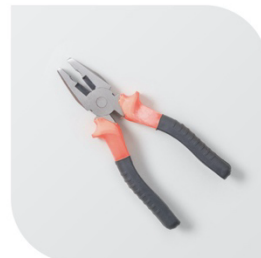


Nova436Q

Outdoor 4x1W eNB

Installation Guide



About This Document

This document is a guidance of Nova436Q hardware installation for installation personnel, including the preparation of installation tools and supporting materials, the demands for installation environment, installation procedure, cable connection and power on.

Accomplish the installation of the device according to this guide, the installation personnel can avoid potential damage to the device during the installation procedure, which makes sure the subsequent good running of the device.

This document suits for the models of mBS31001 eNodeB (eNB).

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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.

Exclamation Mark

According to Article 10 (10) of Directive 2014/53/EU, the packaging shows that this radio equipment will be subject to some restrictions when placed on the market.



AT	BE	CY	CZ	DK	EE	FI
FR	DE	EL	HU	IE	IT	LV
LT	LU	MT	NL	PL	PT	SK
SI	ES	SE	UK	BG	RO	HR

Revision Record

Date	Version	Description
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15 July, 2024	01	Initial Released.

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Safety Information

For the safety of installation personnel and for the protection of the equipment from damage, please read all safety warnings. If you have any questions concerning the warnings, before installing or powering on the base station contact the Baicells support team.



Warning IMPORTANT SAFETY INSTRUCTIONS

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents.



Warning Read the installation instructions before you connect the system to its power source.

 **Warning** Installation of the equipment must comply with local and national electrical codes.

 **Warning** This product relies on the existing building or structure for short-circuit (overcurrent) protection. Ensure that the protective device is rated no greater than 20A.

 **Warning** Do not operate this wireless network device near unshielded blasting caps or in an explosive environment unless the device has been modified and qualified for such use.

 **Warning** In order to comply with the United States Federal Communications Commission (FCC) radio frequency (RF) exposure limits, antennas should be located at a minimum of 70 centimeters (27.6 inches) or more from the body of all persons.

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1. Product Overview

1.1 Introduction

BaiCells Nova436Q is an advanced two-carrier outdoor eNodeB (eNB) compliant with 3GPP LTE TDD technology. This 4x1W eNB operates in Carrier Aggregation (CA) mode or Dual Carrier (DC) mode.

In CA mode, Nova436Q supports 2CC (2 component carriers) DL/UL CA. 2CC DL/UL CA doubles DL/UL peak throughput comparing to that of a single carrier. By aggregating 2 separated spectrum resources into a virtual contiguous spectrum resource. In DC mode, each carrier is treated as an independent cell, supporting 128+128 users, with each cell supporting 5, 10, 15, or 20 MHz bandwidth. Using a Nova436Q in DC mode simplifies and streamlines the deployment of split sectors.

In addition, HaloB (an embedded EPC option) is available on the Nova436Q as part of the base software. The BaiCells patented HaloB solution migrates the necessary core network functions to the eNB.

1.2 Highlights

Following are some of the key Nova436Q highlights.

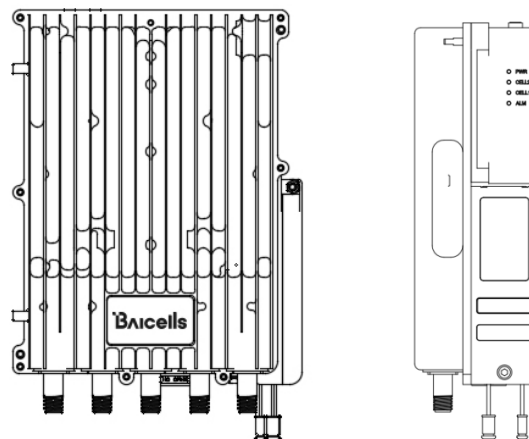
- GUI-based local and remote Web management
- Excellent Non-Line-of-Sight (NLOS) coverage
- Peak rate: Up to DL 290Mbps and UL 70Mbps with 2x20MHz bandwidth
- 2CC DL/UL CA improves the spectrum efficiency of fragmented spectrum resources.
- Suitable for private and public deployments; any IP based backhaul can be used, including public transmission protected by Internet Protocol Security (IPsec)
- 128 RRC connected users per carrier, 128+128 in DC mode; upgradeable to higher capacity in future releases
- Supports 4-port antenna or 2 antennas with 2 ports
- Integrated small cell form factor for quick and easy installation

- Configured out of the box to work with Baicells Cloud Core
- HaloB as embedded EPC solution
- Supports Transparent Bridge Mode
- Supports Citizens Broadband Radio Service (CBRS) with proxy/direct Spectrum Access System (SAS)
- Supports Multi Operator Radio Access Network (MORAN)
- Support Inter Cell Interference Coordination (ICIC) with static
- Plug-and-play with Self-Organizing Network (SON) capabilities
- Inter operation with all standard LTE Evolved Packet Core network (EPC)
- Supports TR-069 network management interface
- Lower power consumption, which reduces OPEX, can be powered easily by Baicells compact outdoor smart UPS

1.3 Appearance

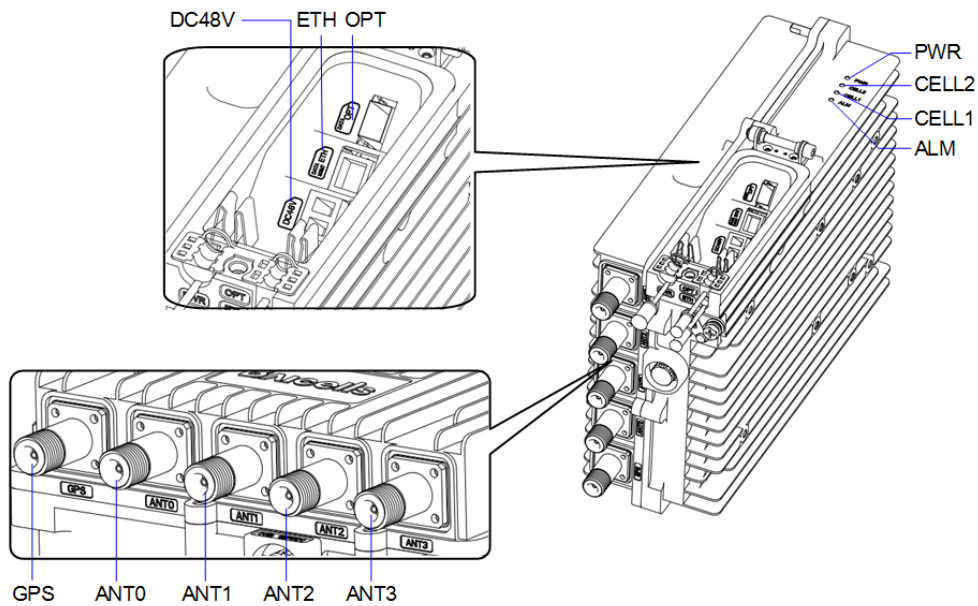
The Nova436Q eNB appearance is shown in Figure 1-1.

Figure 1-1 Nova436Q Appearance



The Nova436Q interfaces and LED indicators are shown in Figure 1-2.

Figure 1-2 Nova436Q Interfaces and LED Indicators



The Nova436Q interfaces are described in Table 1-1.

Table 1-1 Nova436Q Interface Description

Interface Name	Description
DC48V	Power interface: -40VDC ~ -57 VDC, nominal -48VDC
OPT	Optical interface (SFP), connect to external transmission network, used for data backhaul.
ETH	RJ-45 interface (GE), used for debug or data backhaul.
GPS	External GPS antenna, N-female connector.
ANT0	External antenna 0, N-female connector.
ANT1	External antenna 1, N-female connector.
ANT2	External antenna 2, N-female connector.
ANT3	External antenna 3, N-female connector.

The Nova436Q interface indicators are described in Table 1-2.

Table 1-2 Nova436Q LED Indicators

Identity	Color	Status	Description
PWR	Green	Steady On	Power On
		OFF	No Power Supply
CELL2	Green	Fast flash: 0.125s on,0.125s off	CELL 2 inactivated
		Slow flash: 1s on,1s off	CELL 2 activated
CELL1	Green	Fast flash: 0.125s on,0.125s off	CELL 1 inactivated
		Slow flash: 1s on,1s off	CELL 1 activated
ALM	Red	Steady On	Hardware alarm, e.g., VSWR alarm
		OFF	No alarm

1.4 Technical Specification

1.4.1 Technology

Item	Description
Standard	LTE TDD RAN (3GPP R15 compliant)
TDD UL/DL Configuration	1, 2, 6 (with Special Subframe Configuration 7)
Frequency Band	B42 (3400 MHz – 3600 MHz) B48 (3550 MHz – 3700 MHz)
Channel Bandwidth	SC: 5/10/15/20 MHz CA: 40 MHz as maximum aggravated bandwidth
Multiplexing	MIMO: 2x2 (DL)

Item	Description
Security	Radio: SNOW 3G/AES-128 Backhaul: IPsec (X.509 AES-128, AES-256, SHA-128, SHA-256)

NOTE: FCC Frequency is 3550MHz to 3700MHz; IC Frequency is 3550MHz to 3700MHz.

1.4.2 Interface

Item	Description
Ethernet Interface	1 optical (SFP) and 1 RJ-45 Ethernet interface (1 GE)
Power Supply	-40VDC ~ -57 VDC, nominal -48VDC AC adaptor (multi-national standards)
Protocols Used	IPv4/IPv6 (Dual Stack), UDP, TCP, ICMP, SNMPv2c, NTP, SSH, IPsec, TR-069, HTTP/HTTPS, 1588v2, DHCP
Network Management	IPv4/IPv6, HTTP/HTTPS, SNMPv2c, TR-069, SSH, Embedded EPC
VLAN/VxLAN	802.IQ/VxLAN
LED Indicators	4 x status LED CELL1/CELL2/ALM/PWR

1.4.3 Performance

Item	Description		
Peak Data Rate (DC)	2x20 MHz	DL (Mbps)	UL (Mbps)
	UL/DL Config 1	2x105	2x28
	UL/DL Config 2	2x145	2x14
	UL/DL Config 6	2x85	2x35
	2x10 MHz	DL (Mbps)	UL (Mbps)

Item	Description		
	UL/DL Config 1	2x51	2x14
	UL/DL Config 2	2x70	2x7
	UL/DL Config 6	2x42	2x17
Peak Data Rate (CA)	2x20 MHz	DL (Mbps)	UL (Mbps)
	UL/DL Config 1	210	56
	UL/DL Config 2	290	28
	UL/DL Config 6	170	70
	2x10 MHz	DL (Mbps)	UL (Mbps)
	UL/DL Config 1	102	28
	UL/DL Config 2	140	14
	UL/DL Config 6	84	34
	20MHz + 10MHz	DL (Mbps)	UL (Mbps)
	UL/DL Config 1	156	42
	UL/DL Config 2	215	21
	UL/DL Config 6	127	52
	20MHz + 15MHz	DL (Mbps)	UL (Mbps)
	UL/DL Config 1	182	49
	UL/DL Config 2	250	24
	UL/DL Config 6	148	61
User Capacity	Up to 128 RRC connected users per cell (4 users per TTI) • SC/CA: 128 RRC connected users • DC: 128+128 RRC connected users		
Maximum Deployment	12 kilometers		

Item	Description
Range	
Latency	30 milliseconds
Receive Sensitivity	-100 dBm (per channel)
Modulation	MCS0 (QPSK) to MCS27 (256QAM) DL: QPSK, 16QAM, 64QAM, 256QAM UL: QPSK, 16QAM, 64QAM
Transmit Power Range	0 to 30 dBm per channel (combined +36dBm, configurable) (1 dB interval)
Quality of Service	Nine-level priority indicated by QoS Class Identifiers (QCI)
ARQ/HARQ	Supported
Synchronization	GPS, 1588v2

NOTE: The test method of receiving sensitivity is proposed by the 3GPP TS 36.104, which is based on 5MHz bandwidth, FRC A1-3 in Annex A.1 (QPSK, R=1/3, 25RB) standard.

1.4.4 Modulation Levels (Adaptive)

MCS	Modulation Scheme	RSRP (dBm)	Coverage Distance (km)
0 - 4	QPSK	$-120 \leq \text{RSRP} < -110$	$9 < D \leq 12$
5- 9	16QAM	$-110 \leq \text{RSRP} < -100$	$4 < D \leq 9$
10 - 19	64QAM	$-100 \leq \text{RSRP} < -85$	$2 < D \leq 4$
20 - 27	256QAM	$\text{RSRP} \geq -85$	$D \leq 2$

NOTE: The information provided is for reference only as the environment can impact modulation levels.

Scenario: Base Station height is 30 meters; Customer User Equipment (CPE) height is two meters.

1.4.5 Features

Item	Description
Voice	VoLTE*
NSA	Supported
SON	Self-Organizing Network - Automatic setup - Automatic Neighbor Relation (ANR) - PCI confliction detection
EPC	HaloB (Embedded EPC)
Traffic Offload	Local breakout
Layer 2 Support	Transparent Bridge Mode
Maintenance	- Local/Remote Web maintenance - Online status management - Performance statistics - Fault management - Local/Remote software upgrade - Logging - Connectivity diagnosis - Automatic start and configuration - Alarm reporting - User information tracing - Signaling trace

* Planned for future release

1.4.6 Link Budget

Item	Description
Antenna Connection	External high-gain antenna with N-Type connectors, either (2) 2-port antennas or (1) 4-port antenna

Item	Description
GPS Antenna	External GPS antenna, N-Type connector
Power Control	UL Open-loop/Closed-loop Power Control, DL Power Allocation (3GPP TS 36.213 compliant)

1.4.7 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 60W, maximum 100W
Weight	16.5 lbs / 7.5 kg
Dimensions (HxWxD)	With joint: 13.1 x 9.4 x 4.1 inches 333 x 240 x 105 millimeters Without joint and handle: 11.8 x 9.4 x 4.1 inches

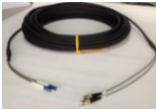
Item	Description
	300 x 240 x 105 millimeters
Installation	Pole or wall mount

2. Installation Preparation

2.1 Support 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 eNB.

Table 2-1 Support Materials

Item	Figure	Description
AC cord		The cross section of power cable must be AWG13 or greater (such as AWG12). The cord is three cores cable and the length is less than 100 meters.
DC cord		A DC power cable is provided with the device. If the length is insufficient, the customer needs to prepare it. It is suggested that AWG13 is used. The cord is two cores cable and the length is less than 100 meters.
RF antenna cable		50 ohm feeder, 1/2 jumper
Optical fiber		Optical fiber (armor) It is suggested that the diameter of the cable is 7 ± 1mm.
Ethernet cable		Outdoor CAT6, shorter than 100 meters (~109 yards) It is suggested that the diameter of the cable is 7 ± 1mm.

Item	Figure	Description
RF antenna		Omni or directional dual polarized antenna When selecting an RF antenna, be sure to match the frequency range of the antenna with the gNB.
Ground cable		If the length of lead is more than 10 meters, a ground cable with 16mm ² cross section should be used. If the length of lead is less than 10 meters, a ground cable with 10mm ² cross section should be used.
Pole		The diameter of the pole is between 40mm to 100mm of hot-galvanized steel pipe. Channel steel and equal angle steel installation are also supported. The width of the channel steel is 50mm to 100mm; the length of side of the angle steel is 63mm to 80mm.
Distribution box		AC Air switch, socket, power grounding point, broadband access is all in the distribution box, which must be waterproofed.

2.2 Installation Tools

The following tools are needed during the installation.

				
Level bar	Marking pen	Knife	Vise	Wrench
				

Percussion drill and some drill heads	hammer	Cross screwdriver	Cable vice	Tape measure
				
5mm L-shape allen wrench	T7 screwdriver head	Ladder	compass	fixed pulley
				
multimeter				

2.3 Installation Environmental Requirements

In addition to network planning, when determining where to place the eNB you need to consider factors such as climate, hydrology, geology, the possibility of earthquakes, reliable electric power, and transportation access. Avoid locating the eNB 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 eNB.

Table 2-2 Environmental Requirements

Item	Range	Typical value
Temperature	-40°C to 55°C	25°C
Relative humidity (no condensation)	0% to 100%	5% to 95%
Safety voltage	42V to 58V	48V

2.4 Personnel Requirements

The installation personnel must master the basic safe operation knowledge, through the

training, and having the corresponding qualifications.

2.5 Lightning & Grounding Protection

You must protect the eNB, antenna, and GPS against lightning. Following are guidelines concerning grounding.

- The yellow-green ground wire must be at least 10mm² in diameter.
- In principle, always place the grounding as near as possible to the equipment.
- Connect to a reliable outdoor grounding point (earth) using one ground screw.
- The connection of the grounding points and ground bar need to be tight and reliable. Rustproofing the terminals, e.g., with anti-oxidant coating or grease, is required.

2.6 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, and 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

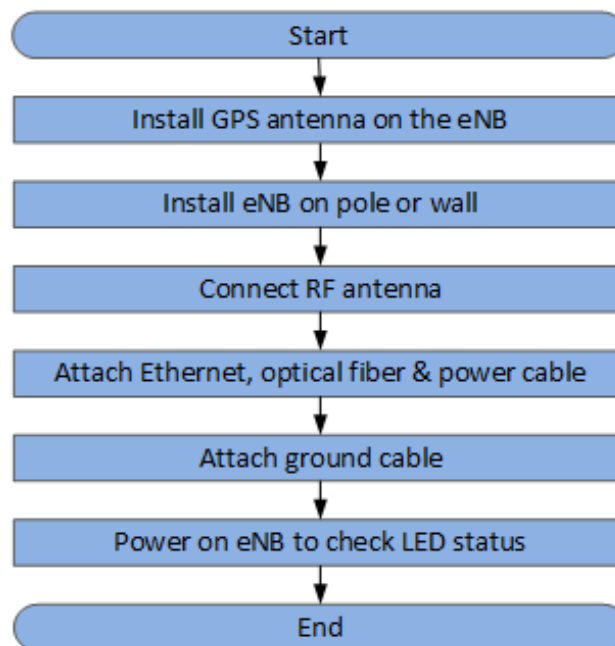
Before opening the box, make sure the package is in good condition, undamaged and not wet. During the unpacking, avoid potential damaging impacts from hits or excessive force.

Once unpacked, check whether the quantity is consistent with the packing list.

3.2 Installation Procedure

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

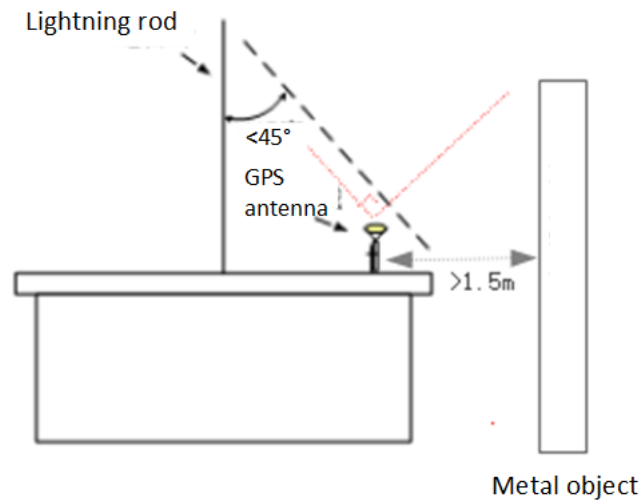
Figure 3-1 Installation Process



3.3 Install GPS Antenna

Read the following GPS antenna installation requirements before installing it on the eNB, as shown in Figure 3-2.

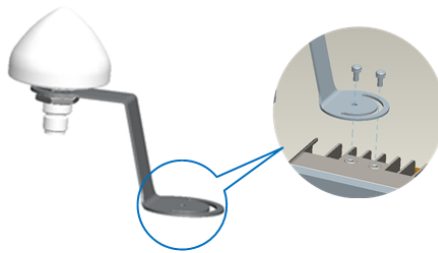
Figure 3-2 GPS Installation Requirements



- No major blocking from buildings in the vicinity. Keep the rooftop buildings a distance away from the GPS. Make sure the space atop within 90 degrees (at least 45 degrees) is not blocked by any buildings.
- Avoid installing the GPS in the vicinity of any other transmitting and receiving devices. Avoid interference from other transmitting antennas to the GPS antennas.
- The GPS antenna should be installed within 45 degrees to the lightning rod.
- When two or more GPS antennas are installed, it is recommended to keep the spacing of more than 2 meters and install multiple GPS antennas in different locations to prevent simultaneous interference.
- Do not install the GPS antenna near other transmitting and receiving equipment. Do not install it under the microwave antenna or high voltage cable. Avoid the direction of radiation from other transmitting antennas to the GPS antenna
- GPS antenna feeders cannot be grounded together with ground conductors of interfering equipment such as air conditioners, motors, and pump motors, etc. to prevent external interference from being introduced into the antenna system.

The GPS antenna system is assembled in manufacturing before packing. The only installation step is to fix the GPS mounting bracket on the eNB with the M4*14 screws (Figure 3-3).

Figure 3-3 GPS Antenna Installation



NOTE: The eNB may adopt different models of GPS antenna, so the GPS antenna may not be the same as above figure. But the installation steps that fix it on the eNB is the same.

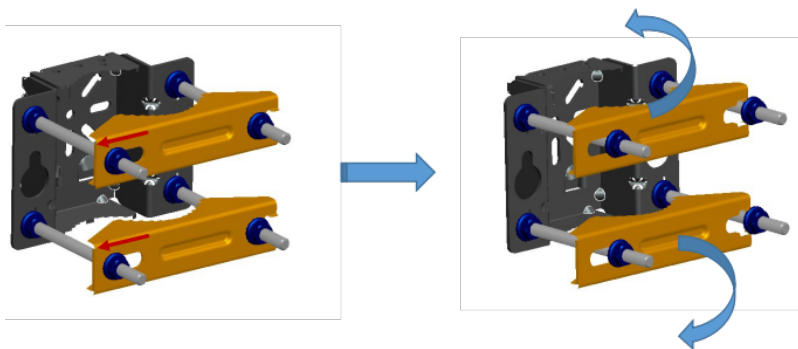
3.4 Install on Pole

The eNB mounting bracket is assembled in manufacturing before packing. The only action required by the installer is to fix the assembly on the pole.

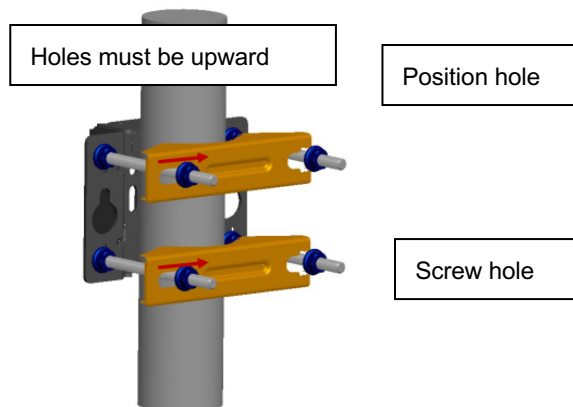
Check to ensure the diameter of the pole is in the range of 1.6 inches to 2.8 inches (40mm to 70 mm). The position of the gNB on the pole should be at least 47 inches (120 cm) in height.

Follow the steps below to install the eNB on a pole.

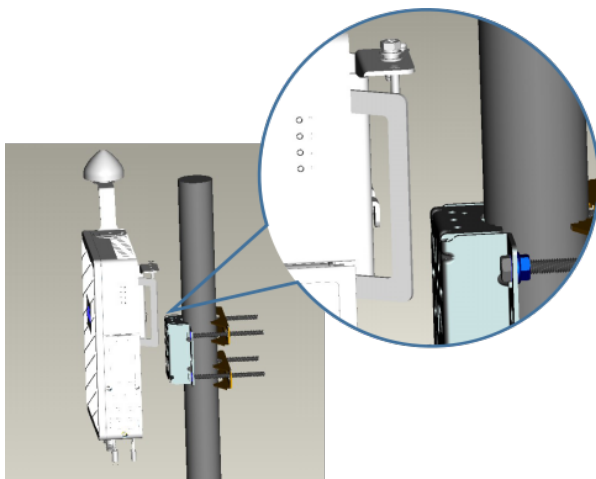
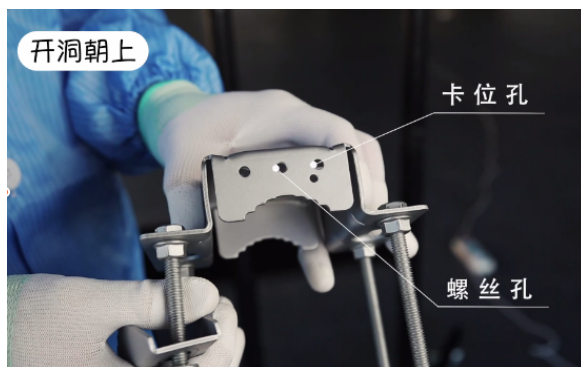
1. Unscrew the 4 screws of the assembled bracket. Slide the two omega clamps to the left, and then turn them up or down.



2. Attach the bracket to the pole, considering the height requirements described above. Fit the threaded rod of the bracket to the pole, and then turn the 2 clamps to the proper position. Fasten with the 4 screws.



- Align the pin on the eNB bracket to the pin holes on the pole bracket, lower the pin into the pin holes vertically until the hook on the eNB gets stuck firmly with the slot on the pole bracket.



- Tighten the screw on the top of the bracket using cross screwdriver to complete the installation.

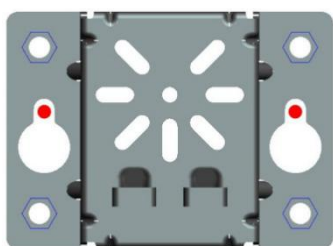


5. Proceed to “3.6 Connect Cable”.

3.5 Install on Wall

Ensure that the wall can bear at least 4 times the weight of the eNB. Follow the steps below to install the Nova436Q eNB on the wall.

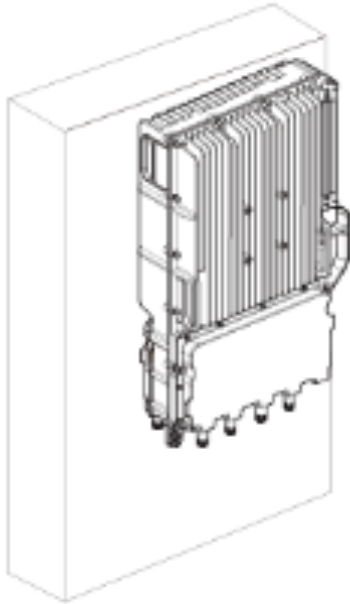
1. Take apart the assembled installation bracket kit to get the installation bracket.
2. Against the installation bracket on the wall, with the arrow pointing up. Mark the drilling locations using a pencil or marker.



3. Drill two .4in/10mm diameter by 2.8in/70mm deep holes in the wall at the marked locations.
4. Insert M8 * 80 expansion screws and fasten.
5. Check the up/down direction of the installation bracket, and then fix it to the

wall with M8 * 80 expansion screws.

6. Refer to pole installation steps, fix the eNB on the wall bracket.



7. Proceed to “3.6 Connect Cable”.

3.6 Connect Cable

3.6.1 Cable Laying Requirements

General requirements:

- Bending radius of feeder cable: 7/8" > 250mm, 4/5" > 380mm.
- Bending radius of jumper cable: 1/4" > 35mm, 1/2" (super soft) > 50mm, 1/2" (ordinary) > 127mm.
- Bending radius of power cable and grounding cable: > tripled of the diameter of the cable.
- The minimum bend radius of the optical fiber is the 20 times the diameter of the optical fiber.
- Bind the cables according the type of the cable, intertwining and crossing are forbidden.

- An identification label should be attached after the cable is laid.

Optical fiber laying requirements:

- Avoid circling and twisting during the laying.
- Avoid binding on a turn.
- Avoid pulling and weighing down the optical fiber.
- The redundant optical fiber must enwind the dedicated device.

Grounding laying requirements:

- The grounding cable must connect to the grounding point.
- The grounding cable must be separate with the signal cables, of enough distance to avoid signal interference.

3.6.2 Connect GPS Antenna

1. Insert the GPS jumper into a cold shrink tube.
2. Connect one end of the GPS jumper to the GPS antenna.
3. Push the cold shrink tube to the top joint, and pull out the strip.
4. Take another cold shrink tube, and pass through the GPS jumper.
5. Connect the other end of the GPS jumper to **GPS** interface on the eNB, which also need weatherproof protection.

The top of the GPS antenna should avoid the frontal position of the directional antenna as far as possible. In the case of obstruction, it is recommended to pull away and install the GPS antenna, that is, the GPS antenna be installed in an open and lightning protected position.

3.6.3 Connect RF Cable

**CAUTION:**

It is strictly prohibited to activate the cell and transmit RF if the antenna feed system is not connected properly. The wireless signal transmission power of the

outdoor eNBs is large, if the eNB transmits without the antenna feed system, which may cause injury to the body of the construction personnel and the damage of RF power amplifier devices.

1. Open the dust caps of the **ANT0**, **ANT1**, **ANT2**, and **ANT3** interfaces.
2. Insert RF cables into cold shrink tubes.
3. Connect RF cables to the **ANT0**, **ANT1**, **ANT2**, and **ANT3** interfaces on the eNB, and tighten them with wrench to 12-15 in-lbs or 1.4-1.7 NM torque.
4. Push the cold shrink tube to the top joint and pull out the strip.
5. Take another cold shrink tubes, and pass through the RF cables.
6. Connect the other end of the RF cables to the external antenna.
7. Push the cold shrink tube to the antenna connector, and pull out the strip.

3.6.4 Connect Optical Fiber

1. Unscrew the 3 screws on the cover of the eNB's wiring cavity using M4 cross screwdriver. Open the wiring cavity.
2. Connect the optical fiber to **OPT** interface in the wiring cavity.
3. Lay the optical fiber along the wire groove, and stretch out the wiring cavity from **OPT** hole.

The redundant fiber should enwind neatly.

3.6.5 Connect Ethernet Cable

1. Connect the Ethernet cable to **ETH** interface in the wiring cavity.
2. Lay the Ethernet cable along the wire groove, and stretch out the wiring cavity from **ETH** hole.

3.6.6 Connect Power Connector

Since the length of cable needed for power varies from site to site, the two ends of the power adaptor are bare terminal ends. You will need to make the power cable according to the actual measurements of the installation site, and assemble the power plug and

power terminal on the two ends of the power adaptor, as shown in Figure 3-4.

Figure 3-4 Power Supply Adaptor



- AC power
 - It is recommended to install an air switch in the distribution box for lightning protection and leakage protection, or a socket or plug with a fuse.
 - The power cord needs to be protected by a soft casing or wiring tube.
 - The distribution box should be grounding and have leakage protection.

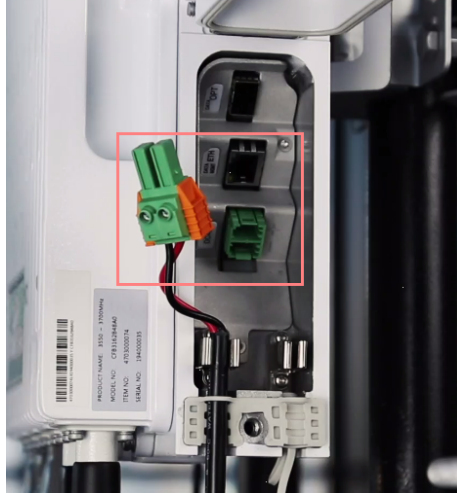


Strip .47in/12mm insulating layer with a wire stripper, reserved conductor is used for connection. The power cord length should be kept below 330 ft/100m.

ATTENTION: If the adaptor connects to a surge arrester, it must be grounding.

- DC power

The DC power cord length from the adaptor should be kept below 98.4 ft/30m.



The connection steps for the power cable are as follows.

1. Assemble the power plug.

The power plug should be self-prepared according to local standards by the customer.

The power plug will be installed on the end of the input direction. Refer to the labels on the power plug for connecting the live wire, neutral wire, and ground wire to the corresponding terminals separately, and tighten the screws.

2. Assemble the power terminal.

The power terminal will be installed on the end of the output direction. Refer to Figure 3-5 to connect the live wire and neutral wire.

Figure 3-5 Power Terminal



3. Connect the power cable to the **PWR** interface in the wiring cavity.
4. The power cable lays along the lint slot, and stretch out the wiring cavity from the PWR hole.
5. The input of the power adaptor connects to the outlet.

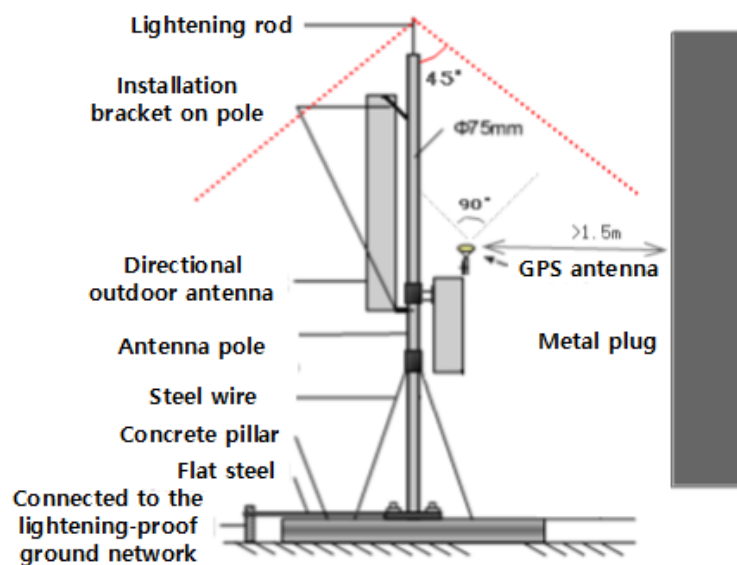
- If the outlet is indoors, place the power adaptor indoors.
 - If the outlet is outdoors, place the power adaptor in a waterproof box.
6. After the cable connection is complete in the wiring cavity, tighten the screws on the cover to close the wiring cavity using M4 cross screwdriver.

3.6.7 Connect Ground Cable

3.6.7.1 Pole Grounding

The purpose of the pole grounding is to protect the equipment in the station from the damage of lightning overvoltage as far as possible. However, the interfaces between the eNB and the outside world mainly include power system, grounding system, antenna feeder and lightning receiving device, and signal line. Therefore, the damage caused by lightning mainly comes from the voltage difference between the equipment in the eNB and one or more of the four interfaces. The pole grounding is shown in Figure 3-6.

Figure 3-6 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 diameter of the grounding wire meets the design requirements. The copper

nose must be used for grounding, and the grounding resistance is required to be less than 10 ohms. If the resistance of the public network communication equipment placed in other systems is less than 10 ohms, the grounding network of the system should be overlapped.

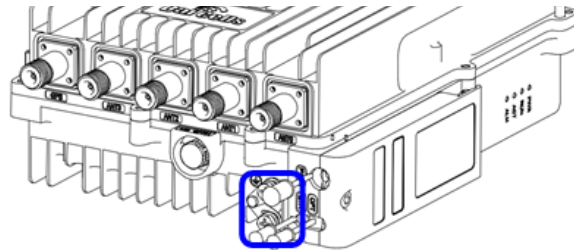
3. The grounding wire must be the whole wire material. When laying, it should be bound separately with other cables. All grounding wires should be fixed with wire code or binding tape with a fixed spacing of 0.3m. The appearance should be straight and beautiful.
4. The copper bar must be used for the grounding bar, and the specification of the grounding bar shall meet the design requirements. If there are no specific requirements in the design, 300 × 40 × 4mm and fixed with expansion bolts.
5. The grounding wire must be made of the whole cable material, the intermediate joint is strictly prohibited, and the excess length should be cut. The skin shall be complete, and the insulation resistance of the core wire to the ground (or metal isolation layer) shall meet the technical requirements of the cable.
6. The grounding wire shall be connected to the integrated grounding bar of the building. If it is impossible to connect to the integrated grounding bar of the building, the appropriate grounding point can be selected according to the integrated grounding situation of the indoor building. The selection of grounding point must be higher than the grounding grid, and the feeder grounding shall be towards 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 buried depth of the grounding electrode and the welding quality of the flat iron meet the specification requirements. In principle, the buried depth of the grounding electrode shall not be less than 0.7m. The non-self-built grounding network shall be connected to the grounding network of the owner.
8. The eNB 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 the earth.

3.6.7.2 eNB Grounding

Prepare the grounding cable according to the actual measurements and requirements of

the specific installation site. The eNB has two grounding screws located on the bottom of the unit, as shown in Figure 3-7. Follow the steps below the figure to connect the ground cable.

Figure 3-7 Grounding Screws

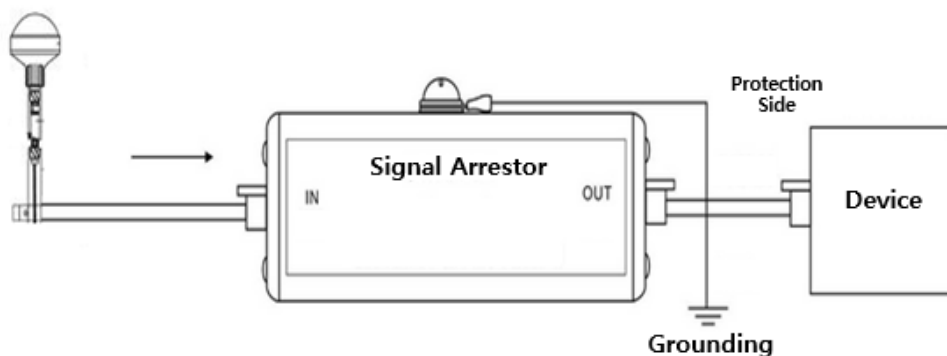


1. Unscrew one grounding screw, connect one end of the ground cable to the grounding screw, and fasten it again.
2. Once the eNB is installed at the outdoor location, the other end of the ground cable needs to connect to a good grounding point.

3.6.7.3 GPS Antenna Grounding

If the length of GPS antenna is more than 5 meters, it is recommended to extend the installation distance. It is suggested to carry out lightning protection of GPS antenna, add lightning protector, and connect the lightning protector to the grounding bar, as shown in Figure 3-8.

Figure 3-8 GPS Grounding

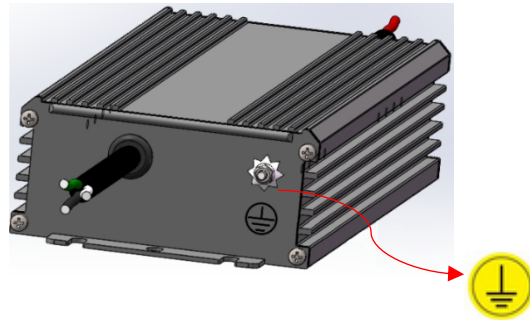


3.6.7.4 Power Adapter Grounding

The adapter ground terminal is connected to the ground bar conforming to the local

standard through the ground wire, as shown in Figure 3-9.

Figure 3-9 Power Adapter Grounding



3.7 Maintenance Chamber Waterproofing

When all the installation has been completed, it is necessary to close the maintenance chamber of the equipment and play the role of waterproof at the same time.

1. Clamp the power cord to the wire position and seal the wire diameter $9 \pm 1\text{mm}$.
2. Put the pigtail / network cable on the wire, and seal the wire diameter $7 \pm 1\text{mm}$.

3.8 Power on to Check LED Status

Power on the eNB, and wait a few minutes while the eNB boots up. Per the previous Figure 1-2 and Table 1-2 in “1.3 Appearance”, check that the LED indicators are lighting as expected.

4. Attentions

4.1 FAQ

1. After the device is connected with the power line, the PWR of the device will not be displayed when it is powered on.
 - 1) Maybe the power line is not connected well, and the contact is poor.
 - 2) There is no power in the circuit.
 - 3) Reverse connection of DC wire.
 - 4) The adapter does not work.
 - 5) Poor contact of equipment power interface.
2. How to connect the antenna feeder
 - 1) ANT0 is the main channel and ANT1 is the secondary channel.
3. GPS has been out of sync
 - 1) The antenna is not installed in an open place.
 - 2) The antenna is blocked, which affects the search.
 - 3) There are strong interference sources around the installation location, such as large transformer station and high-power motor fan.
 - 4) Installed under the front cover of wireless antenna, strong signal interference and so on.
 - 5) GPS satellite search is slow and takes a long time. The number of satellites and signal strength can be observed in the maintenance page.
4. How to choose the position of holding pole in the roof
 - 1) Not near the edge.
 - 2) The position of non-bearing beam cannot be selected.
 - 3) Do not choose the side close to the barrier, you need to choose the most open position.

5. The coverage of eNB signal is not ideal after opening
 - 1) Check if the power is full in the base station configuration.
 - 2) Check whether the equipment has standing wave alarm. If there is any alarm, please handle it in time.
 - 3) Check whether the RF frequency band of the equipment is consistent with that of the antenna.
 - 4) Check whether the dip angle planning of the base station is reasonable.
 - 5) Whether there is blocking in antenna coverage direct vision.
6. 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



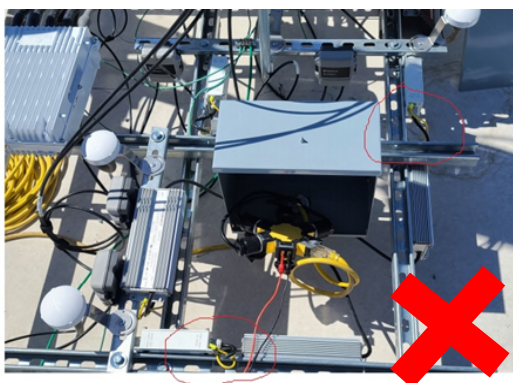
The GPS antenna is mounted on the front of the RF antenna

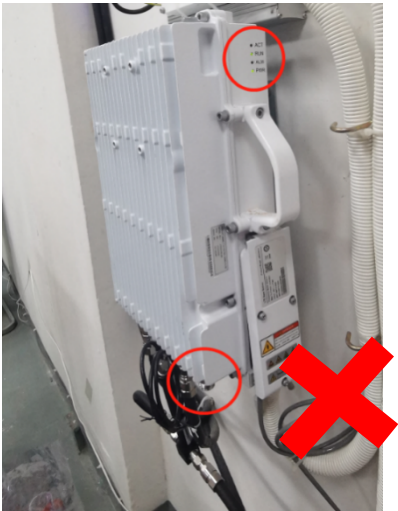


Without the lightning rod



Disordered wiring of distribution box



Power line and signal cable are crossed	Multiply the grounding point
	
The RF feed system does not connect, the cell is activated and RF transmits signal	

Appendix A Terminology & Acronym

Acronym	Full Name
ANR	Automatic Neighbor Relations
ARQ	Automatic Repeat Request
CA	Carrier Aggregation
CC	Component Carriers
CSFB	Circuit Switched Fallback
DC	Dual Carrier
EPC	Evolved Packet Core network
GPS	Global Positioning System
HARQ	Hybrid Automatic Repeat Request
IPsec	Internet Protocol Security
MIMO	Multi Input Multi Output
MME	Mobility Management Entity
MOCN	Multi-Operator Core Network
NLOS	Non-Line-of-Sight
OPEX	Operating Expense
PAP	Password Authentication Protocol

Acronym	Full Name
PCI	Physical Cell Identifier
PLMN	Public Land Mobile Network
QAM	Quadrature Amplitude Modulation
QCI	QoS Class Identifiers
QoS	Quality of Service
QPSK	Quadrature Phase Shift Keying
RSRP	Reference Signal Receiving Power
SSH	Secure Shell
SON	Self-Organized Network
TAC	Tracking Area Code

Appendix B Regulatory Compliance

FCC Compliance

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment 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 equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

Warning:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 50cm between the radiator & your body.

ISED Compliance

This device complies with Innovation, Science, and Economic Development 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' Innovation, Science et Développement économique 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.

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 50 cm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter, End-Users must be provided with transmitter operation conditions for satisfying RF exposure compliance.