



**YOUR MISSION  
IS TO PROTECT  
AND SERVE. OURS  
IS TO HELP YOU.**



## WIRELESS AGILITY, PERFORMANCE AND COST SAVINGS

Your agency has been tasked with becoming more open and transparent. While that is a worthwhile goal, you currently have some very real and pressing information technology (IT) challenges. Your most urgent needs are to:

- Upgrade legacy infrastructure – some systems are so outdated that they actually make it more difficult to perform agency functions
- Increase throughput and capacity between video cameras and your control center (backhaul more cameras on a single link) and supply capacity for high-definition, full motion, full color video
- Implement a Continuity of Operations Planning (COOP) program – keep your agency in operation and re-establish communications fast when an emergency occurs
- Provide broadband access and capacity to remote locations, seasonal operations and ad-hoc emergency command posts to keep your personnel and their constituents connected

You have to find a way to do more with less. Wireless technology can help because it offers excellent agility, performance and cost savings. However, you have several questions. Can fixed, point-to-point wireless enable mobile employees? Are wireless communications really secure? Will bad weather and interference cause outages? How will a wireless network impact the rest of the network? You feel like you have more questions than answers.

### Sound familiar?

With more than 80 years experience in wireless communications, we can answer your questions and suggest cost-saving options to:

- Deploy our PTP solutions in place of TDM microwave
- Eliminate or reduce leased-line charges and satellite link-access costs
- Increase your communications reach with PTP links while reducing the total number of hops needed to connect distant locations
- Lower backhaul costs by installing PTP wireless rather than fiber or copper



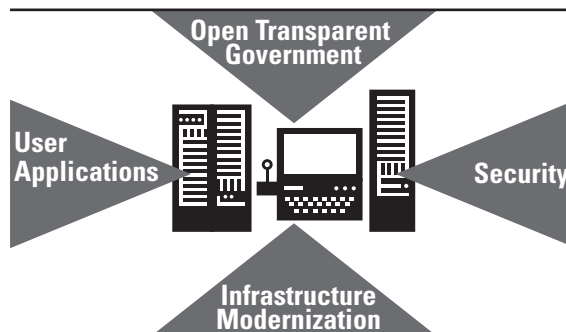
## INTRODUCTION

To support agency objectives, you are systematically migrating to an Internet Protocol (IP) based, converged network. Your migration may be at the beginning, middle or end of the process. Regardless, you know that infrastructure modernization is essential to support your users now and in the future.

The enormous increase in the amount of information your agency handles may be about to overwhelm many of your systems, if it hasn't already. Add in the enhancements needed to support the growing number of remote workers and the increased bandwidth and processing power needed to support applications such as intra-agency and inter-agency communications, video surveillance backhaul and growing amounts of multimedia content. When you put it all together, it's pretty clear that your modernization efforts can't be delayed much longer.

However, moving ahead on these enhancements presents another obstacle – security. In fact, shoring up IT security may be the biggest priority of all. So where do you start?

In this document, we focus on the value and functionality of our PTP 600 and PTP 800 wireless network solutions which are well-suited for a wide variety of federal



Pressing needs threaten to overwhelm existing systems

applications. You'll learn how these solutions can support your network migration and user requirements and how other federal agencies have benefited from PTP deployments. The application scenarios described in the following sections relate to several areas of government operations to touch on issues that you may be facing right now.

## ADDRESSING PRIORITIES

We can help you communicate more easily, more effectively, more securely and more meaningfully. Because our wireless solutions will work with your existing infrastructure, you can start addressing many communication challenges today such as:

- Providing redundancy for continuity planning
- Removing backhaul bottlenecks
- Delivering more bandwidth and connectivity where needed
- Supporting military operations in hostile locations

As for security, we know how important it is to secure wireless communications. That's why we have made and continue to make large investments in security. All our solutions offer robust, multi-layered security to protect your data, voice and video communications. In addition to FIPS-197 compliant, 128-bit and 256-bit Advanced Encryption Standard (AES) encryption, certain PTP 600 radios are FIPS 140-2<sup>1</sup> hardware and software-ready, and certification is pending. (Refer to the PTP Solutions Portfolio section for more detailed information about our security capabilities and certifications.)

### SECURE, DEPENDABLE TACTICAL COMMUNICATIONS

PTP solutions are excellent choices to deliver reliable, high-speed tactical communications for both domestic and battlefield applications. As an example, PTP systems can supply communications from brigade to battalion and battalion to company. Portable packaging makes the systems excellent for tactical deployments, while models with external antennas are superb for longer, permanent fixed deployments. The systems can be deployed quickly and easily, allowing you to reduce your installation man-hours, travel and equipment costs.

### RUGGED BATTLEFIELD COMMUNICATIONS

Our PTP radios can enable battlefield communications over water and hot desert terrain and withstand extreme weather conditions. The ruggedized systems are engineered to deliver high-performance connectivity in some of the most hostile environments on the planet. Plus, robust, multi-layered security protects your sensitive communications.

### SITUATIONAL AWARENESS

For in-theater and border control personnel, having immediate access to surveillance information, law enforcement databases, site information and other incident dynamics is critical to ensuring the success and safety of a mission. PTP solutions can receive data, voice

and video from sensors such as RADAR and IR/VR video and transmit the information to a control point where data can be analyzed and the appropriate response determined. With up to 99.999% availability, up to 368 Mbps full-duplex data rates and robust security, our systems provide the high performance, reliability and confidentiality needed to support critical situations.

### U.S. National Guard National Response (NGNR)

The NNGR program fortifies Civil Support Teams (CSTs) with our PTP 600 Multi-Point-to-Point (M-PTP) systems. The M-PTP systems give CSTs quick-deployment, robust and high-speed IP connectivity which allows them to locate equipment near a contaminated site or danger zone and manage the situation from a safe distance. Each M-PTP system can support up to four simultaneous subscribers in a network where links must be deployed rapidly and redeployed frequently.

### ENHANCING PUBLIC SAFETY ON MILITARY BASES

Military bases are small cities that require the same public safety services as other cities. At a time when budgets and resources are stretched thin, our PTP systems can provide needed bandwidth and reliability to support public safety applications while offering maximum value and cost efficiency.

Experience shows that when on-scene responders have the right information at the right time, they can react quickly and make better on-scene decisions. Typically, that information is delivered through the use of two-way radios, laptop computers and in-vehicle information systems. PTP radios can provide both the backhaul from these mobile devices and the connectivity between law enforcement, fire stations and dispatch centers. Added communications support can include:

- **Situational Awareness:** Military police, fire fighters, emergency medical teams and dispatchers can discuss situational issues and response options to facilitate safer, faster and more effective outcomes.
- **ASTRO® 25 Backhaul:** With built-in T1 capabilities and high-throughput, PTP solutions can backhaul voice traffic from ASTRO® 25 base stations as well as provide last-mile access and connectivity between base sites.
- **Video Surveillance:** Recent advances in video surveillance not only capture what the camera sees,

### PTP Optimized for Federal Applications

PTP 600 – 4.5, 4.8 GHz  
(licensed for Federal and NATO use)

PTP 600 – 4.9 GHz  
(licensed for public safety use)

PTP 600 – 5.4 and 5.8 GHz  
(license exempt)

PTP 800 – 6, 7, 8, 11, 18, 23, 26  
and 38 GHz  
(licensed Ethernet microwave)

**PTP 600 radios with FIPS 140-2 Level 2 certification meet regulatory requirements for cryptographic algorithms, key security and tamper evidence.**

**Our PTP solutions provide connectivity for many U.S. military situational awareness systems, including RAID, PSDS2, GBOSS, BETSS-C, C-RAM and RVA.**

<sup>1</sup> Certification status may be confirmed online at: <http://csrc.nist.gov/groups/STM/cmvp/inprocess.html>

but also provide the precise camera location, object detection intelligence and object/intruder tracking. PTP radios can provide the critical backhaul component and extend surveillance to remote areas reliably, securely and cost-effectively.

**MIGRATING TO A CONVERGED NETWORK**

For many agencies, one of the most critical objectives is to expand, accelerate and secure information access. The following information suggests several ways in which PTP solutions can help you start addressing critical objectives while advancing your overall migration toward an IP-based, converged network.

• **Eliminate or Reduce Recurring Fees**

One of the fastest and easiest ways to cut costs is to replace your T1 or fiber lines with PTP wireless systems. Because our PTP systems have a one-time purchase cost, you can achieve a significant savings by greatly reducing or even eliminating recurring fees. Plus, the more lines you replace, the more you can save.

Leased-Line Capacity	Estimated Cost	PTP 45600 (One Link)	PTP Estimated Cost <sup>2</sup>	ROI
10 Mbps ATM	\$1,230/mo.	150 Mbps	\$25,500	21 Months
10 Mbps Ethernet	\$1,600/mo.	150 Mbps	\$25,500	16 Months
100 Mbps Ethernet	\$3,600/mo.	150 Mbps	\$25,500	7 Months

The above examples compare monthly leased-line charges based on estimated GSA pricing to the one-time cost of a PTP 45600 system. In each case, you would realize significant cost savings after your ROI. Plus, you would also increase throughput capacity from 10 Mbps and 100 Mbps up to 150 Mbps with a 4.5 GHz PTP 600 link (model PTP 45600).

**Calculate your own ROI at:**

[http://business.motorola.com/WirelessBroadbandROI/ROI/LeaseLine\\_ROI.html](http://business.motorola.com/WirelessBroadbandROI/ROI/LeaseLine_ROI.html)

Simply go to the ROI calculator, enter your information and see the cost savings you could realize.

Availability of service is another reason to replace T1 or fiber lines. If you need to establish communications in a remote area where there is no existing T1 or fiber service, a PTP wireless solution can extend your communications reach to otherwise unreachable locations. Plus, because fiber cable is often cut by construction workers and field technicians, a PTP

solution can provide more reassuring uptime for critical applications.

- **Broader Connectivity:** PTP wireless can reliably and efficiently disseminate information to maximize the productivity of personnel and provide always-on access to crucial information. Because they are IP-optimized, our PTP solutions can also help you advance your IP migration by deploying links for network redundancy and last mile access.

Plus, a PTP wireless network can add throughput capacity, extend your communications reach and increase availability for day-to-day operations while providing robust communications during emergencies. With up to 377 years projected elapsed time between equipment failures (MTBF or Mean Time Between Failures), our systems are engineered to withstand extreme conditions. Some of our radios have even maintained operations through hurricanes.

- **1710-1755 MHz Spectrum Relocation:** The Federal Communications Commission (FCC) has mandated that Federal agencies with wireless communication systems operating in the 1710-1755 MHz spectrum move to another suitable band. This relocation is necessary because the spectrum has been reallocated to commercial use. Since our PTP systems are deployment-ready, you can transition effortlessly from 1710-1755 MHz to the licensed or license-exempt spectrum which best meets your requirements.

**ANYWHERE CONNECTIVITY**

Mobility, collaboration, video surveillance, situational awareness and a host of other communications extend beyond your facility to connect with networks in other facilities. The minute you go outside your walls, you can encounter a host of radio frequency (RF) challenges such as:

- Trees and buildings which obstruct the line of communications
- Interference from other communicators in the area (unless you deploy licensed microwave)
- High winds, extreme temperatures and other weather-related challenges

Our PTP 600 Series systems deliver carrier-grade performance in these conditions as well as over water and desert terrain. Whether you need to connect two buildings or connect buildings in a campus setting, PTP radios are engineered to work around obstacles, overcome interference and withstand extreme weather conditions. We often connect locations that were previously considered un-connectable.

<sup>2</sup> Estimated cost does not include tower space leasing costs.

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### **Streaming Video from a Bobbing Buoy**

The National Oceanic and Atmospheric Administration (NOAA) operates an undersea laboratory on the ocean floor off the Florida Keys. From this location, NASA conducts aquatic research and experiments that simulate an outer-space environment. Our PTP solution streams high-quality video and voice from a buoy on the ocean to an office in Key Largo while providing carrier-grade availability through rough 6-foot swells. Plus, the bandwidth is adequate to support their video-conferencing and VoIP applications.

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### **U.S. Geological Survey (USGS)**

The USGS is monitoring volcanic activity in the Northwest and using a PTP system to backhaul the information from the volcano to the command center.

Operating reliably across distances of up to 124 miles, PTP radios can reduce the number of hops needed to connect locations. When you need to deploy multiple radios on a tower or rooftop, radios equipped with our PTP-SYNC Unit can synchronize transmit and receive signals and perform efficiently with little or no cross interference.

### **BACKHAUL WITHOUT BOTTLENECKS**

If your backhaul system does not have adequate bandwidth and speed to transmit data, voice and video efficiently, the system can create a network bottleneck. Our PTP systems are efficiently backhauling traffic for a variety of Federal and DoD applications such as Voice-over-IP (VoIP), video surveillance, telemetry and Land Mobile Radios (LMRs), including ASTRO® 25 radios. Typically, backhaul communications are the most expensive component in your communication network. Because our PTP systems are extremely cost-efficient, you can significantly reduce backhaul costs and still deliver high-speed communications with up to five-nines of reliability.

### **GREATER CONTINUITY OF OPERATIONS**

The volume of information processed annually by the federal government is staggering. For example, millions of social security checks are mailed each month, millions of Federal withholdings deposits are made each week and millions of tax payments and refunds are processed each year. Stoppage of these or the thousands of other critical operations would be devastating to our nation. As a result, most Federal agencies are implementing a COOP plan to ensure that operations can continue during emergencies.

In a number of federal agencies, multiple redundant networks are required for critical applications. PTP solutions are excellent alternatives to provide redundancy for existing communications on leased lines or fiber. As an example, our PTP solutions can provide the redundancy needed to ensure that the Internal Revenue Service can continue processing the year's 200-million-plus tax returns.

### **GREATER PRODUCTIVITY FOR REMOTE WORKERS**

As the federal government has become more mobile, agencies such as the Departments of Energy, Agriculture and Interior have more remote workers than ever before. Whether taking soil samples in Iowa, measuring volcanic activity at Mount St. Helens or analyzing the impact of a non-native species in the Everglades, field personnel must perform their duties outside a traditional office setting. They may be in the field a week, a month or a year. During the life of their projects, they need real-time access to information and communications with in-office personnel. PTP wireless solutions can reliably and efficiently disseminate information to maximize productivity for remote workers and enable the free flow of information and ideas for collaborative staff.

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### **Improve Communications and Productivity for Remote Workers**

One Department of Energy (DOE) agency uses our PTP radios to provide connectivity to a remote work site. As remote workers deconstruct a nuclear reactor, they are required to submit reports twice each day. Since the remote work site had no connectivity, workers were traveling to an office twice a day just to deliver the reports. After deploying PTP radios, they submit reports directly from the reactor site and have added several hours of productivity to each work day.

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Wireless connectivity is typically the most efficient and cost-effective means to keep mobile personnel connected. Our PTP systems offer several key features for such deployments. The systems can be deployed and taken down very quickly. They can provide high availability and throughput for data, voice and video communications and can operate reliably in obstructed and high interference locations, as well as over water and desert terrain. The systems are extremely durable and can withstand extreme temperatures and severe weather conditions. In fact, many times our PTP solutions have been the only systems that can provide reliable connectivity in seriously challenged environments.



### **FEDERAL AGENCIES USING OUR PTP SOLUTIONS**

- Defense Information Systems Agency (DISA)
- Federal Aviation Administration (FAA)
- Federal Bureau of Investigation (FBI)
- Federal Emergency Management Association (FEMA)
- National Aeronautics and Space Administration (NASA)
- National Oceanic and Atmospheric Administration (NOAA)
- Naval Special Warfare Command
- North Atlantic Treaty Organization (NATO)
- Space and Naval Warfare Systems Command (SPAWAR)
- U.S. Air Force Space Command
- U.S. Army
- U.S. Army Special Operations Command
- U.S. Coast Guard (USCG)
- U.S. Department of Energy
- U.S. Department of Interior
- U.S. Department of State
- U.S. Joint Forces Command
- U.S. Marshals
- U.S. Navy
- U.S. Navy Air National Guard

### DEPLOYABLE BROADBAND: “DROP-IN” COMMUNICATIONS FOR EMERGENCIES

During emergencies, federal, state and local agencies need to join forces to rescue and house survivors, treat injuries, supply food and water, and a host of other activities. However, critical inter-agency communications may be interrupted or completely destroyed. A whole geographic area may be devastated as occurred in Louisiana following Hurricane Katrina’s landfall in 2005. Restoring communications is crucial to coordinate personnel, resources and services.

You can re-establish communications quickly with PTP radios which are configured to provide “drop-in” communications. Deployable broadband links can be shipped into an affected area and brought online quickly and easily. You can also configure deployable broadband as mobile RF sites with pre-mounted PTP links installed on trucks, trailers or other land-based vehicles. Then the vehicles can go where needed and re-establish communications in a matter of hours.

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#### Vehicle Monitoring and Identification

As vehicles approach a border check point, license plate readers capture the license number. PTP systems are backhauling data from the license plate readers, sending the information to the central database for verification and identification, and disseminating the information to border guards at the check points.

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### BORDER CONTROL MOBILITY

Border control officials need high-speed information access to efficiently identify and track the movement of people, vehicles, vessels and goods across borders. Information has to be collected from a variety of devices at observation areas and disseminated to personnel at the

check points. PTP solutions can help officials coordinate surveillance and search-and-rescue operations by providing wireless broadband for real-time access to vital data, voice and video.

### SMARTER TRAINING AND SIMULATION NETWORKS

You can deploy our cost-effective PTP radios to increase productivity and accessibility for training and simulation networks and provide always-on course material for mobile and remote personnel. With Ethernet data rates up to 368 Mbps (full duplex), PTP links can efficiently deliver data, voice and video content with carrier-grade availability.

### MORE CONNECTED HEALTH CARE

Whether in-theater or at a healthcare facility, advances in telemedicine such as electronic health records (EHR), medication administration systems, patient tracking systems, and diagnosis support systems are extremely valuable. However, they place enormous demands on the communications infrastructure. To efficiently transmit the huge medical files and ensure always-on communications, a PTP solution can provide added capacity and redundancy to an existing backbone.

The military requires the same high bandwidth, fail-safe communications for battlefield medical services. These interim facilities are often established in remote, unfriendly geographies. To provide the facilities and staff with needed connectivity, deployable broadband is often the only option. Designed for easy, fast deployment and take-down, PTP radios can be shipped and installed very quickly. The radios also can be configured as vehicle-based mobile RF sites with pre-mounted PTP links for quick connectivity or backhaul. In this configuration, vehicles go where needed and communications can be online within hours.



## PTP SOLUTIONS PORTFOLIO

Our market-leading PTP 600 Series 5.4 and 5.8 GHz license-exempt solutions combine convenience, ease of use and fast deployment with carrier-grade reliability and high-throughput. The PTP 600 4.5 and 4.8 GHz are licensed for exclusive use by U.S. Federal and NATO agencies. The 4.9 GHz systems are optimized for public safety use. All our PTP 600 solutions deliver the high availability

and performance needed to support operations around the globe. Our IP-optimized PTP 800 licensed microwave solutions are affordable, high-speed wireless IP radios that operate in the 6 to 38 GHz licensed bands. All PTP solutions can be deployed independently or integrated to accomplish your specific requirements.

**Key Features of PTP 600 and  
800 Series solutions**

<b>KEY FEATURES</b>	<b>PTP 600 LICENSE EXEMPT</b>	<b>PTP 600 FEDERAL, NATO AND PUBLIC SAFETY</b>	<b>PTP 800 LICENSED MICROWAVE</b>
Radio Frequency Bands	5.4 and 5.8 GHz	4.5, 4.8 and 4.9 GHz	6, 7, 8, 11, 18, 23, 26 and 38 GHz
Max. Throughput <sup>3</sup> (Mbps)	300	4.5 – 300 4.8, 4.9 – 200	368 (full duplex)
Max. Range <sup>4</sup> (external antennas)	124 mi	124 mi	Depends on link budget and environment
Wind Speed Survival	202 mph	202 mph	150 mph
Operating Temperature	-40° to +140° F	-40° to +140° F	-27° to +131° F
<b>SECURITY AND COMPLIANCE</b>			
FIPS-197 AES	128 / 256-bit AES	128 / 256-bit AES	128 / 256-bit AES
SNMP v3	Yes	Yes	Future Release
HTTPS/TLS	Yes	Yes	Future Release
Identity-based User Accounts	Yes	Yes	Under Evaluation
Vulnerability Scanning	Yes	Yes	Yes
Diagnostic Alarms	Yes	Yes	Yes
Disaster Recovery	Yes	Yes	Yes
FIPS 140-2	Yes	Yes	Under Evaluation

**SAFE, SECURE COMMUNICATIONS**

Today's security technology, policies and processes are very effective in protecting wireless communications. While there is no network that is 100% secure, our PTP networks<sup>5</sup> provide robust, multi-layered security to protect your wireless communications. Key capabilities include: HTTPS/TLS and SNMPv3; identity, auditing and event management; AES encryption; FIPS 140-2 compliance; disaster recovery features; and vulnerability management.

**PRECISE LINK PLANNING**

Available as a stand-alone software tool or as part of our One Point Wireless Suite, PTP LINKPlanner is an easy-to-use PTP link planning and optimization tool that greatly reduces the man-hours required to plan a link. The tool allows you to accurately determine link performance characteristics prior to purchase, based on certain assumptions about geography, distance, antenna height, transmit power and other relevant factors. You can perform calculations for both licensed and license-exempt PTP links and plan one link or multiple links simultaneously. Once a link is optimized, LINKPlanner will provide a detailed performance report with deployment-assistance information. For licensed microwave solutions, you will also get an automatic bill-of-materials (BOM).

**EASY, FLEXIBLE NETWORK MANAGEMENT**

You can manage your wireless network remotely via a Web browser, integrate with your existing network management system (NMS), and/or use our Wireless Manager as your NMS. Included in our One Point Wireless Suite, Wireless Manager gives you powerful, easy-to-use software tools that help you design, deploy, manage and secure your entire wireless network. From one live Google™ map view, you can monitor and manage point-to-point, point-to-multipoint, mesh and WLAN sites as well as other SNMP-enabled devices.

**POWERFUL PERFORMANCE-ENHANCING TOOLS**

PTP solutions provide industry-leading metrics, including: antenna alignment information; measurements of interference, throughput capacity, signal quality and signal level; and diagnostic information with equipment settings. Together, this information shows how well your links are working. If they are not performing to their potential, the tools can help you diagnose the cause and optimize performance.

For more information, download "Information Assurance for Point-to-Point" and our "PTP Security Data Sheet" at [www.motorola.com/ptp](http://www.motorola.com/ptp).

<sup>3</sup> Data rates are dynamically variable based on channel size and modulation.

<sup>4</sup> Due to the power restrictions imposed by U.S., Canadian and EU authorities on systems operating in the 5.4 GHz band, lower ranges will be realized with systems operating in the 5.4 GHz band within power-restricted regions. Use our PTP LINKPlanner to provide accurate performance estimates for all systems.

<sup>5</sup> Certain security features and compliance certifications may not be available on all PTP systems.

## SUMMARY

Agencies that have deployed our PTP systems have realized significant operational benefits and cost savings, and we are confident that we can help you do the same. Some key PTP advantages include:

- Wide choice of licensed and unlicensed RF bands
- IP-optimized systems that support your IP network migration
- Scalable, future-proof architecture
- Carrier-grade performance in virtually any environment
- Field-tested, proven performance – 64,000+ radios deployed worldwide
- Easy, efficient link planning and network management
- Outstanding durability – MTBF in the decades and more than 1.5 billion field hours logged
- Ruggedized casings – IP (Ingress Protection) 66 rated for resistance to dust and water ingress
- Global service and support
- Exceptional wireless knowledge and experience

Let us help you achieve your wireless communication goals. We understand how the barrage of information has impacted your agency, the trends toward increased government mobility and collaboration, the need to update aging networks, and the budgetary obstacles you face. We have the experience, expertise and wireless solutions to help your agency become more mobile, more collaborative and more IP-centric. So, we can answer your wireless questions and suggest solutions to address your needs today and tomorrow.

### WIRELESS NETWORK SOLUTIONS

At Motorola, we deliver seamless connectivity that puts real-time information in the hands of users, giving you the agility you need to better protect and serve the public. Our PTP 600 and PTP 800 solutions are included in our unrivaled wireless solutions portfolio which includes indoor WLAN, outdoor wireless mesh, point-to-multipoint and point-to-point networks as well as voice over WLAN solutions. Combined with powerful software for wireless network design, security, management and troubleshooting, our solutions deliver trusted networking and anywhere access to organizations across the globe.

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**PTP 600 and PTP 800 Solutions  
for Federal Applications**

