

Cambium Networks Solutions for Tribal Communities



Indigenous and tribal communities remain among the least connected in North America. A large percentage of Native Americans still do not have any access to high speed internet whatsoever. These communities require reliable broadband internet now more than ever, in order to provide economic opportunities and access to essential services such as remote classroom instruction, online learning programs, telehealth services, e-commerce, and remote working.

TRIBAL LANDS OFTEN PRESENT significant obstacles to deploying broadband and have been traditionally expensive to serve. These challenges include rugged and remote terrain, complex permitting processes and lack of necessary infrastructure. Furthermore, the low population density found in many Tribal lands necessitates coverage across very large geographic areas. Due to these considerable operational and economic challenges, fiber infrastructure is oftentimes not viable.

Fortunately, today's fixed wireless and Wi-Fi platforms from Cambium Networks can provide Tribal governments and service providers with a cost-effective, highly reliable, true-broadband solution. Cambium has been the chosen wireless equipment provider for many Tribal organizations across North America. Serving broadband in remote rural areas requires cost-effective reliable point-to-multipoint systems which utilize the increasing amount of licensed and unlicensed spectrum which is available to Tribal entities including 2.5 GHz, 3.5 GHz (CBRS), as well as 5 GHz, 60 GHz, and 900 MHz unlicensed. Tribes may also utilize the FCC's licensed microwave bands for point-to-point including 6, 11, 18, 23, and 80 GHz.

Cambium offers products in all of these frequency bands and our team, as well as our extensive network of partners and system integrators are available to provide guidance, consultation, wireless network designs, and technical support, to ensure successful deployments.



New Spectrum Opportunities

THE AVAILABILITY OF EXPANDED SPECTRUM in 3 GHz CBRS as well as the opportunity for qualifying Tribes to obtain 2.5 GHz licenses has created a tremendous opportunity for Tribal organizations to dramatically improve broadband coverage. Cambium has been on the forefront of these developments with the release of fully compliant products which take advantage of the characteristics of these frequency bands.

2.5 GHZ SPECTRUM

In July 2019, the FCC established a Rural Tribal Priority Window that will provide federally recognized Tribal entities with an opportunity to apply for unassigned 2.5 GHz spectrum in what was formerly designated as the Educational Broadband Service (EBS).

The FCC has announced that it has granted 259 spectrum licenses in the 2.5 Ghz band to help connect rural Tribal communities to the internet. These licenses provide for the exclusive use of up to 117.5 megahertz of 2.5 GHz band spectrum that Tribes can use to connect their rural communities to wireless broadband and other advanced services. The FCC will continue to review and process additional applications filed in the Rural Tribal Priority Window. Additionally the FCC has announced the Tribal Broadband Priority Act of 2021 to give tribal nations a real chance at increasing their internet access. Additional information on this opportunity is available on the [FCC's Rural Tribal Window website](#).

3 GHZ SPECTRUM (CBRS)

Another opportunity to access spectrum is available to all Tribal entities. The FCC has made more 3 GHz spectrum available to help bring broadband to underserved areas, including rural areas. Like 2.5 GHz spectrum, this mid-band spectrum is well suited to rural deployments. The FCC has established a three-tiered approach to access in this band, protecting incumbent operations, establishing Priority Access Licenses (PALs), which will be offered at auction, in the lower portion of the band, and making the remaining 80 MHz available via General Authorized Access. Not only can Tribal entities access, via GAA, this 80 MHz of spectrum to serve their Tribal Lands, they also may access up to the full 150 MHz where no PAL licensee is using the spectrum. View the [FCC website](#) to learn more.

Access to 3 GHz spectrum via GAA does not require a license; rather, access is managed by FCC-certified Spectrum Access Systems, or SASs. Cambium has enabled full SAS connectivity and functionality via the cnMaestro network management system. cnMaestro is available without any associated cost although there is a small fee associated with each device utilizing SAS service.

Cambium Products for Tribal Broadband Projects

cnRanger LTE

THE CNRANGER LTE PLATFORM brings coverage where it's needed by taking advantage of 2.5 GHz licensed and 3 GHz CBRS spectrum along with the highly evolved LTE protocol and performance characteristics. Compared to competing fixed LTE solutions, cnRanger reduces the cost and complexity typically associated with LTE networks. The system is simple to deploy and manage, and features a virtualized EPC which is embedded within the cnRanger hardware itself.

The cnRanger platform enables network operators to benefit from the advantages of LTE protocols and standards without the complexities and costs typically associated with LTE networks. The platform provides operators with a high degree of simplicity and manageability along with capacity and coverage. LTE provides non-line-of-sight performance improvements due to higher power and OFDMA frequency selective scheduling and air frame design. However, unlike competing LTE systems, cnRanger is not dependent upon expensive and complex Evolved Packet Core (EPC) network architecture which is typically required for LTE implementations. Instead, cnRanger features a fully virtualized and embedded core which resides within the cnRanger equipment itself.

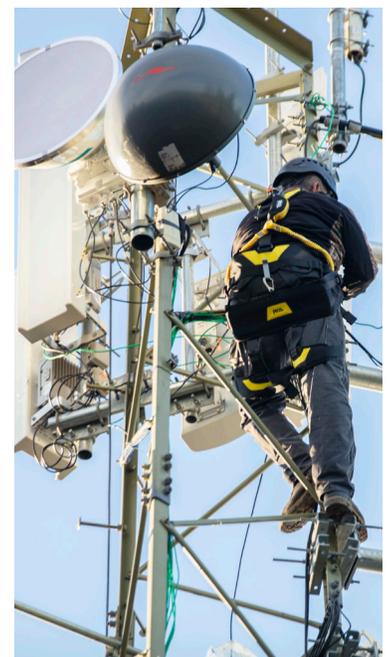


Photo courtesy of EnerTribes

CNRANGER PROVIDES tremendous ease of network management and provisioning through a simple GUI graphical user interface and full integration with Cambium's award-winning cnMaestro™ network management platform. cnMaestro™ is a cloud-based or on-premises platform specialized for secure, end-to-end network lifecycle management: inventory management, device onboarding, daily operations, and maintenance and is recommended for managing cnRanger platform networks. The cnMaestro wireless network manager simplifies device management by offering full network visibility. Network operators can have a real-time view of their complete end-to-end network and perform a full suite of wireless network management functions to optimize system availability, maximize throughput, and meet the emerging needs of business and residential customers. In addition, the cnMaestro wireless network manager collects and displays compliance with service level agreements. This LTE solution had been designed with the idea that an operator can get a new wireless network up and running serving multiple users with only a few basic configuration steps required. This concept is previously unheard of with LTE networks. When you marry this solution up with our easy to use cnMaestro based CBRS network configuration manager, the result is a complete and simple network build and operation, all maintained under a single pane of glass.

PMP 450

THE PMP 450 PLATFORM is Cambium's highest-capacity fixed wireless platform and also supports the highest density of subscribers per sector and is a top choice for many of the world's largest fixed wireless operators. Its software-defined nature enables platform advancement to happen continuously, bringing new features, enhancements and updated performance with every software release. PMP 450 features cnMedusa™ technology which provides massive Multi-User MIMO (MU-MIMO) coupled with uplink/downlink beamforming capability. cnMedusa is available on the PMP 450m access points (AP) for the 5 GHz and 3 GHz bands, and it is certified for use in the new CBRS (U.S.) spectrum. PMP 450 is also available in the 900 MHz which excellent non-line-of-sight coverage in areas with excessive trees and foliage.

PTP 850

THE PTP 850 POINT-TO-POINT PLATFORM is an industry-leading backhaul solution which provides capacity of 1 – 10 Gbps depending on frequency. The PTP 850E 80 GHz solution provides up to 10 Gbps capacity backhaul for distances up to 2-4 miles. The PTP 850S and 850C are Cambium's latest generation microwave solution for 6-23 GHz and provides capacity over 2 Gbps for long range backhaul applications.

60 GHz cnWave

THE 60 GHZ CNWAVE PLATFORM is a new multi-gigabit mesh solution which enables fiber like speeds to interconnect homes and businesses utilizing Facebook Connectivity's Terragraph routing technology.

ePMP

THE EPMP PLATFORM is built on low cost standards-based 802.11 chipsets with the latest generation models utilizing AC Wave 2 technology, and it continues to evolve with the 802.11 standard. It has set the standard for affordable scalability and capacity in a standards-based PMP product. Despite its low cost, ePMP is packed with additional capabilities not found in competing solutions, including Cambium Networks' highly efficient MAC protocol, advanced air-fairness scheduler, GPS synchronization, transmit power control and dynamic RF filtering. ePMP is the only platform in its class offering MU-MIMO, beamforming and frequency re-use. New and exciting advancements will be incorporated into the platform, ensuring long-term protection of operators' investments and a roadmap to even greater capacity and scalability in the future.

cnPilot™ Home & Small Business

CNPILOT HOME & SMALL BUSINESS is a suite of 802.11ac home Wi-Fi network access points supported by cnMaestro™ to provide simple end-to-end lifecycle administration, remote configuration, monitoring, and upgrades. With cnPilot Wi-Fi access points and cnMaestro management, customer satisfaction increases while network administration and maintenance costs decrease.