

# User Manual

## PROSE High Power Blade HPRU System

**Manual Version 1.1**

**Nov 10, 2023**

**No part of this documentation may be  
excerpted, reproduced, translated, annotated or duplicated.  
In any form or by any means  
without the prior written permission of PROSE Technologies LLC**

## Contents

Introduction .....	1
1. Safety instructions.....	3
2. System Introduction.....	5
3. Product Introduction .....	6
3.1 Product Outline Drawing and Description .....	6
3.1.1 PBMU.....	6
3.1.1.1 PBMU Exterior .....	6
3.1.1.2 PBMU Ports .....	7
3.1.2 IM2U.....	8
3.1.2.1 IM2U Exterior .....	8
3.1.2.2 IM2U Ports .....	9
3.1.3 HPRU .....	12
3.1.4 MCU .....	12
3.1.4.1 MCU Exterior .....	12
3.1.4.2 MCU Ports .....	13
3.1.5 LPA.....	15
3.1.5.1 LPA Exterior .....	15
3.1.5.2 LPA Port.....	16
3.2 Product Specifications .....	19
3.2.1 PBMU.....	19
3.2.2 IM2U.....	20
3.2.3 HPRU .....	21
4. Installation .....	24
4.1 Installation Preparation .....	24
4.1.1 Select one site location.....	24
4.1.2 Installation tools .....	24
4.1.3 Information about the installation.....	25
4.2 Installation steps .....	25
4.2.1 Installation .....	25
4.2.2 Installation of PBMU .....	26
4.2.2.1 Installation Scenarios.....	26
4.2.2.2 Installing a PBMU in cabinet.....	26
4.2.3 Installation of IM2U .....	28
4.2.3.1 Installation Scenarios.....	28
4.2.3.2 Installing an IM2U in cabinet .....	28
4.2.4 Installation of MCU .....	31
4.2.4.1 Install Accessories for MCU .....	31
4.2.4.2 Installing an MCU on a wall.....	32
4.2.4.3 Installing an MCU on a pole .....	37
4.2.5 Installation of LPA .....	40
4.2.5.1 Install Accessories for LPA .....	40
4.2.5.2 Installing an LPA on a wall .....	41

---

4.2.5.3 Installing an LPA on a pole .....	45
4.3 Installation standard .....	47
4.3.1 Device installation.....	47
4.3.2 Jumper and connector .....	47
4.3.3 Power source .....	47
4.3.4 The patch cord.....	47
4.3.5 Ports introduction .....	48
4.3.5.1 PBMU .....	48
4.3.5.2 IM2U .....	49
4.3.6 Fiber and RF cable connection.....	50
5. Device configuration.....	51
5.1 PC configuration .....	51
5.2 Parameter description.....	52
5.2.1 PBMU.....	52
5.2.2 PBMU configuration.....	55
5.2.3 IM2U.....	58
5.2.4 HPRU .....	61
6. Warnings .....	64
6.1 FCC&IC statement.....	64
6.2 5G WiFi IC statement .....	65

## Introduction

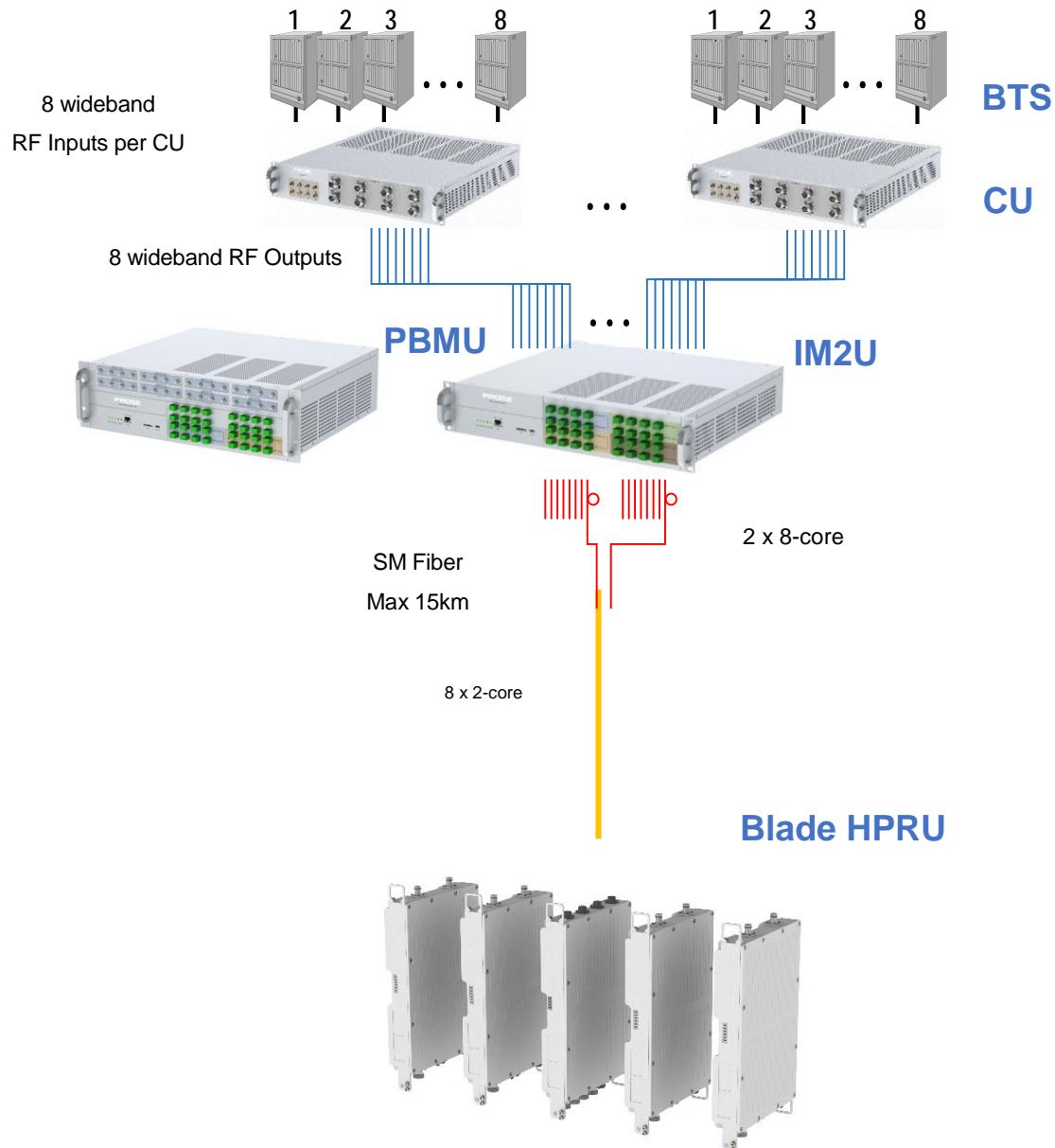
As the requirement for mobile communication quality keeps enhancing, the operators of wireless network need to pay more attention to improve the network quality and expand the network coverage. Due to the change of electromagnetic environment and increase of mobile subscribers, those existing BTS may be unable to meet the specified performance requirements and the following coverage problems will occur:

1. High call-drop rate
2. Low rate of successful handover
3. Low coverage rate or bad coverage quality
4. Low connection rate
5. Bad conversation quality

To solve all these problems in an all-around way, only adjusting the cell parameters of the BTS is not enough. The adoption of “BTS + Repeaters” is a better solution that has been verified in many sites in village, highway and tourism regions, especially at the edge of a BTS coverage region. And since the repeater requires fewer accessories and no need special equipment-room, operators can get more profit from lower construction and operation cost.

PROSE High Power System is a multi-standards integration system, which has integrated 2G/3G/4G/5G, and support for broadband access to this system. This system mainly consists of two parts. Repeater is especial tailored to provide a comprehensive and flexible coverage solution in complex coverage environments like densely populated residential area, underground areas, tunnels, stations and terminals, Hotels, Meeting rooms and shopping mall and so on. It widely used on the mobile communication networks. The system receives filters, amplifies, and transfers the uplink and downlink radio frequency (RF) signals of the base transceiver station (BTS) to extend and accurately distribute the coverage of the BTS.

PROSE's High Power Blade Remote Unit (HPRU-P) solution system supports multi operators. The system frequency range is 689MHz-3800MHz. Applicable to subway and tunnel scenarios. The core of the HPRU solution system is the power balance main control unit (PBMU). It is mainly for RF signal processing, and RF signal to optical signal conversion, and then connected with HPRU via optical fiber. Optical signals are transmitted through single-mode fiber with low loss and almost no noise added. It supports a 2X2 MIMO configuration, or 2 channels for SISO.



**Figure 1.1 Functional Components of PROSE High Power System**

## 1. Safety instructions

It is important to read safety instructions before installing the equipment. These instructions are supplementary to any local safety regulations in place. In case of any conflict, local safety regulations shall prevail.

Installation personnel should have preliminary knowledge about safety operations and must have received training on PROSE equipment installation, maintenance and operations.

Some important safety instructions are discussed in the chapter. PROSE shall not bear any liabilities incurred by violation of universal safety operation requirements, or violation of safety standards for designing, manufacturing and equipment usage.



1. The equipment must follow system requirements with proper grounding & lightning protection.



2. Power supply voltage must satisfy safety requirements. Anybody who installs or modifies equipment must turn off the power supply first. Only certified maintenance staff are allowed to perform operations with power-on.



3. The equipment radiates electromagnetic waves, which can cause damage to the human body. Proper safety and precautions should be taken. People other than maintenance staff should keep away.



4. Do not expose yourself for long periods of time to the FOR system while in operation because the electromagnetic field emitted by the equipment may do harm to your health.



5. If installed at height (onto the pole), the equipment shall be securely fixed to prevent harm and bodily injury from dropping parts.



6. The equipment must be away from fire, as electronic components may explode upon fire.



7. Static electricity produced by human body can damage sensitive components on the circuit board, such as large integrated circuits (ICs).

**8. WARNING!** 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** License to operate this device. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of \$100.000 for each continuing violation.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

l'appareil contient des émetteurs/récepteurs exempts de licence qui sont conformes aux CNR exempts de licence d'Innovation, Sciences et Développement économique Canada.

L'exploitation est soumise aux deux conditions suivantes :

- (1) l'appareil ne doit pas produire de brouillage,
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 450cm between the radiator & your body.

10. **WARNING:** This is **NOT** a **CONSUMER** device. It is designed for installation by an installer approved by an ISED licensee. You **MUST** have an **ISED LICENCE** or the express consent of an **ISED** licensee to operate this device.

**WARNING:** Industrial zone enhancers are **NOT** consumer devices. They are designed for installation by **ISED** licensees and qualified installers who have recognized RF training. You **MUST** be an **ISED** licensee to install or operate this device.

This device must be professionally installed.

## 2. System Introduction

### Overview

PROSE's high power system supports multiple operators deploying multiple mobile technologies. The system operates from 698-3800MHz and extends 2G, 3G, 4G, 5G and broadband data coverage for indoor applications. It is particularly suited for high-capacity application scenarios such as business towers, shopping malls, offices, airports, stadiums, and other indoor application scenarios.

The core of the system, consisting of the Power Balance Master Unit (PBMU), deals with the power level aligning for multiple operators accessing, signal processing and the conversion of RF signals to optical. The optical signals are transmitted over single mode fiber with low loss and virtually no increased in noise floor. The PBMU uses single mode fiber to connect to the High Power Remote Unit (HPRU), where each PBMU can connect 16 units of HPRU for SISO, and 8 units of HPRU for 2x2 MIMO applications.

The advantages of the system are:

- Easy and quick to design and deploy Fiber DAS, where RF radiated power is determined only by each HPRU
- Achieve uniformed coverage, each HPRU provides constant output power for each band
- Precisely adjust the RF output power level in specific applications
- Zero RF loss in signal transmission
- No PIM and VSWR issues
- One PBMU connects a maximum of 16 HPRUs for 2x2 MIMO solution
- Management via OMT or NMS software

### 3. Product Introduction

#### Overview

System consists of PBMU and HPRU.

Interconnection between PBMU and HPRU is fiber optical cable via optical module.

Optical interface supports 690-3800MHz band.

#### 3.1 Product Outline Drawing and Description

##### 3.1.1 PBMU

###### 3.1.1.1 PBMU Exterior



Figure 3-1 PBMU exterior

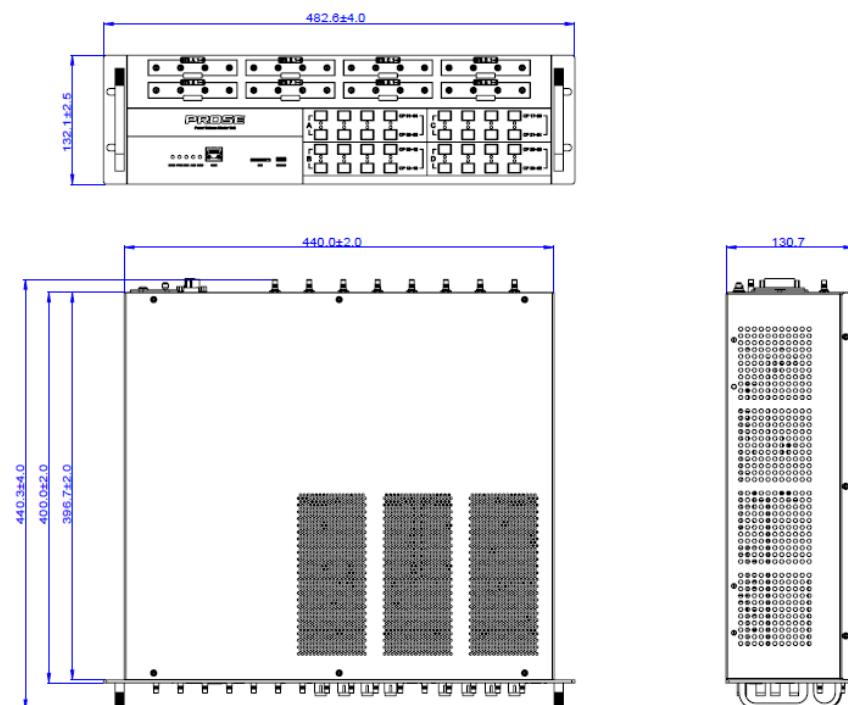


Figure 3-2 PBMU dimensions

### 3.1.1.2 PBMU Ports

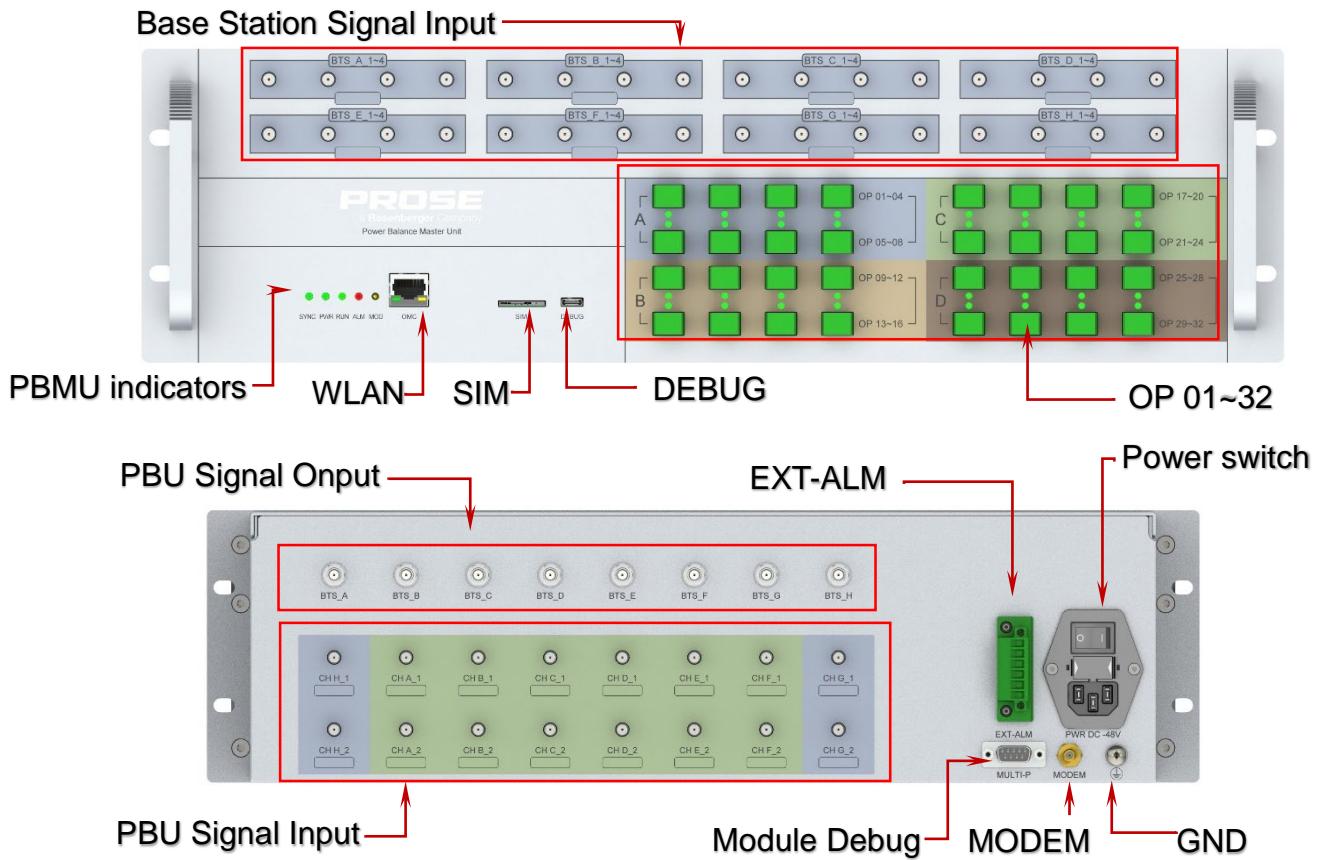


Figure 3-3 Ports in the PBMU top/real panel

Table 3-1 PBMU indicators

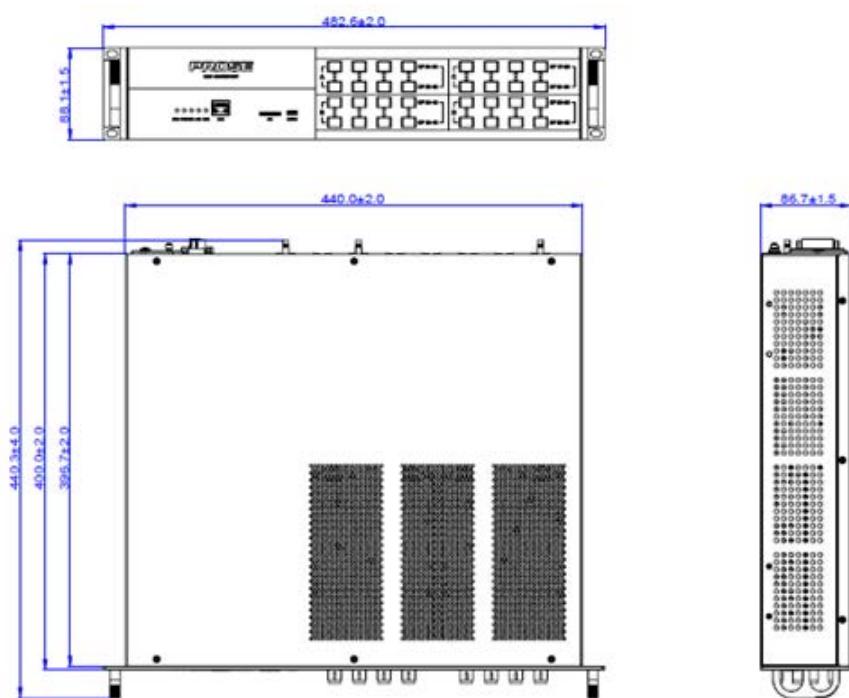
Indicator	Color	Status	Meaning
SYNC	Green	Steady off	5G or 4G TDD signals are out of sync
		Steady on	5G or 4G TDD signal synchronization
PWR	Green	Steady on	The power input is available
RUN	Green	Blinking	The software works fine
		Steady on or off	Software operating abnormally or no power
ALM	RED	Steady on	The system has alarm
		Steady off	The system has no alarm
MOD	Green	Blinking	Motherboard MODEM in network
		Steady off	Motherboard MODEM is offline

### 3.1.2 IM2U

### 3.1.2.1 IM2U Exterior



**Figure 3-4** IM2U exterior



**Figure 3-5** IM2U dimensions

### 3.1.2.2 IM2U Ports

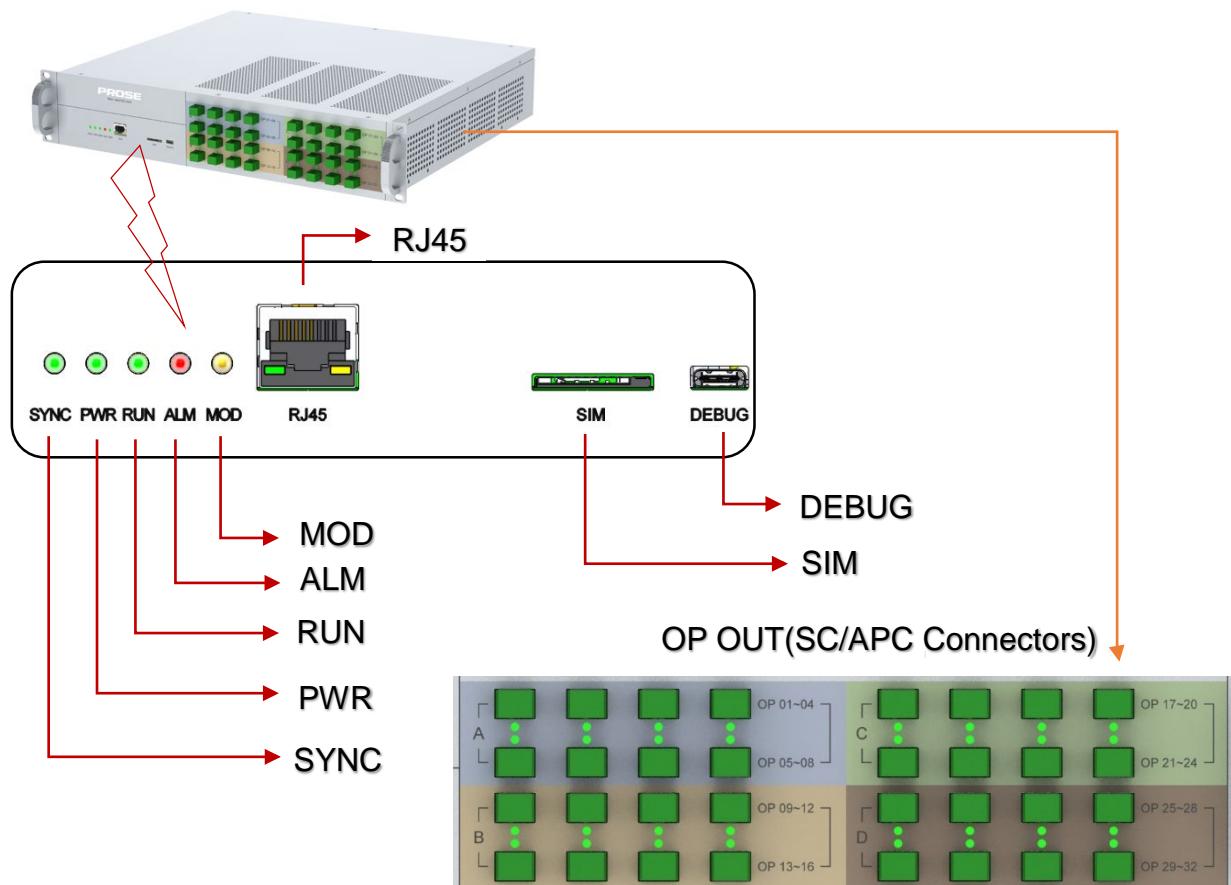


Figure 3-6 Ports in the NEU front panel

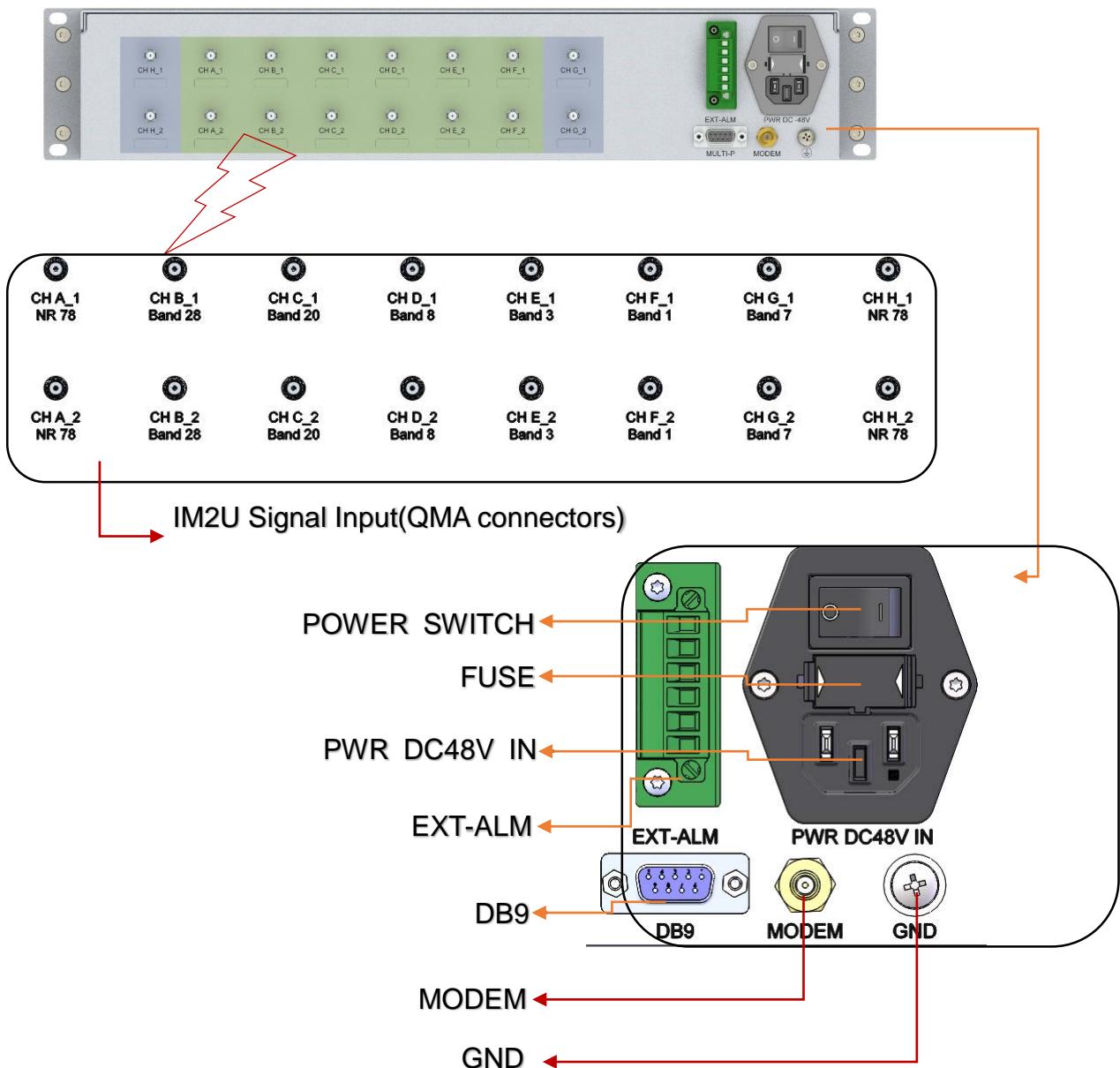


Figure 3-7 Ports in the IM2U rear panel

Table 3-2 Ports and indicators on the NEU panels

Item	Silkscreen	Remarks
(IM2U) Ports in the front panel	RJ45	Network interface
	SIM	Insert SIM card
	A OP 01~04 OP 05~08	Signal output, connect with optical fiber line
	B OP 09~12 OP 13~16	Signal output, connect with optical fiber line

	C OP 17~20 OP 21~24	Signal output, connect with optical fiber line
	D OP 25~28 OP 29~32	Signal output, connect with optical fiber line
Item	Silkscreen	Remarks
(IM2U) Ports in the rear panel	PWR DC48V IN	DC48V Power input
	GND	NEU equipment grounding
	MODEM	Connect the MODEM
	DB9	DB9
	EXT-ALM	Alarm extension
	CH(A~B)_1 (NR78,Band 28.....)	IM2U Signal Input (QMA connectors)
	CH(A~B)_2 (NR78,Band 28.....)	IM2U Signal Input (QMA connectors)

**Table 3-3** IM2U indicators

Indicator	Color	Status	Meaning
SYNC	Green	Steady off	5G or 4G TDD signals are out of sync
		Steady on	5G or 4G TDD signal synchronization
PWR	Green	Steady on	The power input is available
RUN	Green	Blinking	The software works fine
		Steady on or off	Software operating abnormally or no power
ALM	RED	Steady on	The system has alarm
		Steady off	The system has no alarm
MOD	Green	Blinking	Motherboard MODEM in network
		Steady off	Motherboard MODEM is offline

### 3.1.3 HPRU



**Figure 3-8** HPRU exterior

HPRU consists of MCU and LPAs, the system support up to 4 LPAs connected to 1 MCU.

MCU4-2F16R-XX	Monitoring & Control Unit
LPA2-46-N77N77-64F-XX	3600MHz LPA Unit MIMO
LPA2-46-N41N77-64F-XX	2593MHz&3600MHzMHz LPA Unit SISO

### 3.1.4 MCU

#### 3.1.4.1 MCU Exterior



**Figure 3-9** MCU exterior

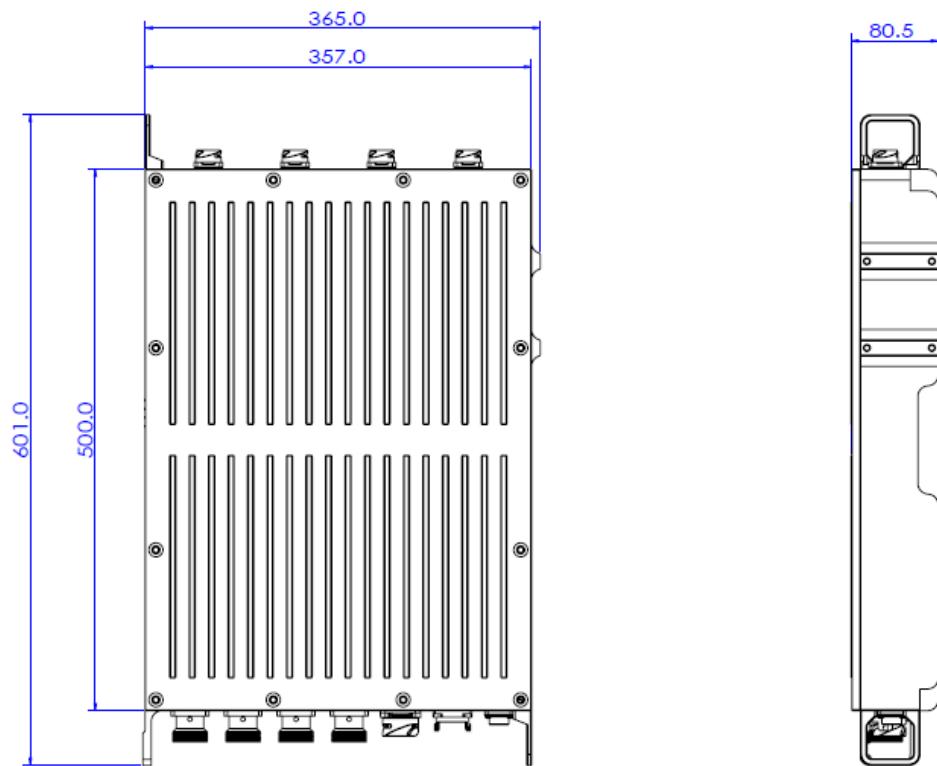


Figure 3-10 MCU dimensions

### 3.1.4.2 MCU Ports

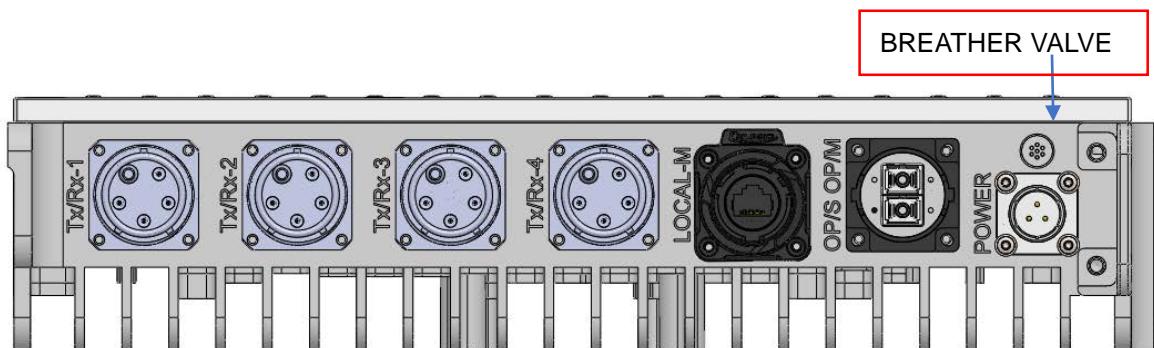


Figure 3-11 Ports in the MCU top panel

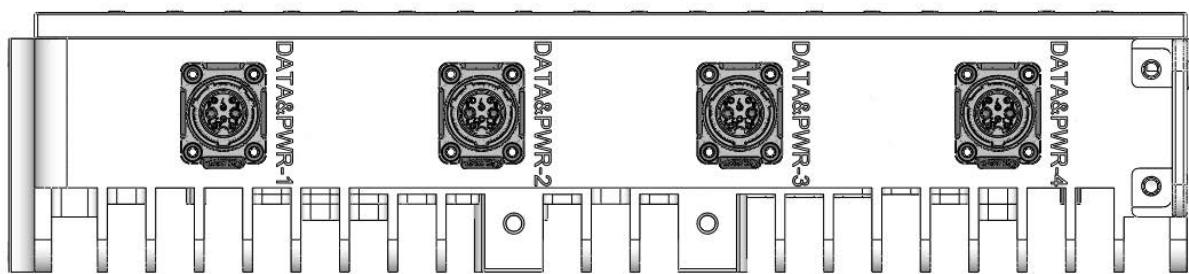


Figure 3-12 Ports in the MCU bottom panel

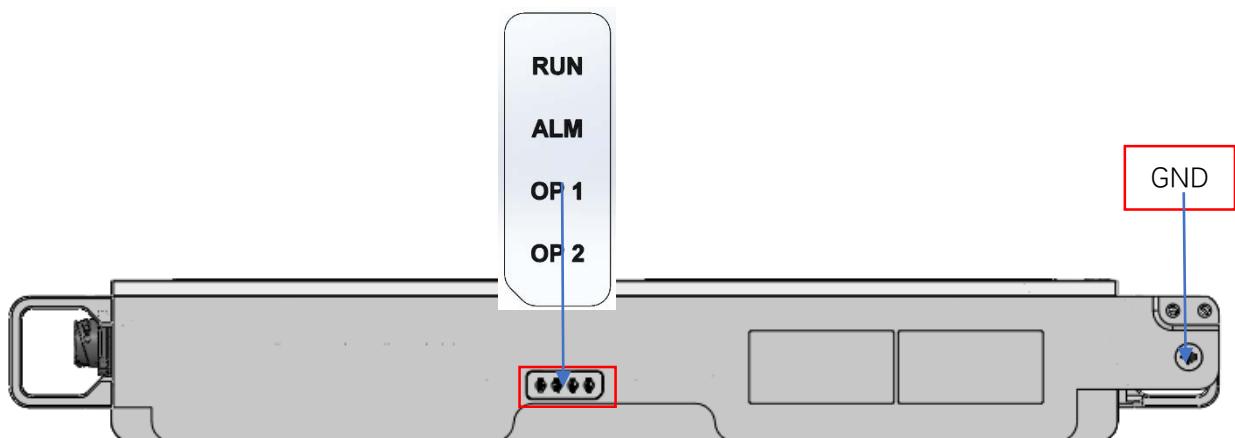


Figure 3-13 Ports in the MCU flank panel

Table 3-4 Ports and indicators on the MCU panels

Item	Silkscreen	Remarks
Ports in the top panel	DATA&PWR1-4	DC power output and RS485 signal contact for LPA
Ports in the bottom panel	POWER	AC Power input
	LOCAL-M	RJ45 port for MCU
	OP/S	Optic connector with optical fiber jumper cable and optical adapter
	OP/M	Optic connector with optical fiber jumper cable and optical adapter

	Rx/Tx 1-4	Connect to LPA
Ports in the flank panel	GND	Module grounding

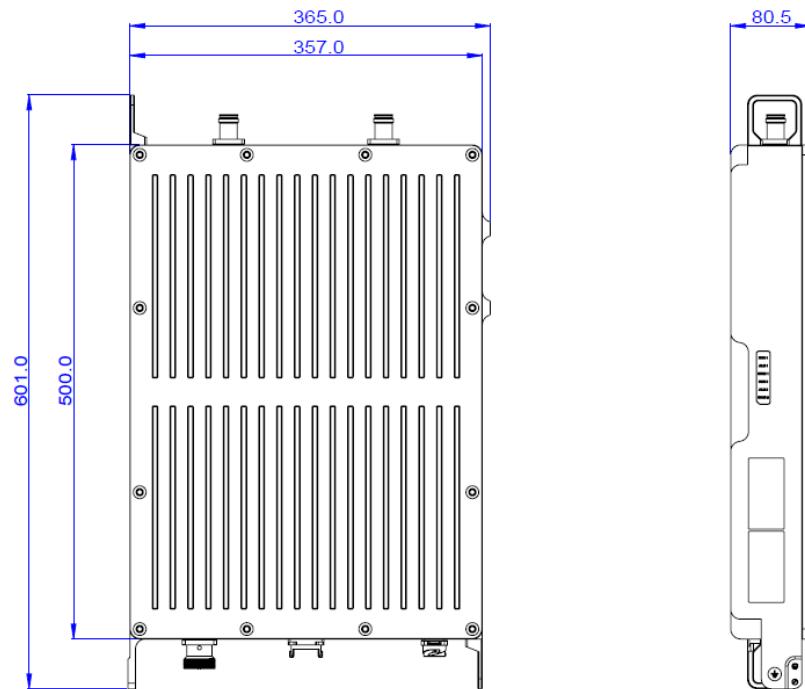
**Table 3-5** MCU indicators

ITEM	Indicator	Color	Status	Meaning
MCU	RUN	Green	Blinking	The MCU is running properly, and the board software is loaded
			Steady on or off	The MCU and the board software is not working
	ALM	Red	Steady on	Alarms are generated
			Steady off	No alarms are generated
	OP 1	Green	Blinking	The optical link is running properly
			Steady off	The optical link is disconnected
	OP 2	Green	Blinking	The optical link is running properly
			Steady off	The optical link is disconnected

### 3.1.5 LPA

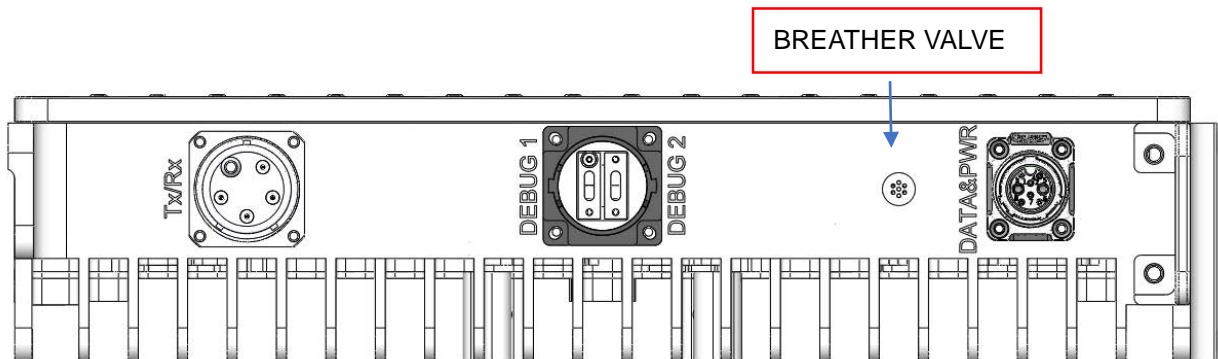
#### 3.1.5.1 LPA Exterior

**Figure 3-14** LPA exterior



**Figure 3-15** LPA dimensions

### 3.1.5.2 LPA Port



**Figure 3-16** Ports in the LPA top panel

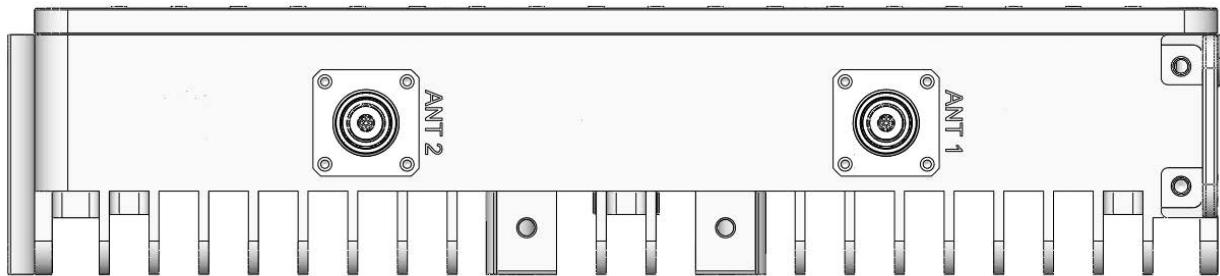


Figure 3-17 Ports in the LPA bottom panel

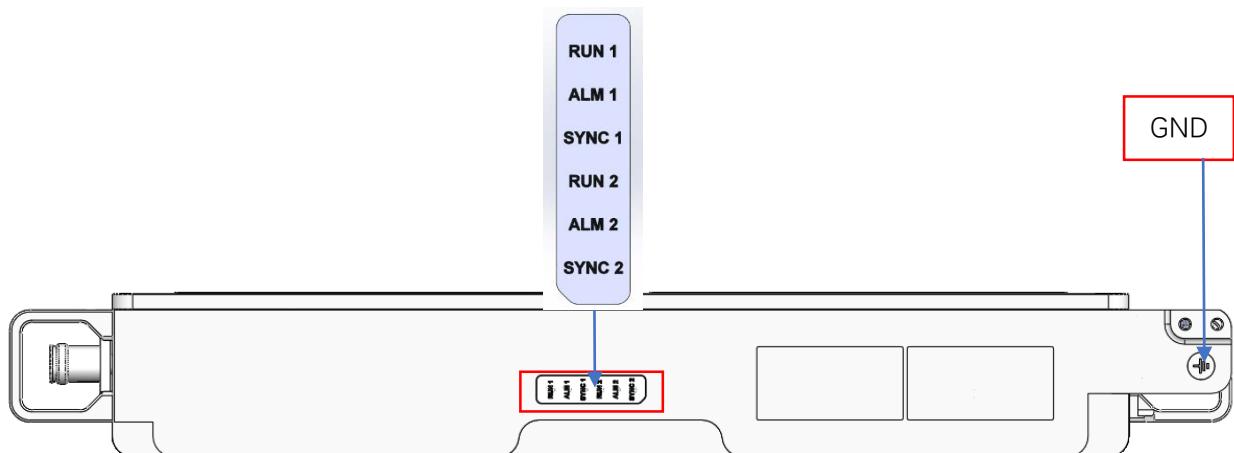


Figure 3-18 Ports in the LPA flank panel

Table 3-6 Ports and indicators on the LPA panels

Item	Silkscreen	Remarks
Ports in the top panel	ANT1-2	Connect to combiner
Ports in the bottom panel	DATA&PWR	DC power output and RS485 signal contact for LPA
	DEBUG-1	Type C port for LPA
	DEBUG-2	Type C port for LPA
	Rx/Tx	Connect to MCU
Ports in the flank panel	GND	Module grounding

**Table 3-7 LPA indicators**

ITEM	Indicator	Color	Status	Meaning
LPA	RUN1/ 2	Green	Blinking	LPA is running properly and the board software is loaded
			Steady on or off	software is not working
	ALM1/2	Red	Steady on	Alarms are generated
			Steady off	No alarms are generated
	SYN1/2	Green	Steady on	The PA module is syncing
			Steady off	The PA module is out of sync

## 3.2 Product Specifications

### 3.2.1 PBMU

	Uplink	Downlink
Frequency	Band 1 (2x2 MIMO)	1920 - 1980 MHz
	Band 3 (2x2 MIMO)	1710 - 1785 MHz
	Band 5 (2x2 MIMO)	824 - 849 MHz
	Band 7 (2x2 MIMO)	2500 - 2570 MHz
	Band 8 (2x2 MIMO)	880 - 915 MHz
	Band 28 (2x2 MIMO)	703 - 748 MHz
	N41/band 41(2x2 MIMO)	2496 - 2690 MHz
	N77 (2x2 MIMO)	3700 - 3980 MHz
		3450 - 3550 MHz
	n78 (4x4 MIMO)	3300 - 3800 MHz
Gain	-20 ± 2 dB	-20 ± 2 dB
RF Output Power	≤ -25 dBm (RF)	---
Optical Power	---	-6 ± 2 dBm (O/P)
Gain Control Range (per operator)	25 dB / 0.1 dB step	25 dB / 0.1 dB step
Gain Control Range (per band)	15 dB / 1 dB step	15 dB / 1 dB step
VSWR	≤ 2.0:1	≤ 2.0:1
Max. operation Input Power	---	≤ 20 dBm
Impedance	50 Ω	50 Ω
Optical Wavelength	1310 nm	1550 nm
Power Supply	DC-48V ± 10%	
Operating temperature range	-10°C to +45°C	
Storage temperature range	-40°C to +85°C	
Relative humidity	10% - 95%	
Ingress protection	IP40 for indoor	
Monitoring and control	LAN-RJ45 (local) 3G&4G wireless modem (remote)	
Cooling	Nature cooling	
Optical connector	16 sets x SC/APC (4G 2x2 MIMO)	
	8 sets x SC/APC (5G 4x4 MIMO)	
RF connector	IM2U: 16 x QMA-Female PBU: 32 x QMA-Female	
Installation	19" Rack Mounting	

**3.2.2 IM2U**

		Uplink	Downlink
Frequency	Band 1 (2x2 MIMO)	1920 - 1980 MHz	2110 - 2170 MHz
	Band 3 (2x2 MIMO)	1710 - 1785 MHz	1805 - 1880 MHz
	Band 5 (2x2 MIMO)	824 - 849 MHz	869 - 894 MHz
	Band 7 (2x2 MIMO)	2500 - 2570 MHz	2620 - 2690 MHz
	Band 8 (2x2 MIMO)	880 - 915 MHz	925 - 960 MHz
	Band 28 (2x2 MIMO)	703 - 748 MHz	758 - 803 MHz
	N41/band 41(2x2 MIMO)	2496 - 2690 MHz	2496 - 2690 MHz
	N77 (2x2 MIMO)	3700 - 3980 MHz	3700 - 3980 MHz
		3450 - 3550 MHz	3450 - 3550 MHz
	n78 (4x4 MIMO)	3300 - 3800 MHz	3300 - 3800 MHz
Gain		-5 ± 2 dB	-5 ± 2 dB
Ripple in Band		± 3 dB	± 3 dB
RF Output Power		≤ -10 dBm (RF)	----
Optical Power		---	-6 ± 2 dBm (O/P)
VSWR		≤ 2.0:1	≤ 2.0:1
Max. Non-destructive Input Power		---	10 dBm
Impedance		50 Ω	50 Ω
Optical Wavelength		1310 nm	1550 nm
Gain Control Range		15 dB / 1 dB step, separate for each path	15 dB / 1 dB step, separate for each path
Power Supply		DC -48V ± 10%	
Operating temperature range		-10°C to +45°C	
Storage temperature range		-40°C to +85°C	
Relative humidity		10% - 95%	
Ingress protection		IP40 for indoor	
Monitoring and control		LAN-RJ45 (local)	
		3G&4G wireless modem (remote)	
Cooling		Nature cooling	
Optical connector		8 sets x SC/APC (5G 4x4 MIMO)	
		16 sets x SC/APC (4G 2x2 MIMO)	
RF connector		TX/RX: 14 x QMA-Female	
Installation		19" Rack Mounting	
Environment Protections		RoHS	

**3.2.3 HPRU****MCU**

	Uplink	Downlink
Frequency	617 - 4000 MHz	617 - 4000 MHz
Gain	-5 ± 2 dB	-5 ± 2 dB
RF Output Power	---	-12 ± 2 dBm (RF per port)
Fiber Optical Power	5 ± 1 dBm (O/P)	---
Optical Wavelength	1310 nm	1550 nm
Ripple in Band	≤ ± 3 dB (System of 1x PBMU: HPRU via 1m optical fiber)	≤ ± 3 dB (System of 1x PBMU: HPRU via 1m optical fiber)
Group Delay	≤ 1 µS	≤ 1 µS
Impedance	50 Ω	50 Ω
Power Supply	AC 90 ~ 264V, 50 ~ 60Hz	
Power Consumption	< 80 W (Without LPA connection)	
Operating temperature range	-40°C to +55°C	
Storage temperature	-40°C to +85°C	
Relative humidity	5% - 98%	
Ingress protection	IP67	
Monitoring and control	PC via LAN	
Dimensions	357 x 500 x 80 mm (Without handle, connectors and brackets)	
Weight	≤ 12 kg	
RF connector	4 x L32 (Output to LPA)	
Optical connector	2 x SC/APC	
Power Connector (Output power supply to LPA)	4 x integrated socket with power supply and communication pins	
Installation	Wall/pole mounting	

**LPA**

	Uplink	Downlink
Frequency	N77 (2x2 MIMO)	3450 - 3550 MHz
Gain	$55 \pm 2$ dB	$49 \pm 1$ dB
RF Output Power	$-5 \pm 2$ dBm	$\geq 43.5$ dBm
Gain Control Range	25 dB/1 dB step	25 dB/1 dB step
	$\leq 3.5$ dB (Single LPA)	$\leq 3.5$ dB (Single LPA)
Ripple in Band	$\leq \pm 3$ dB (System of 1x PBMU: HPRU via 1m optical	$\leq \pm 3$ dB (System of 1x PBMU: HPRU via 1m optical fiber)
ALC control	When in max output power, if increased 20dB input Level, the variation of the output power can be controlled within $\pm 2$ dB	When in max output power, if increased 10dB input Level, the variation of the output power can be controlled within 2dB
	$\leq 3.5$ dB (Single LPA)	---
Noise Figure	$\leq 5$ dB (System of 1x PBMU: HPRU via 1m optical fiber)	---
VSWR	$\leq 1.5$	$\leq 1.5$
Group Delay	$\leq 1$ $\mu$ s	$\leq 1$ $\mu$ s
Spurious Emissions	Meets 3GPP TS 36.106 for	
Impedance	$50 \Omega$	$50 \Omega$
Max.non-destructive input power	$\leq -10$ dBm	$\leq 10$ dBm
Power Supply	DC +27.5 ~ +28.5 V	
Power Consumption	< 270 W	
Operating temperature range	-40°C to +55°C	
Storage temperature	-40°C to +85°C	
Relative humidity	5% - 98%	
Ingress protection	IP67	
Monitoring and control	RS485 (via MCU)	
Dimensions	357 x 500 x 80 mm (Without handle, connectors, and brackets)	
Weight	$\leq 15$ kg	
RF Connectors	2 x 4.3-10 female (Output to antenna) 1 x L32 (Input from MCU4)	
Power Connector	1 x integrated socket with power supply and communication pins	
Debug Connectors	2 x USB Type C	
Installation	Wall or ground mounting	

**HPRU-P**

		Uplink	Downlink
Frequency	N77 (2x2 MIMO)	3700 - 3980 MHz	3700 - 3980 MHz
System Gain		$49 \pm 2$ dB	$49 \pm 2$ dB
RF Output Power		$-5 \pm 2$ dBm	$46 \pm 1$ dBm
Gain Control Range		25 dB/1 dB step	25 dB/1 dB step
Ripple in Band		$\leq 3.5$ dB (Single LPA)	$\leq 3.5$ dB (Single LPA)
		$\leq \pm 3$ dB (System of 1x PBMU: HPRU via 1m optical fiber)	$\leq \pm 3$ dB (System of 1x PBMU: HPRU via 1m optical fiber)
ALC control		When in max output power, if increased 20dB input Level, the variation of the output power can be controlled within 2dB	When in max output power, if increased 10dB input Level, the variation of the output power can be controlled within 2dB
Noise Figure		$\leq 3.5$ dB (Single LPA)	---
		$\leq 6$ dB (System of 1x PBMU: HPRU via 1m optical fiber)	---
VSWR		$\leq 1.5$	$\leq 1.5$
Group Delay		$\leq 1 \mu\text{s}$	$\leq 6 \mu\text{s}$
Spurious Emissions		Meets 3GPP TS 36.106 for LTE	
Impedance		$50 \Omega$	$50 \Omega$
Max.non-destructive input power		$\leq -10$ dBm	$\leq 10$ dBm
Power Supply		AC110 ~ 250V, 50/60Hz	
Power Consumption		650W	
Operating temperature range		-40°C to +55°C	
Storage temperature		-40°C to +85°C	
Relative humidity		5% - 98%	
Ingress protection		IP67	
Monitoring and control		RS485 (via MCU)	
Dimensions		500 x 357 x 144 mm (Without handle, connectors, and brackets)	
Weight		$\leq 24$ kg	
RF Connectors		2 x 4.3-10 female (Output to antenna)	
		1 x L32 (Input from MCU4)	
Power Connector		1 x integrated socket with power supply and communication pins	
Debug Connectors		UDP	
Installation		Wall or ground mounting	

## 4. Installation

### 4.1 Installation Preparation

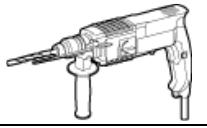
This chapter introduces installation and commissioning flow of the equipment to help installation personnel understand the entire process. Brief introduction to some physical parameters of repeater, such as size, weight, humidity and temperature is also included in this chapter.

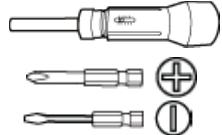
#### 4.1.1 Select one site location

1. Make sure access is restricted to qualified personnel
2. Install the product where power supply and feeder cables are accessible.
3. Site location should be far away from heat source and damp environment.
4. Make sure can get the power supply near the site, and the power voltage is stable.
5. Make sure the grounding is well, and lightning protection is good.

#### 4.1.2 Installation tools

You must prepare the following tools and instruments before the installation.

Item	Description	Remark
1	Hammer drill (a $\varnothing$ 13.5~14)	
2	Rubber Hammer	
3	Adjustable wrench (size: 32mm)	
4	Torque wrench (size:16mm / 20mm / 22mm)	
5	Combination wrench (size:16mm / 20mm / 22mm)	
6	Phillips screwdriver (M3 to M6)	

7	Torque screwdriver kit (Cross head and flat-head M3 to M6)	
8	Wire stripper	
9	Pliers	
10	Safety gloves	
11	Measuring tape	
12	Multimeter	
13	Knife	
14	Safety helmet	
15	Safety goggles	
16	Flash lights	

#### 4.1.3 Information about the installation

Before installing a blade HPRU, you must be familiar with its exterior, ports, indicators, installation options and installation clearance requirements.

## 4.2 Installation steps

### 4.2.1 Installation

Before any installation, check that the device has no visible damages or defects. A blade HPRU can be installed on a wall, pole. Installation scenarios must meet heat-dissipation and waterproofing requirements of HPRU.

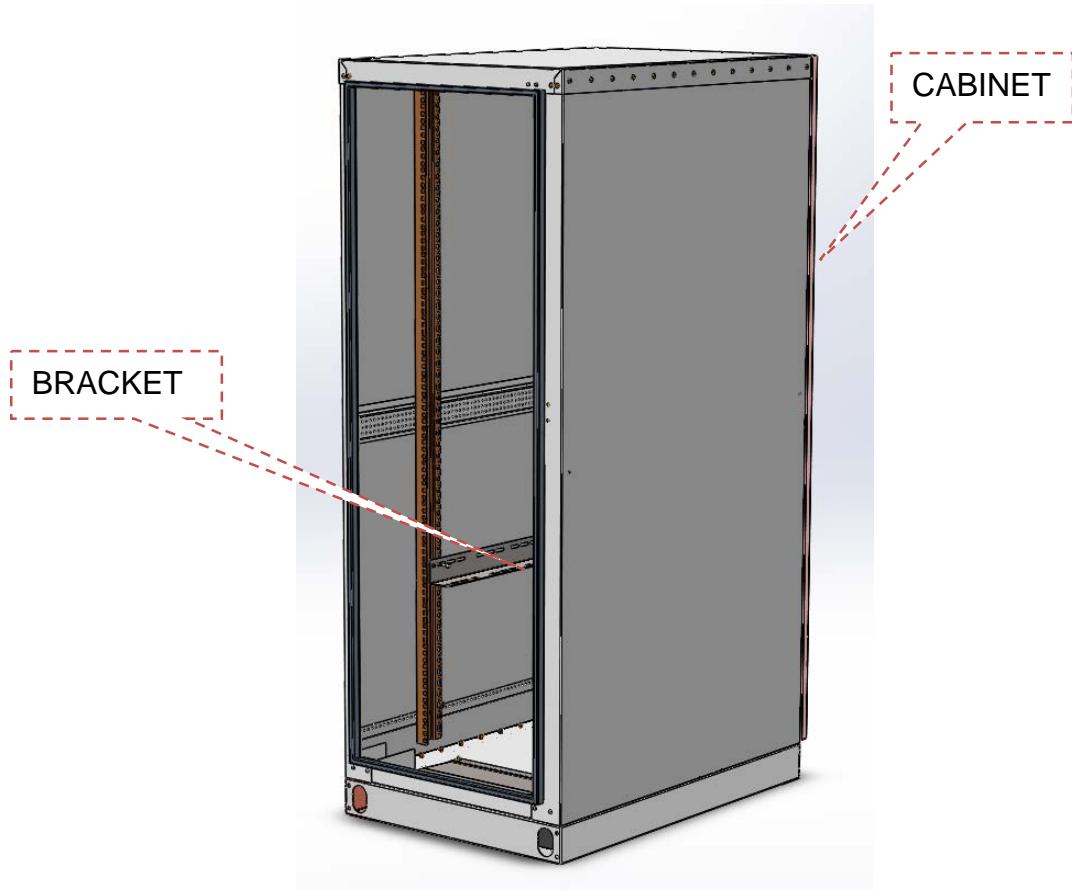
## 4.2.2 Installation of PBMU

### 4.2.2.1 Installation Scenarios

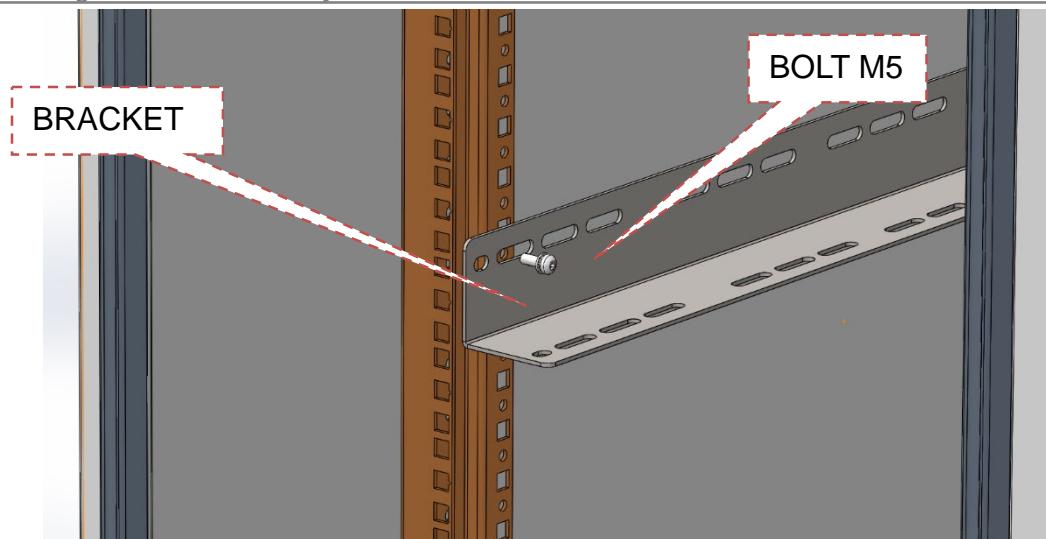
A PBMU be installed in cabinet. Installation scenarios must meet heat-dissipation and waterproofing requirements of the PBMU.

### 4.2.2.2 Installing a PBMU in cabinet

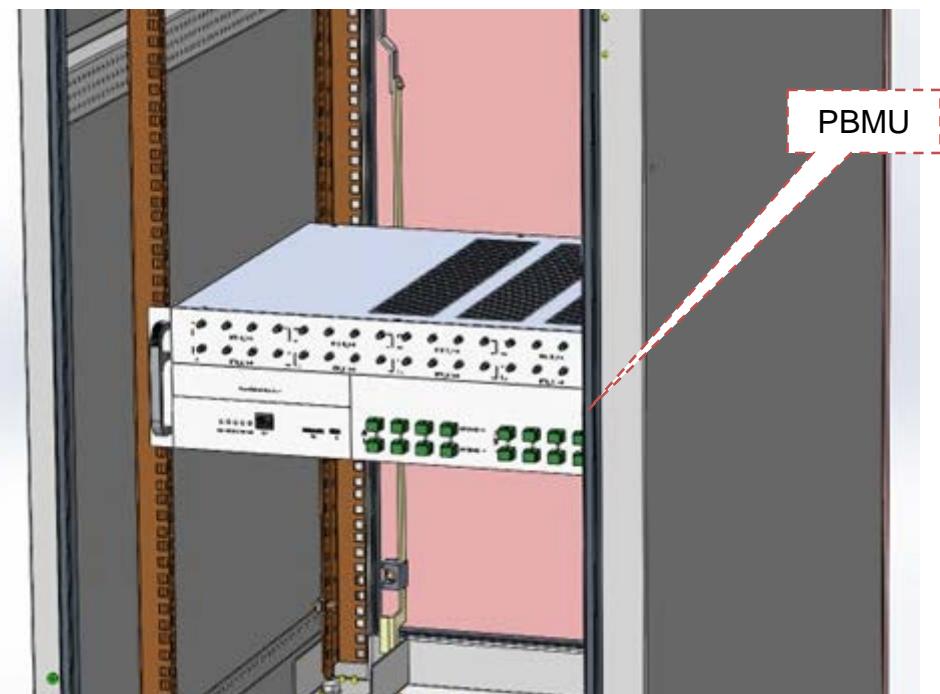
1. Install bracket on the cabinet with the screw. as shown in Figure 4-1. Attention: Please pay attention to mounting of bracket. as shown in Figure 4-2.
2. Push PBMU into the cabinet. as shown in Figure 4-3
3. Use screw to mount PBMU, as shown in Figure 4-4.



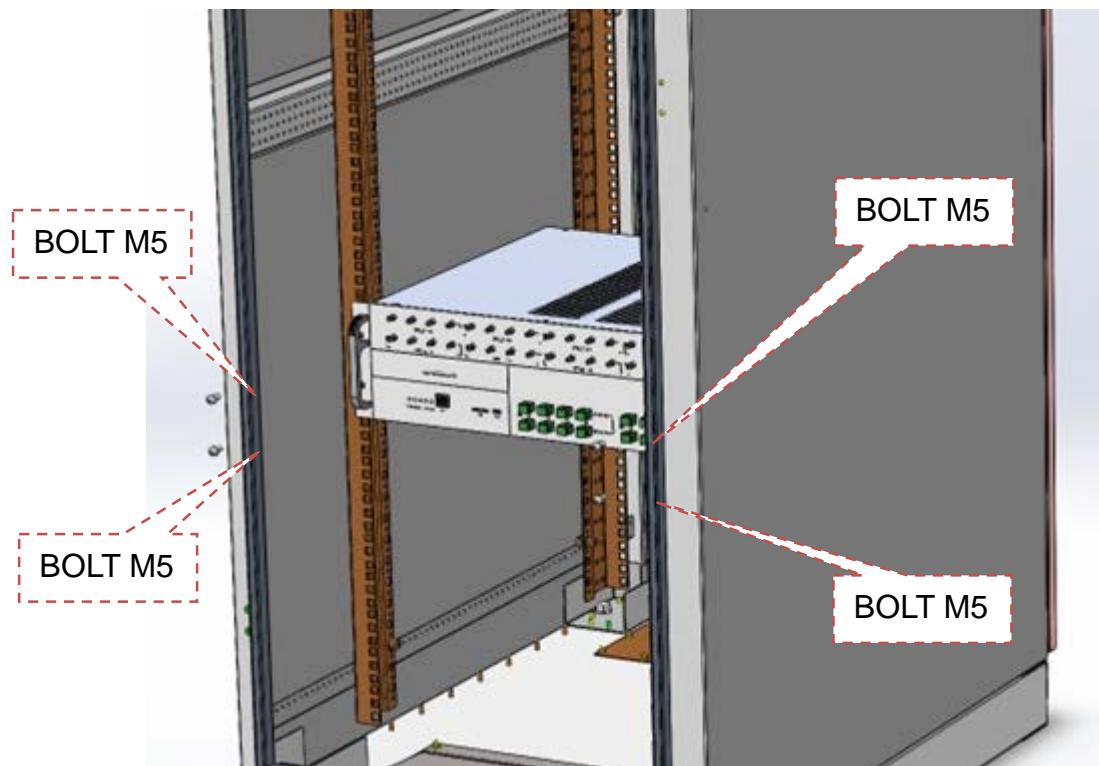
**Figure 4-1** pay attention to mounting of bracket.



**Figure 4-2** Drill holes and Install the Mounting rack on wall



**Figure 4-3** Push PBMU into the cabinet.



**Figure 4-4 Use screw to mount PBMU**

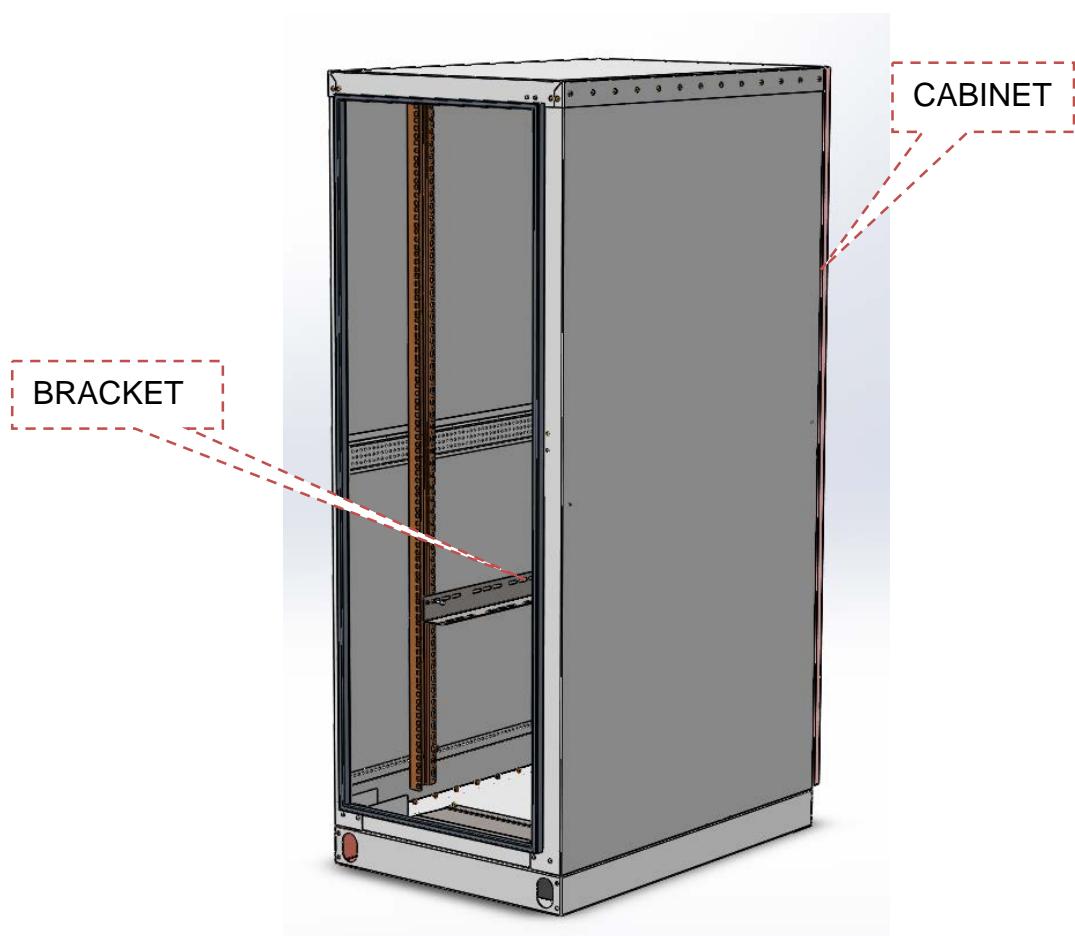
### 4.2.3 Installation of IM2U

#### 4.2.3.1 Installation Scenarios

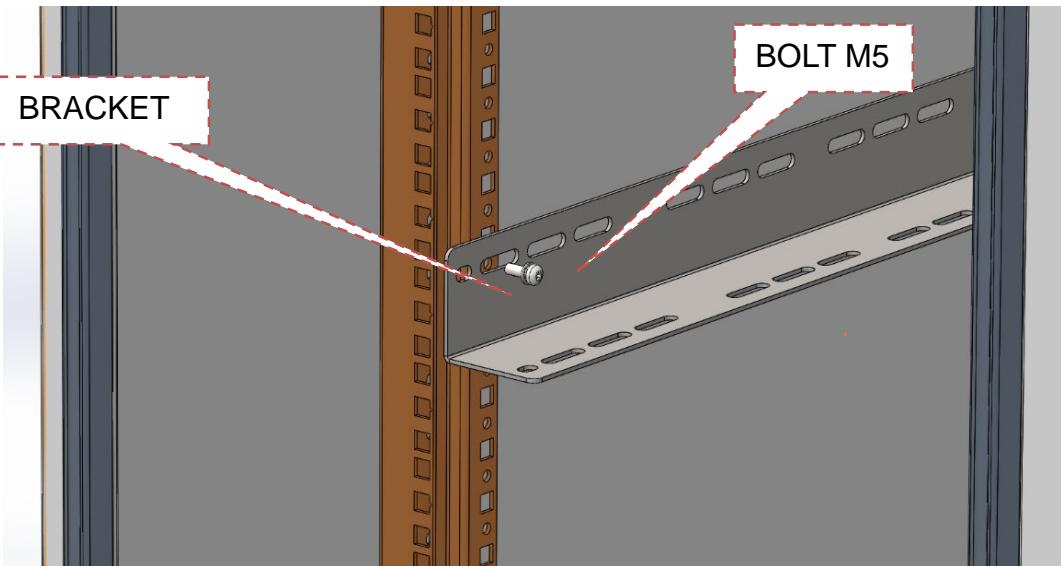
An IM2U be installed in cabinet. Installation scenarios must meet heat-dissipation and waterproofing requirements of the IM2U.

#### 4.2.3.2 Installing an IM2U in cabinet

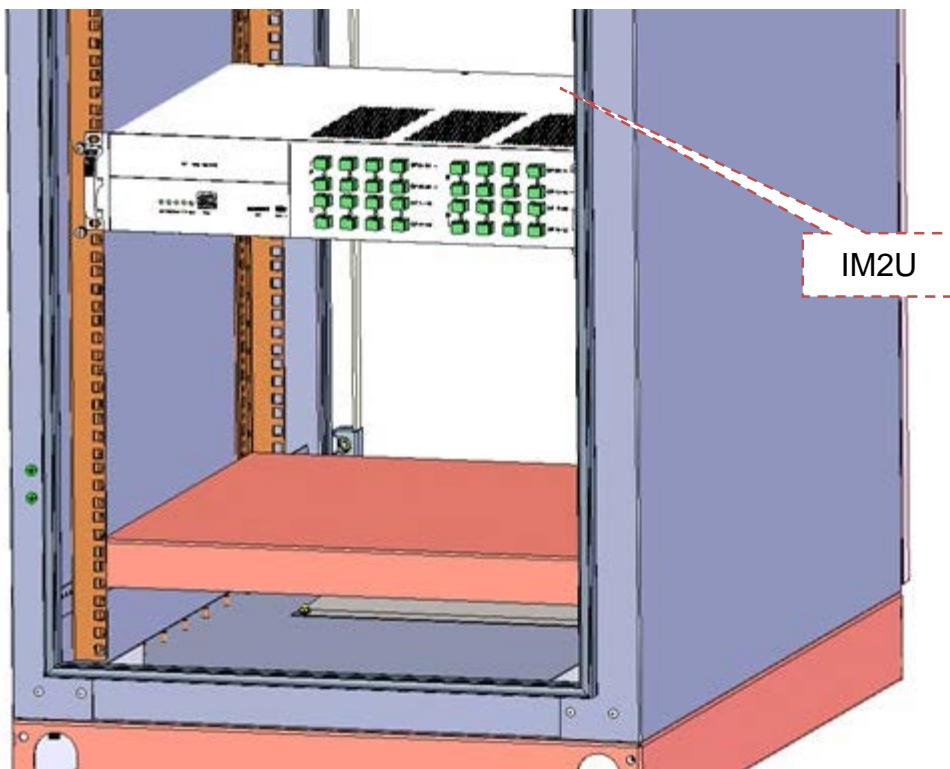
1. Install bracket on the cabinet with the screw. as shown in Figure 4-5. Attention: Please pay attention to mounting of bracket. as shown in Figure 4-6.
2. Push IM2U into the cabinet. as shown in Figure 4-7
3. Use screw to mount IM2U, as shown in Figure 4-8.
4. Connect the IM2U to terminal box by patch cord, the patch cord connector type is SC/APC to SC/APC or another type for terminal box
5. Connect the ground cable to ground
6. When connect the power, please check the Power voltage in advance, and need a breaker to protect the IM2U.



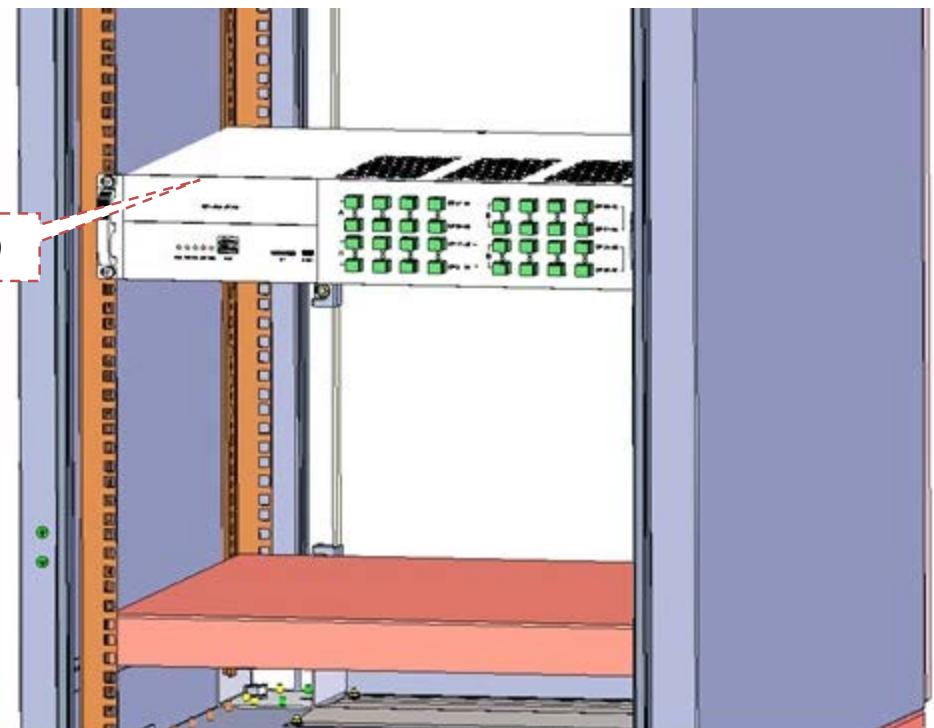
**Figure 4-5** pay attention to mounting of bracket.



**Figure 4-6** Drill holes and Install the Mounting rack on wall



**Figure 4-7** Push IM2U into the cabinet.



**Figure 4-8** Use screw to mount IM2U

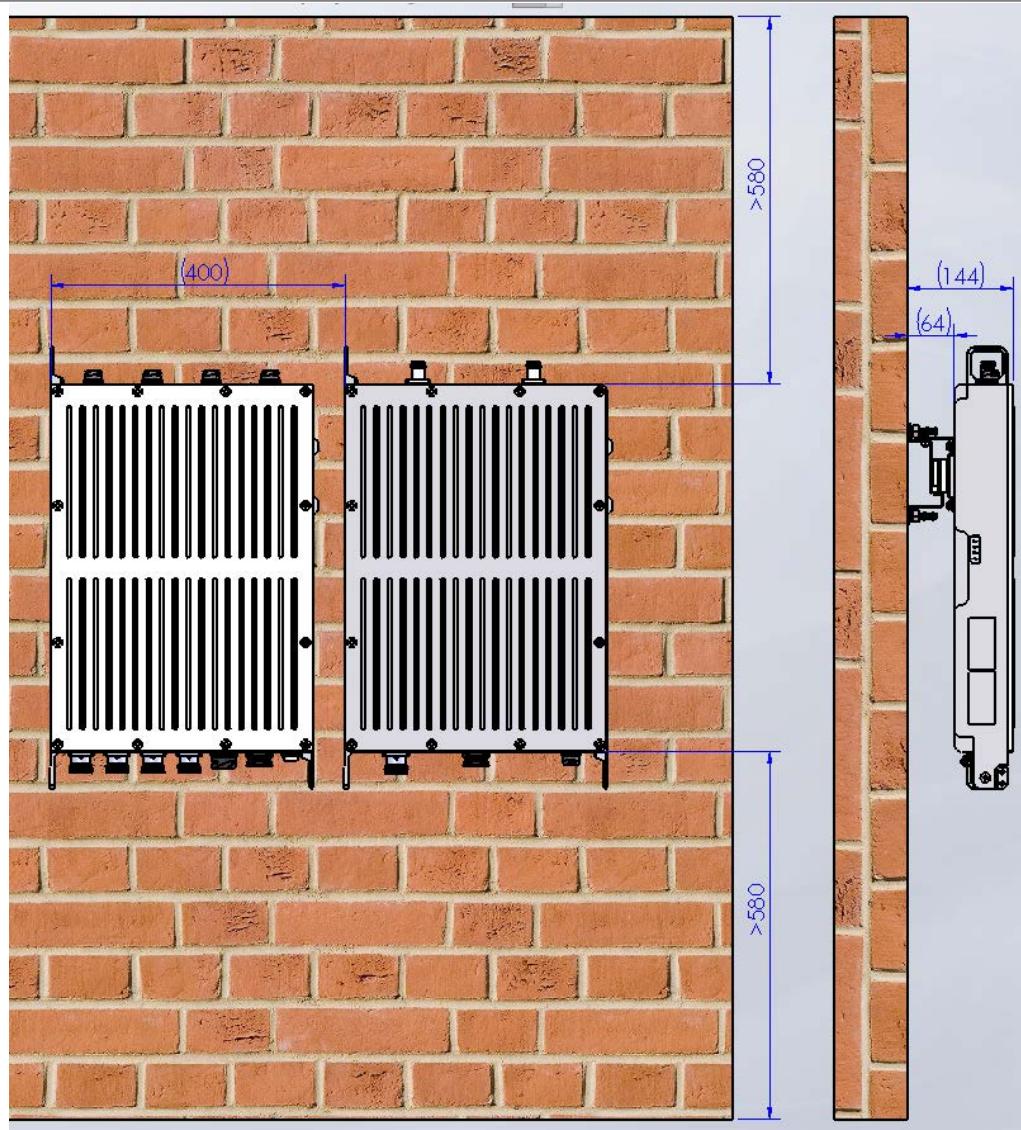
**4.2.4 Installation of MCU****4.2.4.1 Install Accessories for MCU**

No.	Description	Quantity	Remarks
1	Fiber Optical Repeater Remote Unit	1	
2	Grounding Cable	1	
3	Fixed Bracket	1	
4	Up-Down Activity Bracket	1	
5	Clamp Plate	2	
6	LAN Cable	2	
7	M10x150D-SS-GB/T 5781	4	
8	M10 NUT,HEX, SS304	4	
9	SW10 SW,SC LCK, SS304	4	
10	W10Q WASHER,PLAIN, SS304	4	
11	M6X20-GB/T 9074.1 or ISO 10644	5	
12	POWER CABLE, EN	1	
13	POWER CABLE, EU	1	
14	Gasket	1	
15	Optical Connector Cap	1	

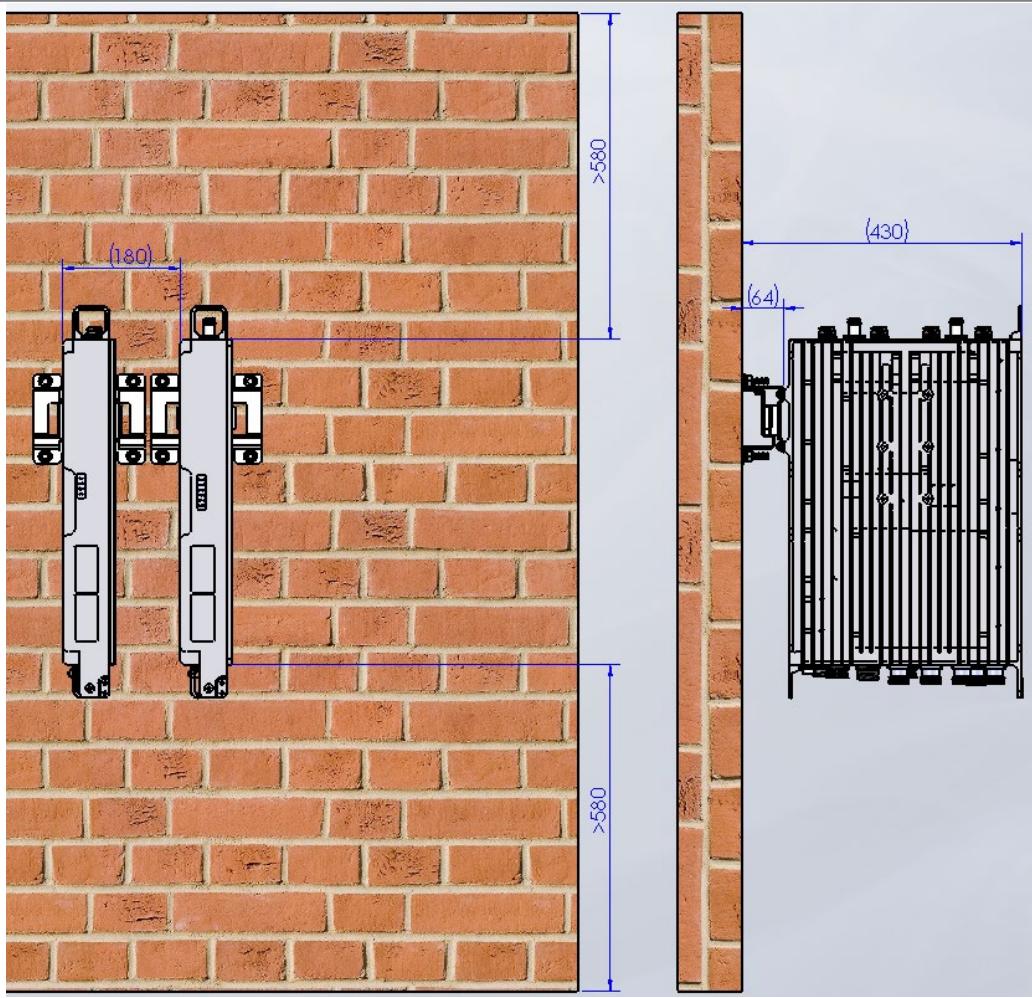
Part Number		Part Description	Quantity	Image
16	Heat-shrinkable Tubing		5	
17	Patchcord,SC/APC-SC/APC,G657A2,2.0mm,LSZH,3m		5	
18	POWER CABLE, 2m, for LPA		1	
19	RF CABLE ASSY, 2m, for LPA		1	

#### 4.2.4.2 Installing an MCU on a wall

7. Refer to Figure 4-9A, 4-9B to check the top, bottom, and wall space of the device. And determine the installation position.
8. Drill four holes on the wall as shown in Figure 4-10.
9. Fix the expansion bolts to the holes and align the Up-Down activity bracket with the expansion bolts and secure them to the wall with a wrench. Pay attention to the installation direction, as shown in Figure 4-11.
10. Fix a fixed bracket to the MCU. Pay attention to the installation direction. The MCU can be installed in three positions: back and side, as shown in Figure 4-12.
11. Install the MCU device on the support and tighten the screws, as shown in Figure 4-13.
12. Install grounding cables. After tightening screws, connect the grounding cables to the ground. There are two grounding holes to be installed, as shown in Figure 4-14.
13. Connect the MCU to LPA by cluster radio frequency cable, the connector type is L32 female.
14. Install the optical cable, as shown in Figure 4-15.
15. Installing power cables.
16. When connect the power, please check the power voltage in advance, and need a breaker to protect the MCU.

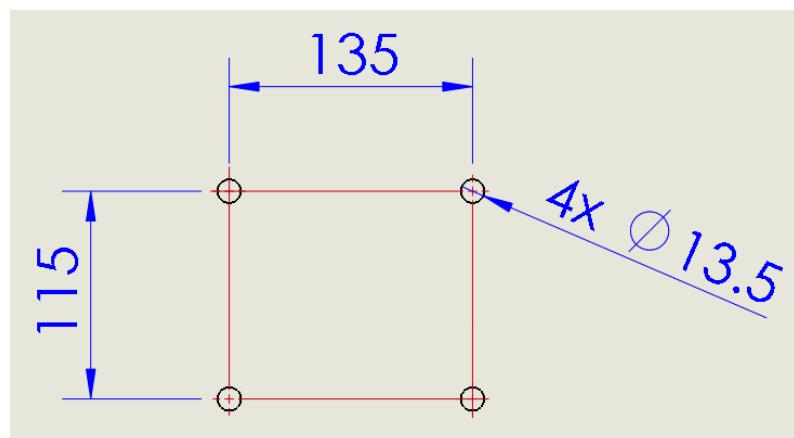


A

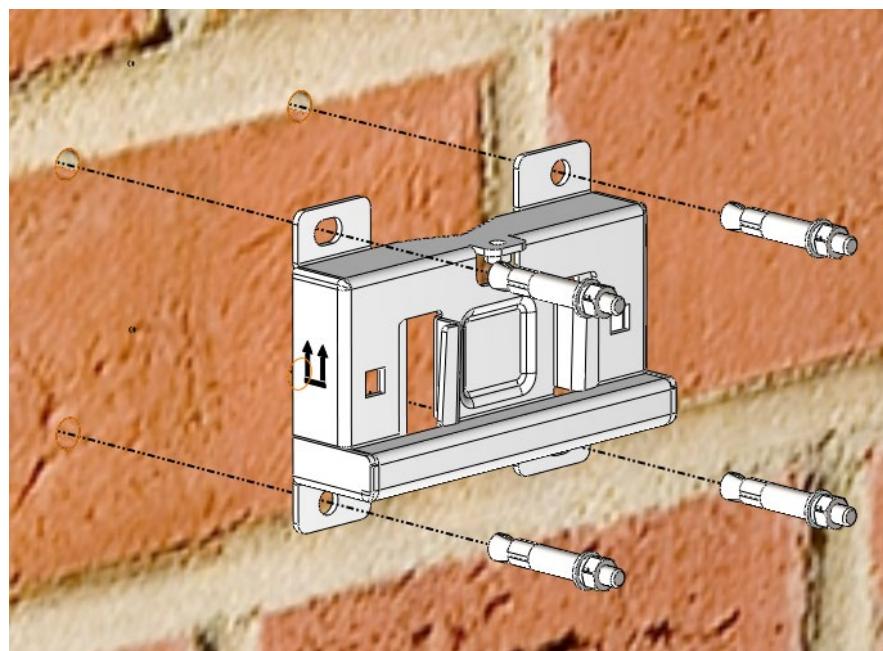


B

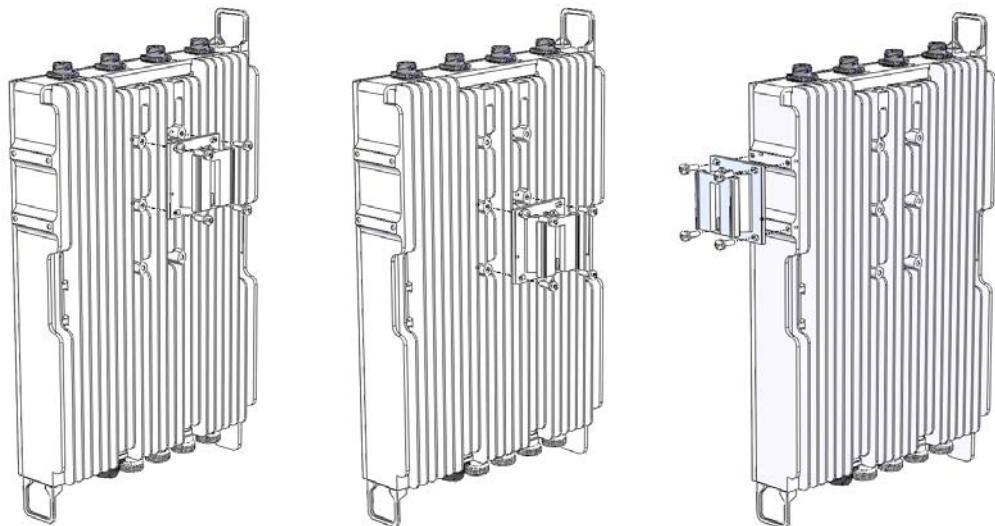
**Figure 4-9** Measure distance between top, bottom, left and right for mounting rack



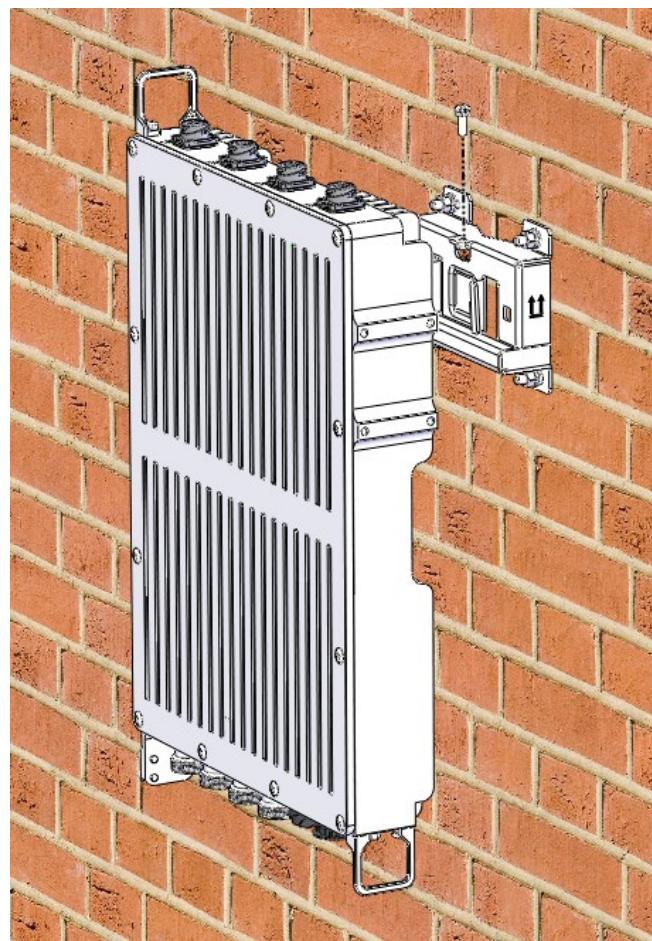
**Figure 4-10** Drill holes



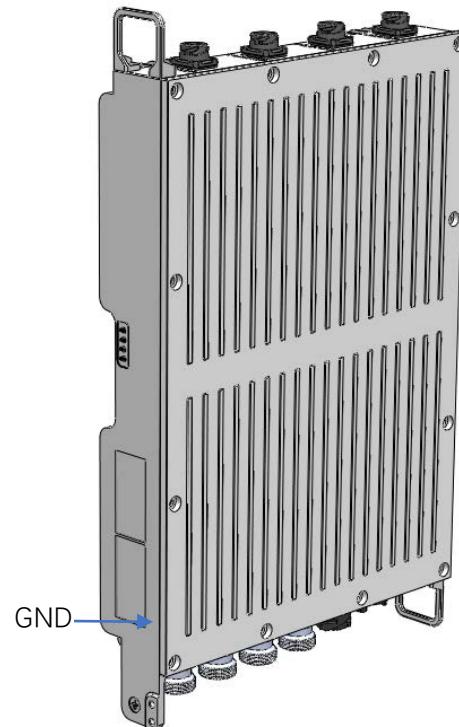
**Figure 4-11** Fixed Up-Down activity bracket on the wall



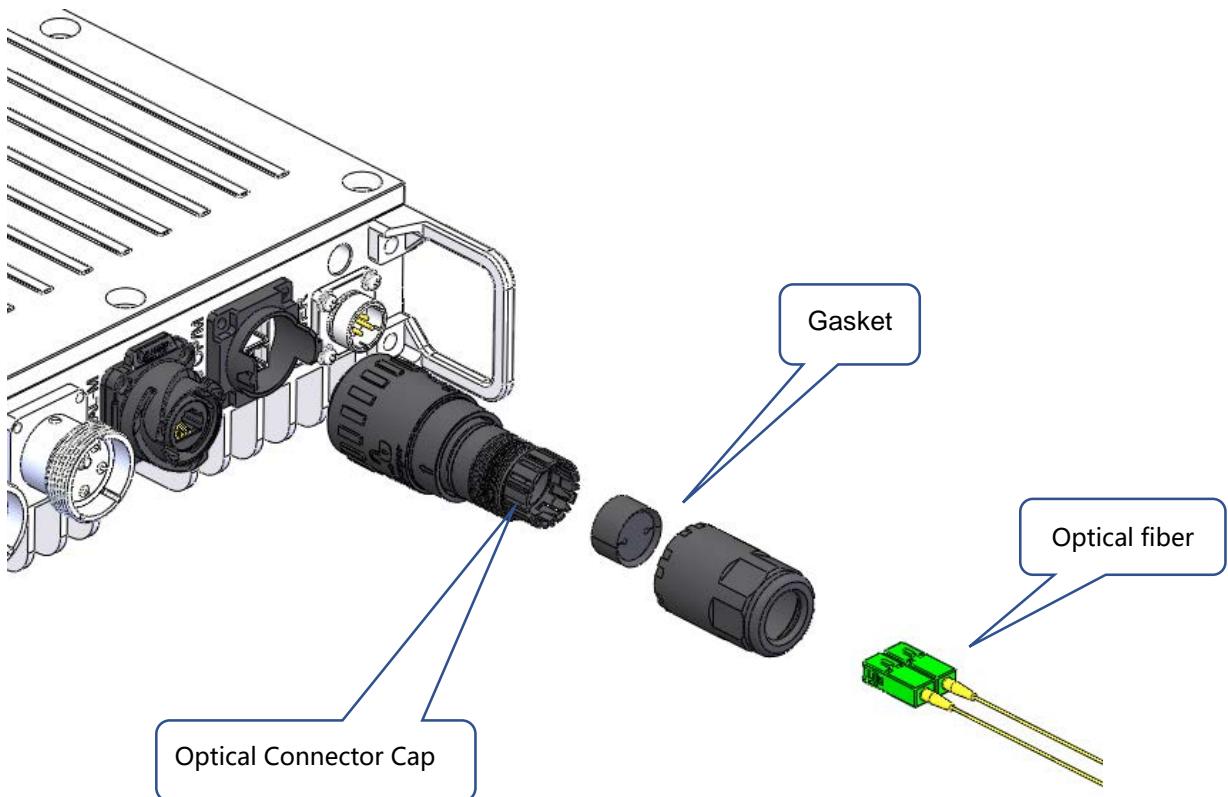
**Figure 4-12** Fixed bracket on the equipment



**Figure 4-13** Put the device on the support and tighten the screws



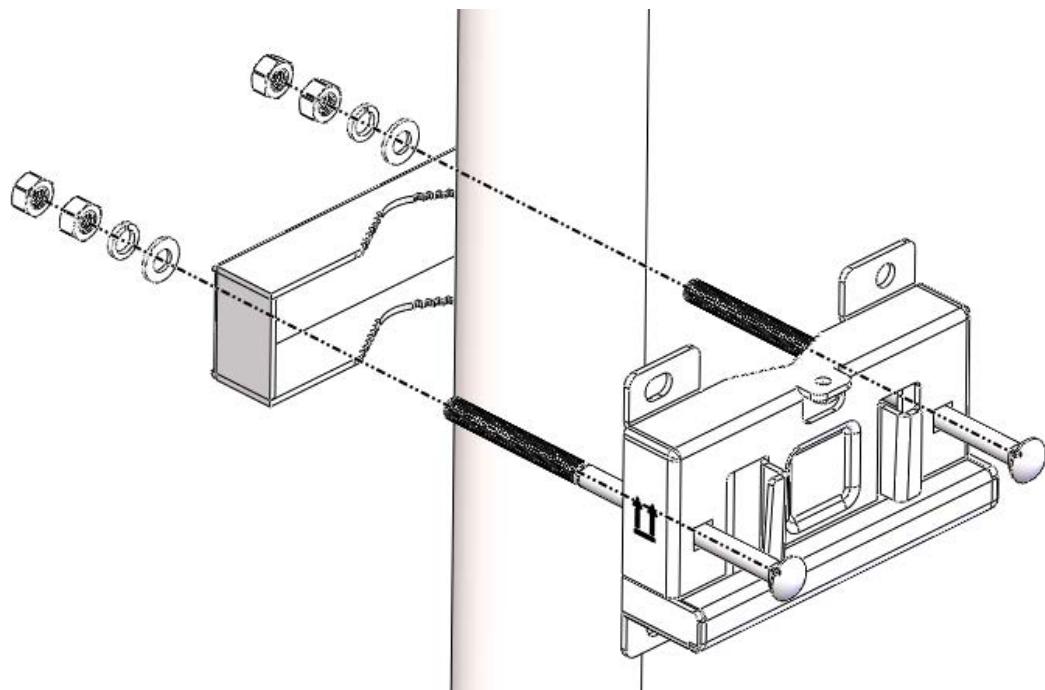
**Figure 4-14** Earthing position



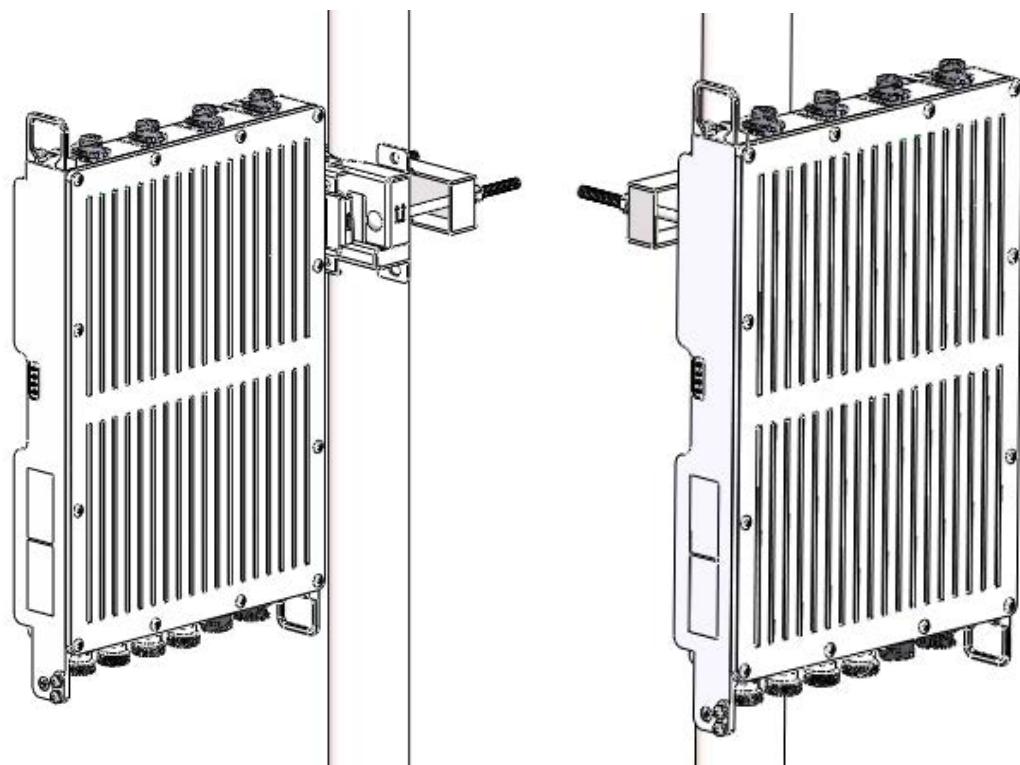
**Figure 4-15** Optical fiber installation

#### 4.2.4.3 Installing an MCU on a pole

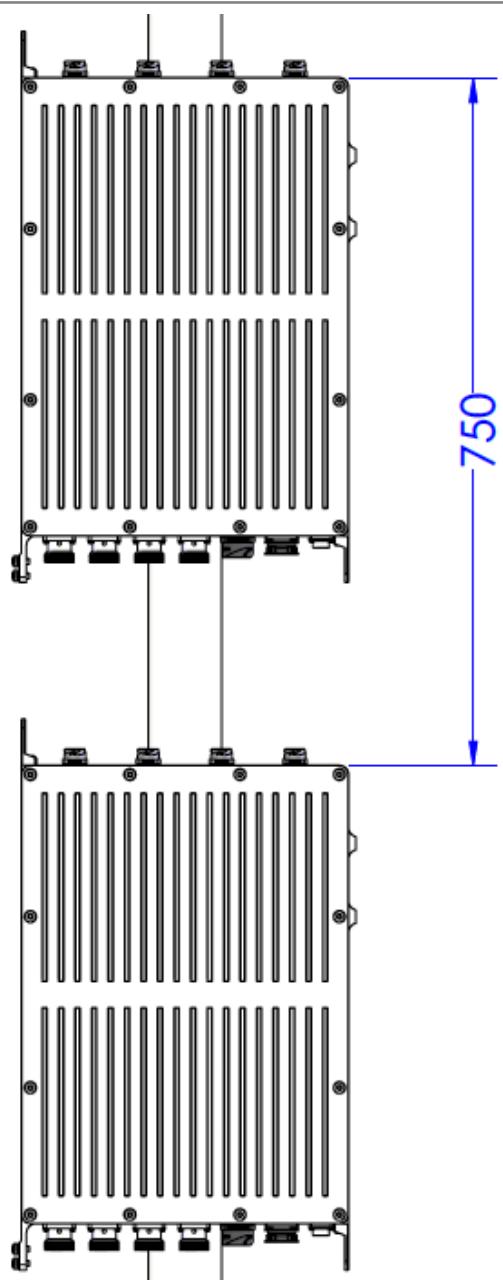
1. The Holding pole and Auxiliary Holding pole are installed on the Holding pole and Auxiliary Holding pole by M10X150 bolts, nuts, flat washers, and spring washers, as shown in figure 4-16. The diameter of the Holding pole should be between 40 mm and 120mm and the strength should be sufficient.
2. Fix a Fixed plate to the MCU. Pay attention to the installation direction. The MCU can be installed in three positions: back and side, as shown in Figure 4-12.
3. Install the MCU device on the support and tighten the screws, as shown in Figure 4-17.
4. If two devices need to be installed on the same pole, the spacing between the two devices should be 750mm, as shown in Figure 4-18
5. Install grounding cables. After tightening screws, connect the grounding cables to the ground. There are two grounding holes to be installed, as shown in Figure 4-14.
6. Connect the MCU to LPA by cluster radio frequency cable, the connector type is L32 female.
7. Install the optical cable, as shown in Figure 4-15.
8. Installing power cables.
9. When connect the power, please check the Power voltage in advance, and need a breaker to protect the MCU.



**Figure 4-16** Fix the bracket on the rod



**Figure 4-17** Put the equipment on the pole



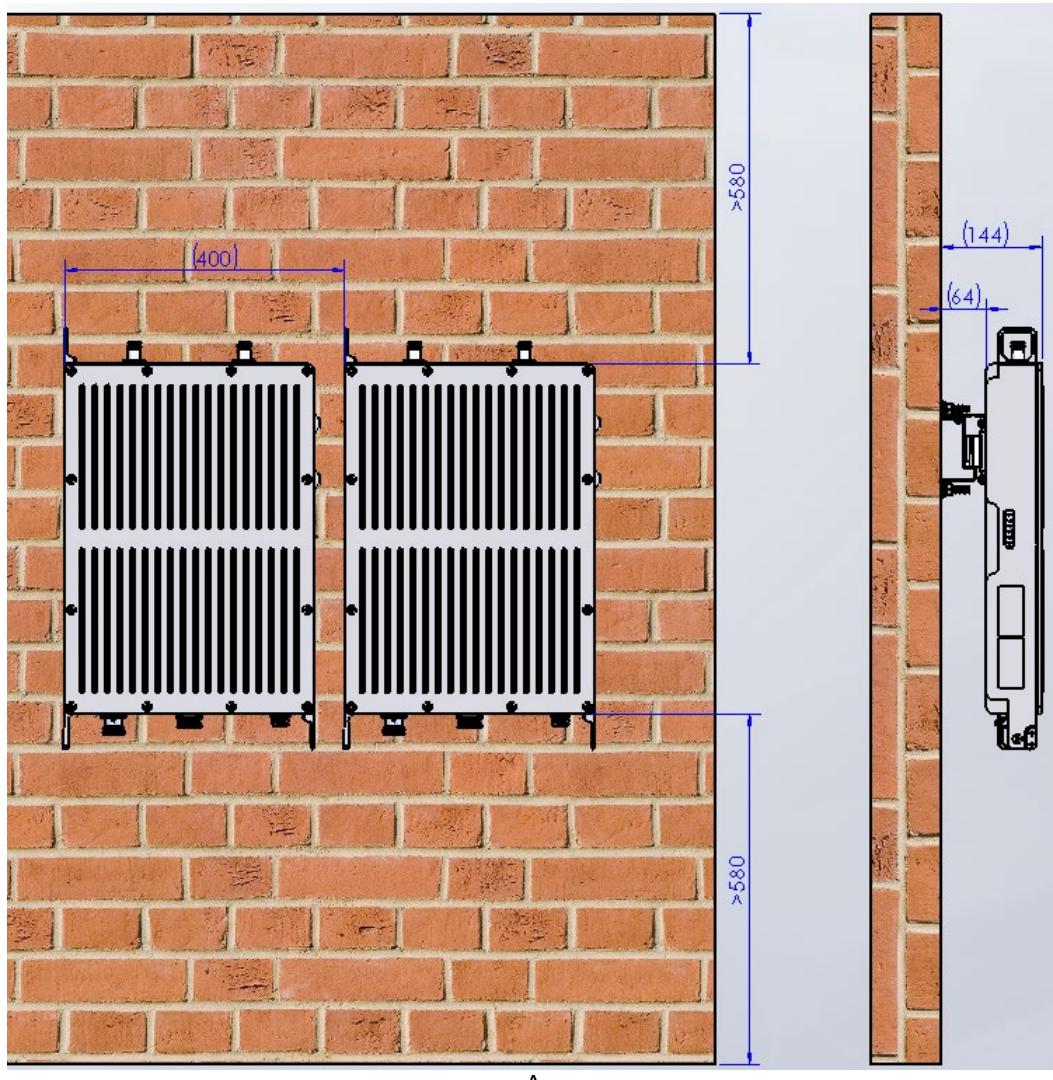
**Figure 4-18** Installation spacing

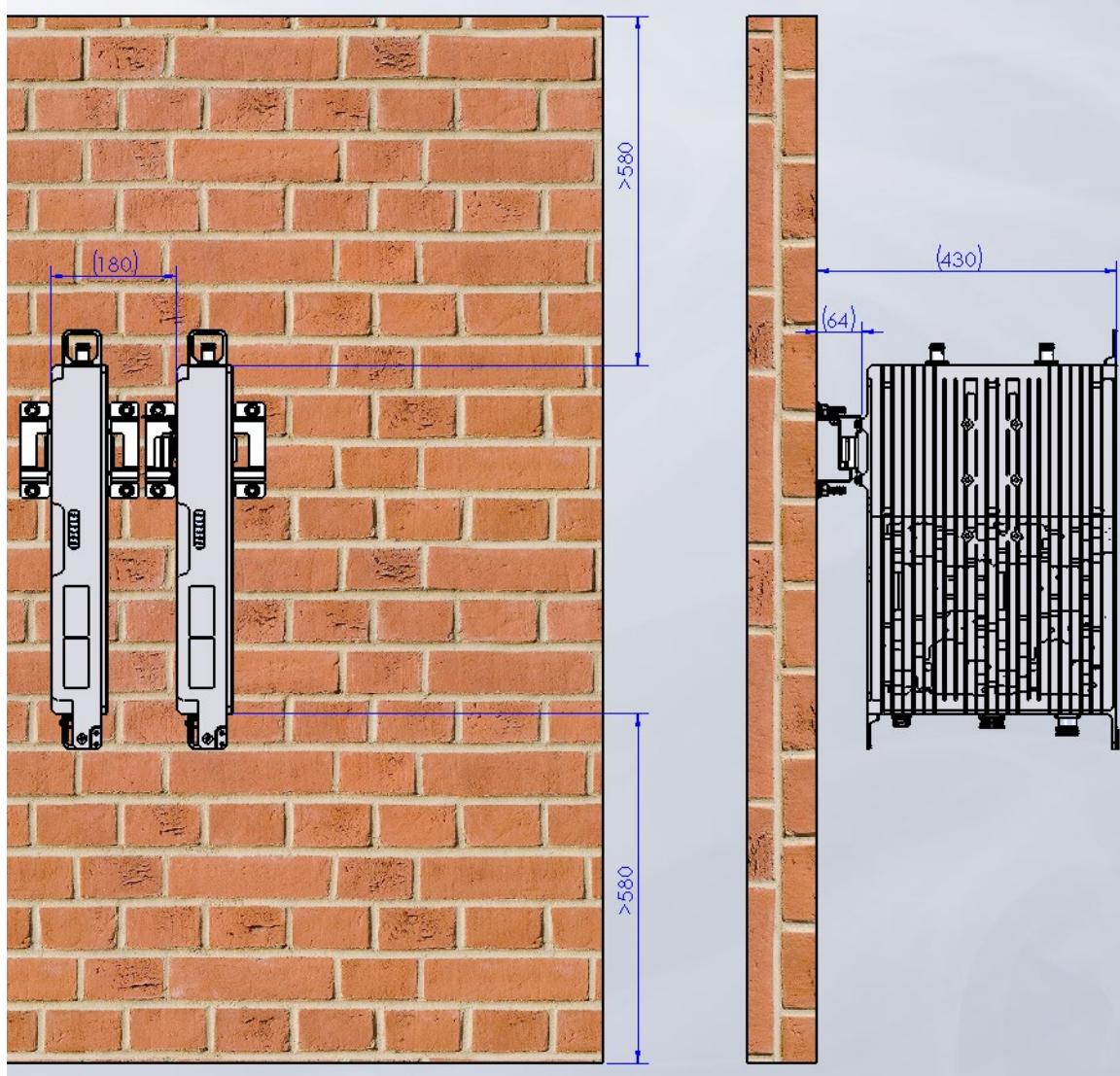
**4.2.5 Installation of LPA****4.2.5.1 Install Accessories for LPA**

No.	Description	Quantity	Remarks
1	Fiber Optical Repeater Remote Unit	1	
2	Grounding Cable	1	
3	Fixed Bracket	1	
4	Up-Down Activity Bracket	1	
5	Clamp Plate	2	
6	M10x150D-SS-GB/T 5781	4	
7	M10 NUT, HEX, SS304	4	
8	SW10 SW, SC LCK, SS304	4	
9	W10Q WASHER, PLAIN, SS304	4	
10	M6X20-GB/T 9074.1 or ISO 10644	5	
11	POWER CABLE	1	
12	RF CABLE ASSY	1	

#### 4.2.5.2 Installing an LPA on a wall

1. Refer to Figure 4-19A, 4-19B to check the top, bottom, and wall space of the device. And determine the installation position.
2. Drill four holes on the wall as shown in Figure 4-20.
3. Fix the expansion bolts to the holes and align the mounting bracket with the expansion bolts and secure them to the wall with a wrench. Pay attention to the installation direction, as shown in Figure 4-21.
4. Fix a fixed bracket to the LPA. Pay attention to the installation direction. The LPA can be installed in three positions: back and side, as shown in Figure 4-22.
5. Install the LPA device on the support and tighten the screws, as shown in Figure 4-23.
6. Install grounding cables. After tightening screws, connect the grounding cables to the ground. There are the grounding cables to be installed, as shown in Figure 4-24.
7. Connect the LPA to combiner by jumper, the jumper connector type is 4.3-10 male
8. Install the optical cable, as shown in Figure 4-25.
9. Installing power cables
10. When connect the power, please check the power voltage in advance.





B

Figure 4-19 Measure distance between top, bottom, left and right for mounting rack

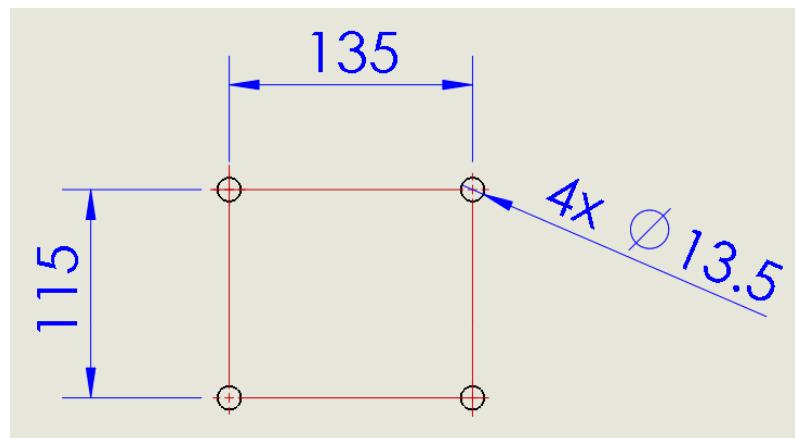
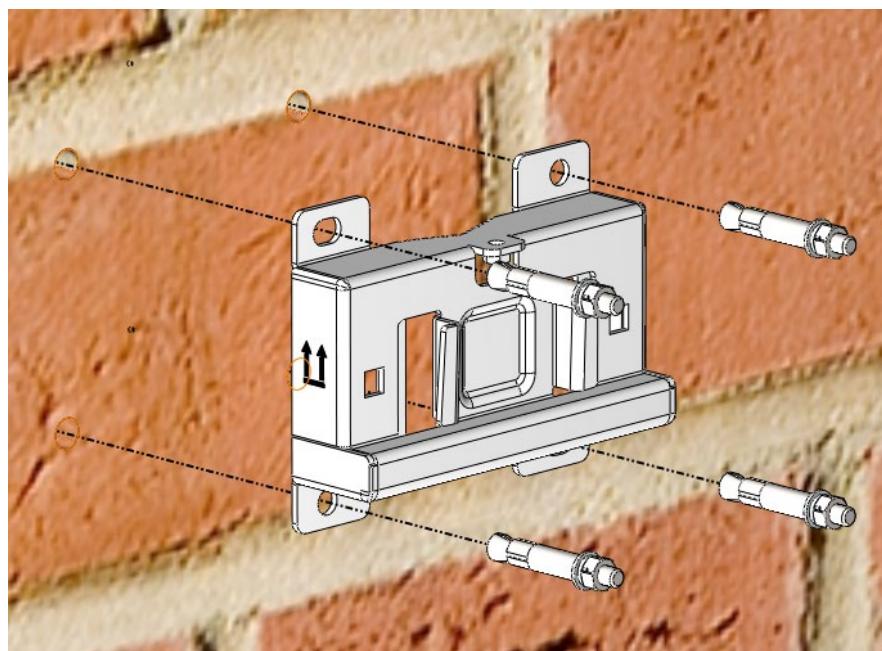
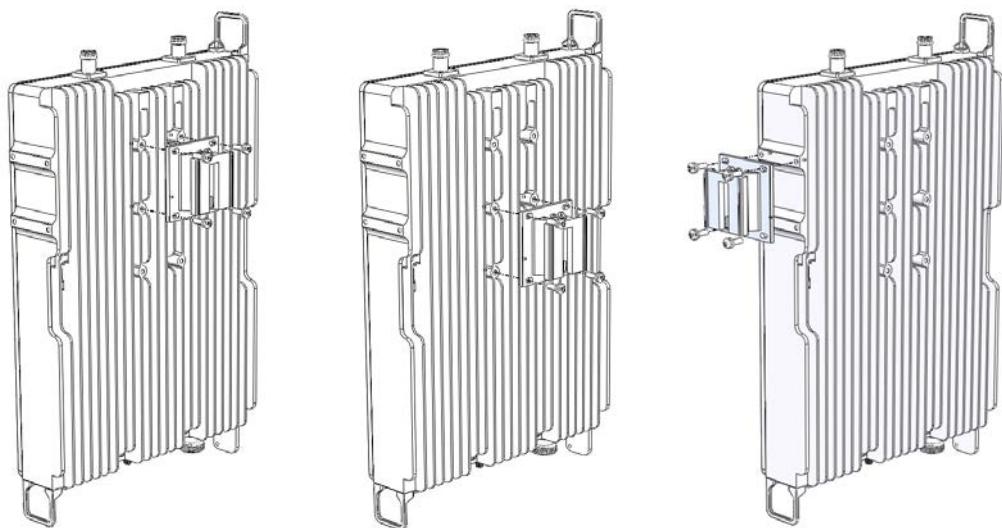


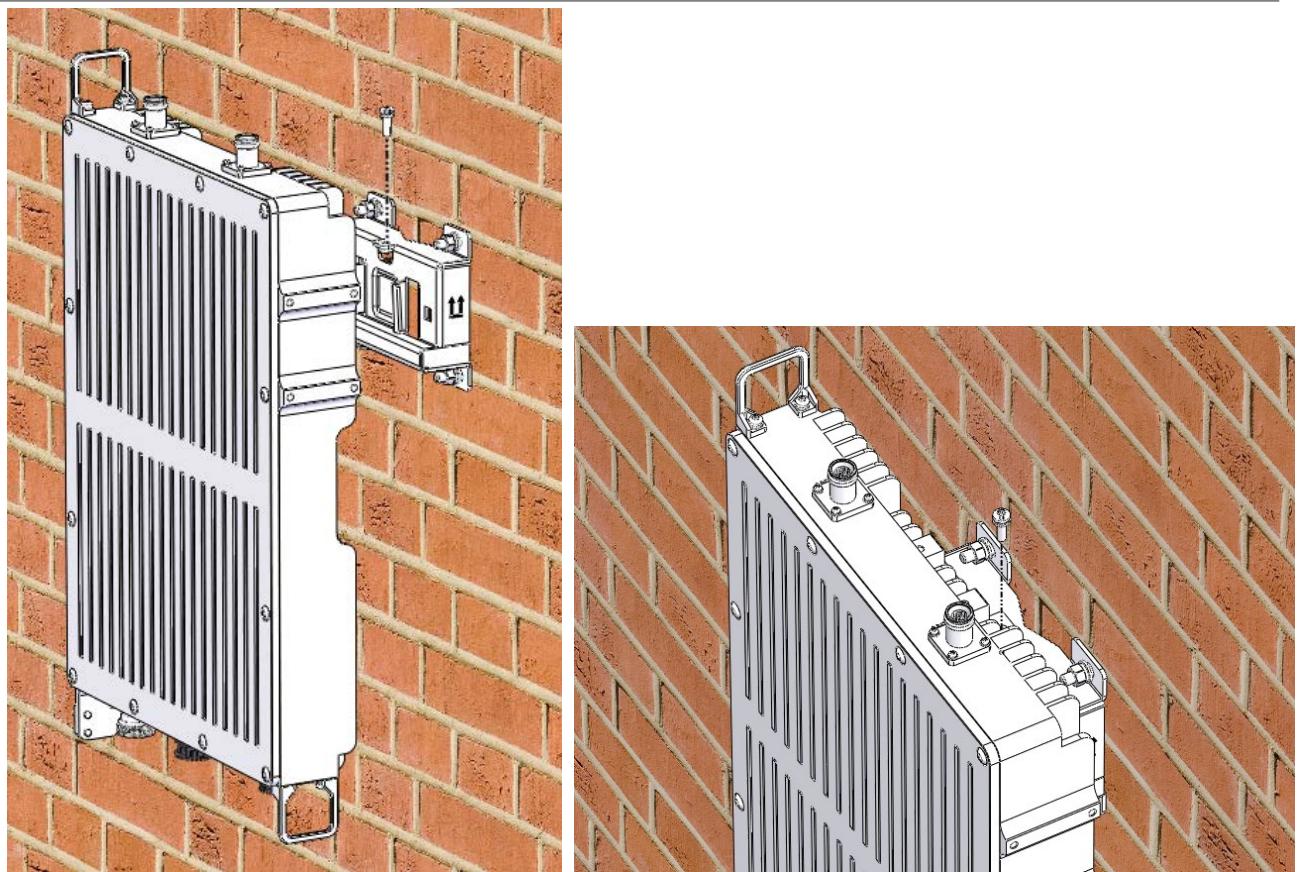
Figure 4-20 Drill holes



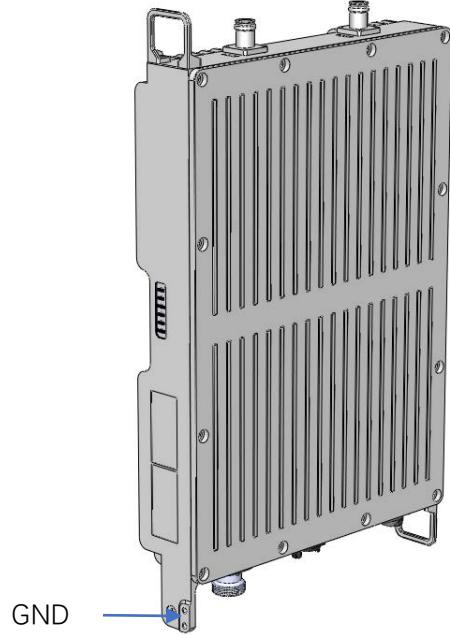
**Figure 4-21** Fixed Up-Down activity bracket on wall



**Figure 4-22** Fixed bracket on the equipment



**Figure 4-23** Put the device on the support and tighten the screws



**Figure 4-24** Earthing position

#### 4.2.5.3 Installing an LPA on a pole

1. The Up-Down Activity Bracket and Clamp Plate are installed on the holding pole by M10X150 bolts, nuts, flat washers, and spring washers, as shown in figure 4-25. The diameter of the Holding pole should be between 40 mm and 120mm and the strength should be sufficient.
2. Fix a fixed bracket to the LPA. Pay attention to the installation direction. The LPA can be installed in three positions: back and side, as shown in Figure 4-25.
3. Install the LPA device on the support and tighten the screws, as shown in Figure 4-26.
4. If two devices need to be installed on the same pole, the spacing between the two devices should be 750mm, as shown in Figure 4-27.
5. Install grounding cables. After tightening screws, connect the grounding cables to the ground. There are the grounding cables to be installed, as shown in Figure 4-24.
6. Connect the LPA to MCU by cluster radio frequency cable, the connector type is L32 female.
7. Installing power cables connected with the MCU

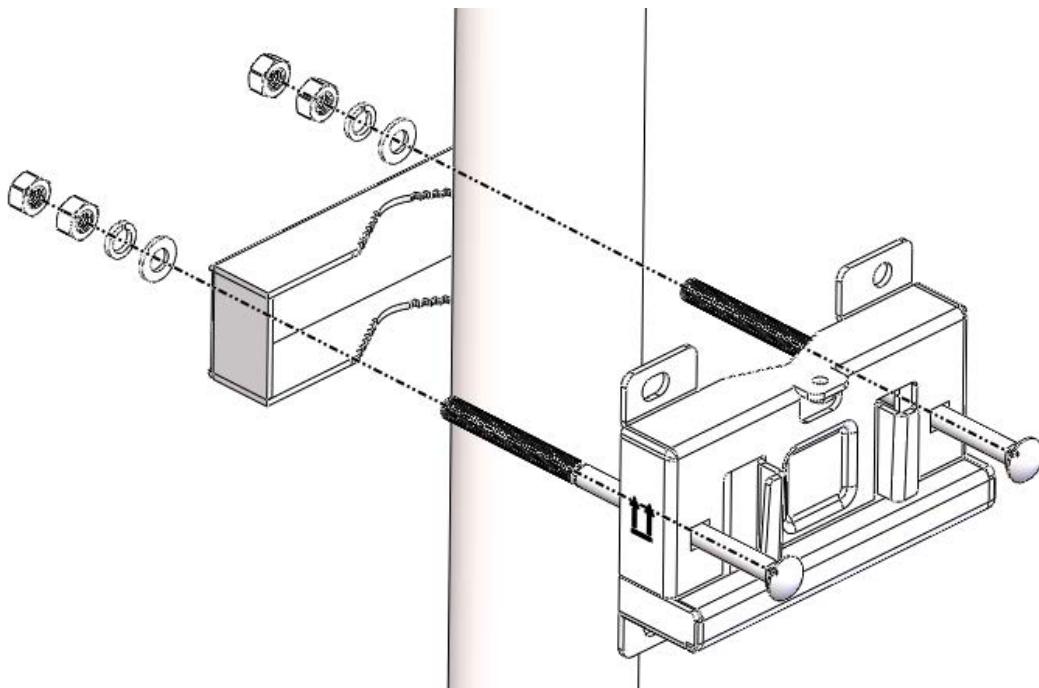
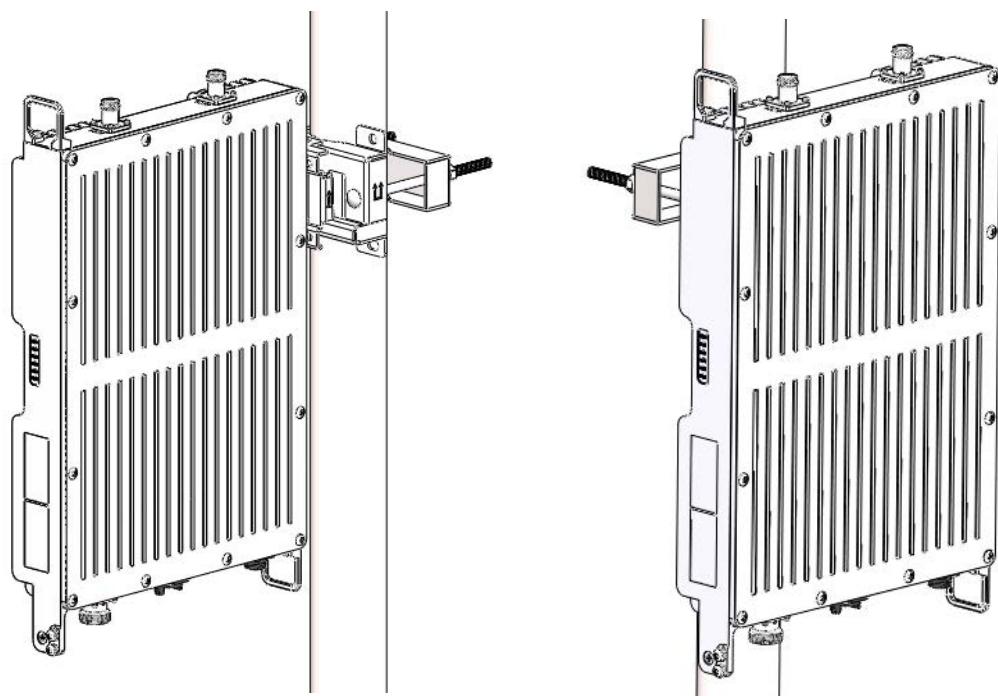
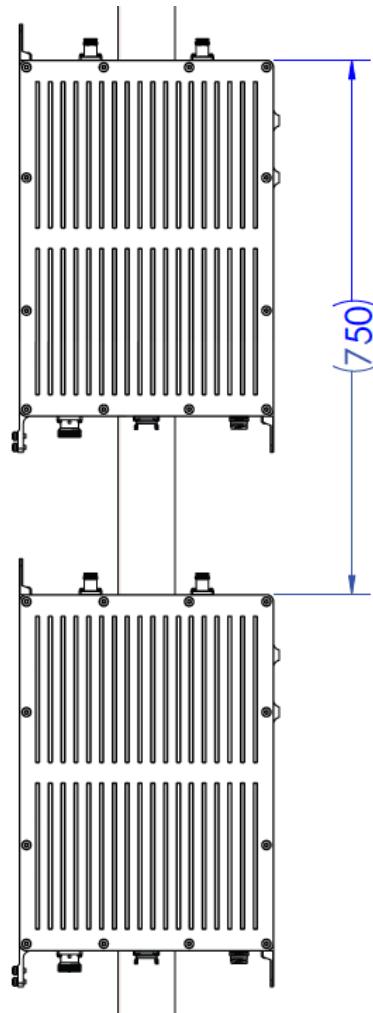


Figure 4-25 Fix the bracket on the rod



**Figure 4-26** Put the equipment on the pole



**Figure 4-27** Installation spacing

## 4.3 Installation standard

### 4.3.1 Device installation

1. The installation position should ensure that there is no interference from strong electric, strong magnetic and corrosive equipment.
2. The installation site should be dry with little dust and good ventilation.
3. The installation should be firm and smooth, and the installation should be fixed with the corresponding installation parts.
4. The mainframe power cable should be installed in the online slot.
5. The ground wire of equipment is earthed to the nearest grounding net from equipment, and the grounding terminal must be welded firmly.

### 4.3.2 Jumper and connecter

1. It is required that the line should be firm and parallel wiring. The jumper stick to the wall.
2. PVC pipe should be used for jumper running. Keep the line straight horizontally and separate line. Use a plastic pipe card when fixing the wall.
3. The jumper connecter must be installed firmly, and the special head tool should be used correctly. Never loosen the joint. Make sure that the contact is good, and the waterproof seal is done.

### 4.3.3 Power source

1. The power supply of the equipment must be a separate power supply.
2. The power cable should be straight and neat without sharp bending and uneven.
3. The power cable must be put through iron pipe or PVC pipe according to the design requirements. No connection should be made to the power cord through the pipe.
4. Power ground wire and protection ground wire should be laid separately from ac middle.
5. The grounding wire should be connected to the building's integrated grounding grid.
6. Good contact is required, and no looseness is allowed, and the contact surface should be coated with anti-oxidant.

### 4.3.4 The patch cord

1. The patch cord should be protected by routing pipe, and the part without routing pipe should be tied with Nylon Cable Ties.
2. When fixing the patch cord, it is recommended to wrap the outside of the patch cord around the nylon adhesive tape, and then use the Nylon Cable Ties to fix it.
3. The long patch cord should be coiled in the box or fixed in a circle.
4. The patch cord should be protected by protective sleeve.
5. The patch cord should have a small allowance at the elbow.
6. The patch cord should not be twisted after laying.

#### 4.3.5 Ports introduction

##### 4.3.5.1 PBMU

The QMA ports on the front panel of PBMU are used to combine the signal of the operators. Each set of the ports must be connected to same band. For example, all the four ports of BTS\_A can only combine band 78. The eight groups of ports on the front panel correspond to the eight ports on the back panel.

Since each Channel port has a fixed band, which band the BTS ports on the front panel connected to depends on which Channel ports the BTS port on the back panel connected to. In 4T4R mode, one PBMU can support up to 8 NEUs. There are 4 areas at the front panel of PBMU: A/B/C/D, each area has 8 optic ports. The optic ports at the corresponding location of each area are connected to the same NEU.

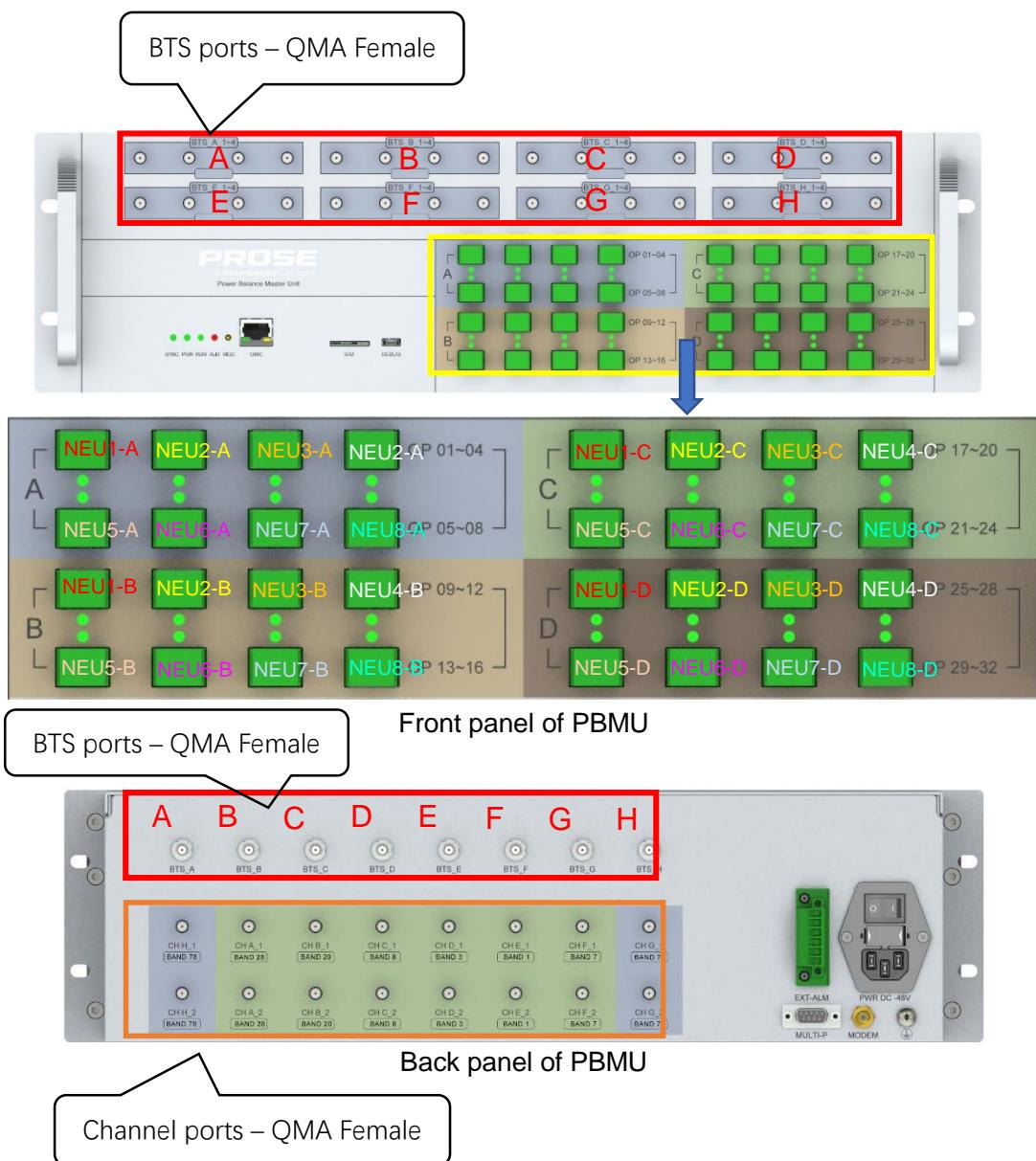


Figure 4-28 PBMU Ports

#### 4.3.5.2 IM2U

In 4T4R mode, one IM2U can support up to 8 NEUs. There are 4 areas at the front panel of IM2U: A/B/C/D, each area has 8 optic ports. The optic ports at the corresponding location of each area are connected to the same NEU.

The channel ports on the back panel of IM2U are connected with the combiner units which are used to combine the signal of the operators. The frequency bands of all channel ports are fixed.

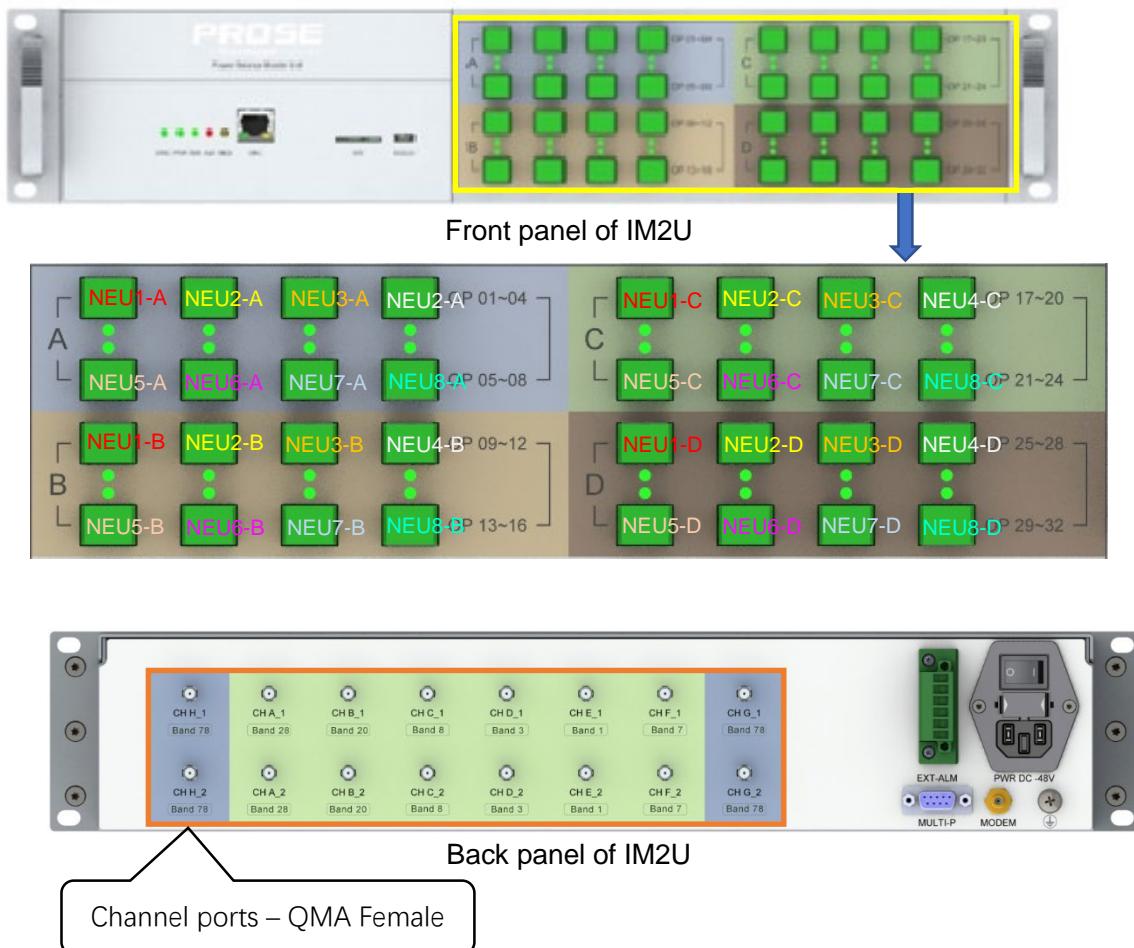


Figure 4-29 IM2U Ports

#### 4.3.6 Fiber and RF cable connection

Here use the connection between PBMU and HPRU as an example:

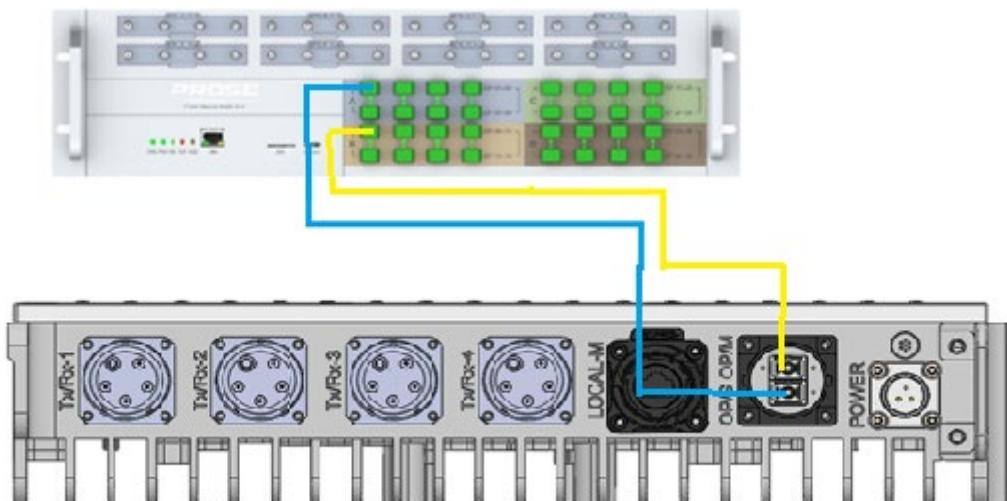
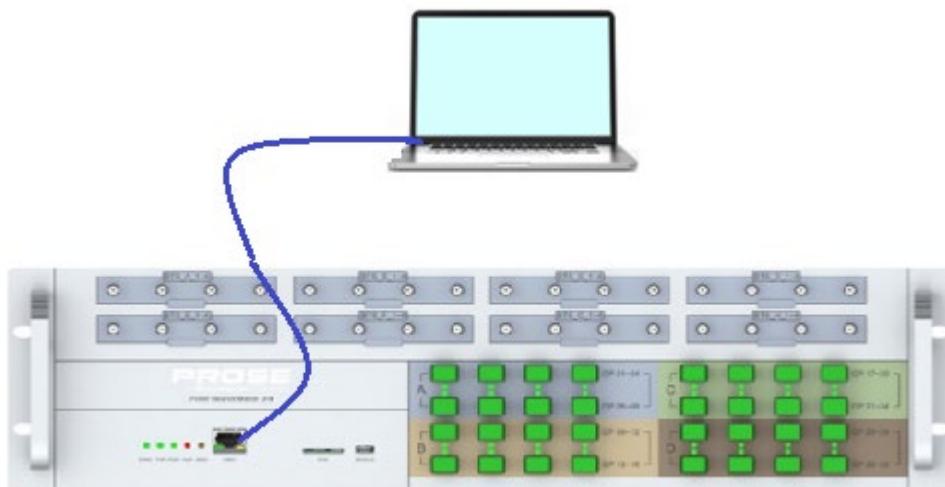


Figure 4-30 optical connection between PBMU and HPRU

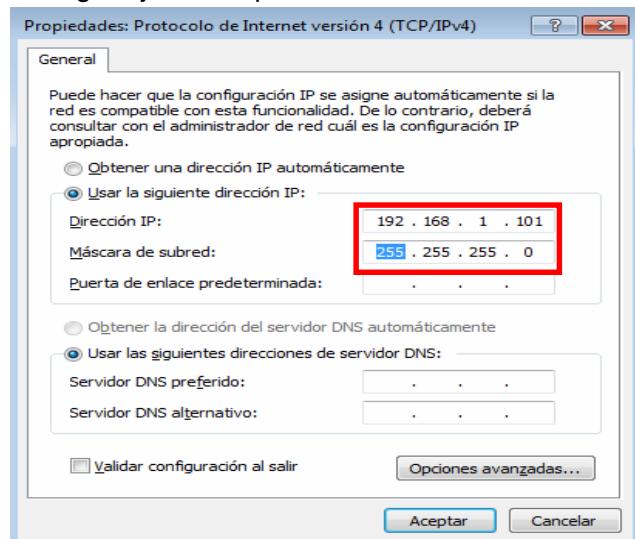
## 5. Device configuration

### 5.1 PC configuration

Connect the PC with PBMU via Ethernet cable.



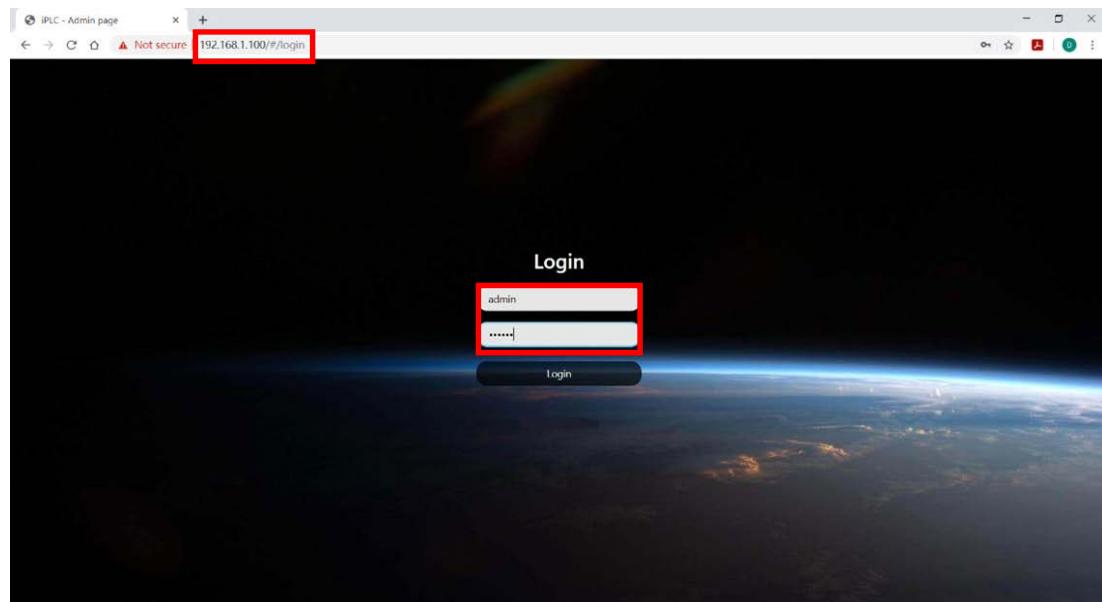
Configure your computer's IPv4 address.



Open the browser and enter 192.189.1.100 in the address bar.

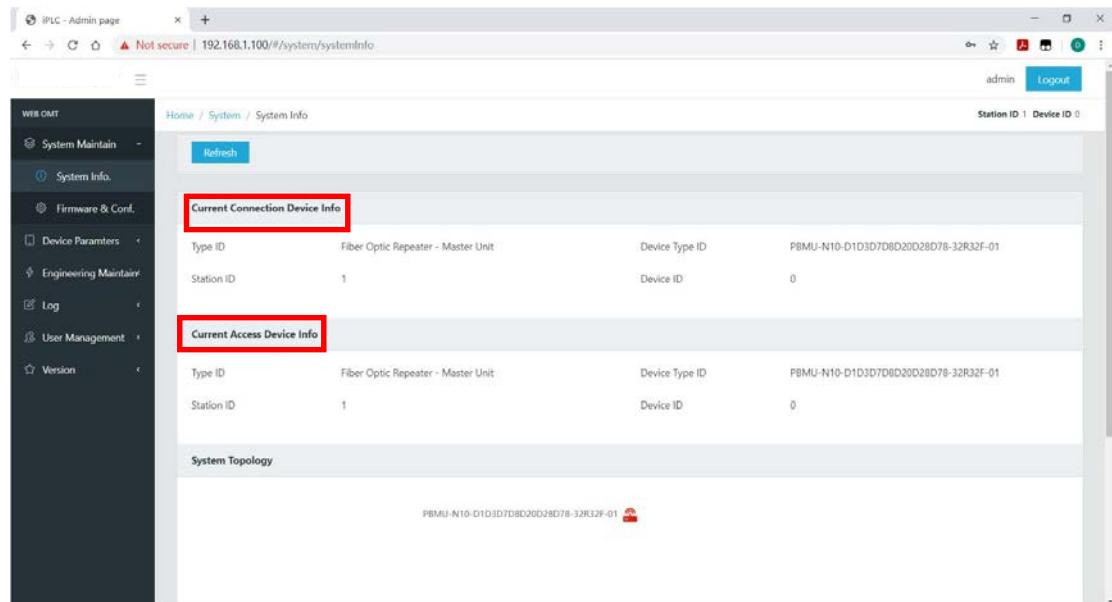
Username: admin

Password: 123456



## 5.2 Parameter description

### 5.2.1 PBMU



#### Current Connection Device Info.:

It shows the devices that are currently connected with an Ethernet cable.

#### Current Access Device Info.:

It shows the device whose parameters are actually being viewed.

## PROSE High Power Blade HPRU System

Check	Name	Value	Unit	CommStatus	Update Time	Filter
SG Band	78			Success	2021-04-14 15:37:57	All Channel
5G Arfcn(SSB)	640000			Success	2021-04-14 15:37:57	Common
5G NR Slot	02070000040604			Success	2021-04-14 15:37:57	
5G TDD Sync Channel	Channel 2			Success	2021-04-14 15:37:57	
UpLink Att.	0	dB	Success	2021-04-14 15:37:57		
DownLink Att.	0	dB	Success	2021-04-14 15:37:57		
DownLink Input Min	-24	dBm	Success	2021-04-14 15:37:57		
DownLink Input Max	8	dBm	Success	2021-04-14 15:37:57		
BTS_A Att 1	0	dB	Success	2021-04-14 15:37:57		
BTS_A Att 2	0	dB	Success	2021-04-14 15:37:57		
BTS_A Att 3	0	dB	Success	2021-04-14 15:37:57		

Check	Name	Value	Unit	CommStatus	Update Time	Filter
BTS_A Att 3	0	dB	Success	2021-04-14 15:37:57	CH A-1: Band28	
BTS_A Att 4	0	dB	Success	2021-04-14 15:37:57		
UpLink Att.	0	dB	Success	2021-04-14 15:37:57		
DownLink Att.	0	dB	Success	2021-04-14 15:37:57		
DownLink Input Min	-24	dBm	Success	2021-04-14 15:37:57		
DownLink Input Max	8	dBm	Success	2021-04-14 15:37:57		
BTS_B Att 1	0	dB	Success	2021-04-14 15:37:57		
BTS_B Att 2	0	dB	Success	2021-04-14 15:37:57		
BTS_B Att 3	0	dB	Success	2021-04-14 15:37:57		
BTS_B Att 4	0	dB	Success	2021-04-14 15:37:57		

**Click Device Parameters.**

**Click Select All, then Search.**

Configure **5G ARFCN** and **5G NR Slot** according to the actual configuration of the operator.

**Uplink Att.:** Set attenuation for uplink, range: 0 ~ 15 dB.

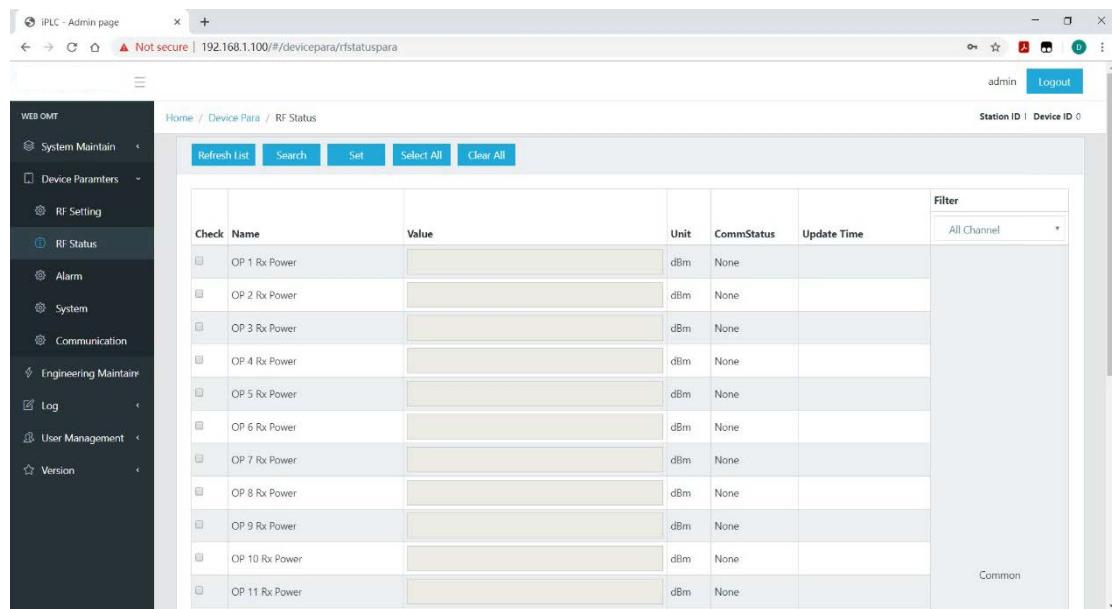
**Downlink Att.:** Set attenuation for downlink, range: 0 ~ 15 dB.

**Downlink Input Min:** Set minimum threshold value of downlink. There will be alarm if the actual power is lower.

**BTS Att:** Set attenuation for downlink RF input of the BTS ports on the front panel of PBMU, range: 0 ~ 15 dB.

**Downlink Input Max:** Set maximum threshold value of downlink. There will be alarm if the actual power is higher.

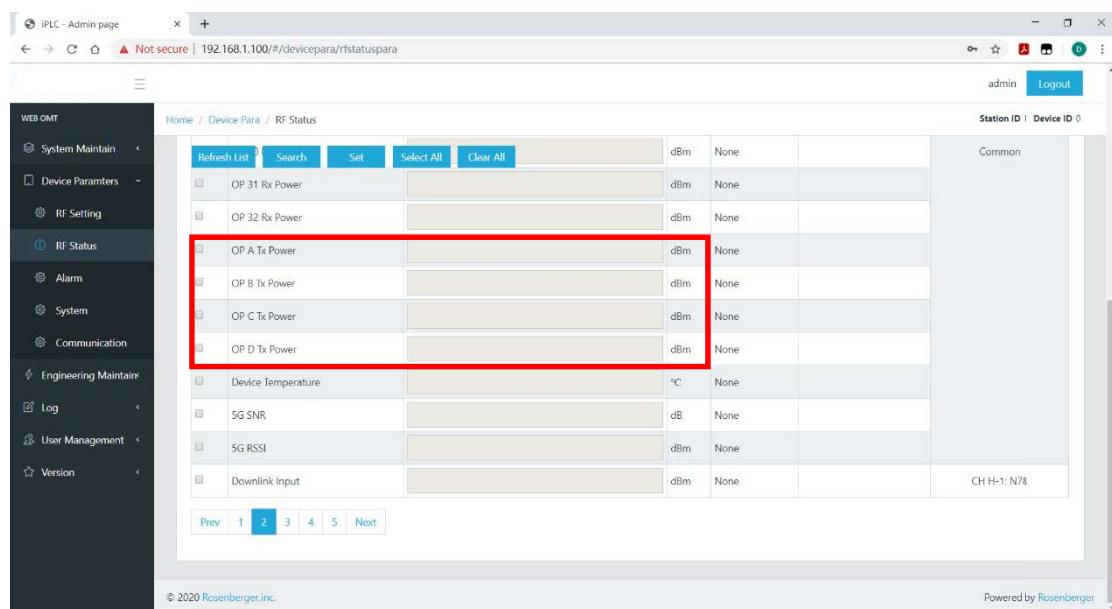
## PROSE High Power Blade HPRU System



This screenshot shows the RF Status page of the PROSE High Power Blade HPRU System. The left sidebar contains a navigation menu with categories like System Maintain, Device Parameters, RF Setting, RF Status, Alarm, System, Communication, Engineering Maintain, Log, User Management, and Version. The RF Status section is currently selected. The main content area displays a table of 11 optical Rx power measurements. The table has columns for Check (checkbox), Name, Value, Unit, CommStatus, and Update Time. A 'Filter' dropdown is set to 'All Channel'. The table rows are as follows:

Check	Name	Value	Unit	CommStatus	Update Time
<input type="checkbox"/>	OP 1 Rx Power		dBm	None	
<input type="checkbox"/>	OP 2 Rx Power		dBm	None	
<input type="checkbox"/>	OP 3 Rx Power		dBm	None	
<input type="checkbox"/>	OP 4 Rx Power		dBm	None	
<input type="checkbox"/>	OP 5 Rx Power		dBm	None	
<input type="checkbox"/>	OP 6 Rx Power		dBm	None	
<input type="checkbox"/>	OP 7 Rx Power		dBm	None	
<input type="checkbox"/>	OP 8 Rx Power		dBm	None	
<input type="checkbox"/>	OP 9 Rx Power		dBm	None	
<input type="checkbox"/>	OP 10 Rx Power		dBm	None	
<input type="checkbox"/>	OP 11 Rx Power		dBm	None	

**Optical Rx Power:** The optical power received from PBMU (normal range:  $\geq -2$  dBm).



This screenshot shows the RF Status page of the PROSE High Power Blade HPRU System. The left sidebar contains a navigation menu with categories like System Maintain, Device Parameters, RF Setting, RF Status, Alarm, System, Communication, Engineering Maintain, Log, User Management, and Version. The RF Status section is currently selected. The main content area displays a table of 11 optical power measurements. The table has columns for Check (checkbox), Name, Value, Unit, CommStatus, and Update Time. A 'Filter' dropdown is set to 'All Channel'. The table rows are as follows:

Check	Name	Value	Unit	CommStatus	Update Time
<input type="checkbox"/>	OP 31 Rx Power		dBm	None	
<input type="checkbox"/>	OP 32 Rx Power		dBm	None	
<input type="checkbox"/>	OP A Tx Power		dBm	None	
<input type="checkbox"/>	OP B Tx Power		dBm	None	
<input type="checkbox"/>	OP C Tx Power		dBm	None	
<input type="checkbox"/>	OP D Tx Power		dBm	None	
<input type="checkbox"/>	Device Temperature		°C	None	
<input type="checkbox"/>	5G SNR		dB	None	
<input type="checkbox"/>	5G RSSI		dBm	None	
<input type="checkbox"/>	Downlink Input		dBm	None	CH H-1: N78

At the bottom of the table, there is a navigation bar with buttons for Prev, 1, 2, 3, 4, 5, and Next. The footer of the page includes the text '© 2020 Rosenberger, Inc.' and 'Powered by Rosenberger'.

## PROSE High Power Blade HPRU System

**Optical Tx Power:** The optical power transmitted by PBMU.

(A\_Tx ~ D\_Tx:  $-4 \pm 2$  dBm)

**Downlink Input:** The downlink input RF power of the channel ports on the back panel of the PBMU.

**BTS Downlink Input Power:** The downlink input RF power of the BTS ports on the front panel of the PBMU.

## 5.2.2 PBMU configuration

### 5.2.2.1 Band information of Channel port configuration

The flow for configuring Channel port Band information is as follows:

- (1) Clear System Type Expand specifies the existing configuration.
- (2) Add Band numbers in order (CH 1 to CH 16); Ports CH 1 to CH 16 are added with Band numbers in sequence. And set and query the changed configuration, confirm the configuration is successful!

(3) After the configuration, check the configuration:

Example: The mapping between the device port and System Type Expand port is unchanged, and the Band information can be modified.

Equipment port	System Type Expand (Channel Information)	Band Information (Modifiable)
CH_H_1	CH_1	N78
CH_A_1	CH_2	Band 40
CH_B_1	CH_3	Band 28
CH_C_1	CH_4	Band 8
CH_D_1	CH_5	Band 3
CH_E_1	CH_6	Band 1
CH_F_1	CH_7	Band 7
CH_G_1	CH_8	N78
CH_H_2	CH_1	N78
CH_A_2	CH_2	Band 40
CH_B_2	CH_3	Band 28
CH_C_2	CH_4	Band 8
CH_D_2	CH_5	Band 3
CH_E_2	CH_6	Band 1
CH_F_2	CH_7	Band 7
CH_G_2	CH_8	N78

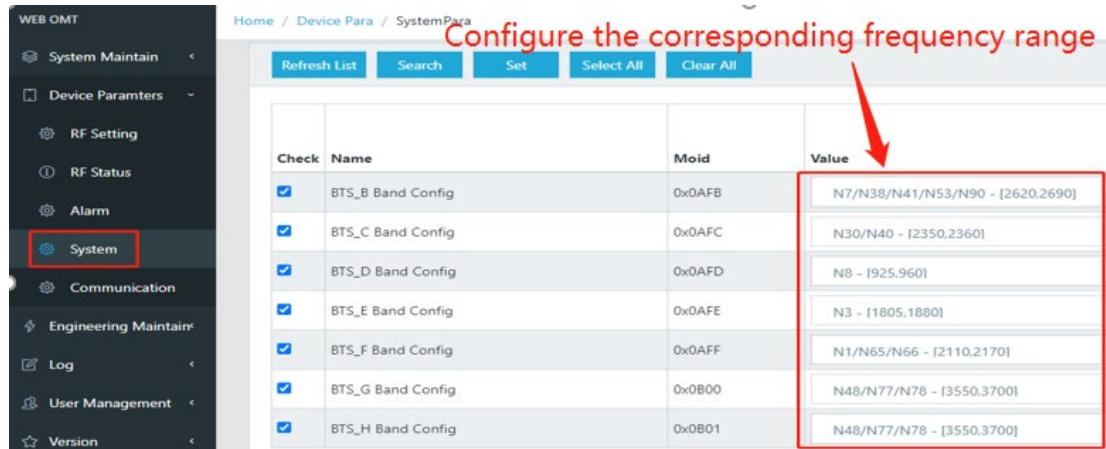
Note: this configuration is OK before delivery, please do not modify!!

### 5.2.2.2 Band information of BTS port configuration

To configure Band information for BTS ports, perform the following steps:

- (1) BTS A port through BTS A Band Config through the software to configure the Band information;
- (2) BTS B to BTS H ports in the same way, the Band of the corresponding CHANNEL BTS port is configured.
- (3) After the configuration, query and check the configuration.

Configure the corresponding frequency range



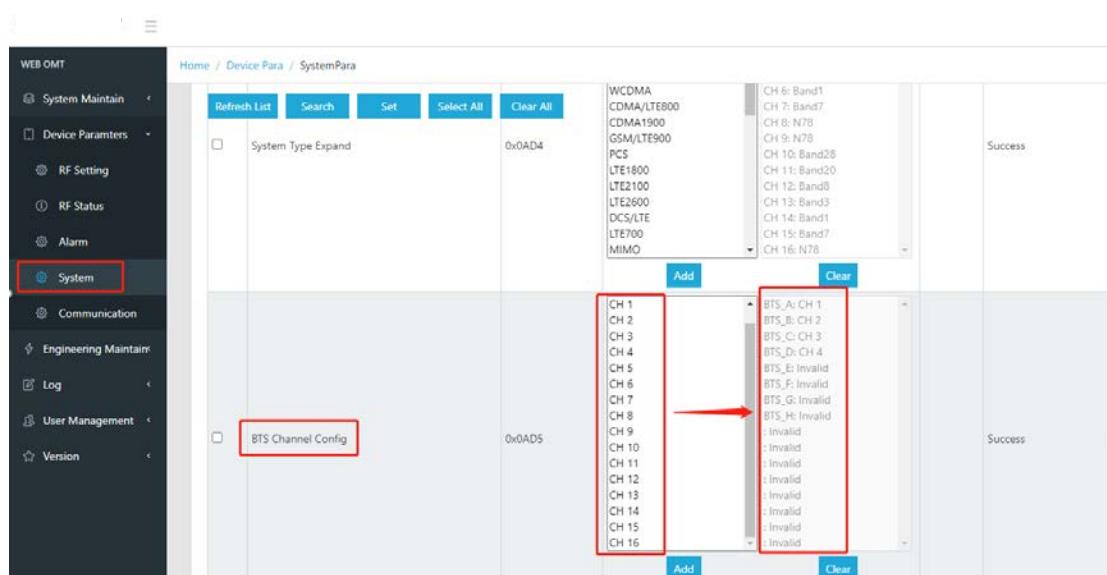
Check	Name	Mod	Value
<input checked="" type="checkbox"/>	BTS_B Band Config	0x0AFB	N7/N38/N41/N53/N90 - [2620,2690]
<input checked="" type="checkbox"/>	BTS_C Band Config	0x0AFC	N30/N40 - [2350,2360]
<input checked="" type="checkbox"/>	BTS_D Band Config	0x0AFD	N8 - [925,960]
<input checked="" type="checkbox"/>	BTS_E Band Config	0x0AFE	N3 - [1805,1880]
<input checked="" type="checkbox"/>	BTS_F Band Config	0x0AFF	N1/N65/N66 - [2110,2170]
<input checked="" type="checkbox"/>	BTS_G Band Config	0x0B00	N48/N77/N78 - [3550,3700]
<input checked="" type="checkbox"/>	BTS_H Band Config	0x0B01	N48/N77/N78 - [3550,3700]

### 5.2.2.3 Matching process of PBMU unit, BTS port and CH (Channel) port

The BTS Channel Config function is used to configure the Band information of the BTS port. The configuration process is as follows:

- (1) Clear BTS Channel Config Existing Band configuration information.
- (2) Add Channel port numbers in sequence (BTS A to BTS H). Add Channel ports corresponding to BTS ports in sequence (currently, only eight channels from BTSA to BTS H are supported for Channel (CH 1 to CH 16). And set and query the changed configuration, confirm the configuration is successful!
- (3) Check the configuration.

Example: BTS port configuration relationship with Channel port:



**Note:** This configuration needs to be modified according to the base station Band information, and affects the link gain from the BTS interface to the Channel port.

### 5.2.2.4 PBMU unit, BTS(BTS A ~BTS H) port and Channel(CH A\_1~CH H\_2) port connection

Before connecting cables, confirm the following information:

- (1) Channel port Band configuration in PBMU unit;
- (2) BTS port Band configuration in PBMU unit;
- (3) THE BTS port in the PBMU unit matches with the Channel port;

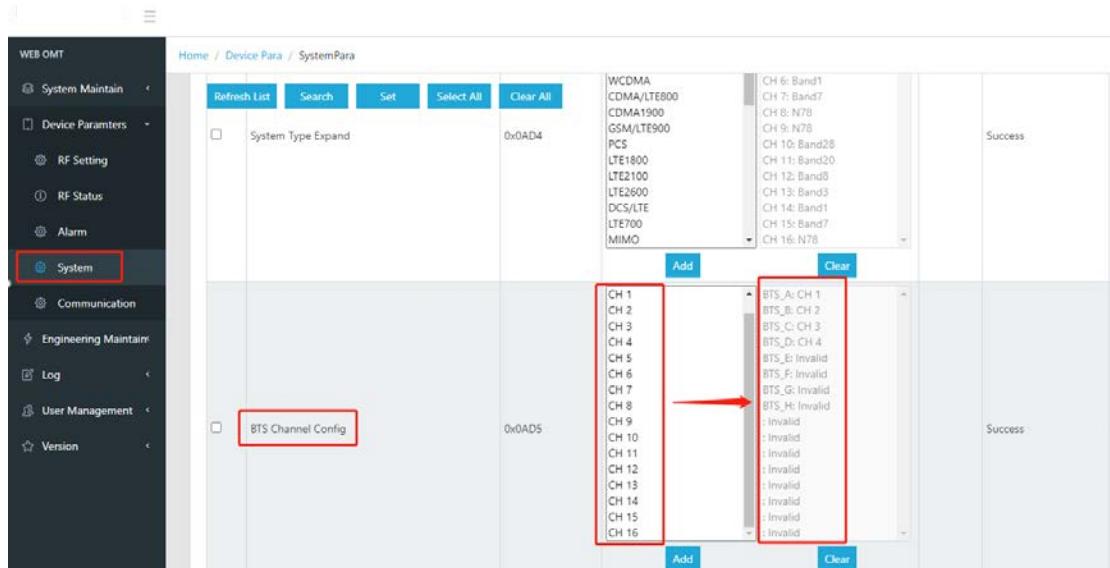
Note: The Band information of the BTS port number is the same as that of the matching Channel port.

After the configuration is complete, the Channel port information summary on the WEBGUI page contains the corresponding BTS port parameters.

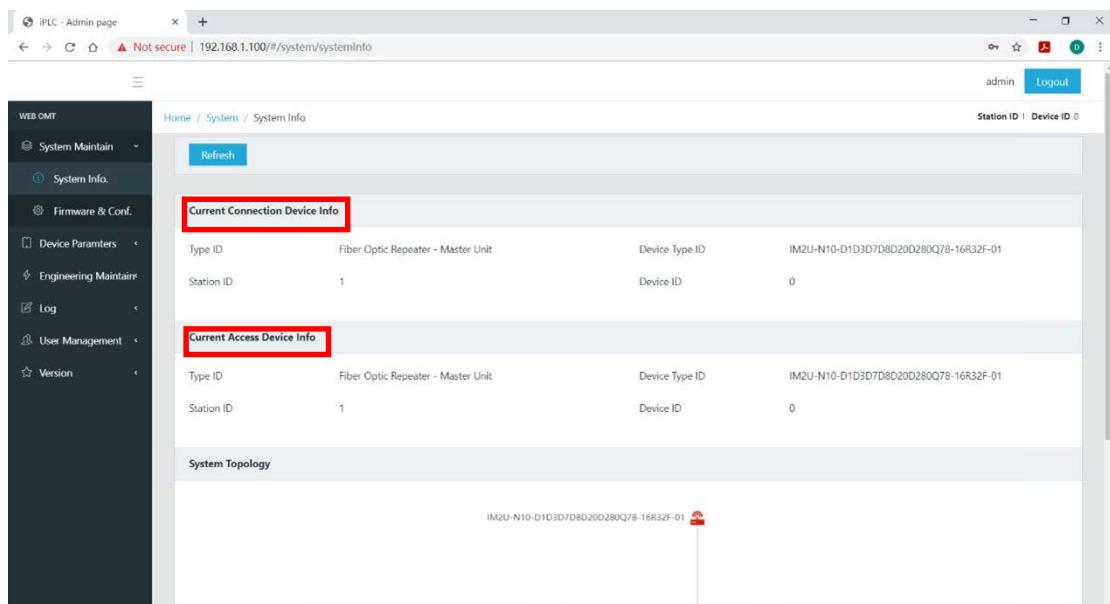
Wiring instructions:

- (1) After the Band information is configured for the BTS port, the BTS port is labeled with the corresponding Band label.

(2) According to the BTS port matching the Channel port, the BTS port is connected to the Channel port through the RF jumper.



### 5.2.3 IM2U



#### Current Connection Device Info.:

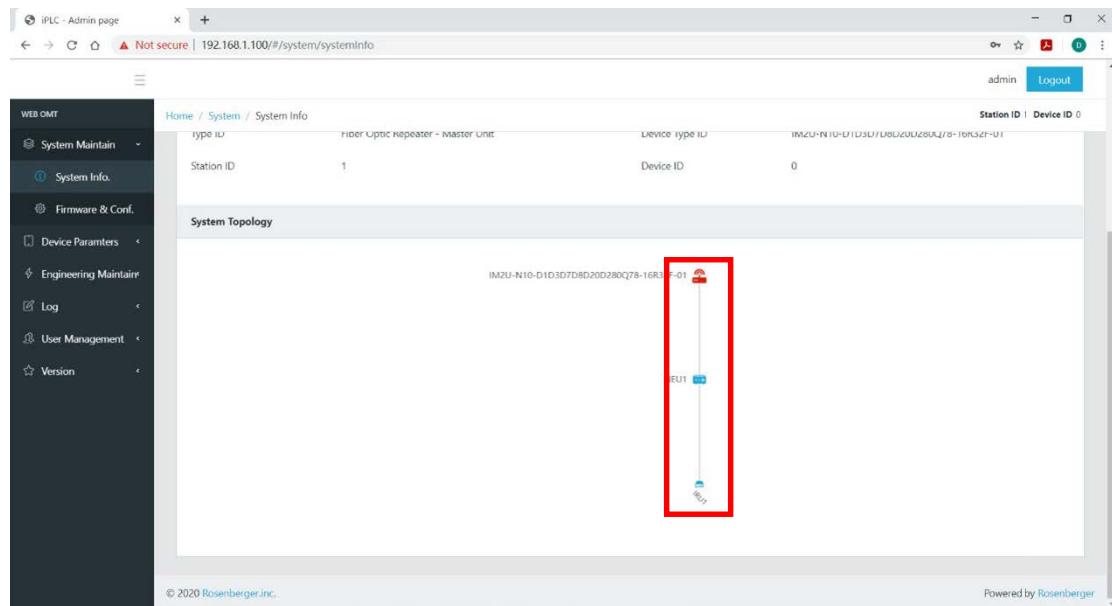
It shows the devices that are currently connected with a Ethernet cable.

#### Current Access Device Info.:

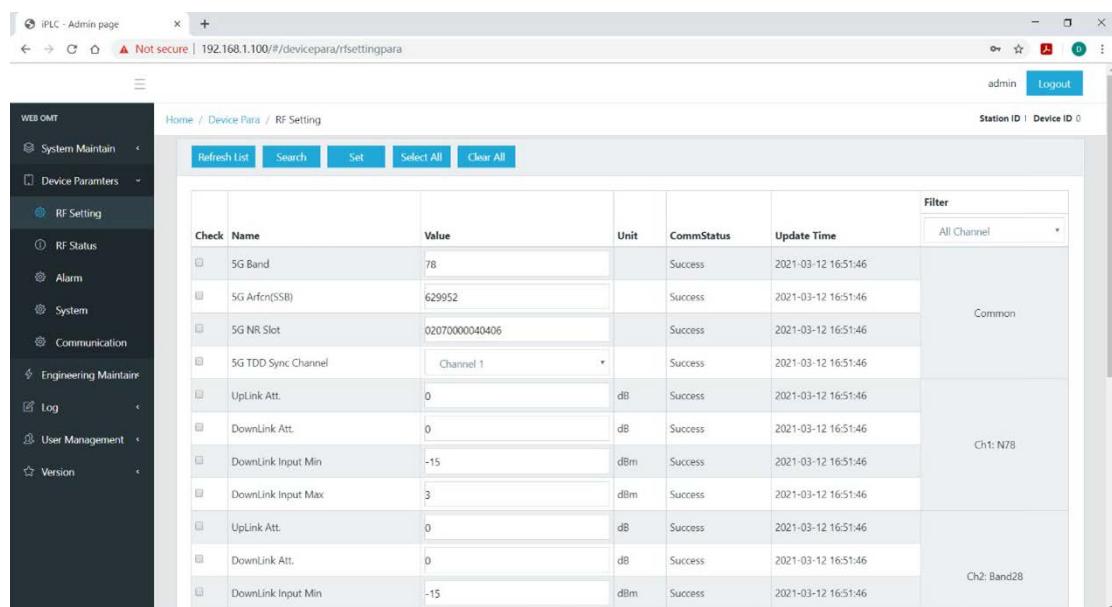
It shows the device whose parameters are actually being viewed.

## User Manual

### PROSE High Power Blade HPRU System



Click the icon to switch access to the device.



Click **Device Parameters**.

Click **Select All**, then **Search**.

Configure **5G ARFCN** and **5G NR Slot** according to the actual configuration of the operator.

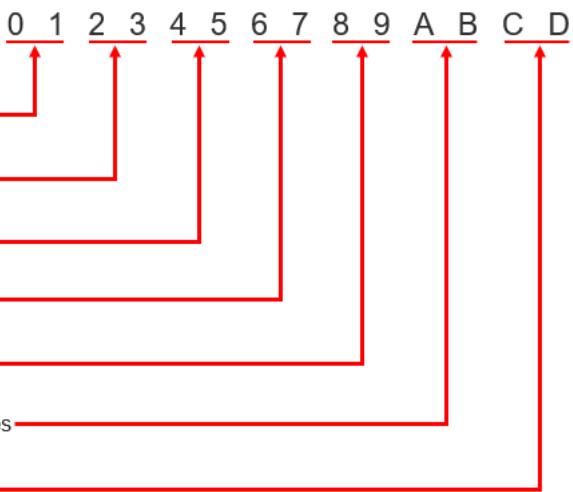
**Uplink Att.:** Set attenuation for uplink, range: 0 ~ 15 dB

**Downlink Att.:** Set attenuation for downlink, range: 0 ~ 15 dB

**Downlink Input Min:** Set minimum threshold value of downlink. There will be alarm if the actual power is lower.

**Downlink Input Max:** Set maximum threshold value of downlink. There will be alarm if the actual power is higher.

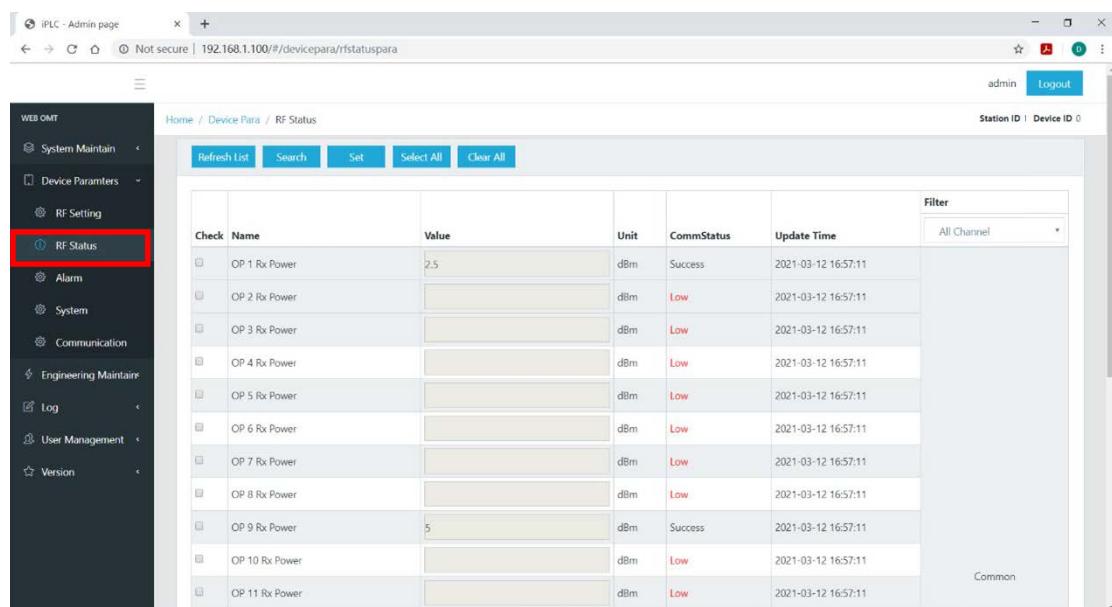
## Configuration instruction of 5G NR Slot:



The diagram illustrates a 5G NR Slot structure with 12 time slots labeled 0 through 9, followed by groups A, B, C, and D. Red arrows point from the following list items to specific slots in the diagram:

- Numbers of slots in the first uplink slot (pointing to slot 0)
- Numbers of slots in the first downlink slot (pointing to slot 1)
- Numbers of slots in the second uplink slot (pointing to slot 2)
- Numbers of slots in the second downlink slot (pointing to slot 3)
- Number of uplink symbols in special subframes (pointing to slots 4-9)
- Number of guard period symbols in special subframes (pointing to slots A-D)
- Number of downlink symbols in special subframes (pointing to slots A-D)

Note: If NR uplink and downlink are configured as single time slot, the second time slot is configured as 0000.



The screenshot shows the PROSE WEB OMT interface with the following details:

- Left Sidebar:** WEB OMT, System Maintain, Device Parameters, RF Setting (highlighted with a red box), Alarm, System, Communication, Engineering Maintain, Log, User Management, Version.
- Top Bar:** iPLC - Admin page, Not secure | 192.168.1.100/#/devicepara/rfstatuspara, admin, Logout.
- Page Title:** Home / Device Para / RF Status.
- Table:** RF Status data table with columns: Check, Name, Value, Unit, CommStatus, Update Time. The table shows 11 rows of data, mostly with 'Low' status.

**Optical Rx Power:** The optical power received from NEU (normal range:  $\geq -2$  dBm).

## PROSE High Power Blade HPRU System

WEB OMT

System Maintain

Device Parameters

RF Setting

RF Status

Alarm

System

Communication

Engineering Maintenance

Log

User Management

Version

Home / Device Para / RF Status

OP 28 Rx Power

OP 29 Rx Power

OP 30 Rx Power

OP 31 Rx Power

OP 32 Rx Power

OP A Tx Power

OP B Tx Power

OP C Tx Power

OP D Tx Power

SG SNR

SG RSSI

Downlink Input

Downlink Input

dim

Low

2021-03-12 16:58:30

dBm

Low

2021-03-12 16:58:30

dBm

Low

2021-03-12 16:58:30

dBm

Low

2021-03-12 16:58:30

dBm

Success

2021-03-12 16:58:30

Ch1: N78

Ch2: Band28

Common

Station ID 1 Device ID 0

admin Logout

Prev 1 2 3 Next

**Optical Tx Power:** The optical power transmitted by IM2U.

(A\_Tx ~ D\_Tx:  $-6 \pm 2$  dBm)

**Downlink Input:** The downlink input RF power received from CU.

## 5.2.4 HPRU

WEB OMT

System Maintain

System Info

Firmware & Conf.

Device Parameters

Engineering Maintenance

Log

User Management

Version

Home / System / System Info

Refresh

Apply For RS485 Bus Rights

Current Connection Device Info

Type ID: Fiber Optic Repeater - Remote Unit

Device Type ID: HPRU

Station ID: 1

Device ID: 4

Current Access Device Info

Type ID: Fiber Optic Repeater - Remote Unit

Device Type ID: HPRU

Station ID: 1

Device ID: 4

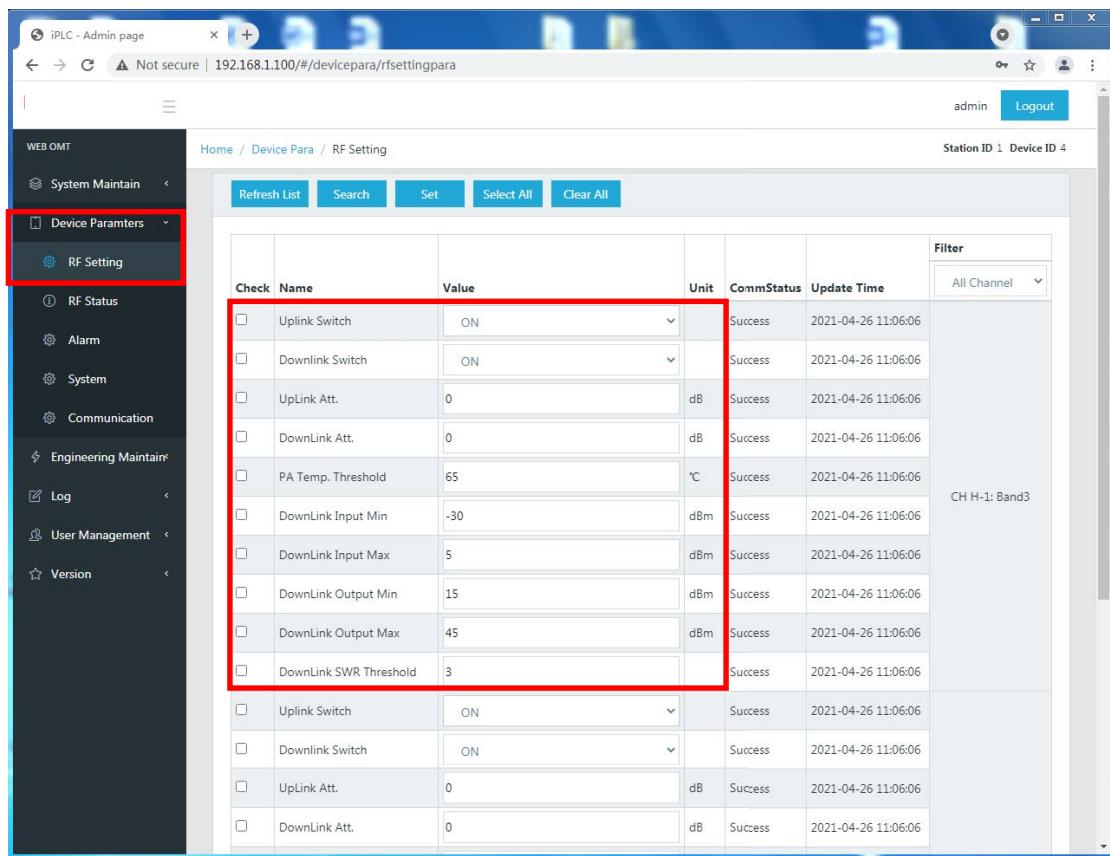
System Topology

HPRU

Station ID 1 Device ID 4

admin Logout

Click **System Info**, and switch access to HPRU.



The screenshot shows the PROSE High Power Blade HPRU System Admin page. The left sidebar has a 'Device Parameters' section with 'RF Setting' highlighted. The main content is a table titled 'RF Setting' with columns: Check, Name, Value, Unit, CommStatus, and Update Time. The table lists various RF parameters. A red box highlights the first eight rows of the table, which correspond to the parameters: Uplink Switch, Downlink Switch, UpLink Att., DownLink Att., PA Temp. Threshold, DownLink Input Min, DownLink Input Max, DownLink Output Min, DownLink Output Max, and DownLink SWR Threshold. The last two rows are not highlighted.

Check	Name	Value	Unit	CommStatus	Update Time
<input type="checkbox"/>	Uplink Switch	ON		Success	2021-04-26 11:06:06
<input type="checkbox"/>	Downlink Switch	ON		Success	2021-04-26 11:06:06
<input type="checkbox"/>	UpLink Att.	0	dB	Success	2021-04-26 11:06:06
<input type="checkbox"/>	DownLink Att.	0	dB	Success	2021-04-26 11:06:06
<input type="checkbox"/>	PA Temp. Threshold	65	°C	Success	2021-04-26 11:06:06
<input type="checkbox"/>	DownLink Input Min	-30	dBm	Success	2021-04-26 11:06:06
<input type="checkbox"/>	DownLink Input Max	5	dBm	Success	2021-04-26 11:06:06
<input type="checkbox"/>	DownLink Output Min	15	dBm	Success	2021-04-26 11:06:06
<input type="checkbox"/>	DownLink Output Max	45	dBm	Success	2021-04-26 11:06:06
<input type="checkbox"/>	DownLink SWR Threshold	3		Success	2021-04-26 11:06:06
<input type="checkbox"/>	Uplink Switch	ON		Success	2021-04-26 11:06:06
<input type="checkbox"/>	Downlink Switch	ON		Success	2021-04-26 11:06:06
<input type="checkbox"/>	UpLink Att.	0	dB	Success	2021-04-26 11:06:06
<input type="checkbox"/>	DownLink Att.	0	dB	Success	2021-04-26 11:06:06

**Uplink Switch:** The switch of uplink power amplifier module of HPRU.

**Downlink Switch:** The switch of downlink power amplifier module of HPRU.

**Uplink Att.:** Set attenuation for uplink, range: 0 ~ 15 dB.

**Downlink Att.:** Set attenuation for downlink, range: 0 ~ 15 dB.

**PA Temp. Threshold:** Set maximum temperature threshold value of power amplifier. There will be alarm if the actual temperature is higher.

**Downlink Input Min:** Set minimum threshold value of downlink input power. There will be alarm if the actual power is lower.

**Downlink Input Max:** Set maximum threshold value of downlink input power. There will be alarm if the actual power is higher.

**Downlink Output Min:** Set minimum threshold value of downlink output power. There will be alarm if the actual power is lower.

**Downlink Output Max:** Set maximum threshold value of downlink output power. There will be alarm if the actual power is higher.

**Downlink SWR Threshold:** There will be alarm if the actual SWR value is higher.

## PROSE High Power Blade HPRU System

Check the downlink output of the channels at page **RF Status**.

WEB OMT

System Maintain

Device Parameters

RF Setting

**RF Status**

Alarm

System

Communication

Engineering Maintain

Log

User Management

Version

Home / Device Para / RF Status

admin Logout

Station ID 1 Device ID 4

Refresh List Search Set Select All Clear All

Filter All Channel

Check	Name	Value	Unit	CommStatus	Update Time
<input type="checkbox"/>	Optical Tx Power	2.5	dBm	Success	2021-04-26 11:07:15
<input type="checkbox"/>	Optical Rx Power	-5	dBm	Success	2021-04-26 11:07:15
<input type="checkbox"/>	Device Temperature	28	°C	Success	2021-04-26 11:07:15
<input type="checkbox"/>	Band1/CH1 PA Temp	33	°C	Success	2021-04-26 11:07:15
<input type="checkbox"/>	Downlink Input	-30	dBm	Success	2021-04-26 11:07:15
<input type="checkbox"/>	Downlink Output		dBm	Low	2021-04-26 11:07:15
<input type="checkbox"/>	Downlink SWR	3		Success	2021-04-26 11:07:15
<input type="checkbox"/>	Downlink Rated Gain	48	dB	Success	2021-04-26 11:07:15
<input type="checkbox"/>	Downlink Rated Output	43	dBm	Success	2021-04-26 11:07:15
<input type="checkbox"/>	Band1/CH1 PA Temp	70	°C	Success	2021-04-26 11:07:15
<input type="checkbox"/>	Downlink Input	-30	dBm	Success	2021-04-26 11:07:15
<input type="checkbox"/>	Downlink Output		dBm	Low	2021-04-26 11:07:15
<input type="checkbox"/>	Downlink SWR	3		Success	2021-04-26 11:07:15
<input type="checkbox"/>	Downlink Rated Gain	48	dB	Success	2021-04-26 11:07:15

**Optical Tx Power:** The optical power transmitted to PBMU or HPRU.

**Optical Rx Power:** The optical power received from PBMU or HPRU.

**Device Temp.:** The temperature of MCU module.

**PA Temp.:** The temperature of the power amplifier.

**Downlink Input:** The downlink input power.

**Downlink Output:** The downlink output of power.

**Downlink SWR:** The SWR value of downlink.