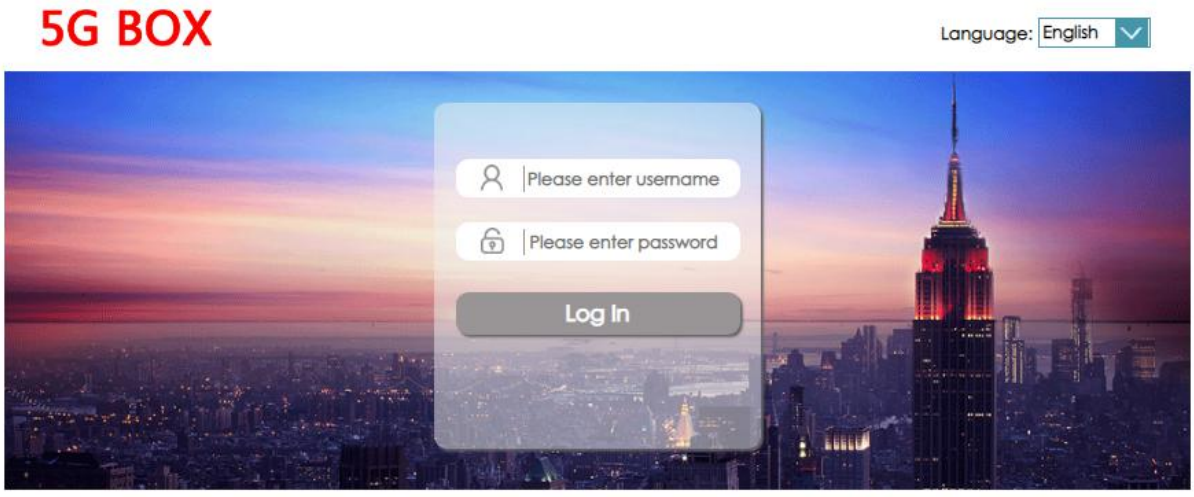
Note:
Please do not insert or remove SIM card when the device is running, as this will damage the SIM card and the device.

4.2 Log in to WebUI

Launch the computer/mobile browser, and enter the gateway address in the address bar. Enter the username and password of the device, and log in to the Web UI.

The default gateway address is: http://192.168.1.1; the default username/password is: **admin/admin**.

It's suggested to change the default login username and password of the WebUI in time to prevent others from tampering with the device settings at will.



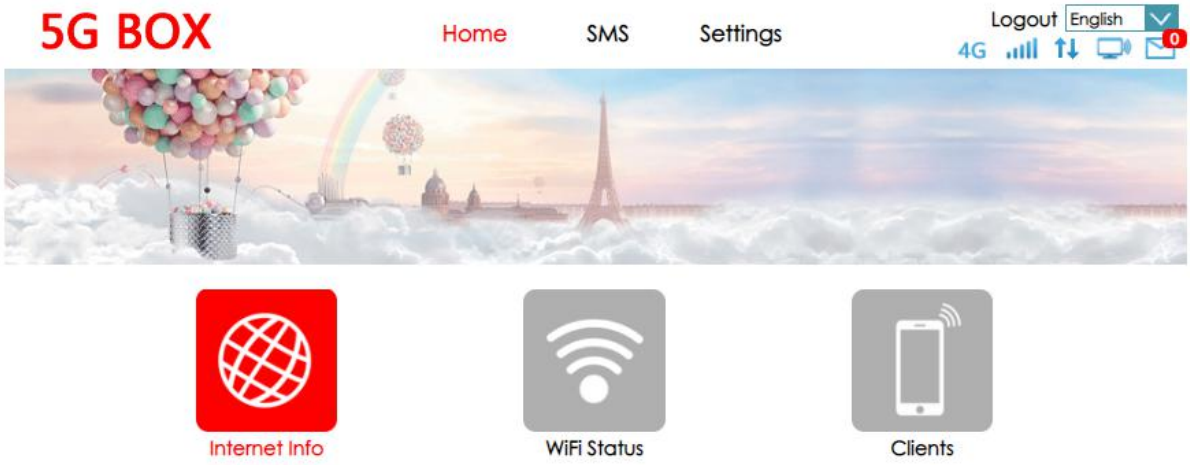
After logging in to the WebUI, the home page is displayed by default. In addition, there are SMS and settings pages

The following will introduce each menu and function one by one.

4.3 Home

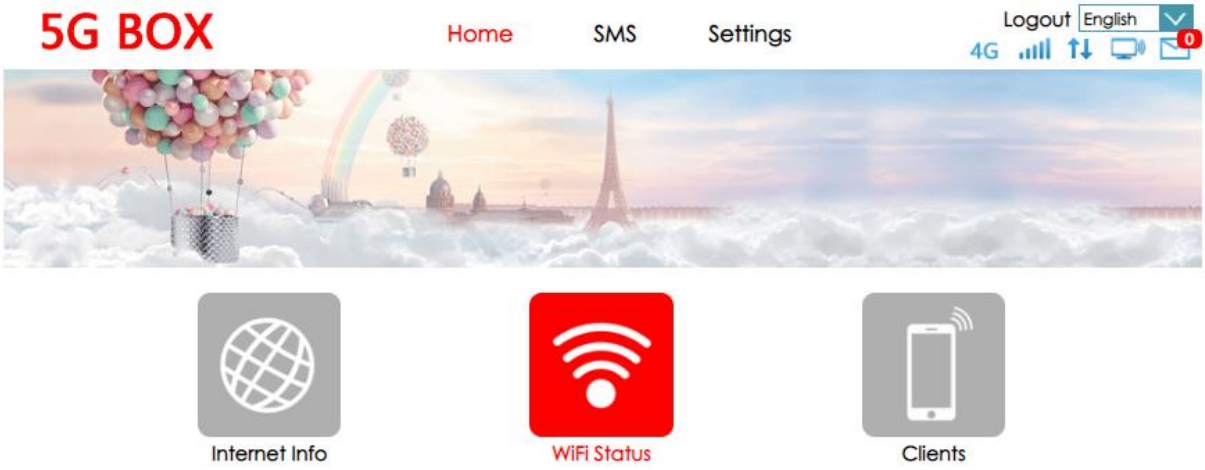
Click the icon on the homepage to view the basic information of the device.

Internet Information： After clicking the  icon, you can view the internet mode, network status, connection uptime, MAC address, IP address and other information.



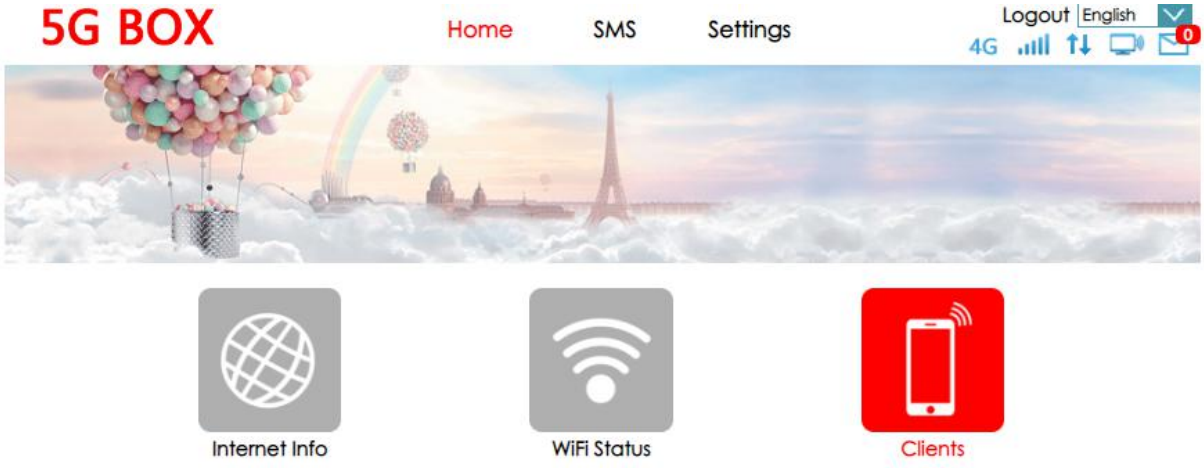
Internet Mode:	Mobile Data
Network Status:	Connected
Connection Uptime:	14 Mins
MAC Address:	A4:D4:B2:60:08:2B
IP Address:	10.234.126.3
Subnet Mask:	255.255.255.248
Default Gateway:	10.234.126.4
Primary DNS Server:	221.11.1.67
Secondary DNS Server:	221.11.1.68
IPv6 Address:	2408:8470:a03:990f:5b2:a767:319c:3319
IPv6 Primary DNS Server:	2408:8888::8
IPv6 Secondary DNS Server:	2408:8899::8

Wi-Fi Status: Click the  icon to view the SSID and password information of Wi-Fi 2.4G and Wi-Fi 5G.



Wi-Fi 2.4G	
Status:	Enabled
Wi-Fi Name(SSID):	5G-Box-2G-
Password:	12345678
Wi-Fi 5G	
Status:	Enabled
Wi-Fi Name(SSID):	5G-Box-5G-
Password:	12345678

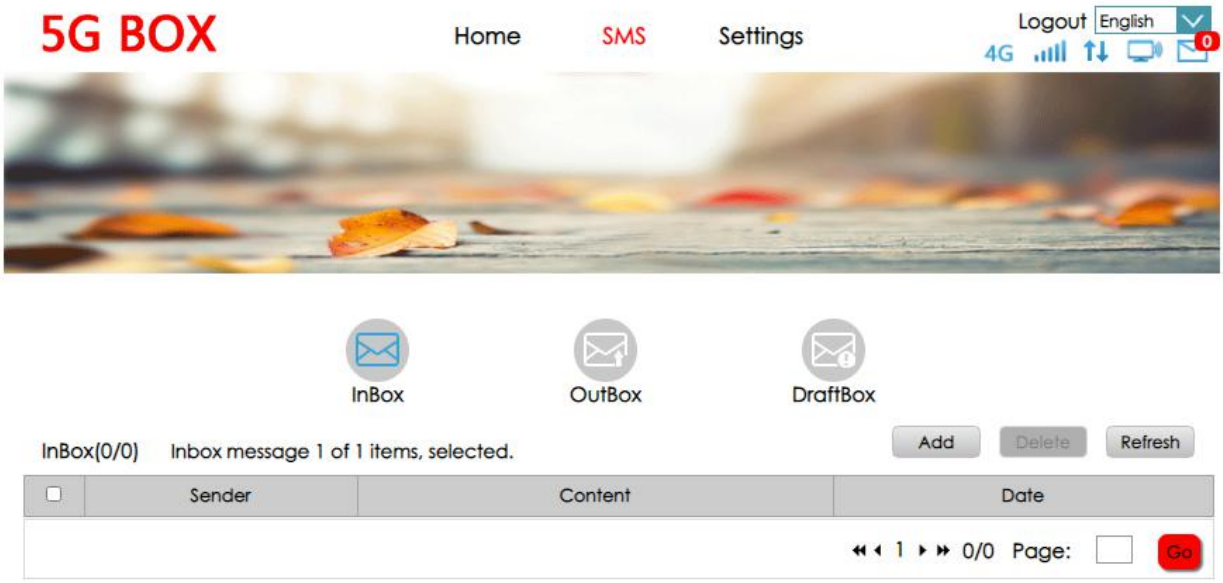
Clients: Click the  icon to view the host name, MAC address and IP address of the currently connected terminal.



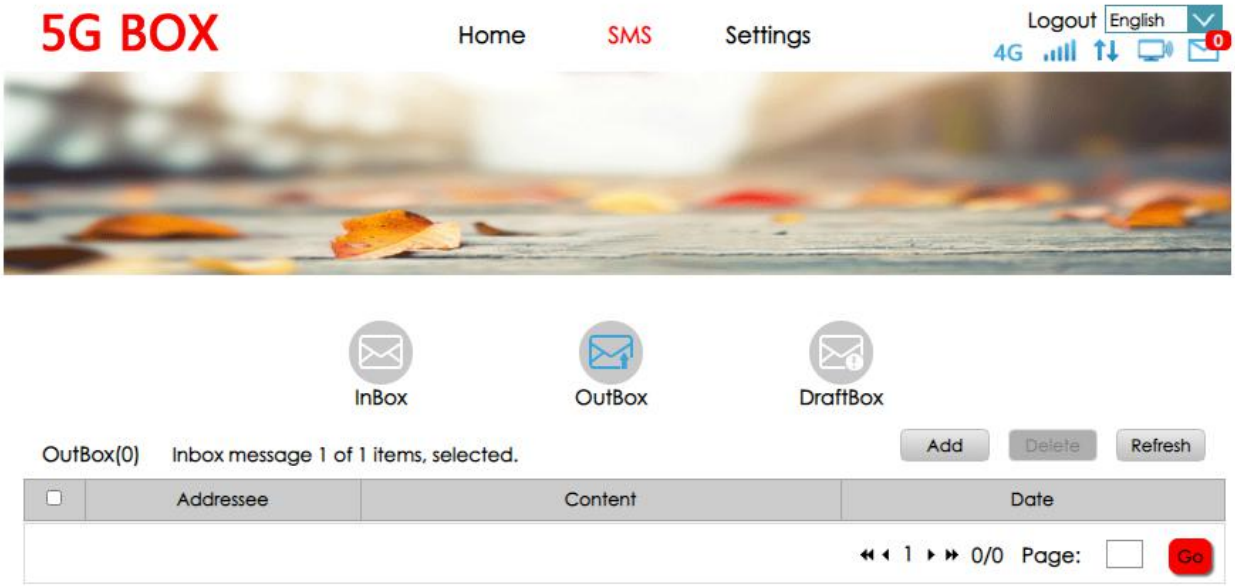
index	hostname	Mac	IP
1	CN-20201110NXNS	5a:0f:b0:21:e8:98	192.168.1.111

4.4 SMS

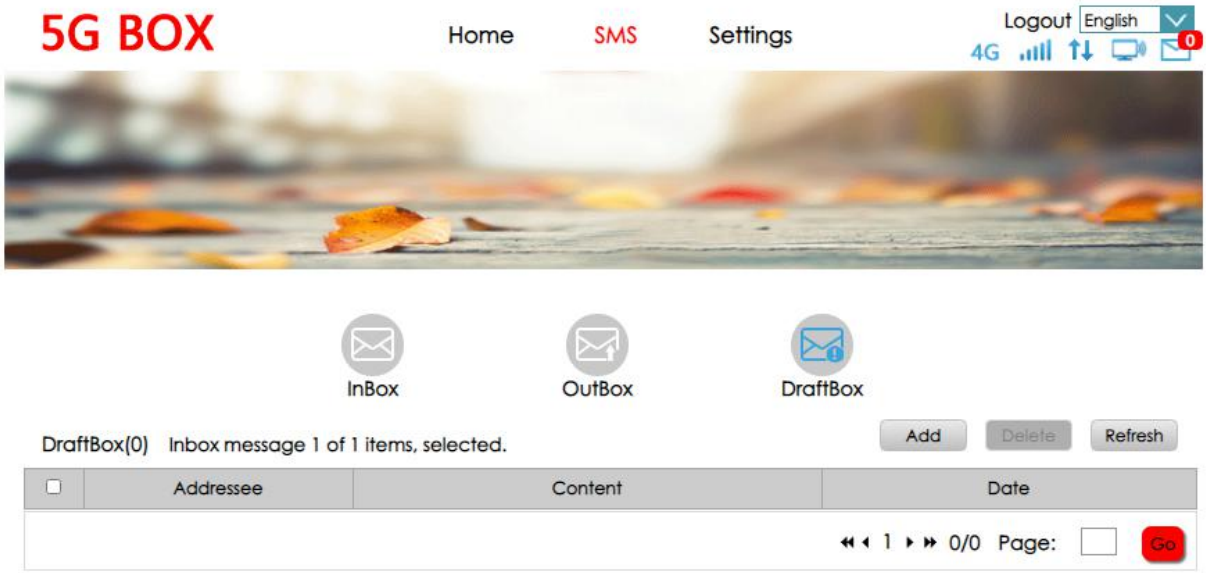
InBox: Click the  icon to view the messages received by the device.



OutBox: Click the  icon to view the messages sent by the device.



DraftBox: Click the  icon to view draft messages saved in the device.



4.5 Settings

4.5.1 Internet

4.5.1.1 Mobile Connection

Through the mobile connection menu, you can configure the device's mobile network, data roaming, network mode, network search mode, and APN parameters, etc.

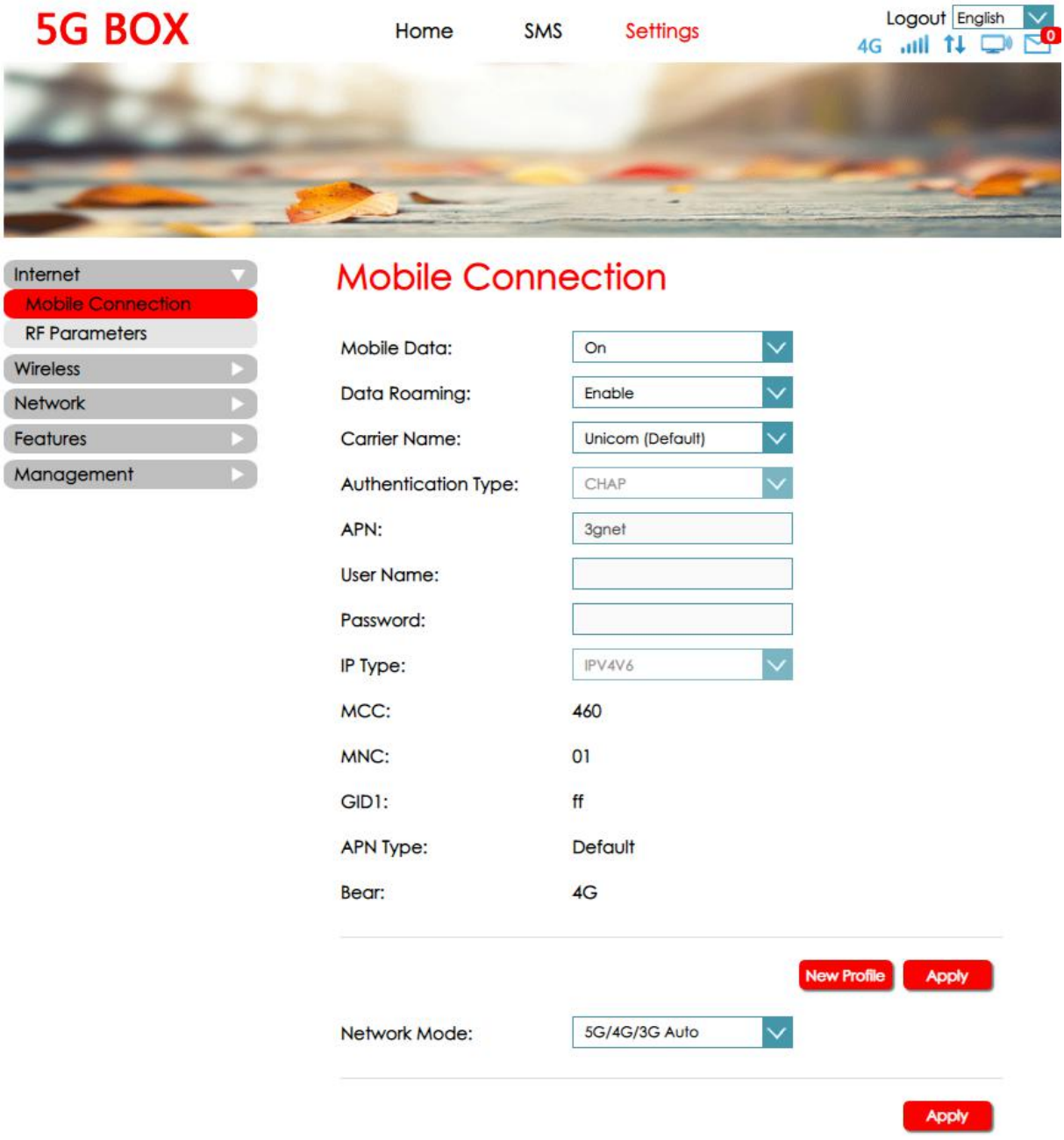
Mobile network: Enable/Disable 5G/4G/3G data services;

Data roaming: Enable/disable data roaming function;

The network mode and network search method are recommended to be set to automatic;

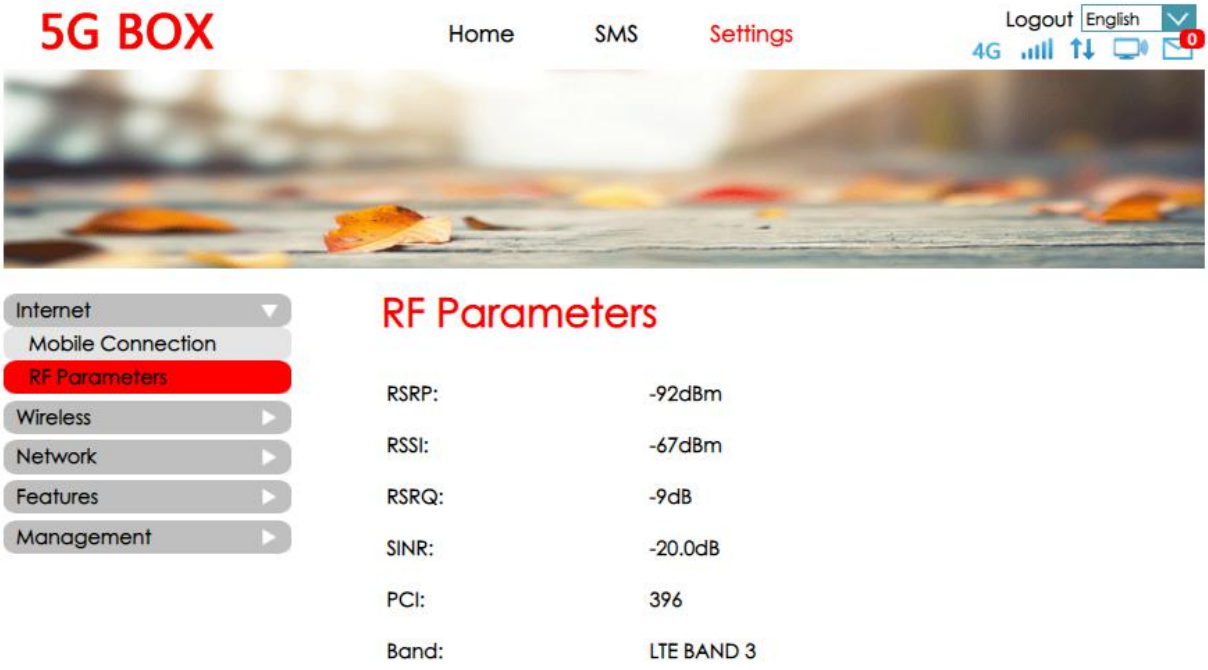
The device supports automatically matching the appropriate APN according to the SIM card for data services. If the device fails to automatically match the APN, you can click "New Profile" to manually create the APN for data services.

Please contact your network service provider for correct APN information.


5G BOX
Home
SMS
Settings
Logout
English
4G
Internet
Mobile Connection
RF Parameters
Wireless
Network
Features
Management
Mobile Connection
Mobile Data:
On
Data Roaming:
Enable
Carrier Name:
Unicom (Default)
Authentication Type:
CHAP
APN:
3gnet
User Name:
Password:
IP Type:
IPV4V6
MCC:
460
MNC:
01
GID1:
ff
APN Type:
Default
Bear:
4G
New Profile
Apply
Network Mode:
5G/4G/3G Auto
Apply

4.5.1.2 RF Parameters

Through the **RF parameters** menu, you can view the basic parameters of the current network of the device.

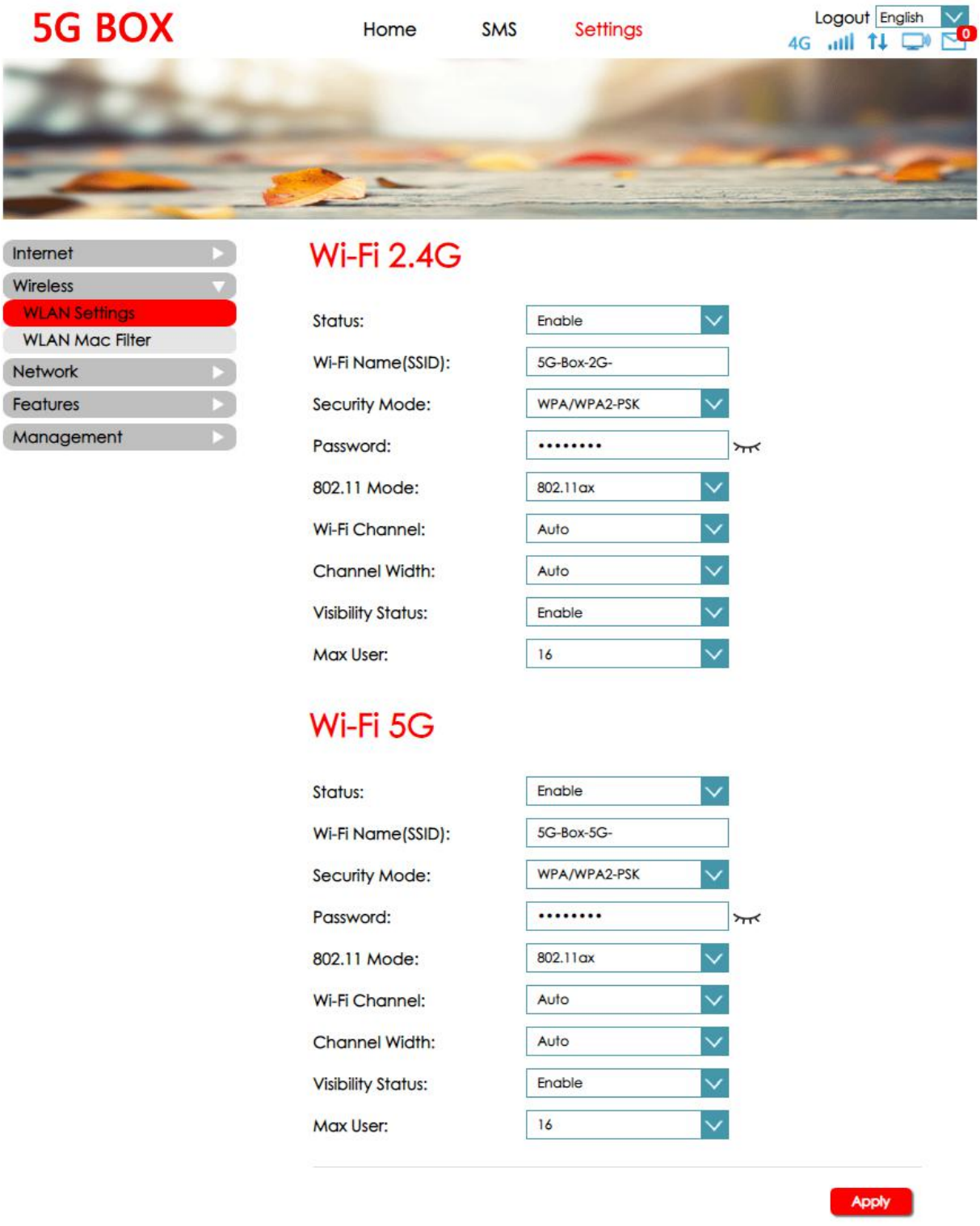


4.5.2 Wireless

4.5.2.1 WLAN Settings

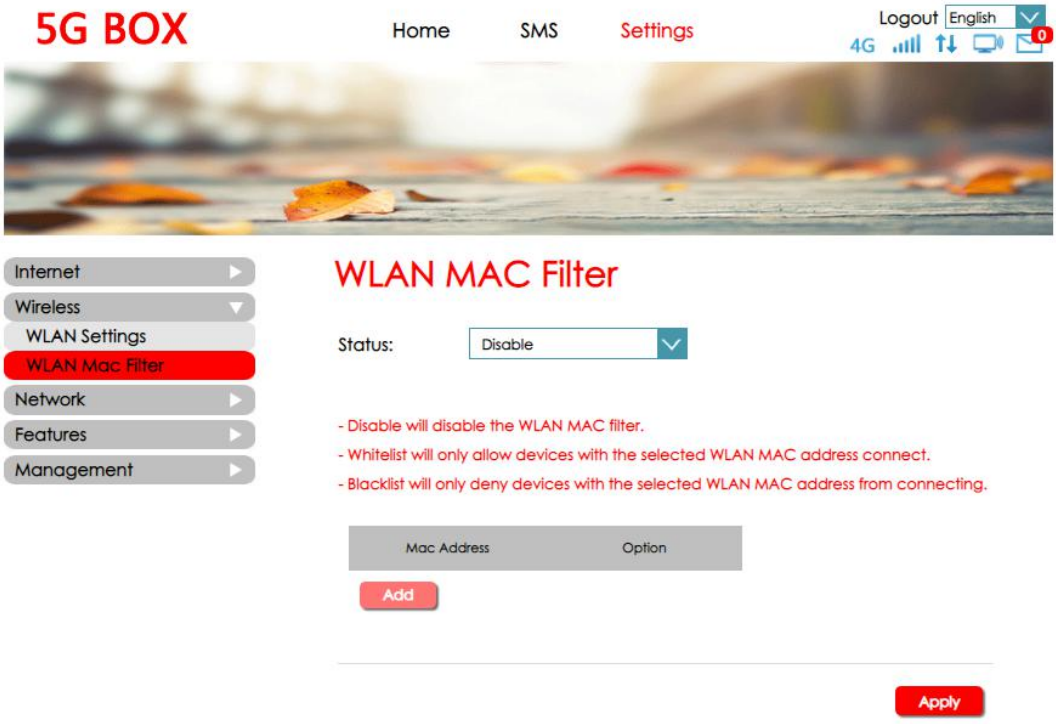
Through the **WLAN settings** menu, you can set the relevant parameters of Wi-Fi 2.4G and Wi-Fi 5G.

The “Auto” setting of Wi-Fi channel and channel width is recommended.



4.5.2.2 WLAN MAC Filter

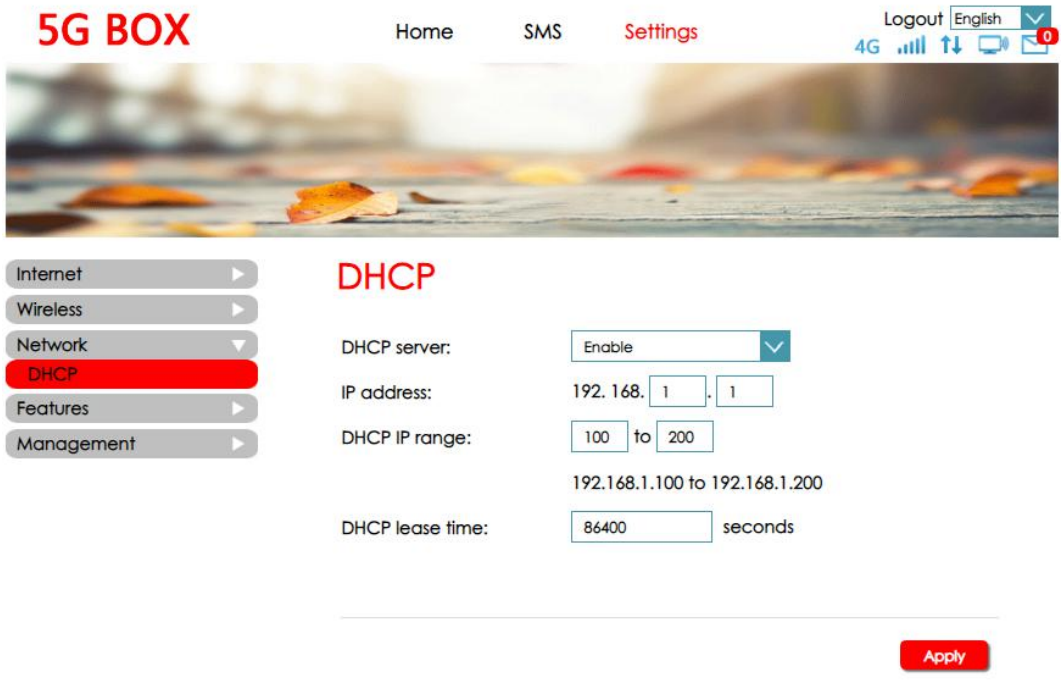
Through the **WLAN Mac Filter** menu, you can configure the rules of WLAN MAC filter to enable or disable certain Wi-Fi terminals from accessing the device.



4.5.3 Network

4.5.3.1 DHCP

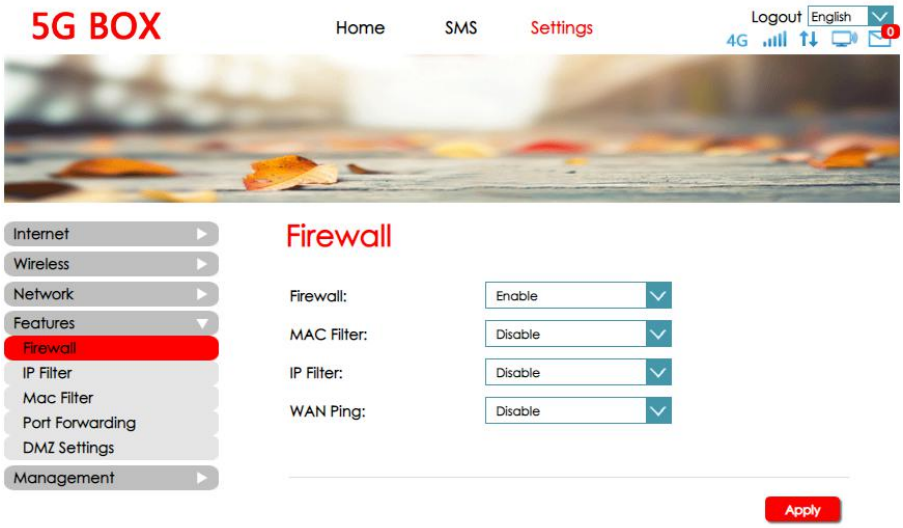
Through the **DHCP** menu, you can configure the routing parameters of the device.



4.5.4 Features

4.5.4.1 Firewall

Through the **Firewall** menu, you can enable or disable the device's firewall, IP filter, MAC filter, and WAN ping.



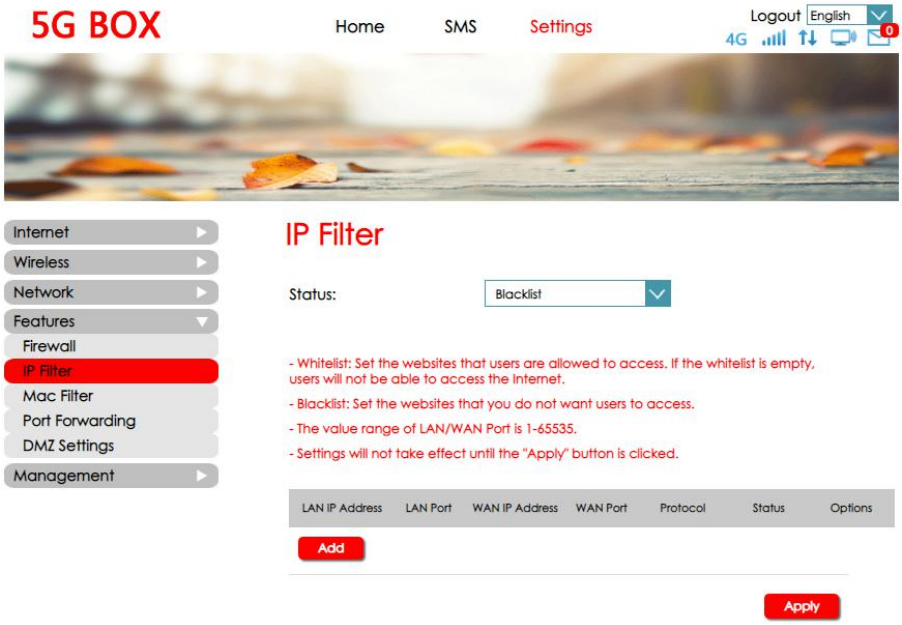
4.5.4.2 IP Filter

Through the **IP Filter** menu, you can configure the IP Filter rules of the device, including LAN IP address, LAN port, WAN IP address, WANP port, protocol, etc.

Disable: disable the IP address filter function;

Whitelist: only allow users to access the websites in the whitelist;

Blacklist: do not allow users to access the websites in the blacklist;



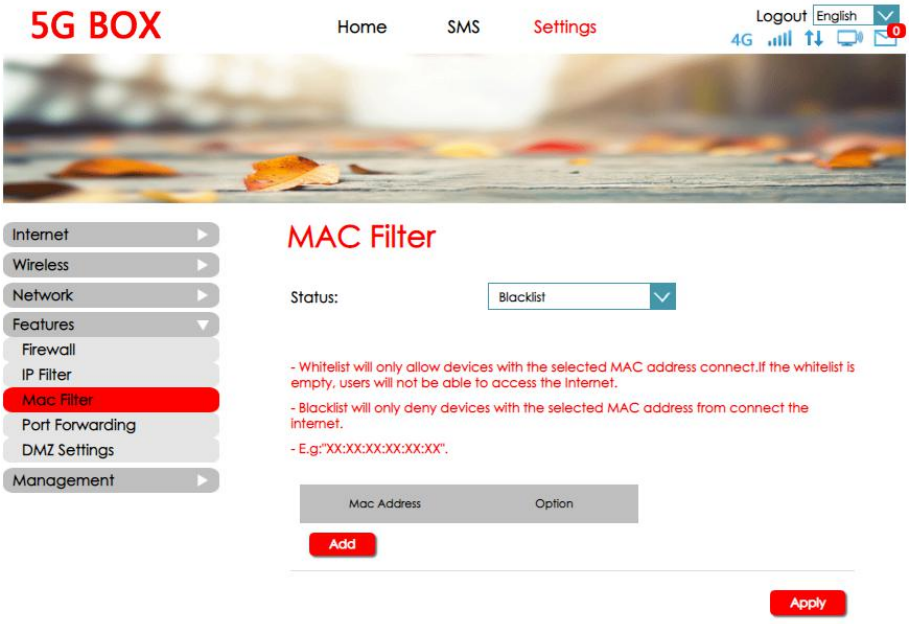
4.5.4.3 Mac Filter

Through the **Mac Filter** menu, you can configure Mac filter rules to enable or disable certain LAN-side terminals from accessing the device.

Disable: disable the Mac address filter function;

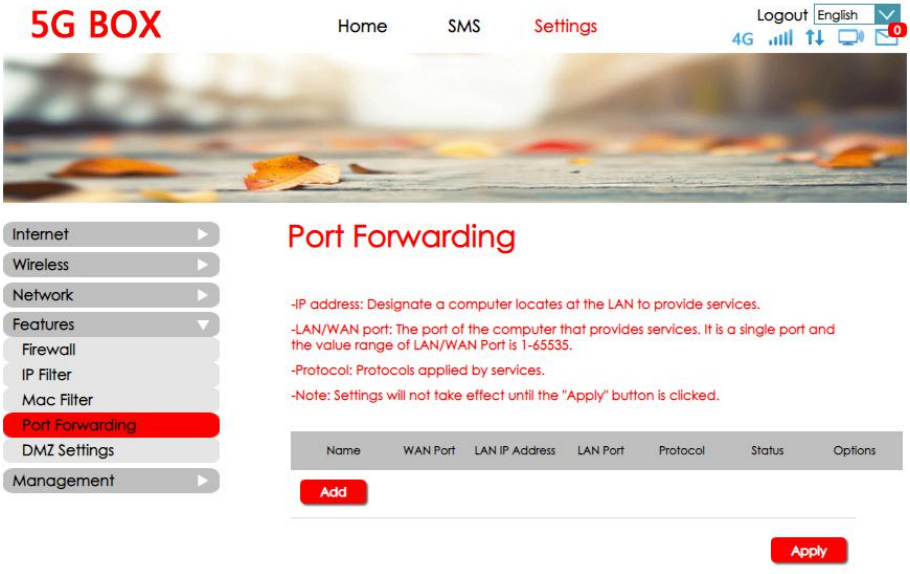
Whitelist: only allow terminals in the whitelist to access the Internet;

Blacklist: do allow the terminals in the blacklist to connect to the device;



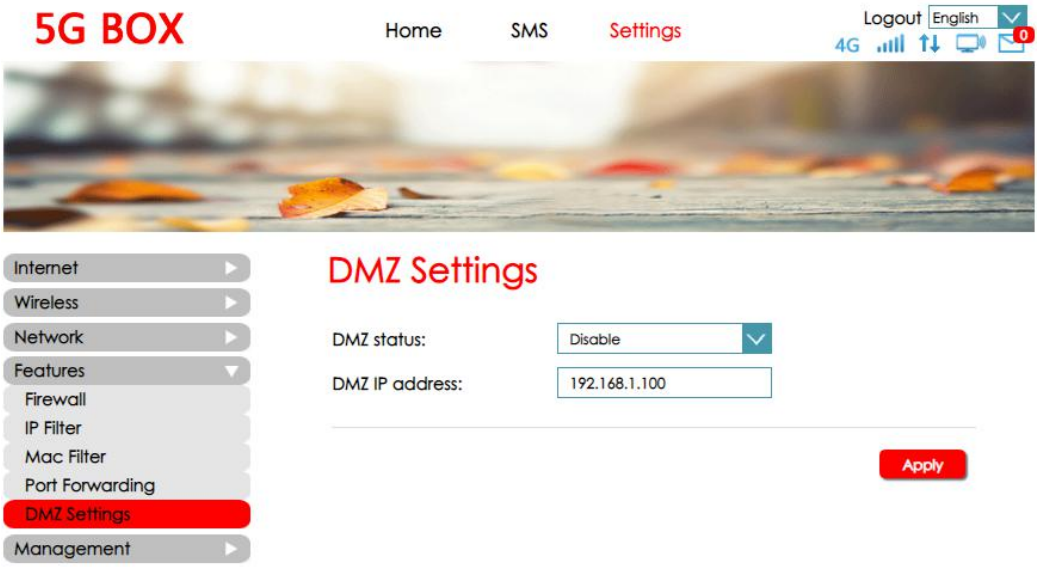
4.5.4.4 Port Forwarding

Through the **Port Forwarding** menu, you can enable external terminals to access FTP or other services provided on the LAN side.



4.5.4.5 DMZ Settings

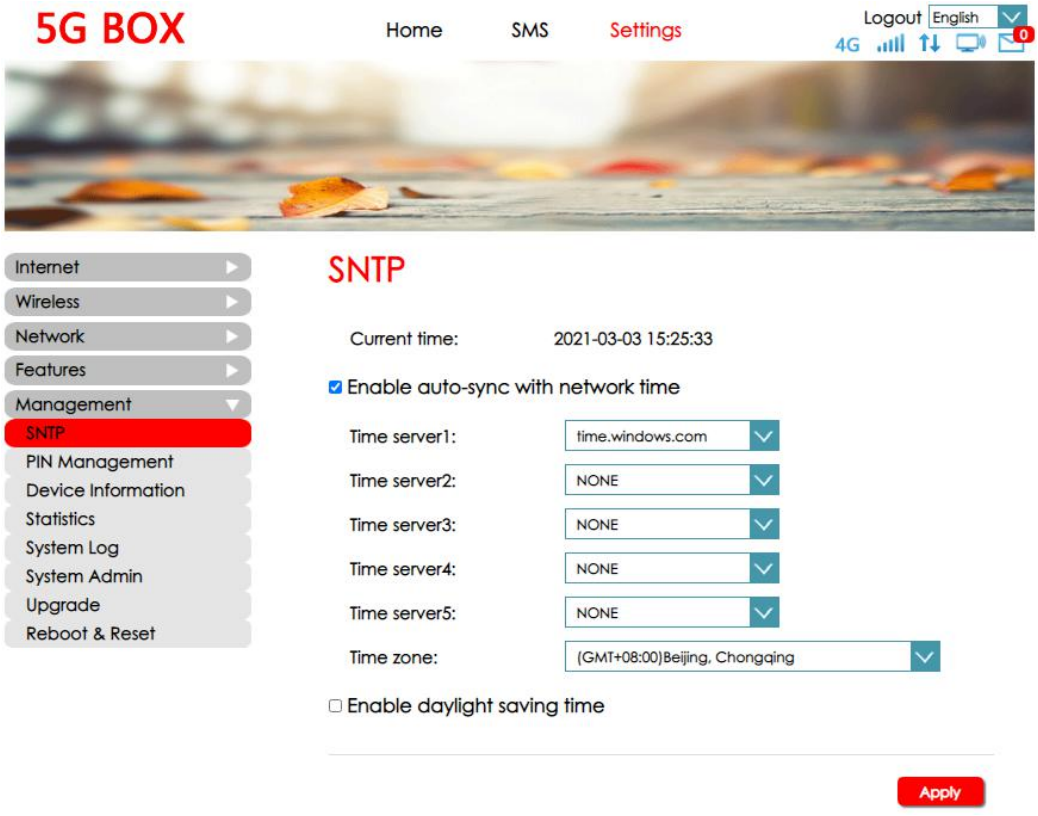
Through the **DMZ Settings** menu, the external network can be allowed to connect and communicate with the internal LAN terminal through the designated DMZ host IP address.



4.5.5 Management

4.5.5.1 SNTP

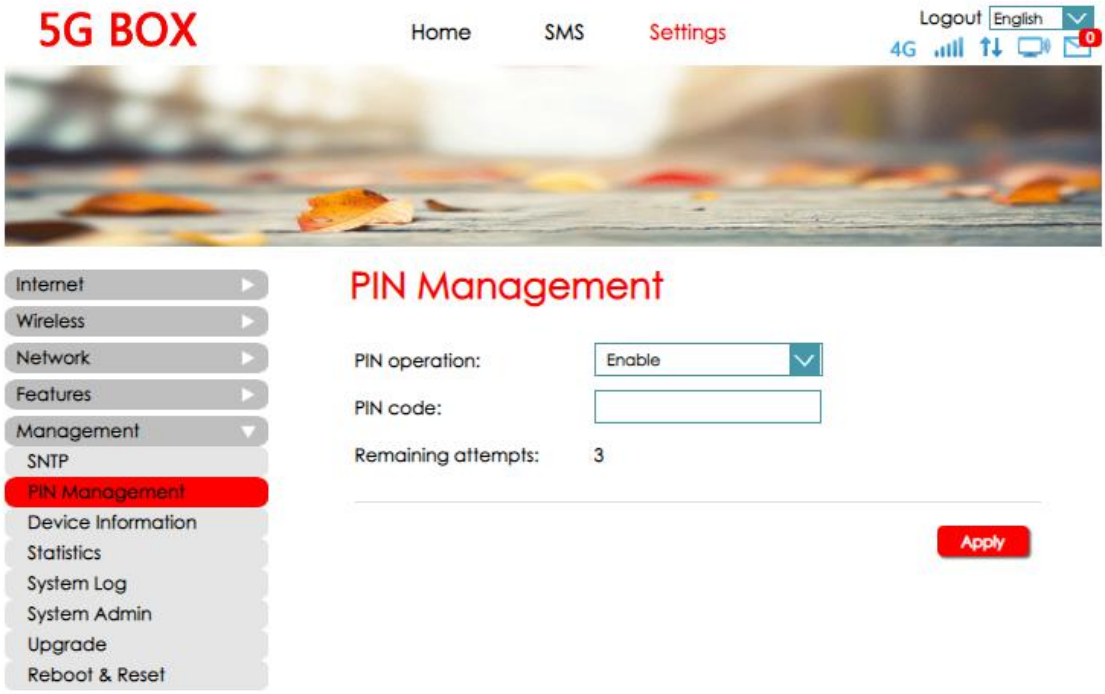
Through the **SNTP** menu, you can set the network synchronization time, time synchronization server, time zone and daylight saving time.



4.5.5.2 PIN Management

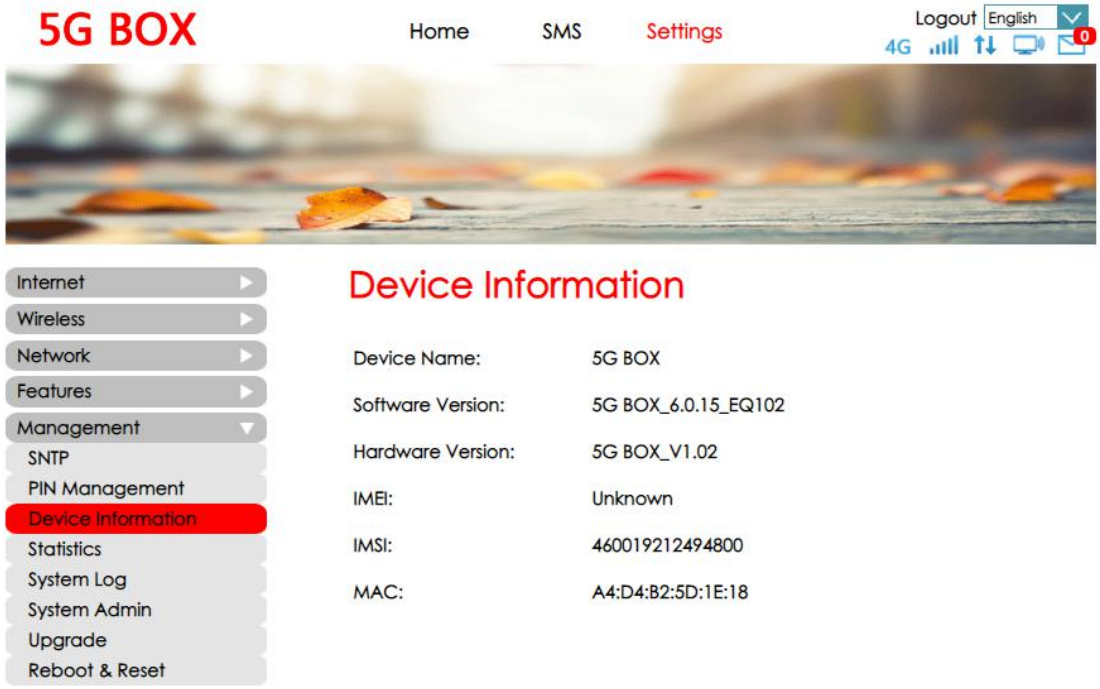
Through the **PIN management** menu, you can enable or disable the SIM card PIN code.

Please contact your service provider for initial PIN code.



4.5.5.3 Device Information

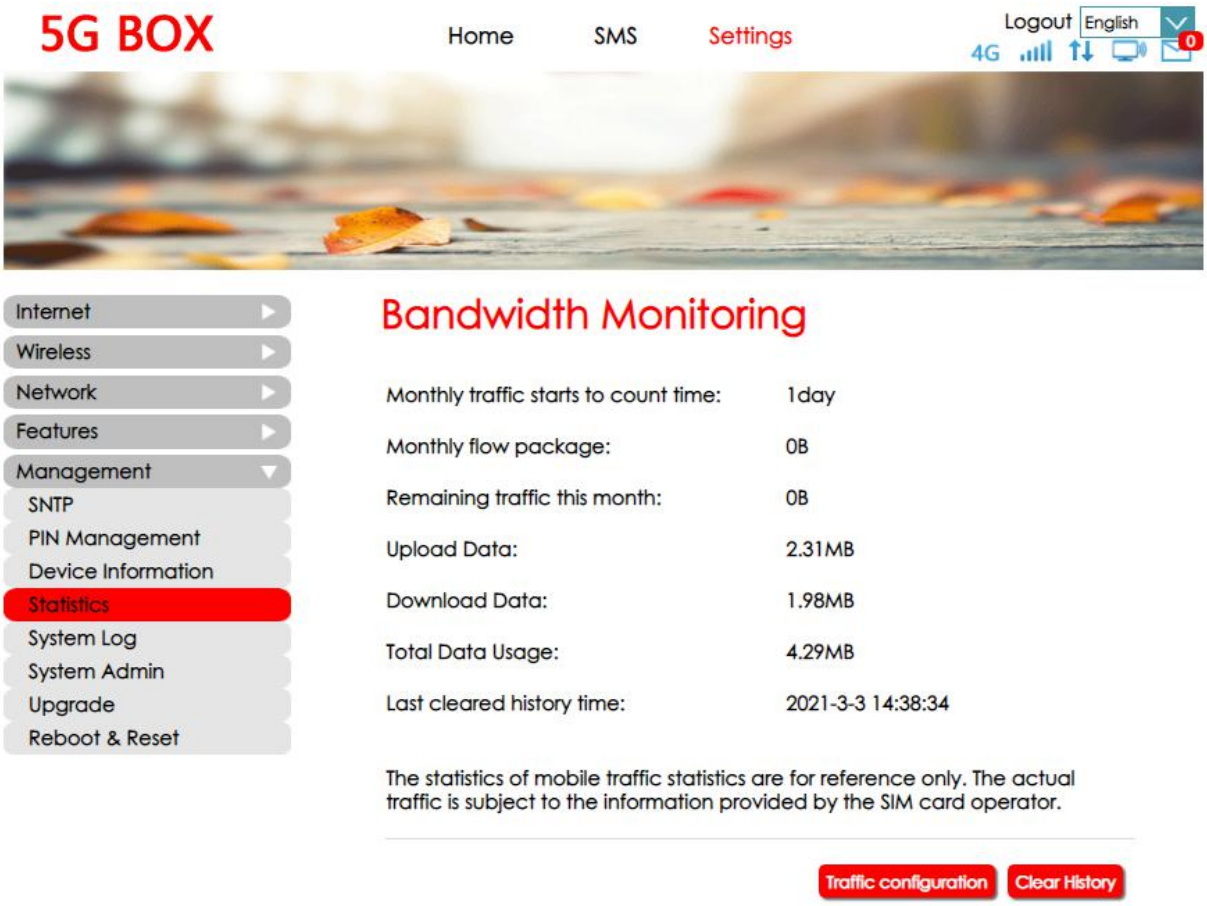
Through the **Device Information** menu, you can view basic information such as device name, software version, and hardware version, etc.



4.5.5.4 Statistics

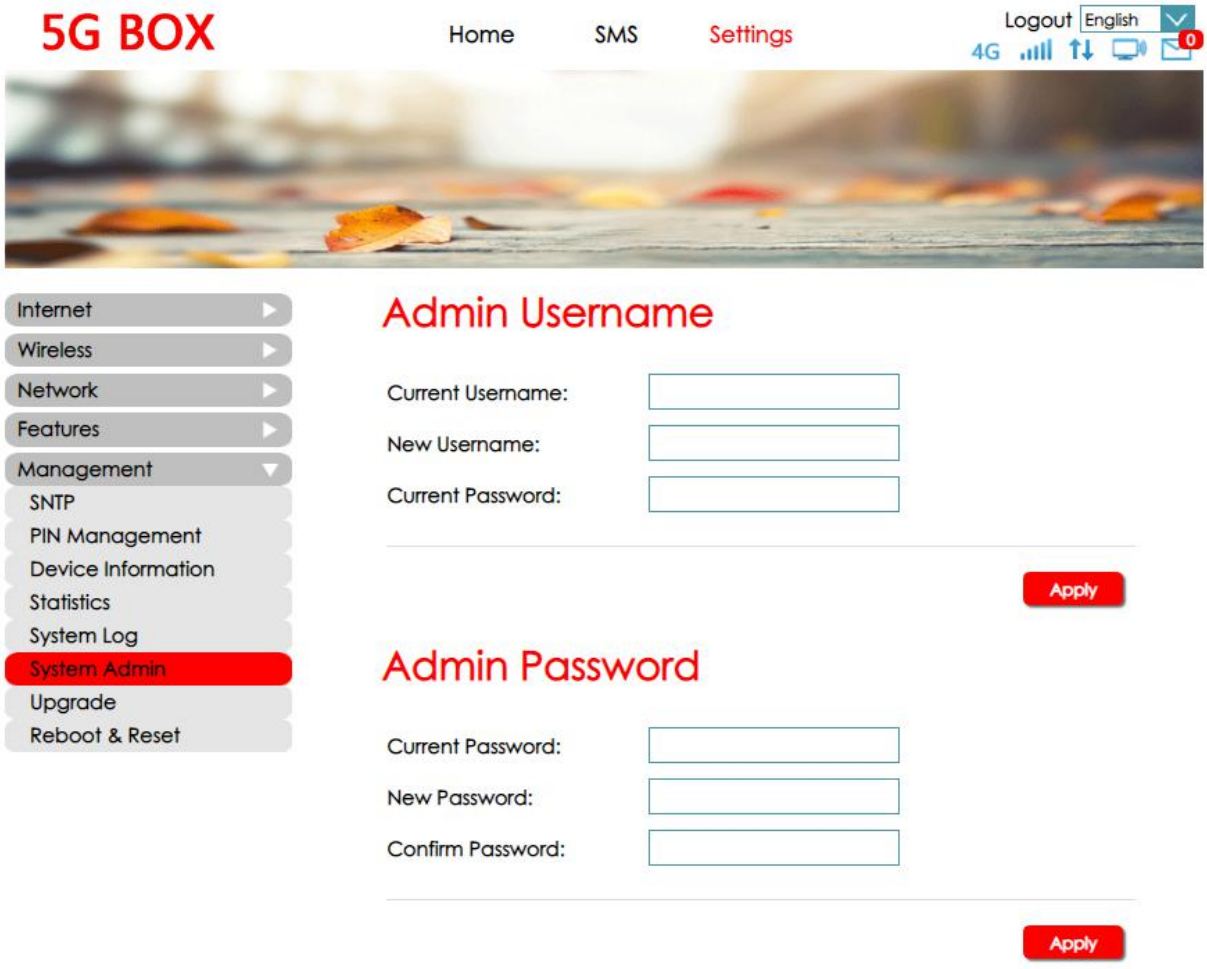
Through the **Statistics** menu, you can view traffic usage and support the configuration of monthly traffic plans.

The traffic statistics displayed on this page is calculated by the device and is for reference only. Please contact your service provider for actual data usage.



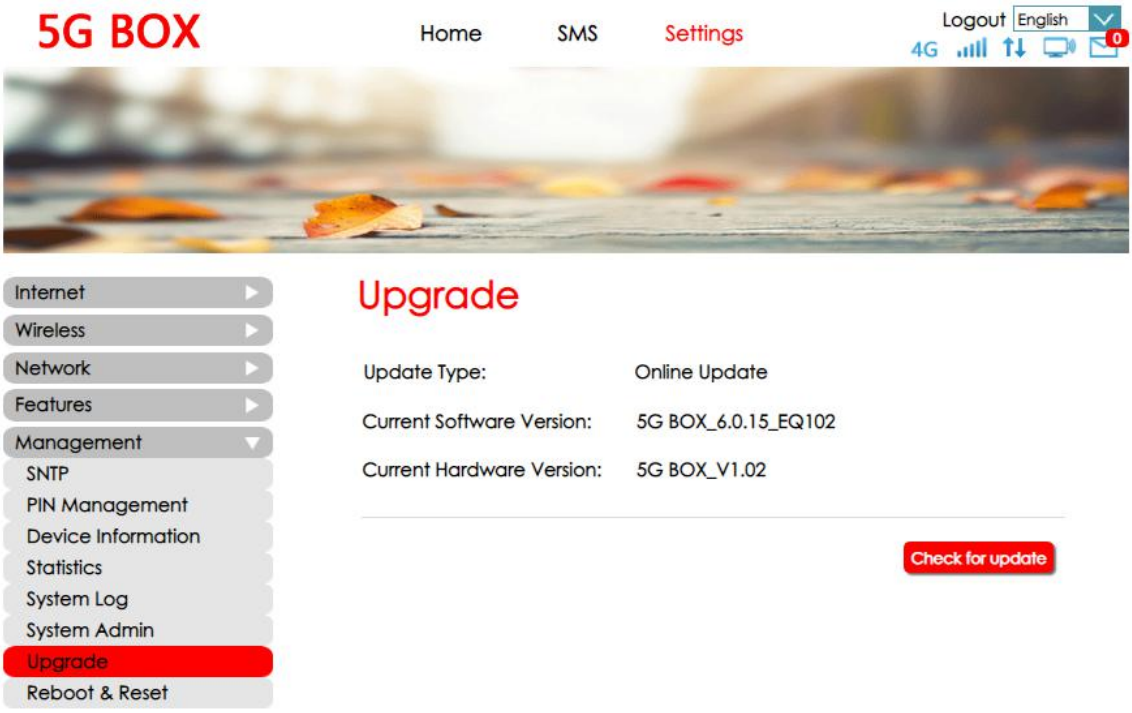
4.5.5.5 System Admin

Through the **System Admin** menu, you can modify the WebUI user name and password of the device.



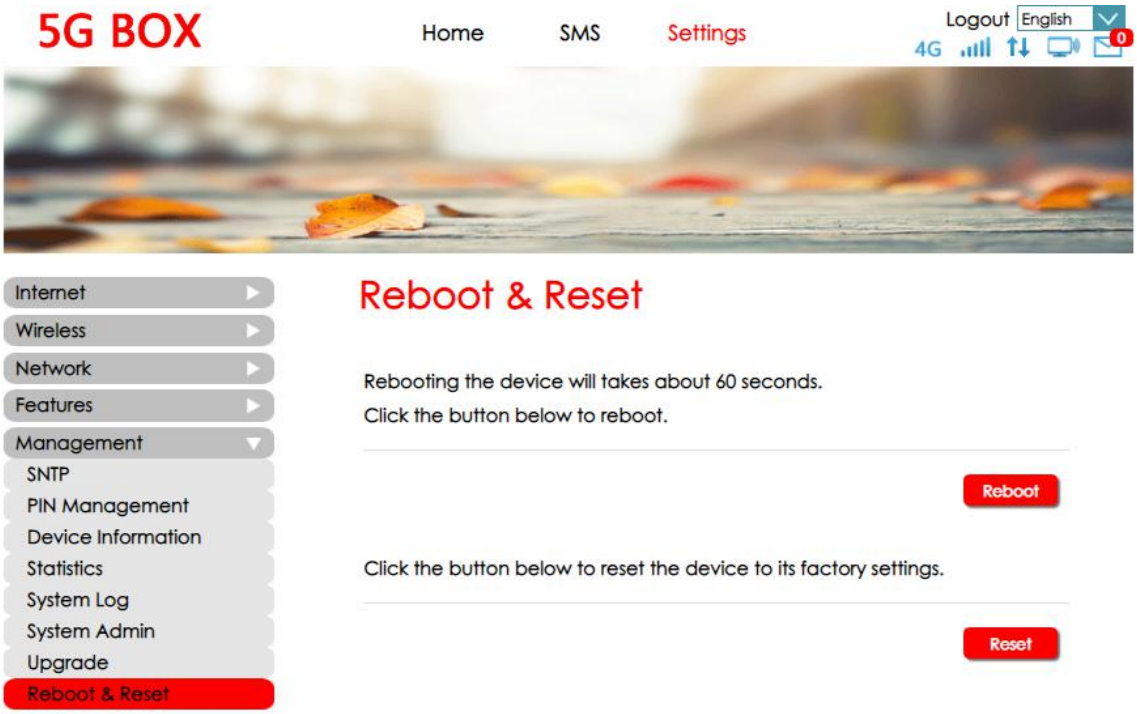
4.5.5.6 Upgrade

Through the **Upgrade** menu, you can check whether there is an online upgrade version and upgrade.



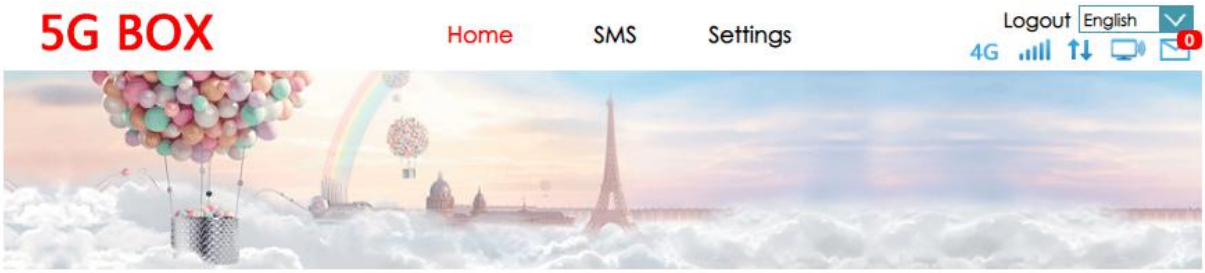
4.5.5.7 Reboot & Reset

Through the **Reboot & Reset** menu, you can reboot the device or reset the device parameters to the factory default state.



4.8 Logout

Click the **Logout** in the upper right corner of the WebUI to log out.



5 Troubleshooting

When the equipment is abnormal, please refer to this chapter for simple troubleshooting first, which can save your time and energy. If the problem persists, please contact your service provider for support.

1. Cannot connect to Wi-Fi

Problem Description:

The terminal cannot connect to the device through Wi-Fi.

Processing steps:

1) Check whether the device has been powered on;
2) Check whether the Wi-Fi of the device is enabled;
3) Check whether the Wi-Fi name and password are entered correctly;
4) When the above steps are all checked, you can try to restart the device or restore the device to factory settings;
5) If the problem persists, please contact your service provider.

2. Failed to access web UI

Problem Description:

The web UI management interface of the device cannot be accessed through the browser.

Processing steps:

1) Check whether the device has been powered on;
2) Check whether the connection between the terminal and the device (Wi-Fi or LAN port) is normal;
3) Check whether the input in the address bar of the browser is correct;
4) When the above steps are all checked, you can try to restart the device or restore the device to factory settings;
5) If the problem persists, please contact your service provider.

3. Abnormal network connection

Problem Description:

The device is abnormally connected to the network and cannot perform data transmission services.

Processing steps:

1) Confirm whether the device is normally powered;
2) Confirm whether the SIM card is inserted properly;

3) Confirm whether the device normally resides on the Internet;
4) When the above steps are all checked, you can try to restart the device or restore the device to factory settings;
5) If the problem persists, please contact your service provider.