
T&W

catalog

3、 Quick start

3.2Log in to the web client

Requirements for client computer browser are as followsTable 3-1.

project	requirements
The CPU	Intel Core above 2GHz
memory	More than 2 g RAM
The hard disk	Not less than 100 MB of available space
The operating system	• Microsoft: Windows XP, Windows Vista, or Windows7 • Mac: MacOS x 10.5 or above
Display resolution	Above 1024*768 pixels
The browser	Chrome 6 or later

surface3-1Client environment requirements

3.2.1Set up client computers

Before logging into the Web client, firstly set the IP address of the client computer and ensure that the client computer is connected to the base station.Take Windows 7 as an example.

1. Click start > control panel, and in the pop-up window click network and Internet.
2. Click view network status and tasks, and in the window that pops up, click local connections.
3. In the pop-up local connection status dialog box, click properties to pop up local connection properties.
4. Select Internet protocol version (TCP/IPV4), click properties, and the pop-up window looks like figure 3-2.

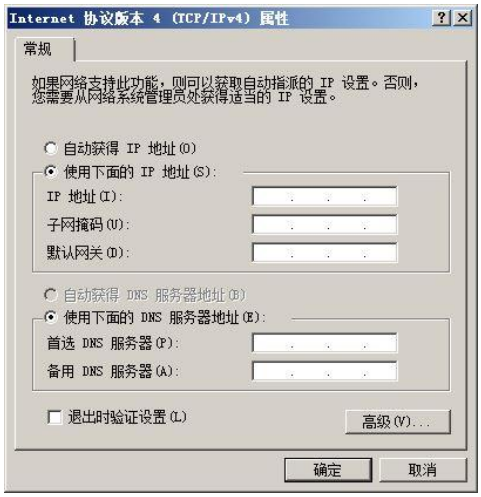

Figure 3-2 setting the client IP address

5. Select the IP address below.
6. Enter the IP address, subnet mask, and default gateway, and click ok.
   - IP address: 192.168. 0. XXX: (the recommended value of XXX is 102~199)
   - Subnet mask: 255.255.255.0
   - Default gateway: not required
7. Perform ping 192.168.0.101 in the command line window to check whether the network is connected between the client computer and the device.

3.2.2Log in to the web maintenance page

1. 1. Enter https://192.168.0.101 in the browser address bar and click "sing in" to open the Web client login page, as shown in figure 14.**Error! Reference source not found.**

   User name: admin

   Password: Pico @ 2018

   192.168.0.101 is the initial IP address of the interface.

chart3-3Log in to the base station web page

3.3Quick initial configuration

Rapid configuration is to configure the cell parameters of the base station, including the working mode of the base station, cell identification, working frequency band, frequency point, etc., which needs to be set according to network planning data.

Select "management-> Cell" in the navigation bar to set basic parameters of the base station, as shown in figure 3-4.

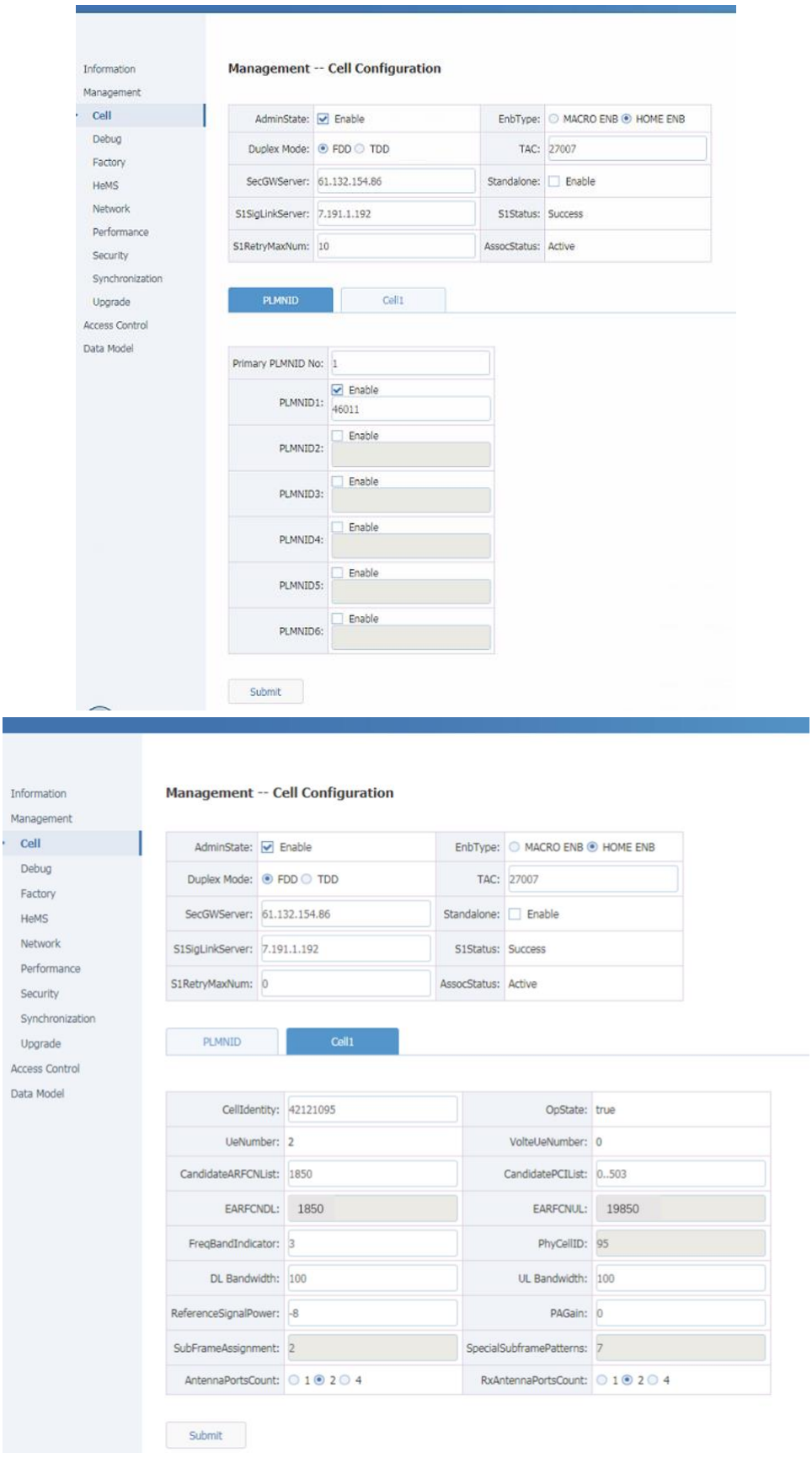

chart3-4Set basic parameters of base station quickly

The basic parameters are described in table 3-2.

The parameter name	instructions
AdminState	Cell state control switch.(check enable when all basic parameters are configured) • Check Enable: protocol stack to set up cell, base station RF work; • Uncheck Enable: protocol stack delete cell, base station RF shutdown;
EnbType	ENB type, MARCO and HOME
Duplex Mode	Duplex mode, default is FDD
TAC	Set the tracking area code where the base station is located to define the sending range of paging messages.TAC is Assigned by the operator. Value range: 0~65535
PLMN ID	PLMN ID of cell ownership
S1SigLinkServer	The IP address of MME. It should be consistent with the IP address of MME on the core network side. • Support to configure up to 32 MME addresses; • Multiple MME addresses are separated by English commas
CellIdentity	The Cell ID. • When the eNB type is MARCO, it is the same as the eNB ID (20bits); • When the eNB type is HOME, it is the value of eNB ID moved 8bits to the left and Cell ID and operation, that is, eNB ID*256+Cell ID (28bits);
OpState	Cell working status. • When the cell is successfully established and the RF works, the state is "true"; • The Opstate is False when Adminstate is not enabled or the cell is not successfully established.
CandidateARFCNList	Absolute frequency point list.(multiple frequency points are separated by English commas) • If only one frequency point is configured, the base station use this frequency point to establish the cell; • If multiple frequency points are configured, the base station selects frequency points according to SON's self-configuration function and establishes the cell.
CandidatePCIList	PCI list.(multiple PCI is separated by English commas) • If only one PCI is configured, the base station will use this PCI to establish cell. • If multiple PCI is configured, the base station selects PCI according to SON's PCI self-configuration function and establishes the cell
EARFCNDLInUse/EARFCNULInUse	The actual uplink and downlink absolute frequency points used by the base station
FreqBandIndicator	The frequency band in which the base station operates
PhyCellIDInuse	The PCI that Base station actually uses
DL Bandwidth / UL Bandwidth	The number of PRBS of the bandwidth (the uplink and downlink bandwidth should be the same) • The 5MHz bandwidth is 25 • The 10MHz bandwidth is 50 • The 15MHz bandwidth is 75 • The 20MHz bandwidth is 100
ReferenceSignalPower	Reference signal power.(maximum value is -10) • For a single rf port, the actual output power is ReferenceSignalPower+31 with dBm unit, such as -10+31=21dBm
PAGain	PA gain value, the integrated base station is set to "0"
AntennaPortsCount	Number of base station antennas, usually configured as "2" (MIMO)
RxAntennaPortsCount	The number of antennas a base station USES for receiving, usually configured as "2" (MIMO)

Table 3-2 quick setting parameter description

1. After setting basic base station parameters in table 1-2, click "Submit" to Submit.

Note: some parameter changes (such as bandwidth, etc.) will cause the base station to restart, just wait for the restart to complete.

2. After basic parameter configuration is submitted, check "Enable" of "AdminState"

4、 Common configuration

4.1Configure network interface

The network interface configuration interface of base station equipment is shown in the figure below.

Select ″management network IP″ in the navigation bar to enter the network interface configuration page.

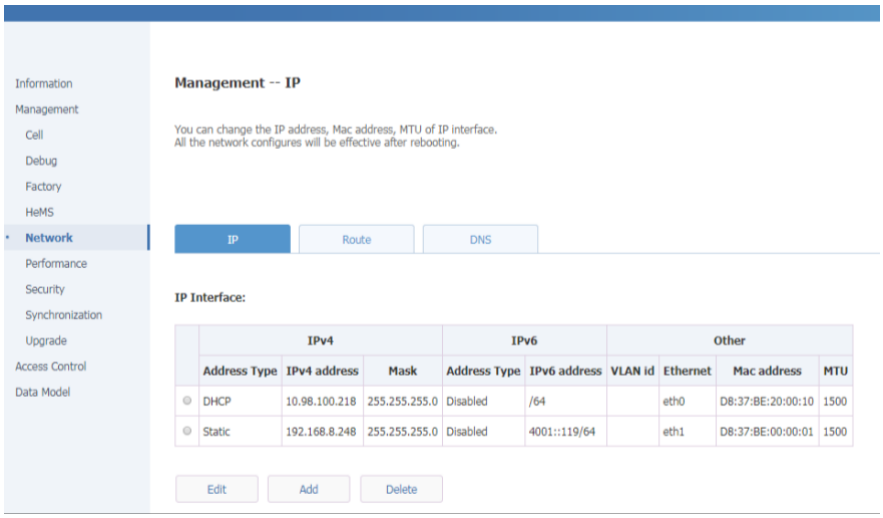

Figure 4-1 network interface configuration

4.1.1Configure WAN interface

WAN interface is the external communication interface of the base station. It is mainly used to connect the base station with external devices, such as OMC, Mme, gateway and other devices. It supports the configuration of multiple VLANs to connect with different devices.

Select "management-> Network"->IP in the navigation bar and WAN interface configuration is shown in Figure 4-2.

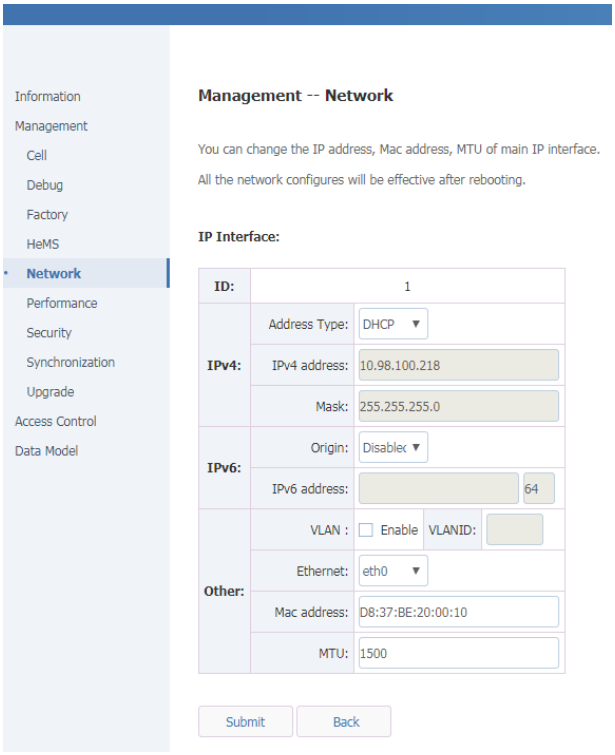

chart4-2Configure WAN interface address

The WAN port parameters are described in table 4-1, Table 4-2 and table 4-3.

Parameter name	explain
The Address Type	The mode for WAN interface to obtain IPv4 address.Support: • DHCP: dynamically obtaining IP address, no other parameters need to be configured; • Static: IP address and mask need to be configured; • Disabled: closes the function of WAN port IPv4 protocol. It is not recommended to select.
IPv4 address	The IPv4 address of the WAN interface. • In DHCP mode, it is allocated by DHCP server. • Static mode requires manual configuration;
Mask	IPv4 subnet mask for the WAN interface. • In DHCP mode, it is allocated by DHCP server. • Static mode requires manual configuration;

surface4-1 IPv4 parameter description of WAN interface

Parameter name	explain
Origin	WAN interface to get IPv6 address.Support: • DHCPv6: dynamically obtain IP address, no need to configure other parameters; • Static mode: IPv6 address and mask need to be configured; • Disabled: turns off IPv6 protocol function of WAN port (turns off IPv6 protocol by default);
IPv6 address	IPv6 address and mask of WAN interface. • In DHCPv6 mode, it is assigned by DHCPv6 server. • Static mode requires manual configuration;

Table 4-2 IPv6 parameter description of WAN interface

Parameter name	explain
Mac address	MAC address of WAN interface
MTU	MTU size of WAN interface

Table 4-3 description of other common parameters of WAN interface

4.1.2Configure VLAN

Refer to Figure 4-2 for VLAN configuration interface and table 4-4 for parameter description.

Parameter name	explain
Enable	VLAN function switch
VLAN ID	VLAN ID

surface4-4 VLAN parameter description

4.1.3Configure LAN interface

LAN interface is the local maintenance interface of the base station, which is mainly used for the local maintenance and configuration of the base station.

The default IP address for the LAN interface is 192.168.8.248, which is usually left as the default configuration.

4.1.4Configure IPv4 routing

Select “management-> Network->Route” in the navigation bar to enter the route configuration view.

1. Click "add" to add a routing instance, as shown in Figure 4-3.

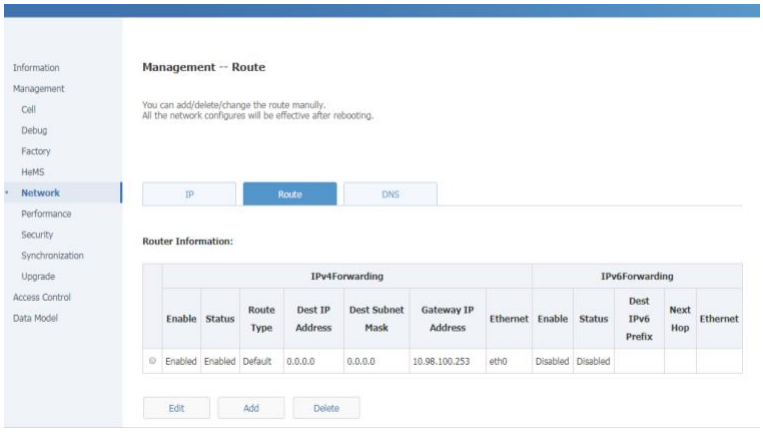

chart4-3Add route

2. Configure routing entries

1) Add a default route, as shown in Figure 4-4.

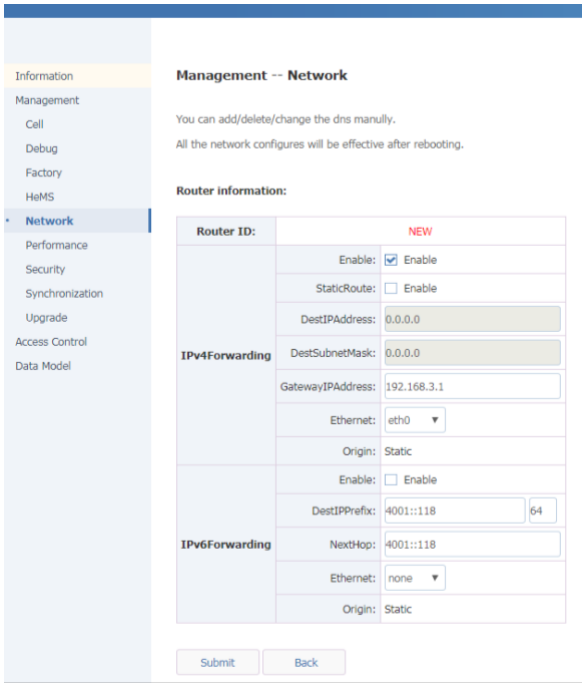

Figure 4-4 add default route

2) Add network segment route, as shown in Figure 4-5.

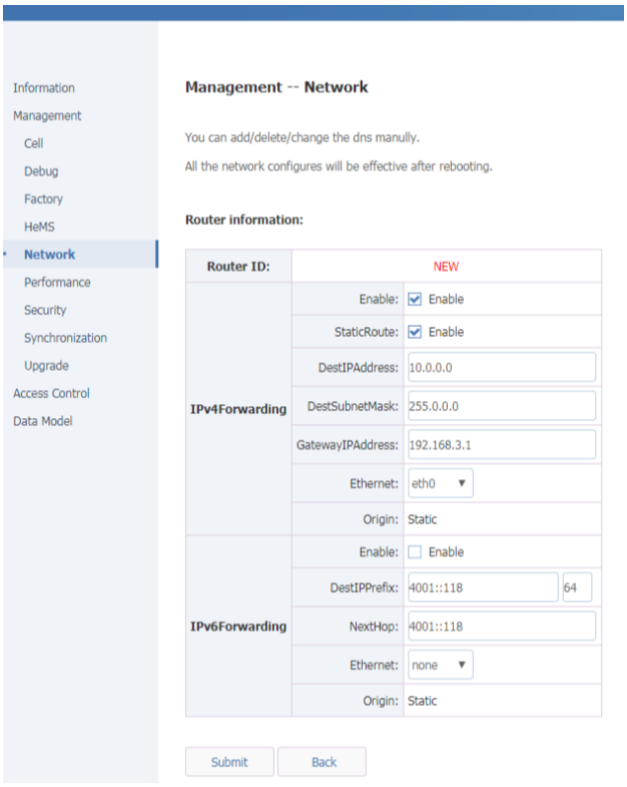

Figure 4-5 add segment route

Description of main route configuration parameters, as shown in table 4-5.

Parameter classification	Parameter name	explain
IPv4 routing parameters	The Enable	Route item switches.Check to enable, check to not enable.
	The StaticRoute	Check this if the configured route is network segment route; If the configured route is the default route, this item is not checked;
	DestIPAddress	Destination IP address.
	DestSubnetMask	The subnet mask for the destination IP address.
	GatewayIPAddress	Gateway IP address to destination IP address.
	Ethernet	Select “eth0”
IPv6 Routing parameters	Enable	Route entry switch. Tick to enable and uncheck to disable.
	DestIPPrefix	Destination IPv6 network segment.
	NextHop	Next hop address.
	Ethernet	Configure the network interface where the route is located, WAN port is eth0

surface4-5Description of main route configuration parameters

4.2Configure IPSec

Enb-f02004 supports EAP-AKA, certificate and PSK authentication modes. The configuration methods of the three modes are described below.

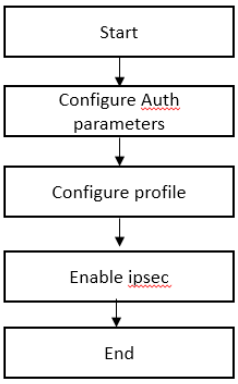

Figure 4-6 IPSec configuration flow

4.2.1Set PSK

Web page path: “management -> security -> PSK“

1. Click "add" to add PSK, or select and click "Edit" to edit PSK.

Figure 4-7 adding or modifying PSK

2. Select the encoding method of PSK, enter the key value, such as 123456, and then click "submit" to submit.

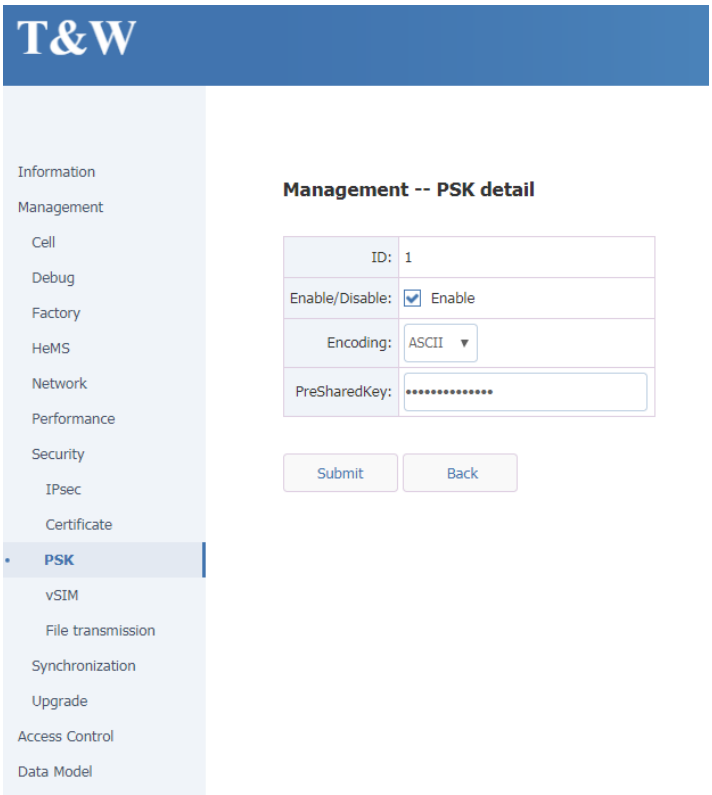

Figure 4-8 configure PSK

3. After submitting the configuration, you can view the PSK information through the web, as shown in Figure 4-9.

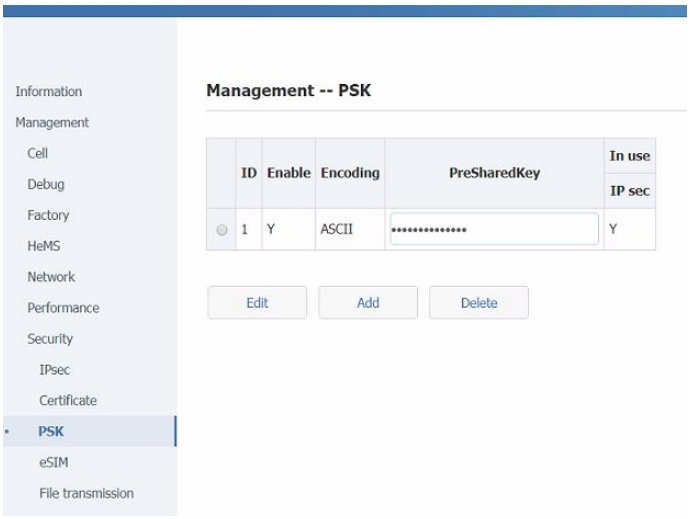

Figure 4-9 view PSK information on the web

4.2.2Configure virtual SIM card

Web page path: management->Security->Vsim

1. Click Add to add the virtual SIM configuration, or select and click Edit to edit the vSIM configuration.

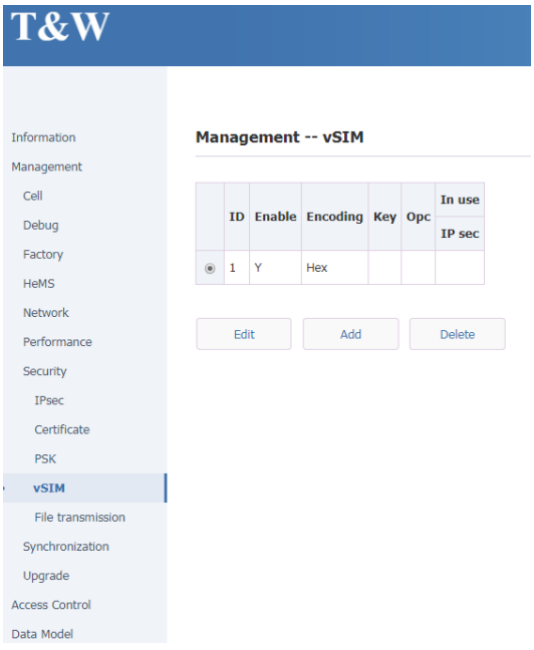

Figure 4-10 adding or modifying virtual USIM

2. Enable virtual SIM configuration, select encoding mode, input key and OPC value, and then click "submit" to submit.

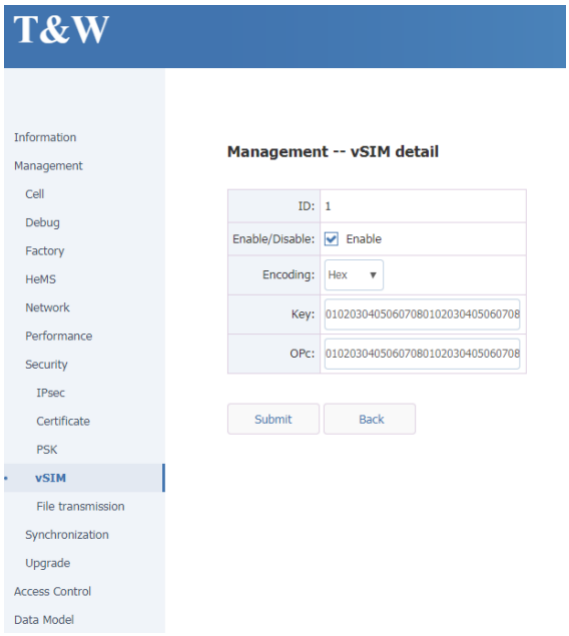

Figure 4-11 configuring virtual SIM parameters

4.2.3Configure certificate

There are two ways to import certificates: through the web interface and through the network management.

1. Import the certificate through the web, as shown in Figure 3-11.

   - Select CA Cert, click browse, and select the corresponding certificate file (usually in PEM format)

⚠ be careful:

It is not supported to put multiple CA certificates into one certificate file;If there are multiple CA certificates, you need to import them multiple times.

   - Select "client cert", click "Browse", and select the corresponding certificate file (usually in p12 format);If the pkcs12 file has a decompression password, you need to enter the corresponding password.

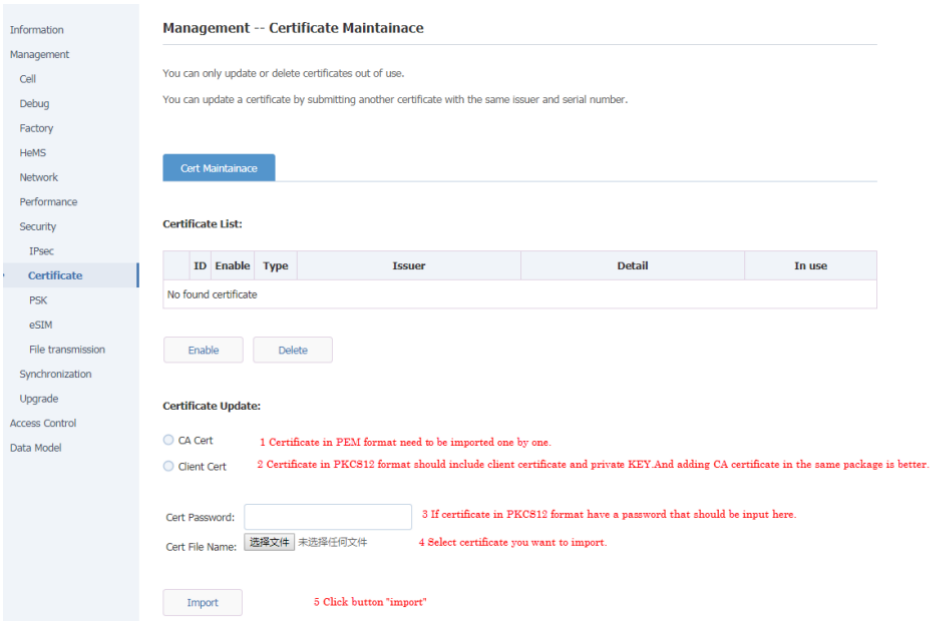

Figure 4-12 web import certificate

2. Import the certificate through the network management.

   The NMS can download the certificate through the download method. The download file types are "x d837be clcert" (client certificate p12 / PFX) and "x d837be cacert" (CA certificate). D837be is the manufacturer oui. Pay attention to replacement when different manufacturers have different versions.

3. After the certificate is imported, you can view the relevant information of the certificate through the web page.

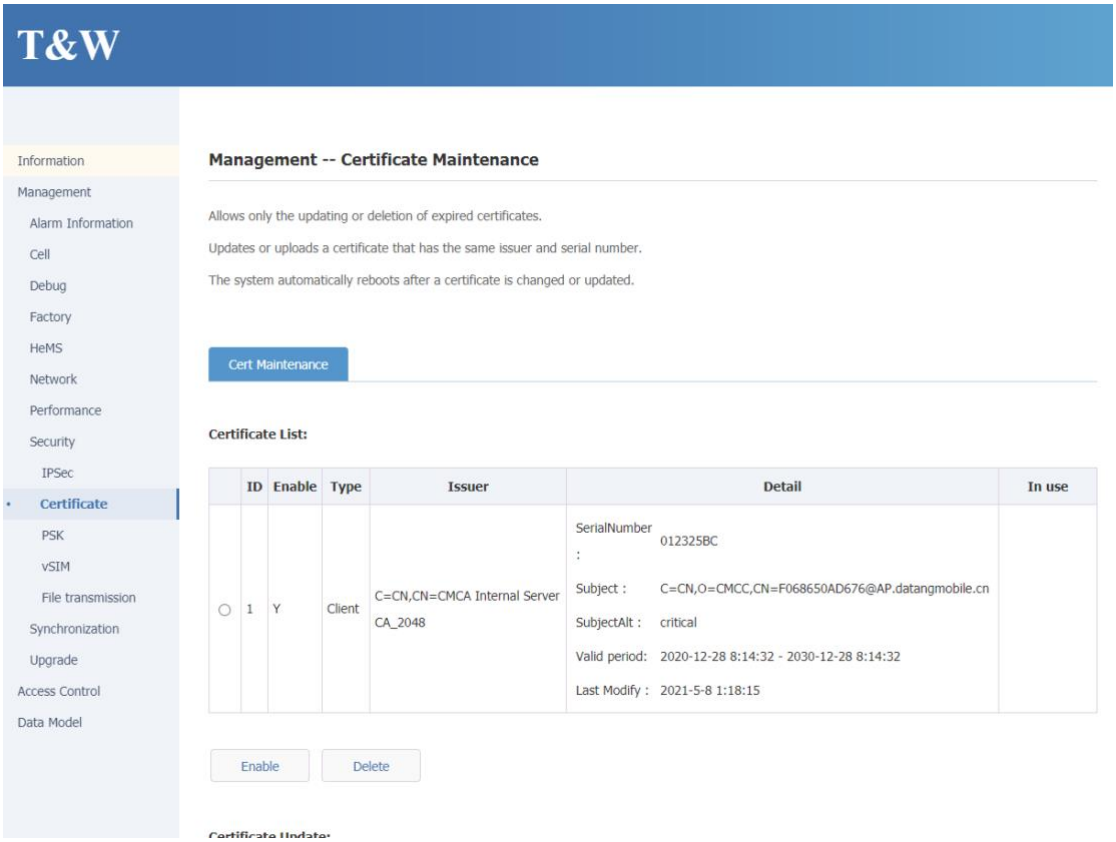

Figure 4-13 viewing certificate information on the web

4.2.4Configure profile

4.2.4.1Add or modify profile

Web page path: management -> security -> IPSec -> profile

Click Add to add or edit to modify the profile configuration.

4.2.4.2Setting profile parameters

For PSK, certificate and USIM, except for different authentication mode parameters, other parameters can be configured in public.Please refer to the following details.

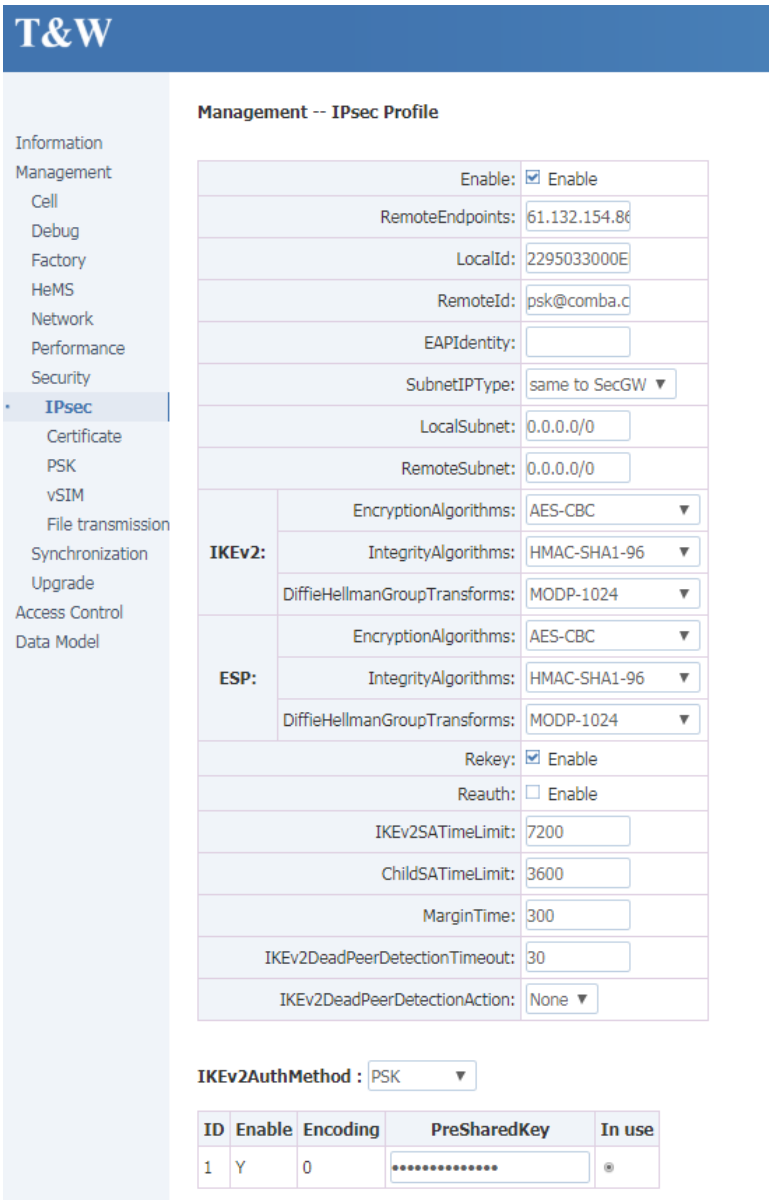

Figure 4-14 web configuration profile

(1) Profile common parameter description

The profile common parameters are described as follows:

Device.IPsec.Profile.{i}.X_D837BE_Mode = tunnel (default)

Device.IPsec.Profile.{i}.X_D837BE_Interface = Device.IP.Interface. 1. (used to specify the enabling IPSec network port. The default is WAN portIP.Interface.1.)

Device.IPsec.Profile{I}. Remoteendpoints = 10.98.100.192 (fill in the security gateway address)

Device.IPsec.Profile.{i}.X_D837BE_LocalId = *@lte.strongswan.org(base station ID (left ID))

Device.IPsec.Profile.{i}.X_D837BE_RemoteId = secgw.femto.cn (security gateway ID (right ID))

Device.IPsec.Profile.{i}.X_D837BE_Eapidentity = 0 + IMSI (15 IMSI of ESIM, specific filling requirements need to be confirmed with security gateway maintenance personnel)

Device.IPsec.Profile.{i}.X_D837BE_Subnetiptype = 0 (0: virtual address IP type is consistent with real address, 4: apply for IPv4 virtual address, 6: apply for IPv6 virtual address)

Device.IPsec.Profile.{i}.X_D837BE_Localsubnet = 0.0.0.0/0 (specify local TS policy, but general security gateway will ignore it)

Device.IPsec.Profile.{i}.X_D837BE_Remotesubnet = 0.0.0.0/0 (specify remote TS policy, fill in according to network planning)

Device.IPsec.Profile{I}. Ikev2allowedencryptionalgorithms = aes-cbc (encryption algorithm of Ike, multiple choices)

Device.IPsec.Profile{I}. Espallowedencryptionalgorithms = aes-cbc

Device.IPsec.Profile{I}. Ikev2allowedpseudorandomfunctions = hmac-sha1 (random number algorithm of Ike, multiple choice)

Device.IPsec.Profile{I}. Ikev2allowedintegrity algorithms = hmac-sha1-96

Device.IPsec.Profile{I}. Espallowedintegrity algorithms = hmac-sha1-96

Device.IPsec.Profile{I}. Ikev2alloweddiffiehellmangrouptransforms = modp-1024

Device.IPsec.Profile.{i}.X_D837BE_Espalloweddiffiehellmangrouptransforms = none

Device.IPsec.Profile{I}. Ikev2deadpeerdetectiontimeout = 30

Device.IPsec.Profile. {I}. Antireplaywindowsize = 32 (anti replay parameter, max. 64)

Device.IPsec.Profile.{i}.X_D837BE_Strictcrlpolicy = no (do not perform CRL check)

Device.IPsec.Profile.{i}.X_D837BE_Rekey = 1 (rekey function switch)

Device.IPsec.Profile.{i}.X_D837BE_Reauth = 0 (reauth function switch, reauth turns off automatically when rekey function is turned off)

Device.IPsec.Profile. {I}. Ikev2satimelimit = 7200 (IKE SA life cycle)

Device.IPsec.Profile{I}. Childsatrafficlimit = 5368709120 (bytes allowed in ESP life cycle, 5g bytes by default)

Device.IPsec.Profile. {I}. Childsatimelimit = 3600 (ESP SA life cycle)

(2) PSK authentication mode, profile configuration

When PSK authentication is used, the PSK for authentication needs to be configured in the profile.As shown in Figure 4-15.

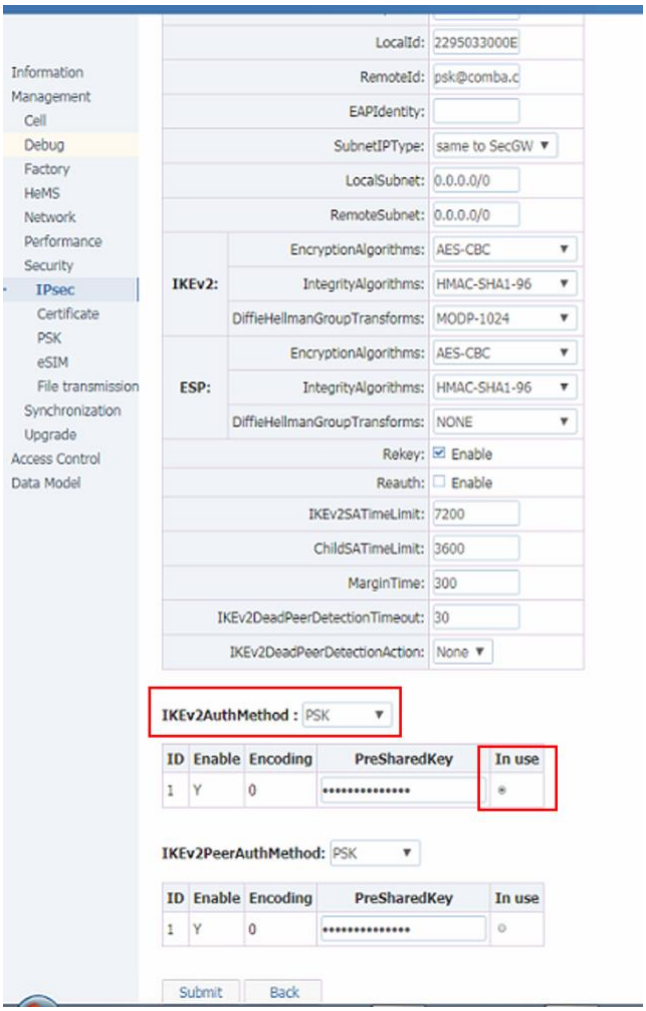

Figure 4-15 select PSK

(3) Virtual SIM authentication mode, profile configuration

When the virtual USIM authentication mode is adopted, the virtual vSIM for authentication needs to be configured in the profile. As shown in the figure.

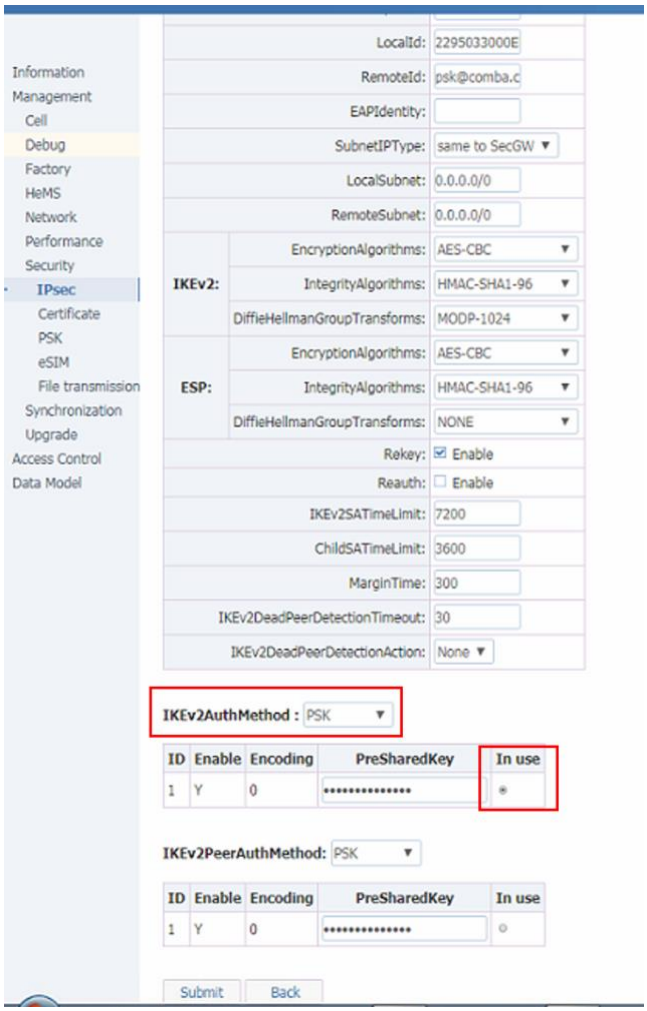

Figure 4-16 selecting virtual SIM

(4) Certificate authentication method, profile configuration

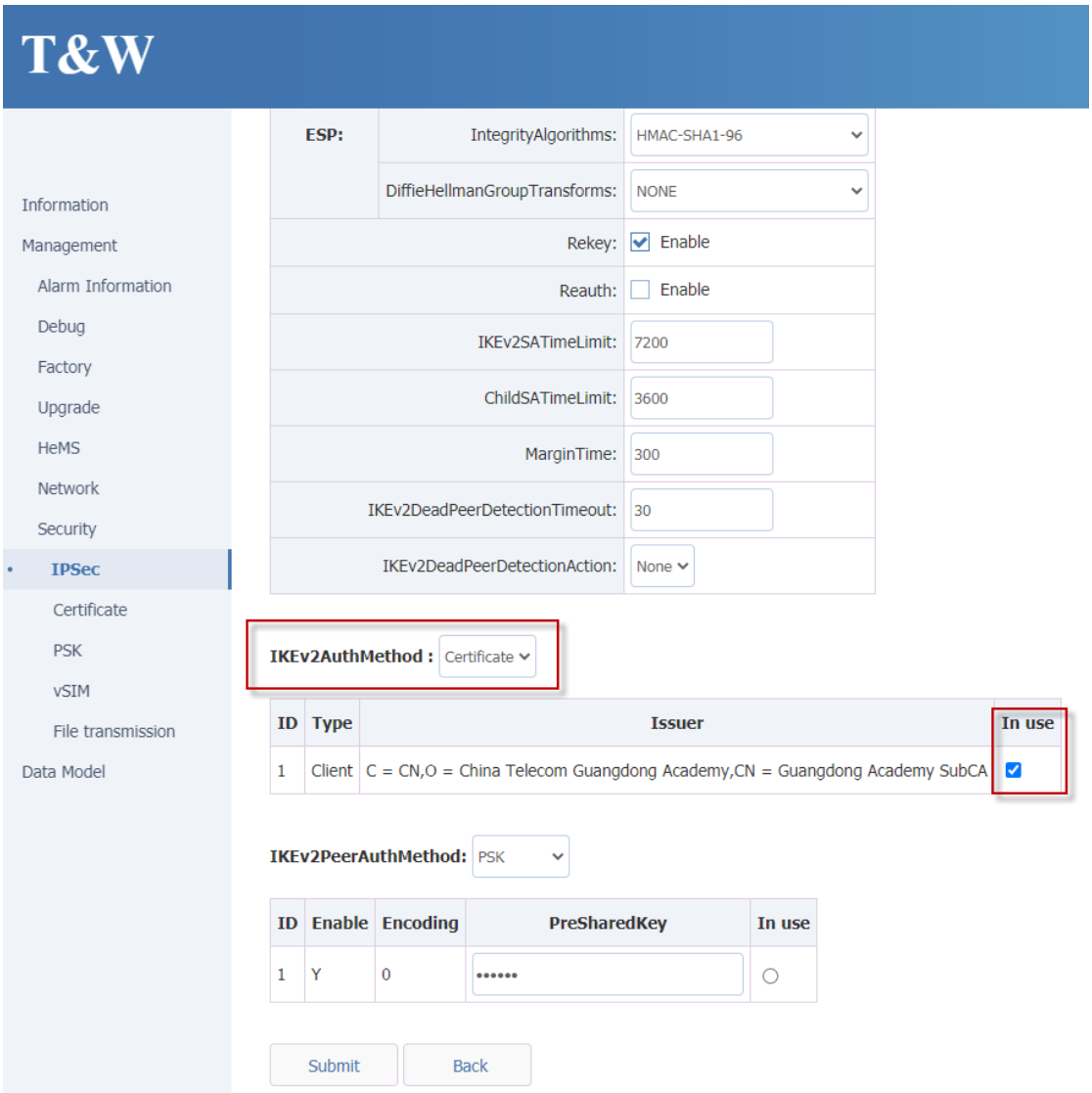

Figure 4-17 selecting certificates

(5) View profile configuration information

After the profile configuration is completed, you can view and confirm the profile configuration information through the web page, as shown in the figure.

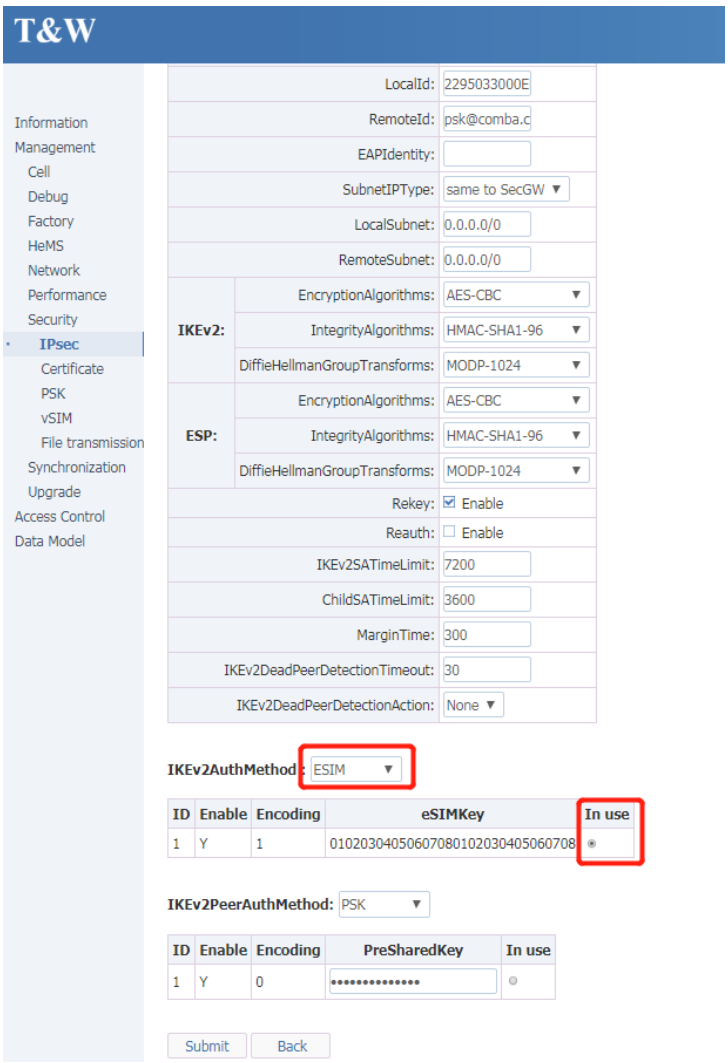

Figure 4-18 viewing profile information

4.2.5Enable IPSec

After completing the relevant configuration in the above chapters, enable IPSec. Check the corresponding authentication method and click enable to enable IPSec function.

⚠ note:

After clicking "enable", the button will switch to "disable", indicating that the current status is already enabled, and clicking again will perform the disable operation.

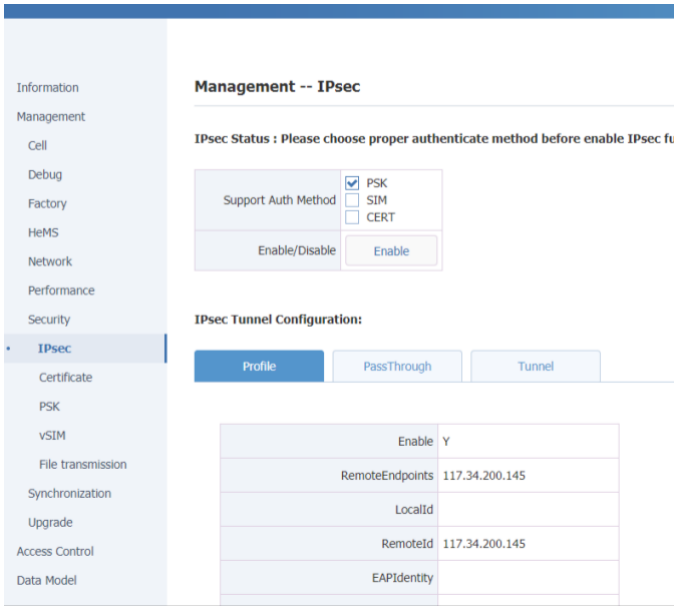

Figure 4-19 enabling IPSec

4.2.6View IPSec status

After the base station and the security gateway successfully establish a security tunnel, you can view the IPSec tunnel status in the page Management → IPsec → Tunnel. As shown in the figure below.

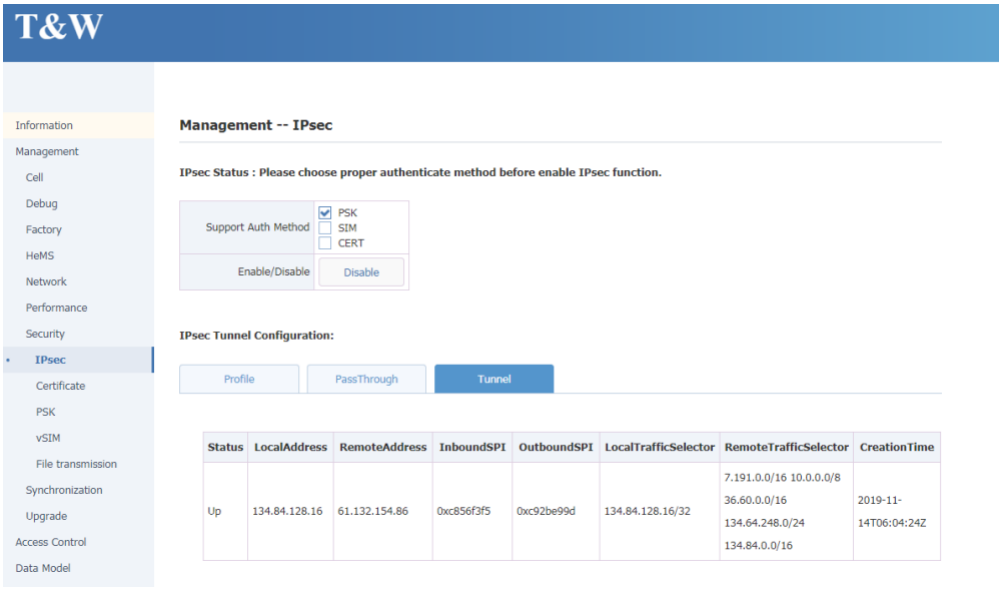

Figure 4-20 viewing IPSec tunnel status

4.3Configure base station parameters

4.3.1Set encryption and integrity protection algorithm

Set the data encryption and integrity protection algorithm of PDCP sublayer.

1. Select "data model" and "device" in the navigation bar
2. Enter "" to enter the configuration page, as shown in Figure 4-21. *Device.Services.FAPService.1.CellConfig.LTE.EPC.*
3. *AllowedCipheringAlgorithmList*

⚠note:

The following security parameters usually do not need to be modified, just keep the default value!

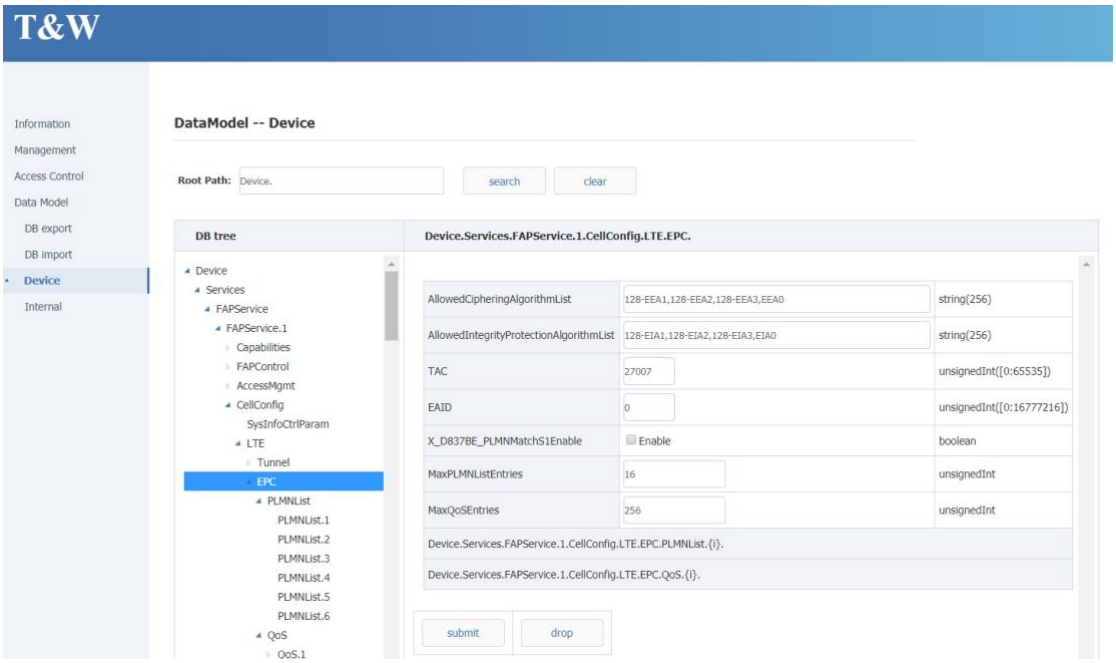

Figure 4-21 setting encryption and integrity protection algorithm

4. Safety parameter description is shown in table 4-6.

Parameter name	explain
AllowedCipheringAlgorithmList	Encryption algorithm. Value range: • 128-EEA1, 128-EEA2, 128-EEA3, EEA0 • Configurable, separated by commas The default value is 128-eea1
AllowedIntegrityProtectionAlgorithmList	Integrity protection algorithm. Value range: • 128-EIA1, 128-EIA2, 128-EIA3, EIA0 • Configurable, separated by commas

Parameter name	explain
	The default value is 128-eial

Table 4 -6Safety parameter description

4.3.2Configure network management connection

Select "management-> HeMS" in the navigation bar, as shown in Figure 4-22.

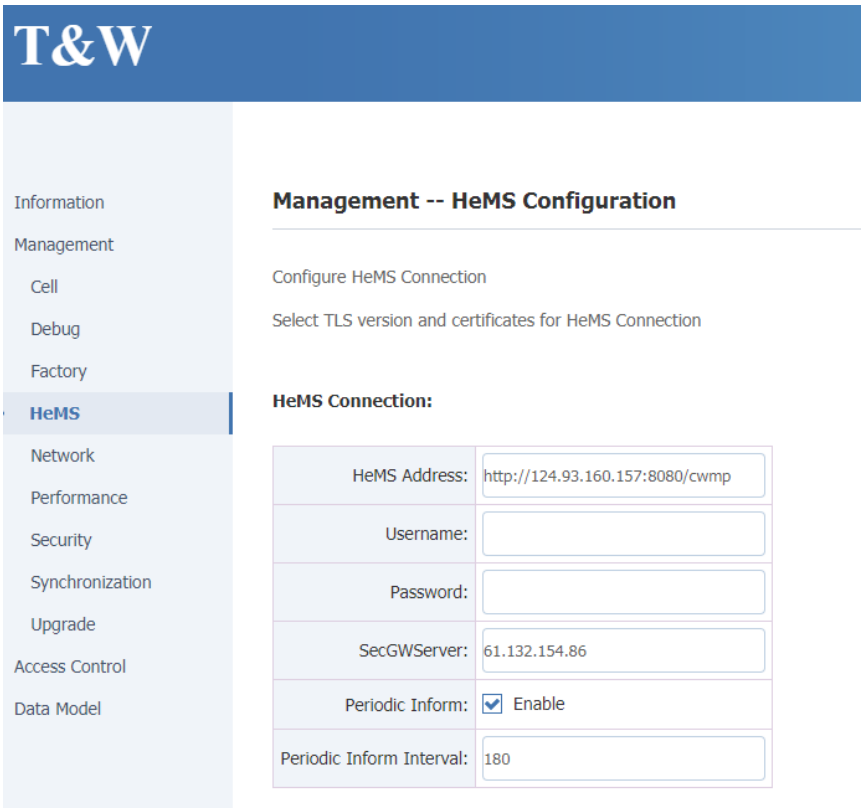

chart4-22Configure network management

Network management parameters are shown in table 3-9.

Parameter name	explain
HeMS Address	Network management address of Picchi station, such as http://135.224.42.2:8080/itmscpe/inform
Username	User name of network management, fill in as required.
Password	Network management password, fill in as required.
SecGWServer	Security gateway address. According to the actual network deployment, this item needs to be filled in when the security gateway needs to be connected before connecting to the network management.

Table 4-7 network management parameter description

4.3.3Configure base station synchronization parameters

4G small base station supports 3 synchronization modes, IEEE1588 air port and GPS. When the synchronization mode switching function is turned on, the base station can switch between synchronization modes.

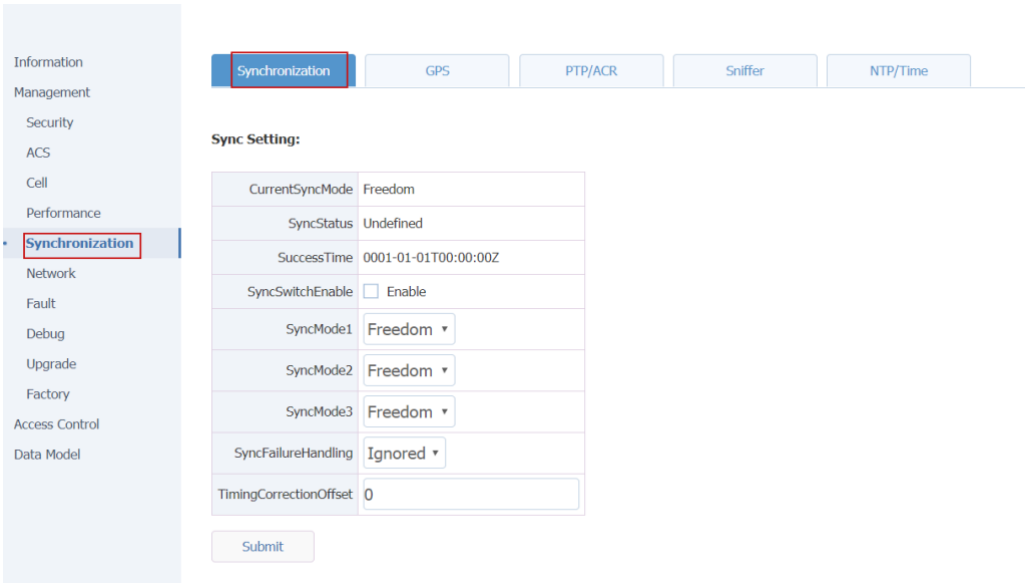

Figure 4-23 synchronization mode interface

note:

• At present, syncmode1 is only used for synchronization mode setting, while syncmode2 and syncmode3 are not used temporarily.

• Air port synchronization can only synchronize frequency, not time. It needs to be used with NTP function.

1. The corresponding parameters of synchronization mode are shown in table

Synchronization mode	explain
Freedom	Free mode, i.e. no synchronization
IEEE1588 V2	IEEE1588 uses accurate time stamp to calculate time and frequency offset through IEEE1588 message transmitted between master and slave devices, so as to achieve frequency and time synchronization between master and slave. And the accuracy can reach microsecond level.IEEE1588 V2 supports frequency synchronization and time synchronization.
IEEE1588 ACR	1588acr (adaptive clock recovery) refers to the master device supporting IEEE 1588v2 that encapsulates the clock information of local system into 1588v2 message and transmits it to the slave device of the opposite through the third party network. The slave device obtains the time stamp from the 1588v2 message and recovers the clock to achive the frequency synchronization of the devices at both sides of PSN (packet switched network).
Sniffer synchronization	By receiving the reference signal of macro cell to calculate the time deviation between macro cell and itself so as to

Synchronization mode	explain
	calibrate the timing and achieve the purpose of synchronization with macro cell.
GPS/RGPS	The base station needs external GPS antenna

Table 4 -8Synchronization mode

2. Synchronization configuration parameters are shown in table 4-9.

parameter	explain
SyncSwitchEnable	Synchronous source switch. Off by default.
SyncFailureHandling	How to deal with synchronization failure in BTS • Ignore by default: ignore synchronization failure; • Restart: if the synchronization fails, the cell will be deleted and retried; • Reboot: if the synchronization fails, the BTS will be restarted and retried;

Table 4-9 synchronization mode parameters

4.3.3.1GPS synchronization

1. The base station needs external GPS antenna.
2. Set the synchronization mode to "GPS";
3. Configure frame migration according the operter plan, as shown in figure 4-24 and the calculation method of frame migration is shown in table4-10.

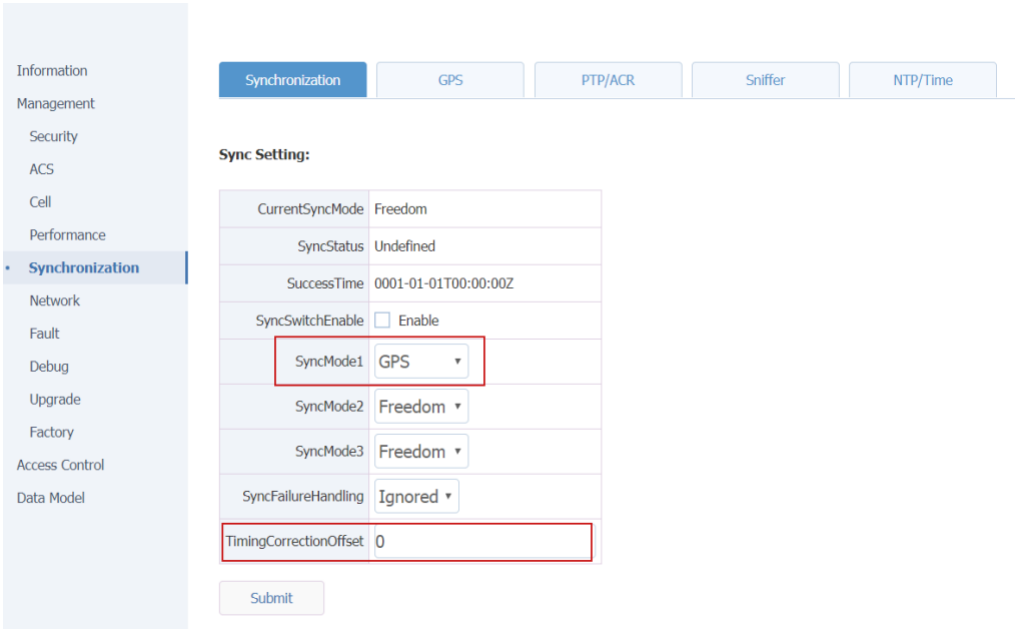

Figure 4-24GPS synchronization configuration-

Table 4-10 frame migration parameter description-

The parameter name	instructions
TimingCorrectionOffset	Time synchronization frame offset, Chip(1/30.72us), valid for GNSS and IEEE1588V2.If the macro station is 700us ahead of the GPS frame header, then the frame offset should be 700*30.72=21504.(the macro station here is of the same frequency band)

4. After parameter configuration is completed, click "Submit";
5. Restart base station and perform GPS synchronization.
6. After the base station restarts, query the GPS synchronization status, as shown in the figure below.

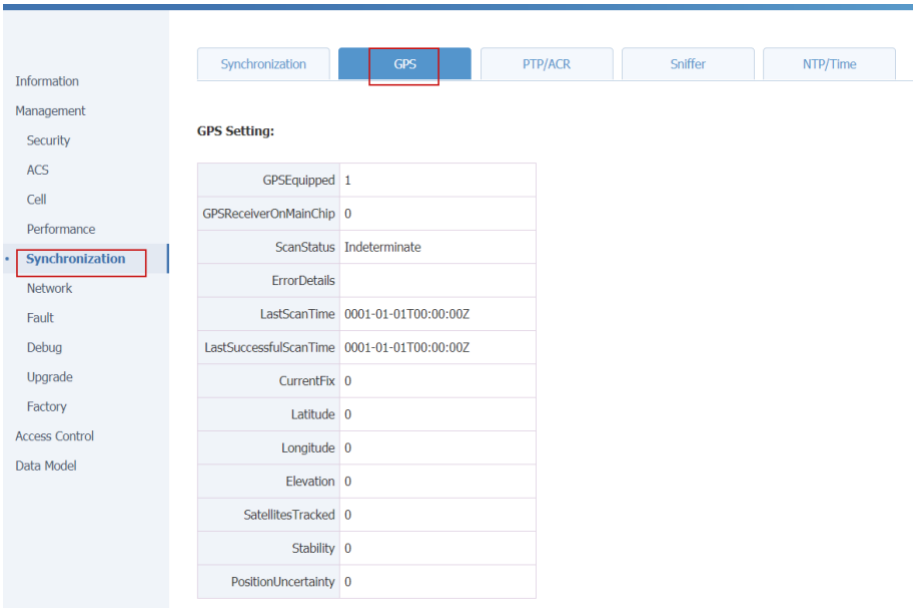

Figure 4-25 GPS synchronization status-

4.3.3.2 Configure IEEE1588 V2 synchronization

1. There are 1588 clock synchronization signals in the network environment of the base station.
2. 1588 PTPv2 is divided into two modes: multicast and unicast. The configuration of multicast mode is shown in figure 4-26.
   - Select "Ethernet" for Transport;
   - Role select "Slave";

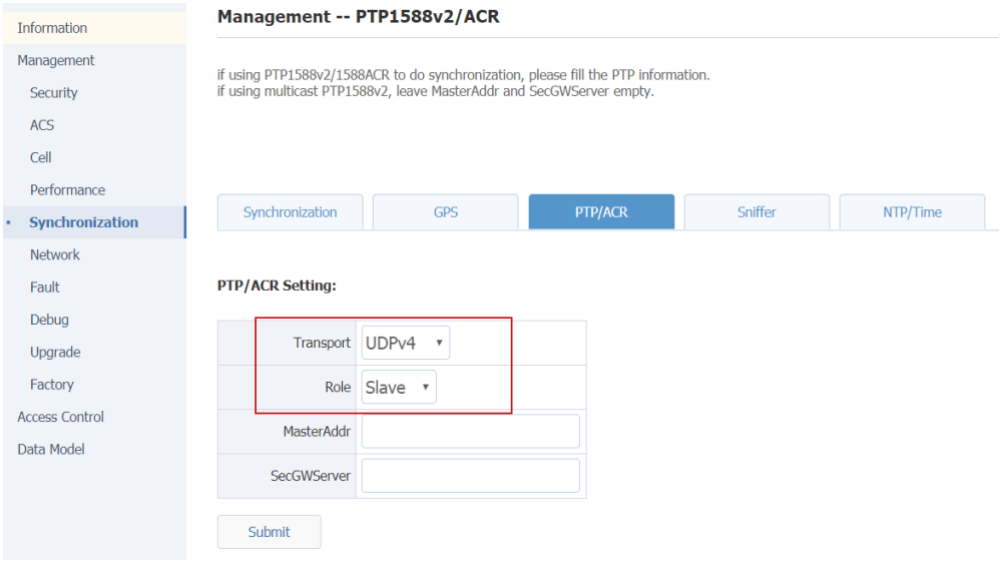

Figure 4-26 IEEE1588 V2 layer 2 multicast mode

3. IEEE1588 V2 unicast mode configuration, as shown in Figure 4-21.

- Select "Ethernet" for transport;
- Role select "slave";
- Master addr fills in IP address of master clock;
- In the PTP over IPSec scenario, you need to specify the security gateway address. Secgwserver fills in the security gateway IP address.

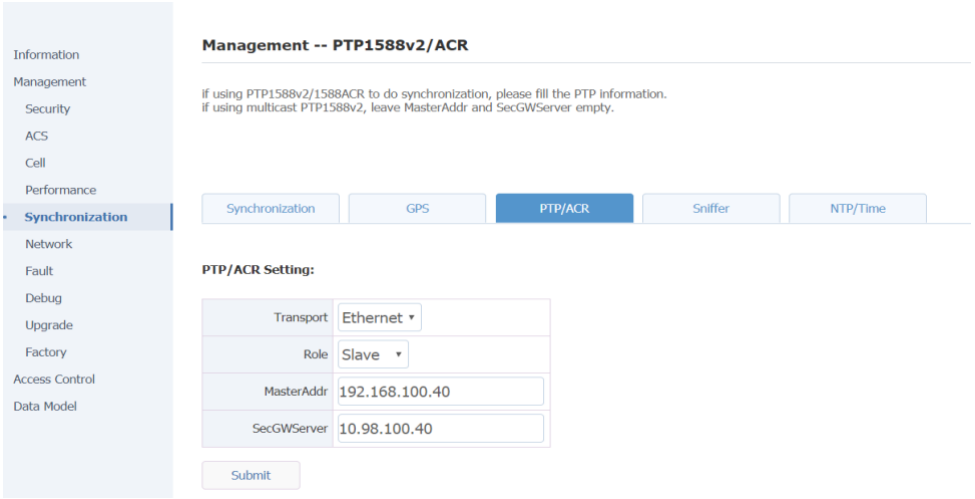

Figure 4-21 IEEE1588 layer V2 three unicast mode

4. Configure frame offset. See the table below for the value of frame offset.

Parameter name	explain
TimingCorrectionOffset	Time synchronization frame offset, in chip (1 / 30.72us), is effective for GNSS and ieee1588v2 modes. If the macro station is 700us ahead of the GPS frame head, then the frame offset should be

Parameter name	explain
	700 * 30.72 = 21504.(the macro station here is of the same frequency band)

Table 4 -10Frame offset parameter description

5. After setting the above synchronization parameters, set the synchronization mode to "ptp1588", and click "submit" to submit;

⚠note:

After modifying the synchronization mode, the base station takes effect by restarting to performs synchronization.

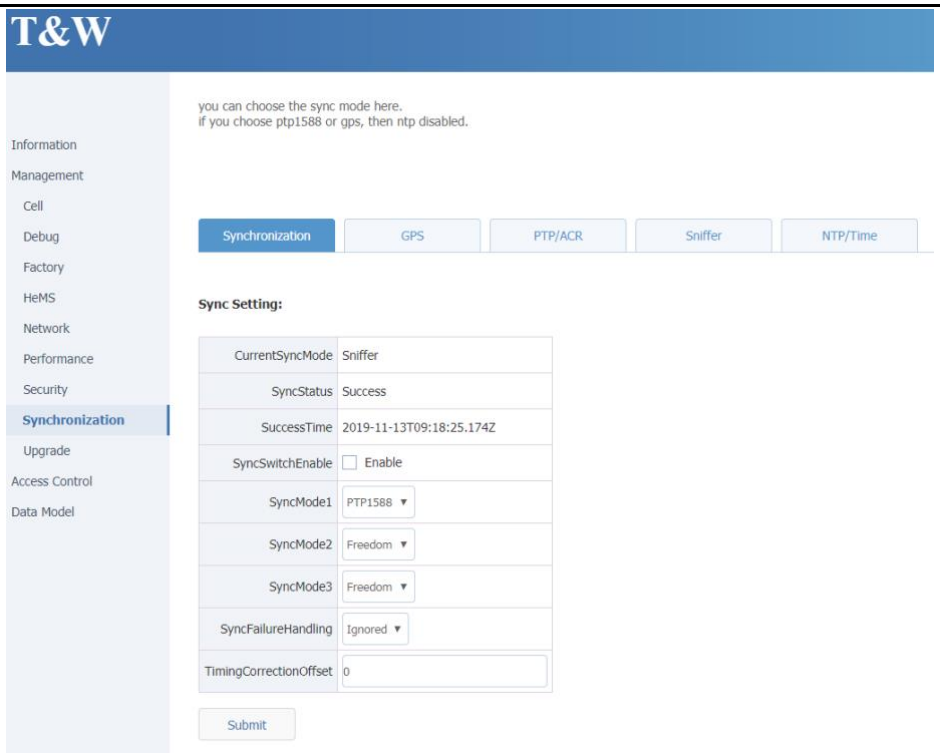

Figure 4-27 1588 ptpv2 synchronization configuration

6. After the base station is restarted, check the synchronization status.

4.3.3.3 Configure IEEE1588 ACR synchronization

1. IEEE1588 ACR synchronization parameter settings are shown in Figure 4-28.

- Transport select "udpv4";
- Role select "slave";
- Master addr fills in 1588 ACR server address;
- In the PTP over IPSec scenario, you need to specify the security gateway address.Secgwserver fills in the security gateway IP address.

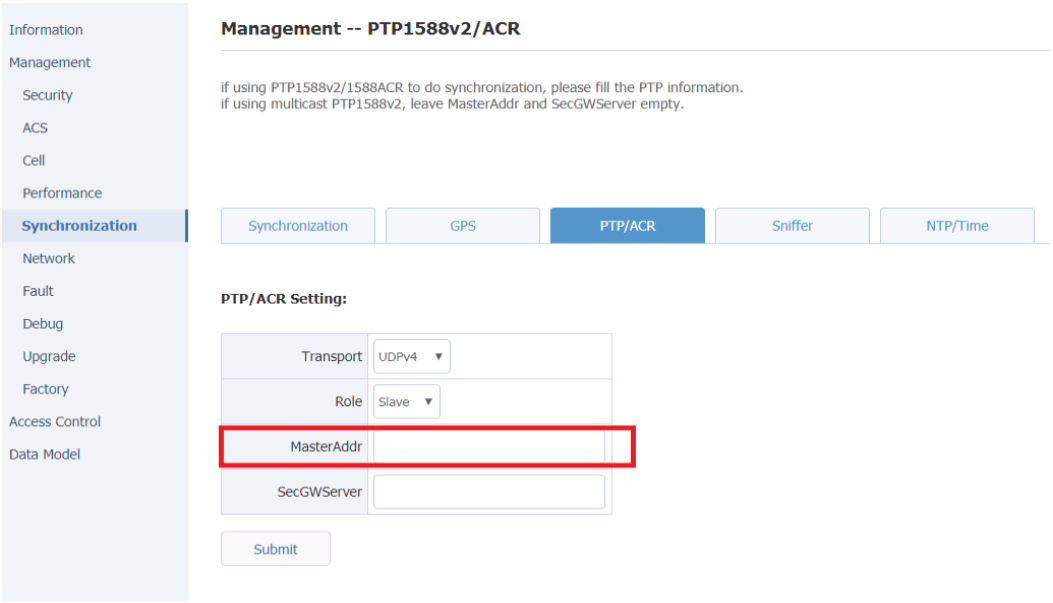

Figure 4-28 IEEE1588 ACR synchronization parameter setting

2. Set the synchronization mode to 1588 ACR, and click "submit" to submit, as shown in Figure 4-29;

⚠note:

After modifying the synchronization mode, the base station takes effect by restarting to performs synchronization.

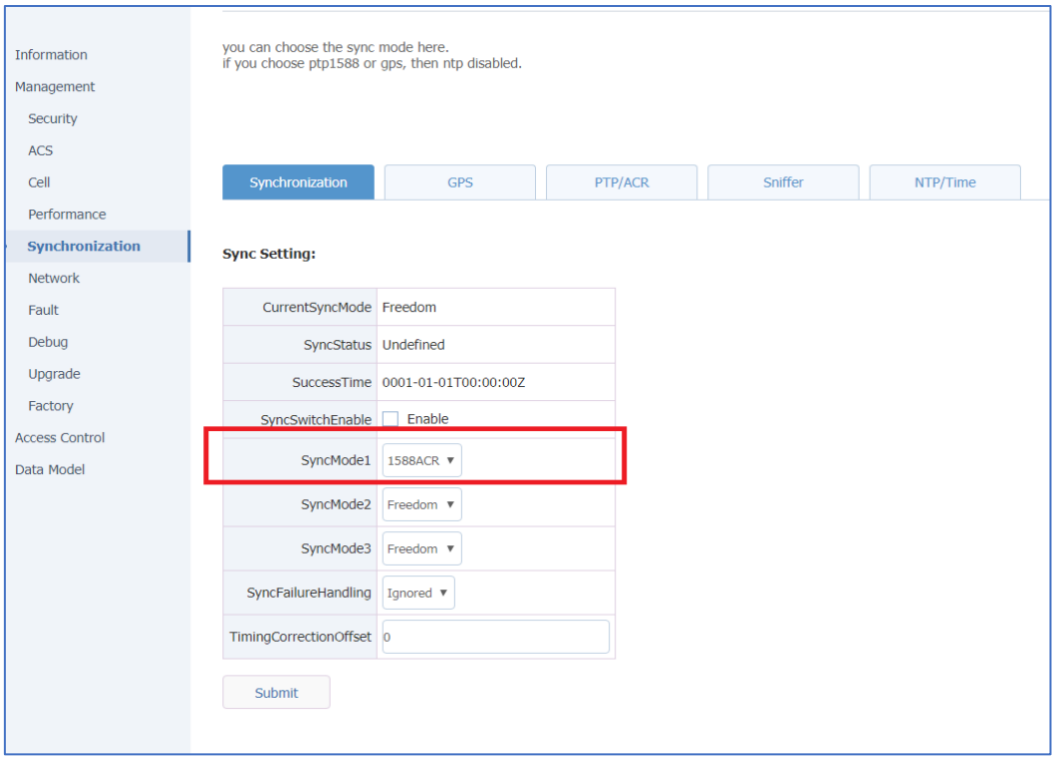

Figure 4-29 IEEE1588 ACR synchronization mode setting

4.3.3.4Set air port synchronization

1. Configure the frequency point of air port synchronization, as shown in Figure 4-30.

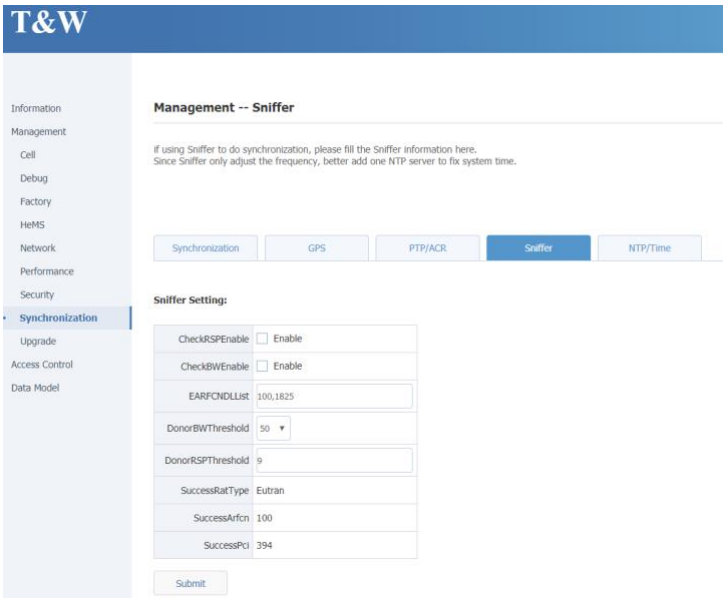

Figure 4-30 setting the sniffer synchronization frequency point

2. Set the synchronization mode to "sniffer", and click "submit" to submit;

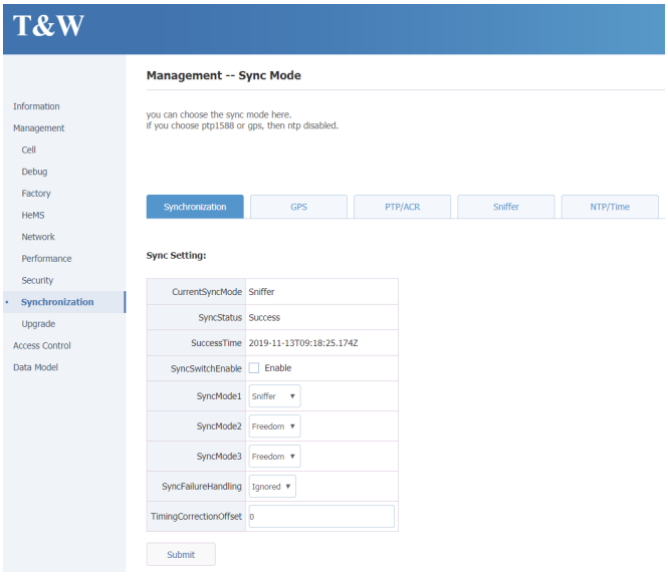

Figure 4-31 sniffer synchronization configuration

⚠note:

After modifying the synchronization mode, the base station takes effect by restarting to performs synchronization.

3. After the base station is restarted, check the air port synchronization status, as shown in Figure 4-32.

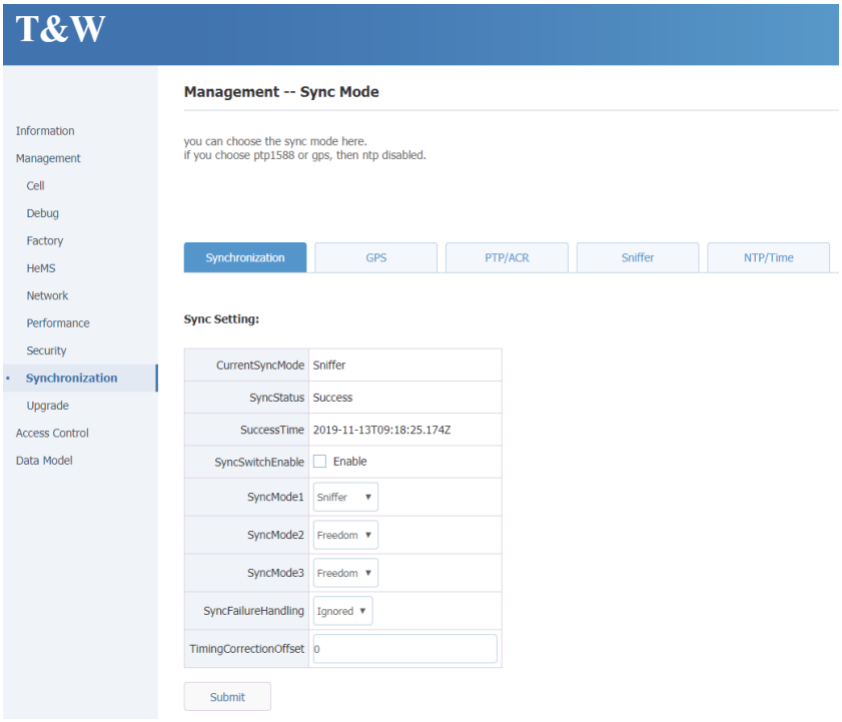

Figure 4-32 air port synchronization status query

4. When the sniffer synchronization mode is selected, not all the scanned base stations can be used as synchronization targets, Device.Services.FAPService.1.X_D837BE_SON.CNM.DonorRSPThresholdThe minimum threshold that can be used as the reference signal power of the synchronization target cell is defined. The default value is 9, as shown in Figure 4-33. See table 4-11 for parameter description.

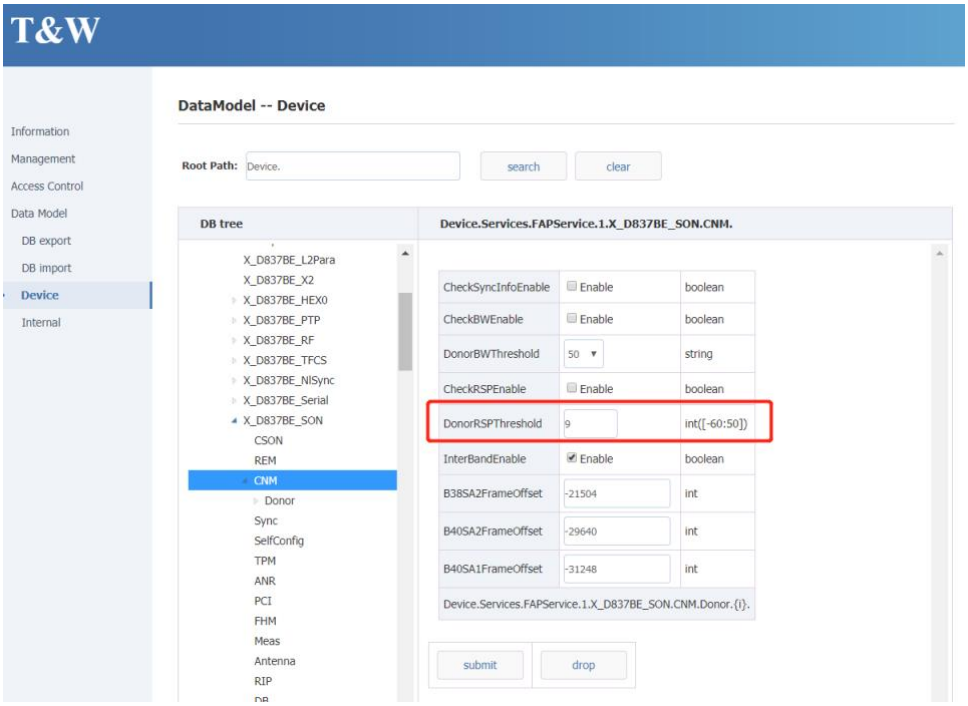

Figure 4-33 power threshold of synchronous target reference signal

Parameter name	Value range	explain
DonorRSPThreshold	[-60:50]	The minimum threshold that can be used as the reference signal power of the synchronization target cell. The default value is 9, which generally corresponds to the reference signal power of the macro station. If you want to use the small base station as the synchronization target, you should set this parameter as the reference signal power of the corresponding small base station, which is generally negative.

surface4-11Synchronous target reference power description

4.3.3.5Free mode

1. Set the synchronization mode to "freedom";
2. In free mode, the base station will not synchronize with any synchronous source, only rely on its own crystal oscillator to ensure frequency offset.

4.3.4Configure NTP service

Select "management synchronization" in the navigation bar to enter the NTP / time setting page, as shown in Figure 4-34 below.

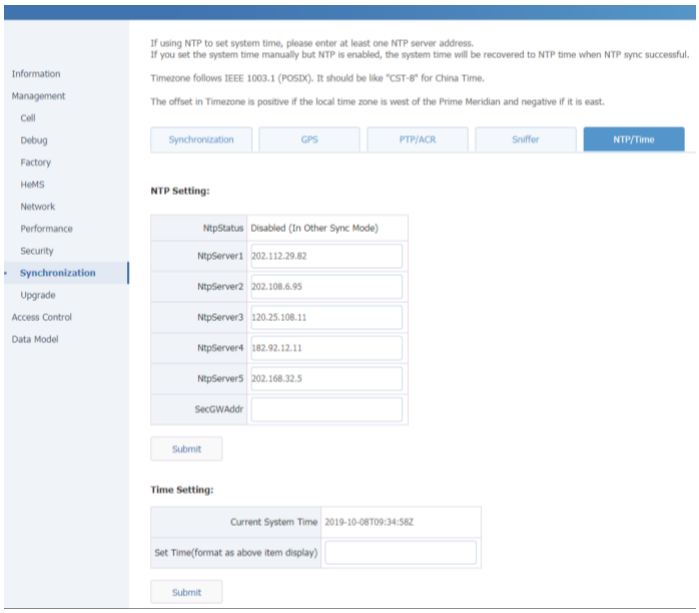

Figure 4-34 NTP configuration

Configure NTP server parameters, as shown in 4-12.

Parameter name	explain
NTP Server	The domain name or IP address of the NTP server.(multiple can be configured at the same time)

surface4-12 NTP server parameter description

4.4Configure LTE parameters

4.4.1Configure neighborhood parameters

4.4.1.1 Neighbor cell is found by air port listening mode

The base station has the self discovery and self configuration functions of the intra frequency neighborhood, inter frequency neighborhood and inter system neighborhood based on air port listening. It supports the self discovery and self configuration functions of the measurement frequency points based on air port listening.

1. Enable neighborhood self-discovery and frequency point self-measurement functions based on air port interception, as shown in Figure 4-35.

   Data model path:

   Device.Services.FAPService.1.FAPControl.LTE.SelfConfig.SONConfigParam.SnifferForANREnable
   Device.Services.FAPService.1.FAPControl.LTE.SelfConfig.SONConfigParam.SnifferForMeasurementEnable

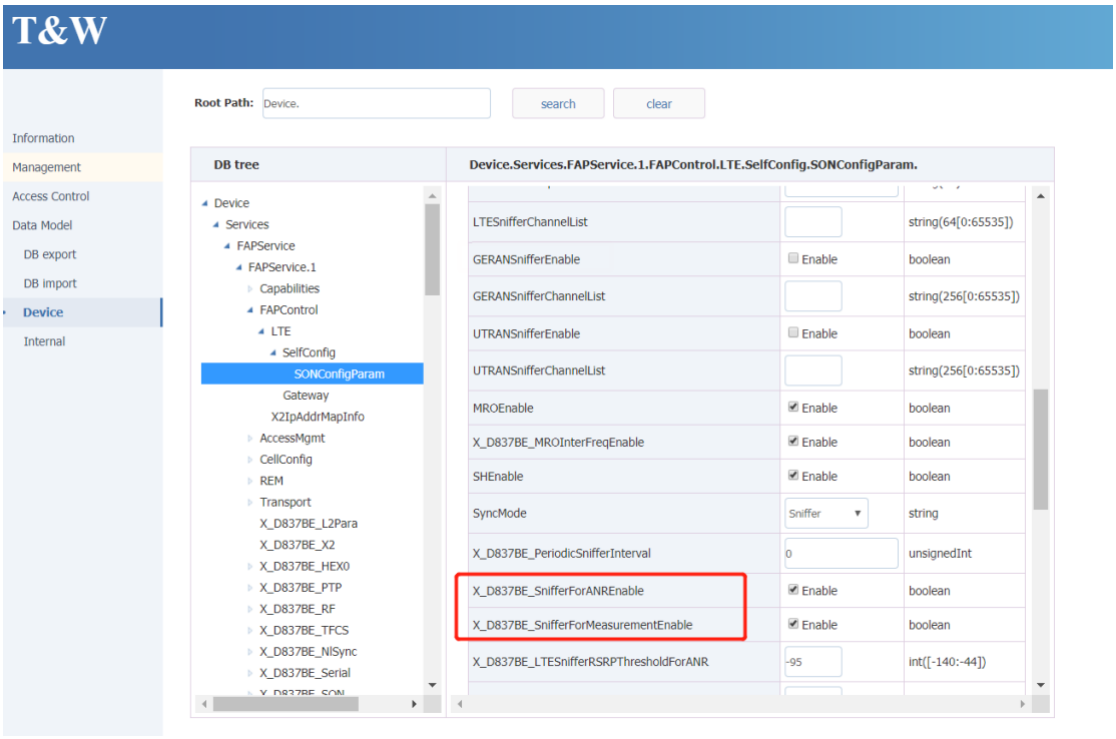

Figure 4-35 function switch of neighbor self discovery and frequency point self measurement based on air port listening

Parameter description is shown in table 4-13.

Parameter name	explain
SnifferForANREnable	Neighborhood self-discovery function switch based on air port interception. (default enable)
SnifferForMeasurementEnable	Frequency point self-measurement function switch based on air port interception. (default enable)

Table 4-13 parameter description

(1) Add LTE neighbor by air port listening

1) Sets the LTE band or frequency point .

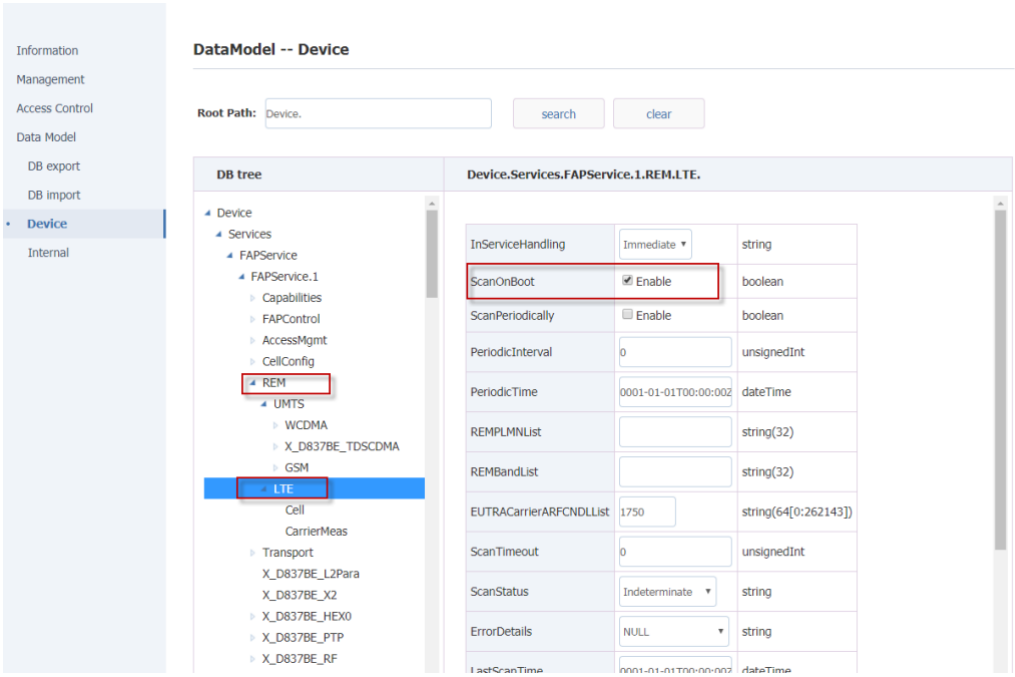

Figure 4-36 setting listen LTE enable switch

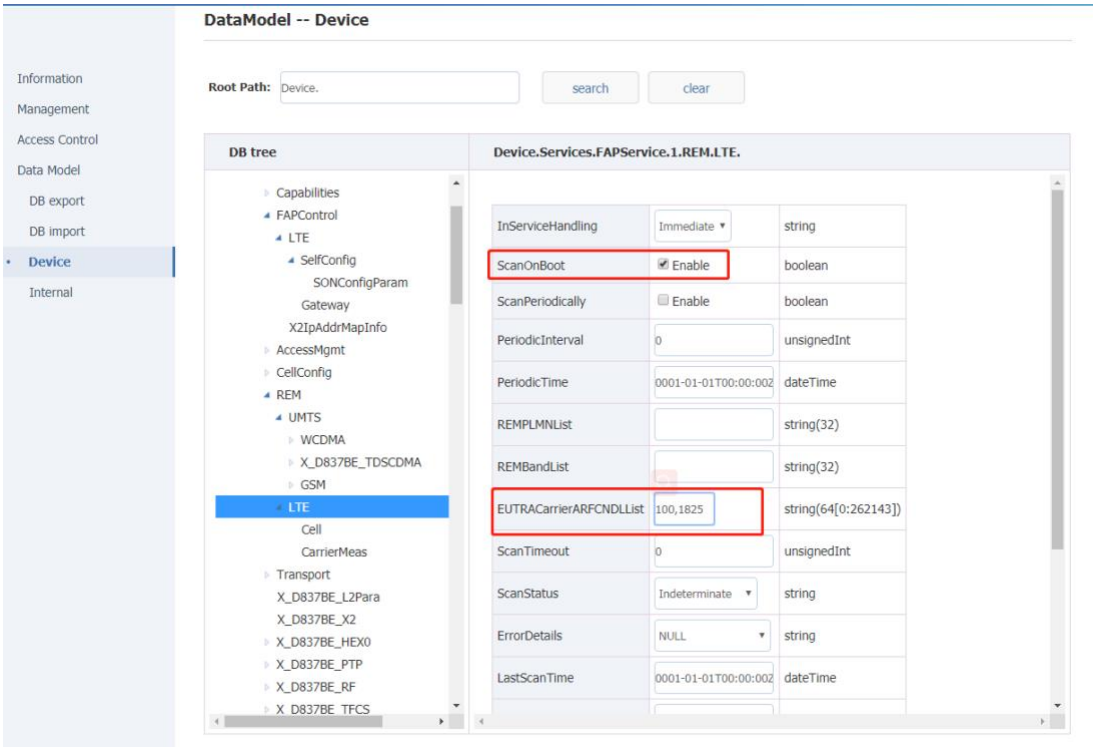

Figure 4-37 setting LTE frequency points for listening

Parameter name	explain
ScanOnBoot	function switch,
LTESnifferFreqBandList	Scanning frequency points, common frequency points include: 1850, 1825, 100

Parameter name	explain
LTESnifferChannelList	Frequency band scanned. Full band scanning will takes a long time so it need to be configured as required.

surface4-14 configuration description of LTE adjacent area scanning parameters

2) Check the scanning results of air port listening, as shown in figure 4-38.

Data model path:Device. Services. FAPService. 1. REM. LTE. Cell

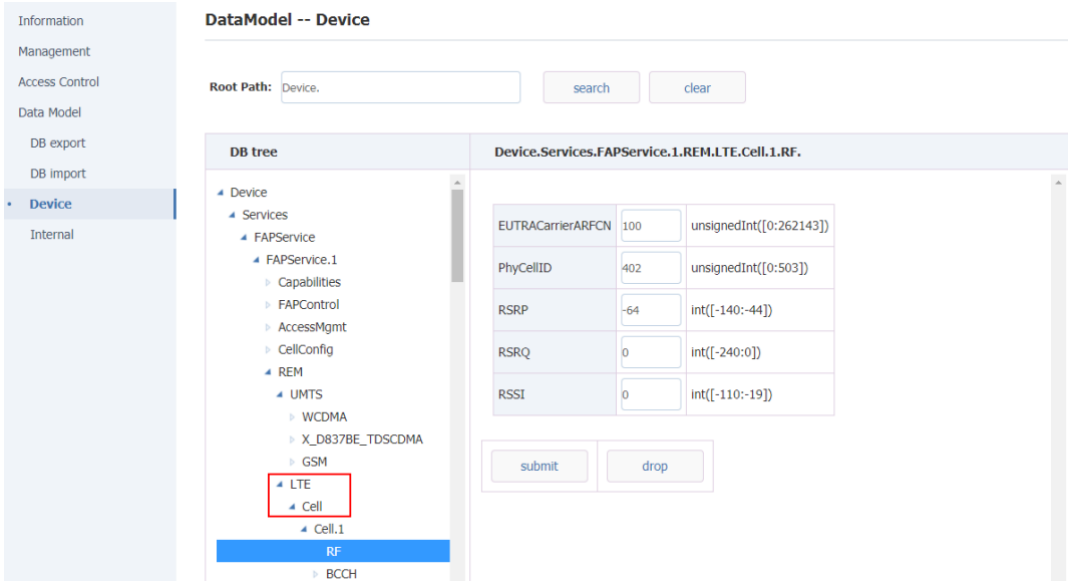

Figure 4-38 viewing the scanning results of air port listening

3) View the neighbor cells added by air port listening.

The neighbor cells discovered through the air port listening mode will be added to the neighbor relationship table of the base station.

Data model path:

Device.Services.FAPService.1.CellConfig.LTE.RAN.NeighborListInUse.

⚠ note:

Some of the scanned LTE cells are not added to the neighbor relationship table of the base station due to weak RSRP of the scanned LTE cells. You can add these cells to the neighbor relationship table by properly adjusting the threshold (LTESnifferRSRPThresholdForANR), see table 4-15.

Data model path:

Device.Services.FAPService.1.FAPControl.LTE.SelfConfig.SONConfigParam.LTESnifferRSRPThresholdForANR

Parameter name	Value range	explain
LTESnifferRSRPThresholdForANR	[-140:-44]	The RPSR threshold that LTE adjacent cell scanned can be used as neighbor

		cell . The default value is - 95, which can be adjusted according to the actual environment.

surface4-15Whether the LTE neighbor listening is the neighbor of the base station

(2) Add GSM neighbor cell by air port listening mode

1) Enable GSM air port listening function

2) Set parameters for GSM listening

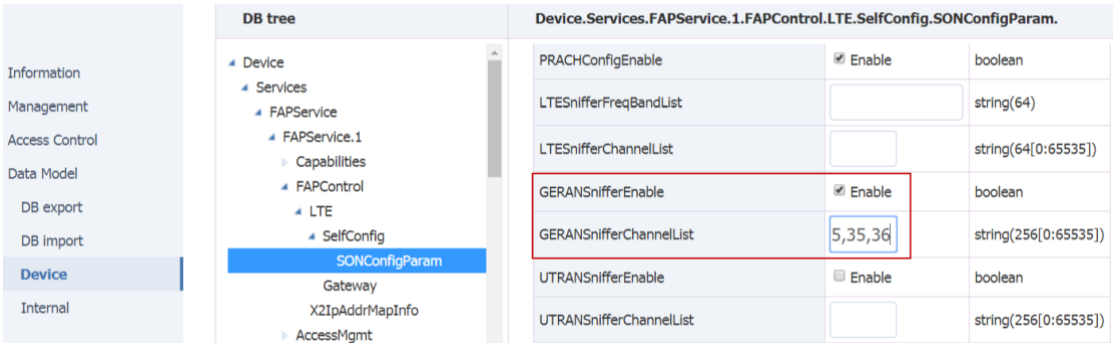

Figure 4-39 setting the GSM frequency point for listening

Parameter name	explain
Device.Services.FAPService.1.REM.UMTS.GSM. ScanOnBoot	GSM air port listening switch.0：disable；1：enabled
Device.Services.FAPService.1.REM.UMTS.GSM.REMPLMNList	Enter the operators PLMN, and the BTS will filter the scanned neighbor cell and only keep neighbor cell which PLMN belonging to the remplmnlist.
Device.Services.FAPService.1.REM.UMTS.GSM.REMBandList	Generally, the scanned GSM frequency band does not need to be scanned, so this item can be left blank.
Device.Services.FAPService.1.REM.UMTS.GSM. ARFCNList	GSM frequency point scanned.

Table 4 -16 configuration description of GSM adjacent area scanning parameters

3) Check the scan results of GSM cell, as shown in figure 4-40.

Data model path:Device.Services.FAPService.1.REM.UMTS.GSM.Cell.

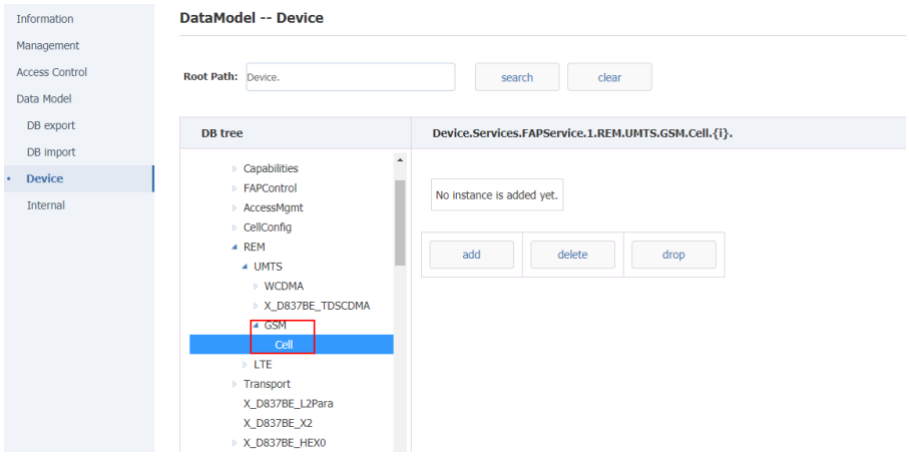

Figure 4-40gsm cell scan results

4) Add GSM neighbor through air port listening.

The neighbor discovered through the air port listening mode will be added to the neighbor list of the base station.

Data model path:
Device.Services.FAPService.1.CellConfig.LTE.RAN.NeighborListInUse.InterRATCell.GSM.

---

note:

Some scanned cells are not added to the GSM neighborhood table of the base station due to weak RSSI of the scanned cells. In this case, these cells can be added to the neighborhood table by properly adjusting the threshold value, as shown in table 4-17.

Data model path:

Device.Services.FAPService.1.FAPControl.LTE.SelfConfig.SONConfigParam.GERANSnifferRSSIThresholdForANR

Parameter name	Value range	explain
GERANSnifferRSSIThresholdForANR	[-110:48]	The RSSI threshold that GSM adjacent cell scanned can be used as neighbor cell . The default value is - 95, which can be adjusted according to the actual environment.

surface4-17 The threshold that BS add a scanned cell to the neighbor list

4.4.1.2Manually configure adjacent area

When you manually configure the neighbor cell, you need to configure the candidate neighbor cell list and enable the corresponding neighbor cell; the

enabled neighbor cell information will be added to the neighbor cell relationship table of the base station as an effective neighbor cell.

1. Manual configuration of neighborhood is achieved by setting the list of neighborhood.

   Data model path:

   Device.Services.FAPService.1.CellConfig.LTE.RAN.NeighborList.

2. The enabled neighbor in the neighbor list will be added to the neighbor relationship table of the base station.

   Data model path:
   Device.Services.FAPService.1.CellConfig.LTE.RAN.NeighborListInUse.

(1) Manually configure LTE neighborhood

1) Manually configure the neighbor list;

Data model path:
Device.Services.FAPService.1.CellConfig.LTE.RAN.NeighborList.

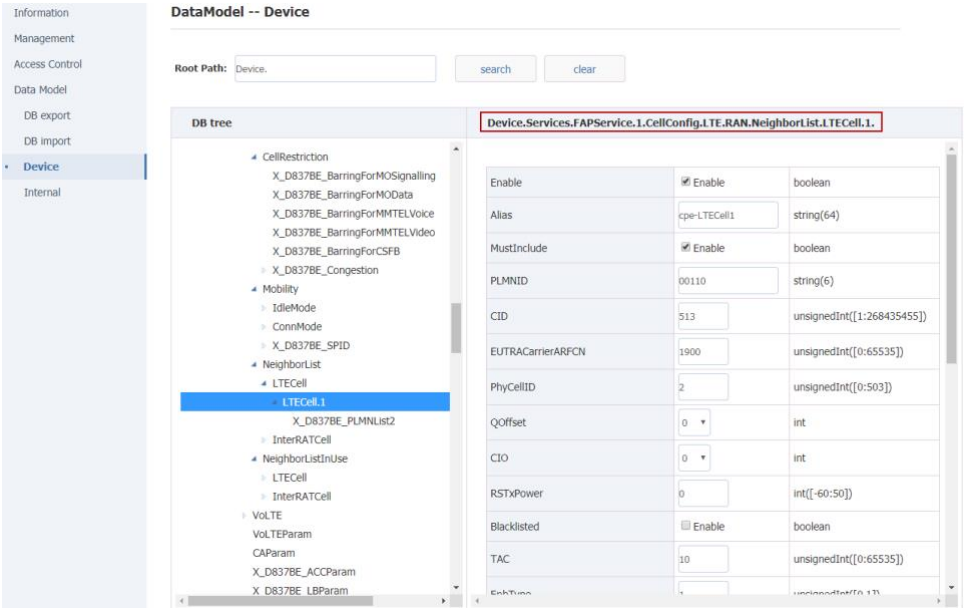

Figure 4-41 manually adding LTE neighborhood

2） After setting the LTE neighbor information, select "submit" to submit;

3) See table 4-18 for main parameters.

Parameter name	explain
The Enable	Adjacent enable switch 0: invalid neighborhood;1: effective neighborhood
Alias	Keep the default
MustInclude	Whether to include the neighbor table switch 0: not added to neighborhood relational table;1: is added to the neighborhood relationship table
PLMNID	Adjacent regions PLMN ID

Parameter name	explain
CID	Neighborhood community ID, • When the neighborhood type is Home, the length is 28 bits • When the neighborhood type is Marco, the length is 20 bits (that is, eNodeB ID)
EUTRACarrierARFCN	Neighborhood absolute frequency
PhyCellID	Adjacent regions PCI
QOffset	Neighborhood migration, Idle mode cell re - selection, the larger the easier to re - selection to this cell
The CIO	Neighborhood offset, connection mode cell switching, the larger the easier to switch to this cell
RSTxPower	Reference signal power of adjacent region
Blacklisted	Turns off by default. If enabled, this neighborhood will not be a switching target for UE
TAC	Adjacent regions TAC
EnbType	0: macro station, 1: small station
X_18396E_NoRemove	Disabled by default. If enabled, this neighborhood will not be automatically removed from the InUse list
X_18396E_NoX2	Default off. • If enabled, the base station will not establish an X2 connection with this neighborhood
X_18396E_NoX2HO	Default off. • If enabled, the base station will not be switched with the adjacent area via the X2 interface
X_18396E_AccessMode	Neighborhood Access mode, default is Open Access
X_18396E_CSGID	CSG ID of adjacent area, default does not need to be filled in
X_18396E_BlacklistedSIB	This is turned off by default, corresponding to BlackCellList in SIB4 or 5
X_18396E_AntennaPortsCount	Number of adjacent antenna ports
X_18396E_DLBandwidth	Adjacent downlink bandwidth
X_18396E_SubFrameAssignment	Neighborhood sub-frame ratio
X_18396E_SpecialSubframePatterns	Neighborhood special subframe mode

surface4-18 LTE adjacent area parameter configuration description

(2) Manual configuration of 3G adjacent area

1) Manual configuration of 3G neighbor list

Data model path:

Device.Services.FAPService.1.CellConfig.LTE.RAN.NeighborList.InterRATCell.UMTS.

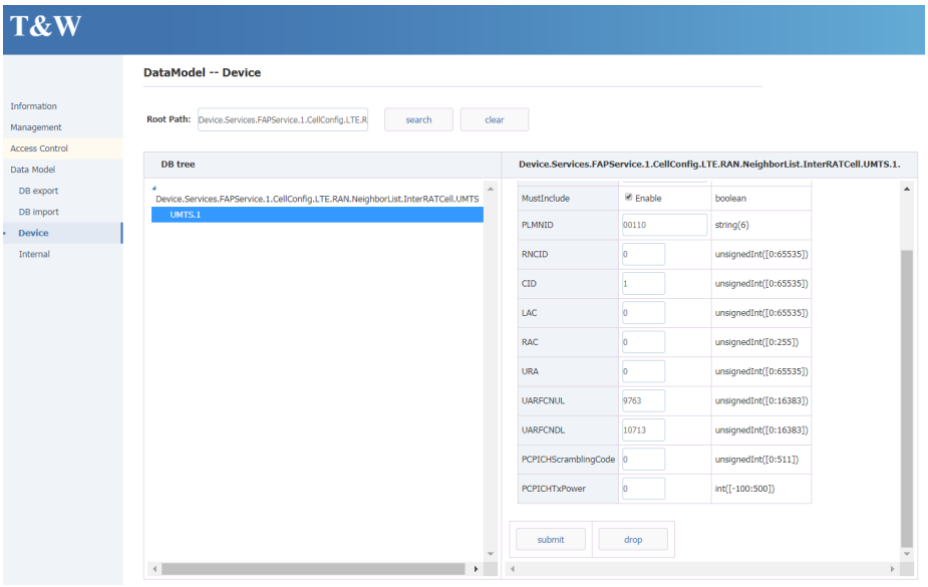

Figure 4-42 add 3G neighbor manually

2) Select "submit" to submit after setting 3G neighborhood information;

3) See table 4-19 below for the description of main parameters.

Parameter name	explain
Enable	Item enable switch, enable required
Alias	Keep default
MustInclude	Mandatory include switch, enable required
PLMNID	Adjacent PLMN ID
RNCID	Neighbor RNC ID
Parameter name	**explain**
CID	Neighborhood C-ID
LAC	Lac of adjacent area
RAC	Adjacent area RAC
URA	Neighborhood URA
UARFCNUL	Uplink frequency point
UARFCNDL	Downlink frequency point
PCPICHScramblingCode	Scrambling code
PCPICHTxPower	Pcpich transmit power, multiplied by 0.1 is the actual value, in dBm

surface4-19 UMTS adjacent area parameter configuration description

(3) Manually configure GSM neighborhood

1) Manual configuration of GSM neighbor list

Data model path:
Device.Services.FAPService.1.CellConfig.LTE.RAN.NeighborList.InterRATCell.GSM.

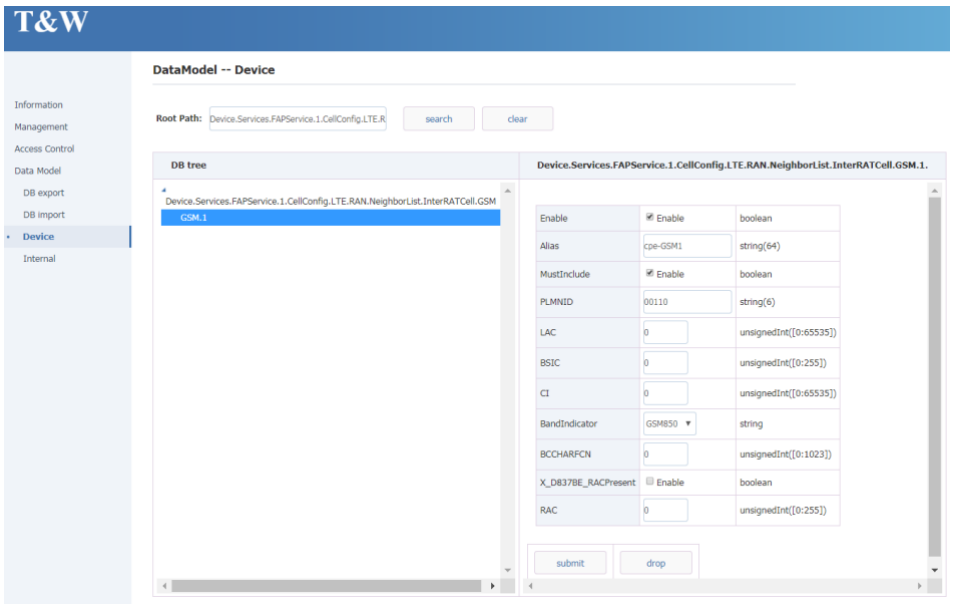

Figure 4-43 manual addition of GSM neighborhood

2) Select "submit" to submit after setting the adjacent area information of GSM;

3) See table 4-20 for main parameters.

Parameter name	explain
Enable	Item enable switch, enable required
Alias	Keep default
MustInclude	Mandatory include switch, enable required
PLMNID	Adjacent PLMN ID
LAC	Lac of adjacent area
BSIC	Bit 7:6 - not used ("00") Bit 5:3 - NCC (PLMN Color Code) Bit 2:0 - BCC (BS color code)
CI	Cell ID of adjacent area
BandIndicator	Adjacent band indication
Parameter name	explain
BCCHARFCN	Adjacent frequency point
RAC	Adjacent area RAC

surface4-20 GSM adjacent area parameter configuration description

4.4.2Configure mobility parameters

1. The base station handover decision mainly uses the following events:

   A1 event: indicates that the signal quality of the service community is higher than a certain threshold. When UE reports this event, the base station stops the measurement of different frequency/different system;

A2 event: indicates that the signal quality of the service community is below a certain threshold. When UE reports this event, the base station starts the measurement of different frequency/different system.

A3 event: indicates that the quality of the same frequency/different frequency neighborhood is higher than that of the service community. When UE reports this event, the base station initiates the same frequency/different frequency switching request.

B1 event: indicates that the quality of the neighboring area of the different system is higher than a certain threshold. When UE reports this event, the base station starts the eSRVCC switching request based on the uplinking service quality.

B2 event: it means that the quality of the service community is below a certain threshold and the quality of the neighboring area of the different system is above a certain threshold. When UE reports this event, the base station initiates the overcover-based eSRVCC switching request.

2. The data model configuration item corresponding to the above events is:

Device. Services. FAPService. 1. CellConfig. LTE. RAN. Mobility. ConnMode. EUTRA. A1MeasureCtrl

Device. Services. FAPService. 1. CellConfig. LTE. RAN. Mobility. ConnMode. EUTRA. A2MeasureCtrl

Device. Services. FAPService. 1. CellConfig. LTE. RAN. Mobility. ConnMode. EUTRA. A3MeasureCtrl

Device. Services. FAPService. 1. CellConfig. LTE. RAN. Mobility. ConnMode. IRAT. B1MeasureCtrl

Device. Services. FAPService. 1. CellConfig. LTE. RAN. Mobility. ConnMode. IRAT. B2MeasureCtrl

Date model path:

Device.Services.FAPService.1.CellConfig.LTE.RAN.Mobility.ConnMode.EUTRA.A1MeasureCtrl
Device.Services.FAPService.1.CellConfig.LTE.RAN.Mobility.ConnMode.EUTRA.A2MeasureCtrl
Device.Services.FAPService.1.CellConfig.LTE.RAN.Mobility.ConnMode.EUTRA.A3MeasureCtrl
Device.Services.FAPService.1.CellConfig.LTE.RAN.Mobility.ConnMode.IRAT.B1MeasureCtrl
Device.Services.FAPService.1.CellConfig.LTE.RAN.Mobility.ConnMode.IRAT.B2MeasureCtrl

4.4.2.1 Start inter frequency / inter system measurement

1. The measurement of the different frequency / different system is triggered by the A2 event, as shown in figure 4-44. There are 11 groups of A2 events in total, which need to be focused on 1 to 7, which are respectively used in different scenarios:

   A2measurerctr1: different frequency measurement
   A2measurecrl. 2: 3G measurement (LTE data service exists)
   A2measurecrl.3: 2G measurement (LTE data service exists)
   A2measurecrl. 4: 3G blind handover

A2measurecrl.5: 2G blind handover

A2measurecrl. 6: 3G measurement (LTE voice service exists)

A2measurecrl.7: 2G measurement (LTE voice service exists)

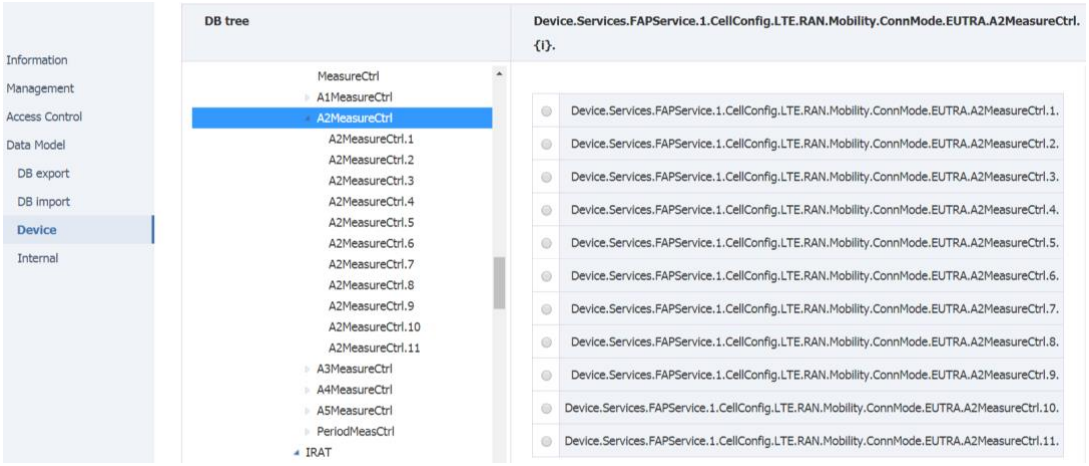

Figure 4-44 A2 event

2. Regarding the parameter configuration of A2 event, take the common inter frequency measurement scenario as an example.

A2 event will be triggered when UE's measurement results of primary plot are less than a2thresholdrsrp-hysteresis (both are actual converted values, as shown in figure 4-45, 45-140-2*0.5=-96 dBm) and are maintained longer than TimeToTrigger, and report continuously with ReportInterval.**Error! Reference source not found.**See table 311 for parameter description.

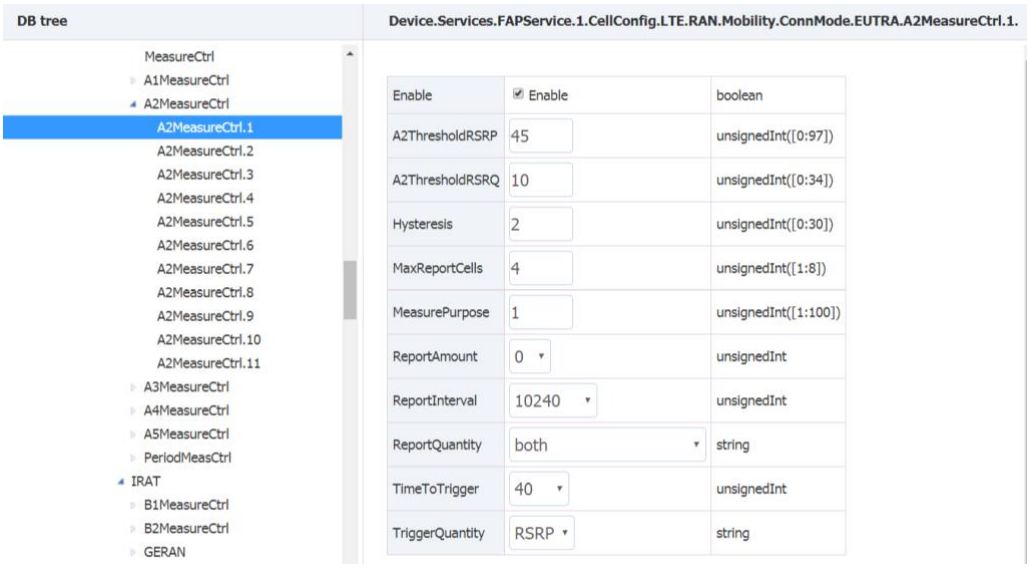

Figure 4-45 A2 event parameters

Parameter name	explain
The Enable	

A2ThresholdRSRP	A2 RSRP trigger threshold, after subtracting 140, is the actual value (in dBm)
A2ThresholdRSRQ	
Hysteresis	Trigger hysteresis, multiplied by 0.5, is the actual value (in unit dB)
MaxReportCells	
MeasurePurpose	
ReportAmount	Number of reports, 0 is infinite
ReportInterval	Report interval, unit ms
ReportQuantity	Report the amount
Parameter name	explain
TimeToTrigger	Trigger time , unit ms
TriggerQuantity	Trigger quantity, rsrp by default

surface4-21 A2 event configuration description

4.4.2.2Stop the measurement of inter frequency / intra system

1. The BTS stops the measurement of inter frequency / inter system by triggering A1 event, as shown in Figure 4-46. There are 11 groups of A1 events in total, which need to be focused on 1 to 5, respectively for different scenarios:

   A1measurecrl. 1: inter frequency measurement

   A1measurecrl. 2: 3G measurement (LTE data service exists)

   A1measurecrl.3: 2G measurement (LTE data service exists)

   A1measurecrl.4: 3G measurement (with LTE voice service)

   A1measurecrl.5: 2G measurement (LTE voice service exists)

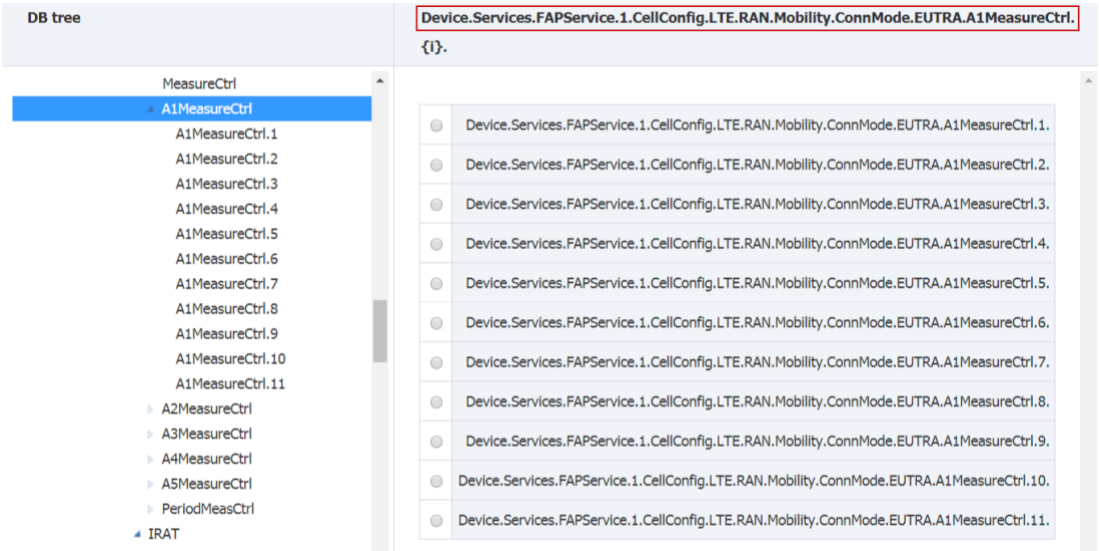

Figure 4-46 event A1

2. For the parameter configuration of A1 event, take the commonly used scene of inter frequency measurement as an example.

When the measurement result of UE to the server cell is greater than A1 thresholdrsrp + hysteresis (both are converted actual values, take figure 4-47 as an example, 55-140 + 2 * 0.5 = - 84 DBM), and the maintain time is greater than timetotrigger, A1 event will be triggered, and the A1 report will be continuously reported at the interval of reportinterval. See table 4-22 for parameter description.

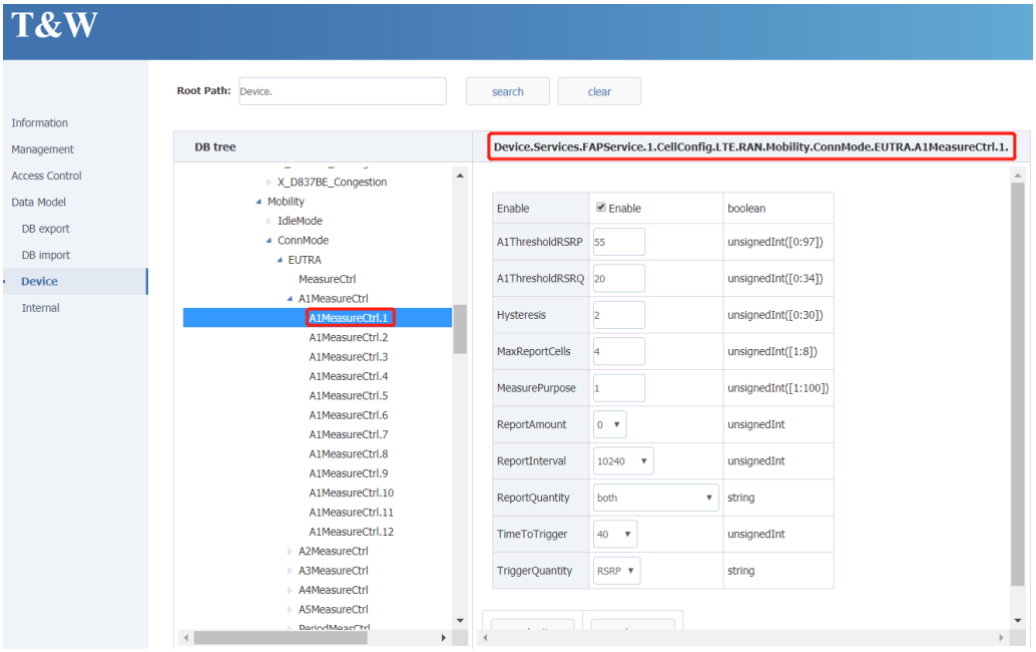

Figure 4-47 A1 event parameters

Parameter name	explain
The Enable	
A1ThresholdRSRP	A1 RSRP trigger threshold, which is the actual value (in dBm) after subtraction of 140
A1ThresholdRSRQ	
Hysteresis	Trigger hysteresis, multiplied by 0.5, is the actual value (in unit dB)
MaxReportCells	
MeasurePurpose	
ReportAmount	Number of reports, 0 is infinite
ReportInterval	Report interval, in ms
ReportQuantity	Report the amount
TimeToTrigger	Trigger time in ms
TriggerQuantity	Trigger, default to RSRP

表 4-22 A1 事件配置说明

⚠note:

Note: a2thresholdrsrp-hysteresis should be lower than a1thresholdrsrp-hysteresis, otherwise UE will repeatedly report A1, A2 events.。

4.4.2.3LTE intra/inter frequency handover

1. LTE same-frequency/different-frequency switching is triggered by A3 events. As shown in figure 4-48, there are two groups of configurations of A3 events, which are used in different scenarios：

   A3MeasureCtrl.1: measurement of same frequency

   A3MeasureCtrl.2: measurement of different frequencies

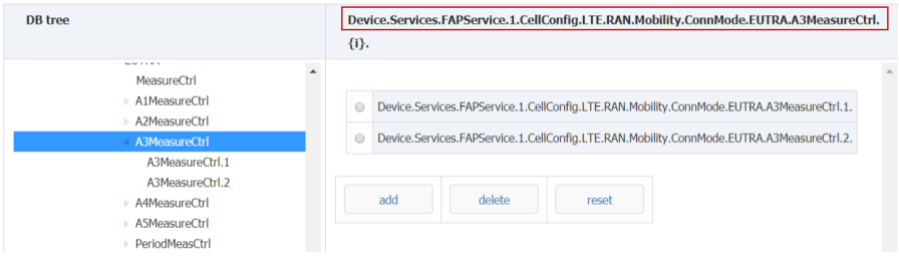

Figure 4-48 A3 event

2. The trigger condition of A3 is: where Mn and Mp are the measurement results of UE on adjacent area and main area respectively, Ofn and Ofp are frequency offset of adjacent area and main area respectively (default is 0), Ocn and Ocp are offset of adjacent area and main area respectively (default is 0), Off is A3Offset, Hys is Hysteresis. $Mn + Ofn + Ocn - Hys > Mp + Ofp + Ocp + Off$ Therefore, when the measurement results of UE on the adjacent area are larger than A3Offset + Hysteresis when compared with the main plot (both are actual values after conversion, as shown in FIG. 4-43, 4*0.5+2*0.5=3dB) and the maintenance time is longer than TimeToTrigger, A3 events will be triggered and report continuously with ReportInterval as interval.**Error! Reference source not found.**See table 313 for parameter description.

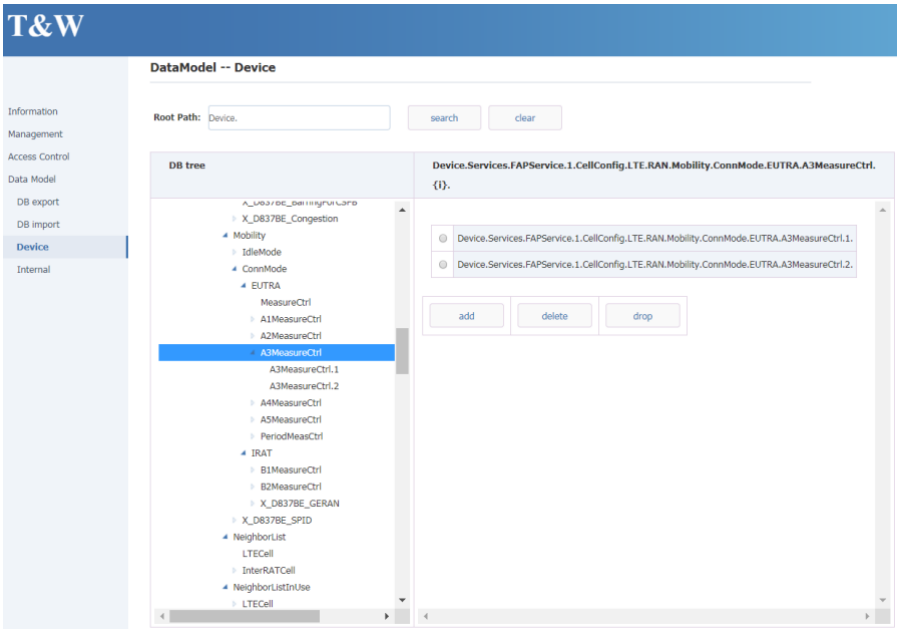

Figure 4-49 A3 event parameters

参数名称	说明
The Enable	
A3Offset	A3 offset, multiplied by 0.5, is the actual value (in dB).
Hysteresis	Trigger hysteresis, multiplied by 0.5, is the actual value (in unit dB)
MaxReportCells	
MeasurePurpose	
ReportAmount	Number of reports, 0 is infinite
ReportOnLeave	
ReportInterval	Report interval, in ms
ReportQuantity	Report the amount
TimeToTrigger	Trigger time in ms

table4-23 A3 event

4.2.3 SONRelated configuration

The son function parameters are located in the following nodes: Device.Services.FAPService.1.FAPControl.LTE.SelfConfig.SONConfigParam.

Please refer to table 4-24 for parameter descriptions.

Parameter name	Value range	explain
SONSysMode	Distributed Centralized	Son system mode
SONWorkMode	Free Control	Son mode setting
PCIOptEnable	-	PCI self optimization algorithm switch
PCIReconfigWaitTime	-	PCI reset wait timer
CandidateARFCNList	64[0:262143]	List of candidate frequency points
CandidatePCIList	64[0:503]	Candidate PCI list
ANREnable	-	Anr algorithm main switch
ANRInterFeqEnable	-	E-utran different frequency ANR algorithm switch
ANRGERANEnable	-	Geran different system ANR algorithm switch
ANRUTRANEnable	-	UTRAN differentsystem ANR algorithm switch
ARFCNEnable	-	Frequency point self configuration algorithm switch
MaxLTENeighbourCellNum	-	Maximum number of LTE neighbors
MaxUTRANNeighbourCellNum	-	Maximum number of UTRAN neighbors
MaxGRANNeighbourCellNum	-	Maximum number of Gen neighbors
ReSynCellEnable	-	Resynchronize cell enable switch
PowerEnable	-	Power self configuration algorithm switch
RootSeqConfigEnable	-	Root sequence self configuration switch
PRACHConfigEnable	-	PRACH index self configuration switch
LTESnifferFreqBandList	64	LTE listening band list
LTESnifferChannelList	64	LTE listening frequency list
GERANSnifferEnable	-	GERAN listen enable
GERANSnifferChannelList	256	GERAN listen channel number list
UTRANSnifferEnable	-	UTRAN listening enable
UTRANSnifferChannelList	256	UTRAN listening channel number list
MROEnable	-	Neighborhood robust optimization function switch
SHEnable	-	Self healing function switch
SyncMode	GNSS IEEE1588V2 Sniffer Freedom	Clock synchronization mode, this parameter is read-only permission
PeriodicSnifferInterval	-	Cycle listening interval, 0 means cycle listening is off

SnifferForANREnable	-	Neighborhood self-discovery function switch based on air port interception. (default enable)
SnifferForMeasurementEnable	-	Frequency point self-measurement function switch based on air port interception. (default enable)
LTESnifferRSRPThresholdForANR	[-140:-44]	The RPSR threshold that LTE adjacent cell scanned can be used as neighbor cell . The default value is -95, which can be adjusted according to the actual environment.
LTESnifferRSRPThresholdForMeasurement	[-140:-44]	The LTE neighbor scanned can be used as the rsrp threshold of the measurement object
UTRANSnifferRSCPThresholdForANR	[-120:-25]	The scanned UTRAN neighborhood can be used as the RSCP threshold of the base station neighborhood
UTRANSnifferRSCPThresholdForMeasurement	[-120:-25]	The scanned UTRAN neighborhood can be used as the RSCP threshold of the base station measurement object
GERANSnifferRSSIThresholdForANR	[-110:48]	The scanned adjacent area of the gen can be used as the RSSI threshold of the adjacent area of the base station
GERANSnifferRSSIThresholdForMeasurement	[-110:48]	The scanned adjacent area of the gen can be used as the RSSI threshold of the base station measurement object
MLBEnable	-	Mobile load balancing switch
MLBTimerLength	-	Mobile load balancing timer duration
MLBThreshold	[0:100]	Mobility load balancing threshold, in%
MLBUEProtectTimerLength	-	Mobile load balancing UE protection timer duration
MLBUEHysteresisOffset	[0:30]	Mobility load balancing UE hysteresis offset

ReduceRspTimerLength	[1:255]	When a cell is deleted, the timer duration of the cell reference signal power is reduced.The purpose is to reduce the power of cell reference signal and let UE switch out. This function is not used at present
ReduceRspTimes	[0:255]	Number of times to reduce cell reference power, 0 means disabled
ReduceRspStep	[1:255]	Step to reduce cell reference power, DB

surface4-24 son parameter configuration description

note:

In general, these parameters do not need to be changed. Please keep the default value except for the parameters related to neighbor listening.

4.5Configure system parameters

4.5.1Software version upgrade

Select "management" upgrade in the navigation bar to enter the version upgrade page, as shown in figure 4-50.

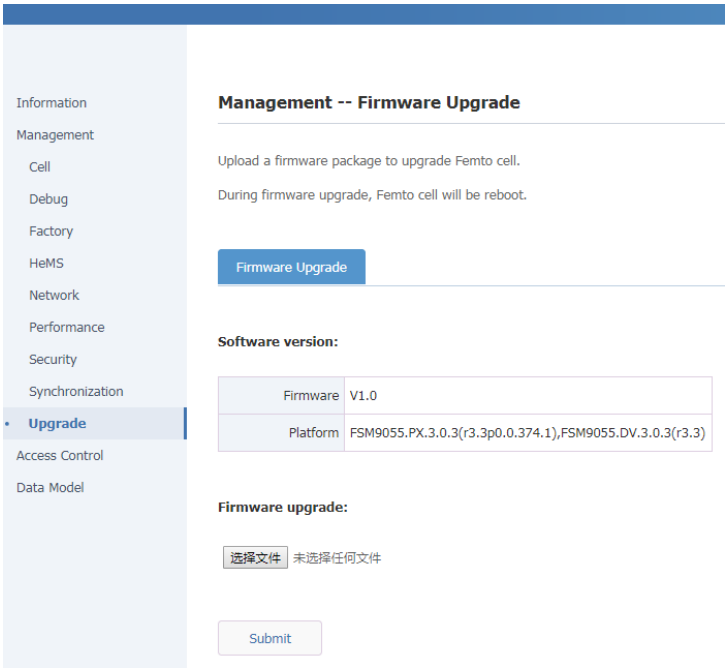

chart4–50Version upgrade

Software upgrade steps:

1. Click Select file, select upgrade file and upload to base station.
2. Click submit to upgrade.

3. The base station is restarted and upgraded, waiting for about 3-5min.After the upgrade is successful, the page will prompt accordingly.

4. The upgraded version can be confirmed through the "information" page.

4.5.2System file backup

4.5.2.1Import / export profile

1. Select "data model" in the navigation bar to enter the DB import / export page, as shown in figure 4-51

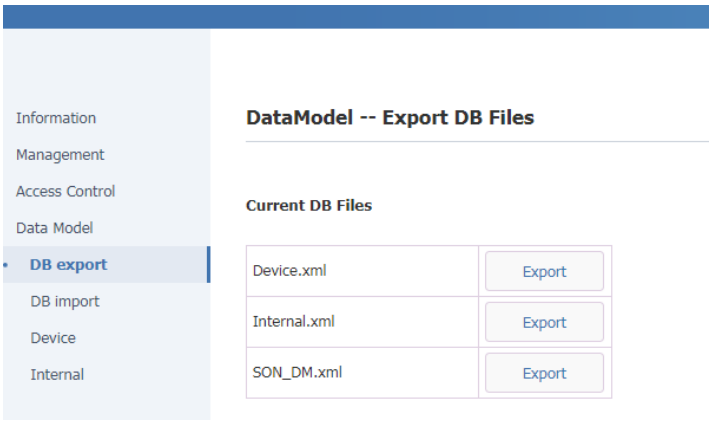

Figure 4-51 profile export and import

2. Export / import is used to export and import configuration files.

4.5.2.2Export log file

1. Select "management debug" in the navigation bar to enter the log operation interface, as shown in figure 4-52.

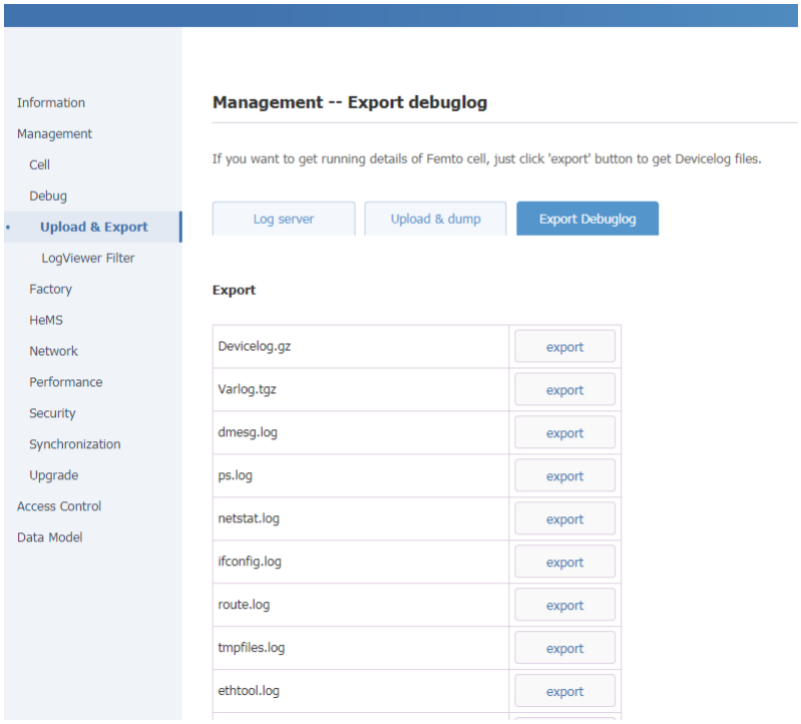

Figure 4-52 export log file

2. Select the log you want to export, and click export.
3. Select the save path in the pop-up download dialog box to save the log file locally.

4.6Restart base station

1. In the navigation bar, select "management->factory".
2. Click "reboot" to restart the base station.
3. It usually takes 3-5 minutes for the base station to restart.

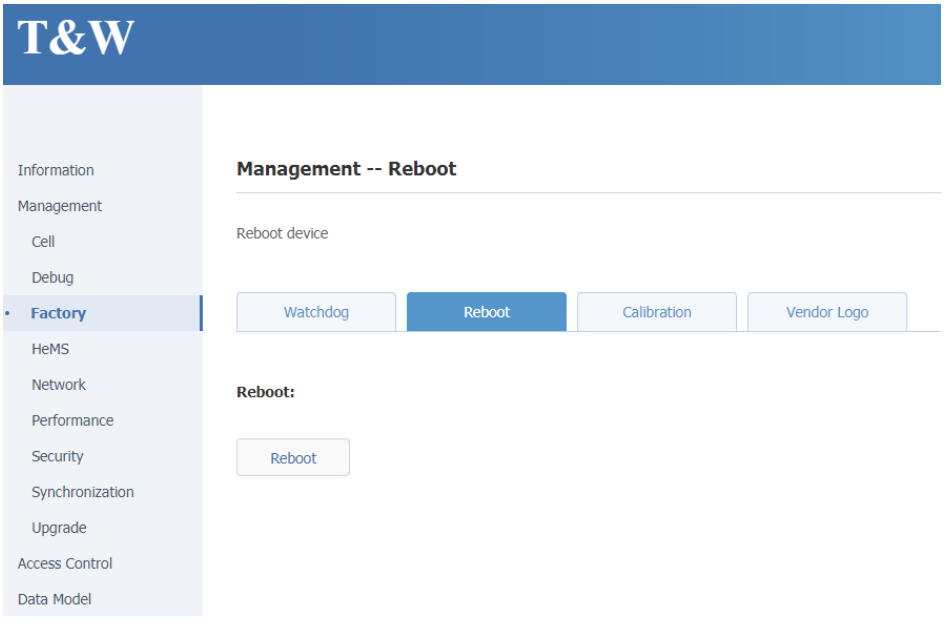

Figure 4-53 device restart