Comba Distributed gNB User Manual

Proprietary & Confidential
© 2023 Comba

COMBA DISTRIBUTED GNB USER MANUAL 1

1 SAFETY AND SECURITY 4

2 SYSTEM INTRODUCTION 5

2.1 5G ACCESS UNIT 5
2.2 REMOTE RADIO UNIT 7

3 EQUIPMENT INSTALLATION 11

3.1 5G AU INSTALLATION 11
3.1.1 Tool requirements 11
3.1.2 Wall-mounted installation 11
3.1.3 Cabinet installation - tray installation (applicable to 1000mm cabinet) 13
3.1.4 Cabinet installation - rail installation (applicable to cabinets 600mm to 1000mm deep) . 14
3.1.5 Installation of ground wire 16
3.1.6 Equipment power 21
3.2 REMOTE RADIO UNIT INSTALLATION 21
3.2.1 Warning for Remote Radio Unit 21
3.2.2 Installation Requirements 22
3.2.3 Installation Instructions 23
3.2.4 RRU Installation 25
3.2.5 Grounding 30
3.2.6 GPS port Lightning protection 31
3.2.7 AISG and External alarm connection 31
3.2.8 Cable connection 33
3.2.9 Equipment power 33
3.2.10 Verifying Normal Operation 34
3.3 GPS EQUIPMENT INSTALLATION 37
3.3.1 Installation environment of GPS antenna 37
3.3.2 Selection and connection of GPS antenna feeder 38
3.3.3 Lightning protection and grounding of GPS antenna 40
3.3.4 Scenarios and suggestions for GPS antenna installation 40
3.4 CABLE CONNECTION 50
3.5 EQUIPMENT GROUNDING INSPECTION 51
3.6 DEVICE IDENTIFICATION 52
3.7 ROUTINE INSPECTION 53

4 SITE COMMISSIONING 53

4.1 COMMISSIONING PROCESS AND PHYSICAL TOPOLOGY 53
4.2 COMMISSIONING PARAMETERS 54
4.2.1 NSA commissioning parameters 54
4.3 LOGIN TO THE WEB INTERFACE 55
4.3.1 Enter the WEB interface 55
4.4 NSA COMMISSIONING 56
4.4.1 Configure WAN network 56

Proprietary & Confidential
© 2023 Comba

4.4.2 NTP settings and clock synchronization settings 58
4.4.3 Gnfid, carrier routing configuration 60
4.4.4 5G PLMN and DU_ TAList Configuration 61
4.4.5 5G carrier parameter configuration 61
4.4.6 Scheduling and working mode configuration 64
4.4.7 X2 parameter setting 65
4.4.8 Network management connection configuration 66
4.4.9 Cell control parameter configuration 66
4.4.10 NSA Neighborhood Configuration 67
4.4.11 4G parameter configuration 67
4.5 SA COMMISSIONING 69
4.5.1 5G SA Mode Configuration 69
4.5.2 5G AMF and network slicing information configuration 70
4.5.3 Network management connection configuration 71
4.5.4 Cell control parameter configuration 71
4.5.5 NTP settings and clock synchronization settings 73
5 APPENDIX 73

Proprietary & Confidential
© 2023 Comba

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
This is NOT a CONSUMER device. It is designed for installation by FCC LICENSEES and QUALIFIED INSTALLERS. You MUST have an FCC LICENSE or express consent of an FCC Licensee to operate this device. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of $100,000 for each continuing violation.

1 Safety and Security

1) When installing the equipment, please leave enough space for heat dissipation, and keep away from heat source or fire, such as electric heater, candle, etc;

2) Do not disassemble the equipment by yourself. In case of equipment failure, please contact the equipment supplier.

3) It must be kept dry during storage, transportation and use. If liquid accidentally flows into the chassis, please cut off the power immediately and contact the equipment supplier.

4) If there are the following phenomena: smoke, abnormal sound, strong smell, etc., please stop using immediately and unplug the power plug;

5) Do not let children use the equipment alone without supervision, and prohibit children from playing with the equipment and accessories to avoid accidents.

6) Please install the equipment on a stable and solid wall, and the environment shall be dry, ventilated and free from strong light

7) Please keep the power plug clean and dry to avoid electric leakage. Do not use damaged or aged power cable

8) Do not place any objects on the power cord or power plug of the equipment, and do not cover chassis with objects. Before cleaning the equipment, please turn off the equipment and cut off the power supply. When cleaning, do not clean with corrosive detergent, but wipe with a soft dry cloth

Proprietary & Confidential
© 2023 Comba

2 System Introduction

2.1 5G Access Unit

The appearance of 5G access unit is shown in Figure 2-1 Appearance of 5G Access Unit

Figure 2-1 Appearance of 5G Access Unit

The technical specification of 5G access unit are shown in Table 2-1 Key technical specification

Table 2-1 Key technical specification

Item	Performance and specifications
Networking	每个 FHD 端口支持 4 级级联
Service capability	Support 2x 100MHz 4T4R cell Support 400 active users and 1200 RRC connected users in each cell;
Synchronization	Support GPS, 1588v2 clock synchronization
Size	19 "standard rack, height 1U. 440 mm × 410 mm × 42mm (w × D × h)
Weight	7.2kg
Power supply	Support AC100V-240V or DC: - 48V (- 40~-57v)
Power Consumption	<200W
Environmental protection	IP30
Installation method	Rack or wall mounted
Cooling	FAN
Operation temperature	-5℃～+55℃
Operation relative humidity	15% - 85% (no condensation)

The interface identification of 5g access unit panel is shown in Figure 2-2 Interface of access unit

Proprietary & Confidential
© 2023 Comba

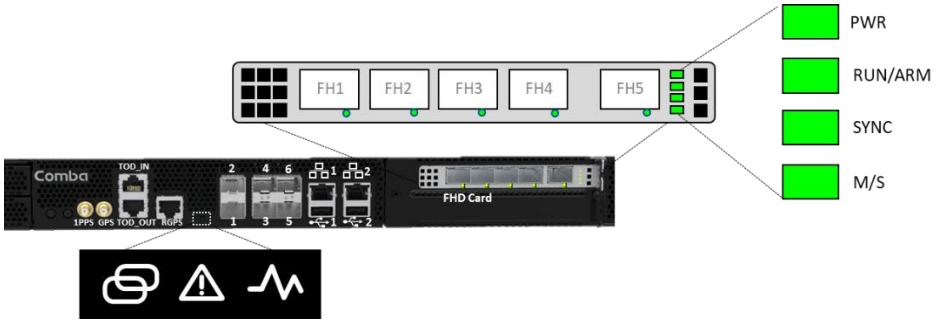


Figure 2-2 Interface of access unit

The interface description of 5g access unit is shown in Table 2-2 Access unit interface description

Table 2-2 Access unit interface description

Interface	Interface description and function description
OP1, OP2	25G SFP + Optical , Backhaul Port, Reserved
OP3, OP5, OP6	10G SFP + Optical , Backhaul Port, reserved
OP4	10G SFP + Optical , Backhaul Port
LAN1	1GE, LMT interface, 100M/1000M
LAN2	1GE, BMC Debug, reserved
USB1/USB2	2 x USB3.0 interface for connecting mouse / keyboard / USB device, etc
GPS	GPS interface (SMA),
1PPS	1 PPS second pulse input
RGPS	RGPS interface (RJ45)
ToD_ IN	1PPS+ToD second pulse input
ToD_ OUT	1PPS+ToD second pulse output
FHD Card FH1~FH4	4 × 12.5Gbps SFP + optical interface, star connection with extension unit, supporting CPRI.
FHD Card FH5	12.5Gbps SFP + optical interface, equipment cascading.

5G AU LED indicator is shown in Table 2-3 5G AU LED Indicator

Table 2-3 5G AU LED Indicator

Identification	Function	Color	Status	Description
PWR	Power indicator	Green	On	Power supply normal
			Off	Power supply abnormal
OP1~6	SFP Synchronous indicator	Green /Orange	Green On	Link OK
			Orange On	SFP exists. Optical module receiving or sending abnormality.
			Orange Flashing	Bit error or the link is out of lock
			Off	Network not connected or

Proprietary & Confidential
© 2023 Comba

				SFP not exists
LAN1~2	LAN indicator	Orange	On	Link normal without data transmission
			Flashing	Link normal with data transmission
			Off	Link not connected
		Green	On	Link Up 1000Mbps
			Off	Link Up 100Mbps or Link Not Up
SYNC	SYNC indicator	Green	On	Sync success
			Flash	Sync source exists but fail to sync
			Off	Sync source not exists
FHD Card PWR	Power indicator	Green	On	Power normal status
			Off	Power abnormal status
FHD Card RUN/ARM	Run/Alarm indicator	Green /Orange	Green On	Software not running
			Green Slow Flashing	Equipment normal status
			Green Fast Flashing	Equipment powering up or software upgrading
			Orange On	Normal alarm
			Orange Flashing	Serious alarm
			Off	Power off or hardware fault
FHD Card SYNC	SYNC indicator	Green	On	Sync success
			Flashing	Sync source exists but fail to sync
			Off	Sync source not exists
FHD Card M/S	Master/Slavery indicator	Green	On	Board running as master
			Off	Board running as slavery

2.2 Remote Radio Unit

The appearance of the Remote Radio Unit Remote Radio Unit (RRU) is shown in Figure 2-3 Appearance of

Proprietary & Confidential
© 2023 Comba

Figure 2-3 Appearance of Remote Radio Unit

Key technical specification of Remote Radio Unit are shown in Table 2-4 Key technical specification.

Table 2-4 Key technical specification

Radio Specification		
Technology	NR	
TRx Configuration	4T4R	
Operation Bandwidth	150MHz	
Instantaneous Bandwidth	100MHz	
Occupied Bandwidth	100MHz	
Capacity (per antenna port)	NR	1 carriers
Operating Frequency	3550 – 3700MHz	
Interface to BBU	CPRI	
Output Power per Tx	10W	
ACLR	Compliant with 3GPP TS 38.104	
Transmitter Spurious Emissions	Compliant with 3GPP TS 38.104	
EVM	Compliant with 3GPP TS 38.104	
Noise Figure	Typical: 3.5dB	
Blocking Features	Compliant with 3GPP TS 38.104	
Receiver spurious emissions	Compliant with 3GPP TS 38.104	
Interface	ANT1-4	4 x 4.3-10 Female
	OPT1-2	2 x SFP+
	Power	AC100-240V

Proprietary & Confidential
© 2023 Comba

	AISG	AISG 2.0
	Debug	Mini-USB (Ethernet over Mini-USB via LMT cable)
	GPS	Optional, N-Type Female, GPS Bands customized
LED Indicator	PWR	Power Running Status
	RUN/ALM	System Running Status
	ACT	PA Running Status
	VSWR	RF Channel VSWR Checking Status
	OP1	Optical Link Status
	OP2	Optical Link Status
lectrical and Mechanical Specification		
Volume	370mm*200mm*95mm	
Power Supply	100-240 VAC/47-63Hz	
Power Consumption	Max: 180W*	
Weight	7kg	
Humidity	5% ~95%	
Operating Temperature	-40°C ~+55°C	
IP Rating	IP65	
Mounting Options	Pole (45mm to 120mm) / Wall	

Note:

** The max power consumption of an RRU is measured at 25°C ambient temperature. The actual power consumption may have a 10% deviation from the value.*

Proprietary & Confidential
© 2023 Comba

Proprietary & Confidential
© 2023 Comba

3 Equipment installation

3.1 5G AU installation

3.1.1 Tool requirements

Requirements for installation tools are shown in Table 3-1 Requirements for installation tools.

Table 3-1 Requirements for installation tools

Tool type	Function
Percussion drill	Self-prepared, capable of drilling Φ 8 holes
Open spanner wrench	Self-prepared, opening 8mm and 10mm
Cross screwdriver	φ 5mm

3.1.2 Wall-mounted installation

Step 1: Take the AU out of the package, and adjust the installation direction of the lug according to the figure, as shown in Figure 3-1 Installation Diagram of Case Lug

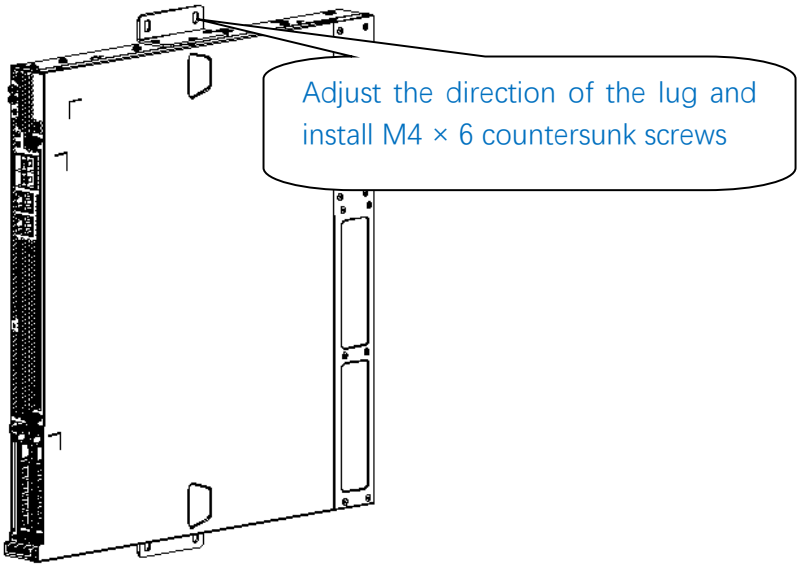


Figure 3-1 Installation Diagram of Case Lug

Step 2: Punch four Φ8 holes in the wall as shown in Figure 3-2 AU wall installation drilling dimension. The hole depth is 50-60mm. Fix the expansion bolt on the wall to ensure the

Proprietary & Confidential
© 2023 Comba

installation is firm. Take out the nut and gasket of the expansion bolt, and align the installation hole of the AU lug with the expansion bolt, as shown in Figure 3-3 AU wall installation diagram.

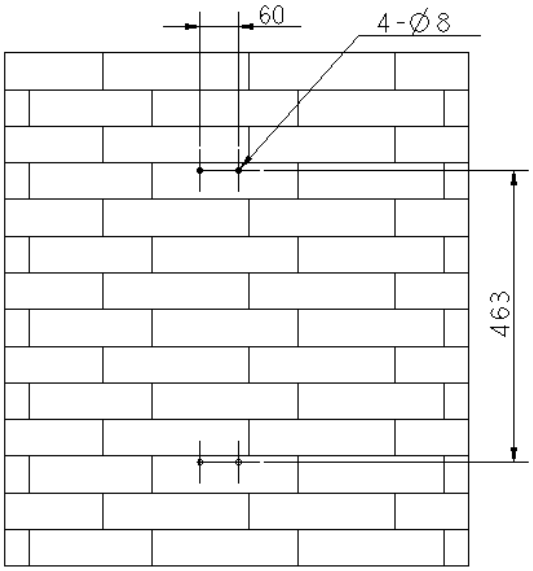


Figure 3-2 AU wall installation drilling dimension

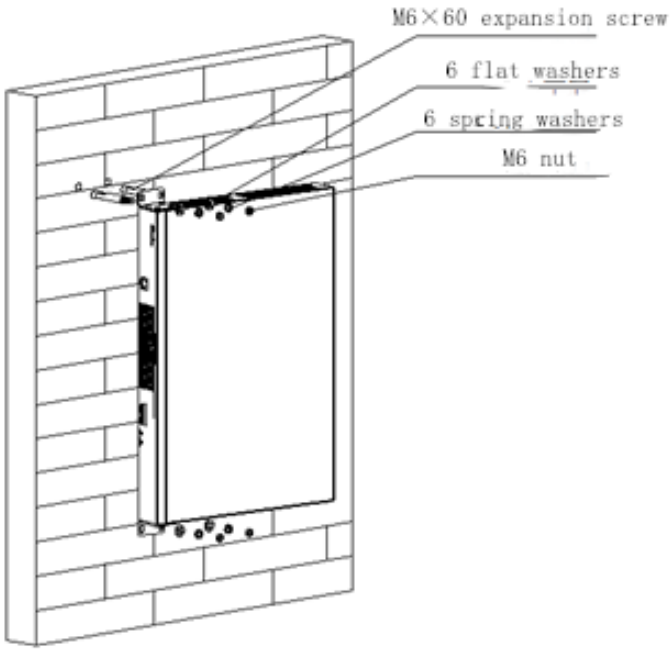


Figure 3-3 AU wall installation diagram

Proprietary & Confidential
© 2023 Comba

Step 3: install the flat cushion and nut, tighten the nut with a fixed open-ended wrench, and the installation is completed.

3.1.3 Cabinet installation - tray installation (applicable to 1000mm cabinet)

9) Installation tools

Installation tools are shown in Table

Table 3-2 Installation Tools

Name	Remarks
Cross screwdriver (universal type)	Self-prepared, φ 5mm

10) Equipment installation

Step 1: Take the AU equipment out of the package and install the lug for the installation of the supporting tray on the AU, as shown in Figure 3-4 Installation diagram of hanger for cabinet.

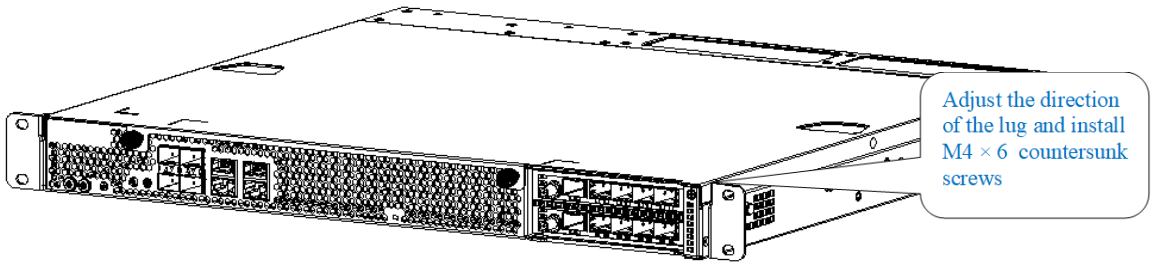


Figure 3-4 Installation diagram of hanger for cabinet

Step 2: Install the tray on the cabinet, as shown in Figure 3-5 Tray Installation Diagram.

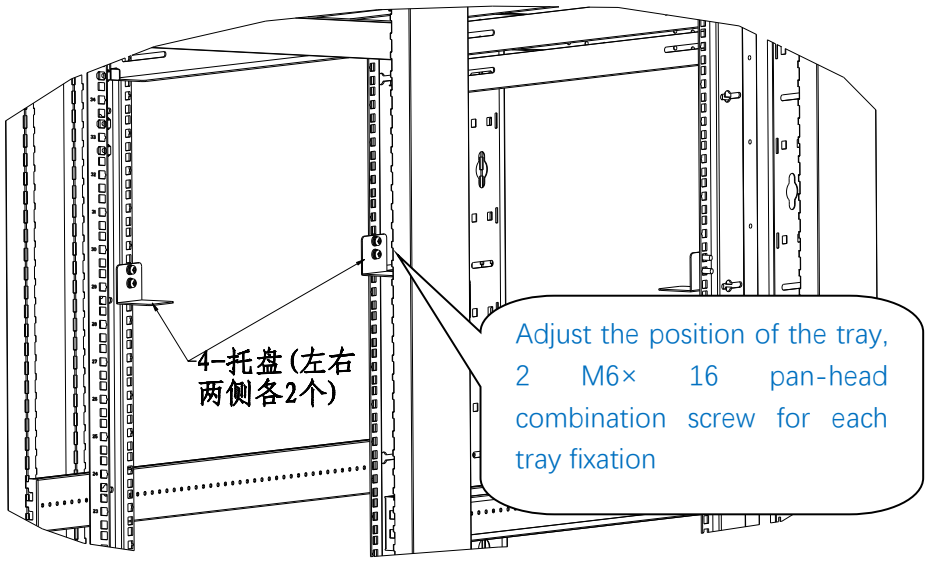


Figure 3-5 Tray Installation Diagram

Step 3: insert the AU horizontally into the cabinet, tighten the M6 screws, as shown in Figure 3-6 Installation diagram of AU on cabinet, and the installation is completed.

Proprietary & Confidential
© 2023 Comba

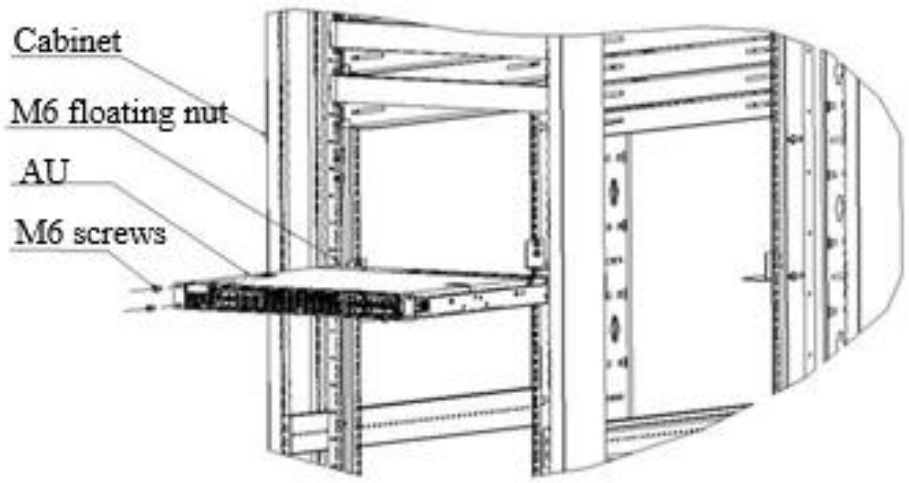


Figure 3-6 Installation diagram of AU on cabinet

3.1.4 Cabinet installation - rail installation (applicable to cabinets 600mm to 1000mm deep)

1) Installation tools

Installation tools are shown in Table 3-3 Installation Tools.

Table 3-3 Installation Tools

Name	Remarks
Cross screwdriver (universal type)	Self-prepared, φ 5mm

2) Equipment installation

Step 1: Take the AU equipment out of the package and install the hanger for the installation of the supporting guide rail on the AU, as shown in Figure 3-7 Installation diagram of hanger for guide rail.

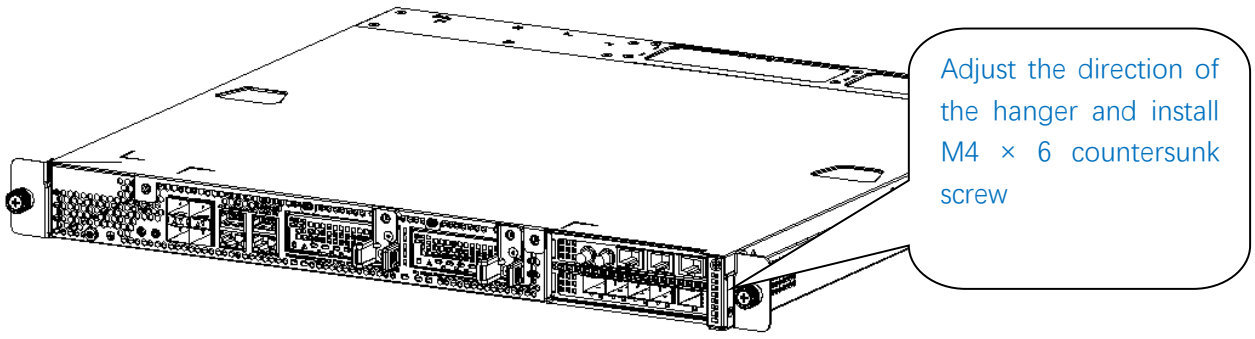


Figure 3-7 Installation diagram of hanger for guide rail

Step 2: Install the sliding rail on the cabinet, as shown in Figure 3-8 to Figure 3-11.

1. Take out the sliding guide rail and remove the screws on the guide rail, a total of 5, as shown in Figure 3-8

Proprietary & Confidential
© 2023 Comba

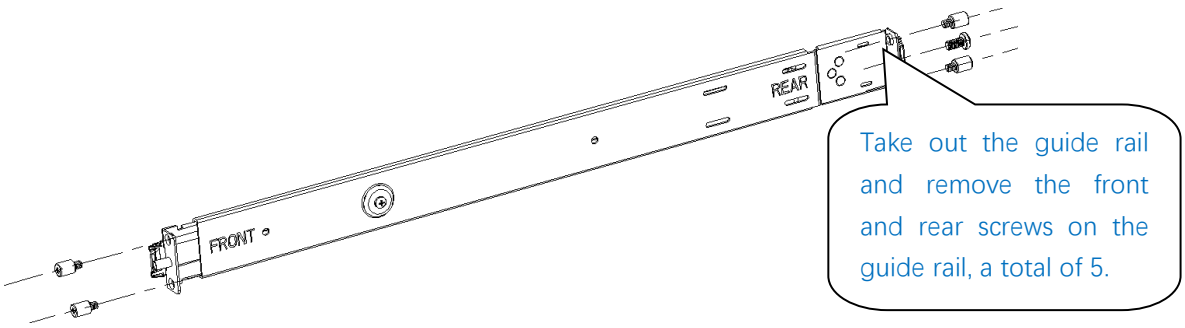


Figure 3-8

2. Install the sliding guide rail on the cabinet, as shown in Figure 3-9 Schematic diagram of sliding guide rail installed on the cabinet

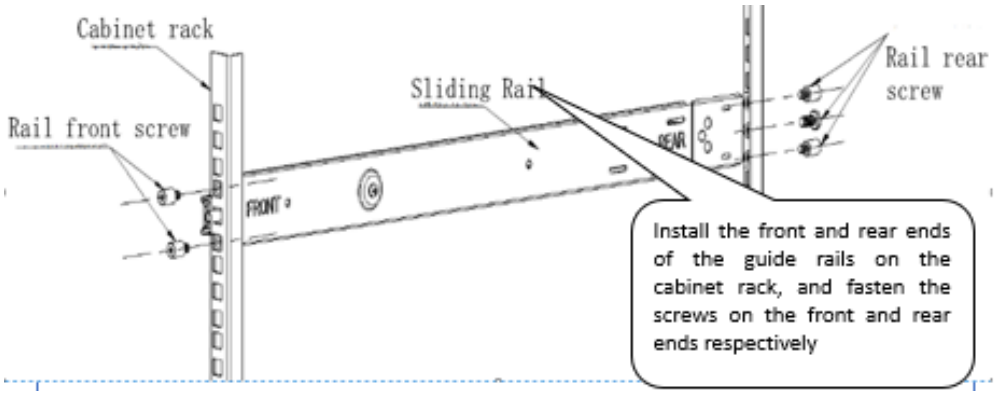


Figure 3-9 Schematic diagram of sliding guide rail installed on the cabinet

3. Repeat the steps of (1) and (2) above to install the sliding rails on the other side on the cabinet frame. Pay attention to the horizontal alignment of the sliding rails on both sides.

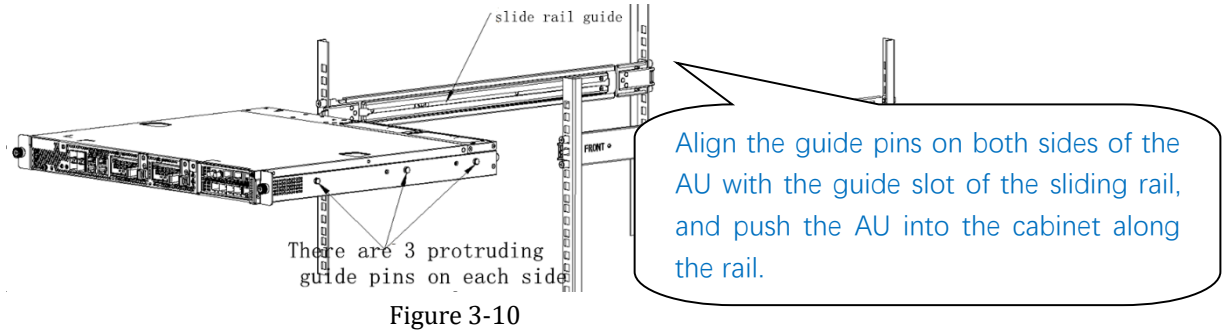


Figure 3-10

Proprietary & Confidential
© 2023 Comba

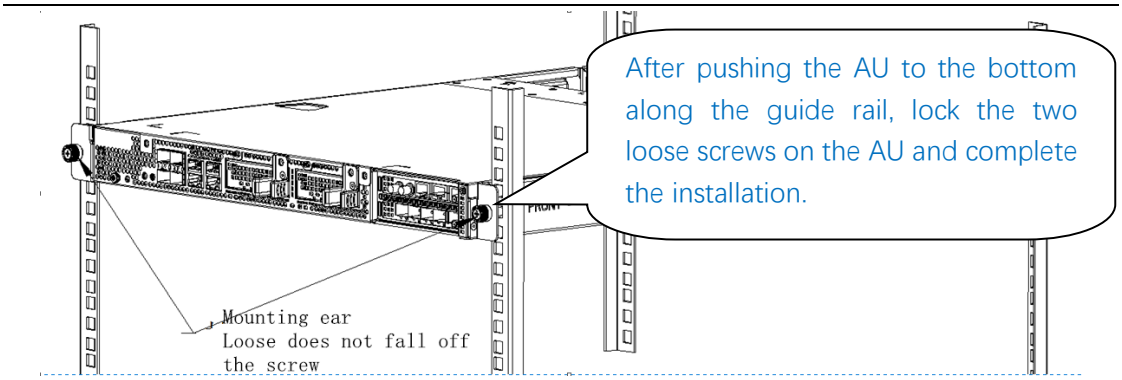


Figure 3-11

3.1.5 Installation of ground wire

3.1.5.1 GPS grounding

Take the yellow and green grounding wire of 2 m from the accessories of the whole machine, cut the yellow and green bottom wire of about 1 m from the bare wire end, and strip the bare wire of 4 cm and 1 cm from the two ends respectively. Refer to Figure 3-12 Schematic diagram of grounding wire stripping

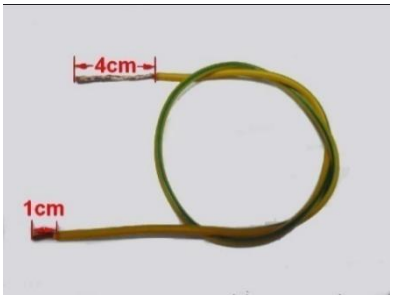


Figure 3-12 Schematic diagram of grounding wire stripping

Take out an OT2.5-6 terminal from the accessories of the whole machine, insert the 1cm long end into the grounding terminal hole, and press it tightly with pliers. Refer to Figure 3-13 Schematic diagram of terminal crimping for terminal crimping diagram.

Figure 3-13 Schematic diagram of terminal crimping

Use a heat-shrinkable tube with a diameter of 6cm to cover the ground wire, and thread the 4cm long bare wire into the grounding copper wire of the arrester. First, wrap it tightly and then press it with pliers, and then weld it with soldering iron as much as possible, as shown in Figure 3-14 Grounding wire connection. Put the heat-shrinkable tube at the junction, and then heat it to cover the terminal, as shown in Figure 3-15 Heat shrinkable tube protection.

Proprietary & Confidential
© 2023 Comba

Figure 3-14 Grounding wire connection

Figure 3-15 Heat shrinkable tube protection

As shown in Figure 3-16 Wiring reference diagram, the GPS grounding wiring is connected to the ground through GPS surge protector. Pay attention to the fixation of the ground wire to avoid contact with other lines.

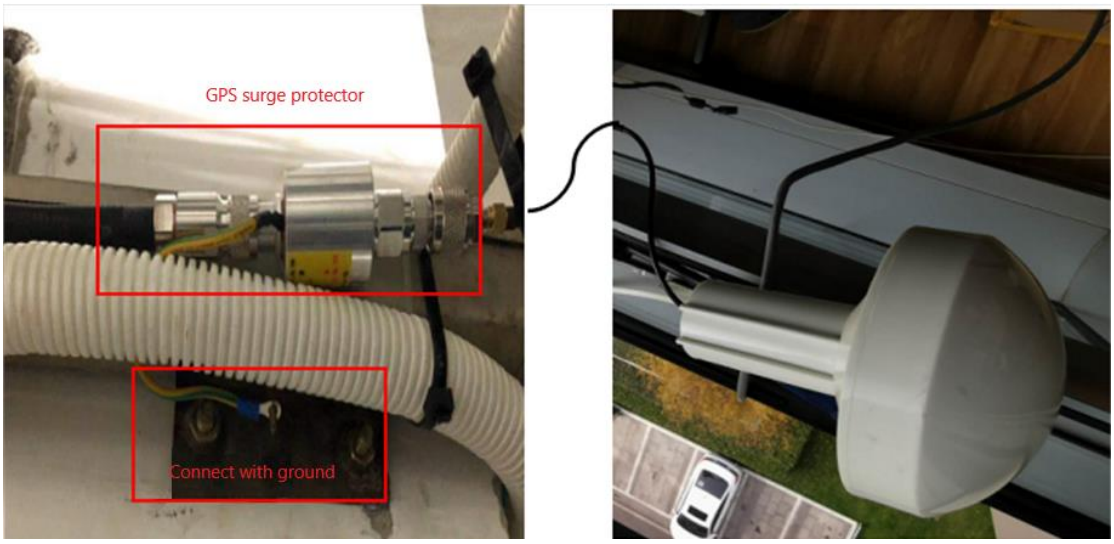


Figure 3-16 Wiring reference diagram

3.1.5.2 AU chassis grounding

Take a yellow and green ground wire, cut the corresponding length according to the actual wiring requirements, and make it as short as possible. The grounding terminal is connected to the chassis grounding port, and the other end is connected to the cabinet ground wire, as shown in Figure Figure 3-17 Installation diagram of AU chassis grounding wire

Proprietary & Confidential
© 2023 Comba

Figure 3-17 Installation diagram of AU chassis grounding wire

Proprietary & Confidential
© 2023 Comba

Proprietary & Confidential
© 2023 Comba

Proprietary & Confidential
© 2023 Comba

3.1.6 Equipment power

The AU and expansion unit need 220V AC power supply, and the power supply mode is preferred to adopt the power supply mode of power cable cutting. This power supply mode needs to take single-phase power (220V AC) from the three-phase power in the distribution cabinet. The schematic diagram of power supply is shown in **错误!未找到引用源。**.

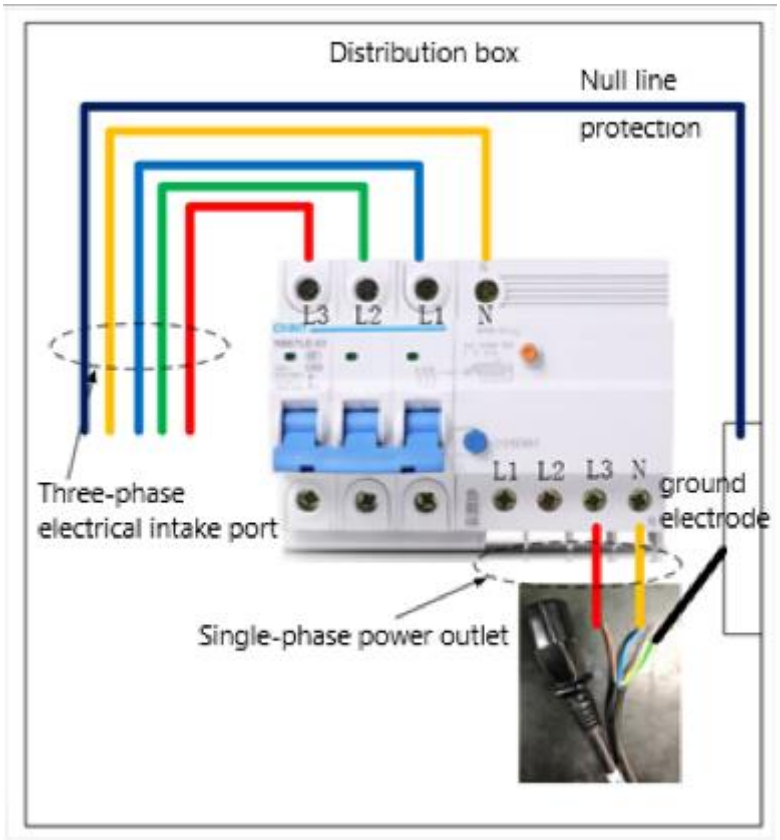


Figure 3-18Schematic diagram of equipment power cable cut off and power taken from cabinet

If the site does not have the power cable cut-out method, use the socket to take 220V AC power. The power socket must be at a height that can not be easily reached by ordinary people to prevent people from unplugging the power plug of the base station.

3.2 Remote Radio Unit installation

3.2.1 Warning for Remote Radio Unit

Warning! Any installation, adjustment, maintenance and repair of the equipment must only be carried out by trained, authorized personnel. At all times, personnel must comply with any safety notices and instructions.

Proprietary & Confidential
© 2023 Comba

3.2.2 Installation Requirements

3.2.2.1 Installation Location

Mounting surface shall be capable of supporting the weight of the equipment.

In order to avoid electromagnetic interference, a proper mounting location must be selected to minimize interference from electromagnetic sources such as large electrical equipment.

3.2.2.2 Environmental

Humidity has an adverse effect on the reliability of the equipment. It is recommended to install the equipment in locations having stable temperature and unrestricted air-flow.

The installation location for the system should be well ventilated. The equipment has been designed to operate at the temperature range and humidity level as stated in the product specifications at temperatures ranging from -40~55oC and a relative humidity of maximum 95%.

3.2.2.3 Powering

To ensure the stability and safety of the power supply, it is recommended that the device operate on a dedicated AC circuit breaker or fuse. This approach helps to isolate the device from other electrical loads, reducing the risk of power fluctuations and ensuring a stable power supply for the device.

3.2.2.4Grounding Requirement

Verify that the equipment has been well grounded. This includes radio remote unit, external combiner, antennas and all cables connected to the system. Ensure lightning protection for the antennas is properly grounded.

3.2.2.5 Cable Routing

Ensure all cables, e.g. power cable, feeder cable, optic fiber, commissioning cable, connecting are properly routed (use drip-loops) and secured so that they are not damaged.

Fiber optic cables require proper handling. Do not stretch, puncture, or crush the fiber cable(s) with staples, heavy equipment, doors, etc.

Always maintain the minimum bending radius specified by the cable manufacturer. The minimum bend radius is usually ten times the cable's outer diameter. In the case of single optical fiber that is not in a cable, the minimum bending radius to be observed is 30 mm.

Wave division multiplexing (WDM) units require single-mode fiber

Use minimum splicing/connectors to achieve minimum losses on the fibers.

Use precaution while installing, bending, or connecting fiber optic cables.

Use an optical power meter and OTDR for checking the fiber optic cables.

Make sure the environment is clean while connecting/splicing fiber optic cables.

All fiber optic connections should be cleaned prior to attaching to termination points using a dry cleaning device (i.e., Cletop or equivalent).

Fiber connector protective caps should be installed on all non-terminated fibers and removed just before they are terminated.

Check the fiber optic connections.

Proprietary & Confidential
© 2023 Comba

3.2.2.6 Manual Handling

During transportation and installation, take necessary handling precautions to avoid potential physical injury to the installation personnel and the equipment.

3.2.3 Installation Instructions

3.2.3.1 Packing List

NO	Description	Model No.	Quantity	Remarks
1	B1+B3 Remote Radio Unit	RRU-5130F48	1 Pcs	

Table 2.1.1 Packing list

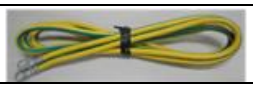
NO	Description	Item code	Quantity	Image
1	GND Cable	BVR10mm2,2M	1 Pcs	
2	U-bolt	M10×85×110	2 Pcs	
3	Expansion bolt	M10×110	4 Pcs	
4	Mounting bracket 2	RRH-3522-5832	1 Pcs	

Table 2.1.2 Accessories list

3.2.3.2 Tools requirement

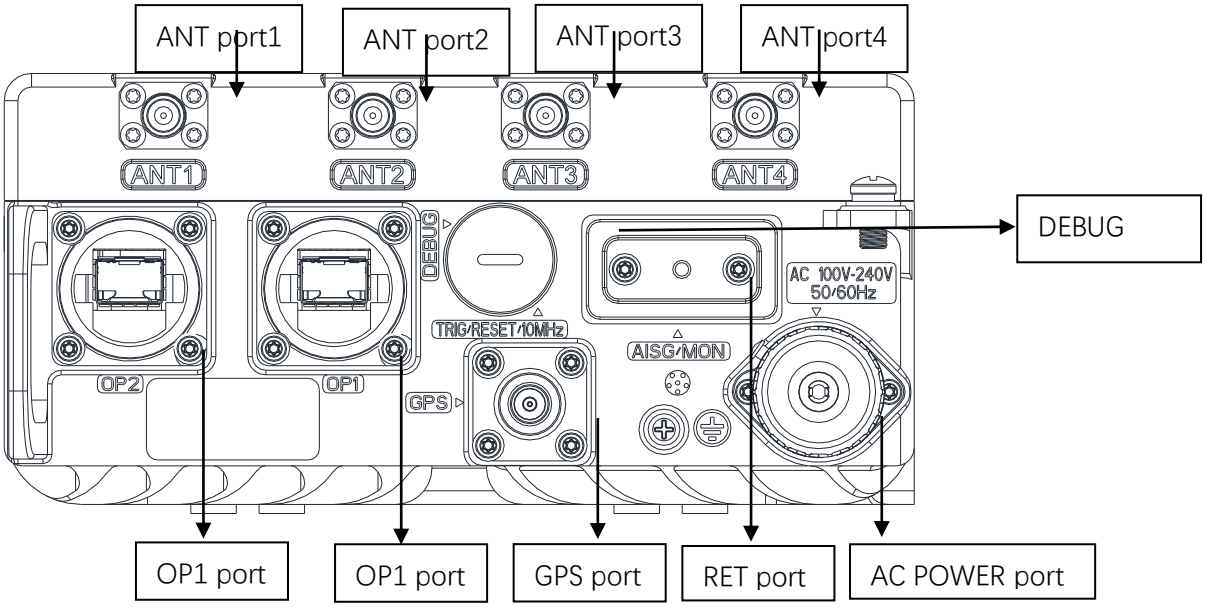
The requirement for the installation tools as follows:

Tool Type	Usage
Percussion drill	self-contained, drill the hole of Φ14 mm
Open spanner	Self-contained, 10 mm and 16 mm
hammer	Self-contained, use to install the expansion bolt when use wall-mounted
Cross screwdriver	φ5mm
T-wrench	use to open the window coverings

Table2.2.1 Installation tools

Proprietary & Confidential
© 2023 Comba

3.2.3.3 Device port description：



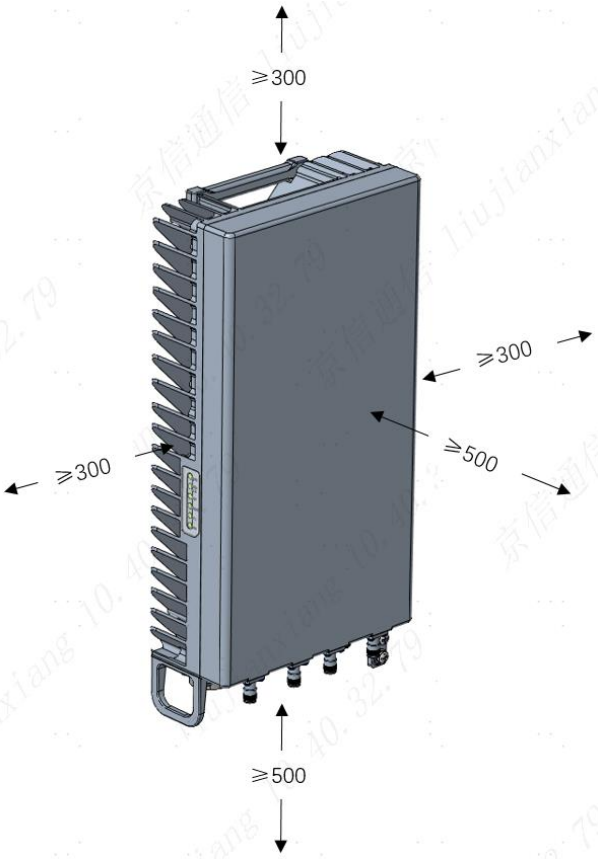
Introduction of the bottomport

Proprietary & Confidential
© 2023 Comba

3.2.4 RRU Installation

3.2.4.1 Installation space requirements

In order to ensure the normal operation and heat dissipation requirements of the equipment, the equipment needs the following installation requirements(unit：mm)



For installation in a confined space or a narrow space, the heat exchange capacity inside and outside the space needs to be considered, and ventilation facilities need to be installed to avoid self-protection of the equipment due to long-term work and air temperature rise. The heat dissipation of the device is 240W.

3.2.4.2 Installation procedure

The RRU support 2 mounting method a) pole-mount and b) wall-mount.

a) Pole-mount Installaion Instructions:

Step 1: take out the RRH from the package, as shown in Figure 1.

Proprietary & Confidential
© 2023 Comba

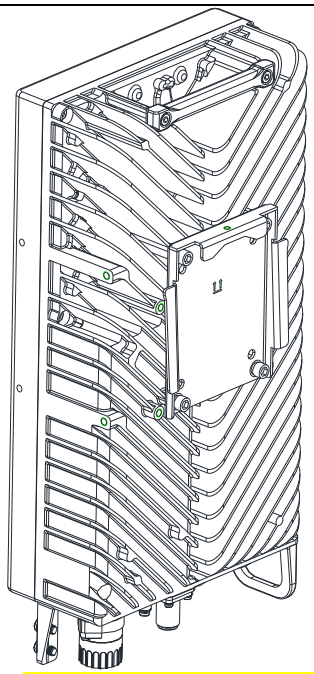


Figure 2.5.1 RRH Diagram

Step 2: use 2 U-Bolt to install the mounting bracket 2(RRH-3522-5832) to the pole(the diameter of the pole should less than 75 mm), as shown in Figure 2.5.2.

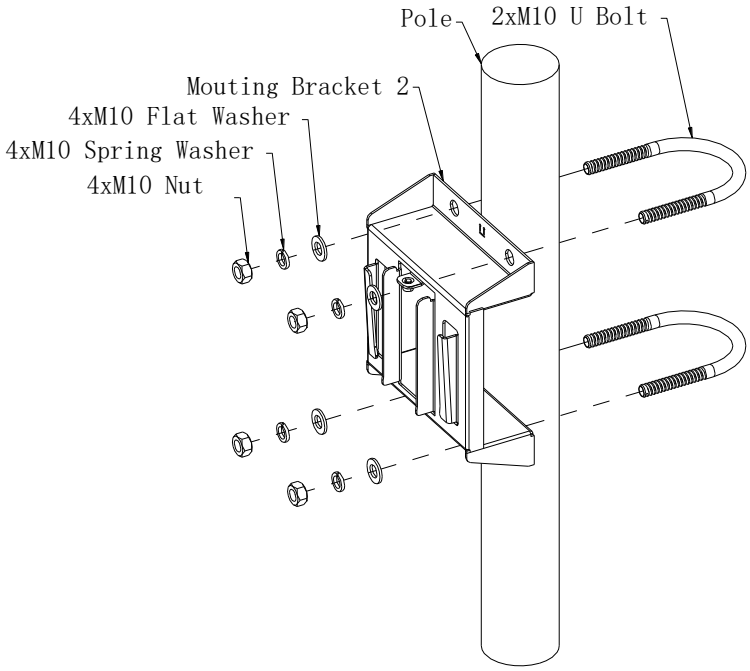


Figure 2.5.2 Pole-mount Installation Diagram

Step 3: put the RRU prepared previous in step 1 insert to the mounting bracket 2, and lock the device with M5 screw, as shown in Figure 2.5.3.

Proprietary & Confidential
© 2023 Comba

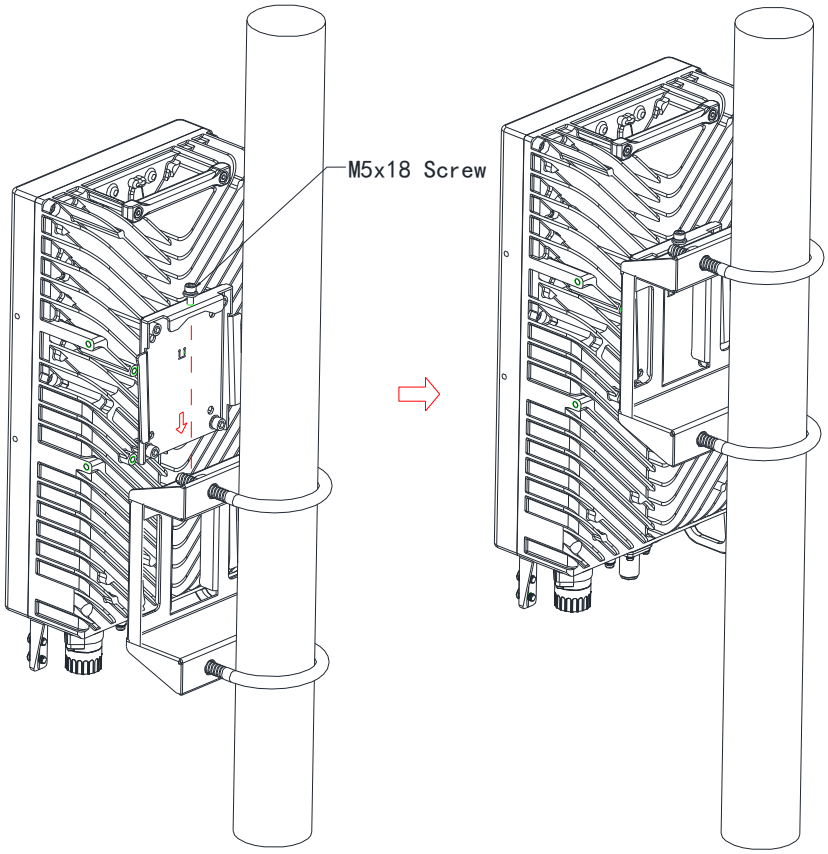
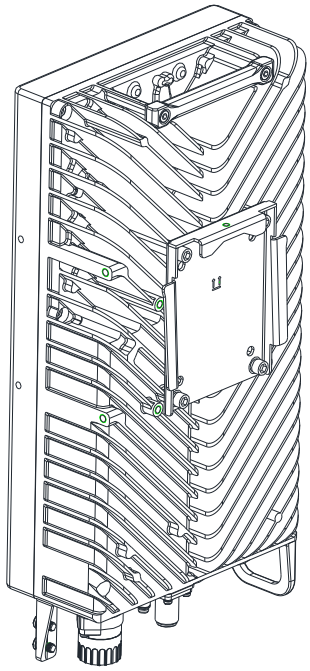


Figure 2.5.3 RRH Pole-mount Complete Diagram

b) Wall-mount Installaion Instructions:

Step 1: take out the RRH from the package, as shown in Figure 1.



Proprietary & Confidential
© 2023 Comba

Figure 2.5.4 RRU Diagram

Step 2: take out the mounting bracket 2(RRH-3522-5832), use percussion drill to drill 4 holes of Φ14 with 65-75 mm depth, as shown in Figure 2.5.5.

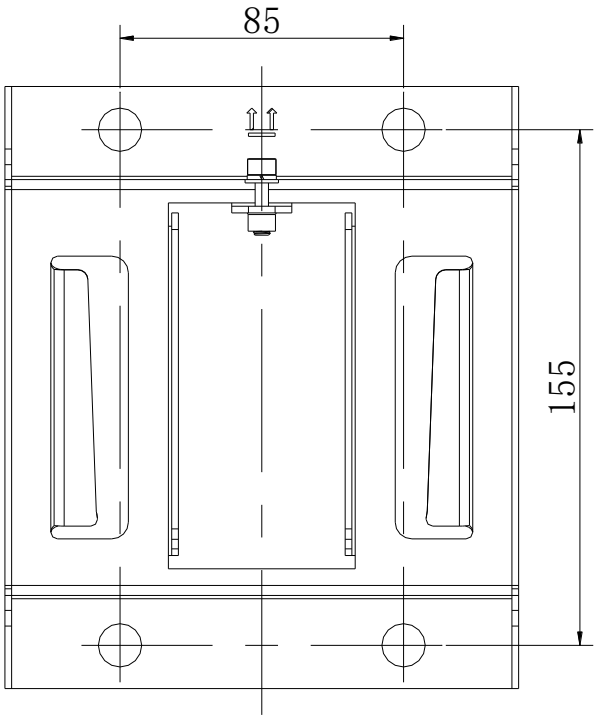


Figure 2.5.5 Wall-mounting Drilling Dimension Diagram

Step 3: use hammer push 4 M10×110 expansion bolt into the hole on the wall, fix the mounting bracket 2(RRH-3522-5832) to the wall according the Figure 2.5.6.

Proprietary & Confidential
© 2023 Comba

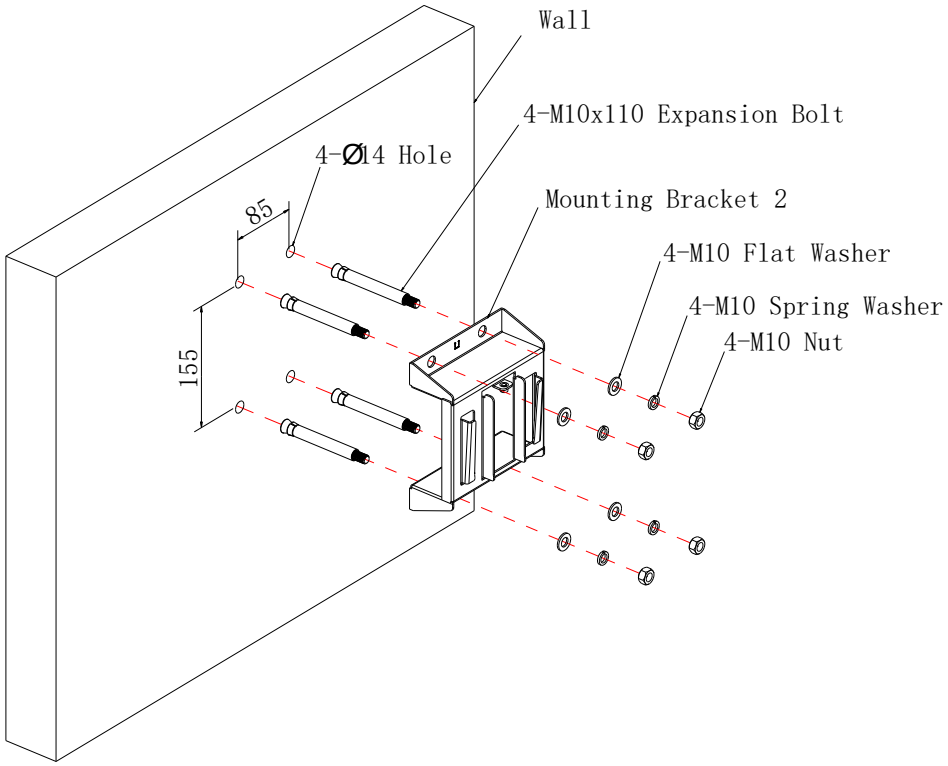


Figure 2.5.6 Mounting Bracket 2 Installation Diagram

Step 4: put the RRU prepared in step 1 and insert to the mounting bracket 2, and lock the device with M5×18 screw, as shown in Figure 2.5.7. And Figure 2.5.8 illustrated the installation complete diagram.

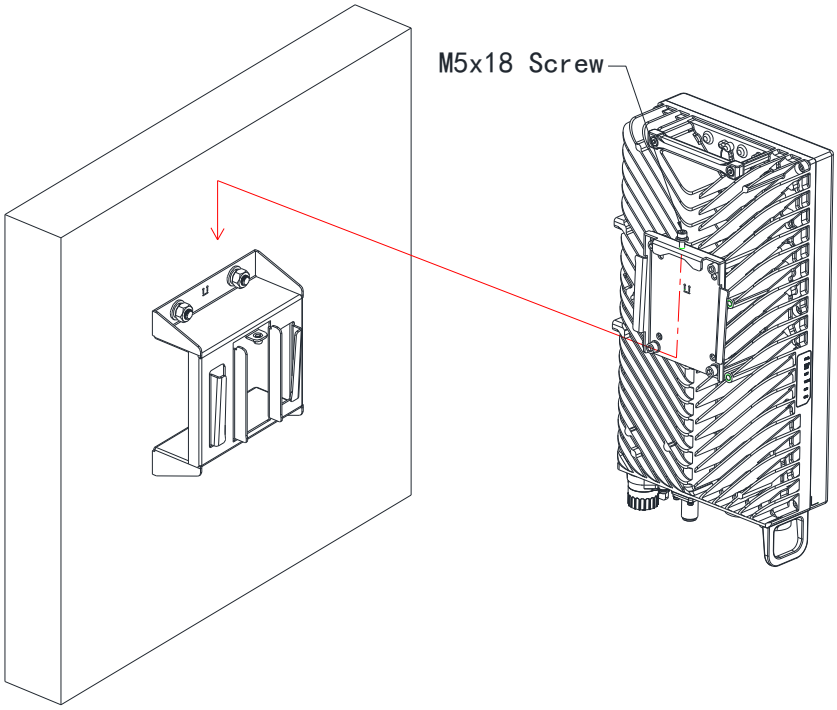


Figure 2.5.7 Wall-mounting Installation Diagram

Proprietary & Confidential
© 2023 Comba

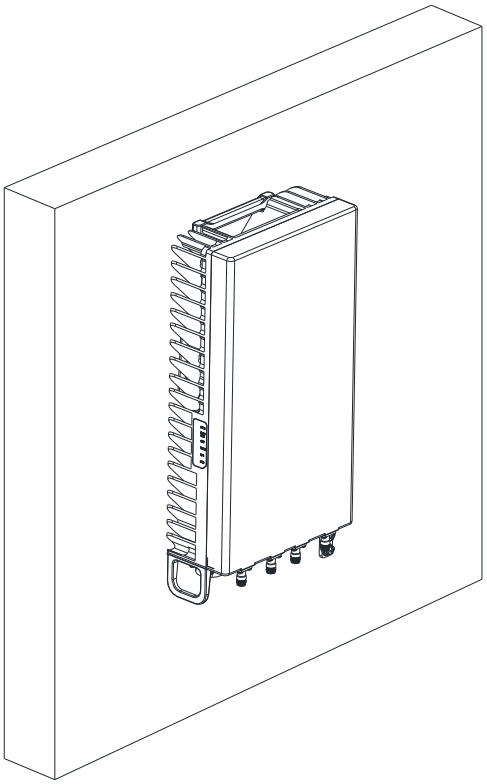


Figure 2.5.8 Wall-mounting Installation Complete Diagram

3.2.5 Grounding

The Grounding cable is provided with the screw which will be installed at the chassis as shown in Figure 3.4.1.

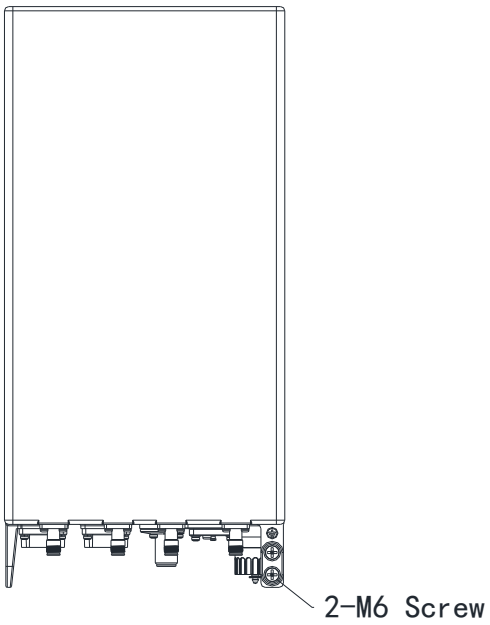


Figure 2.4.1Grounding Cable Diagram

For installation in the seaside or high-salt fog area, it is recommended that the grounding terminal be treated with anti-corrosion treatment after connecting the

Proprietary & Confidential
© 2023 Comba

bottom line, such as encapsulating mud or applying anti-corrosion paint.

3.2.6 GPS port Lightning protection

There is a DC power supply in the GPS feeder, which is sensitive to lightning. It is necessary to add a feeder lightning protection device between the GPS port of the device and the GPS antenna. The lightning protection specification is not less than 20KA.

The link method is as follows:

The connection of the GPS feeder, including the connection of the lightning arrester and the antenna, needs to be waterproofed, and the protection level needs to be above IP65.

3.2.7 AISG and External alarm connection

3.8.1 The extension cable show below is used to connect the antenna AISG port for RET and the external device for alarm monitoring.

Proprietary & Confidential
© 2023 Comba

Figure 2.7.1 AISG/MONextensioncablepicture

Specifications of cable length:

Device side	Connect side	Length
DB15	AISG port	3m
DB15	EXT ALM port	0.5m

3.8.2 The extension cable show below is used to connect the antenna AISG port for RET

Figure 2.7.1 AISG/MONextension cable picture

Specifications of cable length:

Device side	Connect side	Length
DB15	AISG port	3m

The DB-15 port is as shown below is used to connect to RRU for AISG and external alarm connection.

Figure 2.7.2 DB-15 Interface on RRU

Proprietary & Confidential
© 2023 Comba

The 2 circulars ports are used to connect to antenna RET port and external alarm monitoring device.

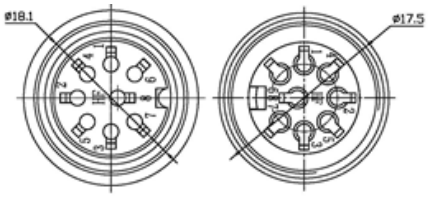


Figure 2.7.3 AISG/MON Port interface.

Remark:
The extension cable is not including in the standard package.
The following figure show the connection of the RRU with Antenna, GPS and the external alarm monitoring device.

3.2.8 Cable connection

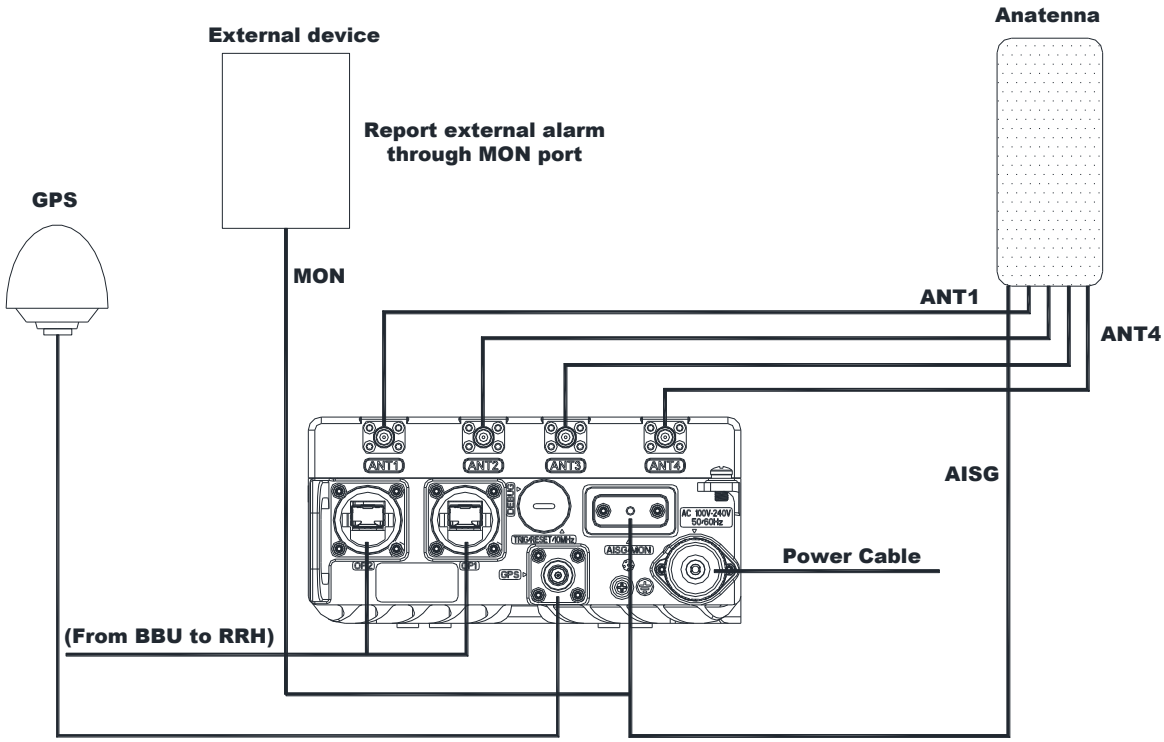


Figure 2.7.4 RRU cables connection diagram

3.2.9 Equipment power

The Remote Radio Unit need 110V AC power supply, and the power supply mode is preferred to adopt the power supply mode of power cable cutting. This power supply mode needs to take single-phase power (110V AC) from the three-phase power in the distribution cabinet. The schematic diagram of power supply is shown in 错误!未找到引用源。.

Proprietary & Confidential
© 2023 Comba

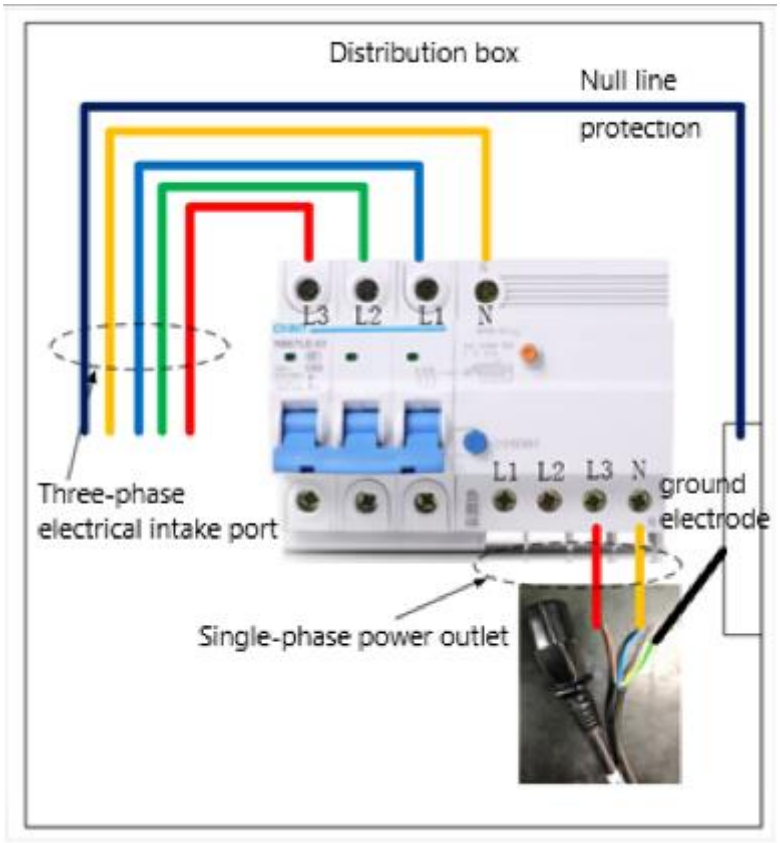


Figure 3-19Schematic diagram of equipment power cable cut off and power taken from cabinet

If the site does not have the power cable cut-out method, use the socket to take 110V AC power. The power socket must be at a height that can not be easily reached by ordinary people to prevent people from unplugging the power plug of the base station.

3.2.10 Verifying Normal Operation

(1) Upon powering up the RRU

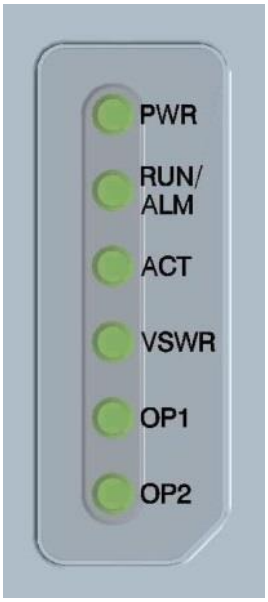
(2) Checking LED indicators to verify normal operation

Identification	Function	Type	State	Description
PWR	Power Running Status	Green	On	Power supply normal
			Off	Power supply abnormal
RUN/ALM	System Running Status	Green /Orange	Green On	Software not running or software is not started
			Green Flash (1s on, 1s off)	Normal
			Green Fast Flash (0.125s on, 0.125s off)	Device powering on or software upgrading
			Orange On	Equipment is abnormal or alarm is generated

Proprietary & Confidential
© 2023 Comba

			Off	No power input or equipment failure
ACT	PA Running Status	Green	On	All channels of the activated cell are functioning normally, and the amplifier is turned on.
			Flashing	The activated cell has abnormal channels, and the amplifier is turned off.
			Off	All amplifiers is turned off.
VSWR	RF Channel VSWR Checking Status	Orange	On	Some channels in the activated cell have VSWR alarms.
			Flashing	Some channels were detected with VSWR alarms during the equipment startup process
			Off	No VSWR alarm
OP1/OP2	Optical Link Status	Green /Orange	Green On	CPRI link OK
			Orange On	The optical module is in place, but there is no optical receiving or sending abnormality. (only available by optical port)
			Orange Flashing (1s on, 1s off)	There is a bit error or link lock loss in the CPRI link
			Off	Optical module not in position or optical port not connected

Proprietary & Confidential
© 2023 Comba



Proprietary & Confidential
© 2023 Comba

3.3 GPS equipment installation

3.3.1 Installation environment of GPS antenna

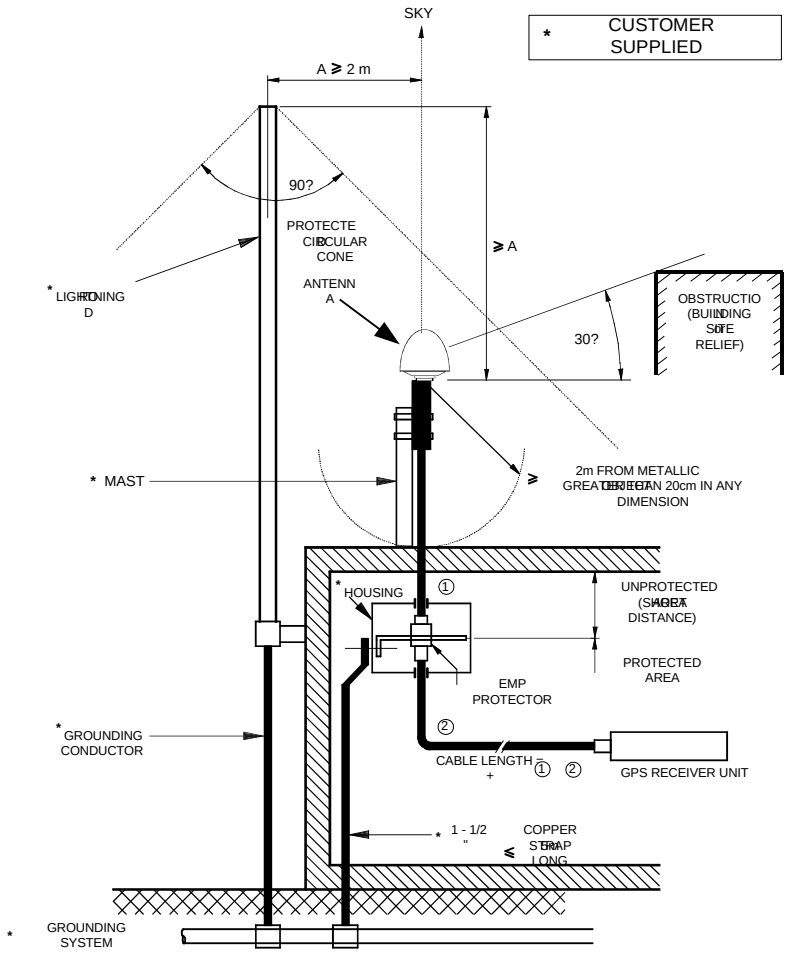


Figure 3-20 Schematic diagram of antenna installation position

1) The GPS antenna shall be installed in a relatively open position to ensure that there are no large obstructions (such as trees, iron towers, buildings, etc.) within the surrounding elevation angle of 30 degrees;

2) In order to avoid the impact of reflected waves, the GPS antenna should be more than 2m away from the surrounding metal objects with a size greater than 20cm. As shown in Figure 3.6-1;

3) Since the probability of satellite appearing in the equator is higher than that in other places, for the northern hemisphere, the GPS antenna should be installed in the

Proprietary & Confidential
© 2023 Comba

south of the installation site as far as possible;

4) Do not install the GPS antenna near other transmitting and receiving equipment to avoid the radiation direction of other transmitting antennas pointing at the GPS antenna;

5) When installing two or more GPS antennas, keep a distance of more than 2m. It is recommended to install multiple GPS antennas at different locations to prevent simultaneous interference.

3.3.2 Selection and connection of GPS antenna feeder

1) Under the condition of meeting the position, the GPS antenna feeder should be as short as possible to reduce the attenuation of the cable to the signal;

2) Figure 3-21 Connection diagram between GPS and feeder using straight head shows the requirements for the length of GPS antenna cable in several occasions. The GPS and the feeder are connected with a straight head, as shown in Figure 3-21 Connection diagram between GPS and feeder using straight head.

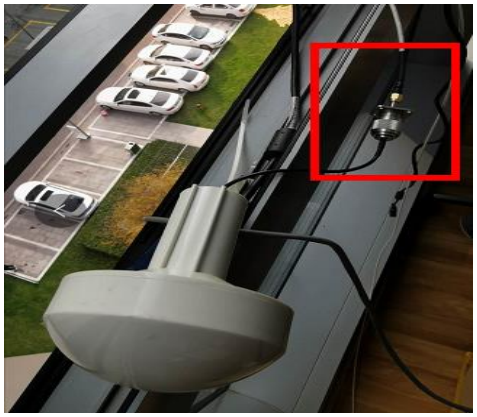


Figure 3-21 Connection diagram between GPS and feeder using straight head

Table 3-4 Cable selection

Cable length requirements	Cable model	Remarks
0~70m	LMR400	Nothing
70～110m	LMR600	Nothing
70~200	LMR400	Need to add a GPS signal amplifier (Gain > 25dB)

1) In order to prevent the cable from shaking and causing the connector to loosen, the cable and the lower end of the support pipe should be fixed with adhesive tape, and the cable should be fixed on the derrick, as shown in Figure 3-22 Installation diagram of

Proprietary & Confidential
© 2023 Comba

antenna feeder. A certain margin (10 cm or longer) shall be reserved for the fixation of cables and holding poles to prevent the cable from contracting due to temperature reduction in winter;

Figure 3-22 Installation diagram of antenna feeder

2) The connection between feeder and antenna shall be waterproof;

3) The installation and replacement of GPS antenna and feeder must follow the following steps, as shown in Figure 3-23 Antenna installation diagram.

Installation of antenna:

4) Pass one end of the feeder through the support tube, screw it onto the N-shaped head of the GPS antenna, and then screw the support tube into the GPS antenna and tighten it;

5) Fix the support pipe on the derrick;

6) Fix the cable and the lower end of the support tube with adhesive tape;

7) The cable shall be fixed on the holding pole, and a certain margin shall be reserved for the fixation of the cable and the holding pole.

Proprietary & Confidential
© 2023 Comba

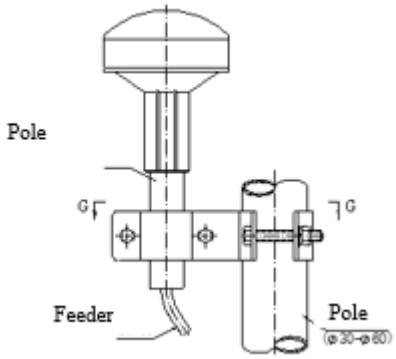


Figure 3-23 Antenna installation diagram

Antenna replacement:

1) Remove the support pipe from the derrick;

2) Rotate the support tube to separate it from the antenna (do not rotate the antenna);

3) Remove the feeder from the antenna N-type connector, replace the antenna or make the connector.

3.3.3 Lightning protection and grounding of GPS antenna

1) To ensure that the GPS antenna is within the protection range of the lightning rod, the GPS antenna should not be the highest point in the area;

2) Lightning arrester may not be installed for GPS antenna, but lightning arrester must be installed for GPS signal at the entrance of base station;

3) The GPS antenna feeder must be grounded, and the grounding point of the feeder should be as close as possible to the antenna;

4) The grounding of GPS antenna feeder shall not be connected with the grounding conductor of air conditioner, motor, water pump motor and other interfering equipment to prevent external interference from being introduced into the antenna system;

5) The grounding of GPS antenna feeder must be waterproof.

3.3.4 Scenarios and suggestions for GPS antenna installation

3.3.4.1 Floor mounted

For a wide platform, it can be installed on the ground, but try not to close the GPS antenna and cable bridge to avoid signal reflection. Suggestions for the installation scenario in Figure 3-24 Floor Installation are as follows:

Proprietary & Confidential
© 2023 Comba

1) The antenna and cable bridge shall be separated by at least 2m. If it is difficult to separate, the antenna can be elevated so that it is at least 2m away from the cable bridge;

2) Where there is a parapet, try to install the antenna on the parapet.

Figure 3-24 Floor Installation

3.3.4.2 Tower installation

For suburban areas or areas with few high-rise buildings, iron towers are mostly used for installation, as shown in Figure 3-25 Tower Installation.

Recommendations for tower installation:

1) GPS antenna shall be installed on the south side of the tower;

2) The GPS antenna shall be as far away from the tower as possible, at least 2m;

3) The GPS antenna should not be erected too high, and the cable length should be as short as possible.

Proprietary & Confidential
© 2023 Comba

Figure 3-25 Tower Installation

3.3.4.3 Post pole installation

1) The antenna should be slightly higher than the post pole. Do not select the post pole with the tip to reduce the probability of induced lightning;

2) The antenna and post pole should not be too high to avoid becoming the highest point in the region, as shown in Figure 3-26 Installation of mail pole.

Proprietary & Confidential
© 2023 Comba

Figure 3-26 Installation of mail pole

3.3.4.4 Installation of parapet

1) The GPS antenna shall be installed on the parapet as far as possible at the place with parapet;

2) It is better to choose the parapet in the south (for the northern hemisphere);

3) The GPS antenna shall be 1~2m higher than the parapet, as shown in Figure 3-27 Installation of parapet.

Proprietary & Confidential
© 2023 Comba

Figure 3-27 Installation of parapet

3.3.4.5 Several wrong installations

1) If the GPS antenna is too far away from the cable rack, the GPS antenna should be raised at least 2m above the cable rack or at least 2m away from the cable rack, as shown in Figure 3-28The antenna is too close to the cable rack;

Figure 3-28The antenna is too close to the cable rack

2) If the post pole is higher than the antenna head, the antenna should be raised or

Proprietary & Confidential
© 2023 Comba

lowered, and the post pole with a tip should not be selected, as shown in Figure 3-29Post is higher than antenna head;

Figure 3-29Post is higher than antenna head

3) There is no cable allowance, as shown in Figure 3-30No cable allowance;

Proprietary & Confidential
© 2023 Comba

Figure 3-30No cable allowance

4) The antenna position is too high relative to the post pole, so the antenna position should be reduced as far as possible to ensure the antenna installation stability, as shown in Figure 3-31Antenna position too high;

Proprietary & Confidential
© 2023 Comba

Figure 3-31Antenna position too high

5) If the antenna spacing is too close, it should be at least 2m away from the two antennas as far as possible, as shown in Figure 3-32Antenna spacing is too close.

Figure 3-32Antenna spacing is too close

Proprietary & Confidential
© 2023 Comba

Proprietary & Confidential
© 2023 Comba

Proprietary & Confidential
© 2023 Comba

3.4 Cable connection

The length of optical fiber between the AU and the RRU is not more than 10km, the total length of optical fiber between the cascaded final RRU and the AU is not more than 20km,
The external ports of the AU are shown in **错误!未找到引用源。**. The identification diagram is shown in **错误!未找到引用源。**.
After the installation of the AU and remote unit, it is necessary to connect the AU,remote unit and other equipment according to the interface instructions, and then turn on the power to work normally after checking and confirming that there is no error.
At present, the AU supports GPS synchronization and RGPS. The GPS interface of AU is connected with GPS antenna through feeder to realize GPS synchronization; Or connect the RGPS interface of AU with the RPGS antenna through the network cable to realize GPS synchronization. the RRU supports GPS Location Updates. The GPS interface of RRU is connected with GPS antenna through feeder to realize GPS Location
The 5G backhaul network needs to provide a 10-gigabit optical port. The 10G optical module and optical fiber are used to connect OP1 of the Micro site with the 10-gigabit optical port of the backhaul transmission equipment.
错误!未找到引用源。 shows the networking topology.

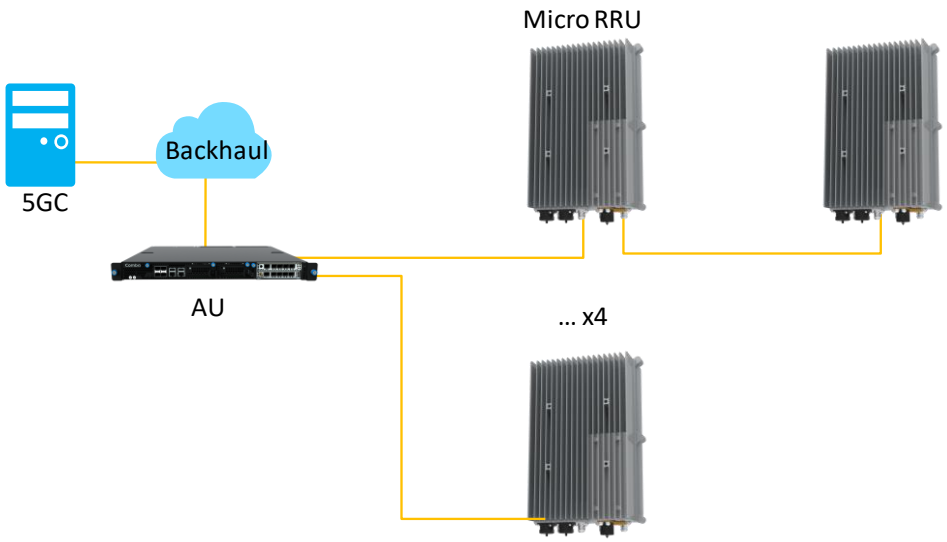


Figure 3-33 Network topology connection diagram

Composite optical cable to ensure that the photoelectric group matching use. Single-core optical modules need to be used together. You are advised to use the same single-core optical module for the upper and lower connectors to prevent link faults caused by unpaired optical modules.
After the above steps are completed, the Micro site can be powered on and started to work.

Proprietary & Confidential
© 2023 Comba

3.5 Equipment grounding inspection

1) Use the resistance range of the meter, connect one lead to the shell screw of the device, and connect one lead to the ground wire of the power socket, as shown in Figure 3-34 Equipment grounding test diagram;

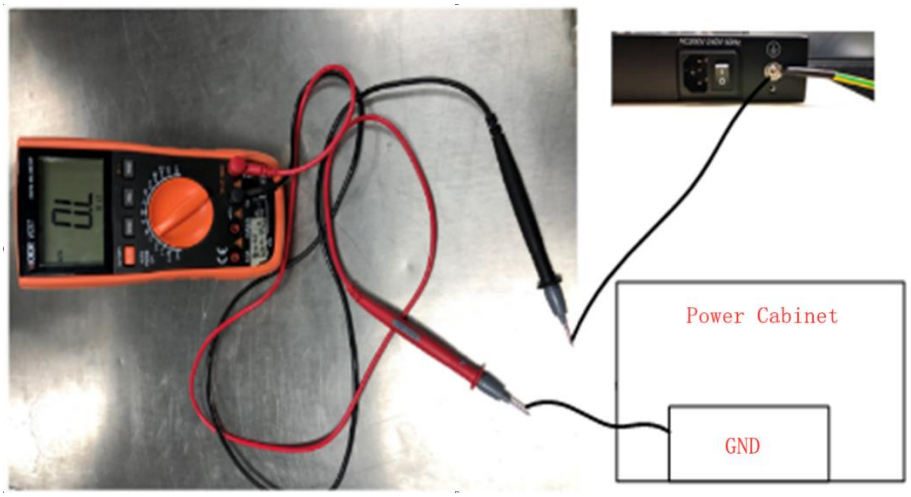


Figure 3-34 Equipment grounding test diagram

If the resistance value measured is relatively small (in the range of a few ohm to ten ohm), the equipment is considered to be well grounded. If the resistance value is too large, it can be checked from the following aspects:

1. Eliminate the problem of the meter itself: meter and two-meter pen are short-circuited, and observe whether the resistance value is zero; The resistance is zero, and the meter is normal; Not zero, the meter is abnormal;
2. Whether the screws for equipment grounding are tightened;
3. Whether the ground wire is broken.

2) Touch the equipment shell with an electric pen. If the electric pen light is on, it means that there is current in the equipment shell and there is leakage. Check whether the equipment grounding is standard.

Proprietary & Confidential
© 2023 Comba

3.6 Device identification

Each equipment, wall-mounted box and electric meter box shall be pasted with obvious labels to facilitate future management and maintenance. The labels shall be pasted at the place where the front of the equipment and equipment is visible. The labels of each cable (such as composite optical cable, power cable, pigtail, etc.) are pasted at the beginning and end of the cable at a distance of 20 mm from the end of the cable to facilitate reading and future management and maintenance. The label shall be neat and clear.

The label of the equipment shall be pasted at a conspicuous place of the equipment, without affecting the unity and coordination of the overall environment, so as to maintain the overall beauty. The main engine and power supply must be hung with warning signs.

When there are multiple equipment or multiple lines side by side, the labels must be pasted on the same horizontal line.

Proprietary & Confidential
© 2023 Comba

3.7 Routine inspection

Equipment installation: check whether the equipment installation position is consistent with the design and whether the installation is firm;
Power supply installation: check whether the power supply is normal and whether the installation process of the power cable is qualified;
Site label: check whether the equipment, power supply and other labels are complete, and whether the stickers are standard;
Cable continuity: use the network cable tester to test whether the network cable is normal, and use the optometry pen to test whether the physical link of the pigtail is normal;
Good grounding of equipment: use a meter to test the resistance of the grounding wire to the ground.
Other: check whether the relevant indicators are on after powering on.

4 Site commissioning

4.1 Commissioning process and physical topology

Equipment opening inspection is shown in Table 4-1.

Table 4-1

Check items before and after commissioning		Check completed
Physical connection between devices	Connection between AU, expansion unit and remote unit	/
Wireless parameters	1. SA networking: 5G mode, AMF IP, PLMN, Gnbid, carrier configuration, TAC, slice parameter, slot ratio 2. NSA networking: 5G mode, PLMN, Gnbid, carrier configuration, TAC, slot ratio, X2 parameter	/
Transmission parameters	WAN network parameter configuration	/
Synchronization mode	GPS synchronization mode	/
Status check after cell activation	CU status: CU_CellStatus DU status: DU_CellStatus RU status: CellStatus DP status: topology map display status on the web RF status: RFChStatus X2 status: CU_ LinkStatus (NSA networking) AMF status: CU_ LinkStatus (SA networking)	/

The commissioning flow diagram and physical topology are shown in Figure 4-1

Proprietary & Confidential
© 2023 Comba

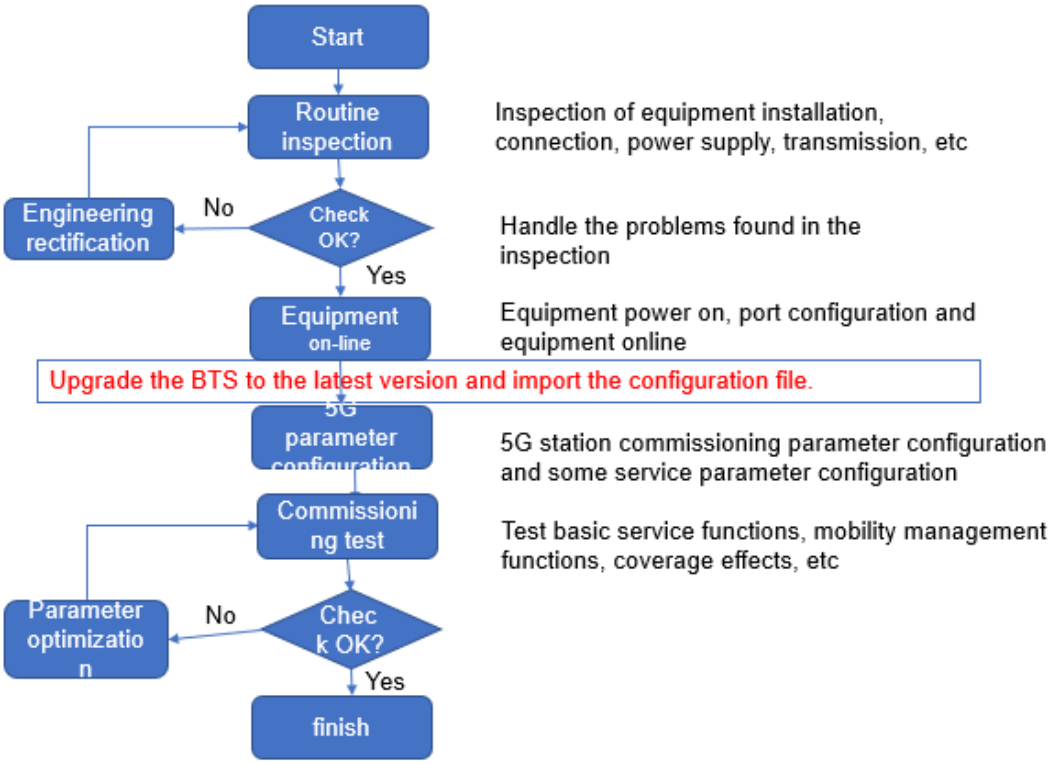


Figure 4-1 Commissioning Flow Chart

4.2 Commissioning parameters

4.2.1 NSA commissioning parameters

NSA commissioning parameters are shown in Table 4-2 (only applicable to ICELL).

Table 4-2

NSA networking parameter configuration		
Type	Demand	Remarks
PTN transmission resources	4G requires one gigabit optical port or network port 5G requires one 10Gbps optical port	/
	PTN port, VLAN number, VLAN IP, subnet mask, default gateway IP	
Base station parameter resources	1 set of 4G base station parameters:	/
	PLMN, eNB ID, Cell ID, TAC, IP address	
	1 set of 5G base station parameters:	
	PLMN, GNB ID, Cell ID, TAC, IP address	
EPC parameters (supporting 5G NSA)	1 set of EPC and provide the following information:	/
	MME IP address	
	MME SCTP port number	

Proprietary & Confidential
© 2023 Comba

	SGW IP address	
FTP server	1 FTP server, providing IP address, port, user name, and password	/
Test equipment	3 5G test phones, 3 USIM cards (unlimited traffic)	/

SA commissioning parameters are shown in Table 4-3 (applicable to ICELL and RRU).

Table 4-3

SA Parameter Configuration		
Type	Demand	Remarks
PTN transmission resources	One 10Gbps optical port, providing the following information:	/
	PTN port, VLAN number, VLAN IP, subnet mask, default gateway IP	
Base station parameter resources	5G base station parameters:	If you need to test the interoperation between the pico sites,Two sets of 5G parameters are required
	PLMN, GNB ID, Cell ID, TAC, IP address	
5GC parameters	1 set of 5GC and provide the following information:	/
	AMF IP address	
	AMF SCTP port number	
	UPF IP address	
FTP server	1 FTP server, providing IP address, port, user name, and password	Used for ping and filling packets
Test equipment	3 5G test phones, 3 USIM cards (unlimited traffic)	/

4.3 Login to the WEB interface

The 5G industrial computer that normally leaves the factory is a self-starting version. It can automatically load large packages and log in to the web within about 5 minutes after powering on, and directly log in to the WEB interface to configure parameters.

4.3.1 Enter the WEB interface

Browser login web: 192.168.197.241, refer to Figure 4-2 Web login interface.

Proprietary & Confidential
© 2023 Comba

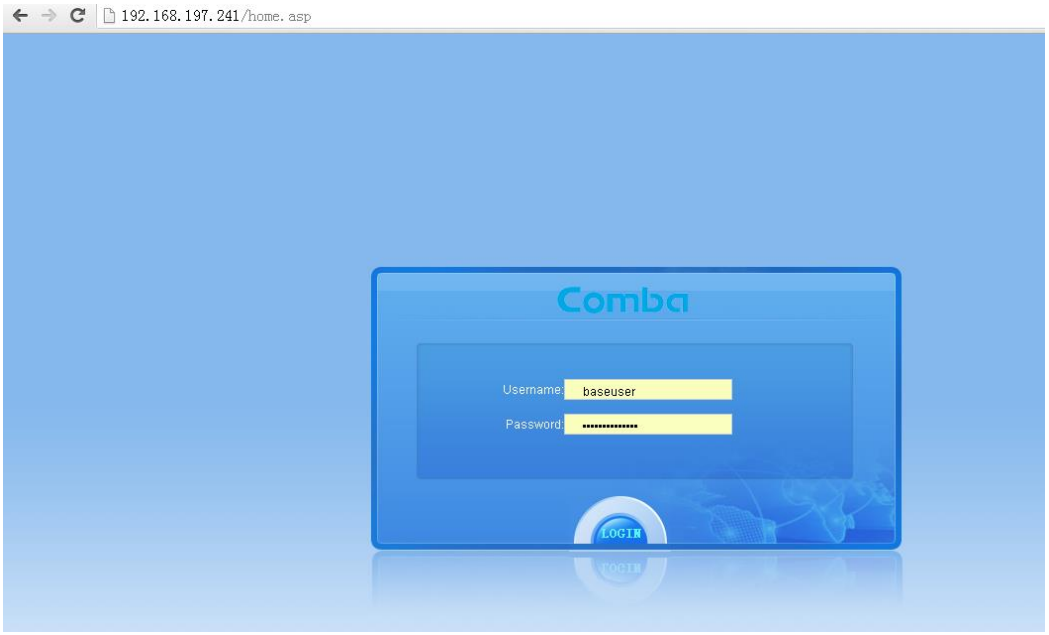


Figure 4-2

4.4 NSA Commissioning

Log in to the web and click Setup guide, as shown in Figure 4-3.

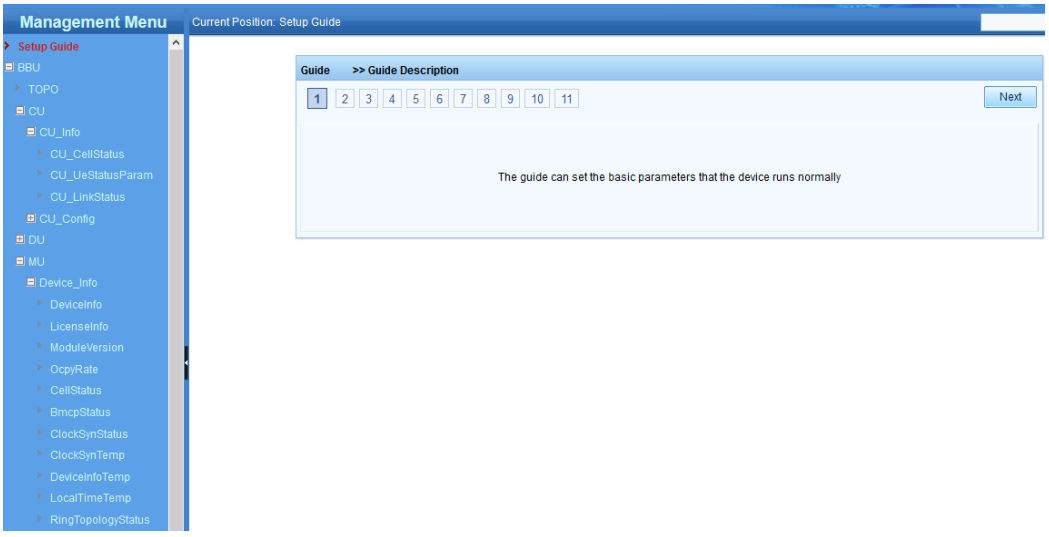


Figure 4-3

4.4.1 Configure WAN network

Click Next to enter Step 2 and configure the network. The following three figures show the configuration of IPV4/IPV6 and VLAN, as shown in Figure 4-4 and Figure 4-5

Proprietary & Confidential
© 2023 Comba

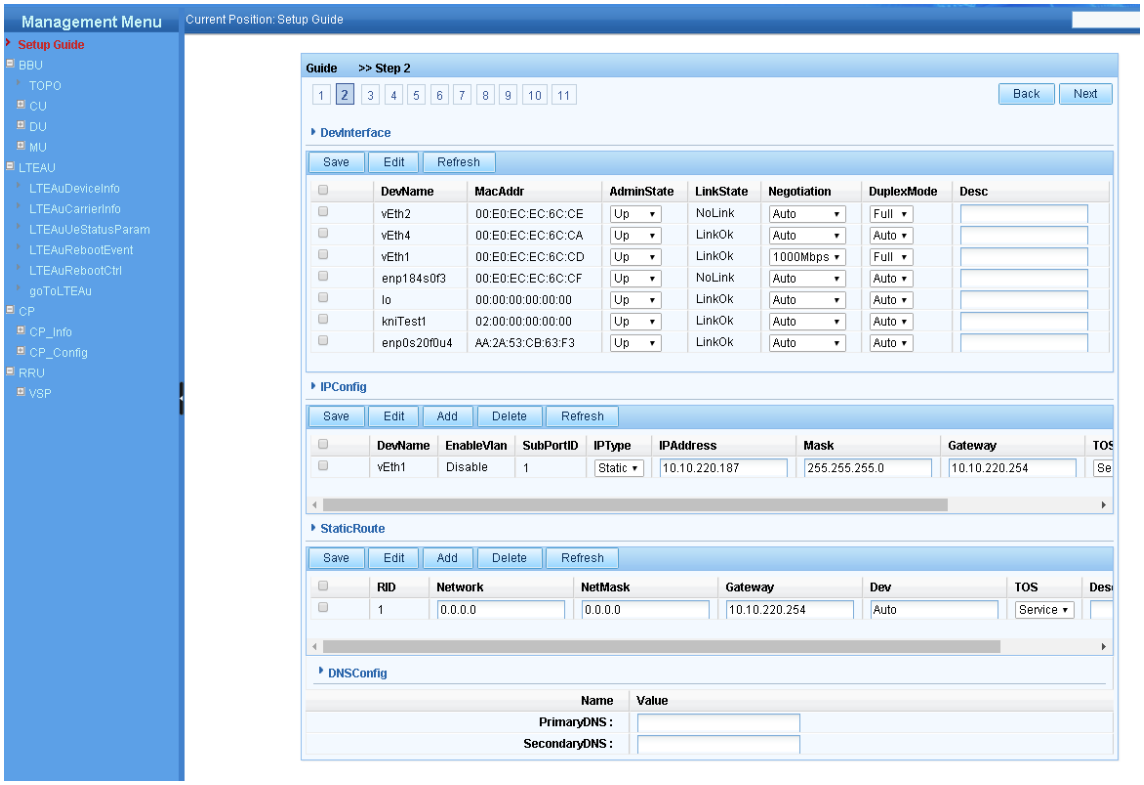


Figure 4-4

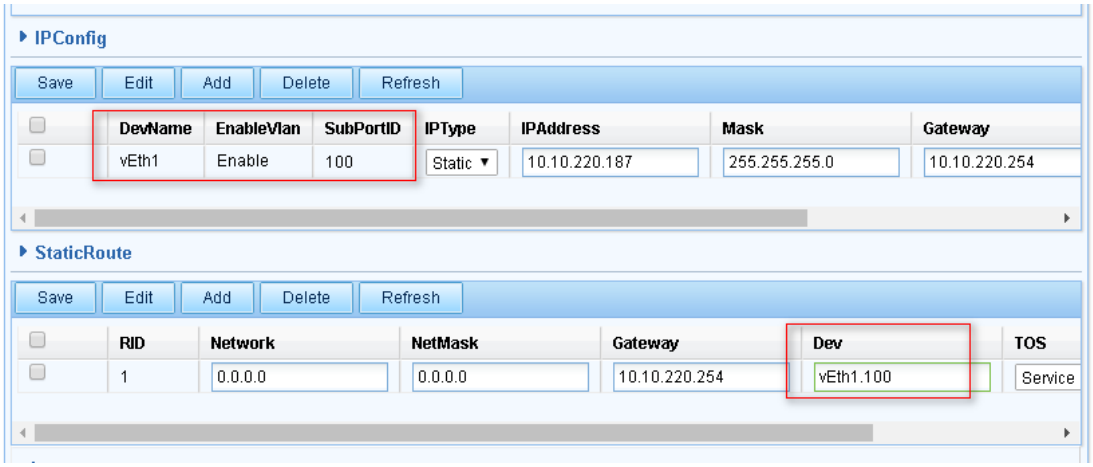


Figure 4-5

IPConfig: Click the Add button to fill in DevName, EnableVlan, IPAddress, Mask, Gateway, and TOS;

3) DevName generally selects vEth1 by default, that is, OP2 port is selected for backhaul transmission (upper left optical port for backhaul transmission);

4) "EnableVlan is a vlan configuration. If there is a vlan, select Enable, and if there is no vlan, select Disable.";

5) The SubPortID is a vlan ID. If there is a vlan, configure the corresponding vlan. If

Proprietary & Confidential
© 2023 Comba

there is no vlan, the default value is 1;

6) IPAddress: IP address, filled in according to the actual provided;

7) Mask: Mask address, filled in according to the actual provided;

8) Gateway: default gateway, filled in according to the actual provided;

9) TOS: Service is selected by default. For example, when configuring dual vlans, the service vlan corresponds to the service, and the management vlan selects other;

10) StaticRoute: If you need to configure a default route, click Add to add it;

11) Dev configuration. If there is no vlan, the default configuration is Auto. If there is a vlan, the configuration is "DevName" in IPConfig "SubPortID", as configured in the above figure for vEth1.100;

In the screenshot above, the first two figures show the configuration of IPV4, and the third figure shows the configuration of IPV6, which is set according to the network configuration provided by the operator.

Click Next after completing the parameters.

4.4.2 NTP settings and clock synchronization settings

NTP settings and clock synchronization settings are shown in Figure 4-6.

Proprietary & Confidential
© 2023 Comba

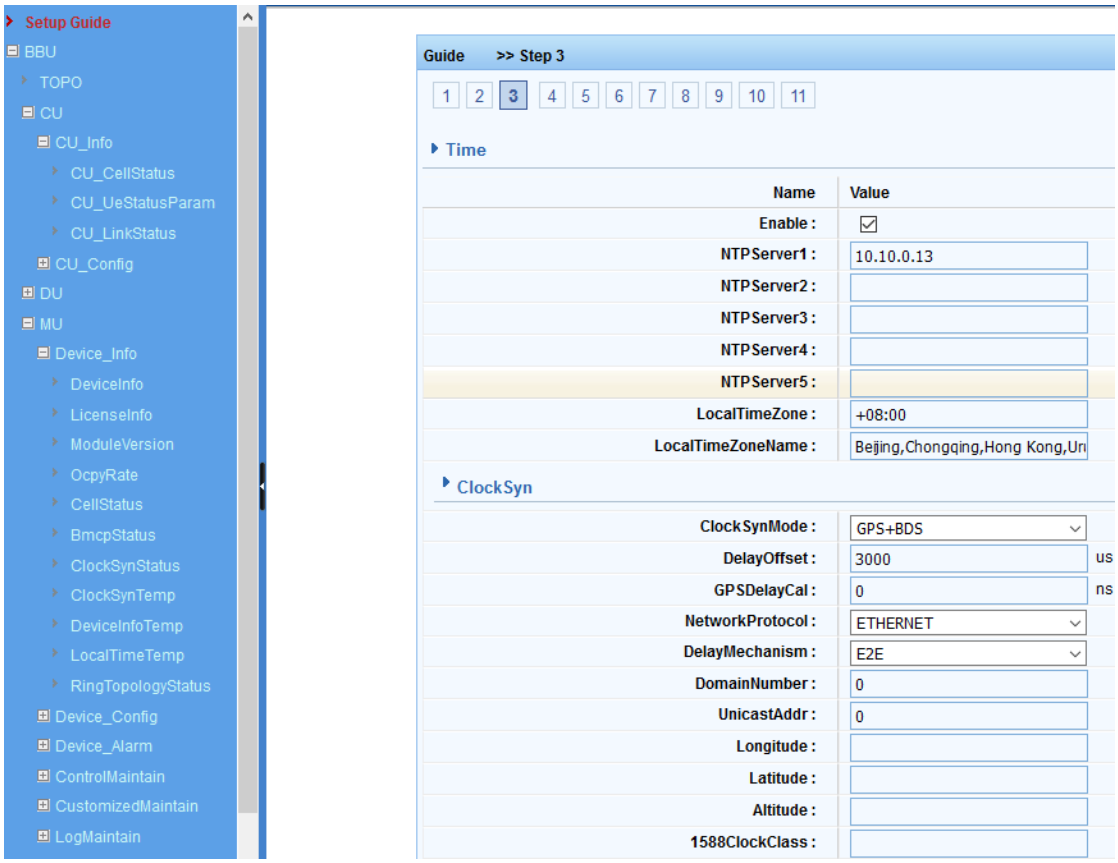


Figure 4-6

1) The NTP service is filled in based on the actual IP address. If there is none, it can be left blank;
2) ClockSynMode: Clock synchronization mode. The default is GPS+Beidou. If using network cable type RGPS, select RPGS;
3) DelayOffset: Before power-on, the default setting is 0. After large data packets are loaded, and the cell is established normally, adjust the frame header offset based on the frame header offset of the 5G macro station or the frame header offset referred to 4G D frequency band (such as 0.7 ms) plus 4/5G (shift back by 3 ms or shift forward by 2 ms), which can be configured according to the actual situation. The adjustment range is - 9 to 9 ms, and 1 ms is 1000;

   Other default parameters.

Proprietary & Confidential
© 2023 Comba

4.4.3 Gnfid, carrier routing configuration

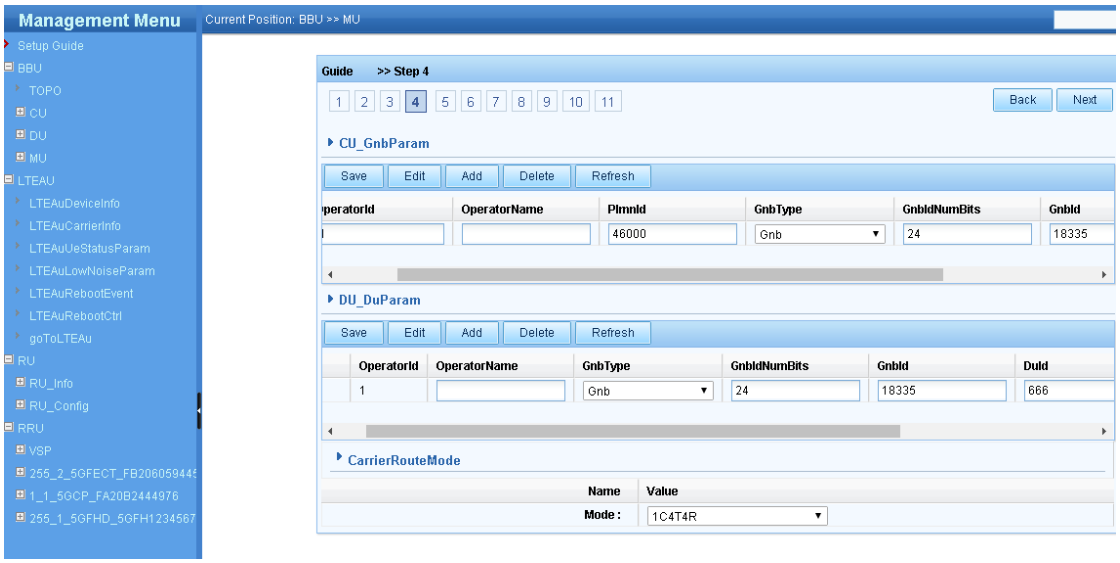


Figure 4-7

CU_ GnbParam：

PlmnId: Fill in the information provided by the operator. Generally Mobile 46000, Unicom 46001, Telecom 46011;

GnbIdNumBits: The number of GnbId bits, which is a 24-bit GnbId by default;

GnbId: Fill in based on the GnbId provided by the operator.

DU_ DuParam：

GnbType: select gNB;

DUID: DU number, optional;

DUName: DU name, optional;

CellType: Select SUB6G.

CarrierRouteMode：The default factory Mode is 1C4T4R, that is, carrier 4T4R. You can configure 1C2T2R and 2C4T4R based on site requirements.

Proprietary & Confidential
© 2023 Comba

4.4.4 5G PLMN and DU_ TAList Configuration

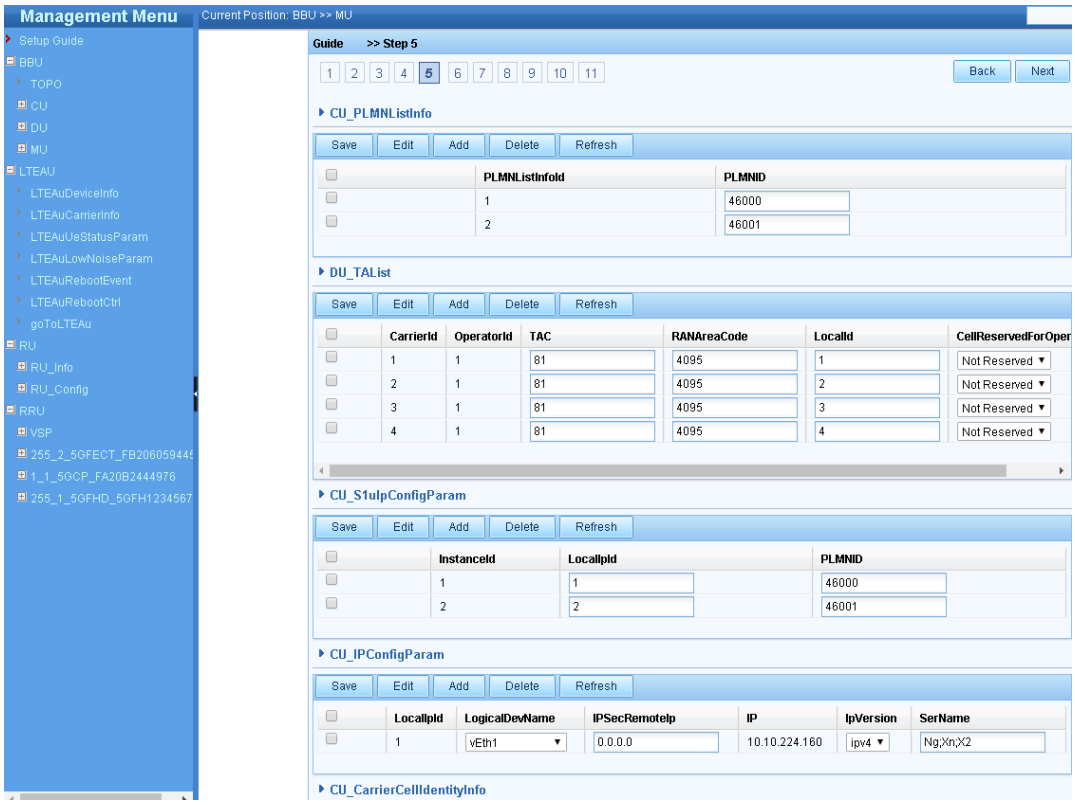


Figure 4-8

Plmn settings are shown inFigure 4-8.

CU_ PLMNListInfo and DU_ PLMNListInfo: Fill in the PLMNID according to the actual situation;

DU_ TAList: The default configuration is 4 carriers, focusing on TAC parameters, and the configuration is based on the TAC provided by the carrier.

LocalIpId: Set the LocalIpId corresponding to the backhaul port on the web BBU>>CU>>CU_Config>>CU_IPConfigParam page.

DU_TAList Localid must be consistent with the corresponding carrier Localid to CU_CarrierCellIdentityInfo.

4.4.5 5G carrier parameter configuration

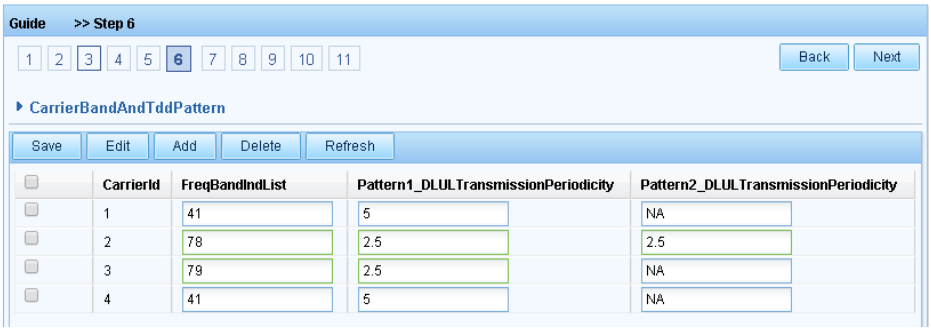


Figure 4-9

© 2023 Comba

Figure 4.4-8 Carrier Setting

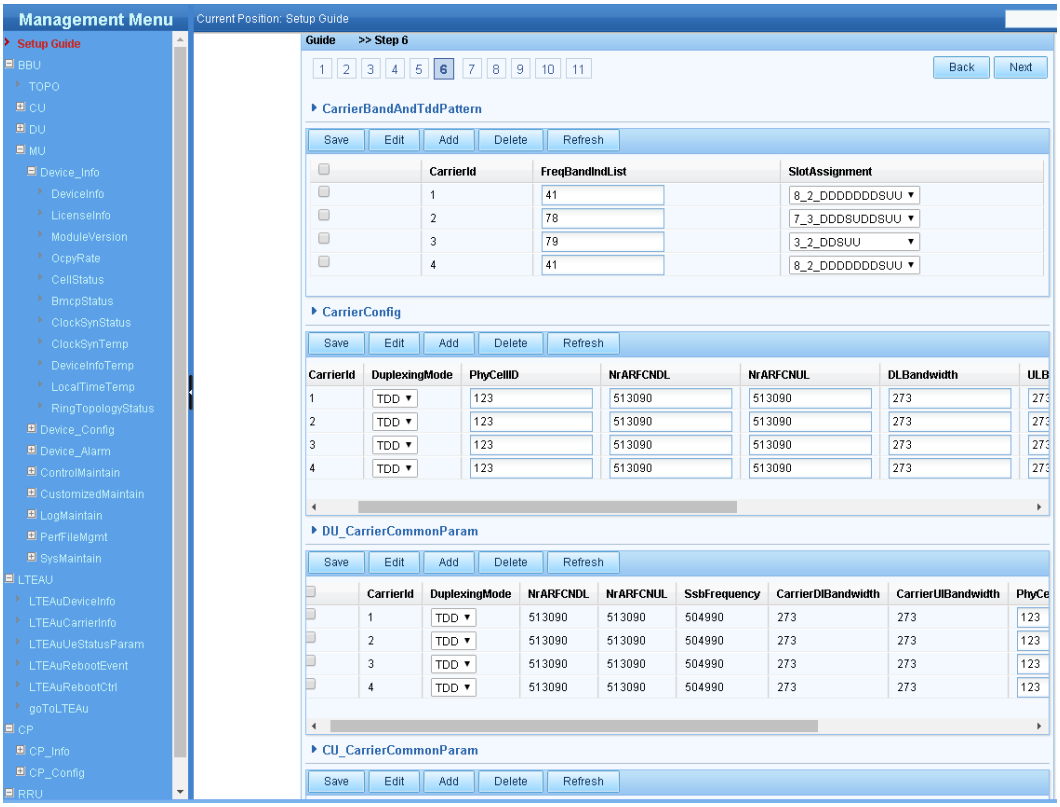


Figure 4-10

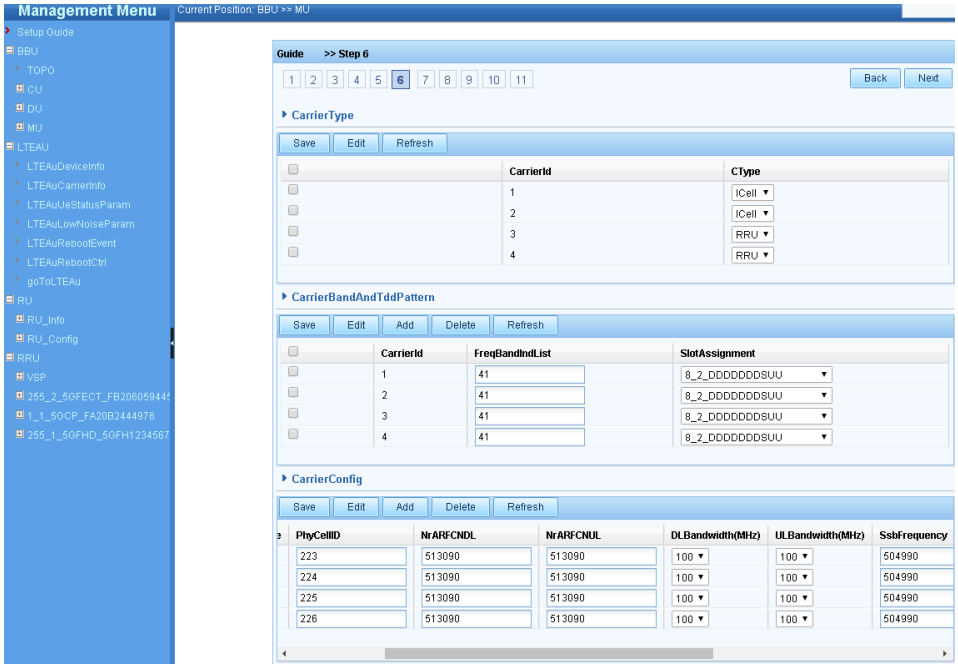


Figure 4-11

Carrier Band AndTddPattern: Version 0.6SP9 (refer to the version description in Appendix 1) and earlier versions. The slot ratio configuration is shown in Figure 4-9. Carrier 1 is the 5ms single-cycle configuration of Band41, carrier 2 is the 2.5ms double-cycle configuration of Band78, carrier 3 is the 2.5ms single-cycle configuration

Proprietary & Confidential
© 2023 Comba

of Band79.The above configuration is for reference only. For the version upgraded to V0.6SP10 or later, CarrierBandAndTddPattern should be changed to only FreqBandIndList and SlotAssignment. In SlotAssignment, 8_ 2 is a 5ms single cycle configuration, 7_ 3 is a 2.5 ms double cycle, 3_ 2 is a 2.5 ms single cycle configuration. Refer to Figure 4-10 for configuration. Upgrade to version V0.8, and the corresponding carrier configuration is shown in Figure 4-11. For CType, select ICell or RRU, and the uplink and downlink bandwidth is configured according to the actual configuration. For example, 100 represents 100 Mhz bandwidth.

CarrierConfig: Require configuring the PhyCellID, NrARFCNDL, NrARFCNUL, DLBandwidth, ULBandwidth, SsbFrequency, and ReferenceSignalPower (dBm) parameters.

PhyCellID is a physical CellID that is configured according to the operator's plan;

NrARFCNDL, NrARFCNUL, DLBandwidth, ULBandwidth, SsbFrequency: If the frequency and bandwidth are normal, configure them based on the data provided by the carrier. If the operator does not provide it, and there are macro stations around as neighboring areas, generally we match SSB frequency points the same as macro stations; If there is no macro station, the default frequency point is generally configured.

ReferenceSignalPower: The distributed default is -12. CarrierTargetPower is 23.15dbm, and the default setting for high power is 16.CarrierTargetPower is 50dbm;

DU_ Carrier Common Param and CU_ CarrierCommonParam: The DU and CU carrier parameters have been associated with the configuration of CarrierConfig and do not need to be modified.

Mobile timeslot ratio: FreqBandIndList in CarrierBandAndTddPattern is set to Band41, Pattern1_ DLULTransmissionPeriod is a single cycle of 5 milliseconds; Select ms5 (5ms) for the time slot interval DlUlTxPeriod, the number of downlink slots NrofDownlinkSlots is 7, the number of downlink symbols NrofDownlinkSymbols is 6, the number of uplink slots NrofUplinkSlots is 2, and the number of uplink symbols NrofUplinkSymbols is 4. Mobile uses this configuration.

Unicom and Telecom timeslot ratio: FreqBandIndList in CarrierBandAndTddPattern is set to Band78. Pattern1_ DLULTransmissionPeriodicity and Pattern2_ DLULTransmissionPeriodicity are 2.5 ms double cycle; Unicom Telecom is 2.5 ms dual cycle (that is, there are two TddPatternid). The slot interval DlUlTxPeriod is ms2p5 (2.5 ms). The downlink slot number NrofDownlinkSlots for TddPatternid 1 is 3. The downlink symbol number NrofDownlinkSymbols is 10. The uplink slot number NrofUplinkSlots is 1, and the uplink symbol number NrofUplinkSymbols is 2; The TddPattern 2 downlink slot number of NrofDownlinkSlots is 2.The downlink symbol number of NrofDownlinkSymbols is 10.The uplink slot number of NrofUplinkSlots is 2, and uplink symbol number of NrofUplinkSymbols is 2. Unicom and Telecom use this configuration, which is filled in according to the configuration in Figure 4-12.

Proprietary & Confidential
© 2023 Comba

SCS (kHz)	5MHz	10MHz	15MHz	20 MHz	25 MHz	30 MHz	40 MHz	50MHz	60 MHz	80 MHz	90 MHz	100 MHz
	N_{RB}	N_{RB}	N_{RB}	N_{RB}	N_{RB}	N_{RB}	N_{RB}	N_{RB}	N_{RB}	N_{RB}	N_{RB}	N_{RB}
15	25	52	79	106	133	160	216	270	N/A	N/A	N/A	N/A
30	11	24	38	51	65	78	106	133	162	217	245	273
60	N/A	11	18	24	31	38	51	65	79	107	121	135

其中，系统带宽100M，子载波间隔30KHz的5G系统，最多传输的PRB数目为273。

Figure 4-12

1) Carrier DLBandwidth: Downlink bandwidth. Currently, 30KHZ subcarrier interval is used, and the 100M bandwidth is 273 RB numbers as shown in Figure 4-10;

2) Carrier ULBandwidth: The downlink bandwidth.Currently, 30KHZ subcarrier interval is used, and the 100M bandwidth is shown in Figure 4.4-10 as 273 RB numbers. The uplink and downlink RBs should be consistent;

3) Currently, China Mobile Unicom Telecom uses this RB number;

4) TAC and Localid are filled in based on the actual situation,as shown in Figure 4-10.

4.4.6 Scheduling and working mode configuration

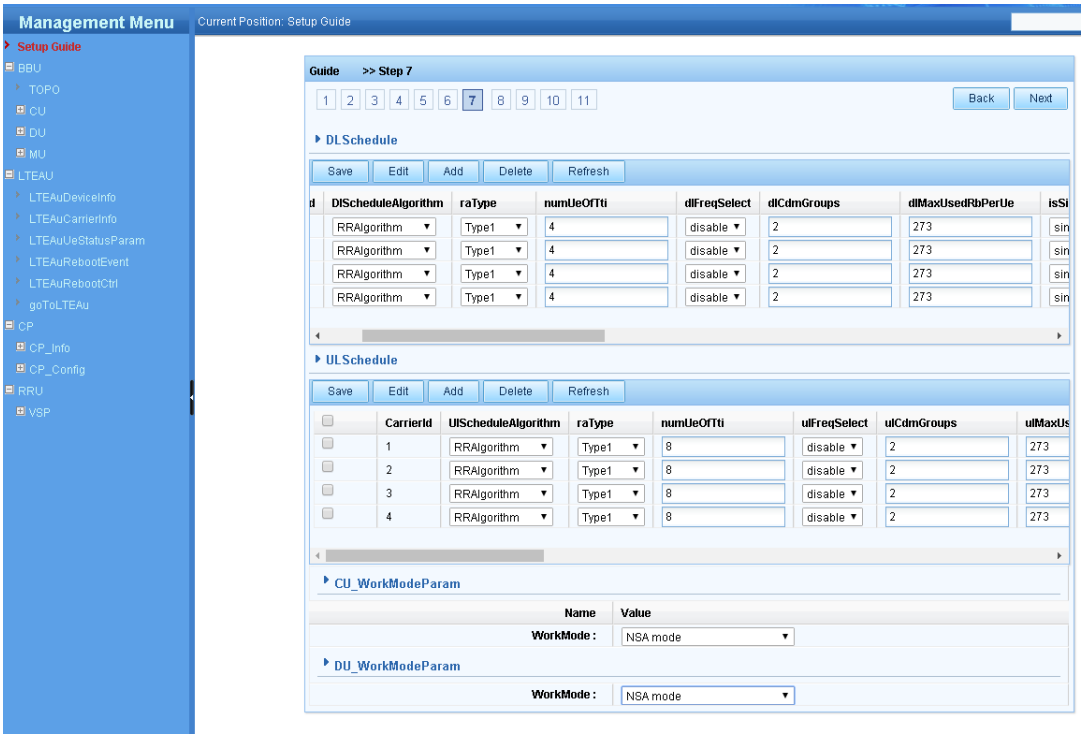


Figure 4-13

Proprietary & Confidential
© 2023 Comba

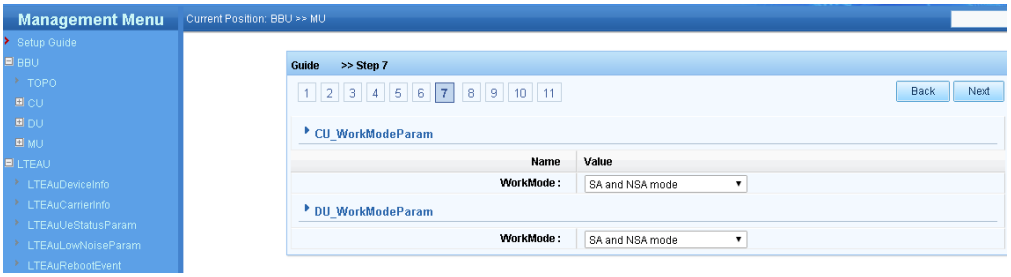


Figure 4-14

The scheduling and working mode configuration of the V0.6 version is shown in Figure 4-13.

DLSchedule: Downlink scheduling parameters, including the numLayers parameter. Configure 2 for 2T2R, and configure 4 for 4T4R;

ULSchedule: Downlink scheduling parameter. The numLayers parameter is configured as 2 by default. NSA's uplink actually only has a single layer, and SA's default uses 2 layers;

Note: In versions later than V0.6SP10 (refer to Appendix 1 for the version description), the numLayers of the uplink and downlink scheduling parameters are adaptive based on the UE and do not need to be modified.

In V08 version, the uplink and downlink scheduling configuration is removed, and only the working mode configuration is retained, as shown in Figure 4-14**.**

CU_ WorkModeParam: select SA or NSA mode according to the actual situation

DU_ WorkModeParam: select SA or NSA mode according to actual situation

The working modes of CU and DU must be consistent;

SA: Independent networking mode;

NSA: Non independent networking mode;

SA and NSA mode: dual networking mode

4.4.7 X2 parameter setting

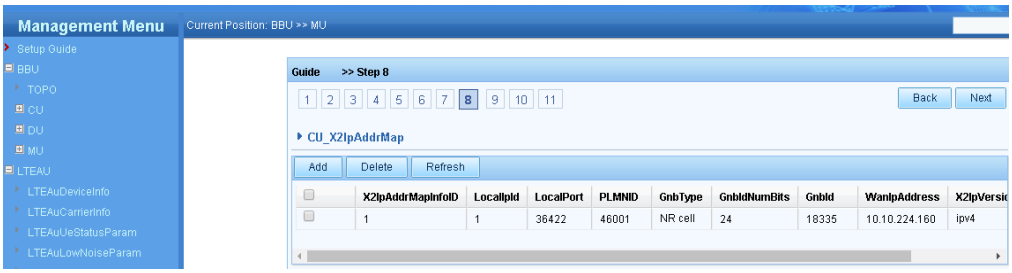


Figure 4-15

When configuring X2 parameters on a 5G AU, the parameters filled in are all 5G parameters. PLMN, GnbId, and WanIpAddress are filled in based on the actual situation. The LocalPort configuration is 36422.GnbType is NR Cell, GnbIdNumBits is 24 bits by default, and X2IpVersion is IPV4, as shown in Figure 4-15.

Proprietary & Confidential
© 2023 Comba

4.4.8 Network management connection configuration

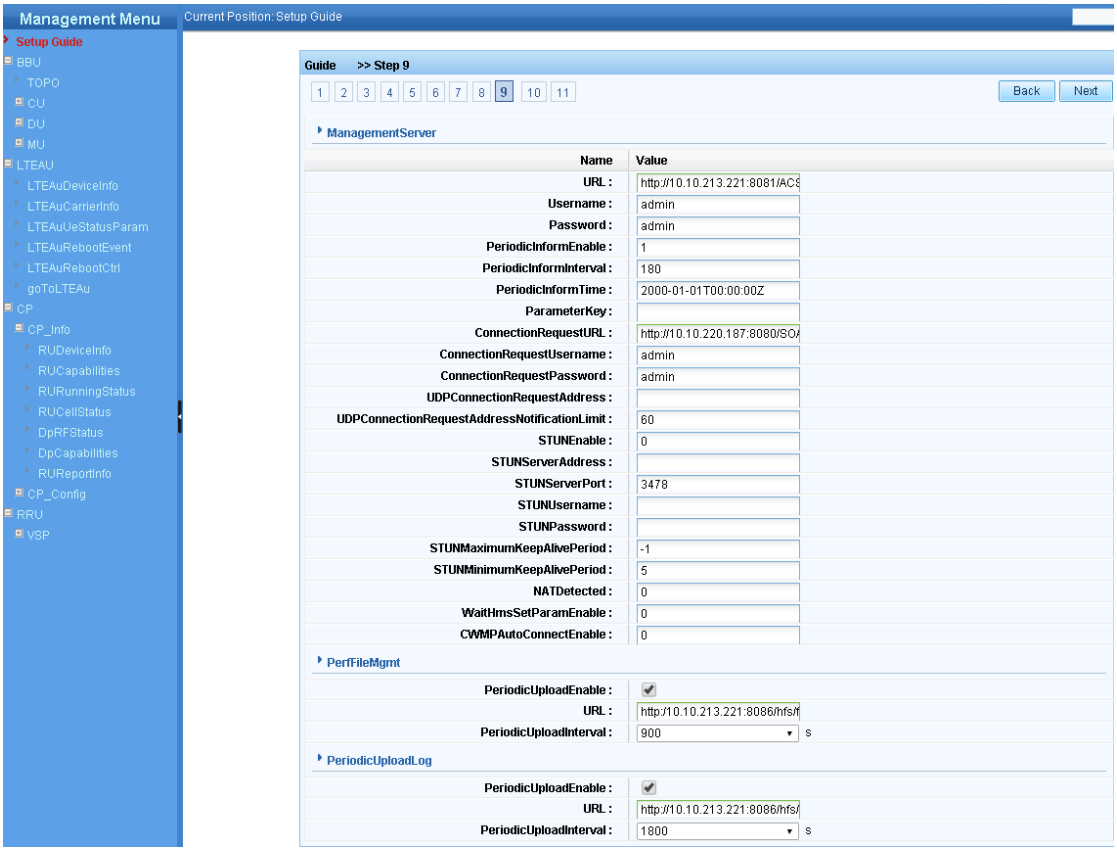


Figure 4-16

The network management connection parameter settings are shown in Figure 4-16. The connection network management URL is filled according to the actual situation.

PerfFileMgmt: Performance file upload switch, URL, and upload cycle;

PeriodicUploadLog: Log file upload switch, URL, and upload cycle.

4.4.9 Cell control parameter configuration

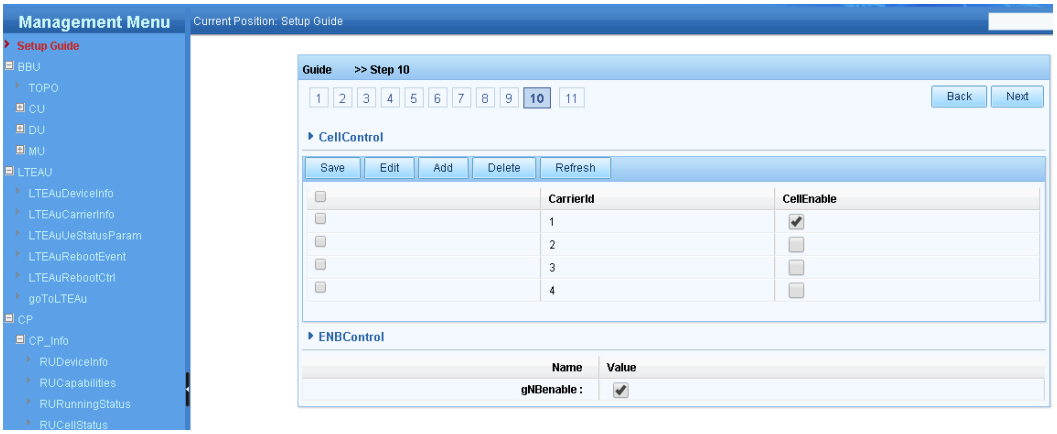


Figure 4-17

The CellEnable switch of CellControl is the cell activation switch, which is enabled by

© 2023 Comba

default, as shown in Figure 4-17.

4.4.10 NSA Neighborhood Configuration

The NSA neighbor configuration is shown in Figure 4-18.

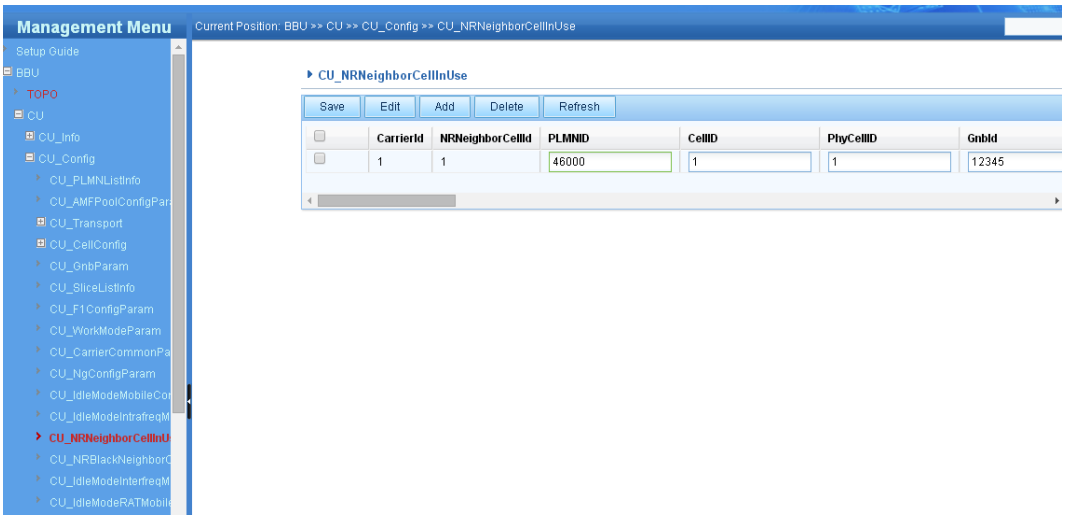


Figure 4-18

4.4.11 4G parameter configuration

4.4.11.1 Configure X2 parameters

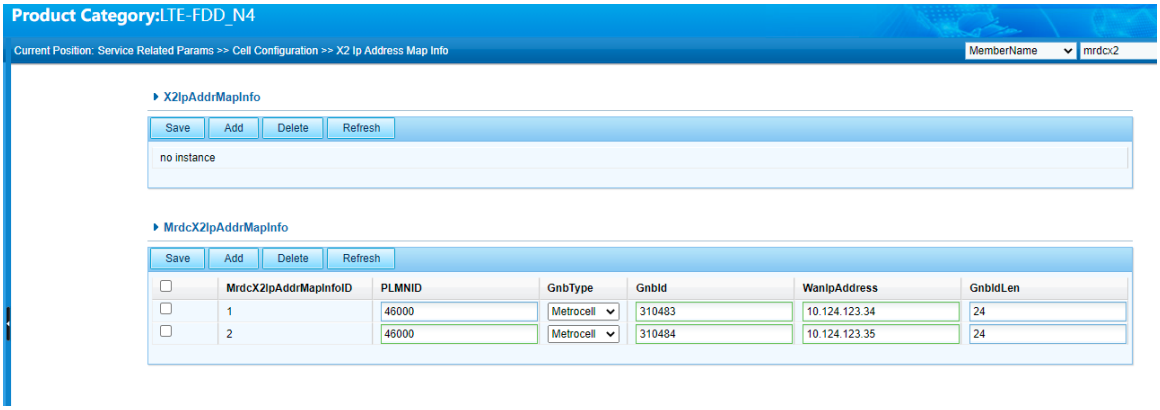


Figure 4-19

When configuring x2 links on the 4G AU side, the parameters configured are all 5G parameters. Select the macro station cell for GnbType, and fill in the Gnbid of 5G for Gnbid. WanIpAddress is a 5G backhaul network IP address, and GnbIdLen is configured based on the actual situation of 5G, with a default of 24 bits, as shown in Figure 4-19.

Proprietary & Confidential
© 2023 Comba

4.4.11.2 Configure NR Neighboring Zone

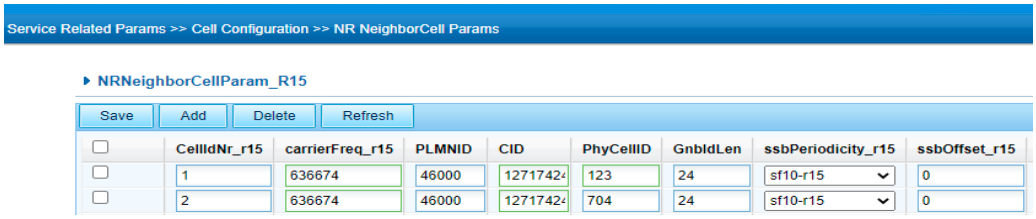


Figure 4-20

The central frequency point allocated on the 4G side is the frequency point of 5G ssb. The 5G ssb frequency point can be seen in the 5G wed, and the CID refers to the 5G cellid. Generally, only carrierFreq_r15,PLMNID, CID, PhyCellID, NRband_r15, and TAC are required. Other values are default. If carrierFreq_r15 is within the NRband_r15 band, a message box is displayed indicating that the setting fails if it is not within the band, as shown in Figure 4-20.

When adding NR adjacent area to ssbPeriodicity_r15, ENB-3566_A0AV01.04.10.16_0 and previous versions, ssb periodicity is 20ms by default, while 5G ssb periodicity is 10ms. If the two parameters do not match, it may lead to a lower success rate of NRB1 measurement. It is suggested to change the SSB cycle to 10ms when adding NR adjacent area on 4G side.

4.4.11.3 Slave clock configuration

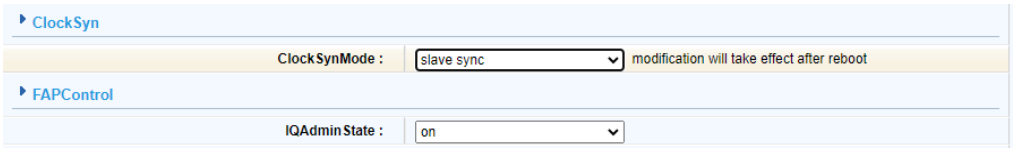


Figure 4-21

In Device Information → System Configuration→Clock Synchronization Parameters, set the base station clock operation mode to sync from clock.The clock synchronization is obtained from the 5G BBU side, as shown in Figure 4-21.

Proprietary & Confidential
© 2023 Comba

4.4.11.4 NSA parameters

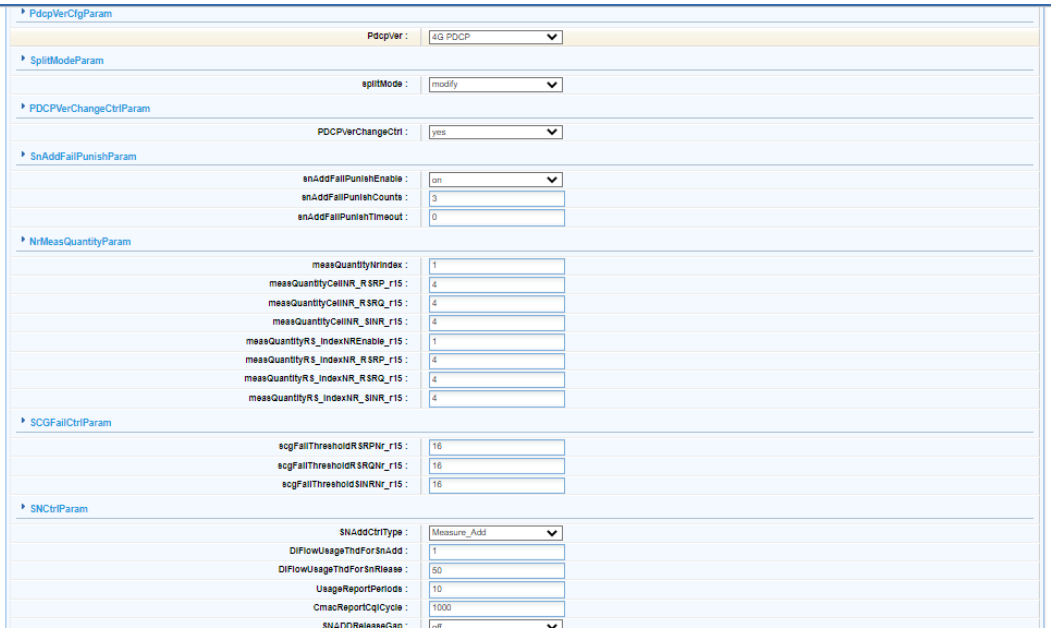


Figure 4-22

SNAddCtrlType adds SN based on traffic configuration by default from the factory, and will also be modified to add SN based on traffic configuration after upgrading the version; For example, to facilitate access to 5G for testing, it can be modified to add SN based on the measurement configuration, as shown in Figure 4-22.

4.5 SA Commissioning

In the setup guide, for the first 8 steps of configuring SA networking, refer to the configurations in NSA networking. Starting from step 7, the configuration is different.

4.5.1 5G SA Mode Configuration

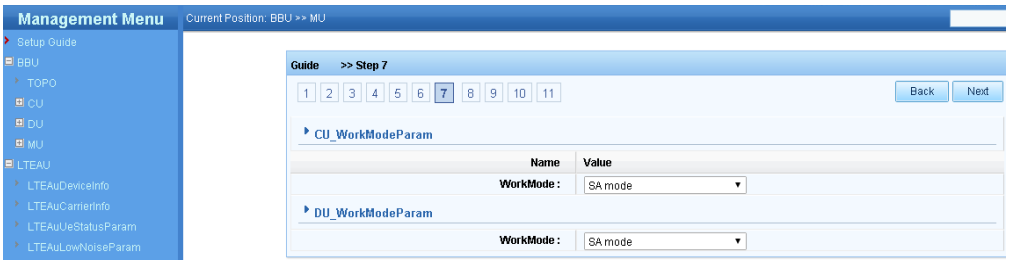


Figure 4-23

The 5G SA mode setting is shown in Figure 4-23.

Proprietary & Confidential
© 2023 Comba

4.5.2 5G AMF and network slicing information configuration

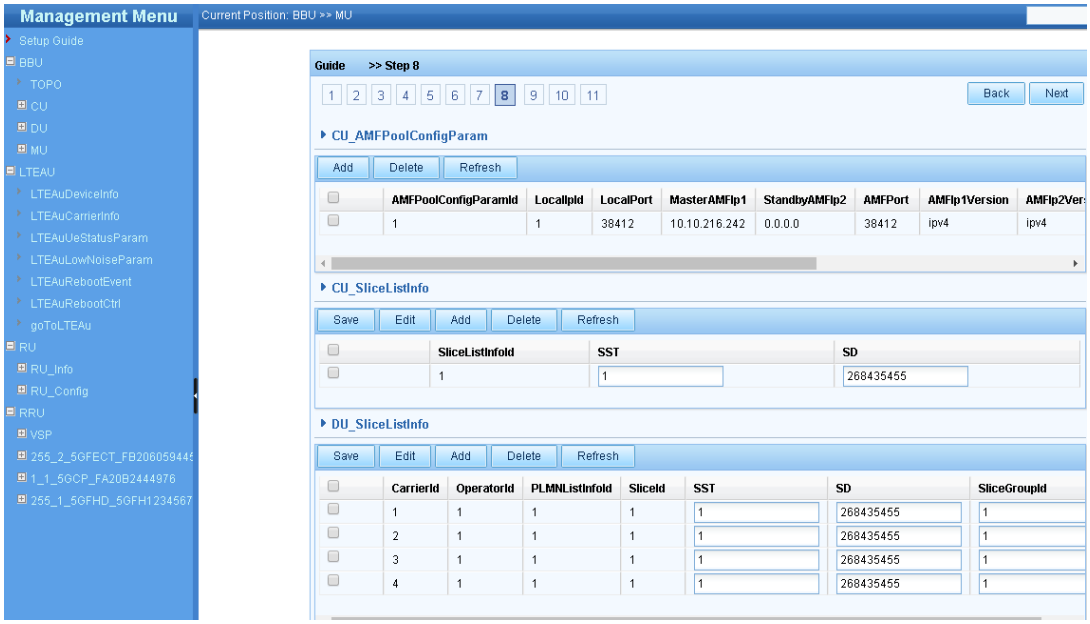


Figure 4-24

When SA networking is selected, configure AMF and network slice information in Guide-- Step8, as shown in Figure 4-24.

1) The default port is 38412;
2) AMF: Access and mobility management function, which is responsible for the mobility and access management of the control plane, replacing the function that cannot be MME. The address is provided by the core network;
3) LocalIpId: Fill in referring to the LocalIpId corresponding to the backhaul port of the IPConfigParam interface in web BBU>>CU>>CU_ Config>>CU_IPConfigParam.
4) Slice information is provided by the core network, and filling in slices under NSA networking does not affect cell establishment;
5) SST: Slice type, which defines the service scenarios/types of network slices, standardized;
6) SD: Slice distinguishing symbol. Distinguish different network slices of the same type.

Proprietary & Confidential
© 2023 Comba

4.5.3 Network management connection configuration

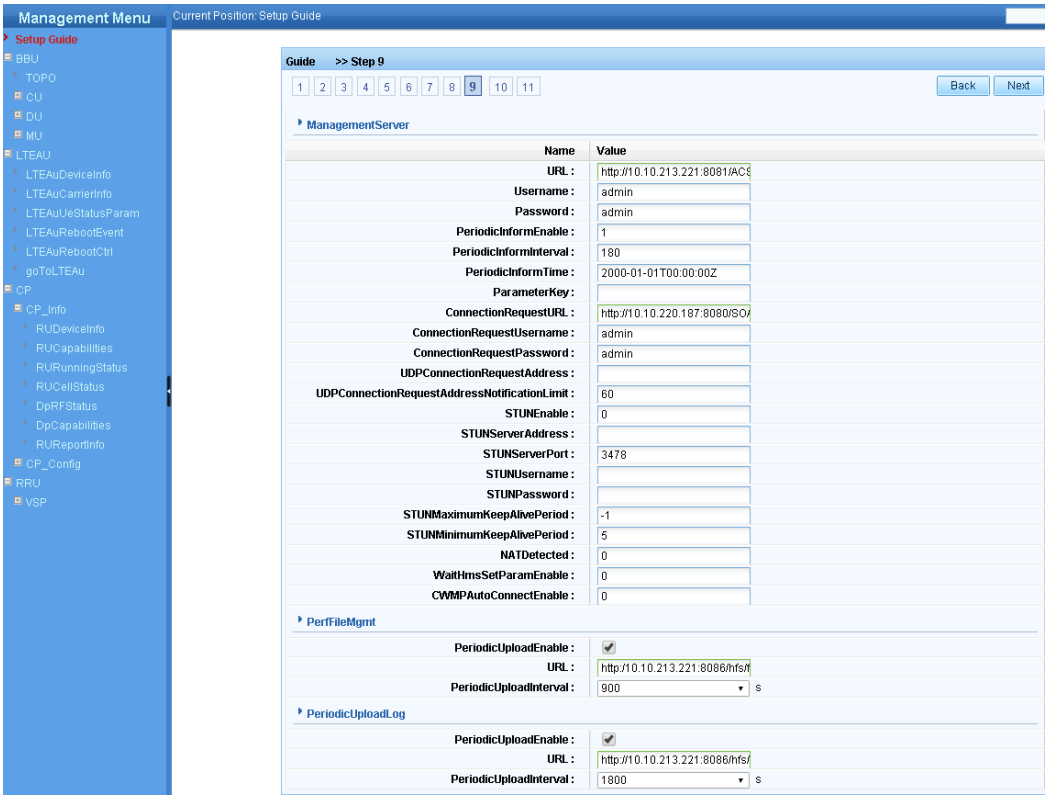


Figure 4-25

The network management connection parameter settings are shown in Figure 4-25. The connection network management URL is filled according to the actual situation.

PerfFileMgmt: Performance file upload switch, URL, and upload cycle;

PeriodicUploadLog: Log file upload switch, URL, and upload cycle;

4.5.4 Cell control parameter configuration

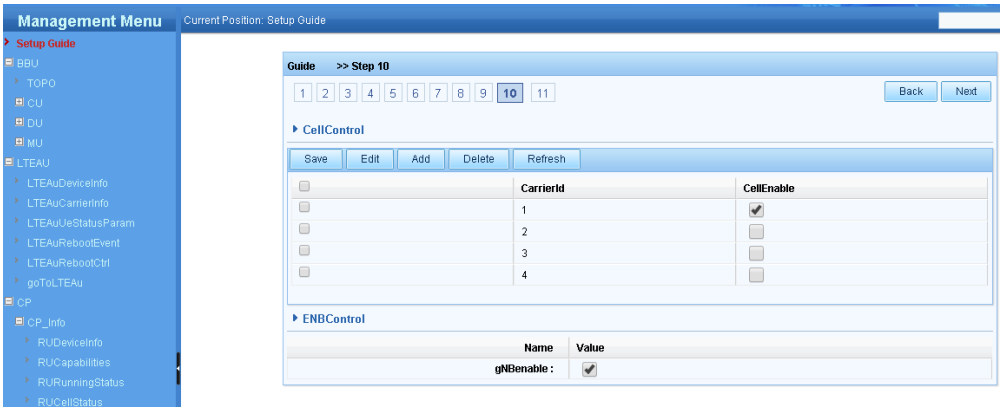


Figure 4-26

CellEnable of CellControl is the cell activation switch, which is enabled by default, as shown in Figure 4-26.

Proprietary & Confidential
© 2023 Comba

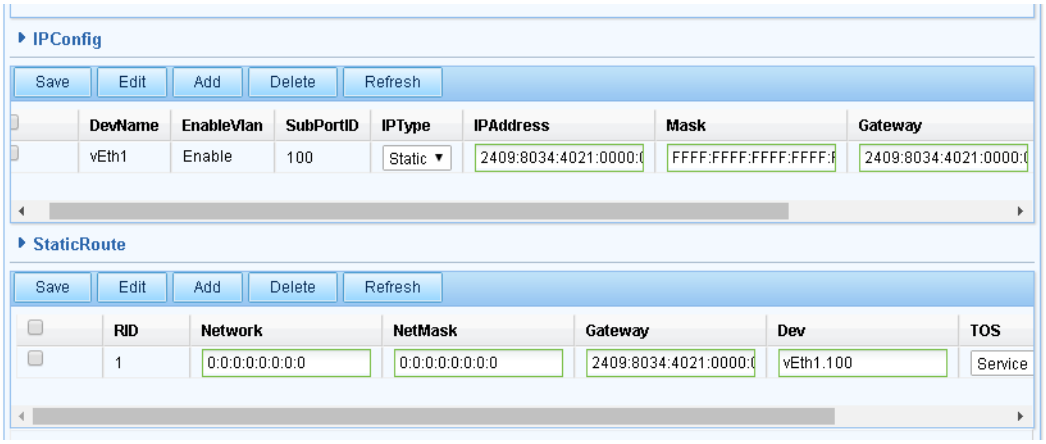


Figure 4-27

IPConfig: Click the Add button to fill in DevName, EnableVlan, IPAddress, Mask, Gateway, and TOS;

1) DevName generally selects vEth1 by default, that is, OP2 port is selected for backhaul transmission (upper left optical port for backhaul transmission);

2) "EnableVlan is a vlan configuration. If there is a vlan, select Enable, and if there is no vlan, select Disable.";

3) The SubPortID is a vlan ID. If there is a vlan, configure the corresponding vlan. If there is no vlan, the default value is 1;

4) IPAddress: IP address, filled in according to the actual provided;

5) Mask: Mask address, filled in according to the actual provided;

6) Gateway: default gateway, filled in according to the actual provided;

7) TOS: Service is selected by default. For example, when configuring dual vlans, the service vlan corresponds to the service, and the management vlan selects other;

8) StaticRoute: If you need to configure a default route, click Add to add it;

9) Dev configuration. If there is no vlan, the default configuration is Auto. If there is a vlan, the configuration is "DevName" in IPConfig "SubPortID", as configured in the above figure for vEth1.100;

In the screenshot above, the first two figures show the configuration of IPV4, and the third figure shows the configuration of IPV6, which is set according to the network configuration provided by the operator.

Click Next after completing the parameters.

Proprietary & Confidential
© 2023 Comba

4.5.5 NTP settings and clock synchronization settings

NTP settings and clock synchronization settings are shown in Figure 4-28

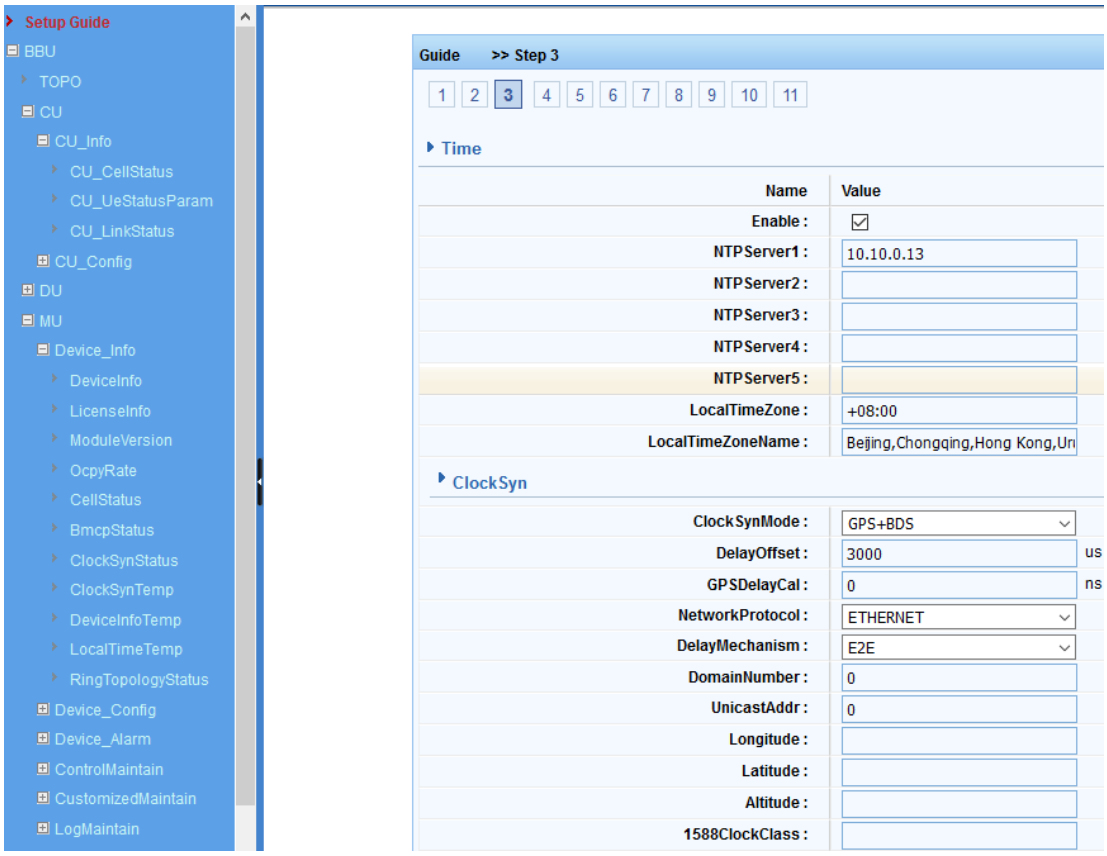


Figure 4-28

1) The NTP service is filled in based on the actual IP address. If there is none, it can be left blank;

2) ClockSynMode: Clock synchronization mode. The default is GPS+Beidou. If using network cable type RGPS, select RPGS;

3) DelayOffset: Before power-on, the default setting is 0. After large data packets are loaded, and the cell is established normally, adjust the frame header offset based on the frame header offset of the 5G macro station or the frame header offset referred to 4G D frequency band (such as 0.7 ms) plus 4/5G (shift back by 3 ms or shift forward by 2 ms), which can be configured according to the actual situation. The adjustment range is - 9 to 9 ms, and 1 ms is 1000;

5 Appendix

Name and content description of hazardous substances in products

Proprietary & Confidential
© 2023 Comba

Product name: 5G iCell

The name and content identification of hazardous substances in this product are shown in the attached table:

Attached table Name and content of hazardous substances in products

Part Name	Harmful materials					
	Pb	Hg	Cd	Cr(VI)	PBB	PBDE
Power module	×	○	○	○	○	○
XXXX Module	×	○	○	○	○	○
XXXX Module	×	○	○	○	○	○
XXXX Module	×	○	○	○	○	○
Structure	×	○	○	○	○	○

This form is compiled in accordance with SJ/T 11364

○: Indicates that the content of the hazardous substance in all homogeneous materials of the part is below the limit requirement specified in GB/T 26572

×: Indicates that the content of the hazardous substance in at least one of the homogeneous materials of the part exceeds the limit requirement specified in GB/T 26572

Remarks: The content of the parts marked with "×" in the above table exceeds the content because the industry has no mature alternative technology, and the substitution of toxic and hazardous substances or elements cannot be achieved.

Proprietary & Confidential
© 2023 Comba