CAMBIUM PTP 800 SERIES
MAXIMIZE YOUR SLICE OF RADIO SPECTRUM

SPLIT-MOUNT AND ALL-INDOOR
POINT-TO-POINT (PTP) LICENSED ETHERNET MICROWAVE SOLUTIONS

STRIKE THE RIGHT BALANCE

Today's converged multi-service networks need high capacity, availability, reliability and security with low latency and true affordability. In addition, you have budgetary, environmental, infrastructure and deployment requirements that have to be considered. Satisfying all these conditions takes a real balancing act. Our Cambium Point-to-Point (PTP) 800 Series Licensed Ethernet Microwave solutions strike just the right balance of performance and cost.

THE PERFECT FIT

PTP 800 solutions are designed to satisfy the demand for reliable, high-throughput, and secure Internet Protocol (IP-based) licensed-microwave communications at an affordable price. Within the PTP 800 family of solutions, we offer two equipment architectures — split-mount and all-indoor. The solutions are designed to provide connectivity and backhaul for a broad array of applications, while giving you the flexibility to choose the architecture that best meets your tower and facility considerations.

PTP 800 SPLIT-MOUNT SOLUTIONS

Our PTP 800 Split-Mount systems deliver up to 368 Mbps (full duplex) throughput with user-configurable channel bandwidths from 7 to 56 MHz. The systems operate in the 6 to 38 GHz radio frequency (RF) bands, providing a range of traditional licensed microwave options that comply with your local regulatory guidelines.[1] Our Split-Mount systems are easy to deploy and typically are installed in a day or two.

PTP 800 Split-Mount links consist of an outdoor radio unit (ODU), a Compact Modem Unit (CMU), an antenna and the appropriate accessories. The radio unit and antenna are deployed on a tower, mast or rooftop. The ODU is connected directly to the antenna and cable-connected to the CMU which is installed inside your building or equipment housing structure. Our Split-Mount systems offer the convenience of an indoor CMU with the cost savings afforded by cable versus waveguide.

PTP 800i ALL-INDOOR SOLUTIONS

Our PTP 800i All-Indoor systems deliver up to 236 Mbps (full duplex) over configurable channel bandwidths from 10 to 40 MHz. The radios operate over Federal Communication Commission (FCC) and Industry Canada (IC) authorized 6 and 11 GHz frequencies and the FCC-authorized 7 GHz frequency. For deployments where weather conditions limit tower climbs or where towers are located in areas that are not easily accessible, our All-Indoor solution offers an excellent alternative. Once installed, you have convenient access to the equipment without a tower climb.

PTP 800i All-Indoor links consist of an Indoor Radio Frequency Unit (IRFU) and a CMU installed inside a building or equipment housing structure. Both units are designed to be rack mounted. All-Indoor systems use the same CMU as our Split-Mount systems. The high-power radio sends and receives transmissions through a waveguide which connects the IRFU to an antenna on a tower, mast or rooftop. You can custom configure your PTP 800 solution as an all split-mount system, an all-indoor system, or a combination of the two, allowing you to engineer your wireless network in the most cost-efficient manner.

PTP 800i solutions offer the highest transmit power and system gain in their category, enabling the radios to transmit reliably over distances up to 50 miles (80 km) in a single hop. Embedded spatial diversity helps to overcome any interference and fading caused by atmospheric conditions.

TYPICAL CUSTOMERS

- Public Safety Agencies
- Government — Civilian and Military
- Oil and Gas Companies
- Transportation Organizations
- Utility Companies
- Wireless Internet Service Providers (WISPs)
- Banks and Financial Institutions
- Enterprises
- Carriers

[1] Local regulatory requirements should be confirmed prior to system purchase.

PTP 800
Outdoor Unit (ODU)

PTP 800i Indoor Radio
Frequency Unit (IRFU)

PTP 800
Compact Modem Unit (CMU)

So, you can communicate over water and flat terrain. Plus, the system's eco-mode reduces power consumption.

CAPACITY AS YOU GROW

Typically, demand for capacity grows during the life of a network. To accommodate that growth, you can purchase the PTP 800 throughput you need today and increase throughput capacity as needed. This capacity-as-you-grow scalability can reduce your initial capital expenditure by not having to pay for tomorrow's needs with today's budget. Instead, you can match throughput capacity to your application requirements or, for carriers and service providers, to your developing demand and revenue stream. In addition, you can assign different throughput capacities to the up and down links.

PTP 800 Compact Modem Units are shipped with a factory-set 10 Mbps capacity cap, meaning that throughput is set to a maximum of 10 Mbps at the user Ethernet port. When you require more than 10 Mbps, you can upgrade the throughput capacity without any change to the hardware. Single-step or step-by-step capacity upgrades can be implemented at the time of purchase and/or anytime after deployment.

ZERO-DOWNTIME ADAPTIVE MODULATION

The PTP 800's dynamic Adaptive Coding and Modulation (ACM) feature provides performance benefits for many IP-based applications. When ACM is selected, the system automatically "up-shifts" and "down-shifts" the modulation and/or coding rate as path conditions change. This enables radio transmitters and receivers to negotiate the highest mutually sustainable data rate.

During good weather, the radio will "up-shift" to a higher modulation level and/or higher coding rate to improve spectral efficiency and increase throughput and availability. If the link's Signal-to-Noise Ratio (SNR) falls below the threshold that your link can sustain, as can occur during heavy rain, the radio will "down shift" to a lower modulation level and/or lower coding rate. The resulting improvement in receive sensitivity enables your link to continue operating.

With exceptionally smooth change steps, errorless coding and modulation technology, and a hitless algorithm, you will experience no service interruption as the modulation steps from one level to another. Many comparable systems need several seconds to adjust the modulation mode which causes outages as the radios switch modes.

FAILSAFE COMMUNICATIONS

There are many applications such as 9-1-1 dispatch, video surveillance, and online stock trades for which a communication outage is just not acceptable. In such crucial situations, you will want hardware redundancy to support your vital functions with uninterrupted, real-time communications. While hardware redundancy is not required to deploy PTP 800 links, it is recommended for each link which supports a critical application or process.

PTP 800 links can be deployed as 1+1 hot standby (HSB) links, 2+0 redundant links in a ring or mesh configuration, and non-redundant links. HSB links are designed to provide full redundancy in the event of a single CMU (Compact Modem Unit) or radio (either ODU or IRFU) failure at one or both ends of a link. If a failure occurs, the secondary unit will automatically take over communications. You can also achieve redundancy by deploying PTP 800 systems in a ring or mesh configuration with two independent links and an external switch. Non-redundant links are good choices to support applications for which you would not incur significant consequences in the event of a failure. If you deploy a non-redundant link, you can later upgrade to a 1+1 or 2+0 configuration without changing your hardware.

INFORMATION SAFEGUARDS

While many traditional microwave solutions offer fewer security features, our PTP 800 systems support a robust, multi-layered approach to information security. To protect your over-the-air transmissions, PTP 800 radios include our proprietary air interface. Added protection can be applied with Federal Information Processing Standards (FIPS) 197 compliant 128-bit or 256-bit Advanced Encryption Standard (AES) encryption.

PTP 800 systems also meet FIPS 140-2[2] guidelines for cryptographic algorithms, key security and tamper evidence. Together AES and FIPS 140-2 offer robust security to protect highly sensitive information from malicious incidents. (AES and FIPS 140-2 are optional features.)

Added security features include:

- **HTTPS/TLS and SNMP v3:** HTTPS/TLS, the secure version of HTTP, protects the system's management interface. 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.
- **Authenticated SNTP:** PTP 800 systems support authenticated Simple Network Time Protocol (SNTP) messaging.

[2] FIPS 140-2 certification status may be confirmed at http://csrc.nist.gov/groups/STM/cmvp/inprocess.html

- **RADIUS:** You can employ identity-based user accounts with configurable password rules to control user access to the radios. Then Remote Authentication Dial-In User Service (RADIUS) can be used to remotely authenticate users and their levels of access based on your network policies.
- **Event Management:** Security and other events are logged locally and, optionally, can be sent to a centralized logging server using syslog. Typical 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 800 systems for vulnerabilities and those that pose significant risk are resolved.

EASY, ACCURATE LINK PLANNING

Our easy-to-use Cambium PTP LINKPlanner tool allows you to 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, obtain configuration details to speed deployment, display a comprehensive overview of your entire wireless network via Google™ Earth and receive a complete licensed-microwave Bill-of-Materials to simplify the ordering process. LINKPlanner is available as a stand-alone tool on our web site.

REDUCED INSTALLATION COSTS

Optimized hardware design and easy-to-follow deployment-assistance information significantly reduce deployment man-hours and costs. A Split-Mount solution includes an ODU and a CMU. The ODU and CMU are connected by a single intermediate frequency (IF) cable. The CMU's extremely small, physical footprint greatly reduces rack-space requirements. You can even mount the CMU on a wall or place it on a table if rack space is scarce or non-existent.

In our All-Indoor solution, the IRFU and CMU are installed indoors with only the antenna on a tower or rooftop. So, you do not have to climb a tower to install either the IRFU or CMU. The IRFU and antenna are connected by a waveguide. Typically, both the IRFU and CMU are rack mounted. Each IRFU can support up to two transceivers and two antenna ports — one port for the main antenna and one for a diversity antenna. All assemblies in the IRFU are field replaceable, including the transceivers, fans, branching units and RF cables.

It is less expensive to pay and insure ground-based personnel to deploy and maintain the equipment than it is for specialized personnel to climb towers and work on electronic equipment. So, eliminating tower climbs can significantly reduce operating costs. In addition, trade unions can be reluctant to approve tower climbing by their members, making all-indoor systems more viable in such cases.

SYSTEM INTEGRATION

All PTP 800 systems integrate seamlessly with our PTP license-exempt and defined-use licensed systems, as well as our Point-to-Multipoint systems. Our comprehensive broadband portfolio gives you an array of line-of-sight (LOS), non-line-of-sight (NLOS) and ultra long-distance solutions. As a result, you have complete flexibility to configure the solution or combination of solutions that best meet your path conditions, application and infrastructure requirements, and budgetary guidelines.

END-TO-END WIRELESS MANAGEMENT

Our Cambium Wireless Manager is an optional feature-rich tool that simplifies management functions and reduces the time required to manage your wireless network. From one live Google™ map view, you can monitor and manage point-to-point, point-to-multipoint, and other SNMP-enabled devices. This holistic, map-based approach is designed to speed up problem resolution and boost your network uptime and availability.

PTP 800 systems also contain embedded web servers to manage a link either locally or remotely and are designed to easily integrate with Web-based or SNMP-based network management systems. Plus, you can choose either in-band or out-of-band management.

PERFORMANCE BOOSTING TOOLS

PTP 800 systems include industry-leading metrics to help you attain the best possible performance from your wireless system. Those metrics include antenna alignment information, throughput measurements, measurements of signal level and quality, and troubleshooting diagnostics.

PTP 800 AT WORK

PTP 800 solutions are designed to efficiently and affordably transport the data, voice and video that your applications require while supporting a smooth migration to an IP-based network. Typical uses include:
- Furnishing reliable, high-performance wireless backhaul for P25 public safety networks
- Supplying 7 and 8 GHz connectivity and backhaul for U.S. Federal Government applications

TYPICAL USES
- Backhaul for P25 networks
- Ethernet data, voice and video backhaul
- Leased-line replacement or extensions
- Network redundancy
- WiMAX/LTE backhaul
- Data overlay networks
- Building-to-building connectivity

FASTER BACKHAUL
ALONG THE RAILS

You are upgrading your rail station video monitoring and transportation control systems. The video systems need to transmit streaming video in real time while your traffic control systems must operate without fail 24-7. However, your existing leased lines are not adequate to handle the current video backhaul requirements. In addition, you need full redundancy for your transportation control systems and want to install the systems inside the rail stations.

You chose Cambium's PTP 800i All-Indoor Solutions with high-power IRFUs and Hot Standby Redundancy. The first two rail stations have been installed and operating successfully for three weeks. The fully redundant systems were deployed in a few days and are handling video traffic easily. During the test phase, the redundant equipment performed flawlessly. Today, you are shutting down your leased lines and operating wirelessly. Two down, and ten more stations to go.

- Providing backhaul for SCADA and process control systems in transportation and utilities
- Replacing leased-lines to eliminate or reduce monthly fees
- Extending video surveillance beyond the constraints of a wired infrastructure
- Backhauling video from surveillance cameras to a dispatch or command center
- Establishing network redundancy for a wired or fiber network
- Delivering high-capacity wireless backhaul for WiMAX and LTE networks
- Supplying added capacity for sophisticated Voice-over-IP, streaming video and multimedia applications
- Transporting data, voice, and video across water and flat terrain
- Improving productivity by connecting a headquarters location to a branch office, warehouse, customer service center or other facility
- Growing subscriber networks by establishing service in distant locations
- Providing a data overlay for an existing legacy network

STRATEGIC GOVERNMENT COMMUNICATIONS

At all levels of government, real-time, secure communications are essential to the efficient delivery of services. Today's communication networks have to transport everything from high-definition (HD) video and battlefield commands to census data and passport records.

Whether you need added backbone capacity, high-speed connectivity and backhaul, and/or network redundancy, our PTP 800 solutions are ideal to support your applications and share vital information. The systems comply with FIPS 140-2 guidelines for cryptographic algorithms, key security, and tamper evidence. Plus, NTIA-compliant 7 and 8 GHz models are available for US Federal and Department of Defense (DoD) applications.

VITAL PUBLIC SAFETY COMMUNICATIONS

PTP 800 solutions can deliver the life-saving intelligence and time-saving efficiencies you need to respond to natural disasters, security threats and other dangers to people and property. With real-time access to vital information, police officers, firefighters, emergency medical teams, dispatchers and other public safety officials can decrease incident response time, improve situational awareness, make better on-scene decisions, and reduce operational costs.

One of most critical areas of a successful public safety network is the backhaul system which transfers communications from a base station to the core network. PTP 800 radios can efficiently backhaul traffic from land mobile radios, surveillance cameras, and other data gathering devices to a command or dispatch center. In addition, you can configure your mission-critical network with full redundancy to ensure always-on communications.
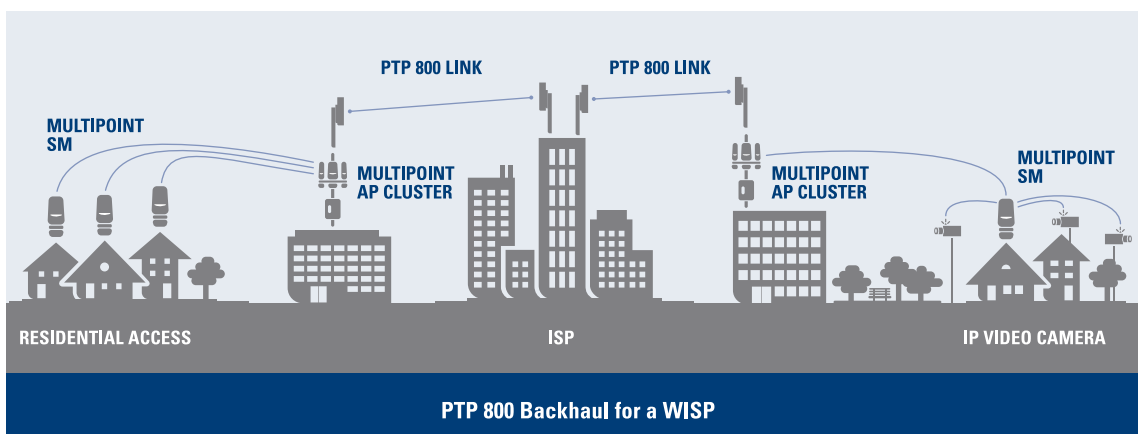
COMMUNICATIONS POWER FOR POWER PLANTS

Utility companies are migrating to the Smart Grid, an intelligent grid to drive greater energy efficiency, reliability and affordability via a fully-capable data communications network. The transition has begun with implementation of AMI (Advanced Metering Infrastructure) systems that include millions of smart meters as well as Distribution Automation and SCADA (Supervisory Control and Data Acquisition) systems for remote monitoring and control of critical infrastructure. Many utilities are turning to Ethernet microwave technology to upgrade antiquated, analog equipment and to extend the life of their legacy hardware, while starting the transition toward all IP-based networks.

Our PTP 800 solutions are uniquely designed for your multi-purpose communication needs, including access and backhaul for multiple Smart Grid applications. Our family of all-indoor and split-mount solutions offers you affordable

7 – 8 GHZ SOLUTIONS
- NTIA-approved dedicated spectrum for U.S. Federal Government
- DoD and non-DoD connectivity and backhaul

MULTIPOINT SM

PTP 800 LINK   PTP 800 LINK

MULTIPOINT AP CLUSTER

MULTIPOINT AP CLUSTER

MULTIPOINT SM

RESIDENTIAL ACCESS   ISP   IP VIDEO CAMERA

PTP 800 Backhaul for a WISP

BACKHAUL YOU CAN DEPEND ON

As dispatcher, you are at the center of the action and the information lifeline between the incident and first responders. At any moment, you can be thrown into an intensely stressful situation. You obtain needed information, analyze appropriate options, prioritize your responses and coordinate response activities in seconds. So, you have to rely on your communication network to transport the right information to the right resources instantly. Your backhaul system cannot waste potentially life-saving seconds.

When it's your moment to act, your P25 network with PTP 800 licensed microwave backhaul keeps up with your rapid-fire commands.

wireless broadband communications with excellent reliability, security, and redundancy. Our flexible "capacity-as-you-grow" throughput option lets you purchase the capacity you need today and increase throughput as Smart Grid applications expand.

COMPETITIVE EDGE FOR SERVICE PROVIDERS

To maintain a competitive advantage, you must be able to respond quickly to constantly changing customer requirements. As a result, you need a communication network that gives you the flexibility and versatility to respond to those ever-evolving requests for new and enhanced services. From backbone to backhaul, PTP 800 solutions can help you grow your subscriber networks by establishing or improving services in underserved areas. The systems can help you remove network bottlenecks, eliminate or reduce recurring leased-line charges, provide a secondary ring off the primary ring, and add broadband capacity.

EXTREME DURABILITY

Our PTP systems have logged more than 2.2 billion field hours. As a result, our radios are proven to withstand the rigors of outdoor use. Radios perform steadfastly in winds up to 150 miles per hour (242 kph) and temperatures from -27° to 131° F (-33° to 55° C).

CAPACITY, RELIABILITY, VALUE

Everyone wants the most value for their investment. When it comes to value, the PTP 800 shines with impressive features that can significantly reduce capital and operating expenditures. Key value drivers include:

- All-Indoor and Split-Mount systems give you the flexibility to deploy the most convenient and cost-efficient network based on your needs.
- All-Indoor solutions reduce or eliminate the expenses associated with tower climbs.
- "Capacity as you grow" scalability lets you budget to meet throughput needs.
- Cost-effective configurations support 1+1 hot standby and 2+0 network redundancy.
- Optimized system design and installation cut deployment man-hours and costs.
- Errorless and hitless ACM maximizes spectral efficiency, increases throughput and improves availability without service interruption.
- Easy, flexible management options integrate with your existing network management activities.
- Licensing service packages[3] save you time and simplify RF licensing procedures.
- Our Complete PTP portfolio gives you tremendous flexibility to configure the solution that is ideal for your business needs, path conditions and budget.

[3] Packages may not be available in certain geographic regions.

Cambium Networks™

www.cambiumnetworks.com