LampSite

Installation Guide

Issue   08
Date   2015-01-15

HUAWEI TECHNOLOGIES CO., LTD.

Huawei Technologies Co., Ltd.

Address: Huawei Industrial Base
           Bantian, Longgang
           Shenzhen 518129
           People's Republic of China

Website: http://www.huawei.com

Email: support@huawei.com

About This Document

Overview

This document describes how to install the modules and cables for the RHUB3908, pRRU3901 indoors. It also provides checklists for hardware installation.

Product Version

The following table lists the product version related to this document.

Product Name	Solution Version	Product Version
DBS3900	● SRAN9.0 and later versions ● RAN16.0 and later versions ● eRAN7.0 and later versions ● eRAN TDD 7.0 and later versions	V100R009C00 and later versions

Intended Audience

This document is intended for:

● BTS installation personnel

Contents

1 Changes in LampSite Installation Guide

This chapter describes the changes in the *LampSite Installation Guide*.

08 (2015-01-15)

This is the eighth commercial release.

Compared with 07 (2014-11-15), this issue includes the following new topics:

- **4 Installing a BBU**

Compared with 07 (2014-11-15), this issue incorporates the following changes:

Content	Change Description
Entire document	- Changed RHUB, and pRRU to RHUB3908, and pRRU3901, respectively. - Added the pRRU3901 with three transmission ports plus no PWR port (or the pRRU3901a for use in North America) .
6.7 Powering on the pRRU3901	Deleted the description that the pRRU3901 supports AC/DC power supply.

Compared with 07 (2014-11-15), no information is deleted.

07 (2014-11-15)

This is the seventh commercial release.

Compared with 06 (2014-09-30), no information is added.

Compared with 06 (2014-09-30), this issue incorporates the following change:

Content	Change Description
Space Requirements	Added the requirements on the installation space when the pRRU3901 working on the 2.6 GHz band and the Wi-Fi module need to process services concurrently.

Compared with 06 (2014-09-30), this issue excludes the following topic:

● Installing RF Daughter Boards on a pRRU3901 (in Capacity Expansion Scenarios)

06 (2014-09-30)

This is the sixth commercial release.

Compared with 05 (2014-08-30), no information is added.

Compared with 05 (2014-08-30), this issue incorporates the following changes:

Content	Change Description
pRRU Installation Environment Requirements	Changed the operating temperature of pRRU3901s to a range from - 5°C to + 40°C.
Requirements for Cable Layout	Added the cabling requirements for Ethernet cables.
Requirements for Cable Layout	

Compared with 05 (2014-08-30), no information is deleted.

05 (2014-08-30)

This is the fifth commercial release.

Compared with 04 (2014-07-30), no information is added.

Compared with 04 (2014-07-30), this issue incorporates the following changes:

Content	Change Description
Installation Clearance Requirements of an RHUB	Added the security precautions for the RHUB3908 installation environment.
Requirements for Cable Layout	
Installing an Ethernet Cable	Added the Ethernet cable specifications and requirements on flame spread rating.
Installing an Ethernet Cable	

Compared with 04 (2014-07-30), no information is deleted.

04 (2014-07-30)

This is the fourth commercial release.

Compared with 03 (2014-06-30), no information is added.

Compared with 03 (2014-06-30), this issue incorporates the following change:

Content	Change Description
7 Installing the Extender (Optional)	Added the descriptions about installing a Extender on a Ceiling.

Compared with 03 (2014-06-30), no information is deleted.

03 (2014-06-30)

This is the third commercial release.

Compared with 02 (2014-05-30), this issue includes the following new topics:

● **8.2 LampSite Engineering Label**

● **8.3 Attaching an L-Shaped Label**

Compared with 02 (2014-05-30), this issue incorporates the following changes:

Content	Change Description
Cable Connections	Modified the description about cable connections of the RHUB3908.
Installing RHUB Cables	Added the steps for attaching labels to cables.
Installing pRRU Cables	
Installing an Ethernet Cable	Added the steps for making Ethernet cables.
Installing an Ethernet Cable	
Installing RF Daughter Boards on a pRRU3901 (in Capacity Expansion Scenarios)	Added the descriptions about the supported block type.

Compared with 02 (2014-05-30), no information is deleted.

02 (2014-05-30)

This is the second commercial release.

Compared with 01 (2014-04-26), no information is added.

Compared with 01 (2014-04-26), this issue incorporates the following change:

Content	Change Description
Entire document	Added the descriptions about the LTE FDD +LTE FDD mode.

Compared with 01 (2014-04-26), no information is deleted.

01 (2014-04-26)

This is the first commercial release.

Compared with Draft C (2014-03-26), no information is added.

Compared with Draft C (2014-03-26), this issue incorporates the following change:

Content	Change Description
Entire document	Changed the pRRU3901 name from pRRU3901 with two Ethernet ports to pRRU3901 with two transmission ports, and pRRU3901 with three Ethernet ports to pRRU3901 with three transmission ports.

Compared with Draft C (2014-03-26), no information is deleted.

Draft C (2014-03-26)

This is a draft release.

Compared with Draft B (2014-02-28), no information is added.

Compared with Draft B (2014-02-28), this issue incorporates the following changes:

Content	Change Description
Installing CRPI Optical Cables	Added the description of connecting the CPRI cable to the TX and RX ports of the optical module crossly.
pRRU Installation Environment Requirements	The operating temperature of pRRU3901 is updated.

Compared with Draft B (2014-02-28), no information is deleted.

Draft B (2014-02-28)

This is a draft release.

Compared with draft A (2013-11-30), this issue includes the following new topics:

- Obtaining the MAC Address (Optional)
- Cable Connections
- MAC Collection Template

Compared with draft A (2013-11-30), this issue incorporates the following changes:

Content	Change Description
Entire document	Added descriptions about pRRU3901s with three transmission ports. Such pRRU3901s support integrated Wi-Fi services.
	Added the descriptions about the UMTS, LTE FDD and UMTS+LTE FDD mode.
LampSite Installation Guide	Optimized descriptions about matching product versions.
Installing an Ethernet Cable	Changed the cable name from RHUB3908-pRRU3901 Ethernet cable to Ethernet cable.
Installing an Ethernet Cable	

Compared with draft A (2013-11-30), this issue excludes the following topics:

- Installing External Antennas (Optional)
- RHUB3908 Exterior
- RHUB3908 Ports and Indicators
- pRRU3901 Exterior
- pRRU3901 Ports and Indicators

Draft A (2013-11-30)

This is a draft release.

2 Installation Preparations

About This Chapter

Before starting the installation, you must obtain the required reference documents, tools, and instruments, and familiarize yourself with the skills required.

2.1 Reference Documents
Before the installation, you must read the following documents:

2.2 Preparing Tools and Instruments
This section describes the tools and instruments that must be prepared before the installation.

2.3 Requirements for Installation Personnel
This section describes requirements for installation engineers. They must be qualified and trained, and familiar with correct operation methods and safety precautions before performing any operations.

2.1 Reference Documents
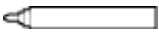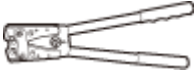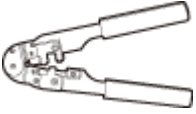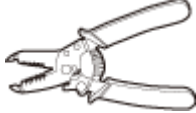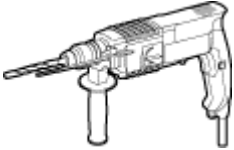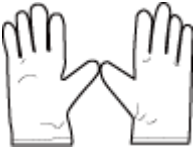
Before the installation, you must read the following documents:
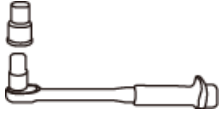
- *LampSite Hardware Description*
- *Installation Reference*

For details about how to install a baseband unit (BBU), see *DBS3900 Installation Guide*.

2.2 Preparing Tools and Instruments

This section describes the tools and instruments that must be prepared before the installation.

Marker Level	Torque screwdriver (M4 to M6)	Diagonal pliers
Power cable crimping tool	RJ11 crimping tool	Cable cutter
Rubber mallet	T20 torque torx screwdriver	Wire stripper
Hammer drill (Ø6, Ø8 and Ø12)	Torque wrench (Ø10 mm)	Protective gloves
Guarded blade utility knife	ESD gloves	Long measuring tape

Multimeter	Network cable tester	Vacuum cleaner
Ladder	Torque wrench for SMA connector	Socket wrench (M6)

2.3 Requirements for Installation Personnel

This section describes requirements for installation engineers. They must be qualified and trained, and familiar with correct operation methods and safety precautions before performing any operations.

Before the installation, pay attention to the following items:

- Technical engineers must take Huawei training and be familiar with proper installation and operation methods.

- The number of installation personnel depends on the engineering schedule and installation environment. Generally, three to five persons are required. Generally, only three to five onsite personnel are necessary.

3 Unpacking and Checking

This section describes how to unpack and check the delivered equipment to ensure that the materials are complete and intact.

Context

📖 **NOTE**

The following lists important notes when you are transporting, lifting, or installing the equipment or components:

- Protect them from colliding with doors, walls, shelves, or other objects.
- Wear clean gloves and do not touch them with bare hands, sweat-soaked gloves, or dirty gloves.

⚠ **NOTICE**

You must power on the RHUB3908 or pRRU within 7 days after it is unpacked.

Procedure

Step 1 Count the total number of the shipments.

If...	Then...
The total number of the components is consistent with that recorded in the packing lists on all packing boxes	Go to **Step 2**.
The total number of the components is inconsistent with that recorded in the packing lists on all packing boxes	Report the problems and causes to the local Huawei office.

Step 2 Check the exterior of each packing box.

If...	Then...
The exterior of each packing box is intact	Go to **Step 3**.
It is damaged or soaked	Report the problems and causes to the local Huawei office.
The collision label is red	Do not unpack the packing box and claim for compensation from the transportation company.

Step 3 Check the type and quantity of the equipment in the boxes according to the packing list.

If...	Then...
The type and number are consistent with the packing list on each packing list	Sign the *Packing List* with the operator.
There is any shortage, wrong delivery, or damaged equipment	Report the problems and causes to the local Huawei office.

⚠ **NOTICE**

Perform the following operations to protect the components from any damages and help find out the cause of any damage in future: 1. Store the unpacked equipment and packing materials indoors. 2. Take photos of the storeroom, rusted or eroded equipment, packing box, and packing materials. 3. File the photos.

----End

4 Installing a BBU

This chapter describes the process of installing a BBU.

The BBU can have BBU3900 and BBU3910. Unless otherwise specified, the BBU refers to both the BBU3900 and BBU3910 in this document.

For details about the installation of the BBU, see *DBS3900 Installation Guide*.

5 Installing an RHUB3908

About This Chapter

This chapter describes the process of installing an RHUB3908.

5.1 Information About the Installation
This section describes the information to be learnt before RHUB3908 installation, including the RHUB3908 installation scenarios, clearance, and installation environment.

5.2 Installation Process
The RHUB3908 installation involves installing an RHUB3908 module, installing RHUB3908 cables, checking the RHUB3908 hardware installation, and powering on the RHUB3908.

5.3 Installing an RHUB3908
An RHUB3908 can be installed in a cabinet, rack, shelf, or on a wall.

5.4 Installing RHUB3908 Cables
This section describes how to install cables for an RHUB3908.

5.5 Checking the RHUB3908 Hardware Installation
After an RHUB3908 is installed, check the installation of hardware including the devices and related cables.

5.6 Power-on Check on an RHUB3908
This section describes the power-on check on the RHUB3908 after the RHUB3908 hardware is installed and checked.

5.1 Information About the Installation

This section describes the information to be learnt before RHUB3908 installation, including the RHUB3908 installation scenarios, clearance, and installation environment.

5.1.1 RHUB3908 Installation Scenarios

An RHUB3908 can be installed in a 19-inch cabinet, rack, shelf, or on a wall.

The RHUB3908 supports that mounting ears are installed in standard mode or reverse mode. The reverse mode is used by default. The two installation modes are defined as follows:

- In standard mode, the front of the mounting ear is aligned with the RHUB3908 panel, as shown in **Figure 5-1**.

Figure 5-1 Installing mounting ears in standard mode
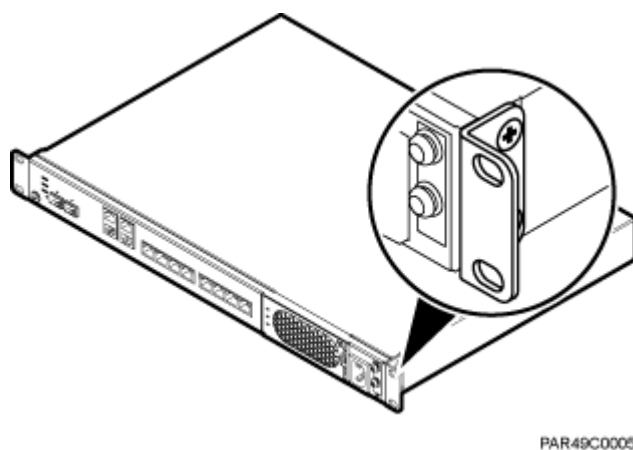
- In reverse mode, the front of the mounting ear is 31 mm away from the RHUB3908 panel, as shown in **Figure 5-2**.

Figure 5-2 Installing mounting ears in reverse mode
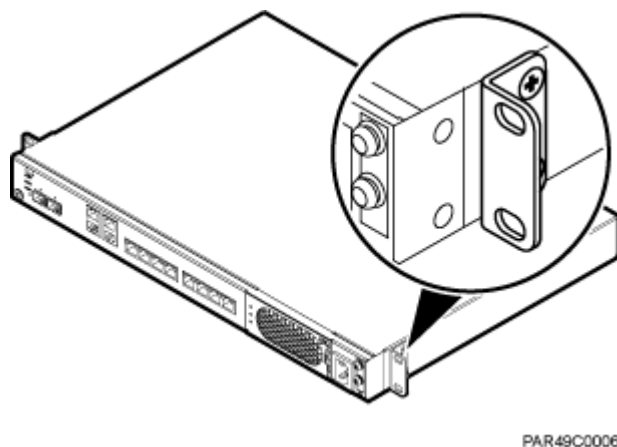
Installing an RHUB3908 in a 19-Inch Cabinet or Rack

Installing an RHUB3908 in a 19-inch cabinet or rack: Secure the mounting ear to the mounting bracket by using M6 screws.

- If there is no other modules installed in the 1 U space near the RHUB3908, install the RHUB3908 directly. Otherwise, remove the modules before installing the RHUB3908.

- Before installation, you need to check the installation mode supported by the rack and adjust the position of the mounting ear.

Figure 5-3 and **Figure 5-4** show RHUB3908s installed in a cabinet or rack, respectively.

Figure 5-3 Installing an RHUB3908 in a 19-inch cabinet or rack in standard mode
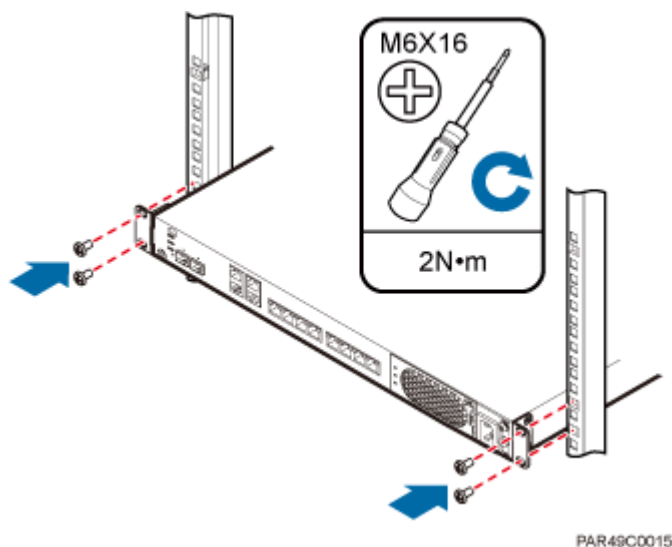
Figure 5-4 Installing an RHUB3908 in a 19-inch cabinet in reverse mode
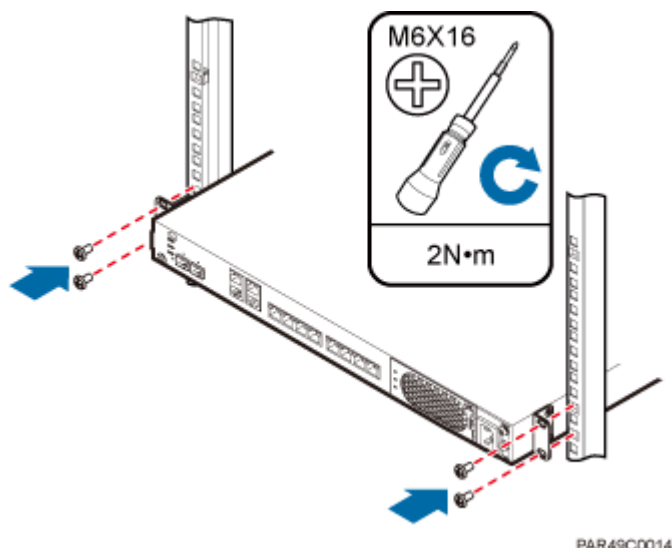
Installing an RHUB3908 in a 19-Inch Shelf

When an RHUB3908 is installed in a 19-inch shelf, the shelf must be installed on a wall. One shelf can house multiple RHUB3908s with 1 U space between two RHUB3908s.

Figure 5-5 and Figure 5-6 show RHUB3908s installed in a 19-inch shelf.

Figure 5-5 RHUB3908 installed in a 19-inch shelf in standard mode

Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.
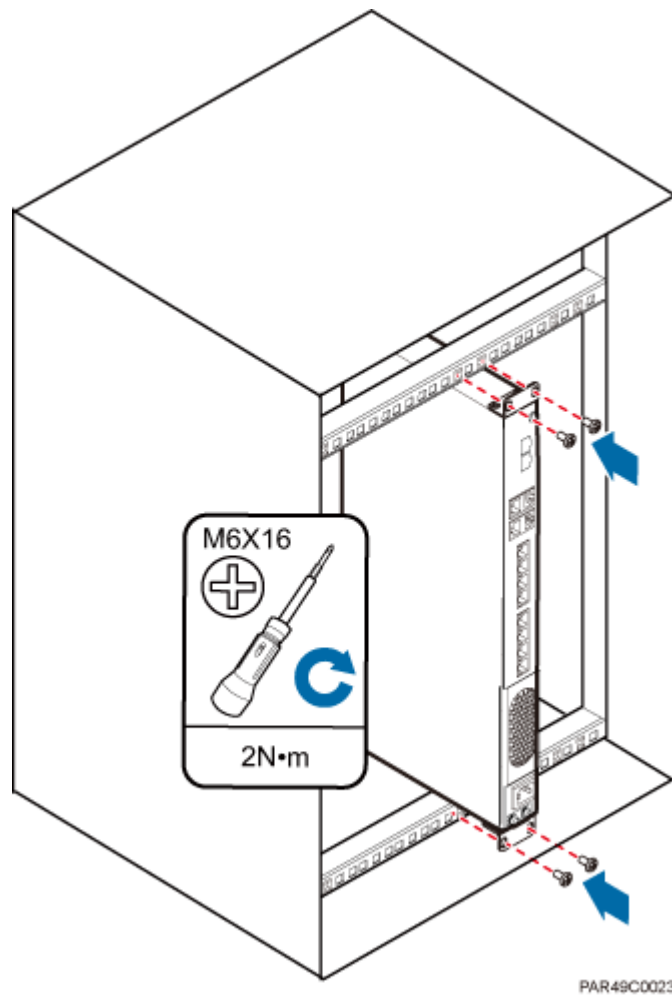
Figure 5-6 RHUB3908 installed in a 19-inch shelf in reverse mode
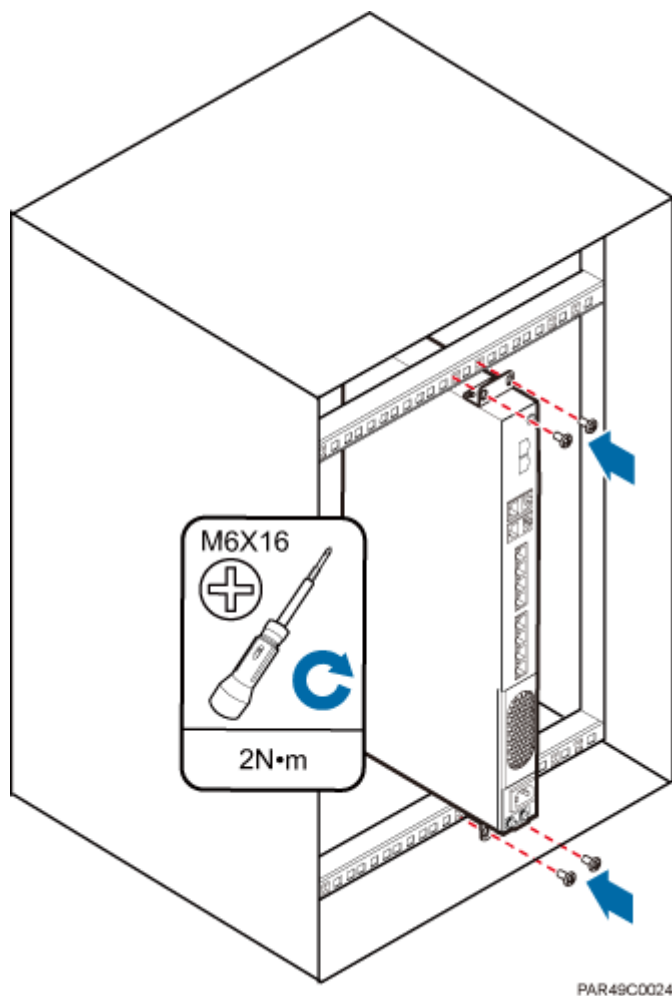
Installing an RHUB3908 on a Wall

An RHUB3908 can be installed on a wall.

The wall on which an RHUB3908 is installed must meet the following requirements:

- When a single RHUB3908 is installed, the wall must have a capacity of bearing at least four times the weight of the RHUB3908.
- Expansion bolts must be tightened to 10 N·m (88.507 bf·in.) to ensure the bolts work properly and the wall remains intact without cracks in it.

Figure 5-7 shows an RHUB3908 installed on a wall.

Figure 5-7 RHUB3908 installed on a wall
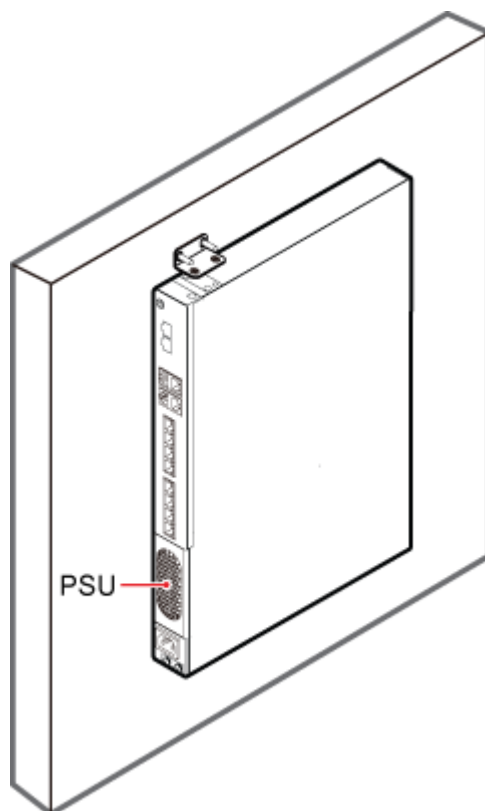
5.1.2 Installation Clearance Requirements of an RHUB3908

When an RHUB3908 is installed in a 19-inch cabinet, rack, shelf, or on a wall, a minimum clearance is required for easy cabling and operation and maintenance. A recommended installation clearance is provided based on experience.

⚠ **NOTICE**

- Do not install or place inflammable materials above or under an RHUB3908.
- A clearance of 350 mm must be reserved in front of the air intake vent of the fan of the power supply unit (PSU) for maintenance.

Figure 5-8 shows the installation clearance for the RHUB3908 installed in a 19-inch cabinet, rack, or shelf.

Figure 5-8 Installation clearance for an RHUB3908 installed in a 19-inch cabinet, rack, or shelf
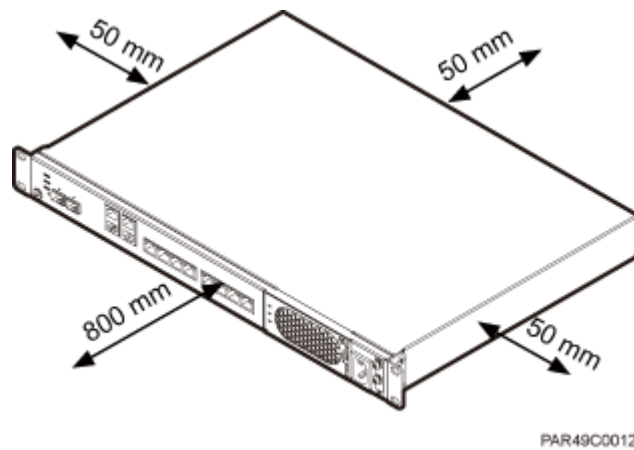
Figure 5-9 and **Figure 5-10** shows the recommended and minimum installation clearance respectively when the RHUB3908 is installed on a wall.

Figure 5-9 Recommended installation clearance for a wall-mounted RHUB3908 (unit: mm)

Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.
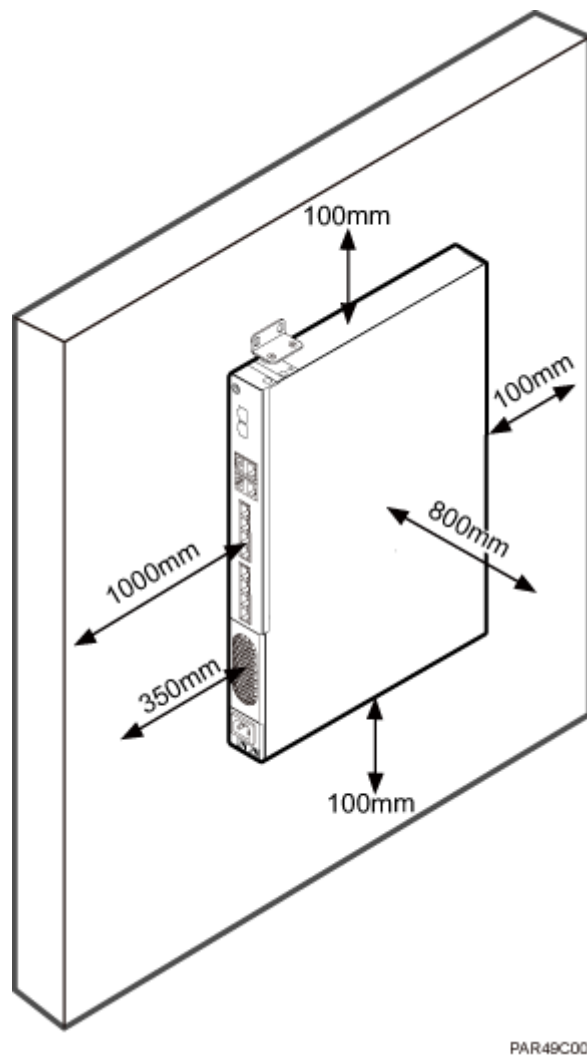
Figure 5-10 Minimum installation clearance for a wall-mounted RHUB3908 (unit: mm)
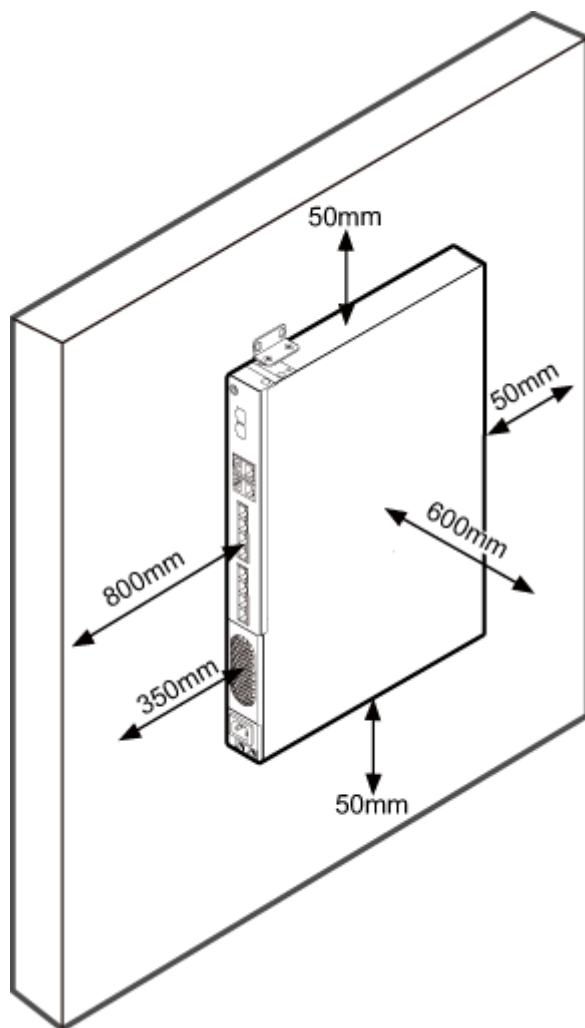
PAR49C0016

5.1.3 Installation Environment of an RHUB3908

The installation environment of an RHUB3908 involves the running environment specifications for the RHUB3908 and other specifications.

RHUB3908 Running Environment Specifications

Table 5-1 shows the environment specifications for the RHUB3908 installed indoors.

● The temperature and humidity of the installation position must ensure normal operation. A cool and ventilated place is recommended.

● The heat dissipation holes on the RHUB3908 cannot be blocked.

Table 5-1 RHUB3908 environment specifications

Specifications	Installation Scenario	RHUB3908 Quantity	Condition	Remarks
Operating temperature	Installed on a wall or in a 19-inch rack.	N/A	-5°C to +50°C	N/A
	Installed in a shelf.	1	-5°C to +45°C	N/A
		2	-5°C to +43°C	N/A
		3	-5°C to +40°C	N/A
Relative humidity	Installed in all scenarios.	N/A	5% RH to 95% RH	N/A
Altitude	N/A	N/A	-60 m to +1800 m	Works properly.
			1800 m to 4000 m	Above the 1800 m altitude, the maximum operating temperature decreases by 1°C each time the altitude increases by 220 m.

☐**NOTE**

Installing more than one RHUB3908, 1 U space is required between two RHUB3908s.

Other Running Environment Specifications

- The RHUB3908 cannot be installed at an air outlet of the heat dissipation box of an air conditioner or other heat-generating appliances.

- The RHUB3908 cannot be installed near a strong heat source.

- The RHUB3908 cannot be installed in a position with water dripping, such as outdoor equipment of air conditioners, pipe, and leaking or dripping roofs.

- The installation position must be far from rains. If the RHUB3908 is installed on a wall, there must be no window on either side of the wall.

- The installation position must be far away from high voltage, highly corrosive devices, flammable or explosive substances, and electromagnetic interference.

- The RHUB3908 must be installed in a dry, ventilating, and dust-proof place.

- If the RHUB3908 is installed in parking areas or basements, the installation position must be well-ventilated.

5.2 Installation Process

The RHUB3908 installation involves installing an RHUB3908 module, installing RHUB3908 cables, checking the RHUB3908 hardware installation, and powering on the RHUB3908.

Figure 5-11 shows the RHUB3908 installation process.

Figure 5-11 RHUB3908 installation process
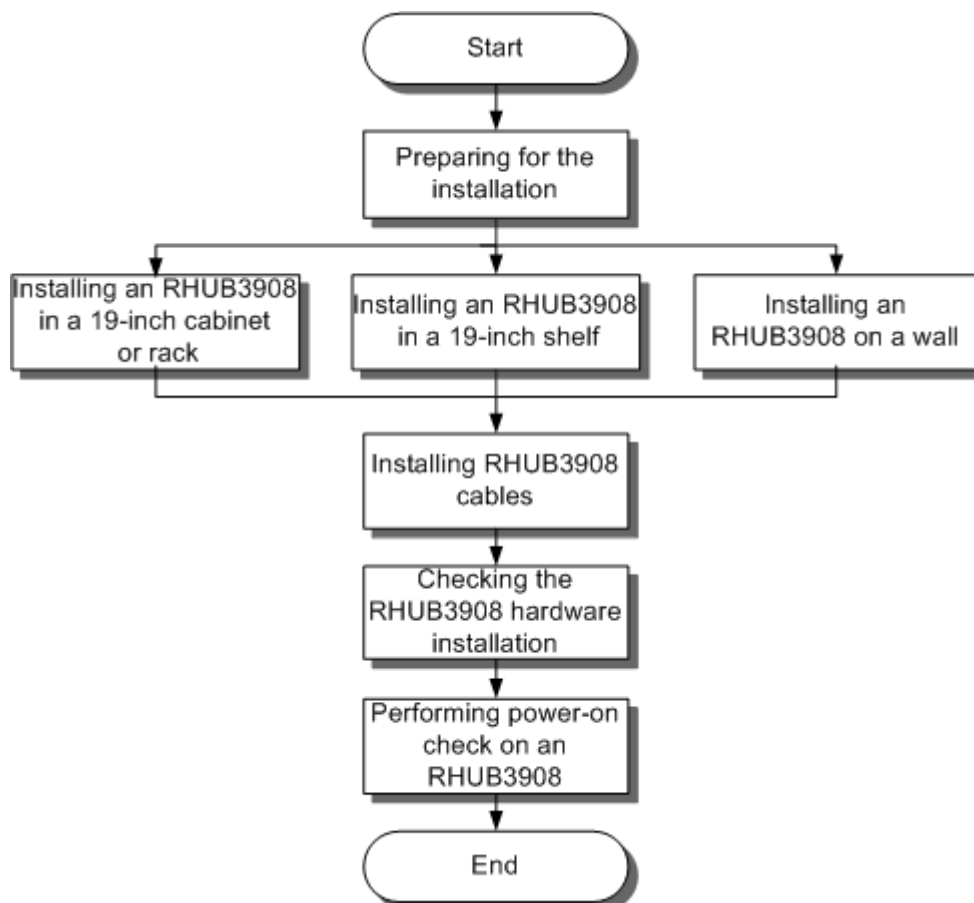
5.3 Installing an RHUB3908

An RHUB3908 can be installed in a cabinet, rack, shelf, or on a wall.

5.3.1 Installing an RHUB3908 in a 19-Inch Cabinet or Rack

This section describes how to install an RHUB3908 in a 19-inch cabinet.

Procedure

- The following describes how to install an RHUB3908 with mounting ears in reverse mode:

  NOTE

  If necessary, request one more person for assistance.

1. With one hand holding it, align the mounting holes with the installation holes, slowly push the RHUB3908 into the required position in the cabinet, as shown in **Figure 5-12**.

    Figure 5-12 Pushing an RHUB3908 into a cabinet
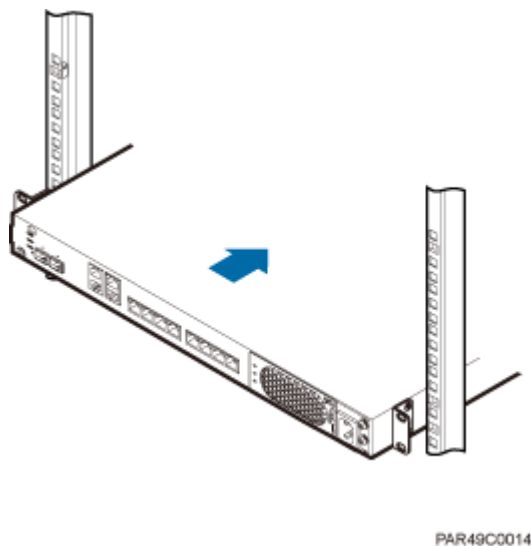
2. Use a torque screwdriver or Phillips screwdriver to tighten the four M6×16 screws with a torque of 2 N•m, as shown in **Figure 5-13**.

    Figure 5-13 Tightening screws
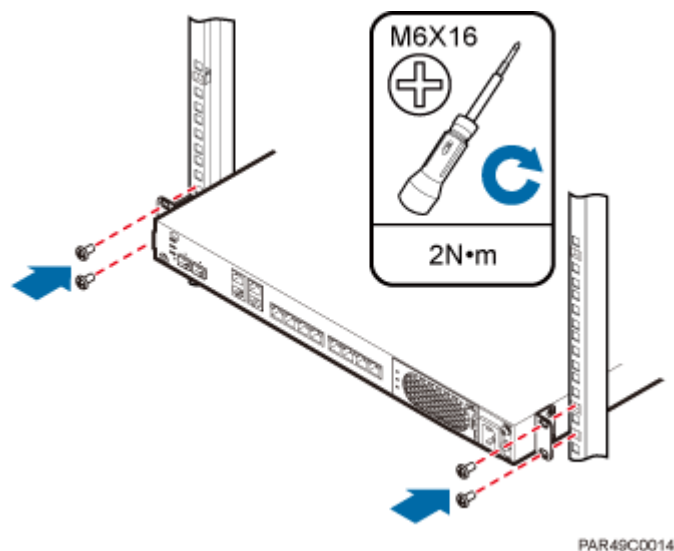
● The following describes how to install an RHUB3908 with mounting ears aligned with the RHUB3908 panel:

    NOTE

    If necessary, request one more person for assistance.

1. Remove the mounting ears on both sides of the RHUB3908 by removing the four M4×8 screws, as shown in **Figure 5-14**.

Figure 5-14 Removing mounting ears and screws
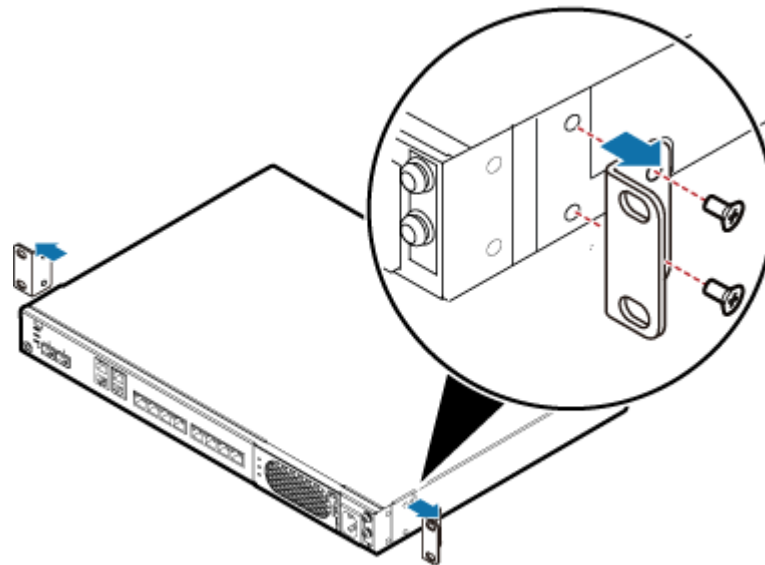
PAR49C0051

2. Use a torque screwdriver or Phillips screwdriver to tighten the four M4×8 screws with a torque of 1.4 N•m to install the removed mounting ears again, as shown in **Figure 5-15**. The mounting ears must be aligned with the RHUB3908 panel.

Figure 5-15 Installing mounting ears in standard mode
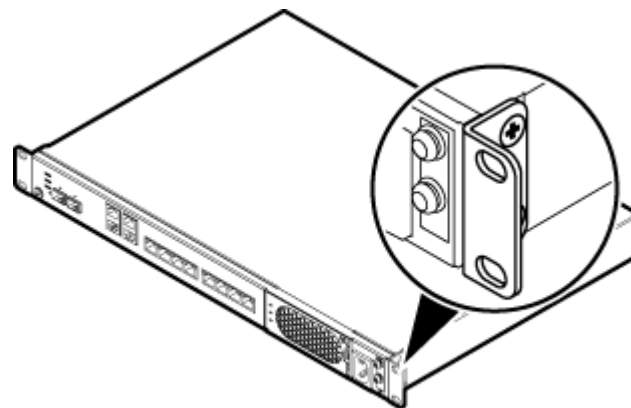
PAR49C0005

3. With one hand holding it, align the mounting holes with the installation holes, slowly push the RHUB3908 into the required position in the cabinet, as shown in **Figure 5-16**.

Figure 5-16 Pushing an RHUB3908 into a cabinet
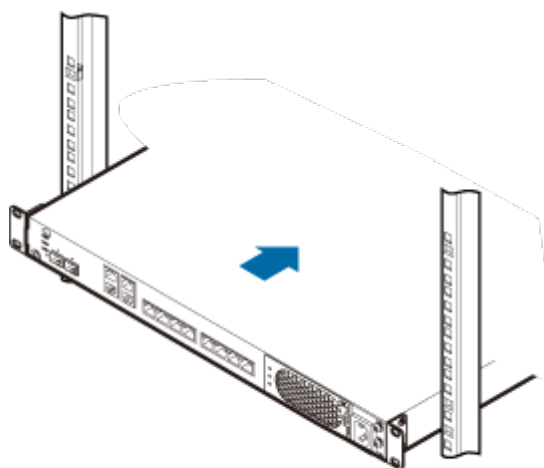
4. Use a torque screwdriver or Phillips screwdriver to tighten the four M6×16 screws with a torque of 2 N•m, as shown in **Figure 5-17**.

Figure 5-17 Tightening screws
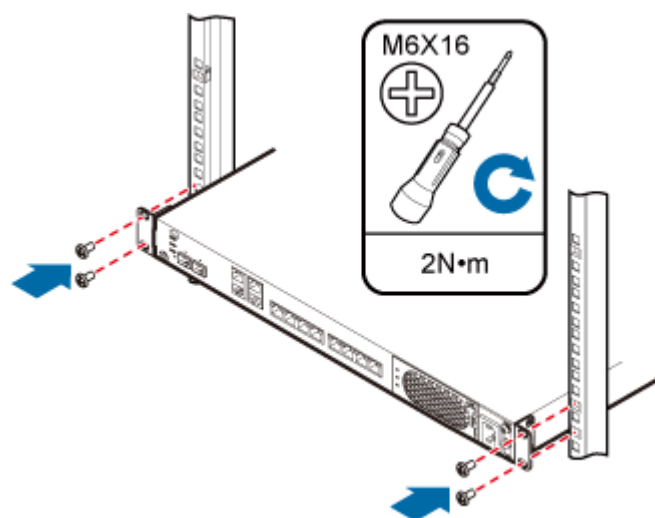
----End

5.3.2 Installing an RHUB3908 in a 19-Inch Shelf

If a shelf houses more than one RHUB3908, 1 U space is required between two RHUB3908s. The PSU must be installed at the bottom of the cabinet.

Procedure

● The following describes how to install an RHUB3908 with mounting ears installed in reverse mode:

📕**NOTE**

If necessary, request one more person for assistance.

1. With one hand holding it, align the mounting holes with the installation holes, slowly push the RHUB3908 into the required position in the shelf.

2. Use a torque screwdriver or Phillips screwdriver to tighten the four M6×16 screws with a torque of 2 N•m, as shown in **Figure 5-18**.

Figure 5-18 Tightening screws

PAR49C0024
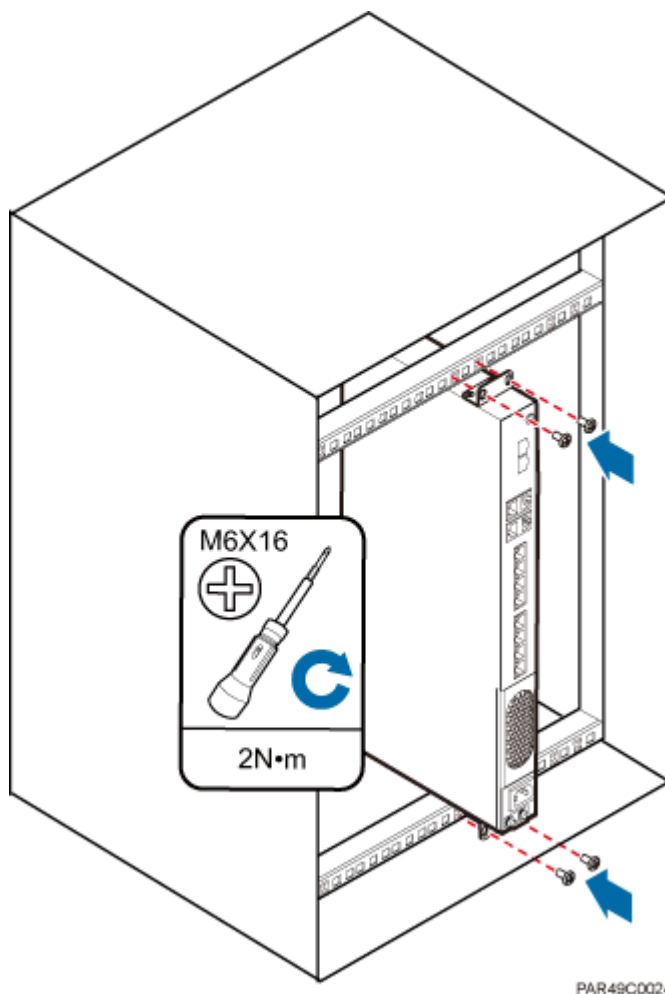
● The following describes how to install an RHUB3908 with mounting ears installed in standard mode:

📖**NOTE**

If necessary, request one more person for assistance.

1. Remove the mounting ears on both sides of the RHUB by removing the four M4×8 screws, as shown in **Figure 5-19**.

Figure 5-19 Removing mounting ears and screws
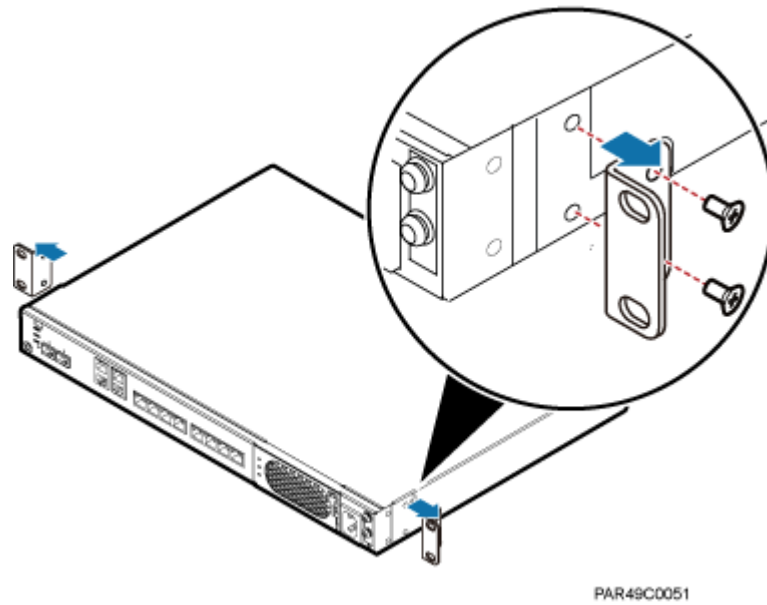
PAR49C0051

2. Use a torque screwdriver or Phillips screwdriver to tighten the four M4×8 screws with a torque of 1.4 N•m to install the removed mounting ears again, as shown in **Figure 5-20**. The mounting ears must be aligned with the RHUB panel.

Figure 5-20 Installing mounting ears in standard mode
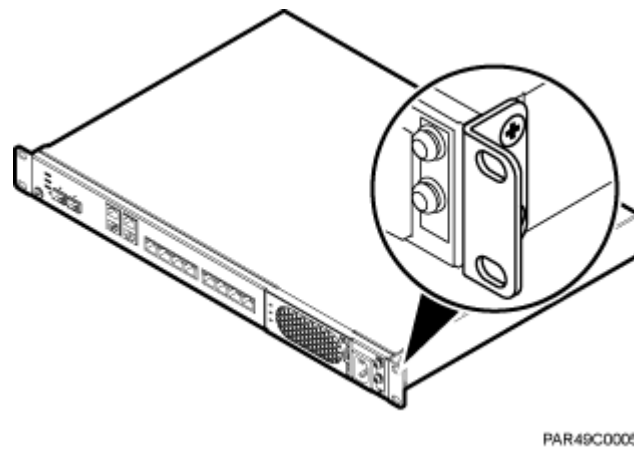
PAR49C0005

3. With one hand holding it, align the mounting holes with the installation holes, slowly push the RHUB3908 into the required position in the cabinet, as shown in .

4. Use a torque screwdriver or Phillips screwdriver to tighten the four M6×16 screws with a torque of 2 N•m, as shown in **Figure 5-21**.

Figure 5-21 Tightening screws
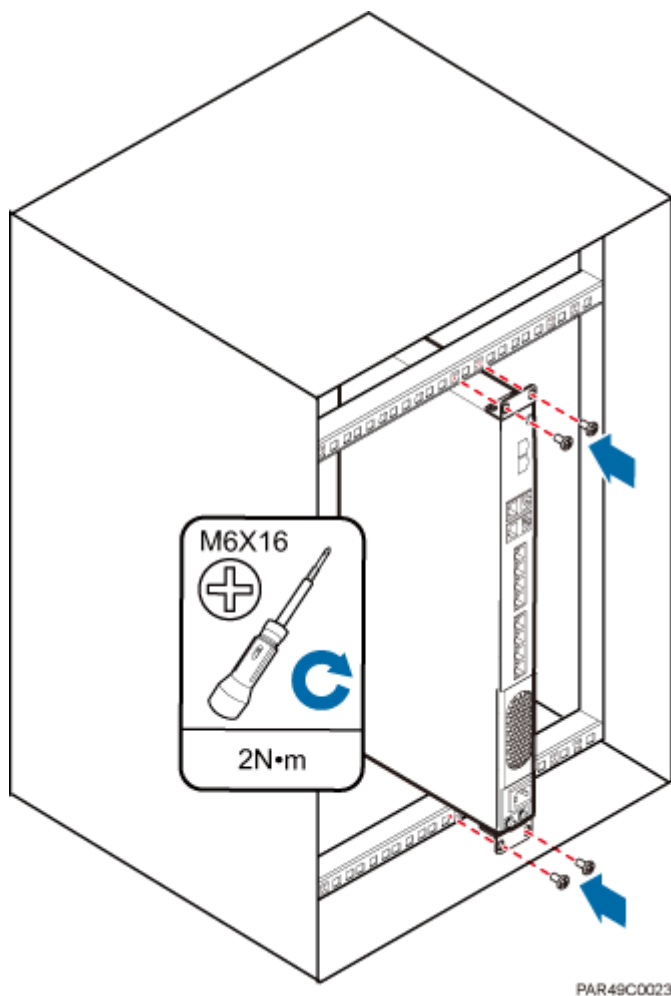
----End

5.3.3 Installing an RHUB3908 on a Wall

An RHUB3908 can be installed on a wall.

Procedure

Step 1 The mounting ears are installed in reverse mode by default. Before installing an RHUB3908 on a wall, modify the installation mode of the mounting ears on the RHUB3908.

● Use a torque screwdriver or Phillips screwdriver to remove the mounting ears on both sides of the RHUB3908 by removing the four M4×8 screws, as shown in **Figure 5-22**.

Figure 5-22 Removing screws and mounting ears

PAR49C0051
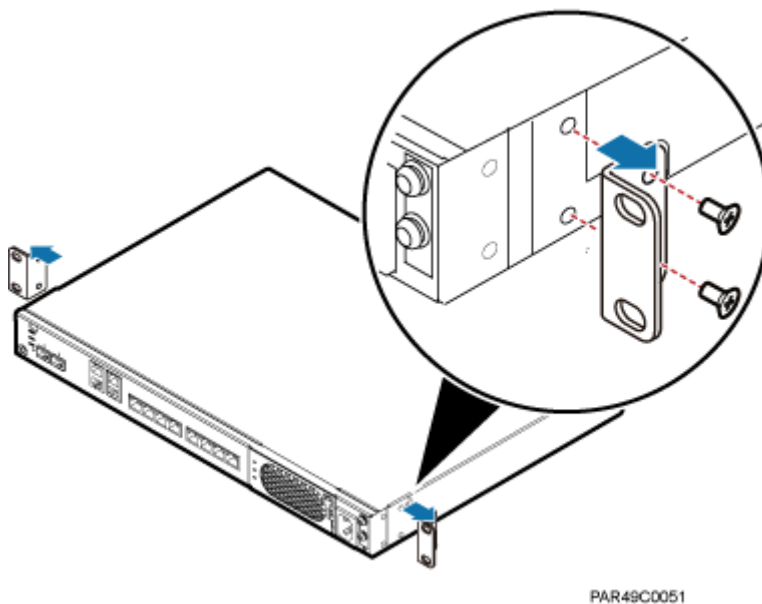
- Rotate the mounting ears 90 degrees clockwise, and use a torque screwdriver or Phillips screwdriver to secure the mounting ear with a torque of 1.4 N•m, as shown in **Figure 5-23**.

Figure 5-23 Installing mounting ears and screws

PAR49C0010
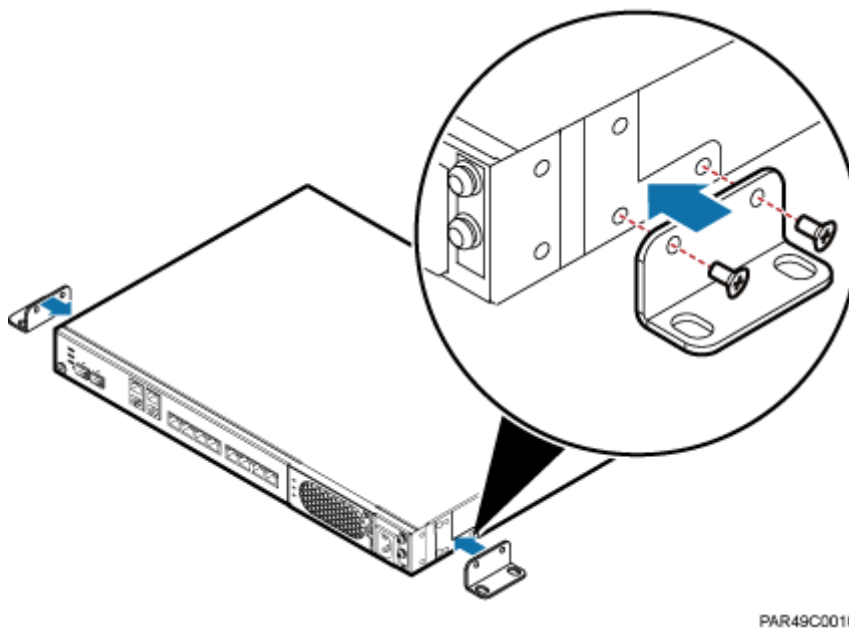
Step 2 Determine the position on the wall for installing the RHUB3908 based on the requirements in the engineering blueprint and Installation Clearance Requirements of an RHUB. Place the RHUB3908 to the position to be installed against the wall, and then mark the four anchor points where the mounting ear screws are fastened using a marker, as shown in **Figure 5-24**.

Figure 5-24 Anchor points for installing an RHUB3908 on a wall
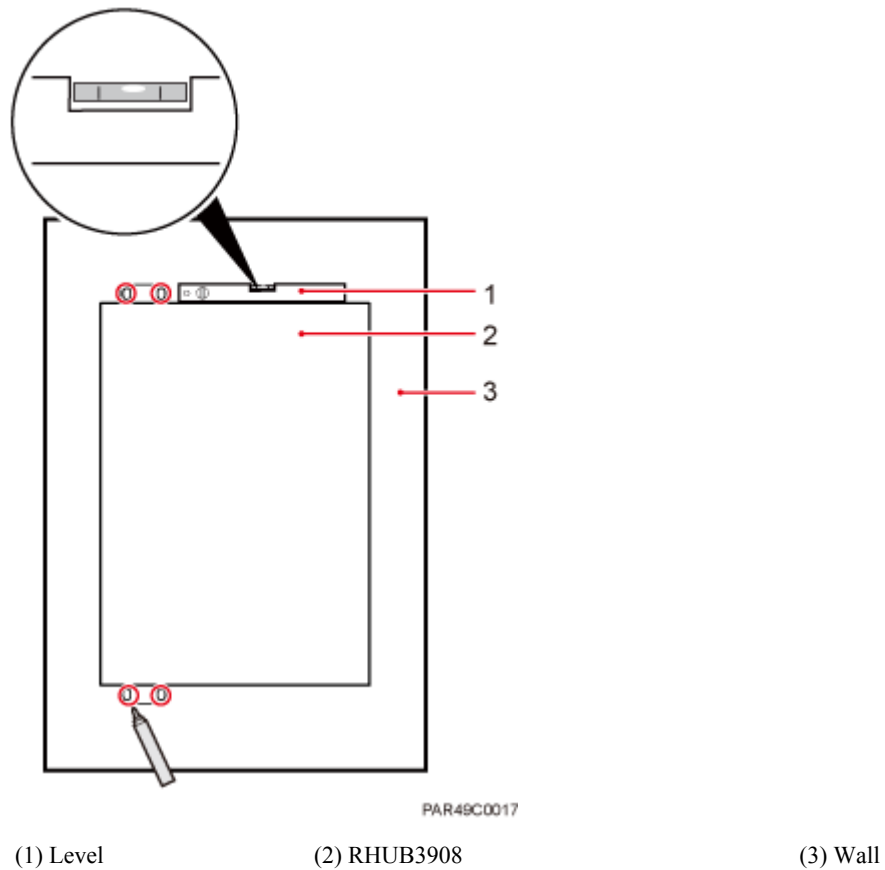
PAR49C0017

(1) Level	(2) RHUB3908	(3) Wall

⚠ **CAUTION**

To prevent inhalation or eye contact with dust, take adequate preventive measures when drilling holes.

Step 3 Drill holes at the anchor point and install expansion bolts, as shown in **Figure 5-25**.

Figure 5-25 Drilling holes and installing expansion bolts

(1) M6×60 expansion bolt	(2) Nut	(3) Spring washer	(4) Flat washer	(5) Extension tub
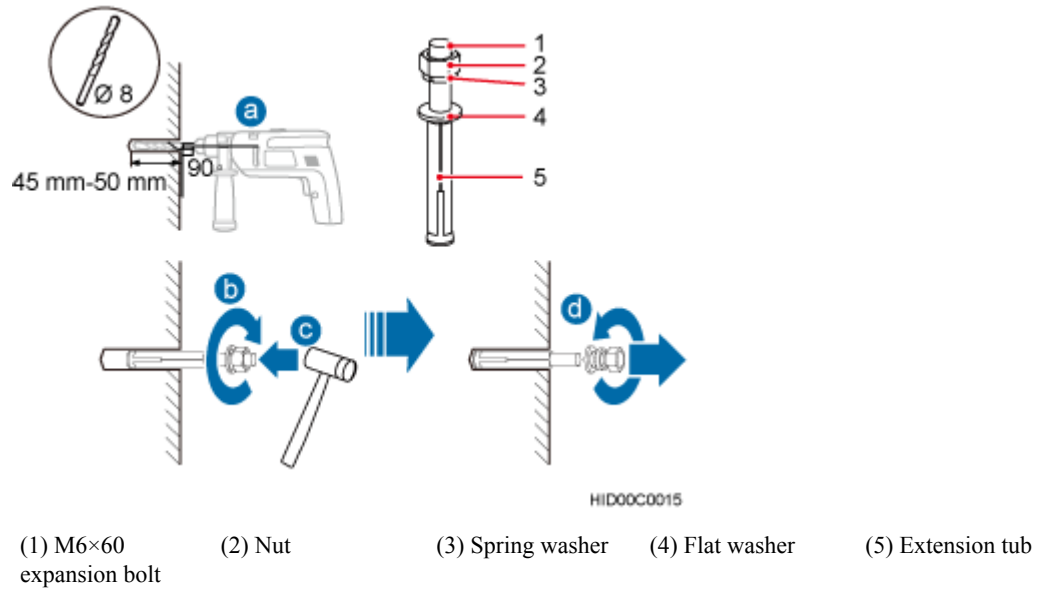
1. Use a hammer drill with bit 8 to drill holes with a diameter of 8 mm and a depth of 45 mm to 50 mm at the marked anchor points. All the holes have the same depth.

2. Use a vacuum cleaner to clear the dust inside and around each hole. If the distance between two holes is incorrect, mark and drill holes again.

3. Partially tighten an expansion bolt and place it vertically into each hole.

4. Use a rubber mallet to hit the expansion bolt until the entire expansion sleeve is in the hole.

5. Remove the M6×60 bolt, nut, spring washer, and flat washer from each expansion bolt in sequence.

⚠ **NOTICE**

After removing an expansion bolt, ensure that the top of the expansion sleeve is level with the wall. If it is not level, the RHUB3908 cannot be installed on the concrete floor evenly and securely.

Step 4 Align the mounting holes with the four M6×60 expansion bolts. Install spring washer 6 and flat washer 6 in sequence on each M6×60 expansion bolt, insert the bolts to each expansion tub, and then use a torque wrench or socket wrench to tighten the four M6×60 bolts with a torque of 5 N•m to secure the RHUB3908 to the wall, as shown in **Figure 5-26**.

Figure 5-26 Installing an RHUB3908 on a wall

PAR49C0021
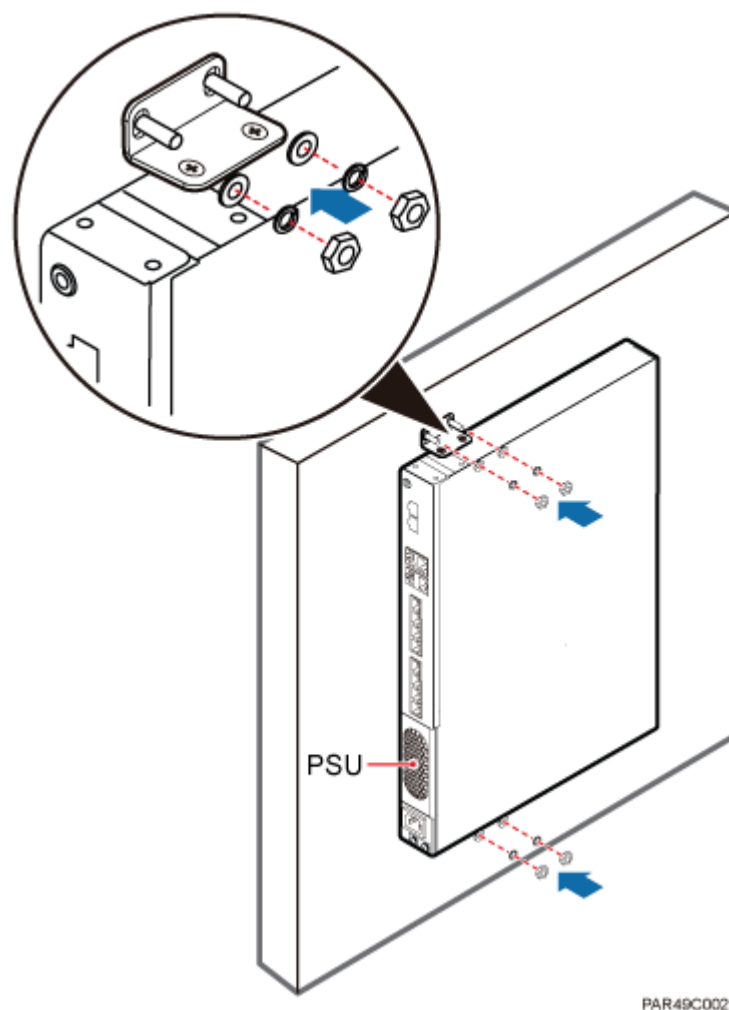
☐**NOTE**

> As shown in the preceding figure, when the RHUB3908 is placed against the wall, ensure that the RHUB3908 panel is vertical to the ground and the PSU is on the lower part of the RHUB3908 panel.

----End

5.4 Installing RHUB3908 Cables

This section describes how to install cables for an RHUB3908.

5.4.1 Requirements for Cable Layout

Cables must be routed according to the specified cabling requirements to prevent signal interference.

☐**NOTE**

> If a cable listed below is not required, skip the requirements for routing the cable.

General Requirements for Cable Layout

中国标准

- 综合布线系统工程设计规范 GB 50311-2007

- 综合布线工程验收规范（含条文说明） GB 50312-2007

- 安全防范工程技术规范 GB 50348-2004

- 电子信息系统机房施工及验收规范 GB 50462-2008

- 智能建筑工程质量验收规范 GB 50339-2003

- 建筑电气工程施工质量验收规范 GB 50303-2002

- 通信管道工程施工及验收技术规范 GB 50374-2006

国际标准

- 用户建筑综合布 ISO／IEC 11801

- 商业建筑电信布线标准 EIA／TIA 568

- 商业建筑电信布线安装标准 EIA／TIA 569

- 商业建筑通信基础结构管理规范 EIA／TIA 606

- 商业建筑通信接地要求 EIA／TIA 60

- 信息系统通用布线标准 EN 50173

- 信息系统布线安装标准 EN 50174

Bending radius

- The bending radius of a power cable or a protection ground (PGND) cable is at least three times the diameter of the cable.

- The bending radius of an optical cable is at least 20 times the diameter of the optical cable, and the minimum bending radius of the branch at each end of the optical cable is 30 mm.

- The bending radius of the signal cable must be at least five times the diameter of the cable.

Cable Binding

- Cables of the same type are bound together.

- Different types of cables must be separately routed with a minimum spacing of 30 mm and cannot be entangled or crossed.

- The cables are bound tightly and neatly and the cable sheath is intact.

- The cable ties face the same direction and all cable ties bound at similar positions must be in a straight line.

- The extra length of each indoor cable tie must be cut off. A slack of 5 mm is reserved for each outdoor cable tie. All cut surfaces have no sharp edges.

- Labels or nameplates are attached to both ends, joints, or turns of cables after they are installed.

Safety

- 穿管/线槽采用钢管或阻燃聚氯乙烯硬质管，线槽的截面利用率应为30％～50％，穿管的截面利用率应为25％～30％。

- Cables are placed away from sharp objects or wall burrs. If these positions are inevitable, protection pipes are required for the cables.

- Cables are routed away from heat sources, or heat-insulation materials are added between cables and heat sources.

- Cables are routed away the cooling vents of the RHUB3908.

● A clearance is reserved at turns of a cable or the position close to a device, facilitating cable and device maintenance. The recommended clearance is about 0.1 m.

Requirements for Special Cables

Ethernet Cable

● A maximum of 100 Ethernet cables can be bundled if no PVC pipes are used. If pipes are used, a maximum of 24 Ethernet cables can be led through a pipe. In this case, ensure that 1/3 space inside the pipes must be vacant.

Power cable

● Positions for routing power cables meet requirements of the engineering design.

● Cables are routed only by qualified and trained personnel before all preparations are made.

● Cables are routed in an untangled and orderly fashion.

PGND cable

● PGND cables are buried in the ground or routed indoors. They cannot be routed overhead before they are routed into the equipment room.

● Outer conductors of coaxial cables and both ends of the shield layers on shielded cables are in proper electrical contact with the metal surface of the equipment to which they are connected.

● PGND cables and signal cables are installed in an untangled and orderly fashion. A certain distance is reserved between them to prevent interference from each other.

● Fuses or switches are not allowed on PGND cables.

● Other devices cannot be used for electrical connections of PGND cables.

● All the metal parts in the equipment are reliably connected to the ground terminal.

Optical cable

● Cables are routed in an untangled and orderly fashion.

● Optical fibers cannot be bound at turns.

● Optical fibers cannot be stretched with too much force or stepped on, and they are far away from sharp objects. Heavy objects cannot be placed on optical cables.

● When optical cables are routed, the extra length of the cables is coiled around special devices, such as a fiber coiler.

● Even strength is applied when optical cables are coiled and optical cables cannot be bent in a forcible manner.

● Vacant optical connectors are covered with dust-proof caps.

● Fiber optic cables cannot be squeezed by the cabinet door when routed through the cabinet.

● If optical cables need to be routed on the tower platform, the optical cables are routed along the inner side of the guard rail and the distance between the guard rail and the cable is the shortest one.

● If optical cables need to be routed close to a device on the tower, the optical cables are secured to the guard rail or pole with cable clips and the device cannot be far away from the position for securing the optical cables.

● If the optical cable close to a device on the tower is too long, the optical cables are wrapped and secured to the tower.

5.4.2 RHUB3908 Cable List

This section describes the connector types and connections of the RHUB3908 cables.

Table 5-2 lists RHUB3908 cables.

Table 5-2 RHUB3908 cable list

Cable	One End		The Other End	
	Connector	**Connected to...**	**Connector**	**Connected to...**
PGND cable	OT terminal (M4, 6 mm^2 [0.009 in.^{2}])	Ground screws on the RHUB3908	OT terminal (M6, 6 mm^2 [0.009 in.^{2}])	Ground terminal on the external ground bar
RHUB3908 Power Supply Cable	C13 female connector	AC power input socket on the RHUB3908	3-pin connector	External power input socket
CPRI Optical Fiber	DLC connector	CPRI port on the LBBP, WBBP or UBBP in the BBU	DLC connector	CPRI0 or CPRI1 port on the RHUB3908
		CPRI0 or CPRI1 port on the RHUB3908	DLC connector	CPRI0 or CPRI1 port on the RHUB3908
		CPRI port on the LBBP, WBBP or UBBP in the BBU	FC connector, SC connector, or LC connector	ODF
		CPRI0 or CPRI1 port on the RHUB3908	FC connector, SC connector, or LC connector	ODF
Ethernet Cable	RJ45 connector	CPRI_E0~CPRI_E7 port on the RHUB3908	RJ45 connector	CPRI_E0~CPRI_E1 port on the pRRU3901
(Optional) RHUB3908 Alarm Cable	RJ45 connector	EXT_ALM port on the RHUB3908	Bare end	Alarm signal port of the monitored equipment

NOTE

- If one end of the CPRI cable is connected to the DLC connector, the other end connects the BBU, or RHUB3908 through the DLC connector. If one end of the CPRI cable is connected to the ODF adapter, the other end connects the BBU or RHUB3908 through a connector corresponding to the adapter. The connectors include the FC connector, SC connector, and LC connector.
- The Extender can be used to lengthen the distance between the RHUB3908 and the pRRU3901 connected using the Ethernet cable. If the Extender is used, the Ethernet cable is divided into two parts, one between the RHUB3908 and the Extender and the other between the Extender and the pRRU3901.

5.4.3 Cable Connections

This section describes the cable connections for an RHUB3908.

Figure 5-27 shows the cable connections for an RHUB3908. The port of GE0, GE1 and ETH are reserved.

Figure 5-27 Cable connections for an RHUB3908
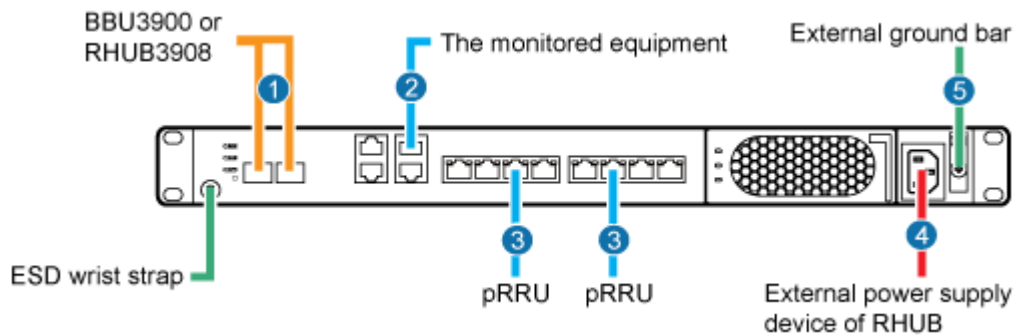
(1) CPRI optical cable	(2) RHUB3908 alarm cable	(3) Ethernet cable
(4) RHUB3908 power cable	(5) PGND cable	-

NOTE

The Extender can be used to lengthen the distance between the RHUB3908 and the pRRU3901 connected using the Ethernet cable. If the Extender is used, the Ethernet cable is divided into two parts, one between the RHUB3908 and the Extender and the other between the Extender and the pRRU3901.

5.4.4 RHUB3908 Cable Installation Process

This section describes the process of installing RHUB3908 cables.

Figure 5-28 shows the RHUB3908 cable installation process.

Figure 5-28 RHUB3908 cable installation process
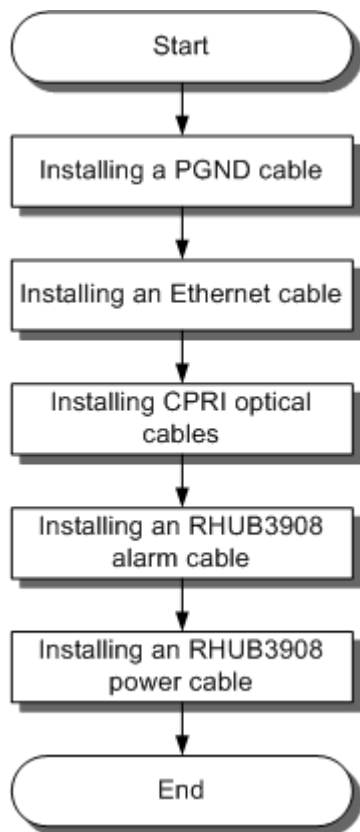
5.4.5 Installing an RHUB3908 PGND Cable

An RHUB3908 PGND cable ensures proper grounding of an RHUB3908.

Prerequisites

The OT terminals at both ends of the PGND cable are prepared.

Context

The yellow and green or green PGND cable is a single cable. The cross-sectional area of the PGND cable is 6 mm^2 (0.009 in.^{2}). Both ends of the cable are OT terminals, as shown in Figure 1.

Figure 5-29 Exterior of a PGND cable

(1) OT terminal (6 mm^2 [0.009 in.^{2}], M4)   (2) OT terminal (6 mm^2 [0.009 in.^{2}], M6)

 NOTE

● If the PGND cable is provided by the customer, a copper-core cable with a minimum cross-sectional area of 6 mm^2 (0.009 in.^{2}) or 10 AWG is recommended.

● The OT terminals at both ends of the PGND cable are assembled at the site.

● The M6 OT terminal has the default size. You can replace it with another OT terminal of the expected size based on the site requirement.

⚠ **NOTICE**

● Ensure proper grounding of the RHUB3908 using a PGND cable.

● When installing the PGND cable, tightly press the OT terminal in the correct direction, as shown in **Figure 5-30**.

Figure 5-30 Correct direction of an OT terminal for the PGND cable
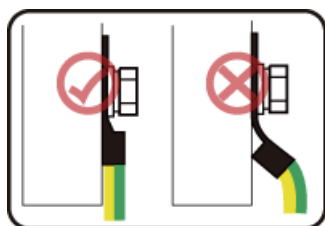
EIR22C6001

Procedure

Step 1 Route the PGND cable by referring to Requirements for Cable Layout.

Step 2 Use a torque screwdriver or Phillips screwdriver to secure the M4 OT terminal at one end of the PGND cable to the ground screw on the RHUB3908 panel with a torque of 1.4 N•m. If the OT terminal is a one-hole OT terminal, connect it to the ground screw on the lower part of the RHUB3908 panel, as shown in **Figure 5-31**.

Figure 5-31 Installing an RHUB3908 PGND cable

PAR49C0007
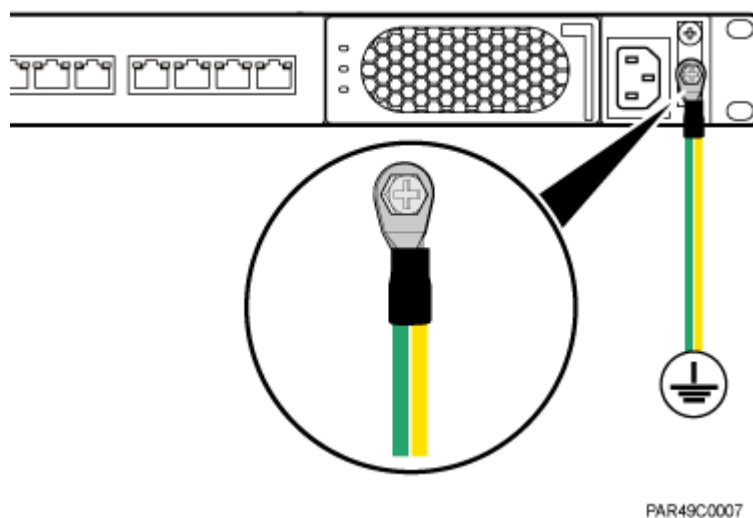
Step 3 Use a torque screwdriver or Phillips screwdriver to secure the M8 OT terminal at one end of the PGND cable to the wiring terminal on the ground bar at the site with a torque of 1.4 N•m.

----End

Follow-up Procedure

1. Route the cable, and then use a cable tie to bind the cable. For details, see Requirements for Cable Layout.

2. Label the installed cable. For details, see section **8.3 Attaching an L-Shaped Label**.

5.4.6 Installing an Ethernet Cable

This section describes how to install an Ethernet cable. A pRRU3901 can have two transmission ports or three transmission ports, requiring the same installation operations. This section uses the pRRU3901 with three transmission ports as an example.

Prerequisites

● Ethernet cables are not delivered, and they must be prepared onsite. You need to use a network cable tester to test the Ethernet cable connection.

● The Ethernet cable must be of Category 5e (enhanced) or higher. In addition, its cross-sectional area must be 24 AWG or larger and frame spread rating must be CM or higher. With the internal PoE module providing power, the maximum length of an Ethernet cable is 100 m. With the Extender, the distance of the pRRU3901 and RHUB3908 can be extended by the Extender up to a total distance of 200 m.

Context

The Ethernet cable has the following functions:

● Provides power supply for the pRRU when connected to the CPRI_E0 port on the pRRU.

● Transmits CPRI signals between an RHUB3908 and a pRRU.

Using the CPRI_E1 port on the pRRU3901 has the same Ethernet cable connection to the RHUB3908 as using the CPRI_E0 port. The following section describes the connection using the CPRI_E0 port.

Procedure

Step 1 Make the Ethernet cables.

1. Assemble an RJ45 connector and an Ethernet cable by following instructions in Assembling the Unshielded RJ45 Connector and the Ethernet Cable of *Installation Reference*.

   □NOTE

   Follow pin assignment instructions described in section Ethernet Cable in *LampSite Hardware Description* to assemble the unshielded RJ45 connector and the Ethernet cable. Otherwise, the transmission signal quality deteriorates and CPRI links may be disconnected.

2. Check whether the made RJ45 connector is qualified by following instructions in Checking the Appearance of Metal Contact Strips.

3. To complete the assembly of the other end, repeat **Step 1.1** and **Step 1.2**.

4. Check whether the touch points on the connectors at both ends are normally conducted and well contacted and whether the connections are correct by following instructions in Testing the Connection of Assembled Cables of *Installation Reference*.

Step 2 Remove the dustproof cap of the CPRI_E0 port on the pRRU3901.

Step 3 Connect the RJ45 connector at one end of the Ethernet cable to the CPRI_E0 port on the pRRU3901 panel.

Step 4 **Optional:** Connect the RJ45 connector at the other end of the Ethernet cable to the output port of the Extender. Then, connect the RJ45 connector at one end of another Ethernet cable to the input port of the Extender.

If the Extender is used, the Ethernet cable is divided into two parts, one between the RHUB3908 and the Extender and the other between the Extender and the pRRU3901.

Step 5 Connect the RJ45 connector at the other end of the Ethernet cable to any port ranging from CPRI_E0 to CPRI_E7 on the RHUB3908 panel based on the engineering design, as shown in **Figure 5-32**.

Figure 5-32 Install an Ethernet cable between an RHUB3908 and a pRRU3901
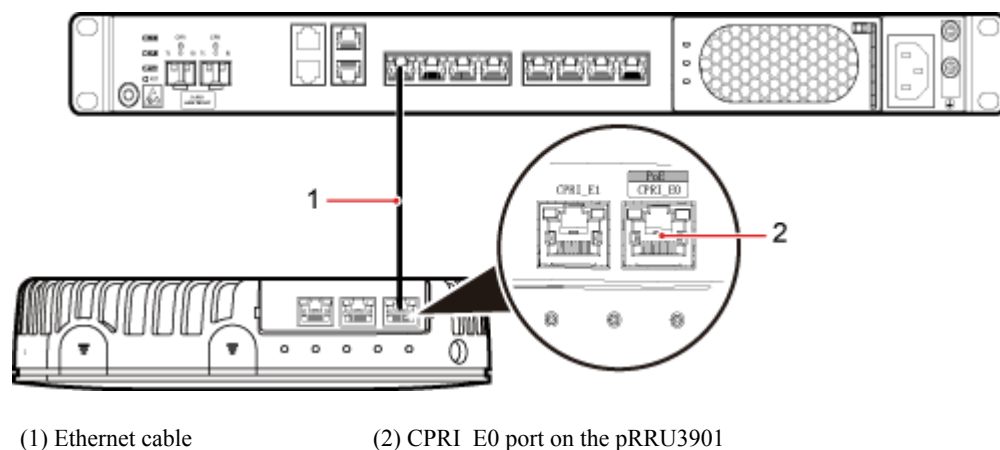
(1) Ethernet cable	(2) CPRI_E0 port on the pRRU3901

☐**NOTE**

The pRRU3901 can have two transmission ports plus PWR port or three transmission ports (plus PWR port or no PWR port). The Ethernet cable connection between the pRRU3901 in any appearance and the RHUB3908 is similar. This section uses the pRRU3901 with three transmission ports plus no PWR port as an example.

----End

Follow-up Procedure

1. Route the cable, and then use a cable tie to bind the cable. For details, see **5.4.1 Requirements for Cable Layout**.

2. Label the installed cable. For details, see section **8.3 Attaching an L-Shaped Label**.

5.4.7 Installing CRPI Optical Cables

Optical fibers can be used to interconnect BBU and RHUB3908s, or cascade RHUB3908s.

Context

- Multi-mode optical modules for CPRI ports are labeled MM and each has a black or gray puller.

- Single-mode optical modules are labeled SM and each has a blue puller.

- For details about the connection of CPRI optical cables, see *Typical Networking* in *LampSite Technical Description* and CPRI Optical Fiber in *LampSite Hardware Description*.

- An optical module to be installed must match the rate of its corresponding port.

⚠ **NOTICE**

The performance of an optical module that is exposed to the air for more than 20 minutes may be abnormal. Therefore, you must insert a fiber optic cable into an unpacked optical module within 20 minutes.

Procedure

Step 1 Install an optical module, as shown in **Figure 5-33** and **Figure 5-34**.

1. Remove the dust-proof cap from the CPRI port on the RHUB3908 panel.

2. Remove the dust-proof cap on the optical module.

3. Lower the puller of the optical module.

4. Insert the optical module into the CPRI port on the RHUB3908, BBU or ODF.

5. Raise the puller of the optical module.

Figure 5-33 Removing the dust-proof cap from a port

CID00C0001
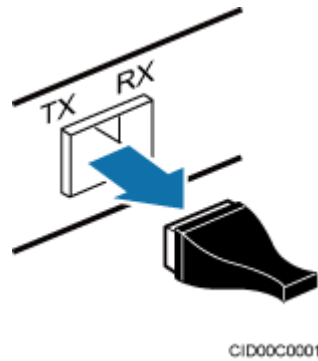
Figure 5-34 Installing an optical module

CID00C0000
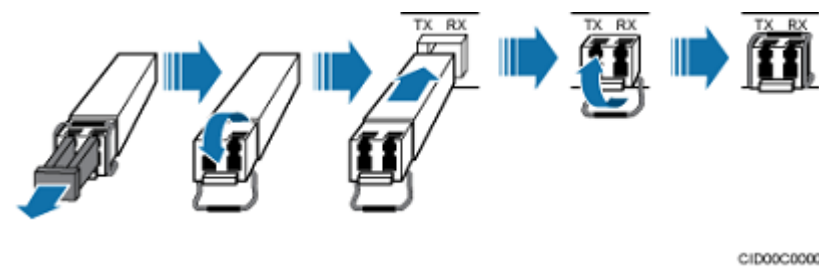
Step 2 Install a CPRI optical cable, as shown in **Figure 5-35**.

1. Remove the dust-proof cap from the optical cable connector.

2. Install the optical cables by referring to **Table 5-3**.

Table 5-3 CPRI optical cable connections

One End		The Other End	
Connect or	**Connected to**	**Connector**	**Connected to**
DLC connecto r	BBU3900/ LBBP&WBBP&UBBP/ CPRI port	DLC connector	CPRI0 or CPRI1 port on the RHUB3908
	CPRI0 or CPRI1 port on the RHUB3908		CPRI0 or CPRI1 port on the RHUB3908
	BBU3900/ LBBP&WBBP&UBBP/ CPRI port	FC, SC, or LC connector	ODF
	CPRI0 or CPRI1 port on the RHUB3908		

◻**NOTE**

- If one end of the CPRI cable is connected to the DLC connector, the other end connects the BBU or RHUB3908 through the DLC connector. If one end of the CPRI cable is connected to the ODF adapter, the other end connects the BBU or RHUB3908 through a connector corresponding to the adapter. The connectors include the FC connector, SC connector, and LC connector.

- When connecting the CPRI cable to the TX and RX ports of the optical module through connectors in a cross manner, ensure that one end of a core of the CPRI cable is connected to the TX port and the other end is connected to the RX port. **Figure 5-35** shows how to install a CPRI optical cable for connecting the BBU and RHUB3908s.

Figure 5-35 Installing an CRPI optical cable
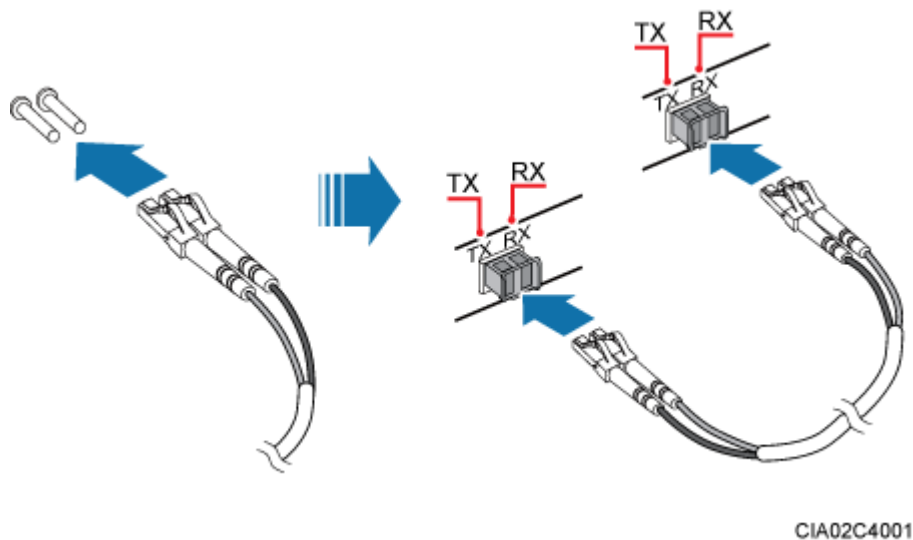
CIA02C4001

----End

Follow-up Procedure

1. Route the cable, and then use a cable tie to bind the cable. For details, see **5.4.1 Requirements for Cable Layout**.

2. Label the installed cable. For details, see section **8.3 Attaching an L-Shaped Label**.

5.4.8 Installing an RHUB3908 Alarm Cable (Optional)

An RHUB3908 alarm cable transmits dry node alarm signals.

Prerequisites

Connectors for an alarm cable are prepared.

Context

Figure 5-36 shows the exterior of an RHUB3908 alarm cable. RHUB Cable List shows the installation position on both ends of the RHUB3908 cable.

Figure 5-36 RHUB3908 alarm cable
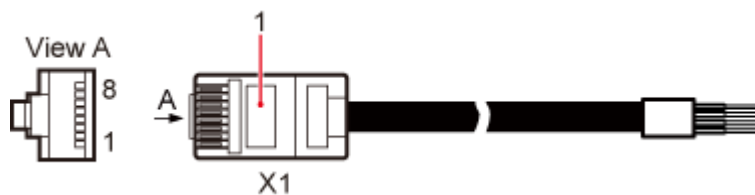
Procedure

Step 1 Connect the RJ45 connector on one end of the alarm cable to the EXT_ALM port on the RHUB3908.

Step 2 Connect the other end of the alarm cable to the alarm cable port on the device to be monitored.

----End

Follow-up Procedure

1. Route the cable, and then use a cable tie to bind the cable. For details, see **5.4.1 Requirements for Cable Layout**.

2. Label the installed cable. For details, see section **8.3 Attaching an L-Shaped Label**.

5.4.9 Installing an RHUB3908 Power Cable

The RHUB3908 power cable provides 110 V AC/220 V AC power supply for the RHUB3908.

Procedure

Step 1 Route the power cable by referring to Requirements for Cable Layout.

Step 2 Connect the power connector on the X1 end to the AC power input port on the RHUB3908 panel, as shown in **Figure 5-37**.

Step 3 Connect the power connector on the X2 end to the external power supply port, as shown in **Figure 5-37**.

Figure 5-37 Installing an RHUB3908 power cable
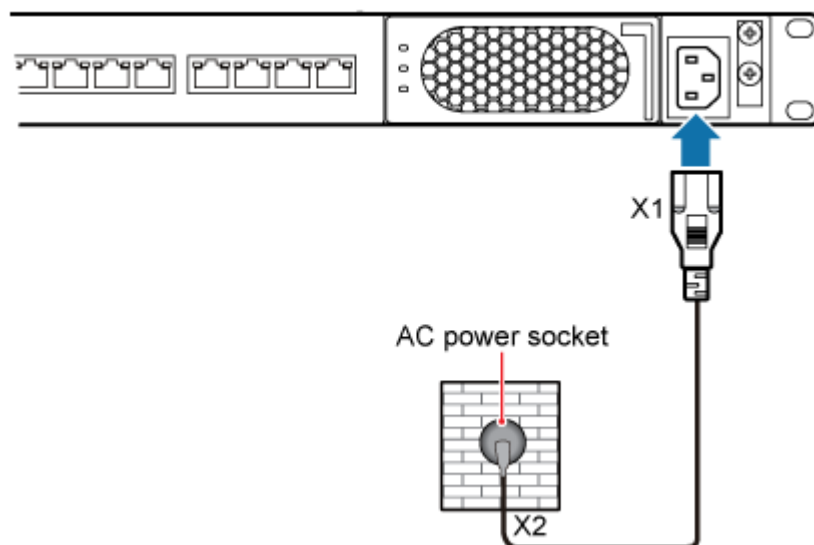
----End

Follow-up Procedure

1. Route the cable, and then use a cable tie to bind the cable. For details, see **5.4.1 Requirements for Cable Layout**.

2. Label the installed cable. For details, see section **8.3 Attaching an L-Shaped Label**.

5.5 Checking the RHUB3908 Hardware Installation

After an RHUB3908 is installed, check the installation of hardware including the devices and related cables.

Table 5-4 lists the hardware installation checking items.

Table 5-4 Hardware installation checking list

No.	Item
1	The position for each device conforms to the engineering design and meets the space requirement.
2	Ensure that the RHUB3908 is properly installed.
3	The surface of the RHUB3908 is neat and clean. The external paint is intact. The labels, tags, and nameplates are correct, legible, and complete.

Table 5-5 lists the checking list of the power cable and PGND cable connections.

Table 5-5 Checklist for power cable and PGND cable connections

No.	Item
1	The power cables and PGND cables comply with the requirements of local regulations.
2	The power cables or the PGND cables are not inversely connected or short-circuited.
3	The power cables and PGND cables are bound separately from other cables.
4	Labels are attached to both ends of the power cables, PGND cables, optical fibers, and Ethernet cables.
5	The power cables and PGND cables are intact.
6	The power cables and PGND cables have no weld nugget.
7	No breaking device such as a switch or fuse lies in the electric connection of the grounding system.
8	The redundant part of PGND cable is stripped off.
9	The lugs at both ends of the power cable or PGND cable are securely soldered or crimped.
10	The flat washers and spring washers are fixed securely and closely at all the wiring terminals.
11	The work GND cable and PGND cable of the BTS share a group of grounding conductors with the lightning and GND cables of the building.

Table 5-6 lists the check items of the signal cable connection.

Table 5-6 Checklist for the signal cable connection

No.	Item
1	The connectors of the signal cables must securely connected.
2	The connectors of the signal cables are intact.
3	The signal cables are intact.
4	The cable ties are evenly spaced. The signal cables are bound neatly with cable ties to proper tightness, and arranged at even intervals in the same direction.
5	The extra length of the cable ties is cut and removed. The cut surfaces of the indoor cables are smooth and have no sharp edges.
6	The cable layout facilitates maintenance and expansion.
7	Correct and clear labels are attached to both ends of the signal cables.

No.	Item
8	The distance between the bundled fiber tails and the RHUB3908 panel is less than 70 mm.

Table 5-7 lists the checking items for other cable connections.

Table 5-7 Checklist for other cable connections

No.	Item
1	The connectors of the other cables must securely connected.
2	Labels on the cables are legible and bound based on the engineering requirements. The cables must be bound tightly and neatly. The sheaths of the cables must not be damaged.
3	Positions for routing the cables must meet requirements of the engineering design.

5.6 Power-on Check on an RHUB3908

This section describes the power-on check on the RHUB3908 after the RHUB3908 hardware is installed and checked.

Context

⚠ **DANGER**

Power-on check involves high-voltage operation. Be cautious when conducting the power-on check. Any direct contact with the input voltage or indirect contact through damp objects might endanger your life.

Procedure

Step 1 Measure the RHUB3908 earth resistance.

If...	Then...
The RHUB3908 earth resistance is less than 10 ohms	Go to **Step 2**.
The RHUB3908 earth resistance is equal to or larger than 10 ohms	Find out the cause and ensure that the resistance meets requirement. Then, go to **Step 2**.

Step 2 Measure the voltage of the RHUB3908.

If...	Then...
The external power supply ranges from 100 V AC to 240 V AC	Go to **Step 3**.
The external power supply does not range from 100 V AC to 240 V AC	Find out the cause and ensure that the resistance meets requirement. Then, go to **Step 3**.

Step 3 Power on the RHUB3908. Wait 3 to 5 minutes, check the status of the RUN indicator of the RHUB3908 after the RHUB3908 runs properly.

If the Status of the RUN Indicator...	It Indicates that...	Then...
Steady on	The power supply is normal while the board is faulty.	Power off the RHUB3908, and power on it again after rectifying the board fault.
Steady off	There is no power input or the board is faulty.	Power off the RHUB3908, and check the power input again. Rectify the board faulty and power on the RHUB3908 again if the power input is normal.
On for 1s and off for 1s	The devices work properly.	End the operation.
On for 0.125s and off for 0.125s	The board software is being uploaded.	Power off the RHUB3908 if the uploading is not finished in 5 minutes, and check whether the configuration file is correct. Power on the RHUB3908 again after the fault is rectified.

----End

6 Installing a pRRU3901

About This Chapter

This chapter describes the pRRU3901 installation process. The pRRU3901 can have two transmission ports (plus PWR port) or three transmission ports (plus PWR port or no PWR port). Unless otherwise specified, this document uses the pRRU3901 with three transmission ports plus no PWR port as an example.

☰**NOTE**

 The pRRU3901 with three transmission ports plus no PWR port is named the pRRU3901a in North Americain.

6.1 Information About the Installation
This section describes the information that you must be familiar with before installing a pRRU3901, including the pRRU3901 product family, installation scenarios, installation space and environment requirements.

6.2 Obtaining the MAC Address (Optional)
Before installing a pRRU3901, record the media access control (MAC) address, which will be used during pRRU3901 commissioning. This section applies only when a pRRU3901 with three transmission ports is configured with a Wi-Fi daughter board.

6.3 Installation Process
This section describes the pRRU3901 installation process, which involves installing a pRRU3901, and cables, checking the pRRU3901 hardware installation, and powering on the pRRU3901.

6.4 Installing a pRRU3901
This section describes the pRRU3901 installation process. A pRRU3901 can be installed on a wall, ceiling, indoor metal pole, or keel.

6.5 Installing pRRU3901 Cables
This section describes the procedure of installing the pRRU3901 cables.

6.6 Checking the pRRU3901 Hardware Installation
pRRU3901 hardware installation checking includes hardware and cable installation checking.

6.7 Powering on the pRRU3901

This section describes the power-on check on the pRRU3901 after the pRRU3901 hardware is installed and checked.

6.1 Information About the Installation

This section describes the information that you must be familiar with before installing a pRRU3901, including the pRRU3901 product family, installation scenarios, installation space and environment requirements.

6.1.1 pRRU3901 Product Family

This chapter describes the configurations and functions of the pRRU3901 components.

Table 6-1 lists the pRRU3901 product family.

Table 6-1 pRRU3901 product family

Category	Equipment	Optional Item	Quantity	Function
Main equipment	pRRU3901	Mandatory	1	Processes the radio frequency signals.
	External antenna	Optional	2	Provides external antennas for the pRRU3901. **NOTE** Configure two external antennas for each RF daughter board.
Auxiliary device	Mounting kits	Mandatory	1	Supports the pRRU3901 installation on a wall, pole, ceiling, or keel. The mounting kits vary with the pRRU3901 installation mode.
	Extender	Optional	1	Extends the distance between the pRRU3901 and RHUB3908.

6.1.2 pRRU3901 Installation Scenario

The pRRU3901 can be installed on a wall, ceiling, pole, or keel. The following table describes the installation in different scenarios.
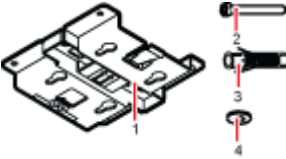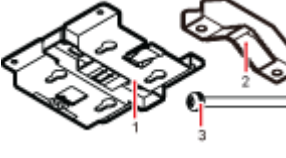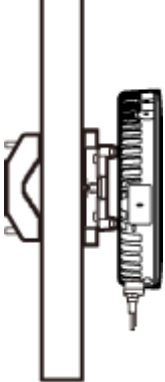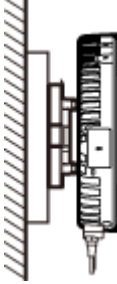
Installing a pRRU3901 on a wall

📖**NOTE**

- The pRRU3901 must keep a minimum of 0.5 m away from the power equipment with interference, and keep a minimum of 2 m away from the source with radiation.
- The pRRU3901 must keep away from a metal wall to avoid the impact on the antenna performance.

When a pRRU3901 is installed on a wall, installation modes vary with the quality of wall, as shown in Table 6-2.
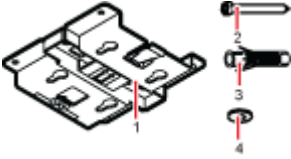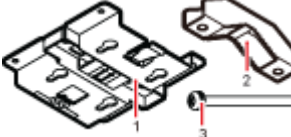
Table 6-2 Wall-mounted suggestion

Installation Mode	Requirements	Mounting Brackets	Installation Diagram
Installing the pRRU3901 on a wall by drilling holes For details, see pRRU Installed on a Wall.	● The wall can bear a load at least four times the weight of a pRRU3901. ● The screws must be tightened with a torque of 10 N·m. This ensures the screws work properly and the wall remains intact without cracks in it.	1. Plate 2. Screw (M6X50) 3. Plastic expansion sleeve 4. Flat washer 	
Installing the pRRU3901 on a wall using a V clamp through an attachment plate For details, see pRRU Installed on a Plate.	● The wall can bear a load at least four times the weight of a pRRU3901. ● The thickness of the wall is less than the bolt length (80 mm).	1. Plate 2. V clamp 3. Bolt (M6X80) 	
Installing the pRRU3901 on a wall using a plate on a metal wall	● The wall cannot bear a load at least four times the weight of the pRRU3901. For example, EPS walls, MDF walls, or walls cannot be drilled. ● The wall is too thick to drill, and the pRRU3901 cannot be installed on a wall using a V clamp through an attachment plate.	The plate is prepared by customers.	

Installing a pRRU3901 on a ceiling

When a pRRU3901 is installed on a ceiling, installation modes vary with the quality of the ceiling, as shown in **Table 6-3**.

Table 6-3 Ceiling-mounted suggestion
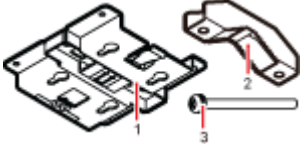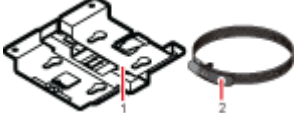
Installation Mode	Requirements	Mounting Brackets	Installation Diagram
Installing the pRRU3901 on a ceiling by drilling holes For details, see pRRU Installed on a Ceiling.	● The ceiling, such as a concrete ceiling, can bear a load at least four times the weight of the pRRU3901. ● The screws must be tightened with a torque of 10 N·m. This ensures the screws work properly and the ceiling remains intact without cracks in it.	1. Plate 2. Screw (M6X50) 3. Plastic expansion sleeve 4. Flat washer 	
Installing the pRRU3901 on a ceiling using a V clamp through an attachment plate For details, see pRRU Installed on a Plate.	● The ceiling, such as a concrete ceiling, can bear a load at least four times the weight of the pRRU3901. ● The thickness of the ceiling is less than the bolt length (80 mm).	1. Plate 2. V clamp 3. Bolt (M6X80) 	
Installing the pRRU3901 on a pole For details, see pRRU Installed on a Pole.	A pole under the ceiling can bear a load at least four times the weight of the pRRU3901.	For details, see **Table 6-4**.	For details, see **Table 6-4**.

Installation Mode	Requirements	Mounting Brackets	Installation Diagram
Installing the pRRU3901 on a keel For details, see pRRU Installed on a Keel.	A keel under the ceiling can bear a load at least four times the weight of the pRRU3901.	For details, see **Table 6-5**.	For details, see **Table 6-5**.

Installing the pRRU3901 on a pole

When a pRRU3901 is installed on a pole, installation modes vary with the diameter of the pole, as shown in **Table 6-4**.
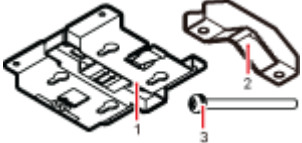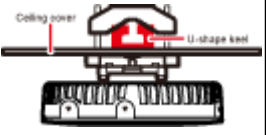
Table 6-4 Pole-mounted suggestion

Installation Mode	Requirements	Mounting Brackets	Installation Diagram
Installing the pRRU3901 on a pole For details, see pRRU Installed on a Pole.	The diameter of the pole ranges from 30 mm to 70 mm.	1. Plate 2. V clamp 3. Bolt (M6X80) 	
	The diameter of the pole ranges from 70 mm to 110 mm.	1. Plate 2. Hose clamp, which is prepared by the customer 	

Installing the pRRU3901 on a keel

The pRRU3901 can be installed on a keel of U-shape, T-shape, or H-shape. For the keels of other shapes, they are determined based on the onsite requirements.

Table 6-5 Keel-mounted installation suggestion

Installation Mode	Requirements	Mounting Brackets	Installation Diagram
Installing the pRRU3901 on a keel For details, see pRRU Installed on a Keel.	The keel is in U-shape, T-shape, H-shape, or other shapes.	1. Plate 2. V clamp 3. Bolt (M6X80) 	 shows the pRRU3901 installed on a U-shaped keel.

6.1.3 Space Requirements

When the pRRU3901 is installed on a wall, ceiling, pole or keel, the minimum space is required for easy cabling and O&M. Based on the engineering practice, the recommendation for the installation space is provided.

□NOTE

During installation, a minimum clearance of 2 m must be reserved between the pRRU3901 working on the 2.6 GHz band and the Wi-Fi module if they need to process services concurrently.

Figure 6-1 shows the recommended space requirements of the pRRU3901 when the external antenna is required.

Figure 6-1 Recommended space requirements of the pRRU3901
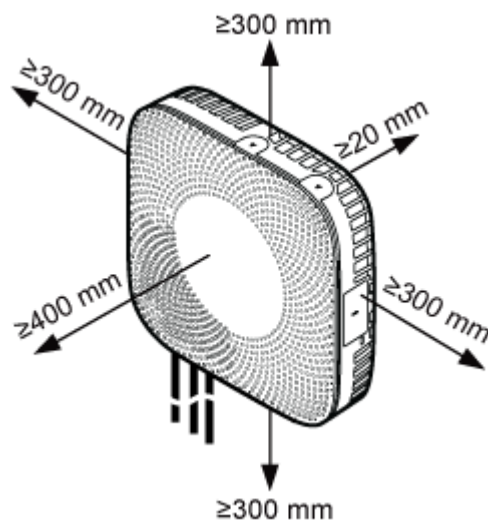
When the external antenna is required, the recommended space for installing a single pRRU3901 is described as follows:

- At least 300 mm above the pRRU3901 is reserved for maintenance.
- At least 300 mm under the pRRU3901 is reserved for cabling.

- At least 300 mm on the left of the pRRU3901 is reserved for maintenance.

- At least 300 mm on the right of the pRRU3901 is reserved for maintenance.

- At least 400 mm in front of the pRRU3901 is reserved for maintenance

- At least 20 mm on the back of the pRRU3901 is reserved for ventilation.

Figure 6-2 shows the minimum space requirements of the pRRU3901 when the external antenna is not required.

Figure 6-2 Minimum space requirements of the pRRU3901
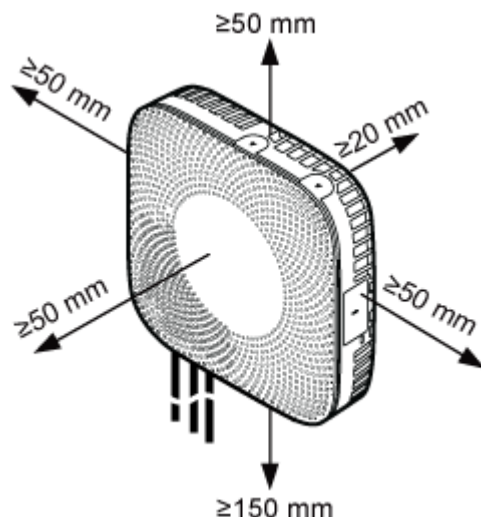
When the external antenna is not required, the minimum space for installing a single pRRU3901 is described as follows:

- At least 50 mm above the pRRU3901 is reserved for maintenance.

- At least 150 mm under the pRRU3901 is reserved for cabling.

- At least 50 mm on the left of the pRRU3901 is reserved for maintenance.

- At least 50 mm on the right of the pRRU3901 is reserved for maintenance.

- At least 50 mm in front of the pRRU3901 for maintenance.

- At least 20 mm on the back of the pRRU3901 is reserved for ventilation.

6.1.4 pRRU3901 Installation Environment Requirements

The installation environment of a pRRU3901 involves the running environment specifications for the pRRU3901 and other specifications.

pRRU3901 Running Environment Specifications

Table 6-6 shows the environment specifications for the pRRU3901 installed indoors.

Table 6-6 pRRU3901 environment specifications

Specifications	Condition	Remarks
Operating temperature	- 5°C to + 40°C	-
Relative humidity	5% RH to 95% RH	-
Altitude	- 60 m to + 1800 m	Works properly.
	1800 m to 4000 m	Above the 1800 m altitude, the maximum operating temperature decreases by 1°C each time the altitude increases by 220 m.

Other Running Environment Specifications

- The pRRU3901 cannot be installed at an air outlet of the heat dissipation box of an air conditioner or other heat-generating appliances.

- The pRRU3901 cannot be installed near a strong heat source.

- The pRRU3901 cannot be installed in a position with water dripping, such as outdoor equipment of air conditioners, pipe, and leaking or dripping roofs.

- The installation position must be far from rains. If the pRRU3901 is installed on a wall, there must be no window on either side of the wall.

- The installation position must be far away from high voltage, highly corrosive devices, flammable or explosive substances, and electromagnetic interference.

- The pRRU3901 must be installed in a dry, ventilating, and dust-proof place.

- If the pRRU3901 is installed in parking areas or basements, the installation position must be well-ventilated.

6.2 Obtaining the MAC Address (Optional)

Before installing a pRRU3901, record the media access control (MAC) address, which will be used during pRRU3901 commissioning. This section applies only when a pRRU3901 with three transmission ports is configured with a Wi-Fi daughter board.

Context

The MAC address indicates the IP address through which a device can be reached.

Procedure

Step 1 Remove the backup WIFI MAC label from the front housing of the pRRU3901 and keep them secure, as shown in **Figure 6-3**.

❖**NOTE**

- Do not remove the WIFI MAC label on the side of the pRRU3901 housing.
- Before removing the backup WIFI MAC label, photograph it.

Figure 6-3 Removing backup WIFI MAC label
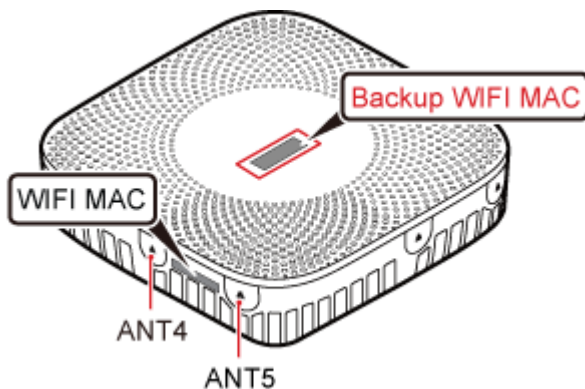
Step 2 Save the MAC according to MAC Collection Template, and report it to the pRRU3901 commissioning personnel.

----End

6.3 Installation Process

This section describes the pRRU3901 installation process, which involves installing a pRRU3901, and cables, checking the pRRU3901 hardware installation, and powering on the pRRU3901.

Figure 6-4 shows the pRRU3901 installation process.

Figure 6-4 pRRU3901 installation process
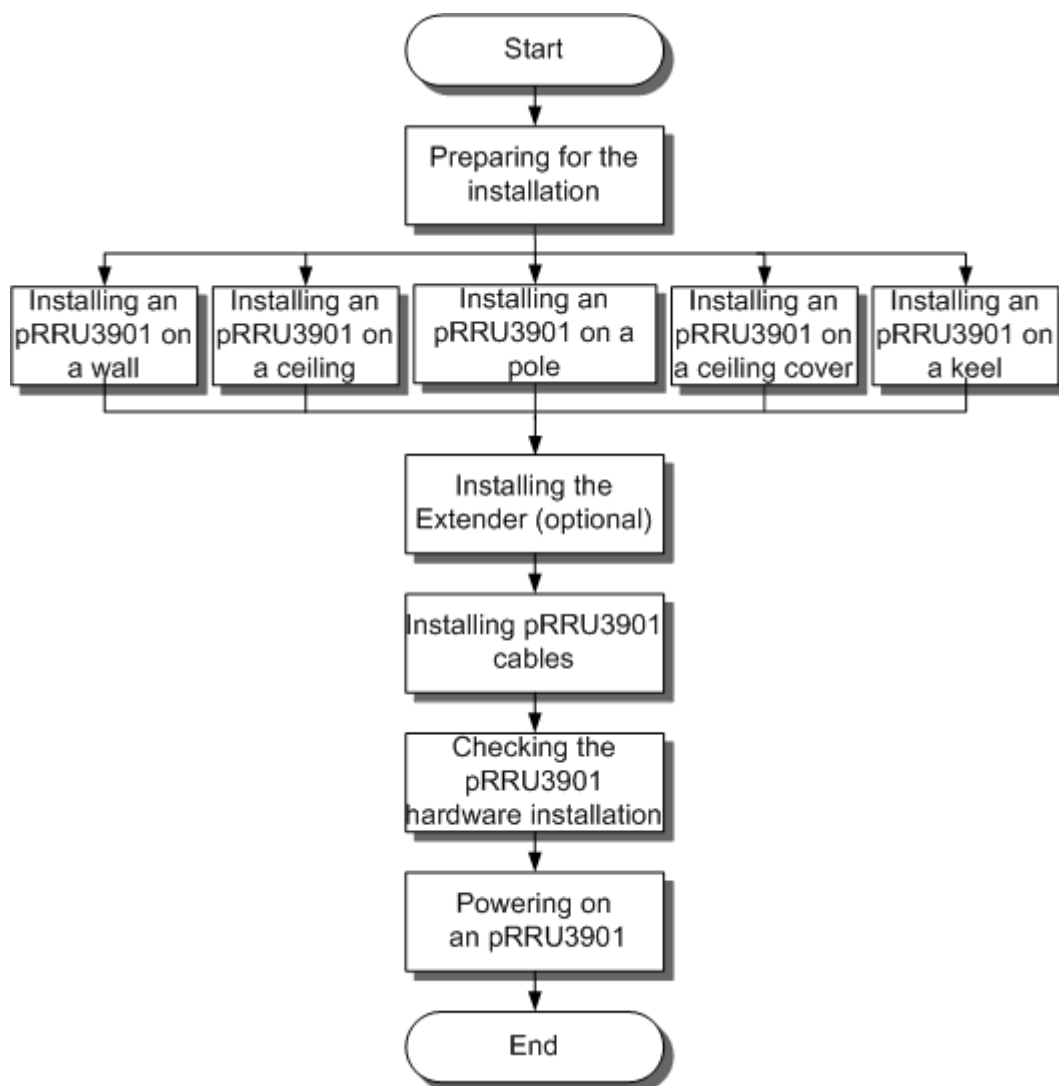
6.4 Installing a pRRU3901

This section describes the pRRU3901 installation process. A pRRU3901 can be installed on a wall, ceiling, indoor metal pole, or keel.

☐**NOTE**

- The pRRU3901 cannot be grounded. If the pRRU3901 is grounded but the RHUB3908 connected to this pRRU3901 is not, the pRRU3901 may fail to be powered on.

- A minimum distance of 50 cm must be reserved between the pRRU3901 and the incandescent lamp.

- The installation spacing between the pRRU3901 and the temperature sensor must be greater than 50 cm.

- It is good practice to install the pRRU3901 on materials that can tolerate a temperature higher than 65°C and have an ignition point higher than 70°C.

6.4.1 pRRU3901 Installation Kits

This section describes the pRRU3901 installation kits.

Figure 6-5 shows the exterior of the pRRU3901 installation kits.

Figure 6-5 pRRU3901 installation kits

PAR49C0052

(1) V clamp	(2) Plate	(3) Screw (M6x50)
(4) Plastic expansion sleeve	(5) Bolt (M6x80)	(6) Flat washer
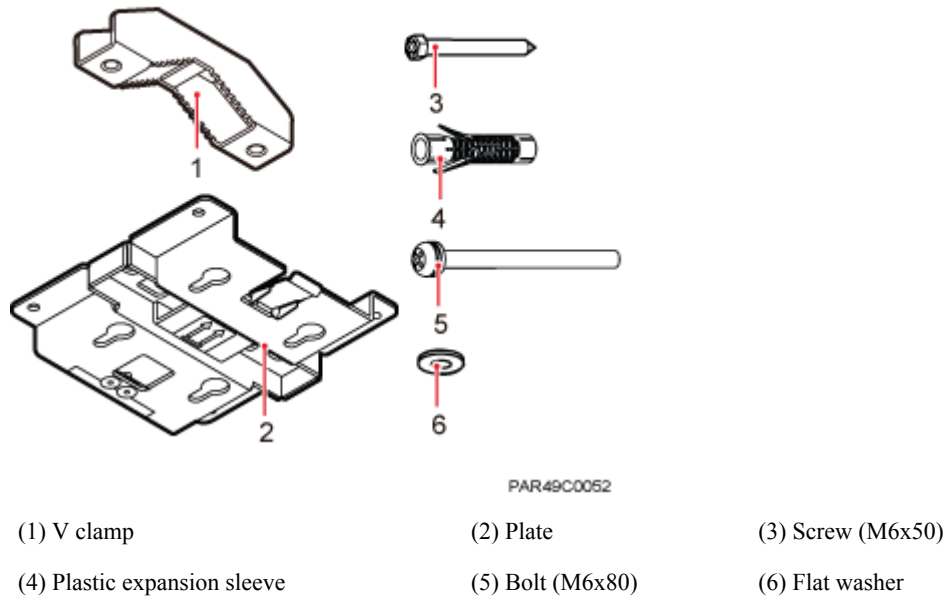
The following figure shows the specifications of the installation plate.

Figure 6-6 Plate specifications

PAR49C0000
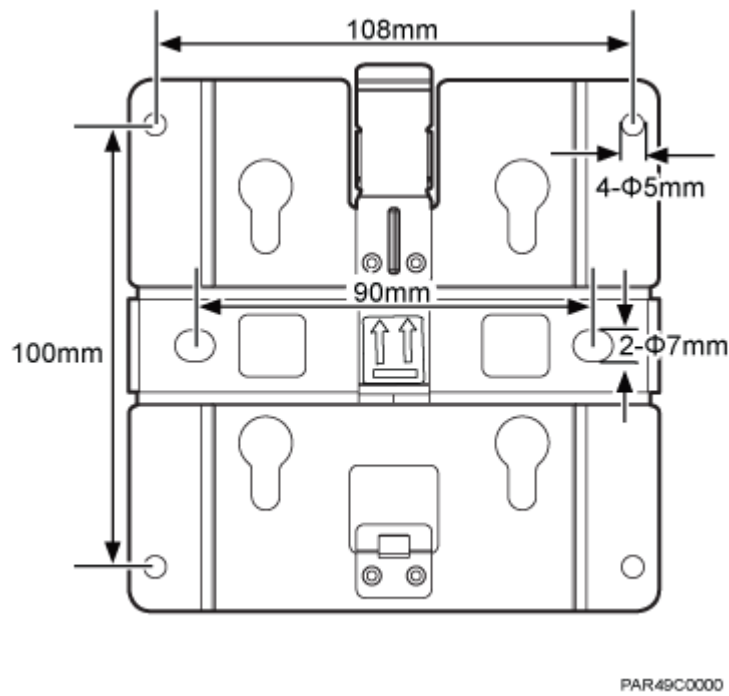
6.4.2 pRRU3901 Installed on a Wall

If the wall indoors has sufficient load bearing capacity and space, the pRRU3901 is recommended to install on a wall. If the wall cannot bear the capacity, choose an installation mode based on site requirements.

Context

⚠ **NOTICE**

This section only describes the procedure of installing the pRRU3901 on a wall without any other auxiliary devices. The installation procedure of other wall-mounted modes is similar to that of installing the pRRU3901 on a wall without auxiliary devices.

Procedure

Step 1 Determine the position for installing the pRRU3901 based on the construction blueprint and the space requirements.

☐**NOTE**

For pRRU3901 installation space requirements, see Space Requirements.

Step 2 Place the plate in the installation position against the wall. Then, level the plate and mark the two anchor points using a marker, as shown in **Figure 6-7**.

Figure 6-7 Anchor points of the pRRU3901 installation kits (unit: mm)

PAR49C0000
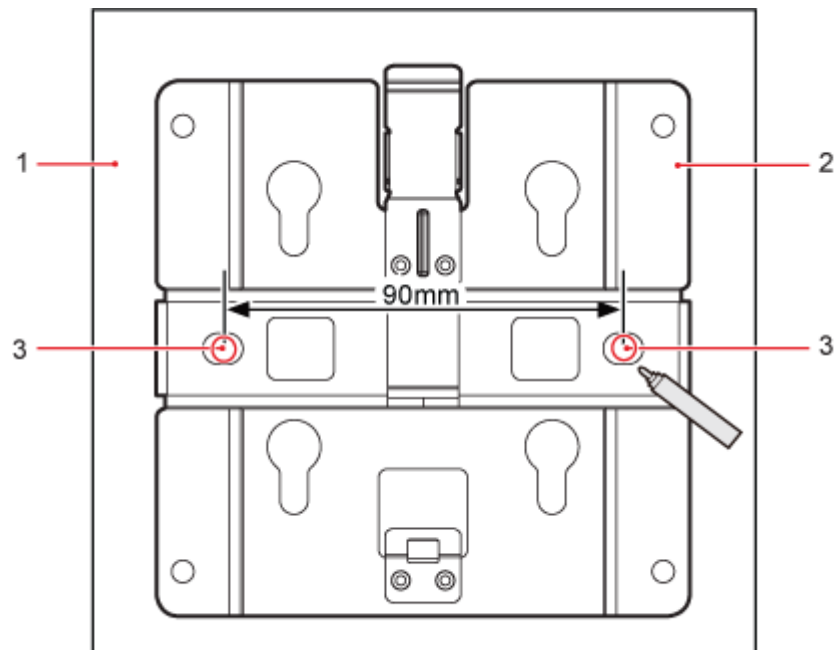
(1) Wall	(2) Plate	(3) Anchor point

⚠ **CAUTION**

To prevent inhalation or eye contact with dust, take adequate preventive measures when drilling holes.

Step 3 Use a hammer drill with a φ 8 bit to drill holes at the marked anchor points as shown in as shown in **Figure 6-8**. Use the cleaner to clean the dust inside and around the holes and measure the distance between them. If they are inaccurately positioned, re-measure and re-drill the holes. Then, use a rubber mallet to push the two plastic expansion sleeve into the holes.

Figure 6-8 Drilling holes and installing expansion bolts
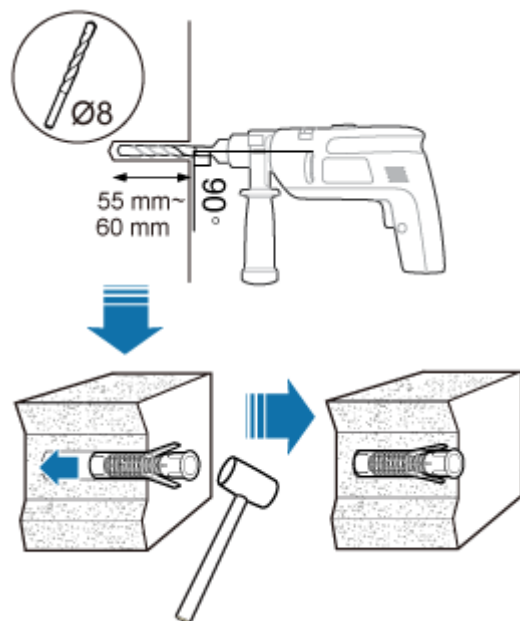
Step 4 Lead the M6x50 screw through the washer, and then through the drilling holes of the plate to the plastic expansion sleeve, and tighten the screw to a torque of 5 N•m, as shown in **Figure 6-9**.

Figure 6-9 Installing the plate
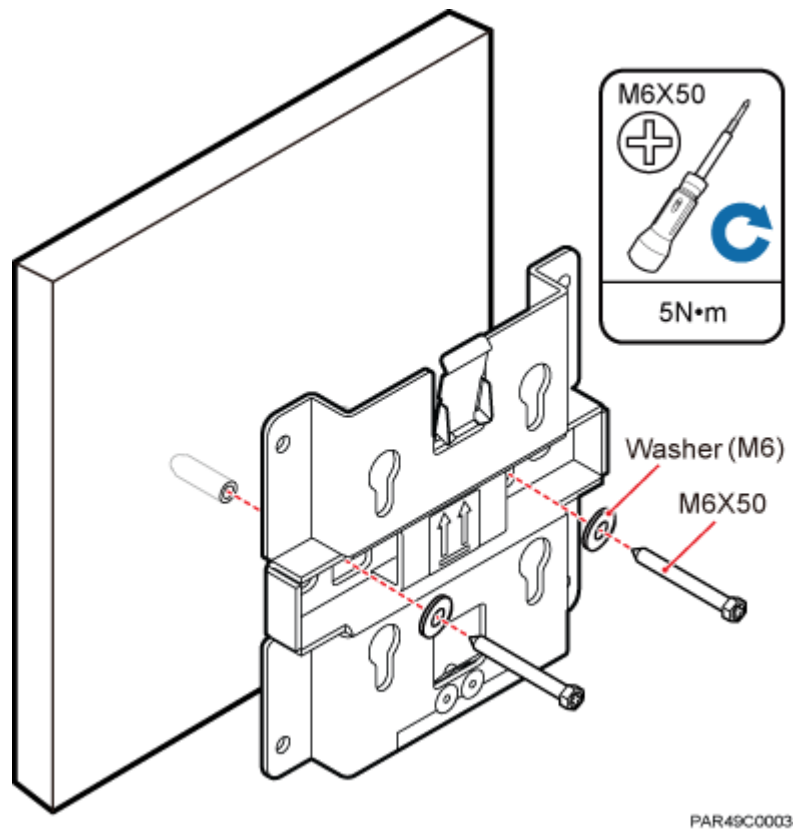
NOTE

> If the screws cannot be tightened using a Phillips screwdriver, use a hex key or an electric screwdriver to assist the installation.

Step 5 Fit the four hooks of the pRRU3901 into the installation kits, as shown in **Figure 6-10**. If the hooks are properly installed, a slight clack can be heard.

NOTE

> It is recommended that you observe the installation from one side of the pRRU3901 when inserting hooks into the kits.

Figure 6-10 Installing the pRRU3901 on a plate
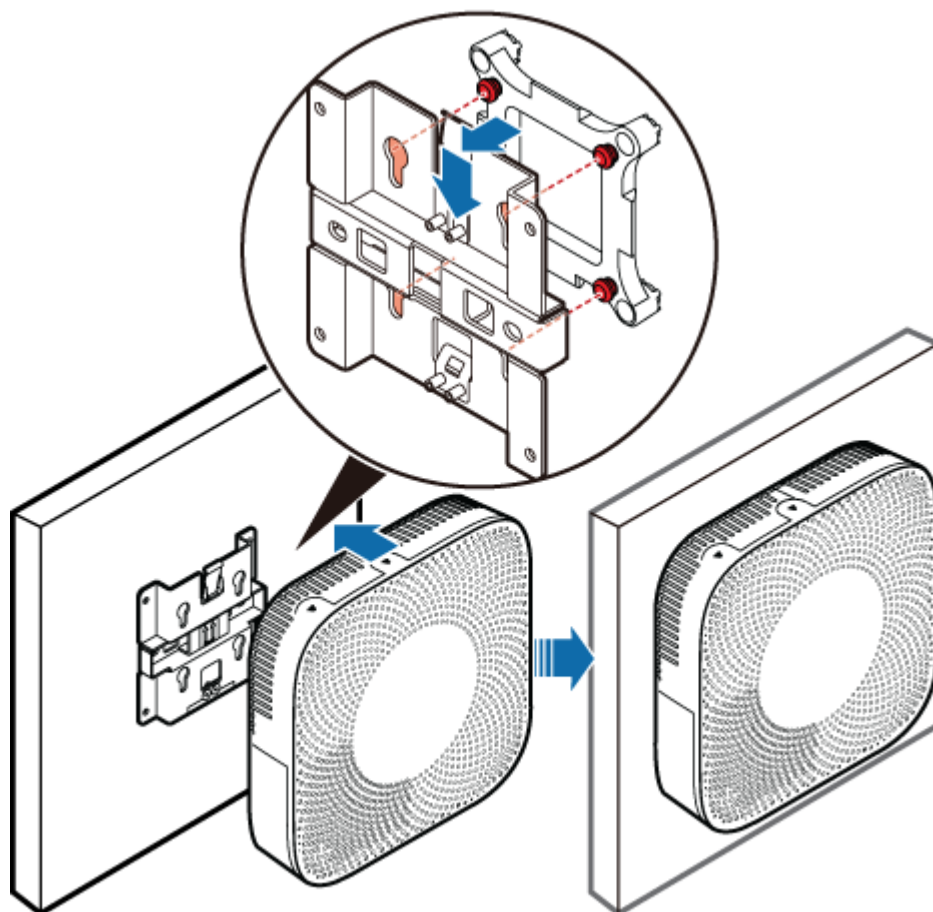
PAR49C0003

----End

6.4.3 pRRU3901 Installed on a Ceiling

This section describes the procedure of installing a pRRU3901 on the ceiling, such as the concrete ceiling, when the ceiling has sufficient load bearing capacity and installation space.

Context

⚠ NOTICE

If the pRRU3901 is installed on the ceiling, the temperature of the ceiling may increase by a maximum of 30 degrees. Therefore, whether a pRRU3901 can be installed on a ceiling depends on the ceiling material.

Procedure

Step 1 Determine the position for installing the pRRU3901 based on the construction blueprint and the space requirements.

📖**NOTE**

> For pRRU3901 installation space requirements, see Space Requirements.

Step 2 Place the plate in the installation position against the ceiling. Then, level the plate and mark the two anchor points using a marker, as shown in **Figure 6-11**.

Figure 6-11 Anchor points of the pRRU3901 installation kits (unit: mm)
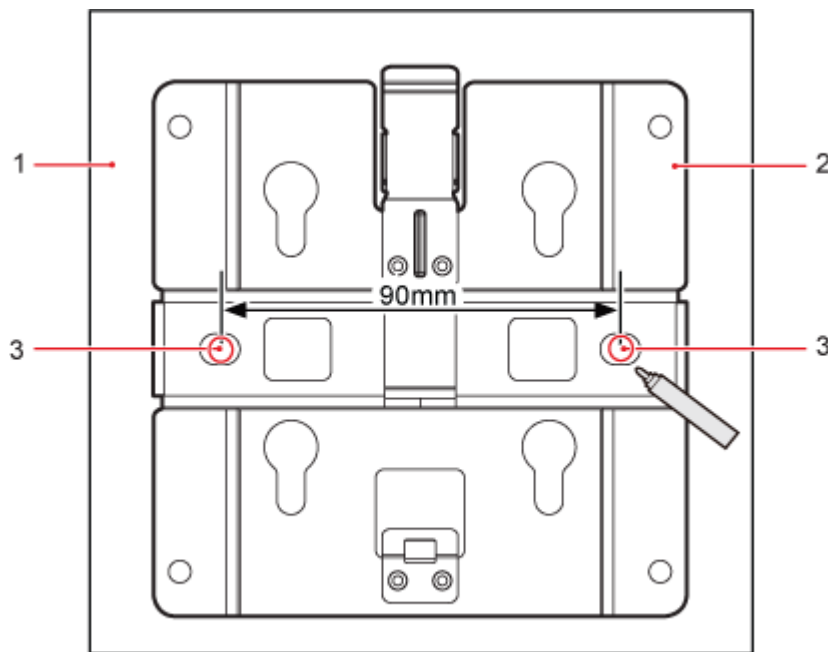
PAR49C0000

(1) Ceiling	(2) Plate	(3) Anchor point of the bolt

⚠️ **CAUTION**

To prevent inhalation or eye contact with dust, take adequate preventive measures when drilling holes.

Step 3 Use a hammer drill with a φ 8 bit to drill holes at the marked anchor points as shown in as shown in **Figure 6-12**. Use the cleaner to clean the dust inside and around the holes and measure the distance between them. If they are inaccurately positioned, re-measure and re-drill the holes. Then, use a rubber mallet to push the two plastic expansion sleeve into the holes.

Figure 6-12 Drilling holes and installing expansion bolts
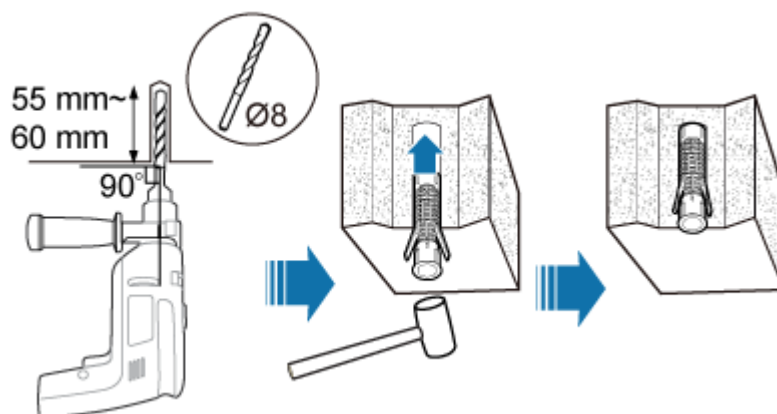
Step 4 Lead the M6x50 screw through the washer, and then through the drilling holes of the plate to the plastic expansion sleeve, and use a torque screwdriver to tighten the screw with a torque of 5 N•m, as shown in **Figure 6-13**.

Figure 6-13 Installing the plate
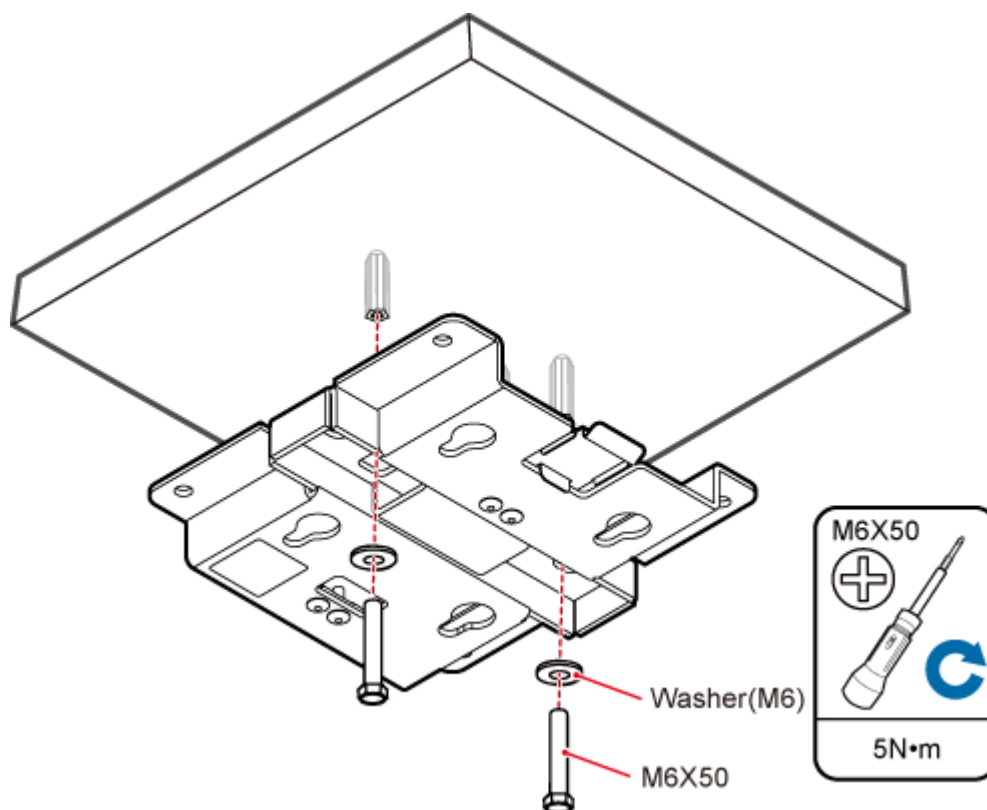
NOTE

> If the screws cannot be tightened using a Phillips screwdriver, use a hex key or an electric screwdriver to assist the installation.

Step 5 Fit the four hooks of the pRRU3901 into the installation kits, as shown in **Figure 6-14**. If the hooks are properly installed, a slight clack can be heard.

NOTE

> It is recommended that you observe the installation from one side of the pRRU3901 when inserting hooks into the kits.

Figure 6-14 Installing a pRRU3901

PAR49C0037
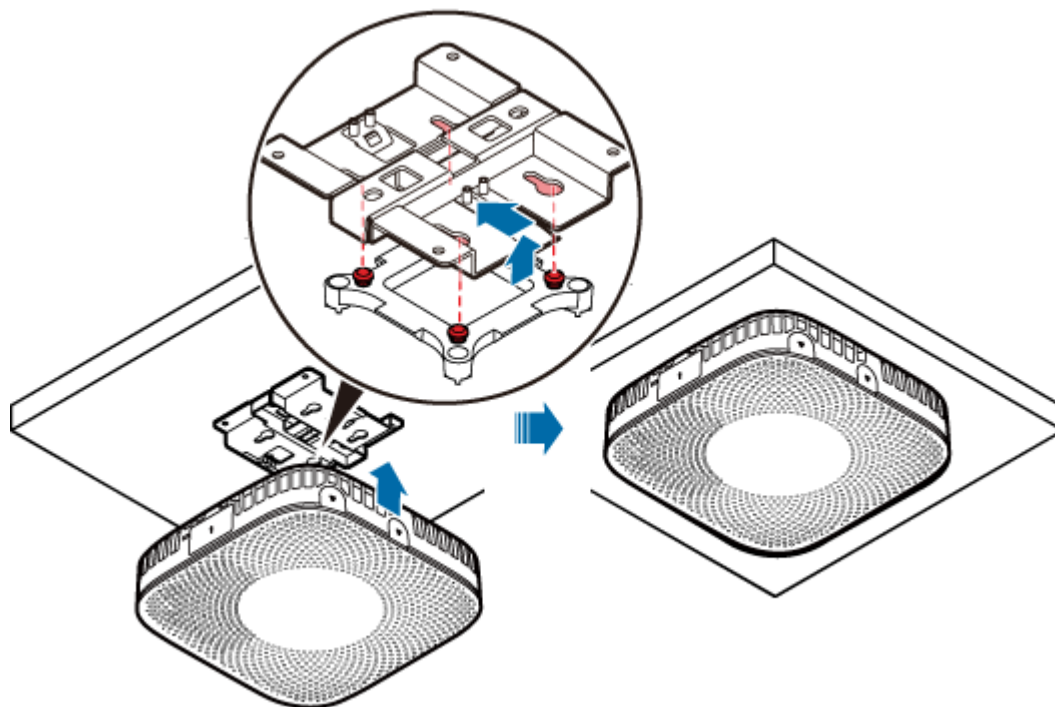
----End

6.4.4 pRRU3901 Installed on a Pole

A pRRU3901 can be installed on a metal pole indoors.

Procedure

Step 1 Determine the position for installing the pRRU3901 based on the construction blueprint and the space requirements.

☐**NOTE**

For pRRU3901 installation space requirements, see Space Requirements.

Step 2 If the diameter of the pole ranges from 30 mm to 70 mm, use the delivered V clamp, installation plate, and bolts to install the pRRU3901 on the pole. Lead the M6x80 bolt through the plate, and tighten the bolt to a torque of 5 N•m, as shown in **Figure 6-15**.

Figure 6-15 Securing the pRRU3901 installation kits on the metal pole
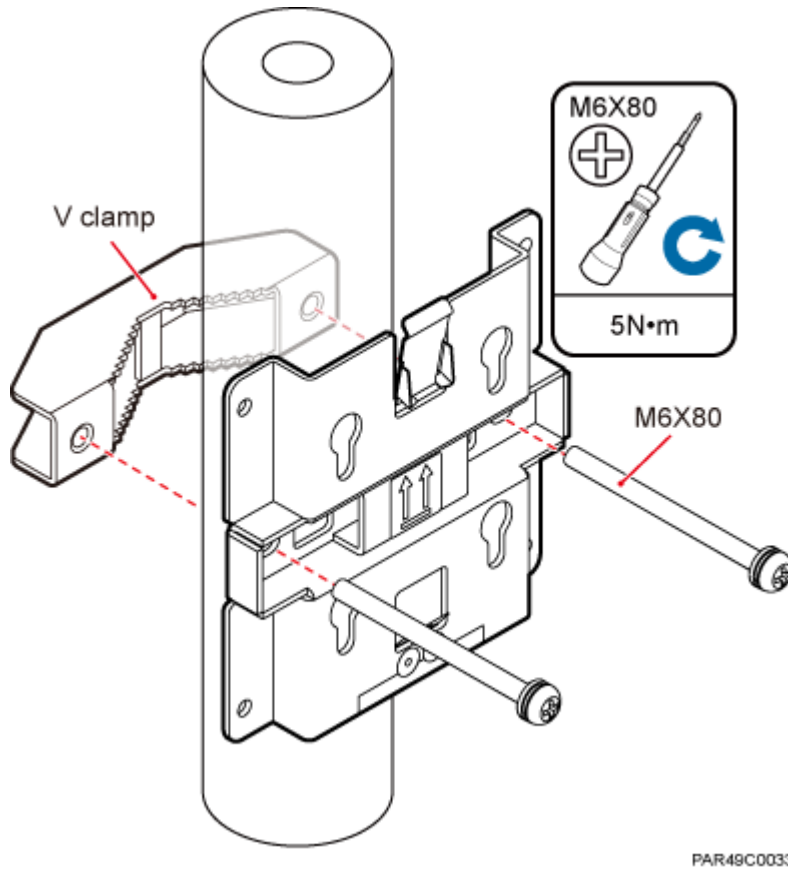
If the diameter of the pole is larger than 70 mm, use the hose clamp to install the plate on the pole. The hose clamp is prepared by customers. Tighten the bolt with a torque of 5 N•m, as shown in **Figure 6-16**.

Figure 6-16 Securing the pRRU3901 installation kits on the metal pole
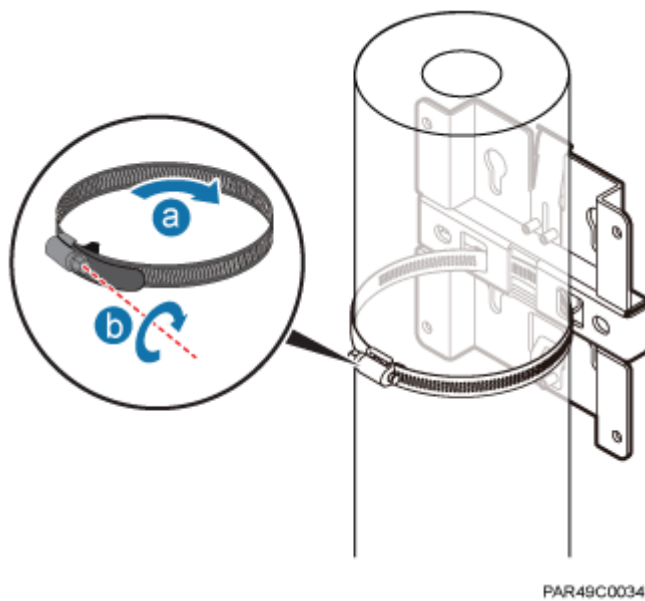
Step 3 Fit the four hooks of the pRRU3901 into the installation kits, as shown in **Figure 6-17**. If the hooks are properly installed, a slight clack can be heard.

❐**NOTE**

It is recommended that you observe the installation from one side of the pRRU3901 when inserting hooks into the kits.

Figure 6-17 Installing a pRRU3901

PAR49C0035
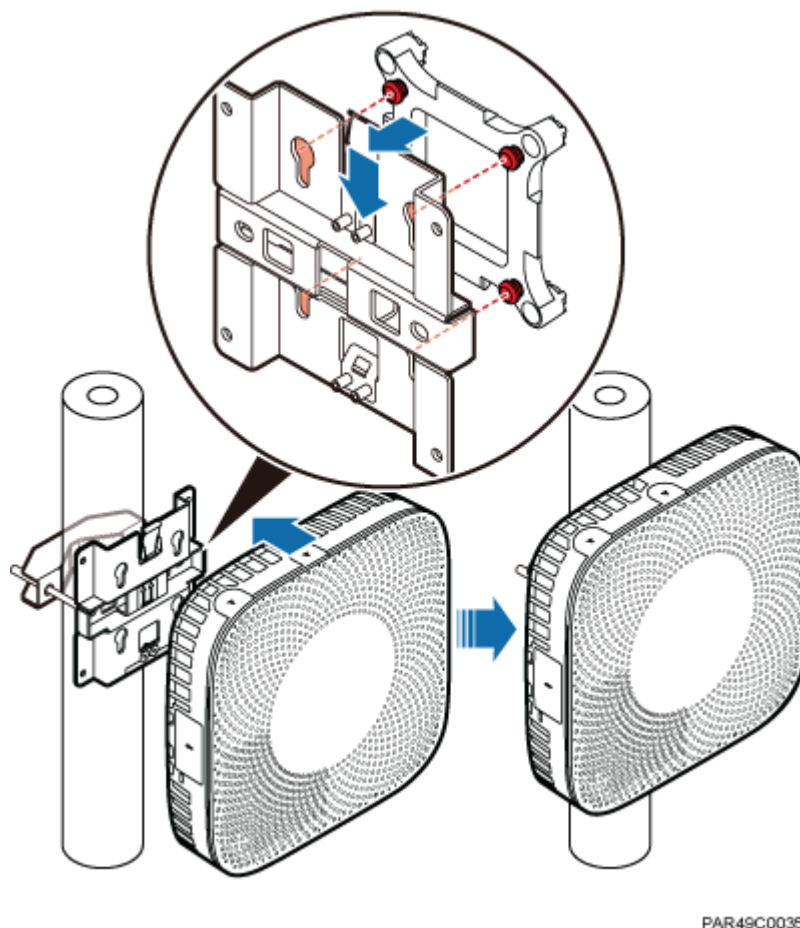
----End

6.4.5 pRRU3901 Installed on a Plate

If the plate on the ceiling has sufficient load bearing capacity and space installation, the pRRU3901 can be installed on the plate of the ceiling indoors.

Procedure

Step 1 Determine the position for installing the pRRU3901 based on the construction blueprint and the space requirements.

❐**NOTE**

For pRRU3901 installation space requirements, see Space Requirements.

Step 2 Place the plate in the installation position against the wall. Then, level the plate and mark the two anchor points using a marker, as shown in **Figure 6-18**.

Figure 6-18 Anchor points of the pRRU3901 installation kits (unit: mm)
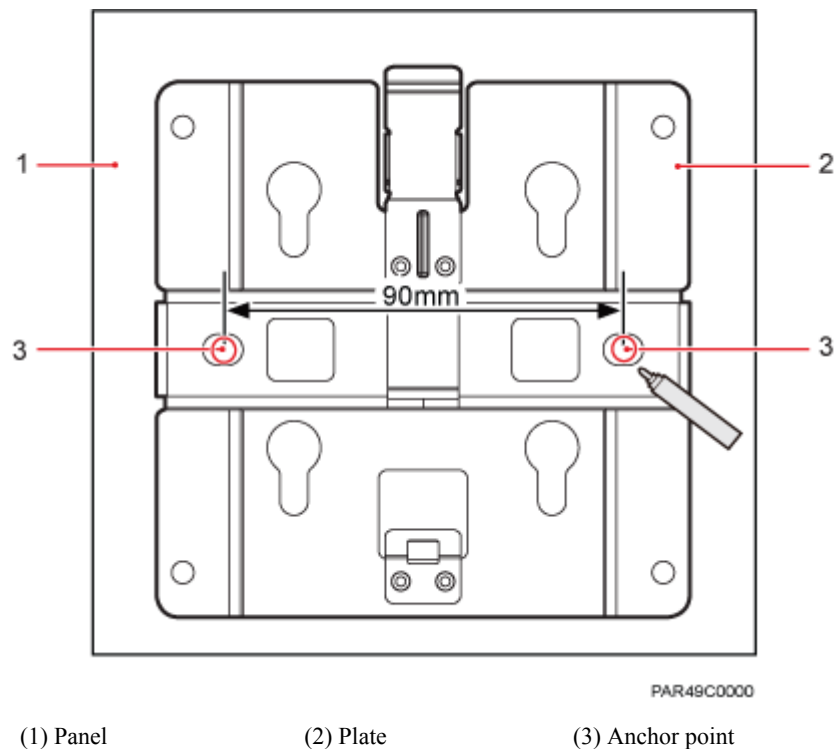
PAR49C0000

(1) Panel	(2) Plate	(3) Anchor point


⚠ **CAUTION**

To prevent inhalation or eye contact with dust, take adequate preventive measures when drilling holes.

**Step 3** Use a hammer drill with bit 8 to drill holes at the anchor points.

Step 4 Lead the bolt M6x80 through the panel and daughter board, and tighten the torque screwdriver to a torque of 5 N•m, as shown in **Figure 6-19**.

Figure 6-19 Installing the pRRU3901 installation kits
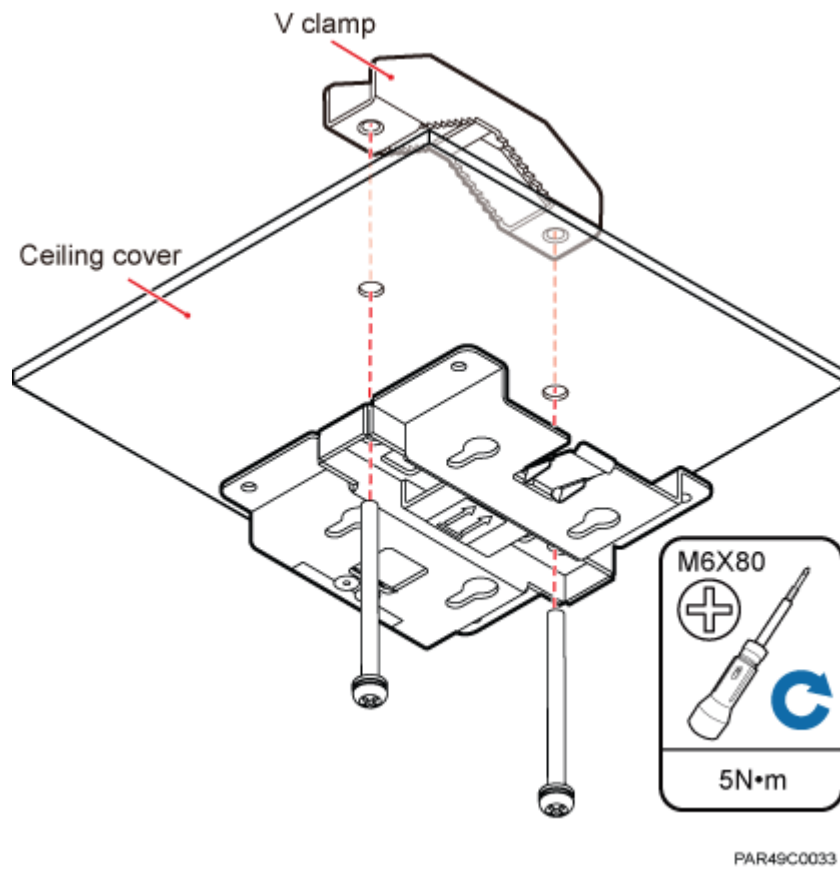
Step 5 Fit the four hooks of the pRRU3901 into the installation kits, as shown in **Figure 6-20**. If the hooks are properly installed, a slight clack can be heard.

📖**NOTE**

It is recommended that you observe the installation from one side of the pRRU3901 when inserting hooks into the kits.

Figure 6-20 Installing a pRRU3901
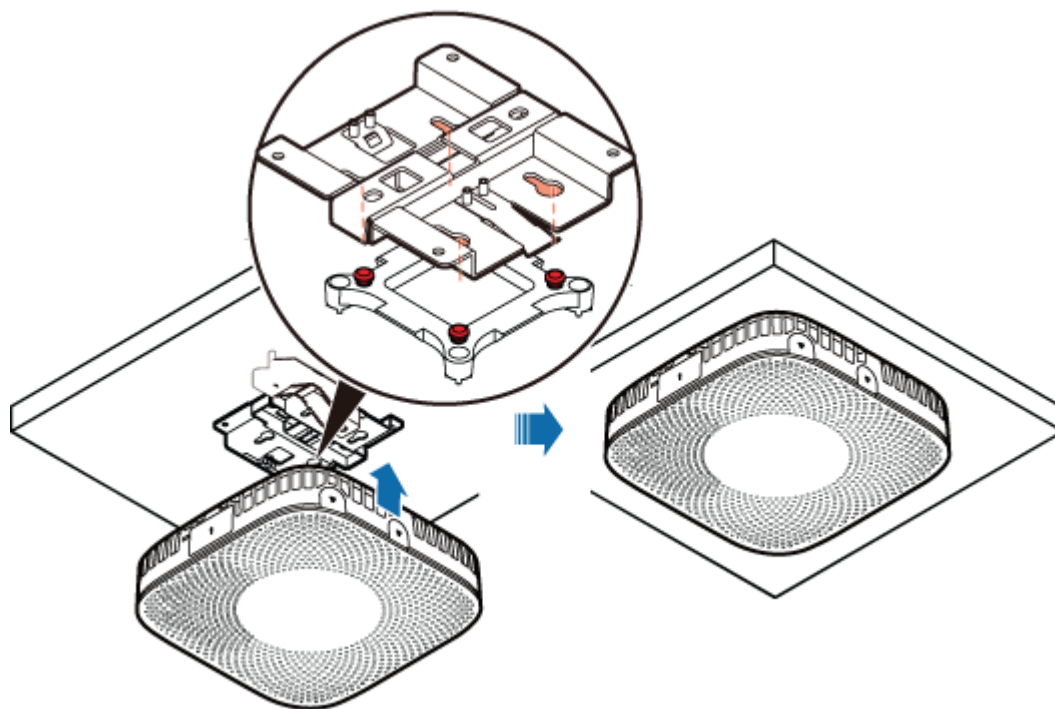
PAR49C0037

----End

6.4.6 pRRU3901 Installed on a Keel

If the ceiling cover cannot bear the pRRU3901, the pRRU3901 can be installed on the keel of a ceiling.

Context

Before installing the pRRU3901 on a keel, ensure that the keel is strong enough to bear the pRRU3901.

- The installation kits of the pRRU3901 can be installed on the keel of the following specifications: GBT 11981-2008, JIS A6517-2002, and ASTM C635 C635M-2007. The installation mode must depends on onsite requirements because there are various keels.

- This section describes the procedure of installing a pRRU3901 on the keel of JIS standard used in Japan. The procedure of installing a pRRU3901 on other keels is the same as that of installing a pRRU3901 on the keel of JIS standard.

Procedure

Step 1 Determine the position for installing the pRRU3901 based on the construction blueprint and the space requirements.

📖**NOTE**

For pRRU3901 installation space requirements, see Space Requirements.

Step 2 Lead the V clamp on across the keel, and mark the projective position on the cover with a marker, as shown in **Figure 6-21**.

**Figure 6-21** Anchor points on a plate (unit: mm)
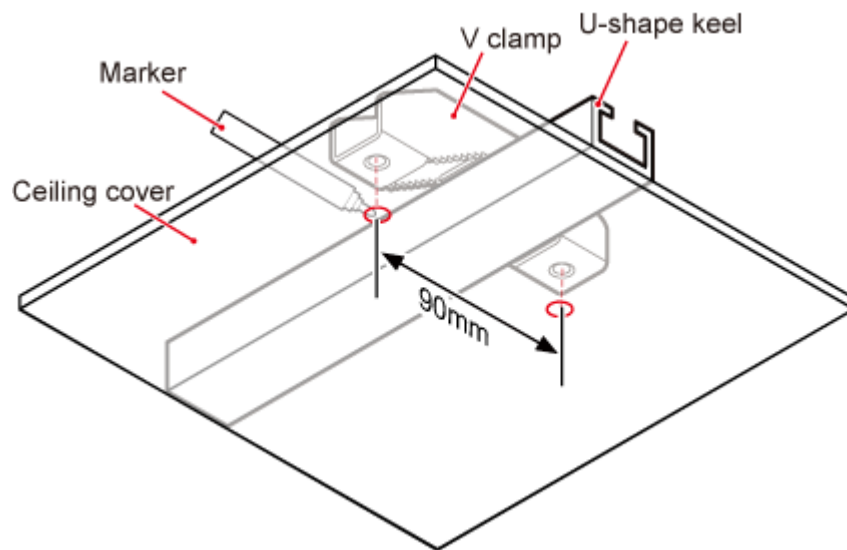
![CAUTION]

⚠ **CAUTION**

To prevent inhalation or eye contact with dust, take adequate preventive measures when drilling holes.

Step 3 Use a hammer drill to drill holes at the anchor points. You are advised to use the hammer drill Φ12.

Step 4 Lead the bolt M6x80 through the installation plate and ceiling cover, and then socket to tighten the bolt to a torque of 5 N•m, as shown in **Figure 6-22**.

Figure 6-22 Installing the pRRU3901 installation kits
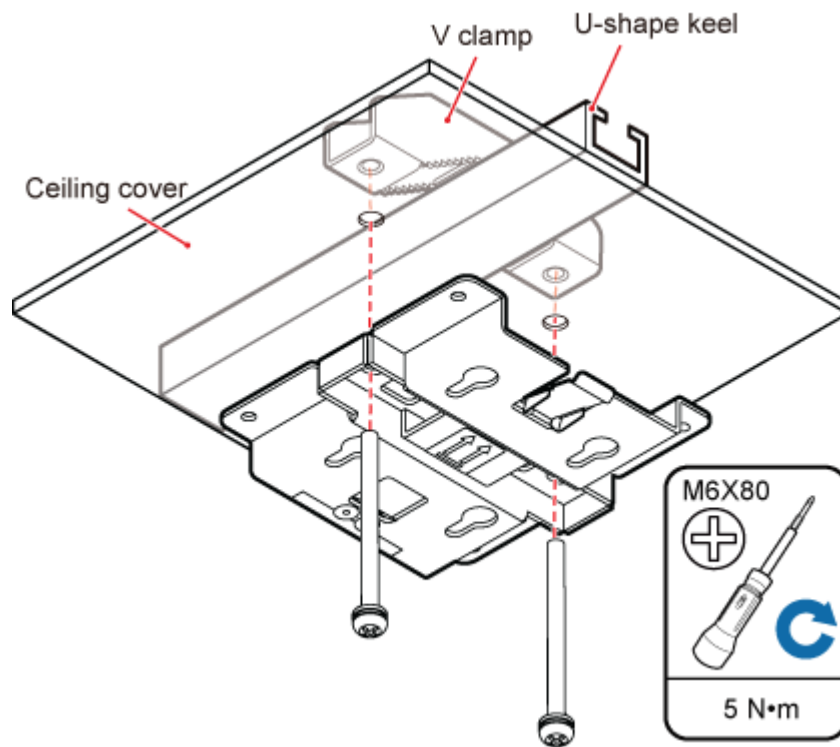
Step 5 Fit the four hooks of the pRRU3901 into the installation kits, as shown in **Figure 6-23**. If the hooks are properly installed, a slight clack can be heard.

📖**NOTE**

It is recommended that you observe the installation from one side of the pRRU3901 when inserting hooks into the kits.

Figure 6-23 Installing a pRRU3901
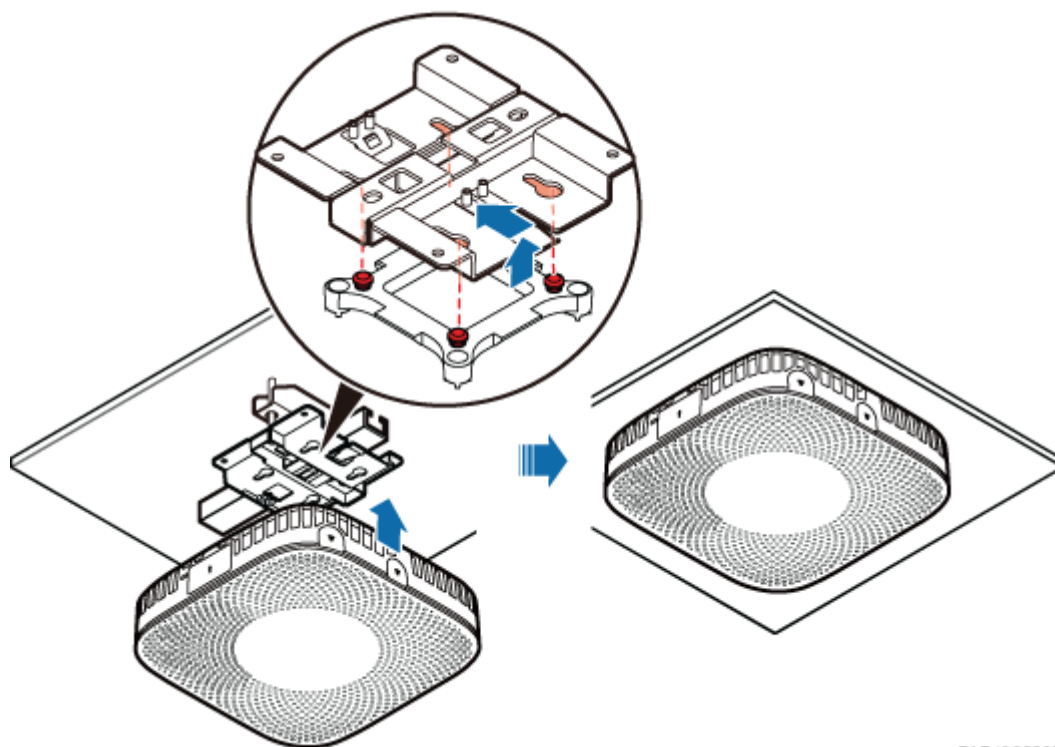
PAR49C0062

----End

6.5 Installing pRRU3901 Cables

This section describes the procedure of installing the pRRU3901 cables.

6.5.1 Requirements for Cable Layout

Cables must be routed according to the specified cabling requirements to prevent signal interference.

☐**NOTE**

  If certain cables listed below are not required, skip the requirements for routing these cables.

General Requirements for Cable Layout

中国标准

- 综合布线系统工程设计规范 GB 50311-2007
- 综合布线工程验收规范（含条文说明） GB 50312-2007
- 安全防范工程技术规范 GB 50348-2004
- 电子信息系统机房施工及验收规范 GB 50462-2008
- 智能建筑工程质量验收规范 GB 50339-2003
- 建筑电气工程施工质量验收规范 GB 50303-2002
- 通信管道工程施工及验收技术规范 GB 50374-2006

国际标准

- 用户建筑综合布 ISO／IEC 11801
- 商业建筑电信布线标准 EIA／TIA 568
- 商业建筑电信布线安装标准 EIA／TIA 569
- 商业建筑通信基础结构管理规范 EIA／TIA 606
- 商业建筑通信接地要求 EIA／TIA 60
- 信息系统通用布线标准 EN 50173
- 信息系统布线安装标准 EN 50174

Bending radius

- The bending radius of a 1/4" jumper, a 1/2" softer jumper, and a 1/2" common jumper must be longer than 35 mm, 50 mm, and 127 mm, respectively.
- The bending radius of a power cable is at least three times the diameter of the cable.
- The bending radius of a signal cable must be at least five times of the diameter of the cable.

Cable binding

- Cables of the same type are bound together.
- Different types of cables must be separately routed with a minimum spacing of 30 mm and cannot be entangled.
- The cables are bound tightly and neatly and the sheaths of the cables is intact.
- The cable ties face the same direction and all cable ties bound at similar positions must be in a straight line.
- The extra length of each indoor cable tie must be cut off. A slack of 5 mm is reserved for each outdoor cable tie before the extra length is cut off. All cut surfaces are without sharp edges.
- Labels or nameplates are attached to both ends, joints, or turns of cables after they are installed.

Safety

- Cables are placed away from sharp objects or wall burrs. If these positions are inevitable, protection pipes are required for the cables.
- Cables are routed away from heat sources, or heat-insulation materials are added between cables and heat sources.
- A clearance is reserved at turns of a cable or the position close to a device, facilitating cable and device maintenance. The recommended clearance is about 0.1 m.

Requirements for Special Cables

Ethernet Cable

- A maximum of 100 Ethernet cables can be bundled if no PVC pipes are used. If pipes are used, a maximum of 24 Ethernet cables can be led through a pipe. In this case, ensure that 1/3 space inside the pipes must be vacant.

6.5.2 pRRU3901 Cable List

This section describes pRRU3901 cable connections.

Table 6-7 lists pRRU3901 cables.

Table 6-7 List of pRRU3901 cables

Cable	One End		The Other End	
	Connector	**Connected to ...**	**Connector**	**Connected to ...**
Ethernet Cable	RJ45 connector	RHUB3908/ CPRI_E0~CP RI_E7 port	RJ45 connector	pRRU3901/ CPRI_E0~CPRI_ E1 port
	RJ45 connector	AC or Transmission port	RJ45 connector	pRRU3901/GE port
(Optional) pRRU3901 RF Jumper	SMA straight male connector	External antenna TX/ RX RF port on the pRRU3901	Based on the port model of the antenna system.	Antenna system

☐**NOTE**

● The Extender can be used to lengthen the distance between the RHUB3908 and the pRRU3901 connected using the Ethernet cable. If the Extender is used, the Ethernet cable is divided into two parts, one between the RHUB3908 and the Extender and the other between the Extender and the pRRU3901.

● The Ethernet cable used for connecting the GE port on the pRRU3901 to the AC transmission port is required only when the pRRU3901 have three transmission ports and is configured with the Wi-Fi daughter board.

6.5.3 Cable Connections

This section describes the cable connections for a single pRRU3901 and multiple pRRU3901s in UMTS, LTE FDD, UMTS+LTE FDD, LTE FDD+LTE FDD mode.

Before installing the pRRU3901 cables, you must be aware of the following information:

● The pRRU3901 can obtain power supply through the power over Ethernet (PoE).

● For external antennas corresponding to RF daughter board 1, the TX port and RX port are ANT0 and ANT1, respectively. For external antennas corresponding to RF daughter board 2, the TX port and RX port are ANT2 and ANT3, respectively. For external antennas corresponding to RF daughter board 3, the TX port and RX port are ANT4 and ANT5, respectively.

● The external antenna system is optional, and the pRRU3901 jumpers are not delivered. By default, the pRRU3901s are configured with built-in antennas. If the external antenna system is connected, the antenna system automatically switches to the external one. One end of the pRRU3901 RF jumper is the SMA male connector, which is connected to the external antenna TX/RX RF port on the pRRU3901. The other end of the pRRU3901 RF jumper is the type N male connector, which is connected to the antenna system. For the standard of the pRRU3901 RF jumper, see (Optional) pRRU3901 RF Jumper of the *LampSite Hardware Description*.

Figure 6-24 shows the cable connection when the pRRU3901 is configured with only one RF Daughter Board.

Figure 6-24 pRRU3901 cable connection (1)
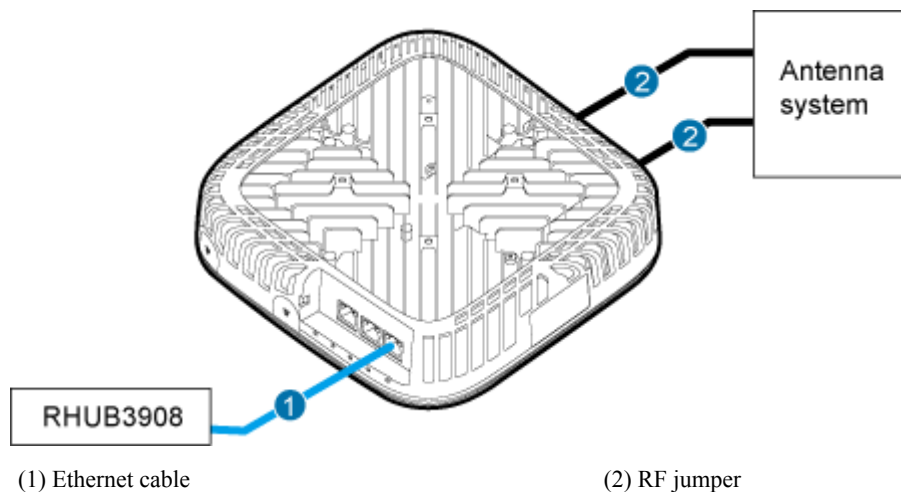
(1) Ethernet cable   (2) RF jumper

📖**NOTE**

- The Extender can be used to lengthen the distance between the RHUB3908 and the pRRU3901 connected using the Ethernet cable. If the Extender is used, the Ethernet cable is divided into two parts, one between the RHUB3908 and the Extender and the other between the Extender and the pRRU3901.

- When two Ethernet cables are used to transmit CPRI signals, connect one end of the cables to the CPRI_E0 and CPRI_E1 ports on the pRRU3901 panel and the other end to any two ports of CPRI_E0 to CPRI_E7 on the RHUB3908 panel. This document describes signal transmission using one Ethernet cable as an example.

Figure 6-25 shows the cable connection when the pRRU3901 is configured with two RF Daughter Boards.

Figure 6-25 pRRU3901 cable connection (2)
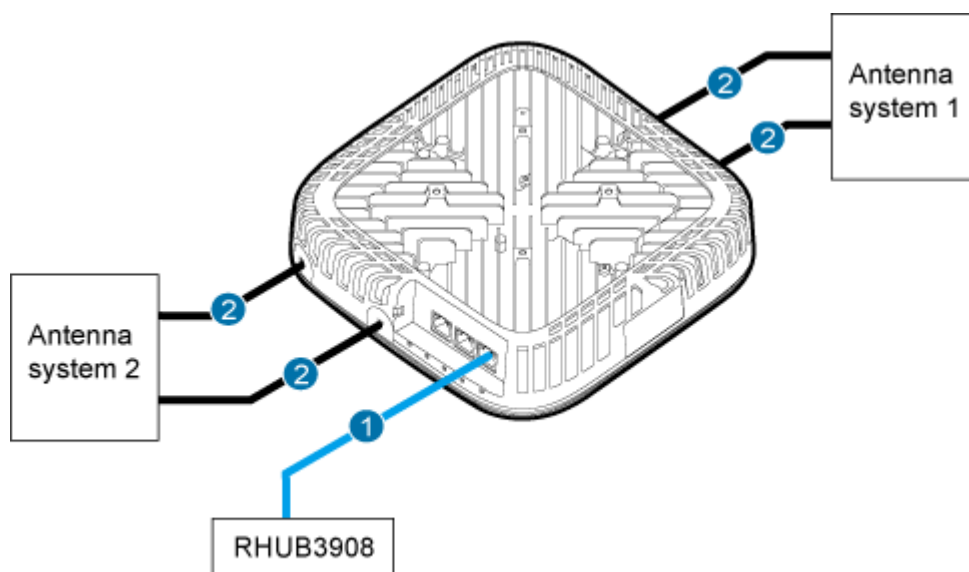
PAR49C0028

(1) Ethernet cable	(2) RF jumper

□NOTE

- The Extender can be used to lengthen the distance between the RHUB3908 and the pRRU3901 connected using the Ethernet cable. If the Extender is used, the Ethernet cable is divided into two parts, one between the RHUB3908 and the Extender and the other between the Extender and the pRRU3901.

- When two Ethernet cables are used to transmit CPRI signals, connect one end of the cables to the CPRI_E0 and CPRI_E1 ports on the pRRU3901 panel and the other end to any two ports of CPRI_E0 to CPRI_E7 on the RHUB3908 panel. This document describes signal transmission using one Ethernet cable as an example.

Figure 6-26 shows the cable connection when the pRRU3901 is configured with two RF Daughter Boards and one Wi-Fi daughter board.

Figure 6-26 pRRU3901 cable connection (3)
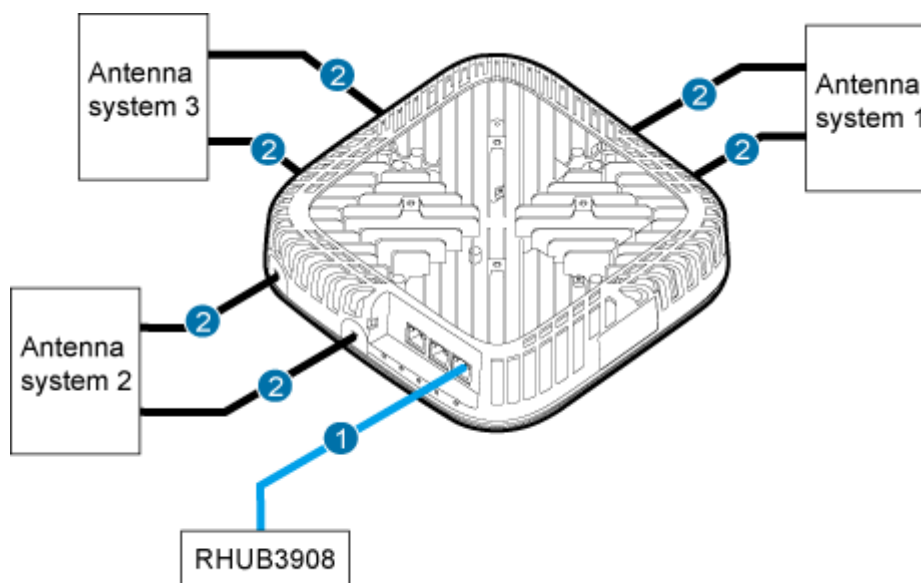
PAR49C0028

(1) Ethernet cable   (2) RF jumper

📖**NOTE**

- The Extender can be used to lengthen the distance between the RHUB3908 and the pRRU3901 connected using the Ethernet cable. If the Extender is used, the Ethernet cable is divided into two parts, one between the RHUB3908 and the Extender and the other between the Extender and the pRRU3901.

- When two Ethernet cables are used to transmit CPRI signals, connect one end of the cables to the CPRI_E0 and CPRI_E1 ports on the pRRU3901 panel and the other end to any two ports of CPRI_E0 to CPRI_E7 on the RHUB3908 panel. This document describes signal transmission using one Ethernet cable as an example.

6.5.4 Cable Connections (LTE TDD)

This section describes the cable connections for a single pRRU3901 and multiple pRRU3901s in LTE TDD mode.

Before installing the pRRU3901 cables, you must be aware of the following information:

- The pRRU3901 can obtain power supply through the power over Ethernet (PoE).

- For external antennas corresponding to RF daughter board 1, the TX port and RX port are ANT0 and ANT1, respectively. For external antennas corresponding to RF daughter board 2, the TX port and RX port are ANT2 and ANT3, respectively. For external antennas corresponding to RF daughter board 3, the TX port and RX port are ANT4 and ANT5, respectively.

- The external antenna system is optional, and the pRRU3901 jumpers are not delivered. By default, the pRRU3901s are configured with built-in antennas. If the external antenna system is connected, the antenna system automatically switches to the external one. One end of the pRRU3901 RF jumper is the SMA male connector, which is connected to the external antenna TX/RX RF port on the pRRU3901. The other end of the pRRU3901 RF jumper is the type N male connector, which is connected to the antenna system. For the standard of the pRRU3901 RF jumper, please see (Optional) pRRU RF Jumper of the *LampSite Hardware Description*.

Figure 6-27 shows the cable connection when the pRRU3901 is configured with only one RF Daughter Board.

Figure 6-27 pRRU3901 cable connection (1)

(1) Ethernet cable	(2) RF jumper
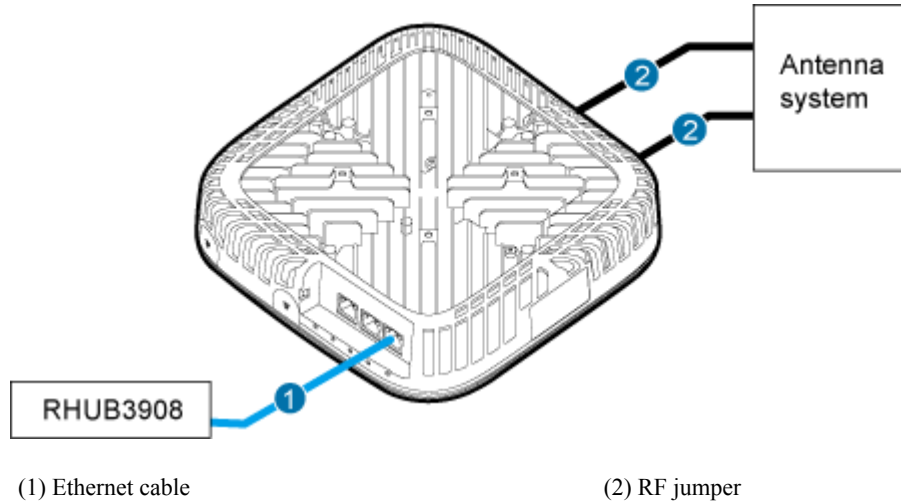
📖**NOTE**

> The Extender can be used to lengthen the distance between the RHUB and the pRRU connected using the Ethernet cable. If the Extender is used, the Ethernet cable is divided into two parts, one between the RHUB and the Extender and the other between the Extender and the pRRU.

6.5.5 pRRU3901 cable installation process

This section describes the process of installing pRRU3901 cables.

Figure 6-28 shows the process of installing pRRU3901 cables.

Figure 6-28 pRRU3901 cable installation process
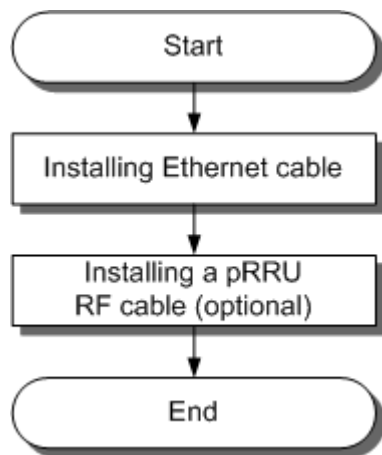
6.5.6 Installing an Ethernet Cable

This section describes how to install an Ethernet cable.

Prerequisites

- Ethernet cables are not delivered, and they must be prepared onsite. You need to use a network cable tester to test the Ethernet cable connection.

- The Ethernet cable must be of Category 5e (enhanced) or higher. In addition, its cross-sectional area must be 24 AWG or larger and frame spread rating must be CM or higher. With the internal PoE module providing power, the maximum length of an Ethernet cable is 100 m. With the Extender, the distance of the pRRU3901 and RHUB3908 can be extended by the Extender up to a total distance of 200 m.

Context

The Ethernet cable has the following functions:

- Provides power supply for the pRRU3901 when the cable connects the CPRI_E0 port on the pRRU3901 to the RHUB.

- Transmits CPRI signals between an RHUB3908 and a pRRU3901.

- Provides Wi-Fi services for the pRRU3901 when the cable connects the GE port on the pRRU3901 with three transmission ports to the AC.

Using the CPRI_E1 port on the pRRU3901 has the same Ethernet cable connection to the RHUB3908 as using the CPRI_E0 port. The following section describes the connection using the CPRI_E0 port.

Procedure

Step 1 Make the Ethernet cables.

1. Assemble an RJ45 connector and an Ethernet cable by following instructions in Assembling the Unshielded RJ45 Connector and the Ethernet Cable of *Installation Reference*.

   📖**NOTE**

   Follow pin assignment instructions described in section Ethernet Cable in *LampSite Hardware Description* to assemble the unshielded RJ45 connector and the Ethernet cable. Otherwise, the transmission signal quality deteriorates and CPRI links may be disconnected.

2. Check whether the made RJ45 connector is qualified by following instructions in Checking the Appearance of Metal Contact Strips.

3. To complete the assembly of the other end, repeat **Step 1.1** and **Step 1.2**.

4. Check whether the touch points on the connectors at both ends are normally conducted and well contacted and whether the connections are correct by following instructions in Testing the Connection of Assembled Cables of *Installation Reference*.

Step 2 Install an Ethernet cable between an RHUB3908 and a pRRU3901.

1. Remove the dustproof cap of the CPRI_E0 port on the pRRU3901.

2. Connect the RJ45 connector at one end of the Ethernet cable to the CPRI_E0 port on the pRRU3901 panel.

3. **Optional:** Connect the RJ45 connector at the other end of the Ethernet cable to the output port of the Extender. Then, connect the RJ45 connector at one end of another Ethernet cable to the input port of the Extender.

4. Connect the RJ45 connector at the other end of the Ethernet cable to any port ranging from CPRI_E0 to CPRI_E7 on the RHUB3908 panel based on the engineering design, as shown in **Figure 6-29**.

Step 3 **Optional:** Install the Ethernet cable between the pRRU3901 and the AC. This operation is required when the pRRU3901 with three transmission ports is configured with a Wi-Fi daughter board.

1. Remove the dustproof cap of the GE port on the pRRU3901.

2. Connect the RJ45 connector at one end of the Ethernet cable to the GE port on the pRRU3901 panel.

3. Connect the RJ45 connector at the other end of the Ethernet cable to the transmission port of the AC based on the engineering design, as shown in **Figure 6-29**.

Figure 6-29 Installing an Ethernet cable

| (1) Ethernet cable | (2) GE port on the pRRU3901 | (3) CPRI_E0 port on the pRRU3901 |
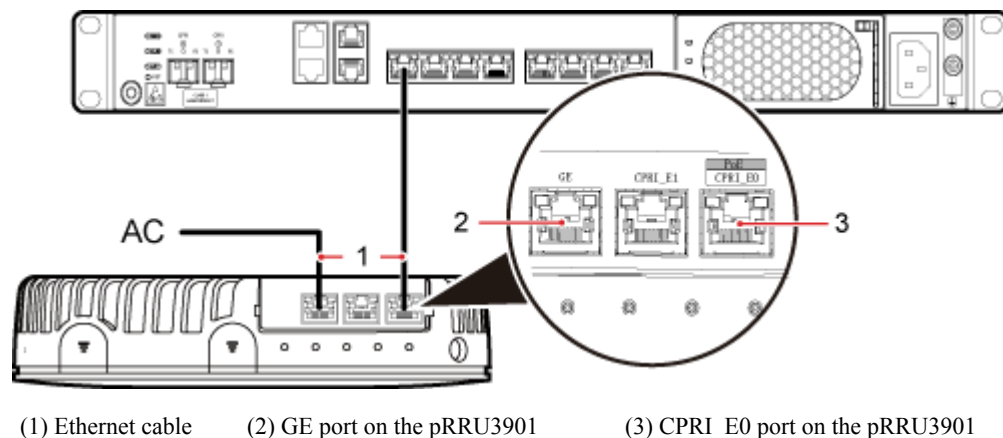
☐**NOTE**

The pRRU3901 can have two transmission ports plus one PWR port or three transmission ports (plus one PWR port or no PWR port), requiring the same installation operations. This section uses the pRRU3901 with three transmission ports no PWR port as an example.

----End

Follow-up Procedure

1. Route the cable, and then use a cable tie to bind the cable. For details, see **6.5.1 Requirements for Cable Layout**.

2. Label the installed cable. For details, see section **8.3 Attaching an L-Shaped Label**.

6.5.7 Installing pRRU3901 Jumpers (Optional)

pRRU3901 jumpers transmit radio frequency signals. One end of the jumper is the SMA straight male connector, and the other end is the type N connector.

Context

● If the RF jumper is provided by the customer, the jumper must not be lower than the RG316 specifications. In addition, the jumpers can be used after they are checked by Huawei engineers.

● pRRU3901s can be connected to external whip antennas or external remote antennas (through pRRU3901 RF jumpers). Whip antennas are delivered optionally. RF jumpers are not delivered.

Procedure

Step 1 Expose the SMA female connector by removing the pRRU3901 antenna housing, as shown in **Figure 6-30**.

Figure 6-30 Removing the pRRU3901 antenna housing
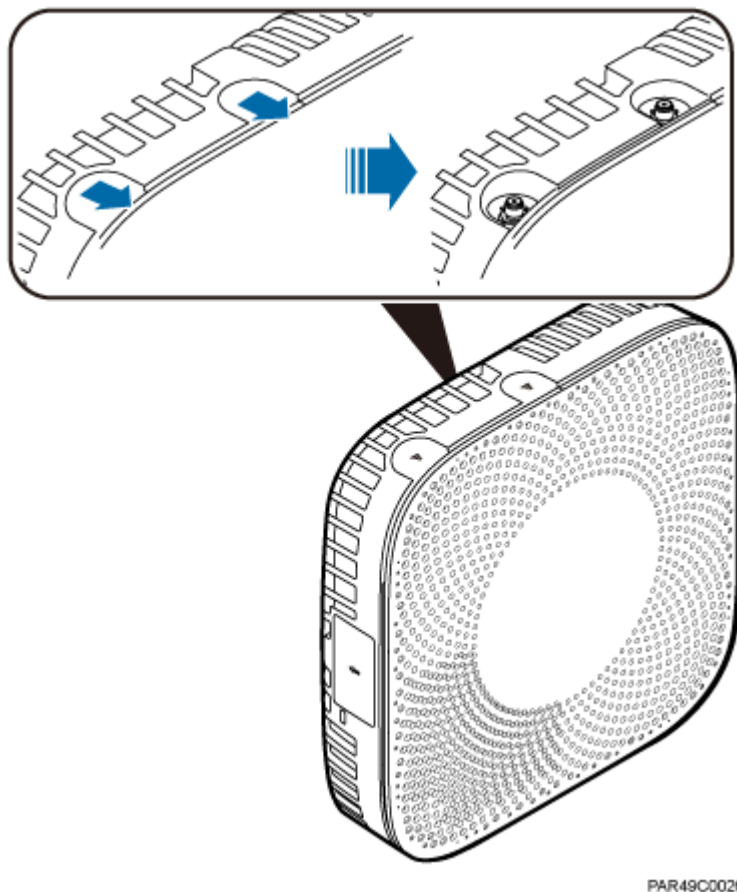
Step 2 Use a torque wrench with a torque of 0.6 N•m to connect the SMA straight male connector on a jumper to the ANT port on the pRRU3901 panel.

⚠ **NOTICE**

Tighten it with hands, and then use a torque wrench to tighten it with a rotational speed of less than or equal to 2.4 rpm to tighten it.

Step 3 Connect the type N female connector of the jumper to the type N male connector of the RF feeder connected to the built-in antenna.

> ⚠️ **NOTICE**
>
> Tighten the feeder close to the type N connector to ensure that the jumper is not tightened. In this way, the connectors on both ends of a jumper are not affected by the external force.

Figure 6-31 Installing jumpers between the pRRU3901 and external antennas
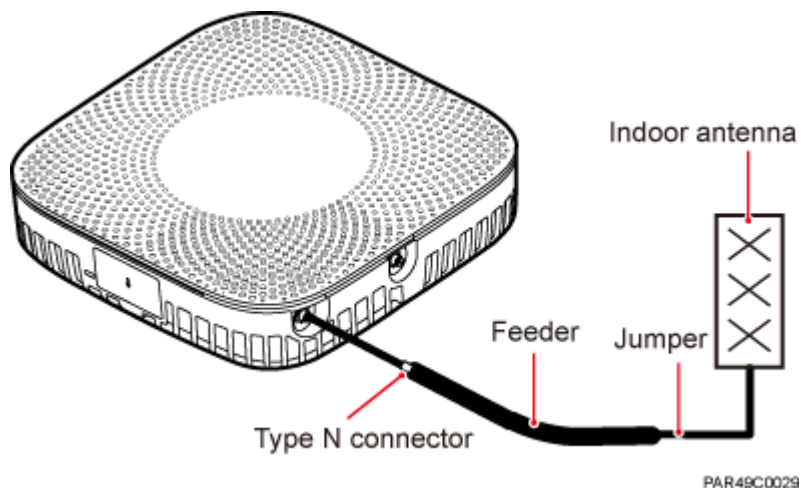
----End

Follow-up Procedure

1. Route the cable, and then use a cable tie to bind the cable. For details, see **6.5.1 Requirements for Cable Layout**.

2. Label the installed cable. For details, see section **8.3 Attaching an L-Shaped Label**.

6.6 Checking the pRRU3901 Hardware Installation

pRRU3901 hardware installation checking includes hardware and cable installation checking.

Table 6-8 lists the hardware installation checking items.

Table 6-8 Hardware installation checking list

No.	Item
1	Ensure that the pRRU3901 is not grouned.
2	The position for each device conforms to the engineering design and meets the space requirement.
3	Ensure that the pRRU3901 is properly installed.
4	The surface of the pRRU3901 is neat and clean. The external paint is intact. The labels, tags, and nameplates are correct, legible, and complete.

Table 6-9 lists the check items of the signal cable connection.

Table 6-9 Checklist for the signal cable connection

No.	Item
1	The connectors of the signal cables must securely connected.
2	The connectors of the signal cables are intact.
3	The signal cables are intact.
4	The cable ties are evenly spaced. The signal cables are bound neatly with cable ties to proper tightness, and arranged at even intervals in the same direction.
5	The extra length of the cable ties is cut and removed. The cut surfaces of the indoor cables are smooth and have no sharp edges.
6	The cable layout facilitates maintenance and expansion.
7	Correct and clear labels are attached to both ends of the signal cables.

Table 6-10 lists the checking items for other cable connections.

Table 6-10 Checklist for other cable connections

No.	Item
1	The connectors of the other cables must securely connected.
2	Labels on the cables are legible and bound based on the engineering requirements. The cables must be bound tightly and neatly. The sheaths of the cables must not be damaged.
3	Positions for routing the cables must meet requirements of the engineering design.

6.7 Powering on the pRRU3901

This section describes the power-on check on the pRRU3901 after the pRRU3901 hardware is installed and checked.

Procedure

Step 1 Power on the pRRU3901.

The pRRU3901 can be powered in PoE mode. The RHUB3908 adopts the PoE power supply to provide power for the pRRU3901 over the CPRI_E0 port.

Step 2 Power on the pRRU3901. Wait 3 to 5 minutes, check the status of the RUN indicator on the pRRU3901.

If the RUN Indicator...	Because...	Then...
Steady on	There is power input, but the board is faulty.	Power off the power supply, rectify the fault, and power on the pRRU3901.
Steady off	There is no power input, or an alarm is reported on the board.	Power off the power supply and check the power input. If no fault is found after the pRRU3901 is powered off, clear the fault on the board, and power on the pRRU3901.
On for 1s and off for 1s	The device works properly.	End this operation.
On for 0.125s and off for 0.125s	The software of the board is loading.	Wait five minutes for the software to be successfully loaded. If the software is loading five minutes later, shut off the power supply. Check whether the data configuration file is correct. After the fault is rectify, power on the pRRU3901 again.

----End

7 Installing the Extender (Optional)

This section describes the Extender installation process.

Context

When an RHUB3908 and a pRRU need extended install, use extender. With the Extender, the distance of the pRRU and RHUB3908 can be extended by the Extender up to a total distance of 200 m.

The Extender can be installed on a wall or ceiling in the same mode. This section describes wall-mounted installation as an example.

Only space above and under the Extender is required to be reserved when installing the Extender. The recommended space for installing the Extender is described as follows:

● At least 150 mm above the Extender is reserved for cabling.

● At least 150 mm under the Extender is reserved for cabling.

Procedure

Step 1 Use a marker to mark the two anchor points according to inter-hole spacing, as shown in **Figure 7-1**.

Figure 7-1 Marking anchor points
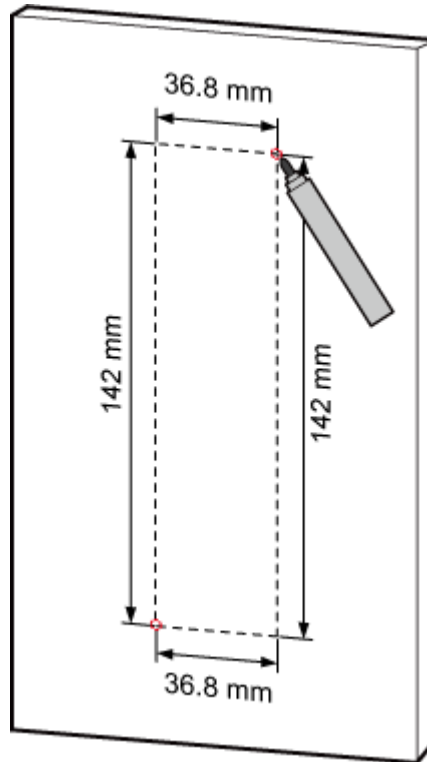
Step 2 Drill holes at the anchor points, and install expansion bolt assemblies, as shown in **Figure 7-2**. The diameter of the hole is 6 mm, and the depth is 25 mm to 30 mm.

Figure 7-2 Drilling holes and installing expansion bolts
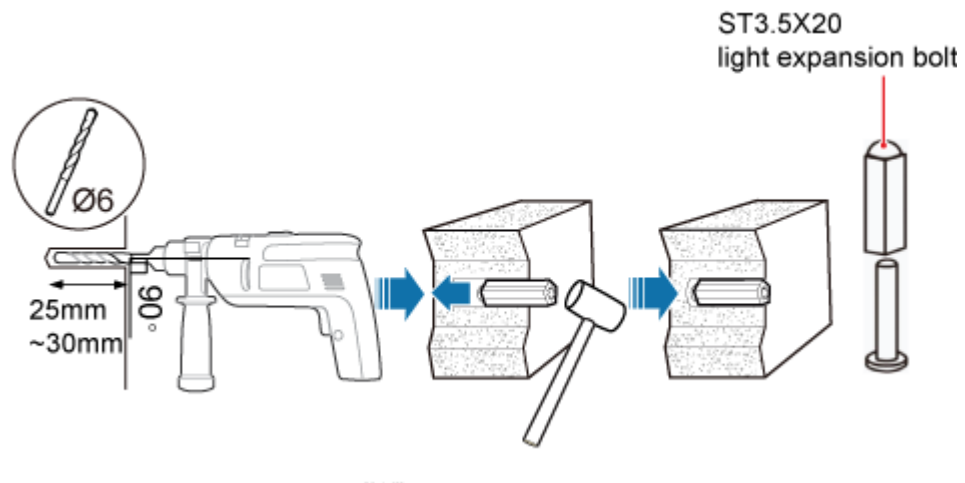
Step 3 Place the Extender in the corresponding position and use an M4 Phillips screwdriver to tighten the screws to 1.4 N•m, as shown in **Figure 7-3**.

Figure 7-3 Installing Extender
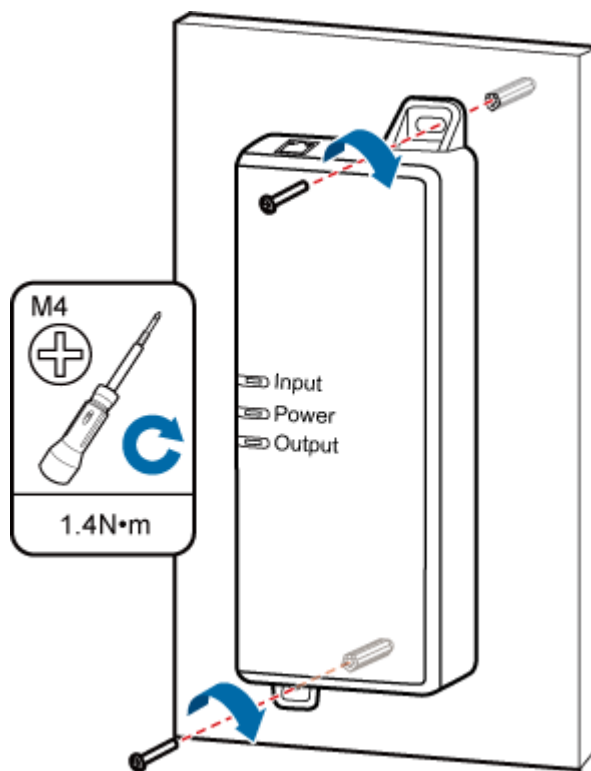
----**End**

8 Appendix

About This Chapter

This chapter describes reference information during installation.

8.1 MAC Collection Template

This section describes the MAC collection template for a pRRU3901 with three transmission ports.

The MAC collection template is used to record the installation position, MAC address of the site at the initial installation stage to facilitate subsequent commissioning and maintenance. **Table 8-1** shows the MAC collection template.

Table 8-1 MAC collection template

No.	Site Number	Site Name	WIFI MAC	Location Information
Sample	*01*	*pRRU3901*	CC53B5A735A0	*xx floor, xx building, xx mansion*
Note: The MAC collection template is essential to the engineering stage and subsequent maintenance, especially when multiple devices are installed at a short distance. This is because the template defines the radio network to access. Maintain this template with caution.				

8.2 LampSite Engineering Label

This section describes the content and presents the exterior of LampSite engineering labels.

Label Content

The LampSite engineering labels include the RHUB3908 power label, RHUB3908 ground label, RHUB3908 alarm or monitoring label, RHUB3908 optical transmission label, and RHUB3908 network transmission label, the pRRU3901 power label, pRRU3901 network transmission label, pRRU3901 antenna label. The engineering labels are used for LampSite units RHUB3908 and pRRU3901 for indoor scenarios.

By default, blank labels are delivered for LampSite and must be filled in onsite. **Table 8-2** describes the content of engineering labels.

Table 8-2 LampSite Engineering Label Content

NE	Label Content		Description	Corresponding port on the base station
RHUB3908	Power label	RHUB3908x PWR	Label for the RHUB3908x power cable. **x** specifies the number of RHUB3908s and cannot exceed the maximum RHUB3908 number supported by the networking.	**PWR**
	Ground label	RHUB3908x PGND	Label for the RHUB3908x ground cable. **x** specifies the number of RHUB3908s and cannot exceed the maximum RHUB3908 number supported by the networking.	⏚
	Alarm or monitoring label	RHUB3908x EXT_ALM	Label for the RHUB3908x alarm cable. **x** specifies the number of RHUB3908s and cannot exceed the maximum RHUB3908 number supported by the networking.	**EXT-ALM**

NE	Label Content		Description	Corresponding port on the base station
	Optical transmission label	RHUB3908x BBU/RHUB3908a/RHUB3908b	Label for the RHUB3908x CPRI cable. **x** specifies the number of RHUB3908s and cannot exceed the maximum RHUB3908 number supported by the networking. **a** can be set to **0** or **1**. **0** and **1** respectively correspond to CPRI0 port and CPRI1 port of the upper-level RHUB3908. **b** can be set to **0** or **1**. **0** and **1** respectively correspond to CPRI0 port and CPRI1 port of the lower-level RHUB3908.	**CPRI0** or **CPRI1**
	Network transmission label	RHUB3908x CPRI_Ea	Label for the RHUB3908x Ethernet cable. **x** specifies the number of RHUB3908s and cannot exceed the maximum RHUB3908 number supported by the networking. **a** can be set to **0** or **1**. **0** and **1** respectively correspond to CPRI_E0 port and CPRI_E1 port of the pRRU3901.	**CPRI_E0** to **CPRI_E7**
pRRU3901	Power label	pRRU3901y PWR	Label for the pRRU3901y power cable. **y** specifies the number of pRRU3901s and cannot exceed the maximum pRRU3901 number supported by the networking.	**PWR** or **CPRI_E0**

NE	Label Content		Description	Corresponding port on the base station
	Network transmission label	pRRU3901y CPRI_Ea	Label for the pRRU3901y Ethernet cable. ● **y** specifies the number of pRRU3901s and cannot exceed the maximum pRRU3901 number supported by the networking. ● **a** can be set to **0** to **7**, which respectively correspond to CPRI_E0 port to CPRI_E7 port of the RHUB3908.	**CPRI_E0** or **CPRI_E1**
	Antenna label	pRRU3901y ANTa	Label for the pRRU3901y RF Jumper. ● **y** specifies the number of pRRU3901s and cannot exceed the maximum pRRU3901 number supported by the networking. ● **a** can be set to **0** to **5**, which respectively correspond to **ANT0** port and **ANT5** port of the pRRU3901.	**ANT0** to **ANT5**

□NOTE

● In the label, **RHUB3908** and **pRRU3901** identify the specific LampSite NEs.

● If only one RHUB3908 is deployed, mark it as RHUB39080 on the label. If multiple RHUB3908s are deployed, mark them in ascending sequence, beginning with RHUB39080.

● If only one pRRU3901 is deployed, mark it as pRRU39010 on the label. If multiple pRRU3901s are deployed, mark them in ascending sequence, beginning with pRRU39010.

● For details about the maximum number of RHUB3908s and pRRU3901s in the LampSite solution, see *Typical Configurations* in *LampSite Technical Description*.

Label Structure

Using the RHUB3908 power label as an example, **Figure 8-1** shows the structure of a LampSite engineering label.

Figure 8-1 Label structure
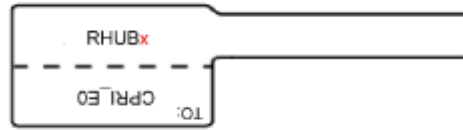
8.3 Attaching an L-Shaped Label

This section describes the procedure and precautions to be taken for attaching an L-shaped label.

Context

- This section applies to Huawei sign plate labels. If other engineering labels in accordance with local standards are used on site, follow the local standards for attaching sign plate labels.

- In the LampSite solution, blank L-Shaped engineering labels are delivered by default.

- The L-shaped label is usually used for the signal cable, E1/T1 cable, optical cable, and power cable. The description in this section takes the Ethernet cable in a base station as an example.

Procedure

Step 1 Obtain the engineering label to be attached from the whole set of the L-shaped engineering labels, as shown in **Figure 8-2**.

Figure 8-2 Engineering label to be attached
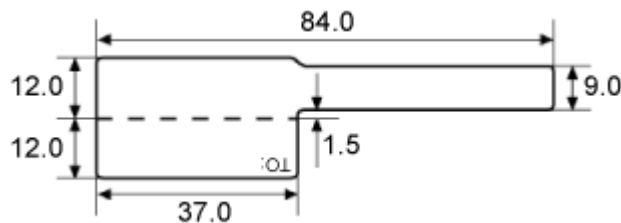
Step 2 Attach the long end of the engineering label to the cable in the position 20 mm away from the connector, and then turn over the long end along the adhesive face. Ensure that the edges of the turned-over engineering label are in a line, as shown in **Figure 8-3**.

📖**NOTE**

By default, the label is attached in the position 20 mm away from the connector. If required, you can change the position to make installation faster and more efficient. Consistency and neatness, however, must be maintained.

Step 3 Adhere the long end to the labeling area. Ensure that the spacing between the cable and the labeling area is 2 mm to 3 mm.

Figure 8-3 Adhering the long end to the labeling area
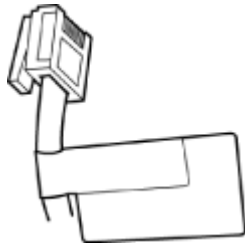
Step 4 Turn over the labeling area along the adhesive face from the bottom, and then finish attaching the engineering label, as shown in **Figure 8-4** and **Figure 8-5**. Ensure that the edges of the turned-over labeling area are in a line.

Figure 8-4 Turning over the labeling area along the adhesive face

Figure 8-5 Attached engineering label

Step 5 Fill in the attached blank label by referring to **8.2 LampSite Engineering Label**.

----End

pRRU3901, pRRU3901 AWS+PCS+WIFI

Issue: 02
Date: 2014.12.11

Huawei Technologies Co., Ltd.

Address: Huawei Industrial Base

Bantian, Longgang

Shenzhen 518129

People's Republic of China

Website: http://www.huawei.com

Email: support@huawei.com

1 Safety

About This Chapter

1.1 Health and Safety

1.1.1 Overview

Introduction

This section describes the safety precautions you must take before installing or maintaining Huawei equipment.

- To ensure safety of humans and the equipment, pay attention to the safety symbols on the equipment and all the safety instructions in this document.
- The "NOTE", "CAUTION", and "WARNING" marks in other documents do not represent all the safety instructions. They are only supplements to the safety instructions.
- Installation and maintenance personnel must understand basic safety precautions to avoid hazards.
- When operating Huawei equipment, in addition to following the general precautions in this document, follow the specific safety instructions given by Huawei.

- Only trained and qualified personnel are allowed to install, operate, and maintain Huawei equipment.

Local Safety Regulations

When operating Huawei equipment, you must follow the local laws and regulations. The safety instructions in this document are only supplements to the local laws and regulations.

General Requirements

To minimize risk of personal injury and damage to equipment, read and follow all the precautions in this document before performing any installation or maintenance.

Ensure that the instructions provided in this document are followed completely. This section also provides guidelines for selecting the measuring and testing devices.

Installation

- The device (or system) must be installed in an access-controlled location.
- The device can be mounted only on concrete or non-combustible surfaces.
- The device must be fixed securely on the floor or to other immovable objects such as walls and mounting racks before operation.
- When installing the unit, always make the ground connection first and disconnect it at the end.
- Tighten the thumbscrews by using a tool after initial installation and subsequent access to the panel.

Ground

- Do not damage the ground conductor or operate the device in the absence of a properly installed ground conductor. Conduct the electrical inspection carefully.
- The device (or system) must be connected permanently to the protection ground before an operation. The cross-sectional area of the protective ground conductor must be at least 16 mm^2.

Power Supply

- For DC-supplied model: The device applies to DC power source that complies with the Safety Extra-Low Voltage (SELV) requirements in IEC 60950-1 based safety standards.
- Prepared conductors are connected to the terminal block, and only the appropriate AWG/Type of wire is secured with the lug terminals.
- Short-circuit (overcurrent) protection of the device varies according to the building's installation. Ensure that a circuit breaker no larger than 125 VDC, 10 A (fuse) for DC supplied model is used on the phase conductors (all current-carrying conductors).
- For this device, a readily accessible disconnect device must be incorporated in the building installation wiring.

Human Safety

- Do not operate the device or cables during lightning strikes.
- To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telecommunication network voltage (TNV) circuits.

- Move or lift the chassis by holding its lower edge. Do not hold the handles on certain modules such as power supply, fans, and boards because they cannot support the weight of the device.
- Do not look into the optical port without eye protection.
- Do not wear jewelry or watches when you operate the device.

Operator

- Only qualified professional personnel are allowed to install, configure, operate, and disassemble the device.
- Only the personnel authenticated or authorized by Huawei are allowed to replace or change the device of the parts of the device (including the software).
- Any fault or error that might cause safety problems must be reported immediately to a supervisor.
- Only qualified personnel are allowed to remove or disable the safety facilities and to troubleshoot and maintain the device.

1.1.2 Electrical Safety

High Voltage

DANGER

The high voltage power supply provides power for the device operation. Direct or indirect contact (through damp objects) with high voltage and AC mains supply may result in fatal danger.

- During the installation of the AC power supply facility, follow the local safety regulations. The personnel who install the AC facility must be qualified to perform high voltage and AC operations.
- Do not wear conductive articles, such as watches, hand chains, bracelets, and rings during the operation.
- When water is found in the rack or the rack is damp, switch off the power supply immediately.
- When the operation is performed in a damp environment, make sure that the device is dry.

WARNING

Non-standard and improper high voltage operations may result in fire and electric shock. Therefore, you must abide by the local rules and regulations when bridging and wiring AC cables. Only qualified personnel are allowed to perform high voltage and AC operations.

WARNING

Before powering on a device, ground the device. Otherwise, personal injury or device damage may be caused by high leakage current.

Thunderstorm

DANGER

Do not perform any operation, including high voltage and AC operations, on a steel tower or mast during a thunderstorm.

Tools

WARNING

Dedicated tools must be used during high voltage and AC operations. Avoid using ordinary tools.

High Electrical Leakage

WARNING

Ground the device before powering it on. Otherwise, personal injury or device damage may be caused by high leakage current.

If a "high electrical leakage" tag is present on the power terminal of the device, you must ground the device before powering it on.

Power Cable

WARNING

Do not install or remove power cables when the device is on. Transient contact between the core of the power cable and the conductor may generate electric arcs or sparks, which may cause fire or hurt human eyes.

- Before installing or removing the power cable, turn off the power switch.
- Before connecting a power cable, check that the label on the power cable is correct.

⚠ **CAUTION**

● If the device is connected with the DC power supply, use 16 mm² minimum power supply cord.

● Use type H03VV-F or light PVC-sheathed flexible cord according to IEC 60227.

1.1.3 Inflammable Environment

Operating the electrical device in an inflammable environment can be fatal.

⚠ **DANGER**

Do not place the device in an environment that has inflammable and explosive air or gas. Do not perform any operation in this environment.

.

1.1.4 Working at Heights

⚠ **WARNING**

Avoid object falling when you work at heights.

When working at heights, fulfill the following requirements:

● Only trained personnel can work at heights.

● Prevent the devices and tools that you carry from falling down.

● Take safety and protection measures, for example, wear a helm and safety belt.

● Wear warm clothes when working at heights in a cold region.

● Before working at heights, check that all the lifting facilities are in good condition.

Hoisting Heavy Objects

⚠ **WARNING**

Do not walk below the cantilever or hoisted objects when heavy objects are being hoisted.

● Only trained and qualified personnel can perform hoisting operations.

● Before hoisting heavy objects, check that the hoisting tools are complete and in good condition.

- Before hoisting heavy objects, ensure that the hoisting tools are fixed to a secure object or wall with good weight capacity.
- Issue orders with short and explicit words to avoid misoperations.
- Ensure that the angle formed by two cables is not larger than 90 degrees. See Figure 1-1.

Figure 1-1 Hoisting heavy objects
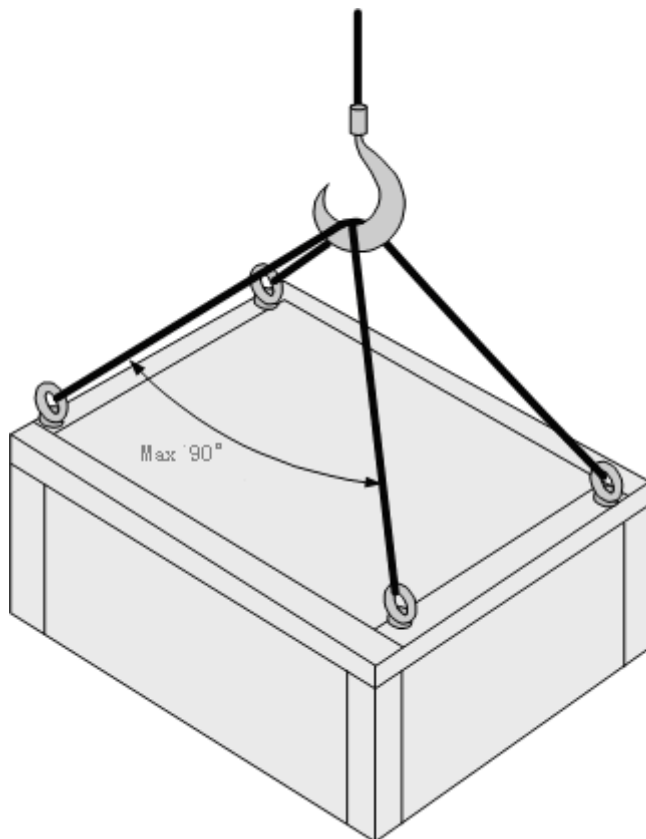
Using Ladders

Checking a Ladder

- Before using a ladder, check whether the ladder is damaged. Only the ladder in good condition can be used.
- Before using a ladder, you should know the maximum weight capacity of the ladder. Avoid overweighing the ladder.

Placing a Ladder

The recommended gradient of ladders is 75 degrees. You can measure the gradient of the ladder with an angle square or your arms. When using a ladder, ensure that the wider feet of the ladder are downward, or take protection measures for the ladder feet to prevent the ladder from sliding. Ensure that the ladder is placed securely.

Climbing Up a Ladder

When climbing up a ladder, note the following:

- Ensure that the center of gravity of your body does not deviate from the edges of the two long sides.
- To minimize the risk of falling, hold your balance on the ladder before any operation.
- Do not climb higher than the fourth rung of the ladder (counted from up to down).
- If you want to climb up a roof, ensure that the ladder top is at least one meter higher than the roof.

1.1.5 Mechanical Safety

Drilling Holes

WARNING

Do not drill the cabinet at will. Drilling holes without complying with the requirements affects the electromagnetic shielding performance of the cabinet and damages the cables inside the cabinet. In addition, if the scraps caused by drilling enter the cabinet, the printed circuit boards (PCBs) may be short circuited.

- Before you drill a hole in the cabinet, wear insulated gloves and remove the internal cables from the cabinet.
- Wear an eye protector when drilling holes. This is to prevent your eyes from being injured by the splashing metal scraps.
- Ensure that the scraps caused by drilling do not enter the cabinet.
- Drilling holes without complying with the requirements affects the electromagnetic shielding performance of the cabinet.
- After drilling, clean the metal scraps immediately.

Sharp Objects

WARNING

Before you hold or carry a device, wear protective gloves to avoid getting injured by sharp edges of the device.

Lifting Heavy Objects

WARNING

When heavy objects are being lifted, do not stand or walk under the cantilever or the lifted object.

1.1.6 Bundling Signal Cables

CAUTION

- Do not bundle signal cables with high current cables or high voltage cables.
- Maintain a minimum space of 150 mm between adjacent ties.

1.2 Equipment Safety

1.2.1 Electricity Safety

Thunderstorm

CAUTION

During thunderstorms, the electromagnetic field generated in the thunderstorm area may damage the electronic parts. To prevent damage to the device during lightning, ground the device properly.

High Electrical Leakage

CAUTION

If the "high electrical leakage" tag is present on the power terminal of the device, you must ground the device before powering it on.

Fuse

 WARNING

If a fuse is to be replaced, the new fuse must be of the same type and specifications.

Table 1-1 lists the fuses that affect the safety of the device (or system). Use fuses according to this list.

Table 1-1 Fuse description

Position	Manufacturer	Type	Rating
Fuse （F7000）on pRRU3901 19040112	LITTELFUSE INC	0451010.MRL	125VAC/DC,10 A
	CONQUER ELECTRONICS CO LTD	SEF010	125VAC/DC,10 A
	BEL FUSE INC	SSQ10	125VAC/86 VDC, 10 A
Fuse （F7001）on pRRU3901 19040110	LITTELFUSE INC	0452004.MRL	125VAC/DC, 4 A
	CONQUER ELECTRONICS CO LTD	SET004	125VAC, 32 VDC, 4 A
	BEL FUSE INC	SST4	125VAC, 4 A

1.2.2 Electrostatic Discharge

 CAUTION

The static electricity generated by human bodies may damage the electrostatic-sensitive components on boards, for example, the large-scale integrated (LSI) circuits.

Human body movement, friction between human bodies and clothes, friction between shoes and floors, or handling of plastic articles causes static electromagnetic fields on human bodies. These static electromagnetic fields cannot be eliminated until the static is discharged.

To prevent electrostatic-sensitive components from being damaged by the static on human bodies, you must wear a well-grounded ESD wrist strap when touching the device or handling boards or application-specific integrated circuits (ASICs).

Figure 1-2 shows how to wear an ESD wrist strap.

Figure 1-2 Wearing an ESD wrist strap
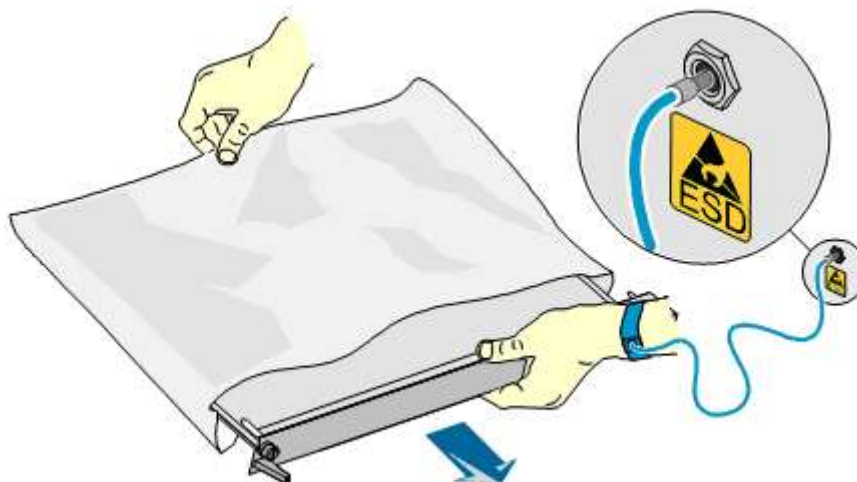
1.2.3 Installing and Removing a Board

⚠ **CAUTION**

When installing a board, use proper force to prevent the pins on the backplane from being leaned.

When installing or removing a board, note the following:

● Insert the board along the guide rails.

● Prevent the surface of a board from contacting the surface of another board. This is to prevent the boards from being short-circuited or scratched.

● To prevent electrostatic-sensitive devices from being damaged by the ESD, do not touch the circuits, components, connectors, or connection slots on boards.

1.2.4 Laying Cables

When the temperature is very low, violent strike or vibration may damage the cable sheathing. To ensure safety, comply with the following requirements:

● Cables can be laid or installed only when the temperature is higher than 0℃.

● Before laying cables which have been stored in a temperature lower than 0℃, move the cables to an environment of the ambient temperature and store them at the ambient temperature for at least 24 hours.

● Handle cables with caution, especially at a low temperature. Do not drop the cables directly from the vehicle.

1.3 Electromagnetic Field Exposure

Introduction

The Base Transceiver Station (BTS) emits Radio Frequency (RF) radiation. Follow the local safety regulations when installing and operating the BTS to avoid radiation hazard.

Location of Base Station Antennas

Base station antennas, the source of the radiation, are usually mounted:

- On freestanding towers, with a height up to 30 m
- On a tower on the top of buildings
- To the side of buildings, on rare occasions

Generally, the antenna cannot be located in a position lower than 10 m. The energy usually forms a horizontal main beam and is slightly tilted downwards. The remaining energy forms into weaker beams on both sides of the main beam. The main beam, however, does not reach the ground if the antenna is around 50–200 m away from the ground.

The highest level of emission would be expected in close vicinity of the antenna and in line of sight to the antenna.

Exclusion Zones

The requirements for exclusion zones are as follows:

- The antenna should be properly located to prevent the public from accessing the area where the RF radiation exceeds the previously mentioned limits.
- If areas with excessive RF radiation are accessible to the operation and maintenance (O&M) personnel, ensure that they know the source of radiation and can power off or shut down the transmitters before entering high radiation areas. In addition, such areas must be confined within a distance of 10 m from the antennas.
- Each exclusion zone should be defined by a physical barrier and by a recognizable sign warning the public or O&M personnel.

Guidelines on Choosing Antenna Sites

The guidelines on choosing the antenna sites are as follows:

- For roof-mounted antennas, raise the antennas above the height of the personnel who may have to work on the rooftop.
- For roof-mounted antennas, keep the transmitter antennas away from the areas accessible to the public, such as roof access points, telephone service points, and HVAC devices.
- For roof-mounted directional antennas, place the antennas near the periphery, and do not make the antennas face the building.
- Consider the trade-off between large aperture antennas (lower maximum RF) and small aperture antennas (lower visual impact).
- Keep higher-power antennas away from accessible areas.
- Keep the antennas in a site that is far away from urban areas, though this may contradict the coverage area requirements.

- Exercise extra caution when designing co-location sites, that is, antennas owned by different companies are located in the same site or are co-sited. This applies particularly to sites that include high-power broadcast (FM/TV) antennas. Local zone often favors co-location, but co-location may cause safety problems.
- Take special precautions for antenna sites near hospital and schools.

Location of BTS

The BTS is shielded from RF radiation hazards. The device has been tested to comply with the radioactive spurious emission requirements of international standards or local regulations. Therefore, the BTS under normal operating conditions does not cause danger to the public and O&M engineers. However, the limits for RF radiation might be exceeded due to faulty antenna cables or for other causes.

- BTS sites shall not be accessible to the public. Only authorized and trained personnel can access BTS sites or equipment rooms.
- A sign of excessive RF radiation must be present on the doors of the sites or equipment rooms to warn the personnel inside the site or equipment room of excessive RF radiation.
- BTS sites must be regularly monitored and inspected after installation.

Prediction of the Exposure to Electromagnetic Fields

This section provides a theoretical approach to calculate possible exposure to electromagnetic radiation around a BTS antenna. Precise statements are possible either with measurements or complex calculations considering the complexity of the environment, such as soil conditions, nearby buildings and other obstacles. The complexity may cause reflection, deflection, and scattering of electromagnetic fields.

The maximum output power (given in EIRP) of a BTS is usually limited by license conditions of the network operator.

A rough estimation of the expected exposure in power flux density on a given point can be made with the following equation:

$S = (P(W) \times G_{numeric})/(4 \times r^2(m) \times \pi)$

Where,

P = Maximum output power at antenna port of the BTS in W

$G_{numeric}$ = Numeric gain (see below)

r = Distance between the antenna and the point of exposure in meters

For the calculation of the $G_{numeric}$,

$G_{numeric} = 10^{GdB/10}$

$GdB = G_{antenna}(dB) - B_{cable}(dB) - B_{vertical\text{-}attenutation}(dB) - B_{horizontal\text{-}attenuation}(dB)$

B = attenuation in dB
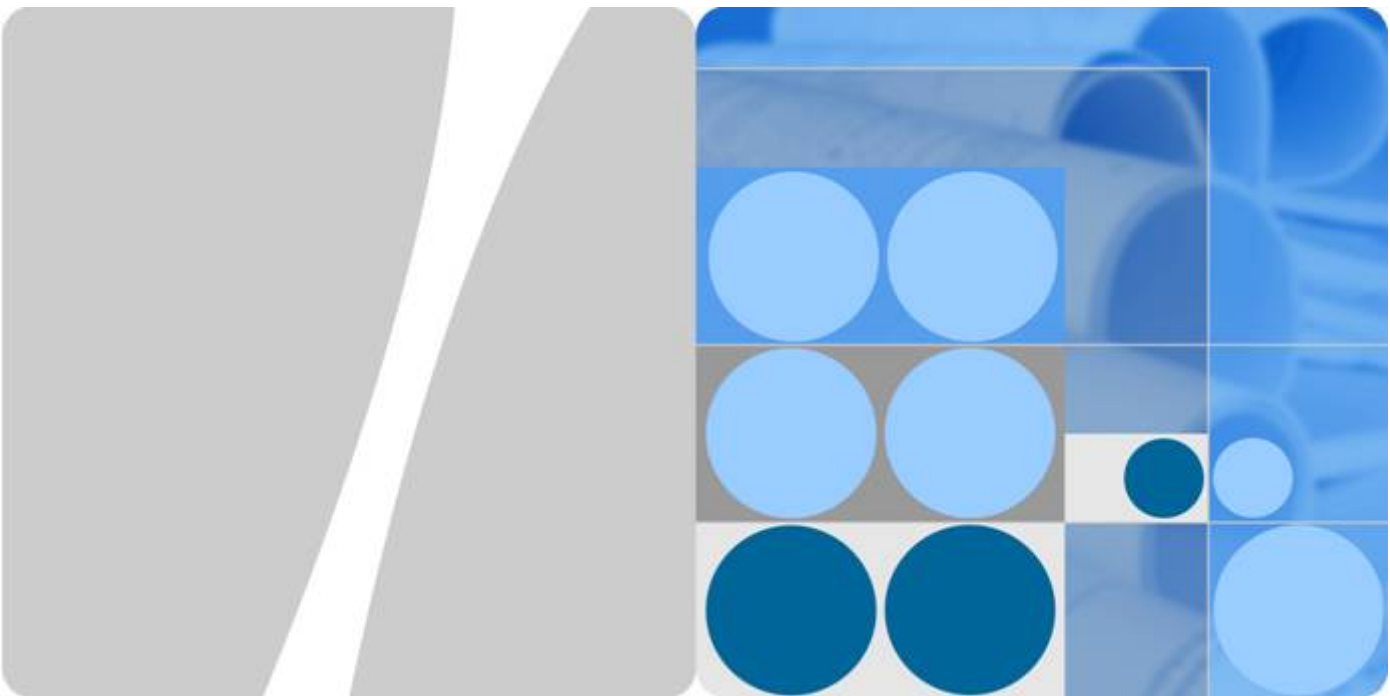
LampSite

Site Maintenance Guide

Issue   05
Date   2015-01-15

Copyright © Huawei Technologies Co., Ltd. 2015. All rights reserved.

No part of this document may be reproduced or transmitted in any form or by any means without prior written consent of Huawei Technologies Co., Ltd.

Trademarks and Permissions

and other Huawei trademarks are trademarks of Huawei Technologies Co., Ltd.

All other trademarks and trade names mentioned in this document are the property of their respective holders.

Notice

The purchased products, services and features are stipulated by the contract made between Huawei and the customer. All or part of the products, services and features described in this document may not be within the purchase scope or the usage scope. Unless otherwise specified in the contract, all statements, information, and recommendations in this document are provided "AS IS" without warranties, guarantees or representations of any kind, either express or implied.

The information in this document is subject to change without notice. Every effort has been made in the preparation of this document to ensure accuracy of the contents, but all statements, information, and recommendations in this document do not constitute a warranty of any kind, express or implied.

Huawei Technologies Co., Ltd.

Address: Huawei Industrial Base
            Bantian, Longgang
            Shenzhen 518129
            People's Republic of China

Website: http://www.huawei.com

Email: support@huawei.com

About This Document

Overview

This document describes routine maintenance items for a RHUB3908, pRRU3901, such as equipment maintenance, and power-on and power-off operations. It also explains how to replace the components and modules.

📖 **NOTE**

For details of the BBU site maintenance guide, see *DBS3900 Site Maintenance Guide*.

Product Version

The following table lists the product version related to this document.

Product Name	Solution Version	Product Version
DBS3900	● SRAN9.0 and later versions ● RAN16.0 and later versions ● eRAN7.0 and later versions ● eRAN TDD 7.0 and later versions	V100R009C00 and later versions

Intended Audience

This document is intended for:

● System engineers

● Site maintenance engineers

Organization

1 Changes in LampSite Site Maintenance Guide

This chapter provides information about the changes in different document versions of *LampSite Site Maintenance Guide*.

2 RHUB3908 Maintenance Items

This chapter describes the RHUB3908 maintenance items, involving the equipment room, equipment, power system, and grounding system.

3 pRRU3901 Maintenance Items

This chapter describes the pRRU3901 maintenance items, involving equipment and power system.

4 Powering On and Powering Off the RHUB3908

After the RHUB3908 is powered on, check the indicator status. Power off the RHUB3908 in normal or emergency mode as required.

5 Powering On and Powering Off the pRRU3901

After the pRRU3901 is powered on, check the power supply voltage and indicator status. Power off the pRRU3901 based on the power supply mode.

6 Replacing the RHUB3908

The RHUB3908 is an indoor convergence unit. It converges multiple pRRUs to the BBU3900. Replacing the RHUB3908 interrupts services carried on the serving cell.

7 Replacing an Optical Module

An optical module provides a port for opto-electronic conversion. This enables the transmission between the RHUB3908 and BBU3900 through the optical fiber. Replacing the optical module requires removing the optical fibers. This interrupts all the services.

8 Replacing the pRRU3901

pRRU3901 is an indoor remote radio unit. It processes RF signals. Replacing the pRRU3901 interrupts all the services carried on it.

Conventions

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
⚠ DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

Symbol	Description
⚠ NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.
📖 NOTE	Calls attention to important information, best practices and tips. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

General Conventions

The general conventions that may be found in this document are defined as follows.

Convention	Description
Times New Roman	Normal paragraphs are in Times New Roman.
Boldface	Names of files, directories, folders, and users are in **boldface**. For example, log in as user **root**.
Italic	Book titles are in *italics*.
`Courier New`	Examples of information displayed on the screen are in Courier New.

Command Conventions

The command conventions that may be found in this document are defined as follows.

Convention	Description
Boldface	The keywords of a command line are in **boldface**.
Italic	Command arguments are in *italics*.
[ ]	Items (keywords or arguments) in brackets [ ] are optional.
{ x | y | ... }	Optional items are grouped in braces and separated by vertical bars. One item is selected.
[x | y | ...]	Optional items are grouped in brackets and separated by vertical bars. One item is selected or no item is selected.
{ x | y | ... }*	Optional items are grouped in braces and separated by vertical bars. A minimum of one item or a maximum of all items can be selected.

Convention	Description
[x	y	...]*	Optional items are grouped in brackets and separated by vertical bars. Several items or no item can be selected.

GUI Conventions

The GUI conventions that may be found in this document are defined as follows.

Convention	Description
Boldface	Buttons, menus, parameters, tabs, window, and dialog titles are in **boldface**. For example, click **OK**.
>	Multi-level menus are in **boldface** and separated by the ">" signs. For example, choose **File** > **Create** > **Folder**.

Keyboard Operations

The keyboard operations that may be found in this document are defined as follows.

Format	Description
Key	Press the key. For example, press **Enter** and press **Tab**.
Key 1+**Key 2**	Press the keys concurrently. For example, pressing **Ctrl**+**Alt**+**A** means the three keys should be pressed concurrently.
Key 1, **Key 2**	Press the keys in turn. For example, pressing **Alt**, **A** means the two keys should be pressed in turn.

Mouse Operations

The mouse operations that may be found in this document are defined as follows.

Action	Description
Click	Select and release the primary mouse button without moving the pointer.
Double-click	Press the primary mouse button twice continuously and quickly without moving the pointer.
Drag	Press and hold the primary mouse button and move the pointer to a certain position.

Contents

1 Changes in LampSite Site Maintenance Guide

This chapter provides information about the changes in different document versions of *LampSite Site Maintenance Guide*.

05 (2015-01-15)

This is the fifth commercial release.

Compared with 04 (2014-07-30), this issue includes the following new topic:

- **8 Replacing the pRRU3901**

Compared with 04 (2014-07-30), this issue incorporates the following changes:

Content	Change Description
Entire document	- Changed RHUB, and pRRU to RHUB3908, and pRRU3901, respectively. - Added the pRRU3901 with three transmission ports plus no PWR port (or the pRRU3901a for use in North America) .
5 Powering On and Powering Off the pRRU3901	Deleted the description that the pRRU3901 supports AC/DC power supply.

Compared with 04 (2014-07-30), no information is deleted.

04 (2014-07-30)

This is the fourth commercial release.

Compared with 03 (2014-06-30), no information is added.

Compared with 03 (2014-06-30), this issue incorporates the following change:

Content	Change Description
Replacing an Optical Module	Modified the steps of replacing an Optical Module.

Compared with 03 (2014-06-30), no information is deleted.

03 (2014-06-30)

This is the third commercial release.

Compared with 02 (2014-05-30), no information is added.

Compared with 02 (2014-05-30), this issue incorporates the following changes:

Content	Change Description
Replacing the RF Daughter Board	Added descriptions about the block type supported in the LampSite solution.
Replacing the pDock Mother Board	
Replacing the Wi-Fi Daughter Board	

Compared with 02 (2014-05-30), no information is deleted.

02 (2014-05-30)

This is the second commercial release.

Compared with 01 (2014-04-26), no information is added.

Compared with 01 (2014-04-26), this issue incorporates the following change:

Content	Change Description
Entire document	Added the descriptions about the LTE FDD +LTE FDD mode.

Compared with 01 (2014-04-26), no information is deleted.

01 (2014-04-26)

This is the first commercial release.

Compared with Draft C (2014-03-26), no information is added.

Compared with Draft C (2014-03-26), this issue incorporates the following changes:

Content	Change Description
Entire document	Changed the pRRU3901 name from pRRU3901 with two Ethernet ports to pRRU3901 with two transmission ports, and pRRU3901 with three Ethernet ports to pRRU3901 with three transmission ports.
Replacing the pDock Mother Board	Changed the pDock name from pDock with two Ethernet ports to pDock with two transmission ports, and pDock with three Ethernet ports to pDock with three transmission ports.

Compared with Draft C (2014-03-26), this issue excludes the following topic:

● Replacing a PSU

Draft C (2014-03-26)

This is a draft release.

Compared with Draft B (2014-02-28), no information is added.

Compared with Draft B (2014-02-28), this issue incorporates the following change:

Content	Change Description
Replacing the RHUB	Deleted the operation of resetting the RHUB3908 after replacing.

Compared with Draft B (2014-02-28), no information is deleted.

Draft B (2014-02-28)

This is a draft release.

Compared with draft A (2013-11-30), this issue includes the following new topic:

● Replacing the Wi-Fi Daughter Board

Compared with draft A (2013-11-30), this issue incorporates the following changes:

Content	Change Description
Entire document	Added descriptions about pRRU3901s with three transmission ports. Such pRRU3901s support integrated Wi-Fi services.

Content	Change Description
	Added the descriptions about the UMTS, LTE FDD and UMTS+LTE FDD mode.
LampSite Site Maintenance Guide	Optimized descriptions about matching product versions.
Replacing the RF Daughter Board	Added the procedures for removing and attaching labels.
Replacing the Wi-Fi Daughter Board	

Compared with draft A (2013-11-30), this issue excludes the following topic:

● Replacing the pRRU3901

Draft A (2013-11-30)

This is a draft release.

2 RHUB3908 Maintenance Items

This chapter describes the RHUB3908 maintenance items, involving the equipment room, equipment, power system, and grounding system.

Equipment Room Maintenance Items

Table 2-1 lists the equipment room maintenance items.

Table 2-1 Equipment room maintenance items

Item	Check Frequency	Operation	Reference Standard
Environment alarms in the equipment room	Daily	Check whether any power alarm, fire alarm, or smoke alarm is reported.	No power alarm, fire alarm, or smoke alarm is reported.
Temperature in the equipment room	Each time maintenance is performed	Record temperatures in the equipment room measured by a thermometer.	-5°C to +50°C
Humidity in the equipment room	Each time maintenance is performed	Record humidity in the equipment room measured by a hygrometer.	5%RH to 95%RH
Lighting system in the equipment room	Every other month	Check whether the routine lighting system and emergency lighting system are running properly.	-
Air conditioner	Every other month	Check whether the air conditioner is running properly.	-

Item	Check Frequency	Operation	Reference Standard
Disaster protection devices	Every one month	Check whether the disaster protection, equipment protection, and firefighting devices are normal.	- The equipment room is equipped with portable foam-type extinguishers, and the pressure and expiration date must be checked. - The equipment room has no mice, ants, flying insects, or other risks.
Cleanness	Every one month	Check whether the cabinet, equipment housing, equipment interior, desktop, floor, door, and window are clean and tidy.	All these items are clean and tidy.

Equipment Maintenance Items

Table 2-2 lists the equipment maintenance items.

Table 2-2 Equipment maintenance items

Item	Check Frequency	Operation	Reference Standard
Fan in the PSU	Monthly or quarterly	Check whether the fan is working properly.	The fan works properly without any abnormal smell or sound.
Equipment surface	Monthly or quarterly	Check whether the equipment surface is intact.	The equipment surface is intact and the label of the cabinet is legible.
Equipment cleanness	Monthly or quarterly	Check whether the equipment is clean.	The equipment surface is clean.

Item	Check Frequency	Operation	Reference Standard
Indicators	Monthly or quarterly	Check whether the indicators on the equipment are working properly.	For details about the indicator status, see RHUB3908 Ports and Indicators in *LampSite Hardware Description*.
Electrostatic discharge (ESD) wrist strap	Quarterly	Check the ESD wrist strap in either of the following ways: ● Use an ESD wrist strap tester to check the ESD wrist strap. ● Use a multimeter to test the ground resistance of the ESD wrist strap.	If you use an ESD wrist strap tester, the GOOD indicator is on. If you use a multimeter, the ground resistance of the ESD wrist strap ranges from 0.75 ohms to 10 ohms.

Maintenance Items for the Power System and Grounding System

Table 2-3 lists the maintenance items for the power system and grounding system.

Table 2-3 Maintenance items for the power system and grounding system

Item	Check Frequency	Operation	Reference Standard
Power cables	Monthly or quarterly	Check the power cable connections.	The power cables are securely connected and not deteriorating. The joints are not corroded.
Voltage	Monthly or quarterly	Use a multimeter to measure the voltage of the power supply.	The voltage is in the permissible range.
PGND cables	Monthly or quarterly	Checks whether the PGND cables and ground bar are securely connected.	The joints are secure and not corroded. The PGND cables and ground bar are not deteriorated and are protected from corrosion.

Item	Check Frequency	Operation	Reference Standard
Ground resistance	Monthly or quarterly	Use a ground resistance tester to measure the ground resistance and record the measurement result.	The ground resistance is equal to or less than 10 ohms.

3 pRRU3901 Maintenance Items

This chapter describes the pRRU3901 maintenance items, involving equipment and power system.

Equipment Maintenance Items

Table 3-1 lists the equipment maintenance items for the pRRU3901.

Table 3-1 Equipment maintenance items

Item	Check Frequency	Operation	Reference Standard
Equipment surface	Monthly or quarterly	Check whether the equipment surface is intact.	The equipment surface is intact and the label of the cabinet is legible.
Equipment cleanness	Monthly or quarterly	Check whether the equipment is clean.	The equipment surface is clean.
Indicators	Monthly or quarterly	Check whether the indicators on the equipment are working properly.	For details about the indicator status, see pRRU3901 Ports and Indicators in *LampSite Hardware Description*.

Power System Maintenance Items

Table 3-2 lists the power system maintenance items for the pRRU3901.

Table 3-2 Power system maintenance items

Item	Check Frequency	Operation	Reference Standard
Power cables	Monthly or quarterly	Check the power cable connections.	The power cables are securely connected and not deteriorating. The joints are not corroded.
Voltage	Monthly or quarterly	Use a multimeter to measure the voltage of the power supply.	The voltage is in the permissible range.

4 Powering On and Powering Off the RHUB3908

About This Chapter

After the RHUB3908 is powered on, check the indicator status. Power off the RHUB3908 in normal or emergency mode as required.

4.1 Powering On the RHUB3908
The RHUB3908 is powered by AC input.

4.2 Powering Off the RHUB3908
An RHUB3908 can be powered off in two ways: normal power-off and emergency power-off. You need to perform a normal power-off in scenarios such as an equipment swap or foreseeable regional blackout, and you need to perform an emergency power-off in emergencies such as a fire, smoke, or water damage in indoor scenarios.

4.1 Powering On the RHUB3908

The RHUB3908 is powered by AC input.

Prerequisites

The power cable of the RHUB3908 is not connected to power, that is, the power plug is removed.

Context

⚠ **NOTICE**

The RHUB3908 must be powered on within 7 days after it is unpacked, and the period of its power-off state cannot exceed 7 days during maintenance.

Procedure

Step 1 Insert the power plug to power on the RHUB3908.

Step 2 Wait 3 to 5 minutes. Then check the status of the RUN indicator.

If the RUN Indicator Is...	It Indicates that...	Then...
Steady on	There is power input, but the board is faulty.	Disable the power supply, rectify the board fault, and then power on the RHUB3908 again.
Steady off	There is no power input, or an alarm about the board is reported.	Disable the power supply and check the power input again. If the power input is normal, rectify the board fault, and then power on the RHUB3908 again.
1s on and 1s off	The RHUB3908 is running properly.	End the power-on check task.
0.125s on and 0.125s off	The board software is being loaded.	If the loading is not complete after 5 minutes, disable the power supply and check whether the data in the configuration file is correct. Rectify the fault and then power on the RHUB3908 again.

----End

4.2 Powering Off the RHUB3908

An RHUB3908 can be powered off in two ways: normal power-off and emergency power-off. You need to perform a normal power-off in scenarios such as an equipment swap or foreseeable regional blackout, and you need to perform an emergency power-off in emergencies such as a fire, smoke, or water damage in indoor scenarios.

Procedure

● Normal power-off

⚠ **NOTICE**

Powering off the RHUB3908 interrupts services, and therefore perform associated operations before a power-off.

1. Remove the power plug to disconnect the RHUB3908 with the external power input.
2. If the RHUB3908 is equipped with an external power device, turn off the switch of the external power device.

● Emergency power-off
1. Turn off the switch of the external power device.

----End

5 Powering On and Powering Off the pRRU3901

About This Chapter

After the pRRU3901 is powered on, check the power supply voltage and indicator status. Power off the pRRU3901 based on the power supply mode.

5.1 Powering On the pRRU3901
After the pRRU3901 is powered on, check its running status by observing the indicator status.

5.2 Powering Off the pRRU3901
A pRRU3901 can be powered off in two ways: normal power-off and emergency power-off. You need to perform a normal power-off in scenarios such as an equipment swap or foreseeable regional blackout, and you need to perform an emergency power-off in emergencies such as a fire, smoke, or water damage in indoor scenarios.

5.1 Powering On the pRRU3901

After the pRRU3901 is powered on, check its running status by observing the indicator status.

Prerequisites

The pRRU3901 and the cables are correctly installed.

Context

![NOTICE icon] **NOTICE**

The pRRU3901 must be powered on within 7 days after it is unpacked, and the period of its power-off state cannot exceed 7 days during maintenance.

Procedure

Step 1 Power on the pRRU3901.

The pRRU3901 can be powered in PoE mode. The RHUB3908 adopts the PoE power supply to provide power for the pRRU3901 over the CPRI_E0 port.

Step 2 Wait 3 to 5 minutes. Then Check the status of the RUN indicator.

If the RUN Indicator Is...	It Indicates that...	Then...
Steady on	There is power input, but the board is faulty.	Disable the power supply, rectify the board fault, and then power on the pRRU3901 again.
Steady off	There is no power input.	Disable the power supply and check the power input again.
On for 1s and off for 1s	The pRRU3901 is running properly.	End the power-on check task.
On for 0.125s and off for 0.125s	The board software is being loaded.	If the loading is not complete after 5 minutes, disable the power supply. Check whether the data in the configuration file is correct. Rectify the fault and then power on the pRRU3901 again.

----End

5.2 Powering Off the pRRU3901

A pRRU3901 can be powered off in two ways: normal power-off and emergency power-off. You need to perform a normal power-off in scenarios such as an equipment swap or foreseeable regional blackout, and you need to perform an emergency power-off in emergencies such as a fire, smoke, or water damage in indoor scenarios.

Procedure

- Normal power-off

⚠ **NOTICE**

Powering off the pRRU3901 interrupts services, and therefore perform associated operations before a power-off.

---

1. Remove the Ethernet cable.
- Emergency power-off
    1. Turn off the switch of the external power device.

----End

6 Replacing the RHUB3908

The RHUB3908 is an indoor convergence unit. It converges multiple pRRUs to the BBU3900. Replacing the RHUB3908 interrupts services carried on the serving cell.

Prerequisites

- A new RHUB3908 is available.

- The labels and connections of the cables connected to the RHUB3908 are recorded.

- The following tools are available: a Phillips screwdriver, an ESD wrist strap, and a rubber mallet.

Context

It takes about 10 minutes to replace the RHUB3908.

Procedure

- Replace the RHUB3908 installed on a 19-inch rack, in a 19-inch cabinet or in a 19-Inch Shelf.

    📖**NOTE**

    The procedures for replacing the RHUB3908 installed on a 19-inch rack are the same for replacing the RHUB3908 installed in a 19-inch cabinet or in a 19-Inch Shelf. The following uses the RHUB3908 installed on a 19-inch rack as an example.

    1. Power off the RHUB3908 by referring to **4.2 Powering Off the RHUB3908**.

    2. Record the cable connections.

    3. Take insulation measures, and then remove all cables from the RHUB3908.

    4. Use a torque screwdriver or Phillips screwdriver to remove the four screws on the mounting ear of the RHUB3908, as shown in **Figure 6-1**.

Figure 6-1 Removing the mounting ear
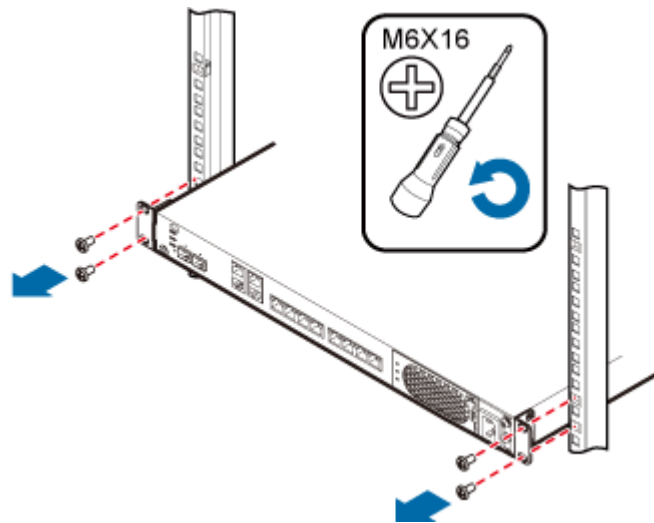
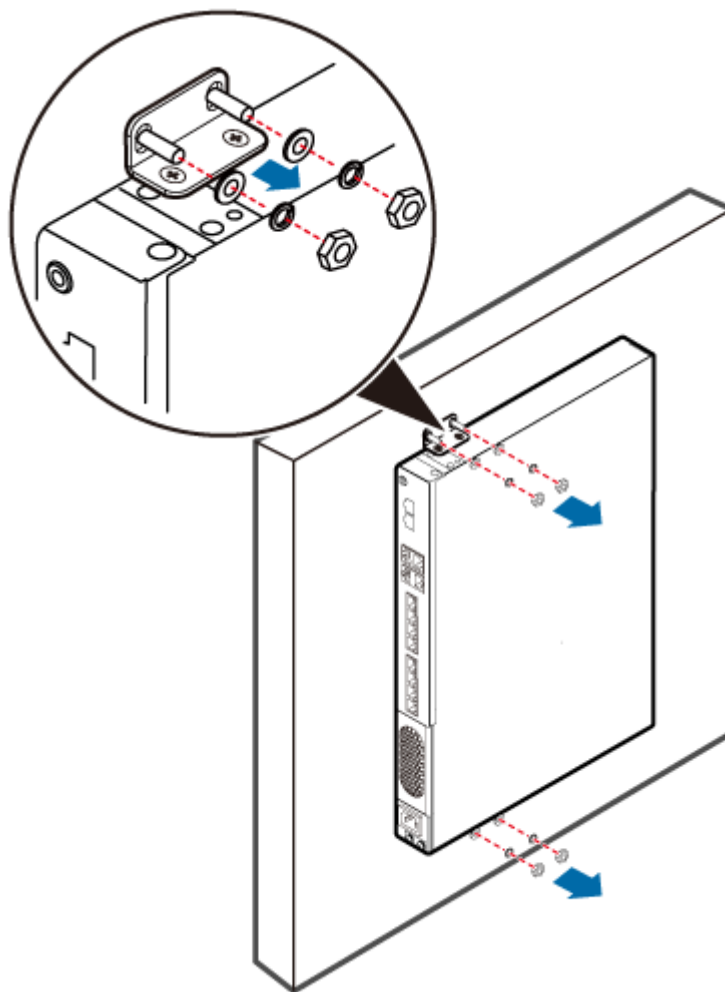5. Remove the RHUB3908 from the rack.

6. Install the new RHUB3908. For details, see *LampSite Installation Guide*.

⚠ NOTICE

Take proper ESD protection measures, such as wearing an ESD wrist strap or ESD gloves to prevent electrostatic damage to the boards, modules, or electronic components.

---

7. Connect all the cables to the new RHUB3908 according to the recorded installations.

8. Power on the RHUB3908 by referring to **4.1 Powering On the RHUB3908**.

9. Determine whether the new RHUB3908 is working properly according to the indicator status on the RHUB3908. For details about the indicator status, see RHUB3908 Ports and Indicators in *LampSite Hardware Description*.

● Replace the RHUB3908 installed on a wall.

1. Power off the RHUB3908 by referring to **4.2 Powering Off the RHUB3908**.

2. Record the cable connections.

3. Take insulation measures, and then remove all cables from the RHUB3908.

4. Use a torque wrench or socket wrench to remove the four expansion bolts on the mounting ear, and then remove the RHUB3908, as shown in **Figure 6-2**.

Figure 6-2 Removing the mounting ear

PAR49C0021

5. Install the new RHUB3908 on a wall. For details, see *LampSite Installation Guide*.

⚠ **NOTICE**

Take proper ESD protection measures, such as wearing an ESD wrist strap or ESD gloves to prevent electrostatic damage to the boards, modules, or electronic components.

---

6. Connect all the cables to the new RHUB3908 according to the recorded installations.

7. Power on the RHUB3908 by referring to **4.1 Powering On the RHUB3908**.

8. Determine whether the new RHUB3908 is working properly according to the indicator status on the RHUB3908. For details about the indicator status, see RHUB3908 Ports and Indicators in *LampSite Hardware Description*.

----End

Follow-up Procedure

- Place the replaced RHUB3908 into an ESD box or bag. Then, place the ESD box or bag into a foam-padded carton or the packing box of the new optical module.

- Record the information about the faulty component in the fault card.

- Contact the local Huawei office to deal with the faulty component.

7 Replacing an Optical Module

An optical module provides a port for opto-electronic conversion. This enables the transmission between the RHUB3908 and BBU3900 through the optical fiber. Replacing the optical module requires removing the optical fibers. This interrupts all the services.

Prerequisites

- The number and type of faulty optical modules are confirmed, and new optical modules are available.The new optical modules to be installed must match CPRI rates.

- The position for installing an optical module and the cable connection are recorded.

- The following tools and materials are available: an ESD wrist strap or ESD gloves, and an ESD box or bag.

Context

- The optical modules are connected to the CPRI0 and CPRI1 ports on the RHUB3908 panel.

- An optical module or CPRI fiber optic cable cannot be inserted into or removed from this CPRI port when the power supply is connected.

- Replacing an optical module involves removing an optical fiber and the faulty optical module, installing a new optical module, connecting the optical fiber to the optical module, and recovering the links. The operation takes about 10 minutes.

⚠ **NOTICE**

Take proper ESD protection measures, such as wearing an ESD wrist strap or ESD gloves to prevent electrostatic damage to the boards, modules, or electronic components.

Procedure

Step 1 Wear ESD gloves.

Step 2 Record the optical module and fiber connections.

Step 3 Power off the RHUB3908 according to the instructions in **4.2 Powering Off the RHUB3908**.

⚠️ **CAUTION**

After removing the optical fiber from the optical module, do not look directly at the optical modules without eye protection.

Step 4 Press the latch on the connector of the optical fiber connector, and remove the connector from the faulty optical module, use the dust-proof cap to protect the optical fiber, as shown in **Figure 7-1**.

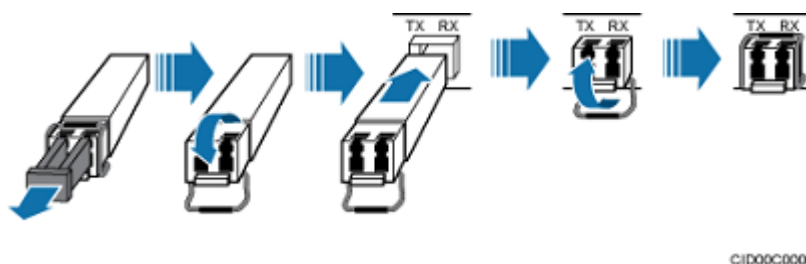**Figure 7-1** Removing the optical fiber
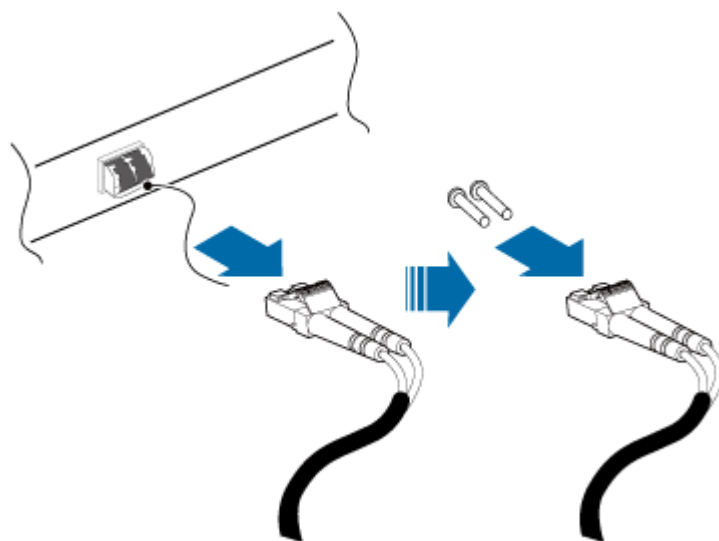
Step 5 Turn the ring-pull on the faulty optical module outwards. Hold the ring-pull and take the faulty optical module out of the slot to remove it from the CPRI0 or CPRI1 port, as shown in **Figure 7-2**.

Figure 7-2 Removing the optical module
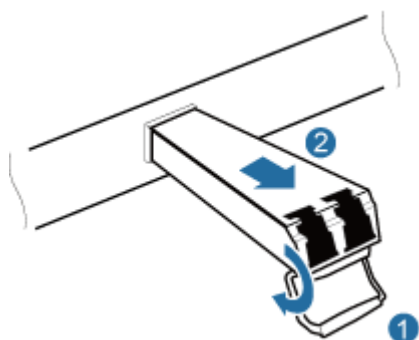
Step 6 Install the new optical module onto the corresponding CPRI port, as shown in **Figure 7-3**.

Figure 7-3 Installing the new optical module

Step 7 Remove the dust-proof caps from the optical module and optical fiber, and connect the optical fiber connector to the new optical module, as shown in **Figure 7-4**.

Figure 7-4 Installing the optical fiber
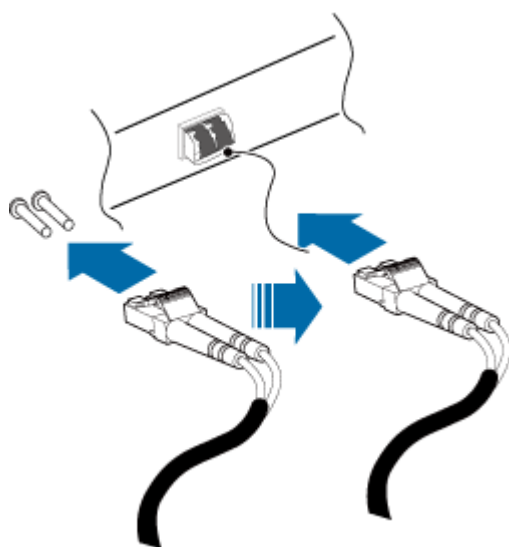
Step 8 Power on the RRU according to the instructions in **4.1 Powering On the RHUB3908**.

Step 9 Check whether CPRI signal transmission recovers by observing the CPRI indicator on the RHUB3908 panel.

If...	Then...
The CPRI indicator is green	CPRI signal transmission recovers and the optical fiber replacement is successful.
The CPRI indicator is red or in another color	CPRI signal transmission is abnormal. Check whether the optical fiber and optical module are securely installed.

Step 10 Take off the ESD gloves and pack up all the tools.

----End

Follow-up Procedure

- Place the replaced optical module into an ESD box or bag. Then, place the ESD box or bag into a foam-padded carton or the packing box of the new optical module.

- Record the information about the faulty component in the fault card.

- Contact the local Huawei office to deal with the faulty component.

8 Replacing the pRRU3901

pRRU3901 is an indoor remote radio unit. It processes RF signals. Replacing the pRRU3901 interrupts all the services carried on it.

Prerequisites

- Replacing the pRRU3901 when:
  - The functional modules inside a pRRU3901 or the housing of pRRU3901 is damaged.
  - Adding the RF daughter board or Wi-Fi daughter board.
- The hardware type is confirmed and a new pRRU3901 is available.
- The labels and connections of the cables connected to the pRRU3901 are recorded.
- The following tools are available: an electrostatic discharge (ESD) wrist strap and ESD gloves.

Context

It takes about 5 minutes to replace the pRRU3901.

♢**NOTE**

The pRRU3901 can be installed on a metal pole, wall, or ceiling, and the procedures for replacing the pRRU3901 are almost the same. The following uses a ceiling-mounted pRRU3901 as an example.

Procedure

Step 1 Instruct the network operator to block the pRRU3901.

♢**NOTE**

The LampSite solution supports immediate block, idle block, and delayed block. Application of idle block and delayed block produces the same effect as application of immediate block.

- On the UMTS side, log in to the LMT and run the **BLK BRD** command to block the RF daughter board of the pRRU3901.
- On the LTE side, log in to the LMT and run the **BLK BRD** command to block the RF daughter board of the pRRU3901.
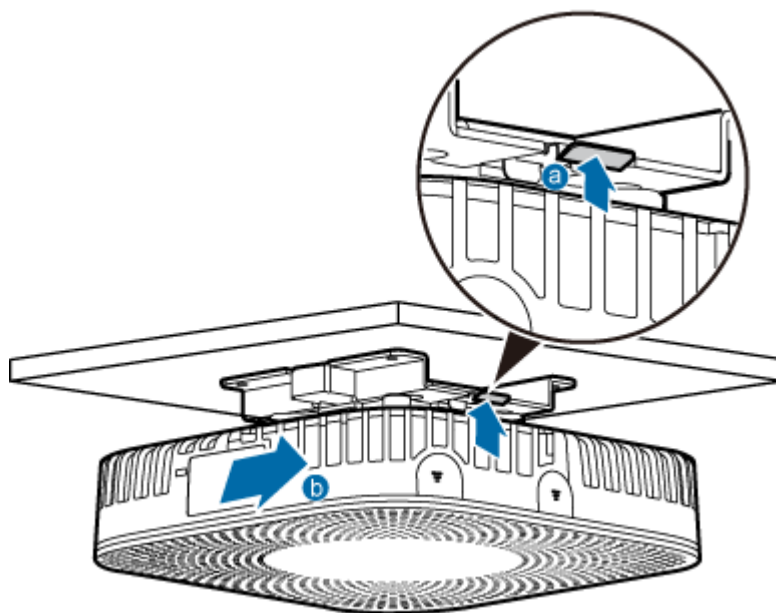
Step 2 Wear ESD gloves.

⚠ **CAUTION**

- Take proper ESD protection measures, such as wearing ESD gloves to prevent electrostatic damage to the boards, modules, or electronic components.
- A pRRU3901 that has just been powered off has afterheat. Take scald-proof measures when removing the pRRU3901.

Step 3 Power off the pRRU3901. For details, see **5.2 Powering Off the pRRU3901**.

Step 4 Record the cable connections.

Step 5 Take insulation measures, and then remove all cables from the pRRU3901.

Step 6 Hold the pRRU3901 case in one hand and pull the hoist clamp on the mounting bracket with the other hand, as shown in step a in **Figure 8-1**. Then, remove the mounting bracket from the pRRU3901, as shown in step b in **Figure 8-1**.

Figure 8-1 Removing the pRRU3901

Step 7 Install the new pRRU3901. The installation must be based on different scenarios. For details, see *LampSite Installation Guide*.

⚠ **NOTICE**

Take proper ESD protection measures, such as wearing an ESD wrist strap or ESD gloves to prevent electrostatic damage to the boards, modules, or electronic components.

Step 8 Connect the cables to the pRRU3901 according to the recorded positions.

Step 9 Power on the pRRU3901 by referring to **5.1 Powering On the pRRU3901**.
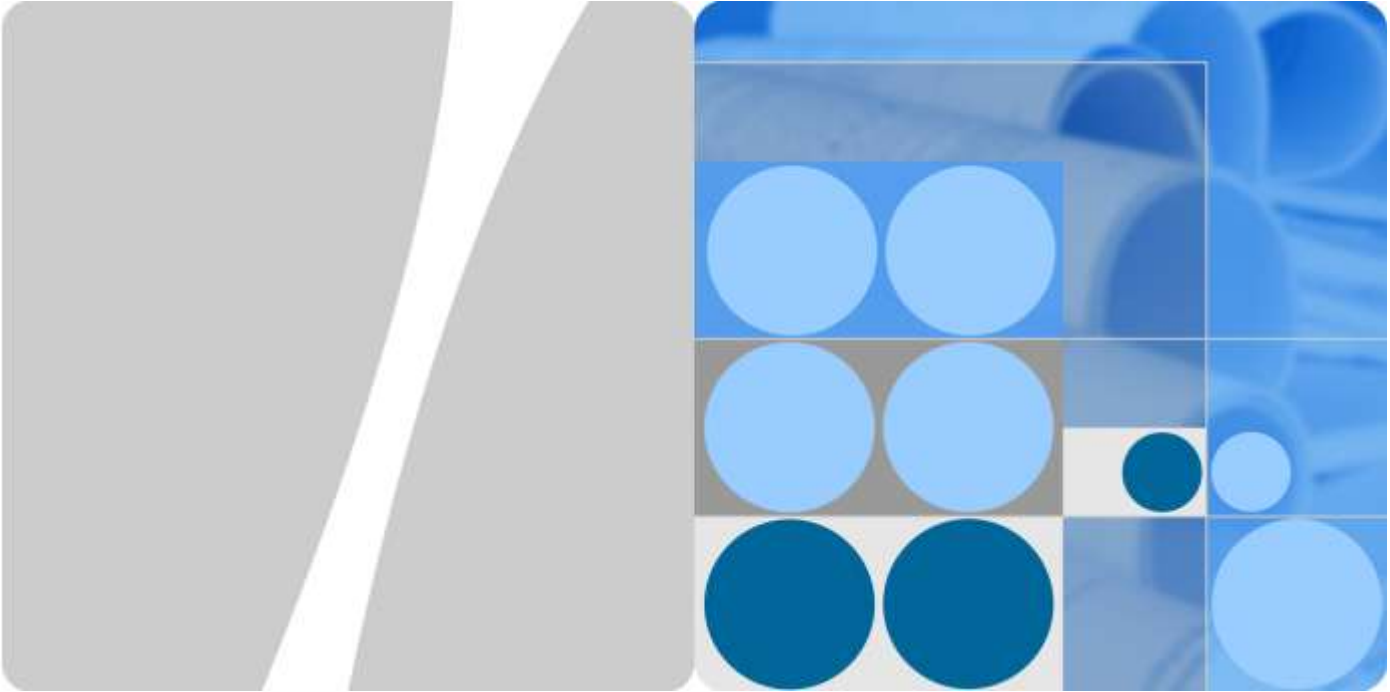

Step 10 Check whether the new pRRU3901 is working properly according to the indicator status on the pRRU3901. For details about the indicator status, see pRRU3901 Ports and Indicators in *LampSite Hardware Description*.

Step 11 Instruct the network operator to unblock the pRRU3901.

1. On the UMTS side, log in to the NodeB LMT and run the **UBL BRD** command to unblock the RF daughter board of the pRRU3901.

2. On the LTE side, log in to the eNodeB LMT and run the **UBL BRD** command to unblock the RF daughter board of the pRRU3901.

Step 12 Take off the ESD gloves and pack up all the tools.

----End

Regulatory Compliance Statement
pRRU3901, pRRU3901 AWS+PCS+WIFI

HUAWEI TECHNOLOGIES CO., LTD.

Huawei Technologies Co., Ltd.

1 Regulatory Compliance Statement

About This Chapter

1.1 Declaration of Conformity to European Directives

1.1 Declaration of Conformity to European Directives

Figure 1-1 Declaration of Conformity to European Directives

Doc NO.: CE-01372135

Declaration of Conformity

For EU Directives and Regulations

For the following equipment

Product : pico Remote Radio Unit

Model/Trademark : pRRU3901 / HUAWEI

Manufacturer's Name : Huawei Technologies Co., Ltd.

Manufacturer's Address : Administration Building, Headquarters of

Huawei Technologies Co., Ltd., Bantian,

Longgang District, Shenzhen, 518129, P.R.C

is herewith confirmed to comply with the requirements which are set out in 1999/5/EC(R&TTE Directive), 2002/95/EC & 2011/65/EU (RoHS Directive), 2002/96/EC&2012/19/EU (WEEE Directive) and 2006/1907/EC(REACH Regulation). For the evaluation of the compliance with these Directives and Regulations, the following standards/requirements were applied:

Safety	EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013
EMC	ETSI EN 301 489-1 V1.9.2 ETSI EN 301 489-17 V2.2.1
	ETSI EN 301 489-23 V1.5.1
	EN 55022:2010 EN 55024:2010 CISPR 22:2008 CISPR 24:2010
Radio & Health	ETSI EN 301 908-1 V6.2.1 ETSI EN 301 908-3 V6.2.1
	ETSI EN 301 908-14 V6.2.1 EN 62311:2008
	EN 300 328 V1.8.1 EN 301 893 V1.7.1
	Council Recommendation 1999/519/EC EN 50385:2002
RoHS	2002/95/EC, 2011/65/EU, EN 50581: 2012
REACH	EC NO. 1907/2006
WEEE	2002/96/EC, 2012/19/EU

Responsible for making this declaration is the:

☑ Manufacturer   ☐ Authorised representative established within the EU

Person responsible for making this declaration

Name/Title: *ZhangXingWei*

                                                    Regulation Compliance Manager

Place/Date   Shenzhen, China   June 17, 2014

2 Regulatory Compliance Information

About This Chapter

2.1 Regulatory Compliance Standards

The Product complies with the standards listed in Table 2-1.

Table 2-1 Regulatory compliance standards

Discipline	Standards
EMC	• CISPR22 Class B • CISPR24 • EN55022 Class B • EN50024 • ETSI EN 301 489 Class B • CFR 47 FCC Part 15 Class B • ICES 003 Class B • AS/NZS CISPR22 Class B • GB9254 Class B • VCCI Class B • CNS 13438 Class B • IEC/EN61000-3-2 • IEC/EN61000-3-3 • IEC/EN61000-6-1 • IEC/EN61000-6-3
RF	• ETSI EN 301 908-1 • ETSI EN 301 908-3 • ETSI EN 301 908-14 • ETSI EN 300 328 • ETSI EN 301 893
Heath	• ICNIRP Guideline • 1999-519-EC • EN 50385 • OET Bulletin 65 • IEEE Std C95.1 • EN 60215 • EN 62311
Safety	• IEC/EN 60950-1 • IEC/EN41003 • EN 60950-1 • UL 60950-1 • CSA C22.2 No 60950-1 • AS/NZS 60950.1 • BS EN 60950-1 • IS 13252 • GB4943

Discipline	Standards
Environmental protection	• 2011/65/EU (RoHS) • EC NO. 1907/2006 (REACH) • 2002/96/EC (WEEE)
Grounding	• ITU-T K.27 • ETSI EN 300 253

NOTE

EMC: electromagnetic compatibility

NEBS: Network Equipment Build Standard

RF: radio frequency

CISPR: International Special Committee on Radio Interference

EN: European Standard

ETSI: European Telecommunications Standards Institute

CFR: Code of Federal Regulations

FCC: Federal Communication Commission

IEC: International Electrotechnical Commission

AS/NZS: Australian/New Zealand Standard

VCCI: Voluntary Control Council for Interference

CNS: Chinese National Standard

UL: Underwriters Laboratories

CSA: Canadian Standards Association

BS: British Standard

IS: Indian Standard

GR: General Requirement

FDA: Food and Drug Administration

BTS: Base Transceiver Station

GSM: Global System for Mobile communications

WLAN: wireless local area network

ICNIRP: International Commission on Non-Ionizing Radiation Protection

OET: Office of Engineering Technology

IEEE: Institute of Electrical and Electronics Engineers

RoHS: restriction of the use of certain hazardous substances

2.2 European Regulatory Compliance

The Product complies with the following European directives and regulations.

- 2004/108/EC (EMC)
- 2006/95/EC (low voltage)
- 1999/5/EC (R&TTE)
- 2011/65/EU (RoHS)
- EC NO. 1907/2006 (REACH)

- 2002/96/EC (WEEE)

Product complies with Directive 2002/95/EC, 2011/65/EU and other similar regulations from the countries outside the European Union, on the RoHS in electrical and electronic equipment. The device does not contain lead, mercury, cadmium, and hexavalent chromium and brominated flame retardants (Polybrominated Biphenyls (PBB) or Polybrominated Diphenyl Ethers (PBDE)) except for those exempted applications allowed by RoHS directive for technical reasons.

Product complies with Regulation EC NO. 1907/2006 (REACH) and other similar regulations from the countries outside the European Union. Huawei will notify to the European Chemical Agency (ECHA) or the customer when necessary and regulation requires.

Product complies with Directive 2002/96/EC on waste electrical and electronic equipment (WEEE). Huawei is responsible for recycling its end-of-life devices, and please contact Huawei local service center when recycling is required. Huawei strictly complies with the EU Waste Electrical and Electronic Equipment Directive (WEEE Directive) and electronic waste management regulations enacted by different countries worldwide. In addition, Huawei has established a system for recycling and reuse of electronic wastes, and it can provide service of dismantling and recycling for WEEE. By Huawei recycling system, the waste can be handled environmentally and the resource can be recycled and reused fully, which is also Huawei WEEE stratagem in the word. Most of the materials in product are recyclable, and our packaging is designed to be recycled and should be handled in accordance with your local recycling policies.

In accordance with Article 11(2) in Directive 2002/96/EC (WEEE), products were marked with the following symbol: a cross-out wheeled waste bin with a bar beneath as below:

2.3 U.S.A Regulatory Compliance

2.3.1 FCC Part 15

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

- This device does not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

If this device is modified without authorization from Huawei, the device may no longer comply with FCC requirements for Class B digital devices. In that a case, your right to use the device may be limited by FCC regulations. Moreover, you may be required to correct any interference to radio or television communications at your own expense.

This device has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This device generates, uses and radiates radio frequency energy. If it is not installed and used in accordance with the instructions, it may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this device does cause harmful interference to radio or television reception, which can be determined by turning the device off and on, the user may take one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Reinforce the separation between the device and receiver.
- Connect the device into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or TV technician for assistance.

This product may contains FCC ID QISPRU01B02 or FCC ID QISPRU01B01 or QISPRU02WLAN or their combination both or three transmitters

2.4 Canada Regulatory Compliance

2.4.1 RSS-Gen statement

This device complies with Industry Canada licence-exempt RSS standard(s).

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

2.4.2 RSS-102 statement

This device is designed and manufactured not to exceed the emission limits for exposure to radio frequency (RF) energy set by Industrial Canada and meets the requirements for radiation exposure limits set forth for an uncontrolled environment.

In order to avoid the possibility of exceeding the Industrial Canada radio frequency exposure limits, human proximity to the equipment shall not be less than 0.2m

Cet appareil est conçu et fabriqué pour ne pas dépasser les limites d'émission pour l'exposition à la fréquence radio (RF) de l'énergie fixé par l'Industrielle Canada et répond aux exigences en matière de limites d'exposition aux rayonnements définies pour un environnement non contrôlé.

Afin d'éviter la possibilité de dépasser les limites d'exposition aux fréquences radio industrielle du Canada, la proximité humaine pour l'appareil nedoit pas être inférieure à0.2m

This product may contains IC 6369A-PRU01B02 or IC 6369A-PRU01B01 or 6369A-PRU02WLAN or their combination both or three transmitters

2.5 Japanese Regulatory Compliance

2.4.1VCCI

The Product complies with VCCI Class B by Information Technology Equipment (ITE).

The preceding translates as follows:

This is a Class B product based on the standard of the Voluntary Control Council for

Interference by Information Technology Equipment (VCCI).If this product is used

Near a radio or television receiver in a domestic environment. It may cause radio

Interference.Install and use the equipment according to the instruction manual.

この装置は、クラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。取扱説明書に従って正しい取り扱いをして下さい。　VCCI－B

2.6 CISPR 22 Compliance

The Product complies with CISPR 22 for Class B by the ITE.

2.7 China RoHS hazardous substance table

This products described in this guide complies with "the Administration on the Control of Pollution Caused by Electronic Information Products" which is also called China RoHS

部件名称	产品中有害物质或元素的名称及含量					
	镉	铅	汞	六价铬	多溴联苯	多溴联苯醚
Alloy Parts	○	╳	○	○	○	○
Metal Fittings	○	○	○	○	○	○
PCBA	○	╳	○	○	○	○
Capacitor	○	╳	○	○	○	○
Other electronics	○	╳	○	○	○	○
Solder	○	╳	○	○	○	○
Cable	○	○	○	○	○	○
Plastic and Polymer	○	○	○	○	○	╳

○：表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T11363-2006 标准规定的限量要求以下。
╳：表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T11363-2006 标准规定的限量要求。

2.8 India RoHS hazardous substance table

This products described in this guide complies with the "e-waste (Management and Handling) Rules, 2011"of India which is also called India RoHS.

Part Descriptions	Restricted Substances in Product					
	Cd	Pb	Hg	Cr(VI)	PBBs	PBDEs
Alloy Parts	○	╳	○	○	○	○
Metal Fittings	○	○	○	○	○	○
PCBA	○	╳	○	○	○	○
Capacitor	○	╳	○	○	○	○

Other electronics	○	╳	○	○	○	○
Solder	○	╳	○	○	○	○
Cable	○	○	○	○	○	○
Plastic and Polymer	○	○	○	○	○	╳

○: indicates that the content of the toxic and hazardous substance in all the Homogeneous Materials of the part is below the concentration limit requirement as described in the e-waste (Management and Handling) Rules, 2011.

╳: indicates that the content of the toxic and hazardous substance in at least one Homogeneous Material of the part exceeds the concentration limit requirement as described in S in the e-waste (Management and Handling) Rules, 2011.

2.9 Other Markets

For relevant compliance information/documentation for markets not mentioned above,

Please contact Huawei representative