

airFiber[®] 5X HD

5 GHz Carrier Radio with LTU™ Technology

Model: AF-5XHD

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

Full-Band Certification including DFS

Ubiquiti's LTU™ Custom Silicon

Overview

Ubiquiti Networks continues to disrupt the wireless broadband market with revolutionary technology at breakthrough pricing by introducing the airFiber® AF-5XHD. Designed for use in the 5 GHz frequency band, the AF-5XHD features the newest radio technology, offering greater channel bandwidths (up to 100 MHz) and more advanced RF components.

The AF-5XHD is also compatible with a number of existing Ubiquiti® antennas for the 5 GHz band, including airFiber X antennas and certain RocketDish™ antennas. Pair the AF-5XHD with a compatible Ubiquiti antenna for a complete 5 GHz Point-to-Point (PtP) solution.

The AF-5XHD also includes a special IP67 upgrade kit for enhanced protection from dust and water.

Engineered for Performance

Ubiquiti's custom silicon and proprietary radio architecture are designed specifically for long-distance, outdoor wireless applications.

Our core communications processing engine surpasses all of the limitations inherent to generic Wi-Fi chips to provide superior performance, long-range capability, DFS flexibility, higher constellations, and power output, along with better receive sensitivity.

The AF-5XHD features industry-leading 10.6 bps/Hz spectral efficiency, line-rate data packet processing for up to 1 Gbps of real data throughput, and innovative xtreme Range Technology (xRT™) for up to 100 km in range.

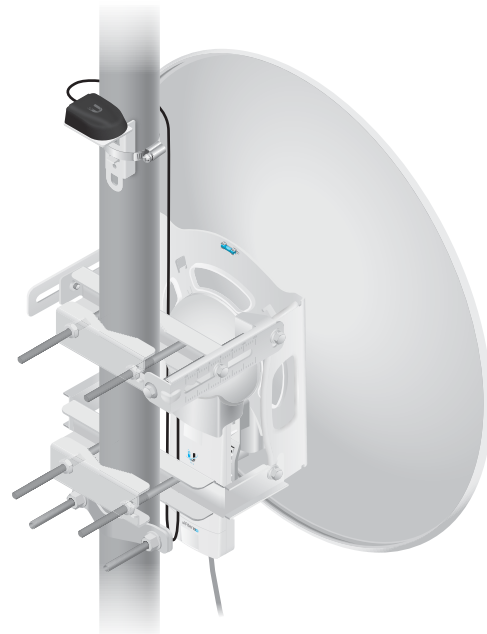


Key Features

The AF-5XHD offers the following advanced features:

- **Programmable Transmit Power** The radio's transmit power level can be programmed up to +29 dBm.
- **Programmable Duty Cycle (GPS synchronized frames)** The AF-5XHD allows configuration of asymmetric TX and RX duty cycles. TX ratios include 25%, 33%, 50%, 66.7%, and 75%.
- **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.
- **Split TX and RX Frequency*** The radio can operate on different frequencies for TX and RX, allowing great flexibility for interference avoidance.
- **Split TX and RX Channel Bandwidth*** Support for different channel bandwidths for TX and RX allows users to scale required data capacity more efficiently.
- **Adaptive Modulation up to 1024QAM** Adaptive modulation rates of up to 1024QAM (4096QAM with targeted upgrade) are supported.
- **Dual Redundant Gigabit Ethernet Ports with PoE** The AF-5XHD has two Gigabit Ethernet ports that can be used to provide redundant PoE power.
- **OFDM and OFDMA Support*** The radio offers flexible scheduling for 2, 4, or 8 subchannels.
- **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.
- **User-Configurable Interference Mitigation** Three user-selectable profiles support both high-interference and greenfield deployments for robust, optimal performance.
- **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 24-48VDC and provides enhanced surge protection.

* Available with a future firmware upgrade.



AF-5XHD Pole-Mount Installation



AF-5XHD with Optional IP67 Kit Installed

5 GHz Backhaul

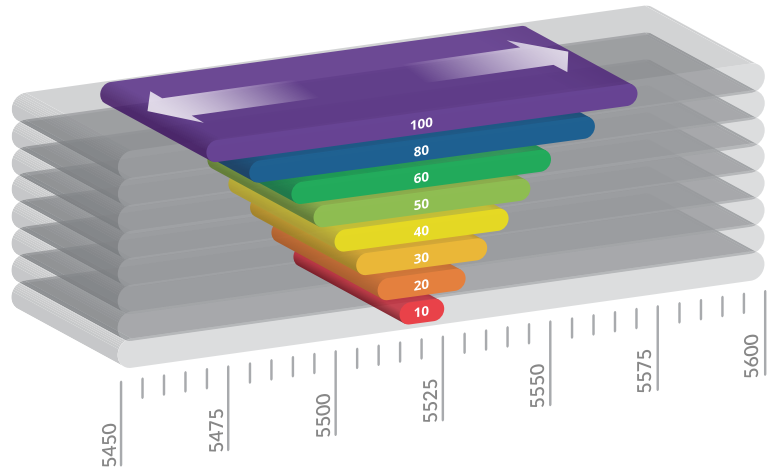
Full-Band Certification with DFS

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

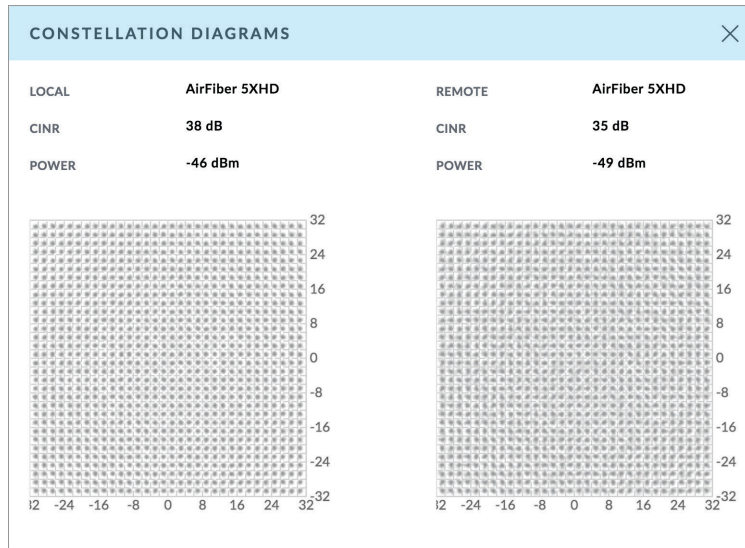
Co-location is vital in many scenarios. For example, a WISP may have limited tower space, so it must co-locate all equipment within that allotted footprint.

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.



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.

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:

airFiber[®] X Antenna



Model	Frequency	Gain
AF-5G23-S45	5 GHz	23 dBi

The AF-5G23-S45 offers 23 dBi of gain in a 378-mm diameter size.



Model	Frequency	Gain
AF-5G30-S45	5 GHz	30 dBi

The AF-5G30-S45 offers 30 dBi of gain in a 650-mm diameter size.



Model	Frequency	Gain
AF-5G34-S45	5 GHz	34 dBi

The AF-5G34-S45 offers 34 dBi of gain in a 1050-mm diameter size.

RocketDish™

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



Model	Frequency	Gain
RD-5G30	5 GHz	30 dBi

The RD-5G30 offers 30 dBi of gain in a 650-mm diameter size.



Model	Frequency	Gain
RD-5G34	5 GHz	34 dBi

The RD-5G34 offers 34 dBi of gain in a 1050-mm diameter size.

Conversion Kit

The 5 GHz RocketDish to airFiber Antenna Conversion Kit converts the RocketDish RD-5G30 or RD-5G34 antenna for use with the AF-5XHD.



Model	RD-5G30	RD-5G34
AF-5G-OMT-S45	✓	✓

Specifications

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	24-50VDC
Mounting	airFiber X Mount (Rocket Mount Compatible) GPS Pole Mount (Included)
Operating Temperature	-40 to 55° C (-40 to 131° F)
IP Rating	IP67 ²
Certifications	CE, FCC, IC

Networking Interface	
Data Port	(1) 10/100/1000 Ethernet Port
Management Port	(1) 10/100/1000 Ethernet Port

System	
Processor	airFiber LTU IC
Maximum Throughput	1 Gbps ¹
Maximum Range	100 km ¹
Packets per Second	2+ Million
Encryption	WPA2-PSK (AES)
OS	airFiber-airOS 8
Wireless Modes	AP/CPE

¹ Varies with firmware load and operational mode.

² After installation of IP67 kit (included).

Radio	
Frequency Range	4.8 GHz - 6.2 GHz ² (Dependent on Regulatory Region)
Max. Conducted TX Power	29 dBm ² (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

Suggested Max. TX Power	
10x	19 - 20 dBm
8x	21 - 22 dBm
6x	23 - 24 dBm
4x	29 dBm
½x	29 dBm
¼x	29 dBm

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

³ Throughput and range values may vary depending on the environmental conditions.

⁴ For region-specific details, refer to the *Compliance* chapter of the airFiber 5XHD User Guide at www.ubnt.com/download/airfiber

