# PTP 700 Fixed Wireless Backhaul

QUICK LOOK:

**National defense, border security, industrial communications and critical infrastructure operators have experienced massive growth in bandwidth demands for reliable and secure broadband connectivity and backhaul.**

- **Single radio covers 4.4 GHz to 5.875 GHz compatible with NTIA Redbook / NATO Band IV and FCC/ETSI requirements**
- **Single radio can be deployed with integrated panel antenna or larger gain dishes using N-type connectors**
- **High-Capacity Multi Point (HCMP) or Point-to-Point (PTP) architectures in same hardware**
- **Dynamic Spectrum Optimization™ (DSO)**

## ONE RADIO – MULTIPLE MISSIONS

Whether deploying in first-responder tactical situations, over water to oil platforms, in urban canyons to video cameras and hot-spots or along remote stretches of national borders for defense and situational awareness, the requirements for high-speed connectivity intersect with constraints on available spectrum, line of sight and non-line of sight topologies, IT/ Enterprise integration, cyber-security threat prevention and harsh environmental conditions.

The dynamic nature and complexity of these missions means that spectrum managers, network Operators and implementation managers need flexibility and adaptability while staying within the constraints of program budgets. The long-term total cost of ownership and sustainability of any solution comes under increasing scrutiny.

**With the PTP 700, Cambium Networks breaks new ground in mission flexibility and overall project sustainability**

- FIPS 140-2 NIST Validated
- Ruggedized to MIL-STD-810G
- Supports IPv6, SyncE, 1588v2

# PTP 700 Fixed Wireless Backhaul

| Radio | |
|---|---|
| **RF Bands** | Wide-band operation 4.4 to 5.875 GHz in a single SKU, support bands including:<br>• NATO Band IV / NTIA Compliant (4.4 GHz to 4.99 GHz)<br>• 4.9 GHz Public Safety Band<br>• 5.1/5.2/5.4/5.8 GHz FCC/ETSI |
| **Congifuration** | 1+0, 1+1 HSB; 2+0 (require external switch) |
| **Channel sizes** | 5, 10, 15, 20, 30, 40, and 45 MHz channels. Channel sizes depend on individual country regulations |
| **Spectral Efficiency** | 10 bps/Hz maximum |
| **Channel selection** | By Dynamic Spectrum Optimization (DSO) or manual intervention<br>Automatic selection on start-up and continual self-optimization to avoid interference |
| **Maximum Transmit Power** | Up to 29 dBm |
| **System Gain** | Up to 169 dB with Integrated antenna |
| **Modulation / Error Correction** | Fast Preemptive Adaptive Modulation featuring 13 modulation / FEC coding levels ranging from BPSK to 256 QAM dual payload MIMO |
| **Duplex Scheme** | Time Division Duplex (TDD)<br>Adaptive or fixed transmit/receive duty cycles<br>Split frequency operation allows separate transmit and receive frequencies where allowed by regulation.<br>Optional TDD synchronization using PTP-SYNC Module |
| **Antenna** | Integrated Flat panel: 23 dBi<br>Connectorized: operate with a selection of separately-purchased single and dual polarity antennas through 2 x N-type female connectors |
| **Range** | Up to 155 miles (250 km) |
| **Security** | 128/256-bit AES Encryption (optional)<br>HTTPS and SNMPv3 , User authentication and RADIUS support Identity-based user accounts<br>Configurable password rules<br>Event logging and management; optional logging via syslog Disaster recovery and vulnerability management<br>FIPS-197 compliant |

| Ethernet Bridging | |
|---|---|
| **Protocol** | IEEE 802.3 |
| **Latency** | 1-3 ms one direction |
| **QoS** | Extensive QoS supporting up to 8 Queues (PTP mode) and 4 Queues (HCMP mode) |
| **Packet Classification** | Layer 2 and Layer 3 IEEE 802.1p, MPLS, Ethernet priority |
| **Packet Performance** | Line rate ( >850K packets per second) |
| **Timing Transport** | Synchronous Ethernet; IEEE 1588v2 |
| **Frame Support** | PTP Mode: Jumbo frame up to 9600 bytes;<br>HCMP Mode: 2000 bytes per frame |
| **Flexible I/O** | 2 x Gigabit Ethernet copper ports:<br>**Gigabit Port 1:** Data + PoE power input<br>**Gigabit Port 2:** 802.3at PoE output port<br>**1 x SFP port:** single-mode fiber, multi-mode fiber or copper Gigabit Ethernet options available |
| **T1/E1 TDM Support** | 8 x T1/E1 TDM (Network Indoor Unit (NIDU)) G.823-compliant timing<br>DC power input (compatible with AC+DC Power Injector output) |

# PTP 700 Fixed Wireless Backhaul

## Management

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

## High Capacity Multi-Point

| | |
|---|---|
| **Remote Modules Master** | Up to 8 Nodes |
| **Channel Bandwidth** | 20 MHz and 40 MHz |
| **Spectral Efficiency in HCMP** | 8 bps/Hz Max |
| **Line Rate Packet per Second** | 850K pps |
| **Latency in HCMP Mode** | 2 to 4 ms one way (typically) |
| **Antenna Options** | 4.4–5.875 GHz 90° sector (15 dBi gain)<br>4.4–5.875 GHz 36° sector (16 dBi gain) |

| **Data Capacity per Remote Module in 1:1 Symmetry** | **Number of Remote Module @ 40 MHz** | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| | **Mbps** | 162 | 106 | 80 | 66 | 56 | 46 | 42 |

## Mechanical Specifications

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|---|---|
| **Dimensions (H x W x D)** | **Integrated Outdoor Unit (ODU):**<br>429 x 371 x 96 mm (16.9 x 14.6 x 3.8 in)<br>**Connectorized ODU:**<br>318 x 204 x 90 mm (12.5 x 8.0 x 3.5 in) |
| **Weight** | **Connectorized + Integrated ODU:** 5.3 kg (11.7 lbs) including bracket<br>**Outdoor Unit (ODU):** 3.1 kg (6.8 lbs) including bracket |
| **Operating Temperature** | -40° to 60°C (-40° to 140°F) |
| **Enviromental Rating** | IP66 and IP67 |
| **Shock/Vibration/Temperature** | MIL-STD-810G |
| **Wind Speed Survival** | 322 kph (200 mph) |
| **Power Supply** | AC + DC power injector: -40° to 140° F (-40° to 60° C); 70 W; 90-240 VAC, 50/60 Hz |
| **Power Consumption** | 30W maximum (up to 70W with 802.3at device on auxiliary port) |

## Environmental and Regulatory

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|---|---|
| **Protection and Safety** | UL60950-1 and -22; IEC60950-1 and -22; EN60950-1 and -22;<br>CSA-C22.2 No. 60950-1; CSA-C22 No. 60950-22-7; CB approval for Global |
| **Radio** | 4.9 GHz: FCC Part 90Y, RSS-111<br>5.x GHz: FCC Part 15, sub-parts 15C and 15E; RSS 247 Issue 1;<br>EN 302 502; EN 301 893; EN 302 625; Eire ComReg 02/71R1, UK Approval to IR2007 |
| **EMC** | Europe – EN 301 489-1 and -17; FCC Part 15B Class B |

# PTP 700 Fixed Wireless Backhaul

| Receiver Sensitivity and Transmit Power dbm @ 4.7 GHz | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Modulation Mode** | **5 MHz** | **10 MHz** | **15 MHz** | **20 MHz** | **30 MHz** | **40 MHz** | **45 MHz** | **Transmit Power (dBm)** |
| **BPSK 0.63 Single** | -93.5 | -92.0 | -90.2 | -89.0 | -87.2 | -86.0 | -85.5 | 28.0 |
| **QPSK 0.63 Single** | -90.0 | -88.5 | -86.7 | -85.5 | -83.7 | -82.5 | -82.0 | 27.0 |
| **QPSK 0.87 Dual** | -86.0 | -84.5 | -82.7 | -81.5 | -79.7 | -78.5 | -77.9 | 26.0 |
| **16QAM 0.63 Single** | -84.1 | -82.6 | -80.8 | -79.5 | -77.8 | -76.5 | -76.0 | 25.0 |
| **16QAM 0.63 Dual** | -81.0 | -79.5 | -77.8 | -76.5 | -74.8 | -73.5 | -73.0 | 25.0 |
| **16QAM 0.87 Single** | -79.4 | -77.9 | -76.1 | -74.8 | -73.1 | -71.8 | -71.3 | 24.0 |
| **16QAM 0.87 Dual** | -76.3 | -74.8 | -73.0 | -71.8 | -70.0 | -68.8 | -68.3 | 24.0 |
| **64QAM 0.75 Single** | -76.4 | -74.9 | -73.1 | -71.9 | -70.1 | -68.9 | -68.4 | 23.0 |
| **64QAM 0.75 Dual** | -73.3 | -71.8 | -70.0 | -68.8 | -67.0 | -65.8 | -65.3 | 23.0 |
| **64QAM 0.92 Single** | -72.6 | -71.1 | -69.4 | -68.1 | -66.3 | -65.1 | -64.6 | 23.0 |
| **64QAM 0.92 Dual** | -69.4 | -67.9 | -66.1 | -64.8 | -63.1 | -61.8 | -61.3 | 23.0 |
| **256QAM 0.81 Single** | -69.4 | -67.9 | -66.1 | -64.8 | -63.1 | -61.8 | -61.3 | 23.0 |
| **256QAM 0.81 Dual** | -65.8 | -64.3 | -62.5 | -61.3 | -59.5 | -58.3 | -57.8 | 23.0 |

| Throughput (Mbps @ 5 km) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Modulation Mode** | **5 MHz** | **10 MHz** | **15 MHz** | **20 MHz** | **30 MHz** | **40 MHz** | **45 MHz** |
| **BPSK 0.63 Single** | 2.3 | 4.8 | 7.2 | 9.6 | 14.5 | 19.8 | 21.7 |
| **QPSK 0.63 Single** | 4.7 | 9.6 | 14.5 | 19.2 | 29.1 | 39.7 | 43.5 |
| **QPSK 0.87 Dual** | 6.5 | 13.4 | 20.2 | 26.8 | 40.5 | 55.2 | 60.5 |
| **16QAM 0.63 Single** | 9.3 | 19.3 | 29.0 | 38.5 | 58.1 | 79.4 | 87.0 |
| **16QAM 0.63 Dual** | 12.9 | 26.8 | 40.3 | 53.5 | 80.9 | 110.4 | 121.0 |
| **16QAM 0.87 Single** | 16.6 | 34.5 | 51.8 | 68.8 | 103.9 | 141.9 | 155.5 |
| **16QAM 0.87 Dual** | 20.4 | 42.2 | 63.4 | 84.2 | 127.2 | 173.7 | 190.3 |
| **64QAM 0.75 Single** | 24.2 | 50.0 | 75.3 | 99.9 | 151.0 | 206.1 | 225.9 |
| **64QAM 0.75 Dual** | 18.6 | 38.5 | 58.0 | 77.0 | 116.3 | 158.7 | 173.9 |
| **64QAM 0.92 Single** | 25.9 | 53.6 | 80.7 | 107.1 | 161.7 | 220.8 | 241.9 |
| **64QAM 0.92 Dual** | 33.3 | 68.9 | 103.7 | 137.6 | 207.9 | 283.8 | 311.0 |
| **256QAM 0.81 Single** | 40.7 | 84.2 | 126.9 | 168.4 | 254.4 | 347.3 | 380.6 |
| **256QAM 0.81 Dual** | 48.4 | 100.1 | 150.6 | 199.9 | 301.9 | 412.2 | 451.7 |

### 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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