DATASHEET



NanoBeam® AC GEN2

airMAX® ac CPE with Dedicated Management Radio

Model: NBE-5AC-Gen2

Uniform Beamwidth Maximizes Noise Immunity

Dedicated Wi-Fi Radio for Management

airMAX ac Processor for Superior Performance

UBIQUITI® NETWORKS

Overview

Ubiquiti Networks launches the latest generation of airMAX® CPE (Customer Premises Equipment), the NanoBeam® 5AC Gen 2.

Improved Noise Immunity

The NanoBeam 5AC Gen 2 directs RF energy in a tighter beamwidth. With the focus in one direction, the NanoBeam 5AC Gen 2 blocks or spatially filters out noise, so noise immunity is improved. This feature is especially important in an area crowded with other RF signals of the same or similar frequency.

Integrated Design

The radio and antenna are combined to create a more efficient and compact CPE. The NanoBeam 5AC Gen 2 gets maximum gain out of the smallest footprint.

Providing high performance and an innovative form factor, the NanoBeam 5AC Gen 2 is versatile and cost-effective to deploy.

Software

airOS® 8

airOS® 8 is the revolutionary operating system for Ubiquiti® airMAX ac products.

Powerful Wireless Features

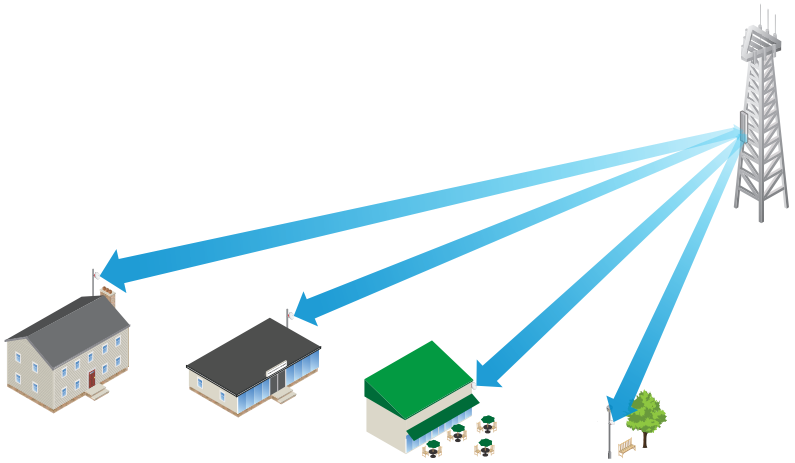
- Access Point PtMP airMAX Mixed Mode
- airMAX ac Protocol Support
- Long-Range Point-to-Point (PtP) Link Mode
- Selectable Channel Width
  - PtP: 10/20/30/40/50/60/80 MHz
  - PtMP: 10/20/30/40 MHz
- Automatic Channel Selection
- Transmit Power Control: Automatic/Manual
- Automatic Distance Selection (ACK Timing)
- Strongest WPA2 Security

Usability Enhancements

- airMagic® Channel Selection Tool
- Redesigned User Interface
- Dynamic Configuration Changes
- Instant Input Validation
- HTML5 Technology
- Optimization for Mobile Devices
- Detailed Device Statistics
- Comprehensive Array of Diagnostic Tools, including RF Diagnostics and airView® Spectrum Analyzer

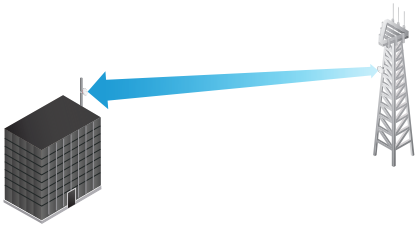
Application Examples

PtMP Client Links

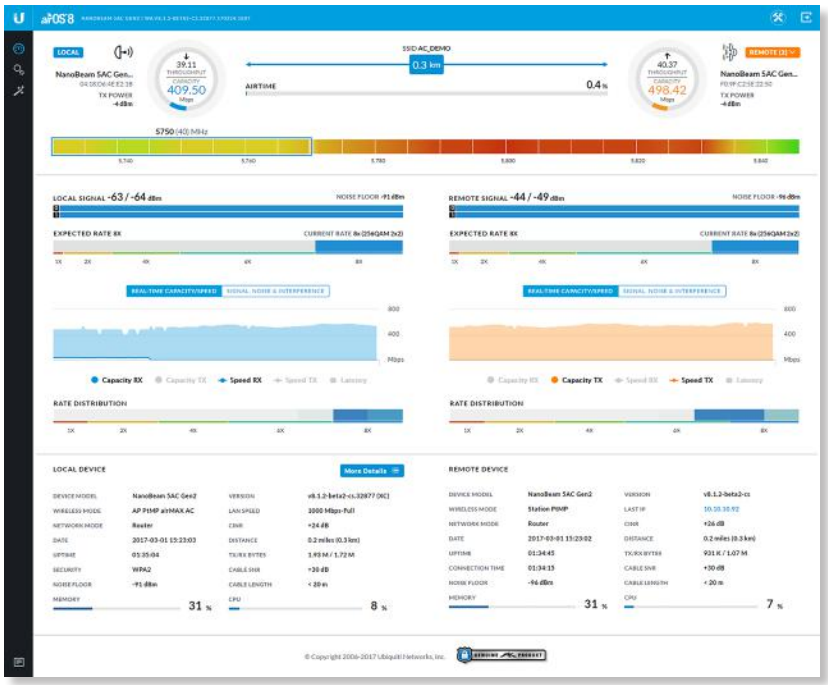


The NanoBeam 5AC Gen 2 used as a CPE device for each client in an airMAX PtMP network.

PtP Link



Use a NanoBeam 5AC Gen 2 on each side of a PtP link.



Advanced RF Analytics

airMAX ac devices feature a multi-radio architecture to power a revolutionary RF analytics engine.

An independent processor on the PCBA powers a second, dedicated radio, which persistently analyzes the full 5 GHz spectrum and every received symbol to provide you with the most advanced RF analytics in the industry.

Real-Time Reporting

airOS 8 displays the following RF information:

- Persistent RF Error Vector Magnitude (EVM) constellation diagrams
- Signal, Noise, and Interference (SNI) diagrams
- Carrier to Interference-plus-Noise Ratio (CINR) histograms

Spectral Analysis

airView allows you to identify noise signatures and plan your networks to minimize noise interference. airView performs the following functions:

- Constantly monitors environmental noise
- Collects energy data points in real-time spectral views
- Helps optimize channel selection, network design, and wireless performance

airView runs in the background without disabling the wireless link, so there is no disruption to the network.

In airView, there are three spectral views, each of which represents different data: waveform, waterfall, and ambient noise level.

airView provides powerful spectrum analyzer functionality, eliminating the need to rent or purchase additional equipment for conducting site surveys.

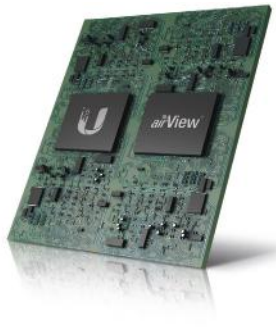
UNMS App

The NanoBeam 5AC Gen 2 integrates a separate Wi-Fi radio for fast and easy setup using your mobile device.

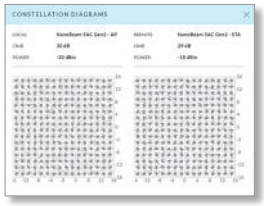
Accessing airOS via Wi-Fi

The UNMS™ app provides instant accessibility to the airOS configuration interface and can be downloaded from the App Store (iOS) or Google Play™ (Android). UNMS allows you to set up, configure, and manage the NanoBeam 5AC Gen 2 and offers various configuration options once you're connected or logged in.

Multi-Radio Architecture



Constellation Diagrams



SNI Diagram and CINR Histogram



Dedicated Spectral Analysis



UNMS Configuration Screen



Technology

airMAX ac

Unlike standard Wi-Fi protocol, Ubiquiti's Time Division Multiple Access (TDMA) airMAX protocol allows each client to send and receive data using pre-designated time slots scheduled by an intelligent AP controller.

This time slot method eliminates hidden node collisions and maximizes airtime efficiency, so airMAX technology provides performance improvements in latency, noise immunity, scalability, and throughput compared to other outdoor systems in its class.

Intelligent QoS Priority assigned to voice/video for seamless streaming.

Scalability High capacity and scalability.

Long Distance Capable of high-speed, carrier-class links.

Superior Performance

The next-generation airMAX ac technology boosts the advantages of our proprietary TDMA protocol.

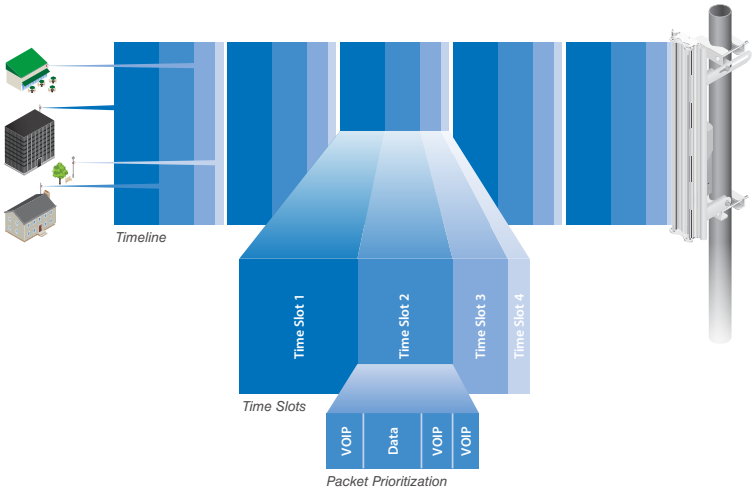
Ubiquiti's airMAX engine with custom IC dramatically improves TDMA latency and network scalability. The custom silicon provides hardware acceleration capabilities to the airMAX scheduler, to support the high data rates and dense modulation used in airMAX ac technology.

Throughput Breakthrough

airMAX ac supports high data rates, which require dense modulation: 256QAM – a significant increase from 64QAM, which is used in airMAX.

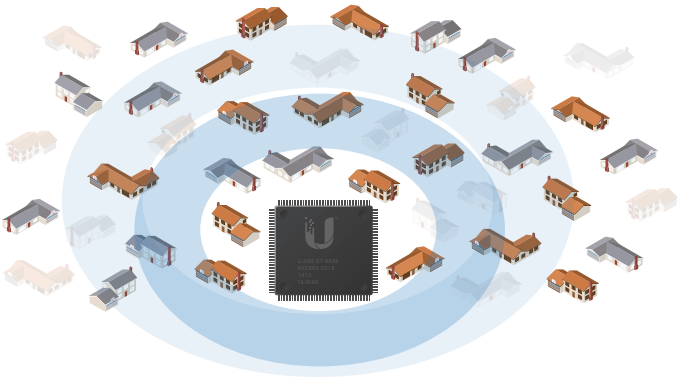
With their use of proprietary airMAX ac technology, airMAX ac products supports up to 450+ Mbps real TCP/IP throughput – up to triple the throughput of standard airMAX products.

airMAX ac TDMA Technology

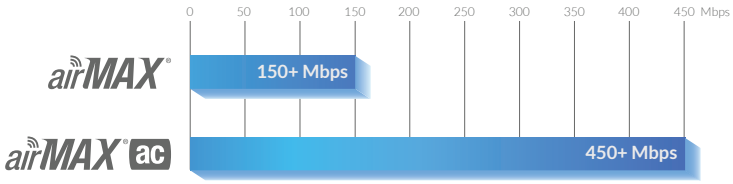


Up to 100 airMAX ac stations can be connected to an airMAX ac Sector; four airMAX ac stations are shown to illustrate the general concept.

airMAX Network Scalability



Superior Throughput Performance



Hardware Overview

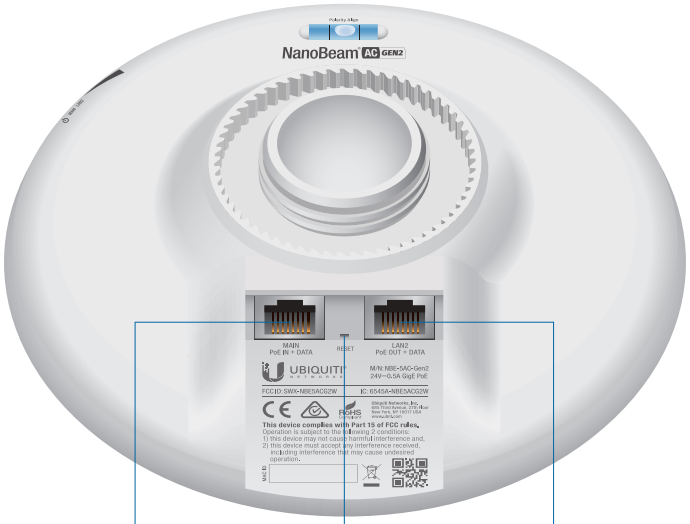
The NanoBeam 5AC Gen 2 features airMAX ac technology and enhanced protection against ESD events.

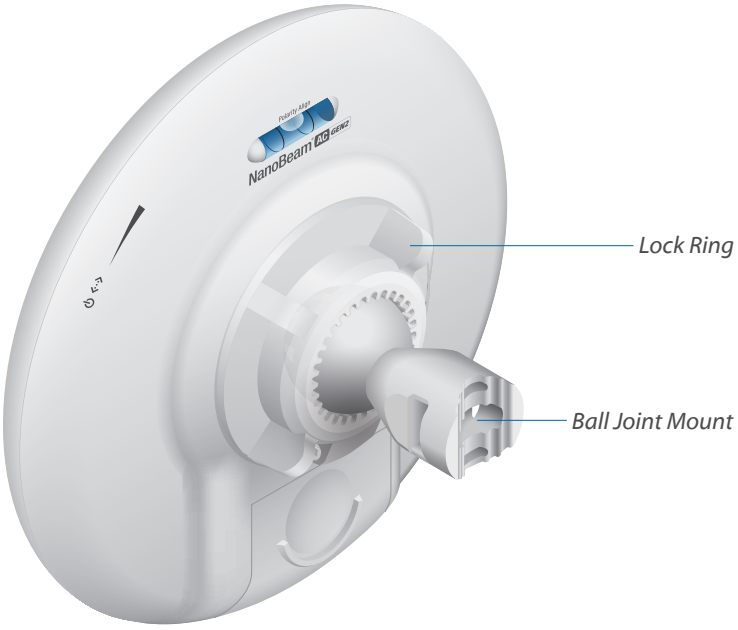
Ease of Installation

- **Quick Installation** No fasteners are required for pole-mounting, and a single wall fastener (not included) is required for wall-mounting.
- **Convenient Alignment** The NanoBeam 5AC Gen 2 pivots on its ball joint 3-axis mount for easy aiming.

Innovative Mechanical Design

- **Efficient Footprint** The radio and antenna are combined into a single body that takes up minimal space. The form factor features the highest gain for its size.
- **Aesthetics** The NanoBeam 5AC Gen 2 is small enough to blend discreetly into the background at a customer's location.
- **Versatile Mounting** The NanoBeam 5AC Gen 2 can be mounted in almost any position needed for line of sight.



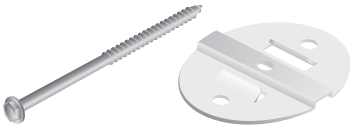


Mounting Accessories

NanoBeam® Wall Mount Kit

Model: NBE-WMK

A wall mount kit is available as an optional accessory to enhance stability for wall-mounting.





NanoBeam® Window Mount

Model: NBE-19-WM

A suction cup mount is available as an optional accessory to mount the NanoBeam 5AC Gen 2 on a window.





IsoBeam Accessory

IsoBeam™

Model: ISO-BEAM-19

An RF isolator shield is available as an optional accessory to enhance signal isolation.





Specifications

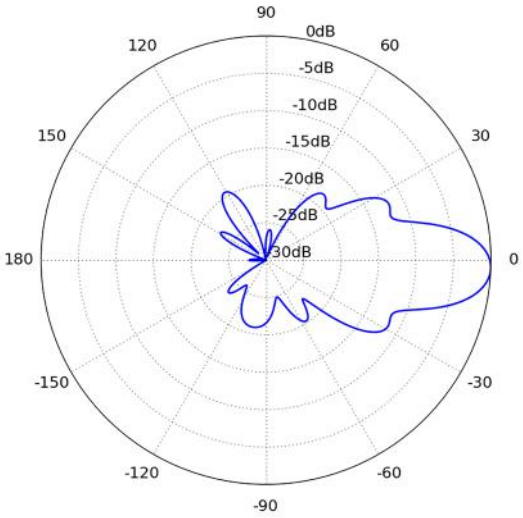
NBE-5AC-Gen2		
Dimensions (Mount Included)	189 x 189 x 125 mm (7.44 x 7.44 x 4.92")	
Weight (Mount Included)	0.530 kg (1.17 lb)	
Power Supply	24V, 0.5A Gigabit PoE Adapter (Included)	
Max. Power Consumption	8.5W	
Gain	19 dBi	
Networking Interface	(2) 10/100/1000 Ethernet Ports Wi-Fi for Management	
Processor Specs	Atheros MIPS 74Kc, 720 MHz	
Memory	128 MB DDR2, 8 MB Flash	
LEDs	Power, Ethernet, (4) Signal Strength	
Signal Strength LEDs	Software-Adjustable to Correspond to Custom RSSI Levels	
Max. VSWR	1.5:1	
Channel Sizes	PtP Mode	PtMP Mode
	10/20/30/40/50/60/80 MHz	10/20/30/40 MHz
Polarization	Dual Linear	
Enclosure	Outdoor UV Stabilized Plastic	
Mounting	Pole-Mount (Kit Included), Wall-Mount	
Wind Loading	45.4 N @ 200 km/h (10.2 lbf @ 125 mph)	
Wind Survivability	200 km/h (125 mph)	
ESD/EMP Protection	Air: ± 24 kV, Contact: ± 24 kV	
Operating Temperature	-40 to 80° C (-40 to 176° F)	
Operating Humidity	5 to 95% Noncondensing	
Certifications	CE, FCC, IC	
RoHS Compliance	Yes	
Salt Fog Test	IEC 68-2-11 (ASTM B117), Equivalent: MIL-STD-810 G Method 509.5	
Vibration Test	IEC 68-2-6	
Temperature Shock Test	IEC 68-2-14	
UV Test	IEC 68-2-5 at 40° C (104° F), Equivalent: ETS 300 019-1-4	
Wind-Driven Rain Test	ETS 300 019-1-4, Equivalent: MIL-STD-810 G Method 506.5	

Operating Frequency (MHz)				
Worldwide	5150 - 5875			
USA	U-NII-1: 5150 - 5250	U-NII-2A: 5250 - 5350 MHz	U-NII-2C: 5470 - 5725 MHz	U-NII-3: 5725 - 5850

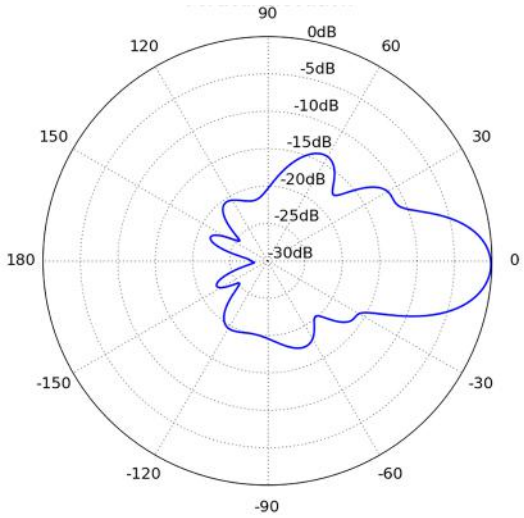
Management Radio (MHz)	
Worldwide	2412 - 2472
USA	2412 - 2462

NBE-5AC-Gen2 Output Power: 25 dBm							
TX Power Specifications				**RX Power Specifications**			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
airMAX ac	1x BPSK (½)	25 dBm	± 2 dB	**airMAX ac**	1x BPSK (½)	-96 dBm	± 2 dB
	2x QPSK (½)	25 dBm	± 2 dB		2x QPSK (½)	-95 dBm	± 2 dB
	2x QPSK (¾)	25 dBm	± 2 dB		2x QPSK (¾)	-92 dBm	± 2 dB
	4x 16QAM (½)	25 dBm	± 2 dB		4x 16QAM (½)	-90 dBm	± 2 dB
	4x 16QAM (¾)	25 dBm	± 2 dB		4x 16QAM (¾)	-86 dBm	± 2 dB
	6x 64QAM (⅔)	24 dBm	± 2 dB		6x 64QAM (⅔)	-83 dBm	± 2 dB
	6x 64QAM (¾)	23 dBm	± 2 dB		6x 64QAM (¾)	-77 dBm	± 2 dB
	6x 64QAM (⅚)	22 dBm	± 2 dB		6x 64QAM (⅚)	-74 dBm	± 2 dB
	8x 256QAM (¾)	21 dBm	± 2 dB		8x 256QAM (¾)	-69 dBm	± 2 dB
	8x 256QAM (⅚)	20 dBm	± 2 dB		8x 256QAM (⅚)	-65 dBm	± 2 dB

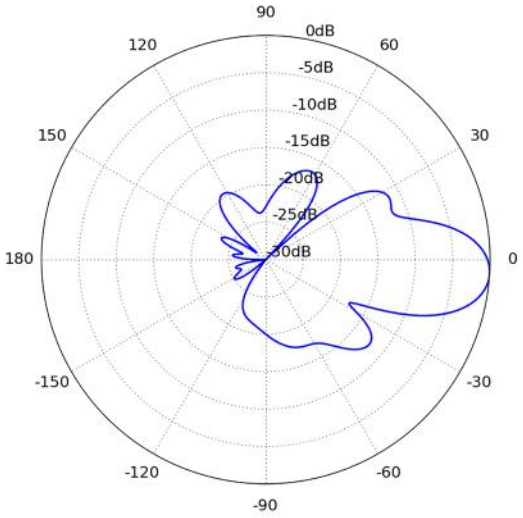
Vertical Azimuth



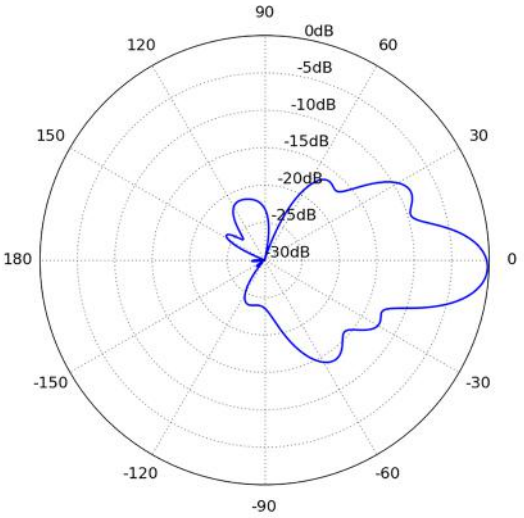
Vertical Elevation



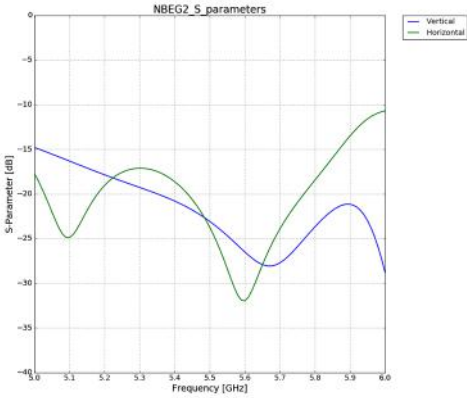
Horizontal Azimuth



Horizontal Elevation



Return Loss





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