

# **Comflex NGc User manual**

# 1. System Introduction

## 1.1 Introduction

Comflex NGc is an in-building distributed antenna solution for enterprise and consumer application, supporting the wide application range of cellular generations.

This solution is based on analog DAS technology with wide-band and multi-band distribution architecture, flexible off-air or wired connection mode, enabling efficient utilization of signal links. It is designed to support multi-band, multi-technology, and multi-operator networks with flexible configuration and easy commissioning.

## 1.2 System Architecture

### MU – Master Unit

Select dedicated radio signal, transmit to fiber signal and then transfer to fiber Hub. It can support two kinds connectivity to radio signal: off-air connection and wired connection with different module.

### Fiber Hub

The Fiber Hub is the central Hub and Distribution element for the analog DAS system. The fiber hub interfaces between the MU and the active antenna unit, allowing it to receive the operators service signals in optical link, and to route signals to the active antenna unit.

### Active Antenna Unit

The active antenna unit is a low-power remote antenna unit with 6 dBm per band.

## 1.3 System Function

### 1.3.1 System features

- 1) Network topology
  - MU + Fiber HUB + ARU: 1+16+256
  - MU can connect to ONE slave MU
  - MU can extend up to 16pcs fiber Hub
  - Fiber HUB can connect to 16pcs ARU
  - MU-HUB max fiber loss 8dB;
  - HUB-ARU max fiber loss distance 45dB
- 2) Power Supply

MU & HUB: AC 110V

ARU: DC 48V

- 3) Couple way  
Off-air couple : MU - BDA Card
- 4) The booster be able to detect and mitigate (i.e., by automatic gain reduction or shut down), any oscillations in uplink and downlink bands. Oscillation detection and mitigation must occur automatically within 0.3 seconds in the uplink band and within 1 second in the downlink band. In cases where oscillation is detected, the booster must continue mitigation for at least one minute before restarting. After five such restarts, the booster must not resume operation until manually reset.
- 5) The booster circuit support that automatically controls the gain of a signal by applying more gain to weaker received signals and less (or no) gain to stronger received signals.

### 1.3.2 Monitoring

- 1) Local monitor: local debug and commission
- 2) Remote control: Control the system in MU site
- 3) System upgrade: Software upgrade in MU
- 4) Demodulation: Demodulate the cellular features: RSRP, SINR, PLMN

## 1.4 Specification

### 1.4.1 Optical Specification

Optical Specification		
Operation Frequency		600MHz-1GHz,1.7GHz-2.2GHz
Fiber Mode	/	Simplex
Wavelength	nm	1310, 1550 + WDM
Optical Output	MU	-2 – +2
	HUB	6-8
Return loss	dB	> 45
Connector Type	/	SC/APC

### 1.4.2 Cable Specification

Cable Specification		
Operation Frequency		DC-4GHZ
impedance	Ω	50
VSWR	/	≤1.2
Insert Loss	dB	≤ (L*0.48+0.2) dB@DC-4GHz @ meter

### 1.4.3 Radio Specification

		700MHz	850MHz	1900MHz	EAWS	
Frequency	UL	MHz	698-716 / 777-787	824-849	1850 – 1915	1710 – 1755
	DL		728-746 / 746-756	869-894	1930 – 1995	2110 – 2155
IBW	MHz	18/10	25	65	45/45	
Downlink max output power (ARU)	dBm	6	6	6	6	
Downlink input range (BDA Card)	dBm	-95 —— -50(RSRP)				
UL max gain (BDA Card)	dB	80				
DL max gain (BDA Card)	dB	80				
ATT adjust range	dB	MU: 0 – 30, ARU: 0 – 20				
In-band ripple(P-P)	dB	≤ 4	≤ 6	≤ 6	≤ 6	
Emission spur		FCC	FCC	FCC	FCC	
UL NF at max gain	dB	≤ 10				
System delay (BDA Card)	usec	≤ 10				
Input VSWR		≤ 1.5				
MU Max input power (BDA Card)	dBm	-10				
ARU Max input RF power	dBm	-10				

## **2. INSTALLATION**

### **2.1 WARNINGS AND ALERTS**

#### **Laser**

Laser light can cause damage to eyes. Laser light is not visible. Viewing it directly does not cause pain. The iris of the eye will not close when viewing a bright light. Consequently, serious damage to the retina of the eye is possible. NEVER LOOK INTO THE END OF A FIBER WHICH MAY HAVE A LASER COUPLED TO IT.

#### **Radio Frequency Energies**

There may be situations, particularly for workplace environments near high-powered RF sources, where recommended limits for safe exposure of human beings to RF energy could be exceeded. In such cases, restrictive measures or actions may be necessary to ensure the safe use of RF energy.

#### **High Voltage**

The equipment has been designed and constructed to prevent practicable danger, as far as reasonably possible. Any work activity on or near equipment involving installation, operation or maintenance must be free from danger, as far as reasonably possible.

Where there is a risk of damage to electrical systems involving adverse weather, extreme temperatures, wet, corrosive or dirty conditions, flammable or explosive atmospheres, the system must be suitably installed to prevent danger.

#### **Protective Earthing**

Equipment provided for the purpose of protecting individuals from electrical risk must be suitable for the purpose and properly maintained and used.

#### **Handling Precautions**

This covers a range of activities including lifting, lowering, pushing, pulling, carrying, moving, holding or restraining an object or person. It also covers activities that require the use of force or effort, such as pulling a lever, or operating power tools.

#### **Electrostatic Discharge (ESD)**

Observe standard precautions for handling ESD-sensitive devices. Assume that all solid-state

electronic devices are ESD-sensitive. Ensure the use of a grounded wrist strap or equivalent while working with ESD-sensitive devices. Transport, store, and handle ESD-sensitive devices in static-safe environments.

## **WARNING**

**This is a CONSUMER device.**

**BEFORE USE, you MUST REGISTER THIS DEVICE with your wireless provider and have your provider's consent. Most wireless providers consent to the use of signal boosters. Some providers may not consent to the use of this device on their network. If you are unsure, contact your provider.**

**You MUST operate this device with approved antennas and cables as specified by the manufacturer. Antennas MUST be installed at least 30 cm (12 inches) from any person. Your MUST cease operating this device immediately if requested by the FCC or a licensed wireless service provider.**

**WARNING. E911 location information may not be provided or may be inaccurate for calls served by using this device.**

**This device may be operated ONLY in a fixed location for in-building use.**

**Caution : for use of unauthorized antennas, cables, and/or coupling devices not conforming with ERP/EIRP restrictions is not permitted.**

**Antenna type and permitted max antenna gain: External Dedicated Antenna with gain 10 dBi or less for MU.**

**The 10 meter height limit of Section 27.50(d)(4) applies for Fixed Consumer Signal Boosters transmitting in 1710-1755 MHz. The antenna for the device must be installed to comply with the 10 meter above ground maximum antenna height limitation.**

**Product request the min cable length for both connect donor antenna to booster and server antenna to booster is 5 meters for mitigate any unintended oscillations in uplink and downlink bands.**

A subscriber must have the consent of a wireless-services provider to operate a Consumer Signal Booster. Subscribers may obtain provider consent in a variety of ways. For example, AT&T, Sprint, T-Mobile, and Verizon Wireless have voluntarily committed to allow their subscribers to use properly certificated Consumer Signal Boosters (i.e., boosters that meet the new rules) on their networks. Also, a signal booster manufacturer could seek authorization for use of a particular booster model on behalf of all subscribers of specific providers. Alternatively, a provider may specify a testing protocol that if satisfied would result in licensee consent to specific booster models. A subscriber may also seek a licensee's express consent to operate a signal booster, e.g., by phone call or e-mail.[R11]

Public Notice DA 16-137 [R28] gives listings of Consumer Boosters that have received FCC certification as of February 2, 2016.

The following selected information about wireless providers' Consumer Booster registration mechanisms supplements the requirements and information given in Sections 20.21, 22.9, 24.9, 27.9, and the FCC Signal Boosters website (<http://wireless.fcc.gov/signal-boosters/>).

- Sprint Nextel will allow consumers to register their signal boosters by calling their toll-free number. They have already trained their calling center and have designated an engineer to handle inquiries. They may eventually allow consumers to register on their website but they want to gauge how the process works via phone first.
- T-Mobile online registration link: ([www.T-Mobile.com/BoosterRegistration](http://www.T-Mobile.com/BoosterRegistration)); (<https://saqat.t-mobile.com/sites/SignalBooster#>).
- Verizon's online registration link: (<http://www.verizonwireless.com/wcms/consumer/register-signal-booster.html>).
- AT&T will allow online registration and will inform OET Lab with the weblink when it is ready.
- U.S.Cellular (<http://www.uscellular.com/uscellular/support/fcc-booster-registration.jsp>).

## **2.2 SITE PLANNING CONSIDERATIONS**

### **2.2.1 SITE PLANNING**

#### **Site Considerations**

The MU is designed to be located indoors to facilitate coupling of BTS signals and power supply connections. The input range of MU RF unit is 10~30 dBm.

The site consideration for HUB is listed below:

- The maximum fiber maximum path loss of 8dBo.
- The system delay of the optical system must be taken into consideration when there are neighboring BTS sites overlapping in coverage.

#### **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.

#### **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.

#### **Grounding Requirement**

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

#### **Cable Routing**

Depending on equipment configuration, a variety of types of cables are connected to the MU HUB



and RU: coaxial cables, optical fibers, power cable, communication cable, and commissioning cable. Where applicable, ensure cables are properly routed and secured so that they are not damaged.

### **Manual Handling**

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

## **2.2.2 SYSTEM INSTALLATION CHECKLIST**

- Working space available for installation and maintenance for each mounting arrangement. Ensure unrestricted airflow.
- Ensure earthing point is within reach of the ground wire. (2m; 6 ft. 10 in.).
- Ensure a power source is within reach of the power cord and the power source has sufficient capacity.
- Where appropriate, ensure unused RF connectors are terminated.
- Where appropriate, ensure unused optical fiber connectors are protected.
- Do not locate the equipment near large transformers or motors that may cause electromagnetic interference.
- Reduce signal loss in feeder cable by minimizing the length and number of RF connections.
- Ensure the equipment will be operated within the stated environment (refer to datasheet).
- Where needed, couple BTS RF signal with a coupler to prevent damaging the equipment.
- Where appropriate, confirm availability of suitably terminated grade of RF and optical fiber.
- Observe handling of all cables to prevent damage.

## **2.3 INSTALLATION PROCEDURES**





### **2.3.1 GOODS INWARDS INSPECTION**

ComFlex was factory tested, inspected, packed, and delivered to the carrier with utmost care. Do not accept shipment from carrier which shows damage or shortage until the carrier's agent endorses a statement of the irregularity on the face of the carrier's receipt. Without documentary evidence, a claim cannot be processed.

Open and check each package against the packing list. For any shortage, contact Comba Telecom Systems. Do not remove items from packing materials until installation.

### 2.3.2 TOOLS

See for a full list of tools required for installation and maintenance.

Tool Type	use	Usage Scenario
Impact drill 	Drill installation holes to fit M8 expansion bolts	Wall hanging
adjustable wrench 	Fix the bolt and tighten the M8 hex nut	Wall hanging
Pentagonal wrench 	Fixing screw	Wall hanging
Cross screwdriver 	Fixing screws, $\phi$ 5mm	Wall hanging

### 2.3.3 PREPARATION

Optical Fiber:

- 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 10 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 3cm. (1.2") .

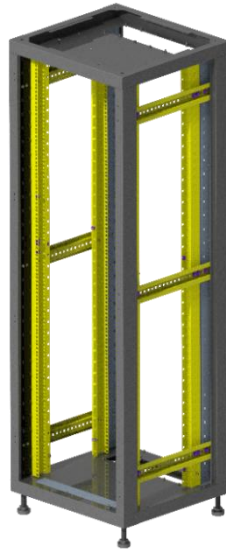
### 2.3.4 MU install

MU consists of three parts: MU chassis, RFU, and FOU. All components are individually packaged. Install the MU chassis on the rack first, then insert the RFU module and FOU module into the MU chassis

### 2.3.5 MU chassis mounted in a 19 inch rack

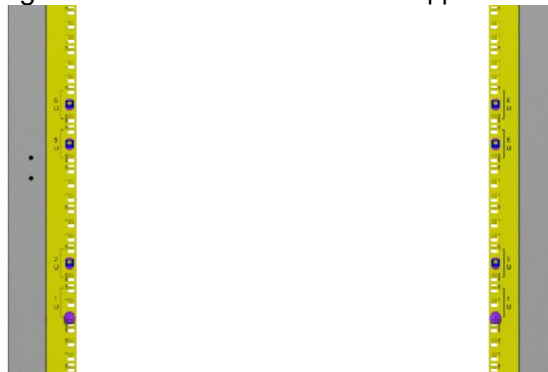
The MU chassis is a 19 inch rack mounted device with a height of 6U, which can be installed into a 19 inch rack as follows:

Figure 2: 19 inch rack



**Step 1:** Determine the installation position of the MU chassis on the rack, install cabinet nuts on the corresponding holes on both sides of the rack as shown in Figure 3, and install cabinet screws on the 1U cabinet nuts on both sides. The cabinet screws are only screwed in half the length.

Figure 3: Install cabinet nuts and support screws



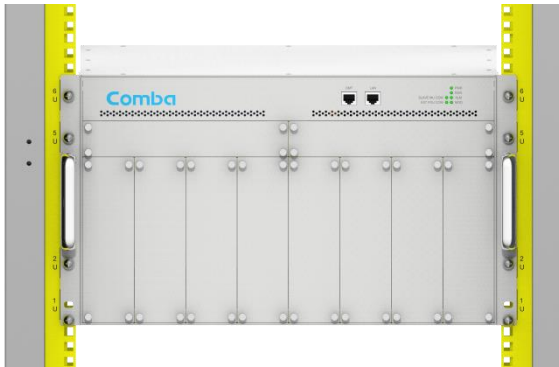
**Step 2:** Place the MU chassis inside the rack, with the notches at the bottom of the hanging ears on both sides slightly higher than the cabinet screws. Then slide the MU chassis down to make the cabinet screws snap into the notches.

Figure 4: Install cabinet nuts and support screws



**Step 3:** Install the remaining 6 cabinet screws on both sides of the MU chassis, tighten the 8 screws (including the pre installed 2 cabinet screws), and complete the installation of the MU chassis.

Figure 5: Install cabinet nuts and support screws

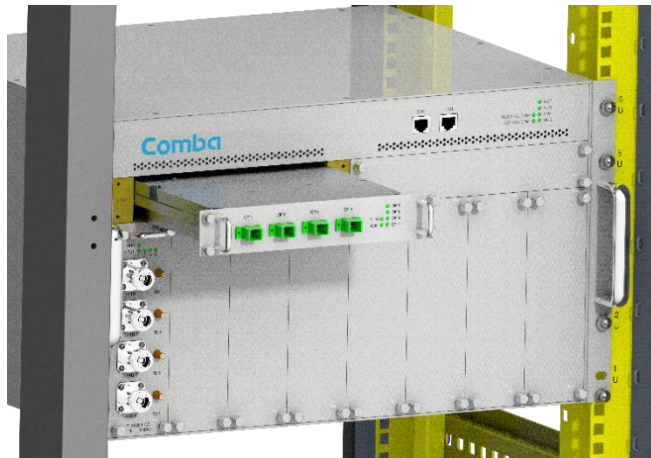


### 2.3.6 RFU and FOU installation

**Step1:** RFU module installation: Remove the baffle of the RFU slot in the MU chassis, insert the RFU module, and tighten the fastening screws on the module (10 RFU modules can be inserted into any of 8 RFU slots)

**Step2:** FOU module installation: Remove the FOU slot baffle from the MU chassis, insert the FOU module, and tighten the fastening screws (FOU module can be inserted into any of the 2 FOU slots)

Figure 7: FOU Installation



### 2.3.7 HUB Wall mounted installation

Install HUB onto the wall as follows

Step 1: Choose the appropriate wall position:

The wall can safely bear the weight of HUB

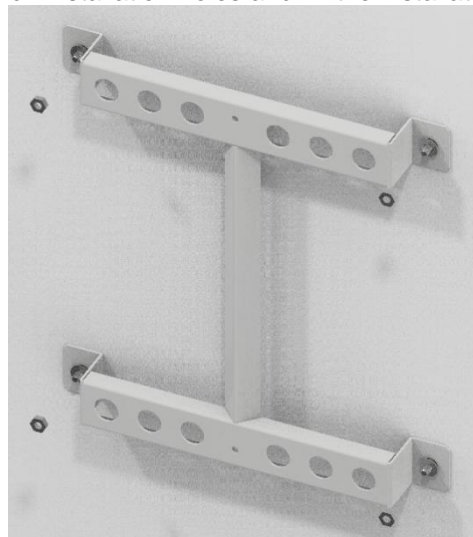
Capable of comfortable wiring at the top and bottom of the HUB

Step 2: Drill installation holes and fix the installation bracket

Use a mounting bracket as a template to mark the positions of four installation holes on the wall. Use a  $\varnothing 10$  impact drill bit to drill installation holes for M8 expansion bolts, with a depth of no less than 50mm.

Install the expansion bolts into the wall, and then fix the installation bracket to the wall through the expansion bolts

Figure 8: Punch installation holes and fix the installation bracket



**Step 3: Hang HUB**

Hang the HUB on the fixed mounting bracket

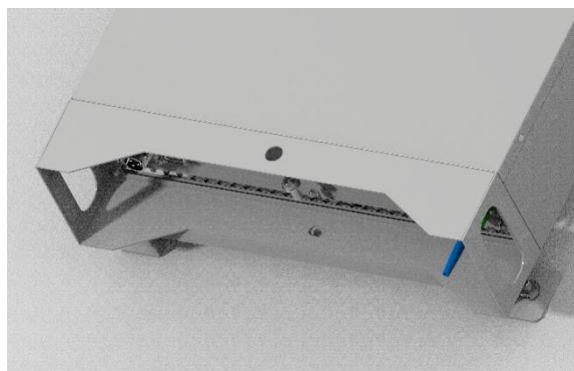
Figure 9: Hang HUB



**Step 3: Fix HUB and complete installation**

At the middle of the bottom of the HUB, use an M6X16 screw to secure the HUB chassis and mounting bracket together to complete the installation.

Figure 10: Tighten the chassis screws



## 2.3.8 ARUinstall

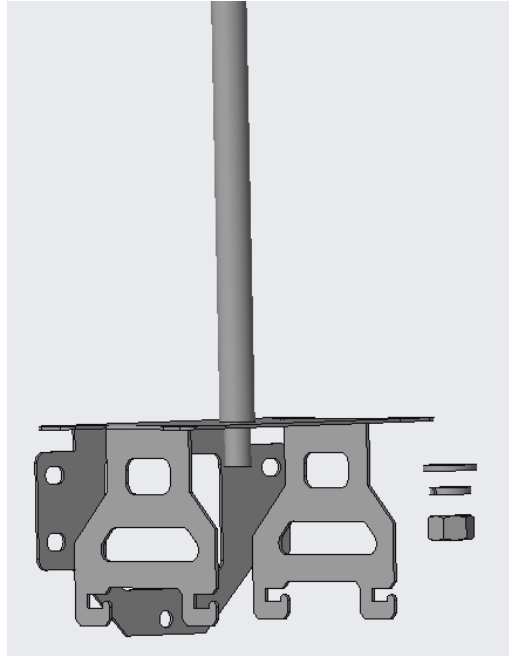
### 1.3.6.1 Hanger installation

In the scenario where ARU is fixed with a suspension rod, complete the installation as follows.

**Step 1:** Fix hanger 1 on the suspension rod.

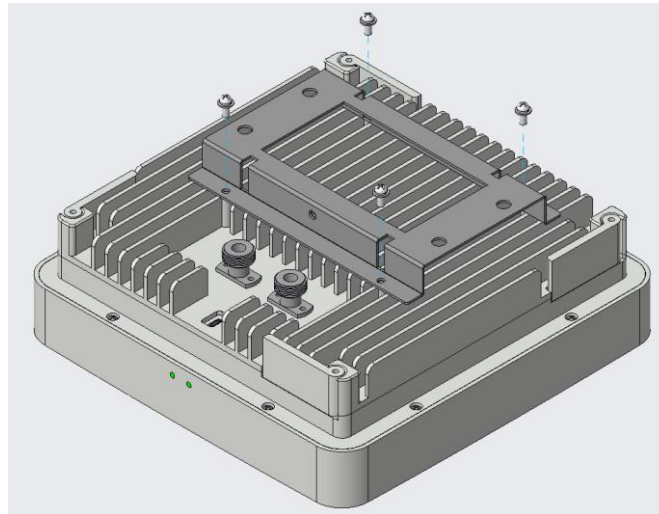
Use nuts and washers to fix Hanger 1 to the already set suspension rod on site (nuts and washers need to be provided by oneself, supporting M8 to M12 suspension rods)

Figure 11: Hanger 1 mounted on the boom



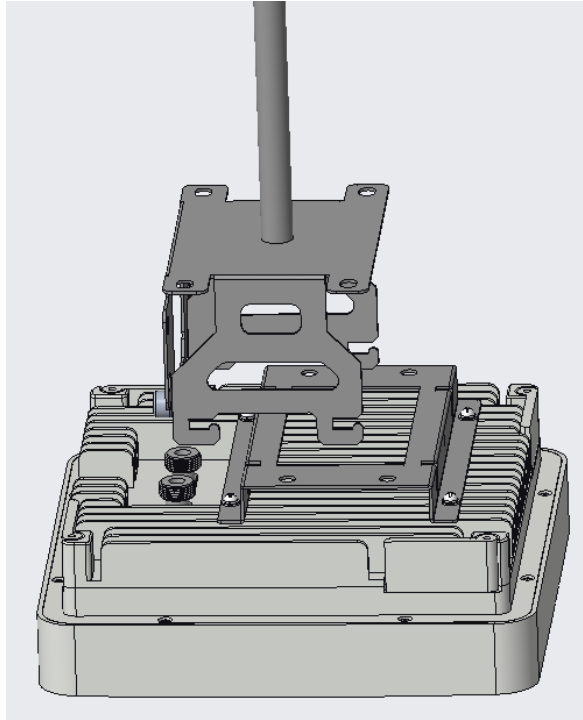
**Step 2:** Mount Hanger 1 on the boom and secure Hanger 2 to the ARU.  
Use M4X10 screws to secure mounting bracket 2 to the ARU.

Figure 12: ARU mounting rack 2



**Step 3:** Hang the ARU, tighten the screws, and complete the installation.  
Hang the ARU on rack 1, tighten the fastening screws on rack 1, and complete the installation.

Figure 13: ARU mounting rack 2

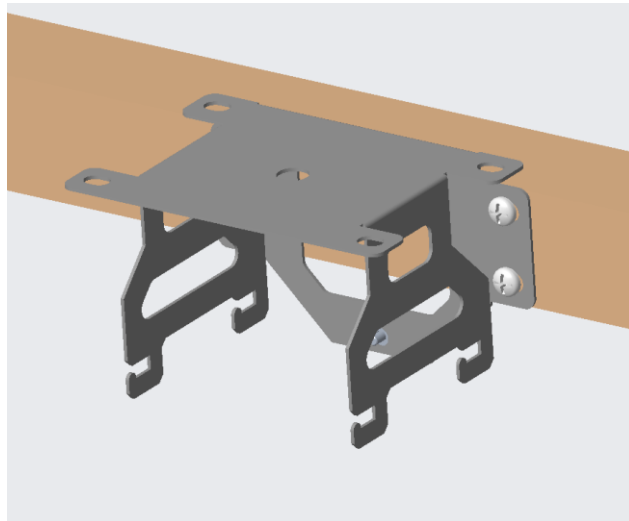


### 1.3.6.2 Installation of wooden beams

**Step 1:** Fix the hanger 1 on the wooden beam.

Use four ST6.3X30 wood screws to secure the hanging bracket 1 to the wooden beam.

Figure 14: Hanger 1 fixed to wooden beam

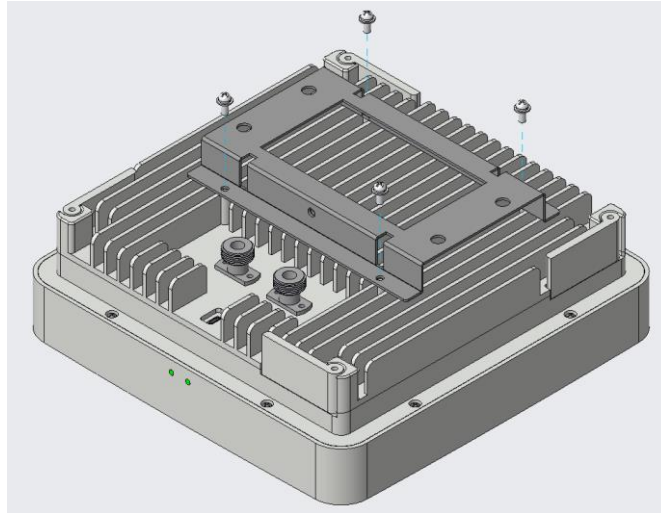


**Step 2:** Secure rack 2 to the ARU.

Use M4X10 screws to secure mounting bracket 2 to the ARU.

Figure 15: ARU MOUNTING RACK 2

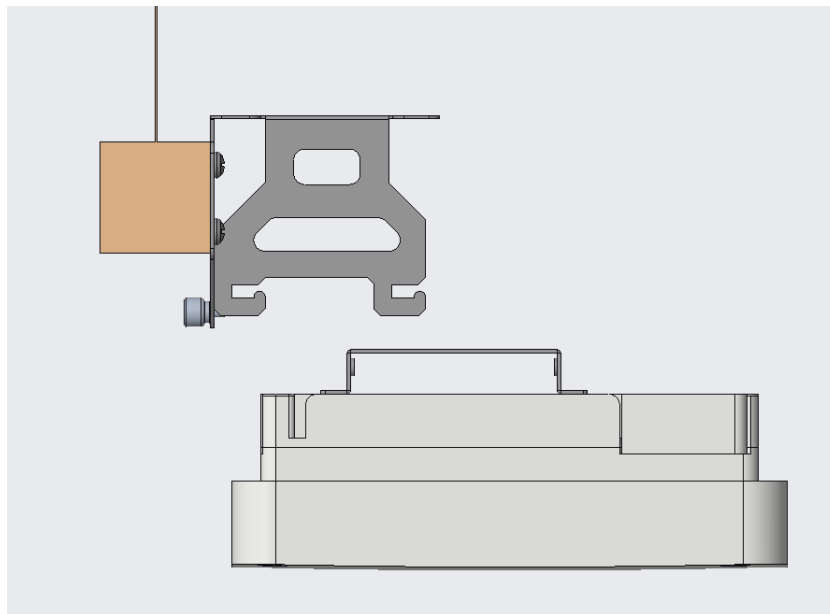




**Step 3:** Hang the ARU, tighten the screws, and complete the installation.

Hang the ARU on rack 1, tighten the fastening screws on rack 1, and complete the installation.

Figure 16: ARU MOUNTING RACK 2



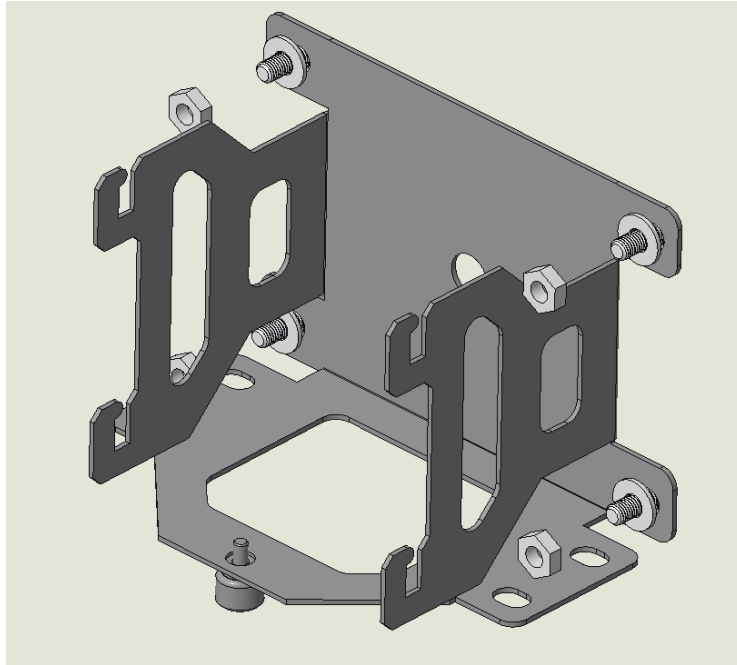
### 1.3.6.3 Wall mounted installation

**Step 1:** Fix hanger 1 on the wall.

Use hanging bracket 1 as a template to mark the drilling position on the wall, and use a  $\varnothing 8$  impact drill bit to drill the installation hole for M6 expansion bolt, with a drilling depth of no less than 40mm.

Install the expansion bolts into the wall, and then fix the installation bracket to the wall through the expansion bolts

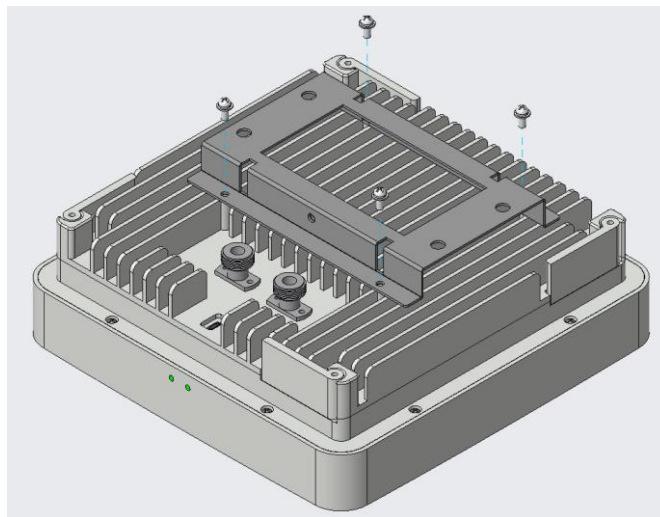
Figure 17: Hanger 1 fixed to the wall



**Step 2:** Secure rack 2 to the ARU.

Use M4X10 screws to secure mounting bracket 2 to the ARU.

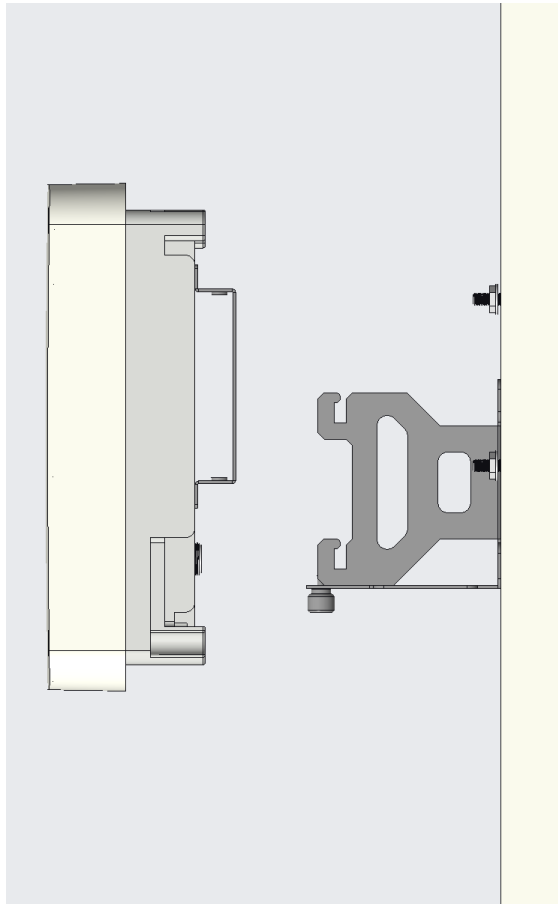
Figure 18: ARU MOUNTING RACK 2



**Step 3:** Hang the ARU, tighten the screws, and complete the installation.

Hang the ARU on rack 1, tighten the fastening screws on rack 1, and complete the installation.

Figure 19: ARU hanging into rack 2

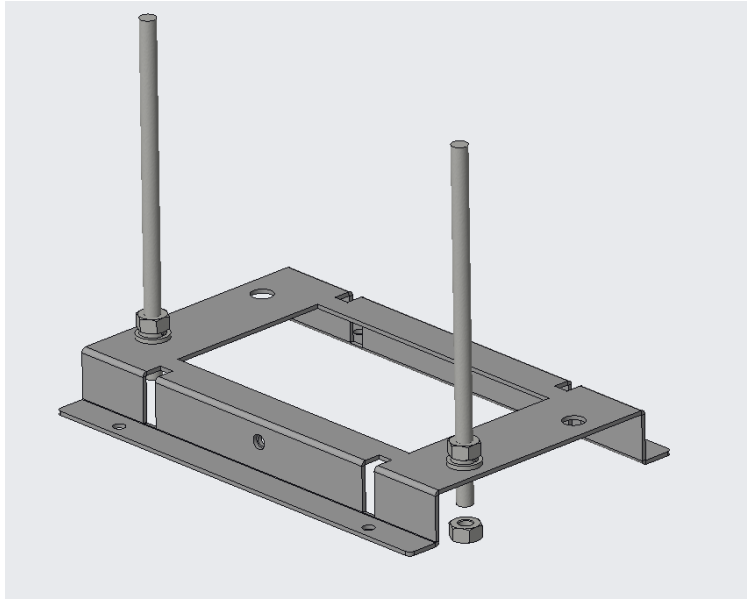


#### 1.3.6.4 Installation of ceiling gantry

**Step 1:** Fix the screw onto the mounting bracket 2.

Fix the screw onto the mounting bracket 2 using M6 nuts and washers.

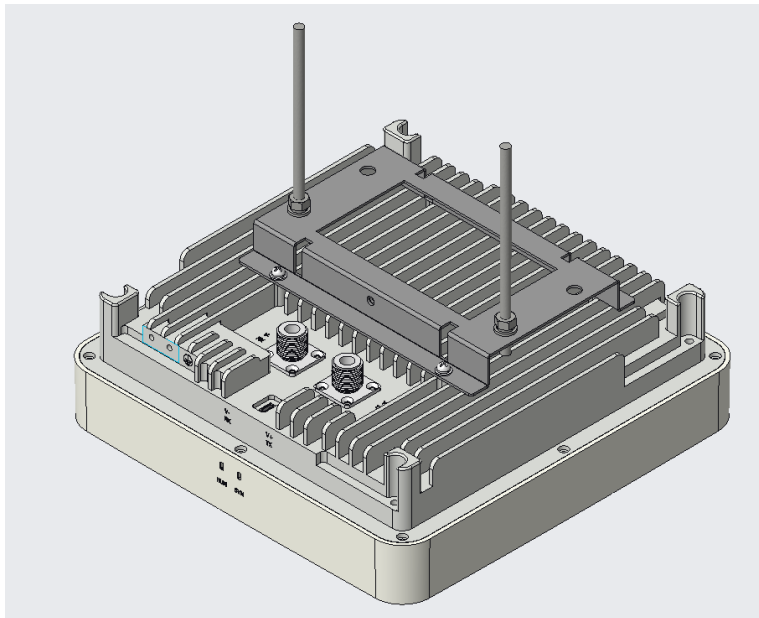
Figure 20: Install bracket 2 onto the screw



**Step 2:** Secure rack 2 to the ARU.

Use M4X10 screws to secure mounting bracket 2 to the ARU.

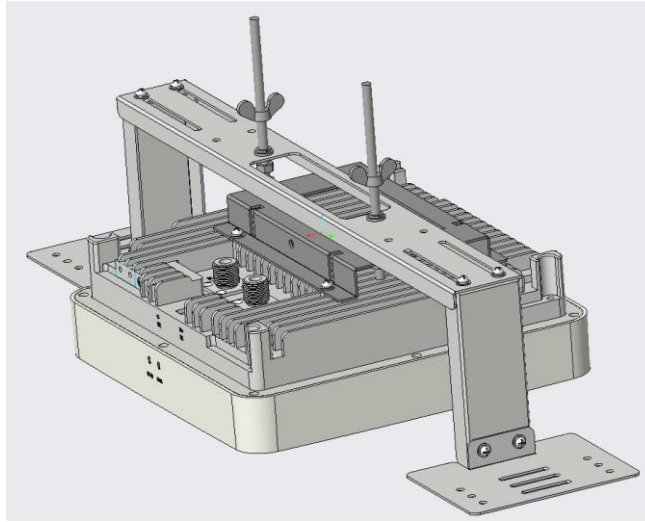
Figure 21: Installation rack 2 installed on ARU



**Step 3:** Fix the ARU on the gantry.

Use M6 ordinary nuts and butterfly nuts to fix the ARU on the gantry through screws and adjust the appropriate height.

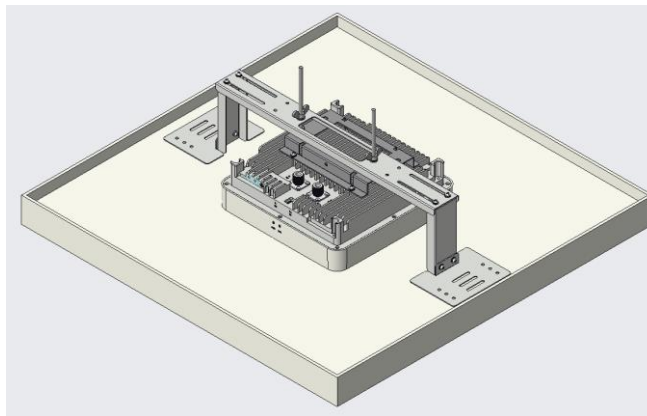
Figure 22: Installation rack 2 installed on ARU



**Step 4:** Place the gantry on the ceiling and complete the installation.

Adjust the width of the gantry to the appropriate position, and then place the entire structure on the ceiling to complete the installation.

Figure 23: Place the gantry on the ceiling

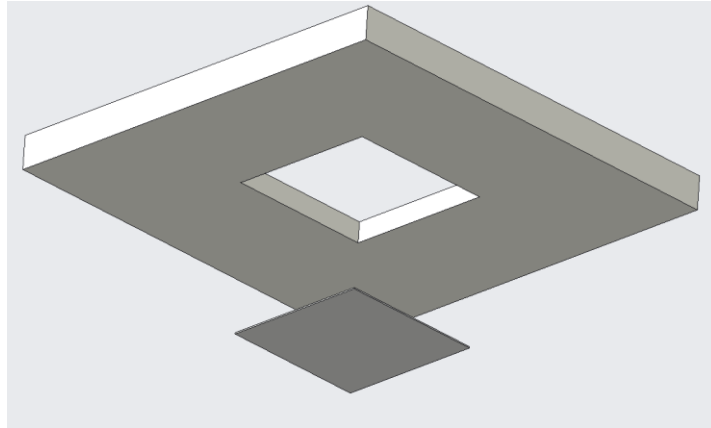


#### 1.3.6.5 Ceiling mounted installation

**Step 1:** Ceiling openings.

Use a hole template to create a square hole in the ceiling.

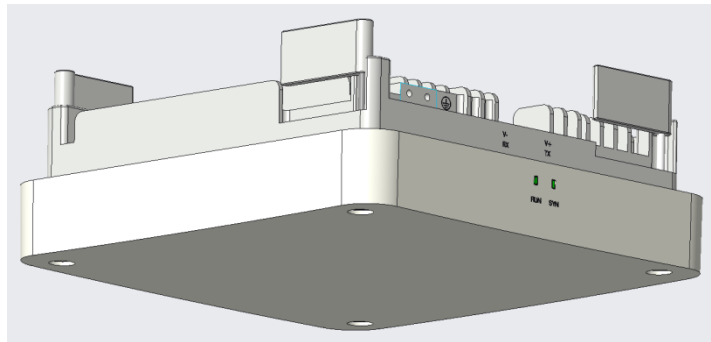
Figure 24: Opening square holes in the ceiling



**Step 2:** Loosen the corner part screws.

Remove the four plugs from the top cover and loosen the screws that secure the corner pieces. The spacing between the corner pieces to be loosened is determined by the thickness of the ceiling.

Figure 25: Loosen the screws of the corner piece



**Step 3:** Place the ARU in the ceiling.

Place the ARU into the square hole in the ceiling that has been opened, and use a screwdriver to rotate the fixing screw of the corner piece. The fixing screw will drive the corner piece to rotate and clamp onto the ceiling.

Figure 26: Loosen the screws of the corner piece

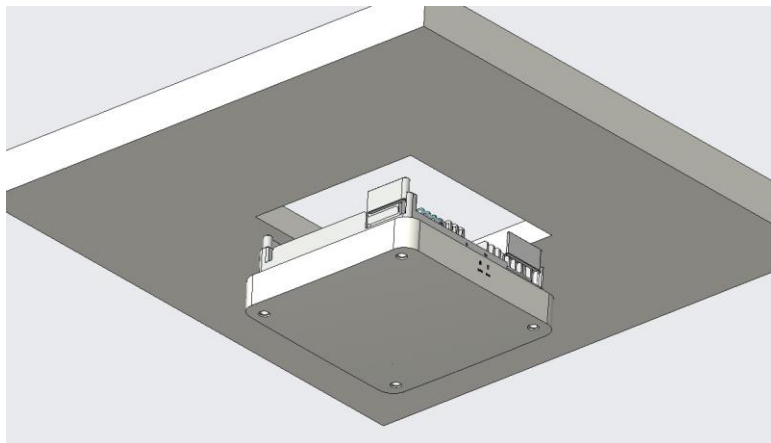
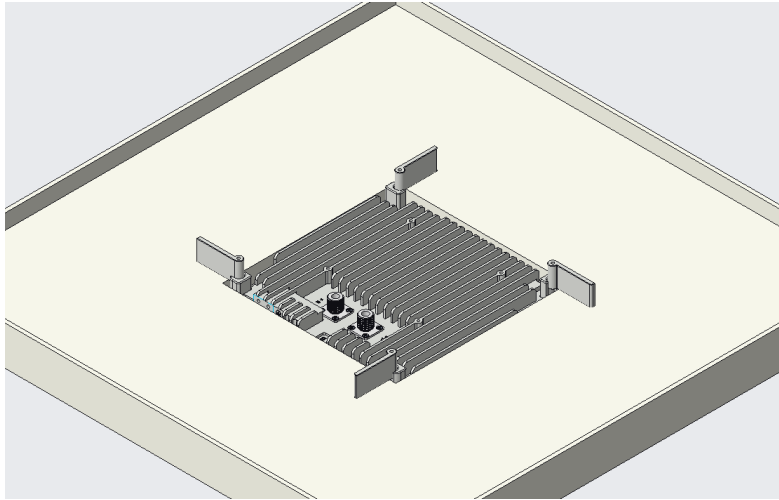


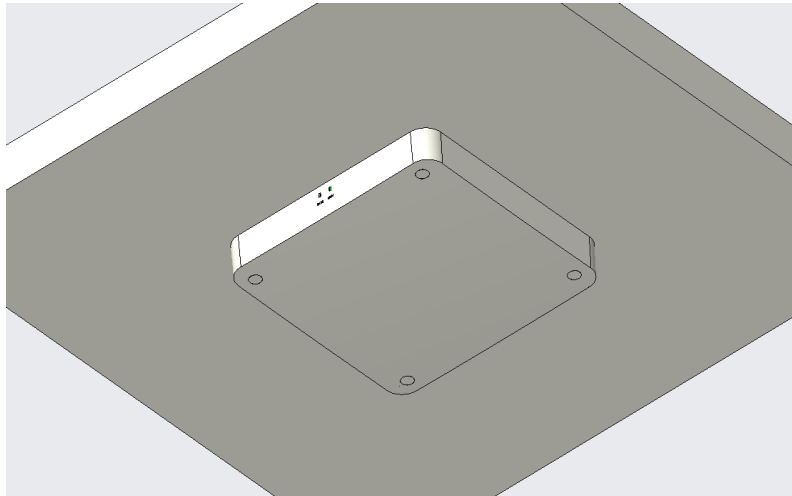
Figure 27: Corner pieces are clamped to the ceiling



**Step 4:** Tighten the screws to complete the installation.

Tighten the fixing screws and reinstall the plugs for the four holes to complete the installation.

Figure 28: Complete installation



## 2.4 Equipment power supply

MU and HUB require 110V AC power supply, and the preferred power supply method is to use the power line cut off method. This power supply method requires single-phase electricity (110V AC) to be extracted from the three-phase electricity in the distribution cabinet

If there is no power cord cutting method available on site, use a socket to take 110V AC power. The power socket must be at a height that is not easily accessible by ordinary people to prevent manual unplugging of the base station power plug.

## 2.5 Equipment grounding

- 1) Use the resistance range of a multimeter, with one probe connected to the device's casing screw and one probe connected to the ground wire of the power socket. If the measured resistance value is relatively small (less than  $10\ \Omega$ ), it is considered that the device has good grounding performance. If the resistance value is too large, it can be investigated from the following aspects:
  - Eliminate the problem with the multimeter itself: short circuit the two probes of the multimeter and observe if the resistance value is zero; The resistance value is zero, and the multimeter is normal; Not zero, abnormal multimeter.
  - Is the screw for equipment grounding tightened.
  - Is the grounding wire broken.
- 2) Touch the device casing with an electric pen. If the electric pen light is on, it indicates that there is current in the equipment casing and there is a leakage situation. Need to check if the equipment grounding is standard.

## 2.6 Cable connection

The fiber length insertion loss between MU and HUB shall not exceed 8dB, and the 5D cable insertion loss between HUB and the farthest ARU shall not exceed 45dB.

After the installation of MU, HUB, and ARU is completed, the installation interface needs to be connected and checked for accuracy before turning on the power and working normally.

## 2.7 Device identification

Each device, as well as wall mounted boxes and meter boxes, should be labeled clearly for future management and maintenance. The labels should be pasted in a visible area on the front of the equipment and equipment. The labels for each cable (such as 5D cable, power cord, tail fiber, etc.) are affixed at 20mm away from the wire head at both ends for easy reading and future management and maintenance. The labeling should be neat and clear.

The label of the device should be prominently placed on the device and not affect the overall harmony of the environment to maintain overall aesthetics. Warning signs must be attached to the host and power supply.

When there are multiple devices or lines running side by side, the labels must be placed on the same horizontal line

## 2.8 Power on inspection

After powering on, it is possible to observe whether the power supply, optical fiber, etc. are connected



properly, and whether the optical fiber and 5D cable are normal can be confirmed through the device indicator light.

## **2.9 Routine inspection**

Equipment installation: Check whether the installation position of the equipment matches 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 cord is qualified;

Site labels: Check if the equipment, power supply, and other labels are complete and labeled in a standardized manner;

Cable continuity: Use an optometry pen to test whether the physical link of the tail fiber is normal;

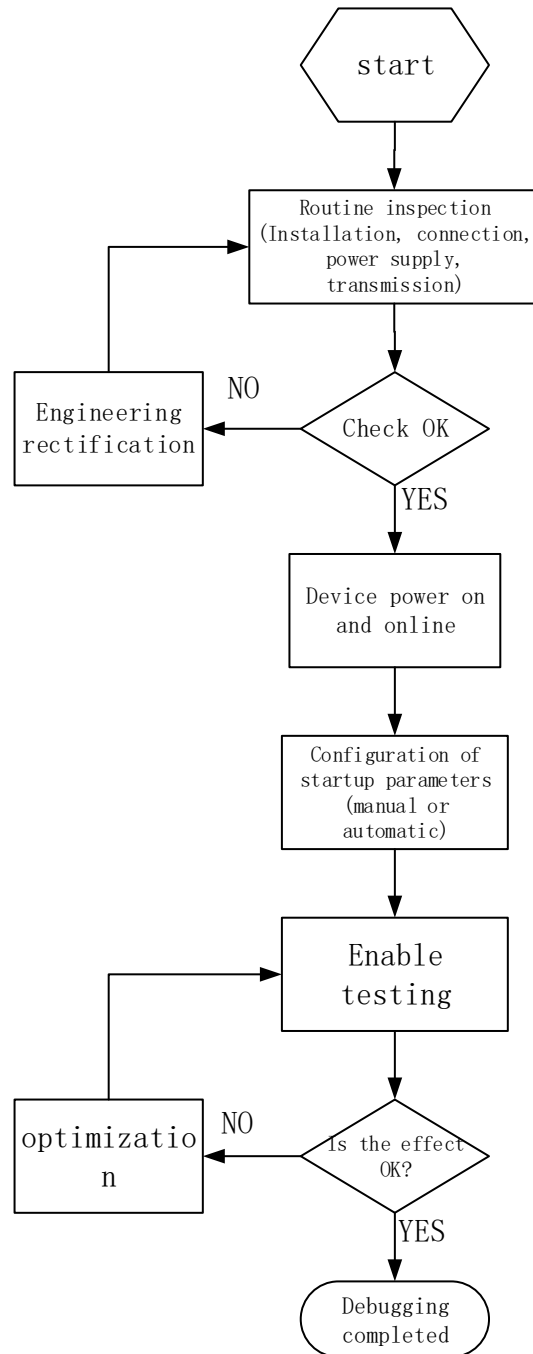
Equipment grounding integrity: Use a multimeter to test the resistance of the grounding wire to ground, etc.

Other: After powering on, check if the relevant indicator lights are on, etc

## **3. Site opening**

### **3.1 Opening process diagram**

The activation process is shown in the following figure:



## 3.2 Equipment power on and online

### 3.2.1 Power on the device

Before powering on the equipment for testing, it is necessary to carefully read Chapter 2. Check all

connections during installation to ensure they are correct. After the inspection is completed, the equipment can only be powered on and put into use.

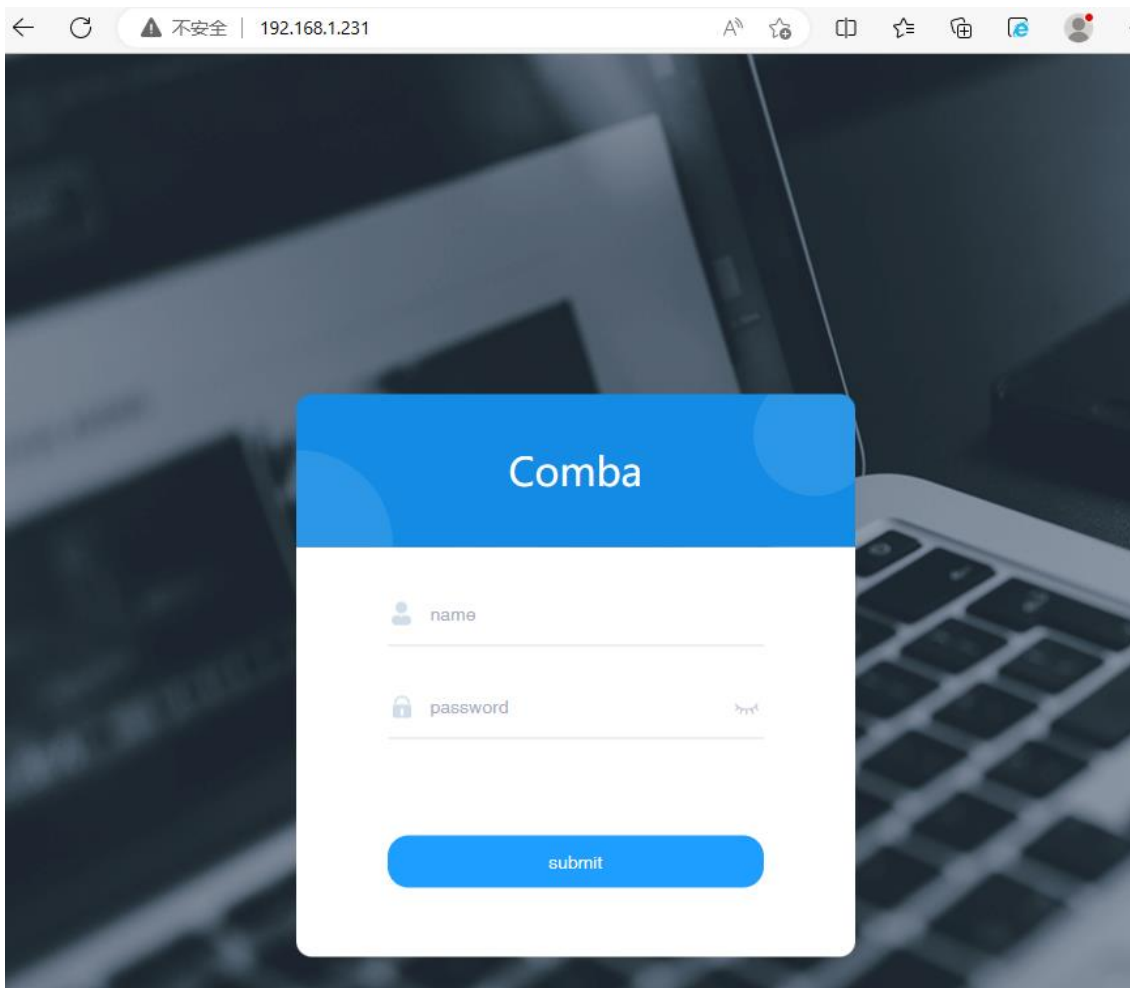
### 3.2.2 Device online

Local WEB enables setting and monitoring of device parameters, and can establish contact between devices and computers through both local and remote online methods.

Currently, only local web connectivity is supported: the local computer is directly connected to the OMT port of the device through an Ethernet port and a network cable.

The steps are as follows:

1. Set the IP address of the local computer to 192.168.1.100 (cannot be 192.168.1.231), the computer network card needs to be set to 100M duplex mode.
2. Open the browser software and enter 192.168.1.231 in the address bar; As shown in the following figure:

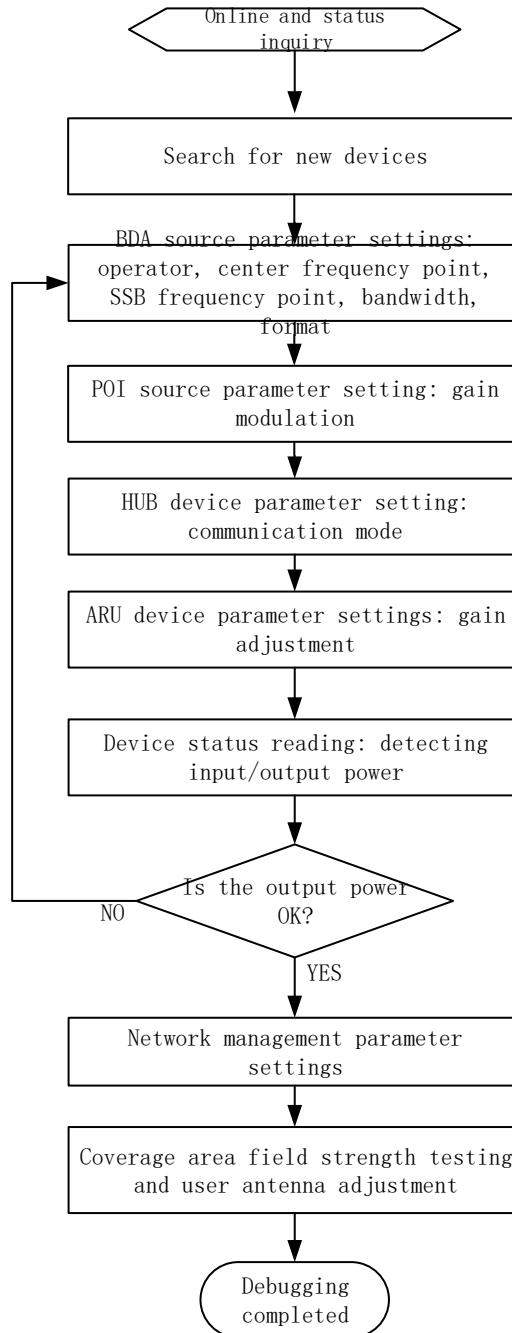


3. Enter the username and password, click submit to enter the device management interface;

### **3.3 Manual station opening parameter configuration**

This system provides two ways to start a station, namely automatic and manual. This chapter mainly explains the configuration process of manual station opening.

After completing the installation and connection of the device, connect the portable computer, turn on the machine power switch, and wait for the initialization of the monitoring system (i.e. when the RUN/ALM on the monitoring motherboard starts flashing) to start debugging. Users can refer to the following debugging steps for online debugging.



### 3.3.1 Search for new devices

According to the website opening requirements, click the button in the following figure to search for new devices. The button information is as follows:

MU Cards Discover: Discovers new MU cards, such as BDA;

HUB Discover: Discovering a new HUB machine;

## ARU Discover: Discovered a new ARU machine.

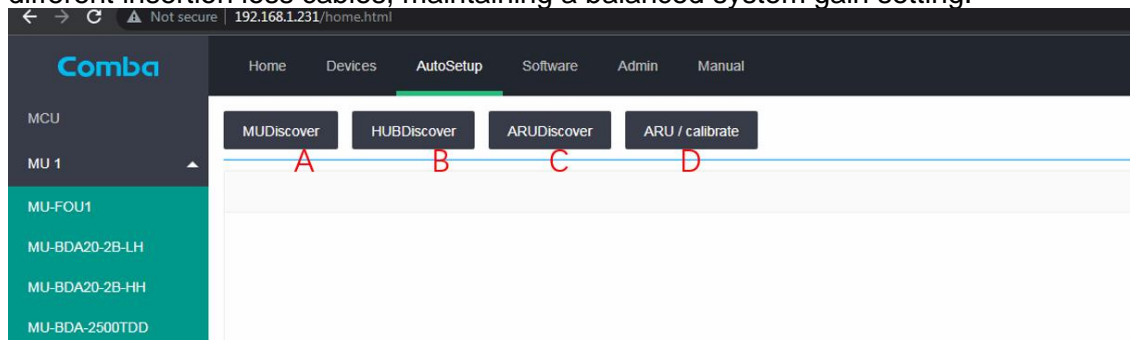
A: MU discover function is used to detect all slot hardware in MU.

B: HUB discover function is used to find the HUB that connect to FOU and automatically provide the site number for each HUB.

C: ARU discover function is used to find the ARU which connect to the HUB, and HUB will automatically provide the site number to each ARU.

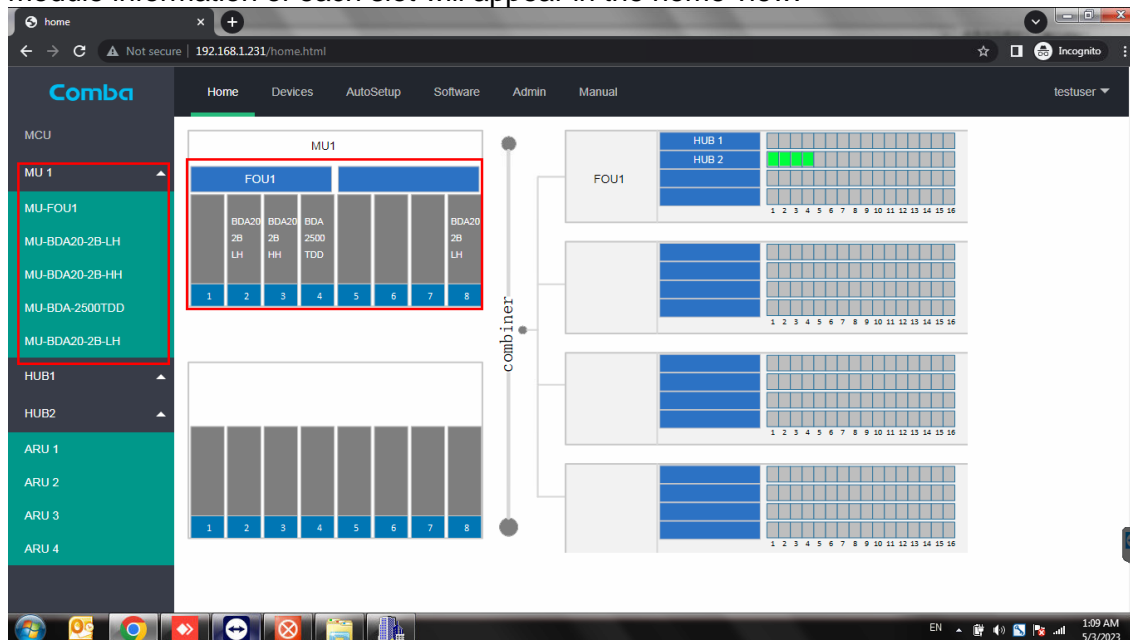
Note: ABC function is necessary for system that be seen by the GUI

D: ARU calibrate function is used to automatically calibrate the gain from HUB to ARU to adapt to different insertion loss cables, maintaining a balanced system gain setting.



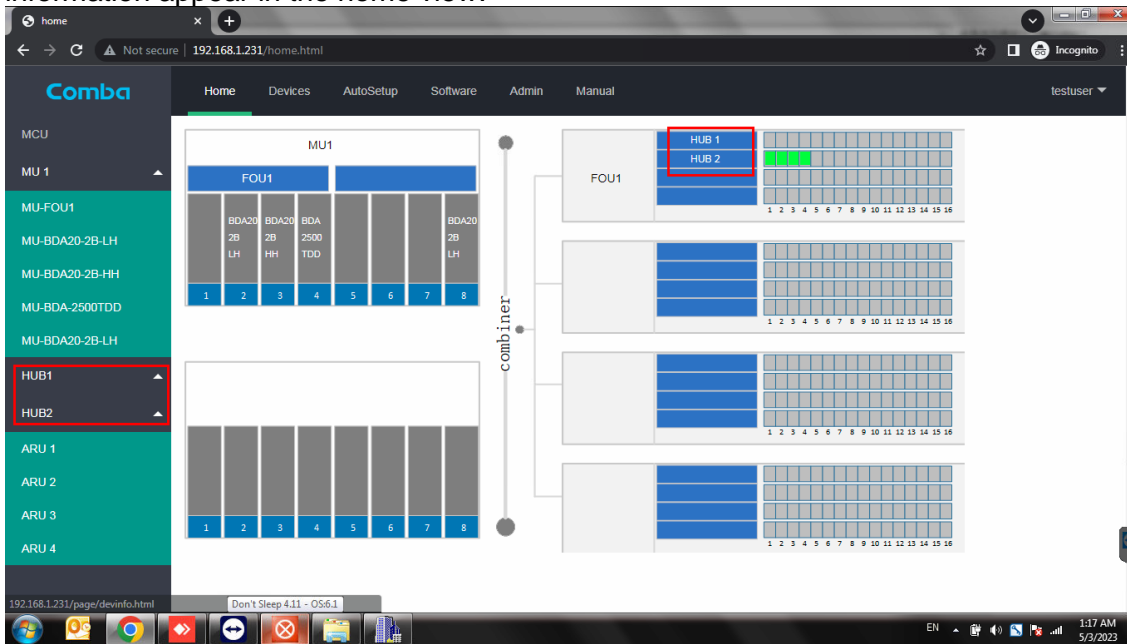
## MU discovers

It takes about 30 seconds to complete the detection, and will automatically exit the progress bar. Click the home button after completion, you can see that the MU device on the left sidebar appears, and the module information of each slot will appear in the home view.



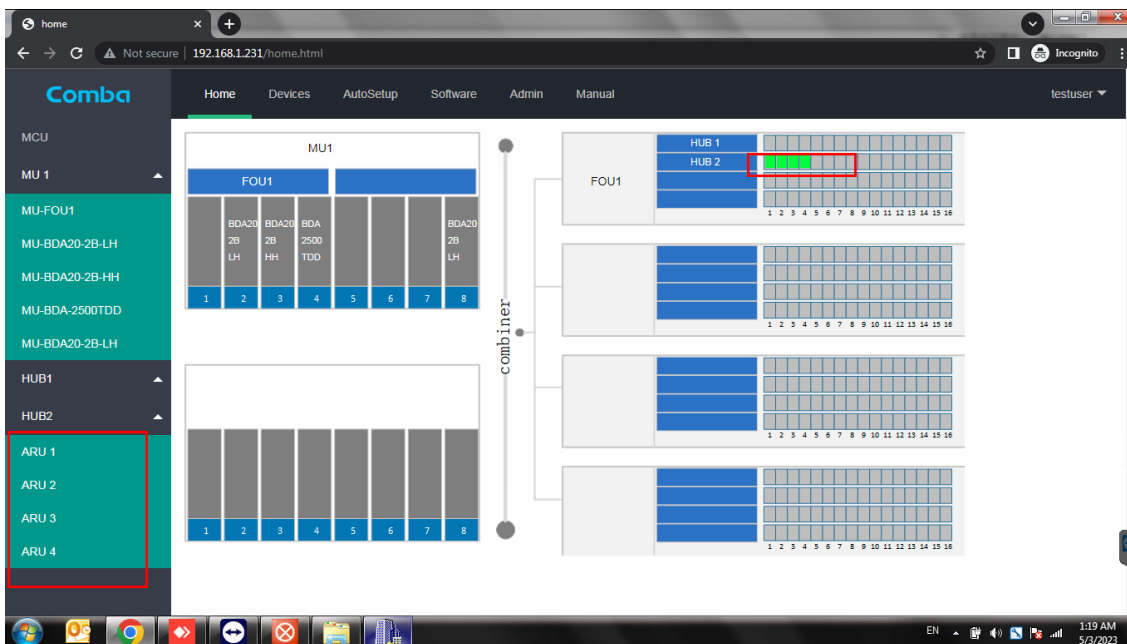
## HUB discovers

It takes about 30 seconds to complete the detection, and will automatically exit the progress bar. Click the home button after completion, you can see that the HUB on the left sidebar appears, and the HUB information appear in the home view.



## ARU discover

It takes about 120 seconds to complete the detection, and will automatically exit the progress bar. Click the home button after completion, you can see that the ARU on the left sidebar appears, and the ARU position information of each HUB will appear in the home view



### 3.3.2 BDA LH/HH Source parameter settings

#### Manual:

1. Operator settings, set corresponding operators according to user needs.
2. Center frequency point setting
3. SSB frequency setting
4. Carrier bandwidth settings

#### LH BDA Control Interface

- 1、Configure specific switching frequency band states by setting the operating frequency band selection; setting center frequency and bandwidth to configure the operation specifications
- 2、other parameters mainly include ATT and RF switch control.

name	type	current value	set value	min value	max value	unit	remarks
Operating Frequency Band	R/W	2				/	1:700MHz ABC 2:700MHz Upp 3:850MHz
LTE Center Frequency	R/W	751000				KHz	
LTE Bandwidth	R/W	10				KHz	
LTE RSRP	R	--				dBm	
LTE SINR	R	0				dB	
LTE PLMNid	R	46008				/	
UL RF Switch	R/W	1		0	1	/	
DL RF Switch	R/W	1		0	1	/	
UL ATT	R/W	0				dB	
DL ATT	R/W	0				dB	
DL Input Power	R	-33		-85	-30	dBm	
Demodulation switch	R/W	0		0	1	/	
Current SYN Freq	R/W	1				KHz	

#### Automatic

1. Click on the LTE SCAN button



2. A window will pop up on the web, waiting for the device to complete the automatic demodulation and frequency scanning function
3. Select the desired channel and click the settings button
4. If there is no good signal source, you can adjust the antenna direction and restart the automatic frequency sweep demodulation function.

The screenshot shows a web interface for device parameter settings. At the top, there are sections for 'Dev Info' and 'Software Version'. The main area is titled 'Dev parameters' and 'LTE SCAN'. A table lists various parameters with columns for name, type, current value, set value, min value, max value, unit, and remarks. A modal window is open over the table, displaying a list of scan results with columns for Frequency, PCI, Bandwidth, RSRP, SINR, and PLMN. The second row of the modal is highlighted in blue. Below the modal are 'RESCAN' and 'Set channel configuration' buttons. The background table lists various parameters like Operating Frequency Band, LTE Center Frequency, LTE Bandwidth, LTE RSRP, LTE SINR, LTE PLMNd, UL RF Switch, DL RF Switch, UL ATT, DL ATT, DL Input Power, Demodulation switch, and Current SYN Freq.

name	type	current value	set value	min value	max value	unit	remarks
<input type="checkbox"/> Operating Frequency Band						/	1:700MHz ABC 2:700MHz Upper 3:850MHz
<input type="checkbox"/> LTE Center Frequency						KHz	
<input type="checkbox"/> LTE Bandwidth						KHz	
<input type="checkbox"/> LTE RSRP						dBm	
<input type="checkbox"/> LTE SINR						dB	
<input type="checkbox"/> LTE PLMNd						/	
<input type="checkbox"/> UL RF Switch						/	
<input type="checkbox"/> DL RF Switch						/	
<input type="checkbox"/> UL ATT	R/W					dB	
<input type="checkbox"/> DL ATT	R/W					dB	
<input type="checkbox"/> DL Input Power	R			-85	-30	dBm	
<input type="checkbox"/> Demodulation switch	R/W			0	1	/	
<input type="checkbox"/> Current SYN Freq	R/W					KHz	

### 3.3.3 FOU parameter settings

Can query and set optical signal related parameters and alarms.



Dev Model:	MU-FOU	Temperature:	39		
Serial Num	123456	Set	Dev Info	12345	Set
Software Version	FOUOAMV0100.04_TS				

<input type="checkbox"/>	name	type	current value	set value	min value	max value	unit	remarks
<input type="checkbox"/>	Optical RX Power 1	R	7		-3	8	*	
<input type="checkbox"/>	Optical RX Power 2	R	-5		-3	8	*	
<input type="checkbox"/>	Optical RX Power 3	R	-5		-3	8	*	
<input type="checkbox"/>	Optical RX Power 4	R	-5		-3	8	*	
<input type="checkbox"/>	Optical TX Switch	R/W	1		0	1	*	
<input type="checkbox"/>	Optical RX Switch 1	R/W	1		0	1	/	
<input type="checkbox"/>	Optical RX Switch 2	R/W	1		0	1	/	
<input type="checkbox"/>	Optical RX Switch 3	R/W	1		0	1	/	
<input type="checkbox"/>	Optical RX Switch 4	R/W	1		0	1	/	
<input type="checkbox"/>	RF Switch 1	R/W	1		0	1	/	
<input type="checkbox"/>	RF Switch 2	R/W	1		0	1	/	
<input type="checkbox"/>	RF Switch 3	R/W	1		0	1	/	
<input type="checkbox"/>	RF Switch 4	R/W	1		0	1	/	

### 3.3.4 HUB Device parameter settings

There are 5 tables, including RF related parameters, power supply related parameters, optical signal related parameters, TDD synchronization related parameters, and alarms.

**Comba**

Home   Devices   AutoSetup   Software   Admin   Manual

- MCU
- MU 1
- MU-FOU1
- MU-FOU2
- MU-POI-HP-FDD
- HUB 4
- ARU 1

Dev Model:	HUB	Temperature:	75		
Serial Num	202302031500	Set	Dev Info		Set
Software Version	HUBMV1010				

Optical information

<input type="checkbox"/>	name	type	current value	set value	min value	max value	unit	remarks
<input type="checkbox"/>	Optical RX Power	R	0		-10	0	/	
<input type="checkbox"/>	Optical TX Switch	R	1		0	1	/	
<input type="checkbox"/>	Optical RX Switch	R	1		0	1	/	
<input type="checkbox"/>	Optical Soft Version	R	HUB-ACOPV...				/	

RF information

<input type="checkbox"/>	name	type	current value	set value	min value	max value	unit	remarks
<input type="checkbox"/>	RF Switch 1	R/W	1		0	1	/	
<input type="checkbox"/>	RF Switch 2	R/W	1		0	1	/	
<input type="checkbox"/>	RF Switch 3	R/W	1		0	1	/	
<input type="checkbox"/>	RF Switch 4	R/W	1		0	1	/	
<input type="checkbox"/>	UL ATT 1	R/W	0		0	30	dB	
<input type="checkbox"/>	UL ATT 2	R/W	0		0	30	dB	
<input type="checkbox"/>	UL ATT 3	R/W	0		0	30	dB	

## HUB Control Interface

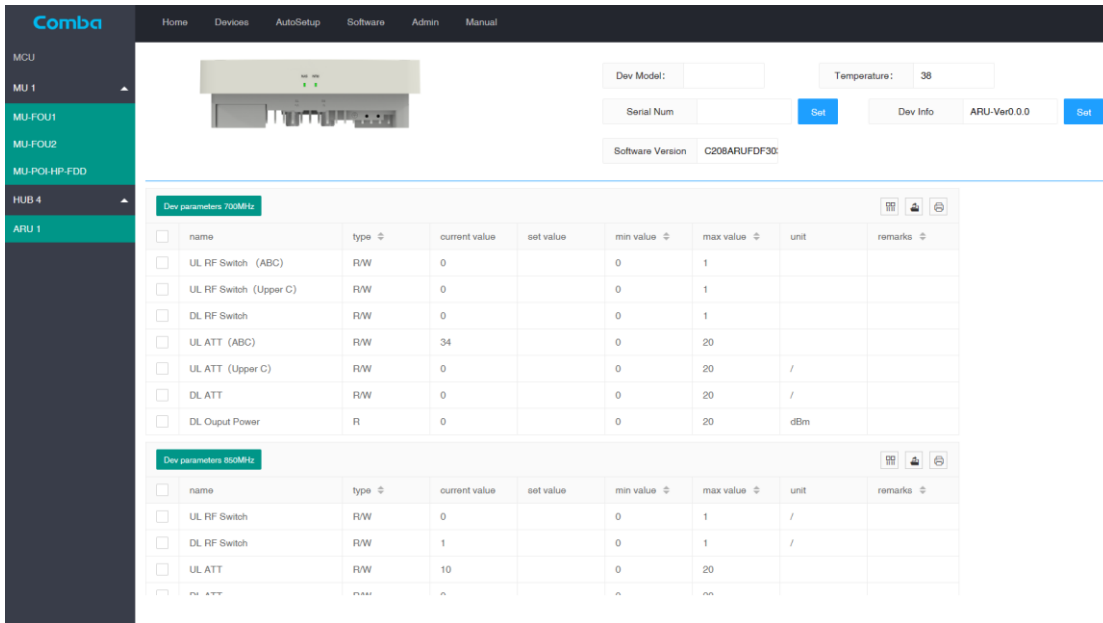
- 1、 RF info is used to control the uplink and downlink gain of HUB and observe the output power of each port
- 2、 Power supply info is Used to control the power switch and current monitoring of 4 ports, which can be used to determine whether the ARU is working properly and the power consumption status

RF SWITCH 4	R/W	1	2	3	4	unit
<input type="checkbox"/> UL ATT 1	R/W	0	0	30		
<input type="checkbox"/> UL ATT 2	R/W	0	0	30		
<input type="checkbox"/> UL ATT 3	R/W	0	0	30		
<input type="checkbox"/> UL ATT 4	R/W	0	0	30		dB
<input type="checkbox"/> DL ATT 1	R/W	10	-30	0	30	dB
<input type="checkbox"/> DL ATT 2	R/W	30		0	30	dB
<input type="checkbox"/> DL ATT 3	R/W	30		0	30	dB
<input type="checkbox"/> DL ATT 4	R/W	30		0	30	dB
<input type="checkbox"/> TEMP ALM VAL	R/W	100				°C
<input type="checkbox"/> DL Output Power A	R	14		0	18	dBm
<input type="checkbox"/> DL Output Power B	R	8		0	18	dBm
<input type="checkbox"/> DL Output Power C	R	7		0	18	dBm
<input type="checkbox"/> DL Output Power D	R	7		0	18	dBm
<input type="checkbox"/> Dc Soft Version	R	HUB-ACCom...				/

Power supply information							rem
name	type	current value	set value	min value	max value	unit	rem
<input type="checkbox"/> ARU Power Supply Switch A	R/W	1		0	1	/	
<input type="checkbox"/> ARU Power Supply Switch B	R/W	1		0	1	/	
<input type="checkbox"/> ARU Power Supply Switch C	R/W	1		0	1	/	
<input type="checkbox"/> ARU Power Supply Switch D	R/W	1		0	1	/	
<input type="checkbox"/> ARU Power Supply current A	R	462				mA	
<input type="checkbox"/> ARU Power Supply current B	R	214				mA	
<input type="checkbox"/> ARU Power Supply current C	R	180				mA	
<input type="checkbox"/> ARU Power Supply current D	R	199				mA	

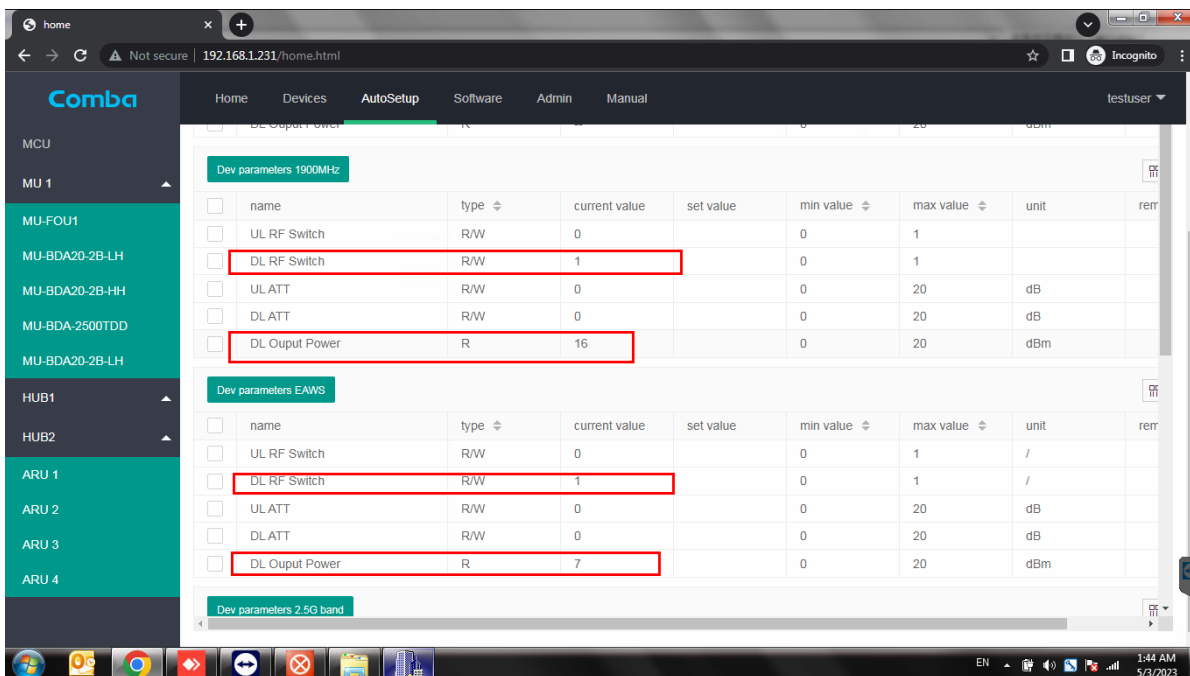
### 3.3.5 ARU Device parameter settings

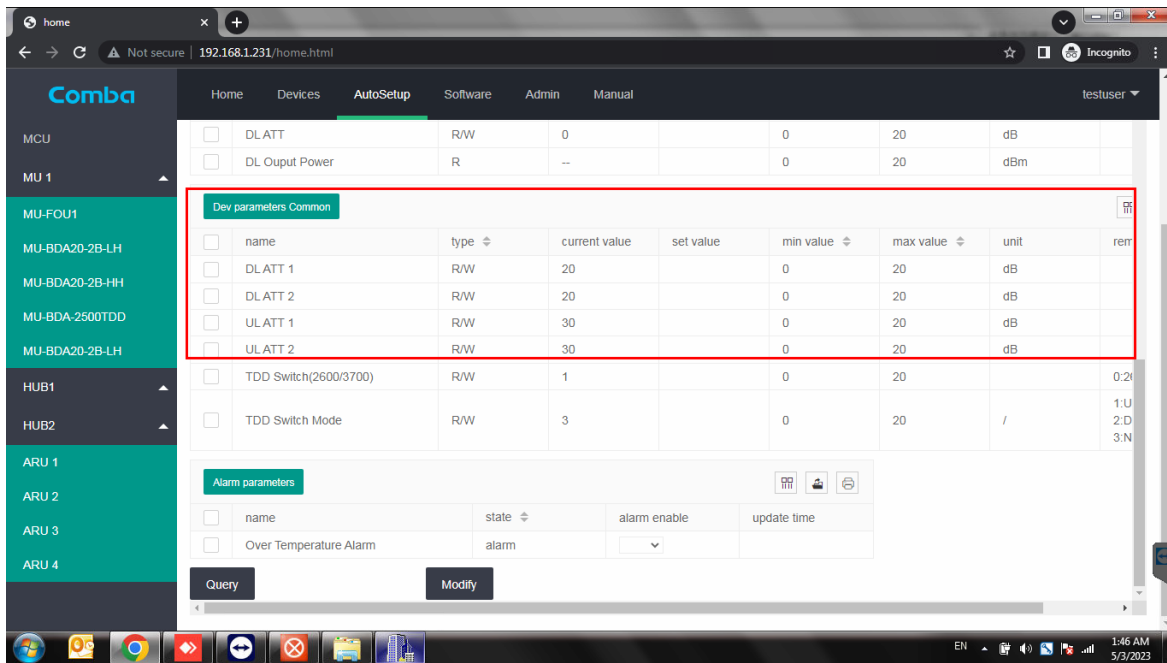
There are 7 tables, namely 700, 850, 1900, 2100, and alarms. Each frequency band can be adjusted for gain, RF switching, and power reading.



## ARU Control Interface

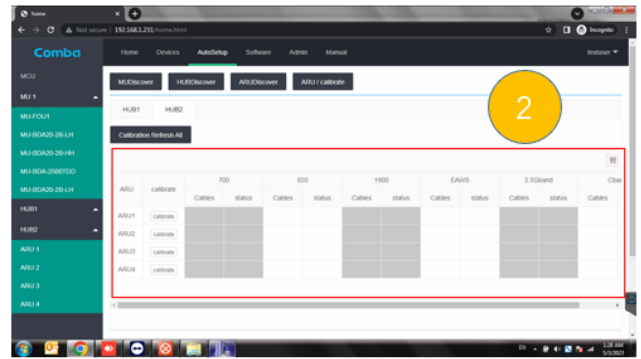
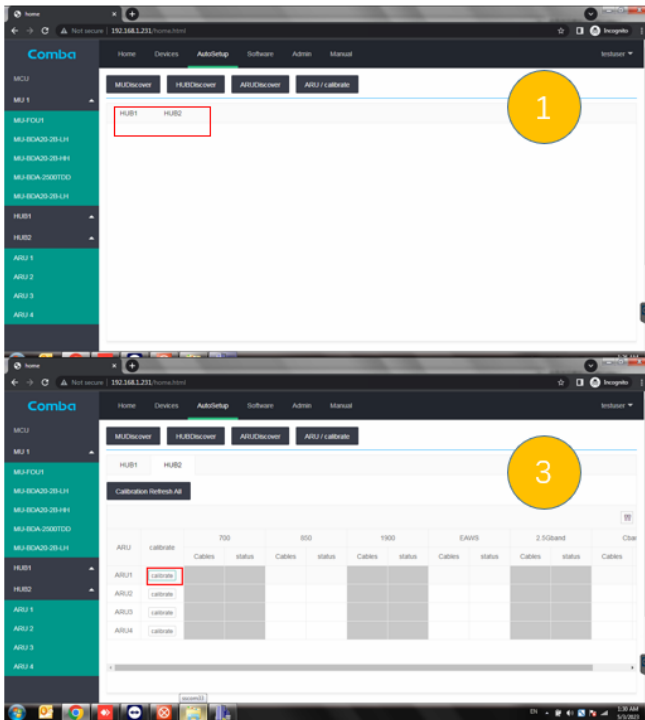
ARU has a parameter table for each frequency band, which mainly includes switch, attenuation, and power reading values, used to control and monitor the working status of each frequency band. The public parameter table of ARU is used to set the attenuation of the common end, that is, when the cable insertion loss is small, by setting the public attenuation, the system gain is too high and the input ARU signal is too strong.





## ARU calibrate

- 1、 After clicking the button, the HUB button connected to the device will appear
- 2、 After clicking the HUB button, the calibration table for the current HUB will appear
- 3、 After clicking the calibration button for a single ARU, the calibration process for a single ARU begins
- 4、 After clicking calibration refresh, the device will query the calibration results and display them in the table.



### 3.3.6 Device status reading

To be updated

### 3.3.7 SNMP Parameter settings

To be updated

## 3.4 Common maintenance operations

### 3.4.1 Upgrade operation

Web: software>web upload>selecting design files>Submit

Equipment: software>Devices upload>Select design files>Submit>Upgrade

### MU/FOU/BDA software upgrade

- 1、 Connect the OMT port of MU using a network cable.
- 2、 Click the bottom "choose file", click submit ,click software tab and click Upgrade bottom.
- 3、 wait 3mins, reconnect the web GUI and check the software version.

## HUB/ARU software upgrade

- 1、 Connect the TEST port of HUB using a network cable.
- 2、 Click the bottom "choose file", click submit ,click software tab and click Upgrade bottom.
- 3、 wait 3mins, reconnect the web GUI and check the HUB software version.

