



## PowerBeam® **AC GEN2**

5 GHz High Performance airMAX® ac Bridge

Models: PBE-5AC-Gen2, PBE-5AC-ISO-Gen2

Highly Efficient Antenna Beam Performance

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Up to 450+ Mbps Throughput

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Dedicated Wi-Fi Radio for Management



# Overview

Ubiquiti Networks launches the latest generation of airMAX® CPE (Customer Premises Equipment), the PowerBeam® 5AC Gen 2, with dedicated Wi-Fi management.

## Improved Noise Immunity

The PowerBeam 5AC Gen 2 directs RF energy in a tighter beamwidth. With the focus in one direction, the PowerBeam 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

Ubiquiti's InnerFeed® technology integrates the radio into the feedhorn of an antenna, so there is no need for a cable. This improves performance because it eliminates cable losses.

Featuring high performance and innovative design, the PowerBeam 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

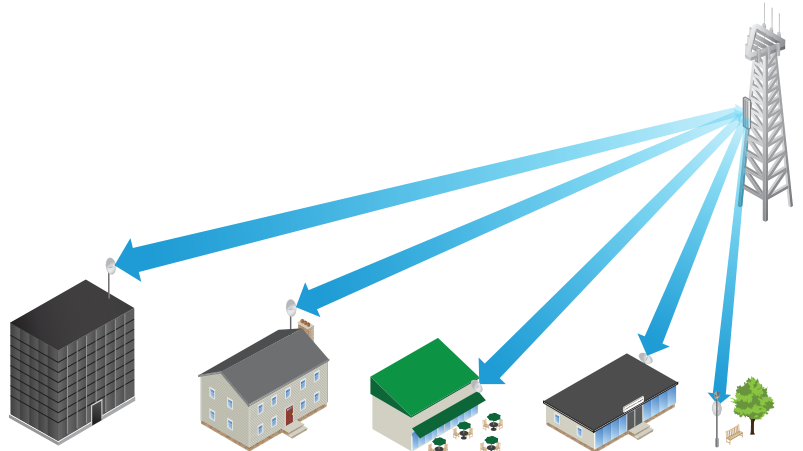
- Access Point PtMP airMAX Mixed Mode
- airMAX ac Protocol Support
- Long-Range PtP Link Mode
- Selectable Channel Width
  - PtP: 10/20/30/40/50/60/80 MHz
  - PtMP: 10/20/30/40 MHz
- Automatic Channel Selection
- Transmit Power Control: Automatic/Manual
- Automatic Distance Selection (ACK Timing)
- Strongest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

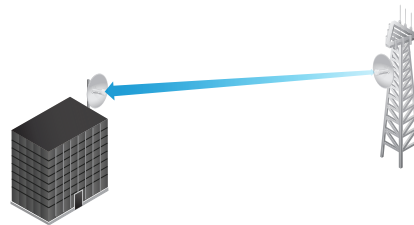
# Application Examples

## PtMP Client Links

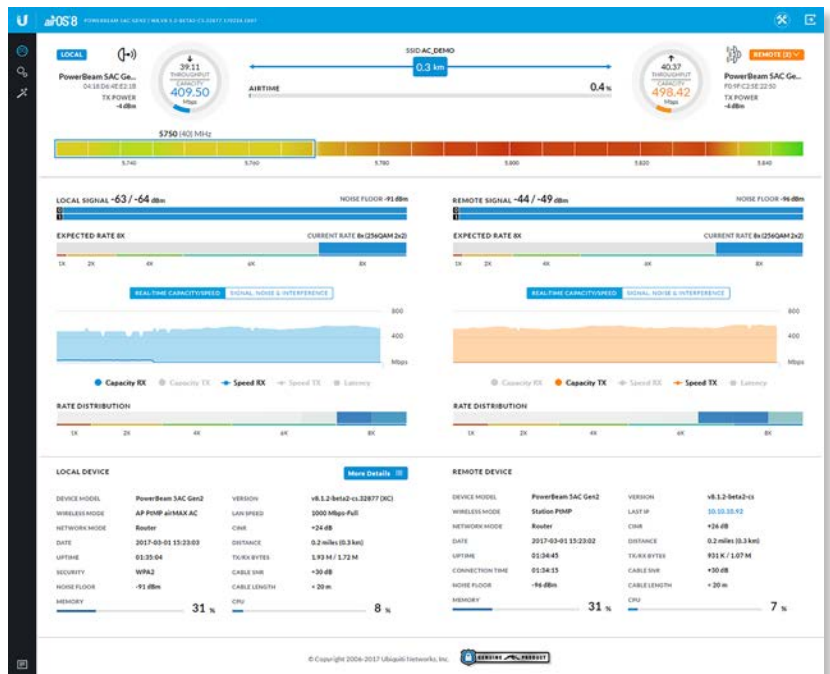


The PowerBeam 5AC Gen 2 used as a CPE device for each client in an airMAX Point-to-MultiPoint (PtMP) network.

## PtP Link



Use a PowerBeam 5AC Gen 2 on each side of a Point-to-Point (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

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.

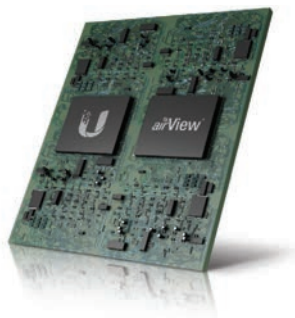
## UNMS App

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

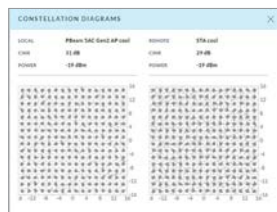
### Accessing airOS via Wi-Fi

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 PowerBeam 5AC Gen 2 and offers various configuration options once you're connected or logged in.

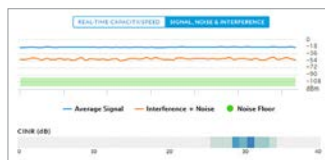
## Multi-Radio Architecture



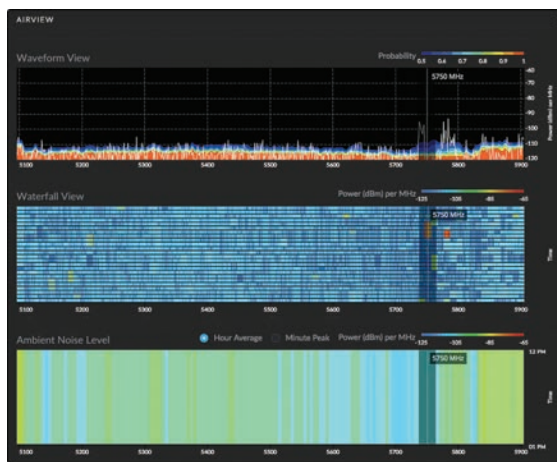
## Constellation Diagrams



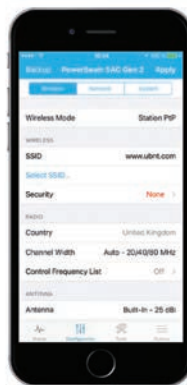
## SNI Diagram and CINR Histogram



## Dedicated Spectral Analysis



## UNMS Configuration Screen



# Technology

## airMAX<sup>®</sup> 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.

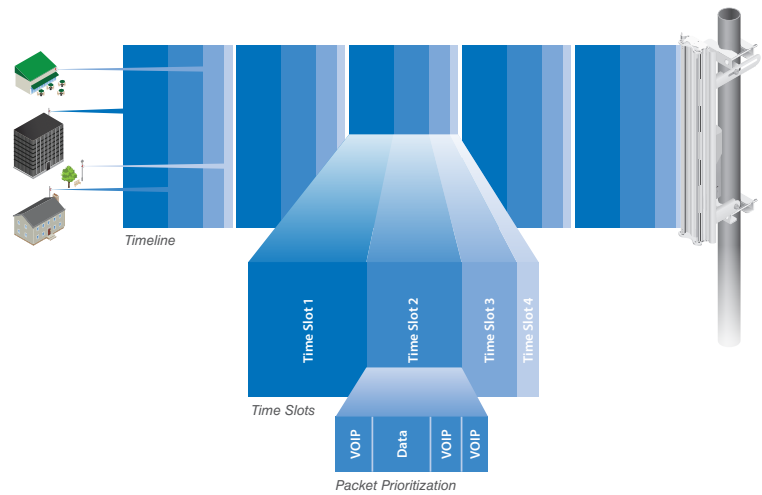
Ubiquiti's airMAX engine with custom IC dramatically improves TDMA latency and network scalability. The custom silicon provides hardware acceleration capabilities to the airMAX scheduler, to support the high data rates and dense modulation used in airMAX ac technology.

### Throughput Breakthrough

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

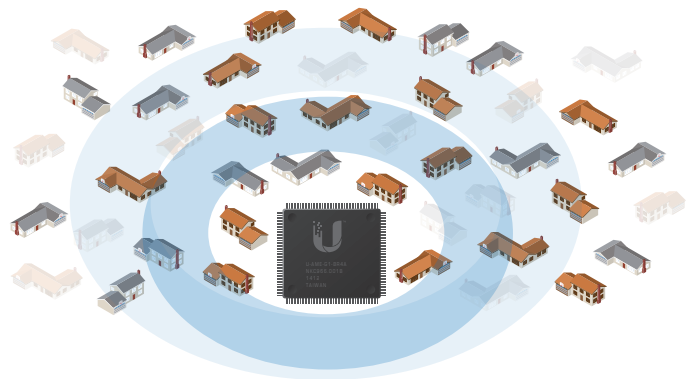
With their use of proprietary airMAX ac technology, airMAX ac products supports up to 450+ Mbps real TCP/IP throughput – up to triple the throughput of standard airMAX products.

## airMAX ac TDMA Technology

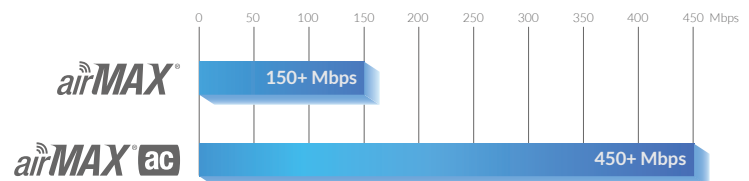


Up to 100 airMAX ac stations can be connected to an airMAX ac Sector; four airMAX ac stations are shown to illustrate the general concept.

## airMAX Network Scalability



## Superior Throughput Performance



# Hardware Overview

The PowerBeam 5AC Gen 2 supports up to 450+ Mbps real TCP/IP throughput and features improved surge protection.

## Innovative Mechanical Design

- **Built-in mechanical tilt** Mounting bracket conveniently offers elevation adjustments:  $\pm 20^\circ$  tilt.
- **Quick assembly** Minimal fasteners simplify installation.
- **Easy removal** The antenna feed can be detached with the push of a button.

## Industrial-Strength Construction

- **Fasteners** GEOMET-coated for improved corrosion resistance when compared with zinc-plated fasteners.
- **Dish and brackets** Made of galvanized steel that is powder-coated for superior corrosion resistance. The hardware also prevents paint from being removed from the metal brackets for improved corrosion resistance.
- **Optional support** In high-wind environments, you can enhance support with additional hardware (not included).

## PBE-5AC-Gen2

The dish reflector design of the PBE-5AC-Gen2 makes it an ideal CPE for deployments requiring maximum performance. A protective radome is available as an optional accessory for the PBE-5AC-Gen2.

### PowerBeam® 400 mm Radome

| Model       | Frequency | PBE-5AC-Gen2 | Dish Reflector |
|-------------|-----------|--------------|----------------|
| PBE-RAD-400 | 5 GHz     | ✓            | 400 mm         |



## PBE-5AC-ISO-Gen2

The PBE-5AC-ISO-Gen2 offers a rear housing with a metal-plated interior, designed to enhance RF shielding. Additionally, an included protective radome shields the PowerBeam 5AC ISO Gen 2 from nature's harshest elements.

### Breakthrough RF Isolation

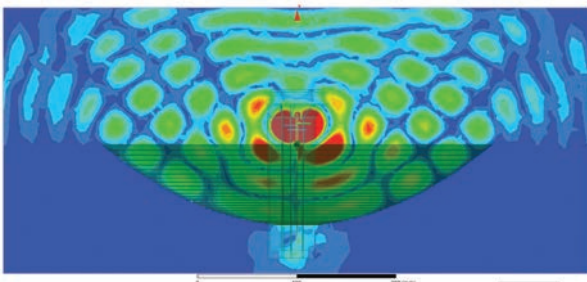
The integrated isolator design spatially filters out interference, so the PBE-5AC-ISO-Gen2 delivers improved noise immunity in co-location deployments.

Compare the two near-field plots below, and note the superior performance of the integrated RF isolator.

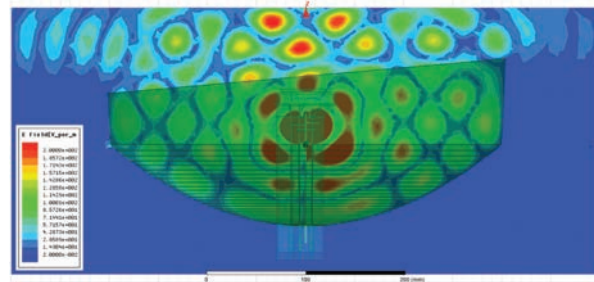
Both near-field plots are displayed in watts and use a linear scale. The strength of the electromagnetic field is color-coded:

- **Red:** Highest strength
- **Green:** Medium strength
- **Indigo:** Lowest strength

Without Integrated RF Isolator



With Integrated RF Isolator



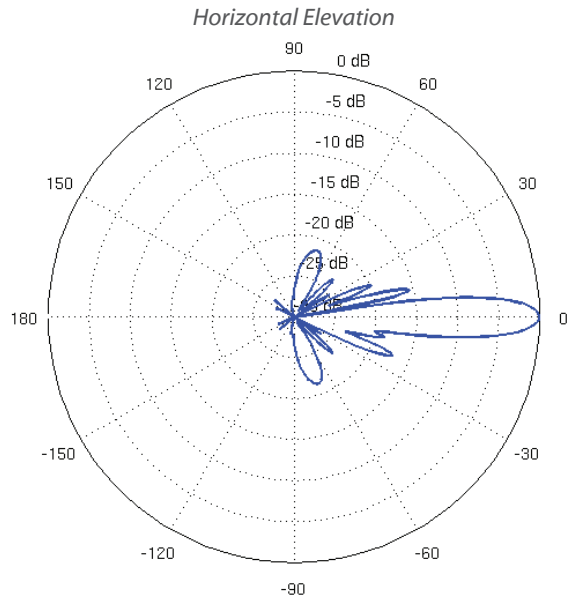
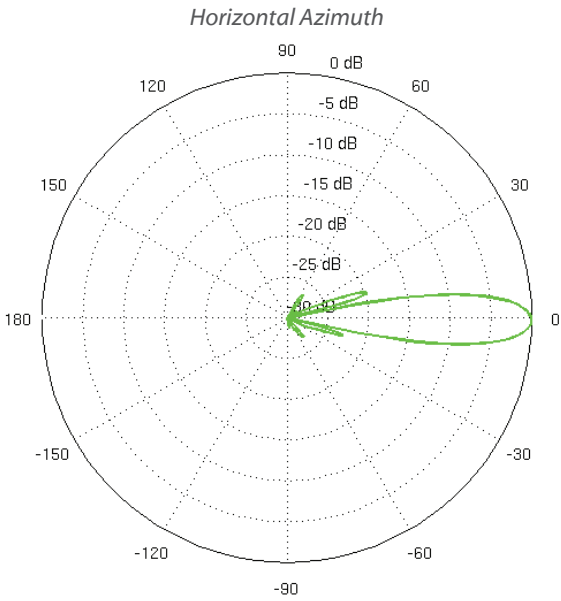
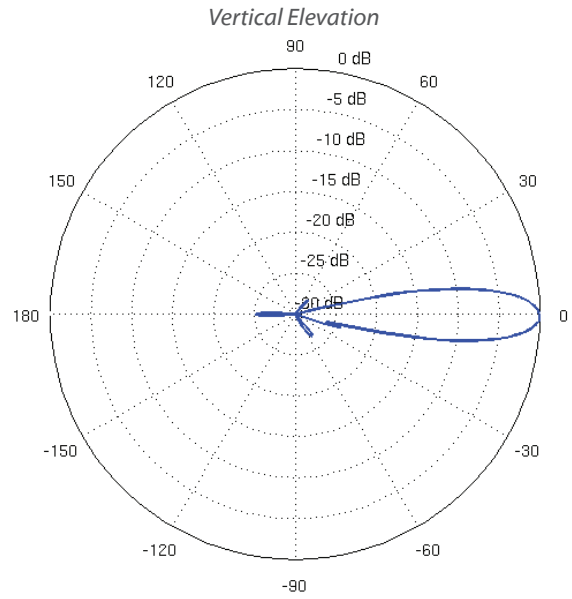
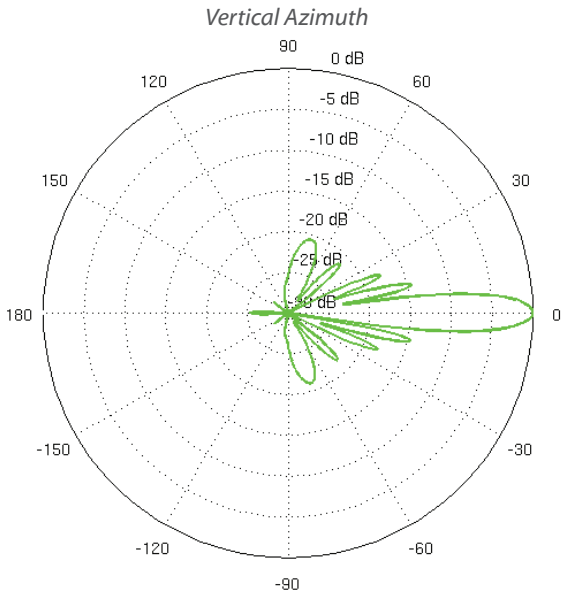
# Specifications

| PBE-5AC-Gen2              |   |                    |
|---------------------------|---|--------------------|
| Dimensions                | 420 x 420 x 230 mm (16.54 x 16.54 x 9.06")                      |                    |
| Weight                    | 2.22 kg (4.89 lbs)  |                    |
| Power Supply              | 24V, 0.5A Gigabit PoE Adapter (Included)                        |                    |
| Max. Power Consumption    | 8.5W  |                    |
| Power Method              | Passive PoE (Pairs 4, 5+; 7, 8 Return)                          |                    |
| Supported Voltage Range   | 20 to 26VDC   |                    |
| Gain                      | 25 dBi  |                    |
| Networking Interface      | (1) 10/100/1000 Ethernet Port                                   |                    |
| Processor Specs           | MIPS 74Kc   |                    |
| Memory                    | 64 MB   |                    |
| LEDs                      | Power, Ethernet, (4) Signal Strength                            |                    |
| Channel Sizes             | PtP Mode  | PtMP Mode          |
|                           | 10/20/30/40/50/60/80 MHz  | 10/20/30/40 MHz    |
| Enclosure Characteristics | Antenna Feed  | Dish Reflector     |
|                           | Outdoor UV Stabilized Plastic                                   | Powder-Coated SPCC |
| Mounting                  | Pole-Mounting Kit (Included)                                    |                    |
| Wind Loading              | 380 N @ 200 km/h (85.4 lbf @ 125 mph)                           |                    |
| Wind Survivability        | 200 km/h (125 mph)  |                    |
| ESD/EMP Protection        | Air: $\pm 24$ kV, Contact: $\pm 24$ kV                          |                    |
| Operating Temperature     | -40 to 70° C (-40 to 158° F)                                    |                    |
| Operating Humidity        | 5 to 95% Noncondensing  |                    |
| 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         |                    |
| Certifications            | CE, FCC, IC   |                    |

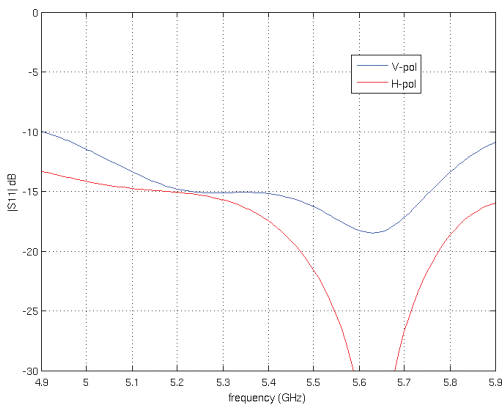
| Operating Frequency (MHz) |                         |                              |                              |                         |
|---------------------------|-------------------------|------------------------------|------------------------------|-------------------------|
| Worldwide 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

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

| PBE-5AC-Gen2 Output Power: 25 dBm |               |         |            |                         |               |              |            |
|-----------------------------------|---------------|---------|------------|-------------------------|---------------|--------------|------------|
| TX Power Specifications           |               |         |            | RX Power Specifications |               |              |            |
| Modulation                        | Data Rate     | Avg. TX | Tolerance  | Modulation              | Data Rate     | Sensitivity  | Tolerance  |
| <b>airMAX ac</b>                  | 1x BPSK (½)   | 25 dBm  | $\pm 2$ dB | <b>airMAX ac</b>        | 1x BPSK (½)   | -96 dBm Min. | $\pm 2$ dB |
|                                   | 2x QPSK (½)   | 25 dBm  | $\pm 2$ dB |                         | 2x QPSK (½)   | -95 dBm      | $\pm 2$ dB |
|                                   | 2x QPSK (¾)   | 25 dBm  | $\pm 2$ dB |                         | 2x QPSK (¾)   | -92 dBm      | $\pm 2$ dB |
|                                   | 4x 16QAM (½)  | 25 dBm  | $\pm 2$ dB |                         | 4x 16QAM (½)  | -90 dBm      | $\pm 2$ dB |
|                                   | 4x 16QAM (¾)  | 25 dBm  | $\pm 2$ dB |                         | 4x 16QAM (¾)  | -86 dBm      | $\pm 2$ dB |
|                                   | 6x 64QAM (½)  | 25 dBm  | $\pm 2$ dB |                         | 6x 64QAM (½)  | -83 dBm      | $\pm 2$ dB |
|                                   | 6x 64QAM (¾)  | 24 dBm  | $\pm 2$ dB |                         | 6x 64QAM (¾)  | -77 dBm      | $\pm 2$ dB |
|                                   | 6x 64QAM (¾)  | 23 dBm  | $\pm 2$ dB |                         | 6x 64QAM (¾)  | -74 dBm      | $\pm 2$ dB |
|                                   | 8x 256QAM (¾) | 21 dBm  | $\pm 2$ dB |                         | 8x 256QAM (¾) | -69 dBm      | $\pm 2$ dB |
|                                   | 8x 256QAM (¾) | 21 dBm  | $\pm 2$ dB |                         | 8x 256QAM (¾) | -65 dBm      | $\pm 2$ dB |



### Return Loss



# Specifications

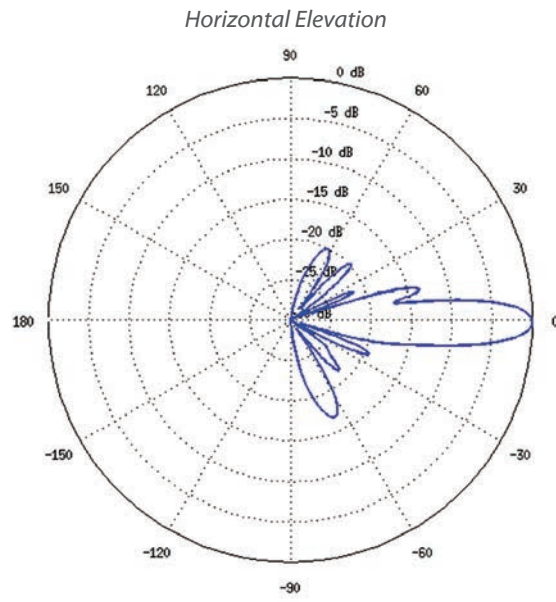
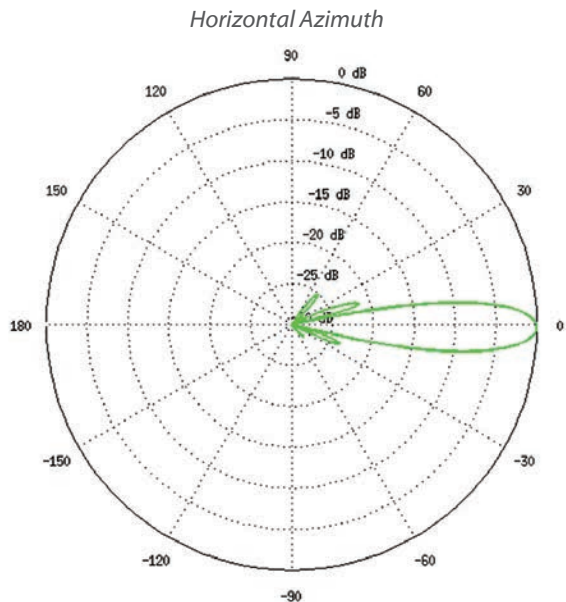
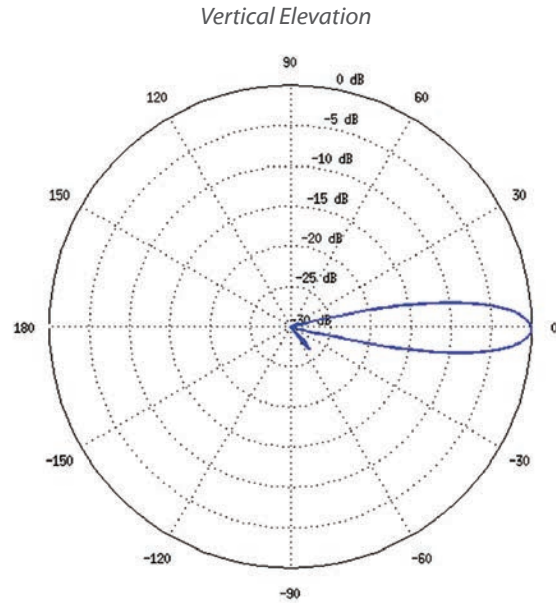
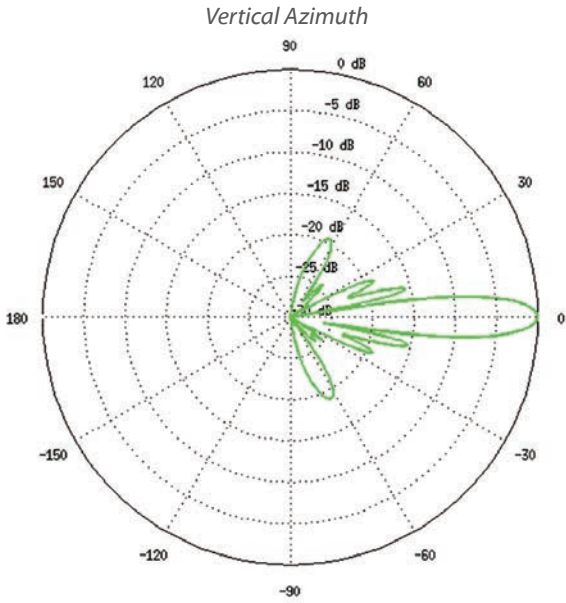
| PBE-5AC-ISO-Gen2          |   |                    |
|---------------------------|---|--------------------|
| Dimensions                | 459 x 459 x 261 mm (18.07 x 18.07 x 10.28")                     |                    |
| Weight (Mount Included)   | 3.22 kg (7.10 lbs)  |                    |
| Power Supply              | 24V, 0.5A Gigabit PoE Adapter (Included)                        |                    |
| Max. Power Consumption    | 8.5W  |                    |
| Power Method              | Passive PoE (Pairs 4, 5+; 7, 8 Return)                          |                    |
| Supported Voltage Range   | 20 to 26VDC   |                    |
| Gain                      | 25 dBi  |                    |
| Networking Interface      | (1) 10/100/1000 Ethernet Port                                   |                    |
| Processor Specs           | MIPS 74Kc   |                    |
| Memory                    | 64 MB   |                    |
| LEDs                      | Power, Ethernet, (4) Signal Strength                            |                    |
| Channel Sizes             | PtP Mode  | PtMP Mode          |
|                           | 10/20/30/40/50/60/80 MHz  | 10/20/30/40 MHz    |
| Enclosure Characteristics | Antenna Feed  | Dish Reflector     |
|                           | Outdoor UV Stabilized Plastic                                   | Powder-Coated SPCC |
| Mounting                  | Pole-Mounting Kit (Included)                                    |                    |
| Wind Loading              | 559 N @ 200 km/h (125.7 lbf @ 125 mph)                          |                    |
| Wind Survivability        | 200 km/h (125 mph)  |                    |
| ESD/EMP Protection        | Air: ± 24 kV, Contact: ± 24 kV                                  |                    |
| Operating Temperature     | -40 to 70° C (-40 to 158° F)                                    |                    |
| Operating Humidity        | 5 to 95% Noncondensing  |                    |
| 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         |                    |
| Certifications            | CE, FCC, IC   |                    |

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

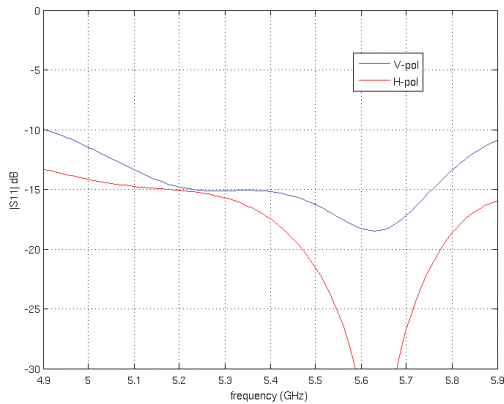
| Management Radio (MHz) |             |
|------------------------|-------------|
| Worldwide              | 2412 - 2472 |
| USA                    | 2412 - 2462 |

| PBE-5AC-ISO-Gen2 Output Power: 24 dBm |               |         |           |                         |               |              |           |
|---------------------------------------|---------------|---------|-----------|-------------------------|---------------|--------------|-----------|
| TX Power Specifications               |               |         |           | RX Power Specifications |               |              |           |
| Modulation                            | Data Rate     | Avg. TX | Tolerance | Modulation              | Data Rate     | Sensitivity  | Tolerance |
| <b>airMAX ac</b>                      | 1x BPSK (½)   | 24 dBm  | ± 2 dB    | <b>airMAX ac</b>        | 1x BPSK (½)   | -96 dBm Min. | ± 2 dB    |
|                                       | 2x QPSK (½)   | 24 dBm  | ± 2 dB    |                         | 2x QPSK (½)   | -95 dBm      | ± 2 dB    |
|                                       | 2x QPSK (¾)   | 24 dBm  | ± 2 dB    |                         | 2x QPSK (¾)   | -92 dBm      | ± 2 dB    |
|                                       | 4x 16QAM (½)  | 24 dBm  | ± 2 dB    |                         | 4x 16QAM (½)  | -90 dBm      | ± 2 dB    |
|                                       | 4x 16QAM (¾)  | 24 dBm  | ± 2 dB    |                         | 4x 16QAM (¾)  | -86 dBm      | ± 2 dB    |
|                                       | 6x 64QAM (⅓)  | 23 dBm  | ± 2 dB    |                         | 6x 64QAM (⅓)  | -83 dBm      | ± 2 dB    |
|                                       | 6x 64QAM (¾)  | 23 dBm  | ± 2 dB    |                         | 6x 64QAM (¾)  | -77 dBm      | ± 2 dB    |
|                                       | 6x 64QAM (⅝)  | 22 dBm  | ± 2 dB    |                         | 6x 64QAM (⅝)  | -74 dBm      | ± 2 dB    |
|                                       | 8x 256QAM (¾) | 20 dBm  | ± 2 dB    |                         | 8x 256QAM (¾) | -69 dBm      | ± 2 dB    |
|                                       | 8x 256QAM (⅝) | 20 dBm  | ± 2 dB    |                         | 8x 256QAM (⅝) | -65 dBm      | ± 2 dB    |





**Return Loss**



Specifications are subject to change. Ubiquiti products are sold with a limited warranty described at: [www.ubnt.com/support/warranty](http://www.ubnt.com/support/warranty)  
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