

# PTP 670 Fixed Wireless Backhaul

## QUICK LOOK:

- **FIPS-197 128/256-bit AES encryption**
- **IEEE 1588v2 and Synchronous Ethernet (SyncE)**
- **IPv6/IPv4 dual-stack management support**
- **Ingress Protection rated (IP66/67) protective aluminum radio enclosures**



Service providers, government public safety agencies, and critical infrastructure operators such as utilities and energy companies have experienced massive growth in bandwidth demands for reliable and secure broadband connectivity and backhaul. The nature of these deployments for small-cell backhaul, disaster recovery, video surveillance and Wi-Fi backhaul drive variety of deployment topologies.

Now with the Point-to-Point (PTP) 670 Series solution, Cambium Networks combines best-in-class spectral efficiency and reliability with high-capacity multipoint (HCMP) deployment flexibility. With up to 450 Mbps aggregate throughput, PTP 670 systems let you flexibly, reliably and securely handle today's needs.

### **FLEXIBLE, SPECTRALLY-EFFICIENT, SELF-OPTIMIZING SUB-6 GHz SOLUTION**

Based on our widely deployed, field-proven non-line-of sight (NLOS) technology, PTP 670 wireless Ethernet bridges offer an array of features that give you more capacity, greater operational flexibility, and the highest spectral efficiency in the industry. PTP 670 systems provide 4.9 to 6.05 GHz, multi-band flexibility in a single radio and operate in channel sizes from 5 to 45 MHz.

With Dynamic Spectrum Optimization (DSO), PTP 670 systems are constantly optimizing the channel of operation to maximize link

reliability and performance. The systems can provide up to 99.999% availability in virtually any environment, including non-line-of-sight, long-distance line-of-sight, high interference, over water and desert, and through extreme weather conditions. As a result, you can deliver more throughput with less spectrum and less investment in even the most challenging environments

### **HIGH-CAPACITY MULTIPOINT AND POINT-TO-POINT IN SINGLE SOLUTION**

With the PTP 670, operators now have the flexibility to deploy not only in Point to Point topologies but also in High-Capacity Multipoint (HCMP) Applications. HCMP allows for up to 8 remote nodes to connect to a single master radio opening up new deployment models that enable rapid deployment, simplify planning and by using the same hardware regardless of topology a rapid return on investment in equipment and training. Whether your organization is an enterprise, government agency, or service provider, PTP 670 systems are ideal solutions for a wide array of applications such as T1/E1 and fiber replacements or extensions; video surveillance backhaul; LTE, macro-cell, and small-cell backhaul; last-mile access; disaster recovery; network redundancy; and building-to-building campus connectivity.

## PTP 670 Fixed Wireless Backhaul

Radio	
<b>RF Bands</b>	Wide-band operation 4.9 to 6.05 GHz (Allowable frequencies and bands are dictated by individual country regulations)
<b>Channel sizes</b>	5, 10, 15, 20, 30, 40, and 45 MHz channels Channel sizes depend on individual country regulations
<b>Spectral Efficiency</b>	10 bps/Hz maximum
<b>Channel selection</b>	By Dynamic Spectrum Optimization or manual intervention Automatic selection on start-up and continual self-optimization to avoid interference
<b>Maximum Transmit Power</b>	Up to 27 dBm
<b>System Gain</b>	Up to 164 dB with Integrated antenna
<b>Modulation / Error Correction</b>	Fast Preemptive Adaptive Modulation featuring 13 modulation / FEC coding levels ranging from BPSK to 256 QAM dual payload MIMO
<b>Duplex Scheme</b>	Time Division Duplex (TDD) Adaptive or fixed transmit/receive duty cycles Split frequency operation allows separate transmit and receive frequencies where allowed by regulation. Optional TDD synchronization using PTP-SYNC Module
<b>Antenna</b>	Integrated Flat panel: 23 dBi Connectorized: operate with a selection of separately-purchased single and dual polarity antennas through 2 x N-type female connectors
<b>Range</b>	Up to 155 miles (250 km)
<b>Security</b>	FIPS-197 compliant 128/256-bit AES Encryption (optional) HTTPS and SNMPv3 Identity-based user accounts Configurable password rules Event logging and management; optional logging via syslog Disaster recovery and vulnerability management
Ethernet Bridging	
<b>Protocol</b>	IEEE 802.3
<b>Latency</b>	1-3 ms one direction
<b>QoS</b>	Extensive QoS supporting up to 8 Queues
<b>Packet Classification</b>	Layer 2 and Layer 3 IEEE 802.1p, MPLS, Ethernet priority
<b>Packet Performance</b>	Line rate (>850K packets per second)
<b>Timing Transport</b>	Synchronous Ethernet; IEEE 1588v2
<b>Frame Support</b>	PTP Mode: Jumbo frame up to 9600 bytes; HCMP Mode: 2000 bytes per frame
<b>Flexible I/O</b>	2 x Gigabit Ethernet copper ports: <b>Gigabit Port 1:</b> Data + PoE power input <b>Gigabit Port 2:</b> 802.3at PoE output port <b>1 x SFP port:</b> single-mode fiber, multi-mode fiber or copper Gigabit Ethernet options available
<b>T1/E1 TDM Support</b>	8 x T1/E1 TDM (Network Indoor Unit (NIDU)) G.823-compliant timing DC power input (compatible with AC+DC Power Injector output)

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### Management

<b>Network Management</b>	In-band and out-of-band management (OOBM)
<b>System Management</b>	IPv6/IPv4 dual-stack management support Web access via browser using HTTP or HTTPS/TLS3 SNMP v1, v2c and v3, MIB-II and proprietary PTP MIB Online spectrum analyzer (no impact on payload traffic or network operation)
<b>Installation</b>	Built-in audio and graphical assistance for link optimization

### High Capacity Multi-Point

<b>Remote Modules Master</b>	Up to 8 Nodes							
<b>Channel Bandwidth</b>	20 MHz and 40 MHz							
<b>Spectral Efficiency in HCMP</b>	8 bps/Hz Max							
<b>Line Rate Packet per Second</b>	850K pps							
<b>Latency in HCMP Mode</b>	2 to 4 ms one way (typically)							
<b>Data Capacity per Remote Module in 1:1 Symmetry</b>	<b>Number of Remote Module @ 40 MHz</b>	2	3	4	5	6	7	8
	<b>Mbps</b>	162	106	80	66	56	46	42

### Mechanical Specifications

<b>Dimensions</b>	<b>Integrated Outdoor Unit (ODU):</b> Width 305 mm (12 in), Height 305mm (13.5"), Depth 81mm (3.2") <b>Connectorized ODU:</b> Width 204 mm (8.0"), Height 318mm (12.5"), Depth 90mm (3.5")
<b>Weight</b>	<b>Integrated ODU:</b> 4.1 kg (8.95 lbs) including bracket <b>Connectorized ODU:</b> 3.1 kg (6.8 lbs) including bracket
<b>Operating Temperature</b>	-40° to 75°C (-40° to 168.8°F)
<b>Environmental Rating</b>	IP66 and IP67
<b>Wind Speed Survival</b>	322 kph (200 mph)
<b>Power Supply</b>	1. AC power injector: 32° to 104° F (0° to +40° C); 35 W; 90-240 VAC, 50/60Hz Dimensions: Width 5.2"(132mm), Height 1.4"(36mm), Depth 2"(51mm) 2. AC + DC power injector: -40° to 140° F (-40° to +60° C); 70 W; 90-240 VAC, 50/60 Hz Dimensions: Width 9.75" (250 mm), Height 1.5" (40 mm), Depth 3" (80 mm)
<b>Power Consumption</b>	30W maximum (up to 70W with 802.3at device on auxiliary port)

### Environmental and Regulatory

<b>Protection and Safety</b>	UL60950-1; IEC60950-1; EN60950-1; CSA-C22.2 NO. 60950-1; CB approval for Global
<b>Radio</b>	4.9 GHz: FCC Part 90Y, RSS-111 5.x GHz: FCC Part 15, sub-parts 15C and 15E; RSS 210 Issue 8; EN 302 502; EN 301 893 Eire ComReg 02/71R1, UK Approval to IR2007
<b>EMC</b>	Europe – EN 301 489-1 and -4

## PTP 670 Fixed Wireless Backhaul

### Receiver Sensitivity and Transmit Power dbm @ 5.8 GHz

Modulation Mode	5 MHz	10 MHz	15 MHz	20 MHz	30 MHz	40 MHz	45 MHz	Transmit Power (dBm)
<b>BPSK 0.63 Single</b>	-96.8	-94.8	-93.0	-91.8	-90.0	-88.8	-88.3	27
<b>QPSK 0.63 Single</b>	-93.7	-91.7	-89.9	-88.7	-86.9	-85.7	-85.2	26
<b>QPSK 0.87 Dual</b>	-89.7	-87.7	-85.9	-84.7	-82.9	-81.7	-81.1	26
<b>16QAM 0.63 Single</b>	-87.4	-85.4	-83.6	-82.3	-80.6	-79.3	-78.8	25
<b>16QAM 0.63 Dual</b>	-83.4	-81.4	-79.6	-78.4	-76.6	-75.4	-74.9	25
<b>16QAM 0.87 Single</b>	-82.9	-80.8	-79.1	-77.8	-76.1	-74.8	-74.3	25
<b>16QAM 0.87 Dual</b>	-79.8	-77.8	-76.0	-74.8	-73.0	-71.8	-71.2	25
<b>64QAM 0.75 Single</b>	-79.8	-77.8	-76.0	-74.8	-73.0	-71.8	-71.2	24
<b>64QAM 0.75 Dual</b>	-76.7	-74.7	-72.9	-71.6	-69.9	-68.6	-68.1	24
<b>64QAM 0.92 Single</b>	-75.8	-73.8	-72.1	-70.8	-69.1	-67.8	-67.3	24
<b>64QAM 0.92 Dual</b>	-72.5	-70.5	-68.8	-67.5	-65.8	-64.5	-64.0	24
<b>256QAM 0.81 Single</b>	-72.5	-70.5	-68.7	-67.4	-65.7	-64.4	-63.9	23
<b>256QAM 0.81 Dual</b>	-68.8	-66.8	-65.0	-63.8	-62.0	-60.8	-60.3	23

### Throughput (Mbps @ 5 km)

Modulation Mode	5 MHz	10 MHz	15 MHz	20 MHz	30 MHz	40 MHz	45 MHz
<b>BPSK 0.63 Single</b>	2.3	4.8	7.2	9.6	14.5	19.9	21.8
<b>QPSK 0.63 Single</b>	4.7	9.6	14.5	19.3	29.1	39.7	43.5
<b>QPSK 0.87 Dual</b>	6.5	13.4	20.2	26.8	40.5	55.2	60.5
<b>16QAM 0.63 Single</b>	6.5	13.4	20.2	26.8	40.5	55.3	60.6
<b>16QAM 0.63 Dual</b>	9.3	19.3	29.0	38.5	58.2	79.5	87.1
<b>16QAM 0.87 Single</b>	12.1	25.1	37.7	50.0	75.6	103.2	113.1
<b>16QAM 0.87 Dual</b>	16.7	34.5	51.9	68.9	104.1	142.1	155.7
<b>64QAM 0.75 Single</b>	24.2	50.1	75.4	100.1	151.1	206.3	226.1
<b>64QAM 0.75 Dual</b>	13.0	26.8	40.4	53.6	80.9	110.5	121.1
<b>64QAM 0.92 Single</b>	18.6	38.6	58.0	77.0	116.4	158.9	174.1
<b>64QAM 0.92 Dual</b>	24.2	50.1	75.4	100.0	151.1	206.3	226.1
<b>256QAM 0.81 Single</b>	33.3	69.0	103.8	137.8	208.1	284.1	311.3
<b>256QAM 0.81 Dual</b>	48.4	100.2	150.7	200.1	302.2	412.6	452.2

#### ABOUT CAMBIUM NETWORKS

Cambium Networks empowers millions of people with wireless connectivity worldwide. Its wireless portfolio is used by commercial and government network operators as well as broadband service providers to connect people, places and things. With a single network architecture spanning fixed wireless and Wi-Fi, Cambium Networks enables operators to achieve maximum performance with minimal spectrum. End-to-end cloud management transforms networks into dynamic environments that evolve to meet changing needs with minimal physical human intervention. Cambium Networks empowers a growing ecosystem of partners who design and deliver gigabit wireless solutions that just work.

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