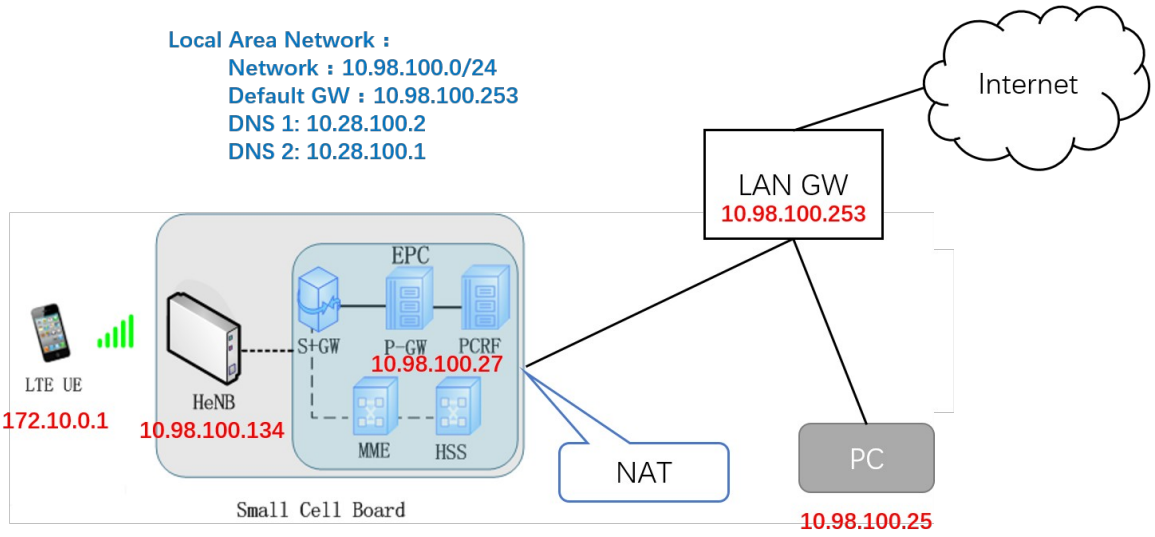
# Intercell Build-in EPC

# User Guide

# 1 Network topology

## 1.1 Description

This doc is based on below network architecture.




P-1 Network architecture

This topology shows typical Smallcell network architecture. HeNB works as LTE base station, provides LTE service to UE and the EPC is working on the same HeNB using seperate IP address.

- Small Cell IP address 10.98.100.134, login WebGUI via this IP address.
- Build-in EPC IP address 10.98.100.27

  Note:

  - ✓ This IP address should be in the same LAN as HeNB
  - ✓ This IP address is static, and can not conflict with others
- Build-in EPC works as P-GW, it will forward packets to local area network and Internet.

## 1.2 Configuration data

### EPC parameters：

| Parameters | Value |
|---|---|
| Build-in EPC IP | 10.98.100.27 |
| MME port | 36412(dafault) |
| PLMN | 00666 |

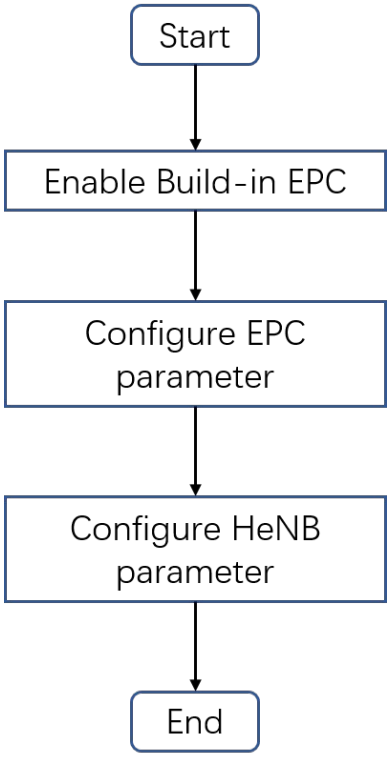
**HeNB parameters：**

| Parameters | Value |
|---|---|
| IP | 10.98.100.134 |
| TAC | 10 |
| eNodeB ID | 257/258 |

**UE：**

| Parameters | Value |
|---|---|
| IMSI | 006660000000001 |
| Encryption Algorithm | Milenage |
| USIM Key | 01020304050607080102030405060708 |
| Op Value | 01020304050607080102030405060708 |
| IP | 172.10.0.1 |

## 1.3 Configuration flow

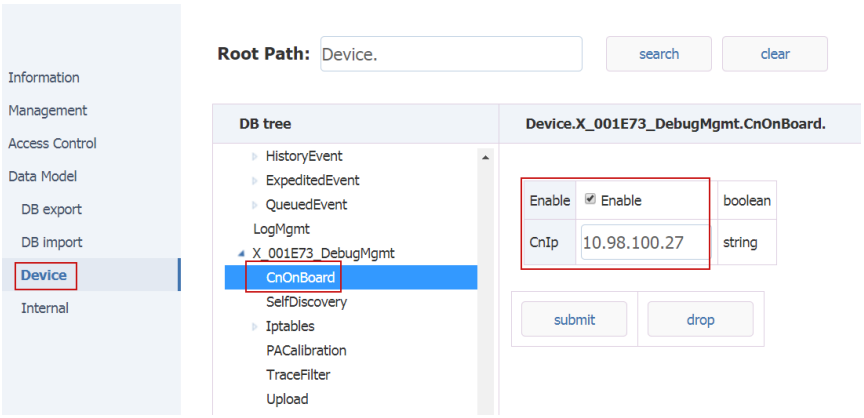



P-2 Configuration Flow

### 1.3.1 Enable Build-in EPC

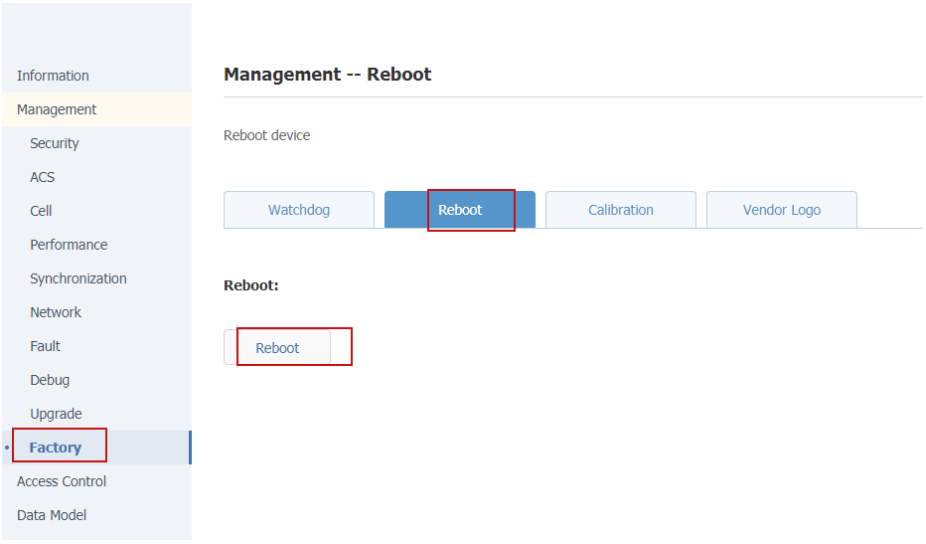
Path：Device.X_OUI_DebugMgmt.CnOnBoard.

1. Configure “CnIp”, for instance 10.98.100.27
2. Select“Enable
3. Press“Submit”




P-3 Configuration and Enable Build-in EPC

4. Reboot HeNB manually

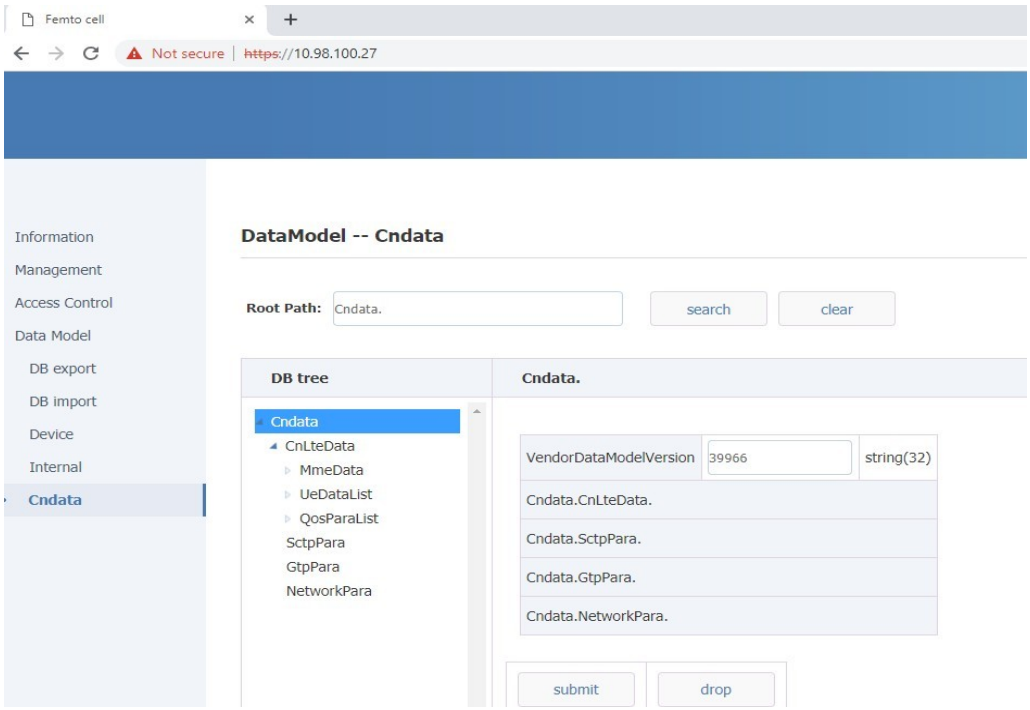



P-4 Reboot manually

## 1.3.2 Configure Build-in EPC parameters

### 1.3.2.1 Login Build-in EPC WebGUI

- Access URL：https://10.98.100.27/
- User name：admin
- Pass word：MikroTik

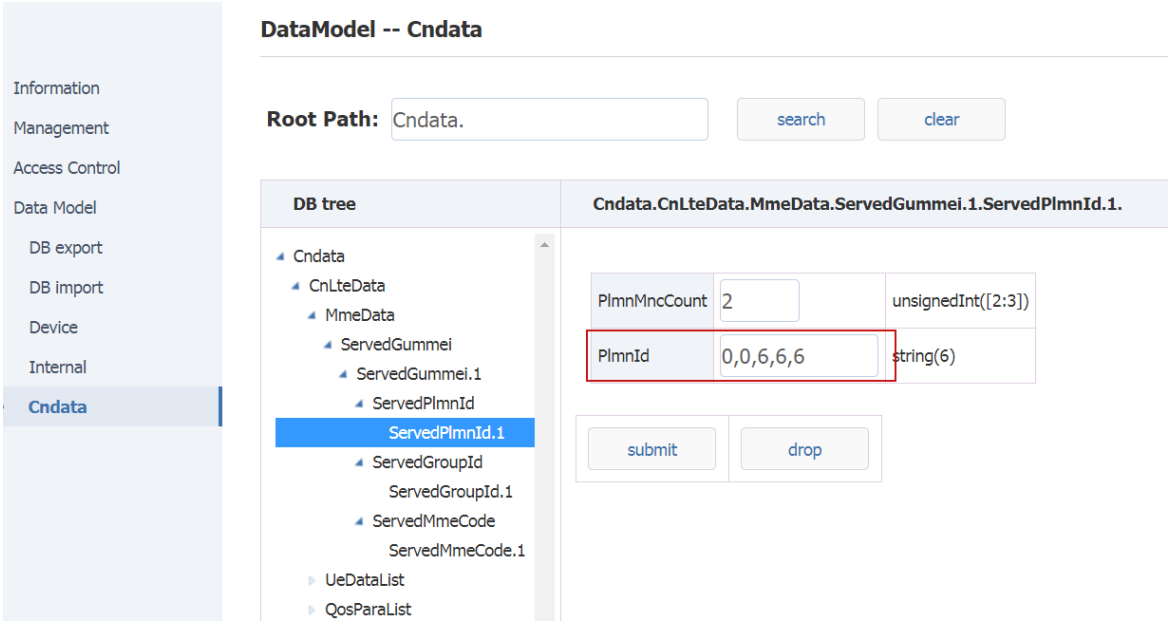



P-5 Login Build-in EPC WebGUI

### 1.3.2.2 Configure Build-in EPC PLMN ID

Path：Cndata.CnLteData.MmeData.ServedGummei.1.ServedPlmnId.1.

- PlmnId：0,0,6,6,6



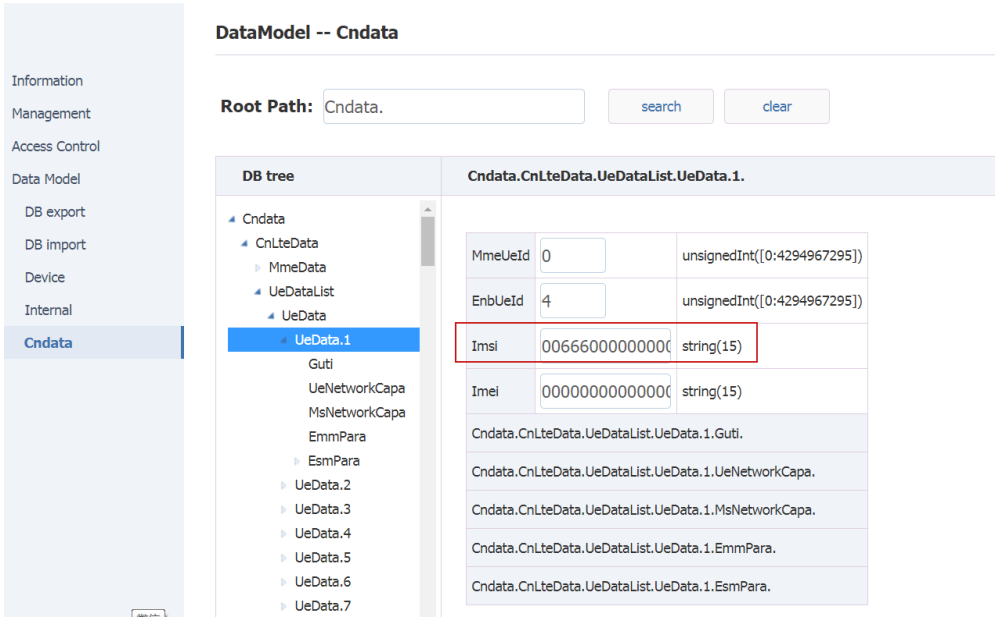

P-6 Configure Build-in EPC PLMN ID

### 1.3.2.3 Configure Build-in EPC UE parameters

1. Configure UE IMSI in Build-in EPC

Path：Cndata.CnLteData.UeDataList.UeData.{i}.

- Imsi: 006660000000001

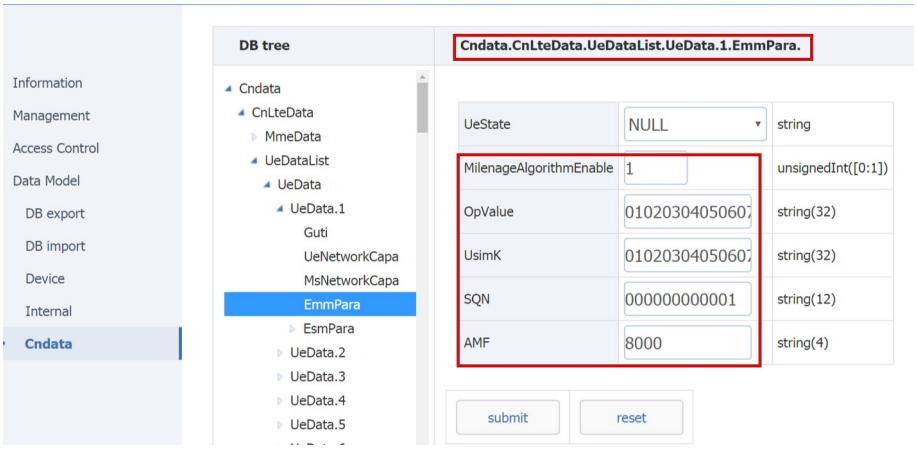



P-7 Configure Build-in EPC UE parameters

2. Configure Build-in EPC EMM parameters

Path：Cndata.CnLteData.UeDataList.UeData.{i}.EmmPara.

- MilenageAlgorithmEnable: Configure as “1” to enable MILENAGE Algorithm
- OpValue: Configure as “0102030405060708010203040506070 8”
- UsimK: Configure as “01020304050607080102030405060708”
- SQN: Configure as “000000000001”
- AMF: Configure as “8000”




P-7 Configure Build-in EPC EMM parameter

3. Configure Build-in EPC ESM parameters

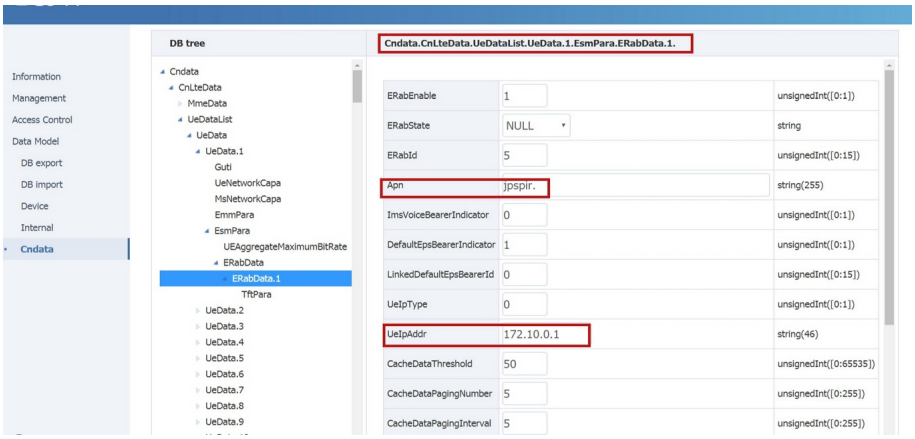
Path：Cndata.CnLteData.UeDataList.UeData.{i}.EsmPara.ERabData.1.

- Apn: jpspir.

  Note:The APN name in UE should be configured the same as this value

- UeIpAddr: 172.10.0.1

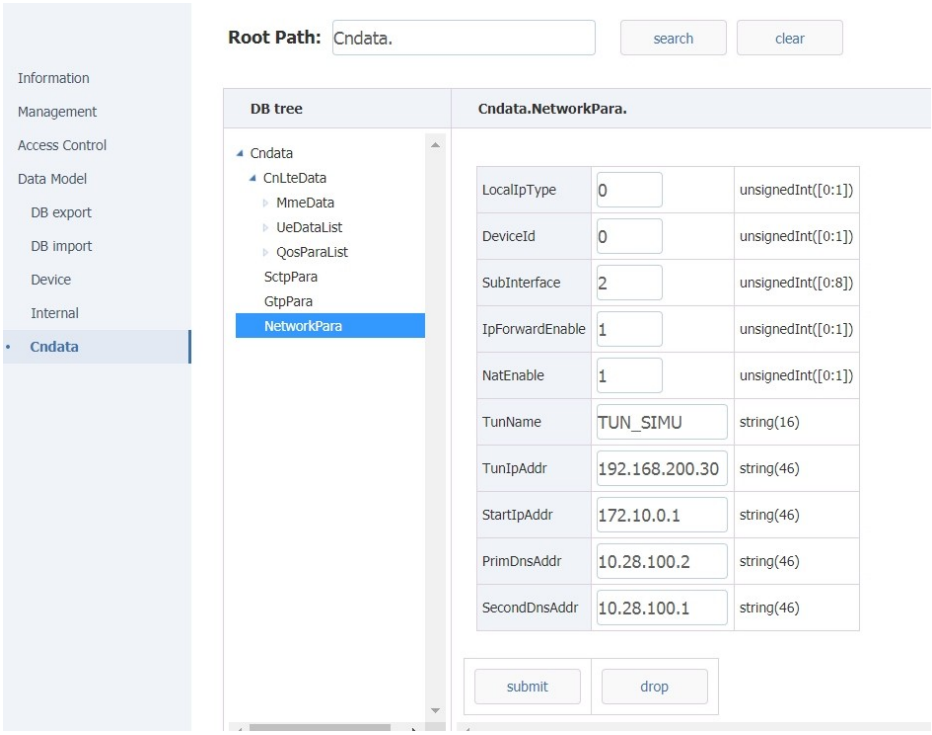
  Note:This is the IP address which will be assigned to UE




P-8 Configure Build-in EPC ESM parameter

#### 1.3.2.4 Configure Build-in EPC network parameters

1. StartIpAddr:
   - ✓ This should be the same as the IP address of the 1st UE
   - ✓ This IP address is for the Build-in EPC to add route to UE in kernel
2. "PrimDnsAddr" and"SecondDnsAddr":
   - ✓ Configure as the DNS servers of local area network, for instance 10.28.100.2 and 10.28.100.1
3. IpForwardEnable
   - ✓ This should be configured as "1" by default, otherwise the Build-in EPC can not forward packets
4. NatEnable
   - ✓ This is switch of NAT function, it is enabled by default




P-9 Configure Build-in EPC Network parameter

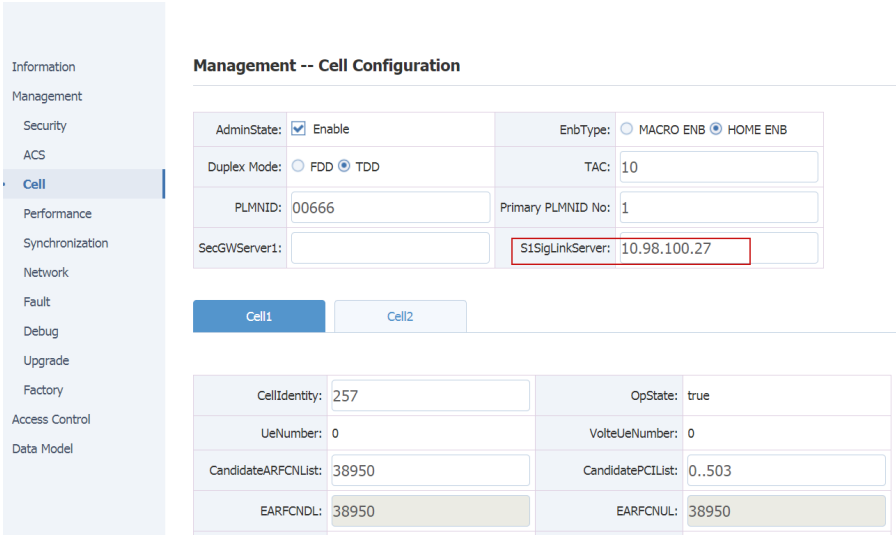
#### 1.3.2.5 Reboot

Reboot manually to take above configuration into effect.

### 1.3.3 Configure Small Cell parameters

#### 1.3.3.1 Configure EPC address in Small Cell

Login Small Cell WebGUI, configure "S1SigLinkServer" as the IP address of Build-in EPC.




P-10 Configure EPC Address in Small Cell

### 1.3.3.2 Configure radio parameters

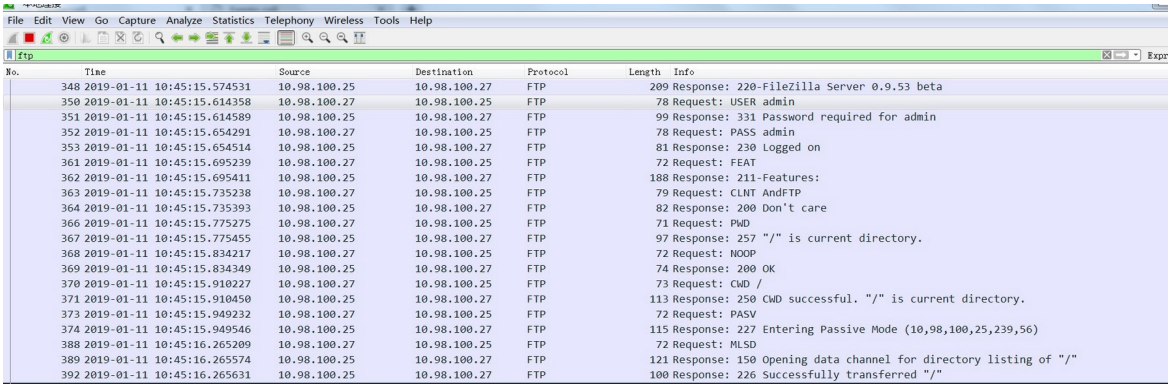
On configuration of radio parameters, please refer Quick Configuration Guide.

## 1.4 Network connectivity verification

### 1.4.1 UE/CPE access local area network

UE/CPE access local area network, for instance 10.98.100.25.

Build-in EPC will forward packets with NAT, the source IP address will be transferred to 10.98.100.27, which is the address of build-in EPC.




P-11 UE access local area network

### 1.4.2 UE/CPE acccess Internet

UE/CPE access Internet, for instance “www.google.com”. Build-in EPC forward packets to the defaut GW of local area network.

### 1.4.2.1 Check route list of Small Cell board

To make sure that UE/CPE packets can be forwarded to default GW of local area network, the small cell should have a default route whose Gateway is the the default GW of local area network.

```
# route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         10.98.100.253   0.0.0.0         UG    0      0        0 eth0
10.98.100.0     0.0.0.0         255.255.255.0   U     0      0        0 eth0
127.0.0.0       0.0.0.0         255.0.0.0       U     0      0        0 lo
172.10.0.0      192.168.200.30  255.255.0.0     UG    0      0        0 TUN_SIMU
192.168.200.0   0.0.0.0         255.255.255.0   U     0      0        0 eth0
#
```

P-12 Check default route

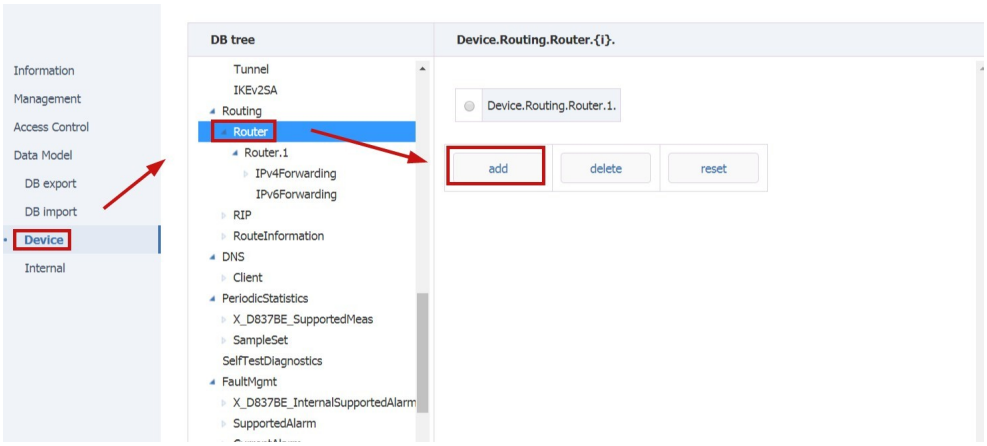
1. DHCP method

   If small cell get its IP address by DHC, the default route is configured by DHCP server automatically.

2. Static method

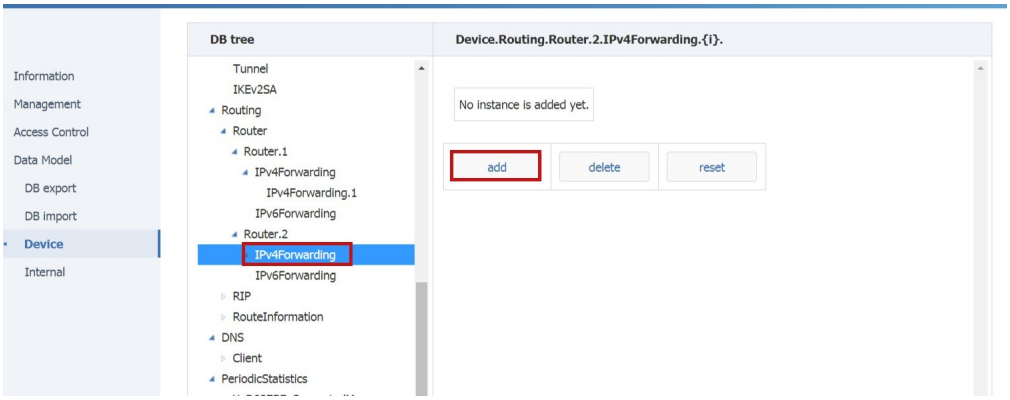
   If IP address of small cell is static, need to configure default route manually.

   1) Adding one route instance




P-13 Adding one route instance

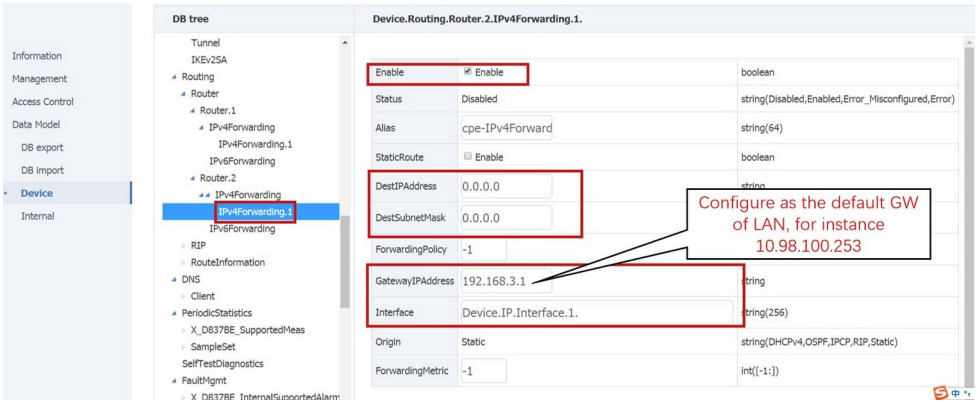
   2) Adding IPv4 forwarding instace in the newly added route instance




P-14 Adding one IPv4 forwarding instance

3) Configure default GW

- Enable: Select to enable
- DestIPAddress: Destination network address, for default route, this should be “0.0.0.0”
- DestSubnetMask: Destination network mask, for default route, this should be “0.0.0.0”
- GatewayIPAddress: IP address of default GW, for instance 10.98.100.253
- Interface: Index of WAN interface, configure as “Device.IP.Interface.1.”




P-15 Configure default GW

## 1.4.3 LAN PC access UE/CPE

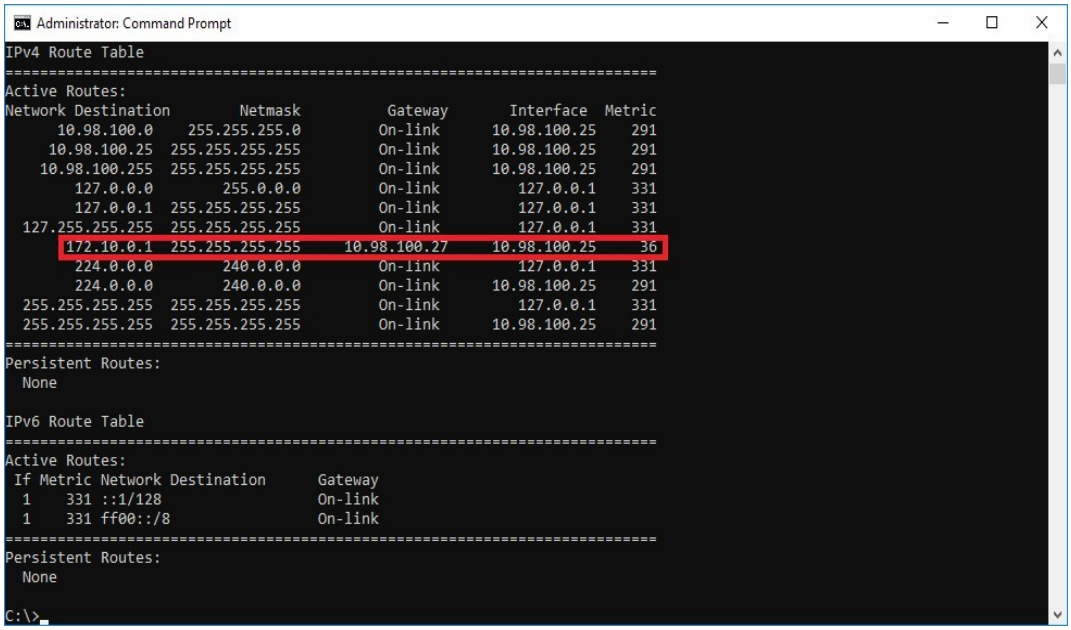
### 1.4.3.1 Adding route to UE/CPE

UE/CPE is behind a NAT network, the LAN PC should add route to access UE.

```
C:\>route add 172.10.0.1 mask 255.255.255.255 10.98.100.27
 OK!

C:\>_
```

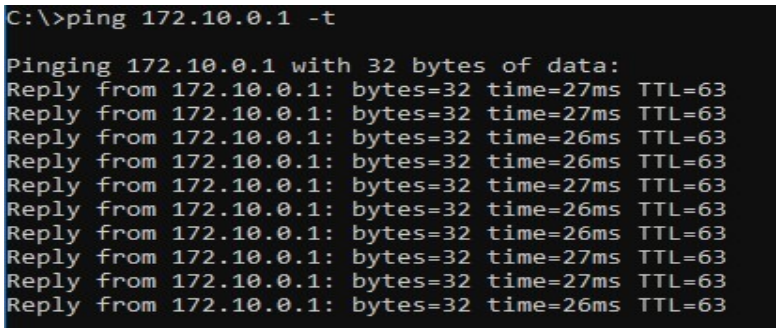
P-16 Adding route to UE




P-16 Check route to UE

### 1.4.3.2 **Check connectivity**

Ping UE/CPE from LAN PC.




P-17 Ping UE/CPE from LAN PC.