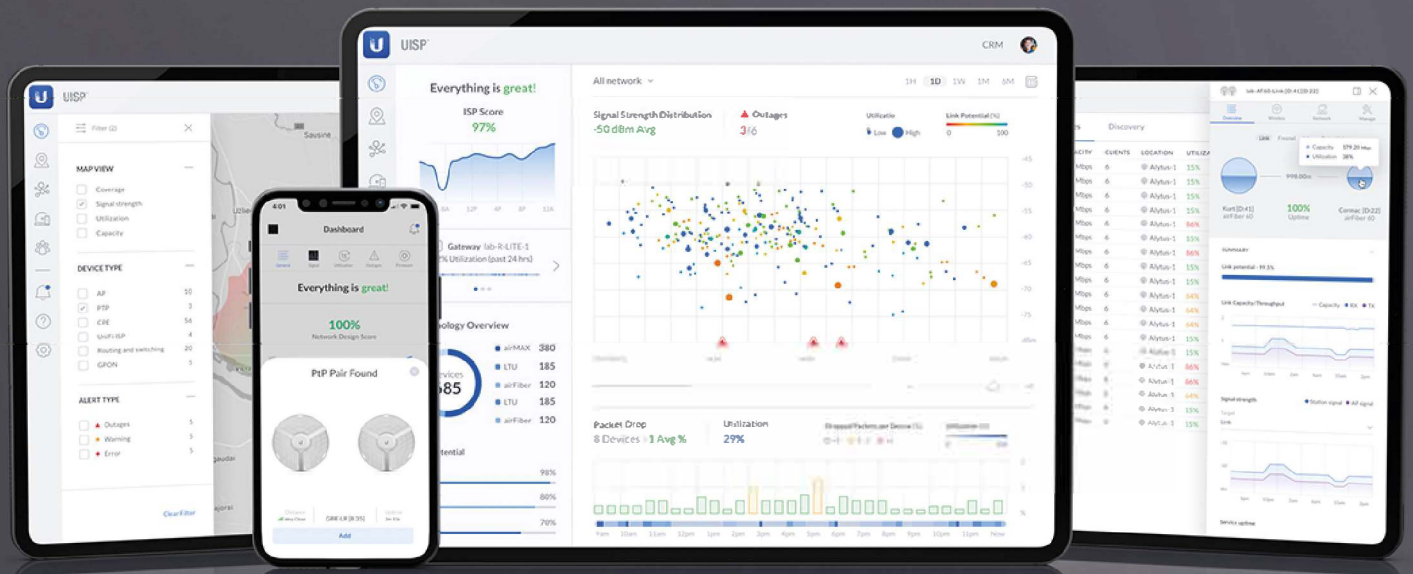
GigaBeam™

Datasheet
GBE

UISP



GigaBeam

The GigaBeam™ is an airMAX® 60 GHz radio designed for low-interference and high-throughput connectivity of up to 1+ Gbps. For the 60 GHz link, the GigaBeam supports full bandwidth use of 2.16 GHz and includes a 5 GHz radio for failover. The dedicated management radio allows easy setup via Wi-Fi.

Mechanical

Dimensions	Ø140 x 44 mm (Ø5.5 x 1.7")
Weight	376 g (13.3 oz)
Enclosure Characteristics	UV Resistant Polycarbonate

Hardware

Processor	Quad-Core ARM Cortex A7
Memory	256 MB DDR3
Networking Interface	10/100/1000 Mbps Ethernet RJ45
RF Connections	Internal
LEDs	Power/Ethernet/5G/60G
Max. Power Consumption	11W
Power Method	Passive PoE (Pairs 4, 5+; 7, 8-)
Power Supply	24VDC, 0.5A Gigabit PoE Adapter
Supported Voltage Range	24V ±10% (22 - 26VDC)
ESD/EMP Protection	Air/Contact: ± 24kV
Operating Temperature	-40 to 60° C (-40 to 140° F)
Operating Humidity	5 - 95% Noncondensing
Certifications	FCC, IC, CE

Software

OS	airOS®
Operating Modes	PtP
Ubiquiti Specific Features	Integrated 60 GHz and 5 GHz Radios, Discovery Protocol
Security	WPA2 AES Only
Dashboard	Yes
Wireless Settings	Yes
Network Settings	Yes
System	Yes
Services	UNMS, Ping Watchdog, Web Server, SSH Server, NTP Client, System Log, Device Discovery
Tools	Antenna Alignment Tool, Discovery Utility, Traceroute, Speed Test
Minimum Software Requirements	Any Modern Web Browser

Radio Sensitivity airMAX AC

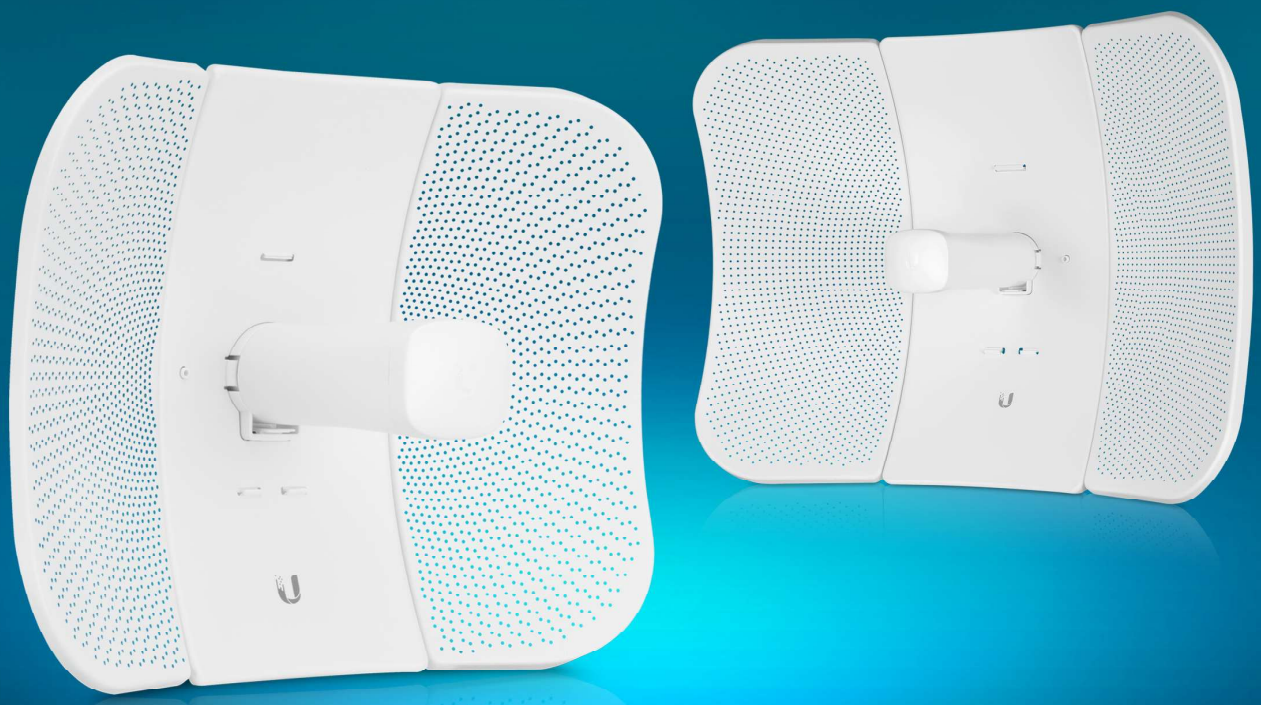
5 GHz TX Specifications

Data Rate	Avg Power (dBm)	Tolerance (dB)
1x BPSK (1/2)	25	±2
2x QPSK (1/2)	25	±2
2x QPSK (3/4)	25	±2
4x 16QAM (1/2)	25	±2
4x 16QAM (3/4)	25	±2
6x 64QAM (2/3)	24	±2
6x 64QAM (3/4)	22	±2
6x 64QAM (5/6)	22	±2
8x 256QAM (3/4)	21	±2
8x 256QAM (5/6)	21	±2

5 GHz RX Specifications

Data Rate	Avg Power (dBm)	Tolerance (dB)
1x BPSK (1/2)	-95	±2
2x QPSK (1/2)	-95	±2
2x QPSK (3/4)	-93	±2
4x 16QAM (1/2)	-90	±2
4x 16QAM (3/4)	-86	±2
6x 64QAM (2/3)	-83	±2
6x 64QAM (3/4)	-77	±2
6x 64QAM (5/6)	-74	±2
8x 256QAM (3/4)	-69	±2
8x 256QAM (5/6)	-66	±2

DATASHEET



LiteBeam® AC GEN2

airMAX® ac CPE with Dedicated Management Radio

Model: LBE-5AC-Gen2, LBE-5AC-LR

Lightweight, Low-Cost Solution

Full Adjustment Flexibility

Quick Assembly and Installation

UBIQUITI® NETWORKS

LiteBeam AC GEN2 | DATASHEET

Overview

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

Improved Noise Immunity

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

Innovative 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 mechanical design, the LiteBeam 5AC Gen 2 is versatile and cost-effective to deploy.

Software

airOS®8

airOS® v8 is the revolutionary operating system for Ubiquiti® airMAX ac products.

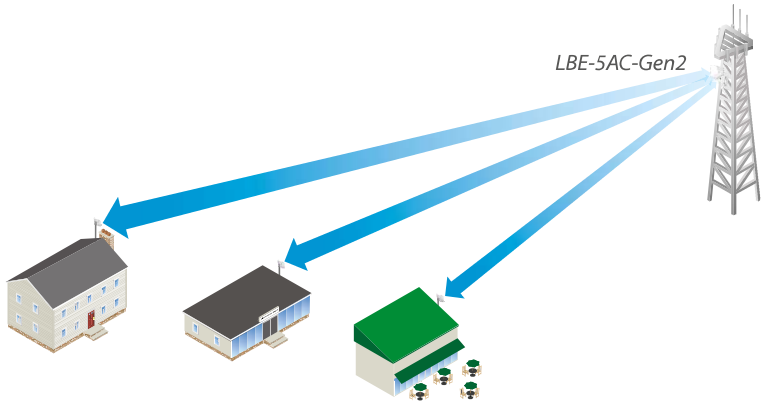
Powerful Wireless Features

- 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

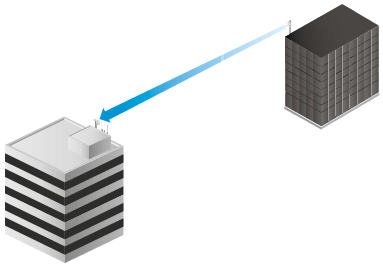
Usability Enhancements

- 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

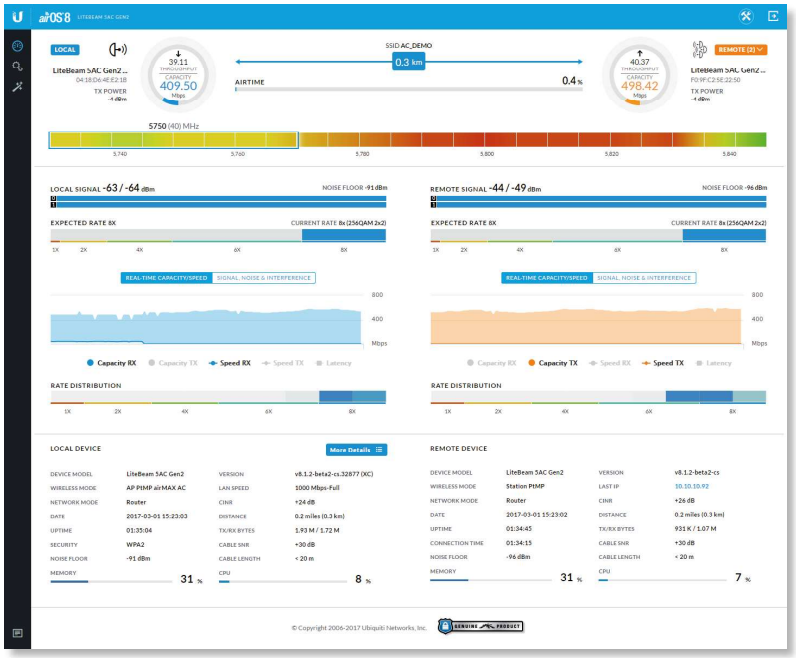
Application Examples



LiteBeam as a cost-effective WISP deployment in an airMAX ac Point-to-MultiPoint network.



A LiteBeam on each side of a Point-to-Point link.



UNMS App

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

Accessing airOS via Wi-Fi

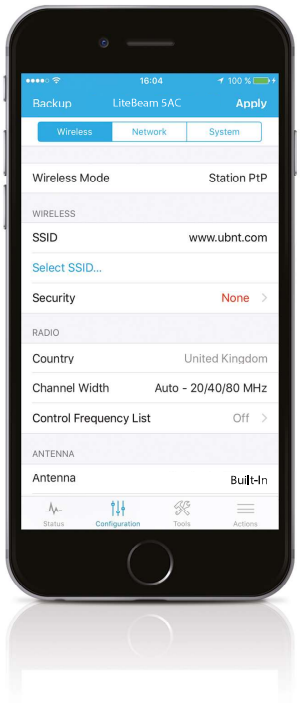
The UNMS™ app provides instant accessibility to the airOS configuration interface and can be downloaded from the App Store (iOS) or Google Play™ (Android). UNMS allows you to set up, configure, and manage the LiteBeam 5AC Gen 2. It offers the following options once you're connected or logged in to the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

Status Check link status information or the basic configuration settings of the LiteBeam 5AC Gen 2.

Configuration Change or update the existing configuration of the LiteBeam 5AC Gen 2.

Tools Access tools for initial installation and configuration of the LiteBeam 5AC Gen 2.

Actions Back up or update the configuration, upload new firmware, reboot the device, reset the device to factory defaults, access the airOS UI in the web browser, or disconnect from the LiteBeam 5AC Gen 2.



Models

The LiteBeam 5AC Gen 2 offers quick and easy alignment and enhanced protection against power surges. There are two models available:

LiteBeam® AC GEN2

Model: LBE-5AC-Gen2

The LBE-5AC-Gen2 features a robust mount with separate azimuth and elevation adjustments.

LiteBeam® AC LR

Model: LBE-5AC-LR

Designed for long-range applications, the LBE-5AC-LR features a larger reflector size and elevation adjustment (azimuth is adjusted by rotation around the pole).

Specifications

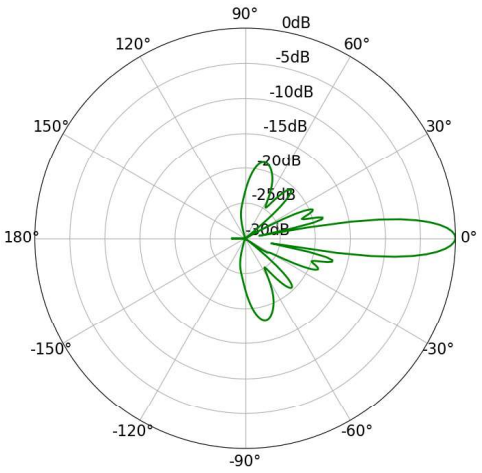
LBE-5AC-Gen2		
Dimensions	358 x 271.95 x 272.5 mm (14.09 x 10.71 x 10.73")	
Weight Without Mount With Mount	 800 g (1.76 lb) 980 g (2.16 lb)	
Power Supply	24V, 0.3A Gigabit PoE Adapter (Included)	
Max. Power Consumption	7W	
Power Method	Passive PoE (Pairs 4, 5+; 7, 8 Return)	
Supported Voltage Range	24V ± 10%	
Gain	23 dBi	
Networking Interface	(1) 10/100/1000 Ethernet Port	
Processor Specs	MIPS 74Kc	
Memory	64 MB DDR2	
LEDs	Power, Ethernet	
Channel Sizes	PtP Mode	PtMP Mode
	10/20/30/40/50/60/80 MHz	10/20/30/40 MHz
Enclosure Characteristics	Reflector (SGCC 0.6T) / Plastic: PC	
Mounting	Pole-Mounting Kit (Included)	
Wind Loading	275 N @ 200 km/h (61.8 lbf @ 125 mph)	
Wind Survivability	200 km/h (125 mph)	
ESD/EMP Protection	± 24 kV Contact / Air	
Operating Temperature	-40 to 70° C (-40 to 158° F)	
Operating Humidity	5 to 95% Noncondensing	
Certifications	CE, FCC, IC	

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

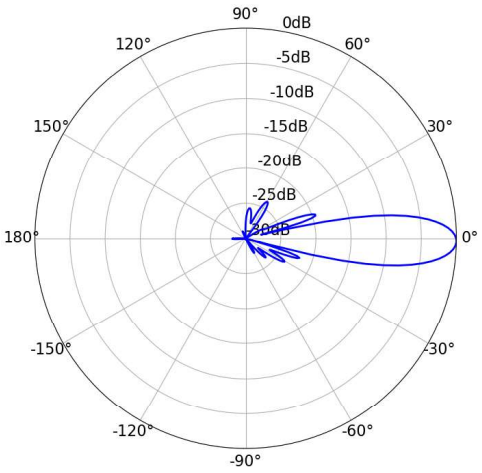
Management Radio (MHz)	
Worldwide	2412 - 2472
US/CA	2412 - 2462

LBE-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 Min.	± 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)	25 dBm	± 2 dB		6x 64QAM (⅔)	-83 dBm	± 2 dB
	6x 64QAM (¾)	24 dBm	± 2 dB		6x 64QAM (¾)	-77 dBm	± 2 dB
	6x 64QAM (⅚)	23 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)	21 dBm	± 2 dB		8x 256QAM (⅚)	-65 dBm	± 2 dB

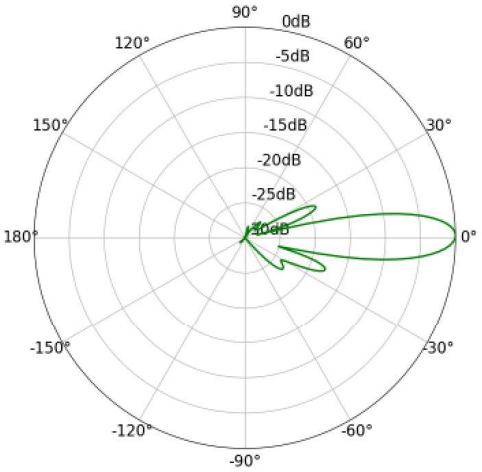
Vertical Azimuth



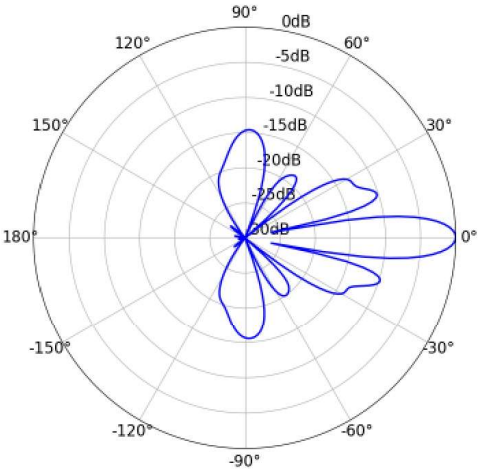
Vertical Elevation



Horizontal Azimuth



Horizontal Elevation



Specifications

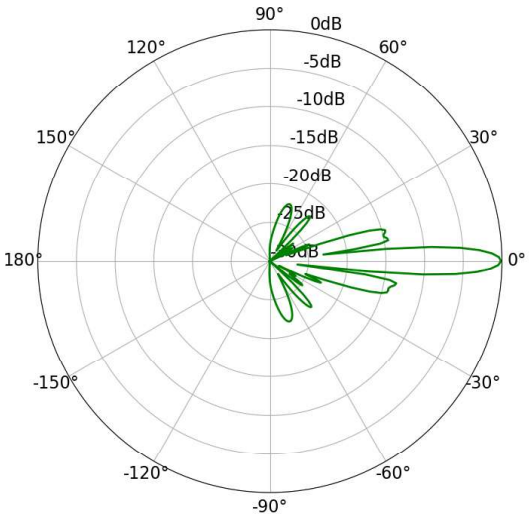
LBE-5AC-LR		
Dimensions	512.5 x 385.75 x 258.3 mm (20.18 x 15.19 x 10.17")	
Weight Without Mount With Mount	 1.360 kg (2.998 lb) 1.735 kg (3.825 lb)	
Power Supply	24V, 0.3A Gigabit PoE Adapter (Included)	
Max. Power Consumption	7W	
Power Method	Passive PoE (Pairs 4, 5+; 7, 8 Return)	
Supported Voltage Range	24V ± 10%	
Gain	26 dBi	
Networking Interface	(1) 10/100/1000 Ethernet Port	
Processor Specs	MIPS 74Kc	
Memory	64 MB DDR2	
LEDs	Power, Ethernet	
Channel Sizes	PtP Mode	PtMP Mode
	10/20/30/40/50/60/80 MHz	10/20/30/40 MHz
Enclosure Characteristics	Reflector (Aluminum) / Plastic: PC	
Mounting	Pole-Mounting Kit (Included)	
Wind Loading	550 N @ 200 km/h (123.6 lbf @ 125 mph)	
Wind Survivability	200 km/h (125 mph)	
ESD/EMP Protection	± 24 kV Contact / Air	
Operating Temperature	-40 to 70° C (-40 to 158° F)	
Operating Humidity	5 to 95% Noncondensing	
Certifications	CE, FCC, IC	

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

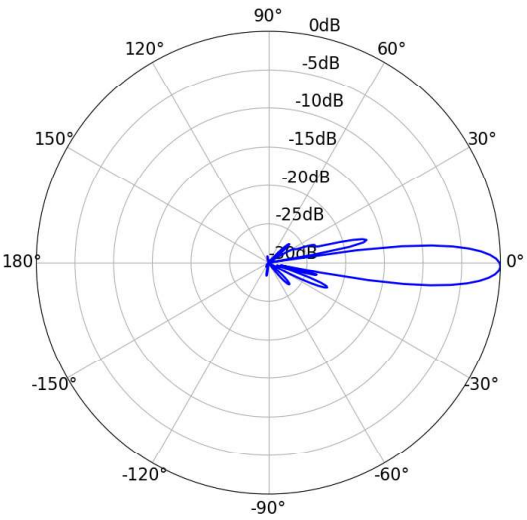
Management Radio (MHz)	
Worldwide	2412 - 2472
US/CA	2412 - 2462

LBE-5AC-LR 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 Min.	± 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)	25 dBm	± 2 dB		6x 64QAM (⅔)	-83 dBm	± 2 dB
	6x 64QAM (¾)	24 dBm	± 2 dB		6x 64QAM (¾)	-77 dBm	± 2 dB
	6x 64QAM (⅚)	23 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)	21 dBm	± 2 dB		8x 256QAM (⅚)	-65 dBm	± 2 dB

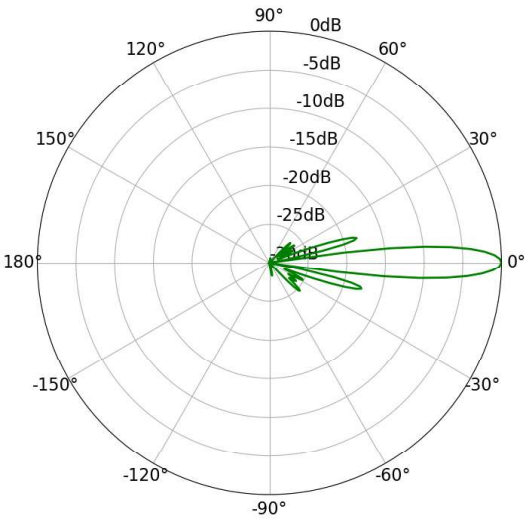
Vertical Azimuth



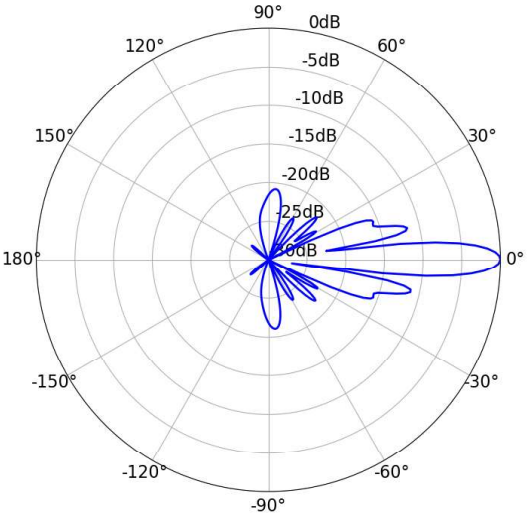
Vertical Elevation



Horizontal Azimuth



Horizontal Elevation



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JLAJ102819

DATASHEET

PowerBeam® AC GEN2

5 GHz High Performance airMAX® ac Bridge

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

Highly Efficient Antenna Beam Performance

Up to 450+ Mbps Throughput

Dedicated Wi-Fi Radio for Management

UBIQUITI® NETWORKS

DATASHEET

PowerBeam AC GEN2

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

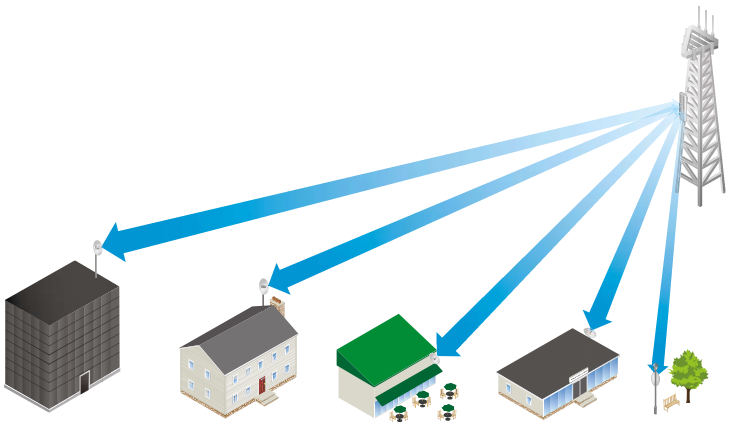
- Access Point PtMP airMAX Mixed Mode
- airMAX ac Protocol Support
- Long-Range PtP Link Mode
- Selectable Channel Width
  - PtP: 10/20/30/40/50/60/80 MHz
  - PtMP: 10/20/30/40 MHz
- Automatic Channel Selection
- Transmit Power Control: Automatic/Manual
- Automatic Distance Selection (ACK Timing)
- Strongest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

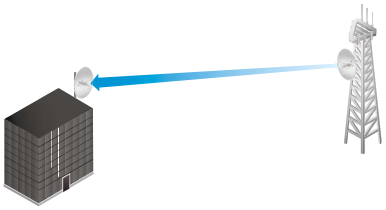
Application Examples

PtMP Client Links

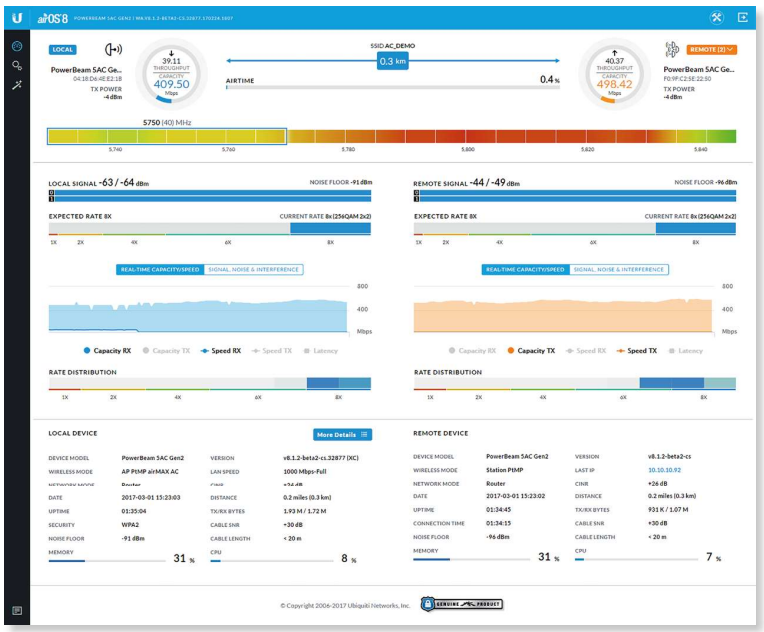


The PowerBeam 5AC Gen 2 used as a CPE device for each client in an airMAX Point-to-MultiPoint (PtMP) network.

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.

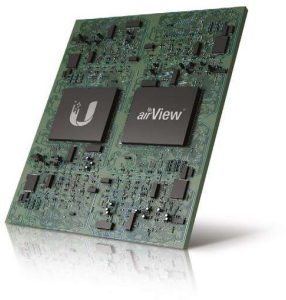
UNMS App

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

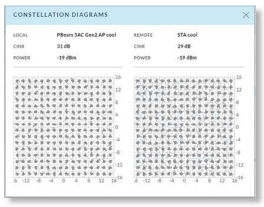
Accessing airOS via Wi-Fi

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.

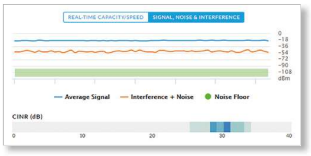
Multi-Radio Architecture



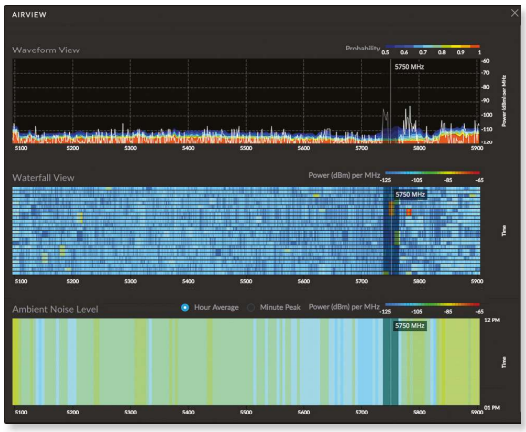
Constellation Diagrams



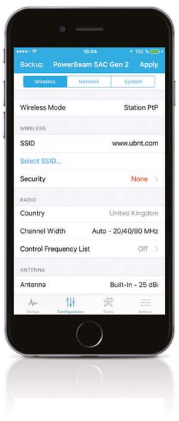
SNI Diagram and CINR Histogram



Dedicated Spectral Analysis



UNMS Configuration Screen



Technology

airMAX 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.

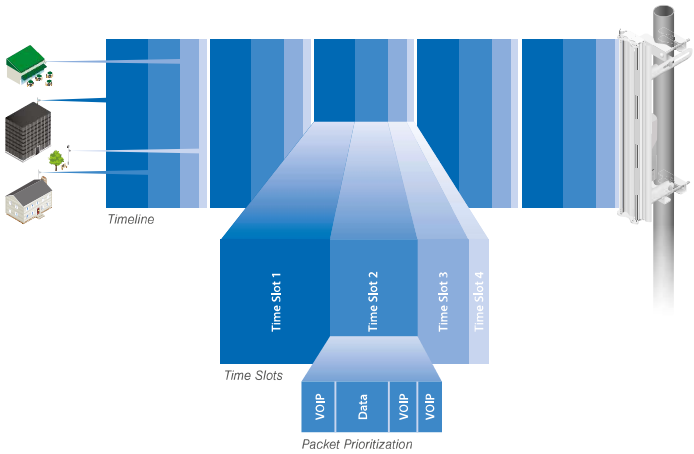
Ubiquiti's airMAX engine with custom IC dramatically improves TDMA latency and network scalability. The custom silicon provides hardware acceleration capabilities to the airMAX scheduler, to support the high data rates and dense modulation used in airMAX ac technology.

Throughput Breakthrough

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

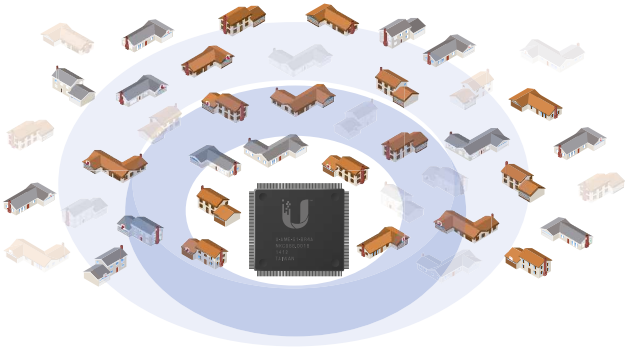
With their use of proprietary airMAX ac technology, airMAX ac products supports up to 450+ Mbps real TCP/IP throughput – up to triple the throughput of standard airMAX products.

airMAX ac TDMA Technology

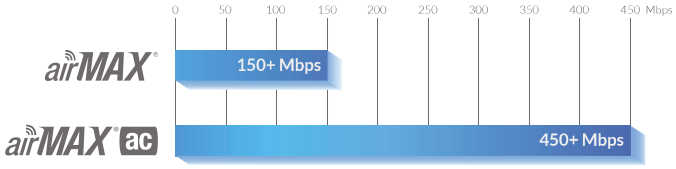


Up to 100 airMAX ac stations can be connected to an airMAX ac Sector; four airMAX ac stations are shown to illustrate the general concept.

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: ± 20° 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

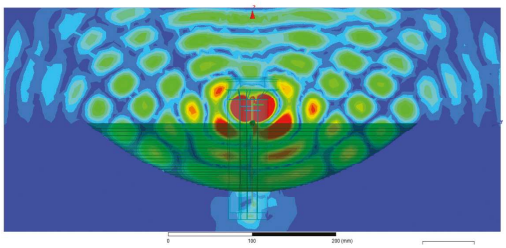
The integrated isolator design spatially filters out interference, so the PBE-5AC-ISO-Gen2 delivers improved noise immunity in co-location deployments.

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

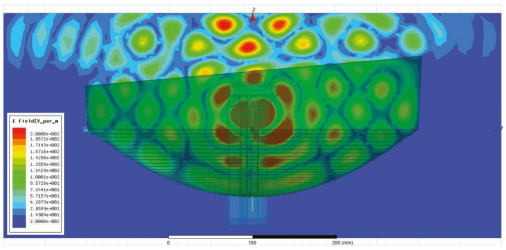
Both near-field plots are displayed in watts and use a linear scale. The strength of the electromagnetic field is color-coded:

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

Without Integrated RF Isolator



With Integrated RF Isolator



Specifications

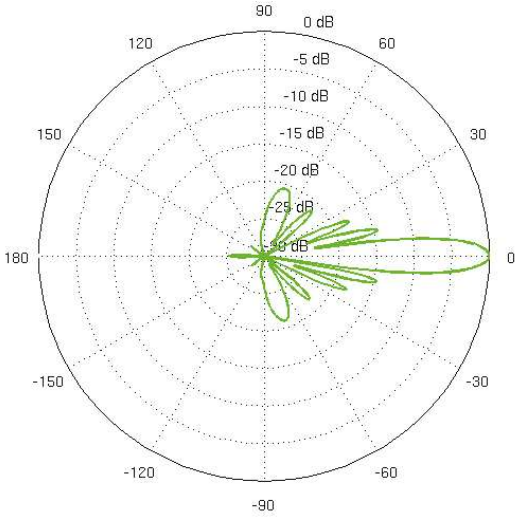
PBE-5AC-Gen2		
Dimensions	420 x 420 x 230 mm (16.54 x 16.54 x 9.06")	
Weight	2.22 kg (4.89 lbs)	
Power Supply	24V, 0.5A Gigabit PoE Adapter (Included)	
Max. Power Consumption	8.5W	
Power Method	Passive PoE (Pairs 4, 5+; 7, 8 Return)	
Supported Voltage Range	20 to 26VDC	
Gain	25 dBi	
Networking Interface	(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: ± 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: 5150 - 5250	U-NII-2A: 5250 - 5350 MHz	U-NII-2C: 5470 - 5725 MHz	U-NII-3: 5725 - 5850

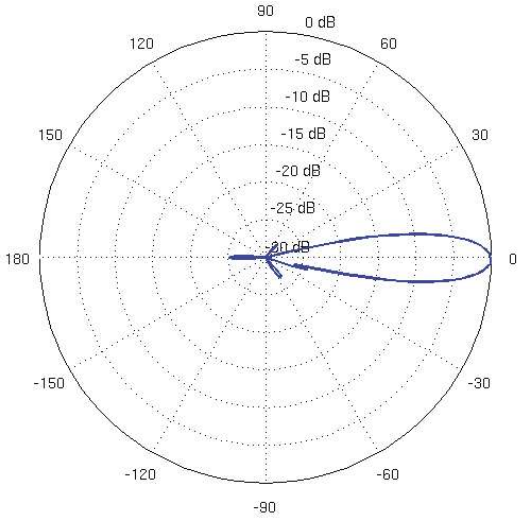
Management Radio (MHz)	
Worldwide	2412 - 2472
USA	2412 - 2462

PBE-5AC-Gen2 Output Power: 24 dBm							
TX Power Specifications				**RX Power Specifications**			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
airMAX ac	1x BPSK (½)	24 dBm	± 2 dB	airMAX ac	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 (⅔)	22 dBm	± 2 dB		6x 64QAM (⅔)	-83 dBm	± 2 dB
	6x 64QAM (¾)	21 dBm	± 2 dB		6x 64QAM (¾)	-77 dBm	± 2 dB
	6x 64QAM (⅚)	21 dBm	± 2 dB		6x 64QAM (⅚)	-74 dBm	± 2 dB
	8x 256QAM (¾)	20 dBm	± 2 dB		8x 256QAM (¾)	-69 dBm	± 2 dB
	8x 256QAM (⅚)	20 dBm	± 2 dB		8x 256QAM (⅚)	-65 dBm	± 2 dB

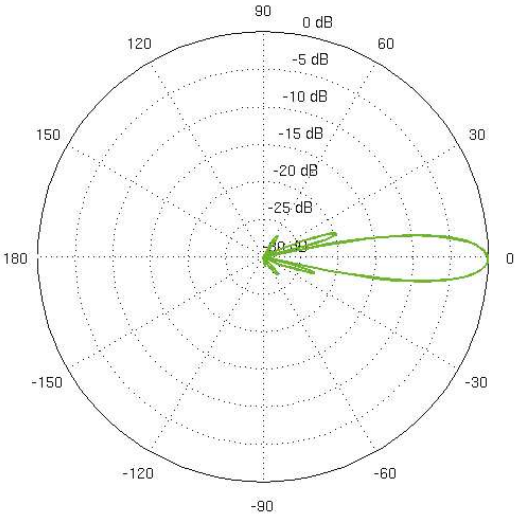
Vertical Azimuth



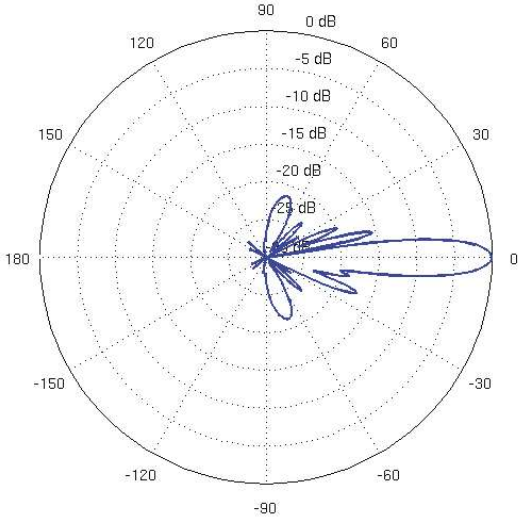
Vertical Elevation



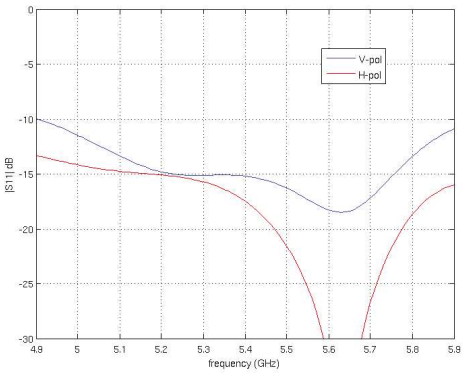
Horizontal Azimuth



Horizontal Elevation



Return Loss



Specifications

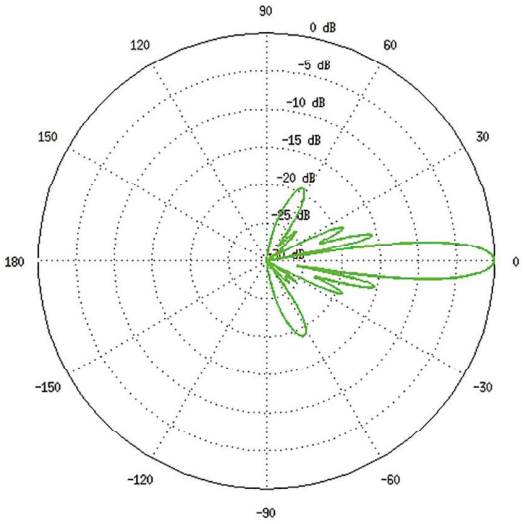
PBE-5AC-ISO-Gen2				
Dimensions	459 x 459 x 261 mm (18.07 x 18.07 x 10.28")			
Weight (Mount Included)	3.22 kg (7.10 lbs)			
Power Supply	24V, 0.5A Gigabit PoE Adapter (Included)			
Max. Power Consumption	8.5W			
Power Method	Passive PoE (Pairs 4, 5+; 7, 8 Return)			
Supported Voltage Range	20 to 26VDC			
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: 5150 - 5250	U-NII-2A: 5250 - 5350 MHz	U-NII-2C: 5470 - 5725 MHz	U-NII-3: 5725 - 5850

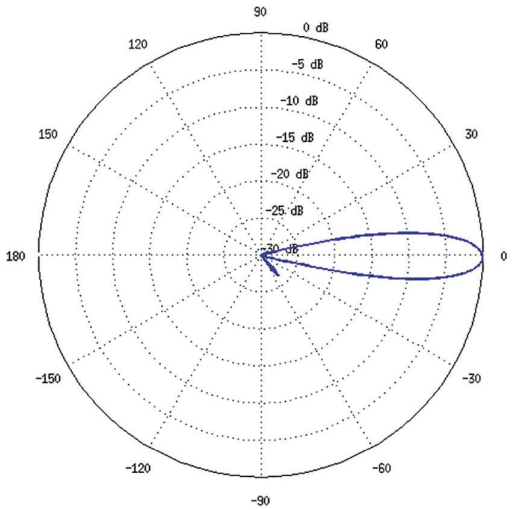
Management Radio (MHz)	
Worldwide	2412 - 2472
USA	2412 - 2462

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
airMAX ac	1x BPSK (½)	24 dBm	± 2 dB	airMAX ac	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 (⅔)	23 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)	20 dBm	± 2 dB		8x 256QAM (¾)	-69 dBm	± 2 dB
	8x 256QAM (⅚)	20 dBm	± 2 dB		8x 256QAM (⅚)	-65 dBm	± 2 dB

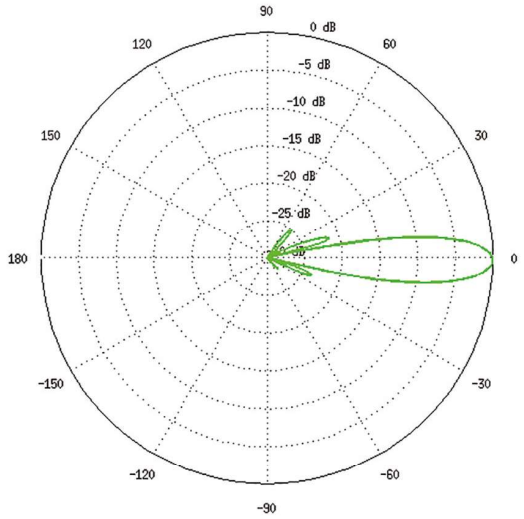
Vertical Azimuth



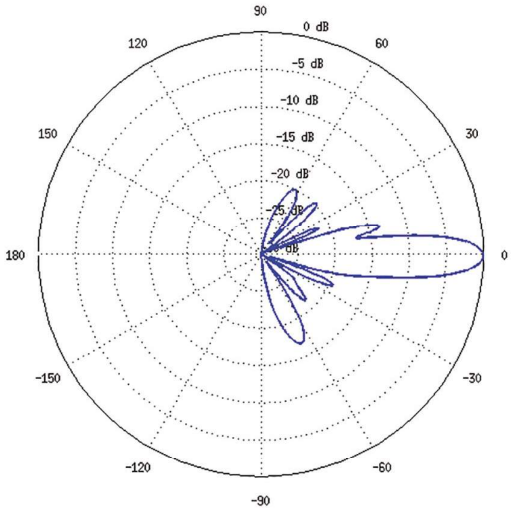
Vertical Elevation



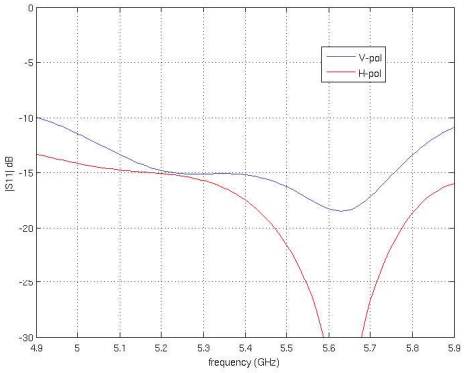
Horizontal Azimuth



Horizontal Elevation



Return Loss



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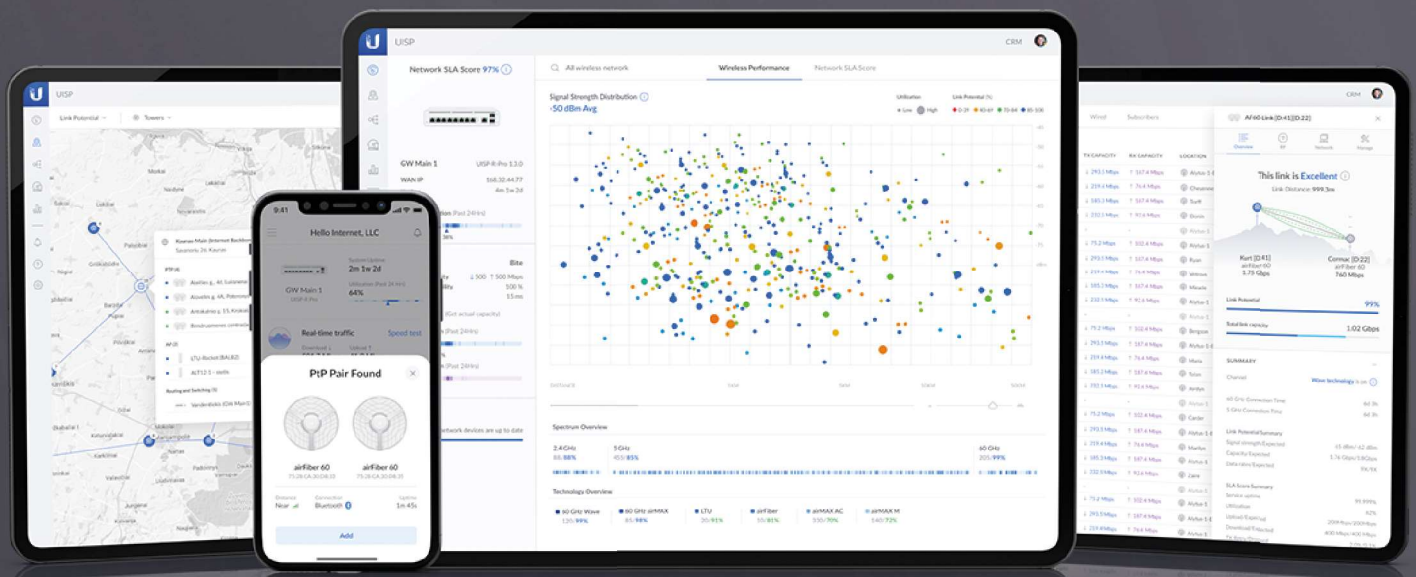
NB010419

airFiber® 60 LR

Datasheet
AF60-LR

UISP



airFiber 60 LR

60 GHz point-to-point (PtP) radio system with a 1.9 Gbps maximum throughput rate and a 12+ kilometer link range.

The airFiber 60 GHz Long-range Radio (AF60 LR) is a PtP system that uses Wave Technology to establish long-distance, true-duplex Gigabit links. Equipped with a high-gain dish antenna, the AF60 LR can reach a 1.9 Gbps maximum throughput rate and sustain its links over 12 km. It also has a dedicated Bluetooth management radio so it can be set up quickly and fully configured with the UISP® application (web/mobile). It can also be seamlessly integrated into an existing deployment with Ubiquiti's dedicated link planning platform and tracked from anywhere with its built-in GPS antenna.

Mechanical

Dimensions	Ø413 x 360 mm (Ø16.3 x 14.2")
Weight	Without mount: 1.5 kg (3.3 lb) With mount: 2.7 kg (6 lb)
Enclosure materials	Aluminum, UV stabilized polycarbonate
Mount material	Galvanized steel
Mounting	Precision Alignment Kit (included) Pole compatibility: Ø25.4-76.2 mm (Ø1-3")
Wind loading	420 N at 200 km/h (94.4 lbf at 125 mph)

Hardware

Processor	Quad-Core ARM® Cortex® A7
Memory	256 MB DDR3
Networking interface	GbE RJ45 port
RF connections	Internal
Max. power consumption	18W
Power method	Passive PoE 4-pairs (1, 2+; 3, 6-) (4, 5+; 7, 8-) or 2-pairs (4, 5+; 7, 8-)
Power supply	48VDC, 0.65A gigabit PoE adapter (included)
Supported voltage range	48VDC ± 10%
ESD/EMP protection	Air/contact: ± 24kV
Operating temperature	-40 to 60° C (-40 to 140° F)
Operating humidity	5 to 95% noncondensing
Certifications	FCC, IC, CE

LEDs

Power	Flashing white: bootup in progress White: not connected to UISP™ console Blue: connected to UISP console
Ethernet	Flashing blue: ethernet activity
GPS	Blue: receiving at least (4) GPS satellite signals
60G	Blue: active connection

Software

OS	airOS®
Operating mode	PtP only
Ubiquiti specific features	Integrated 60 GHz radio, discovery protocol, Wave technology
Network	Bridge mode
Services	UISP, ping watchdog, NTP client, device discovery
Tools	Antenna alignment, discovery utility, ping, trace route, speed test
Software management	Bluetooth management for easy setup over UISP app WEB UI
Minimum software requirements	Any modern WEB browser/iOS or Android based smartphone

System

Maximum throughput	1.95 Gbps
Maximum range	12+ km
Encryption	WPA2-PSK (AES)

RF

Operating Frequency*	57~71 GHz *Depends on regulatory region.
GPS	Yes
Channel Bandwidth	2160, 1080 MHz

airFiber 5X HD

DATASHEET

5 GHz Carrier Radio with LTU™ Technology

Up to 1+ Gbps Real Throughput, 100+ km Range

Full-Band Certification including DFS

Ubiquiti's LTU Custom Silicon

Ten years ago, Ubiquiti sparked a global Wireless ISP revolution with the introduction of NanoStation® — a cost-disruptive 802.11 Wi-Fi long range outdoor plug and play radio. The NanoStation broke down technical and financial barriers for WISP's around the world, enabling nearly any operator to deploy scalable networks and grow profitable business models.

As bandwidth demands and scalability challenges increased through the years, Ubiquiti responded with performance-enhancing innovations such as the airMAX® TDMA protocol, PRISM® active RF filtering, and GPS synchronization — all working to extract every ounce of potential from consumer 802.11 Wi-Fi chipsets.

However, we always knew that one day growing subscriber bandwidth demands combined with an increasingly crowded unlicensed RF spectrum would expose the fundamental limitations of 802.11 Wi-Fi silicon and ultimately threaten the survival of our industry.

Years ago, a core group of engineers at Ubiquiti set out to make sure this day would never come. We began an ambitious plan that would span millions of man hours of development and tens of millions of dollars of investment. The result was a new technology and ASIC chipset created from the ground floor up specifically for the Wireless ISP industry — a technology we believe positions our Industry to succeed in the new challenging landscape of the future. Welcome to what we call the Long Term Ubiquiti vision, or simply LTU™.

Overview

Ubiquiti continues to disrupt the wireless broadband market with revolutionary LTU technology that breaks through the limitations of 802.11 Wi-Fi technology. Designed for use in the 5 GHz frequency band, the new airFiber® AF-5XHD is Ubiquiti's first LTU radio, offering greater channel bandwidths of up to 100 MHz, and more advanced RF components.

Pair the AF-5XHD with a compatible Ubiquiti® airFiber X antenna or RocketDish™ antenna for a complete 5 GHz Point-to-Point (PtP) solution.

An IP67 upgrade kit is included to provide enhanced protection from dust and water.

Engineered for Performance

Designed specifically for the Wireless ISP industry from the ground floor up, the AF-5XHD's custom LTU silicon and radio architecture provide breakthrough performance. Its core communications processing engine surpasses the limitations inherent to generic Wi-Fi chips to provide low latency, long-range capability, DFS flexibility, higher constellations, and better power output, along with improved receive sensitivity.

The AF-5XHD features industry-leading 21.2 bps/Hz spectral efficiency*, line-rate data packet processing for up to 1.34 Gbps of real data throughput*, and innovative xtreme Range Technology (xRT™).

* *Assuming 4096QAM (requires firmware version 1.1.2 or above).*

Key Features

The AF-5XHD offers the following advanced features:

- **Auto Output Power** Enabled by default, the Auto Output Power option causes the AF-5XHD to set the output power (EIRP) to the appropriate level.
- **Programmable Transmit Power** The radio's transmit power level can be programmed up to +29 dBm.
- **Programmable DL/UL Ratio** The AF-5XHD can split downlink and uplink traffic and support asymmetric traffic as needed. DL/UL ratios include 25%, 33%, 50%, 67%, and 75%. The DL/UL Ratio is an essential part of GPS sync functionality; it must be the same in all APs that you wish to synchronize.
- **Configurable GPS Synchronization** The AF-5XHD offers configurable support for 2, 2.5, 4, and 5 ms frames. Timing is compatible with all other synchronous systems, and 5 ms frame length is compatible with airMAX networks.
- **Split TX and RX Frequency**[1] The radio can operate on different frequencies for TX and RX, allowing great flexibility for interference avoidance.
- **Split TX and RX Channel Bandwidth**[2] Support for different channel bandwidths for TX and RX allows users to scale required data capacity more efficiently.
- **Adaptive Modulation up to 4096QAM**[1] Adaptive modulation rates of up to 4096QAM are supported.
- **Dual Redundant Gigabit Ethernet Ports with PoE** The AF-5XHD has two Gigabit Ethernet ports that can be used for redundant PoE power.
- **Bluetooth Wireless Configuration** Use the built-in Bluetooth interface for wireless configuration.
- **AlignLock™ Antenna Aiming Guard** This alerts the user when the radio or antenna aiming is changed due to tampering, impact, or storm damage.
- **Redundant Images for Fail-Safe Configuration** Creation of backup firmware images ensures fail-safe configuration and enhances reliability.
- **Persistent Spectrum Analysis with Dedicated RX** Perform real-time spectral analysis for the full band on live links without interrupting the link operation.
- **Wide Voltage Range, Enhanced Surge Protection** The AF-5XHD has an operating voltage range of 19-50VDC[3] and provides enhanced surge protection.

[1] *Requires firmware version 1.1.2 or above*
[2] *Available with a future firmware upgrade*
[3] *Depends on length of Ethernet cable*

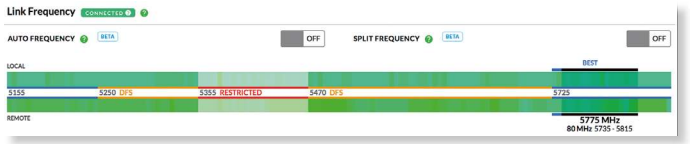
Software

The airFiber AF-5XHD uses Ubiquiti's airOS® LTU software, which offers you a variety of advanced features.

Powerful New Features

Version 1.1.2 offers many new features to help make your network faster, easier to operate, and more resistant to interference:

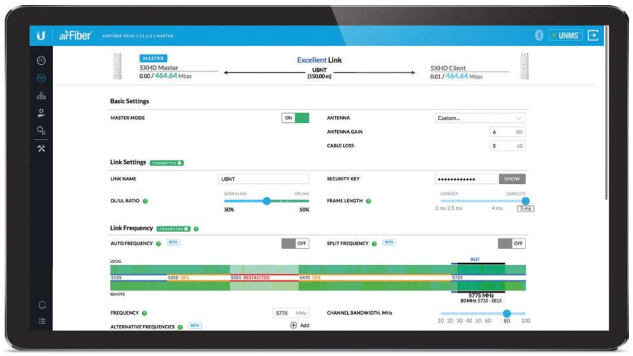
- **Frequency Split** Use this to configure separate TX and RX frequencies. This feature is very helpful in environments where certain channels may be experiencing interference on one end of the link, but are clear on the other end. The ability to configure different channels for each end of the link provides an ideal solution to this problem.
- **4096QAM (12x) Support** The AF-5XHD has been the only product that allows WISPs to push links beyond 256QAM while delivering unmatched spectral efficiency. With the introduction of 4096QAM, WISPs will now be able to further increase link speeds simply by upgrading the software.
- **Link Frequency Selector** Found on the Wireless screen, this feature displays a graph of the link's RF environment that includes a Best Frequency hint to help you select the clearest frequency.



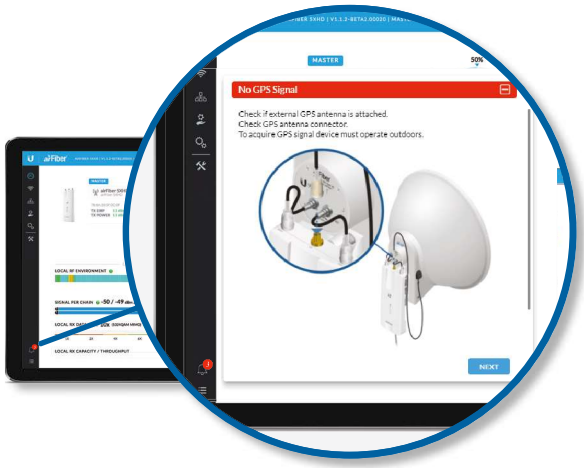
- **Seamless Frequency Changes** The link is no longer dropped when frequency-related settings (Frequency, Split Frequency, Alternative Frequencies, Auto Frequency) are changed.
- **Centralized Link Management** This feature simplifies and speeds up link management. You now only have to manage the master device; changes made to it are automatically propagated to the remote device.
- **Smart Assistant (Alerts)** The new Smart Assistant monitors and alerts you of errors and warnings, such as a missing GPS signal, Ethernet negotiation failures, or a lower than expected signal strength. The Smart Assistant also provides detailed troubleshooting instructions for fixing each problem that it identifies.
- **Auto Frequency on DFS Event (Beta)** When this option is enabled, the link automatically switches to the clearest operating frequency when a DFS event occurs.
- **Other Improvements**
  - Traffic prioritization based on DSCP/TOS bit values
  - Enhanced auto rate recovery
  - Better 4ms/5ms stability in high interference conditions
  - Wider channel stability improvements

airOS LTU

Wireless Screen



Smart Assistant Alerts



Spectral Analysis with airView

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.

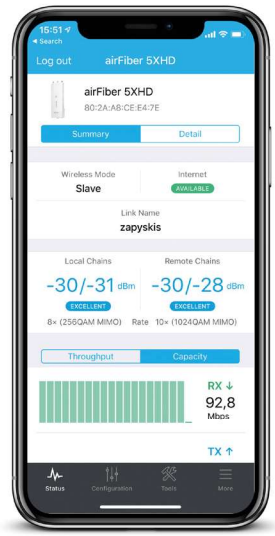
Helpful new features of airView include Zoom, used for quick zooming in/out of the airView display, and In-Band Scanning, which eliminates noise within the working channel.

UNMS App

The AF-5XHD supports the Ubiquiti Network Management System. UNMS™ is a comprehensive management controller featuring an easy-to-navigate graphic UI.

The UNMS app provides instant access 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 AF-5XHD and offers various configuration options once you're connected or logged in.

Management Using UNMS App



Dedicated Spectral Analysis

Zoom View (UNII-1 Selected)

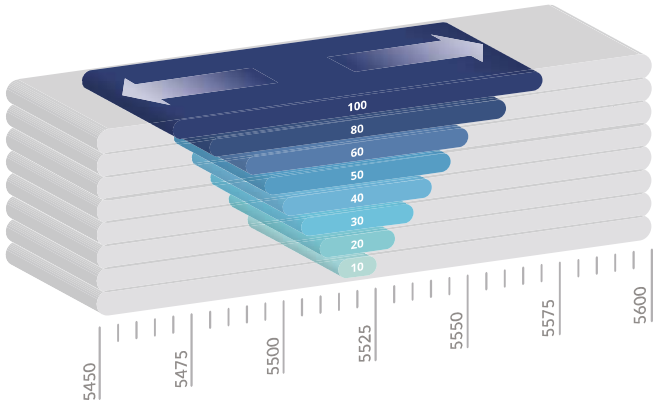
5 GHz Backhaul

Full-Band Certification with DFS

The AF-5XHD covers the entire, license-free, 5 GHz spectrum and includes DFS approval. Anyone around the world can deploy and operate the AF-5XHD in the 5 GHz range practically anywhere they choose (subject to local country regulations).

Optimal Operation in Unlicensed Bands

Channel width flexibility (10/20/30/40/50/60/80/100 MHz) allows independent TX and RX channel frequency configurations anywhere within the radio band to avoid local interference, and the channel centers are selectable in 1 MHz increments. You also have the ability to program different uplink and downlink duty cycles to support asymmetric traffic requirements.



Ultra-Low Latency with HDD Technology

The AF-5XHD is designed to provide the highest TDD throughput available and is engineered with proprietary Hybrid Division Duplexing* (HDD) technology.

In a backhaul link, two AF-5XHD radios use patent-pending HDD technology to calculate the propagation delay and know when each radio can transmit and receive, so they send packets in precise synchronization. Packet transmission latency is virtually eliminated.

Co-Location

Co-location is vital in many scenarios. For example, a WISP may have limited tower space, so it must co-locate all equipment within that allotted footprint.

GPS Synchronization

Precise GPS frame synchronization frees the AF-5XHD from interference for superior co-location capability. GPS enables the concurrency of TX and RX frames so you can co-locate the AF-5XHD radios and enhance the overall performance of your backhaul links.

Clean Power Output

Using digital pre-distortion compensation and multi-IFFT processing, the innovative RF design delivers ultra-clean power output that improves noise immunity and co-location performance. This reduces the potential impact on the RF noise environment and allows for the use of higher-order modulation, such as 1024QAM.

* *Available with a future firmware upgrade*

Deployment Flexibility

The AF-5XHD can be used with existing airFiber slant-polarized antennas for improved noise immunity and Signal-to-Noise Ratio (SNR). It is compatible with multiple Ubiquiti airFiber X antennas offering gain of 23 to 34 dBi. The compact form factor of the AF-5XHD allows it to fit into the radio mount of airFiber X antennas, so installation requires no special tools.

airFiber X Antenna Model Summary

The airFiber X antennas are purpose-built with 45° slant polarity for seamless integration with the AF-5XHD. Pair the AF-5XHD with one of the following airFiber X antennas:

	AF-5G23-S45	AF-5G30-S45	AF-5G34-S45
Freq.	5 GHz	5 GHz	5 GHz
Gain	23 dBI	30 dBi	34 dBi

RocketDish Model Summary

You can also pair the AF-5XHD with one of the RocketDish antennas shown below using the included Universal Bracket or by using a kit to convert the RocketDish to 45° slant polarity.

	RD-5G30	RD-5G34
Freq.	5 GHz	5 GHz
Gain	30 dBI	34 dBi

Conversion Kit

The 5 GHz RocketDish to airFiber Antenna Conversion Kit (model AF-5G-OMT-S45) converts the RocketDish RD-5G30 or RD-5G34 antenna for use with the AF-5XHD.

airFiber AF-5XHD	
Dimensions	224 x 82 x 48 mm (8.82 x 3.23 x 1.89")
Weight	0.35 kg (12.3 oz)
RF Connectors	(2) RP-SMA Weatherproof (CH0, CH1) (1) SMA Weatherproof (GPS)
GPS Antenna	External, Magnetic Base
Power Supply	24V, 1A Gigabit PoE Adapter (Included)
Power Method	Passive Power over Ethernet Pins 1, 2, 4, 5 (+) and Pins 7, 8, 3, 6 (-)
Max. Power Consumption	6-12W[1]
Supported Voltage Range	+18 to +54VDC[2]
Mounting	airFiber X Mount (Rocket Mount Compatible) GPS Pole Mount (Included)
Operating Temperature	-40 to 55° C (-40 to 131° F)
Weatherproofing	IP67[3]
Certifications	CE, FCC, IC

System	
Processor	airFiber LTU IC
Maximum Throughput	1.34 Gbps[4, 5]
Maximum Range	100 km[4]
Packets per Second	2+ Million[6]
Latency	1.5 ms - 3.5 ms[7]
Encryption	AES-256
OS	airOS LTU
Wireless Modes	PtP Master/Slave

[1] *Varies with firmware load and operational mode.*

[2] *Full range depends on Ethernet cable length.*

[3] *After installation of IP67 upgrade kit (included).*

[4] *Throughput and range values may vary depending on the environmental conditions.*

[5] *Assuming 4096QAM (requires firmware version 1.1.2 or above).*

[6] *Hardware bridge mode only.*

[7] *Based on 2 ms frame.*

Networking Interface	
Data Port	(1) 10/100/1000 Ethernet Port
Management Port	(1) 10/100/1000 Ethernet Port Bluetooth v4.0

Radio	
Max. Conducted TX Power	29 dBm (Dependent on Regulatory Region)
Frequency Accuracy	< 2 ppm
Channel Bandwidth	10/20/30/40/50/60/80/100 MHz Selectable Programmable Uplink and Downlink Duty Cycles

Operating Frequency (MHz)	
Worldwide	4800 - 6200*
US/CA	
U-NII-1	5150 - 5250
U-NII-2A	5250 - 5350
U-NII-2C	5470 - 5725
U-NII-3	5725 - 5850

* *Depends on regulatory region.*

Bluetooth LE Management Radio (MHz)	
Worldwide	2400 - 2483.5

Suggested Max. TX Power	
12x	12 - 15 dBm
10x	19 - 20 dBm
8x	21 - 22 dBm
6x	23 - 24 dBm
4x	29 dBm
2x	29 dBm
1x	29 dBm

Receive Sensitivity (dBm)									
Modulation Rate	Modulation	Sensitivity							
		10 MHz	20 MHz	30 MHz	40 MHz	50 MHz	60 MHz	80 MHz	100 MHz
12x	4096QAM	-56	-53	-51	-49	-47	-44	-42	-39
10x	1024QAM	-66	-63	-61	-59	-57	-55	-53	-51
8x	256QAM	-72	-69	-67	-65	-63	-61	-59	-57
6x	64QAM	-78	-75	-73	-71	-69	-67	-65	-63
4x	16QAM MIMO	-84	-81	-79	-77	-75	-73	-71	-69
2x	QPSK MIMO	-88	-85	-83	-82	-81	-80	-79	-78
1x	½ Rate QPSK xRT	-90	-87	-85	-84	-83	-82	-81	-80

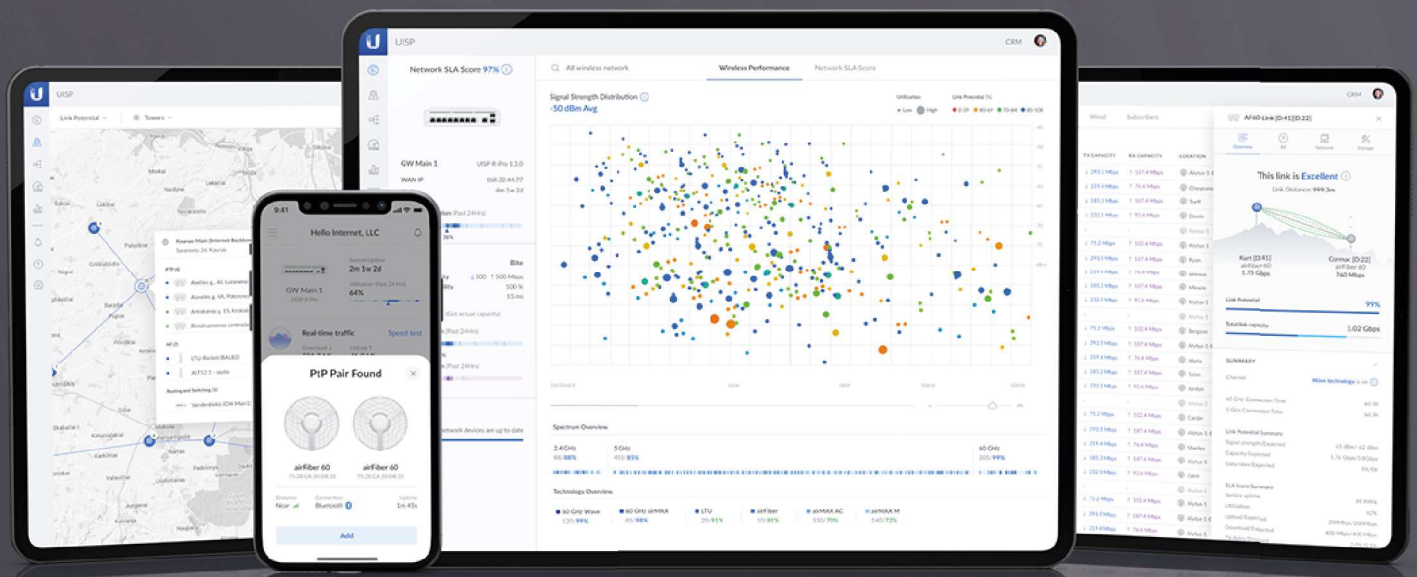
TDD Capacity (Mbps)*									
MCS		Channel Width							
		10 MHz	20 MHz	30 MHz	40 MHz	50 MHz	60 MHz	80 MHz	100 MHz
QPSK SISO	Upload	5.76	12.16	18.24	24.32	29.76	35.20	45.44	54.72
	Download	5.76	12.16	18.24	24.32	29.76	35.20	45.44	54.72
	Aggregate	**11.52**	**24.32**	**36.48**	**48.64**	**59.52**	**70.40**	**90.88**	**109.44**
QPSK MIMO	Upload	11.52	24.32	36.48	48.64	59.52	70.40	90.88	109.44
	Download	11.52	24.32	36.48	48.64	59.52	70.40	90.88	109.44
	Aggregate	**23.04**	**48.64**	**72.96**	**97.28**	**119.04**	**140.80**	**181.76**	**218.88**
16 QAM MIMO	Upload	23.04	48.64	72.96	97.28	119.04	140.80	181.76	218.88
	Download	23.04	48.64	72.96	97.28	119.04	140.80	181.76	218.88
	Aggregate	**46.08**	**97.28**	**145.92**	**194.56**	**238.08**	**281.60**	**363.52**	**437.76**
64 QAM MIMO	Upload	34.56	72.96	109.44	145.92	178.56	211.20	272.64	328.32
	Download	34.56	72.96	109.44	145.92	178.56	211.20	272.64	328.32
	Aggregate	**69.12**	**145.92**	**218.88**	**291.84**	**357.12**	**422.40**	**545.28**	**656.64**
256 QAM MIMO	Upload	46.08	97.28	145.92	194.56	238.08	281.60	363.52	437.76
	Download	46.08	97.28	145.92	194.56	238.08	281.60	363.52	437.76
	Aggregate	**92.16**	**194.56**	**291.84**	**389.12**	**476.16**	**563.20**	**727.04**	**875.52**
1024 QAM MIMO	Upload	57.60	121.60	182.40	243.20	297.60	352.00	454.40	547.20
	Download	57.60	121.60	182.40	243.20	297.60	352.00	454.40	547.20
	Aggregate	**115.20**	**243.20**	**364.80**	**486.40**	**595.20**	**704.00**	**908.80**	**1,094.40**
4096 QAM MIMO	Upload	69.12	145.92	218.88	291.84	357.12	422.40	545.28	656.64
	Download	69.12	145.92	218.88	291.84	357.12	422.40	545.28	656.64
	Aggregate	**138.24**	**291.84**	**437.76**	**583.68**	**714.24**	**844.80**	**1,090.56**	**1,313.28**

* *For 2 ms frame length*

GigaBeam® Plus

Datasheet
GBE-Plus

UISP



airMAX GigaBeam Plus 60 GHz Radio

High-gain 60 GHz radio with a Cassegrain reflector that delivers 1.5+ Gbps throughput with low latency.

The GigaBeam® Plus (GBE Plus) is a 60 GHz radio that can be used as a high-throughput backhaul/edge point-to-point (PTP) solution in WISP deployments. With its integrated Cassegrain reflector, the GBE Plus delivers 35 dBi antenna gain and can exceed a 1.5 Gbps bidirectional throughput rate with very low latency. Designed for simple deployment and ease of use, the GBE Plus can be set up in minutes and fully managed with the UISP™ web application or mobile app.

Mechanical

Dimensions	Ø155 x 137 mm (Ø6.1 x 5.4")
Weight	1 kg (2.2 lb)
Enclosure materials	UV-resistant polycarbonate, stainless steel
Mount material	Metal
Wind loading	50 N at 200 km/h (11.24 lbf at 125 mph)

Hardware

Processor	Quad-Core ARM® Cortex® A7
Memory	256 MB DDR3
Networking interface	10/100/1,000 Mbps RJ45 port
Management interfaces	Ethernet Bluetooth
RF connections	Internal
Max. power consumption	11W
Power method	Passive PoE (Pairs 4, 5+; 7, 8-)
Power supply	24VDC, 0.5A Gigabit PoE adapter
Supported voltage range	22 to 26VDC
ESD/EMP protection	Air/Contact: ± 24kV
Operating temperature	-40 to 60° C (-40 to 140° F)
Operating humidity	5 to 95% noncondensing
Certifications	FCC, IC, CE

LEDs

Power	Flashing white: Booting up White: Not connected to UISP Blue: Connected to UISP
Ethernet	Flashing blue: Ethernet traffic detected
60GHz	Blue: Connected

Software

OS	airOS®
Operating modes	PtP master or station

Ubiquiti specific features	Integrated 60 GHz radio, discovery protocol
Security	WPA2 AES only
Dashboard	Yes
Wireless settings	Yes
Network settings	Yes
System	Yes
Services	UISP, ping watchdog, web server, SSH server, NTP client, system log, device discovery
Tools	Antenna alignment, discovery utility, traceroute, speed test
Management interface	UISP application (web/mobile)
Minimum software requirements	A modern web browser or an iOS/Android device

RF

Operating frequency*	57,000 - 66,000 MHz *Dependent on regional regulations.
Channel bandwidth	2160 MHz
Operating channels	58320, 60480, 62640, 64800 MHz
Beamwidth*	Azimuth: 2° (-3 dB) / 3° (-6 dB) Elevation: 2° (-3 dB) / 3° (-6 dB) *The antenna is only vertically polarized.
Bluetooth	2400 - 2483.5 MHz
Electrical downtilt	0°

LTU™ LR

DATASHEET

5 GHz PtMP LTU™ Long-Range Client Radio

Proprietary Ubiquiti® LTU Processor

Long-Range 26 dBi Antenna with High-Power InnerFeed®

10/20/30/40/50 MHz Channel Width Flexibility

Model: LTU-LR

Overview

Designed for long-range applications, the LTU LR is a 5 GHz subscriber station that functions as a CPE (Customer Premises Equipment) in a Point-to-MultiPoint (PtMP) environment with the LTU Rocket® as the basestation.

Proprietary LTU Technology

Based on Ubiquiti's LTU technology, the LTU LR is not impeded by the limitations of standard 802.11 Wi-Fi technology. Its custom LTU silicon and radio architecture provide up to 600+ Mbps[1] of real TCP/IP throughput and modulation rates of up to 4096QAM[2].

CPE Modes

The LTU LR supports both bridged and built-in hardware NAT router modes to suit your specific deployment.

Frequency Split

The LTU LR can use different frequencies for TX and RX to avoid interference.

Improved Noise Immunity

The LTU LR directs RF energy in a tighter beamwidth. With the focus in one direction, the LTU LR blocks or spatially filters out noise to improve noise immunity. This is especially important in an area crowded with other RF signals of the same or similar frequency.

Innovative Design

Ubiquiti's InnerFeed technology integrates the radio into the feedhorn of a 26 dBi antenna, so there is no need for a cable. This improves performance because it eliminates cable losses.

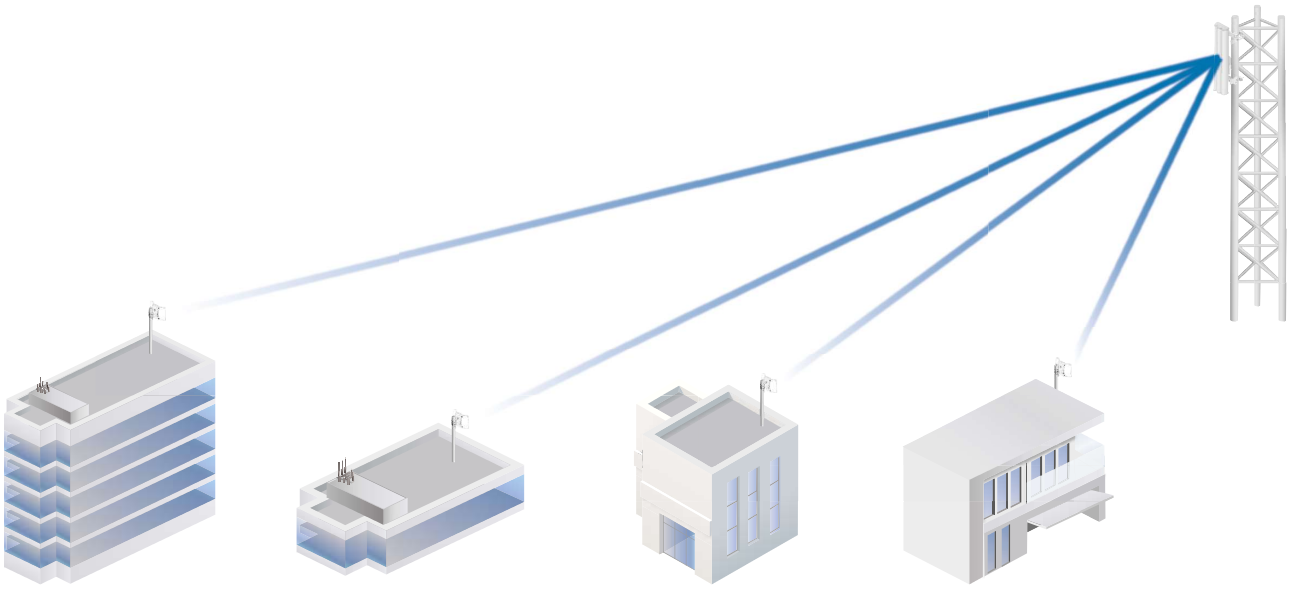
Quick Mounting and Alignment

The LTU LR features a large reflector size and easy elevation adjustment (azimuth is adjusted by rotation around the pole).

[1] *1+ Gbps with future firmware upgrade.*

[2] *Available with future firmware upgrade.*

Deployment Example



In a PtMP link, the LTU LR functions as CPEs to the LTU Rocket, which is paired with an airMAX® sector antenna.

Channel Width Flexibility

Channel width flexibility allows independent TX and RX channel frequency configurations anywhere within the radio band to avoid local interference. Channel width options include the following:

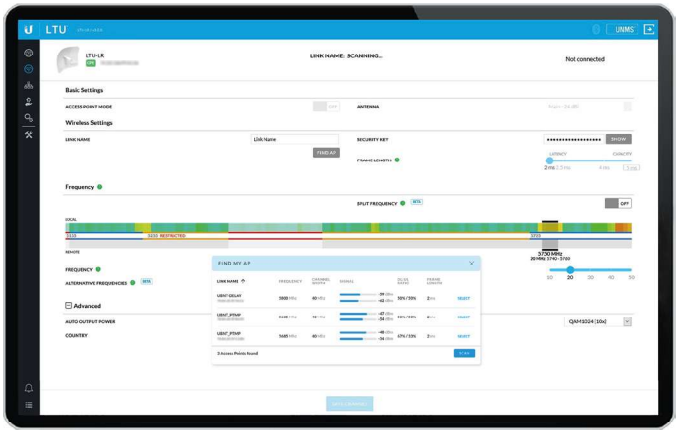
- 10 MHz
- 20 MHz
- 30 MHz
- 40 MHz
- 50 MHz
- Up to 100 MHz*

Auto Power Adjustments

By default, the Auto Output Power option allows the LTU LR to set the output power (EIRP) to the appropriate level.

Signal Control

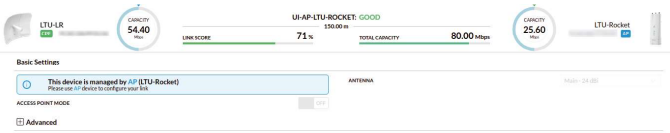
The LTU LR's TX output power is controlled by the AP's target TX output power. A PtMP network can manage signal levels to enhance network stability and achieve optimal wireless performance with the highest possible modulation.



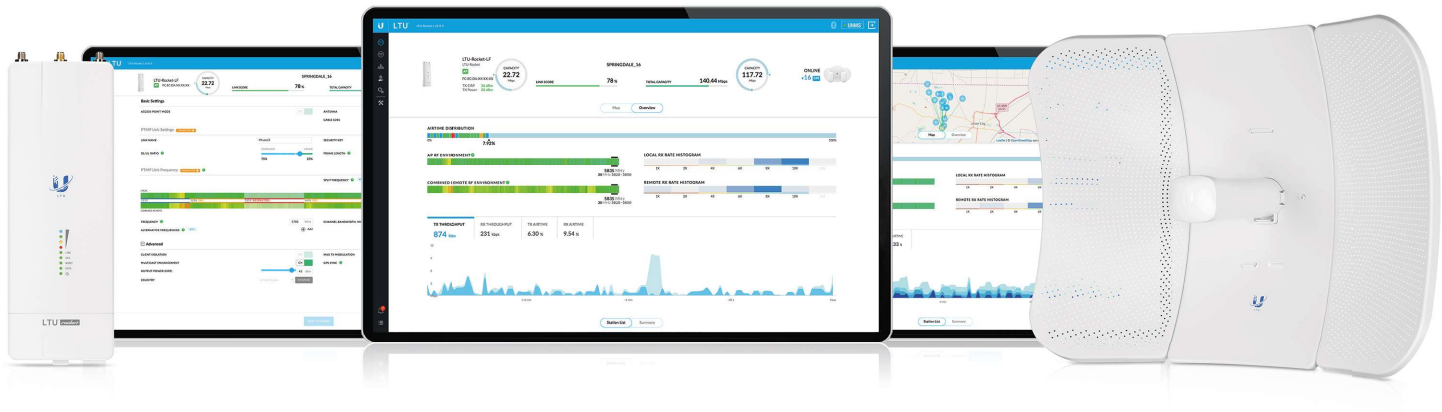
Convenient Configuration

To manage the LTU LR, you have two options: the LTU Configuration Interface and Ubiquiti Network Management System (UNMS™). Either option lets you manually configure the LTU LR.

Within the LTU Configuration Interface, you can manually configure the LTU LR or manage it from the AP side using the Find My AP feature. The LTU LR will automatically scan for APs using the same channel bandwidth. Select the appropriate AP and then use it to configure the LTU LR.



* *Available with future firmware upgrade.*



LTU Configuration Interface

PtMP Dashboard

The Dashboard offers map and Fresnel views* so you can visualize the network. The map view shows your PtMP links overlaid on a geographic map, while the Fresnel view shows the link calculated for your selected CPE, including line of sight, first Fresnel zone, and 60% clearance zone.

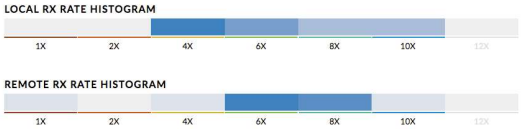
New graphs provide instant status updates and help you to detect connectivity issues and their effects on PtMP performance:

- The airtime distribution bar graph displays in real time how much airtime each CPE is using. Click any point to view the airtime and link score for a specific CPE.

- The AP RF environment bar graph shows ambient RF noise levels across the frequency spectrum.
- The combined remote RF environment bar graph also shows ambient RF noise levels but for the combined environment of all of the remote CPEs.

* *Available for models equipped with GPS.*

- The local and remote RX rate histograms show the receive modulation rates of the various CPEs.



Real-Time Spectral Analysis

airView® spectral analysis runs on a dedicated and independent receiver, which has excellent EVM (Error Vector Magnitude) performance.

The receiver can also perform other tasks, such as a search for channel occupancy, DFS detection, and automatic channel/ frequency assignment. Calibration (signal level measurement accuracy) and resolution bandwidth options are enhanced. Spectral zoom (user-defined scan limits) is also available.

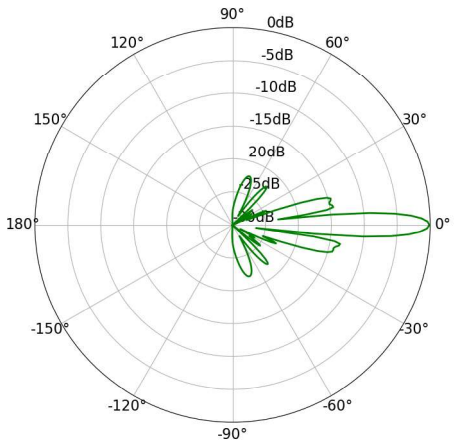
LTU-LR	
Dimensions	512.5 x 385.75 x 258.3 mm (20.18 x 15.19 x 10.17")
Weight With Mount	1.360 kg (2.998 lb) 1.735 kg (3.825 lb)
Networking Interface	(1) 10/100/1000 Ethernet Port
Enclosure	Outdoor UV Stabilized Plastic
Max. Power Consumption	8.5W
Power Supply	24V, 0.5A Gigabit PoE Adapter (Included)
Power Method	24V Passive PoE (Pairs 4, 5+; 7, 8-)
Voltage Range	22 - 26V
Max. Conducted TX Power	22 dBm (per Chain)
Gain	26 dBi
Mounting	Pole-Mount (Kit Included)
Wind Loading	550 N @ 200 km/h (123.6 lbf @ 125 mph)
Wind Survivability	200 km/h (125 mph)
ESD/EMP Protection	± 24kV Contact/Air
Operating Temperature	-40 to 60° C (-40 to 140° F)
Operating Humidity	5 to 95% Noncondensing
Certifications	CE, FCC, IC

Operating Frequency (MHz)	
Worldwide	4800 - 6200*
US/CA U-NII-1 U-NII-2A U-NII-2C U-NII-3	 5150 - 5250 5250 - 5350 5470 - 5725 5725 - 5850

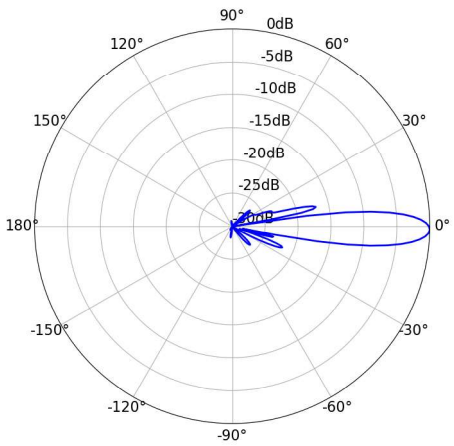
* *Depends on regulatory region.*

Bluetooth LE Management Radio (MHz)	
Worldwide	2400 - 2483.5

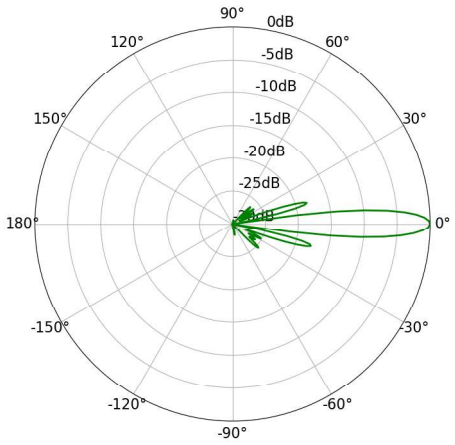
Vertical Azimuth



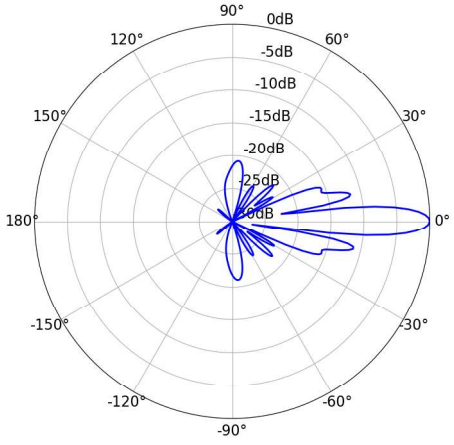
Vertical Elevation



Horizontal Azimuth



Horizontal Elevation



JL020320

LTU™ Rocket

DATASHEET

5 GHz PtMP LTU™ BaseStation Radio

600+ Mbps Point-to-MultiPoint Performance

Up to 125 Client Connections per AP

Up to 2+ Mpps Performance

LTU™ Rocket

Overview

Ubiquiti introduces the LTU Rocket®, the first Point-to-Multi-Point (PtMP) BaseStation radio in our LTU™ product family. Operating in the 5 GHz frequency band, the LTU Rocket is a spectrally efficient, noise-resilient PtMP AP specifically designed for wireless ISPs (WISPs).

Primary features of the LTU Rocket include:

- 600+ Mbps PtMP performance[1]
- Up to 125 client connections per AP
- 2+ Million pps
- Proprietary RF filtering

[1] *1+ Gbps with future firmware upgrade.*

Superior Performance

LTU is a new, proprietary technology with custom silicon and radio design that break through the limitations of 802.11 Wi-Fi technology. This enables LTU to deliver far superior performance over previous airMAX products that are based on 802.11 Wi-Fi.

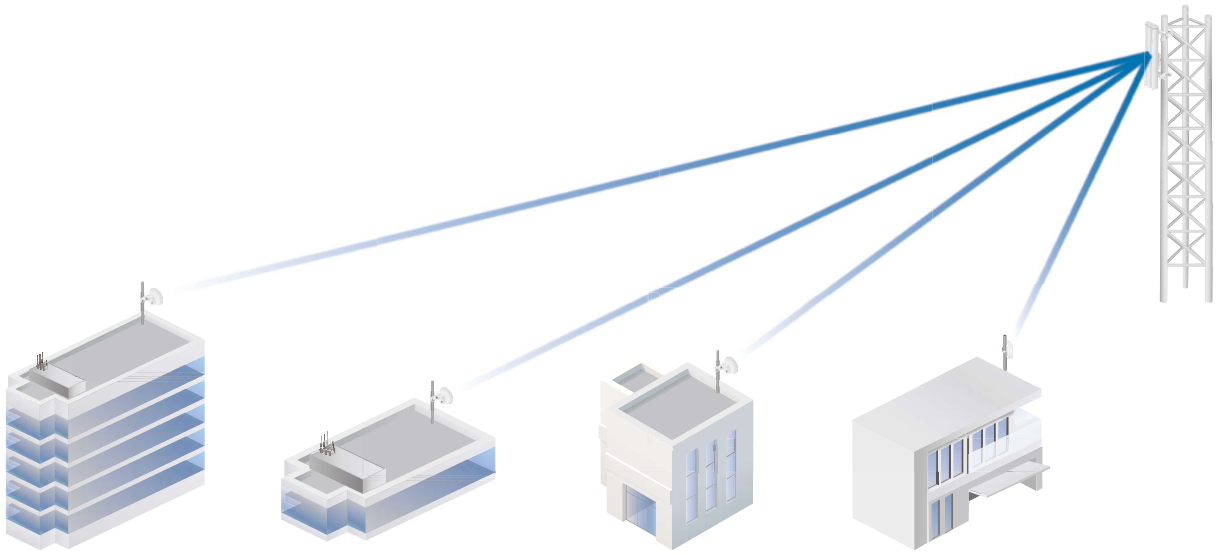
The LTU Rocket is designed for WISPs from the ground floor up. Its core communications processing engine enables low latency, long-range capability, DFS flexibility, higher constellations, better power output, and improved receive sensitivity.

Seamless Compatibility

The LTU Rocket is designed to be paired with a variety of Ubiquiti antennas to suit the needs of each installation. The radio includes a mounting bracket that allows it to be used with a 5 GHz airMAX® Sector antenna or airMAX Omni antenna for a complete 5 GHz PtMP BaseStation. You can even pair three LTU Rocket radios with the airPrism® 5 GHz 3x30° HD Sector Antenna for co-location deployments.

The LTU Rocket also works with any CPE device in the LTU family, such as the LTU-Pro.

Deployment Example



The LTU Rocket paired with a sector antenna provides high-capacity links to multiple LTU CPEs

	Spectral Efficiency	Packets per Second	Modulation Symbols
2020 LTU	21.2 bps/Hz	2,000,000+ pps	4096 QAM*
2012 802.11ac	10.8 bps/Hz	50,000 pps	256 QAM
2007 802.11n	7.5 bps.Hz	25,000 pps	64 QAM

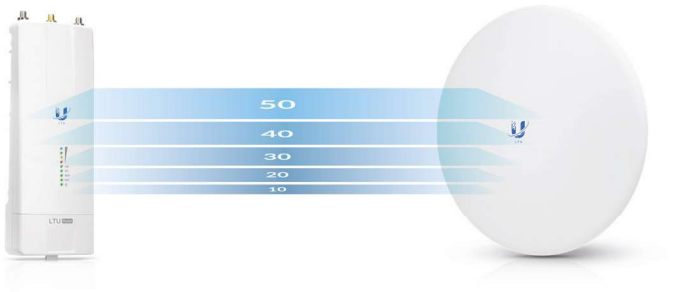
** Available with future firmware upgrade.*

Comparison of LTU Performance vs. 802.11ac and 802.11n

Channel Width Flexibility

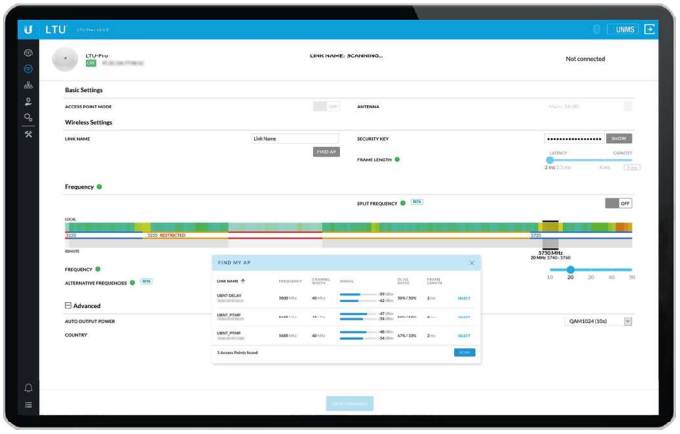
Channel width flexibility allows independent TX and RX channel frequency configurations anywhere within the radio band to avoid local interference. Channel width options include:

- 10 MHz
- 20 MHz
- 30 MHz
- 40 MHz
- 50 MHz
- Up to 100 MHz*



Auto Power Adjustments

By default, the Auto Output Power* option allows the LTU Rocket to set the output power (EIRP) to the appropriate level.



Frequency Split

The LTU Rocket can use different frequencies for TX and RX to avoid interference.

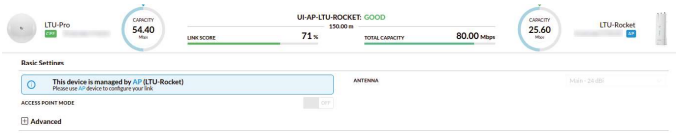
Signal Control

The LTU Rocket's target TX output power controls each station's TX output power. A PtMP network can manage signal levels to enhance network stability and achieve optimal wireless performance with the highest possible modulation.

Convenient Configuration

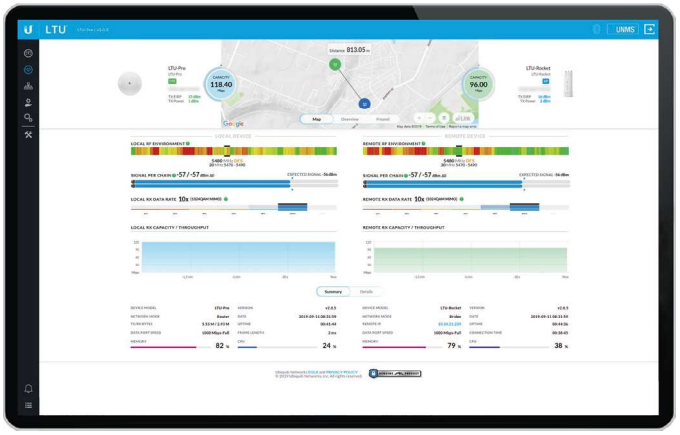
To manage the LTU Rocket, you have two options: the LTU Configuration Interface and Ubiquiti Network Management System (UNMS™). Either option lets you manually configure the LTU Rocket.

The LTU Rocket can also be used to automatically configure the stations. On each station, use the Find My AP feature to scan for APs using the same channel bandwidth, select the appropriate LTU Rocket, and then use it to configure the station.

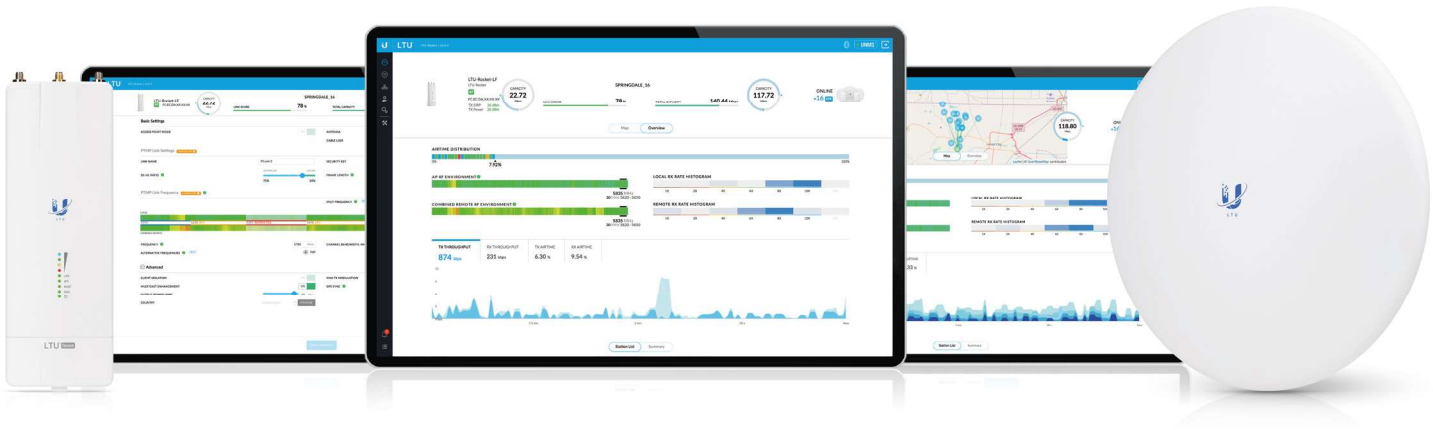


Integrated GPS

Built-in GPS improves synchronization and allows map and Fresnel views on the Dashboard.



* *Available with future firmware upgrade*



LTU Configuration Interface

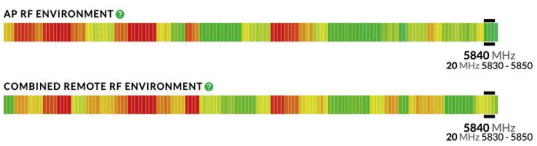
PtMP Dashboard

The Dashboard offers map and Fresnel views* so you can visualize the network. The map view shows your PtMP links overlaid on a geographic map, while the Fresnel view shows the link calculated for your selected CPE, including line of sight, first Fresnel zone, and 60% clearance zone.

New graphs provide instant status updates and help you to detect connectivity issues and their effects on PtMP performance:

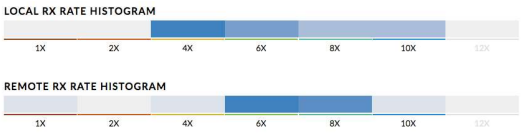
- The airtime distribution bar graph displays in real time how much airtime each CPE is using. Click any point to view the airtime and link score for a specific CPE.

- The AP RF environment bar graph shows ambient RF noise levels across the frequency spectrum.
- The combined remote RF environment bar graph also shows ambient RF noise levels but for the combined environment of all of the remote CPEs.



* *Available for models equipped with GPS.*

- The local and remote RX rate histograms show the receive modulation rates of the various CPEs.



Real-Time Spectral Analysis

airView® spectral analysis runs on a dedicated and independent receiver, which has excellent EVM (Error Vector Magnitude) performance.

The receiver can also perform other tasks, such as a search for channel occupancy, DFS detection, and automatic channel/ frequency assignment. Calibration (signal level measurement accuracy) and resolution bandwidth options are enhanced. Spectral zoom (user-defined scan limits) is also available.

LTU™ Rocket

SPECIFICATIONS

LTU-Rocket	
Dimensions	244 x 82 x 48 mm (9.61 x 3.23 x 1.89")
Weight	0.468 kg (16.5 oz)
Enclosure	Diecast Aluminum and Polycarbonate
RF Connectors	(2) RP-SMA Weatherproof (CH0, CH1) (1) SMA Weatherproof (GPS)
GPS Antenna	External Magnetic Base
Power Supply	24V, 1A Gigabit PoE Adapter (Included)
Power Method	Proprietary 4-Pair Passive PoE Pins 1, 2; 4, 5+ and Pins 3, 6; 7, 8-
Max. Power Consumption	25W
Voltage Range	+18 to +54VDC[1]
Networking Interface	(1) 10/100/1000 Ethernet Port
Mounting	Integrated Pole Mount (Included) Rocket Mount Compatible GPS Pole Mount (Included)
Operating Temperature	-40 to 55° C (-40 to 131° F)
Weatherproofing	IP67[2]
Certifications	FCC Part 15.407 CE EN 302502 v1.2.1, EN 301 893 v1.7.1

System	
Maximum Throughput	675.84 Mbps[3,4]
Maximum Range	100+ km[3]
Packets per Second	2+ Million
Encryption	WPA2-PSK (AES)
Forward Error Correction	LDPC
Uplink/Downlink Ratio	25/75, 33/67, 50/50
OS	airOS LTU
Wireless Modes	AP

[1] *Full range depends on Ethernet cable length.*

[2] *After installation of IP67 upgrade kit (included).*

[3] *Values may vary depending on the environmental conditions.*

[4] *1+ Gbps with future firmware upgrade.*

LTU™ Rocket

SPECIFICATIONS

Radio	
Max. Conducted TX Power	29 dBm (Dependent on Regulatory Region)
Frequency Accuracy	< 2 ppm
Channel Bandwidth	10/20/30/40/50 MHz Selectable Programmable Uplink and Downlink Duty Cycles

Operating Frequency (MHz)	
Worldwide	4800 - 6200*
US/CA	
U-NII-1	5150 - 5250
U-NII-2A	5250 - 5350
U-NII-2C	5470 - 5725
U-NII-3	5725 - 5850

* Depends on regulatory region.

Bluetooth LE Management Radio (MHz)	
Worldwide	2400 - 2483.5

Receive Sensitivity						
Modulation Rate	Modulation	Sensitivity (dBm)				
		10 MHz	20 MHz	30 MHz	40 MHz	50 MHz
10x	1024QAM	-66	-63	-61	-59	-57
8x	256QAM	-72	-69	-67	-65	-63
6x	64QAM	-78	-75	-73	-71	-69
4x	16QAM MIMO	-84	-81	-79	-77	-75
2x	QPSK MIMO	-88	-85	-83	-82	-81
1x	½ Rate QPSK xRT™	-90	-87	-85	-84	-83

Deployment Flexibility

The LTU Rocket can be used with existing airMAX 5 GHz sector antennas offering gain of 16 to 22 dBi, as well as airMAX 5 GHz omni antennas offering gain of 10 to 13 dBi.

The radio's built-in mounting bracket allows it to fit into the radio mount of these antennas – no special tools are needed for installation.

Compatible airMAX Antennas

For best performance, antennas should be selected to allow for a conducted TX power of 20 dBm or below.

	AMO-5G10	AMO-5G13	AM-5G16-120	AM-5G17-90	AM-M-V5G-Ti
Type	Omnidirectional	Omnidirectional	120° Sector	90° Sector	60°/90°/120° Sector
Gain	10 dBi	13 dBi	16 dBi	17 dBi	17 dBi

	AM-5G19-120	AM-5G20-90	AM-V5G-Ti	AM-5AC21-60	AM-5AC22-45	AP-5AC-90-HD
Type	120° Sector	90° Sector	60°/90°/120° Sector	60° Sector	45° Sector	3 x 30° Sector
Gain	19 dBi	20 dBi	21 dBi	21 dBi	22 dBi	22 dBi

Maximum Performance						
		TDD Throughput (Mbps)				
MCS		10 MHz	20 MHz	30 MHz	40 MHz	50 MHz
QPSK SISO	Upload	5.00	10.68	16.76	22.84	28.28
	Download	5.12	11.52	17.60	23.68	29.12
	Aggregate	**10.12**	**22.20**	**34.36**	**46.52**	**57.40**
QPSK MIMO	Upload	10.00	21.36	33.52	45.68	56.56
	Download	10.24	23.04	35.20	47.36	58.24
	Aggregate	**20.24**	**44.40**	**68.72**	**93.04**	**114.80**
16 QAM MIMO	Upload	20.00	42.72	67.04	91.36	113.12
	Download	20.48	46.08	70.40	94.72	116.48
	Aggregate	**40.48**	**88.80**	**137.44**	**186.08**	**229.60**
64 QAM MIMO	Upload	30.00	64.08	100.56	137.04	169.68
	Download	30.72	69.12	105.60	142.08	174.72
	Aggregate	**60.72**	**133.20**	**206.16**	**279.12**	**344.40**
256 QAM MIMO	Upload	40.00	85.44	134.08	182.72	226.24
	Download	40.96	92.16	140.80	189.44	232.96
	Aggregate	**80.96**	**177.60**	**274.88**	**372.16**	**459.20**
1024 QAM MIMO	Upload	50.00	106.80	167.60	228.40	282.80
	Download	51.20	115.20	176.00	236.80	291.20
	Aggregate	**101.20**	**222.00**	**343.60**	**465.20**	**574.00**