Gamma455M

Outdoor 4x80 W Remote Radio Unit (RRU)

Installation Guide

Document version: 01

About This Document

This document is intended for personnel who will install the Gamma455M product. This equipment is based on 3GPP Long-Term Evolution (LTE) and Global System for Mobile Communications (GSM) technology. The product overview is followed by procedures for proper installation, basic configuration, and verification that the BBU + RRU system is operational. Only personnel with appropriate electrical skills and experience should install this device. This document applies to the sRUTCxxx series outdoor Remote Radio Unit (RRU).

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Disposal of Electronic and Electrical Waste

Pursuant to the WEEE EU Directive, electronic and electrical waste must not be disposed of with unsorted waste. Please contact your local recycling authority for disposal of this product.

Revision Record

Date	Version	Description	SMEs/Contributors	Author/Editor
17-Mar-2026	01	Initial release.	ChengXiaoHui	Duanchenjie

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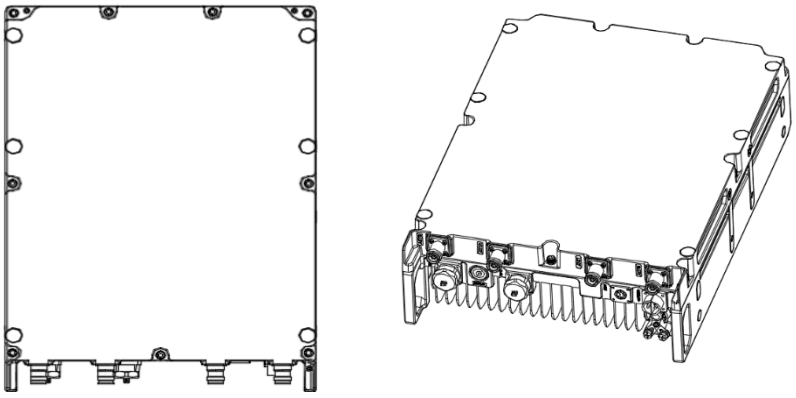
1. Overview

1.1 Introduction

The Gamma455M is an advanced multi-band outdoor 4x80 W Remote Radio Unit (RRU) that supports operation in GSM and Long-Term Evolution (LTE) Frequency Division Duplexing (FDD) mode and is hardware-ready for NR 5G technology. The device can operate in either single-band or multi-band configurations, supporting up to 4T4R. It also supports both multi-carrier and single-carrier operation modes.

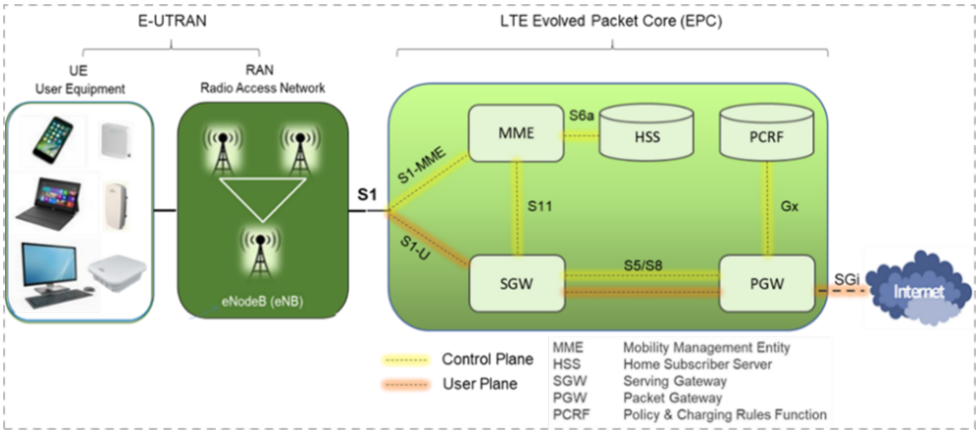
When working with a Baseband Unit (BBU), the Gamma455M provides customers with advanced, high-performance distributed wireless solutions suitable for a variety of scenarios. It has exceptional non-line-of-sight (NLOS) coverage performance (Figure 1-1).

Figure 1-1 Gamma455M RRU



This document provides a general description, guidelines, and procedures for installation. For additional information about configuring features beyond the basic settings, refer to Configuration Guide.

Figure 1-2 LTE Network Architecture



1.2 Features

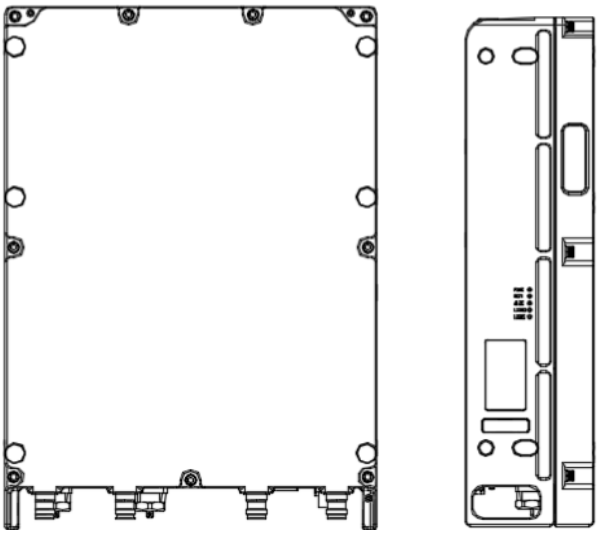
The following are some of the key Gamma455M features.

- Supports 5 MHz/10 MHz/15 MHz/20 MHz operating bandwidths in LTE mode.
- Supports standard LTE FDD Band 28 + Band 20 + Band 8 / Band 1 + Band 3.
- Supports 200 kHz operating bandwidth in GSM mode.
- Supports standard GSM FDD Band 8/Band 3.
- Complies with 3GPP Release 10 standards.
- External high-gain antenna.
- Higher transmission power for extended coverage.
- Excellent Non-Line-of-Sight (NLOS) coverage performance.
- Supports RET function AISG 2.0.

1.3 Appearance

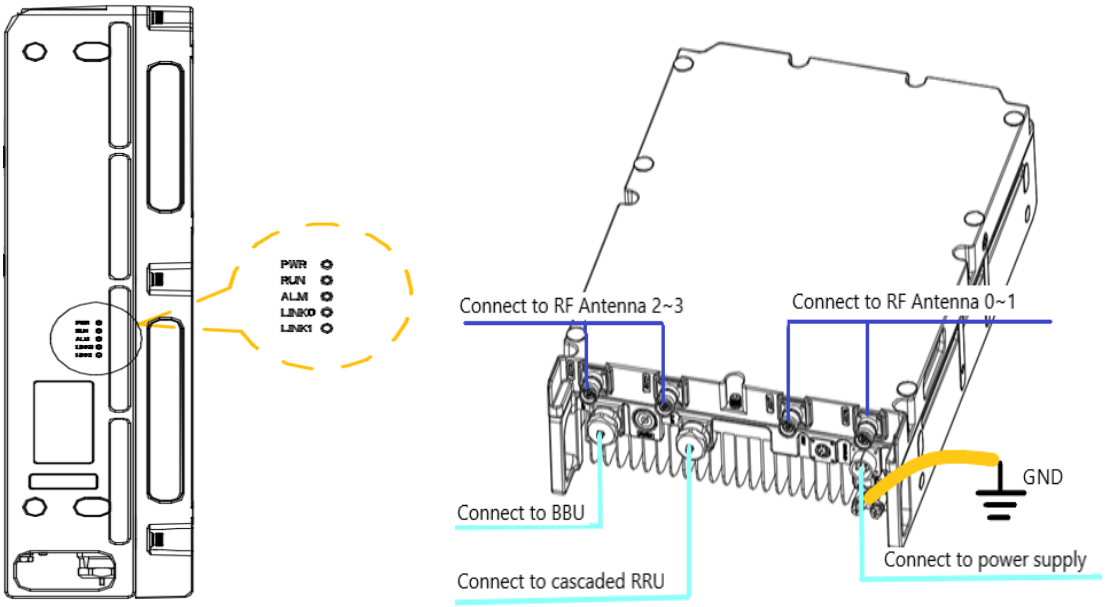
The Gamma455M RRU model is shown in Figure 1-3.

Figure 1-3 Gamma455M RRU Appearance



The interfaces and status indicators (LEDs) for the Gamma455M RRU are shown in Figure 1-4. The interfaces are inside a wiring cavity and on the bottom of the unit. The LEDs are on the upper left side. Refer to Table 1-1 for a description of the interfaces and to Table 1-2 for a description of the LEDs.

Figure 1-4 Gamma455M Interfaces and Indicators



NOTE: The antenna connector shown in the figure is a Mini-DIN type.

Table 1-1 Gamma455M RRU Interfaces

Interface	Description
PWR	Power interface: -36VDC ~ -57VDC, nominal -48VDC
OPT0	External optical interface connected to the BBU.
OPT1	External optical interface cascaded to the RRU.
RET	RS485 interface, AISG 2.0 standard
ANT0	External antenna 0, Mini-DIN type connector.
ANT1	External antenna 1, Mini-DIN type connector.
ANT2	External antenna 2, Mini-DIN type connector.
ANT3	External antenna 3, Mini-DIN type connector.
GND	External equipment ground port.

Table 1-2 Gamma455M LEDs

Identity	Color	Status	Description
PWR	Green	Steady On	Power input present
		OFF	No power input
RUN	Green	Steady On	Base station powered on
		Fast flashing: 0.125 s on, 0.125 s off	Data being transmitted
		Slow flashing: 1 s on, 1 s off	Cell activated.
ALM	Red	Steady On	(Reserved)
		Fast flashing: 0.125 s on, 0.125 s off	S1 alarm
		OFF	No alarm
LINK0	Green	Steady On	Data link is normal
		OFF	Data link is abnormal
LINK1	Green	Steady On	Data link is normal
		OFF	Data link is abnormal

1.4 Technical Specifications

1.4.1 Technology

Item	Description
RF Standard	3GPP TS 36.104 3GPP TS 37.104 3GPP TS 45.005
Frequency Band	Band 1 (UL: 1920 MHz-1980 MHz, DL: 2110 MHz-2170

Item	Description
	MHz) Band 3 (UL: 1710 MHz-1785 MHz, DL: 1805 MHz-1880 MHz) Band 8 (UL: 880 MHz-915 MHz, DL: 925 MHz-960 MHz) Band 20 (UL: 832 MHz-862 MHz, DL: 791 MHz-821 MHz) Band 28 (UL: 703 MHz-733 MHz, DL: 758 MHz-788 MHz)
Channel Bandwidth	GSM: 200 kHz LTE: 5 MHz/10 MHz/15 MHz/20 MHz
Multiplexing	MIMO: 4x4 MIMO (DL)

NOTE: Different models support different frequency bands.

1.4.2 Interface

Item	Description
Ethernet Interface	Two optical (SFP+) interfaces
Powering Method	-36VDC ~ -57VDC, nominal -48 VDC
LED Indicators	5 status LEDs PWR/RUN/ALM/LINK0/LINK1

1.4.3 Performance

Item	Description
Receive Sensitivity	LTE: -105.5 dBm (per channel) Band 8/Band 20/Band 28 LTE: -105 dBm (per channel) Band 1/Band 3 GSM: -110 dBm (per channel)
EVM	QPSK < 5%; 16QAM < 5%; 64QAM < 5%; 256QAM < 3.5%
Transmit Power Range	37 to 46 dBm per channel for a single band

NOTE:

1. The LTE receive sensitivity test method is specified in 3GPP TS 36.104 and is based on 5 MHz bandwidth and the FRC A1-3 standard in Annex A.1 (QPSK, R=1/3, 25 RB).

2. The GSM receiver sensitivity test method is specified in 3GPP TS 45.005. It is based on 200 kHz bandwidth and FCH (FCCH) or SCH, in accordance with the test conditions defined in the standard.

1.4.4 Link Budget

Antenna connection	Mini-DIN connector for external high-gain antenna
VSWR	< 1.5

1.4.5 Physical

Item	Description
Surge Suppression	Yes
Power Interface Lightning Protection	Differential mode: ±10 kA Common mode: ±20 kA
MTBF	≥ 150000 hours
MTTR	≤ 1 hour
Ingress Protection Rating	IP66
Operating Temperature	-40°F to 131°F / -40°C to 55°C
Storage Temperature	-49°F to 158°F / -45°C to 70°C
Humidity	5% to 95% RH
Atmospheric Pressure	70 kPa to 106 kPa
Power Consumption	Typical < 680 W, maximum < 1150 W
Weight	sRUTC604 (Band 1 + Band 3): Without mounting kits: about 49.4 lb / 22.4 kg

Item	Description
	sRUTC804 (Band 8 + Band 20 + B28): Without mounting kits: about 58.0 lb / 26.3 kg
Dimensions (HxWxD)	sRUTC604 (Band 1 + Band 3): 480 mm x 370 mm x 132 mm / 18.90 in x 14.57 in x 5.2 in, without handles or external connectors sRUTC804 (Band 8 + Band 20 + Band 28): 480 mm x 370 mm x 147 mm / 18.90 in x 14.57 in x 5.79 in, without handles or external connectors
Installation	Pole or wall mount

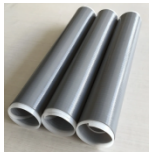
2. Installation Preparation

2.1 Supporting Materials

In addition to industry standard tools, you will need the materials described in Table 2-1 during the installation. When selecting an RF antenna, be sure to match the frequency range of the antenna with the RRU.

Table 2-1 Supporting Materials

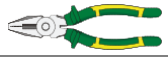
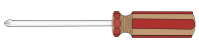
Item	Figure	Description
DC cord		A DC power cable is provided with the device. If the length is insufficient, the customer needs to prepare it. AWG10 is recommended. The cord is a two-core cable, and its length should be less than 50 meters.
RF antenna cable		50-ohm feeder, 1/2 jumper
Optical fiber		Armored optical fiber The recommended cable diameter is 7 ± 1 mm.
RF antenna		Omnidirectional or directional dual-polarized antenna. When selecting an RF antenna, be sure to match the frequency range of the antenna with the RRU.
Ground cable		If the lead length is more than 10 meters, use a ground cable with a 16 mm^2 cross-sectional area. If the lead length is less than 10 meters, use a ground cable with a 10 mm^2 cross-sectional area.

Item	Figure	Description
Pole		The pole diameter should be between 40 mm and 100 mm, and the pole should be made of hot-dip galvanized steel pipe. Channel steel and equal-angle steel installation are also supported. The width of the channel steel should be 50 mm to 100 mm; the side length of the angle steel should be 63 mm to 80 mm.
Distribution box		The AC circuit breaker, socket, power grounding point, and broadband access are all in the distribution box, which must be waterproofed.
Cold shrink tube		The waterproofing material on the RRU side is provided with the device. However, the customer must prepare the waterproofing material on the peer side.

NOTE: Other accessories are included in the packing box.

2.2 Installation Tools

The following standard tools may be needed during the installation.

				
Level bar	Marking pen	Knife	Vise	Wrench
				
Percussion drill and some drill heads	Hammer	Phillips screwdriver	Cable vise	Tape measure

				
5 mm L-shaped Allen wrench	T7 screwdriver head	Ladder	Multimeter	Crimping pliers

2.3 Installation Environment

2.3.1 Location & Environment

In addition to network planning, when determining where to place the RRU you need to consider factors such as climate, hydrology, geology, the possibility of earthquakes, reliable electric power, and transportation access. Avoid locating the RRU in areas where there may be extreme temperatures, harmful gases, unstable voltages, volatile vibrations, loud noises, flames, explosives, or electromagnetic interference (e.g., large radar stations, transformer substations). Avoid areas prone to impounded water, soaking, leakage, or condensation.

Table 2-2 provides typical environmental specifications for this RRU.

Table 2-2 Environmental Requirements

Item	Range	Typical value
Temperature	-40°C to 55°C	25°C
Safety voltage	-36VDC ~ -57VDC	-48VDC

2.4 Lightning and Grounding Protection

You must protect the RRU and antenna against lightning. The following are grounding guidelines.

- If the lead length is more than 10 meters, use a ground cable with a 16 mm^2 cross-sectional area. If the lead length is less than 10 meters, use a ground cable with a 10 mm^2 cross-sectional area. In principle, place the grounding point as close as possible to the equipment.
- Connect to a reliable outdoor grounding point (earth) using one ground screw.

- The connections between the grounding points and the ground bar must be tight and reliable. Rustproofing of the terminals, such as applying antioxidant coating or grease, is required.

2.5 Weatherproofing

To protect the connection points from weather and climate, clean each connection point before installing cold shrink tubes, per the following (Figure 2-1).

1. Insert the cable into the cold shrink tube.
2. Tighten the connector.
3. Push the cold shrink tube to the top joint, then pull out the strip.
4. Ensure the cold shrink tube is tightly fitted with the connection.

Figure 2-1 Weatherproofing

CAUTION: Ensure the cold shrink tube remains intact and is not cut for use.

3. Installation

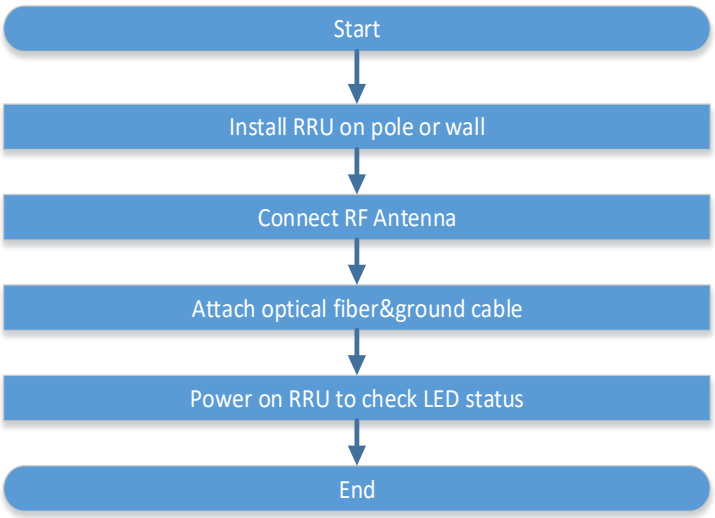
3.1 Unpacking

Before opening the box, make sure the package is in good condition, undamaged, and dry. During unpacking, avoid damage caused by impacts or excessive force. Once unpacked, check whether the quantity matches the packing list.

3.2 Installation Procedure

Figure 3-1 provides an overview of the installation process.

Figure 3-1 Installation Process



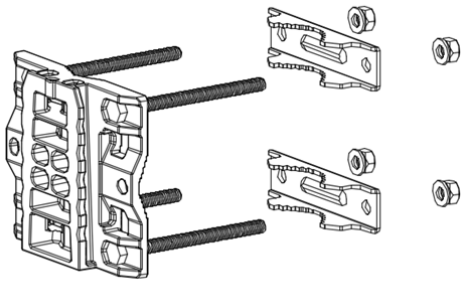
3.3 Install the RRU on a Pole

The RRU mounting bracket is assembled during manufacturing before packing. The only action required by the installer is to secure the assembly to the pole.

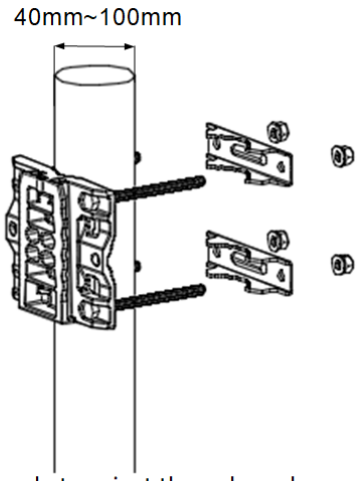
Ensure that the pole diameter is in the range of 1.6-3.9 inches (40-100 mm). The RRU position on the pole should be at least 47 inches (120 cm) above ground. Follow the steps below to install the RRU on a pole.

Figure 3-2 shows the detailed pole installation procedure. Refer to the illustrations below.

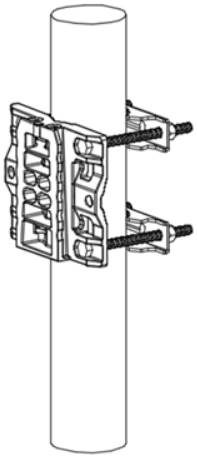
Figure 3-2 Pole Installation Process



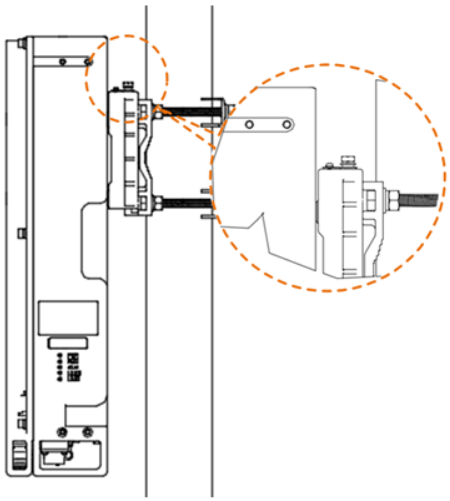
1 Take apart two clamps from the assembled bracket.



2 Put the bracket against the pole and assemble two clamps back. NOTE that the sequence of flat washers, spring washers and nuts keeps the same with original.



3 Fasten the pole bracket to ensure it has firmly fixed on the pole.



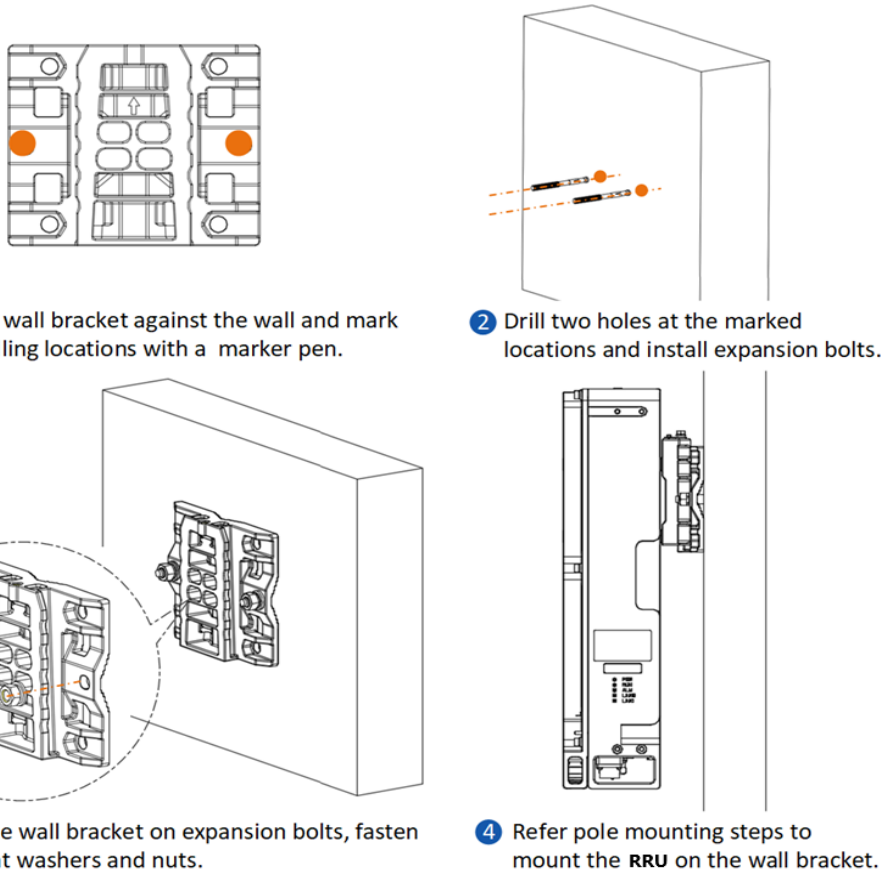
4 Align two pins on the **RRU** bracket with pin holes on the pole mounting bracket and vertically put the eNB from top to bottom, then tighten the screw on the top of the bracket using a cross screwdriver.

3.4 Install the RRU on a Wall

Ensure that the wall can support at least four times the weight of the RRU. Follow the steps below to install the Gamma455M RRU on the wall.

Figure 3-3 shows the detailed wall installation procedure. Refer to the illustrations below.

Figure 3-3 Installation Procedure on a wall



3.5 Connect Cables

3.5.1 Cable Laying Requirements

General requirements:

- Bending radius of the feeder cable: 7/8 in > 250 mm, 4/5 in > 380 mm.
- Bending radius of the jumper cable: 1/4 in > 35 mm, 1/2 in (super soft) > 50 mm, 1/2 in (ordinary) > 127 mm.
- Bending radius of the power cable and grounding cable: greater than three times the cable diameter.
- The minimum bend radius of the optical fiber is 20 times the optical fiber diameter.
- Bind cables by cable type. Intertwining and crossing are prohibited.
- An identification label should be attached after the cable is laid.

Optical fiber laying requirements:

- Avoid circling and twisting during installation.

- Avoid binding at bends.
- Avoid pulling or placing weight on the optical fiber.
- Excess optical fiber must be coiled on the dedicated device.

Grounding laying requirements:

- The grounding cable must be connected to the grounding point.
- The grounding cable must be separated from signal cables by enough distance to avoid signal interference.

3.5.2 Connect RF Cables

CAUTION:

It is strictly prohibited to activate the cell and transmit RF signals if the antenna feed system is not connected properly. The outdoor RRU has high wireless transmission power. If the RRU transmits without the antenna feed system, it may injure construction personnel and damage RF power amplifier devices.

When using only one antenna, the unused antenna interface must be connected to a load to avoid damaging the power amplifier.

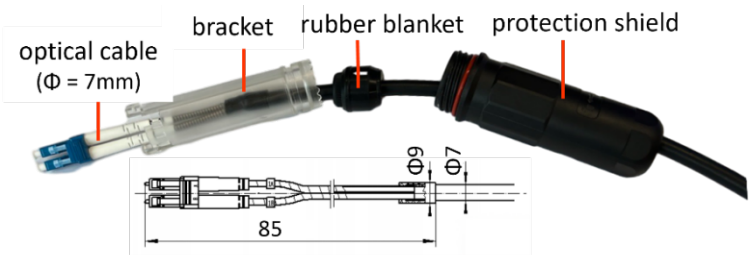
1. Open the dust caps of the ANT0/ANT1/ANT2/ANT3 interfaces.
2. Insert RF cables into cold shrink tubes.
3. Connect RF cables to the ANT0/ANT1/ANT2/ANT3 interfaces on the RRU, then tighten them with a wrench to 44.2-70.8 in-lb or 5-8 N·m torque.
4. Push the cold shrink tube to the top joint and pull out the strip.
5. Take another cold shrink tube and pass the RF cables through it.
6. Connect the other end of the RF cables to the external antenna.
7. Push the cold shrink tube to the antenna connector, then pull out the strip.

3.5.3 Connect Optical Fiber

1. Unscrew the three screws on the cover of the RRU wiring cavity using an M4 Phillips screwdriver. Open the wiring cavity.

2. Connect the optical fiber to the OPT interface in the wiring cavity.
3. Lay the optical fiber along the wire groove, then route it out of the wiring cavity through the OPT hole.

   Excess fiber should be coiled neatly.



3.5.4 Connect the Power Connector

The power cable must meet the following requirements.

- It is recommended to install a circuit breaker in the distribution box for lightning protection and leakage protection, or to use a socket or plug with a fuse.
- The power cord must be protected by a hose sleeve or wiring tube.
- The distribution box should be grounded and have leakage protection.
- The length of the power cord must be kept below 164 ft / 50 m.

Since the length of cables needed for power supply varies from site to site, the customer needs to prepare the power cable according to the actual measurements of the installation site. Strip 0.47 in/12 mm of insulation with a wire stripper to expose the conductor for connection.

The connection steps for the power cable are as follows.

1. Crimp wire ferrules onto the power cable

2. Assemble the power terminal

   Install the power terminal at the output end.

   Refer to the labels on the power terminal. Connect the positive terminal (+) and negative terminal (-) to their corresponding terminals, then tighten the screws.

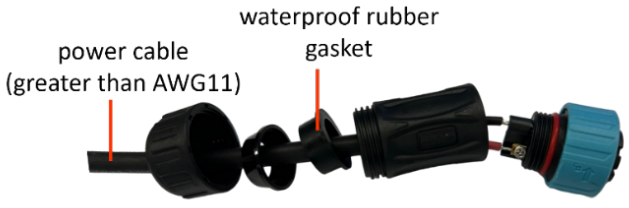
3. Connect the power cable to the **PWR** interface in the wiring cavity.

4. Lay the power cable along the line slot, then route it out of the wiring cavity through the PWR hole.

5. After the cable connection is complete in the wiring cavity, tighten the screws on the cover using an M4 Phillips screwdriver to close the wiring cavity.

6. Connect the other end of the power cord to a reliable 48 VDC power supply(2mm hex key).

   The customer must prepare the power plug. The power supply location must meet the environmental requirements.



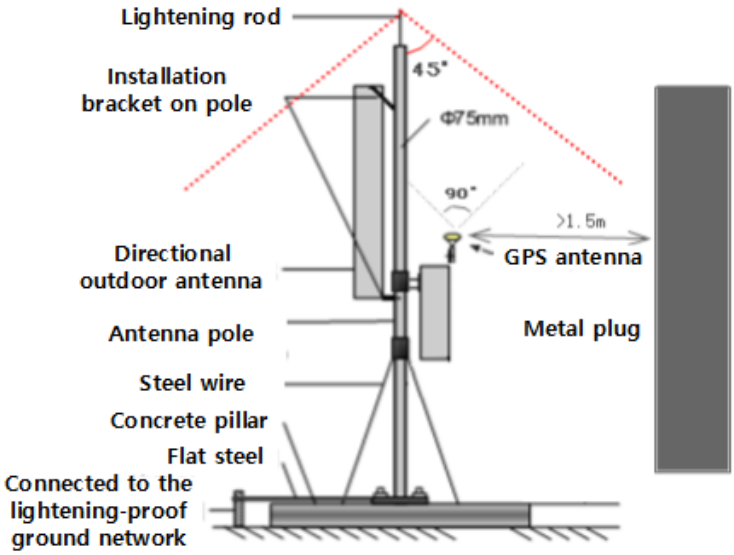
There are two types of waterproof rubber gasket. 14mm~16mm is suitable for AWG11 and above cable. When the power adapter is used, use 10mm~13mm waterproof rubber gasket, because the power adapter outlet cable is thinner.

3.5.5 Connect the Ground Cable

3.5.5.1 Pole Grounding

The purpose of pole grounding is to protect the equipment in the station from damage caused by lightning overvoltage as much as possible. The interfaces between the RRU and external systems mainly include the power system, grounding system, antenna feeder and lightning receiving device, and signal line. Therefore, lightning damage mainly comes from the voltage difference between the equipment in the RRU and one or more of these four interfaces. Pole grounding is shown in Figure 3-4.

Figure 3-4 Pole Grounding



1. The installation position of the grounding bar shall meet the design requirements. The holding pole and tower body must be connected to the lightning protection network or grounded with a separate lead.

2. The grounding wire diameter must meet the design requirements. A copper lug must be used for grounding, and the grounding resistance must be less than 10 ohms. If the resistance of public network communication equipment placed in other systems is less than 10 ohms, the grounding network of this system should be bonded to that system's grounding network.

3. The grounding wire must be a single continuous cable. During installation, it should be bound separately from other cables. All grounding wires should be fixed with cable clips or binding tape at a fixed spacing of 0.3 m. The appearance should be straight and neat.

4. The grounding bar must be made of copper, and its specifications must meet the design requirements. If the design does not specify dimensions, use a 300 × 40 × 4 mm grounding bar and fix it with expansion bolts.

5. The grounding wire must be made of a single continuous cable. Intermediate joints are strictly prohibited, and excess length should be cut. The insulation jacket must be intact, and the insulation resistance of the core wire to ground (or the metal isolation layer) must meet the technical requirements of the cable.

6. The grounding wire should be connected to the integrated grounding bar of the building. If connection to the integrated grounding bar is impossible, an appropriate grounding point can be selected according to the building's grounding conditions. The grounding point must be higher than the grounding grid, and feeder grounding should follow the downward direction of the feeder, never upward.

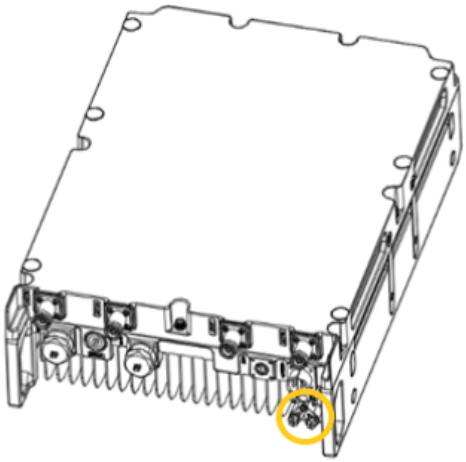
7. The grounding electrode of the self-built grounding grid for the outdoor antenna of the tunnel must meet the design requirements. The burial depth of the grounding electrode and the welding quality of the flat iron must meet specification requirements. In principle, the burial depth of the grounding electrode must not be less than 0.7 m. A non-self-built grounding network must be connected to the site owner's grounding network.

8. The RRU grounding, power adapter grounding, distribution box grounding, and feeder grounding must be connected to the grounding bar independently, and the grounding bar must have a path from the lead to earth.

3.5.5.2 RRU Grounding

Prepare the grounding cable according to the actual measurements and requirements of the specific installation site. The Gamma455M RRU has two grounding screws located on the bottom of the unit (Figure 3-5). Follow the steps below the figure to connect the ground cable.

Figure 3-5 Grounding Screws



1. Unscrew one grounding screw, connect one end of the ground cable to the grounding screw, and secure it again.
2. Repeat step 1 for the second grounding screw.
3. Once the RRU is installed at the outdoor location, the other end of the ground cable must be connected to a reliable grounding point.

3.6 Maintenance Chamber Waterproofing

After installation is complete, close the equipment maintenance chamber and ensure that it is waterproof.

1. Clamp the power cord in the wire position and seal the cable entry for a cable diameter of 9 ± 1 mm.
2. Place the pigtail/network cable in the wire position and seal the cable entry for a cable diameter of 7 ± 1 mm.

3.7 Power On to Check LED Status

Power on the RRU, then wait a few minutes while it boots up. Referring to Figure 1-4 and Table 1-2 in Section 1.3, check that the LED indicators light as expected.

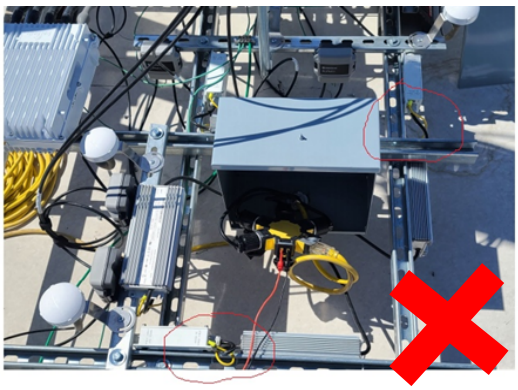
4. Precautions

4.1 FAQ

1. After the device is connected to the power cable, the PWR indicator does not light when the device is powered on.
    1) The power cable may not be connected properly, or the contact may be poor.
    2) There is no power in the circuit.
    3) There may be poor contact at the equipment power interface.
2. How do I choose the position of the support pole on the roof?
    1) Do not install it near the edge.
    2) Do not select a position on a non-load-bearing beam.
    3) Do not choose an area close to an obstruction. Choose the most open position.
3. The RRU signal coverage is not ideal after commissioning.
    1) Check whether the configured transmit power is set to full power.
    2) Check whether the equipment has a standing wave alarm. If an alarm exists, handle it promptly.
    3) Check whether the RF frequency band of the equipment is consistent with that of the antenna.
    4) Check whether the antenna downtilt planning of the base station is reasonable.
    5) Check whether there is any obstruction in the antenna's line-of-sight coverage area.
4. If a RET cable is used, no protection is required at the connector, and no cold shrink tube is needed.

4.2 Common Installation Errors

	
GPS antenna blocked	Disordered wiring
	
The holding pole lightning rod is not led to the ground bar	The GPS antenna is mounted on the front of the RF antenna
	

Lightning rod missing	Disordered distribution box wiring
	
Power cable and signal cable are crossed	Multiple grounding points
	
The RF feed system is not connected, but the cell is activated and transmits RF signals	