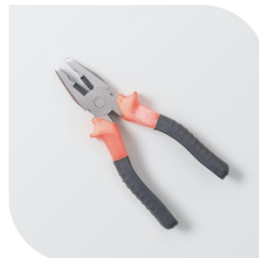


Stellar227

Indoor 2x500mW gNB

Installation Guide



About This Document

This document is intended for personnel who will be installing the Baicells Stellar227 Indoor 2x500mW gNB product. The product overview is followed by the procedures for properly installing. Please be advised that only personnel with the appropriate electrical skills and experience should install this device.

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Disclaimer

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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
15 June, 2024	01	Initial Released.

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Safety Information


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

Warning IMPORTANT SAFETY INSTRUCTIONS

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

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

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

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


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

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1. Overview

1.1 Introduction

The Baicells Stellar227 is an advanced indoor 5G Sub-6G integrated base station (gNB), which is designed and developed based on Qualcomm 5G SoC solution. This 2x500mW gNB is low power, subminiature and easy to maintenance.

This product helps operators to enhance the coverage performance of 5G networks effectively, improve the capacity of 5G networks and eliminate the blind district, meanwhile it also can help to reduce the system power consumption.

1.2 Highlights

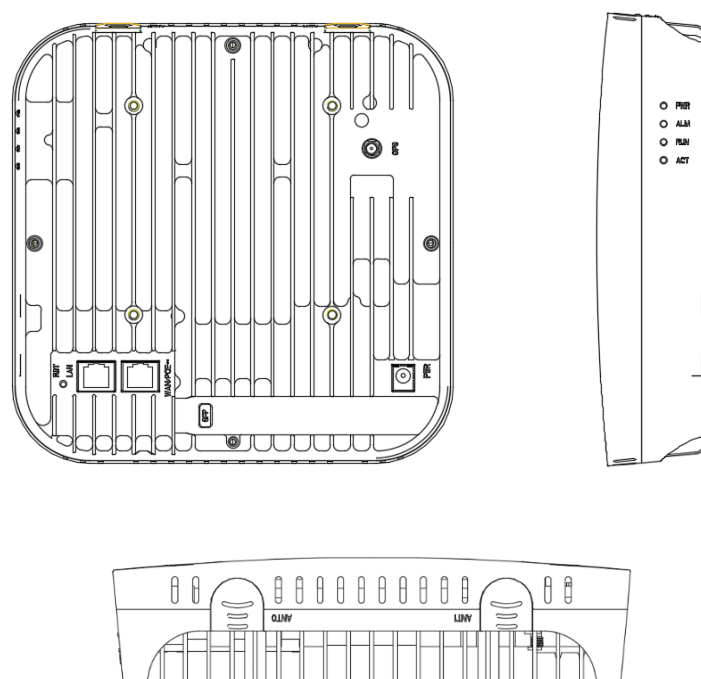
- Standard NR Band n48/n77/n78
- Comply with 3GPP Release 15 and Release 16
- GUI-based local and remote Web management
- Supports 100MHz bandwidth per cell
- Peak rate: Up to DL 850Mbps* and UL 600Mbps
- Supports 128 RRC connected users per cell
- Supports Stand Alone (SA) mode
- Supports F1 setting*
- Supports SCTP control (IKE SCTP)
- Supports embedded 5G core network (HaloB)
- Integrated small cell form factor for quick and easy installation
- Supports flexible xHaul
- Highly secured with equipment certification against potential intrusion risk
- Supports TR-069 network management interface
- Lower power consumption, which reduces OPEX

* Planned for future release

1.3 Appearance

The appearance of Stellar227 is shown in Figure 1-1.

Figure 1-1 Stellar227 Appearance



The Stellar227 interfaces are described in Table 1-1.

Table 1-1 Stellar227 Interface Description

Interface	Description
PWR	12VDC power supply interface
LAN	RJ-45 interface (GE), used for initial configuration or maintenance during device operation
WAN/POE++	RJ-45 interface (GE), used for data backhaul and PoE++ power supply, complied with IEEE 802.3bt standard.
SFP	Optical interface (SFP) 0, used for data backhaul
GPS	External GPS antenna interface 1, SMA (F) connector
RST	Power reset button
ANT0	(optional) External antenna interface 0, SMA (F) connector

Interface	Description
ANT1	(optional) External antenna interface 1, SMA (F) connector

The Stellar227 interface indicators are described in Table 1-2.

Table 1-2 Stellar227 Interface Indicators

Identity	Color	Status	Description
PWR	Green	Steady ON	(Reserved)
RUN	Green	Steady ON	The power supply is normal.
		Fast flash: 0.125s on, 0.125s off	The device is starting up.
		Slow flash: 1s on, 1s off	The device is operating normally.
		OFF	No power supply or device fault.
ACT	Green	Steady ON	The cell is active.
		Slow flash: 1s on, 1s off	The cell is deactivated.
ALM	Red	Steady ON	The device is fault.
		OFF	No alarm.

1.4 Technical Specification

1.4.1 Technology

Item	Description
Standard	5G NR TDD (3GPP R15 & R16 compliant)
Model No.	BSC7048A227
TDD UL/DL Configuration	5ms periodicity ($\mu=1$): DDDDD+DDSUU 5ms periodicity ($\mu=1$): DDDDD+SUUUU* 2.5ms dual periodicity ($\mu=1$): DDDSU+DDSUU 2.5ms single periodicity ($\mu=1$): DDDSU*, DSUUU
Frequency Band	n48 (3550 MHz – 3700 MHz) n77 (3550 MHz – 3700 MHz) n78 (3550 MHz – 3700 MHz)
Channel Bandwidth	n48: 10/20/30/40MHz

Item	Description
	n77: 100MHz n78: 100MHz
Multiplexing	2x2 MIMO
Security	Radio: Null/SNOW 3G/AES-128/ZUC Backhaul: IPsec (X.509 AES-128, AES-256, SHA-128, SHA-256)

1.4.2 Interface

Item	Description
Ethernet Interface	2 x RJ-45 Ethernet interface (1 GE) 1 x 1GE optical interface (SFP) 1 x 10GE optical interface (SFP+)
Power Supply	12VDC/POE++
Protocols Used	IPv4, UDP, TCP, ICMP, NTP, SSH, IPsec, TR-069, HTTP/HTTPS, DHCP
Network Management	IPv4, HTTP/HTTPS, TR-069, SSH, Embedded EPC
VLAN/VxLAN*	802.IQ/VxLAN
LED Indicators	4 x status LED PWR/ACT/RUN/ALM
RF Antenna	Embedded omni antenna or 2T2R external high gain antenna with SMA connectors
GPS Antenna	External GPS antenna, SMA connector

1.4.3 Performance

Item	Description		
Peak Data Rate	100 MHz	DL (Mbps)	UL (Mbps)
	5ms periodicity (DDDDD+DDSUU ,6:4:4)	810	210
	5ms periodicity (DDDDD+SUUUU ,6:4:4)*	525	400

Item	Description
	2.5ms dual periodicity (DDDSU+DDSUU, 10:2:2) 720 330
	2.5ms single periodicity (DDDSU, 10:2:2)* 850 210
	2.5ms single periodicity (DSUUU, 10:2:2) 380 600
User Capacity	Up to 128 RRC connected users
MAX Deployment Range	2000 m ²
Latency	Round-trip delay (RTD) less than 10 milliseconds
Receive Sensitivity	-92 dBm (per channel)
Modulation	UL: MCS0 (QPSK) to MCS27 (256QAM) DL: MCS0 (QPSK) to MCS27 (256QAM)
Transmit Power Range	0 to 27 dBm per channel
Quality of Service	Nine-level priority indicated by QoS Class Identifiers (QCI)
ARQ/HARQ	Supported
Synchronization	GPS/NL/1588v2

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

* Planned for future release

1.4.4 Features

Item	Description
Voice	VoNR/EPS-FB
SON	Self-Organizing Network <ul style="list-style-type: none"> Automatic Neighbor Relation (ANR) PCI confliction detection
Traffic Offload	Local breakout
Maintenance	<ul style="list-style-type: none"> Local/Remote Web maintenance Online status management Performance statistics

Item	Description
	<ul style="list-style-type: none"> Fault management Local/Remote software upgrade Logging Connectivity diagnosis Auto startup

1.4.5 Link Budget

Item	Description
VSWR	≤ 1.5
Power Control	UL Open-loop/Closed-loop Power Control, DL Power Allocation (3GPP TS 38.213 compliant)*

* Planned for future release

1.4.6 Physical

Item	Description
Surge Suppression	Yes
Power Interface	Differential mode: ± 10 KA
Lightning Protection	Common mode: ± 20 KA
MTBF	≥ 150000 hours
MTTR	≤ 1 hour
Ingress Protection Rating	IP30
Operating Temperature	-5°C to 45°C
Storage Temperature	-20°C to 65°C
Humidity	15% to 85% RH
Atmospheric Pressure	70 kPa to 106 kPa
Power Consumption	Maximum 30W
Weight	< 2.4 lbs/ 1.1kg
Dimensions (HxWxD)	7.9 x 7.9 x 1.9 inches / 200 x 200 x 49 millimeters
Installation	Ceiling or wall mount

2. Installation Preparation

2.1 Packing List



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

Once unpacked, check the contents to see if they are consistent with the packing list.

2.2 Support Materials

In addition to industry standard tools, you will need the materials described in Table 2-1 during the installation.



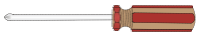

Table 2-1 Supporting Materials

Item	Figure	Description
Optical fiber		Optical fiber (armor) It is suggested that the diameter of the cable is 7 ± 1 mm.
Ethernet cable		Outdoor CAT6, shorter than 100 meters (~109 yards) It is suggested that the diameter of the cable is 7 ± 1 mm.

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

2.3 Installation Tools

The following standard tools may be needed during the installation.

			
Marker pen	Percussion drill	Cross screw driver	hammer

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

2.4 Construction Safety

1. The installation personnel must master the basic safe operation knowledge, through the training, and having the corresponding qualifications.
2. Before installation, the installation personnel must be prepared with safety protection, such as: safety helmet, safety belt, reflective clothing, gloves, and safety shoes, etc.
3. Before installation, the installation personnel must cross-check each other to ensure above preparations have done.

2.5 Installation Environment

To get the signal coverage effect best, please place the Neutrino base station in an unobstructed space.

3. Installation

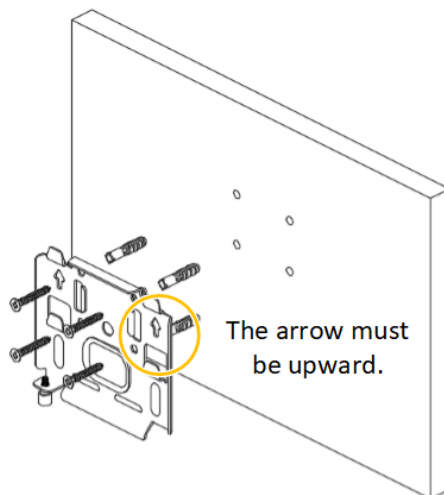
3.1 Ceiling or Wall Mounting

Attention:

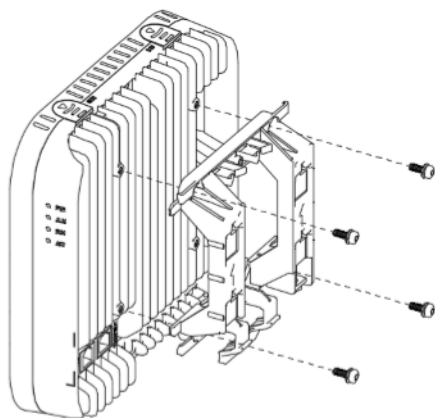
- The thickness of ceiling is not less than 18mm, and bearing more than 5kgs. If the strength is not suitable, the device maybe fall off.
 - If the ceiling is made of unstable material, such as gypsum, this ceiling installation is not recommended. If the device must be installed on ceiling due to environment restriction, add one layer better panel under screws to make sure the device is fastness.
-

Here take mounting on wall as an example, mounting on ceiling is the same as it.

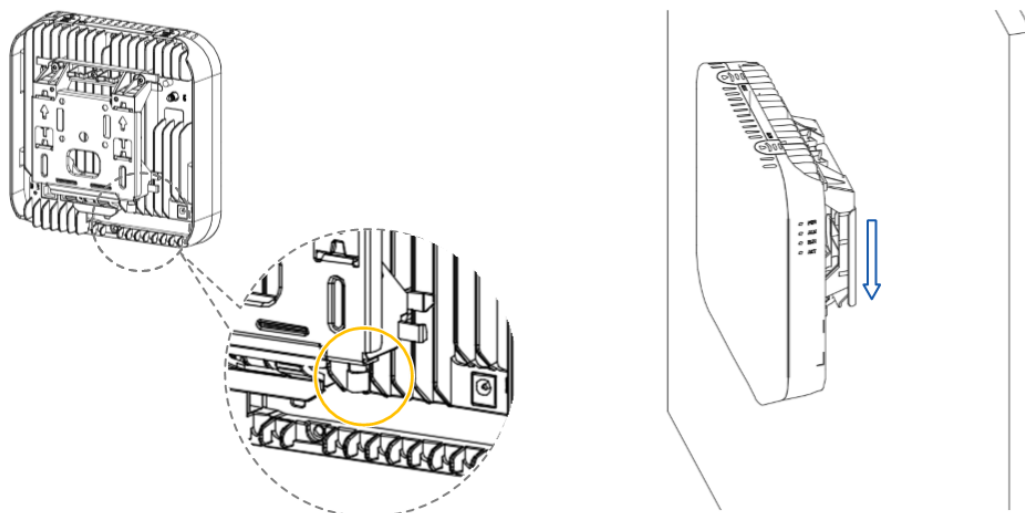
1. Place the bracket against the wall, mark the hole positions with a mark pen, then drill four holes at marked positions. Next, install expansion pipes, bracket and tighten the bracket with screws.



2. Install the bracket on the back of the gNB with screws and tighten four screws.



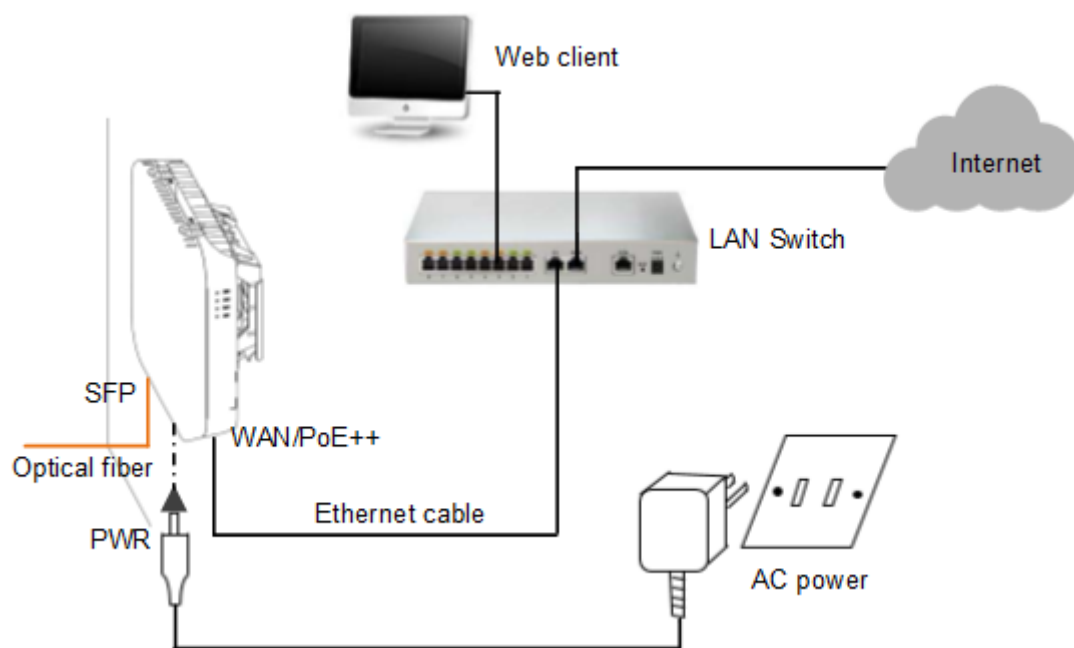
3. Put the gNB down along the slot to the bottom of the bracket, and then tighten the captive screw.



3.2 Connect Cables

The gNB provides two power supply options: 12VDC and POE++ to be selected based on the site condition.

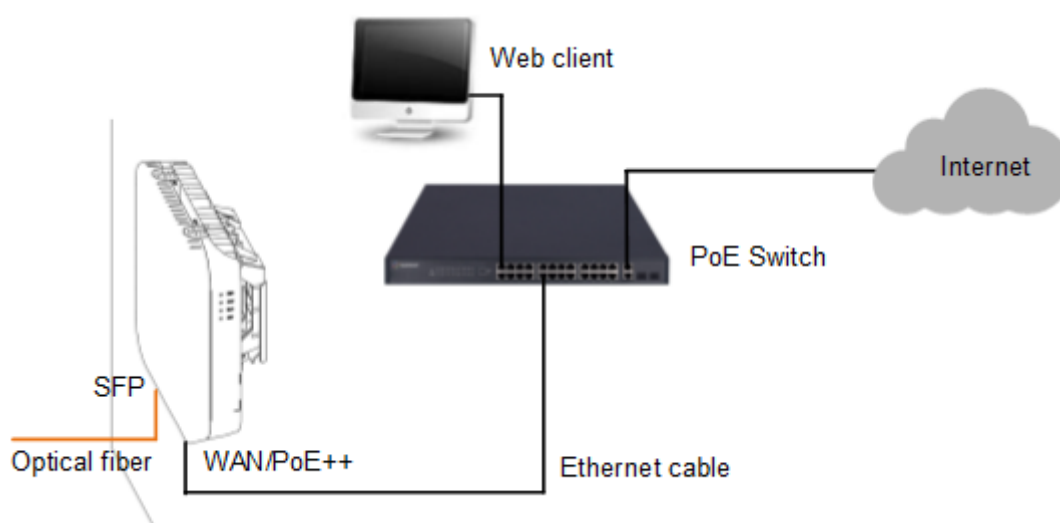
- PWR interface power supply (12VDC)



- POE++ power supply

When the installation site has POE switch, the POE++ supply can be adopted.

The POE switch should meet the POE++ requirements for the BT protocol, with a power of 30 watts or higher.



1. The gNB defaults to using internal antennas. If external antennas are used, the customer should prepare stick antennas and connect them to ANT0 and ANT1 interfaces.
2. Choose to use optical fibers or network cables for backhaul based on the site planning.
3. For initial configuration or debug, connect the LAN port to the LAN switch/PoE switch, so as to connecting the PC. The IP address of the PC is 192.168.150.x.

3.3 Power on to Check LED Status

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

4. 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. 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 20cm between the radiator & your body.