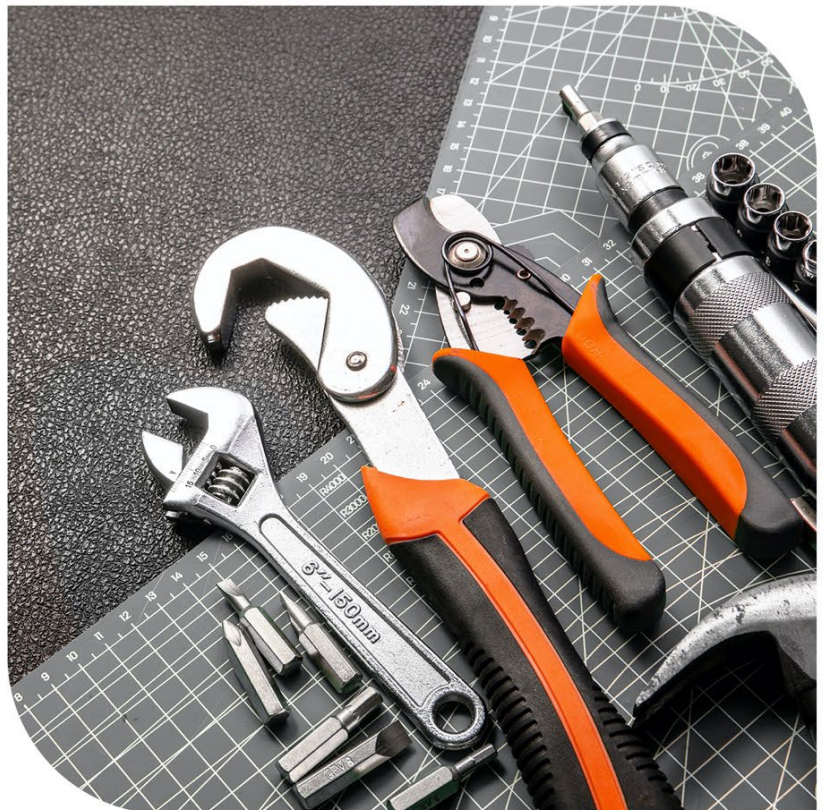


## Nova846

Outdoor 8x5W Two-Carrier  
TDD eNodeB

## Installation Guide

BaiBU\_DNB4\_2.2.7



## About This Document

This document is intended for personnel who will be installing the Baicells Nova846 Outdoor 8x5W eNodeB (eNB) product. The product overview is followed by the procedures for properly installing, performing basic configuration, and verifying the eNB 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 BaiBU\_DNB4\_2.2.7. The Nova846 model numbers are:

- sBS71040, Band 41 (2496 MHz–2690 MHz)
- sBS71010, Band 48 (3550 MHz–3700 MHz)

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	Author/Editor
8-Feb-2023	1.03	Updated packout figure in <a href="#">section 2.1</a>	Blake Volk	Kathy Clark
29-Dec-2022	1.02	Updated procedures in <a href="#">section 3.4.3</a> for connecting RF cables to antenna interfaces	Erik Randall, Blake Volk	Kathy Clark
7-Dec-2022	1.01	Initial release for BaiBU_DNB4_2.2.7 (Nova846)	Warren Lai, Abel Lamas, Sonny May, Kevin Shen, Blake Volk	Kathy Clark

## Resources

- **Documentation** - Baicells product datasheets, this document, and other technical manuals can be found at Baicells.com > Resources > [Documents](#).
- **Support** - How to 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 20 centimeters (7.9 inches) or more from the body of all persons.

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# 1 Overview

## 1.1 Introduction

The Baicells Nova846 (Figure 1-1) is an advanced two-carrier outdoor eNB that is compliant with Third-Generation Partnership Project (3GPP) on LTE Time Division Duplex (TDD) technology. This 8x5W eNB can operate in Carrier Aggregation (CA) mode or Dual Carrier (DC)/split mode. The Nova846 supports broadband data access, providing various data service transformation and transmission capabilities to enable outdoor wireless coverage. This eNB can be used by operators to improve capacity and throughput while eliminating existing dead zones.

**Figure 1-1: Nova846 eNB**



As a two-carrier eNB, the Nova846 hardware unit contains two separate eNBs inside one shell. Having two carriers provides versatile options in how you operate the eNB. The available operating modes are described in the next section, *Features*.

The Nova846's primary cell (Pcell) is referred to as Cell 1. The secondary cell (Scell) is referred to as Cell 2. Each eNB comes pre-configured to simplify the installation. Baicells provides operators with local and Web-based Graphical User Interface (GUI) software applications to configure and manage individual eNBs and Customer Premise Equipment (CPE).

Additionally, Baicells offers a centralized Software-as-a-Service (SaaS) solution called CloudCore. CloudCore includes all of 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 Nova846 eNB.



## 1.2 Features

The two-carrier Nova846 eNB can operate in one of several modes:

- Single Carrier (SC)
- CA mode (based on software license)
- DC/split mode (based on software license)
- HaloB mode (embedded in the base software)
- Citizens Broadband Radio System (CBRS) Spectrum Access System (SAS)

**SC** describes a scenario where the operator wishes to use only one of the two available cells in the eNB. This may be necessary for operators who have limited licensed spectrum or who are planning to use the second carrier later as their network grows. In SC mode, only the primary cell (Pcell), *aka* Cell 1, is used.

**CA** provides the ability to aggregate channels from across the full CBRS range, even channels that are not adjacent. Using CA essentially doubles the downlink capacity when all users have CAT6/7 or later CPEs.

**DC** (split sector) mode enables the operator to run the Nova846 as two independent carriers for split sector coverage.

**HaloB** allows the eNB to function with embedded Mobility Management Entity (MME) capabilities on board so that the eNB operates independently from the usual cloud connection. HaloB is standard in the Nova846 eNB as part of the basic software to provide “lite EPC” capabilities. This enables the user to migrate core network functions to the eNB.

**CBRS SAS** is a multi-vendor SAS database where CBRS spectrum use is managed dynamically across operators. The CBRS band covers 3.55–3.70 GHz. Operators must sign up with a SAS provider, which handles the dynamic frequency assignment and release process. Baicells provides FCC Part 96 certified eNBs, including the Nova846, and CPEs that operate within the Part 96 rules for CBRS. The Baicells eNBs and CPEs use a Domain Proxy (DP) to connect to the SAS server by leveraging the existing connection with the OMC.

---

NOTE 1: Legacy Gen 1 CPEs do not support SAS.

NOTE 2: This installation guide only covers the basic configuration of a single cell for verifying that the eNB unit is operational during the process of installation. More detailed configuration guides are available on the Baicells website:

Baicells.com > Resources > [Documents](#):

- CloudCore Configuration & Network Administration Guide (OMC/BOSS)
  - CPE Configuration Guides
  - QRTB eNodeB Configuration Guide
  - Carrier Aggregation & Dual Carrier (Split Mode) Configuration Guide
  - HaloB Solution User Guide
  - SAS Deployment Guide
-



In addition to the Nova846 eNB's two carriers and multiple operating modes, the following is a list of other key features. The Nova846 datasheet providing technical specifications is kept up-to-date on the [Baicells website](#).

- Supports standard LTE TDD band 41 (2496 MHz–2690 MHz) and band 48 (3550 MHz–3700 MHz)
- Complies with 3GPP Release 15 standards
- Supports 5/10/15/20 MHz bandwidth per carrier, with 40 MHz as the maximum aggregated bandwidth in CA mode
- Provides excellent Non-Line-of-Sight (NLOS) coverage
- Peak rate is a configurable parameter using special Subframe Assignment (SA):
  - DC mode
    - 2x20 MHz, per carrier, Configuration 1: DL 160 Mbps, UL 28 Mbps
    - 2x20 MHz, per carrier, Configuration 2: DL 220 Mbps, UL 14 Mbps
  - DC mode
    - 2x10 MHz, per carrier, Configuration 1: DL 80 Mbps, UL 14 Mbps
    - 2x10 MHz, per carrier, Configuration 2: DL 110 Mbps, UL 7 Mbps
  - CA mode
    - 2x20 MHz, Configuration 1: DL 320 Mbps, UL 56 Mbps
    - 2x20 MHz, Configuration 2: DL 440 Mbps, UL 28 Mbps
  - CA mode
    - 2x10 MHz, Configuration 1: DL 80 Mbps, UL 28 Mbps
    - 2x10 MHz, Configuration 2: DL 110 Mbps, UL 14 Mbps
- Supports downlink of 256 QAM
- Supports 128+128 concurrent users, 256+256 RRC users
- Interoperable with standard LTE EPC
- Supports TR-069 network management interface protocol
- Can be accessed via GUI-based local and remote web management
- Connects to any IP-based backhaul, including public transmission
- Is lightweight and uses low power consumption to reduce OPEX
- Compact, plug-and-play device with Self-Organizing Network (SON) capabilities
- Can be used for Internet of Things (IoT) with all mainstream Evolved Packet Core (EPC) vendors
- Ensures secure protection against illegal intrusion
- External Global Positioning System (GPS) antenna
- Integrated small cell form-factor for quick and easy installation
- Configured out-of-the-box to work with Baicells CloudCore
- GPS synchronization

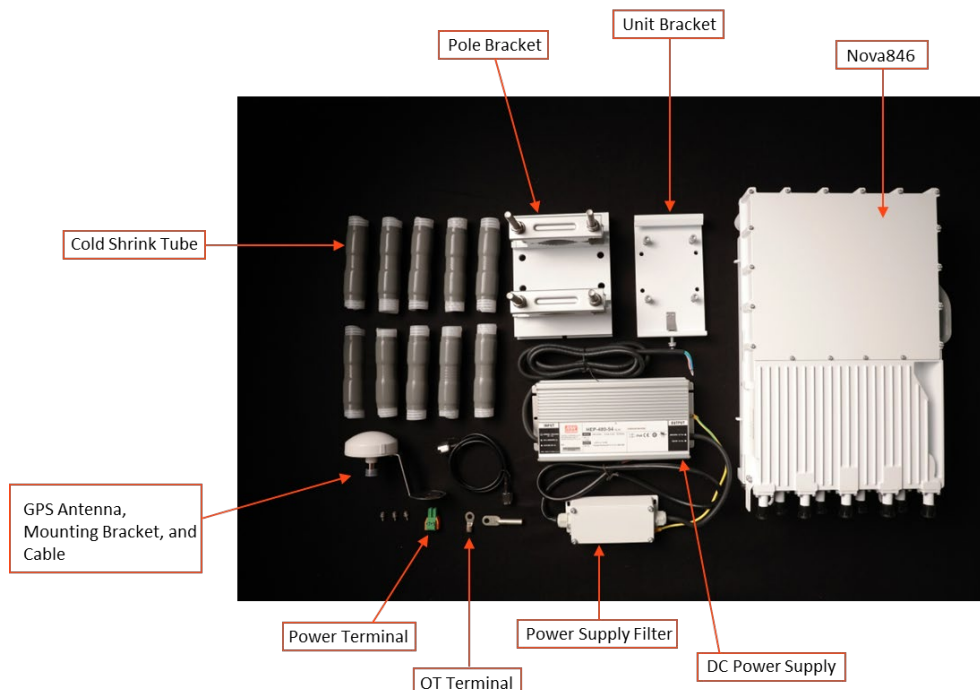
- Built-in Dynamic Host Configuration Protocol (DHCP) Server, DNS Client, and Network Access Translation (NAT) functionality, providing strong high-speed routing
- Supports Transparent Bridge Mode

## 2 Installation Preparation

### 2.1 Materials

Check the Nova846 package to ensure it contains the primary components in the packout (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: Packout**



**Table 2-1: Materials**

Item	Description
AC power cable	> 13 AWG, e.g., 12 AWG, with three cores
DC power cable	<ul style="list-style-type: none"> <li>• 13 AWG if the DC cable is less than 33 feet (10 meters)</li> <li>• 12 AWG if the DC cable is 98 feet to 197 feet (30 meter to 60 meters) and the adaptor output is 500 W</li> </ul> <p>The cable is two cores with a diameter of .4 inches <math>\pm</math> .04 inches (9 mm <math>\pm</math> 1 mm).</p>

Power plug	The plug that connects the power cable to the electricity supply
Ethernet cable	Outdoor CAT6, shorter than 328 feet (100 meters) It is suggested that the diameter of the cable is .3 inches $\pm$ .04 inches (7 mm $\pm$ 1 mm).
Ground cable	<ul style="list-style-type: none"> <li>If the length of lead is more than 33 feet (10 meters), 6 AWG (10 mm<sup>2</sup>) grounding cable should be used.</li> <li>If the length of the lead is less than 33 feet (10 meters), 10 AWG (10 mm<sup>2</sup>) grounding cable should be used.</li> </ul>
RF antenna cable	50 ohm feeder, ½ jumper
RF antenna	Omni or directional dual polarized antenna
Optical fiber	Optical fiber (armor). It is suggested that the diameter of the cable is .3 inches $\pm$ .04 inches (7 mm $\pm$ 1 mm).

Table 2-2: Installation Tools

			
Level bar	Marker pen	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 eNB's LED status indicators and interfaces.

Figure 2-2: LEDs and Interfaces

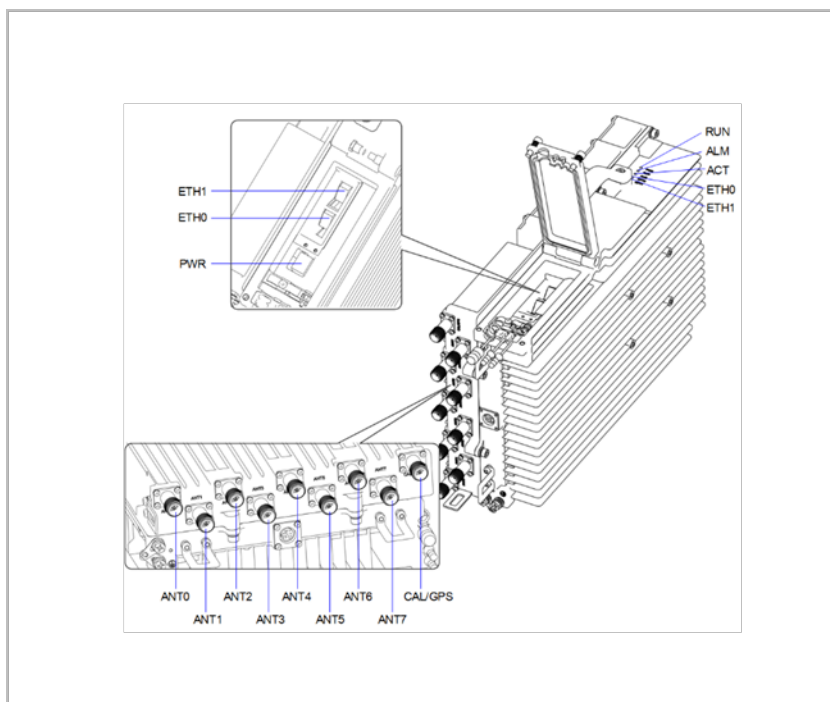


Table 2-3: LEDs

LED	Color	Status	Description
RUN	Green	Steady on	Power is on
		OFF	No power supply
ALM	Red	Steady on	Hardware alarm
		OFF	No alarm
ACT	Green	Steady on	The device is powered on
		Fast flash: 0.125 s on, 0.125 s off	Data is transmitting
		Slow flash: 1 s on, 1 s off	Cell is activated
ETH0	Green	Steady on	S1 link is up
		OFF	Small Form-Factor Pluggable (SFP) module is out of place, the ethernet cable is out of place, the optical module is powered off, or the S1 link is down.
ETH1	Green	Steady on	S1 link is up
		OFF	Small Form-Factor Pluggable (SFP) module is out of place, the ethernet cable is out of place, the optical module is powered off, or the S1 link is down.

**Table 2-4: Interfaces**

Interface Name	Description
ETH0	Ethernet interface 1: 1 optical (SFP) and 1 RJ-45 interface, which is used for data backhaul. Connect to external transmission network.
ETH1	Ethernet interface 2: 1 optical (SFP) and 1 RJ-45 interface, which is used for data backhaul. Connect to external transmission network.
PWR	Power supply: -48 V (-40 V to 57 V) DC
ANT0 – ANT3	Connects to external high-gain antenna 0 to antenna 3. N-type connector.
ANT4 – ANT7	Reserved for future use.
CAL/GPS	CAL is used for antenna alignment. GPS is the port for optional external GPS antenna. N-type connector.

## 2.3 Grounding and Lightning Protection

You must protect the eNB, antenna, and GPS against lightning. All Nova eNBs have a floating ground on the power system. Following are guidelines concerning grounding.

- The yellow-green ground wire must be at least 5 AWG (16 mm<sup>2</sup>) 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 of the grounding points and ground bar needs to be tight and reliable. Rustproofing the terminals, e.g., with antioxidant coating or grease, is required.

## 2.4 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**

## 2.5 Location and Environment

The Nova846 can be installed on a pole or a wall. For the best signal coverage, place the eNB in an unobstructed location. In addition to network planning, when determining where to place the eNB, you need to consider the best location for signal coverage. 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. Environmental specifications are shown in Table 2-5.

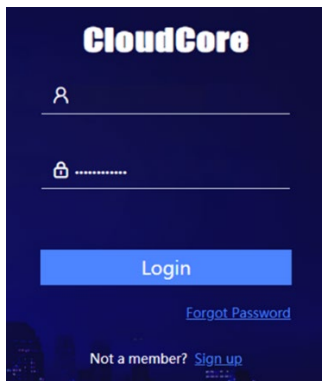
**Table 2-5: Environmental Specifications**

Item	Description
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	2% to 95% RH
Atmospheric Pressure	70 kPa to 106 kPa
Safety voltage	-40 V to -58 V

## 2.6 CloudCore Account

The Baicells CloudCore includes the EPC, managed by Baicells, and two operator applications: the OMC, which is used to manage network elements, and the BOSS, which is used to manage subscribers. If you have not already set up a Baicells CloudCore account, follow the steps below.

- Step 1: Open a web browser, and enter the CloudCore address (Figure 2-4):  
<https://cloudcore.cloudapp.net/cloudcore/>
- Step 2: Click on the *Sign up* button.
- Step 3: Complete the mandatory fields, and again click on *Sign up*.

**Figure 2-4: CloudCore Login Page**

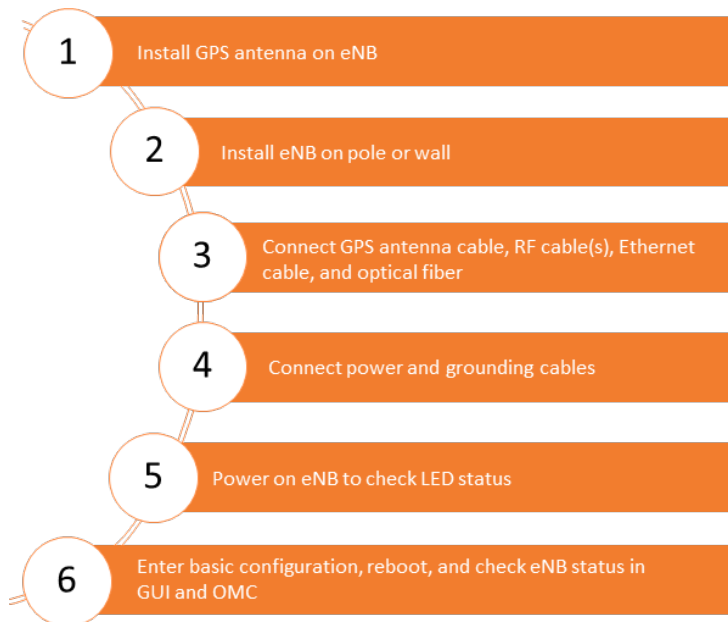
You will receive an email from Baicells. Click on the CloudCore link to go to the login page.

Enter your login user name (email address) and password to authenticate.

## 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 GPS Antenna



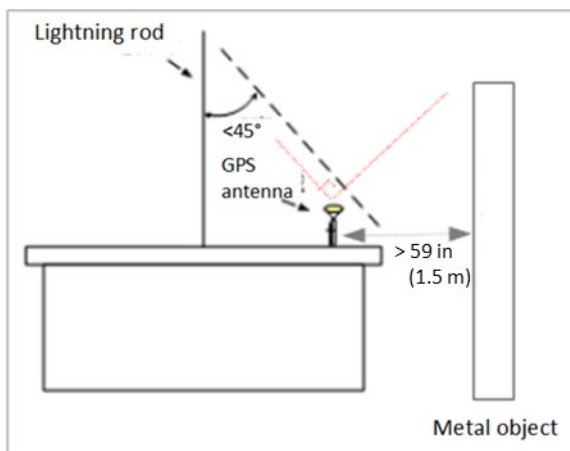
**WARNING:** Ensure the antenna is connected before powering up the eNB. The wireless signal transmission power can cause bodily injury, and damage to the eNB and RF power amplifier devices.

Read the following GPS antenna installation requirements before installing it on the eNB and refer to Figure 3-2.



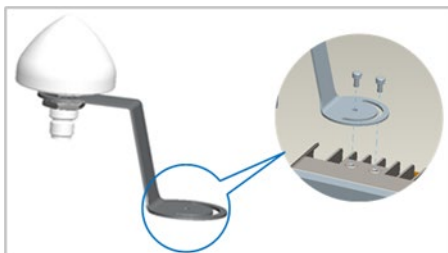
- No major blocking from buildings in the vicinity. Make sure the space atop is at least 45 degrees unblocked by any buildings.
- The GPS antenna should be installed within 45 degrees to the lightning rod.
- Do not install the GPS antenna near other transmitting and receiving equipment, to avoid interference. 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.
- The top of the GPS antenna should not be placed in the frontal position of the eNB's directional antenna if possible. If an obstruction occurs, it is recommended to install the GPS antenna in an open and lightning-protected location rather than to the eNB.
- When two or more GPS antennas are installed, it is recommended to keep the spacing of 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 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.

**Figure 3-2: GPS Installation Requirements**



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 GPS antenna models used may vary, but the installation steps are the same as described here and shown in Figure 3-3.

## 3.3 Install eNB on Pole or Wall

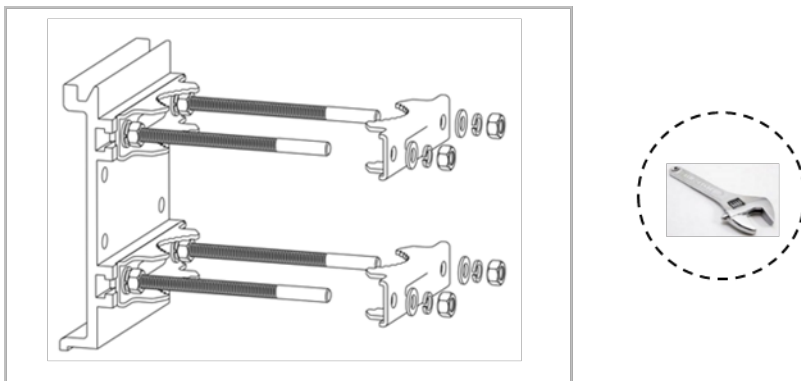
### 3.3.1 Install on Pole

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

Check to ensure the diameter of the pole is in the range of 1.6–3.9 in (41–99 mm). The position of the eNB on the pole should be at least 47 in (120 cm) in height. Follow the steps below to install the Nova846 eNB on a pole.

1. Take apart two clamps from the assembled bracket (Figure 3-4).

**Figure 3-4: Omega Clamps**



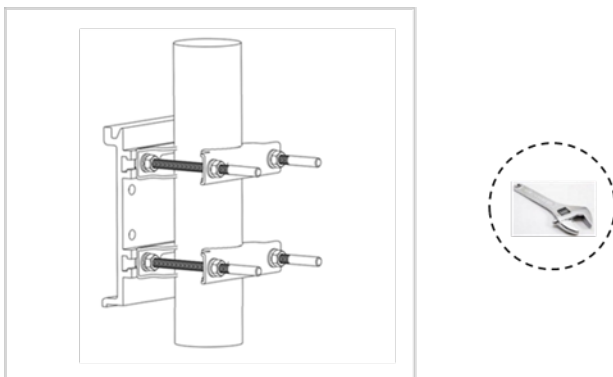
2. Attach the bracket to the pole, considering the height requirements described above. Fit the threaded rod of the bracket to the pole, and then turn the two clamps to the proper position as shown in Figure 3-5. Fasten the four hex nuts with a wrench.

---

NOTE: Ensure the sequence of flat washers, spring washers, and hex nuts is the same as the original assembly.

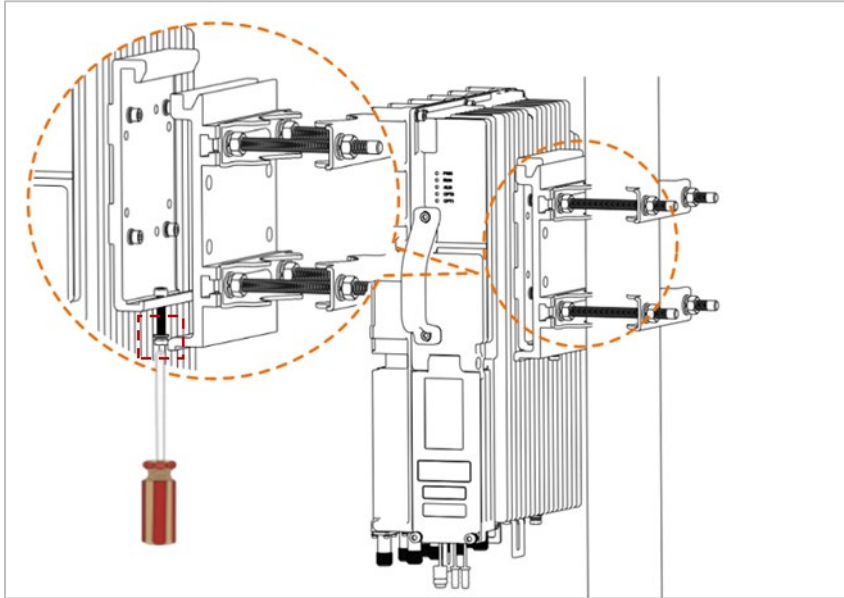
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**Figure 3-5: Attach Bracket to Pole**



3. Hang the eNB (with bracket) onto the pole bracket. Ensure the screw on the bottom of the bracket clips into the groove on the pole bracket, and then fasten the screw with a Phillips-head screwdriver to complete the installation (Figure 3-6).

**Figure 3-6: Attach eNB to Bracket**



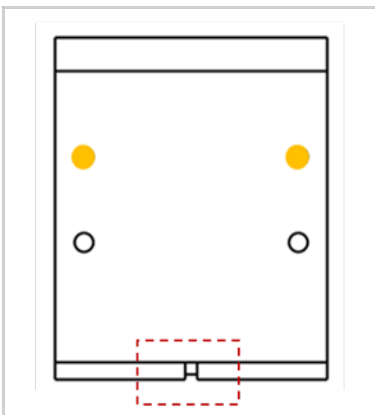
4. After installation is complete, adjust the eNB to a proper angle by tilting.

### 3.3.2 Install on Wall

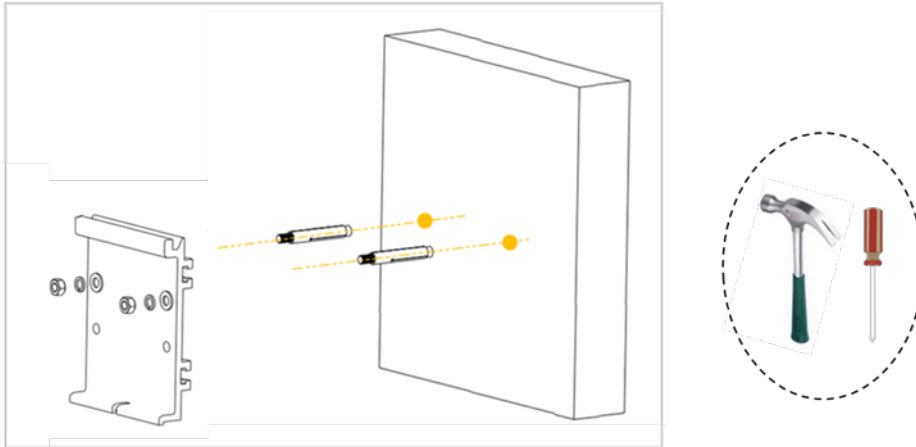
Ensure that the wall can bear at least four times the weight of the eNB. Follow the steps below to install the Nova846 eNB on a wall.

1. Take apart the assembled installation bracket.
2. Place the installation bracket on the wall, ensuring the groove is located on the bottom of the bracket, as shown in Figure 3-7. Mark the two drilling locations using a pencil or marker.
3. Drill two holes in the wall to match the size of the wall bracket holes (Figure 3-7).

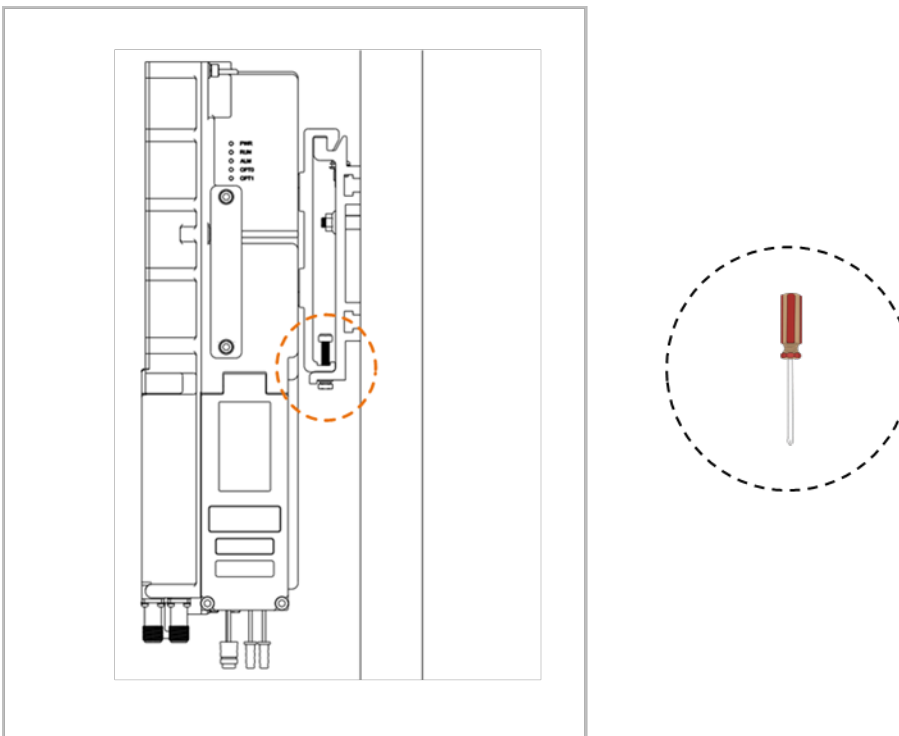
**Figure 3-7: Mark and Drill Holes**



4. Install the wall bracket to the expansion bolts using flat washers, spring washers, and hex nuts (Figure 3-8).

**Figure 3-8: Attach With Expansion Bolts**

5. Attach the eNB to the mounting bracket on the wall. Push the eNB until the hook is firmly attached to the mounting bracket. Tighten the screw on the bottom of the bracket using a Phillips-head screwdriver to complete the installation (Figure 3-9).

**Figure 3-9: Completed Installation**

## 3.4 Connect Cables



**WARNING:** Ensure the antenna is connected before powering up the eNB. The wireless signal transmission power can cause bodily injury and damage to the eNB and Radio Frequency (RF) power amplifier devices.

### 3.4.1 Cable Laying Requirements

#### General requirements:

- Bending radius of antenna feeder cable:
  - 7/8 in > 9.84 in (22.2 mm > 250 mm)
  - 4/5 in > 14.96 in (20.3 mm > 380 mm)
- Bending radius of jumper cable:
  - 1/4 in > 1.38 in (6.3 mm > 35 mm)
  - Super soft 1/2 in > 1.97 in (13 mm > 50 mm)
  - Ordinary 1/2 in > 5 in (13 mm > 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 type of cable; intertwining and crossing are forbidden.
- An identification label should be attached after the cable has been laid.

#### Optical fiber cable requirements:

- Avoid circling and twisting of 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 laying requirements:

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

### 3.4.2 Connect GPS Antenna Cable



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

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. Insert the other end of the GPS jumper into a cold shrink tube, and then connect it to the GPS interface on the eNB, which also needs weatherproof protection.
5. Push the cold shrink tube to the GPS port, and pull out the strip.

### 3.4.3 Connect RF Cable(s)



**WARNING:** Ensure the RF antenna feed is connected properly before activating the cell and transmitting RF signals. The wireless signal transmission power can cause bodily injury, and damage to the eNB and RF power amplifier devices.

---

NOTE: The Nova846 has eight antennas (ANT0–ANT7), but only ANT0–ANT3 are currently used.

---

1. Open the dust caps of the **ANT0**, **ANT1**, **ANT2**, and **ANT3** interfaces.
2. Insert the RF cable(s) into cold shrink tubes.
3. Connect RF cable(s) to the **ANT0**, **ANT1**, **ANT2**, and **ANT3** interfaces on the eNB, and tighten them with a wrench to 12–15 in-lbs or 1.4–1.7 NM torque.

---

NOTE: Only antenna ports ANT0, ANT1, ANT2, and ANT3 are used for single carrier mode. For CA and DC mode, antenna ports ANT0, ANT1, ANT2, and ANT3 connect to the primary cell (Pcell), or Cell 1; and, antenna ports ANT4, ANT5, ANT6, and ANT7 connect to the secondary cell (Scell), or Cell 2.

---

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 cold shrink tubes, and then connect them to the external antennas, 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

1. Unscrew the three screws on the cover of the eNB wiring cavity using a Phillips-head screwdriver. Open the wiring cavity.
2. Connect the optical fiber to the **ETH1** interface in the wiring cavity.
3. Lay the cable along the wire groove, and stretch it out of the wiring cavity from the ETH1 hole.
4. Connect the other end of the optical fiber to the optical distribution frame.

### 3.4.5 Connect Ethernet Cable

Refer to Figure 3-11 (in [section 3.5.1](#)) to complete the Ethernet cable connection.

1. Connect the Ethernet cable to the **ETH0** interface in the wiring cavity.
2. Lay the Ethernet cable along the wire groove, and stretch out the wiring cavity from the **ETH0** hole.
3. Connect the other end of the Ethernet cable to the LAN switch.

## 3.5 eNB Power and Grounding

### 3.5.1 Connect Power Cable

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.

Strip 0.47 in (12 mm) insulating layer with a wire stripper. The power cord length should be kept below 330 ft (100 m). The connection steps for the power cable are as follows.

1. Assemble the power plug. 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. Connect the output of the power adaptor to the lightning protection box.
3. Assemble the power terminal. The power terminal will be installed on the end of the output direction. Refer to Figure 3-10 to connect the live wire and neutral wire.

**Figure 3-10: Power Terminal**

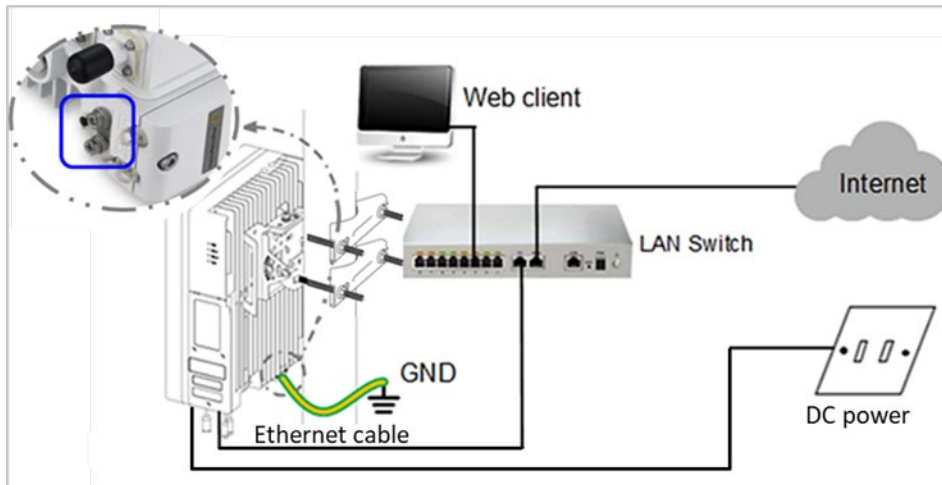


4. Connect the power cable to the PWR interface in the wiring cavity.
5. The power cable lays along the slot and stretches out of the wiring cavity.
6. The input of the power adaptor connects to the outlet.
  - If the outlet is indoors, place the power adaptor indoors.
  - If the outlet is outdoors, place the power adaptor in a waterproof box.
7. 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.

### 3.5.2 Connect Grounding Cables

Prepare the grounding cable according to the actual measurements and requirements of the specific installation site. The Nova846 eNB has two grounding screws located on the bottom of the unit, as shown in Figure 3-11. Follow the steps below the figure to connect the ground cable.



**Figure 3-11: Connect Cables and Grounding Screws**

NOTE: All Nova eNBs have a floating ground on the power system.

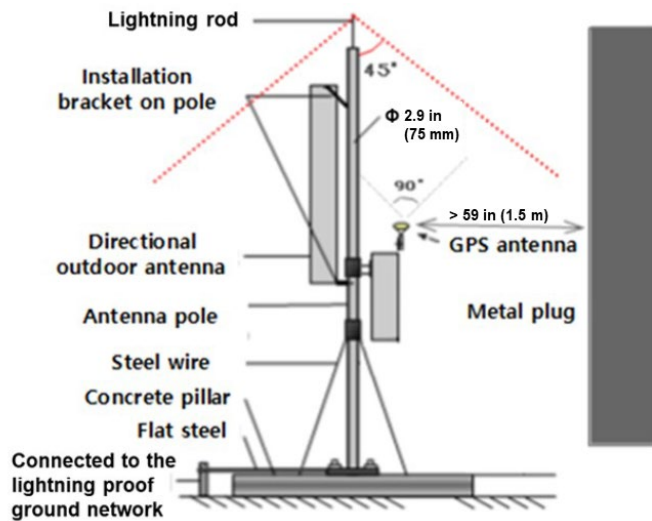
1. Unscrew one grounding screw, connect one end of the ground cable to the grounding screw, and retighten the screw.
2. Repeat **step 1** for the second grounding screw.
3. Once the eNB is installed at the outdoor location, the other end of the ground cable needs to connect to a good earth grounding point.

Before installing the eNB at its final destination, perform the steps in **sections 3.7** and **3.8**. Upon successful testing, the eNB will be ready for installation at the cell site. Seal and weatherproof all the connection points, and rustproof where needed.

### 3.5.3 Pole Grounding

The purpose of pole grounding is to protect the equipment as much as possible from potential damage of lightning overvoltage. 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, any damage caused by lightning primarily 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 3-12.

Figure 3-12: 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 with 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, 12 x 1.6 x 0.16 in (300 x 40 x 4 mm) 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 27.5 in (0.7 m). 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 Maintenance Chamber Waterproofing

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

Clamp the power cord to the wire position, and seal the wire diameter 0.35 in  $\pm$  0.04 in (9 mm  $\pm$  1 mm).

Put the Ethernet cable on the wire, and seal the wire diameter 0.28 in  $\pm$  0.04 in (7 mm  $\pm$  1 mm).

## 3.7 Power on to Check LED Status

After the Nova846 is powered on, check that the LED indicators are lighting as expected and described in Table 2-3 ([section 2.2](#)).

## 3.8 Configure Basic Parameters

Reference: [Nova846 eNodeB Configuration Guide](#)

The Nova846 eNB can be configured in Single Carrier (SC), Carrier Aggregation (CA), or Dual Carrier (DC)/split mode, depending on which licenses you have purchased, and/or in HaloB mode, which is embedded in the base software. The Nova846 also supports CBRS SAS operation.

When first installing and testing the Nova846, Baicells recommends configuring the primary cell (Pcell)/Cell 1 carrier settings (without enabling CA, DC, HaloB, or SAS) for simple verification that the new eNB unit is operational. Once it is confirmed to be operational, you can then 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](#).

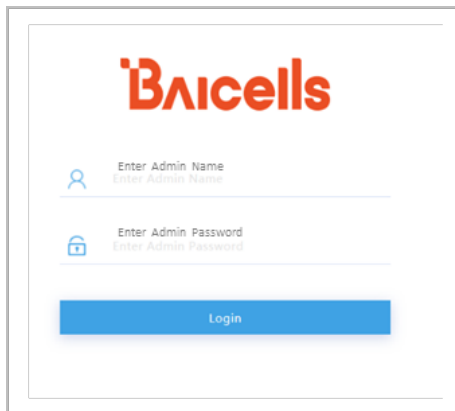
- CloudCore Configuration & Network Administration Guide (OMC/BOSS)
- CPE Configuration Guides
- Nova846 eNodeB Configuration Guide
- Carrier Aggregation & Dual Carrier (Split Mode) Configuration Guide
- HaloB Solution User Guide
- SAS Deployment Guide

### 3.8.1 Launch the eNB GUI

Follow the steps below to connect to the Nova846 GUI.

- Step 1: Use an Ethernet cable to connect the eNB DATA MGMT ETH port to the local network routed to the Internet. The DATA interface is set to DHCP client by default.
- Optionally, you can plug a Personal Computer (PC) directly into the eNB DATA MGMT ETH port. On your PC you will need to assign a static IP address within the Management (MGMT) subnet. The default IP address for the MGMT interface is <http://192.168.150.1/24>.
- Step 2: Open a Web browser, and enter the following IP address: <http://192.168.150.1>.
- Step 3: At the login screen (Figure 3-13), enter the default user name (*admin*) and password (*admin*) and click on *Login* to open the home page.

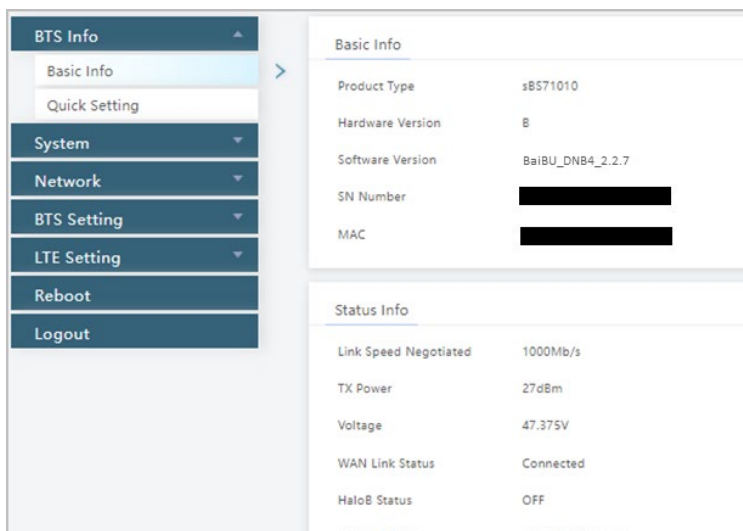
Figure 3-13: GUI Login



The login screen features the Baicells logo at the top. Below it are two input fields: 'Enter Admin Name' with a user icon and 'Enter Admin Password' with a lock icon. A blue 'Login' button is positioned at the bottom.

The home page is the *Basic Setting > Basic Info* menu, which reports the current eNB status (Figure 3-14). In [section 3.8.9](#), you will use this page to confirm that the eNB is active.

Figure 3-14: Home Page



The home page displays a sidebar menu on the left with options: BTS Info, Basic Info, Quick Setting, System, Network, BTS Setting, LTE Setting, Reboot, and Logout. The main content area shows 'Basic Info' and 'Status Info' sections.

Basic Info	
Product Type	s8571010
Hardware Version	B
Software Version	BaIBU_DNB4_2.2.7
SN Number	[REDACTED]
MAC	[REDACTED]

Status Info	
Link Speed Negotiated	1000Mb/s
TX Power	27dBm
Voltage	47.375V
WAN Link Status	Connected
HaloB Status	OFF
eNodeB Status	Start OSC Timeout

Optionally, you may want to:

1. Change the login password.
2. Confirm the firmware version is the latest available from Baicells; upgrade if needed.  
Firmware upgrades can be found at Baicells.com > Support > *Firmware*. See *Section 3.8.2* for detailed instructions regarding firmware upgrades.
3. Set the Network Timing Protocol (NTP).

For help, refer to the *CloudCore Configuration & Network Administration Guide*.

## 3.8.2 Upgrade Firmware

To ensure you are using the most recent software version before configuring the eNB, follow the steps below.

### 3.8.2.1 Upgrade Firmware from the eNB GUI

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

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NOTE: The file type is \*.IMG

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4. Click *Upgrade Now*.
5. In the pop-up window click *PROCEED*.
6. The base station reboots after approximately three minutes.
7. On the *BTS Info > Basic Info* page, the upgraded version is displayed in *Software Version*.

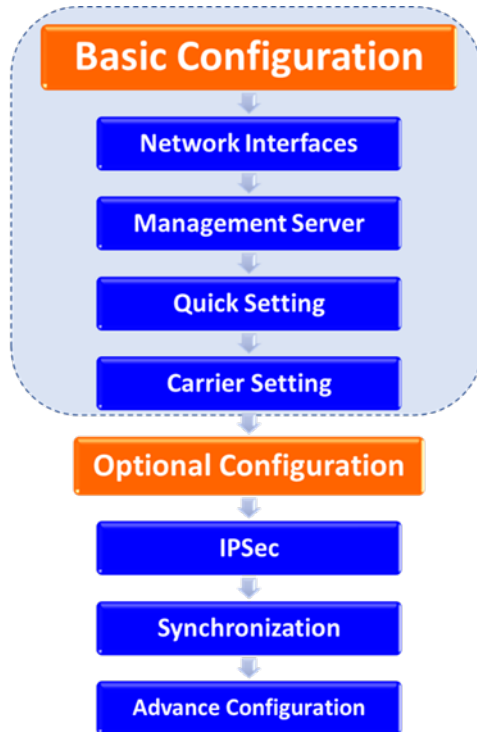
### 3.8.2.2 Upgrade Firmware from the OMC

1. Go to *eNB > Upgrade > Upgrade&Rollback*.
2. Select the correct *Product Type* from the list.
3. Select the checkbox next to the eNB(s) you want to upgrade.
4. In the *New Task* window, select the *Upgrade Type*.
5. In the eNB section, select the checkbox(es) next to the eNB(s) you want to upgrade.
6. Next to *File List*, select/deselect *Retain Configuration*. Under *Select*, choose the software version by clicking in the empty cell (a blue checkmark will appear).
7. Choose the *Execute Type*, which determines when the upgrade will occur.
8. Select *OK*.

### 3.8.3 Basic Configuration Overview

Figure 3-15 indicates four main steps for basic configuration: network interfaces, management server address, quick settings pertaining to key LTE parameters, and the carrier setting.

Figure 3-15: Configuration Flow



### 3.8.4 Configure Network Interfaces

The network interfaces defined as part of the initial, basic setup include the WAN/LAN/VLAN interfaces, DHCP, and the Local Gateway (LGW) mode.

#### 3.8.4.1 WAN/LAN

Go to the *Network > WAN/LAN* menu (Figure 3-16) to configure the WAN interface. The WAN interface is an external communication portal (Internet connection) between the eNB's Network Management System (NMS) – in most cases, the CloudCore OMC – and the Mobility Management Entity (MME). If not using CloudCore, the eNB's NMS may be a Local OMC or the LTE NMS.

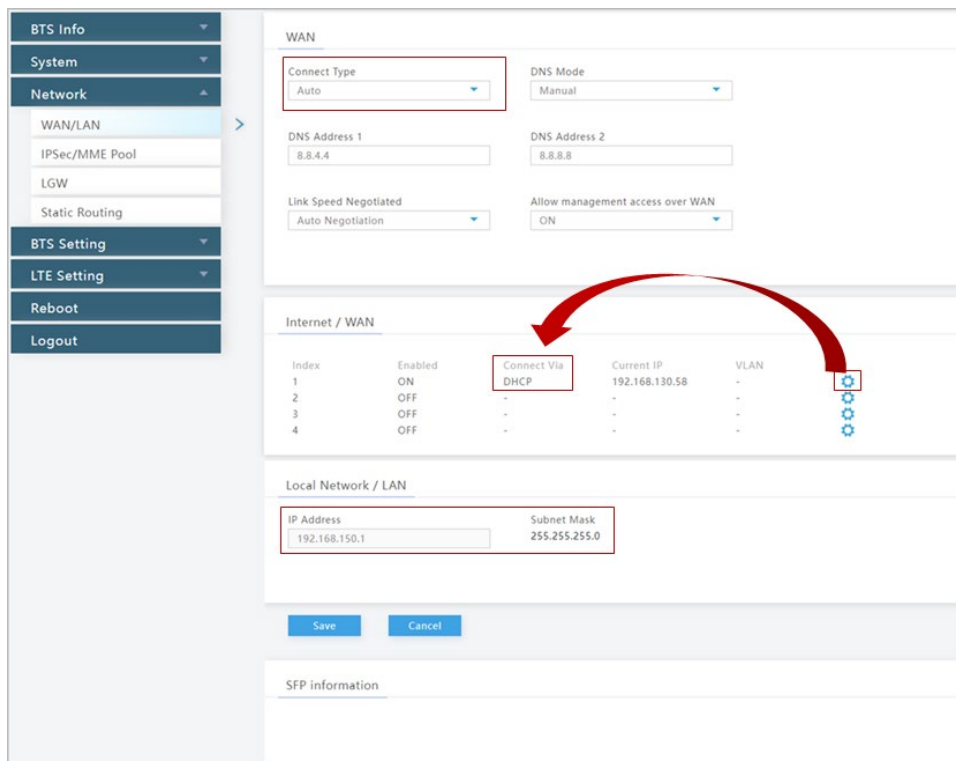
Although not shown in the *Network > WAN/LAN* sub-menu label, the WAN interface supports the configuration of multiple Virtual Local Area Networks (VLANs), which can be used by single-carrier eNBs only. The *Network > WAN/LAN* fields are described in Table 3-1.

If the *Connect Via* field is set to *DHCP* and the LGW function is *ON* ([section 3.8.4.2](#)), the *Connect Type* field must be modified. The IP address of the eNB will be changed due to the MAC address being changed. Therefore, modify the router server at the same time.

The LAN configuration is used only as a local maintenance port during initial eNB setup and basic configuration; it is not used during normal eNB operation. Enter the IP address for the local network connection. The default IP address for the LAN interface is 192.168.150.1 and the default IP address for the and subnet mask address is 255.255.255.0.

NOTE: If the LAN IP address is changed, the eNB will reboot, and you will have to log in to the GUI again.

**Figure 3-16: WAN/LAN**



**Table 3-1: WAN/LAN**

Field Name	Description
<b>WAN Pane</b>	
Connect Type	Select Auto, Copper, or Fiber type of connection to the WAN: <ul style="list-style-type: none"> <li>• Auto: Automatically matches an optical or electrical port based on the hardware connection</li> <li>• Copper: RJ-45 (electrical) port</li> <li>• Fiber: optical port</li> </ul>



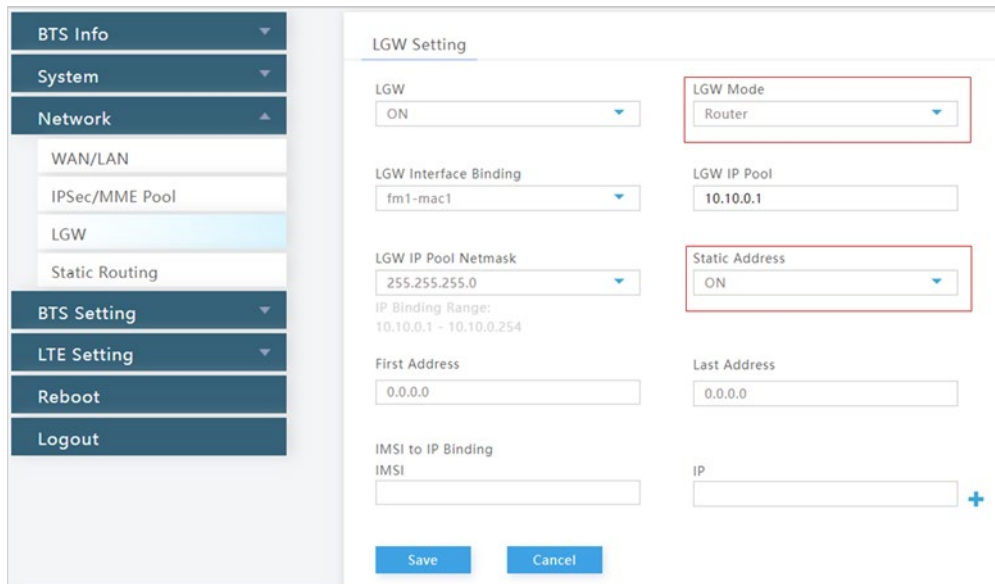
Field Name	Description
DNS Mode	Select DNS mode: <ul style="list-style-type: none"> <li>• Auto: Selects DNS automatically. The DNS's current IP address displays if <i>Auto</i> is selected.</li> <li>• Manual: Set the DNS server manually if the IP address is a static one. The next DNS IP address must also be set if <i>Manual</i> is selected.</li> </ul>
DNS Address 1	This parameter, which is DNS IP address 1, displays if DNS mode is set to <i>Manual</i> .
DNS Address 2	This parameter, which is DNS IP address 2, displays if DNS mode is set to <i>Manual</i> .
Link Speed Negotiated	Select negotiated link speed. <i>Auto negotiation</i> , <i>100M</i> (Mb/s), and <i>1000M</i> are supported.
Allow management access over WAN	Enable or disable the LMT connection through the WAN port.
<b>Internet/WAN Pane</b>	
Enabled	Indicates if the interface is enabled or not. The eNB supports the configuration of four IP addresses at most.
Connect Via	Options for the interface protocol used by the WAN interface: <ul style="list-style-type: none"> <li>• DHCP</li> <li>• Static IP</li> <li>• IPv6 DHCP</li> <li>• IPv6 Static IP</li> </ul> <p>NOTE: See detailed descriptions of each connection type in the section introduction above. The DHCP protocol is recommended. The displayed fields depend on which protocol is selected.</p>
Current IP	The WAN interface IP address. The IP address is acquired automatically if "connect via" protocol type selected is <i>DHCP</i> .
Option60	This parameter displays if "connect via" protocol type selected is <i>DHCP</i> .
Subnet Mask	This parameter displays if "connect via" protocol type selected is <i>Static IP</i> . This is the IP address' subnet mask address.
Gateway	This parameter displays if "connect via" protocol type selected is <i>Static IP</i> . Used to set the default gateway's IP address.

Field Name	Description
Prefix	This parameter displays if “connect via” protocol type selected is <i>IPv6 Static IP</i> . Used to set the IPv6 address’ prefix for the WAN interface.
Vlan ID	Used when the operator needs to transmit multi-types of data through separate channels via IP addresses for the WAN interface through VLAN. The VLAN IDs should be unique numbers not identical to any other VLAN. The range is 1 to 4094. Avoid using “12”, which is commonly used by the LAN interface.

### 3.8.4.2 LGW

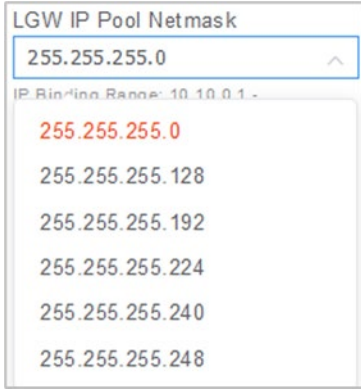
The LGW setting must be configured when using the Baicells CloudCore EPC. Refer to Figure 3-17 and Table 3-2. You must reboot the eNB when you make changes to these settings.

**Figure 3-17: LGW = Router**



**Table 3-2: LGW = Router Fields**

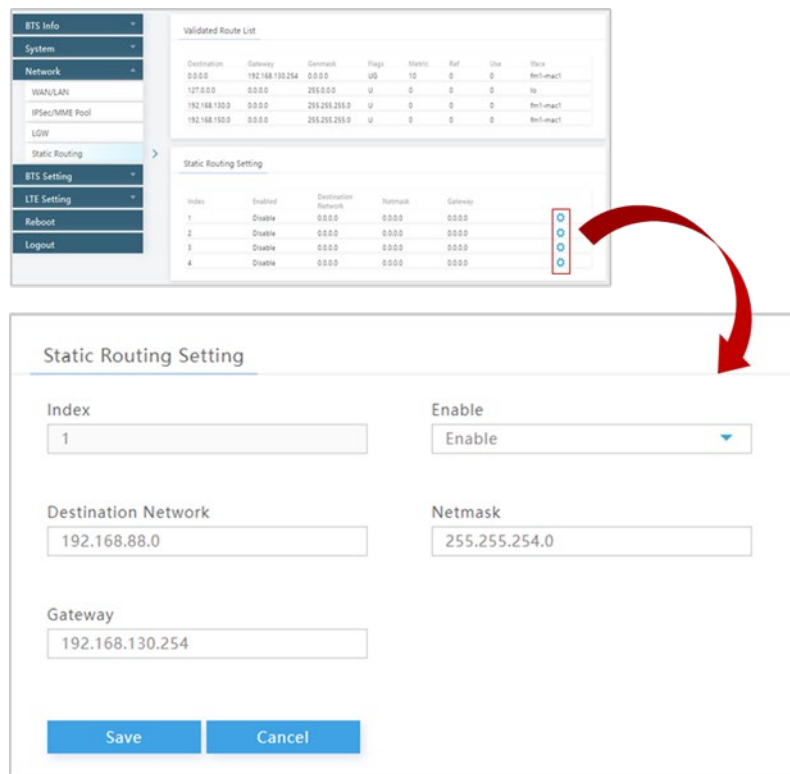
Field Name	Description
LGW	On or Off
LGW Mode	Select an option: NAT: Packages from the internal network to the external network need Network Address Translation Router: Select optimized route from the routing table ( <a href="#">Figure 3-18, section 3.8.4.3</a> ) Bridge: Transfer in the data link layer

Field Name	Description
LGW Interface Binding	The IP address connects to the LGW. Select from configured interfaces. Default is WAN interface. The VLAN interface can also be used to separate different links.
LGW IP Pool	Enter the starting IP address of the dynamic IP address pool
LGW IP Pool Netmask	For example, if the first IP address is 10.10.10.1 and the netmask is 255.255.255.0, the IP address pool includes 255 IP addresses. The options are shown in the pull-down menu: 
Static Address	If <i>LGW Mode = Router</i> (Figure 3-18, section 3.8.4.3), set to <i>ON</i> if you want to use a static IP address.
First Address	If <i>LGW Mode = Router</i> and <i>Static Address = ON</i> (Figure 3-18, section 3.8.4.3), enter the first static IP address in the range.
Last Address	If <i>LGW Mode = Router</i> and <i>Static Address = ON</i> (Figure 3-18, section 3.8.4.3), enter the last static IP address in the range.
IMSI to IP Binding - IMSI	If <i>LGW Mode = Router</i> and <i>Static Address = ON</i> (Figure 3-18, section 3.8.4.3), if you want to bind an IMSI number to the IP address, enter the IMSI number.
IMSI to IP Binding - IP	If <i>LGW Mode = Router</i> and <i>Static Address = ON</i> (Figure 3-18, section 3.8.4.3), enter the IP address to bind to the IMSI. You can add more than one IP address.

### 3.8.4.3 Static Routing

When using static routing, go to *Network > Static Routing*. The *Network > Static Routing* landing page has two main sections, *Validated Route List* and *Static Routing Setting* (Figure 3-18). The configured static route information is displayed under *Static Routing Setting*. To add or edit a static route in the list, click on the settings icon, enter the information, and click *Save*. Field descriptions are in Table 3-3.

Figure 3-18: Static Routing



**Validated Route List**

Destination	Gateway	Netmask	Flags	Metric	Ref	Use	Policy
0.0.0.0	192.168.130.254	0.0.0.0	UG	10	0	0	BestMatch
127.0.0.0	0.0.0.0	255.0.0.0	U	0	0	0	Ho
192.168.130.0	0.0.0.0	255.255.255.0	U	0	0	0	BestMatch
192.168.130.0	0.0.0.0	255.255.255.0	U	0	0	0	BestMatch

**Static Routing Setting**

Index	Enabled	Destination Network	Netmask	Gateway
1	Disable	0.0.0.0	0.0.0.0	0.0.0.0
2	Disable	0.0.0.0	0.0.0.0	0.0.0.0
3	Disable	0.0.0.0	0.0.0.0	0.0.0.0
4	Disable	0.0.0.0	0.0.0.0	0.0.0.0

**Static Routing Setting**

Index:  Enable:

Destination Network:  Netmask:

Gateway:

Table 3-3: Static Routing

Field Name	Description
Index	Auto-generated router index number
Enable	Enable/Disable the static route
Destination Network	The destination IP address
Netmask	The destination subnet mask
Gateway	The destination gateway IP address

### 3.8.5 Configure the Management Server

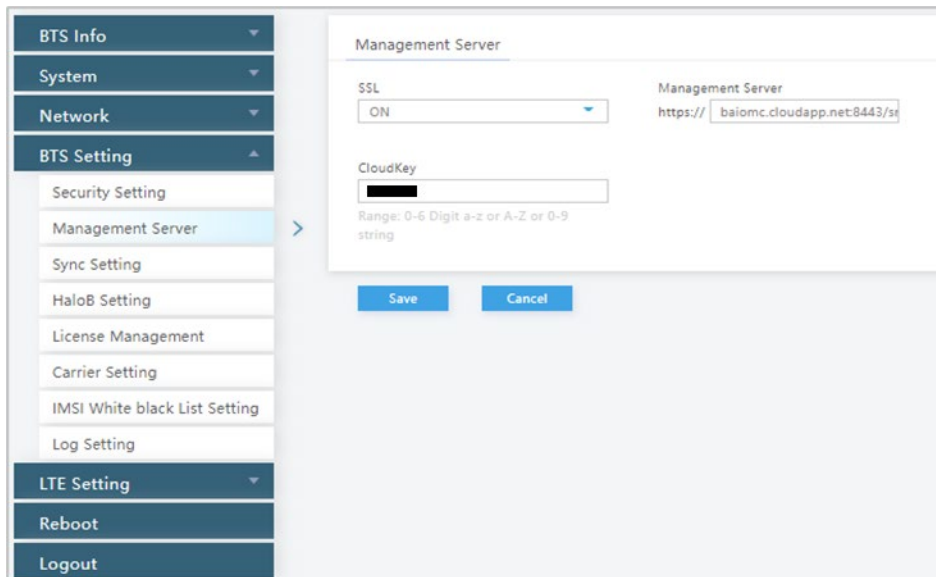
In the *BTS Setting > Management Server* window, you will enter the network management service (NMS) information (Figure 3-19). The fields are described in Table 3-4. When using the Baicells CloudCore to manage the network, in the *http://* field, enter the following URL address and port number: **baiomc.cloudapp.net:8443/smallcell/AcsService**

If you are using Local OMC or another NMS, enter its server address and port number.

Enter your unique operator CloudKey ID that you received from Baicells if you are using the Baicells CloudCore to manage the network. The CloudKey is used as part of the plug-and-play aspect of the Baicells network elements.

You can choose to enable a Secure Socket Layer (SSL) connection as an optional setting for enhanced security.

**Figure 3-19: Management Server**



**Table 3-4: Management Server**

Field Name	Description
SSL	Enable/Disable SSL using <i>ON/OFF</i> . When enabled the Management Server field changes to a secure http extension.
Management Server	Enter the management server IP address and port number
CloudKey	Operators using the Baicells CloudCore are provided a unique CloudKey identifier that may be used when configuring CPEs and eNBs. If entered in this field, when the device is powered on it will immediately associate to the operator's OMC account. You can find your CloudKey ID when you log in to the CloudCore. It is displayed in the top bar.

### 3.8.6 Configure Quick Settings

Under the *BTS Info > Quick Setting* window (Figure 3-20) are several important fields you must configure and/or verify, including several key parameters to support CBRs SAS when SAS is enabled in the *LTE Setting > SAS Settings* sub-menu.

First, if the operator is using the Baicells CloudCore EPC, you must enter a fixed Public Land Mobile Network (PLMN) and MME IP address:

- PLMN = **314030**
- MME IP = **10.3.0.9 and 10.5.0.9**

Do not change these settings except when connecting to a Local (private network) EPC or different vendor's EPC.

Second, if you are not planning to use CBRs SAS, you must enter the operator's planned settings for Band, Bandwidth, EARFCN, Cell ID, PCI, TAC, etc. If you are planning to use CBRs SAS, the SAS vendor will determine the parameters for *Band*, *Bandwidth*, *Frequency*, and *Power Modify*. However, you can configure your preferences for these settings by selecting a preferred *Frequency Selection Logic*, *Preferred Bandwidth*, *Preferred Power*, and *Preferred Frequency*. All of these preferences are explained in the [SAS Deployment Guide](#).

If you are testing the eNB in a lab environment, turn the power down as low as it will go under the *Power Modify* field.

---

NOTE: The Nova846 does not support SFA = 0.

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For a description of all the eNB *Quick Setting* fields, refer to the [Nova846 eNodeB Configuration Guide](#).

Figure 3-20: Quick Setting

The screenshot displays the configuration interface for a Baicells Nova846 eNodeB. On the left is a navigation menu with options: BTS Info, Basic Info, Quick Setting (selected), System, Network, BTS Setting, LTE Setting, Reboot, and Logout. The main area is divided into two sections: 'Quick Setting' and 'Cell Quick Setting'.

**Quick Setting Section:**

- Duplex Mode:** TDD
- Auto ECI:** OFF
- eNB ID:** [Redacted]
- eNodeB Type:** Macro
- Power Modify:** 2 x 6dBm
- Legacy Mode:** OFF
- Frequency Selection Logic:** Power,Bandwidth,Frequency
- Preferred Bandwidth:** 20MHz
- Preferred Power:** 2 x 1dBm
- Preferred Frequency:** Auto

**Cell Quick Setting Section:**

- Band:** 48
- Bandwidth:** 20
- EARFCN:** 56290
- SubFrame Assignment:** 2 (DL:UL = 3:1)
- Special SubFrame Patterns:** 7
- PCI:** 55
- ECI (ECI=eNB\_ID\*256+Cell\_ID):** 73828545
- Cell ID:** 193
- TAC:** 1
- RF Status:** OFF
- PLMN:** 314030

At the bottom of the 'Cell Quick Setting' section are 'Save' and 'Cancel' buttons.

### 3.8.7 Configure Carrier Setting

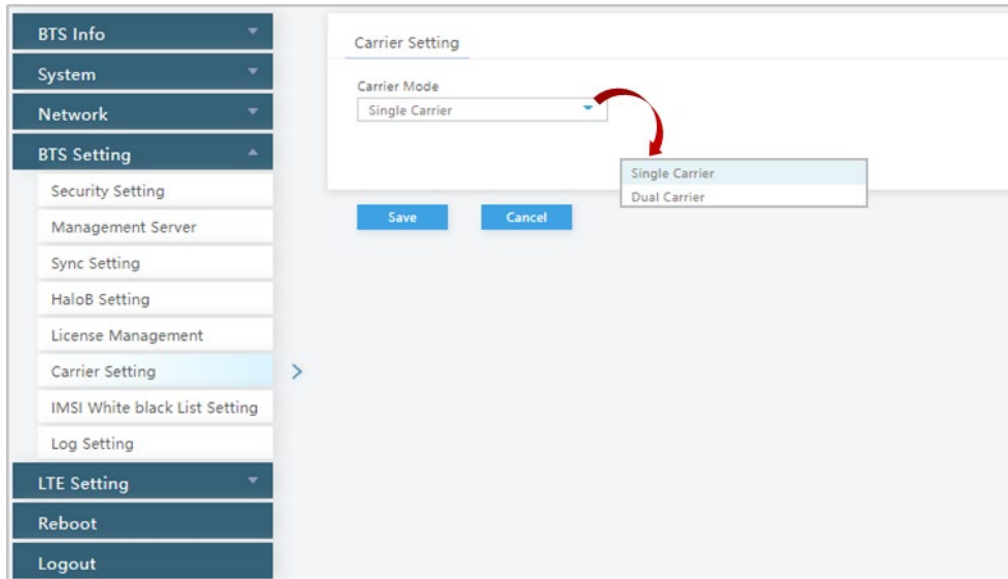
Reference: [Carrier Aggregation & Dual Carrier \(Split Mode\) Configuration Guide](#)

The *BTS Setting > Carrier Setting* sub-menu is used only in the two-carrier Nova846 eNB as shown in Figure 3-21. Click the arrow in the *Carrier Mode* field to view the drop-down menu. You can set the eNB to run as a single carrier, as two combined carriers using CA, or as two independent carriers using Dual Carrier (DC)/split mode, depending on which licenses you have purchased. Single carrier (no CA) means only Cell 1 operates, and it uses only two RF ports instead of four. Operators may need to use this mode if they have limited spectrum or are planning to change to CA or DC mode at a later time when more capacity is needed for the coverage area.

If you set the *Carrier Mode* to *Dual Carrier*, you have the option to enable the CA mode by clicking the *Carrier Aggregation Enabled* checkbox (not shown in Figure 3-21). If you want to use DC mode, do not click the *Carrier Aggregation Enabled* checkbox.

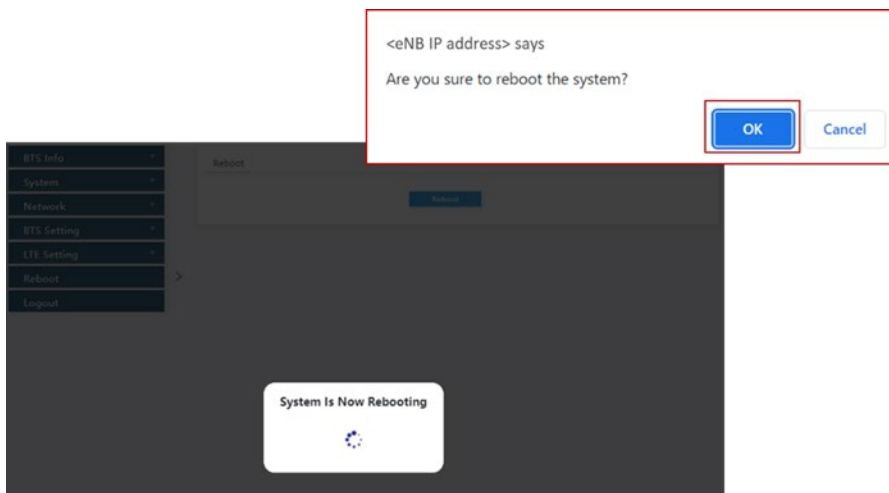
Whenever you change the carrier setting, you must **reboot** the eNB for the change to take effect.



**Figure 3-21: Carrier Setting**

### 3.8.8 Reboot

Once the basic configuration settings are saved, reboot the eNB. Go to the *Reboot* menu and click *Reboot*. Confirm intent to reboot by clicking *OK* at the message prompt (Figure 3-22).

**Figure 3-22: Reboot**

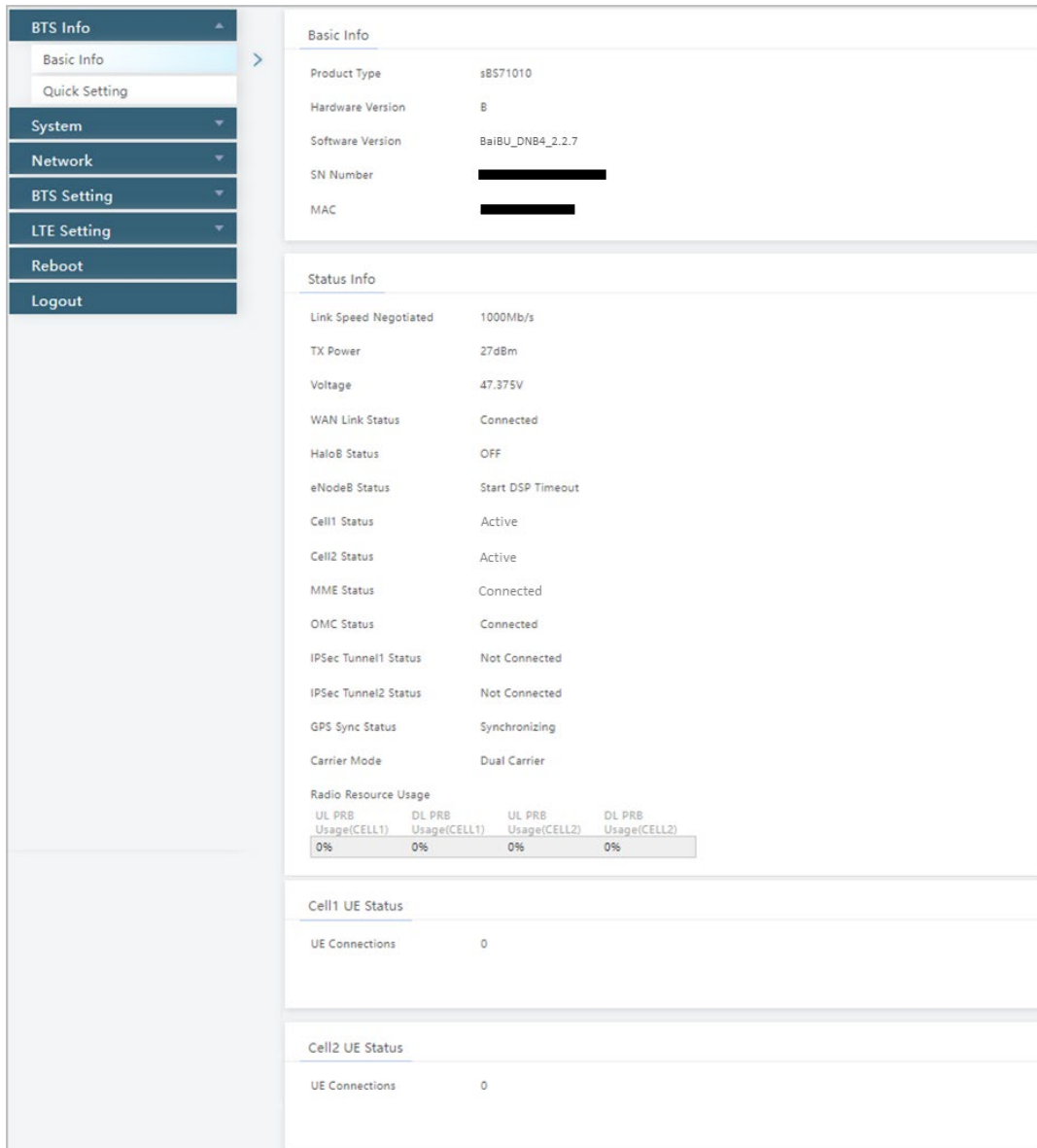
### 3.8.9 Verify eNB Operational Status

When the eNB is finished rebooting, check the eNB status using the eNB GUI and the OMC. Once the eNB is mounted at its intended destination and powered on, recheck the status settings.

- **eNB GUI:** Go to *BTS Info > Basic Info* and check the *Cell Status* field (Figure 3-23). It should show *Active*. Also, check that *GPS Sync Status* is reported as *Synchronizing*.
- **OMC:** Go to *eNB > Monitor* to see if the *Cell Status* shows *Active* and the *Sync Status* shows *GPS Synchronized* (Figure 3-24).

NOTE: Ensure you have selected ALL in the display settings window in the *OMC > eNB > Monitor* page to view *Cell Status* and *Sync Status* (Figure 3-25).

**Figure 3-23: Cell Status (eNB GUI)**



**Basic Info**

Product Type	s8571010
Hardware Version	B
Software Version	BaIBU_DN84_2.2.7
SN Number	[REDACTED]
MAC	[REDACTED]

**Status Info**

Link Speed Negotiated	1000Mb/s
TX Power	27dBm
Voltage	47.375V
WAN Link Status	Connected
HaloB Status	OFF
eNodeB Status	Start DSP Timeout
Cell1 Status	Active
Cell2 Status	Active
MME Status	Connected
OMC Status	Connected
IPSec Tunnel1 Status	Not Connected
IPSec Tunnel2 Status	Not Connected
GPS Sync Status	Synchronizing
Carrier Mode	Dual Carrier

**Radio Resource Usage**

UL PRB Usage(CELL1)	DL PRB Usage(CELL1)	UL PRB Usage(CELL2)	DL PRB Usage(CELL2)
0%	0%	0%	0%

**Cell1 UE Status**

UE Connections	0
----------------	---

**Cell2 UE Status**

UE Connections	0
----------------	---

Figure 3-24: Cell Status (OMC)

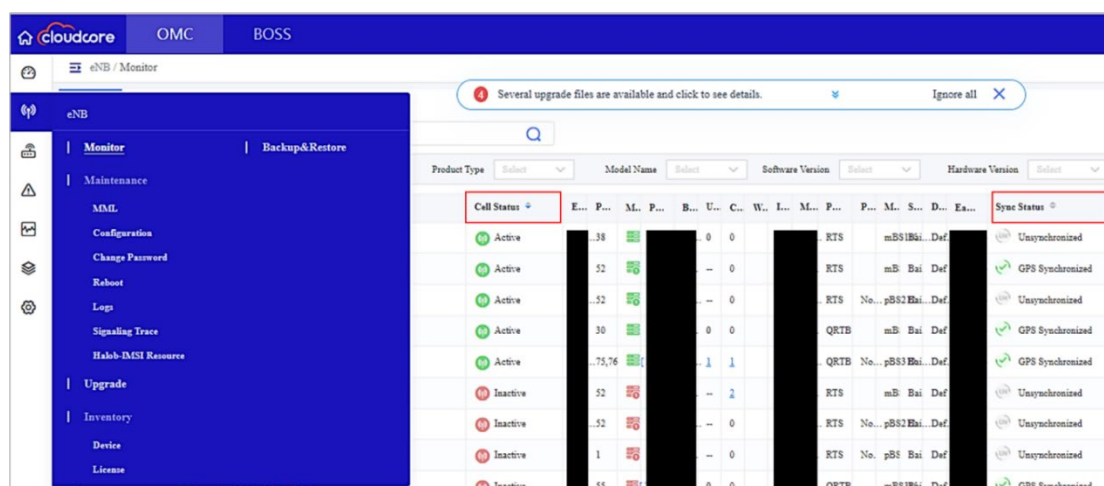
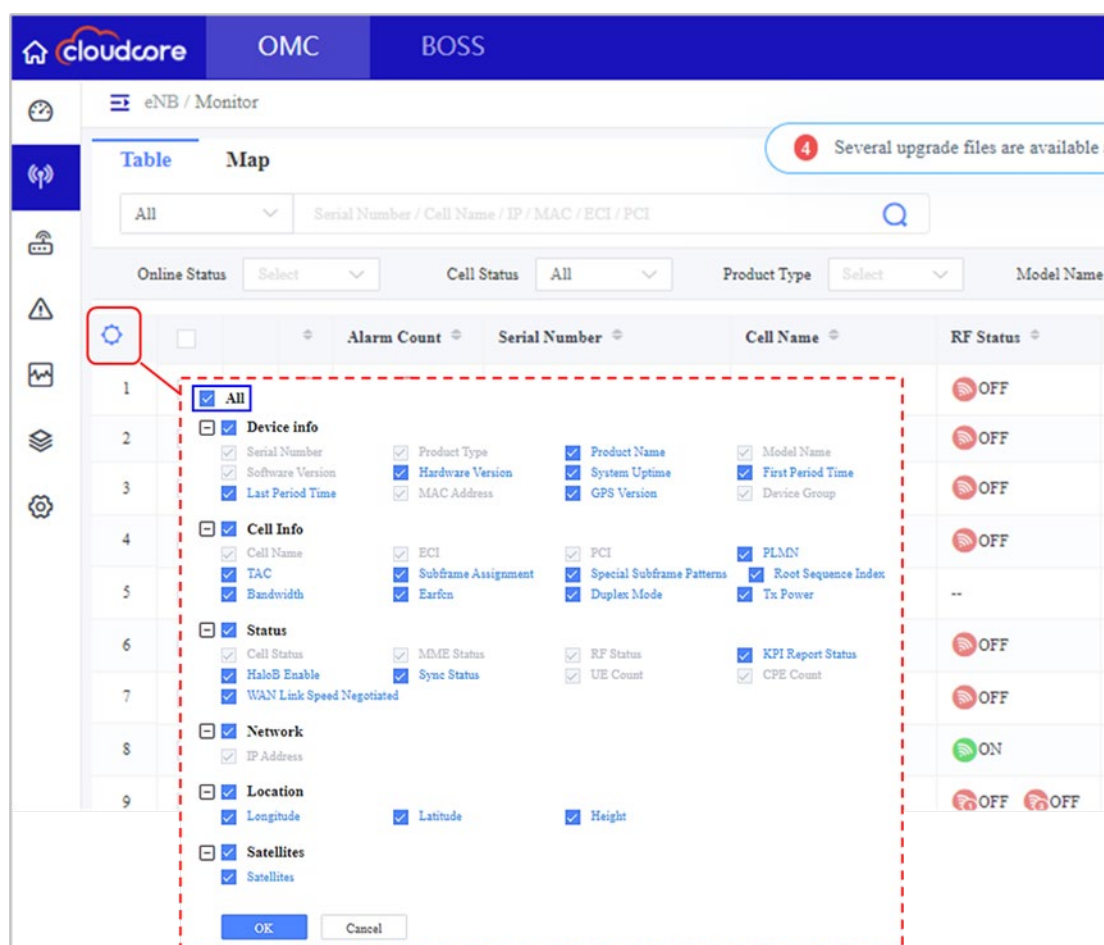


Figure 3-25: OMC &gt; eNB &gt; Monitor &gt; Display Settings



Before commercial operation, Baicells recommends implementing cell site acceptance testing of a new site to ensure the service meets expectations, to document network speeds at various locations in the cell, and to 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 a minimum distance of 20 inches (50 cm) between the radiator and your body.

### ISED 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.