InHand ER805-NRQ3 5G Edge Router

User Manual

V1.0—2021.09

www.inhand.com.cn

Beijing InHand Networks Technology Co., Ltd.

Declaration

Thank you for choosing our product. Before using this product, please read this manual carefully.

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Due to continuous updating, InHand cannot promise that the contents are consistent with the actual product information, and does not assume any disputes caused by inconsistency of technical parameters. The information in this document is subject to change without notice. InHand reserves the right of final change and interpretation.

Conventions

Symbol	Indication
1 1	Button name, for example, ‘click Save button’.
“”	Indicates a window name or menu name, for example, the pop-up window “New User”.
>>	A multi-level menu is separated by the double brackets “>>”. For example, the multi-level menu File >> New >> Folder indicates the menu item [Folder] under the sub-menu [New], which is under the menu [File].
Cautions	Please be careful of the contens under Cautions, improper action may result in loss of data or device damage.
Note	Note contain detailed descriptions and helpful suggestions.

Technical Support

Email: support@inhandnetworks.com

URL: www.inhandnetworks.com

CONTENTS

1 Overview

InHand ER805-NRQ3 5G Edge Router is a new generation 5G edge router launched by InHand Networks. With 4G / 5G wireless network and a variety of broadband services, this product can provide Internet access for all industries of IoT. The product adopts SD-WAN technology to provide uninterrupted data communication link experience for industry applications.

ER805-NRQ3, with its perfect security and agile wireless link services, realizes the networking of a variety of IoT devices, can help enter enterprises to realize informatization and digitization.

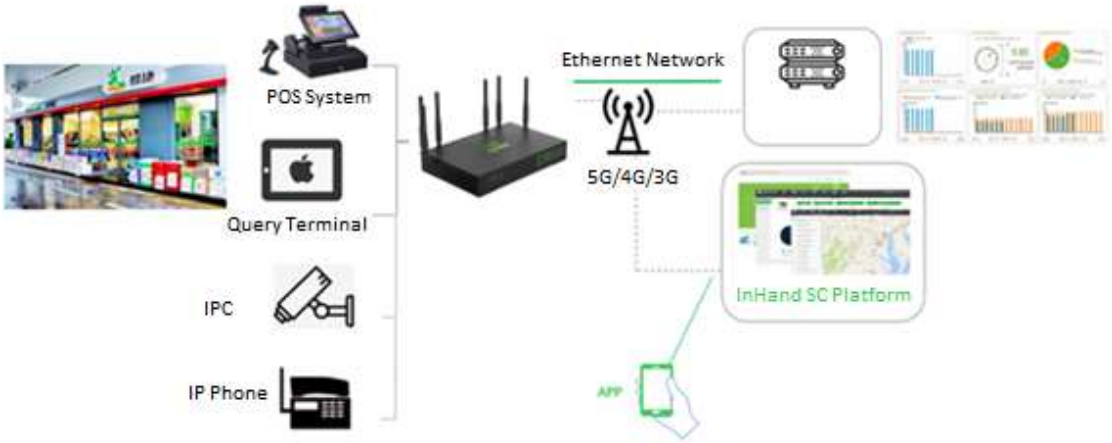


Fig. 1 Application case

2 Hardware

2.1 Indicator Description

ER805-NRQ3 Indicator	LED Status and Definition
System	Steady off --- Power off. Blinking in blue --- System starting. Steady in blue --- System operates properly. Blinking in red --- System faults. Blinking in green --- System upgrading.
Network Status	Blinking in red --- Network connection lost. Blinking in green --- Cellular network connecting. Steady in green --- Cellular network connected. Blinking in blue --- Ethernet network connecting. Steady in blue --- Ethernet network connected.
Wi-Fi 2.4G	Steady off --- Disabled. Steady in green --- Wi-Fi 2.4G connecting. Blinking in green --- Wi-Fi 2.4G working properly.
Wi-Fi 5G	Steady off --- Disabled. Steady in blue --- Wi-Fi 2.4G connecting. Blinking in blue --- Wi-Fi 2.4G working properly.

Note: If both cellular network and ethernet network are working properly, Network Status Indicator will be in blue. And it will show the color of the connecting network if another network is not connected. If either two network are not connected, this indicator will be in red.

2.2 Restoring to Default Settings via the Reset Button

To restore to default settings via the reset button, please perform the following steps:

1. Press the RESET button immediately after power on the device.
2. System indicator will blink after a few seconds, and after blinking for about half a minute, it will be steady on.
3. Release RESET button, System indicator will blink, and press the RESET button again.
4. When System indicator blinks slowly, release the RESET button. The device has been restored to default settings and will start up normally later.

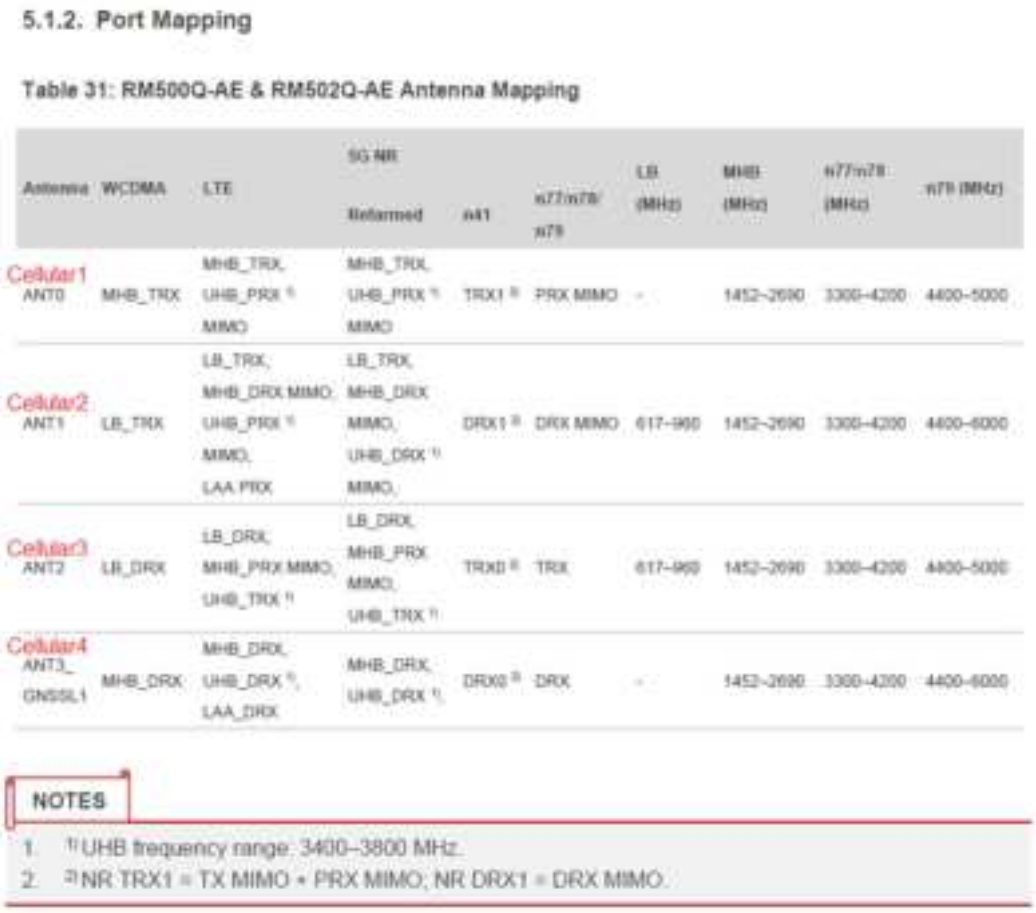
2.3 Antenna:

List of antenna:

Type of Antenna	Model Number	Manufacturer	Max Gain
5G Sucker antenna	GY-XDK-OCL2-B2JG24.1	ShenZhen GuYou Technology Co., Ltd.	5dBi
WiFi Sucker antenna	GY-XPF-BCL2.5-GJG22	ShenZhen GuYou Technology Co., Ltd.	3dBi

Note:

1. Cellular1 is the main antenna of the 3/4G, Cellular2 is the AUX antenna of the 3/4G.
2. The following figure shows the frequency bands supported by 5G antennas:



5.1.2. Port Mapping

Table 31: RM500Q-AE & RM502Q-AE Antenna Mapping

Antenna	WCDMA	LTE	5G NR Reframed	n41	n77/n78/ n79	LB (MHz)	MHB (MHz)	n77/n78 (MHz)	n79 (MHz)
Cellular1 ANT0	MHB_TRX	MHB_TRX, UHB_PRX [1], MIMO	MHB_TRX, UHB_PRX [1], MIMO	TRX1 [2]	PRX MIMO	-	1452~2690	3300~4200	4400~5000
Cellular2 ANT1	LB_TRX	LB_TRX, MHB_DRX MIMO, UHB_PRX [1], MIMO, LAA PRX	LB_TRX, MHB_DRX MIMO, UHB_DRX [1], MIMO,	DRX1 [2]	DRX MIMO	617~960	1452~2690	3300~4200	4400~5000
Cellular3 ANT2	LB_DRX	LB_DRX, MHB_PRX MIMO, UHB_TRX [1]	LB_DRX, MHB_PRX MIMO, UHB_TRX [1]	TRX0 [2]	TRX	617~960	1452~2690	3300~4200	4400~5000
Cellular4 ANT3_ GNSSL1	MHB_DRX	MHB_DRX, UHB_DRX [1], LAA_DRX	MHB_DRX, UHB_DRX [1],	DRX0 [2]	DRX	-	1452~2690	3300~4200	4400~5000

NOTES

1. [1] UHB frequency range: 3400~3800 MHz.
2. [2] NR TRX1 = TX MIMO + PRX MIMO; NR DRX1 = DRX MIMO.

3 Default Settings

No.	Function	Default Settings
1	**Cellular**	– Dual SIM card enabled, use SIM1 by default.
2	**Wi-Fi**	– Wi-Fi 2.4G AP mode enabled, SSID: ER805-NRQ3- followed with the last 6 letters of the AP MAC. – Wi-Fi 5G AP mode enabled, SSID: ER805-NRQ3-5G- followed the last 6 letters of the AP MAC. – Auth Method is WPA2-PSK. – Both WPA/WPA2 PSK keys in two mode are the last 8 letters in serial number.
3	**Ethernet**	– 4 LAN are enabled. – IP Address: 192.168.2.1 – Netmask: 255.255.255.0 – DHCP server enabled, IP address is 192.168.2.2 to 192.168.2.100, can provide IP address for downstream devices automatically.
4	**Management Services**	– Local HTTP(80) and HTTPS(443) are enabled. – Disable HTTPS access from cellular network.
5	**Username and password**	– **adm/123456** (super administrator)

4 Login and Network Access

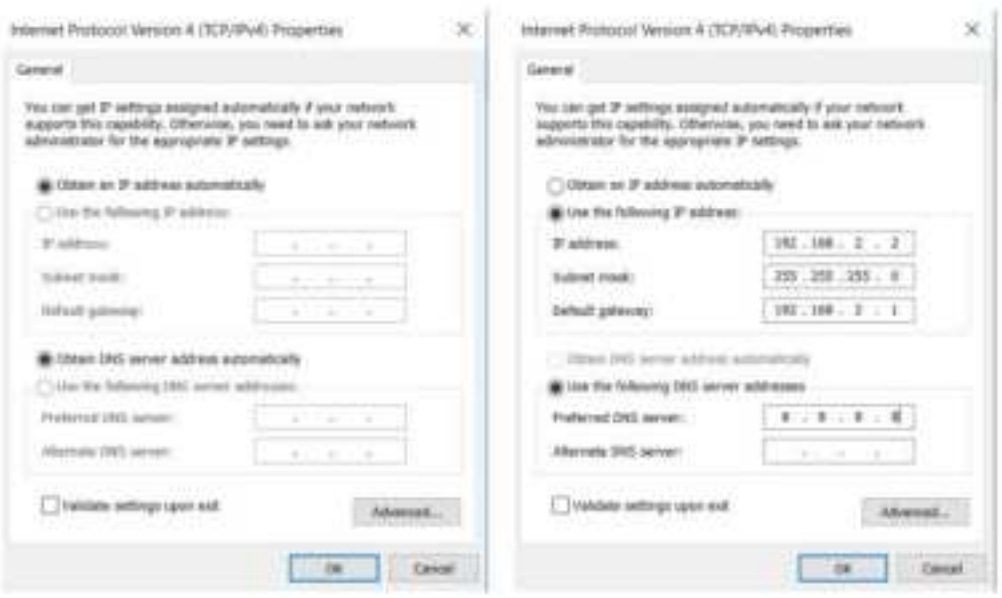
4.1 Network Access via Ethernet

Step 1: Connect power and Ethernet cable to ER805-NRQ3, connect WAN port to public network, and one of LAN to PC.

Step 2: Configure PC to be in the same network segment as the IP address of the router.

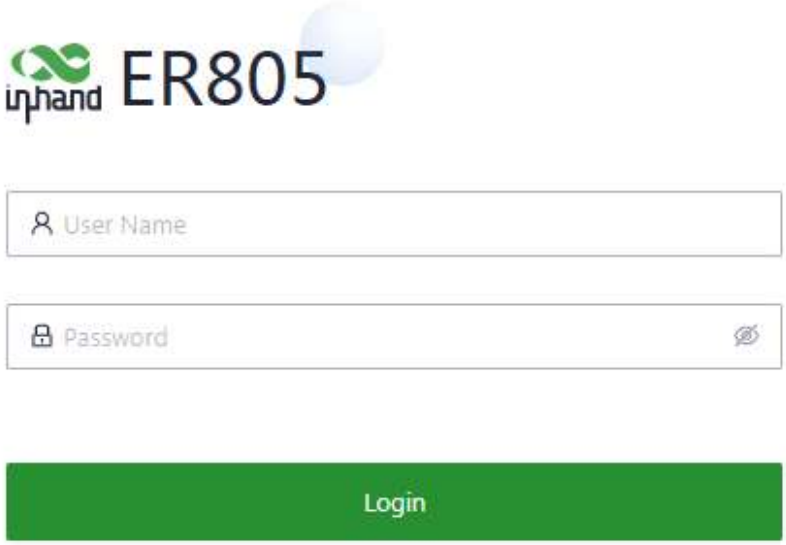
(1) Enable PC to obtain an IP address from DHCP automatically (recommended).

(2) Configure a fixed IP address in the same network segment as the router for PC. The IP address should be one of the address in 192.168.2.2~192.168.2.254, Subnet mask should be 255.255.255.0, and Default gateway should be 192.168.2.1. DNS server should be 8.8.8.8 or the address of ISP’ s DNS server.



Obtain an IP address automatically/manually

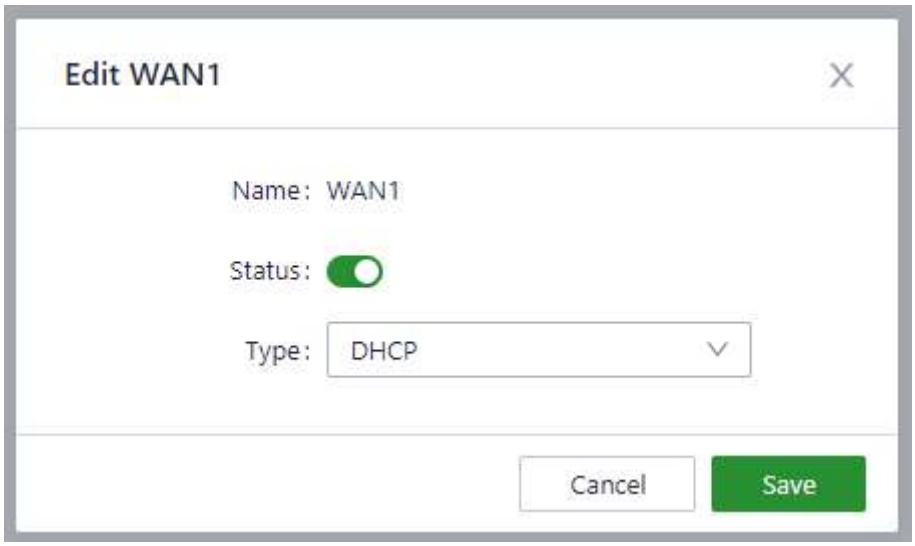
Step 3: Access to the default IP address 192.168.2.1 in a browser, enter username and password(adm/123456 by default) then access to router’ s WEB management page. If the browser alarms the connection is not private, show advanced, and proceed to access to the address.



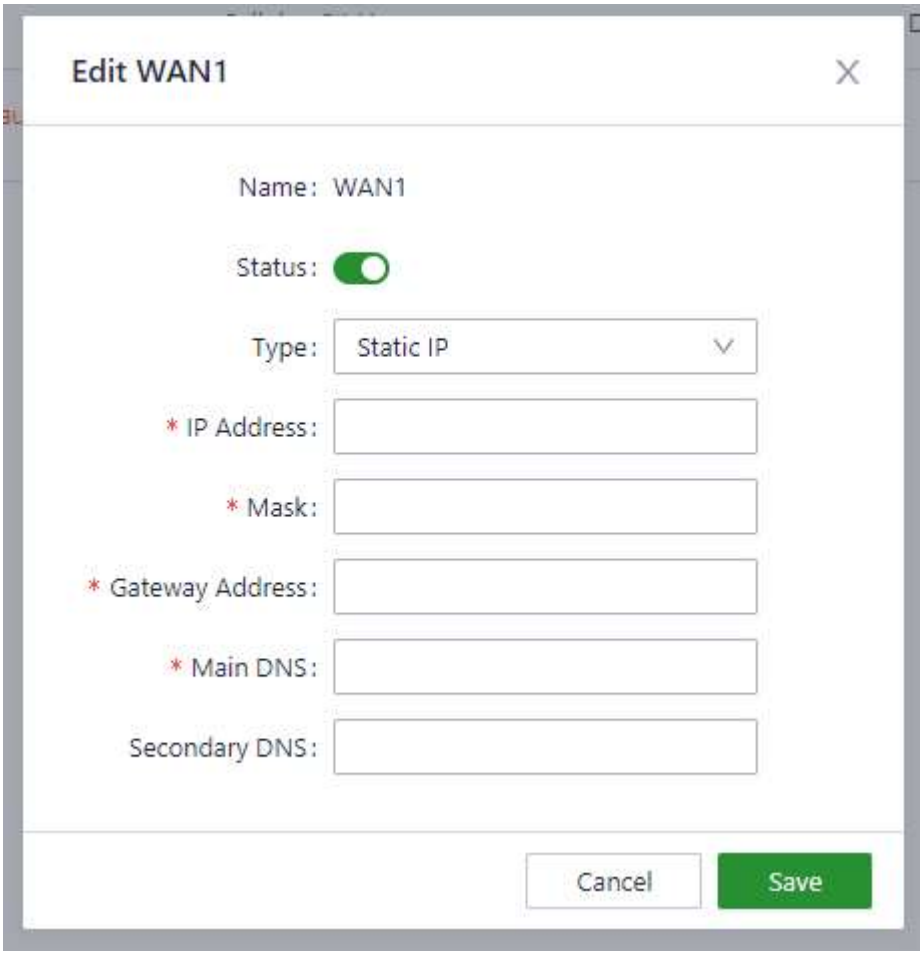
Login to device’ s WEB management page

Step 4: Create a WAN port in "Internet" in the left menu. ER805-NRQ3 wiill enable WAN1 as DHCP mode by default. It will connect to Internet is the upstream device also works in DHCP mode.

There are two methods to obtain IP address: Dynamic DHCP (recommend) and Static IP (save after configure manually).

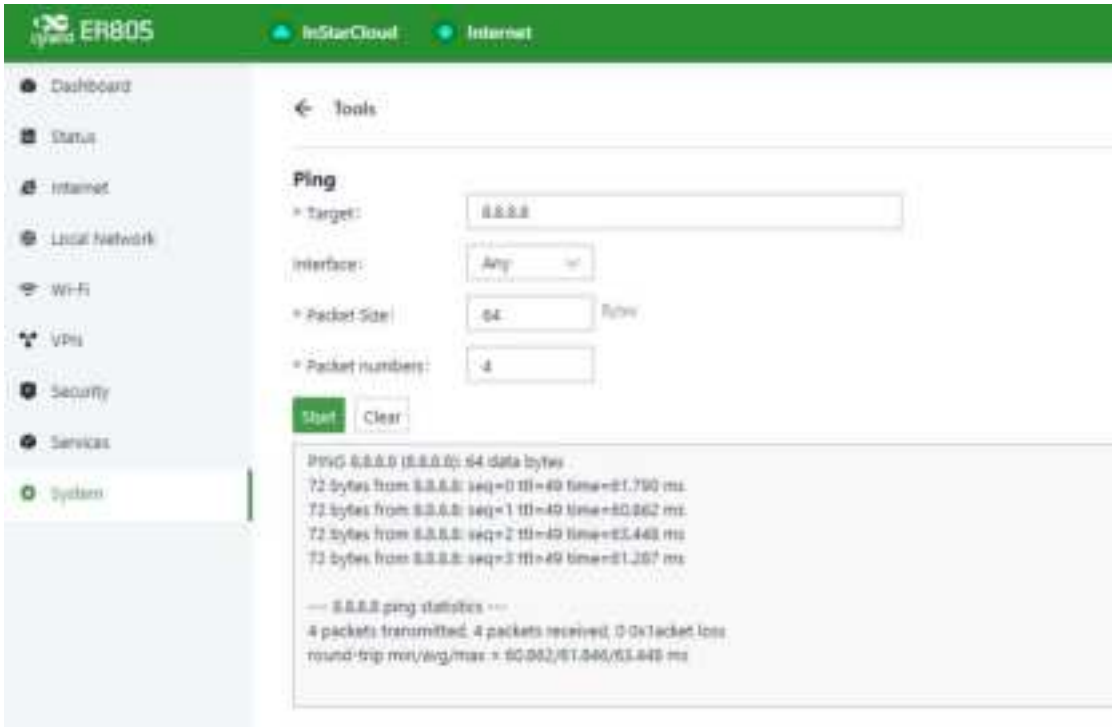


Obtain IP address by Dynamic Address (DHCP)



Obtain IP address by Static IP

Step 5: Check the connectivity in "System >> Tools >> Ping".



4.2 Network Access via SIM card

Step 1: Insert the SIM card when device is power off. Connect 4 4G/5G antennas to the router, and connect PC to router. Then power on.

Note:

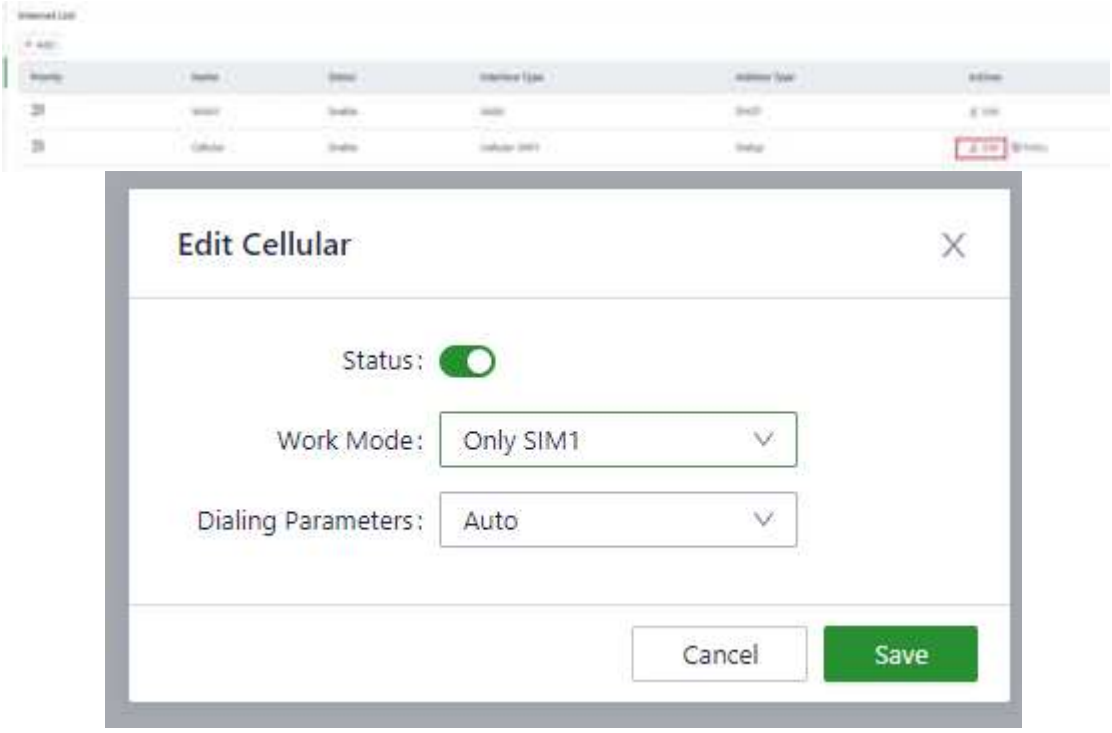
When insert or plug out SIM card, please unplug the power cable to prevent data loss or damage the router.

ER805-NRQ3 supports 4 antennas, please connect all antennas to obtain high communication quality.

Step 2: Open a browser and access to router’ s WEB management page. (refer to 4.1)

Step 3: Click “Internet”, click Edit button in the right of Cellular to set dialup profile. The device enables the cellular by default, it will connect to Internet

within a few minntes. If the device cannot connect to Internet, please disable and restart dialup. (If you use a private network SIM card, you also need to configure APN parameter)

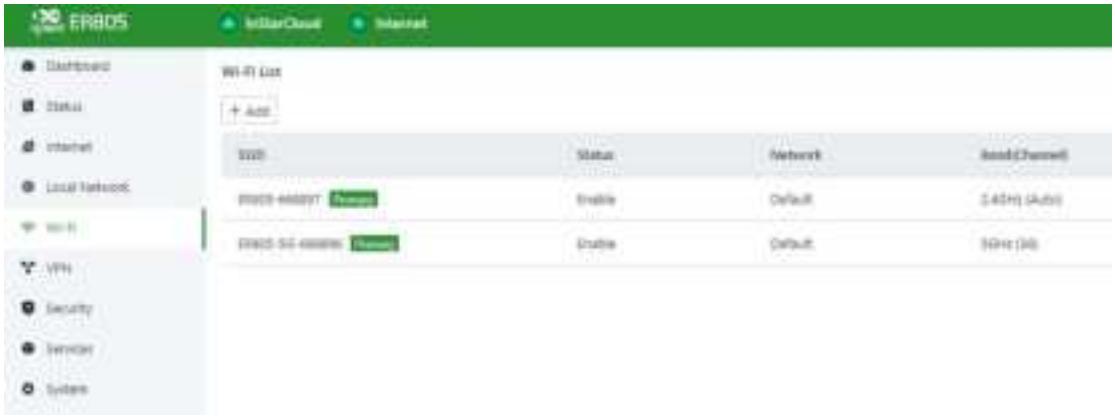


Step 4: Check the dialup status in "Dashboard >> Interface Status", if it shows green in Cellular icon, the router has connected to Internet by SIM card. Click Cellular icon to get check more dialup information like signal strength, IP address or DNS.

4.3 Network Access via Wi-Fi

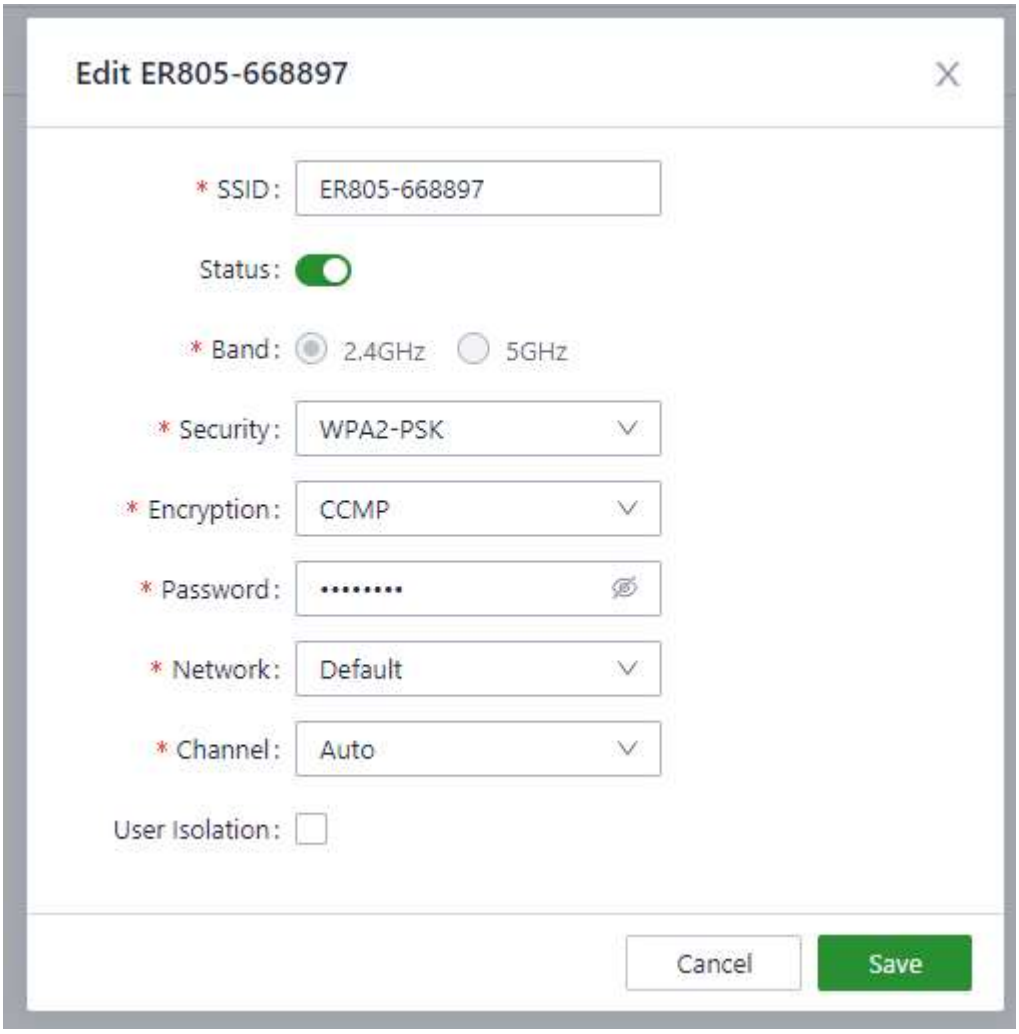
Step 1: Connect Wi-Fi antenna, and connect PC to the device. Access to router’ s WEB management page. (refer to 4.1)

Step 2: Choose the frequent band of Wi-Fi. ER805-NRQ3 supports 2.4G and 5G Wi-Fi. These two Wi-Fi can work independently at the same time. 2.4G Wi-Fi has higher penetration while 5G Wi-Fi has higher transmission speed. You can check Wi-Fi status in “Wi-Fi” of the left menu.



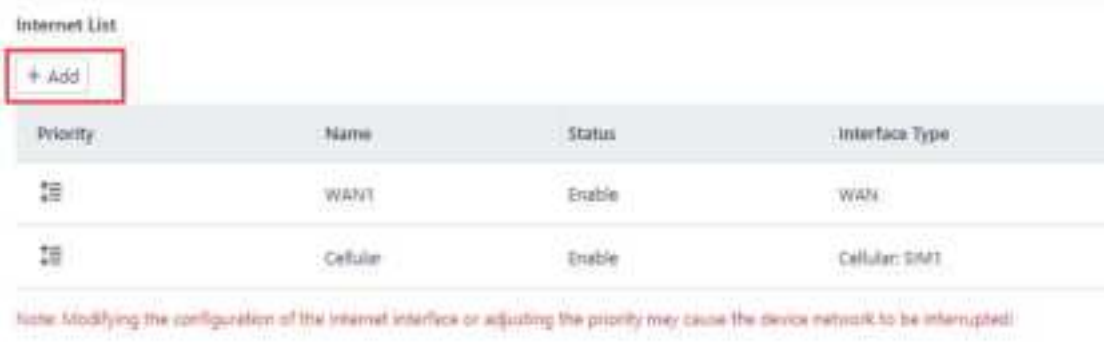
Step 3: Set Station Role in “Wi-Fi 2.4G” or “Wi-Fi 5G”: AP or Client.

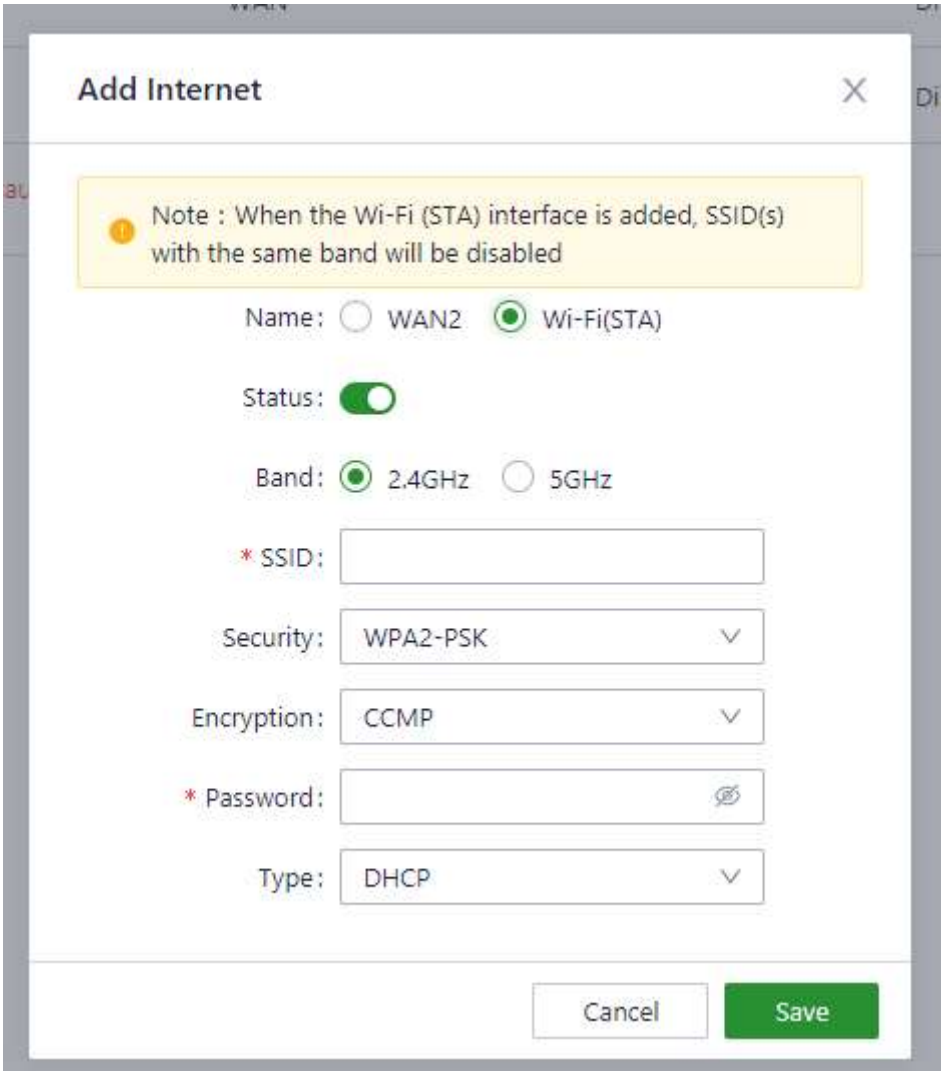
AP mode (default mode): ER805-NRQ3 acts as an accsess point to radiate wireless signals, and other terminal devices can connect this device to access the Internet. It is necessary to ensure that ER805-NRQ3 itself has been connected to the Internet through wired or dialup mode. AP mode supports setting SSID name and encryption authentication mode, and terminal devices will need to input password when connecting.



Client mode: ER805-NRQ3 connects to other AP Wi-Fi device to access the Internet.

Click Add button in "Internet" page, select "Wi-Fi(STA)" and then configure other parameters.

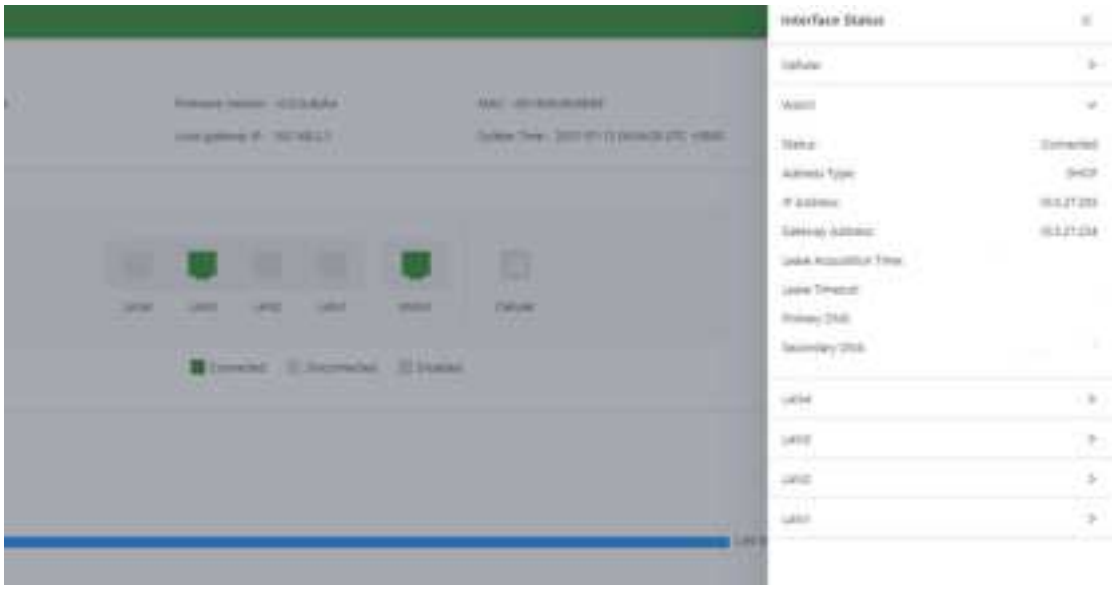



Add Internet
Note : When the Wi-Fi (STA) interface is added, SSID(s) with the same band will be disabled
Name: WAN2 Wi-Fi(STA)
Status:
Band: 2.4GHz 5GHz
* SSID:
Security: WPA2-PSK
Encryption: CCMP
* Password:
Type: DHCP
Cancel
Save

5 Dashboard

Click "Dashboard" in the left menu to access to Dashboard, and check Device Information, Interface Status, Traffic Statistics and other information of the device.

Click interface icon in Interface Status, and check detailed information of the interface in the right menu.



6 Status

Click “Status” in the left menu to access to status page, check events and clients connected to this device and VPN status in this device.

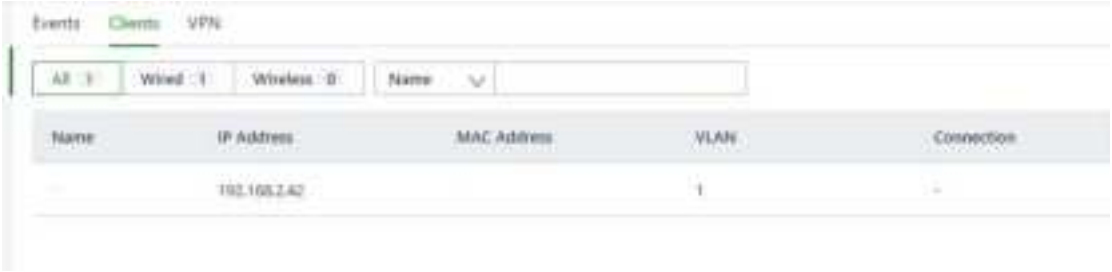
6.1 Events

Router will record event log like user login, configuration changed, link changed, reboot and other events in Events page,

By selecting start data, end date and event type, narrow the scope of retrieval and view a certain type of event.

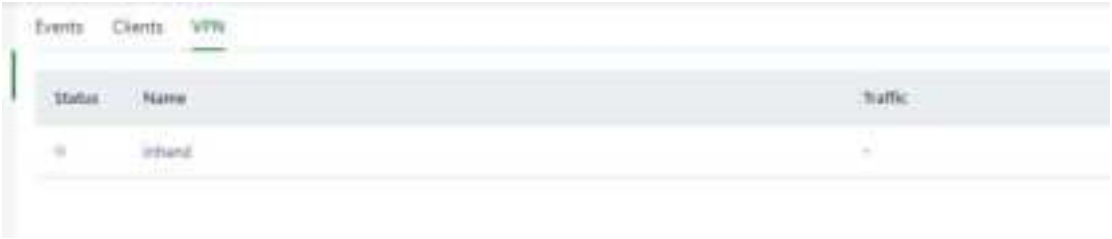
6.2 Clients

Check the information like name, IP address or MAC address of the device connected to ER805-NRQ3 in Clients page.



6.3 VPN

Check the status and the traffic consume of the VPN in ER805-NRQ3 in VPN page.


Events
Clients
VPN
Status
Name
Traffic
inhand

7 Internet

Click "Internet" in the left menu to check and configure the upstream interface of the ER805-NRQ3, and the elementary options for SDWAN.

7.1 Internet List

User can check the status of the upstream link interface, add or delete WAN2 or Wi-Fi (STA) interface and edit or set policy for these interface.

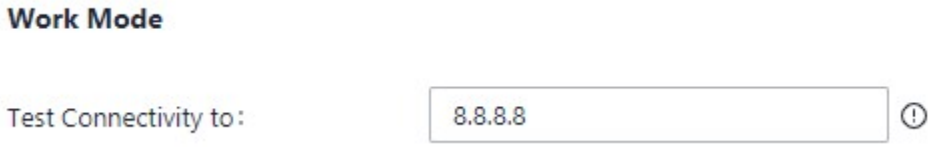
ER805-NRQ3 support up to two WAN interface, LAN1 will change to WAN interface if open WAN2.

ER805-NRQ3 support up to one Wi-Fi (STA) interface, corresponding Wi-Fi AP will close after add Wi-Fi (STA) interface.

7.2 Work Mode

In Work Mode page, user can configure optimal forwarding or load balancing feature in ER805-NRQ3 to get agile upstream link.

ER805-NRQ3 will use ICMP protocol to check link connectivity by ping to the IP address in "Test Connectivity to" chart. Device will switch to other upstream link (Optimal Forwarding) or change the strategy to forward traffic (Load Balancing) when current link is down.

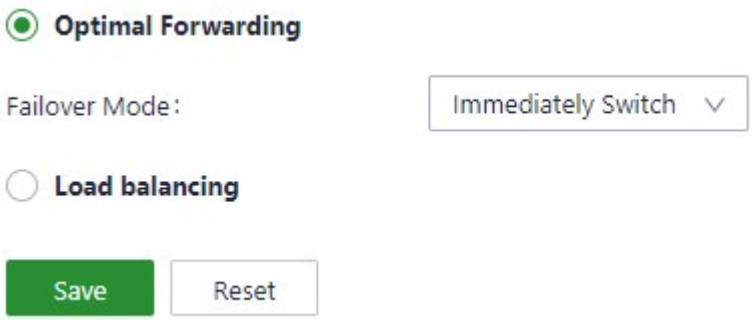


7.2.1 Optimal Forwarding & Load Balancing

ER805-NRQ3 supports working at optimal forwarding mode or load balancing mode, and use optimal forwarding by default.

Optimal Forwarding: ER805-NRQ3 will choose the best available link to forward data traffic in this mode.

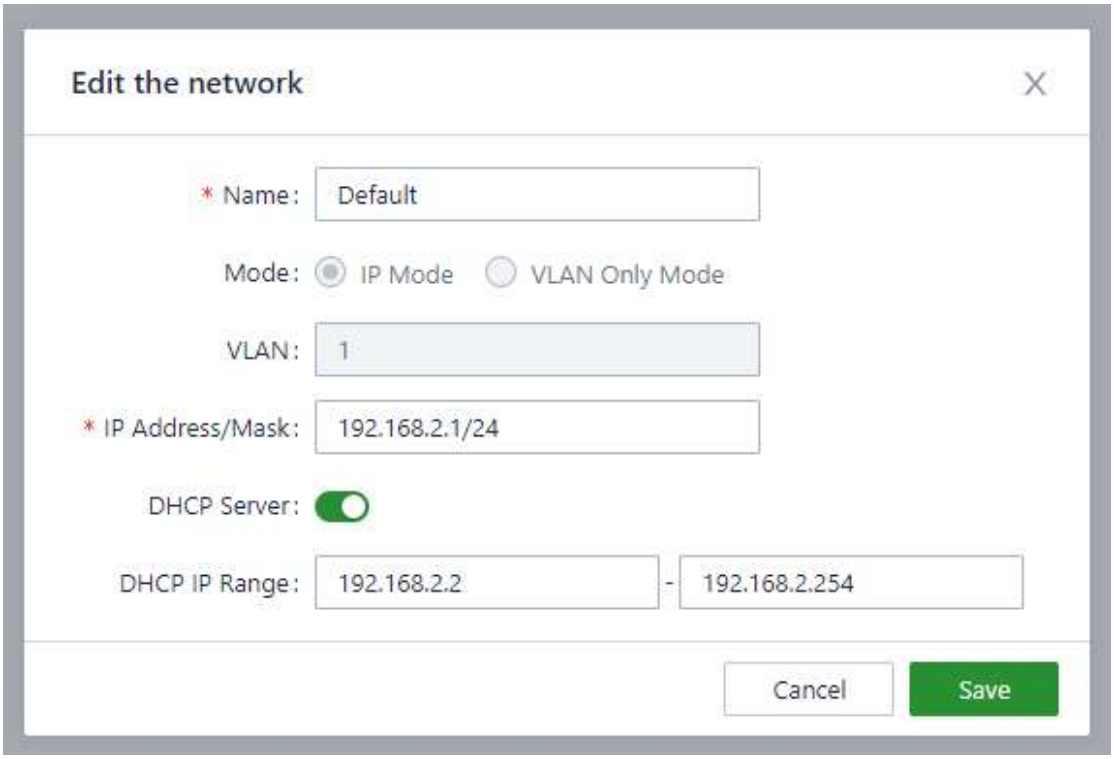
Load Balanciing: ER805-NRQ3 will distribute data traffic to all available links by hash algorithm.



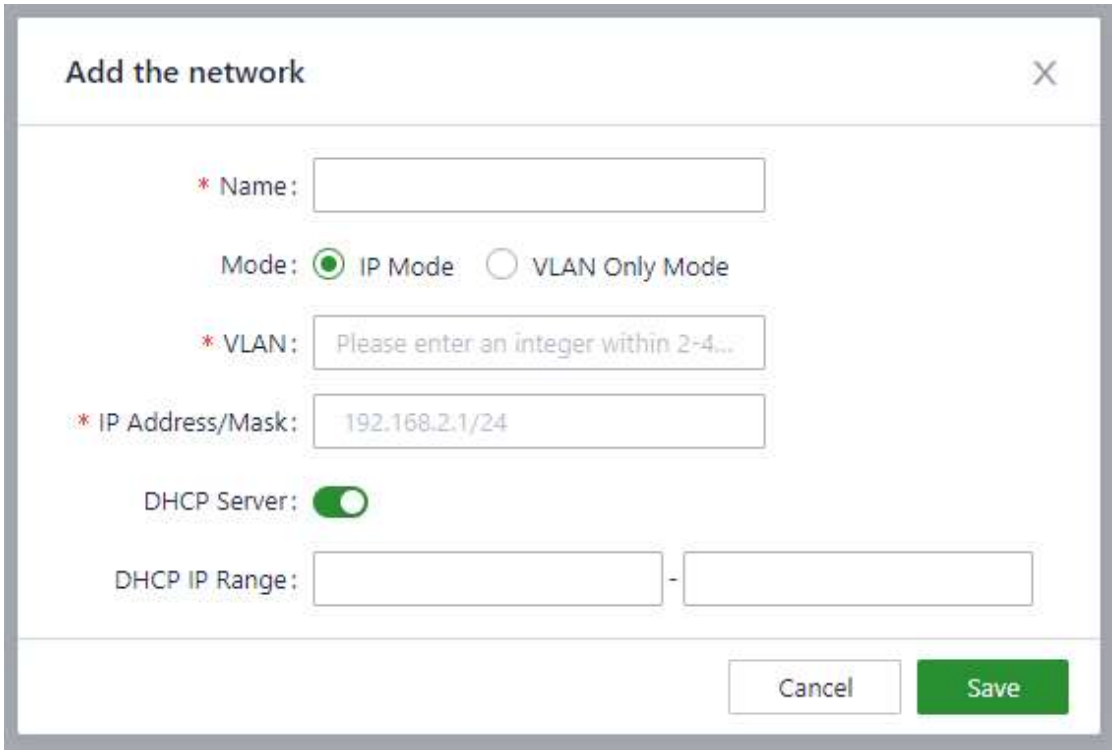
8 Local Network

User can check and configure LAN of the device is Local Network page.

Edit network: Click the Edit button in the right to edit current LAN, allow user to change the range of IP address and DHCP server.

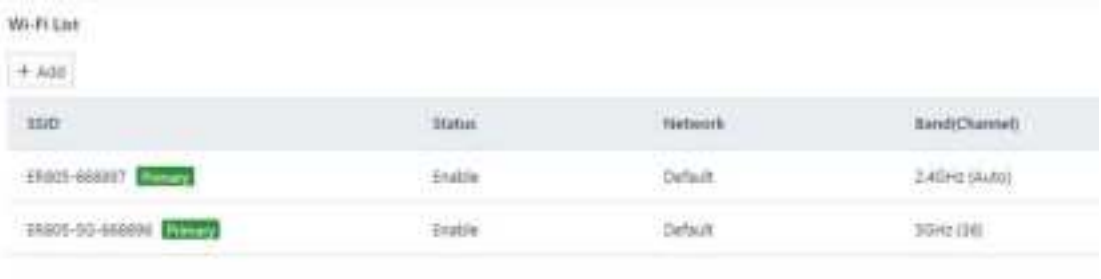


Add network: Add a new LAN by clicking the Add button in the left, set the Name, VLAN, DHCP server and other parameters of this new network. Please ensure the amount of existed LAN in ER805-NRQ3 is less than 16, and the new LAN’ s IP address or VLAN will not be clashed with other existed LAN.

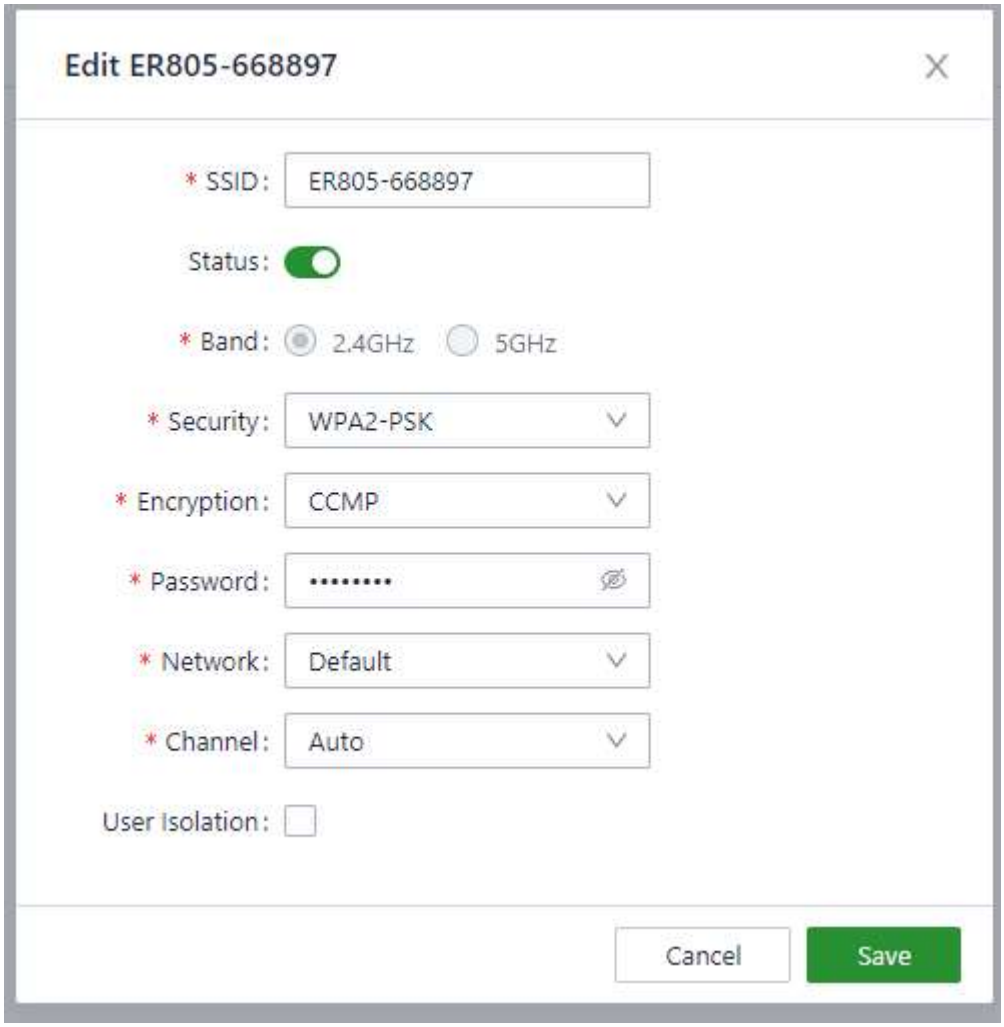

Add the network
* Name:
Mode: IP Mode VLAN Only Mode
* VLAN: Please enter an integer within 2-4...
* IP Address/Mask: 192.168.2.1/24
DHCP Server:
DHCP IP Range: -
Cancel
Save

9 Wi-Fi

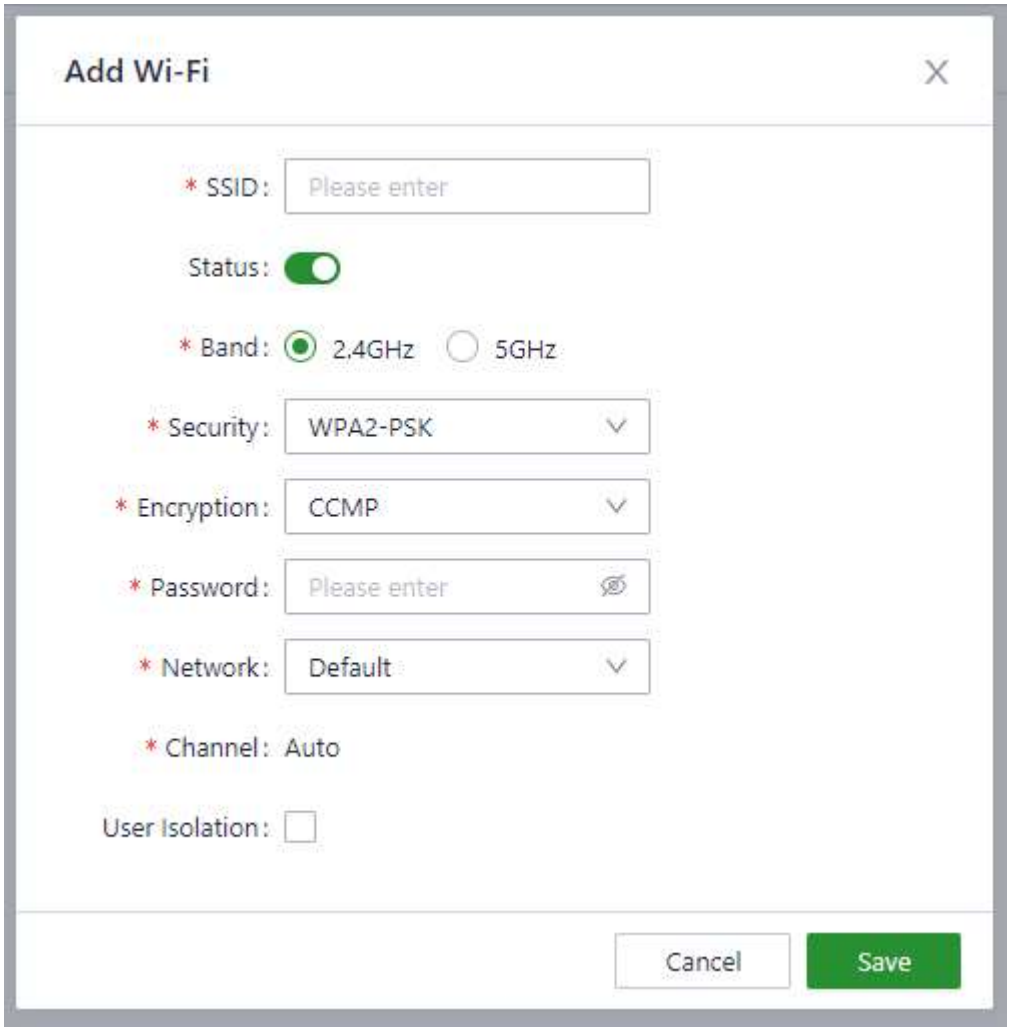
Client devices can use Wi-Fi to connect to ER805-NRQ3 to access to Internet, or ER805-NRQ3 can use Wi-Fi to connect to other AP. User can check, add or configure Wi-Fi network in Wi-Fi page.



Edit Wi-Fi: Click Edit button in the right, configure SSID, password or other parameters of this Wi-Fi.



Add Wi-Fi: Add a new Wi-Fi by clicking Add button in the left. If there is a Wi-Fi (STA) interface use the same frequency with the new Wi-Fi, the Status of the new Wi-Fi will be disable and not able to change.


Add Wi-Fi
* SSID: Please enter
Status:
* Band: 2.4GHz 5GHz
* Security: WPA2-PSK
* Encryption: CCMP
* Password: Please enter
* Network: Default
* Channel: Auto
User Isolation:
Cancel
Save

10 VPN

VPN is intended to establish a private network on the public network for encrypted communication. A VPN router enables remote access by encrypting data packets and converting the destination address of data packets. VPN can be realized by a server, hardware, or software. Compared with the traditional DDN private line or frame relay, VPN provides a more secure and convenient remote access solution.

Click "VPN" in the left menu to access to VPN configure page.

10.1 IPSec

IPsec is a group of open network security protocols developed by IETF. At the IP layer, data source authentication, data encryption, data integrity, and anti-replay functions are used to ensure the security of data transmission between communication parties on the Internet. This reduces the risk of leakage and eavesdropping, ensures the integrity and confidentiality of data, and the security of service transmission for users.

User can check interface, subnet and other parameters in IPSec page, and click Edit or Delete button in the right to modify existed IPSec tunnel.

Click Add button in the left to build a new IPSec tunnel.


Add IPSec VPN
* Name:
IKE Version:
IKEv1
* Pre-Shared Key:
Interface:
WAN1
* Peer Address:
Tunnel Mode:
Tunnel
* Local Subnet:
+ Add
* Peer Subnet:
+ Add
IKE Policy
Encryption:
AES128
Authentication:
SHA1
DH Groups:
2
* Lifetime (seconds):
86400

11 Security

Click "Security" in the left menu to enter Security page, and configure Inbound/Outbound rules and port forwarding.

11.1 Inbound/Outbound Rules

User can set rules to control data traffic based on interface. For example:

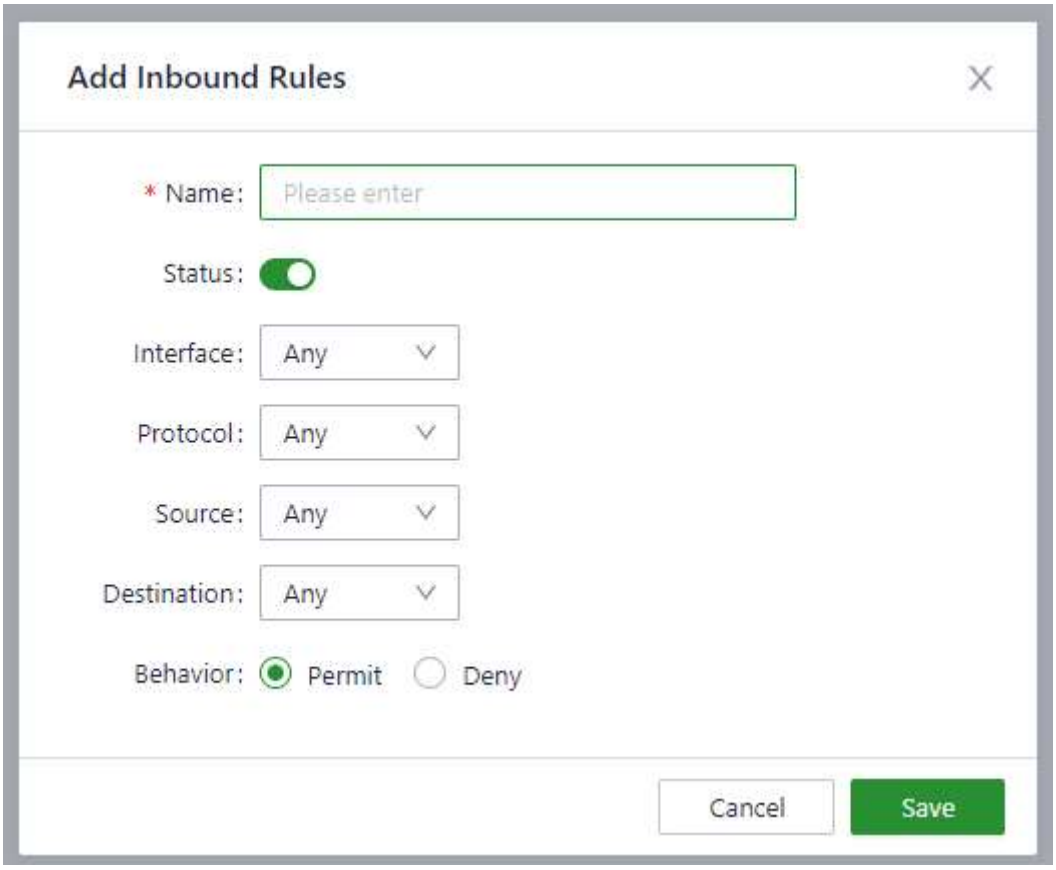
User can use inbound rules to forbid some of IP addresses to access to router when under attack from such IP.

User can use outbound rules to forbid some client devices to access to public network.

Outbound rules: Inside network access to outside network, allow all data by default.

InBound rules: Outside network access to inside network, forbid all data by default.

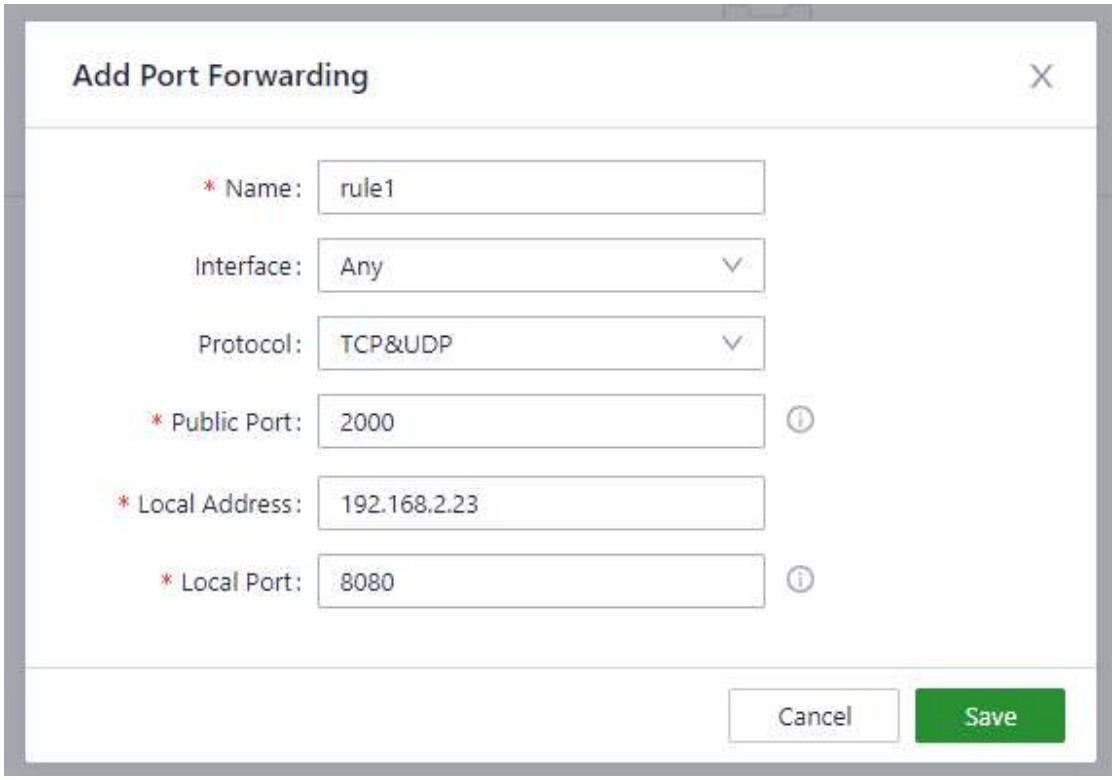
Click Add button in the left to add a new rule.



11.2 Port Forwarding

When outside network accesses to some of ports of the router, ER805-NRQ3 will transfer this data to corresponding ports of inside device according to port forwarding rules. So that the service deployed in LAN can be available for public network, and one public IP can access to plenty of services by using multiple port forwarding rules.

For example, when public network access to ER805-NRQ3’ s port 2000, router will transfer this data to 192.168.2.23:8080 in the LAN.


Add Port Forwarding
* Name: rule1
Interface: Any
Protocol: TCP&UDP
* Public Port: 2000
* Local Address: 192.168.2.23
* Local Port: 8080
Cancel
Save

12 Services

12.1 Interface Management

Configure enable/disable and the speed of each LAN interface.

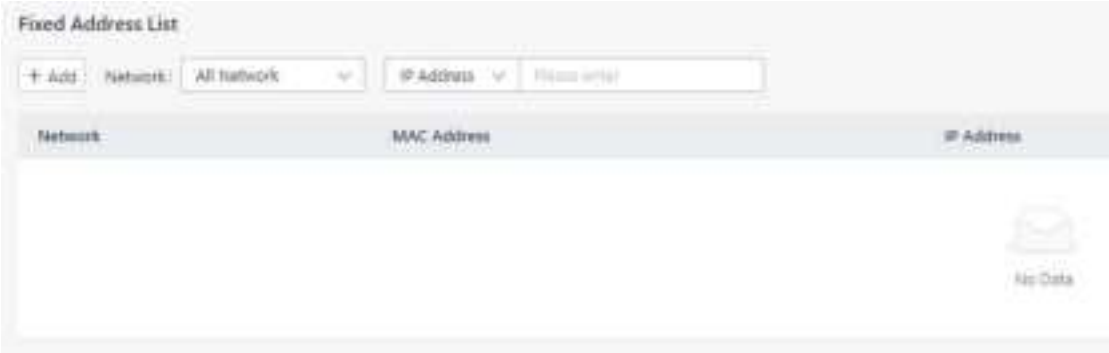
12.2 DHCP server

DHCP uses client/server communication mode. The client submits a configuration application to the server, and the server returns the IP address assigned to the client, in this way, DHCP realizes the dynamic configuration of the IP address.

ER805-NRQ3 builds DHCP service based on internet list. DHCP server will be deleted if corresponding LAN is deleted. Local network should be under IP mode so that can enable DHCP server, VLAN only mode will not have DHCP server.

12.3 Fixed Address List

ER805-NRQ3 will distribute IP address based on MAC address by using fixed address list. Distributed IP address should in the range of IP address of the local network.



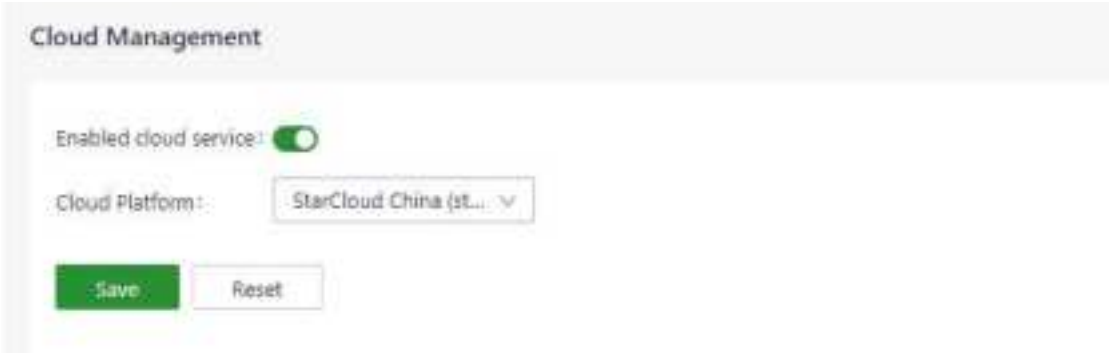
12.4 Static Routes

ER805-NRQ3 will forward data by specific route or interface after configure static routes in this page. This list will only display the rules created by user, and will not show the routes created automatically after modifying WAN or LAN interface.

13 System

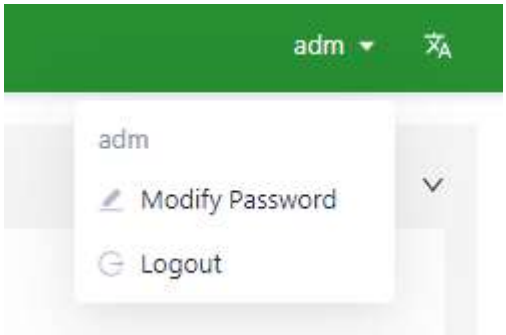
13.1 Cloud Management

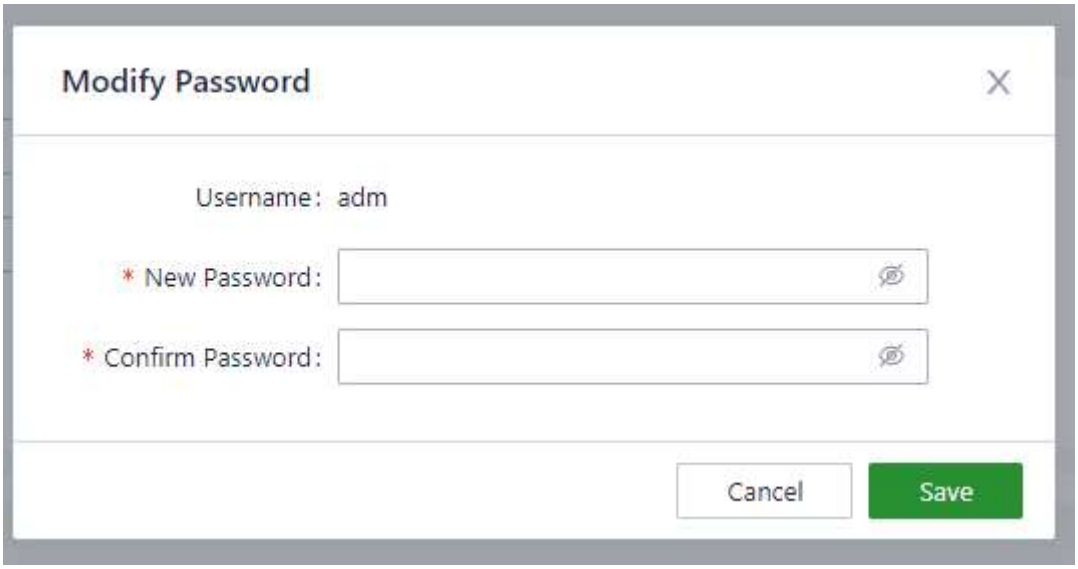
User can select which InHand platform to connect to in this page, and also disable InStarCloud service this page.



13.2 Change the Password

The default username and password of ER805-NRQ3 is adm/123456. Please change the password for securiry. Click “adm” on the top right of the page, click Modify Password in the menu to change the password.





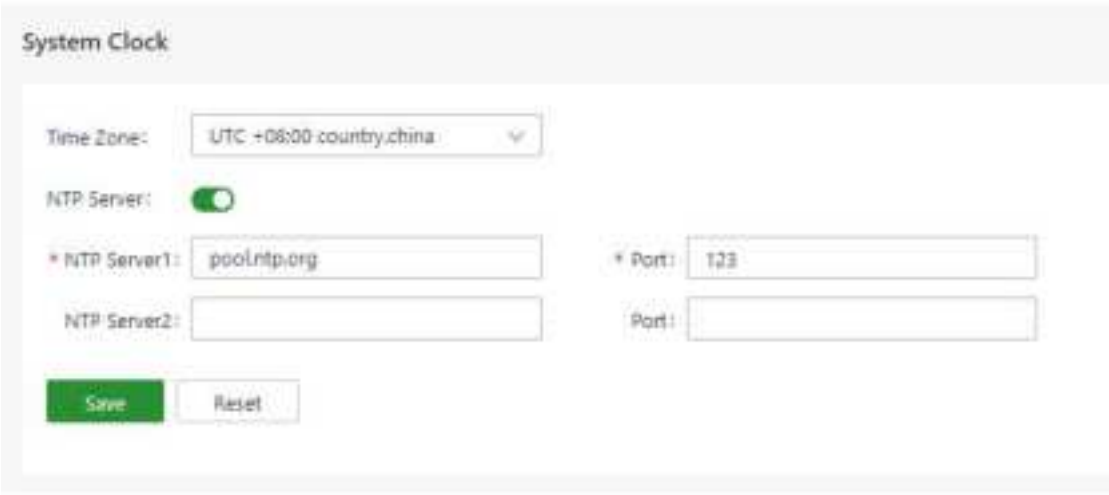
13.3 Remote Access Control

User can allow or forbid public network to access to ER805-NRQ3 and which port for public network to access to ER805-NRQ3 in this page. This rule will not influence LAN device to access to ER805-NRQ3. ER805-NRQ3 supports HTTP and HTTPS when access to its web configuration page.

13.4 System Clock

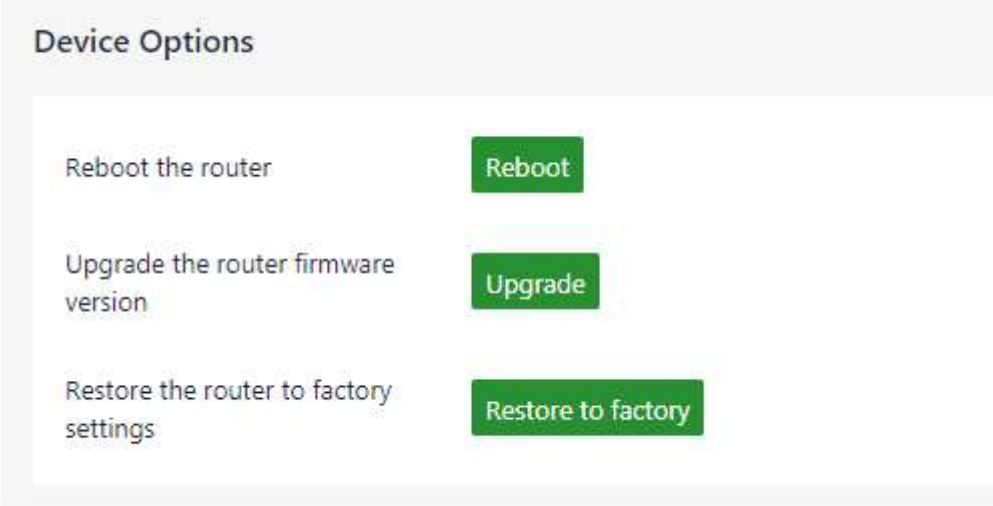
Router should have accurate system time to ensure client devices work without mistake.

NTP server: Configure domain name and port of the NTP server, ER805-NRQ3 will connect to this server to get correct time.



13.5 Device Options

Reboot, upgrade firmware or reset to default factory settings in this page.



13.6 Configuration Management

User can export system configuration to local PC, and import the configuration when device gets error.

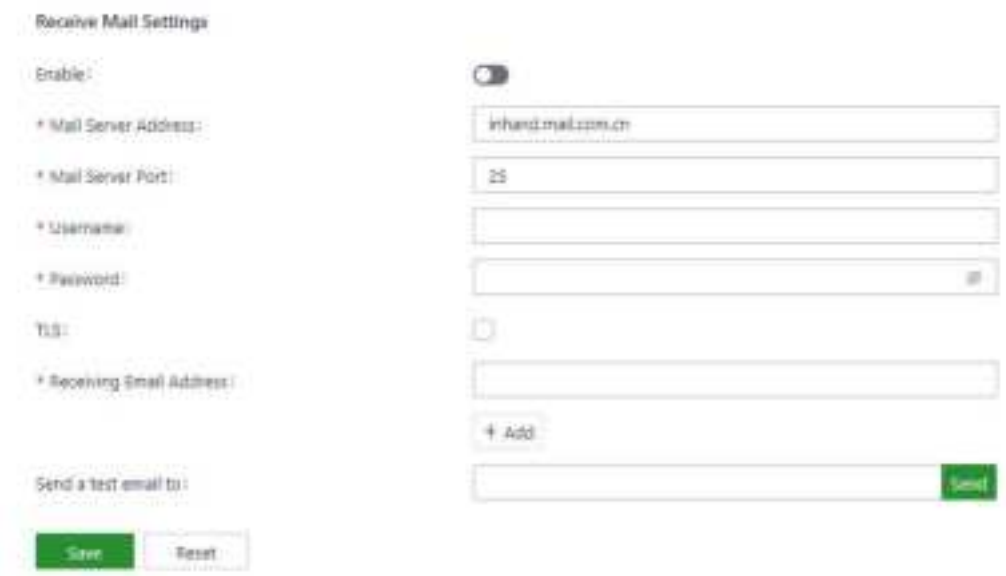
13.7 Device Alarms

When user needs to pay attention to some of events going to happen in the device, user can select corresponding alarm events and set an email address to receive alarm email.

ER805-NRQ3 will still record alarm events in "Status >> Events" even user does not select alarm events in this page.

ER805-NRQ3 supports to record and alarm these events at present.

After configure Mail Server Address, port username and password, ER805-NRQ3 will send alarm email through this email. Configure Receiving Email address and send a test email to this address to check the correctness of the configuration above.



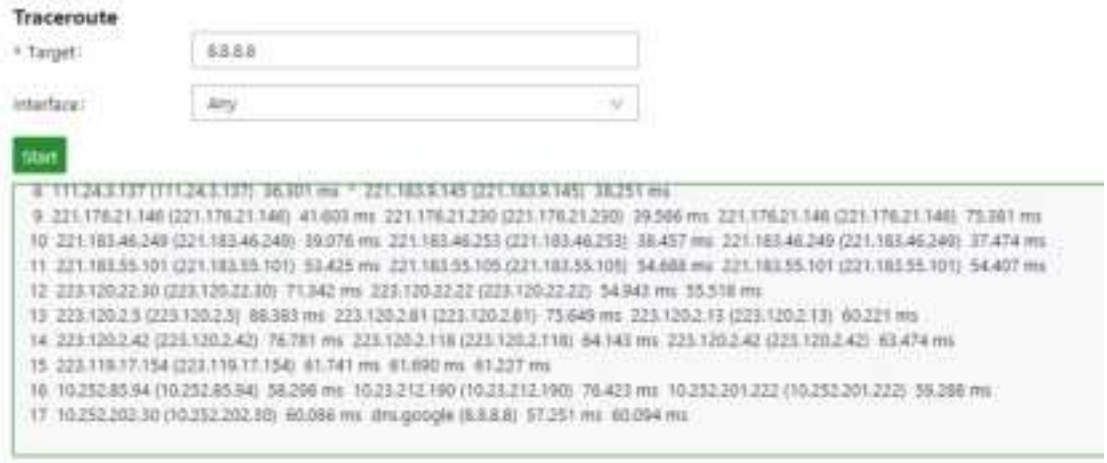
13.8 Tools

13.8.1 Ping

Use ICMP protocol to check the connectivity to other IP address or domain name. Enter IP address or domain name in "Target", and click "Start" to start ping.

13.8.2 Traceroute

Enter target IP address or domain name, select interface, and click "Start". ER805-NRQ3 will trace link situation from itself to the target.

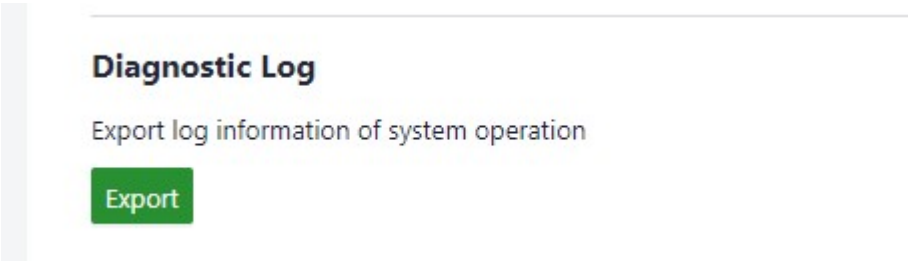


13.8.3 Capture

User can use this feature to catch the data forwarding through one of the interfaces. User can choose to view the result in below chart or export the capture file to local PC by selecting Output option.

13.8.4 Diagnostic Log

Click "Export" to export log to local PC, so that technical support from InHand can check the log when system gets problem.



FCC STATEMENT

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

(1) This device may not cause harmful interference, and

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

NOTE 1: This equipment has been tested and found to comply with the limits for a Class B digital device , pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

NOTE 2: Any changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

RF Exposure

The equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This device should be installed and operated with minimum distance 20cm between the radiator & your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. The availability of some specific channels and/or operational frequency bands is country dependent and firmware programmed at the factory to match the intended destination. The firmware setting is not accessible by the end user.

IC STATEMENT

This device complies with Industry Canada license-exempt RSS standard(s): Operation is subject to the following Two conditions:
(1) this device may not cause interference, and Frequency band 5150-5250 MHz restricted for indoor use only.
(2) This device must accept any interference, including interference that may cause undesired operation of the device. Le present appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :
(1) l'appareil ne doit pas produire de brouillage, et
(2) l'utilisateur de l'appareildoit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.
CAN ICES-3 (B) Avis d’ Industrie Canada Le présent appareil est conforme aux CNR d'industrie Canada applicables aux appareils radio exem pts de licence L'exploitation est autorisée aux deux conditions suivantes:
1) l'appareil ne doit pas produire de brouillage; et
2) l'utillsateur de l'appareil doit accepterbrouillage radioélectrique subi meme si le brouillage est susceptible d'encompromettre le fonctionnement. mauvais fonctionnement de l'appareil. Cet appareil numériquie de la classe B est conforme à la norme NMB-003 du Canada. CAN NMB-3 (B)
Radiation Exposure Statement:
This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.
Déclaration d'exposition aux radiations:
Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20cm de distance entre la source de rayonnement et votre corps.