



LEASED-LINE REPLACEMENT FOR PUBLIC SAFETY: BETTER PERFORMANCE AT LESS COST FOR YOUR MISSION-CRITICAL COMMUNICATIONS

Cambium Networks' fixed wireless broadband solutions are a smart investment when balancing public safety needs with network performance and budget realities.

Public safety officials face a number of challenges today. One of the most notable of these includes developing network migration strategies that enhance essential services, strengthen emergency preparedness, and increase citizen and personnel safety. Simultaneously, the ongoing necessity for upgrades to current networks requires astute and cost-effective investments in infrastructure to deliver continuous connectivity and support collaborative efforts.

Formerly part of Motorola Solutions, Cambium Networks' Wireless Broadband Portfolio offers a wide range of wireless solutions that can help you efficiently upgrade your network while realizing measurable cost-savings.

CAMBIUM NETWORKS WIRELESS

Point-to-Multipoint (PMP) Solutions:

PMP 320 – 3.0, 3.65 GHz (Licensed)

PMP 400 – 4.9 GHz (Licensed)

PMP 450 – 5.4, 5.8 GHz (Dual Band)

Point-to-Point (PTP) Solutions:

PTP 600 – 2.5, 4.5, 4.8, 4.9 GHz (Licensed)

PTP 600 – 5.4, 5.8, 5.9 GHz

PTP 800 – 6 to 38 GHz (Licensed)

PTP 810 – 6 to 38 GHz (Licensed)

ECONOMIC CHALLENGES

During difficult economic cycles, the business of governments and municipalities does not stop. It just gets more challenging. Demand for services does not lessen. It just gets tougher. To provide essential services, you have to employ shrewd strategies that will relieve budgetary strain. Your network has to deliver greater performance to allow users to be more productive. And, you need reliable, secure communications that deliver greater diversity, scalability, and capacity even as budgets tighten.

VIDEO DEMANDS

The increasing usage of video dominates the communications landscape today and for the foreseeable future. Whether it's video surveillance, site monitoring, crime deterrence, traffic management, or video conferencing, bandwidth requirements continue to soar, placing enormous demands on existing networks. This need for speed is one of the many factors driving the migration to IP-based, network performance.

LEASED-LINE PROBLEMS

- **Escalating Costs:** For years public safety officials have relied on leased lines to provide communications between locations. As bandwidth requirements have continued to grow, costs have risen and leased lines have proliferated. Fees for leased-line services can cost from a few hundred dollars per month for a single T1/E1 connection up to thousands of dollars per month for gigabit service. As a result, many organizations that have relied on leased lines are paying expensive lease charges every month.

While T3 lines can provide bigger network pipes, they also have limitations on how high they can scale before additional circuits are required. Additional equipment may be required to install, secure and manage the leased network, and each additional device requires its own rack space. High recurring costs are one major problem with leased lines, but not the only issue.

- **Reduced Reliability:** In many instances, the reliability of leased lines is not what it should be, especially in rural and remote areas. When a natural disaster such as an earthquake, wildfire, or hurricane hits, telephone lines are particularly vulnerable to service interruption at a time when communications are extremely critical. Fiber cable is often cut during construction or damaged by traffic and railroad mishaps, resulting in communication outages.

In addition, leased lines can make public safety agencies dependent on an outside party for important maintenance and repair functions. However, most public safety officials prefer to maintain local control over network operations. In that way, problems can be quickly diagnosed and resolved, and upgrades can be performed without having to wait for an outside party to respond

- **High TCO:** Typically, deployment of new services or upgrades in a leased-line environment is both expensive and slow. The cost and manpower required to manage and monitor contracts and service-level agreements, including verifying billing records, can be significant.

In the final analysis, leased lines are fast becoming an expense not worth paying and a risk not worth taking.

CAMBIUM WIRELESS – A PROVEN ALTERNATIVE

A growing number of organizations are discovering the benefits of replacing T1/E1 and fiber lines with wireless broadband communications. With our Cambium Point-to-Point (PTP) and Point-to-Multipoint (PMP) Wireless Broadband solutions, the advantages can be substantial. First, you can eliminate or significantly reduce monthly lease fees. Overall network performance can be upgraded, which is especially important to support today's in-demand, real-time applications such as video surveillance, video conferencing, disaster recovery and backup, and on-scene video monitoring.



EXAMPLES OF TYPICAL LEASED-LINE CHARGES¹

Type	Throughput (Mbps)	Typical Monthly Cost (USD)	Typical Annual Cost (USD)
T1/E1 Leased Line	1.544 / 2.048	\$200 – \$300	\$2,400 – \$3,600
T3 Leased Line	45	\$3,000 – \$6,000	\$36,000 – \$144,000
Fiber Connection	3	\$600 – \$800	\$7,200 – \$9,600
Fiber Connection	8	\$800 – \$1,000	\$9,600 – \$12,000
Fiber Connection	100	\$2,500 – \$3,500	\$30,000 – \$42,000
OC3 Fiber	150	\$5,000 – \$9,000	\$30,000 - \$42,000

¹ Leased-line charges reflect commercial pricing. Government agencies may receive reduced prices.

CAMBIUM SOLUTIONS PROVE THEIR VALUE AND PERFORMANCE

In many networks, local access is the most problematic point of congestion. Wireless broadband can provide a stable, high-performance platform to ease local-access bottlenecks. Wireless also enables agile and flexible bandwidth provisioning that can be easily and quickly scaled up or down to match dynamic traffic patterns. Our unique, problem-solving technology is able to increase reliability and connect remote, hard-to-reach locations while offering exceptional quality of service. Plus, our non-line-of-sight (NLOS) systems communicate steadfastly in some of the most challenging environments on earth.

VERSATILITY

Our PTP and PMP wireless solutions can support a wide range of network applications, including:

- Replacing leased-line service with wireless broadband
- Providing mission-critical P25 and LMR (land mobile radio) backhaul
- Deploying a wireless backup network for emergency preparedness and disaster recovery
- Extending fiber networks with wireless
- Furthering network migration by integrating wireless into hybrid networks

Optimizing network performance and extending network services to additional users while containing costs is an



ongoing process. With systems that deliver up to 700 Mbps aggregate throughput, our solutions can transmit streaming video very efficiently. High quality-of-service and low latency – as low as 150 microseconds per hop – can protect the quality of voice communications.

SCALABILITY

With a traditional wired circuit, there is no flexibility to increase capacity except by adding circuits. Our wireless broadband systems are highly scalable, allowing you to add capacity as your needs increase. In addition, adding new services and performing upgrades can normally be accomplished in a day or less.

INFORMATION ASSURANCE

Migrating from a TDM-based network to an IP-based network increases the potential threats to information security. At Cambium Networks, we recognize how critical Information Assurance is to public safety agencies. So, we have made and continue to make significant investments to protect your vital information from malicious attacks. In addition, our meticulous attention to Information Assurance has allowed our products to earn the approval of major infrastructure manufacturers.

EXTENSIONS WITHOUT TRENCHING

Public safety agencies with wired networks face major challenges when expanding network capacity or extending service to additional locations. Beyond the monthly lease charges, adding capacity or new locations can be a major undertaking that carries a high price tag. With fiber networks, the cost of termination also can be a major installation expense for labor and material such as connectors, tools, and consumables.

Over long distances, fiber runs may require single-mode fiber to ensure communication reliability at an estimated average cost of \$50 per foot - \$265,000 per mile. In areas where water and challenging terrain are present, trenching along water boundaries or through dense foliage or rocky terrain may not be an option. And, trenching on protected lands is not normally permitted.

Our reliable PTP and PMP systems can be deployed virtually anywhere – over long distances, in obstructed environments, over water, through high interference, and in severe weather conditions. As an example, a PTP or PMP system can provide video backhaul to a remote dam.

ALWAYS-ON NETWORKS

No public safety agency can afford to have communications interrupted by a network failure. Yet wired networks are especially susceptible to service interruptions in times of calamity. When a natural disaster strikes, wire lines are generally among the first casualties, causing service interruptions at times when connectivity is crucial.

Furthermore, it can take hours or even days for wired networks to be repaired. For vital organizations such as police and fire departments, emergency medical teams, 9-1-1 centers, and other public safety officials, interruptions of even a few minutes are unacceptable.

The majority of such interruptions are avoidable. Our fixed wireless broadband solutions offer you the ability to plan and deploy redundant networks in a matter of days... and at a cost that is a fraction of a wired backup. If disaster strikes, a hot switchover can restore communications instantly. For government agencies, crucial public safety communications are uninterrupted and lives are saved. Plus, the significant cost and unwanted consequences of downtime are eliminated or mitigated.

A real-world example of this application was clearly evident in New Orleans, LA when Hurricane Katrina knocked out the city's wired communications network. A wireless broadband connection was quickly established to the city's temporary headquarters and, through the use of Voice-over-IP (VoIP) technology, supported some of the first phone calls the mayor made following the hurricane.

COST-EFFICIENCY AND ROI

Perhaps the most important advantage is that wireless broadband can virtually eliminate expensive monthly lease costs and provide significant savings at a time when you are being asked to do more with less. When you choose wireless broadband to replace leased-line connectivity and backhaul, you often can see ROI in one year or less.

BETTER RESULTS WITH LESS COST

There are two major reasons to replace leased-line service with Cambium Wireless Broadband – eliminate or reduce leased-line charges and improve network performance. As requirements for bandwidth continue to increase and budgets continue to shrink, our wireless broadband solutions can offer you significant cost-saving benefits with greater reliability and performance. Plus, we offer licensed turnkey services that greatly simplify the ordering process and reduce your risk from commissioning and testing through deployment.

With millions of PMP and PTP systems deployed worldwide, we have the experience to help you design a wireless solution that best meets your specific needs. Working with our global network of authorized partners, we have successfully deployed wireless solutions in a wide variety of public safety organizations. So, we have the solutions, partners, and expertise to help you realize greater value and performance from your communications network.

PTP 600:

- Up to 300 Mbps
- FIPS 140-2 validation
- Up to 124 mi (200 km)
- IP66/67 rated
- ATEX and HAZLOC compliance

PMP 800 and PTP 810:

- Up to 700 Mbps
- FIPS 140-2 validation
- 1+0, 1+1 HSB, and 2+0 configurations
- Fixed and adaptive modulation

PMP 320

Access Point (AP):

- Up to 45 Mbps per sector
- Up to 200 subscribers per sector
- Up to 25 mi (40 km)

PMP 320

Subscriber Module (SM):

- Up to 14 Mbps
- Up to 25 mi (40 km)

ROI EXAMPLE #1 – PTP 600 LEASED-LINE REPLACEMENT²

ROI Factor	OC3 Fiber	PTP 800
Full Duplex Throughput (Mbps)	150	368
Estimated Monthly Fee	\$5,000	\$0
Installation/Equipment Fees	\$1,000	\$39,500
First-Year Total Cost	\$61,000	\$39,500
Ongoing Annual Fees	\$60,000	\$2,500

8-MONTH ROI + ANNUAL SAVINGS OF \$57,500 + HIGHER THROUGHPUT

ROI EXAMPLE #2 – PMP 320 LEASED-LINE REPLACEMENT² (Using One AP and Three SMs To Replace Three T1 Lines)

ROI Factor	3 – T1 Leased Lines	PMP 320
Max. Throughput (Mbps)	1.5 per T1 (full duplex)	AP – 45, SM – 14 (per SM) aggregate
Estimated Monthly Fee	\$1,800 (3 at \$600 each)	\$0
Installation/Equipment Fees	\$1,050 (3 at \$350 each)	\$6,300
First-Year Total Cost	\$22,650	\$6,300
Ongoing Annual Fees	\$21,600	\$0

3-MONTH ROI + ANNUAL SAVINGS OF \$21,600 + HIGHER THROUGHPUT

² All values are in USD. Actual costs and savings may vary based on individual usage, application, environmental, and network requirements.

Let us show you what your leased-line-replacement ROI can be.



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