

4G_2G_NB DTU Products






Operation Guide

This document is applicable for the following product, see corresponding product user manual for hardware description.

<p>4G Products</p>		<p>Protoss-PG41</p>
		<p>Protoss-PG41B</p>
		<p>Elfin-EG40 Elfin-EG41</p>

	 <p>The image shows the Elfin-EG41B module, a black rectangular device with a SIM card slot on the left and an RS485 port on the right. Text on the front includes 'Elfin-EG41B', 'RS485', '4G&BLE', and 'Input: 9-36VDC@10W'. On the right side, there are labels for 'Reload', 'GND', 'VCC', and 'GND'.</p>	<p>Elfin-EG4XB</p>
	 <p>The image shows two Meta-MG41 and Meta-MG42 modules. Both are black rectangular devices with a vertical antenna on the left. The Meta-MG41 has a SIM card slot and the Meta-MG42 has an RS485 port. Text on the front includes 'Meta-MG41', '4G&BLE', and 'Input: 9-36VDC@10W'. On the right side, there are labels for 'Reload', 'GND', 'VCC', and 'GND'.</p>	<p>Meta-MG41 Meta-MG42</p>
	 <p>The image shows the Meta-MG41B module, a black rectangular device with a vertical antenna on the left and an RS485 port on the right. Text on the front includes 'Meta-MG41B', 'RS485', '4G&BLE', and 'Input: 9-36VDC@10W'. On the right side, there are labels for 'Reload', 'GND', 'VCC', and 'GND'.</p>	<p>Meta-MG4XB</p>

		<p>Meta-MG4XB-CC</p>
		<p>HF2411</p>
		<p>Gport-G43</p>
		<p>Gport-G43B</p>

		<p>Protoss-PG11</p>
<p>2G</p>		<p>Elfin-EG10, Elfin-EG11</p>
<p>Products</p>		<p>HF2111A</p>
		<p>Gport-G10、Gport-G11、Gport-G12</p>
<p>NB-IoT</p>		<p>HF2611</p>

1. 4G PRODUCT	6
1.1. PROTOSS-PG41	6
1.2. HF2411&HF2611	7
1.3. GPORT-G43 EVK	7
1.4. ELFIN-EG40	8
1.5. ELFIN-EG41	8
1.6. EG40 CABLE	9
1.7. EG41 CABLE	10
2. 2G PRODUCT	11
2.1. PROTOSS-PG11	11
2.2. ELFIN-EG10 4PIN CONNECTOR	11
2.3. ELFIN-EG11 4PIN CONNECTOR	12
2.4. ELFIN-EG10 8PIN CONNECTOR	12
2.5. ELFIN-EG11 8PIN CONNECTOR	12
2.6. EG10 INTERFACE CONVERSION CABLE	13
2.7. EG11 INTERFACE CONVERSION CABLE	14
3. SERIAL SETTING	15
3.1. SERIAL TOOL SECURECRT	15
3.2. CONFIGURE SERIAL PARAMETER	15
4. TEST EXAMPLE	16
4.1. IOTSERVICE TOOLS	16
4.2. IOTSERVICE INTRODUCTION	16
4.3. TEST CASE ONE: IOTSERVICE UART CONFIG	21
4.4. TEST CASE TWO: IOTSERVICE NETWORK CONFIG	23
4.5. TEST CASE THREE: THROUGHPUT VIA SECURECRT	27
4.6. TEST CASE FOUR: HEARTBEAT AND RESISTER PACKET	28
4.7. TEST CASE FIVE: VIRTUAL COM	29
4.8. TEST CASE SIX: SMS THROUGHPUT	30
4.9. TEST CASE SEVEN: HTTP REQUEST	31
4.10. SMS AT COMMAND	33
4.11. UART UPGRADE	35
4.11.1. MCU FIRMWARE	35
4.11.2. 4G FIRMWARE(ONLY 4G PRODUCT)	37
4.12. REMOTE OTA UPGRADE	37
4.12.1. MCU FIRMWARE	37
4.12.2. 4G FIRMWARE(ONLY 4G PRODUCT)	39
4.13. MASSPRODUCTION CONFIG	39
4.14. DATA COLLECT GATEWAY AND MORE FUNCTION	41
APPENDIX A: REFERENCES	42
A.1. TEST TOOLS	42

1. 4G PRODUCT

The PG41/HF2411/G43/EG41 support LTE-TDD, LTE-FDD, WCDMA, TD-SCDMA, GPRS full network. 4G network support maximum download data rate 150Mbps, upload data rate 50Mbps.

The PG41/HF2411/G43/EG41 support TCPIP protocol, with its UART interface, it make traditional UART device easy connecting to IOT.

HF2611 support NB-IoT Band3/Band5/Band8.

1.1. Protoss-PG41



1.2. HF2411&HF2611

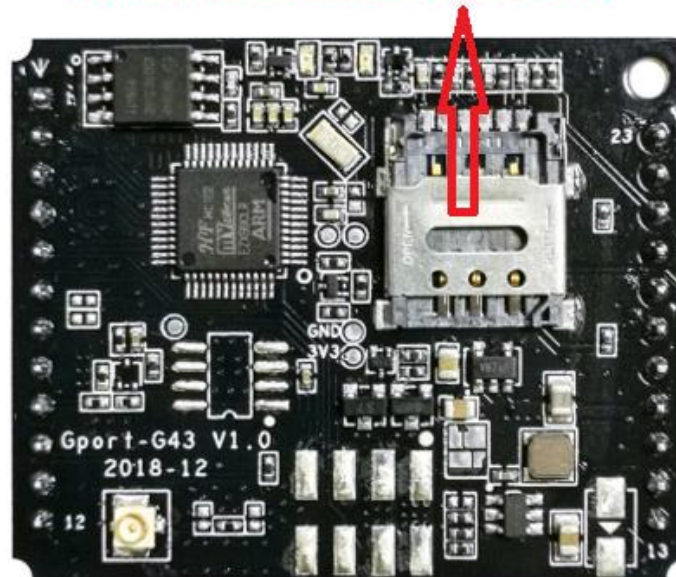


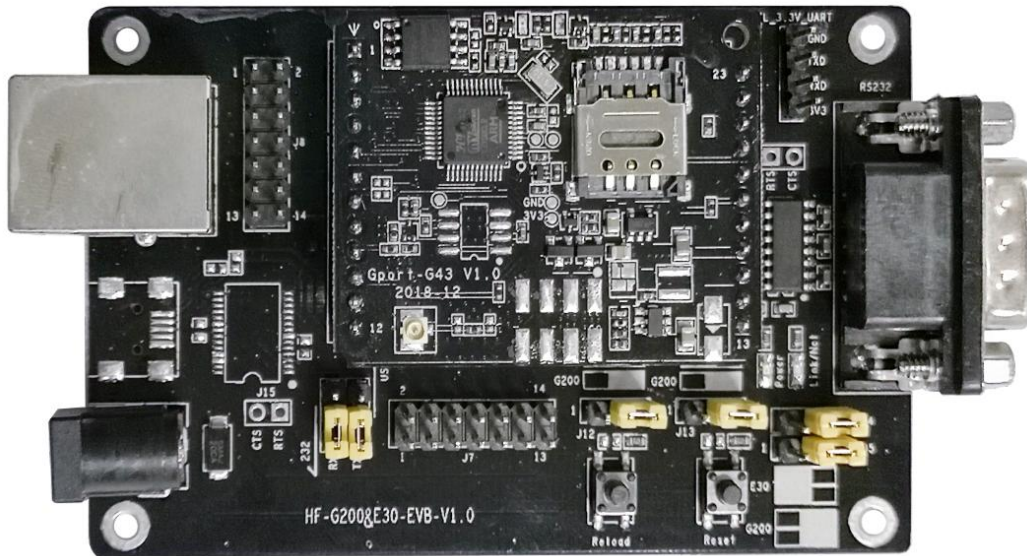
1.3. Gport-G43 EVK

Insert SIM card and use 9~12VDC adapter to power supply the EVK.

向上方向推打开卡座

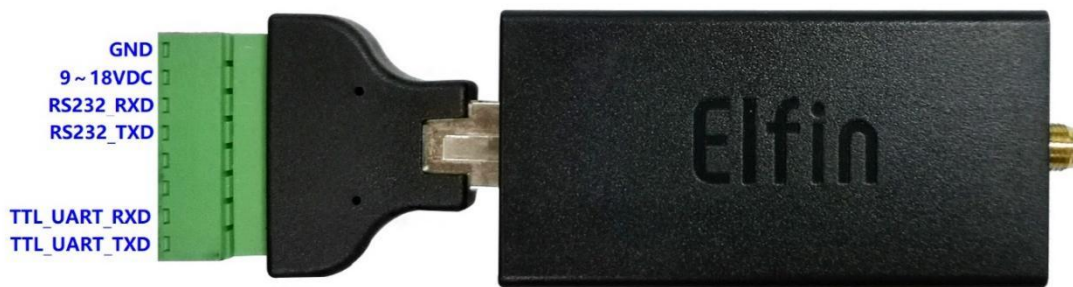
Push in this direction to open the slot





1.4. Elfin-EG40

8PIN Header

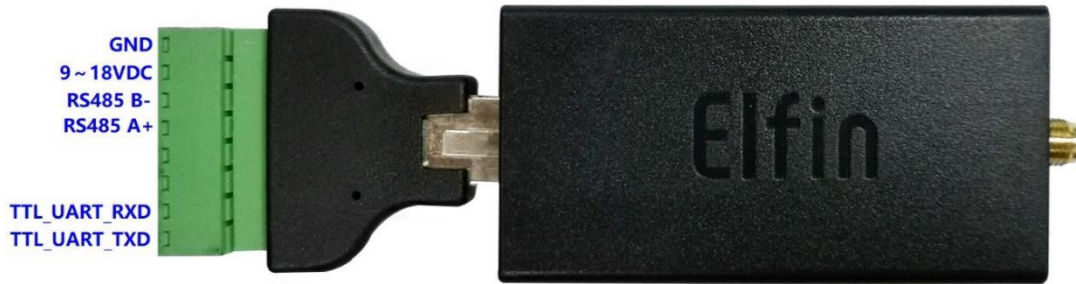


4PIN Header



1.5. Elfin-EG41

8PIN Header



4PIN Header



1.6. EG40 Cable



1.7. EG41 Cable



2. 2G PRODUCT

The PG11, EG1X, HF2111A, G10, G11, G12 support GPRS 2G network.

The PG11, EG1X, HF2111A use G11 for its core module.

2.1. Protoss-PG11



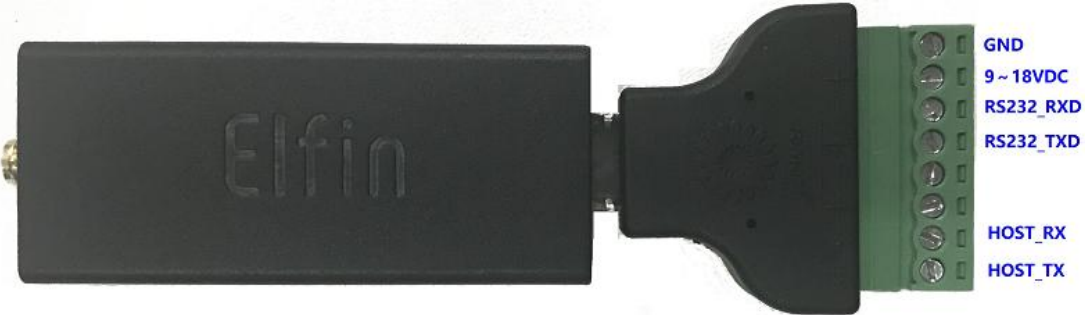
2.2. Elfin-EG10 4PIN Connector



2.3. Elfin-EG11 4PIN Connector



2.4. Elfin-EG10 8PIN Connector



2.5. Elfin-EG11 8PIN Connector



2.6. EG10 Interface Conversion Cable



Figure 1. Interface Conversion Cable

2.7. EG11 Interface Conversion Cable




Figure 2. Interface Conversion Cable

3. SERIAL SETTING

3.1. Serial Tool SecureCRT

Download address: http://www.hi-flying.com/index.php?route=download/category&path=1_4

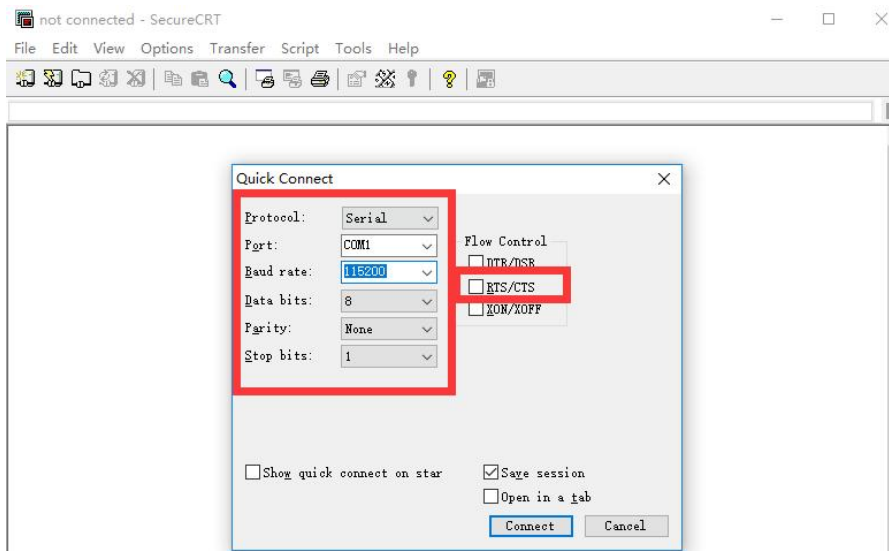
Decompress file and find executable program, then open. Click quick start button  to create connection.



3.2. Configure Serial Parameter

Protocol: Serial

Port: Actual connection port(search by "My PC"->"Device Manager"->"Port(COM and LPT)". As figure:



Notes: The default serial data is as above and user can modify device working parameter by IOTService.

4. TEST EXAMPLE

4.1. IOTService Tools

IOTService is used for config the module parameters by UART or remotely. Make module easy to use and check status. The download address is as following.

<http://www.hi-flying.com/download-center-1/applications-1/download-item-iot-service>

The screenshot shows the HF website's download center for IOTService. It includes a search bar, navigation links (Home, IOT Module, IOT Device, Support, News, Company, Cloud, Mall), and a QR code. The breadcrumb path is: Home > Download Center > Applications > IOTService. The page title is 'IOTService' and the date is '12/03/2018 09:35:59'. A 'File List' table is displayed below:

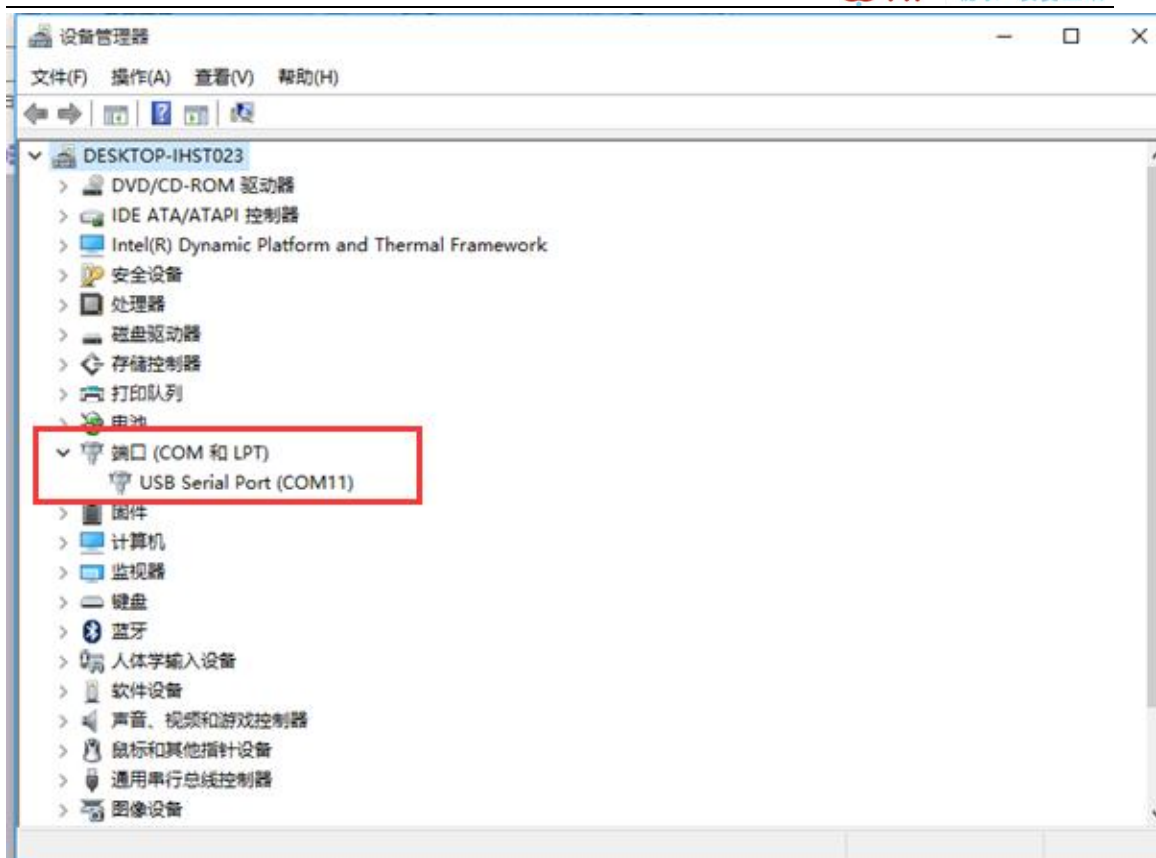
Name	File Name	Download Times	Date Update	Download
IOTService 2.3.00	IOTService 2.3.00.rar	144	12/03/2018 09:33:18	

After download, click the following to update to latest version.

The screenshot shows the 'Software Setting' dialog box for IOTService. It is divided into several sections: 'Remote Access', 'Email Alarm', 'Communication', and 'Others'. The 'Remote Access' section has 'Remote Access Enable' set to 'Enable', 'IOTBridge Server Addr' as 'bridge.iotworkshop.com', 'Service Id' as '7fa02726-79a', and 'Service Name' as 'Service Name'. The 'Email Alarm' section has 'Email Alarm Enable' set to 'Disable'. The 'Communication' section has 'VirPath UDP Port' as '28987' and 'VCOM Parameter Synch' set to 'Enable'. The 'Others' section has 'Language' as 'English', 'Start up to Tray' as 'Disable', 'Auto Upgrade' as 'Disable', and 'Menu Tools' as 'Show'. A red box highlights the 'New Ver' field, which displays '2.3.04h' and an 'Upgrade' button. At the bottom, there are 'Confirm' and 'Cancel' buttons.

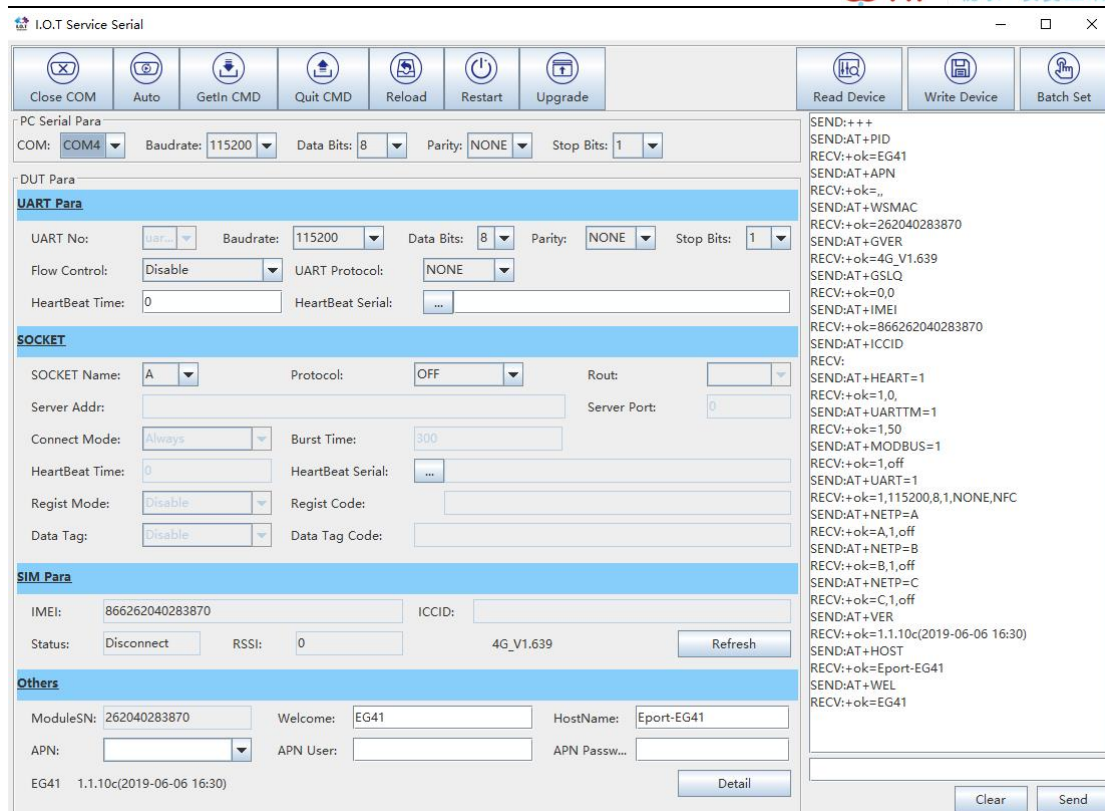
4.2. IOTService Introduction

Step1: PC connect to device UART. Note that RS232/RS485/TTL UART is different.



Step 2: Open IOTService UART tools





Main Menu:

Auto: Auto detect device UART parameters.

GetIn CMD: Enter AT command mode.

Quit CMD: Quit AT command mode.

Reload: Reload product, restore parameters to default.

Restart: Reset product

Upgrade: Upgrade product.

Read Device: Read product parameters.

Write Device: Write modified product parameters

Batch Set: For massproduction parameters setting.

UART Information:

UART No: UART number, for multiple UART product.

UART Protoco: UART protocol, Modbus TCP to RTU function.

HeartBeat Time: UART HeartBeat time

HeartBeat Serial: UART HeartBeat content.

Socket Function:

SOCKET Name: Socket name, choose A/B/C.

Protocol: Protocol, TCP/UDP/HTTP

Connect Mode: short or long connection.

Burst Time: When in long connection ,it is AT+TCPTO reconnection time. When for short conection, it is connection keep time.

Rout: UART channel

HeartBeat Time: HeartBeat time

HeartBeat Serial: HeartBeat content, support wildcard character.

Regist Mode: Register Mode

Regist Code: Register Content, support wildcard character.

Data Tag: Used for multiple data socket distinguishing.

SIM Information:

IMEI: Product IMEI

ICCID: Product ICCID

State: Product GPRS Status

RSSI: Product GPRS signal strength

Others:

Module SN: Product MAC

Welcome: Bootup information.

HostName: Product name shown in IOTBridge.

Detail:

SMS: Short message function.

IOT En: Enable/Disable IOTBridge.

IOT Time: IOTBridge Enable time. Save data flow

I.O.T Service Serial

Close COM Auto GetIn CMD Quit CMD Reload Restart Upgrade Read Device Write Device Batch Set

PC Serial Para
COM: COM4 Baudrate: 115200 Data Bits: 8 Parity: NONE Stop Bits: 1

DUT Para

UART Para
UART No: UART Baudrate: 115200 Data Bits: 8 Parity: NONE Stop Bits: 1
Flow Control: Disable UART Detail
HeartBeat Time: 0

SOCKET
SOCKET Name: A Protocol
Server Addr:
Connect Mode: Always Burst
HeartBeat Time: 0 Heart
Regist Mode: Disable Regist
Data Tag: Disable Data

SIM Para
IMEI: 866262040283870 ICCID:
Status: Disconnect RSSI: 0 4G_V1.639 Refresh

Others
ModuleSN: 262040283870 Welcome: EG41 HostName: Eport-EG41
APN: APN User: APN Passw...
EG41 1.1.10c(2019-06-06 16:30) Detail

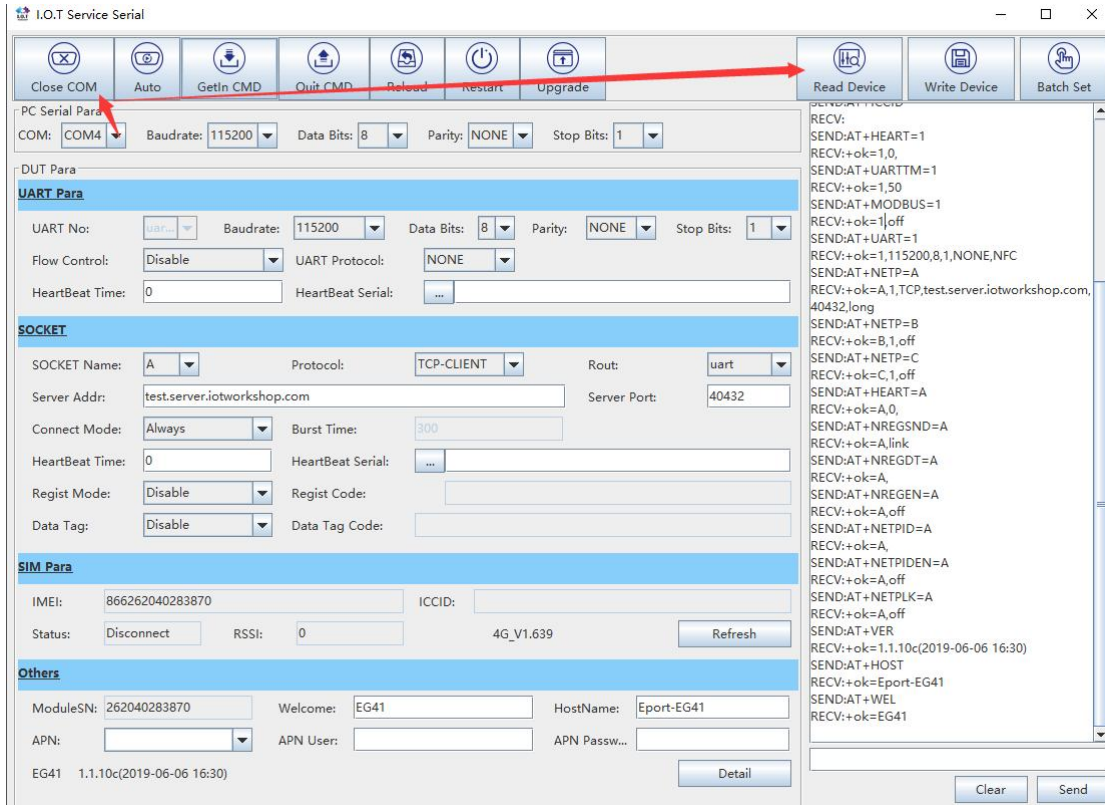
Network:
SMS ID: #SMS#
SMS Phone:
SMS Status: 1
IOT En: Enable
IOT Time: 00:00 ~ 23:59
His Para Confirm Cancel

```
SEND:AT+APN
RECV:+ok=,
SEND:AT+WSMAC
RECV:+ok=262040283870
SEND:AT+GVER
RECV:+ok=4G_V1.639
SEND:AT+GSLQ
RECV:+ok=0,0
SEND:AT+IMEI
RECV:+ok=866262040283870
SEND:AT+ICCID
RECV:
SEND:AT+HEART=1
RECV:+ok=1,0
SEND:AT+UARTTM=1
RECV:+ok=1,50
SEND:AT+MODBUS=1
RECV:+ok=1,off
SEND:AT+UART=1
RECV:+ok=1,115200,8,1,NONE,NFC
SEND:AT+NETP=A
RECV:+ok=A,1,off
SEND:AT+NETP=B
RECV:+ok=B,1,off
SEND:AT+NETP=C
RECV:+ok=C,1,off
SEND:AT+VER
RECV:+ok=1.1.10c(2019-06-06 16:30)
SEND:AT+HOST
RECV:+ok=Eport-EG41
SEND:AT+WEL
RECV:+ok=EG41
SEND:AT+SMSID
RECV:+ok=#SMS#,1
SEND:AT+IOTEN
RECV:+ok=on,00:00,23:59
```

Clear Send

4.3. Test Case One: IOTService UART Config

Step 1: Open UART and do as following to read product parameters.

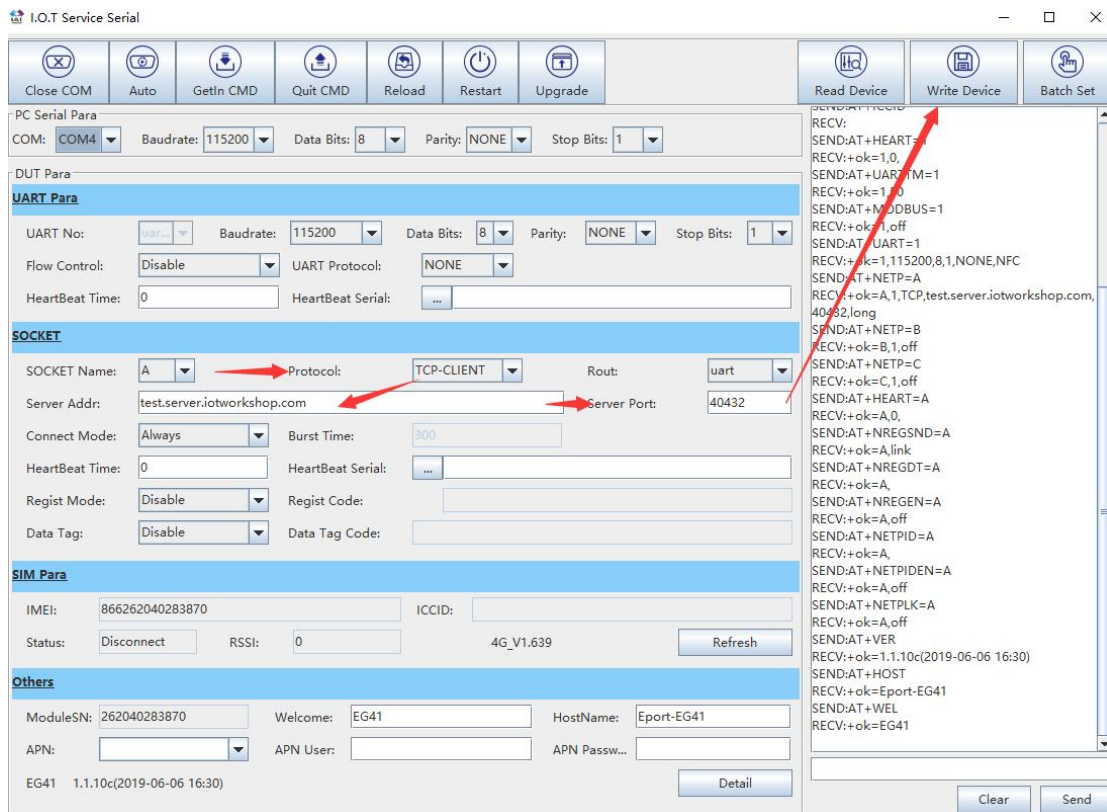


Step 2: The tools show the module parameters. Click **【Write Device】** to change parameter. The following set Socket A to our test server. and reboot

Test Server: test.server.iotworkshop.com

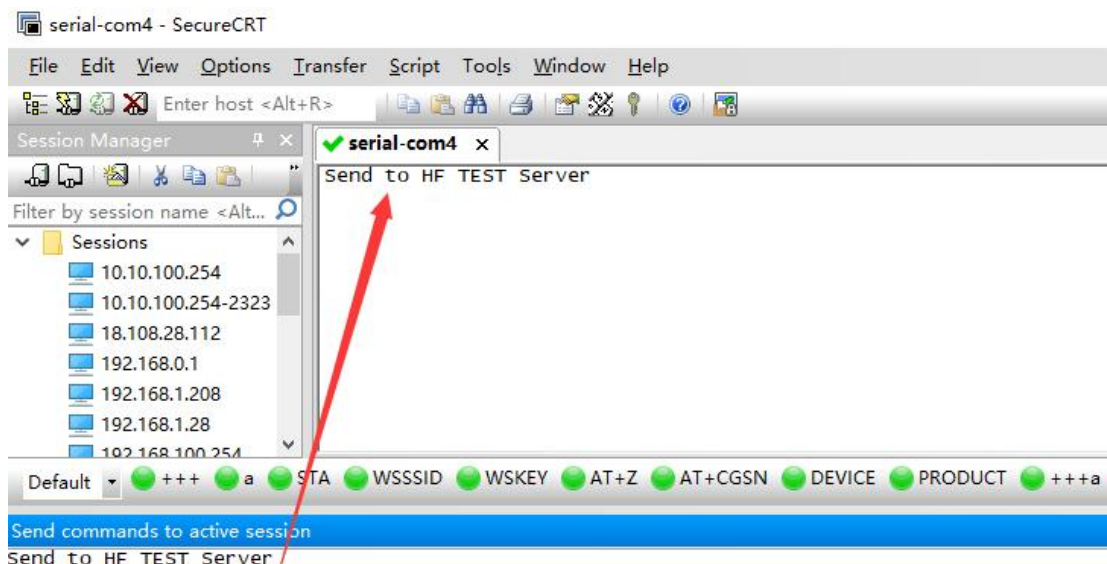
TCP Port: 40432

UDP Port: 40431



Note: Default UART is 115200,8,N,1.

Step 3: Wait for network connection OK, then send UART data, the server will response the received data. The product is in throughput mode by power on, if want to send AT command, need to send “+++” and then “a” to enter command mode, AT+ENTM to change back throughput mod.e.

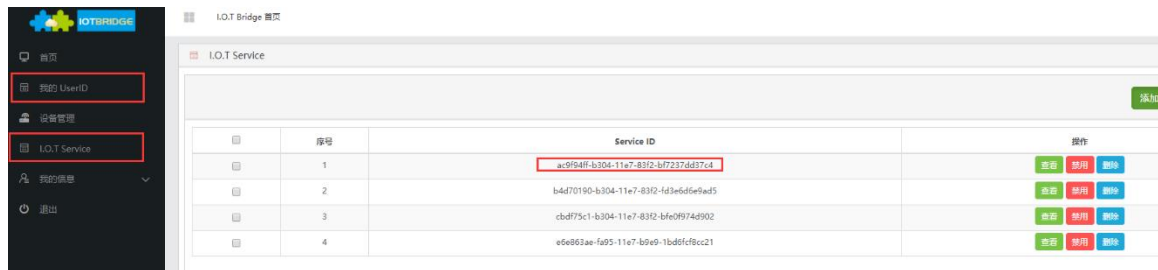


4.4. Test Case Two: IOTService Network Config

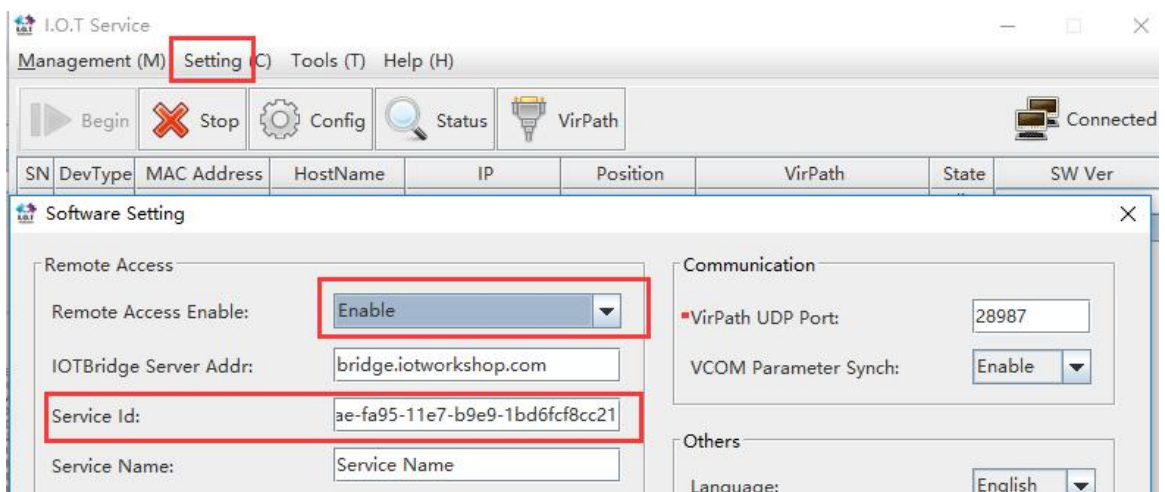
Step 1: Login IOTBridge(<http://bridge.iotworkshop.com/>) to register account.



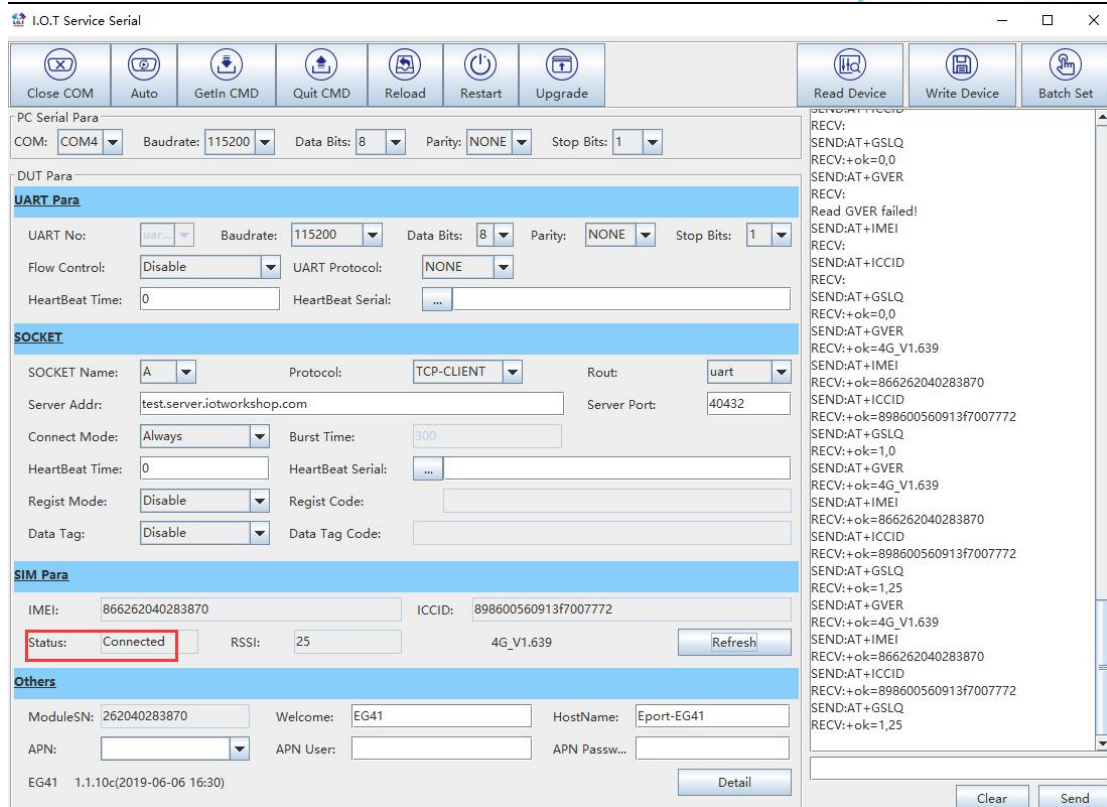
Step 2: Get UserId(device side)and ServiceId(IOTService side)



Step 3: Input ServiceId in IOTService.

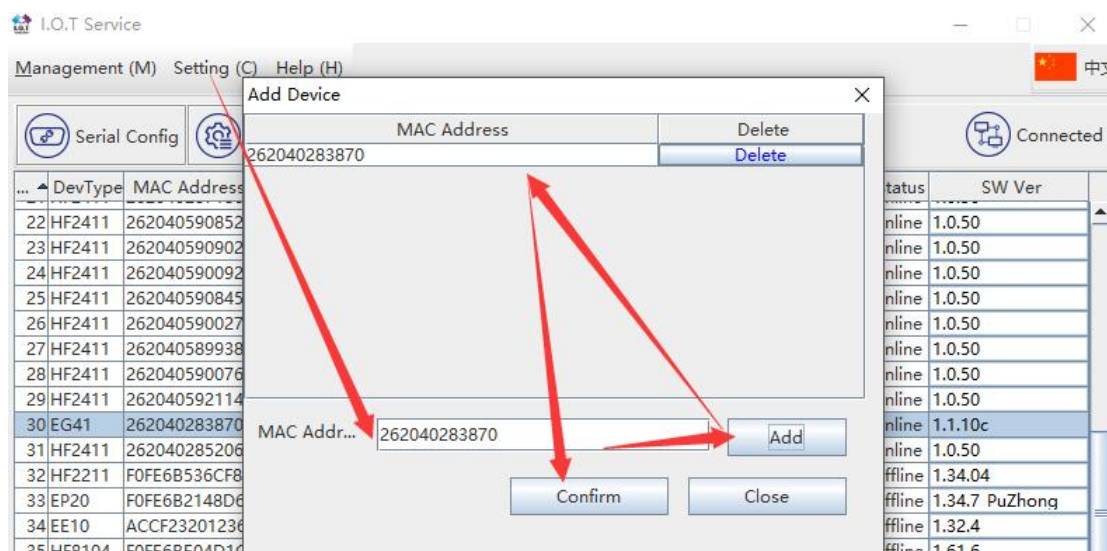


Step 4: Insert SIM card and power on device, wait for device connects to network. The UART tools also shows the network status.



Step 5: Add MAC in the tools to bound account. (AT+WSMAC to get MAC address, usually it is the latter 12 character of the IMEI), recommend to use AT+IOTUID command to write UserId into the device. Prevent bounded by the other vicious customer.

Note:HF2611 only enable the IOTBridge remote device management function at 10:00 to 10:30 in order to save data flow. Other products enable all day by default. This time can be changed via IOTService UART config.



Step 6: Double click device entering the config page.


I.O.T Service Management (M) Setting (C) Help (H) 中文

Serial Config Config Status VirPath Connected

...	DevType	MAC Address	HostName	IP	Position	VirPath	Status	SW Ver
22	HF2411	262040590852	Eport-HF2411	117.132.196.57	China.Shaanxi		Online	1.0.50
23	HF2411	262040590902	Eport-HF2411	221.178.127.13	China.Shaanxi		Online	1.0.50
24	HF2411	262040590092	Eport-HF2411	221.178.127.99	China.Shaanxi		Online	1.0.50
25	HF2411	262040590845	Eport-HF2411	223.104.255.181	China.Shaanxi		Online	1.0.50
26	HF2411	262040590027	Eport-HF2411	221.178.125.53	China.Shaanxi		Online	1.0.50
27	HF2411	262040589938	Eport-HF2411	221.178.124.54	Remote		Online	1.0.50
28	HF2411	262040590076	Eport-HF2411	221.178.127.216	China.Shaanxi		Online	1.0.50
29	HF2411	262040592114	Eport-HF2411	221.178.126.32	China.Shaanxi		Online	1.0.50
30	EG41	262040283870	Eport-EG41	223.104.210.6	China.Shangh...		Online	1.1.10c
31	HF2411	262040285206	Eport-HF2411	218.204.253.149	China.Shaanxi		Online	1.0.50
32	HF2211	F0FE6B536CF8	Eport-HF2211	58.33.115.200	Remote		Offline	1.34.04

Device Status

System



Product ID: EG41
Software Version: 1.1.10c
RTC Time: NTP Disabled
Up Time: 0-Day 0:4:39
Longitude: 121.620697021
Latitude: 31.217960357

GSM

ModuleSN: 262040283870
ICCID: 898600560913f7007772
IMEI: 866262040283870
Connect: Connected(22)
IP Address: 223.104.210.6
4G_V1.639 Upgrade

UART

UART No: UART
Config: 115200,8,1,NONE
Recv Bytes: 4 Recv Frames: 2
Send Bytes: 5 Send Frames: 2
Fail Bytes: 0 Fail Frames: 0

SOCKET

SOCKET Name: A
Protocol: TCP-CLIENT
Status: Connected
Server IP:
Recv Bytes: 0 Recv Frames: 0
Send Bytes: 0 Send Frames: 0
Fail Bytes: 0 Fail Frames: 0

Reload Edit
Restart

Step 7: Can modify the parameters.

Device Setting
✕

System

Welcome:

HostName:

Longitude:

Latitude:

IOT Time: : ~ :

SOCKET

SOCKET Name:

Protocol:

Server Addr:

Server Port:

Connect Mode:

Burst Time:

Rout:

HeartBeat Time:

HeartBeat Serial:

Regist Mode:

Regist Code:

Data Tag:

Data Tag Code:

UART

UART No:

Baudrate:

Data Bits:

Stop Bits:

Parity:

Flow Control:

UART Protocol:

HeartBeat Time:

HeartBeat Serial:

Confirm

Cancel

Import

VirPath

Export

Script

Network

APN:

APN User:

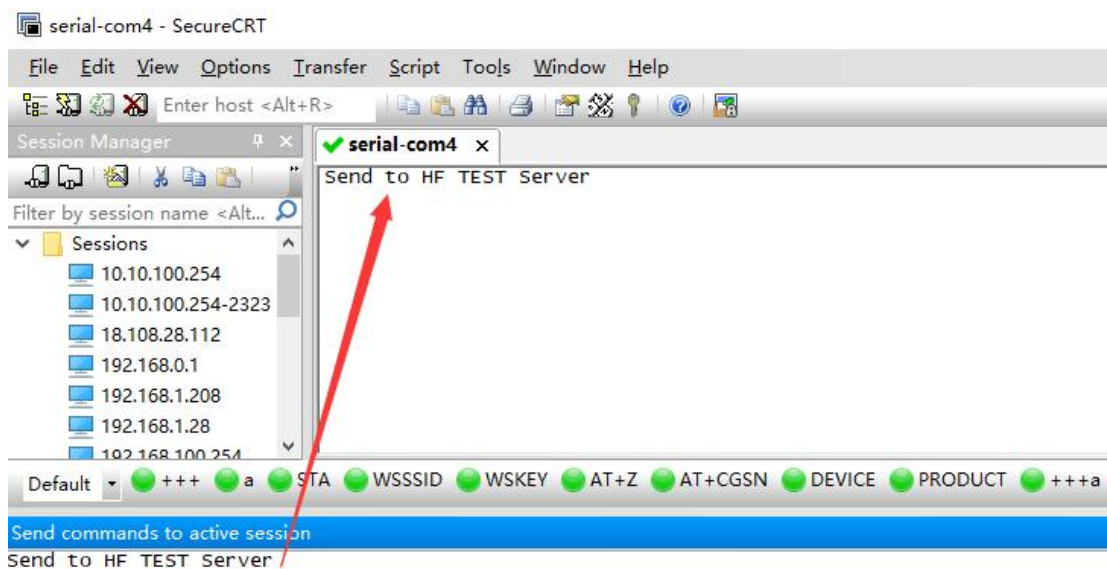
APN Password:

SMS ID:

SMS Phone:

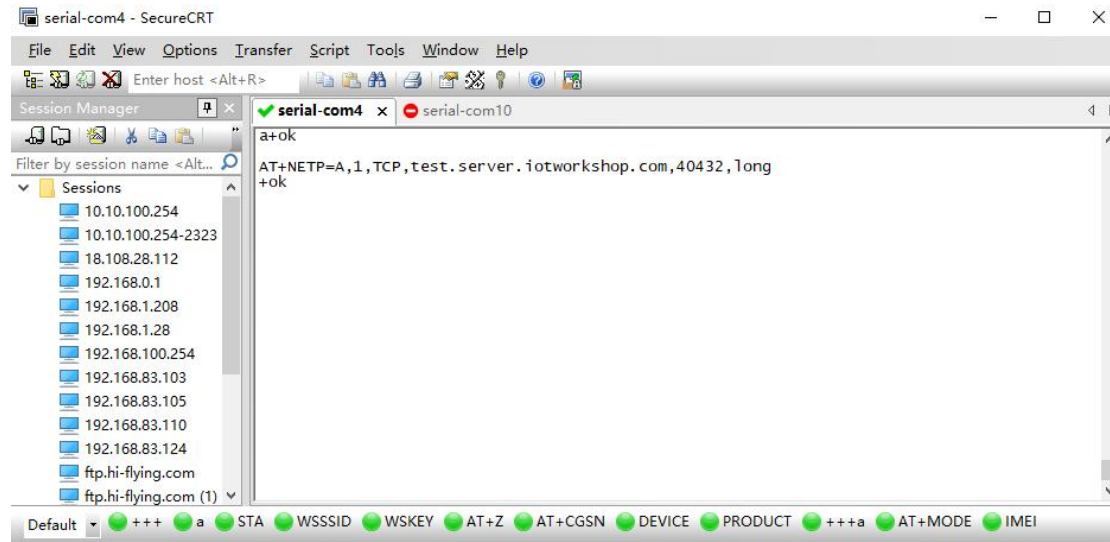
SMS Status:

Step 8: Use our test server to check device function.



4.5. Test Case Three: Throughput Via SecureCRT

Step 1: Open SecureCRT(Baudrate default:115200), Input “+++” (device will response with “a”)and then “a” (device will response with “+ok”) to enter AT command mode.

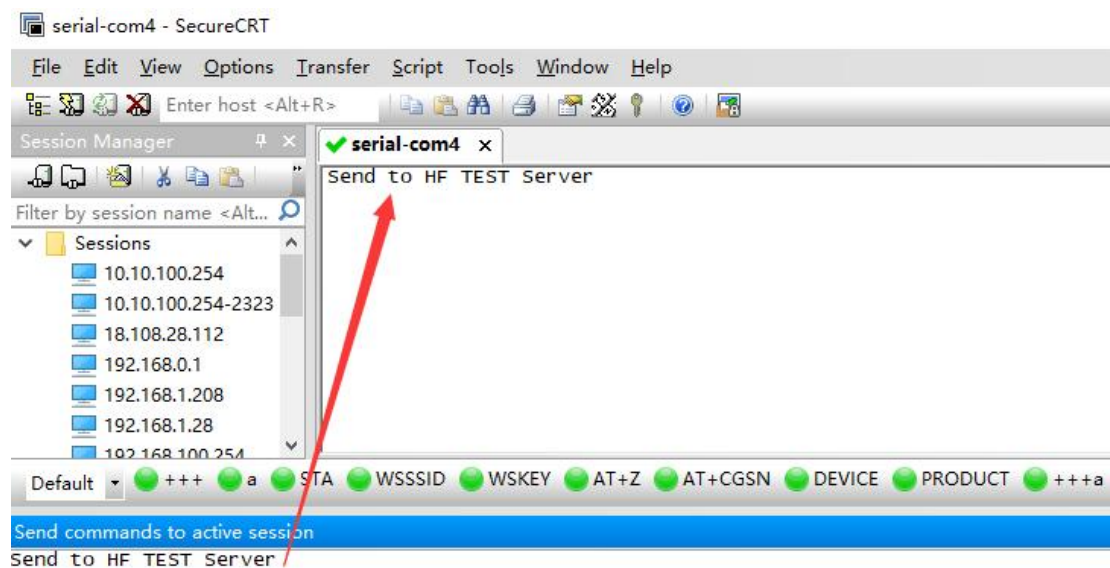


AT+UART to query or change setting.

Step 2: Input “AT+NETP=A,1,TCP,test.server.iotworkshop.com,40432,1ong” to set socket A, and “AT+Z” to reboot.

```
AT+NETP=A,1,TCP,test.server.iotworkshop.com,40432,1ong
+ok
```

Step 3: Wait for network connecting OK. Then send UART data to device, the test server will response with data in defined format(Protocol type, port number and data as following picture).



4.6. Test Case Four: Heartbeat and Resister Packet

Step 1: Set the parameter as following..

AT+HEART=A,10,%IMEI //Enable heartbeat for 10 seconds upload its IMEI.

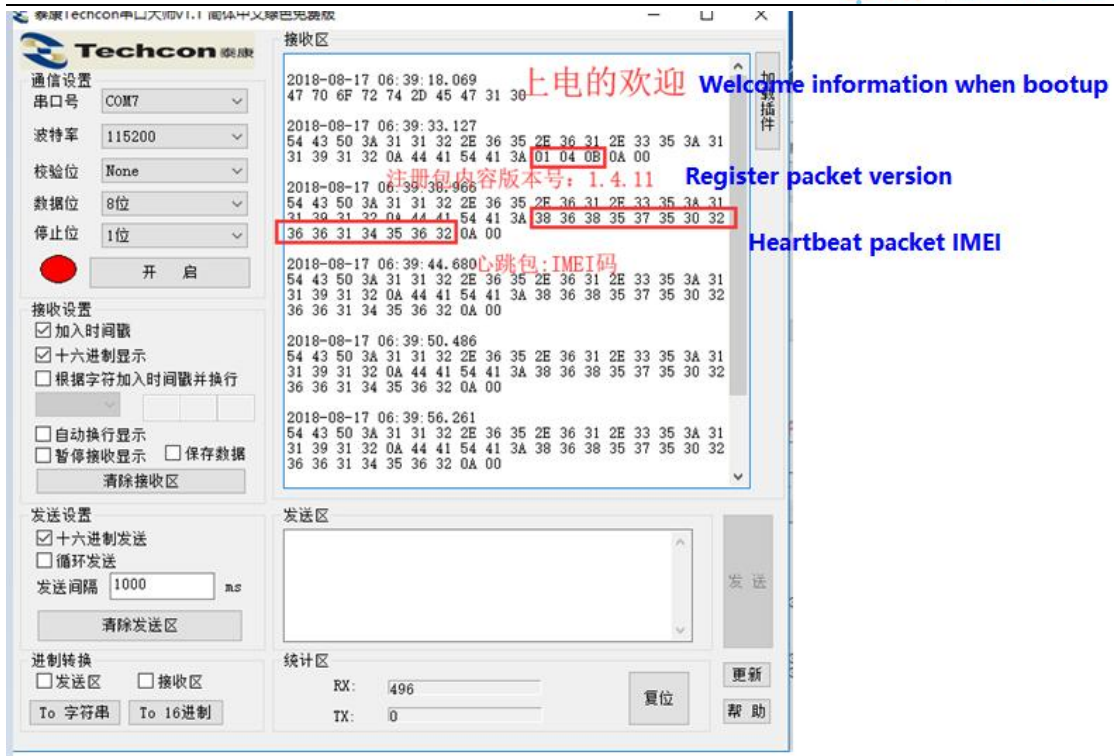
AT+NREGEN=A,on //Enable Register Packet

AT+NREGSND=A,link //Send Register packet when connection established.

AT+NREGDT=A,%VER //Register content is software version

The screenshot shows the I.O.T Service Serial configuration window. The UART Para section is highlighted with a red box, indicating the following settings: HeartBeat Time: 10, HeartBeat Serial: %IMEI, and Regist Mode: Link. The SOCKET section shows Server Addr: test.server.iotworkshop.com and Server Port: 40432. The SIM Para section shows IMEI: 866262040283870 and ICCID: 898600560913f7007772. The Others section shows ModuleSN: 262040283870 and HostName: Eport-EG41.

Step 2: Reboot it. The device will output UART data as following.



Example 1:

Register Code Requirement: FFFFFFFFA+IMEI+0F

Setting Parameter: %FF%FF%FF%FF%FA%IMEI%0F

Upload real data: FF FF FF FF FA 38 36 38 35 37 35 30 32 36 36 31 34 35 36 32 0F

Example 2:

Heartbeat Content: %TIME;%HOST;%DATE;%IMEI;%IMSI;%GPS;

Upload real data: :

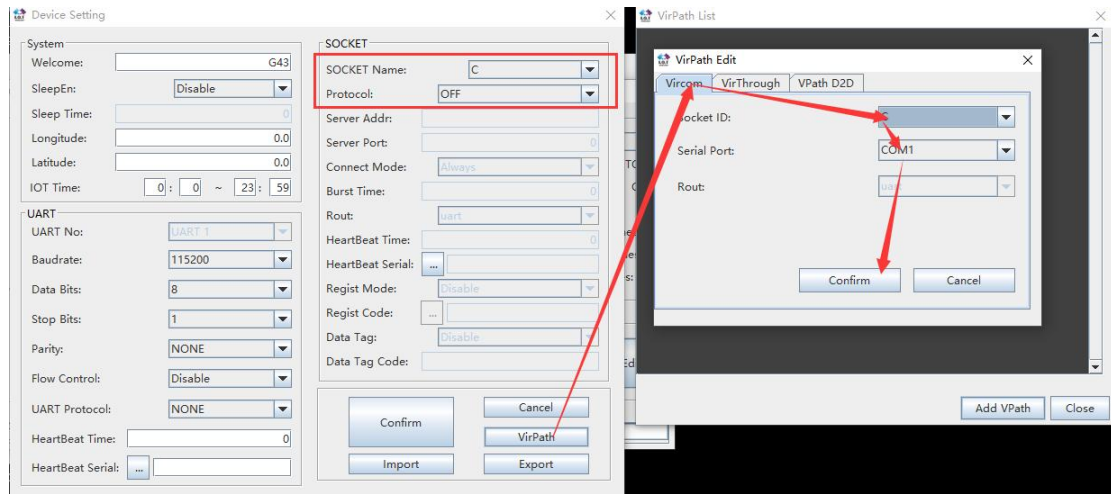
165036;Eport-
HF2411;20190211;862285030465284;460011352509105;121.623046,31.221429;

4.7. Test Case Five: Virtual COM

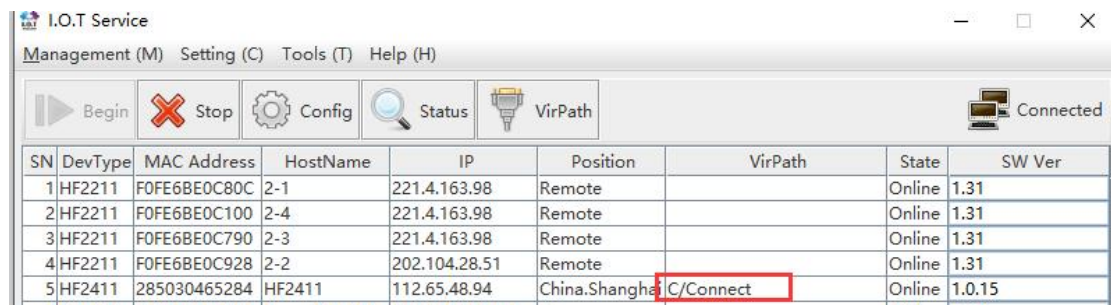
Step 1: Add device to IOTService according to Case Two.

SN	DevType	MAC Address	HostName	IP	Position	VirPath	State	SW Ver
1	HF2211	F0FE68E0C80C	2-1	221.4.163.98	Remote		Online	1.31
2	HF2211	F0FE68E0C100	2-4	221.4.163.98	Remote		Online	1.31
3	HF2211	F0FE68E0C790	2-3	221.4.163.98	Remote		Online	1.31
4	HF2211	F0FE68E0C028	2-2	202.104.28.51	Remote		Online	1.31
5	HF2411	285030465284	HF2411	112.64.68.19	China, Shanghai		Online	1.0.5
6	HF2421	F0FF688832AC	Eport-HF2421	117.132.195.230	Remote		Offline	1.10h

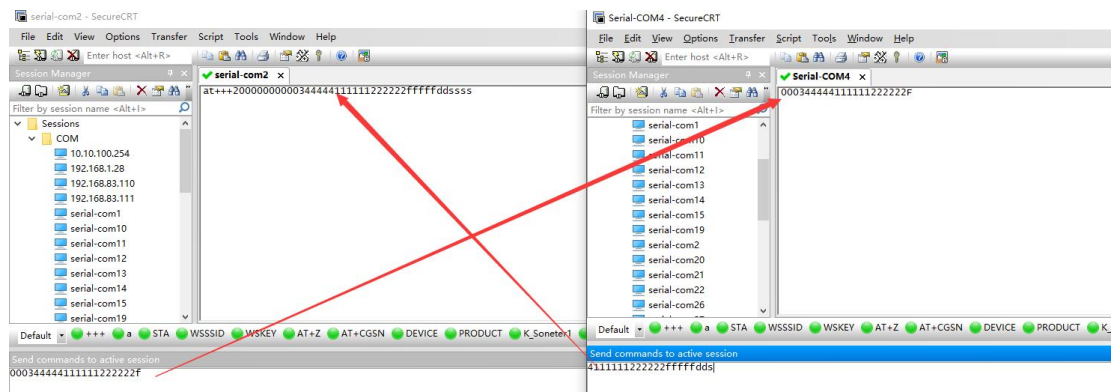
Step 2: Click into the config page, fill the Vircom Socket ID with C(A/B/C all can be used for virtual COM, must choose off socket to use for virtual COM).



Step 3: Wait for VirtualCom Connect.



Step 4: Use virtual com to communicate.

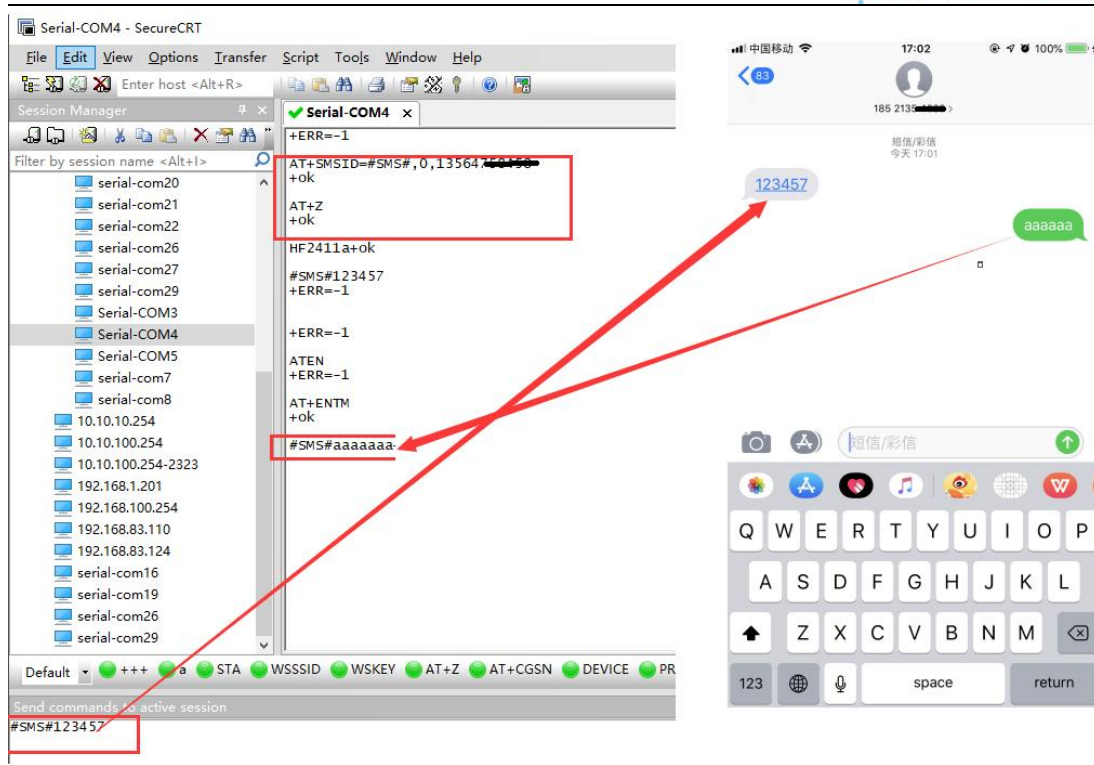


4.8. Test Case Six: SMS Throughput

Step 1: Enter AT command mode, and set SMS parameters.
AT+SMSID=#SMS#,0,135647584XX.

Step 2: Reboot and wait for network connected, UART send "#SMS#123457" to module, the phone will receive the SMS data "123457".

Step 3: Phone send "aaaaa", product will send out "#SMS#aaaaa"

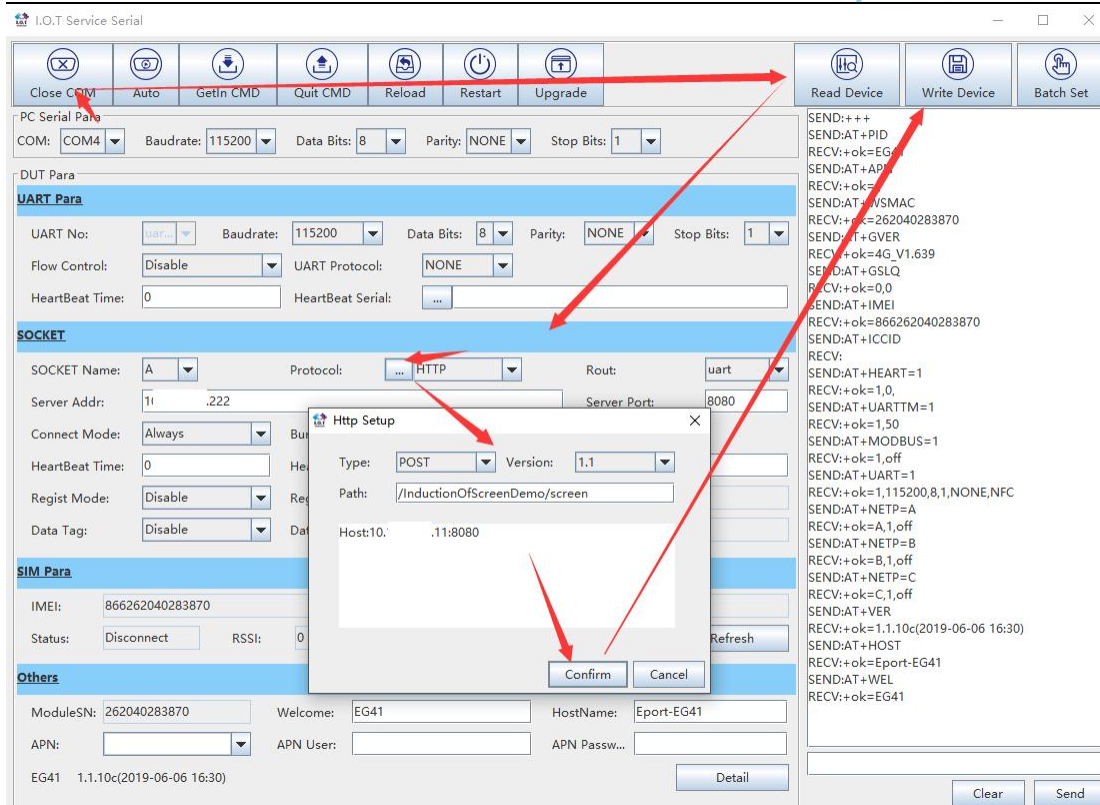


4.9. Test Case Seven: HTTP Request

Step 1: Browser open <http://XX.XX.XX.2:8080/InductionOfScreenDemo/screen?id=1>, got the response as following:



Step 2: Input the HTTP parameters as the following steps.



Protocol: HTTP

Server Addr: Server address, IP or domain name.

Server Port: Server port.

Type: HTTP Type, GET or POST.

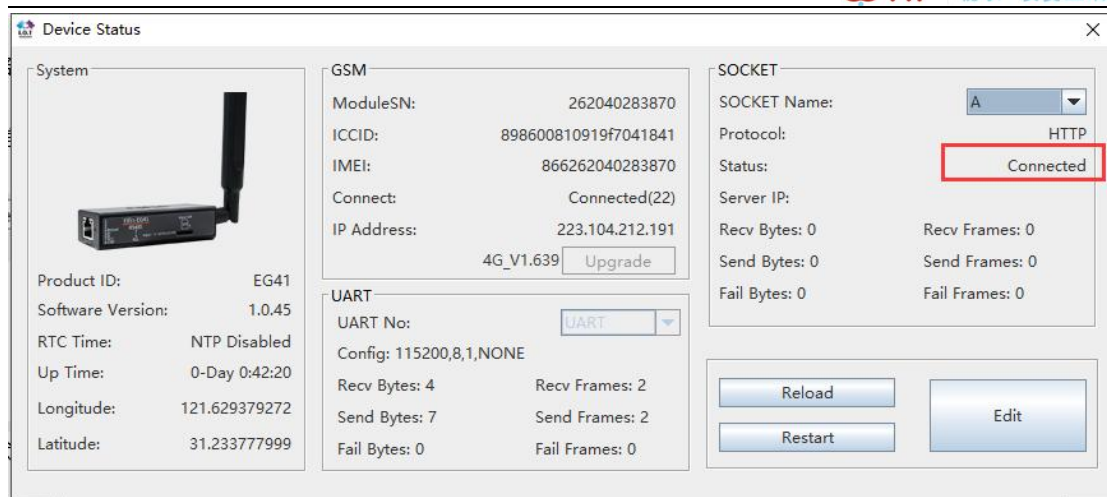
Version: HTTP Version, 1.1.

Path: HTTP path

HTTP header input: Input HTTP header. Usually is Host information.



Step 3: Reboot and wait for SOCKA connection.



Step 4: UART send data id=1, and got response of the server.



Note:

Refer to "4G_2G DTU products function" for more detail.

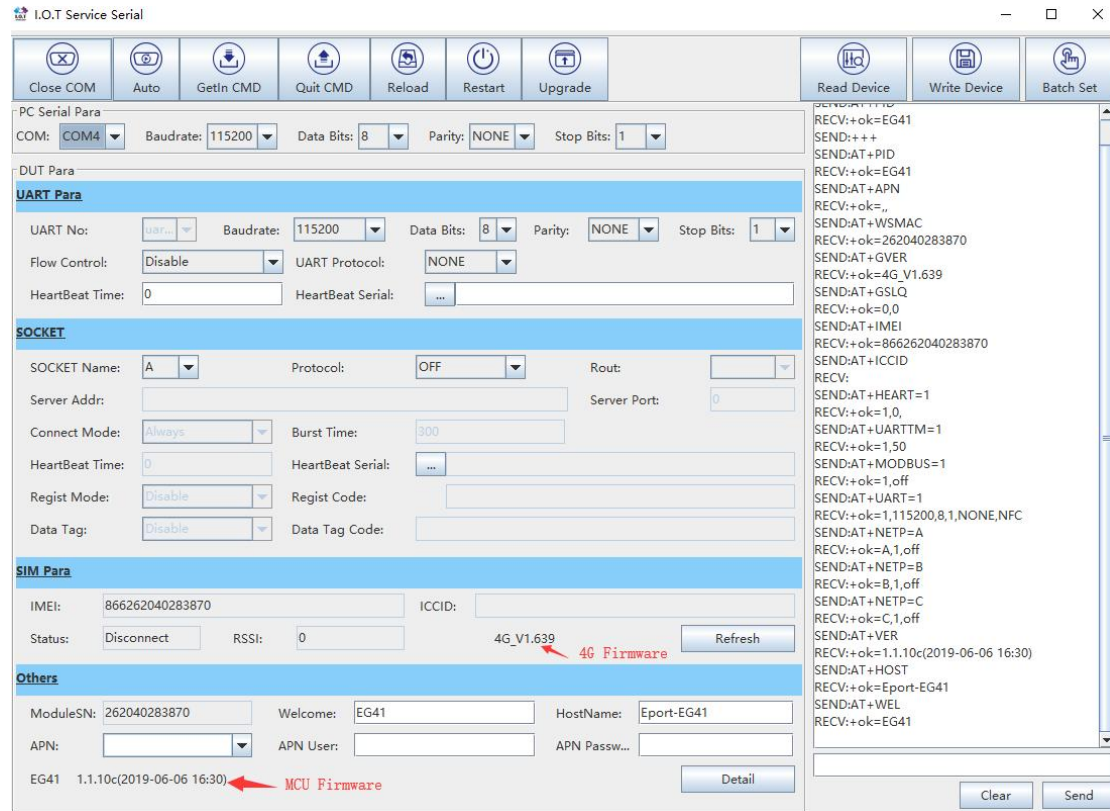
4.10. SMS AT Command

All AT command support using SMS to set. AT+Z do reboot operation, so it won't response.



4.11. UART Upgrade

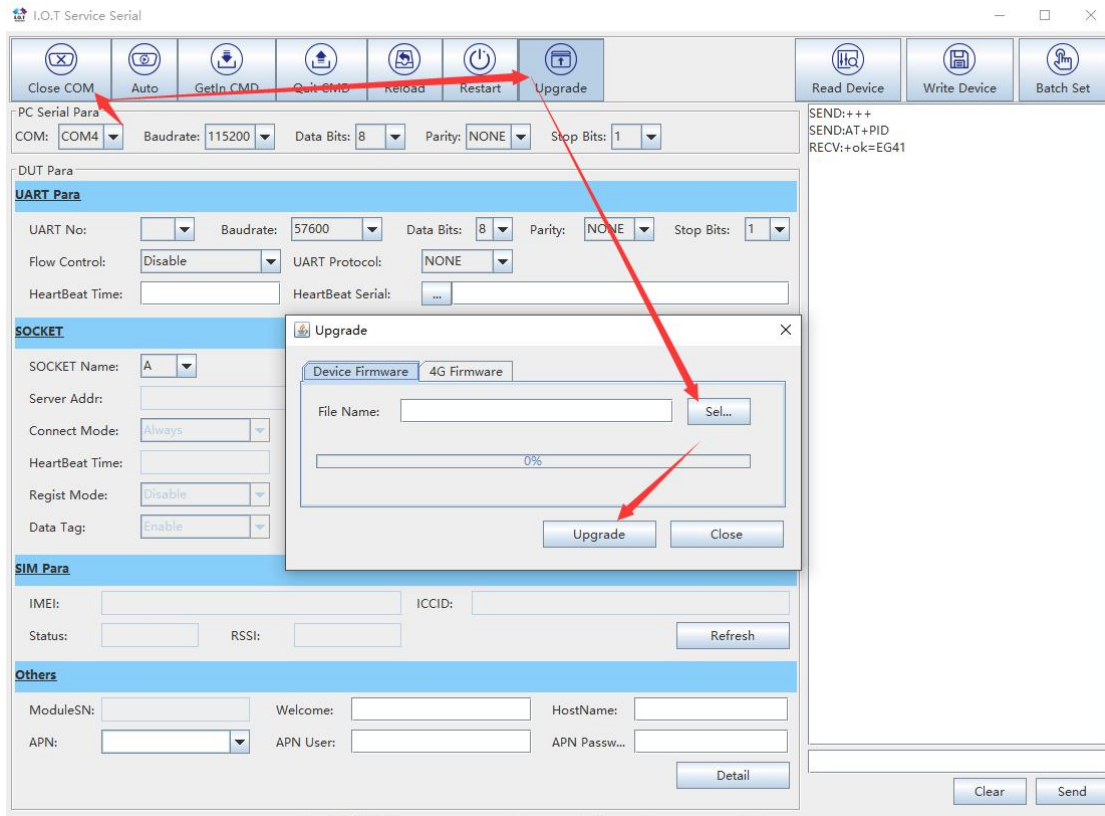
There is MCU firmware and 4G core module firmware. Get the latest firmware from the following link.



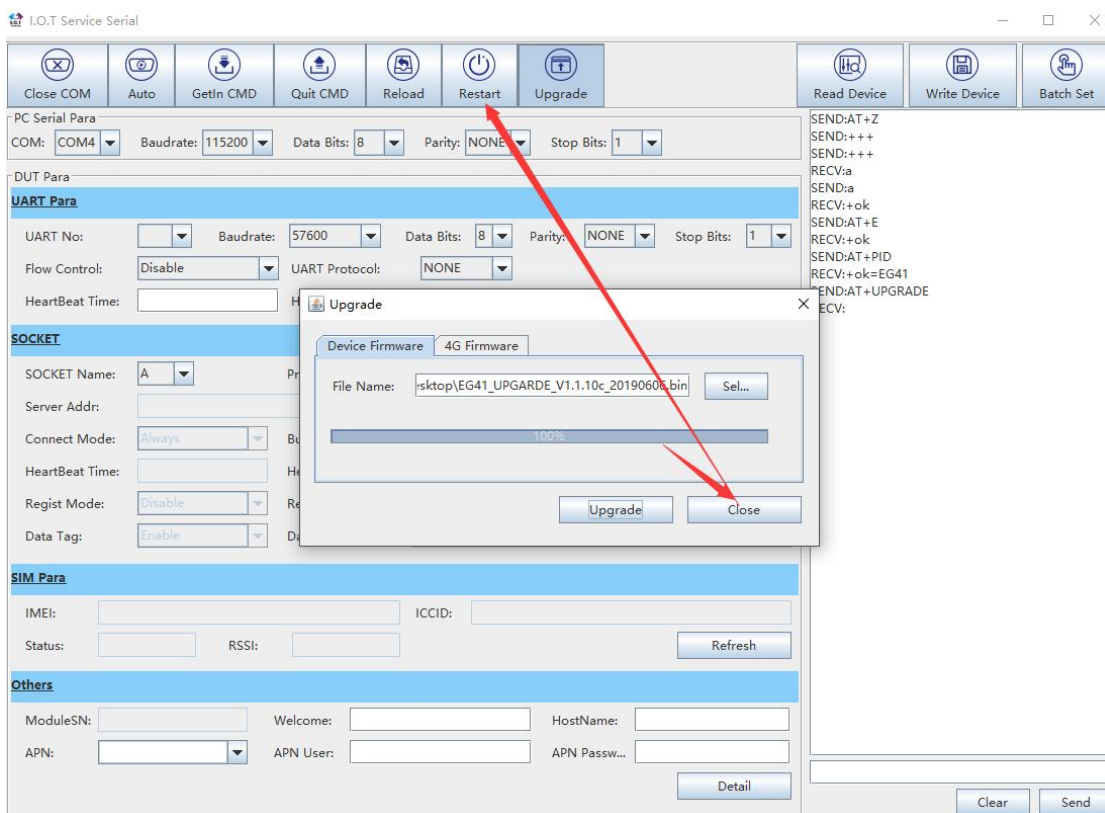
<http://www.hi-flying.com/download-center-1/firmware-1/download-item-hf2411-firmware-v1-0-11>

4.11.1. MCU Firmware

Load the firmware.



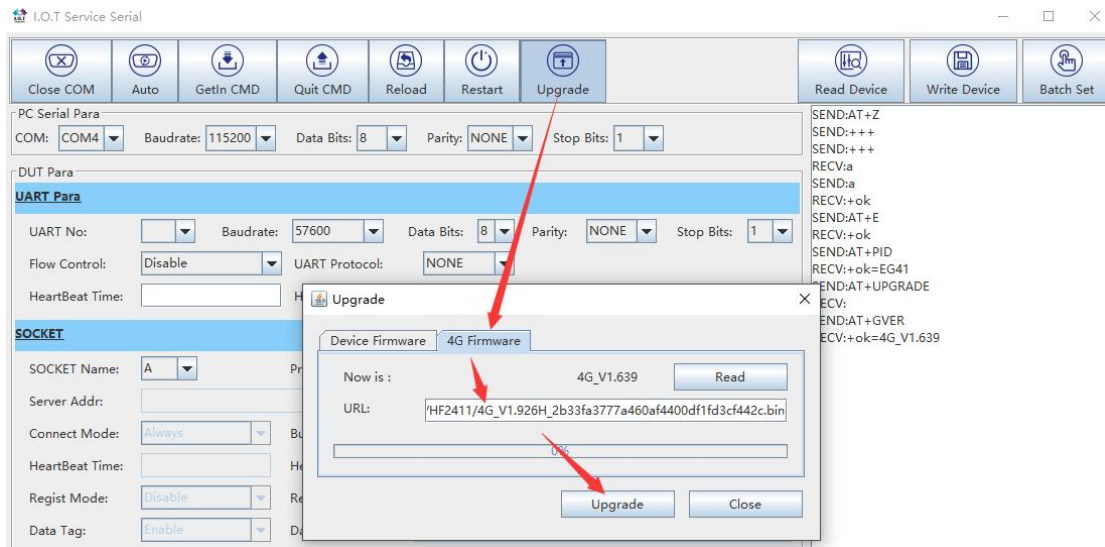
Reboot after upgrade success.



4.11.2. 4G Firmware(Only 4G Product)

After the device connect to network(Show connected), input the 4G download address(Get the latest download address from our website.). The firmware size is about 5MB, it takes about 2 minutes to upgrade.W

http://download.iotworkshop.com/iotbridge/firmwares/HF2411/4G_V1.926H_2b33fa3777a460af4400df1fd3cf442c.bin



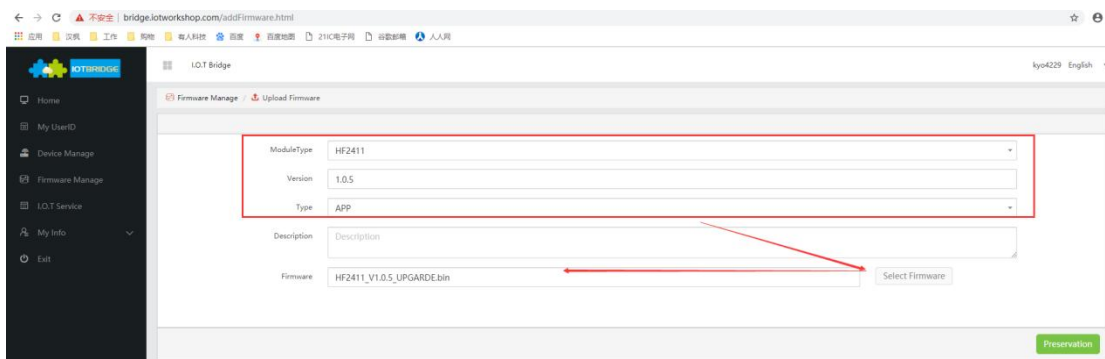
4.12. Remote OTA Upgrade

Currently only support MCU remote OTA update, later will support 4G upgrade

Step 1: Remote upgrade is using our IOTBridge cloud, download firmware from our IOTBridge. Bound device to account as the previous steps.

4.12.1. MCU Firmware

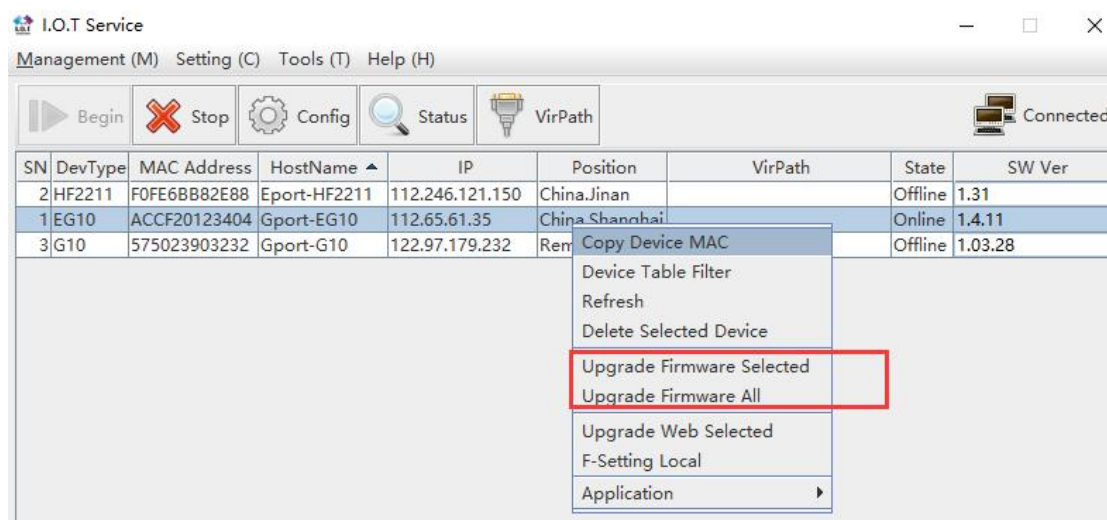
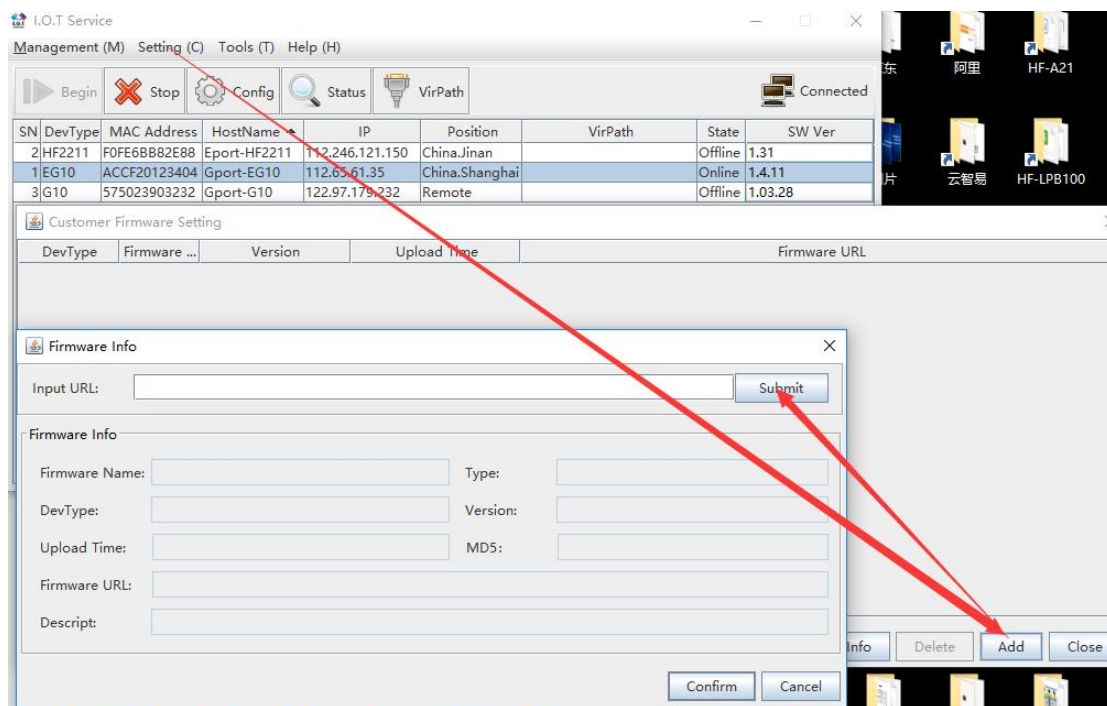
Step 2: Login <http://bridge.iotworkshop.com/>, upload firmware in IOTBridge.



Step 3: Copy the download link as following.

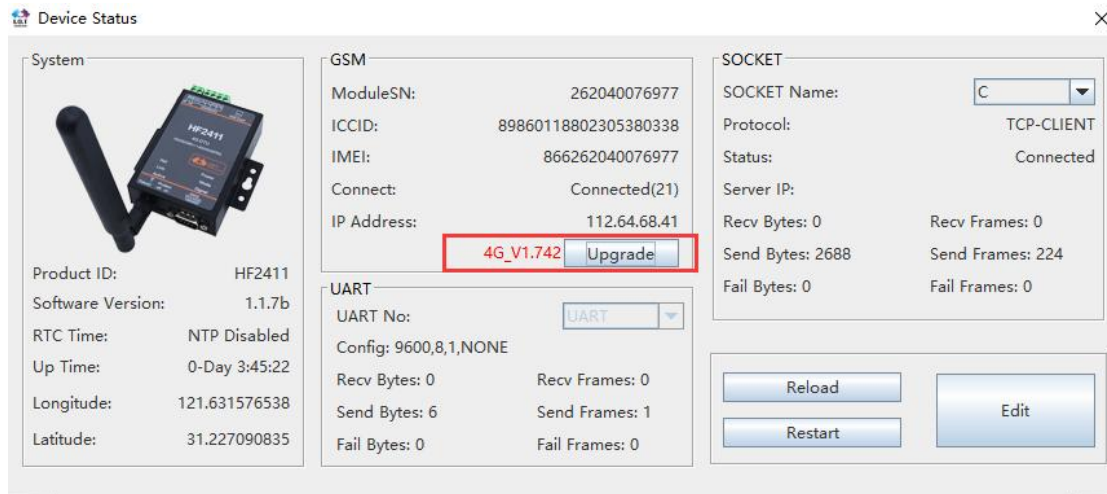


Step 4: Copy the download link into the IOTService tools. And do upgrade operation.

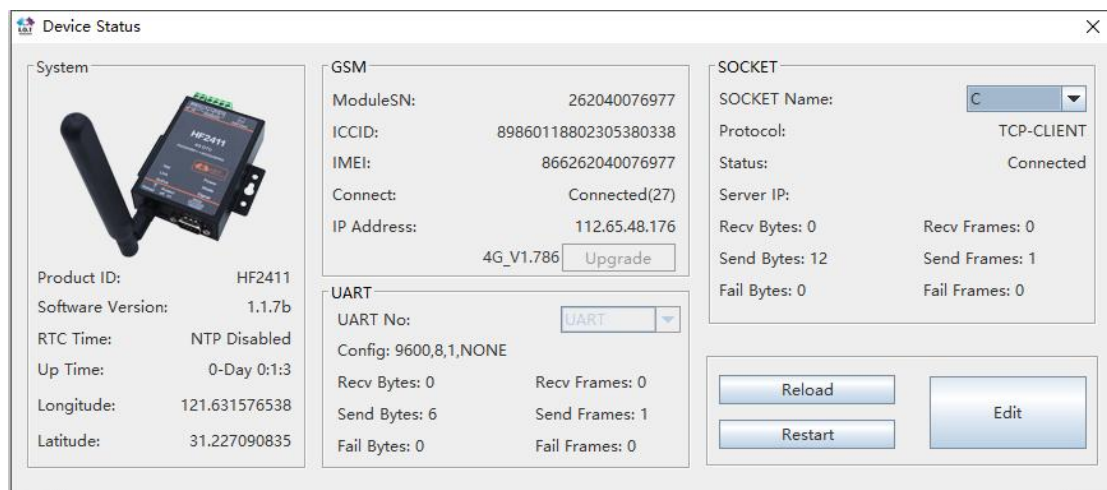


4.12.2. 4G Firmware(Only 4G Product)

Step 1: Add device to account, and click the **【Upgrade】** button. It will take about 2minutes to upgrade. Ater upgrade success, it will restart.

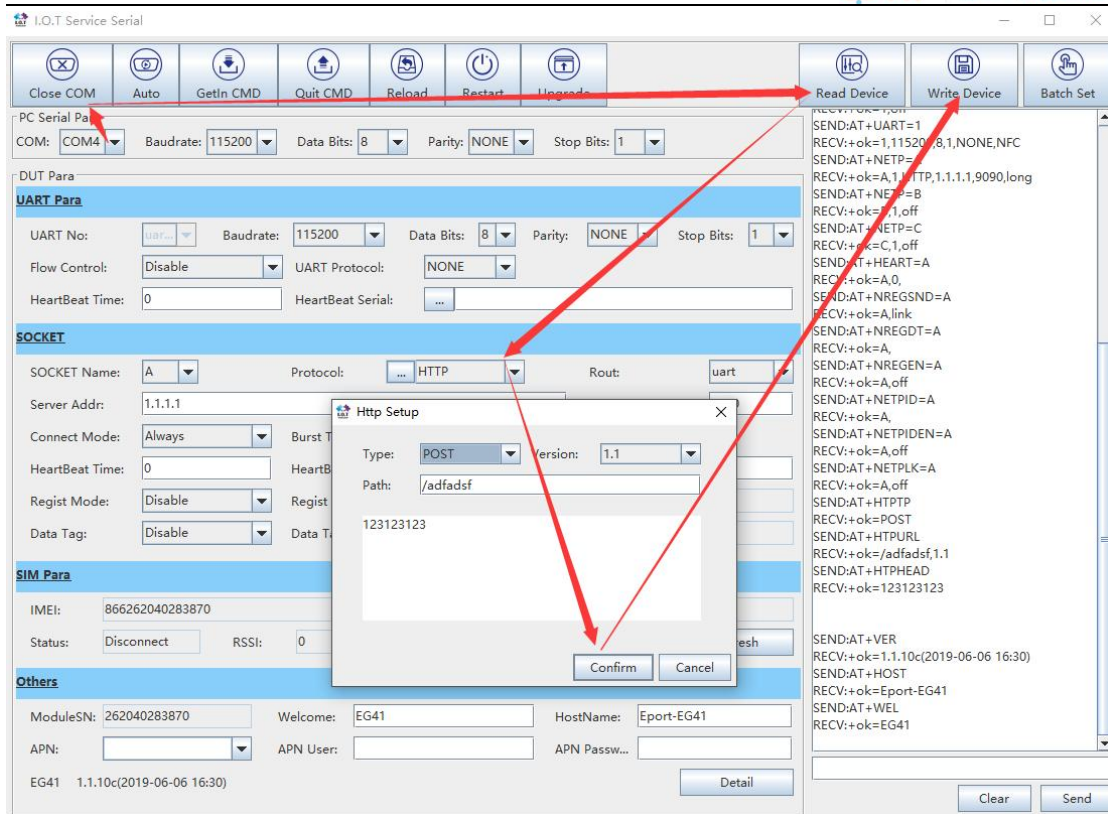


Step 2: Check the software version.

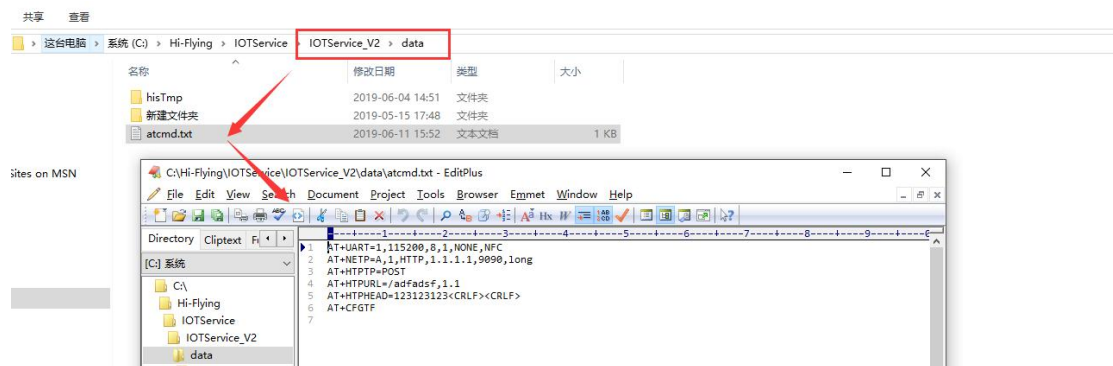


4.13. Massproduction Config

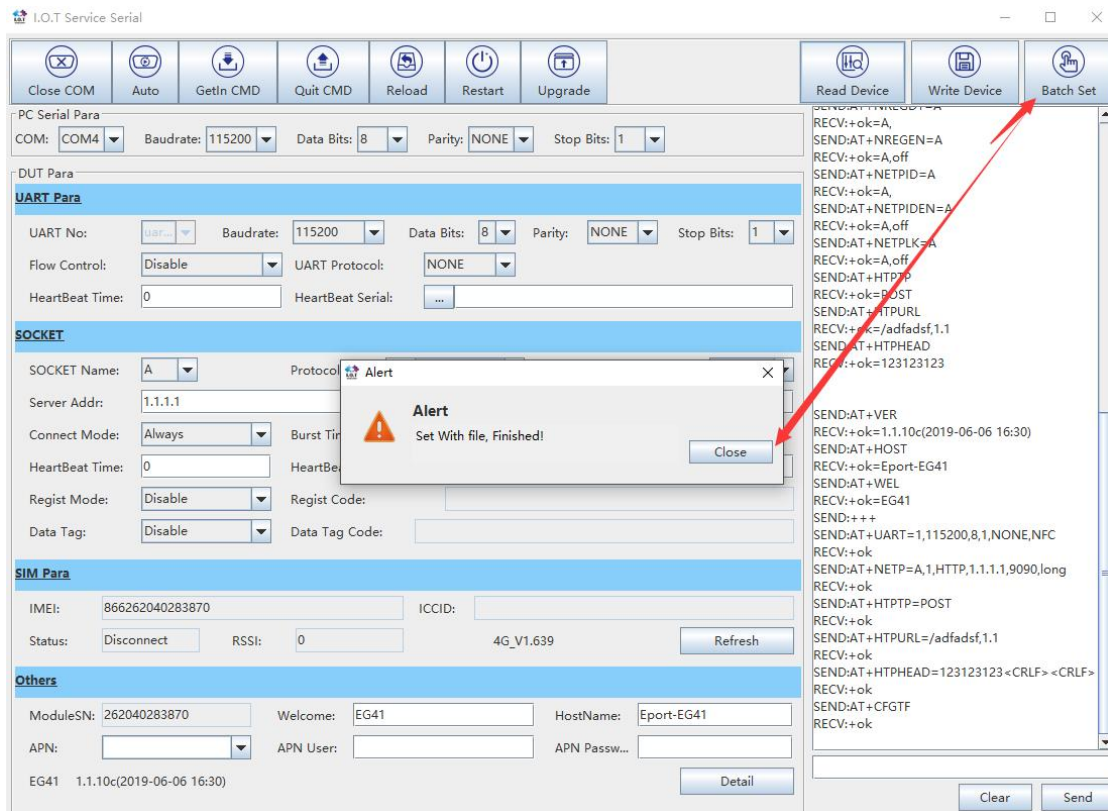
Step 1: Config the first product.



Step 2: The config information will be saved in the following file. This file can be used for massproduction product config. May also direct modify this file.



Step 3: Click **【Batch Set】** for fast config multiple products.



4.14. Data Collect Gateway and More Function

Products support collect packet and upload to server, see more application notes in the following link.

<http://www.hi-flying.com/download-center-1/application-notes-1/download-item-industry-products-application-manual>

APPENDIX A: REFERENCES

A.1. Test Tools

IOTService Configure Software:

http://www.hi-flying.com/index.php?route=download/category&path=1_4