

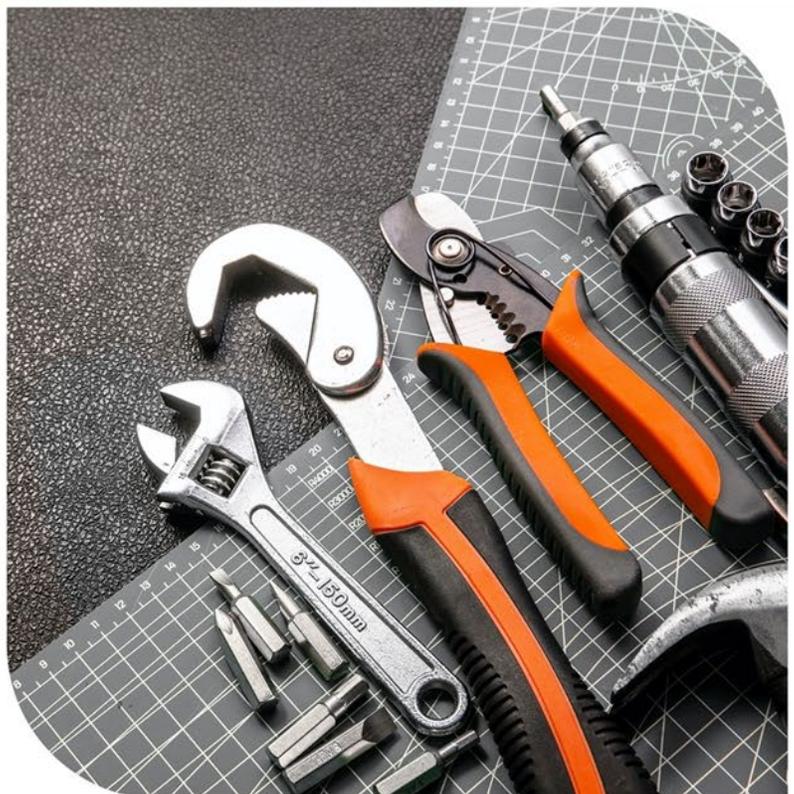
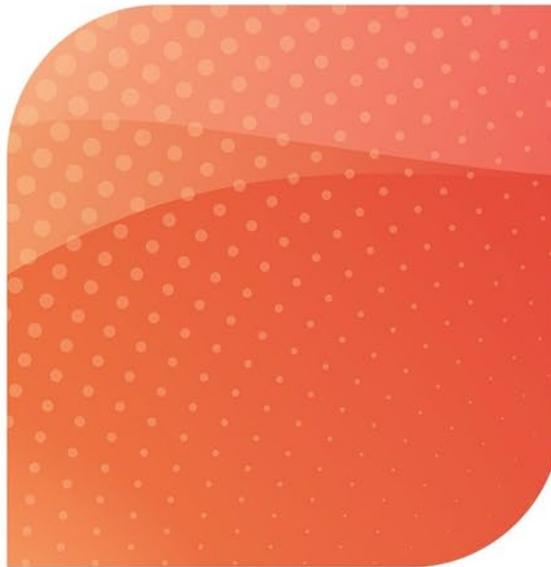


Neutrino430

Indoor 4x250mW Two-Carrier
TDD eNodeB

Installation Guide

QRTB 2.12



February 2023
Version 1.08

About This Document

This document is intended for personnel who will be installing the Baicells Neutrino430 Indoor 4x250mW Two-Carrier Time Division Duplexing (TDD) 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 BaiBS_QRTB_2.12. The Neutrino430 model number is pBS31010.

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](#).

New in This Release

The following updates have been provided in this release:

- Added LGW settings options image in [section 3.5.4.2](#)
- Added Management Server feature enhancement in [section 3.5.5](#)
- Added Quick Setting new feature in [section 3.5.6](#)

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Revision Record

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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](#).

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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

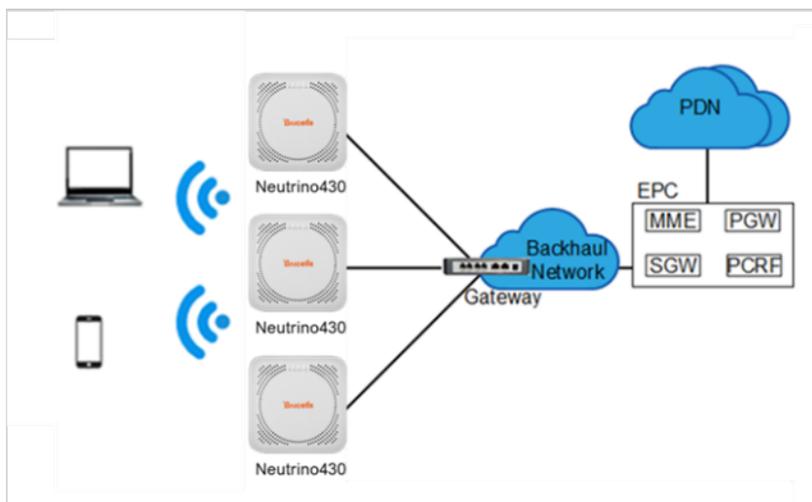
The Baicells Neutrino430 (Figure 1-1) is an advanced two-carrier indoor eNodeB that is compliant with Third-Generation Partnership Project (3GPP) on LTE TDD technology. This 4x250mW eNodeB can operate in Carrier Aggregation (CA) mode or Dual Carrier (DC)/split mode. The Neutrino430 supports broadband data access, providing various data service transformation and transmission capabilities to enable indoor wireless coverage. This eNodeB can be used by operators to improve capacity and throughput while eliminating existing dead zones.

Figure 1-1: Neutrino430 eNB



The network structure of the Neutrino430 is shown in Figure 1-2.

Figure 1-2: Network Structure



As a two-carrier eNB, the Neutrino430 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 Neutrino430'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 Neutrino430 eNodeB.

1.2 Features

The two-carrier Neutrino430 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 CPE.

DC (split sector) mode enables the operator to run the Neutrino430 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 Neutrino430 eNodeB as part of the basic software. 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 Neutrino430, 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)
 - CAT4 CPE Configuration Guide
 - CAT6/CAT15 CPE Configuration Guide
 - QRTB eNodeB Configuration Guide
 - Carrier Aggregation & Dual Carrier (Split Mode) Configuration Guide
 - HaloB Solution User Guide
 - SAS Deployment Guide
-

In addition to the Neutrino430 eNB two carriers and multiple operating modes, the following is a list of other key features. The Neutrino430 datasheet providing technical specifications is kept up-to-date on the [Baicells website](#).

- Supports standard LTE TDD band 48 (3550 MHz–3700 MHz)
- Complies with 3GPP Release 15 standards
- Supports 5/10/15/20 MHz bandwidth per carrier
- Provides excellent Non-Line-of-Sight (NLOS) coverage
- Peak rate is a configurable parameter using special Subframe Assignment (SA):
 - 2x20 MHz, per carrier:
 - SA1: DL 105 Mbps, UL 28 Mbps
 - SA2: DL 145 Mbps, UL 14 Mbps
 - SA6: DL 85 Mbps, UL 35 Mbps
 - 2x10 MHz, per carrier:
 - SA1: DL 51 Mbps, UL 14 Mbps
 - SA2: DL 70 Mbps, UL 7 Mbps
 - SA6: DL 42 Mbps, UL 17 Mbps
- Supports 96 concurrent users per carrier [x2 carriers (96+96) if operating in DC mode]; upgradeable to higher capacity in future software releases
- Supports TR-069 network management interface
- 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 EPC vendors

- Integrated high-gain internal antenna; optional 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
- Supports both CA and DC modes
- Embedded HaloB ("lite" EPC) solution
- Supports CBRS with dual carrier
- GPS synchronization
- Built-in Dynamic Host Configuration Protocol (DHCP) Server, Domain Name System (DNS) Client, and Network Access Translation (NAT) functionality, providing strong high-speed routing
- Highly secured with equipment certification against potential intrusion risk

2 Installation Preparation

2.1 Materials

Check the Neutrino430 package to ensure it contains the primary components in the packout (Figure 2-1). In addition to industry-standard tools, you need the materials described in Table 2-1 and the tools described in the Table 2-2 during the installation.

Figure 2-1: Packout

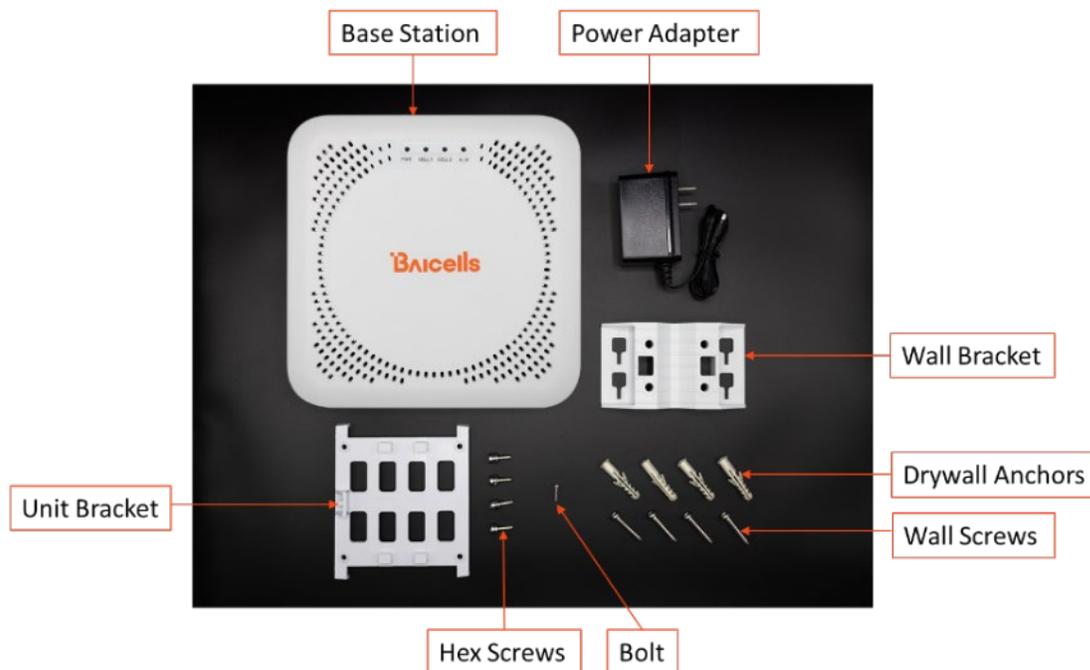


Table 2-1: Installation Tools

			
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 2-2, and Table 2-3 explain the eNB's LED status indicators and interfaces.

Figure 2-2: LEDs and Interfaces

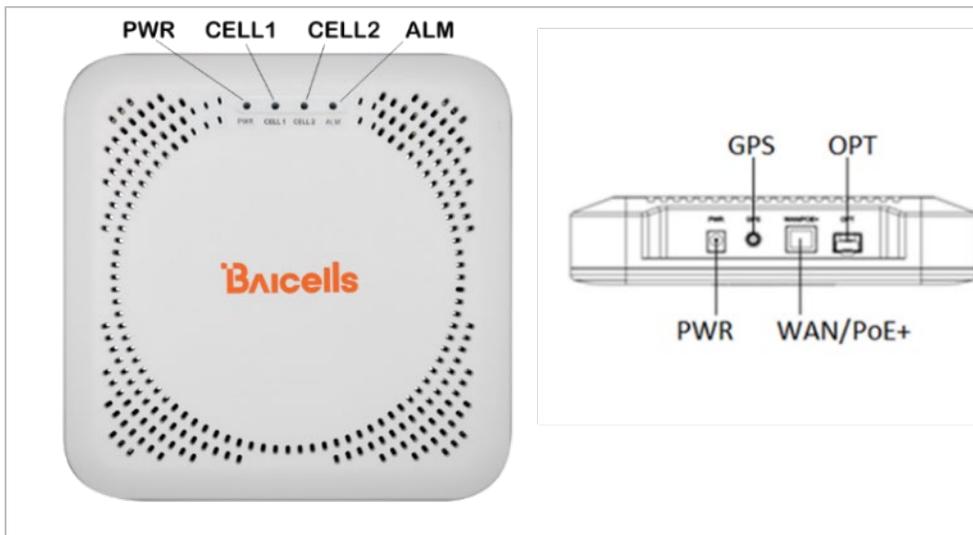


Table 2-2: LEDs

LED	Color	Status	Description
PWR	Green	Steady on	Power is on
		OFF	No power supply
CELL1	Green	Steady on	Power is on
		Fast flash: 0.125 s on, 0.125 s off	Data is transmitting
		Slow flash: 1 s on, 1 s off	The cell has been activated
CELL2	Green	Steady on	Power is on
		Fast flash: 0.125 s on, 0.125 s off	Data is transmitting
		Slow flash: 1 s on, 1 s off	The cell has been activated
ALM	Red	Steady on	Reserved
		Fast flash: 0.125 s on, 0.125 s off	S1 alarm
		Slow flash: 1 s on, 1 s off	Other alarms

Table 2-3: Interfaces

Interface Name	Description
PWR	12 VDC, 2 A power supply interface
GPS	Port for optional external GPS antenna, SMA female connector
WAN/PoE+	Gigabit Ethernet and PoE+ interface, used for debug and power supply
OPT	Optical fiber interface, connect to external transmission network, used for data backhaul

2.3 Location and Environment

The Neutrino430 can be installed on a ceiling 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 2-4.

Table 2-4: Environmental Specifications

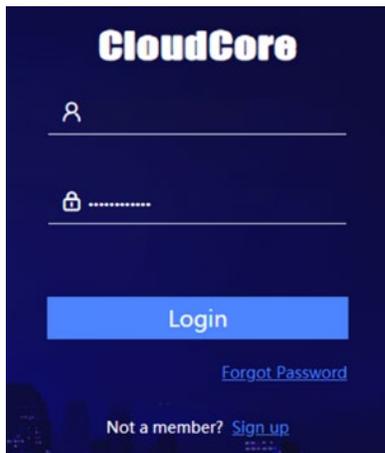
Item	Description
Operating Temperature	23°F (-5°C) to 113°F (45°C)
Storage Temperature	14°F (-10°C) to 122°F (50°C)
Humidity	5% to 95% RH
Atmospheric Pressure	70 kPa to 106 kPa

2.4 CloudCore Account

The Baicells CloudCore includes the EPC managed by Baicells, and two operator applications, OMC to manage network elements, and BOSS 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 2-3):
<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 2-3: CloudCore Login Page



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

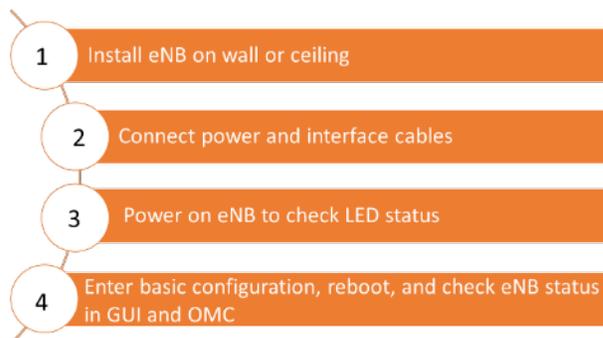
Enter your login user name (email address) and password to authenticate.

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 eNB on Ceiling or Wall

The eNB unit bracket is assembled in manufacturing before packing. The only action required by the installer is to attach the assembly to the ceiling or wall.

Follow the steps below to install the Neutrino430 eNB on the ceiling or wall.

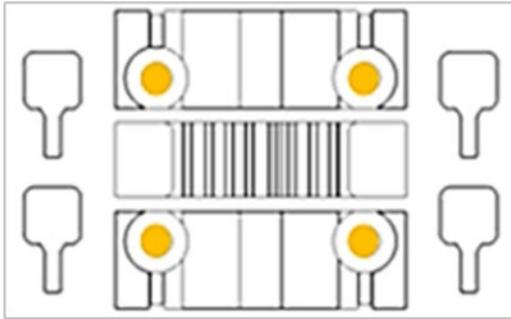


Caution:

- Ceiling thickness must be at least 0.71 in (18 mm) and must bear a weight of at least 11.02 lb (5 kg).
- If the ceiling is made of drywall or gypsum, it must be reinforced before installation to ensure the eNB is secure.

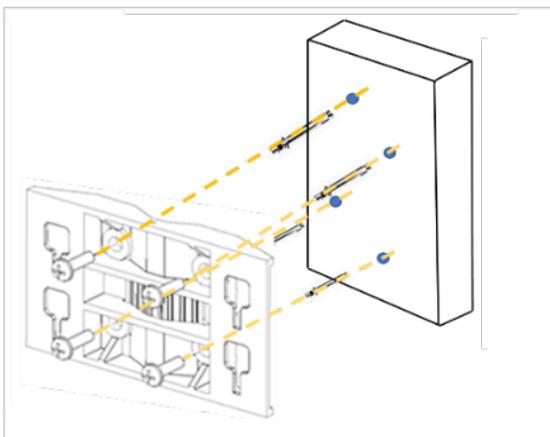
1. Fit the wall bracket on the ceiling or wall, as shown in Figure 3-2. Mark the drilling locations using a pencil or marker.
2. Drill four holes in the wall to match the size of the bracket holes.

Figure 3-2: Mark and Drill the Holes



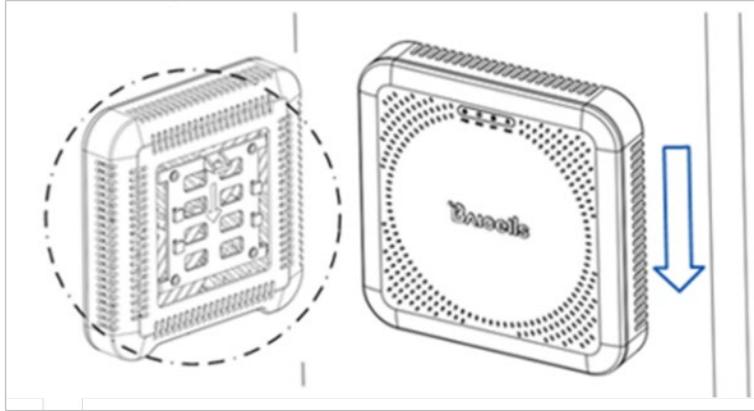
3. Install the drywall anchors and the screws, as shown in Figure 3-3.

Figure 3-3: Install Drywall Anchors and Screws



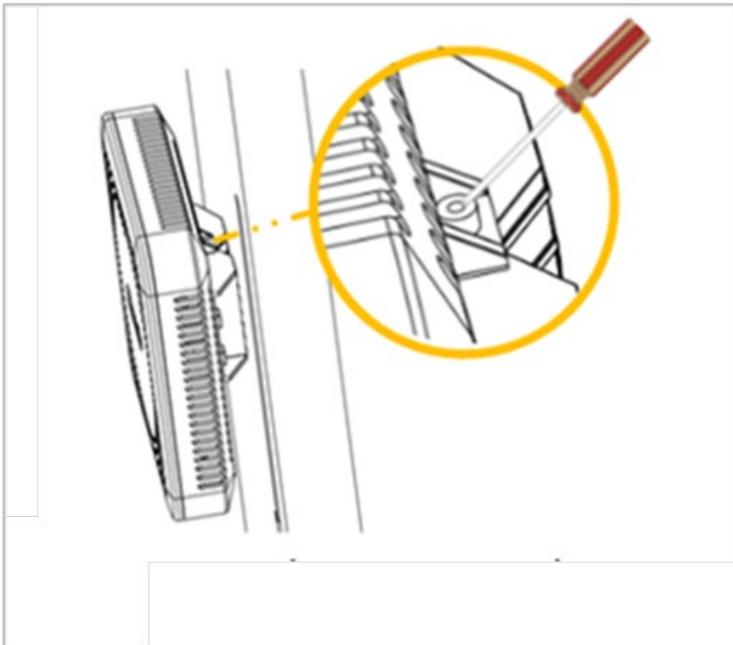
- Slide the eNB along the arrow to fix it on the wall bracket (Figure 3-4).

Figure 3-4: Fix the eNB to the Wall Bracket



- Tighten the bolt on the top of the bracket using a Phillips-head screwdriver to complete the installation (Figure 3-5).

Figure 3-5: Tighten Bolt



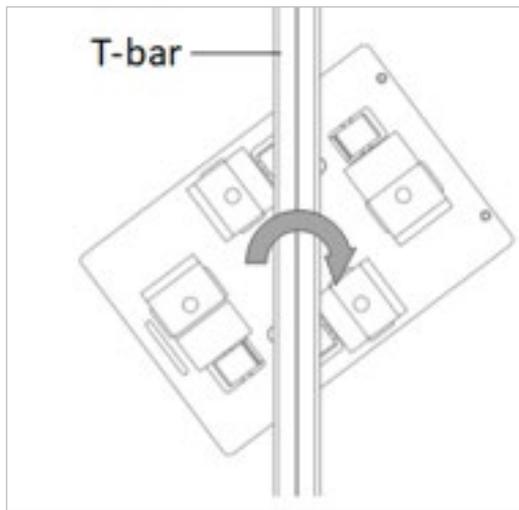
3.2.1 T-Bar Mounting

The T-bar mounting kit has two pieces. One piece is pre-installed on the back side of the eNB, and the other piece is an adaptor used for T-bar and ceiling/wall mounting. The following sections describe the steps for mounting a Neutrino430 eNB on a 9/16-inch (14 mm) T-Bar and a 15/16-inch (24 mm) T-Bar.

3.2.1.1 9/16-Inch (14 mm) T-Bar Mounting

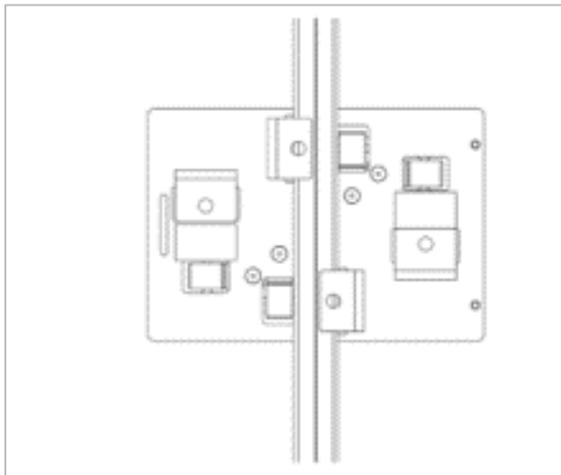
1. Rotate the adaptor piece diagonally, as shown in Figure 3-6.

Figure 3-6: T-Bar Mounting



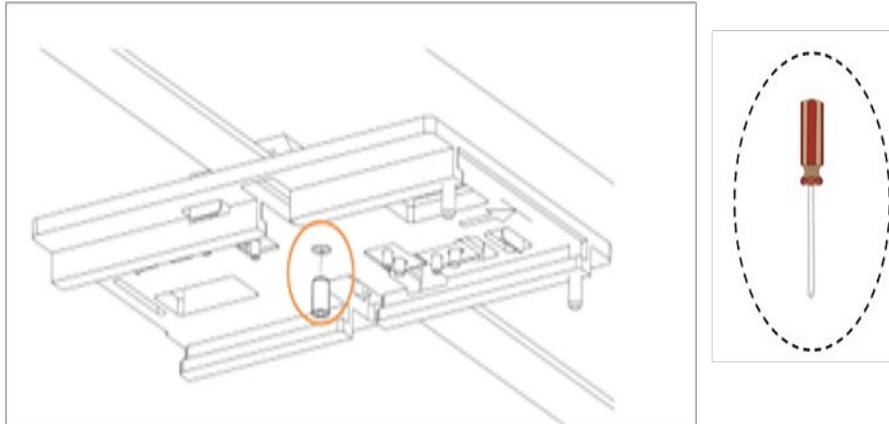
2. Align the adaptor vertically with the T-bar as shown in Figure 3-7.

Figure 3-7: Adaptor Adjustment



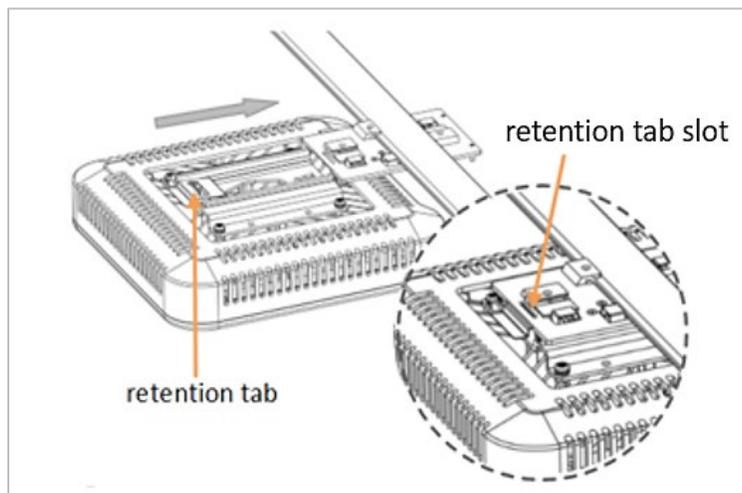
3. Tighten the adaptor with a screw, as shown in Figure 3-8.

Figure 3-8: Tighten Screw



4. Slide the eNB along the arrow until the retention tab is fixed as shown in Figure 3-9.

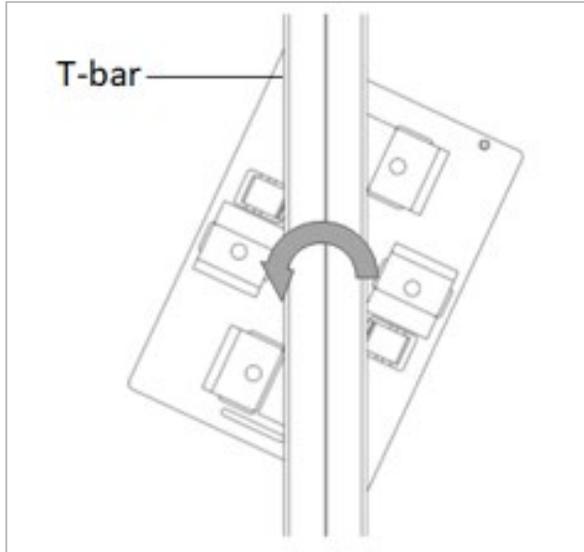
Figure 3-9: Fix the eNB



3.2.1.2 15/16-Inch (24 mm) T-Bar Mounting

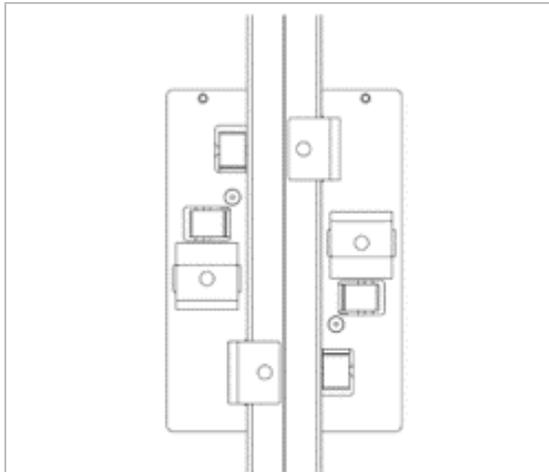
1. Rotate the adaptor piece, as shown in Figure 3-10.

Figure 3-10: T-Bar Mounting



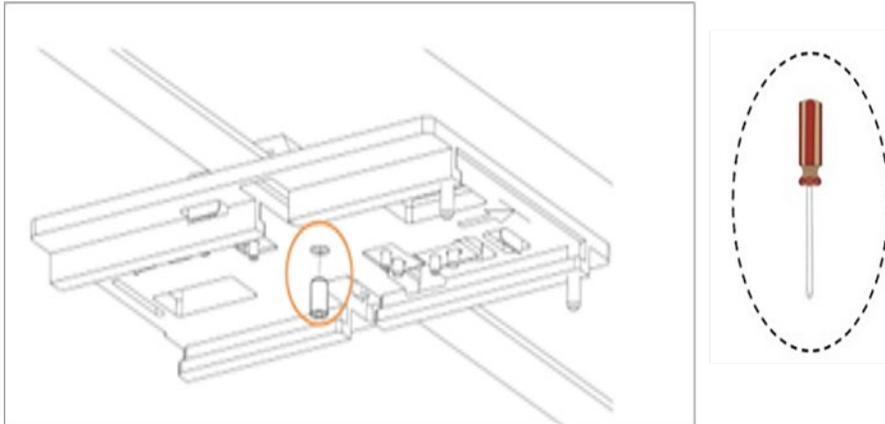
2. Align the adaptor parallel with the T-bar as shown in Figure 3-11.

Figure 3-11: Adaptor Adjustment



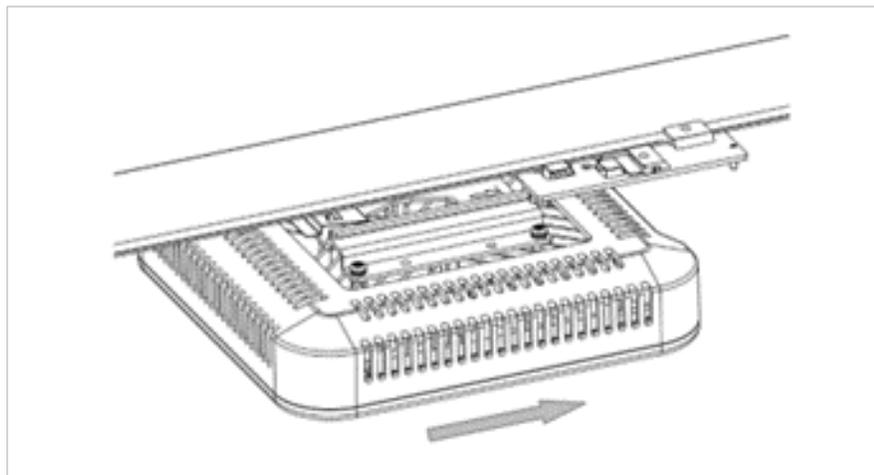
3. Tighten the adaptor with a screw, as shown in Figure 3-12.

Figure 3-12: Tighten Screw



4. Slide the eNB along the arrow until the retention tab is fixed into the retention tab slot Figure 3-13.

Figure 3-13: Fix the eNB



3.3 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 RF power amplifier devices.

The power and interface cables for the Neutrino430 can be connected in three different configurations depending on your specific site requirements or setup:

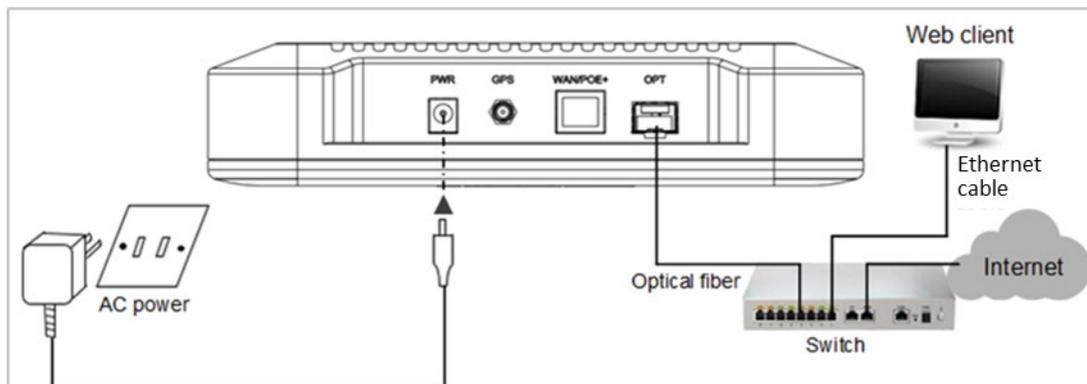
- **PWR** power supply, **OPT** backhaul, [section 3.3.1](#)
- **PWR** power supply, **WAN/PoE+** backhaul, [section 3.3.2](#)
- **WAN/PoE+** power supply and backhaul, [section 3.3.3](#)

3.3.1 PWR Power Supply, OPT Backhaul Configuration:

Connect the cables for the **PWR power supply**, **OPT backhaul** configuration, as shown in the following steps. Refer to Figure 3-14.

1. Connect the AC power supply to the power (PWR) interface on the eNB and the other end to a power outlet.
2. Connect the optical fiber cable to the optical (OPT) interface on the eNB.
3. Connect the other end of the optical fiber cable to the Ethernet port on the Ethernet switch.

Figure 3-14: PWR Power Supply, OPT Backhaul Configuration

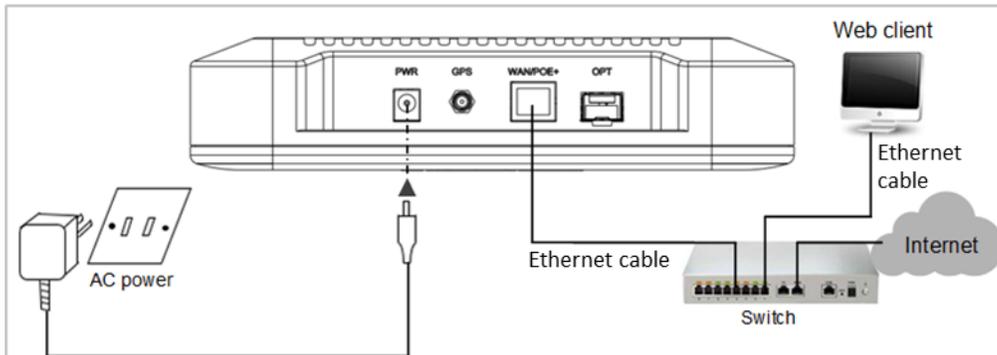


3.3.2 PWR Power Supply, WAN/PoE+ Backhaul Configuration:

Connect the cables for the *PWR* power supply, *WAN/PoE+* backhaul configuration, as shown in the following steps. Refer to Figure 3-15:

1. Connect the AC power supply to the power (PWR) interface on the eNB and the other end to a power outlet.
2. Connect the Ethernet cable to the WAN/PoE port on the eNB.
3. Connect the other end of the Ethernet cable to the Ethernet port on the Ethernet switch.

Figure 3-15: PWR Power Supply, WAN/PoE+ Backhaul Configuration

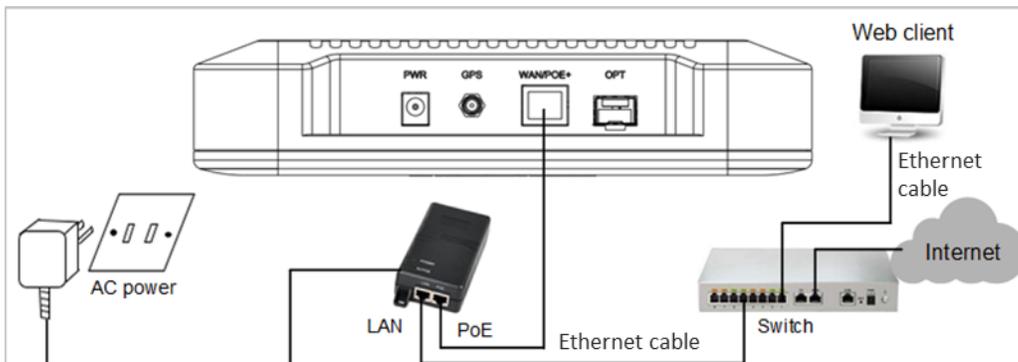


3.3.3 WAN/PoE+ Power Supply and Backhaul Configuration:

Connect the cables for the *WAN/PoE+* power supply and backhaul configuration, as shown in the following steps. Refer to Figure 3-16.

1. Connect the AC power supply to the LAN switch and the other end to a power outlet.
2. Connect the Ethernet cable to the WAN/PoE+ port on the eNB.
3. Connect the other end of the Ethernet cable to the PoE+ port on the LAN switch.
4. Connect another Ethernet cable to the Ethernet port on the LAN switch.
5. Connect the other end of the Ethernet cable to the Ethernet port on the Ethernet switch.

Figure 3-16: WAN/PoE+ and Power Supply Backhaul Configuration



3.4 Power on to Check LED Status

After the Neutrino430 is powered on, check that the LED indicators are lighting as expected: Power is steady green, cell activated is slow flash green, and there are no alarms (Figure 3-17) per previous Table 2-2.

Figure 3-17: Check LEDs



3.5 Configure Basic Parameters

Reference: [QRTB eNodeB Configuration Guide](#)

The Neutrino430 eNB can be configured in SC, CA, or DC/split mode, depending on which licenses you have purchased, and/or in HaloB mode, which is embedded in the base software. The Neutrino430 also supports CBRS SAS operation.

When first installing and testing the Neutrino430, 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)
 - CAT4 CPE Configuration Guide
 - CAT6/CAT15 CPE Configuration Guide
 - QRTB eNodeB Configuration Guide
 - Carrier Aggregation & Dual Carrier (Split Mode) Configuration Guide
 - HaloB Solution User Guide
 - SAS Deployment Guide
-

3.5.1 Launch the eNB GUI

Follow the steps below to connect to the Neutrino430 GUI.

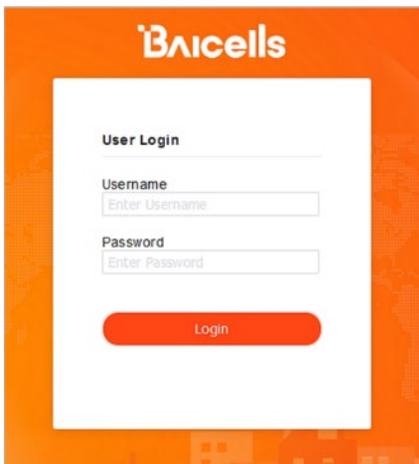
- Step 1: Use an Ethernet cable to connect the eNB WAN/PoE+ port to the local network routed to the Internet. The DATA interface is set to Dynamic Host Configuration Protocol (DHCP) client by default.

Optionally, you can plug a Personal Computer (PC) directly into the eNB MGMT 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>.

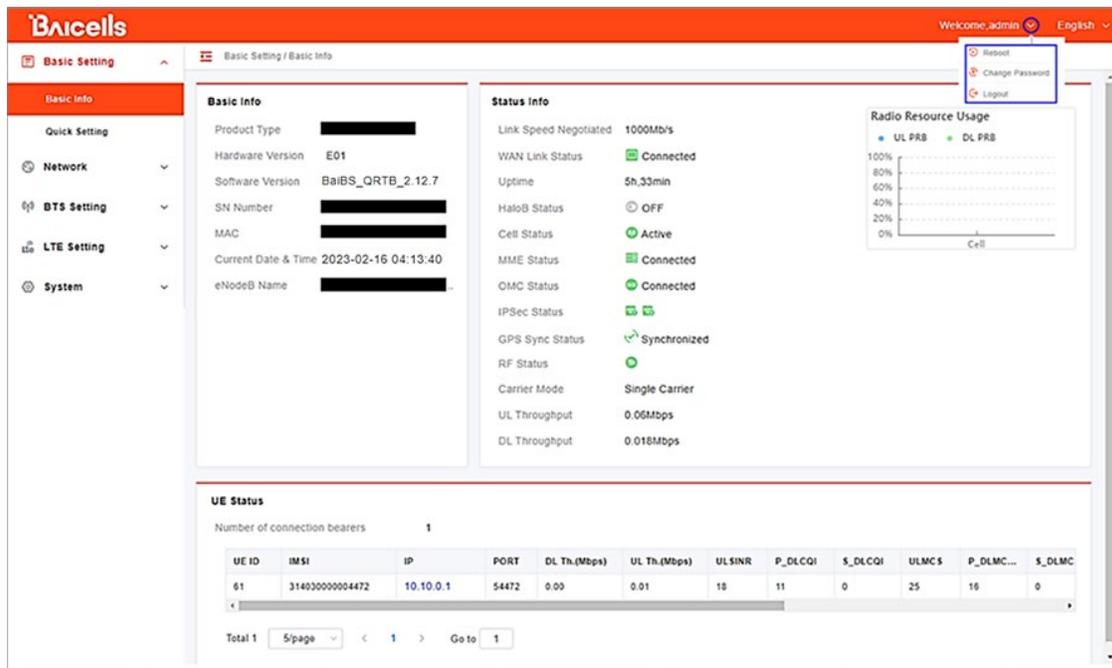
- Step 3: At the login screen (Figure 3-18), enter the default user name (*admin*) and password (*admin*), and click on *Login* to open the home page.

Figure 3-18: GUI Login



The home page is the *Basic Setting > Basic Info* menu, which reports the current eNB status (Figure 3-19). In [section 3.5.9](#), you will use this page to confirm that the eNB is active.

Figure 3-19: Home Page



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 3.5.2](#) for detailed instructions regarding firmware upgrades.
3. Set the Network Timing Protocol (NTP).

For help, refer to the [CloudCore Configuration & Network Administration Guide](#).

3.5.2 Upgrade Firmware

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

3.5.2.1 Upgrade Firmware from 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. Select *Choose File*, and navigate to the firmware file saved on local computer.

NOTE: The file type is *.IMG.

4. Click *Upgrade*.
5. In the pop-up window click *PROCEED*.

6. The base station reboots after approximately three minutes.
7. On the *Basic Setting > Basic Info* page, the upgraded version is displayed in *Software Version*.

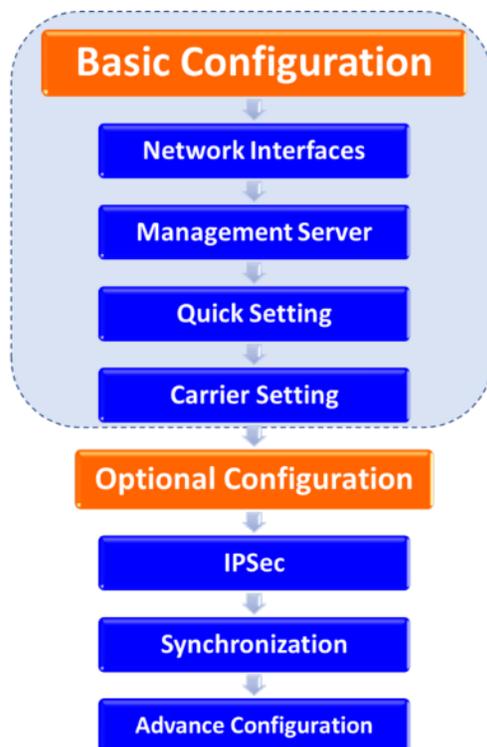
3.5.2.2 Upgrade Firmware from the OMC

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 display).
7. Choose the *Execute Type*, which determines when the upgrade will occur.
8. Select *OK*.

3.5.3 Basic Configuration Overview

Figure 3-20 indicates four main steps for basic configuration: network interfaces, management server address, quick settings pertaining to key LTE parameters, and the carrier setting.

Figure 3-20: Configuration Flow



3.5.4 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.

3.5.4.1 WAN/LAN/VLAN

Go to the Network > WAN/LAN/VLAN menu (Figure 3-21). The WAN interface is an external communication portal (Internet connection) between the eNB Network Management System (NMS) – in most cases, the CloudCore OMC – and the MME. If not using CloudCore, the eNB NMS can be a Local OMC or the LTE NMS. The WAN/LAN/VLAN fields are described in Table 3-1.

If the *IP Access Mode* field is set to *DHCP* and the *LGW* function is *ON* (section 3.5.4.2), the *Connect Type* field must be modified. The IP address of the eNB will be changed due to the Message Authentication Code (MAC) address being changed. Therefore, modify the router server at the same time.

The *LAN Config* interface 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 and subnet mask address for the local network connection. The default IP address for the LAN interface 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 3-21: WAN/LAN/VLAN

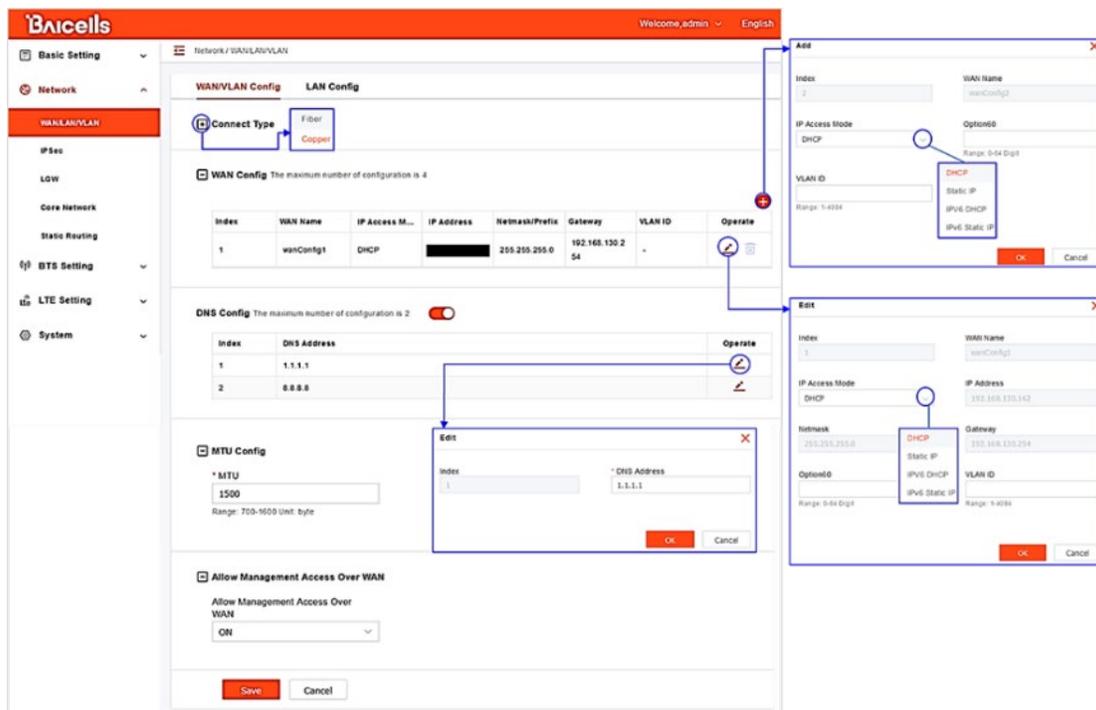


Table 3-1: WAN/LAN/VLAN

Field Name	Description
WAN/LAN Config Tab	
Connect Type Pane	
Connect Type	Used to select the type of connection for the eNB: <ul style="list-style-type: none"> • Copper: RJ-45 electrical interface • Fiber: optical fiber interface The connection type is based on the eNB model. If the eNB doesn't support optical ports, the value must be set to "Copper".
WAN Config Pane	
Index	The WAN index number, which is generated automatically. Four WAN interfaces are the maximum number the eNB supports.
WAN Name	The WAN Name is generated automatically.
IP Access Mode	Used to select the desired interface protocol to be used by the WAN interface: <ul style="list-style-type: none"> • DHCP: only the Option60 parameter needs to be configured if DHCP is the interface protocol selected. • Static IP • IPv6 DHCP • IPv6 Static IP
Option60	Used to differentiate between different terminals when <i>IP Access Mode</i> is set to <i>DHCP</i> . Range is 0–64 digits.
Netmask/Prefix	The IP address' subnet mask address. This parameter displays when <i>IP Access Mode</i> is set to <i>Static IP</i> .
Gateway	The default gateway's IP address. This parameter displays when <i>IP Access Mode</i> is set to <i>Static IP</i> .
Prefix	The IPv6 address' prefix for the WAN interface. This parameter displays when <i>IP Access Mode</i> is set to <i>IPv6 Static IP</i> . Range is 0–128.
IPv6 Gateway	The IPv6 address' gateway for the WAN interface. This parameter displays when <i>IP Access Mode</i> is set to <i>IPv6 Static IP</i> .
IP Address	The WAN interface's IP address. This parameter displays when <i>IP Access Mode</i> is set to <i>Static IP</i> or <i>IPv6 Static IP</i> .
VLAN ID	Used to configure more IP addresses for the WAN interface through the VLAN when there is a need to transmit multi-types of data through a separate channel. Range is 1–4094.
DNS Config Pane	
Index	The DNS index number, which is generated automatically.
DNS Address	The IP address assigned to the DNS. Up to two DNSes are supported.

Field Name	Description
MTU Config Pane	
MTU	Used to specify the size of the largest network layer protocol data unit that can be communicated in a single network transaction. Specifying the correct MTU for the network can help to improve data transmission efficiency. Range is 700 to 1600 bytes. The default value is 1500 bytes.
Allow Management Access Over WAN Pane	
Allow Management Access Over WAN	Used to enable/disable the Local Maintenance Terminal connection through the WAN port (<i>ON</i> or <i>OFF</i>) for management purposes. If set to <i>ON</i> , the administrator can maintain the eNB through the WAN interface.
LAN Config Tab	
LAN Config Pane	
IP Address	The LAN interface IP address. The default value is 192.168.150.1 .
Subnet Mask	Used to define the subnet mask address for the LAN interface. The default value is 255.255.255.0 .

3.5.4.2 LGW

The LGW setting must be configured when using the Baicells CloudCore EPC. Refer to Figure 3-22, Figure 3-23, and Table 3-2. You must reboot the eNB when you make changes to these settings.

The Baicells eNB splits the Data Plane and Control Plane. This generates two IP addresses per CPE. The Data Plane sends LGW, then the Control Plane is routed through an IPsec tunnel to the EPC.

Figure 3-22: LGW

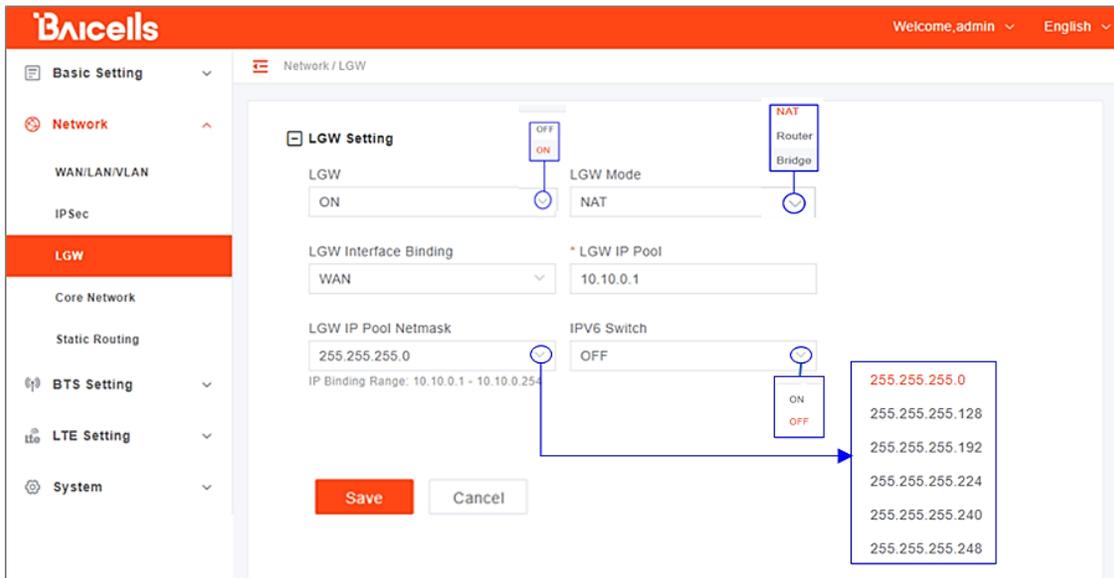
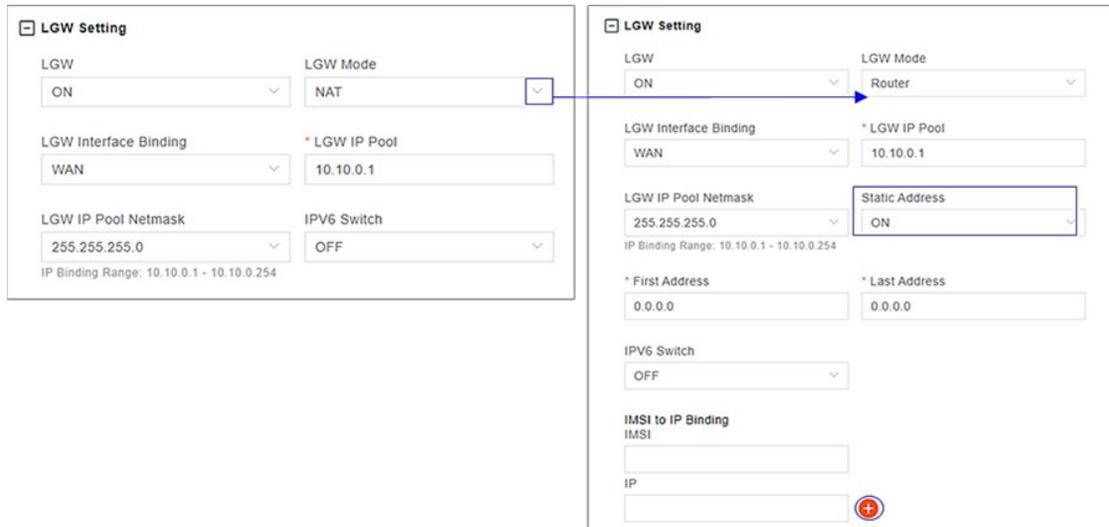


Table 3-2: LGW

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 (Figure 3-23) Bridge: Transfer in the data link layer
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 drop-down menu. 
IPV6 Switch	The IPV6 network interface is used for in-band connectivity with the switch, as ON and OFF.
Static Address	If <i>LGW Mode = Router</i> (Figure 3-23), 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 3-23), enter the first static IP address in the range.
Last Address	If <i>LGW Mode = Router</i> and <i>Static Address = ON</i> (Figure 3-23), 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 3-23), 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 3-23), enter the IP address to bind to the IMSI. You can add more than one IP address.

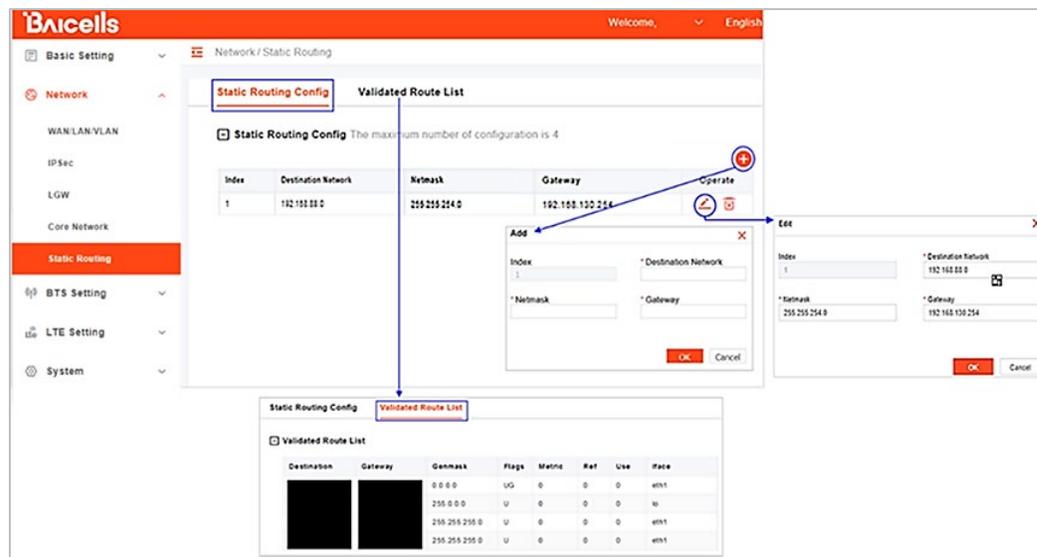
Figure 3-23 LGW = Router



3.5.4.3 Static Routing

When using static routing, go to *Network > Static Routing*. The *Network > Static Routing* landing page has two main sections, *Static Routing Config* tab and *Validated Route List* tab (Figure 3-24). The configured static route information is displayed under *Static Routing Config* tab. To edit a static route in the list, click on the **Edit** icon, enter the information, and click *OK*. To add a static route, click on the **Add** icon. Fill in the information and click *OK*. Field descriptions are in Table 3-3.

Figure 3-24: Static Routing



NOTE: For each field description, refer to the *CAT4 CPE Configuration Guide* and *CAT6/CAT15 CPE Configuration Guide*.

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

3.5.5 Configure the Management Server

In the *BTS Setting > Management Server* window, you will enter the NMS information (Figure 3-25). When using the Baicells CloudCore to manage the network, in the *http://* field, enter the following URL address and port number:

http://baiomc.cloudapp.net:8443/smallcell/AcsService

If you are using Local OMC or another NMS, enter its server address and port number. Refer to the field descriptions in Table 3-4.

Figure 3-25: Management Server

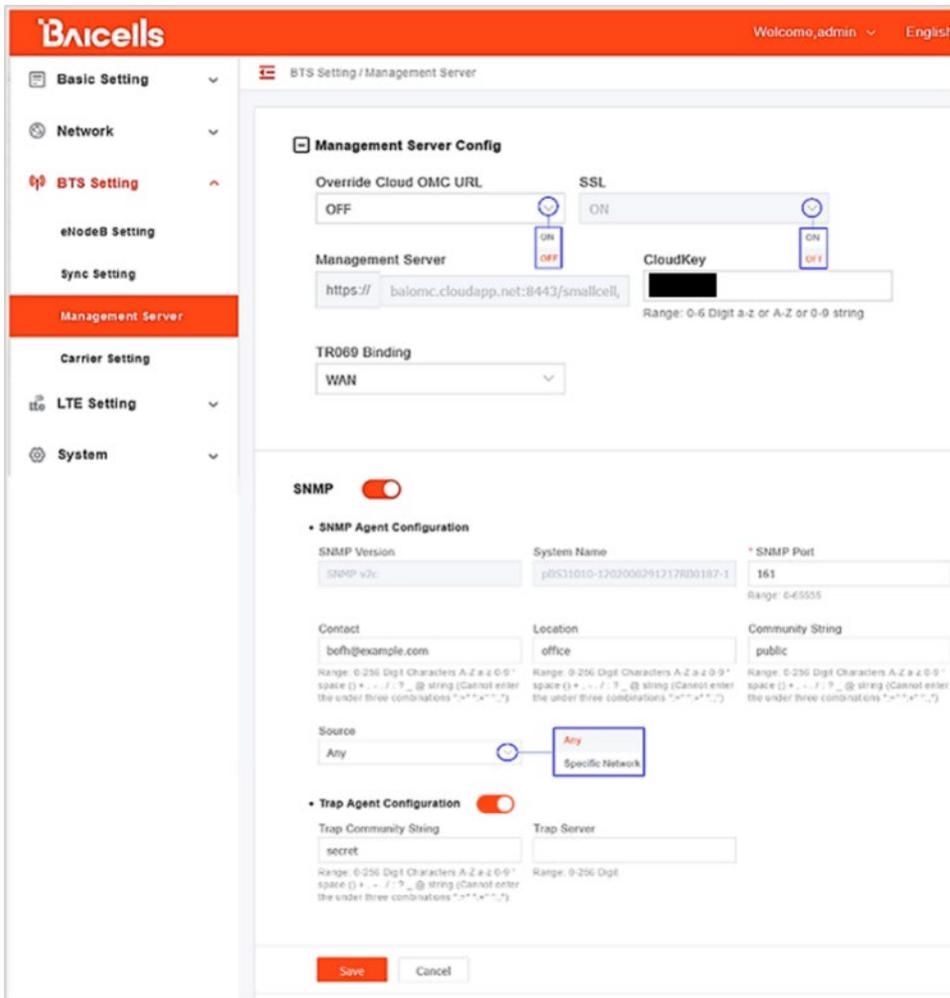


Table 3-4: Management Server

Field Name	Description
Management Server Config	
Override Cloud OMC URL	Select <i>ON</i> or <i>OFF</i> . Selecting <i>ON</i> allows you to configure the URL and port number in the <i>Management Server</i> field in the <i>Management Server Config</i> pane of the <i>BTS Setting > Management Server</i> sub-menu. NOTE: This field only displays when the eNB operating mode is set to <i>Cloud EPC</i> in the <i>Network > Core Network</i> menu.
SSL	Optional: The SSL connection adds enhanced security when it is turned on.
Management Server	The management server's IP address.
CloudKey	The NMS assigns this unique identifier for each operator. Range is 0–6 characters (using upper-case letters A–Z, lower-case letters a–z, and digits 0–9).
TR069 Binding	The interface binding with TR069 protocol. Default is WAN.
SNMP Agent Configuration	
SNMP Version	The current supported SNMP version, which is generated automatically and is SNMP v2c.
System Name	The community name, which is generated automatically.
SNMP Port	The SNMP protocol port used. Range is 0–65535.
Contact	The contact email. Range is 0–256 characters (using upper-case letters A–Z, lower-case letters a–z, and digits 0–9). ' space () + , - . / : ? _ @ string Cannot enter the following three combinations ":@" ":"+" and ";;".
Location	The system's location. Range is 0–256 characters (using upper-case letters A–Z, lower-case letters a–z, and digits 0–9). ' space () + , - . / : ? _ @ string Cannot enter the following three combinations ":@" ":"+" and ";;".
Community String	Used to define a community. Default is <i>public</i> . Range is 0–256 characters (using upper-case letters A–Z, lower-case letters a–z, and digits 0–9). ' space () + , - . / : ? _ @ string Cannot enter the following three combinations ":@" ":"+" and ";;".
Source	The source address of acquiring information. Default is Any.
Trap Agent Configuration	
Trap Community String	Used to define a community. Default is <i>secret</i> . Range is 0–256 characters (using upper-case letters A–Z, lower-case letters a–z, and digits 0–9). ' space () + , - . / : ? _ @ string Cannot enter the following three combinations ":@" ":"+" and ";;".
Trap Server	The IP address for the host. Range is 0–256 characters.

3.5.6 Configure Quick Settings

Under the *BTS Setting > Quick Setting* window (Figure 3-26) are several important fields you must configure and/or verify. 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, you must enter the operator's planned settings for Band, Bandwidth, EARFCN, Cell ID, PCI, TAC, etc. Some *Quick Setting* fields such as *Duplex Mode* and *Frequency* will auto-fill based on the eNB hardware model. Make sure the *Cloud EPC* field is set to *ON* when using the Baicells CloudCore. 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.

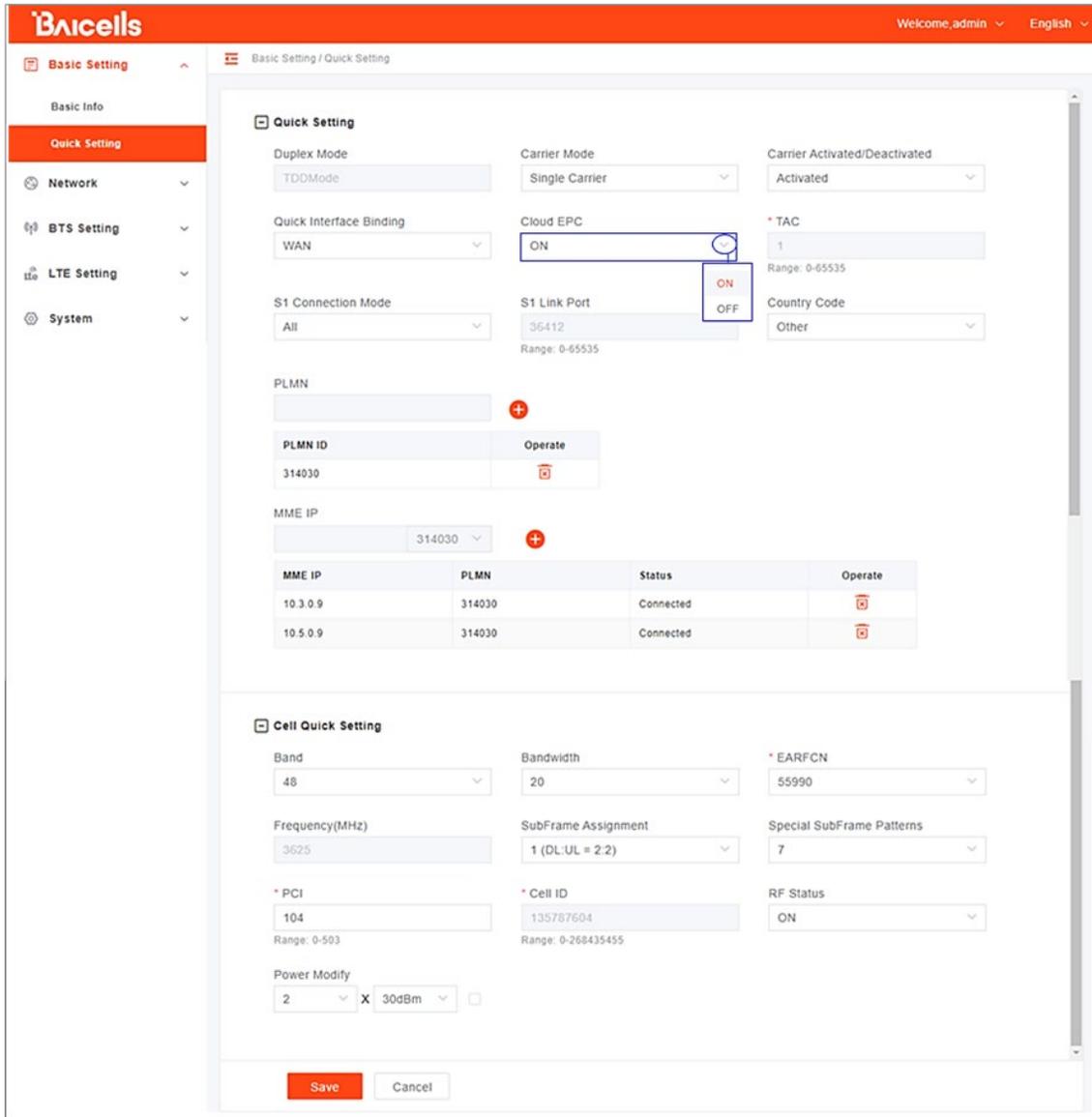
NOTE 1: If planning to use CBRS SAS, the SAS vendor will determine some of these parameters. Refer to the [SAS Deployment Guide](#) for more information.

NOTE 2: Neutrino430 does not support SFA = 0.

NOTE 3: Cloud EPC mode is enabled using the *Network > Core Network* menu.

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

Figure 3-26: Quick Setting



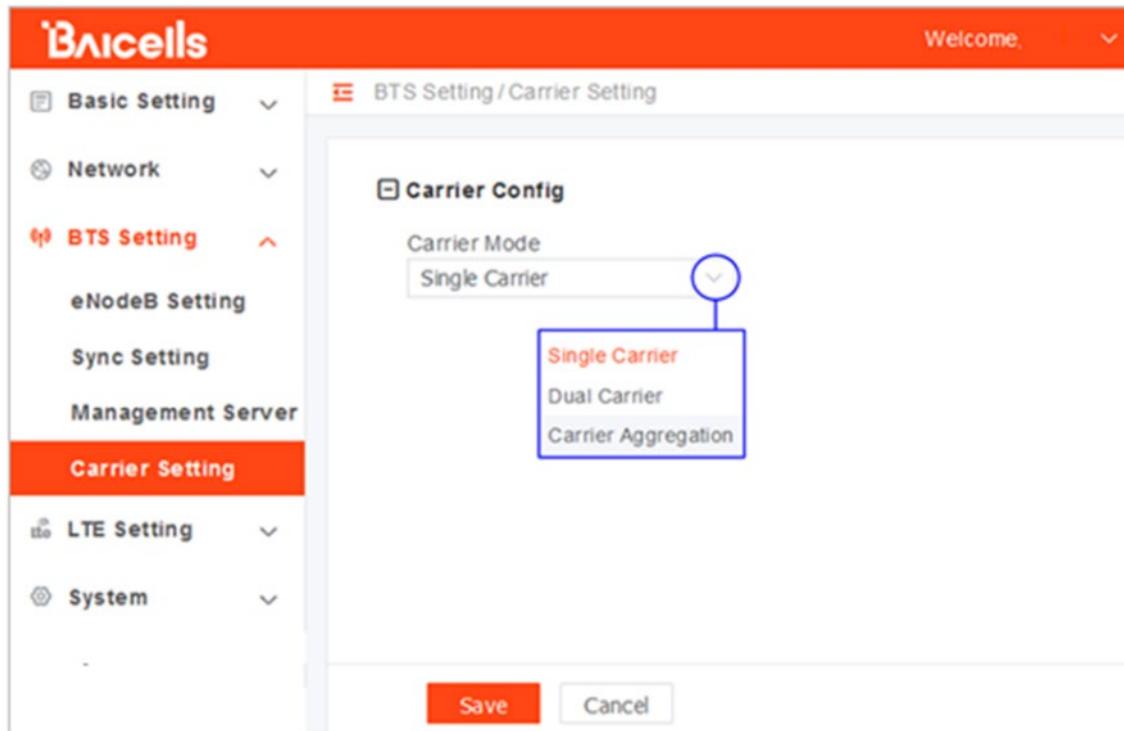
3.5.7 Configure Carrier Setting

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

The *Carrier Setting* menu (Figure 3-27) is used in eNBs running QRTB software to enable a desired carrier mode setting. You can set the eNB to run as a single carrier, as two combined carriers using CA, or as two independent carriers using DC/split mode, depending on which licenses you have purchased. Single carrier (no CA) means only Cell 1 will operate and use 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. Go to *BTS Setting > Carrier Setting* to configure *Carrier Mode*. Click the arrow to view the drop-down menu.

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

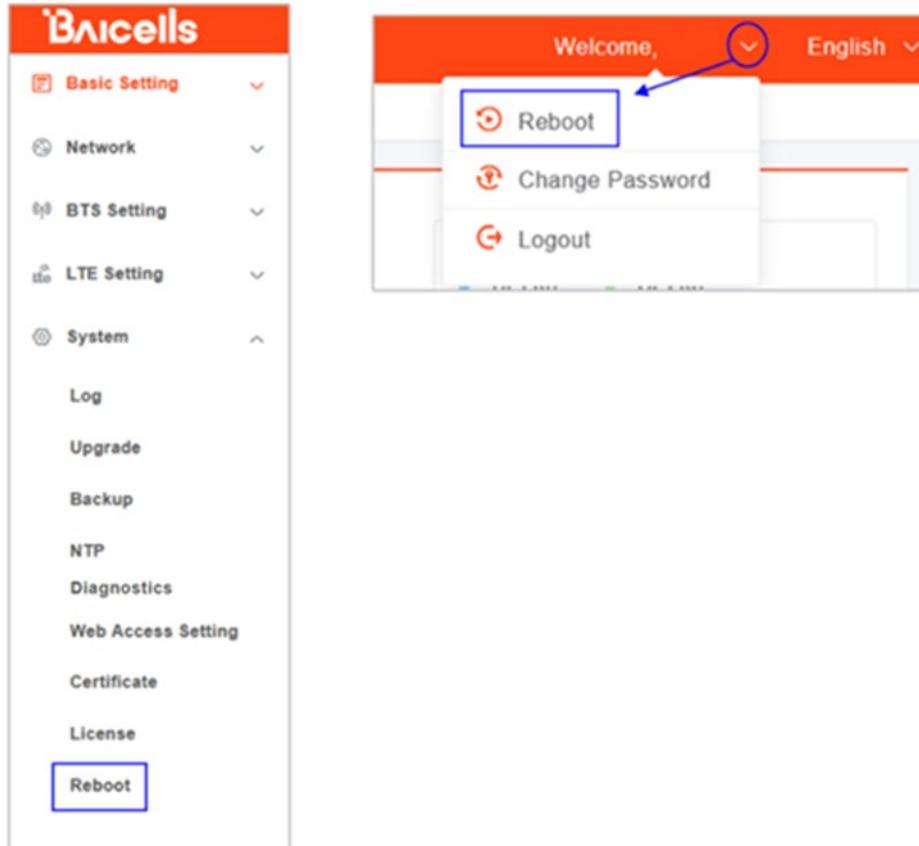
Figure 3-27: Carrier Setting



3.5.8 Reboot

Once the basic configuration settings are saved, reboot the eNB. There are two options for rebooting in the eNB GUI. From the landing page of the eNB GUI, navigate to *System > Reboot*, or select *Reboot* under the *Welcome* banner (Figure 3-28).

Figure 3-28: Reboot



3.5.9 Verify eNB Operational Status

When the eNB is finished rebooting, check the eNB status using the eNB GUI and the OMC.

NOTE: Once the eNB is mounted at its intended destination and powered on, recheck the status settings.

- **eNB GUI:** Go to *Basic Setting > Basic Info* and check the *Cell Status* field (Figure 3-29). It should show *Active*. Also, check that *GPS Sync Status* is reported as *Synchronized*.
- **OMC:** Go to *eNB > Monitor* to see if the *Cell Status* shows *Active* and the *Sync Status* shows *GPS Synchronized* (Figure 3-30).

NOTE: Ensure you have selected *ALL* in the display settings window in the *OMC > eNB > Monitor* page to view *Cell Status* and *Sync Status* as shown in Figure 3-31.

Figure 3-29: Cell Status (eNB GUI)

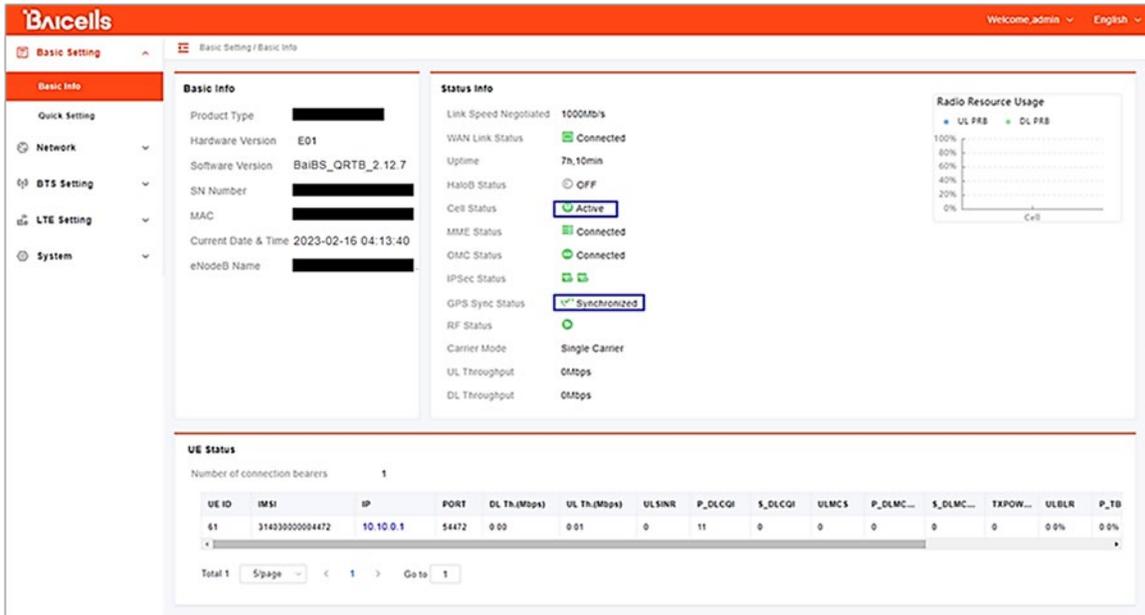
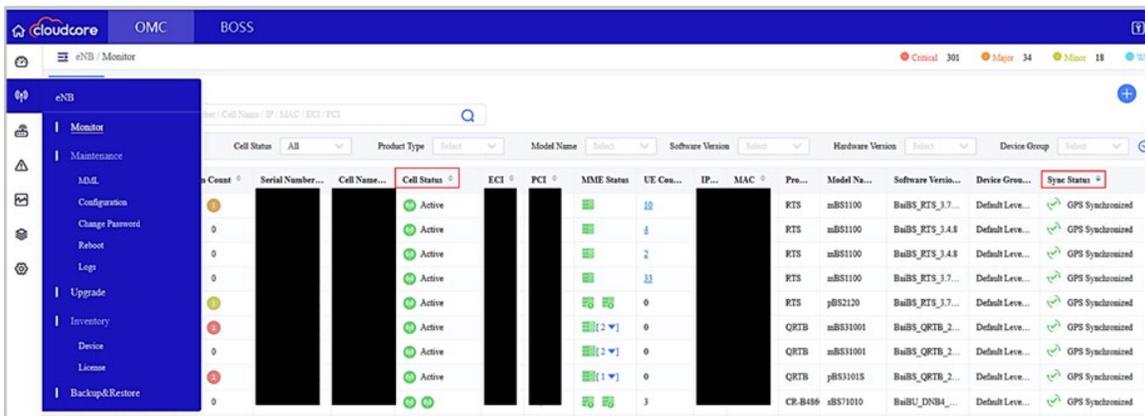
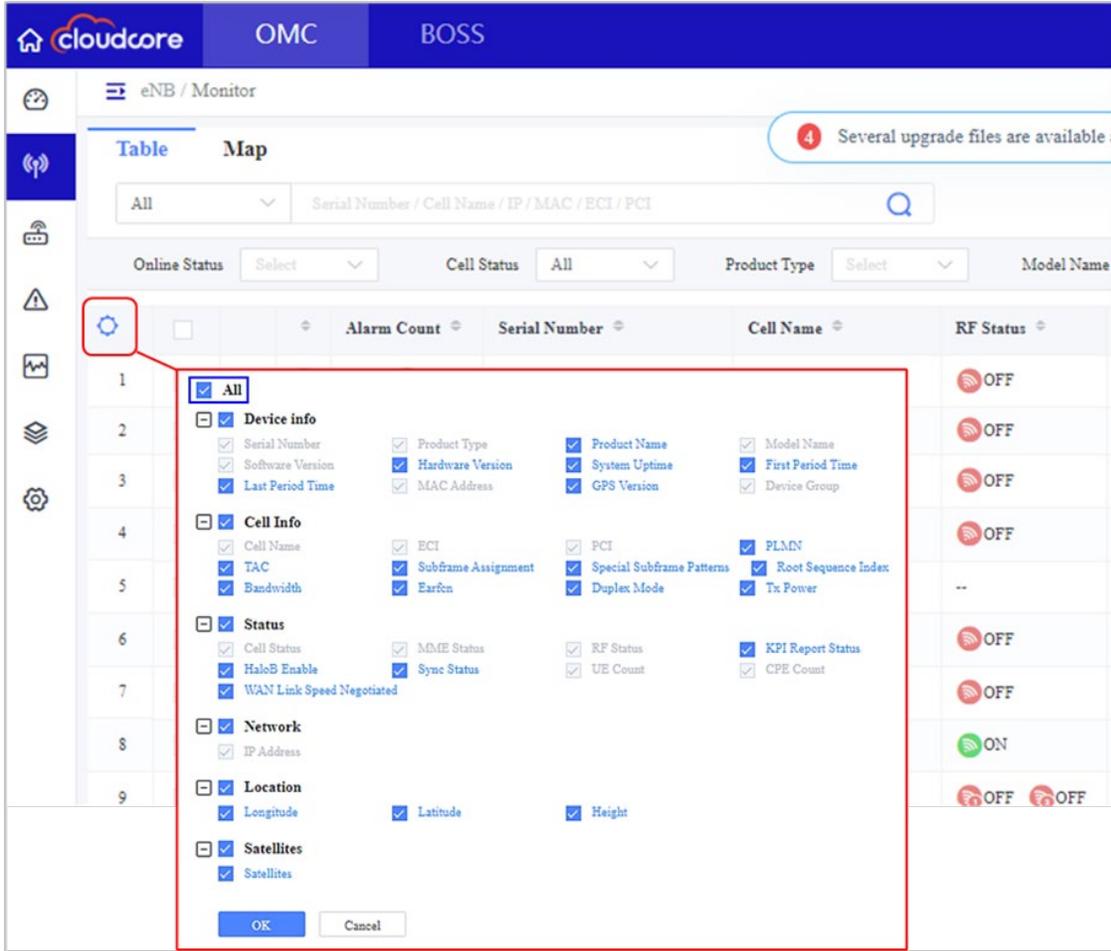


Figure 3-30: Cell Status (OMC)



NOTE: This image is captured by applying filters to show Cell Status and Sync Status.

Figure 3-31: OMC > eNB > Monitor > 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.