Baicells

Aurora243

Outdoor 2x10W TDD gNodeB

Installation Guide

BaiBNQ_2.2-10w

May 2023
Version 1.02

About This Document

This document is intended for personnel installing the Baicells Aurora243 Outdoor Integrated 2x10W gNodeB (gNB) product. The product overview is followed by the procedures for properly installing, performing basic configuration, and verifying if the gNB is operational. Please be advised that only personnel with the appropriate electrical skills and experience should install this device. This document is based on software version BaiBNQ_2.2-10w. The Aurora243 model number is sBSC7471.

Terms used in this document or related to Long-Term Evolution (LTE) are listed in alphabetical order and described in *Acronyms and Abbreviations*, which can be found at Baicells.com > Resources > *Documents*.

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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
05-May-2023	1.02	Standard Release – Includes new initial configuration information	Blake Volk
22-Dec-2022	1.01	Preliminary Release – This is the first release of the document	Blake Volk

Resources

- **Documentation** - Baicells product datasheets and technical manuals can be found at Baicells.com > Resources > *Documents*.
- **Support** - Open a support ticket, process an RMA, and the Support Forum are at Baicells.com > *Support*.

Contact Us

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Safety Information

For the safety of installation personnel and 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: Equipment installation 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: To comply with the United States Federal Communications Commission (FCC) Radio Frequency (RF) exposure limits, antennas should be located at a minimum of 7.9 inches (20 centimeters) or more from the body of all persons.

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1. Overview

1.1 Introduction

The Baicells Aurora243 (Figure 1-1) is an advanced outdoor 5G Sub-6G integrated base station (gNodeB) designed and developed based on Qualcomm 5G System on a Chip (SoC) solution. This 2X10W gNB is compliant with Third-Generation Partnership Program (3GPP) Release 15 New Radio (NR) Time Division Duplexing (TDD) technology and supports broadband data access, providing various data service transformation and transmission capabilities to enable indoor wireless coverage. This gNB consumes low power, has a small form factor, and is easy to maintain. As a result, the Aurora243 enables operators to enhance coverage performance, improve network capacity, and eliminate blind spots for their 5G networks while reducing overall system power consumption.

Figure 1-1: Aurora243 gNodeB

Each gNB is pre-configured to simplify the installation. In addition, Baicells provides operators with local and Web-based Graphical User Interface (GUI) software applications to configure and manage individual gNBs and Customer Premise Equipment (CPE).

Additionally, Baicells offers a centralized Software-as-a-Service (SaaS) solution called CloudCore. CloudCore includes all the essential LTE Evolved Packet Core (EPC) network functions, an Operations Management Console (OMC) for managing multiple sites across the network, and a Business and Operation Support System (BOSS) for subscriber management.

In this document, you will find a general description, guidelines, and procedures for installing, entering basic configuration information, and verifying the operational status of the gNB.

1.2 Features

The following is a list of key Aurora243 features. The datasheet providing technical specifications is kept up-to-date on the *Baicells website*.

- Supports standard NR Bands N41/N48/N77/N78
- Complies with 3GPP Release 15 standards
- Supports 100 MHz bandwidth
- Peak rate:
    - 5 ms periodicity, up to: DL 850 Mbps, UL 230 Mbps (UL 256 QAM)
    - 2.5 ms dual periodicity, up to: DL 720 Mbps, UL 330 Mbps (UL 256 QAM)
    - 2.5 ms single periodicity, up to: DL 380 Mbps, UL 660 Mbps (UL 256 QAM)
- Supports 600 active users
- Supports TR-069 network management interface
- Can be accessed via GUI-based local and remote Web management
- Supports Protocol Data Unit (PDU) session setting
- Supports cell setting
- Supports Standalone (SA) mode
- Supports Next Generation (NG) setting
- Supports F1 setting
- Supports Customer Premise Equipment (CPE) attachment
- Supports Stream Control Transmission Protocol (SCTP) control Internet Key Exchange Stream Control Transmission Protocol (IKE SCTP)
- Integrated small cell form factor for quick and easy installation
- Configured out-of-the-box to work with Baicells Cloud Core
- Acts as a plug-and-play device with Self-Organizing Network (SON) capabilities
- Highly secured with equipment certification against potential intrusion risk
- Uses low power consumption to reduce OPEX
- Global Positioning System (GPS) Synchronization

2. Installation Preparation

2.1 Materials

Check the Aurora243 package to ensure it contains the primary components shown in the pack out (Figure 2-1). In addition to industry-standard tools, you will need the materials described in Table 2-1 and the tools described in Table 2-2 during the installation.

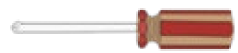
Figure 2-1: Aurora243 Pack Out

Table 2-1: Materials

Item	Description
DC power cord	A DC cable is provided with the device. If the length is insufficient, prepare 13 AWG cable, with two cores, less than 330 ft (100m).
AC power cord (optional)	If the power supply is AC, prepare 13 AWG or greater (e.g., 12 AWG) cable, with three cores, less than 328 feet (100 meters).
Power supply	90 VAC to 264 VAC, 47 Hz to 63 Hz
RF antenna cable	50-ohm feeder, ½ jumper
RF antenna	Omni or directional dual-polarized. Ensure the frequency range of the RF antenna matches the gNB.
Optical fiber	Optical fiber (armor). It is suggested that the diameter of the cable is 0.3 inches ± 0.04 inches (7 mm ± 1 mm)
Ethernet cable	Outdoor CAT6, shorter than 328 feet (100 meters). It is suggested that the diameter of the cable is 0.3 inches ± 0.04 inches (7 mm ± 1 mm)
Ground cable	If the length of the lead is more than 33 feet (10 meters), use 8 AWG (10 mm²). If the length of the lead is less than 33 feet (10 meters), use 8 AWG (10 mm²).

Item	Description
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, and broadband access are all in the distribution box. Distribution box must be waterproofed.

Table 2-2: Installation Tools

			
Level bar	Marker	Knife	Pliers
			
Wrench	Percussion drill and drill heads	Hammer	Phillips-head screwdriver
			
Cable vice (crimper)	Tape measure	0.05 cm (5 mm) L-shape Allen wrench	T7 screwdriver head

2.2 LEDs and Interfaces

Figure 2-2, Table 2-3, and Table 2-4 explain the Auroa243 gNB's LED status indicators and interfaces.

Figure 2-2: LEDs and Interfaces

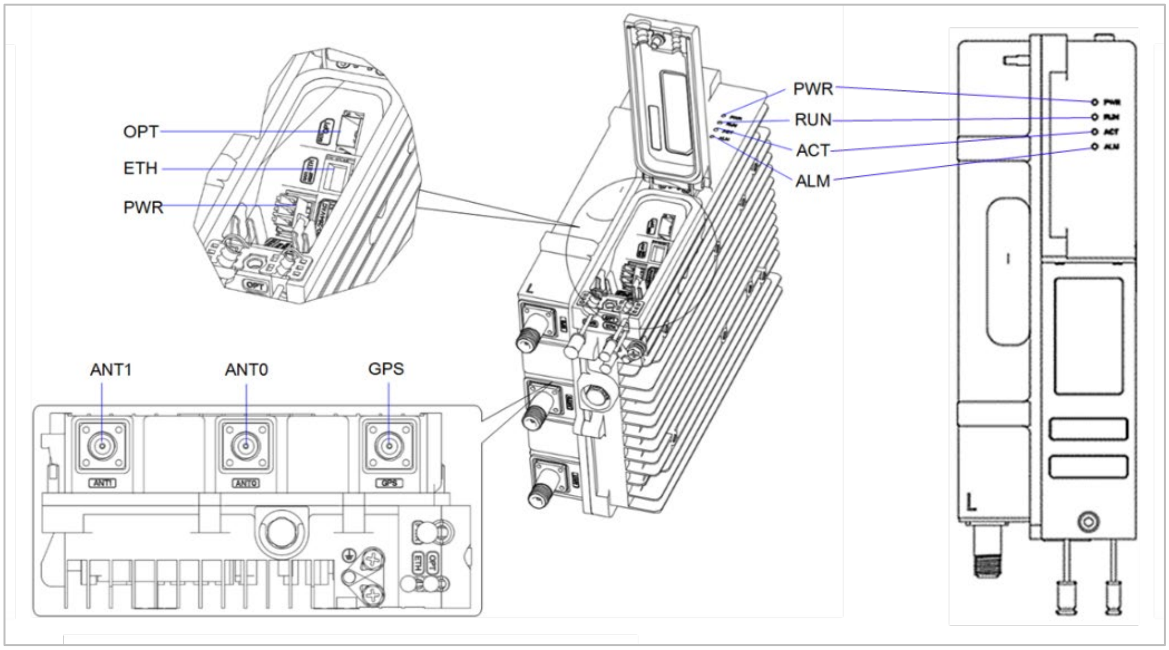


Table 2-3: LEDs

LED	Color	Status	Description
PWR	Green	Steady ON	Power is ON
		OFF	No power supply
RUN	Green	Steady ON	The power input is normal
		Fast flash: 0.12 s on, 0.125s off	The device is powering up
		Slow flash: 1s on, 1s off	The device is operating normally
		OFF	No power input or faulty board
ACT	Green	Steady ON	The cell is active
		Slow flash: 1 s on, 1 s off	The cell is inactive
ALM	Red	Steady ON	Hardware alarm, for example, VSWR alarm
		OFF	No alarm

Table 2-4: Interfaces

Interface Name	Description
PWR	Power interface: The gNB supports AC or DC power supply. AC: 90 VAC to 264 VAC, nominal voltage 110/220 VAC DC: -40 VDC to -57 VDC, nominal -48 VDC
ETH	RJ-45 Ethernet interface, used for debugging or data backhaul
OPT	Optical backhaul interface to connect to the external transmission network
GPS	Port for external GPS antenna, N-female connector
ANT0	Port for antenna 0, N-female connector
ANT1	Port for antenna 1, N-female connector

2.3 Location and Environment

The Aurura243 can be installed on a pole or a wall. For the best signal coverage, place the gNB in an unobstructed location. In addition to network planning, when determining where to place the gNB, you need to consider factors such as climate, hydrology, geology, the possibility of earthquakes, reliable electric power, and transportation access. Avoid locating the gNB in areas with extreme temperatures, harmful gases, unstable voltages, volatile vibrations, loud noises, flames, explosives, or electromagnetic interference (e.g., large radar stations and transformer substations). In addition, avoid areas prone to impounded water, soaking, leakage, or condensation. Environmental specifications are shown in Table 2-5.

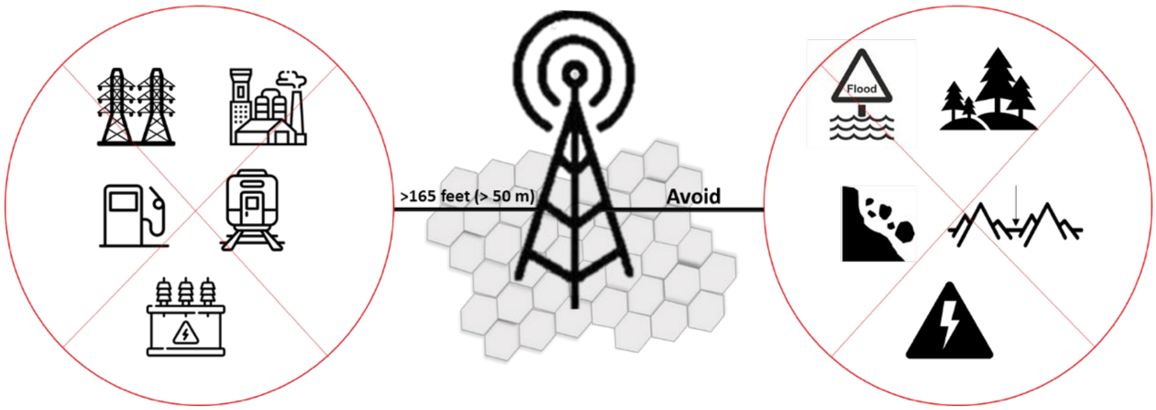


Table 2-5: Environmental Specifications

Item	Description
Operating Temperature	-22°F to 131°F / -30°C to 55°C
Storage Temperature	-40°F to 149°F / -40°C to 65°C
Relative Humidity (no condensation)	2% to 95% RH
Atmospheric Pressure	70 kPa to 106 kPa
Safety Voltage	DC: -40 VDC to -57 VDC AC: 90 VAC to 264 VAC

2.4 Grounding and Lightning Protection

You should protect the gNB, antenna, and GPS against lightning. Following are guidelines concerning grounding.

- The yellow-green ground wire must be at least 6 AWG (10 mm²) in diameter.
- 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 between the grounding points and the grounding bar must be tight and reliable. Rustproofing the terminals, e.g., with 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 2-3).

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.

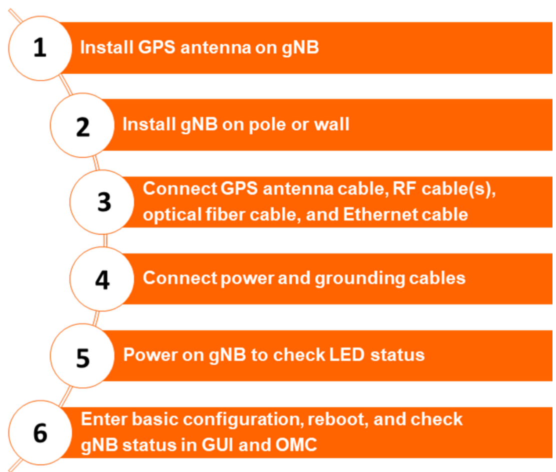
Figure 2-3: Weatherproofing

3. Installation

3.1 Process Overview

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

Figure 3-1: Installation Process Overview



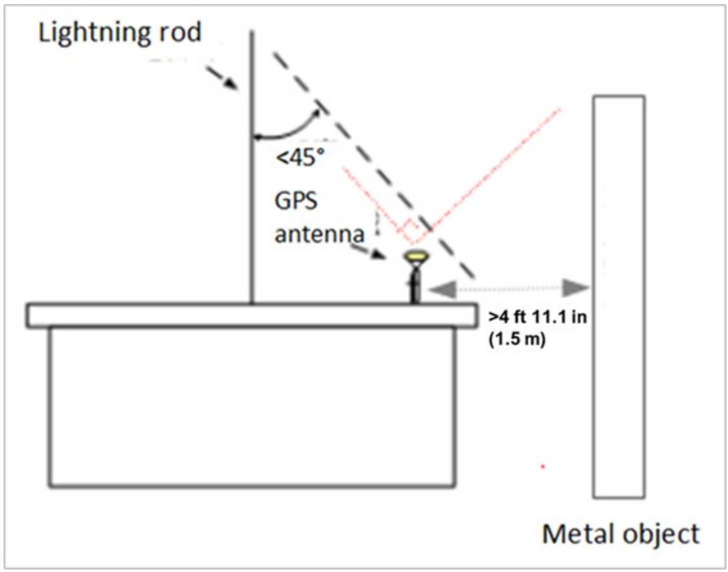
3.2 Install Global Positioning System Antenna

WARNING: Ensure the antenna is connected before powering up the gNB. The wireless signal transmission power can cause bodily injury and damage to the gNB and RF power amplifier devices.

The installer must read the following GPS antenna installation requirements before installing it on the gNB and refer to Figure 3-2.

- Avoid significant blocking from buildings in the vicinity. Ensure the space atop is within 90 degrees (at least 45 degrees) and unblocked by any buildings.
- The GPS antenna should be installed within 45 degrees of the lightning rod.
- Do not install the GPS antenna near other transmitting and receiving equipment to avoid interference. For example, please do not install it under a microwave antenna or high-voltage cable. Avoid the direction of radiation from other transmitting antennas to the GPS antenna.
- When two or more GPS antennas are installed, it is recommended to keep the spacing to more than 6.74 feet (2 meters) and install multiple GPS antennas in different locations to prevent simultaneous interference.
- GPS antenna feeders cannot be grounded with ground conductors of interfering equipment, such as air conditioners, motors, pump motors, etc., to prevent external interference from being introduced into the antenna system.

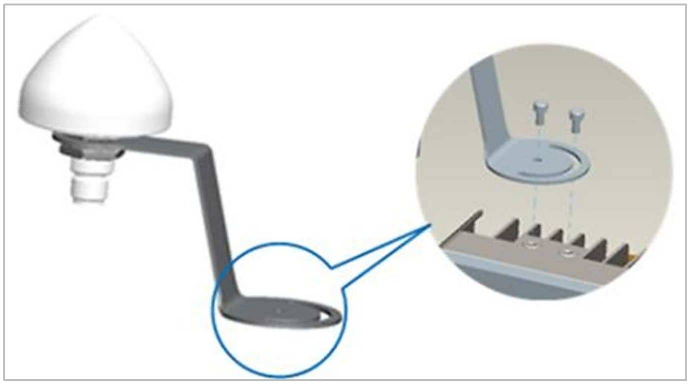
Figure 3-2: GPS Installation Requirements



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

NOTE: The GPS antenna may not appear the same as shown in Figure 3-3, but the installation steps are the same.

Figure 3-3: GPS Antenna Installation



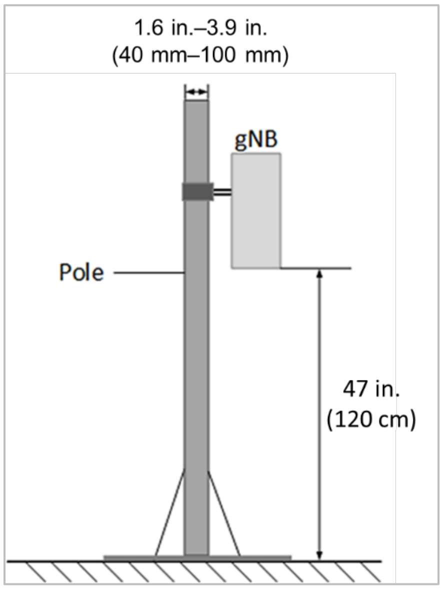
3.3 Install gNB on Pole or Wall

Use the following procedures to install the Aurora243 on a pole or attach to a wall.

3.3.1 Install on Pole

Ensure the pole's diameter is in the range of 1.6 in–3.9 in (40 mm–100 mm), as shown in Figure 3-4. The position of the gNB on the pole should be at least 47 inches (120 cm) in height.

Figure 3-4: Diameter and Height Requirements



The gNB mounting bracket is assembled before packing and includes two components: the pre-assembled bracket on the back of the device (Figure 3-5) and the pole or wall mounting bracket (Figure 3-6).

Figure 3-5: Device with Pre-assembled Mounting Bracket

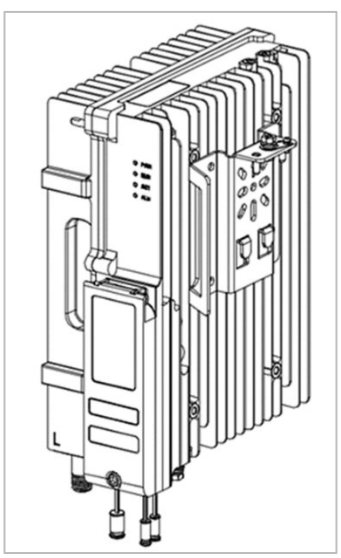
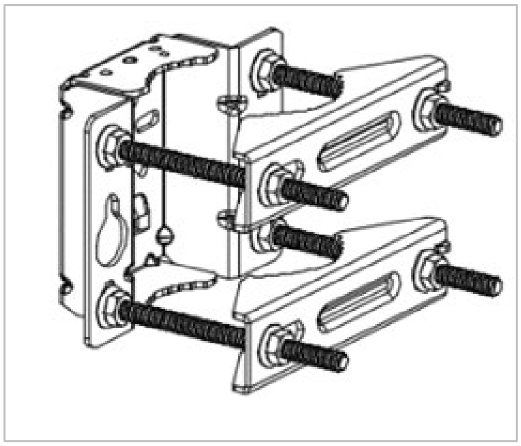


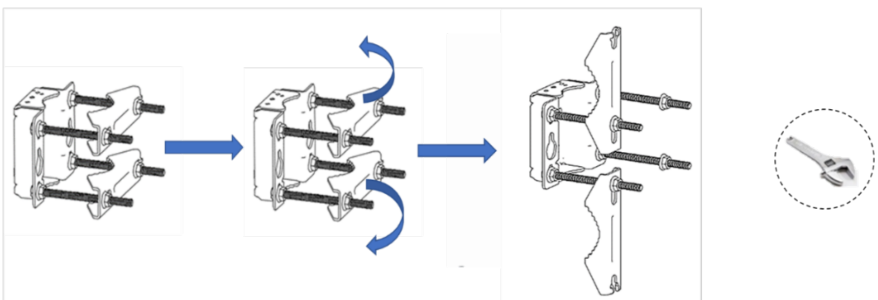
Figure 3-6: Pole or Wall Mounting Bracket



Follow the steps below to install the Auroa243 gNB on a pole.

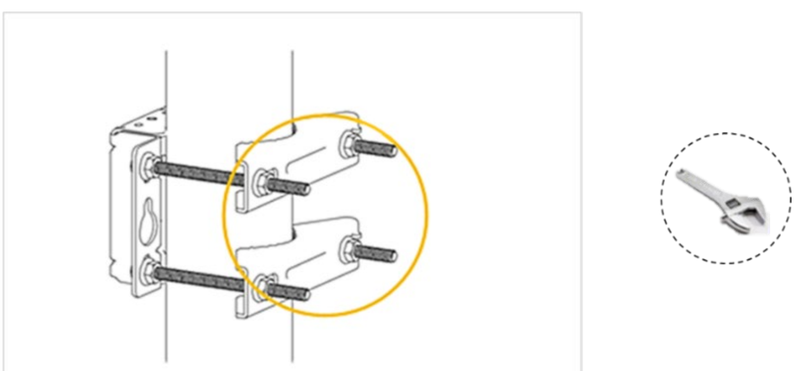
1. Unscrew the nuts of the pole mounting bracket, slide the two clamps to the left, and turn them up or down (Figure 3-7).

Figure 3-7: Turn Clamps



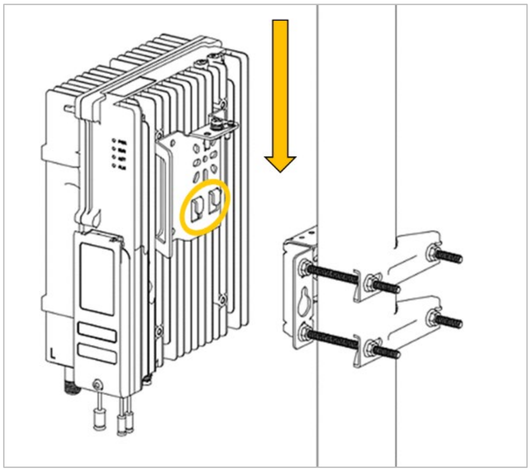
2. Place the pole mounting bracket against the pole and return the clamps to the horizontal position. Next, slide the clamp to the right and retighten the nuts (Figure 3-8).

Figure 3-8: Place Bracket on Pole



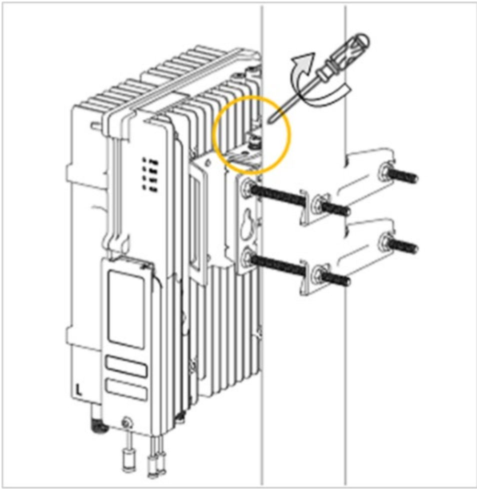
3. Hold the gNB vertically and align the two pins on the gNB bracket with the pin holes on the pole mounting bracket. Next, push the eNB down until the hooks are firmly attached to the corresponding slots on the pole mounting bracket (Figure 3-9).

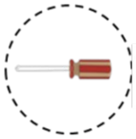
Figure 3-9: Attach gNB to Bracket



4. Tighten the bolt and screw on the top of the gNB with a Phillips-head screwdriver (Figure 3-10).

Figure 3-10: Tighten Bolt and Screw



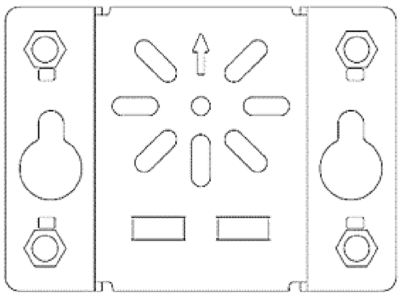


5. Once the installation is complete, proceed to *section 3.4*.

3.3.2 Install on Wall

Ensure the wall can bear at least four times the weight of the gNB. The wall mounting bracket is shown in Figure 3-11.

Figure 3-11: Wall Mounting Bracket



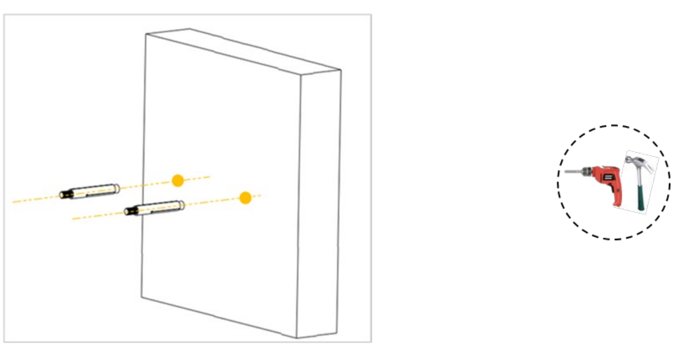
Follow the steps below to install the gNB on a wall.

1. Place the mounting bracket on the wall with arrow point up and mark the drilling location using a pencil or marker (Figure 3-12).

Figure 3-12: Mark Drilling Location

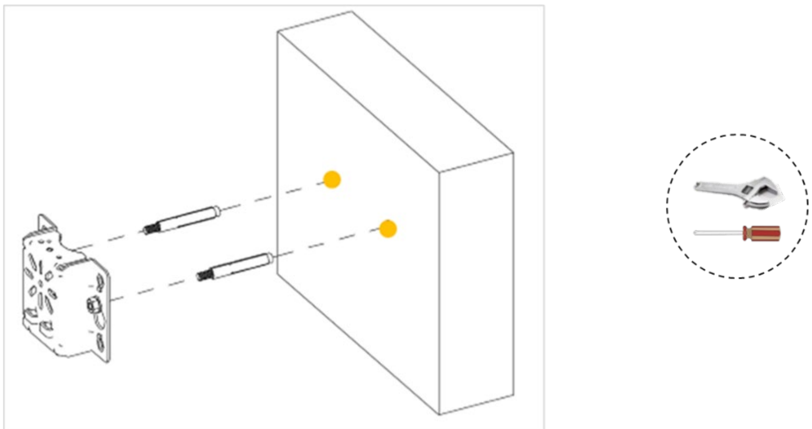
2. Drill two 0.4 in. (10 mm) diameter by 2.8 in. (70 mm) deep holes in the wall at the marked locations and insert expansion bolts.

Figure 3-13: Install Expansion Bolts



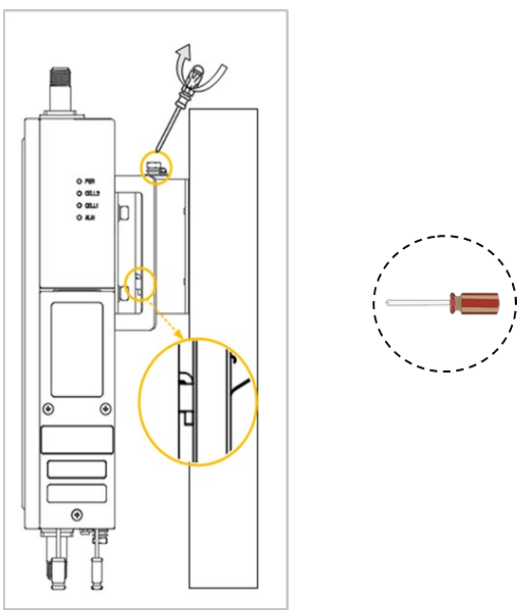
3. Hang the wall mounting bracket on the expansion bolts and fasten it with flat washers, spring washers, and nuts (Figure 3-14).

Figure 3-14: Hang Bracket



4. Hold the gNB vertically and align the two pins on the gNB bracket with the pin holes on the pole mounting bracket. Push the eNB down until the hooks are firmly attached to the corresponding slots on the pole mounting bracket. Then, tighten the screw to complete the installation (Figure 3-15).

Figure 3-15: Completed Installation



5. Once the installation is complete, proceed to *section 3.4*.

3.4 Connect Cables

WARNING: Ensure the antenna is connected before powering up the gNB. The wireless signal transmission power can cause bodily injury and damage to the gNB and RF power amplifier devices.

3.4.1 Cable Laying Requirements

General requirements:

- Bending radius of antenna feeder cable:
  - 7/8" > 250 mm
  - 4/5" > 380 mm
- Bending radius of jumper cable:
  - 1/4" > 35 mm
  - (Super soft) 1/2" > 50 mm
  - (Ordinary) 1/2" > 127 mm
- Bending radius of power cable and grounding cable: > triple the diameter of the cable.
- The minimum bend radius of the optical fiber is 20 times the diameter of the optical fiber.
- Bind the cables according to the cable type; intertwining and crossing are forbidden.
- An identification label should be attached after the cable is laid.

Optical fiber cable requirements:

- Avoid circling and twisting cables while laying the cable.
- Avoid binding or kinking of cables on a turn.
- Avoid pulling or weighing down the optical fiber cable.
- The redundant optical fiber must wind around the dedicated device.

Grounding cable requirements:

- The grounding cable must connect to the grounding point.
- The grounding cable must be separated from the signal cables to avoid signal interference.

3.4.2 Connect GPS Antenna Cable

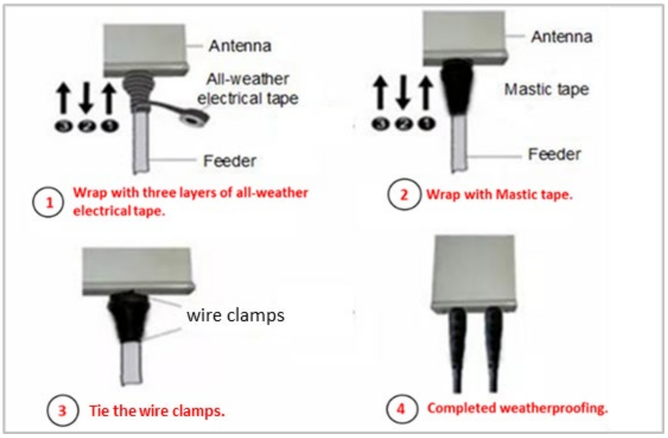
WARNING: Ensure the antenna is connected before powering up the gNB. The wireless signal transmission power can cause bodily injury and damage to the gNB and RF power amplifier devices.

The GPS antenna should be installed in an open, lightning-protected position. The top of the GPS antenna should avoid facing the front of the directional antenna and should be installed as far away as possible from the directional antenna.

1. Insert the GPS jumper into a cold shrink tube.
2. Connect one end of the GPS jumper to the GPS antenna interface and tighten it.
3. Push the cold shrink tube to the top joint and pull out the strip.

4. Take another cold shrink tube and pass it through the GPS jumper.
5. Connect the other end of the GPS jumper to the GPS antenna and tighten it.
6. Push the cold shrink tube to the GPS antenna joint and pull out the strip.
7. Use all-weather electrical and mastic tape to weatherproof the GPS antenna, per Figure 3-16.

Figure 3-16: GPS Antenna Weatherproofing



NOTE: Make sure that the wrapping direction of the last layer is from the bottom up. The last layer should be tight enough to keep it from cracking.

3.4.3 Connect RF Cable(s)

WARNING: Ensure the RF antenna feed is properly connected before powering up the gNB. The wireless signal transmission power can cause bodily injury and damage to the gNB and RF power amplifier devices.

1. Open the dust caps of the **ANT0** and **ANT1** interfaces.
2. Insert the RF cable(s) into cold shrink tubes.
3. Connect RF cable(s) to the **ANT0** and **ANT1** interfaces on the gNB and tighten them with a wrench.
4. Push the cold shrink tube to the top joint and pull out the strip.
5. Insert the other end of the RF cable(s) into the cold shrink tubes, and connect them to the external antenna(s), which also need weatherproof protection.
6. Push the cold shrink tube to the antenna connector and pull out the strip.

3.4.4 Connect Optical Fiber Cable

1. Unscrew the screws on the cover of the gNB wiring cavity using a Phillips-head screwdriver to open the wiring cavity.
2. Connect the optical fiber to the **OPT** interface in the wiring cavity.
3. Lay the cable along the wire groove and stretch it out of the wiring cavity.

NOTE: Redundant optical fiber should be neatly wound.

4. Connect the other end of the optical fiber to the optical distribution frame.

3.4.5 Connect Ethernet Cable

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

NOTE: Use hose sleeves to protect the network cables.

3. Connect the other end of the Ethernet cable to the customer network equipment.

Caution: To prevent damage to the device, you must connect the optical fiber cable/Ethernet cable ***before*** connecting the power cable.

3.4.6 Connect Power Cable

The power cable must meet the following requirements:

- Install an air switch, socket switch, or plug with a fuse in the distribution box for lightning and leakage protection.
- Use a hose sleeve or wiring tube to protect the power cable.
- Ground and weatherproof the distribution box for lightning and leakage protection.
- The length of the DC or AC power cord must be less than 328 ft (100 m).

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

Strip 0.47 in (12 mm) insulating layer with a wire stripper to connect to the conductor.

The steps for assembling the power cable are as follows:

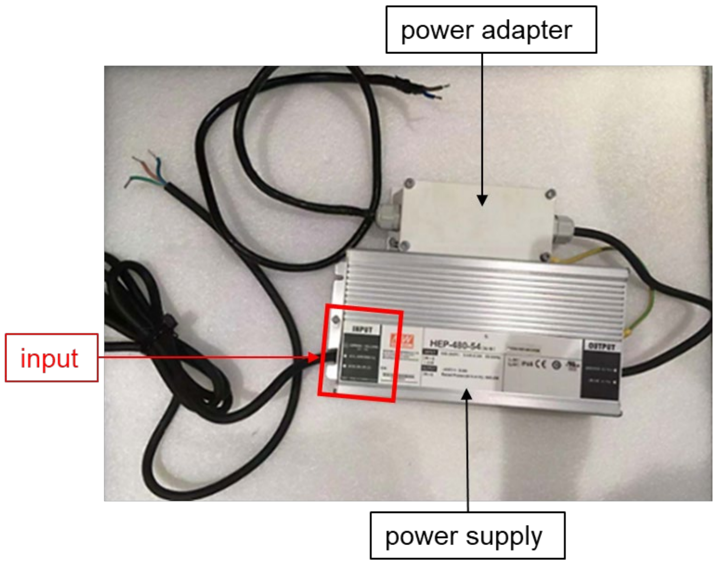
1. Assemble the power plug on the power cable.

NOTE: The gNB supports DC or AC power supply. Therefore, the installer should select the appropriate power supply and assemble the power plug, power adapter, and power terminal according to local standards.

- If the gNB and the power supply are both DC, assemble the plug according to the labels and instructions on the plug.

- If the gNB and the power supply are both AC, assemble the plug according to the labels and instructions on the plug.
- A power adapter must be used if the gNB is DC and the power supply is AC (Figure 3-17). A power plug is installed on the cable connected to the input direction.-Refer to the labels on the outlet for connecting the live, neutral, and ground wires separately to the corresponding terminals, and tighten the screws.

Figure 3-17: Power Adapter



NOTE: If a power adapter is used, it must be connected to a surge arrester. Grounding and waterproofing are required, and place all components in a waterproof distribution box.

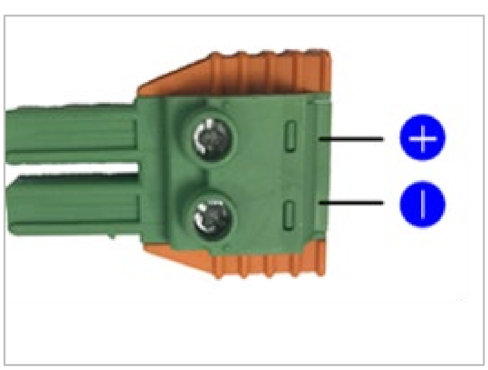
2. Assemble the power terminal for the gNB.

The gNB supports DC or AC power supplies. The gNB provides power terminals based on the power supply mode selected by the customer. If using a DC power supply, refer to Figure 3-18. If using an AC power supply, refer to Figure 3-19.

- DC Power Supply:

  Refer to the labels on the power plug for connecting the positive terminal (+) and the negative terminal (-) to the corresponding terminals separately and tighten the screws.

Figure 3-18: DC Power Terminal



- AC Power Supply

  Refer to the labels on the power terminal for connecting the live, neutral, and ground wires separately to the corresponding terminals separately, and then tighten the screws.

Figure 3-19: AC Power Terminal

3. Connect the power terminal to the **PWR** interface in the wiring cavity.
4. The power cable lays along the slot and stretches out of the wiring cavity.
5. The other end connects to a reliable AC or DC power supply.

NOTE 1: If the outlet is indoors, place the power adaptor indoors.
NOTE 2: If the outlet is outdoors, all components should be placed in a waterproof distribution box.

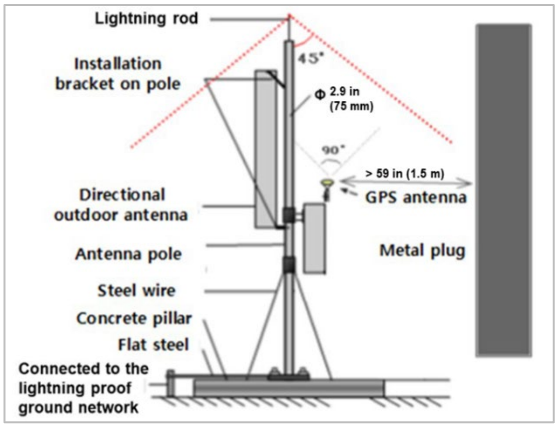
6. After the cable connection is complete in the wiring cavity, tighten the screws on the cover to close the wiring cavity using a Phillips-head screwdriver.

3.4.7 Connect Ground Cable

3.4.7.1 Pole Grounding

Pole grounding aims to protect the equipment as much as possible from potential damage from lightning overvoltage. However, the interfaces between the gNB and the outside world mainly include a power system, grounding system, antenna feeder and lightning receiving device, and signal line. Therefore, any damage caused by lightning primarily comes from the voltage difference between the equipment in the gNB and one or more of the four interfaces. The pole grounding is shown in Figure 3-20.

Figure 3-20: Pole Grounding

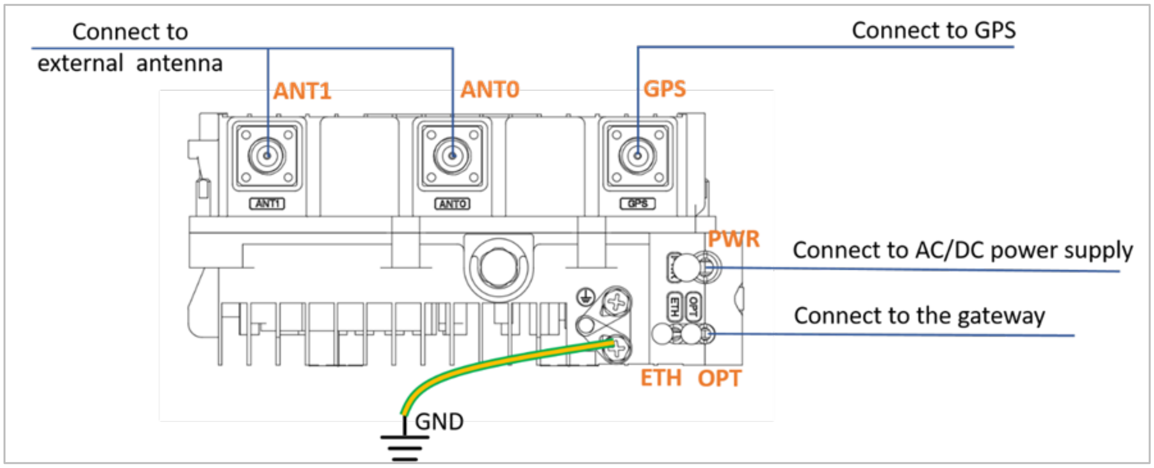


1. The installation position of the grounding bar should meet the design requirements. The holding pole and tower body must be connected to the lightning protection network or grounded with a separate lead.
2. The diameter of the grounding wire should meet the design requirements. The copper nose must 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 from other cables. All grounding wires should be fixed with wire core or binding tape with a fixed spacing of 12 inches (0.3 m).
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, use 12 x 1.6 x 0.16 in (300 × 40 × 4 mm) and fix 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. Suppose it is impossible to connect to the integrated grounding bar of the building. In that case, the appropriate grounding point can be selected according to the integrated grounding situation of the indoor building. The selection of the 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 grounding electrode's buried depth and the flat iron's welding quality must meet specifications. In principle, the buried depth of the grounding electrode shall not be less than 27.5 in (0.7 m). The non-self-built grounding network shall be connected to the grounding network of the owner.
8. The gNB grounding, power adapter grounding, distribution box grounding, and feeder grounding must be independently connected to the grounding bar, and the grounding bar must have a path from the lead to the earth.

3.4.7.2 gNB Grounding Cable

Prepare the grounding cable according to the actual measurements and requirements of the specific installation site. The Aurora243 gNB has two grounding screws located on the bottom of the unit, as shown in Figure 3-21.

Figure 3-21: Grounding Screws



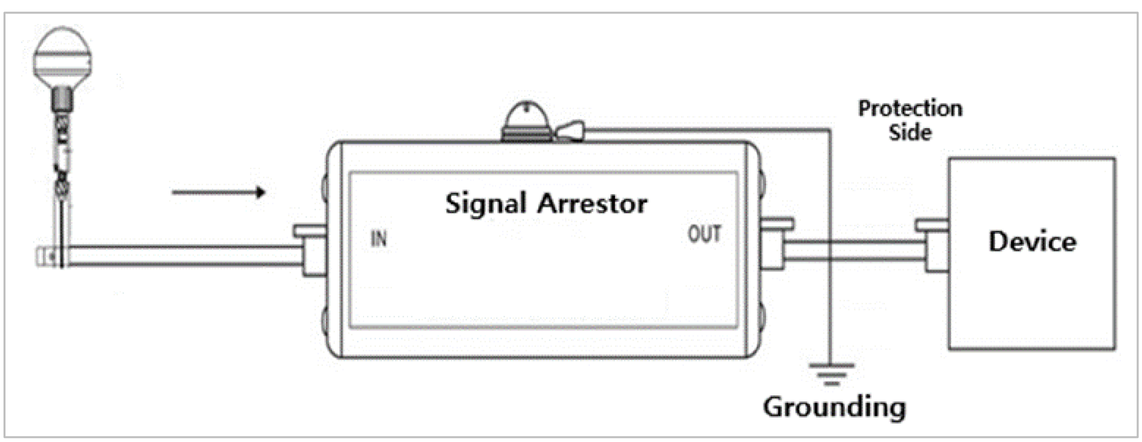
Follow the steps below to connect the ground cable.

1. Unscrew one grounding screw. Connect one end of the ground cable to the grounding screw and tighten the screw.
2. Repeat *step 1* for the second grounding screw.
3. Once the gNB is installed in the outdoor location, the other end of the ground cable must connect to a reliable grounding point.

3.4.7.3 GPS Antenna Grounding

If the length of the GPS antenna is less than 16.5 feet (5 meters) from the gNB, extend the installation, ensure it is lightning protected, and connect it to the grounding bar, as shown in Figure 3-22.

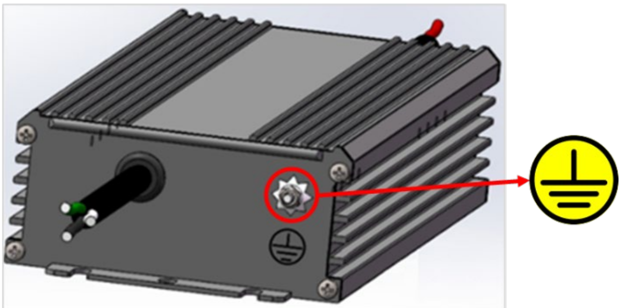
Figure 3-22: GPS Antenna Grounding



3.4.7.4 Power Adapter Grounding (Optional)

The power adapter grounding terminal should connect to the grounding bar through the ground wire and adhere to local standards (Figure 3-23).

Figure 3-23: Power Adapter Grounding



3.5 Maintenance Chamber Waterproofing

Once the installation is complete, you must close the maintenance chamber of the equipment and waterproof the chamber.

1. Clamp the power cord to the wire position and seal the wire diameter 0.35 inches ± 0.04 inches (9 mm ± 1 mm).
2. Put the Ethernet cable on the wire and seal the wire diameter 0.28 inches ± 0.04 inches (7 mm ± 1 mm).

3.6 Power on to Check the LED Status

After the Aurora243 is powered on, check that the LED indicators are lighting as expected, as described in Table 2-3 (*section 2.2*).

4. Initial Configuration

4.1 Configure Basic Parameters

After installing and testing the Aurora243 gNB, Baicells recommends configuring the gNB without enabling HaloB or SAS to verify that the new eNB unit is operational. Once it is confirmed to be operational, you can refer to the appropriate configuration guide(s) for the operating mode you plan to use.

NOTE: For all GUI menus and fields, refer to the following documents on the Baicells website: Baicells.com > Resources > *Documents*.

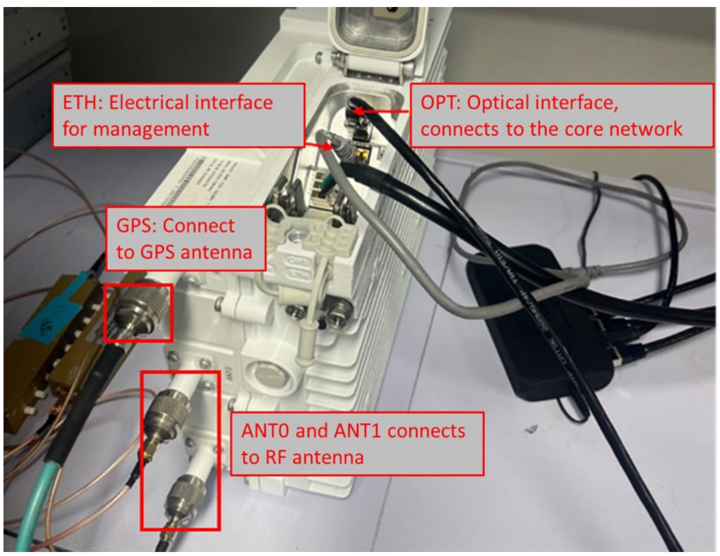
- CloudCore Configuration & Network Administration Guide (OMC/BOSS)
- CPE Configuration Guides

4.1.1.1 Network Connection Requirements

Before initial configuration, verify that the following network connections of Aurora243 gNB, as shown in (Figure 4-1) are connected successfully.

- Aurora243 gNB connects to the core network through the optical backhaul interface (**OPT**).
- **ETH** interface is the management port used for debugging.
- The **ANT0** and **ANT1** ports must be connected to the external RF antennas.
- Connect the **GPS** interface to the external GPS antenna.

Figure 4-1: Network Connection



4.1.1.2 Caution

After the initial network connections, please verify the following steps to avoid damage to the equipment.

1. The frequency band and parameters must be set first on the gNB GUI to activate the gNB.
2. Before the gNB transmits the radio signal, add enough attenuation on the RF cable, the recommended attenuation is 30W, 30dB above.

Caution: If you cannot achieve the two settings mentioned above, it indicates damage to the hardware of the gNB caused by a short circuit at full power. Please process an RMA with the *Baicells support team*.

3. You can configure only one network port of the network card as the default route on the gNB GUI. Otherwise, this causes route confusion, and the network will be unreachable.
4. The management port only supports 1GE optical module. Therefore, the switch must also support the port type.

4.1.2 Computer Requirements

Refer to Table 4-1 for the minimum computer requirements to launch the gNB GUI.

Table 4-1: Computer Requirements

Item	Description	
CPU	Higher than Intel Core 1GHz	
Memory	Greater than 2G RAM	
Hard Disk	No less than 100 MB space available	
Ethernet Port	10/100/1000 adaptive Ethernet interface	
Operating System	Microsoft: Windows XP, Windows Vista, Windows 7, or higher	Mac: MacOSX 10.5 or higher
Screen Resolution	Higher than 1024 x 768 pixels	
Browser	Google Chrome 9+, Internet Explorer 7.0+, Mozilla Firefox 3.6+	

4.1.3 Launching the Aurora243 gNB GUI

Follow the steps below to connect to the Aurora243 gNB GUI.

1. Connect the Aurora243 to a Personal Computer (PC) directly. Before launching the GUI, you must set up the computer's Internet Protocol (IP) address to connect the client to the server.
2. Ensure the PC's IP address and the IP address of the management port of gNB are in the same network segment (for example, 192.168.150.X), as shown in Figure 4-2.
3. To launch the GUI, open a Web browser and enter *http://<OAMIP>*. The OAM IP is the IP address of the management port, and the default IP is *http://192.168.150.7*.
4. Enter new_user as the *Username*, gNB@2014 as the *Password,* and enter the random case-sensitive *Verification Code* at the *User Login* dialogue window.

5. Click *Login* to enter the Aurora243 gNB GUI. The home page defaults to the *Basic Setting > Basic Info* menu, which reports the current gNB status.

NOTE: For security reasons, you should change the password after logging in rather than leaving the default *Username* and *Password*.

Figure 4-2: IP Setting on PC

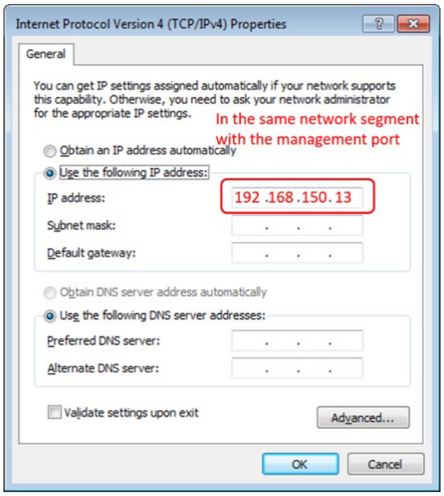


Figure 4-3: Login

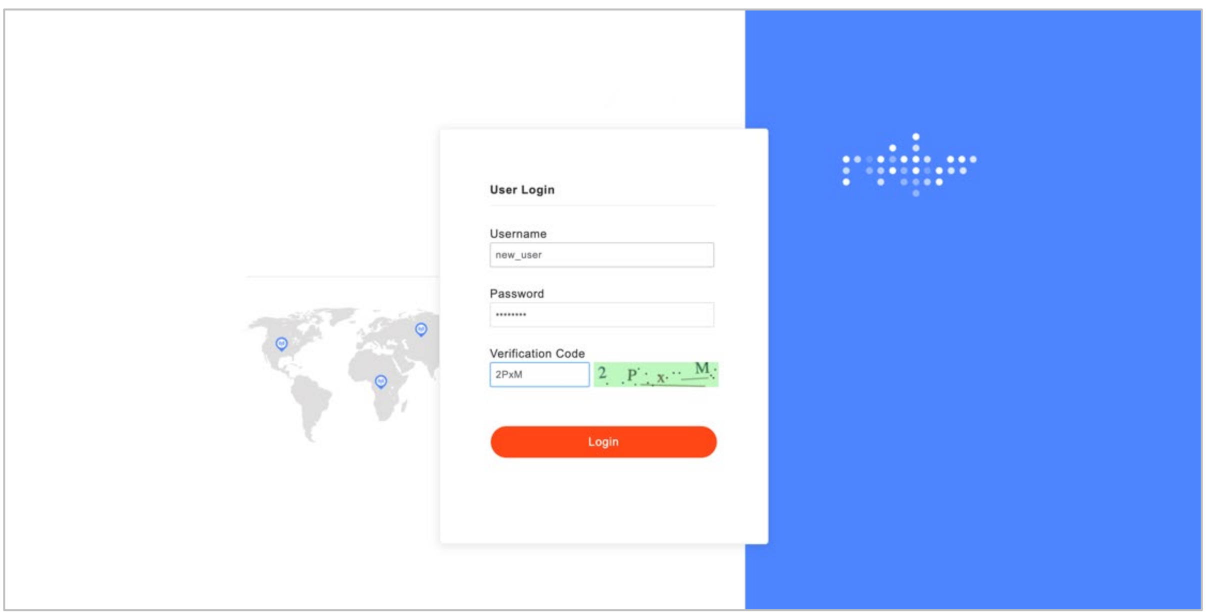
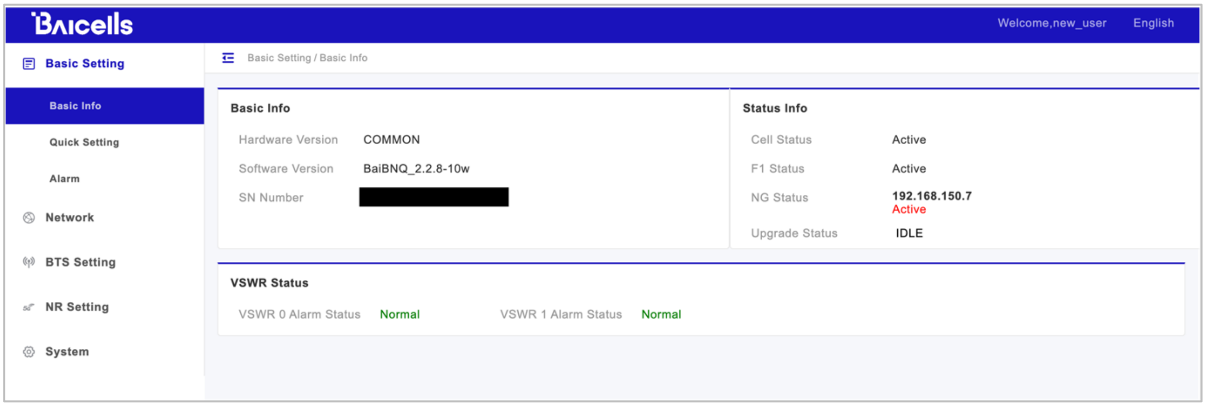


Figure 4-4: Home Page



4.1.4 Upgrade Firmware

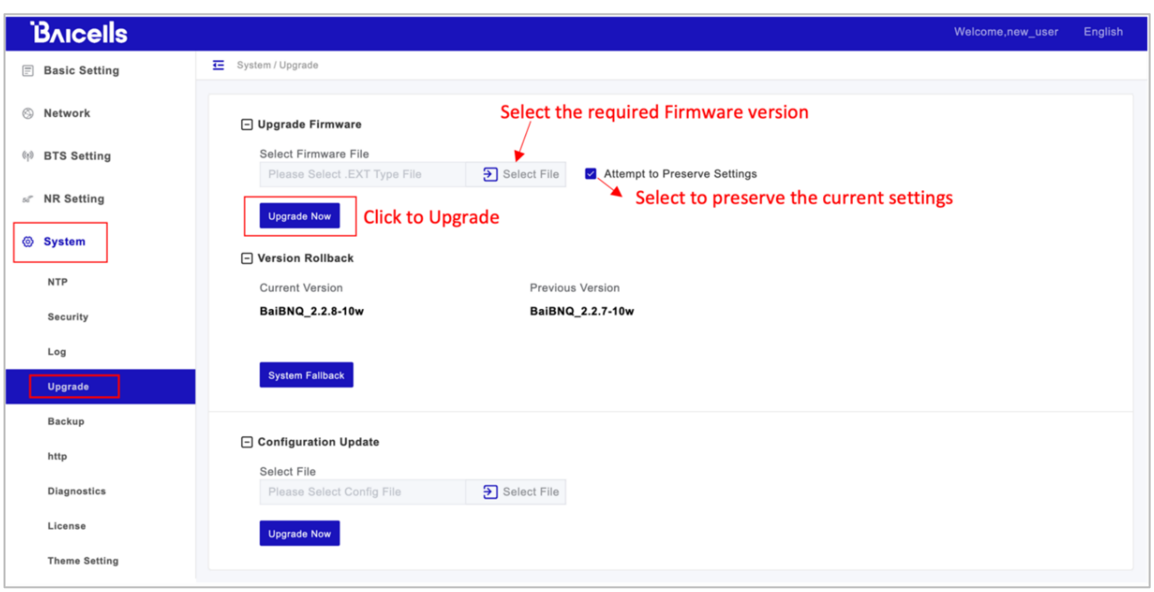
Verify that the *Software Version* in the *Basic Info* pane is the most recent firmware version. Follow the steps below to upgrade to the most recent software version before configuring the gNB.

1. Download the most recent firmware file from *Baicells.com > Support > Firmware*, and save it on your local computer.
2. Go to *System > Upgrade* and select whether to preserve the current settings (Figure 4-5).
3. Click *Select File* and navigate to the firmware file saved on the local computer.

   NOTE: The file type is *.EXT.

4. Click *Upgrade Now*.
5. In the pop-up window, click *PROCEED*.
6. Reboot the gNB, wait for a few minutes, and login back to the gNB GUI to confirm the upgrade.
7. On the *Basic Setting > Basic Info* page, the upgraded version is displayed in *Software Version.*

Figure 4-5: Upgrade Firmware



4.1.5 Configure Parameters

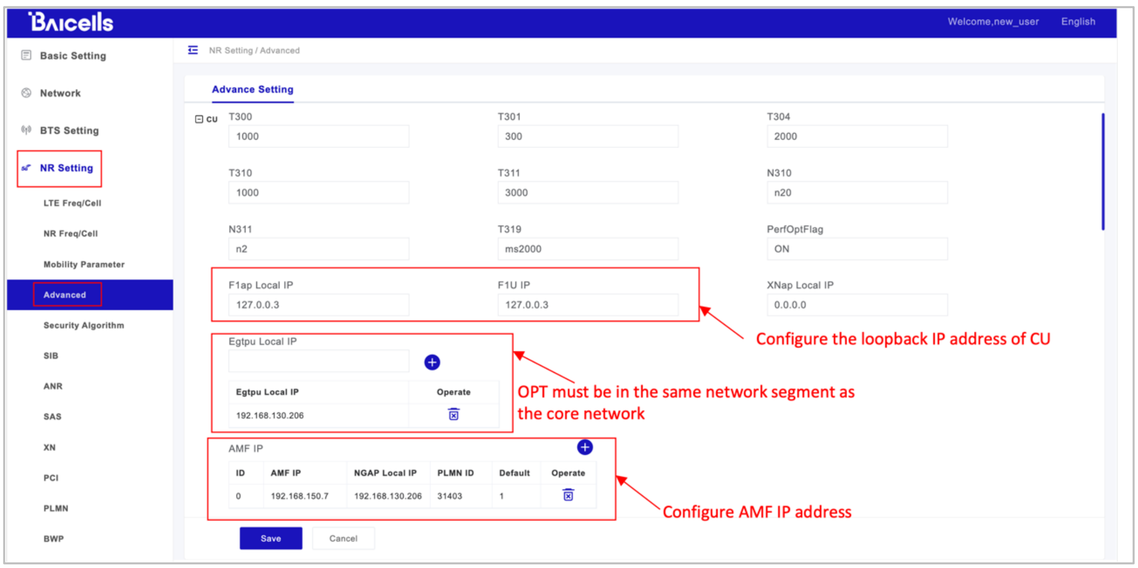
After upgrading the gNB to the recent firmware version, log in to the gNB GUI and configure related parameters to bring up the gNB online.

4.1.5.1 Configure CU and DU IP Addresses

Configure the CU and DU loopback IP address as 127.0.0.X. The *NGAP Local IP* and *Egtpu Local IP* of the CU should be the same network segment as the *AMF IP* of the core network.

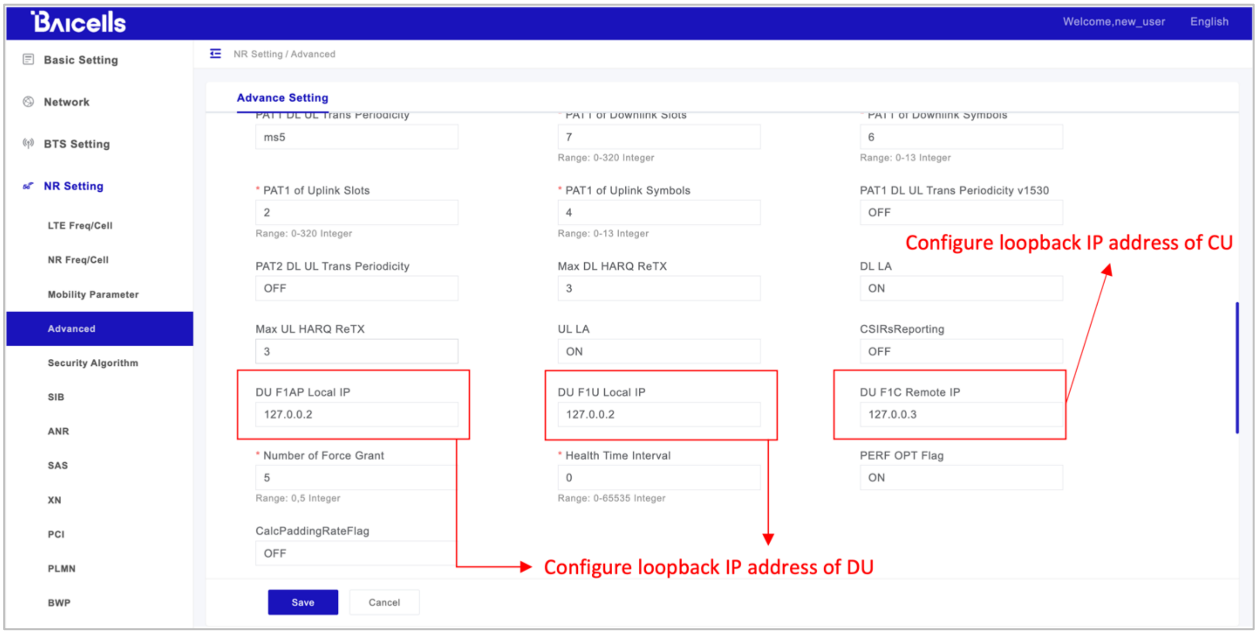
1. Go to *NR Setting > Advanced*. Then, under the *CU* pane, configure the CU IP address.
2. Configure the loopback IP address of CU in the *F1ap Local IP* and *F1U IP* field as 127.0.0.X.
3. Click the *+ Add* icon in the *AMF IP* field to enter the *AMF IP* address and the *NGAP Local IP* address.

Figure 4-6: Configure the IP address of CU



4. Go to *NR Setting > Advanced*. Click the *DU* pane to open the fields and configure the DU IP address.
5. Enter the loopback IP address of the CU in the *DU F1C Remote IP* field.
6. Enter the loopback IP address of DU in the *DU F1AP Local IP* and *DU F1U Local IP* fields.
7. Click the *Save* button.

Figure 4-7: Configure the IP Address of DU

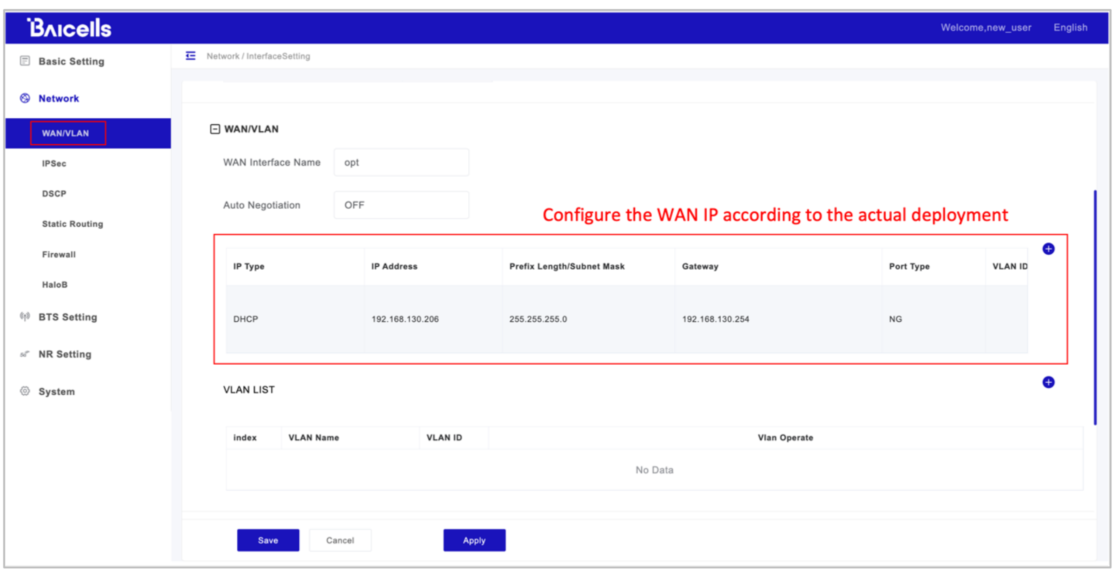


4.1.5.2 Configure WAN/LAN IP Address

Configure the network-related parameters according to the actual network deployment.

1. Go to *Network* > *WAN/VLAN* (Figure 4-8).
2. Enter the *WAN/VLAN* pane and click the *+ Add* icon to configure the IP address of the WAN interface.

Figure 4-8 Configure the IP address of WAN Interface-Aurora243

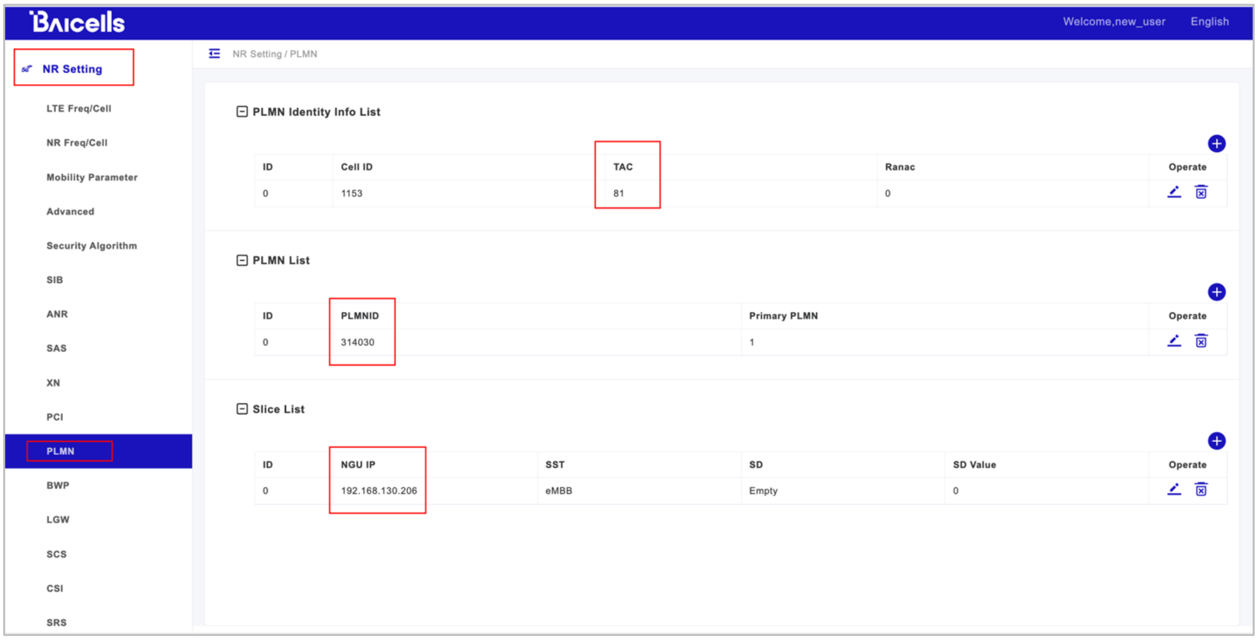


4.1.5.3 Configure PLMN/Slice/TAC

Configure the PLMN ID/Slice/TAC related parameters according to the actual network deployment.

1. Go to *NR Setting > PLMN*. Under the *PLMN Identity Info List,* enter the PLMN menu to configure the IP address of the WAN interface.

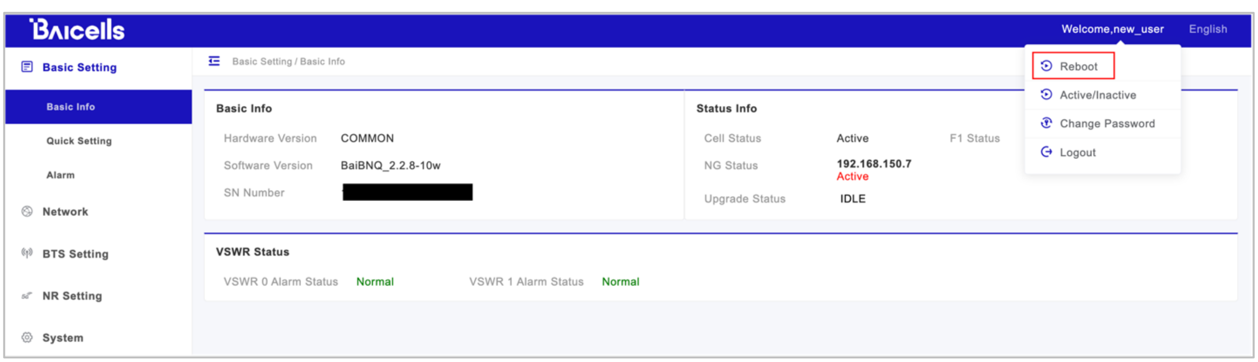
Figure 4-9 Configure PLMNID/Slice/TAC-Aurora243



4.1.6 Reboot

Once the basic configuration settings are saved, reboot the gNB. Go to the *Basic Setting > Basic Info* page. Select the *Welcome* message (Figure 4-10) and choose *Reboot* from the drop-down menu.

Figure 4-10: Reboot

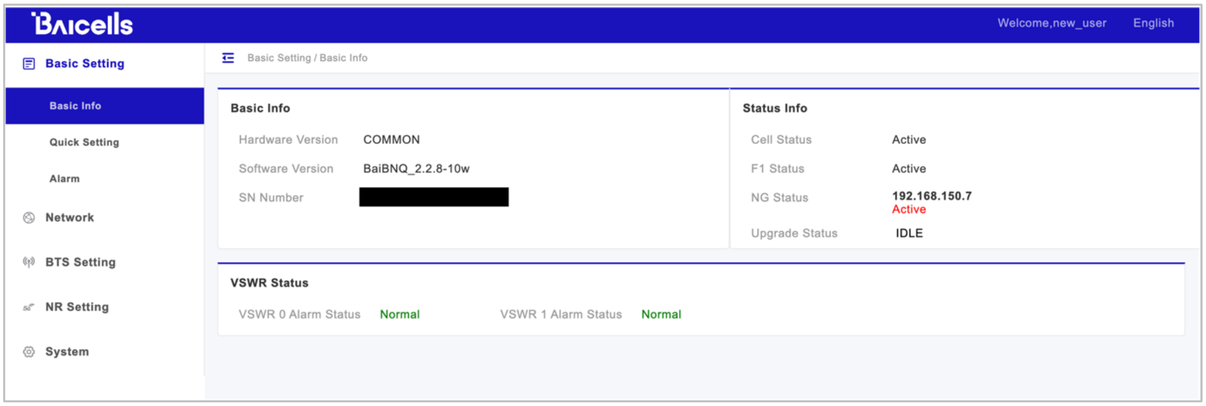


4.1.7 Verify gNB Operational Status

After the gNB reboots, check the gNB status using the gNB GUI. Once the gNB is mounted at its intended destination and powered on, recheck the status settings.

- **gNB GUI**: Go to *Basic Setting > Basic Info* (Figure 4-11) and check if the *Cell Status* and *NG Status* field shows *Active*. Also, check that *GPS Sync Status* is reported as *Synchronized*.

Figure 4-11: Verify Operational Status



Before commercial deployment, Baicells recommends implementing cell site acceptance testing of a new site to ensure the service meets expectations, document network speeds at various cell locations, and verify RF coverage.

Appendix: 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. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

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 20 inches (50 cm) between the radiator and your body.

ISEDC Compliance

This device complies with Innovation, Science, and Economic Development Canada license-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.

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 inches (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.