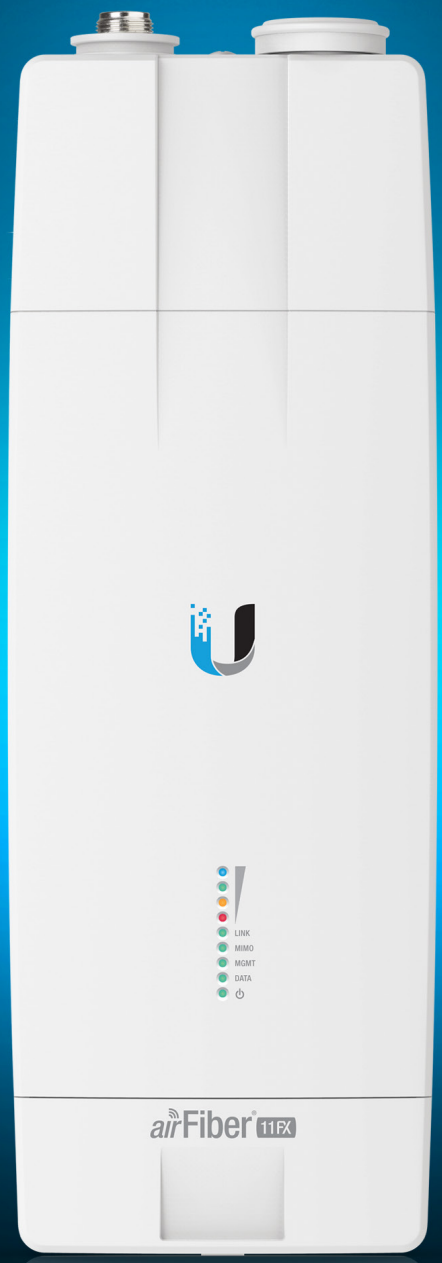
DATASHEET



airFiber® 11FX

Licensed Backhaul Radio

Models: AF-11FX-L, AF-11FX-H

Full-Duplex, Point-to-Point Radio

11 GHz Frequency Operation

Up to 1.2+ Gbps Throughput

UBIQUITI® NETWORKS

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Overview

Ubiquiti Networks continues to disrupt the wireless broadband market with revolutionary technology at breakthrough pricing, by introducing the airFiber® AF-11FX, a radio purpose-built for outdoor PtP bridging and carrier-class network backhauls using the licensed 11 GHz radio band.

The AF-11FX breaks free from the congested 5 GHz band to help meet the growing need for broadband capacity.

For maximum flexibility, the airFiber AF-11FX works with the Ubiquiti® AF-11G35 antenna, or with most third-party antennas using an optional adapter kit (not included).

AF-11FX Radio Mounted on AF-11G35 Antenna

Groundbreaking Design

The AF-11FX gives exceptional performance compared to other 11 GHz radios in its price range. Unlike other products that use adaptations of Wi-Fi-based designs, the AF-11FX is specially engineered for the 11 GHz band, with a custom modem and radio design that are optimized for the efficient transport of data. Specific advantages of the AF-11FX include:

TDD

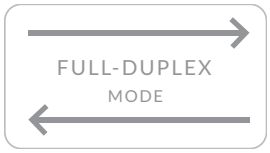
True FDD

True Full-Duplex Design The AF-11FX offers a true FDD solution that fully satisfies all licensing requirements for the 11 GHz band.

Ultra-Low Latency Overall customer experience and system capacity is enhanced with FDD performance.

Enhanced Robustness The AF-11FX features a unique, built-in, rain-fade mitigation strategy for increased link robustness.

Extended Range The RF power amplifiers feature a unique bias scheme, allowing high-order constellations at longer ranges.



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Channel Configuration

Optimized Channels

The airFiber AF-11FX can use single (SISO) or bonded (MIMO)* channels, depending on your specific licensing requirements. The AF-11FX also features different channel width sizes to suit your deployment needs, and you can independently configure TX and RX channel frequencies.

Reconfigurable Duplexers

The AF-11FX features a unique modular duplexer design to suit multiple frequency configurations.

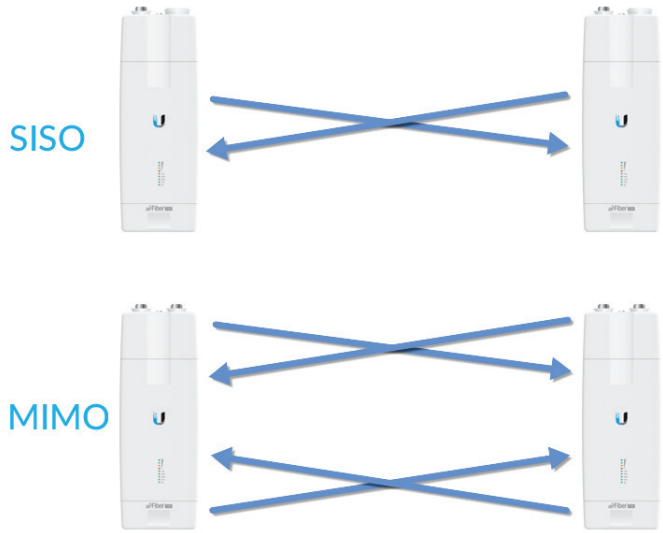
Each AF-11FX radio can be configured to support any allowable frequency by simply changing the duplexers for high-band or low-band use in the 10.7 - 11.7 GHz allocation.

Each duplexer has a low channel and a high channel that can be configured by simply reversing the position of the duplexer.

Highest Performance Value

The compact AF-11FX supports high-order constellations – up to 1024QAM – allowing it to deliver the greatest spectral efficiency in its class.

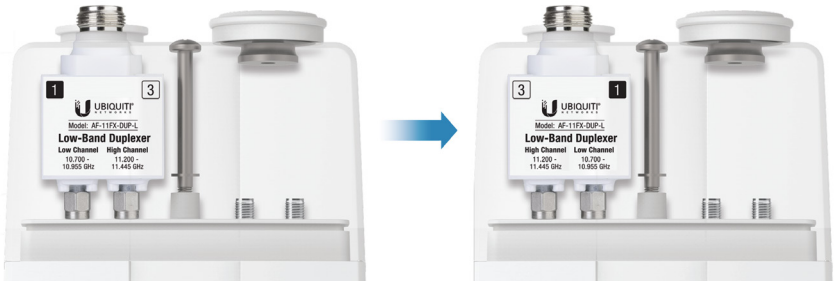
* Each AF-11FX includes either one low-band duplexer or one high-band duplexer for SISO mode configuration. MIMO mode configuration requires a second low-band or high-band duplexer (not included).



Low-Band Duplexer

High-Band Duplexer

Duplexer	Low Channel	High Channel	Model
Low-Band Duplexer	10.700 - 10.955 GHz	11.200 - 11.445 GHz	AF-11FX-L
High-Band Duplexer	10.940 - 11.200 GHz	11.440 - 11.700 GHz	AF-11FX-H



Reversible Duplexers For Easy Channel Configuration

SISO Mode *MIMO Mode*

Example of SISO Mode vs MIMO Mode Configuration

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Advanced Engineering

Ubiquiti's INVICTUS™ 2 custom silicon and proprietary radio architecture are designed specifically for long-distance, outdoor wireless applications, providing superior performance, long-range capability, and higher delivered throughput.

Deployment Flexibility

The airFiber AF-11FX provides a number of deployment options including:

Power Source Options

Support for PoE or DC power gives you the flexibility to power the AF-11FX separately from Ethernet traffic.

- PoE power can be supplied on the DATA port, using the provided PoE adapter.
- DC power can be supplied using the terminal block.

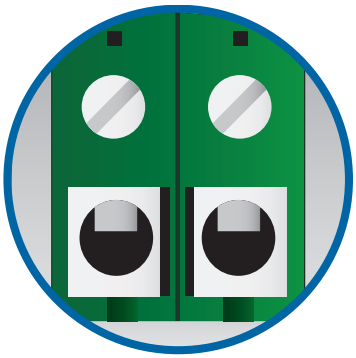
Versatile, Ruggedized N-Type Connectors

N-connectors allow the AF-11FX to be used with either the Ubiquiti AF-11G35 antenna or a variety of commonly available antennas.

Specially designed silicone boots provide a weatherproof barrier against dust and moisture.

AF-11FX INVICTUS 2 Custom Silicon Design

PoE Power



DC Power

N-Connector with Boot Retracted

N-Connector with Boot In Place

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airFiber X Antenna

Ubiquiti offers the AF-11G35 antenna, specially designed for the AF-11FX radio, so that installation requires no special tools. The AF-11G35 comes preconfigured with V/H polarization, and can be configured to support ± 45° slant polarization for improved noise immunity and Signal-to-Noise Ratio (SNR), dependent on regulatory region.

For even greater flexibility, the AF-11FX can also work with most commonly available 11 GHz antennas, using an adapter kit (available from the antenna manufacturer).

AF-11G35 Antenna

Model	Frequency	Gain	Radome
AF-11G35	11 GHz	35 dBi	Integrated

The AF-11G35 offers up to 35 dBi of gain.

Front View of AF-11G35 With Radome

Back View of AF-11G35 With AF-11FX Radio

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Specifications

AF-11FX	
Dimensions	327 x 112 x 86 mm (12.87 x 4.41 x 3.39")
Weight	2.260 kg (5 lb)
RF Connectors	(4) SMA Weatherproof: TX 0, RX 0 (Chain 0) and TX 1, RX 1 (Chain 1) (2) N-Type Waterproof, One per Duplexer
Power Supply	50VDC, 1.2A PoE Gigabit Adapter (Included)
Power Method	Passive Power over Ethernet Pins 1, 2, 4, 5 (+) and Pins 7, 8, 3, 6 (-) or DC Power Block
Max. Power Consumption	36W
Supported Voltage Range	38-56VDC
Mounting	Integrated Pole Mount Included Oversized Rocket Mount Compatible
Certifications	CE, FCC, IC
Operating Temperature	-40 to 55° C (-40 to 131° F)
LEDs	(8) Status LEDs: Data Port Link/Activity Management Port Link/Activity MIMO Mode RF Link (4) Autoscaling Signal Strength Bar Graph

AF-11FX Networking Interface	
Data Port	(1) 10/100/1000 Ethernet Port
Management Port	(1) 10/100 Ethernet Port

AF-11FX System	
Processor	INVICTUS 2 IC
Maximum Throughput	1.2+ Gbps[1]
Maximum Range	300+ km[1]
Encryption	128-bit AES
OS	airOS® F
Wireless Modes	SISO/MIMO

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

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AF-11FX Radio	
Frequency Range	10.7-11.7 GHz[2]
Max. Conducted TX Power	30 dBm[2] (Dependent on Regulatory Region)
Frequency Accuracy	± 2.0 ppm
Channel Bandwidth	3.5/5/7/10/14/20/28/30/40/50/56 MHz Selectable[3]

AF-11FX Suggested Max. TX Power	
10x (1024QAM)	18 dBm
8x (256QAM)	21 dBm
6x (64QAM)	24 dBm
4x (16QAM)	30 dBm
2x (4QAM)	30 dBm
1x (QPSK)	30 dBm

AF-11FX Duplexer	
Low-Band Duplexer	Low Channel: 10.700 to 10.955 GHz High Channel : 11.200 to 11.445 GHz
High-Band Duplexer	Low Channel : 10.940 to 11.200 GHz High Channel : 11.440 to 11.700 GHz

[2] For region-specific details, refer to the *Compliance* chapter of the airFiber AF-11FX User Guide at **downloads.ubnt.com/airfiber**

[3] Channel widths may vary according to country/region regulations.

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AF-11FX Capacity				
Channel Bandwidth	**Mode**	**Constellation**	**Rate Multiplier**	**Capacity in Mbps**
3.5 MHz	MIMO	1024 QAM	10x	76.8
		256 QAM	8x	61.4
		64 QAM	6x	46.0
		16 QAM	4x	30.8
		QPSK	2x	15.4
		QPSK xRT™	1x	7.6
	SISO	1024 QAM	5x	38.4
		256 QAM	4x	30.7
		64 QAM	3x	23.0
		16 QAM	2x	15.4
		QPSK	1x	7.7
5 MHz	MIMO	1024 QAM	10x	121.6
		256 QAM	8x	97.3
		64 QAM	6x	73.0
		16 QAM	4x	48.6
		QPSK	2x	24.2
		QPSK xRT™	1x	12.2
	SISO	1024 QAM	5x	60.8
		256 QAM	4x	48.6
		64 QAM	3x	36.5
		16 QAM	2x	24.3
		QPSK	1x	12.1
7 MHz	MIMO	1024 QAM	10x	172.8
		256 QAM	8x	138.2
		64 QAM	6x	103.6
		16 QAM	4x	69.2
		QPSK	2x	34.6
		QPSK xRT™	1x	17.2
	SISO	1024 QAM	5x	86.4
		256 QAM	4x	69.1
		64 QAM	3x	51.8
		16 QAM	2x	34.6
		QPSK	1x	17.3
10 MHz	MIMO	1024 QAM	10x	256.0
		256 QAM	8x	204.8
		64 QAM	6x	153.6
		16 QAM	4x	102.4
		QPSK	2x	51.2
		QPSK xRT™	1x	25.6
	SISO	1024 QAM	5x	128.0
		256 QAM	4x	102.4
		64 QAM	3x	76.8
		16 QAM	2x	51.2
		QPSK	1x	25.6

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AF-11FX Capacity				
Channel Bandwidth	**Mode**	**Constellation**	**Rate Multiplier**	**Capacity in Mbps**
14 MHz	MIMO	1024 QAM	10x	364.8
		256 QAM	8x	291.8
		64 QAM	6x	218.8
		16 QAM	4x	145.8
		QPSK	2x	73.0
		QPSK xRT™	1x	36.4
	SISO	1024 QAM	5x	182.4
		256 QAM	4x	145.9
		64 QAM	3x	109.4
		16 QAM	2x	72.9
		QPSK	1x	36.5
20 MHz	MIMO	1024 QAM	10x	518.4
		256 QAM	8x	414.6
		64 QAM	6x	311.0
		16 QAM	4x	207.4
		QPSK	2x	103.6
		QPSK xRT™	1x	51.8
	SISO	1024 QAM	5x	259.2
		256 QAM	4x	207.3
		64 QAM	3x	155.5
		16 QAM	2x	103.7
		QPSK	1x	51.8
28 MHz	MIMO	1024 QAM	10x	723.2
		256 QAM	8x	578.6
		64 QAM	6x	433.8
		16 QAM	4x	289.2
		QPSK	2x	144.6
		QPSK xRT™	1x	72.4
	SISO	1024 QAM	5x	361.6
		256 QAM	4x	289.3
		64 QAM	3x	216.9
		16 QAM	2x	144.6
		QPSK	1x	72.4
30 MHz	MIMO	1024 QAM	10x	768.0
		256 QAM	8x	614.4
		64 QAM	6x	460.8
		16 QAM	4x	307.2
		QPSK	2x	153.6
		QPSK xRT™	1x	76.8
	SISO	1024 QAM	5x	384.0
		256 QAM	4x	307.2
		64 QAM	3x	230.4
		16 QAM	2x	153.6
		QPSK	1x	76.8

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AF-11FX Capacity				
Channel Bandwidth	**Mode**	**Constellation**	**Rate Multiplier**	**Capacity in Mbps**
40 MHz	MIMO	1024 QAM	10x	1004.8
		256 QAM	8x	803.6
		64 QAM	6x	602.8
		16 QAM	4x	401.8
		QPSK	2x	200.8
		QPSK xRT™	1x	100.4
	SISO	1024 QAM	5x	502.4
		256 QAM	4x	401.8
		64 QAM	3x	301.4
		16 QAM	2x	200.9
		QPSK	1x	100.4
50 MHz[4]	MIMO	1024 QAM	10x	1235.2
		256 QAM	8x	988.2
		64 QAM	6x	741.2
		16 QAM	4x	494.0
		QPSK	2x	247.0
		QPSK xRT™	1x	123.6
	SISO	1024 QAM	5x	617.6
		256 QAM	4x	494.1
		64 QAM	3x	370.6
		16 QAM	2x	247.0
		QPSK	1x	123.5
56 MHz[4]	MIMO	1024 QAM	10x	1375.8
		256 QAM	8x	1100.8
		64 QAM	6x	825.6
		16 QAM	4x	550.4
		QPSK	2x	275.2
		QPSK xRT™	1x	137.6
	SISO	1024 QAM	5x	687.9
		256 QAM	4x	550.4
		64 QAM	3x	412.8
		16 QAM	2x	275.2
		QPSK	1x	137.6

[4] Used only for 80 MHz licensing for the FCC.

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