



**Nova430**

**Outdoor 4x250mW eNodeB**

**Quick Guide**

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# 1. Product Overview

## 1.1 Introduction

Baicells Nova430 is an advanced two-carrier outdoor eNodeB based on LTE TDD technology, which is developed by Baicells. It is capable of operating in Carrier Aggregation (CA) or Dual Carrier (DC) mode / split mode.

In CA mode, contiguous or non-contiguous channels are aggregated to provide up to 40 MHz bandwidth. This essentially doubles the downlink capacity when the CA 430 is used with all CAT6/7 user equipment.

In DC mode, each carrier is treated as an independent cell, supporting 96+96 users, and each supporting 5, 10, 15, or 20 MHz bandwidth. Using a Nova430 in DC mode simplifies and streamlines the deployment of split sectors.

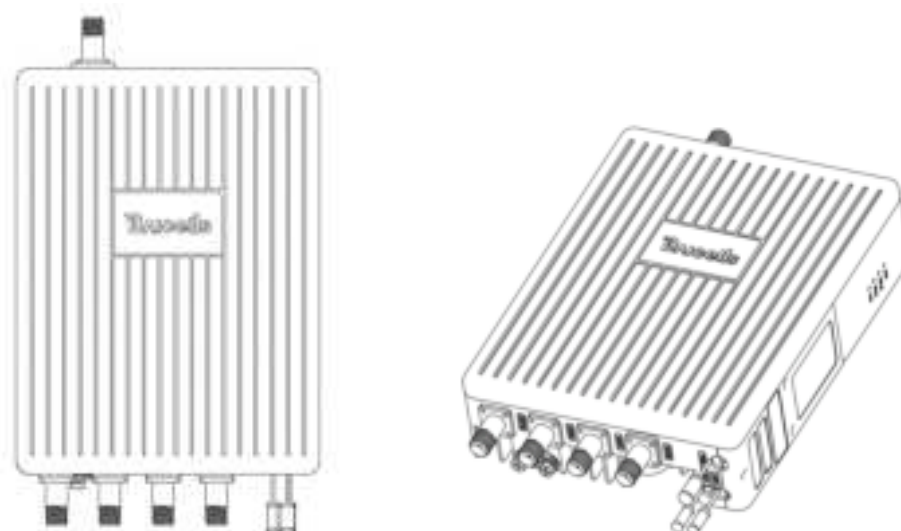
In addition to having the option to operate Nova430 in either CA or DC mode, HaloB (an embedded MME option) comes as a default feature in the base software. Baicells's patented HaloB solution migrates the necessary core network functions to the eNB.

## 1.2 Features

- Citizens Broadband Radio Service (CBRS) band covers with dual carrier.
- Peak rate: (up to) DL 220Mbit/s, UL2x28 (56) Mbit/s with 2x20MHz spectrum, using all Cat6/7 or higher UEs.
- Support flexible uplink and downlink time slot ratio: 1(2:2), 2(1:3), and high speed data transmission.
- Support 5MHz/10MHz/15MHz/20MHz operation bandwidth.
- 96 concurrent users per carrier, 96+96 in DC mode.
- Support copper (RJ-45) backhaul, flexible to deploy.
- Integrated small cell form factor for quick and easy installation.
- Suitable for private and public deployments; any IP based backhaul can be used, including public transmission protected by Internet Protocol Security (IPSec).
- Support PoE++ power supply, only one Ethernet cable required for data transmission and power supply.
- Security services to provide timely protection against potential security risks and illegal intrusion.

- Support simple and convenient local and remote web management.
- Integration as required, easy to installation and deployment, accurate coverage and improved network capacity.
- Support network management functions, which includes the management, monitoring and maintenance.

## 1.3 Appearance



The Nova430 interfaces are described in Table 1-1.

Table 1-1 Nova430 Interface Description

Interface Name	Description
ETH/POE	RJ-45 interface (FE/GE) Used for power supply, debug or data backhaul. PoE++, complied with IEEE 802.3bt standard
GPS	GPS antenna interface, N type connector
ANT0	External antenna interface 1, N type connector
ANT1	External antenna interface 2, N type connector
ANT2	External antenna interface 3, N type connector
ANT3	External antenna interface 4, N type connector

The Nova430 interface indicators are described in Table 1-2.

Table 1-2 Nova430 Interface Indicators

Identity	Color	Status	Description
PWR	Green	Steady On	Power on
		OFF	No power supply
CELL1	Green	OFF	CELL1 is in inactivated.

Identity	Color	Status	Description
		Fast flash: 0.1s on,0.1s off	CELL1 is in deactivated.
		Slow flash: 1s on,1s off	CELL1 is in activated.
		OFF	CELL2 is in inactivated.
CELL2	Green	Fast flash: 0.1s on,0.1s off	CELL2 is in deactivated.
		Slow flash: 1s on,1s off	CELL2 is in activated.
		OFF	CELL2 is in inactivated.
ALM	Red	Steady On	Hardware alarm
		OFF	No alarm

## 1.4 Technical Specification

### 1.4.1 Hardware Specification

Item	Description
LTE Mode	LTE TDD
LTE Frequency	Band48
Channel Bandwidth	5MHz, 10MHz, 15MHz, 20MHz per carrier
Output Power	24 dBm per antenna
Receive Sensitivity	-100 dBm
Synchronization	GPS
Backhaul	1 RJ-45 Ethernet interface (1 FE/GE)
MIMO	DL 2 x 2 on each carrier, 2 carriers
Dimension (HxWxD)	with joint: 381x 227 x 75 millimeters without joint and handle: 311 x 227 x 75 millimeters
Installation Type	Pole or wall mount
Antenna Type	<ul style="list-style-type: none"> <li>External high-gain antenna compatible with eNB N-Type connectors</li> <li>External GPS antenna, N-Type connector</li> </ul>
Power Consumption	Typical 20W, MAX 25W
Power Supply	PoE++, comply with IEEE 802.3bt standard
Weight	4.75kgs (with pre-installed bracket) 4.35kgs (without bracket)
MTBF	≥ 150000 hours
MTTR	≤ 1 hour

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

## 1.4.2 Global Part Numbers

Model No.	Description
pBS3101SE	Band42/43/48, 10MHz, 20MHz per carrier, DL 2 x 2 on each carrier, 2 carriers.

## 1.4.3 Software Specification

Item	Description				
LTE Standard	3GPP Release 15				
Peak Rate	<table> <tr> <td>DC mode</td><td> <ul style="list-style-type: none"> <li>2x20 MHz: SA1: DL 2x80Mbps, UL 2x28Mbps SA2: DL 2x110Mbps, UL 2x14Mbps</li> <li>2x10MHz: SA1: DL 2x40Mbps, UL 2x14Mbps SA2: DL 2x55Mbps, UL 2x7Mbps</li> </ul> </td></tr> <tr> <td>CA mode</td><td> <ul style="list-style-type: none"> <li>2x20 MHz: SA1: DL 160Mbps, UL 28Mbps SA2: DL 220Mbps, UL 14Mbps</li> <li>2x10MHz: SA1: DL 80Mbps, UL 14Mbps SA2: DL 110Mbps, UL 7Mbps</li> </ul> </td></tr> </table>	DC mode	<ul style="list-style-type: none"> <li>2x20 MHz: SA1: DL 2x80Mbps, UL 2x28Mbps SA2: DL 2x110Mbps, UL 2x14Mbps</li> <li>2x10MHz: SA1: DL 2x40Mbps, UL 2x14Mbps SA2: DL 2x55Mbps, UL 2x7Mbps</li> </ul>	CA mode	<ul style="list-style-type: none"> <li>2x20 MHz: SA1: DL 160Mbps, UL 28Mbps SA2: DL 220Mbps, UL 14Mbps</li> <li>2x10MHz: SA1: DL 80Mbps, UL 14Mbps SA2: DL 110Mbps, UL 7Mbps</li> </ul>
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User Capacity	96 concurrent users in single carrier mode 96+96 concurrent users in DC mode 96 concurrent users in CA mode				
QoS Control	3GPP standard Quality of Service Class Identifier (QCI), SC1				
Modulation	UL: QPSK, 16QAM, 64QAM DL: QPSK, 16QAM, 64QAM				
Voice Solution	VoLTE (future software release)				
Traffic Offload	Local breakout				
SON	Self-organizing network: <ul style="list-style-type: none"> <li>Automatic setup</li> <li>Automatic Neighbor Relation (ANR)</li> <li>PCI confliction detection</li> </ul>				
Network Mgmt.	TR-069,SNMP				
Maintenance	Support remote/local maintenance, based on SSH protocol				
	Support online status management				
	Support performance statistics				
	Support failure management				

Item	Description
	Support configuration management
	Support local or remote software upgrading and loading
	Support log
	Support connectivity diagnosis
	Support automatic start and configuration
	Support alarm reporting
	Support user information tracing
	Support signaling trace

## 1.4.4 Environment Specification

Item	Description
Operating Temperature	-40°C to 55°C
Storage Temperature	-50°C to 65°C
Humidity	5% to 95%
Atmospheric Pressure	70 kPa to 106 kPa
Ingress Protection Rating	IP65
Power Interface Lightning Protection	Differential mode: $\pm 10\text{KA}$ Common mode: $\pm 20\text{KA}$

## 1.4.5 Regulatory Compliance

### FCC Compliance

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

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

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a

particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

Warning:

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

## ISED Compliance

This device complies with Innovation, Science, and Economic Development Canada licence-exempt RSS standard(s).

Operation is subject to the following two conditions:

- (1) This device may not cause interference, and
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Innovation, Science et Développement économique Canada applicables aux appareils radio exempts de licence.  
L'exploitation est autorisée aux deux conditions suivantes:

- (1) l'appareil ne doit pas produire de brouillage, et
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 50cm 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.

Les antennes utilisées pour cet émetteur doivent être installées de façon à offrir une distance de séparation d'au moins 50cm entre toutes les personnes et ne doivent pas être colocalisées ou fonctionner conjointement avec d'autres antennes ou transmetteurs. pour satisfaire la conformité à l'exposition RF.

## 2. Installation









### 2.1 Installation Material

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

Table 2-1 Support Materials

Item	Description
Antenna RF cable	50 ohm feeder
Ethernet cable	Outdoor CAT6, shorter than 100 meters
Antenna	Omnidirectional, or directional antenna
Ground cable	The diameter of grounding cable must be 10mm <sup>2</sup> or greater.

### 2.2 Installation Tool

			
Knife	Vise	Wrench	Cross screw driver
			
Tape measure	Percussion drill and	Cable vice	hammer

**NOTE:** Other accessories have been packed in the packing box.

### 2.3 Weatherproofing

For RF antenna weatherproof, adopt cold shrink tubes.

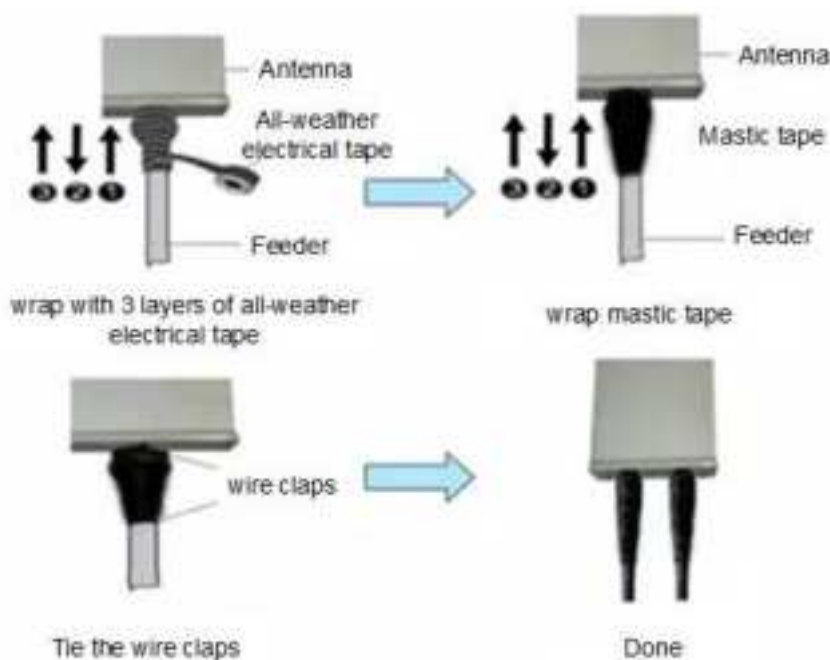


To protect the connection points from weather and climate, clean each connection point before installing cold shrink tubes, per the following figure.



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.

For GPS antenna weatherproof, adopt all-weather electrical tape and mastic tape, per the followed figure.



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

## 2.4 Install GPS Antenna

Read the following GPS antenna installation requirements before installing it on the eNB.

- No major blocking from buildings in the vicinity. Make sure the space atop is at least 45 degrees unblocked by any buildings.
- Avoid installing the GPS antenna in the vicinity of any other transmitting and receiving devices, to avoid interference.
- The GPS antenna should be installed within 45 degrees to the lightning rod.

The GPS antenna system includes an antenna and a connector. The two parts should be assembled according to Figure 2-1.

Figure 2-1 Assemble GPS Antenna



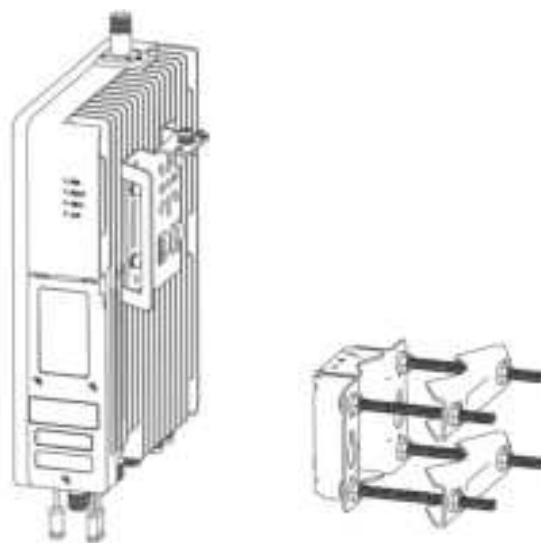
After assembling the GPS antenna, the connector must be waterproofed by all-weather electrical tape and mastic tape.

## 2.5 Install on Pole

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

The brackets have been pre-assembled in manufacturing before packing. It includes two parts, one is pre-assembled on the back of device. The other is for pole mounting or wall mounting, as shown in Figure 2-2.

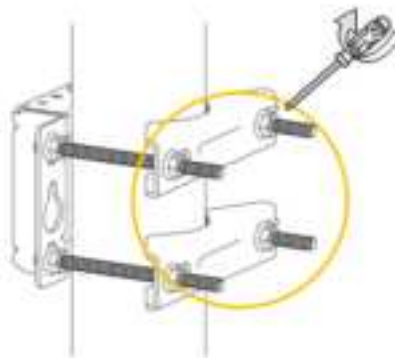
Figure 2-2 Pre-assembled Device



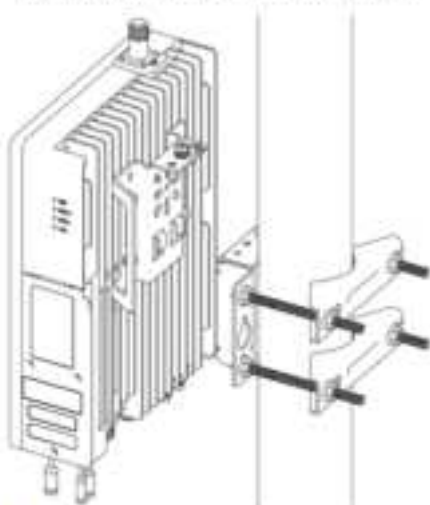
Following will introduce how to fix the pre-assembled eNB on a pole.



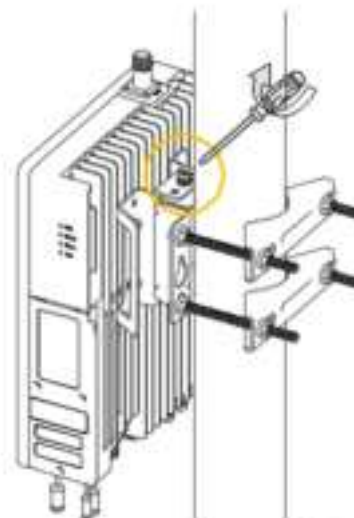
- 1 Unscrew 4 screws on the assembled Pole bracket. Slide the two omega clamps to the left, and then turn them up or down.



- 2 Put the pole bracket against the pole. Restore the two omega clamps to their original position and fasten 4 screws with a screwdriver.



- 3 Hung the eNB (with bracket) on the pole bracket. Ensure two hooks on the eNB bracket is stuck in the slot.



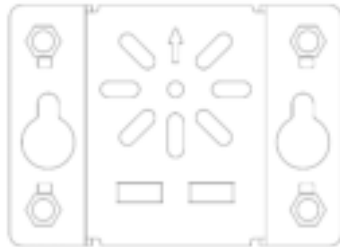
- 4 Fasten the screw on the top of the bracket using a cross screwdriver.

## 2.6 Install on Wall


**NOTE:** The wall must bear at least 4 times the weight of the eNB.

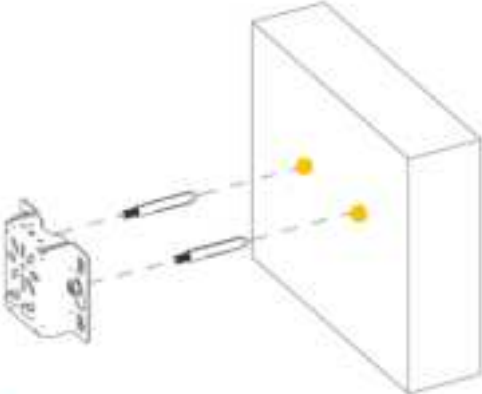
Take apart assembly bracket first, only remains the wall bracket, as shown in Figure 2-3.

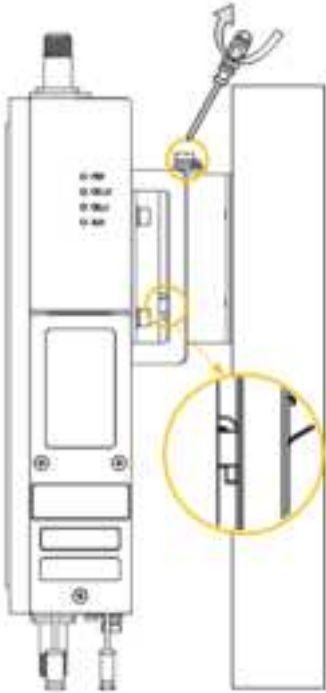
Figure 2-3 Wall Bracket



Following steps introduce how to fix the pre-assembled eNB on a wall.

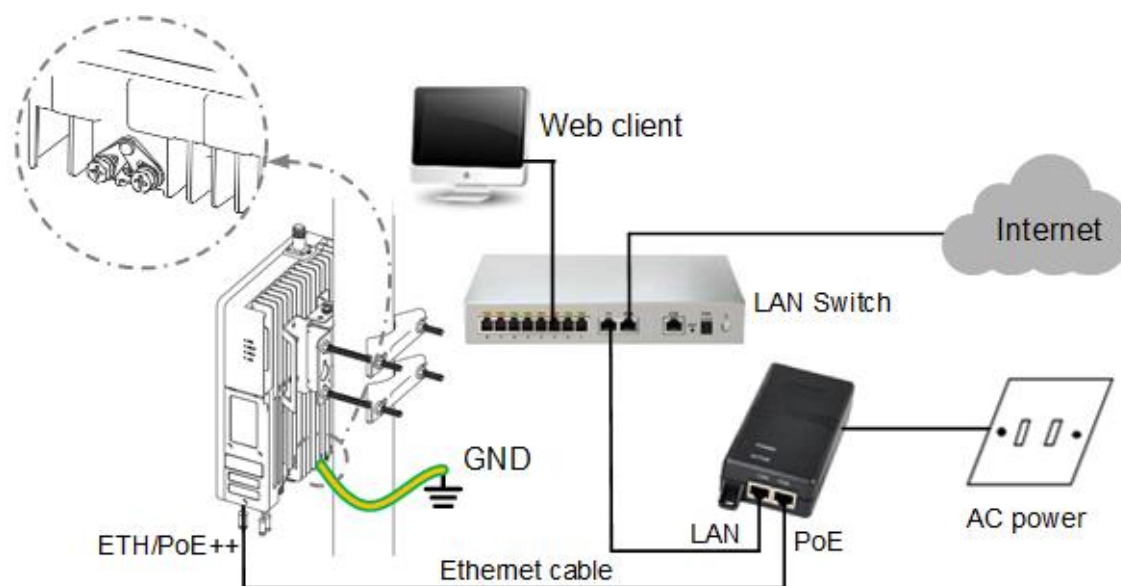
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**1** Fit the installation bracket on the wall and mark drilling locations with a marker pen.  
NOTE: the arrow must be upward.
- 

**2** Drill two holes at the marked locations and install expansion bolts.  
And then hang the wall bracket on expansion bolts, and fasten with flat washers, spring washers and nuts.
- 

**3** From top to bottom, clip the eNB into the two hooks on the bracket and tighten the pin on the top of the bracket.

## 2.7 Connect Cables



**NOTE:** The GPS antenna connector and the RF antenna connector must have weatherproof protection, refer to “2.3 Weatherproofing”.

## 2.8 Power On

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