4G Socket Modem

MDG100-0TU01 (LTE cat. 4)

User Manual

4G Socket Modem

Chapter 1 Introduction

1.1 Introduction

Congratulations on your purchase of AMIT's MDG100 M2M Cellular Socket Modem. With this AMIT cellular modem you have made a great first step in the world of connected Internet of things (IOT) by simply inserting a SIM card from the local mobile carrier into this device to get things connected. This section gives you all the information you need to set up your device.

Main Features:

- Provide 3G/4G cellular connection.
- Deriver ready on Windows 10, Linux and FreeSD.
- Simple Web GUI is used for basic setting and check the 3G/4G status.
- Optional GNSS function for location service.

Before you install and use this product, please read this manual in detail for fully exploiting the functions of this product.

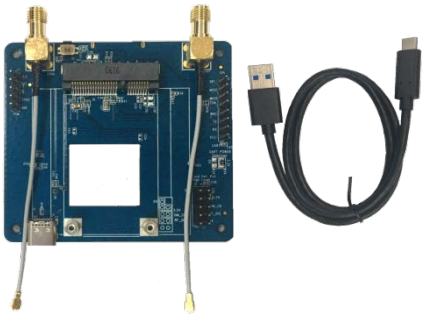
1.2 Contents List

1.2.1 Package Contents

#Standard Package

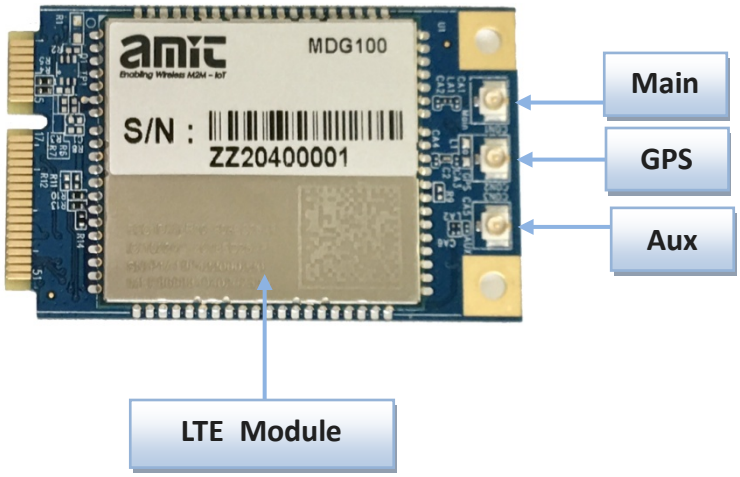
Items	Description	Contents	Quantity
1	**MDG100-0TU01** **4G Socket Modem**		1pcs

#Optional Package

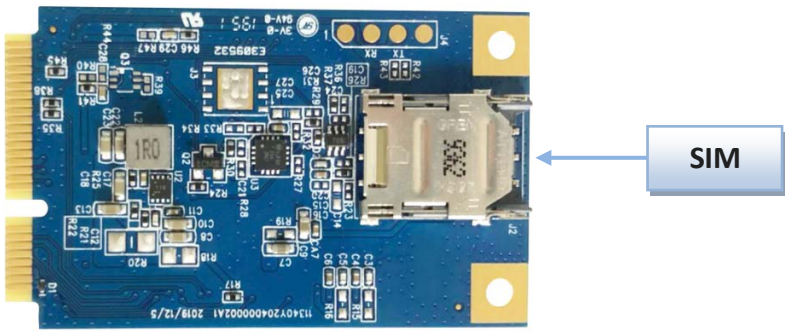
Items	Description	Contents	Quantity
1	**Cellular Antenna**		2 pcs
2	**RF Cable SMA to iPex**		100mm / 120mm / 150mm
3	**Mini-PCIe to USB Loader**		1 pcs

1.3 Hardware Configuration

- Top View



- Bottom View



1.4 Installation

1.4.1 SYSTEM REQUIREMENTS

Network Requirements	• Mini-PCIe with USB2.0 interface • 3G/4G cellular service subscription
Web-based Configuration Utility Requirements	**Computer with the following:** • Windows®, Macintosh, or Linux-based operating system **Browser Requirements:** • Internet Explorer 10.0 or higher • Chrome 73 or higher • Firefox 60.0 or higher

Federal Communication Commission Interference 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.

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

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

FOR PORTABLE DEVICE USAGE (<20m from body/SAR needed)

Radiation Exposure Statement:

The product comply with the FCC portable RF exposure limit set forth for an uncontrolled environment and are safe for intended operation as described in this manual. The further RF exposure reduction can be achieved if the product can be kept as far as possible from the user body or set the device to lower output power if such function is available.

FOR MOBILE DEVICE USAGE (>20cm/low power)

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 20cm between the radiator & your body.

FOR COUNTRY CODE SELECTION USAGE (WLAN DEVICES)

Note: The country code selection is for non-US model only and is not available to all US model. Per FCC regulation, all WiFi product marketed in US must fixed to US operation channels only.

1.4.2 Product Information

The following product information is required to be presented in product User Manual

(1) Frequency Band & Maximum Power

1.a Frequency Band for Cellular Connection (for EC25-EU version)

Band number	Operating Frequency	Max output power
LTE FDD BAND 1	Uplink: 1920-1980 MHz Downlink: 2110-2170 MHz	23.1 dBm
LTE FDD BAND 3	Uplink: 1710-1785 MHz Downlink: 1805-1880 MHz	23.0 dBm
LTE FDD BAND 7	Uplink: 2500-2570 MHz Downlink: 2620-2690 MHz	22.8 dBm
LTE FDD BAND 8	Uplink: 880-915 MHz Downlink: 925-960 MHz	23.2 dBm
LTE FDD BAND 20	Uplink: 832-862 MHz Downlink: 791-821 MHz	23.5 dBm
LTE FDD BAND 28A	Uplink: 704 -723 MHz Downlink: 759 - 778MHz	23 dBm
LTE FDD BAND 38	Uplink: 2570-2620 MHz Downlink: 2570-2620 MHz	21.7 dBm
LTE FDD BAND 40	Uplink: 2300-2400 MHz Downlink: 2300-2400 MHz	21.5 dBm
WCDMA BAND 1	Uplink: 1920-1980 MHz Downlink: 2110-2170 MHz	23.3 dBm
WCDMA BAND 8	Uplink: 880-915 MHz Downlink: 925-960 MHz	
E-GSM	Uplink: 880-915 MHz Downlink: 925-960 MHz	32.9 dBm
DCS	Uplink: 1710-1785 MHz Downlink: 1805-1880 MHz	29.9 dBm

1.b Frequency Band for Cellular Connection (for Quectel EC25-AF version)

Band number	Operating Frequency	Max output power
LTE FDD BAND 2	Uplink: 1850-1910 MHz Downlink: 1930-1990 MHz	23.86 dBm
LTE FDD BAND 4	Uplink: 1710-1755 MHz Downlink: 2110-2155 MHz	23.82 dBm
LTE FDD BAND 5	Uplink: 824-849 MHz Downlink: 869-894 MHz	23.46 dBm
LTE FDD BAND 12	Uplink: 699-716 MHz Downlink: 729-746 MHz	23.75 dBm
LTE FDD BAND 13	Uplink: 777-787 MHz Downlink: 746-756 MHz	23.86 dBm

LTE FDD BAND 14	Uplink: 788-798 MHz Downlink: 758-768 MHz	23.86 dBm
LTE FDD BAND 66	Uplink: 1710-1780 MHz Downlink: 2100-2200 MHz	23.34 dBm
LTE FDD BAND 71	Uplink: 663-698 MHz Downlink: 617-652 MHz	23.46 dBm
WCDMA BAND 2	Uplink: 1850-1910 MHz Downlink: 1930-1990 MHz	23.3 dBm
WCDMA BAND 4	Uplink: 1710-1755 MHz Downlink: 2110-2155 MHz	
WCDMA BAND 5	Uplink: 824-849 MHz Downlink: 869-894 MHz	

(2) DoC Information

You can get the DoC information of this product from the following URL:
http://www.amitwireless.com/products-doc/

(3) Manufacture Information

Manufacture Name: AMIT Wireless Inc.
Manufacture Address: No. 28, Lane 31, Sec. 1, Huandong Rd., Sinshih Dist., Tainan 74146, Taiwan

1.5 Hardware Installation

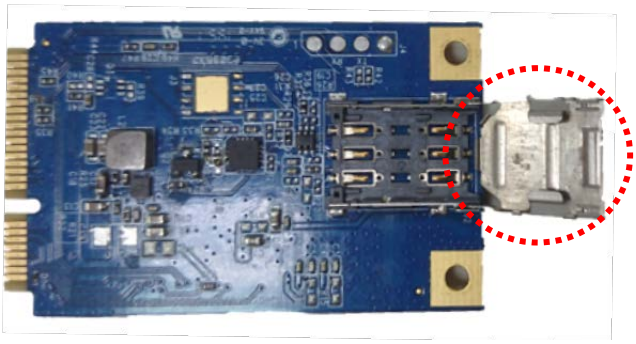
This chapter describes how to install and configure the hardware

1.5.1 Insert the SIM Card

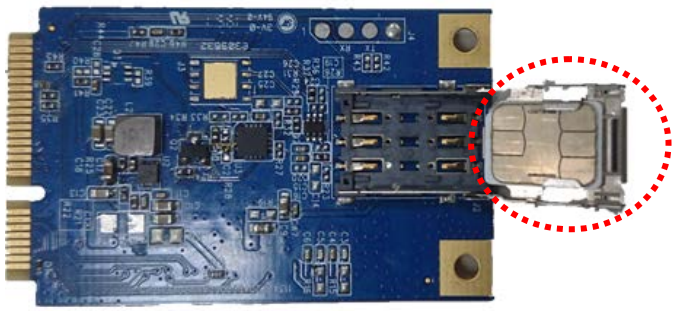
WARNING: BEFORE INSERTING OR CHANGING THE SIM CARD, PLEASE MAKE SURE THAT POWER OF THE DEVICE IS SWITCHED OFF.

SIM card slot is located in the botton area of MDG100 series. You need to insert the SIM card first and mount the device on Mini-PCIe socket if your host board has no SIM slot. Please follow below instructions to install or remove a SIM card.

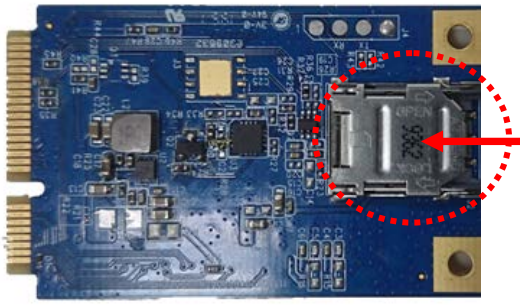
Step 1: Raise-up SIM Holder
Raise-up the SIM holder



Step 2: Insert SIM
Push the inserted SIM card on SIM holder.



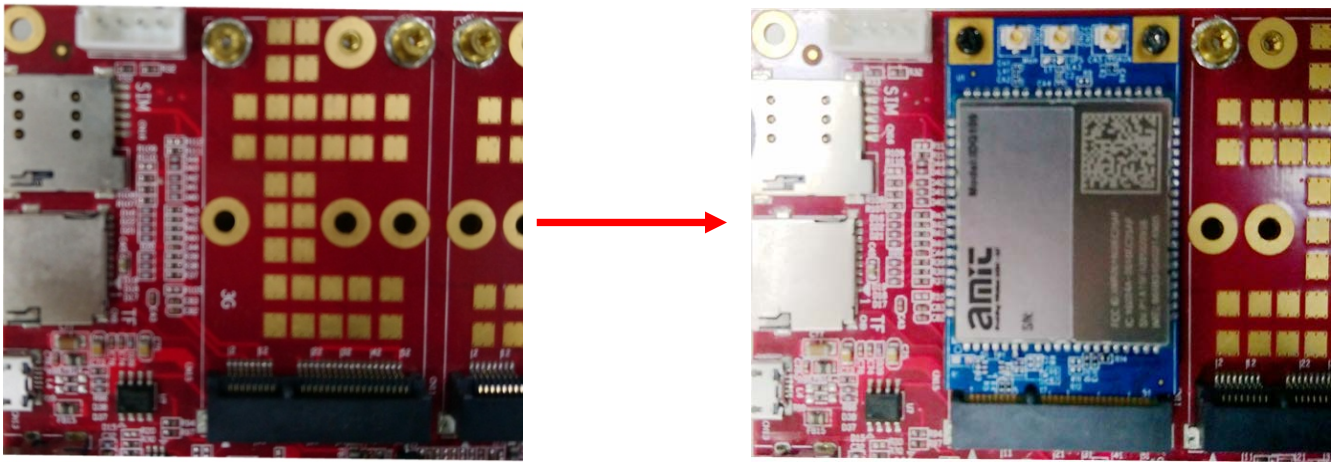
Step 3: Lock down SIM Holder



Pull the SIM holder down to lock it

1.5.2 Connecting to the Host Board

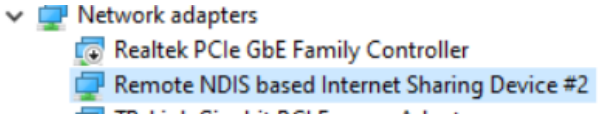
The MDG100 is a modem device with Miin-PCIe interface with USB 2.0. User needs to put the card on a Mini-PCIe socket and link cellular antenna on the modem to enable the cellular connection.



Put the MDG100 on MiniPCIe socket

User can check device information in serval different OS as below.

Windows



Linux

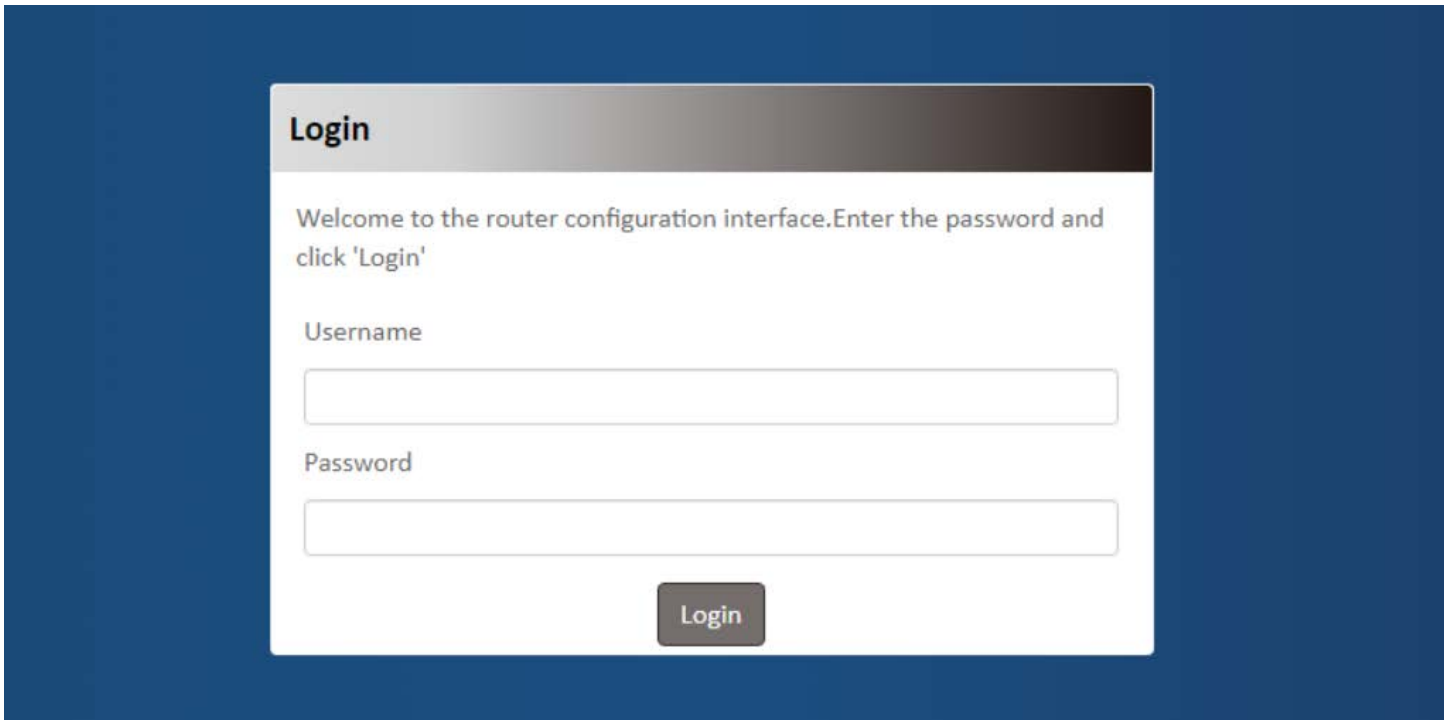
```
T:  Bus=01 Lev=01 Prnt=01 Port=01 Cnt=01 Dev#=  6 Spd=480  MxCh= 0
D:  Ver= 2.00 Cls=ef(misc ) Sub=02 Prot=01 MxPS=64 #Cfgs=  1
P:  Vendor=05c6 ProdID=90b3 Rev= 3.18
S:  Manufacturer=Qualcomm
S:  Product=EC25-AF
C:* #Ifs= 4 Cfg#= 1 Atr=a0 MxPwr=500mA
A:  FirstIf#= 0 IfCount= 2 Cls=e0(wlcon) Sub=01 Prot=03
I:* If#= 0 Alt= 0 #EPs= 1 Cls=e0(wlcon) Sub=01 Prot=03 Driver=rndis_host
E:  Ad=82(I) Atr=03(Int.) MxPS=   8 Ivl=32ms
I:* If#= 1 Alt= 0 #EPs= 2 Cls=0a(data ) Sub=00 Prot=00 Driver=rndis_host
E:  Ad=81(I) Atr=02(Bulk) MxPS= 512 Ivl=0ms
E:  Ad=01(O) Atr=02(Bulk) MxPS= 512 Ivl=0ms
```

1.5.2 Setup by Configuring WEB UI

User can browse web UI to configure the modem device.

Type in the IP Address (**http://172.16.0.1**)[1]

When you see the login page, enter the user name and password and then click **'Login'** button.
The default setting for both username and password is **'admin'** [2].



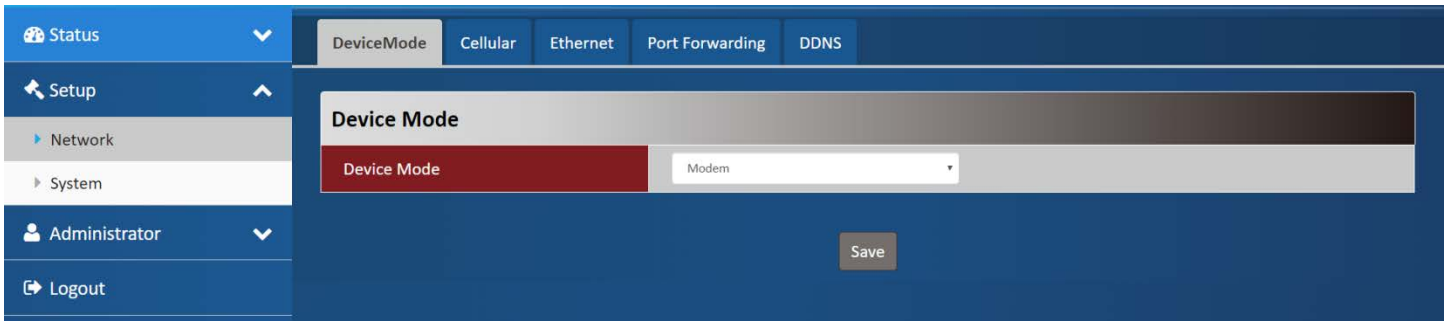
1 The default LAN IP address of this device is 172.16.0.1. If you change it, you need to login by using the new IP address.

2 For security concern, the login process will force user to change default password at the first time.

Chapter 2 Setup

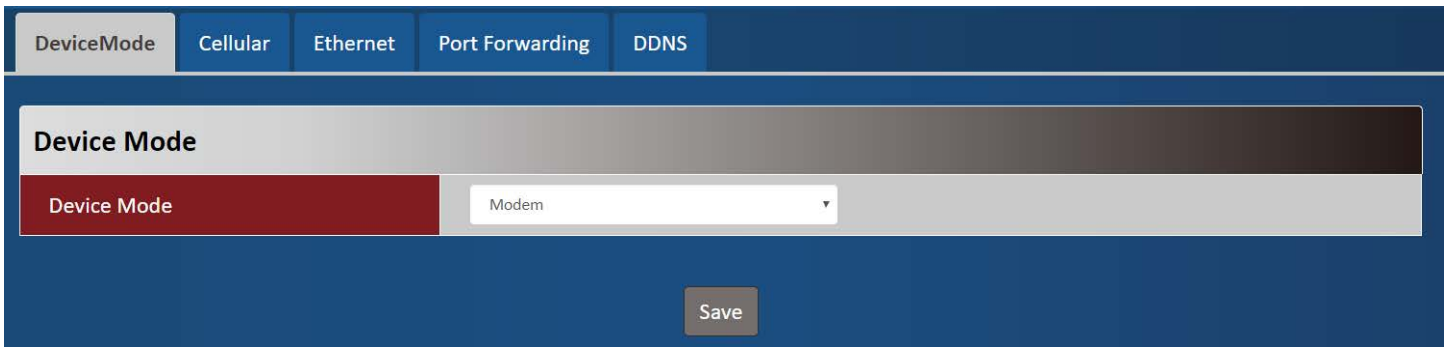
The MDG100 series connect to a machine via USB 2.0 interface on Mini-PCIe socket for 3G/4G network connection. MDG100 provides NAT and Modem functions and helps the network application more flexible.

2.1 Network



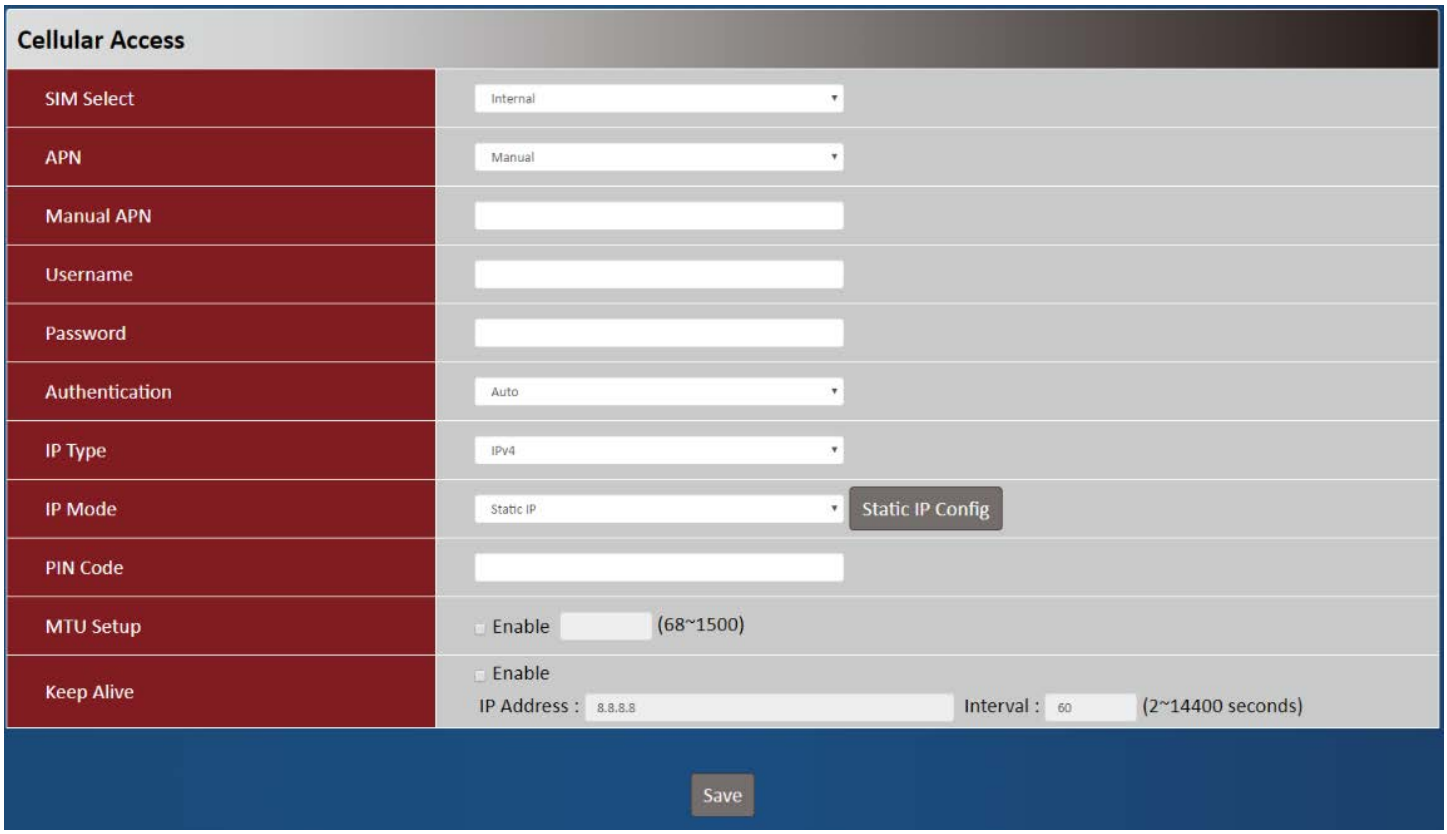
Network Page	
Item	**Description**
Device Mode	Set the unit operating mode
Cellular	Set the parameter for cellular network.
Ethernet	Set the IP of LAN side and DHCP service
Port Forwarding	Enable specified port or protocol for service on connected device.
DDNS	Register a dynamic host name for the unit.

2.1.1 Device Mode



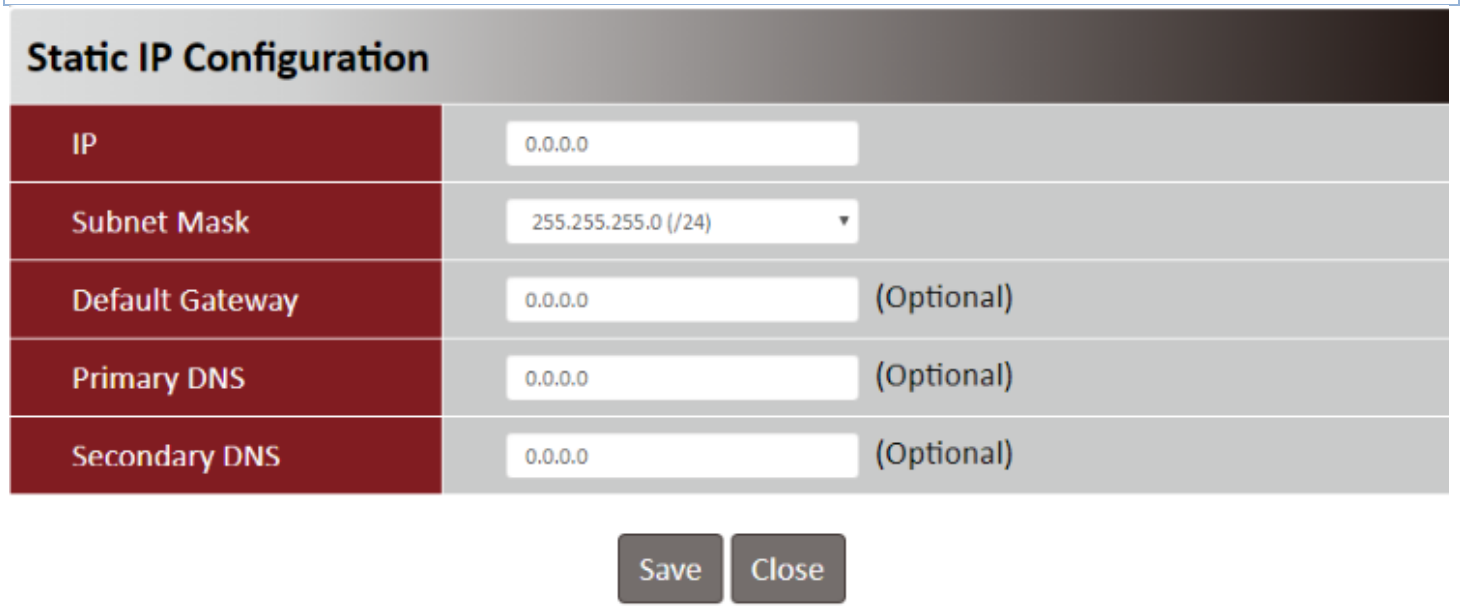
Device Mode		
Item	**Value setting**	**Description**
Device Mode	1. A Must filled setting 2. By default **NAT** is selected	**NAT** The unit will provide a NAT service and provide a simple firewall for the connected device. **Modem** The unit will pass the cellular IP to connected device on LAN side.

2.1.2 Cellular



Device Mode Item	Value setting	Description
SIM Select	1. A Must filled setting 2. By default **Internal** is selected	**Auto** The unit will switch SIM path automatically. **Internal** The unit will use SIM slot on board. **External** The unit will use SIM path via Mini-PCIe interface.
APN	1. A Must filled setting 2. By default **Auto** is selected	**Auto** The unit will detect the SIM and set an APN from internal database. **Manual** User must set APN manually.
Manual APN	1. A Must filled setting 2. String format : any text	Enter the **APN** you want to use to establish the connection. This is a must-filled setting if you selected **Manual APN** as APN scheme.
Username	1. An Optional setting 2. String format : any text	Enter the optional **username** settings if your ISP provided such settings to you.
Password	1. An Optional setting 2. String format : any text	Enter the optional **Password** settings if your ISP provided such settings to you.
Authentication	1. A Must filled setting 2. By default **Auto** is selected	Select **PAP** (Password Authentication Protocol) and use such protocol to be authenticated with the carrier's server. Select **CHAP** (Challenge Handshake Authentication Protocol) and use such

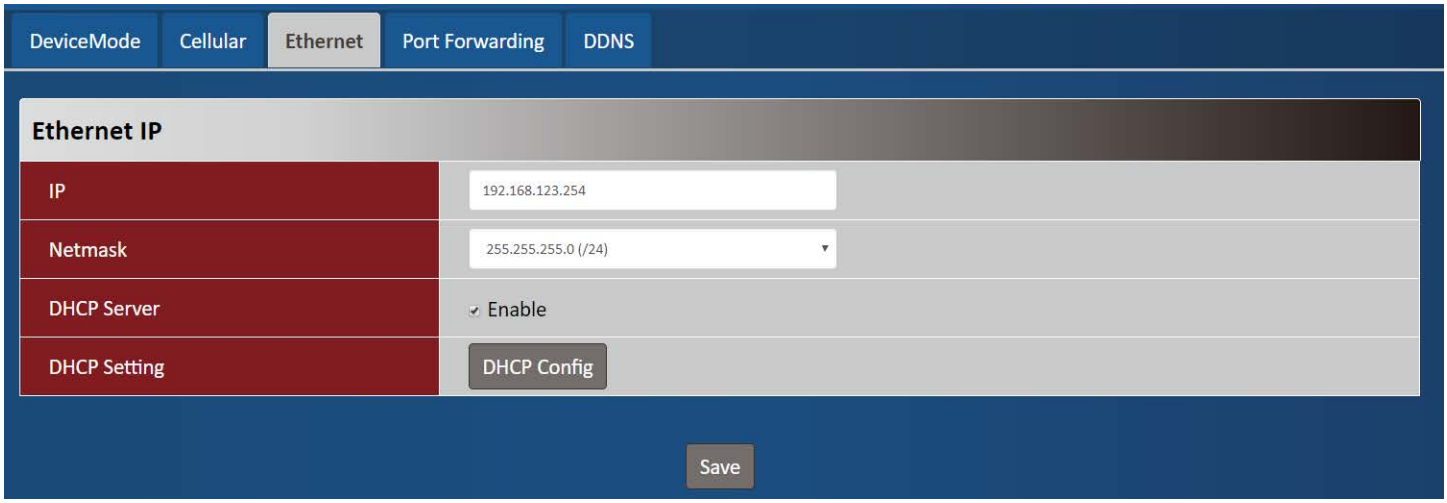
		protocol to be authenticated with the carrier's server. When **Auto** is selected, it means it will authenticate with the server either **PAP** or **CHAP**.
IP Mode	1. A Must filled setting 2. By default **Dynamic IP** is selected	**Dynamic IP** The unit will get IP from cellular service.. **Static IP** The unit will set IP according **Static IP Config**.
IP Type	1. A Must filled setting 2. By default **IPv4** is selected	Specify the IP type of the network service provided by your 3G/4G network. It can be **IPv4**, **IPv6**, or **IPv4v6**.
PIN Code	1. An Optional setting 2. String format : interger	Enter the PIN (Personal Identification Number) code if it needs to unlock your SIM card.
MTU Setup	1. An Optional setting 2. **Uncheck** by default	Check the Enable box to enable the MTU (Maximum Transmission Unit) limit, and specify the **MTU** for the 3G/4G connection. **MTU** refers to Maximum Transmission Unit. It specifies the largest packet size permitted for Internet transmission. ***Value Range***: 68 ~ 1500.
Keep Alive	1. An optional setting 2. Box is unchecked by default	Check the **Enable** box to activate the keepalive function. Input **IP Address** and **interval** to send an ICMP packet to check the network status.



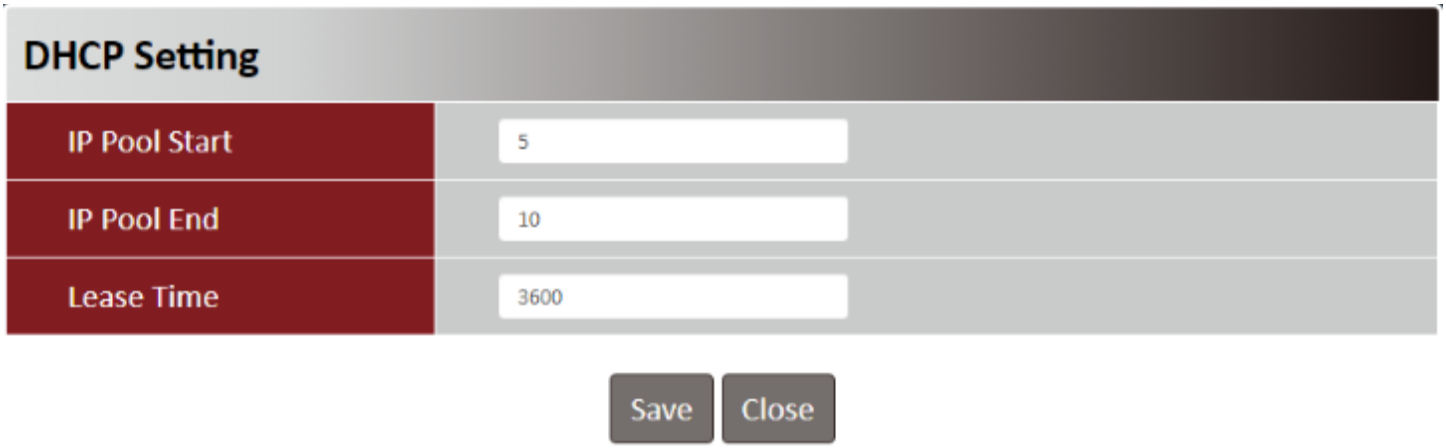
Static IP Configuration Item	Value setting	Description
IP	1. IPv4 format. 2. A Must filled setting	The Static IP Address setting of this unit.
Subnet Mask	255.255.255.0 (/24) is set by default	The Subnet Mask of this configed static IP.
Default Gateway	1. IPv4 format. 2. An Optional setting	The gateway setting of this configed static IP.
Primary DNS	1. IPv4 format. 2. An Optional setting	Assigned DNS server of this configed static IP.
Secondary DNS	1. IPv4 format.	Assigned DNS server of this configed static IP.

2. An Optional setting

2.1.3 Ethernet



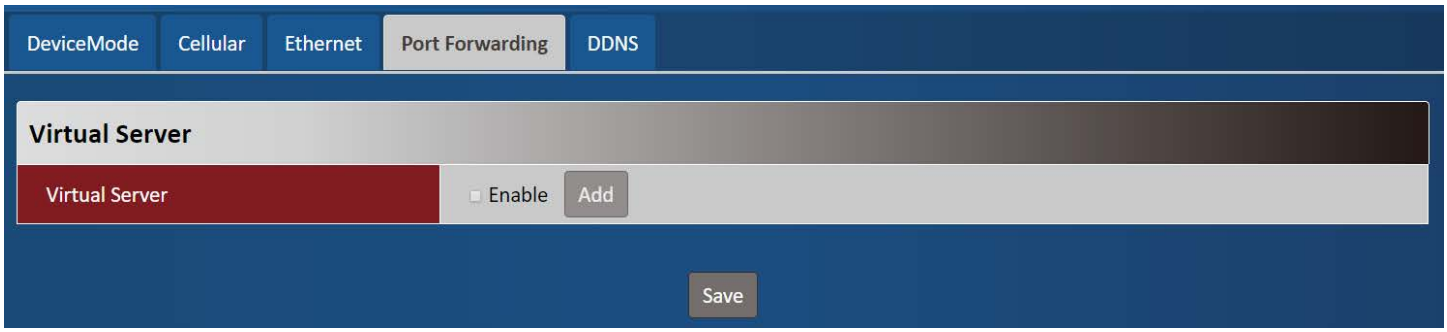
Ethernet IP Item	Value setting	Description
IP	1. IPv4 format. 2. A Must filled setting	The LAN IP Address of this unit.
Netmask	255.255.255.0 (/24) is set by default	The Subnet Mask of this unit.
DHCP Server	The box is checked by default.	Click **Enable** box to activate DHCP Server.
DHCP Setting	N/A	Click **DHCP Config** button to pop-up the **DHCP Setting** page.



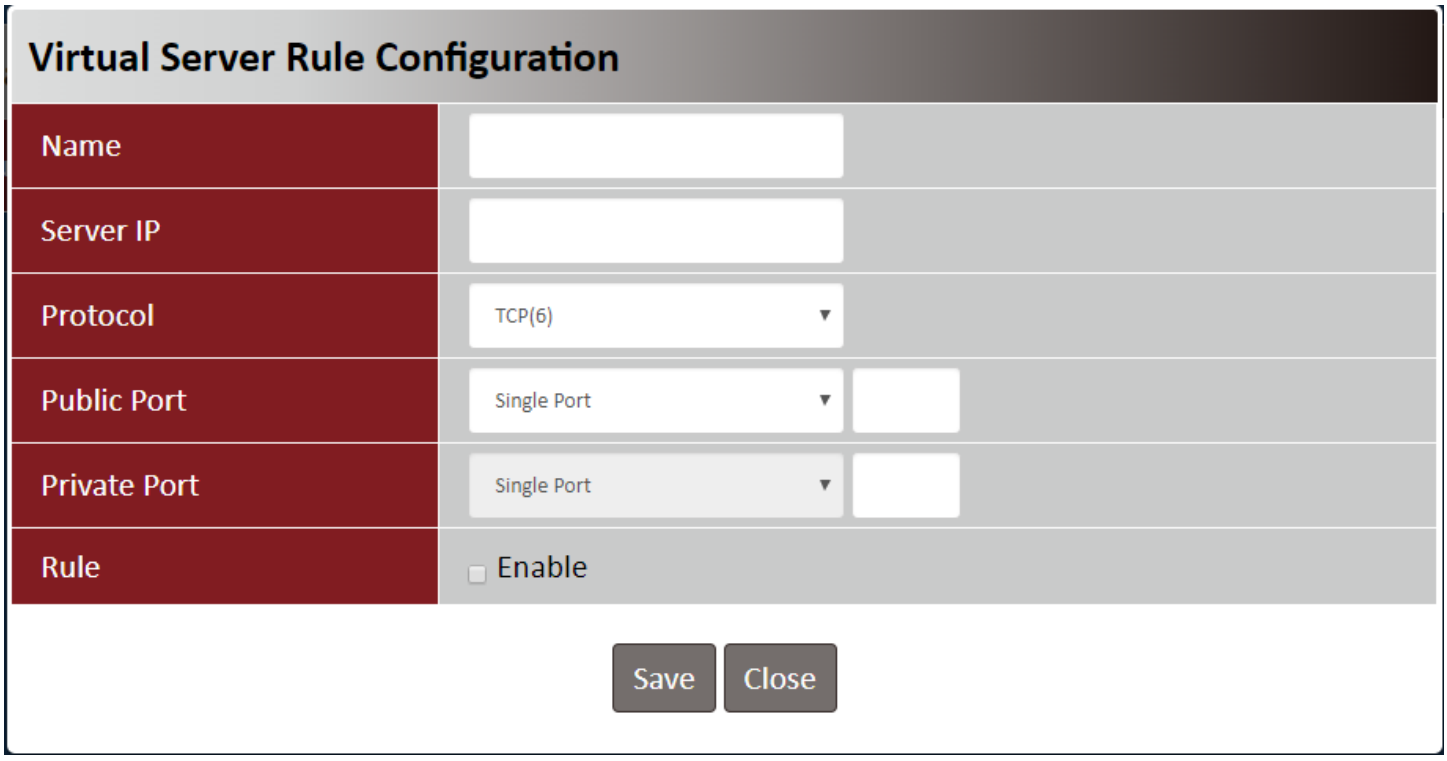
DHCP Setting Item	Value setting	Description
IP Pool Start	1. Numberic string format.	The IP Pool of this DHCP Server. It is Starting Address entered in this field.

	2. A Must filled setting	
IP Pool End	1. Numberic string format. 2. A Must filled setting	The IP Pool of this DHCP Server. It is Ending Address entered in this field.
Lease Time	1. Numberic string format. 2. A Must filled setting	The Lease Time of this DHCP Server. ***Value Range***: 300 ~ 604800 seconds.

2.1.4 Port Forwarding



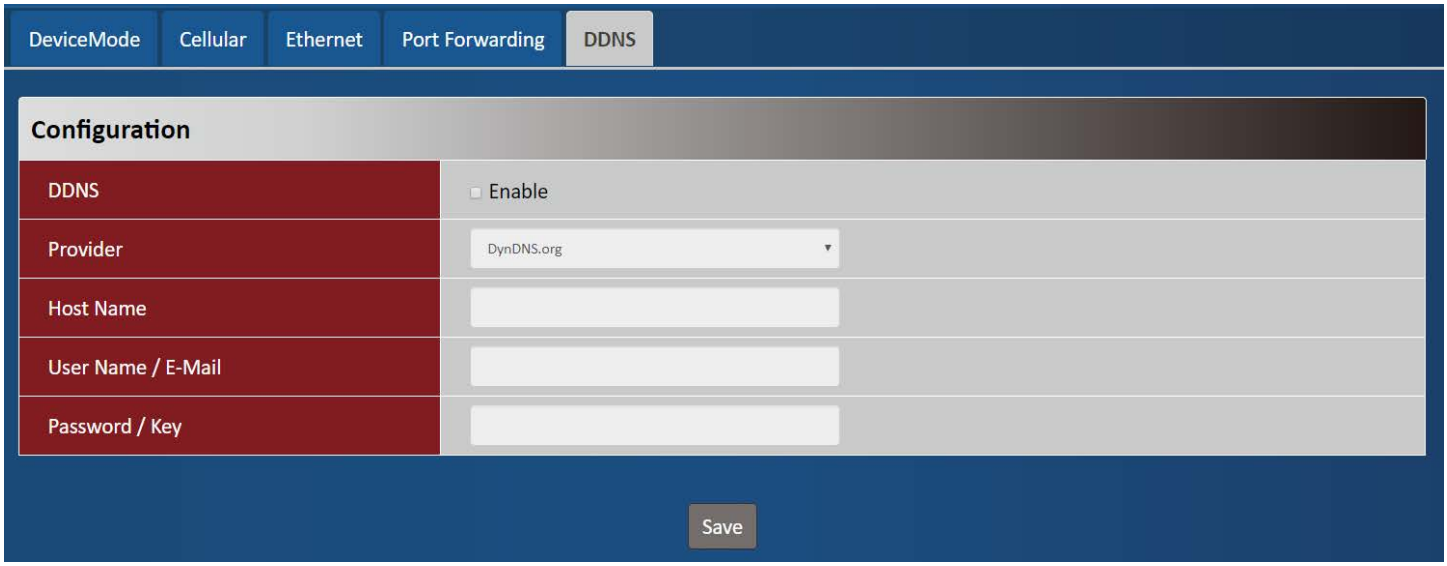
Virtual Server Item	Value setting	Description
Virtual Server	The box is unchecked by default	Check the **Enable** box to activate this port forwarding function Click **Add** will pop-up **Virtual Server Rule Configuration** page.



Virtual Server Rule Configuration		
Item	**Value setting**	**Description**
Name	1. String format can be any text 2. A Must filled setting	The name of current rule
Server IP	A Must filled setting	This field is to specify the IP address of the interface selected in the WAN Interface setting above.
Protocol	A Must filled settin	When **"TCP(6)"** is selected It means the option "Protocol" of packet filter rule is TCP. **Public Port** selected a predefined port from **Well-known Service**, and **Private Port** is the same with **Public Port** number. **Public Port** is selected **Single Port** and specify a port number, and **Private Port** can be set a **Single Port** number. **Public Port** is selected **Port Range** and specify a port range, and **Private Port** can be selected **Single Port** or **Port Range**. *Value Range*: 1 ~ 65535 for Public Port, Private Port. When **"UDP(17)"** is selected It means the option "Protocol" of packet filter rule is UDP. **Public Port** selected a predefined port from **Well-known Service**, and **Private Port** is the same with **Public Port** number. **Public Port** is selected **Single Port** and specify a port number, and **Private Port** can be set a **Single Port** number. **Public Port** is selected **Port Range** and specify a port range, and **Private Port** can be selected **Single Port** or **Port Range**. *Value Range*: 1 ~ 65535 for Public Port, Private Port. When **"TCP(6) & UDP(17)"** is selected It means the option "Protocol" of packet filter rule is TCP and UDP. **Public Port** selected a predefined port from **Well-known Service**, and **Private Port** is the same with **Public Port** number. **Public Port** is selected **Single Port** and specify a port number, and **Private Port** can be set a **Single Port** number. **Public Port** is selected **Port Range** and specify a port range, and **Private Port** can be selected **Single Port** or **Port Range**. *Value Range*: 1 ~ 65535 for Public Port, Private Port. When **"User-defined"** is selected It means the option "Protocol" of packet filter rule is User-defined. For **Protocol Number**, enter a port number.
Rule	1. An optional filled setting 2.The box is unchecked by default.	Check the Enable box to activate the rule.

Virtual Server – Rule Name		
Item	**Value setting**	**Description**
Rule name	N/A	Clicl "**Edit**" button to pop-up **Virtual Server Rule Configuration** page to edit the rule. Click "**Delete**" button to delete this rule

2.1.5 DDNS

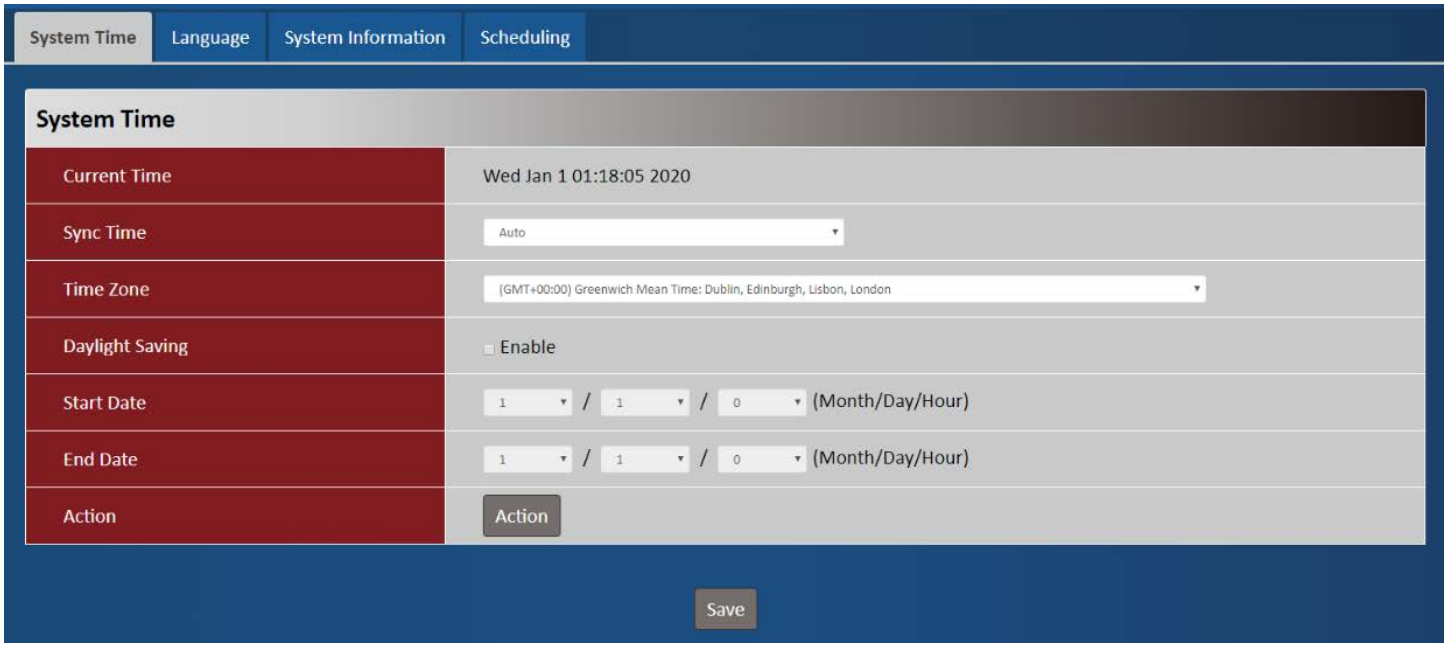


DDNS		
Item	**Value setting**	**Description**
DDNS	The box is unchecked by default	Check the **Enable** box to activate this function.
Provider	**DynDNS.org** is set by default	Select your DDNS provider of Dynamic DNS. It can be **DynDNS.org**, **NO-IP.com**, **TZO.com** etc...
Host Name	1. String format can be any text 2. A Must filled setting	Your registered host name of DDNS Service. ***Value Range*:** 0 ~ 63 characters.
User Name / E-Mail	1. String format can be any text 2. A Must filled setting	Enter your User name or E-mail addresss of DDNS Service.
Password / Key	1. String format can be any text 2. A Must filled setting	Enter your Password or Key of DDNS Service.

2.2 System

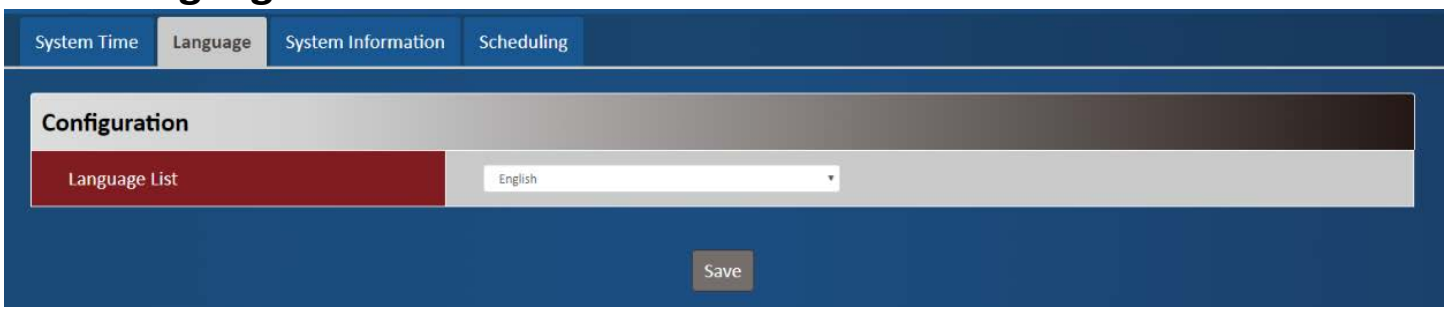
This section provides the configuration of system features.

2.2.1 System Time



System Time Item	Value setting	Description
Current Time	N/A	Show the current time of the unit.
Sync Time	1. A Must-filled item. **2. Atuo is selected by default.**	When select **Auto**, unit will sync the time via cellular cell, and then try to use NTP if cellular cell doesn't provide time information. When select **NTP**, the unit will sync time via ntp service.
Time Zone	1. A Must-filled item. 2. **GMT+00 :00** is selected by default.	Select a time zone where this device locates.
Daylight Saving	1. It is an optional item. 2. Un-checked by default	Check the **Enable** button to activate the daylight saving function. When user enabled this function, user has to specify the **Start Date** and **End Date** for the daylight saving time duration.
Start Date	N/A	Start time for Daylight Saving.
End Date	N/A	End Time of Daylight Saving.
Action	N/A	Click **Action** to sync time immediately

2.2.2 Language

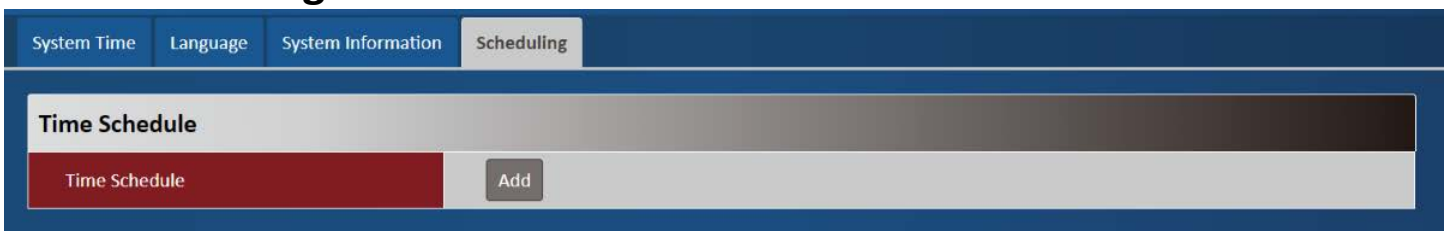


Language		
Item	**Value setting**	**Description**
Language List	1. A Must-filled item. **2. English** is selected by default.	Language setiing of the WebGUI.

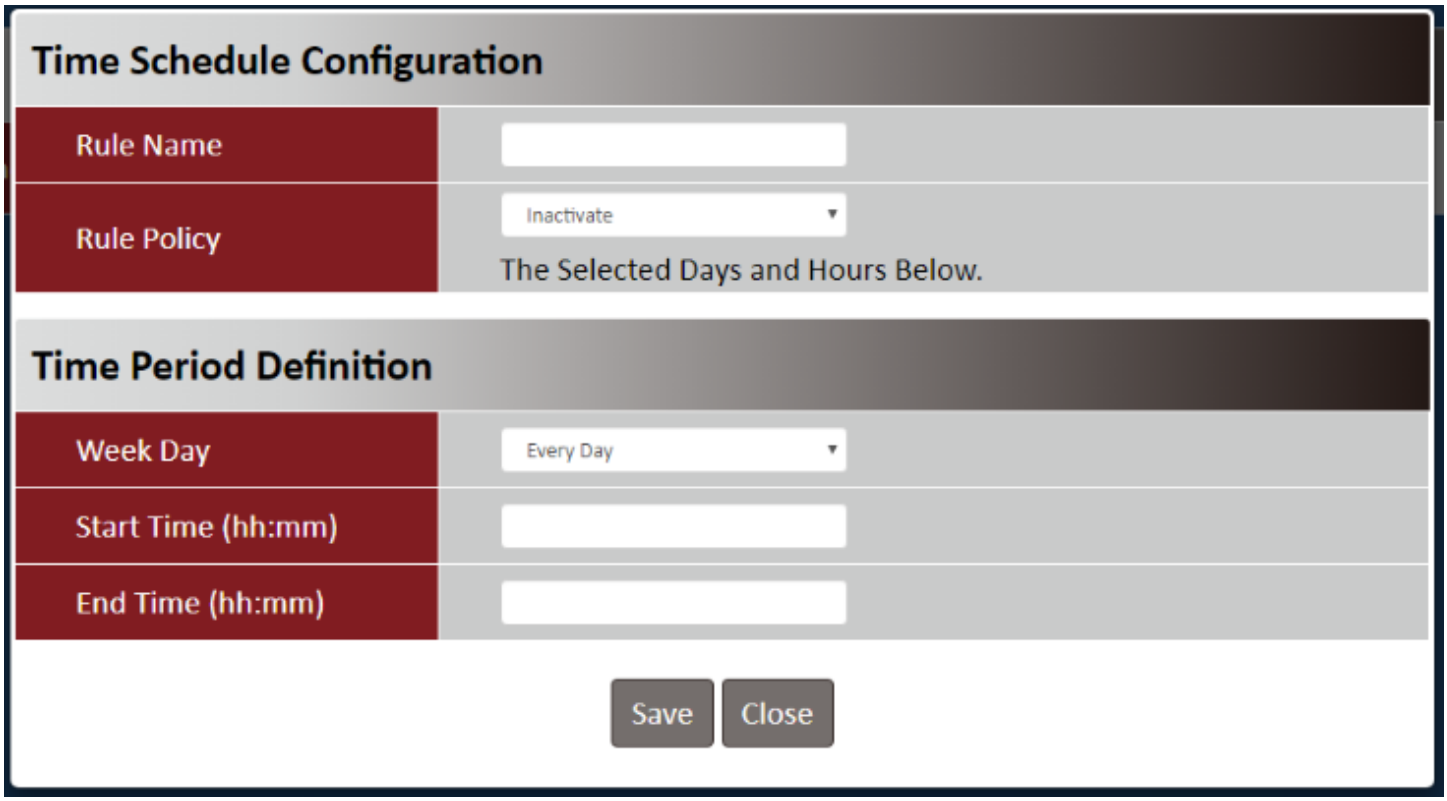
2.2.3 System Information

System Information		
Item	**Value setting**	**Description**
Model Name	N/A	Show the model name of the device
Serial Number	**N/A**	Show the serial number of the device
Manufacturing Datte	N/A	Show the manufacturing date of the device.

2.2.4 Scheduling



Scheduling		
Item	**Value setting**	**Description**
Time Schedule	N/A	Press **Add** to create a schedule rule for system.



Time Schedule Configuration		
Item	**Value Setting**	**Description**
Rule Name	String: any text	Set rule name
Rule Policy	Default Inactivate	Inactivate/activate the function been applied to in the time period below

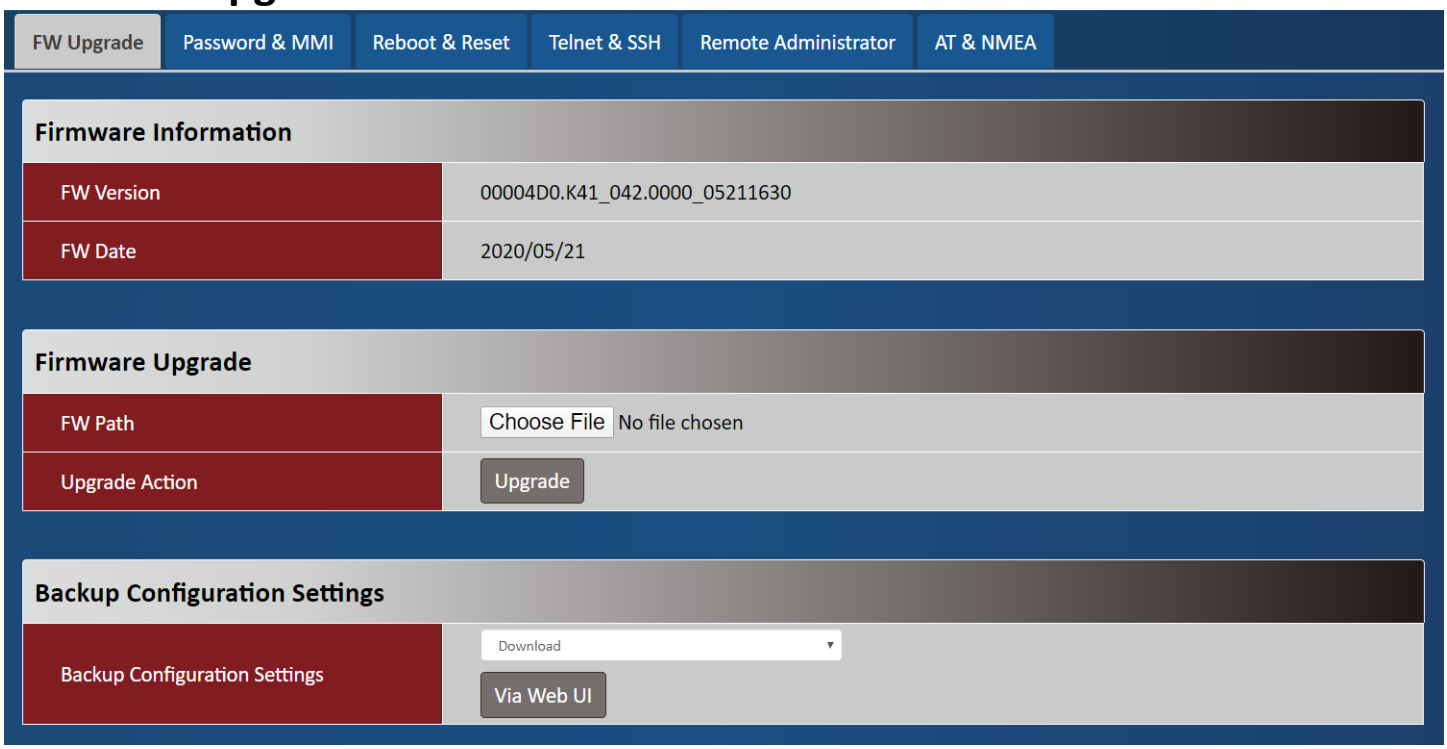
Time Period Definition		
Item	**Value Setting**	**Description**
Week Day	Select from menu	Select everyday or one of weekday
Start Time	Time format (hh :mm)	Start time in selected weekday
End Time	Time format (hh :mm)	End time in selected weekday

Chapter 3 Administrator

3.1 Manager

This section provides configuration to manage the device.

3.1.1 FW Upgrade

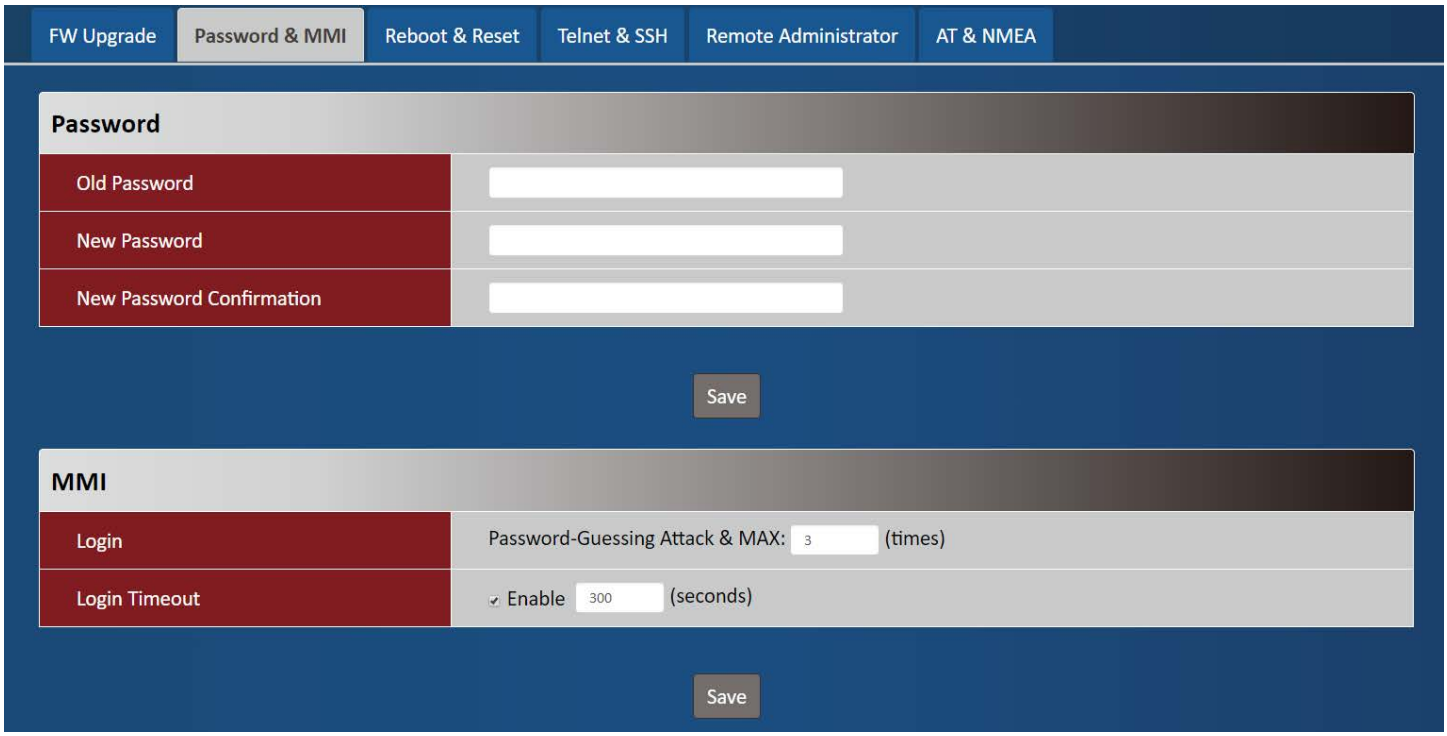


Firmware Information		
Item	**Value setting**	**Description**
FW Version	N/A	It displays the firmware version of the product
FW Date	N/A	It displays the build time of the firmware

Firmware Upgrade		
Item	**Value setting**	**Description**
FW Path	N/A	Select firmware file to be upgraded
Upgrade Action	N/A	Click **Upgrade** button to start upgrade process with selected FW

Backup Configuration Settings		
Item	**Value setting**	**Description**
Backup Configuration Settings	N/A	Select "**Download**" to backup current configuration to a file. Select "**Upload**" to restore configuration from selected file.

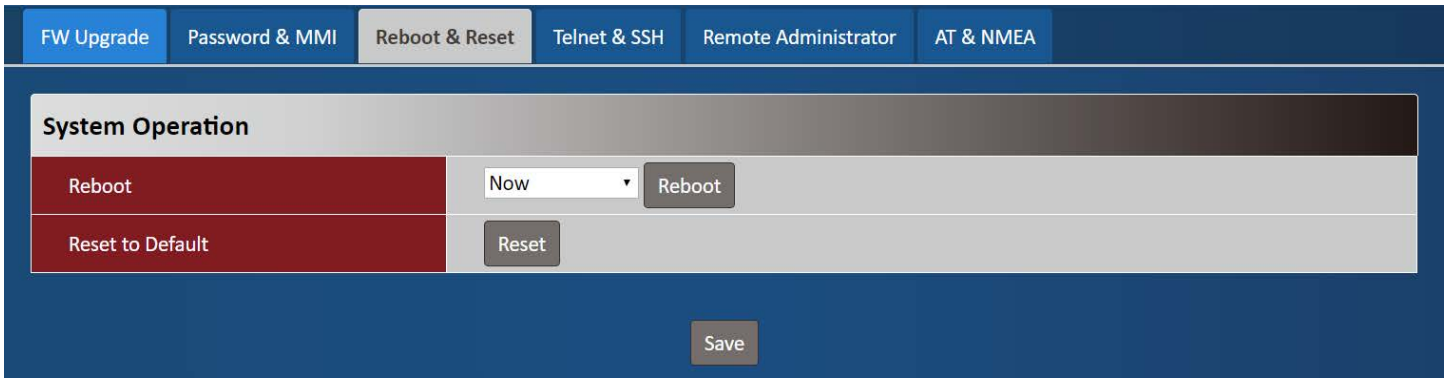
3.1.2 Password & MMI



Password Item	Value setting	Description
Old Password	1. String: any text **2. The default password for web-based MMI is 'admin'.**	Enter the current password to enable you unlock to change password.
New Password	String: any text	Enter new password
New Password Confirmation	String: any text	Enter new password again to confirm

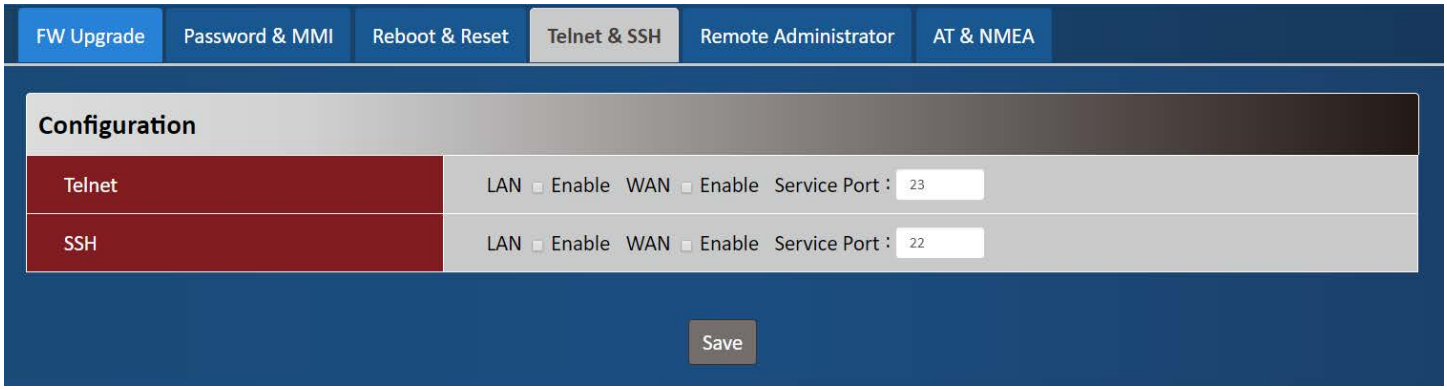
MMI Item	Value setting	Description
Login	3 times is set by default	Enter the login trial counting value. ***Value Range***: 3 ~ 10. If someone tried to login the web GUI with incorrect password for more than the counting value, an warning message "***Already reaching maximum Password-Guessing times, please wait a few seconds!***" will be displayed and ignore the following login trials.
Login Timeout	The Enable box is checked, and 300 is set by default.	Check the Enable box to activate the auto logout function, and specify the maximum idle time as well. ***Value Range***: 30 ~ 65535.

3.1.3 Reboot & Reset



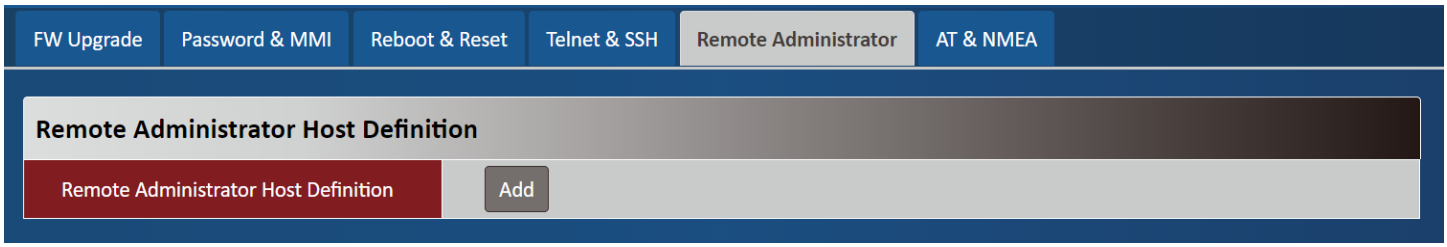
Device Mode		
Item	**Value setting**	**Description**
Reboot	N/A	Chick the **Reboot** button to reboot the unit immediately
Reset to Default	N/A	Click the **Reset** button to reset the device configuration to its default value.

3.1.4 Telnet & SSH

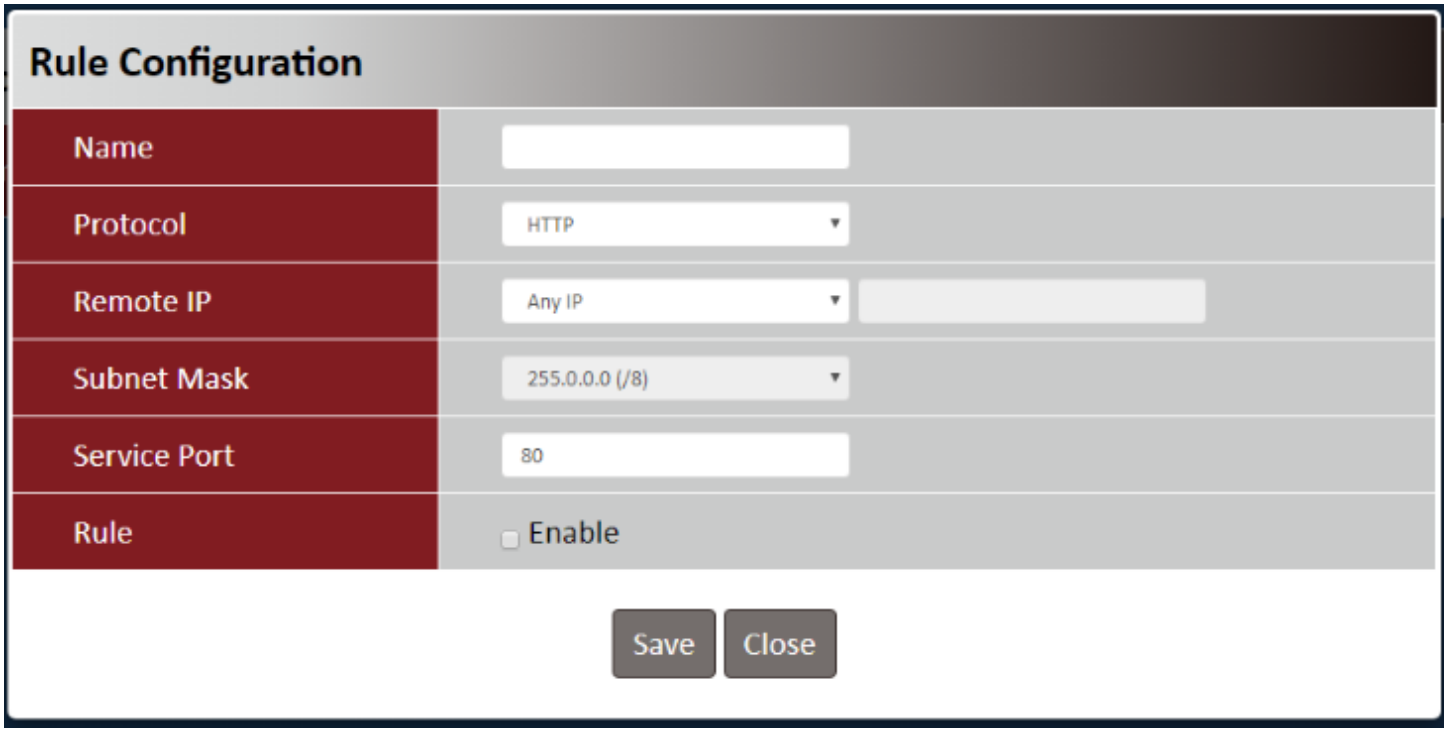


Telnet & SSH		
Item	**Value setting**	**Description**
Telnet	1. Default value is disable such service 2. By default **Service Port** is 23.	Check the **Enable** box to activate the Telnet function for connecting from LAN or WAN interfaces. You can set which number of **Service Port** you want to provide for the corresponding service. It doesn't command to enable WAN site if the device service in public IP. ***Value Range***: 1 ~65535.
SSH	1. Deafule value is disable such service. 2. By default **Service Port** is 22.	Check the **Enable** box to activate the SSH Telnet function for connecting from LAN or WAN interfaces. You can set which number of **Service Port** you want to provide for the corresponding service. ***Value Range***: 1 ~65535.

3.1.5 Remote Administrator



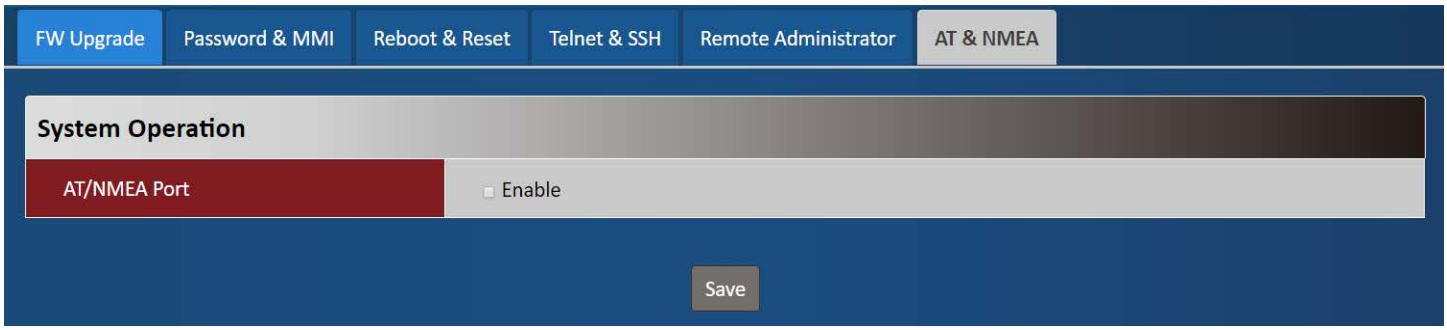
Remote Administrator Host Definition		
Item	**Value setting**	**Description**
Remote Administrator Host Definition	N/A	Press "Add" to set a remote administrator rule



Rule Configuration		
Item	**Value setting**	**Description**
Name	String: any text	Set rule name
Protocol	HTTP is set by default	Select **HTTP** or **HTTPS** method for router access.
Remote IP	A Must filled setting	This field is to specify the remote host to assign access right for remote access. Select **Any IP** to allow any remote hosts Select **Specific IP** to allow the remote host coming from a specific subnet.
Subnet Mask	N/A	An IP address entered in this field and a selected **Subnet Mask** to compose the subnet if Remote IP set in **Specific IP.**
Service Port	1. 80 for HTTP by default	This field is to specify a Service Port to HTTP or HTTPS connection.

	2. 443 for HTTPS by default	***Value Range***: 1 ~ 65535.
Rule	The box is unchecked by default.	Click **Enable** box to activate this rule.

3.1.6 AT & NMEA



AT & NMEA Item	Value setting	Description
AT/NMEA Port	Default value is disabled	Enable this function to have additional AT and NMEA ports of the modem. AT port provides interface for user to send standard AT command(3GPP TS 27.005 / 27.007). NMEA port will informs location satat if user enable GNSS function.