DATASHEET

PowerBeam™

High-Performance airMAX® Bridge

Models: PBE-M5-620, PBE-M5-400, PBE-M5-300, PBE-M2-400

Uniform Beamwidth Maximizes Noise Immunity

Innovative Mechanical Design

High-Speed Processor for Superior Performance

UBIQUITI® NETWORKS

Overview

Starting with the first-generation NanoBridge®, Ubiquiti Networks pioneered the all-in-one design for an airMAX® product functioning as a CPE (Customer Premises Equipment). Now Ubiquiti Networks launches the latest generation of CPE, the PowerBeam™.

Improved Noise Immunity

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

Providing high performance and innovative mechanical design at a low cost, the PowerBeam is extremely versatile and cost-effective to deploy.

airMAX Technology Included

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. It provides significant performance improvements in latency, throughput, and scalability compared to all other outdoor systems in its class.

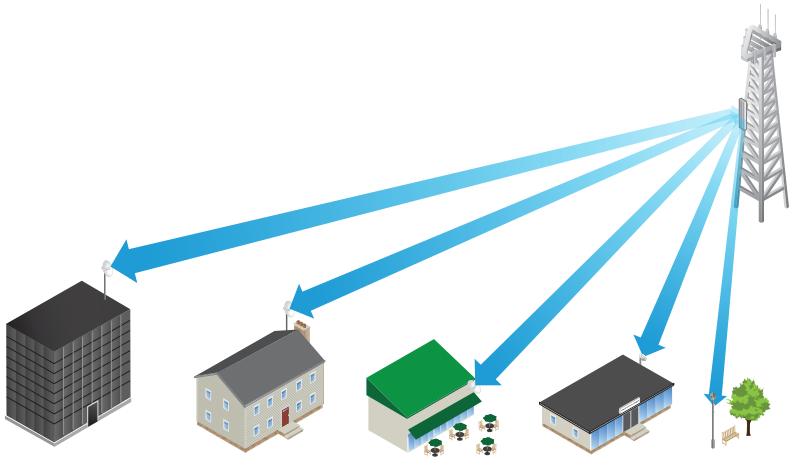
Intelligent QoS Priority is given to voice/video for seamless streaming.

Scalability High capacity and scalability.

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

Application Examples

PtMP Client Links

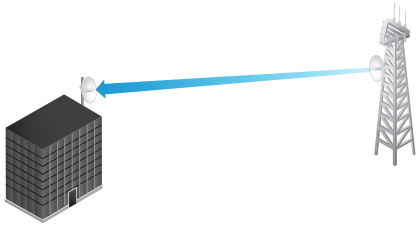


The PowerBeam used as a CPE device for each client in an airMAX PtMP network.

Wireless Client

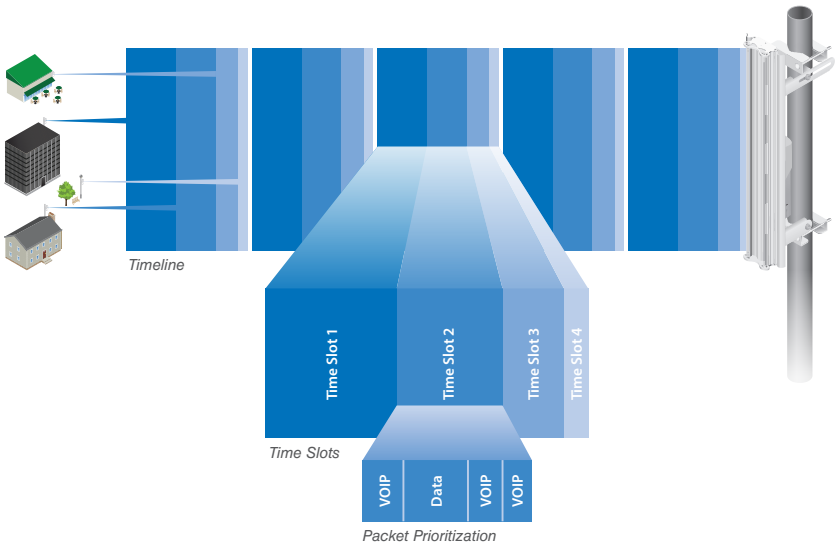
The PowerBeam as a powerful wireless client.

PtP Link



Use a PowerBeam on each side of a PtP link.

airMAX TDMA Technology



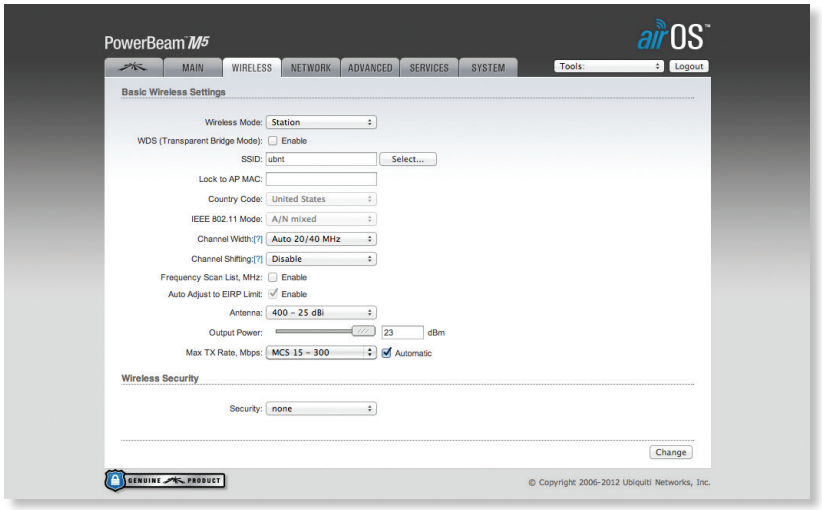
Up to 100 airMAX stations can be connected to an airMAX Sector; four airMAX stations are shown to illustrate the general concept.

Software

airOS®

airOS® is an intuitive, versatile, highly developed Ubiquiti firmware technology. It is exceptionally intuitive and was designed to require no training to operate. Behind the user interface is a powerful firmware architecture, which enables high-performance, outdoor multi-point networking.

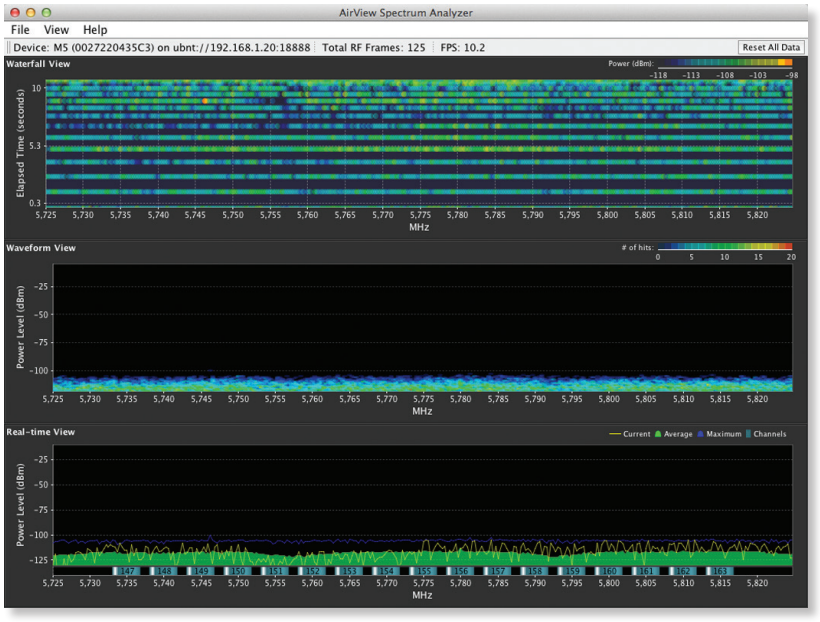
- Protocol Support
- Ubiquiti Channelization
- Spectral Width Adjustment
- ACK Auto-Timing
- AAP Technology
- Multi-Language Support



airView®

Integrated on all Ubiquiti M products, airView® provides advanced spectrum analyzer functionality: waterfall, waveform, and real-time spectral views allow operators to identify noise signatures and plan their networks to minimize noise interference.

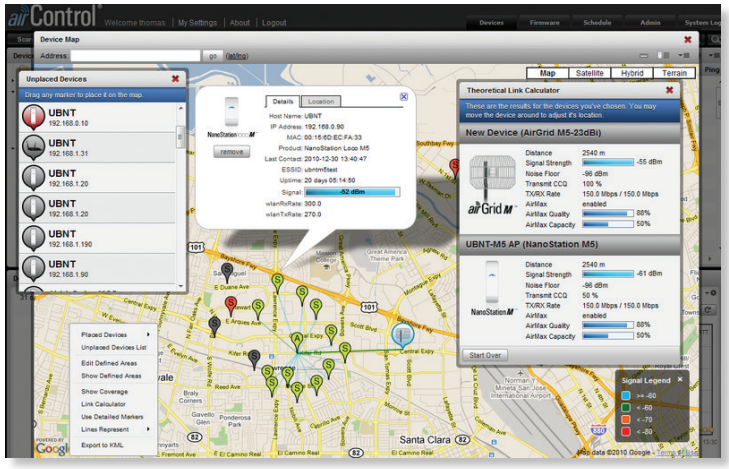
- **Waterfall** Aggregate energy over time for each frequency.
- **Waveform** Aggregate energy collected.
- **Real-time** Energy is shown in real time as a function of frequency.
- **Recording** Automate airView to record and report results.



airControl®

airControl® is a powerful and intuitive, web-based server network management application, which allows operators to centrally manage entire networks of Ubiquiti devices.

- Network Map
- Monitor Device Status
- Mass Firmware Upgrade
- Web UI Access
- Manage Groups of Devices
- Task Scheduling



Hardware Overview

Innovative Mechanical Design

- **Built-in mechanical tilt** The mounting bracket conveniently offers 20° of uptilt and up to 20° of downtilt.
- **Quick assembly** The number of fasteners was reduced to simplify assembly. Tools are required only when the technician mounts the PowerBeam on the pole.
- **Easy removal** The antenna feed can be detached with the push of a button.

Corrosion Resistance

- **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 redesigned pole bracket for the 400 mm dish and fender washers for the 300 mm dish prevent paint from being removed from the metal brackets for improved corrosion resistance.

Models

PowerBeam™ M5

Model	Frequency	Gain	Dish Reflector
PBE-M5-620	5 GHz	29 dBi	620 mm

The PBE-M5-620 supports up to 150+ Mbps real TCP/IP throughput.

PowerBeam™ M5

Model	Frequency	Gain	Dish Reflector
PBE-M5-400	5 GHz	25 dBi	400 mm

The PBE-M5-400 supports up to 150+ Mbps real TCP/IP throughput. Its Antenna Feed has a thin gray ring around the center of the cap to differentiate it from the PBE-M5-300 Antenna Feed.

Models

PowerBeam™ M5

Model	Frequency	Gain	Dish Reflector
PBE-M5-300	5 GHz	22 dBi	300 mm

The PBE-M5-300 supports up to 150+ Mbps real TCP/IP throughput.

PowerBeam™ M2

Model	Frequency	Gain	Dish Reflector
PBE-M2-400	2.4 GHz	18 dBi	400 mm

The PBE-M2-400 supports up to 150+ Mbps real TCP/IP throughput.

PowerBeam™ M 400 mm Radome

Model	PBE-M2-400	PBE-M5-400	PBE-M5-300
PBE-RAD-400	✓	✓	N/A

A protective radome is available as an optional accessory for the PBE-M2-400 and PBE-M5-400.

PowerBeam™ Accessories

IsoBeam™

Model: ISO-BEAM-620

The IsoBeam™ is an isolator radome that is available as an optional accessory for the PBE-M5-620 and other models:

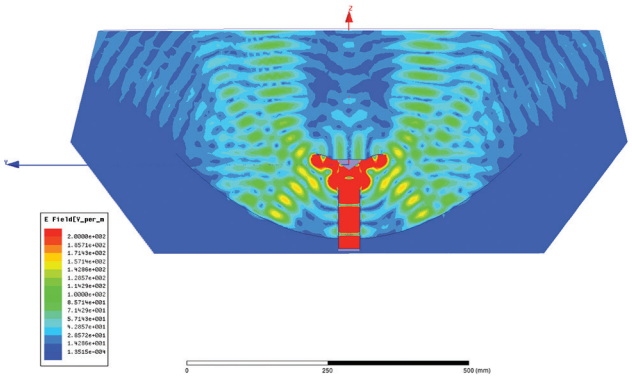
- airFiber® AF-5G30-S45
- PowerBeam PBE-5AC-620
- RocketDish™ RD-5G30-LW

The innovative RF-choke perimeter of the IsoBeam delivers superior noise immunity in co-location deployments; its perimeter corrugation provides enhanced RF shielding. Compare the two near-field plots below, and note the breakthrough isolation performance of the IsoBeam.

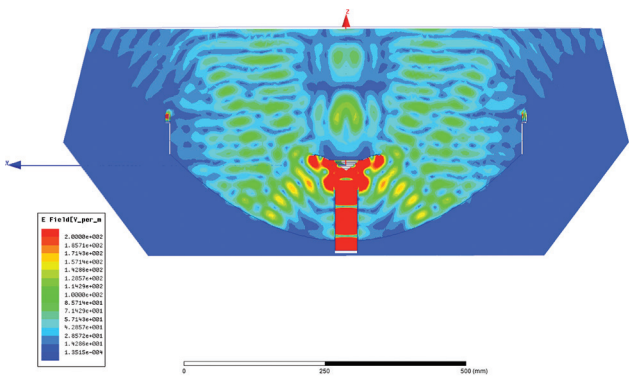
Both near-field plots are displayed in watts and use a linear scale. The strength of the electromagnetic field is color-coded:

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

Without IsoBeam

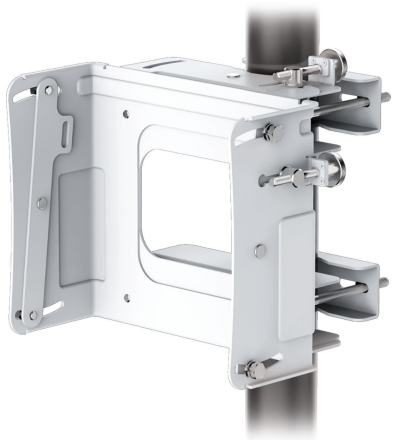


With IsoBeam



Precision Alignment Kit

Model: PAK-620



The Precision Alignment Kit is available as an optional accessory for the PBE-M5-620. It features 15° of azimuth adjustment and 15° of elevation adjustment to enable extremely accurate aiming for optimal PtP link performance.

The Precision Alignment Kit is also compatible with other dish antennas:

- airFiber AF-5G30-S45
- PowerBeam PBE-5AC-620
- RocketDish RD-5G30-LW

Specifications

PBE-M5-620 System and Regulatory/Compliance	
Processor Specs	Atheros MIPS 74Kc, 560 MHz
Memory	64 MB DDR2, 8 MB Flash
Networking Interface	(1) 10/100/1000 Ethernet Port
Wireless Approvals	FCC, IC, CE
RoHS Compliance	Yes

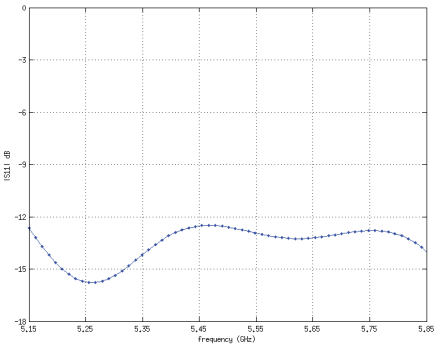
PBE-M5-620 Physical/Electrical/Environmental	
Dimensions	620 x 620 x 386 mm (24.41 x 24.41 x 15.2")
Weight	6.4 kg (14.11 lb)
Power Supply	24V, 0.5A Gigabit PoE
Power Method	Passive PoE (Pairs 4, 5+; 7, 8 Return)
Max. Power Consumption	8.5W
Gain	29 dBi
Operating Frequency Worldwide USA	 5170 - 5875 MHz 5725 - 5850 MHz
Wind Loading	872 N @200 km/h (196 lbf @125 mph)
Wind Survivability	200 km/h (125 mph)
LEDs	(1) Power, (1) LAN, (4) WLAN
Signal Strength LEDs	Software-Adjustable to Correspond to Custom RSSI Levels
Channel Sizes	5/8/10/20/30/40 MHz
Polarization	Dual Linear
Enclosure	Outdoor UV Stabilized Plastic
Mounting	Pole-Mount Kit Included
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
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

Specifications

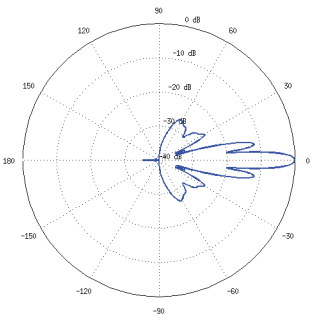
PBE-M5-620 Output Power: 24 dBm							
TX Power Specifications				**RX Power Specifications**			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
802.11a	6 - 24 Mbps	24 dBm	± 2 dB	**802.11a**	6 - 24 Mbps	-94 dBm Min.	± 2 dB
	36 Mbps	24 dBm	± 2 dB		36 Mbps	-80 dBm	± 2 dB
	48 Mbps	23 dBm	± 2 dB		48 Mbps	-77 dBm	± 2 dB
	54 Mbps	22 dBm	± 2 dB		54 Mbps	-75 dBm	± 2 dB
802.11n/airMAX	MCS0	24 dBm	± 2 dB	**802.11n/airMAX**	MCS0	-96 dBm	± 2 dB
	MCS1	24 dBm	± 2 dB		MCS1	-95 dBm	± 2 dB
	MCS2	23 dBm	± 2 dB		MCS2	-92 dBm	± 2 dB
	MCS3	23 dBm	± 2 dB		MCS3	-90 dBm	± 2 dB
	MCS4	22 dBm	± 2 dB		MCS4	-86 dBm	± 2 dB
	MCS5	21 dBm	± 2 dB		MCS5	-83 dBm	± 2 dB
	MCS6	20 dBm	± 2 dB		MCS6	-77 dBm	± 2 dB
	MCS7	20 dBm	± 2 dB		MCS7	-74 dBm	± 2 dB
	MCS8	24 dBm	± 2 dB		MCS8	-96 dBm	± 2 dB
	MCS9	24 dBm	± 2 dB		MCS9	-95 dBm	± 2 dB
	MCS10	23 dBm	± 2 dB		MCS10	-92 dBm	± 2 dB
	MCS11	23 dBm	± 2 dB		MCS11	-90 dBm	± 2 dB
	MCS12	22 dBm	± 2 dB		MCS12	-86 dBm	± 2 dB
	MCS13	21 dBm	± 2 dB		MCS13	-83 dBm	± 2 dB
	MCS14	20 dBm	± 2 dB		MCS14	-77 dBm	± 2 dB
	MCS15	20 dBm	± 2 dB		MCS15	-74 dBm	± 2 dB

PBE-M5-620 Antenna Information	
Gain	29 dBi
Max. VSWR	1.6:1
Built-In Mechanical Downtilt	+15° to -15°

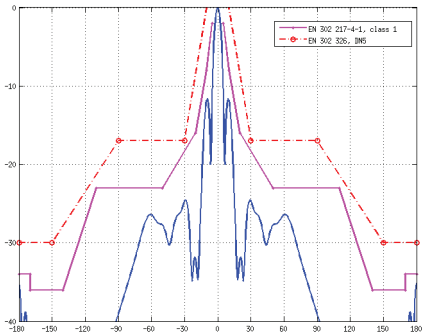
Return Loss



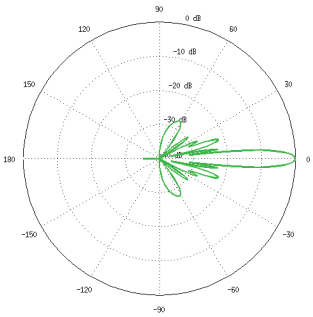
E-Plane



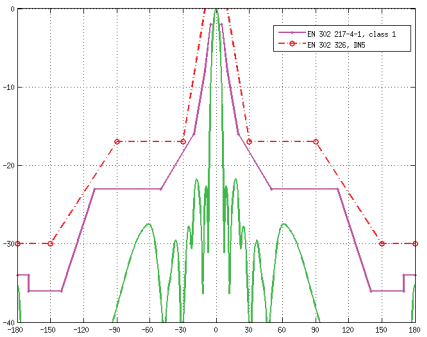
E-Plane Specs



H-Plane



H-Plane Specs



Specifications

PBE-M5-400 System and Regulatory/Compliance	
Processor Specs	Atheros MIPS 74Kc, 560 MHz
Memory	64 MB DDR2, 8 MB Flash
Networking Interface	(1) 10/100/1000 Ethernet Port
Wireless Approvals	FCC, IC, CE
RoHS Compliance	Yes

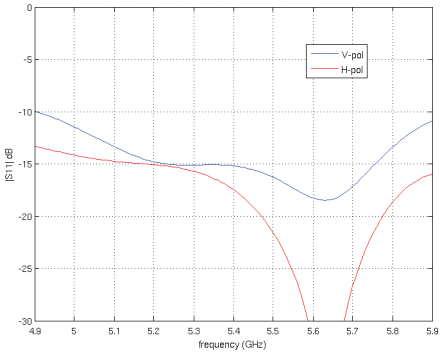
PBE-M5-400 Physical/Electrical/Environmental	
Dimensions	420 x 420 x 275 mm (16.54 x 16.54 x 10.83")
Weight	1.753 kg (3.87 lb)
Power Supply	24V, 0.5A Gigabit PoE
Power Method	Passive PoE (Pairs 4, 5+; 7, 8 Return)
Max. Power Consumption	8W
Gain	25 dBi
Operating Frequency Worldwide USA	 5170 - 5875 MHz 5725 - 5850 MHz
Wind Loading	342.5 N @ 200 km/h (77 lbf @ 125 mph)
Wind Survivability	200 km/h (125 mph)
LEDs	(1) Power, (1) LAN, (4) WLAN
Signal Strength LEDs	Software-Adjustable to Correspond to Custom RSSI Levels
Channel Sizes	5/8/10/20/30/40 MHz
Polarization	Dual Linear
Enclosure	Outdoor UV Stabilized Plastic
Mounting	Pole-Mount Kit Included
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
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

Specifications

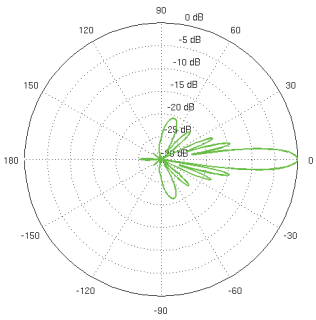
PBE-M5-400 Output Power: 26 dBm							
TX Power Specifications				**RX Power Specifications**			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
802.11a	6 - 24 Mbps	26 dBm	± 2 dB	**802.11a**	6 - 24 Mbps	-94 dBm Min.	± 2 dB
	36 Mbps	25 dBm	± 2 dB		36 Mbps	-80 dBm	± 2 dB
	48 Mbps	24 dBm	± 2 dB		48 Mbps	-77 dBm	± 2 dB
	54 Mbps	23 dBm	± 2 dB		54 Mbps	-75 dBm	± 2 dB
802.11n/airMAX	MCS0	26 dBm	± 2 dB	**802.11n/airMAX**	MCS0	-96 dBm	± 2 dB
	MCS1	25 dBm	± 2 dB		MCS1	-95 dBm	± 2 dB
	MCS2	25 dBm	± 2 dB		MCS2	-92 dBm	± 2 dB
	MCS3	25 dBm	± 2 dB		MCS3	-90 dBm	± 2 dB
	MCS4	24 dBm	± 2 dB		MCS4	-86 dBm	± 2 dB
	MCS5	23 dBm	± 2 dB		MCS5	-83 dBm	± 2 dB
	MCS6	23 dBm	± 2 dB		MCS6	-77 dBm	± 2 dB
	MCS7	23 dBm	± 2 dB		MCS7	-74 dBm	± 2 dB
	MCS8	26 dBm	± 2 dB		MCS8	-95 dBm	± 2 dB
	MCS9	25 dBm	± 2 dB		MCS9	-93 dBm	± 2 dB
	MCS10	25 dBm	± 2 dB		MCS10	-90 dBm	± 2 dB
	MCS11	25 dBm	± 2 dB		MCS11	-87 dBm	± 2 dB
	MCS12	24 dBm	± 2 dB		MCS12	-84 dBm	± 2 dB
	MCS13	23 dBm	± 2 dB		MCS13	-79 dBm	± 2 dB
	MCS14	23 dBm	± 2 dB		MCS14	-78 dBm	± 2 dB
	MCS15	23 dBm	± 2 dB		MCS15	-75 dBm	± 2 dB

PBE-M5-400 Antenna Information	
Gain	25 dBi
Max. VSWR	1.5:1
Built-In Mechanical Downtilt	+20° to -10°

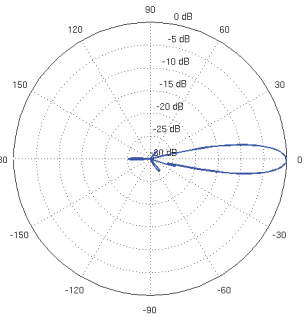
Return Loss



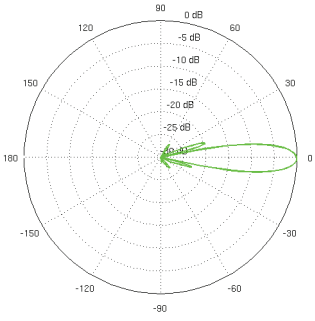
Vertical Azimuth



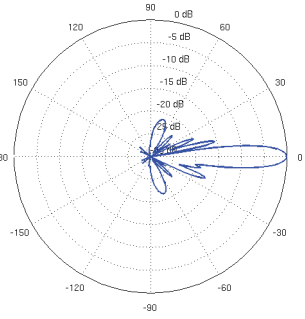
Vertical Elevation



Horizontal Azimuth



Horizontal Elevation



Specifications

PBE-M5-300 System and Regulatory/Compliance	
Processor Specs	Atheros MIPS 74Kc, 560 MHz
Memory	64 MB DDR2, 8 MB Flash
Networking Interface	(1) 10/100 Ethernet Port
Wireless Approvals	FCC, IC, CE
RoHS Compliance	Yes

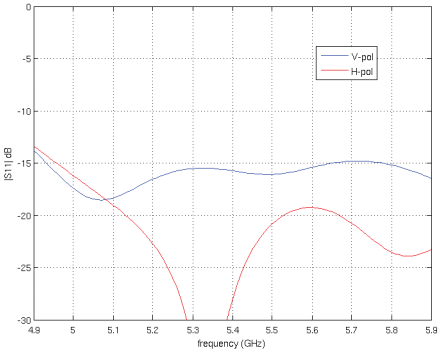
PBE-M5-300 Physical/Electrical/Environmental	
Dimensions	325 x 325 x 256 mm (12.80 x 12.80 x 10.08")
Weight	1.203 kg (2.65 lb)
Power Supply	24V, 0.5A PoE
Power Method	Passive PoE (Pairs 4, 5+; 7, 8 Return)
Max. Power Consumption	6W
Gain	22 dBi
Operating Frequency Worldwide USA	 5170 - 5875 MHz 5725 - 5850 MHz
Wind Loading	200.2 N @ 200 km/h (45 lbf @ 125 mph)
Wind Survivability	200 km/h (125 mph)
LEDs	(1) Power, (1) LAN, (4) WLAN
Signal Strength LEDs	Software-Adjustable to Correspond to Custom RSSI Levels
Channel Sizes	5/8/10/20/30/40 MHz
Polarization	Dual Linear
Enclosure	Outdoor UV Stabilized Plastic
Mounting	Pole-Mount Kit Included
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
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

Specifications

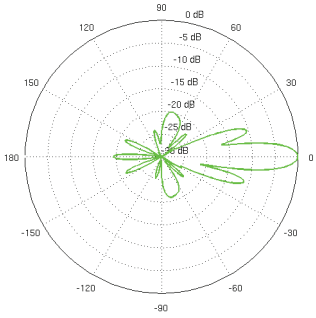
PBE-M5-300 Output Power: 26 dBm							
TX Power Specifications				**RX Power Specifications**			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
802.11a	6 - 24 Mbps	26 dBm	± 2 dB	**802.11a**	6 - 24 Mbps	-94 dBm Min.	± 2 dB
	36 Mbps	25 dBm	± 2 dB		36 Mbps	-80 dBm	± 2 dB
	48 Mbps	24 dBm	± 2 dB		48 Mbps	-77 dBm	± 2 dB
	54 Mbps	23 dBm	± 2 dB		54 Mbps	-75 dBm	± 2 dB
802.11n/airMAX	MCS0	26 dBm	± 2 dB	**802.11n/airMAX**	MCS0	-96 dBm	± 2 dB
	MCS1	25 dBm	± 2 dB		MCS1	-95 dBm	± 2 dB
	MCS2	25 dBm	± 2 dB		MCS2	-92 dBm	± 2 dB
	MCS3	25 dBm	± 2 dB		MCS3	-90 dBm	± 2 dB
	MCS4	24 dBm	± 2 dB		MCS4	-86 dBm	± 2 dB
	MCS5	23 dBm	± 2 dB		MCS5	-83 dBm	± 2 dB
	MCS6	23 dBm	± 2 dB		MCS6	-77 dBm	± 2 dB
	MCS7	23 dBm	± 2 dB		MCS7	-74 dBm	± 2 dB
	MCS8	26 dBm	± 2 dB		MCS8	-95 dBm	± 2 dB
	MCS9	25 dBm	± 2 dB		MCS9	-93 dBm	± 2 dB
	MCS10	25 dBm	± 2 dB		MCS10	-90 dBm	± 2 dB
	MCS11	25 dBm	± 2 dB		MCS11	-87 dBm	± 2 dB
	MCS12	24 dBm	± 2 dB		MCS12	-84 dBm	± 2 dB
	MCS13	23 dBm	± 2 dB		MCS13	-79 dBm	± 2 dB
	MCS14	23 dBm	± 2 dB		MCS14	-78 dBm	± 2 dB
	MCS15	23 dBm	± 2 dB		MCS15	-75 dBm	± 2 dB

PBE-M5-300 Antenna Information	
Gain	22 dBi
Max. VSWR	1.5:1
Built-In Mechanical Downtilt	+20°

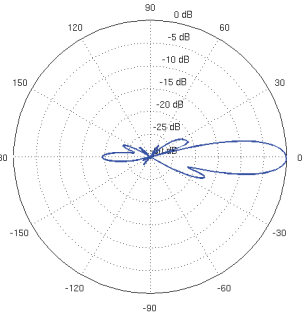
Return Loss



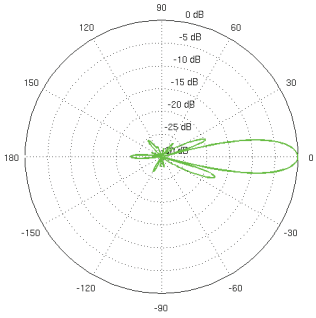
Vertical Azimuth



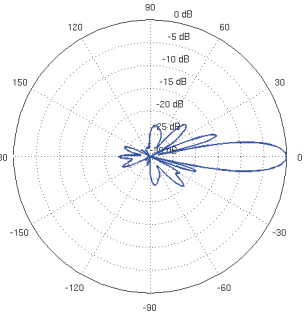
Vertical Elevation



Horizontal Azimuth



Horizontal Elevation



Specifications

PBE-M2-400 System and Regulatory/Compliance	
Processor Specs	Atheros MIPS 74Kc, 560 MHz
Memory	64 MB DDR2, 8 MB Flash
Networking Interface	(1) 10/100 Ethernet Port
Wireless Approvals	FCC, IC, CE
RoHS Compliance	Yes

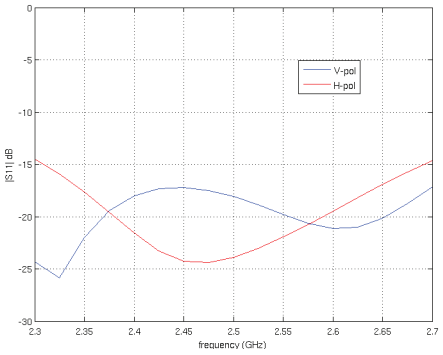
PBE-M2-400 Physical/Electrical/Environmental	
Dimensions	420 x 420 x 289 mm (16.54 x 16.54 x 11.38")
Weight	1.795 kg (3.96 lb)
Power Supply	24V, 0.5A PoE
Power Method	Passive PoE (Pairs 4, 5+; 7, 8 Return)
Max. Power Consumption	6 W
Gain	18 dBi
Operating Frequency	2405 - 2475 MHz
Wind Loading	342.5 N @ 200 km/h (77 lbf @ 125 mph)
Wind Survivability	200 km/h (125 mph)
LEDs	(1) Power, (1) LAN, (4) WLAN
Signal Strength LEDs	Software-Adjustable to Correspond to Custom RSSI Levels
Channel Sizes	5/8/10/20/30/40 MHz
Polarization	Dual Linear
Enclosure	Outdoor UV Stabilized Plastic
Mounting	Pole-Mount Kit Included
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
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

Specifications

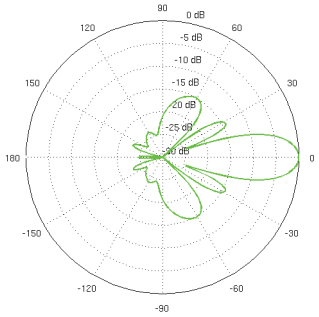
PBE-M2-400 Output Power: 28 dBm							
TX Power Specifications				**RX Power Specifications**			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
802.11g	1 - 24 Mbps	28 dBm	± 2 dB	802.11g	1 - 24 Mbps	-97 dBm Min.	± 2 dB
	36 Mbps	26 dBm	± 2 dB		36 Mbps	-80 dBm	± 2 dB
	48 Mbps	25 dBm	± 2 dB		48 Mbps	-77 dBm	± 2 dB
	54 Mbps	24 dBm	± 2 dB		54 Mbps	-75 dBm	± 2 dB
802.11n/airMAX	MCS0	28 dBm	± 2 dB	802.11n/airMAX	MCS0	-96 dBm	± 2 dB
	MCS1	28 dBm	± 2 dB		MCS1	-95 dBm	± 2 dB
	MCS2	28 dBm	± 2 dB		MCS2	-92 dBm	± 2 dB
	MCS3	28 dBm	± 2 dB		MCS3	-90 dBm	± 2 dB
	MCS4	27 dBm	± 2 dB		MCS4	-86 dBm	± 2 dB
	MCS5	25 dBm	± 2 dB		MCS5	-83 dBm	± 2 dB
	MCS6	23 dBm	± 2 dB		MCS6	-77 dBm	± 2 dB
	MCS7	22 dBm	± 2 dB		MCS7	-74 dBm	± 2 dB
	MCS8	28 dBm	± 2 dB		MCS8	-95 dBm	± 2 dB
	MCS9	28 dBm	± 2 dB		MCS9	-93 dBm	± 2 dB
	MCS10	28 dBm	± 2 dB		MCS10	-90 dBm	± 2 dB
	MCS11	28 dBm	± 2 dB		MCS11	-87 dBm	± 2 dB
	MCS12	27 dBm	± 2 dB		MCS12	-84 dBm	± 2 dB
	MCS13	25 dBm	± 2 dB		MCS13	-79 dBm	± 2 dB
	MCS14	23 dBm	± 2 dB		MCS14	-78 dBm	± 2 dB
	MCS15	22 dBm	± 2 dB		MCS15	-75 dBm	± 2 dB

PBE-M2-400 Antenna Information	
Gain	18 dBi
Max. VSWR	1.5:1
Built-In Mechanical Downtilt	+20° to -10°

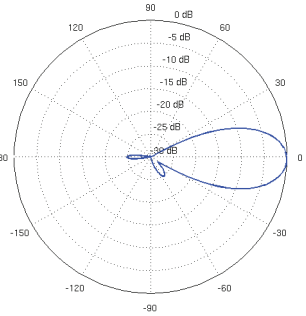
Return Loss



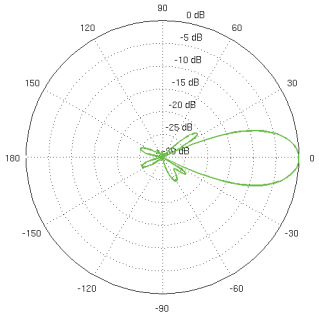
Vertical Azimuth



Vertical Elevation



Horizontal Azimuth



Horizontal Elevation