

# CAMBIUM PTP 600 SERIES CONNECT VIRTUALLY ANYWHERE

POINT-TO-POINT (PTP) 600 WIRELESS BROADBAND SOLUTIONS



# WIRELESS THAT WORKS WHEN AND WHERE YOU DO

In today's connected world, you don't always have the option to communicate in controlled, ideal conditions. Mobility, by definition, means that you're on the move. You might be in a congested city today and a dusty desert or dense forest tomorrow. The weather might be hot and humid or cold and dry. So, your communication network has to work in all the places you do and at anytime you do. Cambium Point-to-Point (PTP) 600 Wireless Ethernet Solutions give you that level of communications agility.

## RELIABILITY AND PERFORMANCE

Our PTP 600 radios let you establish reliable, high-throughput, secure communications in challenging environments. With our unique combination of technologies, PTP 600 radios operate dependably in non-line-of-sight (NLOS), long-distance line-of-sight (LOS), high interference, water and desert environments as well as severe weather conditions.

The PTP 600 family of wireless broadband solutions includes license-exempt systems operating in the 5.4, 5.8 and 5.9 GHz radio frequency (RF) bands<sup>1</sup> and defined-use licensed systems operating in the 2.5, 4.5, 4.8 and 4.9 GHz bands. Our 2.5 GHz systems are designed to support a variety of Educational Broadband Service (EBS) applications, while our 4.5 and 4.8 GHz systems are designed for U.S. Federal, North Atlantic Treaty Organization (NATO) and public safety uses. The 4.9 GHz systems meet the stringent connectivity requirements of public safety communications.

## CHOICE AND FLEXIBILITY

Within our family of PTP 600 solutions, we offer several models to meet your specific communication objectives, application requirements, budgets and path conditions.

CAMBIUM PTP 600 SOLUTIONS		
Model	RF Band	Max. Ethernet Throughput
<b>Defined-Use Licensed Bands:</b>		
PTP 25600	2.5 GHz	300 Mbps
PTP 45600	4.5 GHz	300 Mbps
PTP 48600	4.8 GHz	200 Mbps
PTP 49600	4.9 GHz	200 Mbps
<b>License-Exempt Bands:</b>		
PTP 54600 Full	5.4 GHz	300 Mbps
PTP 54600 Lite	5.4 GHz	150 Mbps
PTP 58600 Full	5.8 GHz	300 Mbps
PTP 58600 Lite	5.8 GHz	150 Mbps
PTP 59600	5.9 GHz	300 Mbps

All PTP 600 models are available in Integrated and Connectorized versions. The Integrated systems have multiple built-in antennas, while the Connectorized systems can be fitted with separately-purchased, external antennas. Over distances up to 124 miles (200 km) and in extremely adverse environments, including deep non-line-of-sight, Connectorized solutions let you connect previously inaccessible locations with a higher level of reliability and speed than comparable wireless solutions. In addition, PTP 600 systems offer selectable channel sizes with varying data rates to provide even greater flexibility to match our capabilities to your requirements.

PTP 600 CHANNEL SIZES	
Channel Widths <sup>2</sup>	Max. Ethernet Data Rate
<b>PTP 25600</b>	
5 MHz Channel	40 Mbps
10 MHz Channel	84 Mbps
15 MHz Channel	126 Mbps
30 MHz Channel <sup>3</sup>	300 Mbps
<b>PTP 48600, 49600</b>	
5 MHz Channel	48 Mbps
10 MHz Channel	100 Mbps
20 MHz Channel	200 Mbps
<b>PTP 45600, 54600, 58600, 59600 Full</b>	
5 MHz Channel	40 Mbps
10 MHz Channel	84 Mbps
15 MHz Channel	126 Mbps
20 MHz Channel <sup>4</sup>	168 Mbps
30 MHz Channel	300 Mbps
<b>PTP 54600, 58600 Lite</b>	
10 MHz Channel	Up to 42 Mbps
15 MHz Channel	Up to 63 Mbps
30 MHz Channel	Up to 150 Mbps

<sup>1</sup> Regulatory conditions for RF bands should be confirmed prior to system purchase.

<sup>2</sup> Local regulations should be confirmed prior to system purchase, and an additional license key may be required for certain channel widths.

<sup>3</sup> The 30 MHz channel size is not FCC-authorized for use in the U.S.

<sup>4</sup> The 20 MHz channel size is available on the PTP 45600 model only.



## BETTER RESULTS

PTP 600 solutions employ a unique combination of technologies that together enable the robustness and high performance of your links, even in very challenging environments.

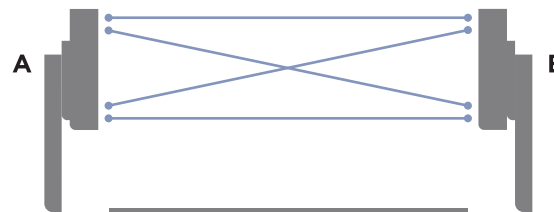
- **Multiple-Input Multiple-Output (MIMO):** Each radio radiates multiple beams from the antenna, the effect of which significantly protects against fading and increases the probability of making a successful connection.
- **Intelligent Orthogonal Frequency Division Multiplexing (i-OFDM):** *Intelligent* OFDM sends transmissions over multiple frequencies, or sub-carriers, enabling high spectral efficiency, high resistance to multi-path interference and fading, and instant fade recovery.
- **Advanced Spectrum Management with i-DFS:** *Intelligent* Dynamic Frequency Selection (*i-DFS*) is at the heart of our exceptional spectrum management capabilities. During operation, our PTP 600 radios sample the band up to 1,200 times a second and automatically switch to the clearest channel. The time-stamped database alerts you to any interference that exists and provides statistics that help you pinpoint the channels that offer the clearest data paths, creating virtually interference-free performance in the band.
- **Adaptive Modulation:** Our PTP 600's powerful transmitters and receivers negotiate the highest mutually sustainable data rate and dynamically "upshift" and "downshift" the rate as path conditions change. So you get the maximum performance possible within the current power limits.
- **Time Division Duplex (TDD) Synchronization:** TDD capability synchronizes transmit and receive signals and enables efficient frequency reuse. This lets you collocate multiple radios on a rooftop or tower with greatly reduced interference. Our Cambium PTP-SYNC synchronization unit is required for each link to provide your PTP 600 radios with an accurate timing reference.

## INTEROPERABILITY

All this power is extremely beneficial, but only if you can deploy it with your existing network. PTP 600 systems are tested and MEF9 (Metro Ethernet Forum) certified as compliant with the MEF's essential specifications. So, you can be confident that your PTP 600 solution will operate with your existing network equipment.

## MORE RANGE TO ANYWHERE

Class-leading sensitivity and power output enable the links to go farther, regardless of conditions. Plus, we combine MIMO, intelligent-OFDM and our advanced signal-processing algorithms to create four simultaneous channels between pairs of transceivers at each end of the link without losing spectrum efficiency.



## PTP 600

- FIPS 140-2
- UC-APL
- MEF9

Dual transceivers in each radio allow data to be sent from A to B – or B to A – on four channels, significantly increasing the likelihood that data will get through.

## BETTER SPECTRUM UTILIZATION

Built on our time-tested Orthogon technology, PTP 600 radios provide higher spectral efficiency than most comparable systems. This means you can deliver high-throughput performance with minimal spectrum usage.

In addition, PTP 600 bridges monitor all available channels and dynamically select those over which they can sustain the highest data rate and the most reliable availability. So, your radios are very likely to find a clear channel without your intervention, even in a crowded space. Plus, you can manually lock the frequency (in either direction) and restrict each link to specified frequencies.

## MORE WAYS TO USE THE BAND

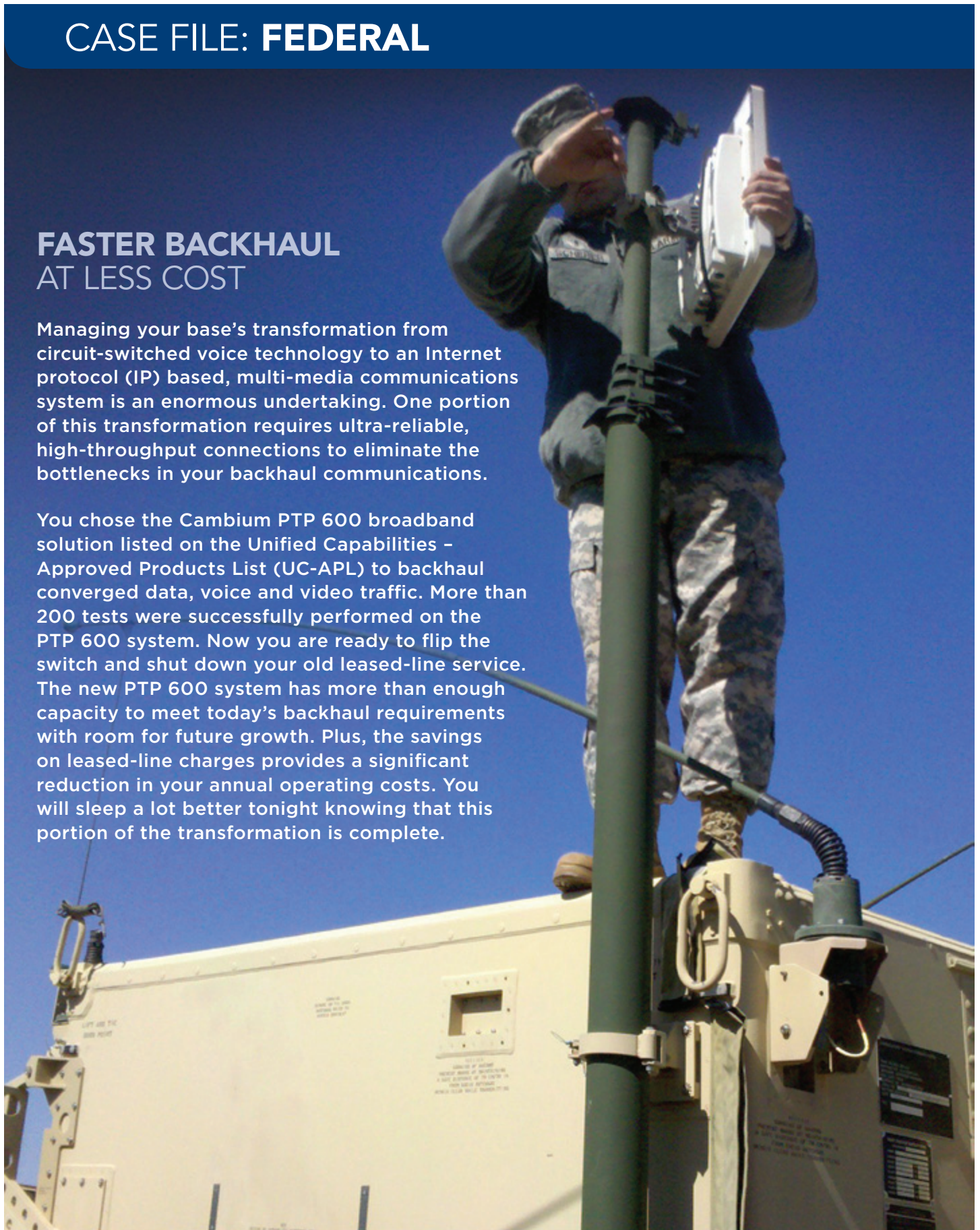
Our innovative architecture combines an abundance of Ethernet and circuit-switched options. Whether your infrastructure is based on Ethernet over copper or multimode fiber, 10/100/1000 Base T or 1000 Base SX, or even T1/E1 ports that bundle circuit-switched connectivity with IP service, you can connect with a PTP 600 solution.

# CASE FILE: **FEDERAL**

## **FASTER BACKHAUL AT LESS COST**

Managing your base's transformation from circuit-switched voice technology to an Internet protocol (IP) based, multi-media communications system is an enormous undertaking. One portion of this transformation requires ultra-reliable, high-throughput connections to eliminate the bottlenecks in your backhaul communications.

You chose the Cambium PTP 600 broadband solution listed on the Unified Capabilities - Approved Products List (UC-APL) to backhaul converged data, voice and video traffic. More than 200 tests were successfully performed on the PTP 600 system. Now you are ready to flip the switch and shut down your old leased-line service. The new PTP 600 system has more than enough capacity to meet today's backhaul requirements with room for future growth. Plus, the savings on leased-line charges provides a significant reduction in your annual operating costs. You will sleep a lot better tonight knowing that this portion of the transformation is complete.



## ROBUST, MULTI-LAYERED SECURITY

Information security technology and procedures are highly effective to secure your wireless communication network. To protect your over-the-air transmissions, PTP 600 solutions include:

- **Encryption:** In addition to our proprietary air interface, PTP 600 radios can be configured with FIPS-197 compliant 128-bit or 256-bit AES encryption.
- **FIPS 140-2:** The systems also meet FIPS 140-2 Level 2 validation for cryptographic algorithms, key security and tamper evidence. Together AES and FIPS 140-2 offer robust security to help protect your highly sensitive information from malicious incidents. (AES and FIPS 140-2 are optional features.)

PTP 600 systems support additional security features, including:

- **Management Interface Protection:** HTTPS/TLS, the secure version of HTTP, has been implemented on PTP 600 systems to protect the system's management interface. PTP 600 radios also support installation of user-provided X.509 digital certificates. Simple Network Management Protocol (SNMP) version 3 adds security and remote configuration enhancements to SNMP. In certain cases a license key is required to implement these capabilities.
- **Identity and Event Management:** You can enable identity-based user accounts with configurable password rules to control user access to the radios. Remote Authentication Dial In User Service (RADIUS) can be used to remotely authenticate your users and their levels of access based on your network policies.
- **Auditing and Event Management:** Security and other events are logged locally and optionally can be sent to a centralized logging server using syslog. Such messages include: successful and failed log-in events and changes to security configuration.
- **Disaster Recovery:** Our "save and restore" feature lets you back up a radio's operating configuration file. Then the file can be restored quickly and easily if a unit must be reset or replaced.
- **Vulnerability Management:** Using commercially available tools, we regularly scan PTP 600 systems for vulnerabilities and those that pose significant risk are resolved.

## EASY, ACCURATE LINK PLANNING

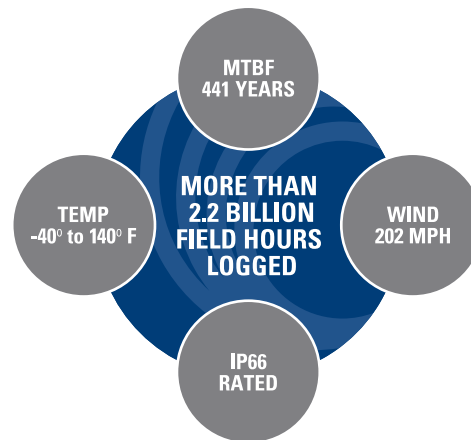
Our easy-to-use Cambium PTP LINKPlanner tool lets you accurately project performance characteristics prior to purchase based on your specific radio path conditions. You can plan and optimize a single link or multiple links simultaneously, apply "what if" scenarios, see the effects of your changes immediately and obtain configuration details to speed deployment. LINKPlanner is available as a stand-alone tool and can be downloaded from our web site.

## PERFORMANCE BOOSTING TOOLS

PTP 600 systems include industry-leading metrics to help you attain the best possible performance from your wireless system. Those metrics include antenna alignment information, measurements of throughput, signal level and signal quality, and troubleshooting diagnostics.



TM: Certification Mark of NIST (National Institute of Standards and Technology), which does not imply product endorsement by NIST, the U.S. or Canadian Governments.



## UNCOMMON DURABILITY

With more than 2.2 billion field hours logged, our radios are proven to withstand the rigors of outdoor use. Radios perform steadfastly in winds up to 202 mph (325 kph) and temperatures from -40° to 140° F (-40° to 60° C). Our PTP 600 systems average 441 years MTBF (Mean Time Between Failures) based on field component failure rates. In addition, the radios have protective aluminum enclosures that are IP66 (Ingress Protection) Rated against dust and water intrusion.

## FLEXIBLE SYSTEM MANAGEMENT

Easy to use and deploy, PTP 600 systems contain embedded web servers to manage a link either locally or remotely and are designed to easily integrate with Web or SNMP-based management systems as well as our Wireless Manager software, version 3.0 or higher. PTP 600 systems support both in-band and out-of-band<sup>5</sup> management.

<sup>5</sup> Out-of-band management is available on PTP 45600, 54600 and 58600 models.

## CASE FILE: SERVICE PROVIDER



### **EXPANDING YOUR SERVICES PROFITABILITY**

With a growing residential and small-business subscriber base, you are now targeting larger enterprises. As a result, you need to add capacity to meet enterprise requirements for Voice-over-IP (VoIP) and high-definition video. You selected Cambium PTP 600 radios to deliver dedicated access and service-on-demand for new and existing enterprise customers. With the PTP 600's proven performance in obstructed paths, high-interference areas and extreme weather conditions, you can support enterprises in virtually any environment.

Your first links have been installed and tested, and everything went very smoothly. As you walk into this important meeting with a new customer, you are fully confident that you can deliver top-notch service while increasing your profitability.

## OUR PTP 600 WORKS FOR YOU

Our PTP 600 solutions are our premier systems for high-speed, reliable NLOS and ultra-long-distance connectivity and backhaul. These systems routinely perform in some of the most challenging environments on earth – environments where comparable systems cannot even sustain a connection.

## SERVICE PROVIDERS

With multi-level security, the ability to connect T1/E1 ports for bundled connectivity, and high-speed WiMAX and LTE backhaul capability, PTP 600 systems support sophisticated convergent and multimedia applications. Our backhaul and last-mile solutions can help you supply services to large, wide-spread customer bases. With our complete portfolio of point-to-point and point-to-multipoint solutions, you can rely on Cambium's wireless technology to help you respond to ongoing market changes and capitalize on new opportunities.

## FEDERAL AND MILITARY

The 4 GHz licensed spectrum, in which our PTP 45600 and PTP 48600 operate, has been designated for use by the U.S. Federal Government and NATO countries for fixed and mobile communications. Typical PTP 600 applications include base modernization, battlefield communications, Land Mobile Radio (LMR) backhaul, public safety, video surveillance, border security, training and simulation networks, and building-to-building connectivity. Because PTP 48600 frequencies encompass the 4.9 GHz band, you can utilize the same radios for Federal operations, public safety and collaboration with local and state agencies. The PTP 600's portable packaging makes it excellent for tactical deployments, while the Connectorized models are superb for longer, permanent fixed deployments.

PTP 600 solutions, release 10-00 and higher, are listed on the Unified Capabilities Approved Products List (UC-APL), indicating that the radios comply with requirements for interoperability and information assurance. This compliance allows DoD agencies to purchase and operate UC-certified systems over all DoD network infrastructure. The listing can be confirmed at <https://aplits.disa.mil/processAPList.do>.

## GOVERNMENT, PUBLIC SAFETY AND ADMINISTRATION

PTP 600 radios operate in the 4.5, 4.8, 4.9, 5.4 and 5.8 GHz bands, giving you great flexibility to communicate in your preferred radio frequency. The systems deliver exceptional reliability, spectral efficiency, security and reach to support military operations, government administration, public safety and public service departments. Whether you need to extend communications, backhaul voice and video traffic,

remove network bottlenecks or reduce leased-line or fiber costs, you can depend on PTP 600 radios to send and receive the crucial information you need to achieve your mission-critical objectives.

Because PTP 600 systems offer carrier-class reliability, support wayside T1/E1 links, and have low latency and jitter, they are also an excellent addition to a Motorola ASTRO® 25 or Dimetra™ network. PTP 600 radios can supply public safety agencies with cost-effective backhaul, connectivity between base sites, last-mile access and broadband access at tower sites.

## INDUSTRIAL COMMUNICATIONS

With PTP 600 solutions, organizations such as transportation and logistics companies, public and private utilities, and gas and oil companies can achieve efficient, reliable and high-performance communications in even the most challenging environments. The systems can provide connectivity and backhaul for building-to-building communications, video surveillance, VoIP, high-definition video, wire-line and fiber extensions or replacement, and a variety of other applications. In utility companies, you can also supply connectivity and backhaul for telemetry and Smart Grid operations.

## ATEX AND HAZLOC CERTIFICATIONS

### ATEX

- Equipment Group II
- Category 3 / Zone 2
- Gas Group IIC
- Temperature Class T4

### HAZLOC

- Class 1 Location
- Division 2
- Gas Groups A, B, C, D



For oil and gas companies, PTP 600 radios comply with ATEX (ATmospheres EXplosibles) and HAZLOC (Hazardous Locations) directives for equipment operations in hazardous locations. The systems can help you safely:

- Supply communications for turnarounds
- Backhaul traffic from surveillance cameras, VoIP and process control systems
- Increase capacity for bandwidth-intensive voice and video communications
- Provide network redundancy for critical operations.

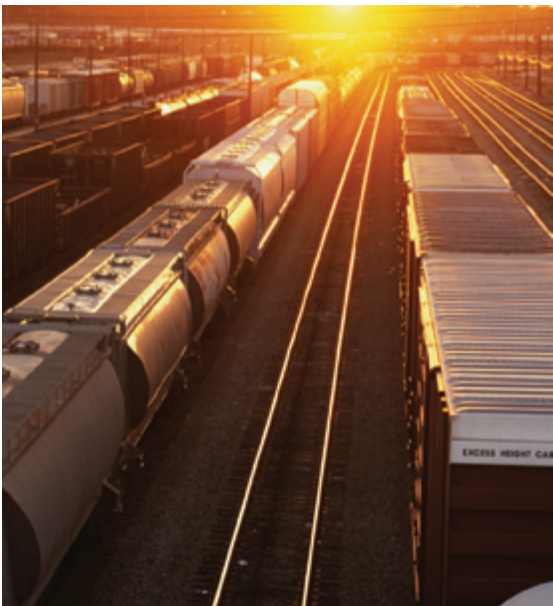
# CAMBIUM 600 SERIES

## ENTERPRISES

PTP 600 solutions can support your high-bandwidth enterprise applications in environments where wired networks are too expensive or impossible to implement. Whether migrating from an analog to a digital network, linking networks between buildings or deploying video surveillance, PTP 600 radios supply high-throughput and reliability for a wide variety of business-critical applications in enterprises such as retail, healthcare, education, hospitality and general business.

## ALWAYS IN CONTACT

With our PTP 600 connectivity and backhaul solutions, you can communicate regardless of path conditions, weather conditions and distances. So, you can remain connected to the people, places and information you need to accomplish your objectives.



For more information, refer to the Cambium [PTP 600 Series Product Specification Sheet](#) or visit [cambiumnetworks.com](http://cambiumnetworks.com).



[www.cambiumnetworks.com](http://www.cambiumnetworks.com)

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