rocket® ac

Powerful airMAX® ac BaseStation

Model: R5AC-Lite, R5AC-PTP, R5AC-PTMP

airMAX ac Technology for up to 500+ Mbps Throughput

Superior Processing by airMAX Engine with Custom IC

Plug and Play Integration with airMAX ac Antennas

UBIQUITI®
N E T W O R K S

Overview

Ubiquiti Networks has designed the first airMAX® ac radios for high performance and ease of installation. You have the freedom to deploy the Rocket® ac anywhere in the world, and it allows for a high degree of flexibility in configuring channel bandwidths (subject to local country regulations).

The Rocket ac is available as three models: the Rocket5ac Lite, Rocket5ac PtP, and Rocket5ac PtMP. All three include airMAX ac technology. The Rocket5ac PtP and Rocket5ac PtMP also feature airPrism® technology to further enhance performance.

Pair the Rocket ac with airMAX ac antennas for optimal performance:

- **PtP backhaul** Rocket5ac Lite or Rocket5ac PtP with the RocketDish™ ac
- **PtMP links** Rocket5ac PtMP or Rocket5ac Lite[1] with the airMAX ac Sector

Software

airOS® 7

Sporting an all-new design for improved usability, airOS® v7 is the revolutionary operating system for Ubiquiti® airMAX ac products.

Powerful Wireless Features

- airMAX ac Protocol Support
- Long-Range PtP Link Mode
- Selectable Channel Width
  - PtP: 10/20/30/40[2]/50/60/80 MHz
  - PtMP: 10/20/30/40 MHz
- Automatic Channel Selection
- TX Power Control: Auto/Manual
- Automatic Distance Selection (ACK Timing)
- Strongest WPA2 Security

Usability Enhancements

- Dynamic Configuration Changes
- Instant Input Validation
- HTML5 Technology
- Optimization for Mobile Devices
- Detailed Device Statistics
- Diagnostic Tools, including Ethernet Cabling Test, RF Diagnostics, and airView® Spectrum Analyzer
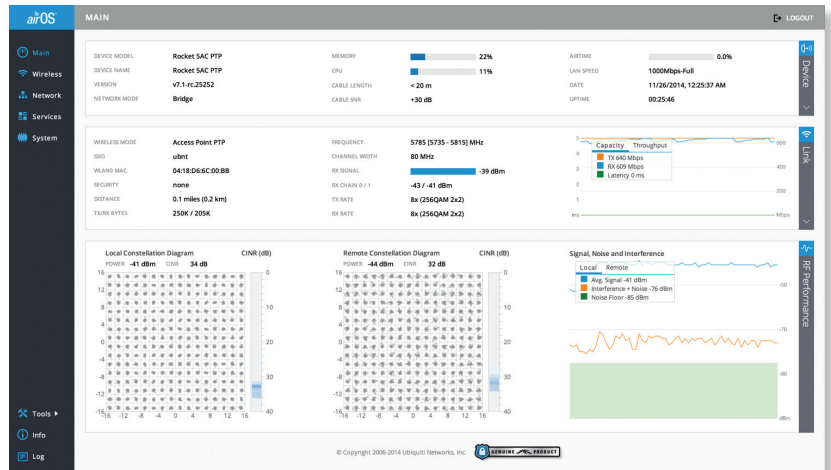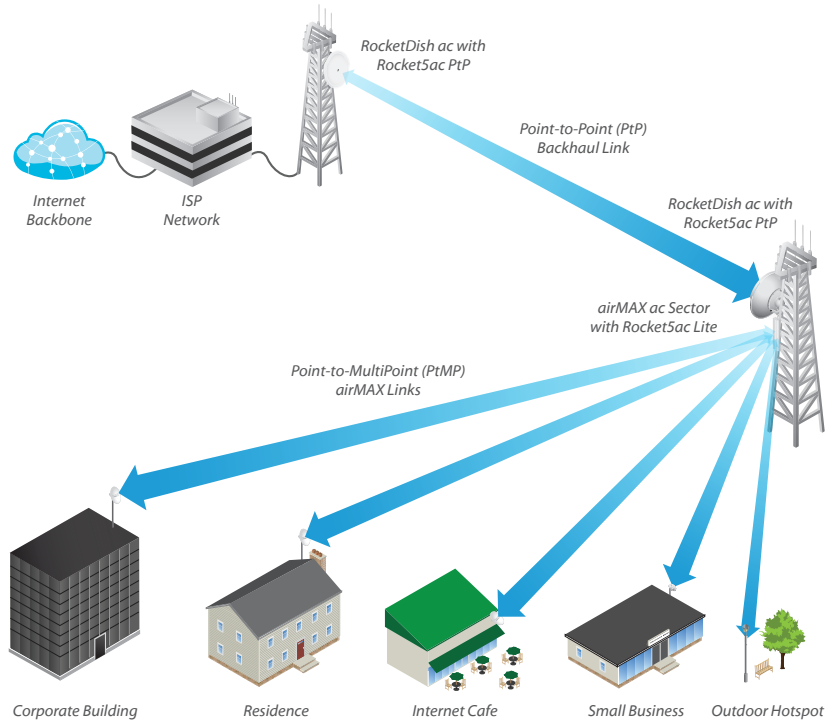
[1] PtMP functionality is available with a firmware upgrade to airOS v7.1 or higher.

[2] Maximum 40 MHz channel width for the R5AC-PTMP.

Application Example

Internet Backbone

ISP Network

RocketDish ac with Rocket5ac PtP

Point-to-Point (PtP) Backhaul Link

RocketDish ac with Rocket5ac PtP

airMAX ac Sector with Rocket5ac Lite

Point-to-MultiPoint (PtMP) airMAX Links

Corporate Building   Residence   Internet Cafe   Small Business   Outdoor Hotspot

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.

Data from the spectrum analysis and RF performance monitoring is displayed on the *Main* tab and airView Spectrum Analyzer.

Real-Time Reporting

The *Main* tab displays the following RF information:

- Persistent RF Error Vector Magnitude (EVM) constellation diagrams
- Carrier to Interference-plus-Noise Ratio (CINR) histograms
- Signal-to-Noise Ratio (SNR) time series plots

Spectral Analysis

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

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

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

In airView, there are three spectral views, each of which represents different data.

- **Waterfall** Aggregate energy collected for each frequency
- **Waveform** Aggregate energy collected
- **Ambient Noise Level** Background noise energy shown as a function of frequency

Available with a firmware upgrade to airOS v7.1, airView provides powerful spectrum analyzer functionality, eliminating the need to rent or purchase additional equipment for conducting site surveys.
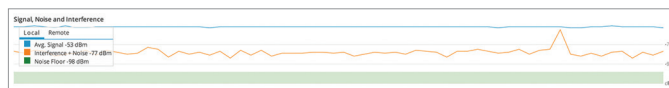
Multi-Radio Architecture
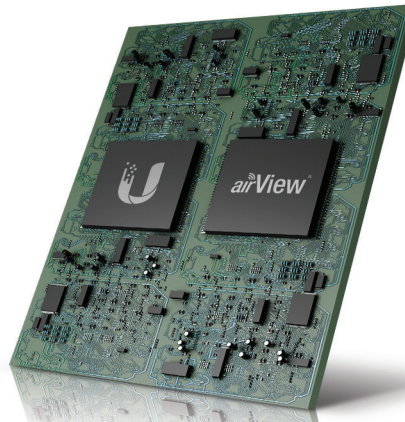
Constellation Diagrams and CINR Histograms
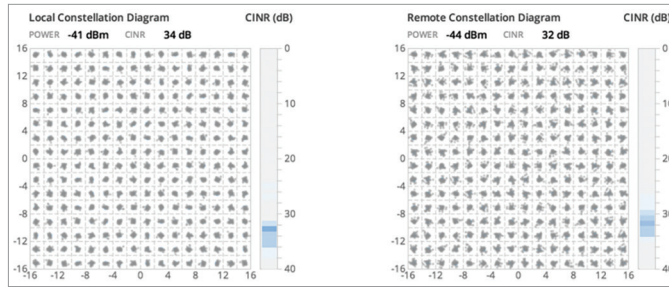
SNR Time Series Plots

Dedicated Spectral Analysis

Technology

airMAX ac

Unlike standard Wi-Fi protocol, Ubiquiti's Time Division Multiple Access (TDMA) airMAX ac 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 ac 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.
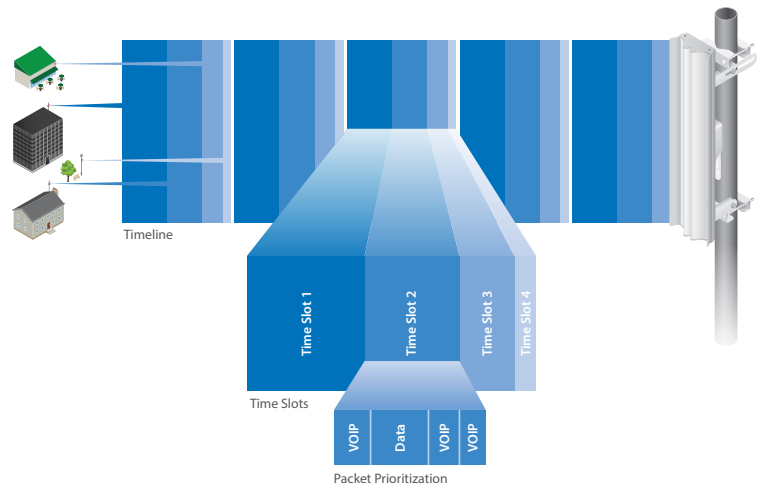
Ubiquiti's airMAX engine with custom IC dramatically improves TDMA latency and network scalability. The custom silicon provides hardware acceleration capabilities to the airMAX scheduler, to support the high data rates and dense modulation used in airMAX ac technology.

Throughput Breakthrough

airMAX ac supports high data rates, which require dense modulation: 256QAM – a significant increase from 64QAM, which is used in airMAX.
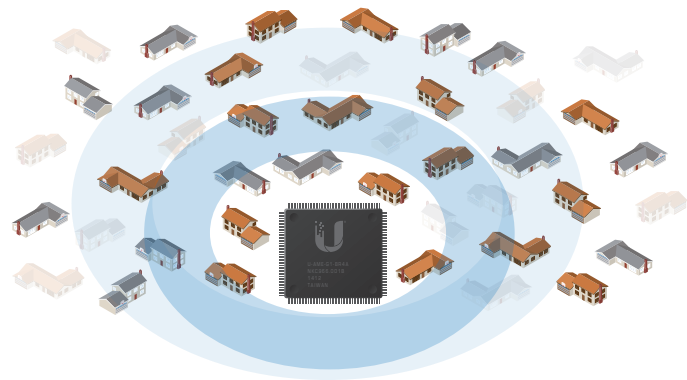
With their use of proprietary airMAX ac technology, airMAX ac products supports up to 500+ Mbps* (maximum 80 MHz channel width) real TCP/IP throughput – up to triple the throughput of standard airMAX products.

airMAX ac TDMA Technology

Timeline

Time Slot 1 Time Slot 2 Time Slot 3 Time Slot 4

Time Slots

VOIP Data VOIP VOIP

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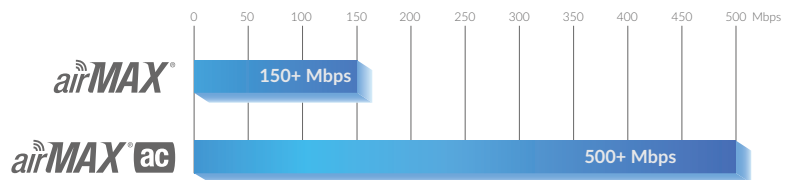
Up to 100 airMAX ac stations can be connected to an airMAX ac Sector; four airMAX ac stations are shown to illustrate the general concept.

airMAX ac Network Scalability

Superior Throughput Performance

0   50   100   150   200   250   300   350   400   450   500 Mbps

airMAX 150+ Mbps

airMAX ac 500+ Mbps

*   Up to 330+ Mbps (maximum 40 MHz channel width) for the R5AC-PTMP.

Technology

airPRISM®

To enhance airMAX ac performance, Ubiquiti Networks introduces our patented airPrism technology, which is featured on the Rocket ac models, R5AC-PTP and R5AC-PTMP.

Improves SNR

High data rates require a high Signal-to-Noise Ratio (SNR), which is challenging to achieve, especially in noisy, high-density areas.

Integrated into Ubiquiti's custom silicon, airPrism technology creates a high SNR by isolating signals within the operating channel and rejecting interference using specialized circuitry, the High-Selectivity Receiver (HSR).

Removes Interference

Depending on the product model and operating mode, available channel widths may include 10, 20, 30, 40, 50, 60, and/or 80 MHz.

Theoretically APs operate on different channels; however, because of the wider channel bandwidths, there can be overlap in spectrum usage.

airPrism technology removes up to an additional 30+ dB of adjacent channel interference through the active filtering design, so an airMAX ac AP with airPrism technology can provide significantly greater performance than a typical AP.

Facilitates AP Co-Location

Co-location is vital in many scenarios. For example, a WISP may have limited tower space, so it must co-locate all APs within that allotted footprint. Shielding and other means can lessen interference but may be impractical.

By deploying airMAX ac APs with airPrism technology, you can co-locate APs and enhance the overall performance of your wireless network.

Number of APs	Channel Width
4	80 MHz*
8	40 MHz
16	20 MHz

*   Supported by R5AC-PTP only.

Active Radio Frequency Filtering

5 GHz Environment

5 GHz with airPrism

airPRISM®

What the Radio Sees
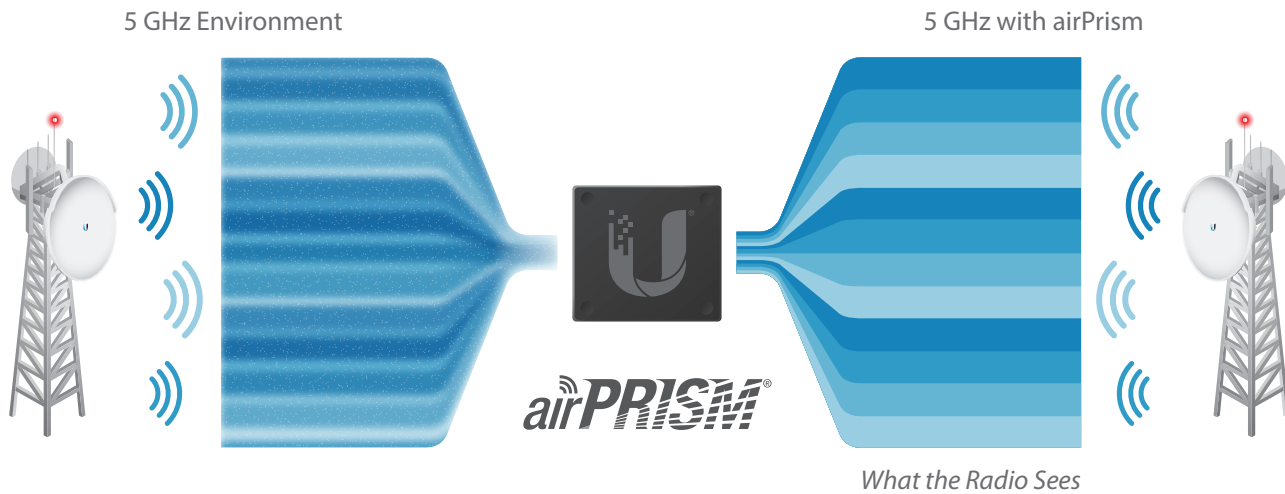
Improved Latency and Noise Immunity

Models

rocket™ ac

Features

5 GHz Frequency Band This unlicensed band of plentiful spectrum works well for long-distance links.

Gigabit Ethernet Deliver high throughput over its wired connection.

Rocket5ac Lite

Launched with PtP functionality, the Rocket5ac Lite adds PtMP functionality with a firmware upgrade to airOS v7.1 or higher.

The Rocket5ac Lite is a cost-effective basestation for links experiencing low or moderate levels of interference.

Passive Power over Ethernet (PoE) 24V Passive PoE functionality is included. Both power and data are carried over a single Ethernet cable to the Rocket ac. Use the included PoE Adapter or an optional PoE switch.

Rocket5ac PtP

Featuring Ubiquiti's airPrism technology, the Rocket5ac PtP is designed for optimal PtP performance, although it can operate in PtMP mode. To take full advantage of its design and capabilities, deploy the Rocket5ac PtP for PtP links in noisy, high-density areas.

Plug and Play Integration Every airMAX antenna has a built-in Rocket mount, so no tools are needed to install the Rocket ac. (airMAX ac antennas are recommended for optimal performance.)

Rocket5ac PtMP

Also featuring Ubiquiti's airPrism technology, the Rocket5ac PtMP is designed for optimal PtMP performance, although it can operate in PtP mode. To take full advantage of its capabilities, deploy the Rocket5ac PtMP for PtMP links to airMAX ac CPEs located in crowded RF environments.

Model Comparison Chart

	Rocket5ac Lite	Rocket5ac PtP	Rocket5ac PtMP
Model Number	R5AC-Lite	R5AC-PTP	R5AC-PTMP
Frequency	Full-Band 5 GHz	Mid-Band 5 GHz	Mid-Band 5 GHz
airMAX ac Technology	✓	✓	✓
airPrism Technology		✓	✓
PtP Functionality	✓	✓	✓[1]
PtMP Functionality	✓[2]	✓[1]	✓
Gigabit Ethernet	✓	✓	✓
Ubiquiti PoE	✓	✓	✓
Output Power	27 dBm	27 dBm	27 dBm

[1] Requires firmware airOS v7.1.1 or higher.

[2] Requires firmware airOS v7.1 or higher.

Specifications

R5AC-Lite					
Dimensions	162 x 84 x 37 mm (6.38 x 3.31 x 1.46")				
Weight	250 g (8.81 oz)				
Power Supply	24V, 0.5A Gigabit PoE Adapter				
Power Method	Passive PoE (Pairs 4, 5+; 7, 8 Return)				
Max. Power Consumption	8.5W				
Operating Frequency	Worldwide	USA: U-NII-1	USA: U-NII-2A	USA: U-NII-2C	USA: U-NII-3
	5150 - 5875 MHz	5150 - 5250 MHz*	5250 - 5350 MHz*	5470 - 5725 MHz*	5725 - 5850 MHz*
Processor	Atheros MIPS 74Kc, 720 MHz				
Memory	128 MB DDR2 SDRAM, 16 MB NOR FLASH				
Networking Interface	(1) 10/100/1000 Mbps				
RF Connections	(2) RP-SMA (Waterproof)				
LEDs	Power, LAN, (4) Signal Strength				
Channel Sizes	PtP Mode		PtMP Mode		
	10/20/30/40/50/60/80 MHz		10/20/30/40 MHz		
Enclosure Characteristics	Outdoor UV Stabilized Plastic				
Supported Voltage Range	20-26VDC				
ESD/EMP Protection	± 24KV Air / Contact				
Operating Temperature	-40 to 80° C (-40 to 176° F)				
Operating Humidity	5 to 95% Noncondensing				
Shock and Vibration	ETSI300-019-1.4				
Wireless Approvals	FCC, IC, CE				
RoHS Compliance	Yes				
Modes	Access Point, Station				
Services	Web Server, SNMP, SSH Server, Telnet , Ping Watchdog, DHCP, NAT, Bridging, Routing				
Utilities	Antenna Alignment Tool, Discovery Utility, Site Survey, Ping, Traceroute, Speed Test				
Distance Adjustment	Dynamic Ack and Ackless Mode				
Power Adjustment	Software Adjustable UI or CL				
Security	WPA2 AES Only				
QoS	Supports Packet Level Classification WMM and User Customer Level: High/Medium/Low				
Statistical Reporting	Up Time, Packet Errors, Data Rates, Wireless Distance, Ethernet Link Rate				
Other	Remote Reset Support, Software Enabled/Disabled, VLAN Support, 256QAM				
Ubiquiti Specific Features	30/50/60 MHz Channels, airMAX ac Mode, Traffic Shaping with Burst Support, Discovery Protocol, Frequency Band Offset, Ackless Mode				

R5AC-Lite Output Power: 27 dBm							
TX Power Specifications				**RX Power Specifications**			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
airMAX ac	1x BPSK (½)	27 dBm	± 2 dB	airMAX ac	1x BPSK (½)	-96 dBm	± 2 dB
	2x QPSK (½)	27 dBm	± 2 dB		2x QPSK (½)	-95 dBm	± 2 dB
	2x QPSK (¾)	27 dBm	± 2 dB		2x QPSK (¾)	-92 dBm	± 2 dB
	4x 16QAM (½)	27 dBm	± 2 dB		4x 16QAM (½)	-90 dBm	± 2 dB
	4x 16QAM (¾)	27 dBm	± 2 dB		4x 16QAM (¾)	-86 dBm	± 2 dB
	6x 64QAM (⅔)	27 dBm	± 2 dB		6x 64QAM (⅔)	-83 dBm	± 2 dB
	6x 64QAM (¾)	26 dBm	± 2 dB		6x 64QAM (¾)	-77 dBm	± 2 dB
	6x 64QAM (⅚)	25 dBm	± 2 dB		6x 64QAM (⅚)	-74 dBm	± 2 dB
	8x 256QAM (¾)	23 dBm	± 2 dB		8x 256QAM (¾)	-69 dBm	± 2 dB
	8x 256QAM (⅚)	22 dBm	± 2 dB		8x 256QAM (⅚)	-65 dBm	± 2 dB

* Some frequencies may require activation; visit: **https://www.ubnt.com/fcclabelrequest**

rocket® ac

Specifications

R5AC-PTP			
Dimensions	198.5 x 86.4 x 44.1 mm (7.82 x 3.40 x 1.74")		
Weight	295 g (10.41 oz)		
Power Supply	24V, 0.5A Gigabit PoE Adapter		
Power Method	Passive PoE (Pairs 4, 5+; 7, 8 Return)		
Max. Power Consumption	8.5W		
Operating Frequency	Worldwide	USA: U-NII-2C	USA: U-NII-3
	5470 - 5875 MHz	5470 - 5725 MHz*	5725 - 5850 MHz*
Processor	Atheros MIPS 74Kc, 720 MHz		
Memory	128 MB DDR2 SDRAM, 16 MB NOR FLASH		
Networking Interface	(1) 10/100/1000 Mbps		
RF Connections	(2) RP-SMA (Waterproof)		
LEDs	Power, LAN, (4) Signal Strength		
Channel Sizes	PtP Mode	PtMP Mode	
	10/20/30/40/50/60/80 MHz	10/20/30/40 MHz	
Enclosure Characteristics	Outdoor UV Stabilized Plastic		
Supported Voltage Range	20-26VDC		
ESD/EMP Protection	± 24KV Air / Contact		
Operating Temperature	-40 to 80° C (-40 to 176° F)		
Operating Humidity	5 to 95% Noncondensing		
Shock and Vibration	ETSI300-019-1.4		
Wireless Approvals	FCC, IC, CE		
RoHS Compliance	Yes		
Modes	Access Point, Station		
Services	Web Server, SNMP, SSH Server, Telnet , Ping Watchdog, DHCP, NAT, Bridging, Routing		
Utilities	Antenna Alignment Tool, Discovery Utility, Site Survey, Ping, Traceroute, Speed Test		
Distance Adjustment	Dynamic Ack and Ackless Mode		
Power Adjustment	Software Adjustable UI or CL		
Security	WPA2 AES Only		
QoS	Supports Packet Level Classification WMM and User Customer Level: High/Medium/Low		
Statistical Reporting	Up Time, Packet Errors, Data Rates, Wireless Distance, Ethernet Link Rate		
Other	Remote Reset Support, Software Enabled/Disabled, VLAN Support, 256QAM		
Ubiquiti Specific Features	30/50/60 MHz Channels, airMAX ac Mode, Traffic Shaping with Burst Support, Discovery Protocol, Frequency Band Offset, Ackless Mode		

R5AC-PTP Output Power: 27dBm							
TX Power Specifications				**RX Power Specifications**			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
airMAX ac	1x BPSK (½)	27 dBm	± 2 dB	airMAX ac	1x BPSK (½)	-96 dBm	± 2 dB
	2x QPSK (½)	27 dBm	± 2 dB		2x QPSK (½)	-95 dBm	± 2 dB
	2x QPSK (¾)	27 dBm	± 2 dB		2x QPSK (¾)	-92 dBm	± 2 dB
	4x 16QAM (½)	27 dBm	± 2 dB		4x 16QAM (½)	-90 dBm	± 2 dB
	4x 16QAM (¾)	27 dBm	± 2 dB		4x 16QAM (¾)	-86 dBm	± 2 dB
	6x 64QAM (⅔)	27 dBm	± 2 dB		6x 64QAM (⅔)	-83 dBm	± 2 dB
	6x 64QAM (¾)	26 dBm	± 2 dB		6x 64QAM (¾)	-77 dBm	± 2 dB
	6x 64QAM (⅚)	25 dBm	± 2 dB		6x 64QAM (⅚)	-74 dBm	± 2 dB
	8x 256QAM (¾)	23 dBm	± 2 dB		8x 256QAM (¾)	-69 dBm	± 2 dB
	8x 256QAM (⅚)	22 dBm	± 2 dB		8x 256QAM (⅚)	-65 dBm	± 2 dB

* Some frequencies may require activation; visit: **https://www.ubnt.com/fcclabelrequest**

Specifications

R5AC-PTMP			
Dimensions	198.5 x 86.4 x 44.1 mm (7.82 x 3.40 x 1.74")		
Weight	295 g (10.41 oz)		
Power Supply	24V, 0.5A Gigabit PoE Adapter		
Power Method	Passive PoE (Pairs 4, 5+; 7, 8 Return)		
Max. Power Consumption	8.5W		
Operating Frequency	Worldwide	USA: U-NII-2C	USA: U-NII-3
	5470 - 5875 MHz	5470 - 5725 MHz*	5725 - 5850 MHz*
Processor	Atheros MIPS 74Kc, 720 MHz		
Memory	128 MB DDR2 SDRAM, 16 MB NOR FLASH		
Networking Interface	(1) 10/100/1000 Mbps		
RF Connections	(2) RP-SMA (Waterproof)		
LEDs	Power, LAN, (4) Signal Strength, (5) Reserved		
Channel Sizes	PtP Mode	PtMP Mode	
	10/20/30/40 MHz	10/20/30/40 MHz	
Enclosure Characteristics	Outdoor UV Stabilized Plastic		
Supported Voltage Range	20-26VDC		
ESD/EMP Protection	± 24KV Air / Contact		
Operating Temperature	-40 to 80° C (-40 to 176° F)		
Operating Humidity	5 to 95% Noncondensing		
Shock and Vibration	ETSI300-019-1.4		
Wireless Approvals	FCC, IC, CE		
RoHS Compliance	Yes		
Modes	Access Point, Station		
Services	Web Server, SNMP, SSH Server, Telnet , Ping Watchdog, DHCP, NAT, Bridging, Routing		
Utilities	Antenna Alignment Tool, Discovery Utility, Site Survey, Ping, Traceroute, Speed Test		
Distance Adjustment	Dynamic Ack and Ackless Mode		
Power Adjustment	Software Adjustable UI or CL		
Security	WPA2 AES Only		
QoS	Supports Packet Level Classification WMM and User Customer Level: High/Medium/Low		
Statistical Reporting	Up Time, Packet Errors, Data Rates, Wireless Distance, Ethernet Link Rate		
Other	Remote Reset Support, Software Enabled/Disabled, VLAN Support, 256QAM		
Ubiquiti Specific Features	30/50/60 MHz Channels, airMAX ac Mode, Traffic Shaping with Burst Support, Discovery Protocol, Frequency Band Offset, Ackless Mode		

R5AC-PTMP Output Power: 27dBm							
TX Power Specifications				**RX Power Specifications**			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
airMAX ac	1x BPSK (½)	27 dBm	± 2 dB	airMAX ac	1x BPSK (½)	-96 dBm	± 2 dB
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	4x 16QAM (½)	27 dBm	± 2 dB		4x 16QAM (½)	-90 dBm	± 2 dB
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	6x 64QAM (⅔)	27 dBm	± 2 dB		6x 64QAM (⅔)	-83 dBm	± 2 dB
	6x 64QAM (¾)	26 dBm	± 2 dB		6x 64QAM (¾)	-77 dBm	± 2 dB
	6x 64QAM (⅚)	25 dBm	± 2 dB		6x 64QAM (⅚)	-74 dBm	± 2 dB
	8x 256QAM (¾)	23 dBm	± 2 dB		8x 256QAM (¾)	-69 dBm	± 2 dB
	8x 256QAM (⅚)	22 dBm	± 2 dB		8x 256QAM (⅚)	-65 dBm	± 2 dB

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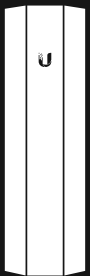
Plug and Play Integration

Rocket radios and airMAX antennas have been designed to work together seamlessly. Every airMAX antenna has a built-in Rocket mount, so installation requires no special tools.

Antenna Compatibility

	Rocket5ac Lite	Rocket5ac PtP	Rocket5ac PtMP
Frequency Band	5 GHz	5 GHz	5 GHz
Sector	AM-5AC21-60 AM-5AC22-45 AM-V5G-Ti AM-M-V5G-Ti AM-5G16-120 AM-5G17-90 AM-5G19-120 AM-5G20-90		AM-5AC21-60 AM-5AC22-45 AM-V5G-Ti AM-M-V5G-Ti AM-5G16-120 AM-5G17-90 AM-5G19-120 AM-5G20-90
Rocket Dish	RD-5G31-AC RD-5G30-LW RD-5G30 RD-5G34	RD-5G31-AC RD-5G30-LW RD-5G30 RD-5G34	

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