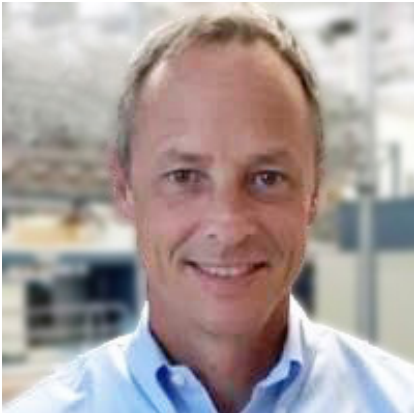


7 Questions on Cambium Networks' PMP Platforms

John Seaman



Cambium Networks offers an extensive selection of Point-to-Multipoint (PMP) solutions that enable network operators to provide high-speed wireless internet service to business and residential customers. Determining which wireless platform to choose for a specific application can sometimes be confusing, and there are many common questions that arise. John Seaman, Regional Sales Manager for the Western Region of the U.S. and Canada, answers common questions to provide a high-level understanding of the key differentiators and commonalities between Cambium Networks' PMP platforms.

Why do network operators choose Cambium Networks' equipment?

As a regional sales manager for Cambium Networks, I enjoy the opportunity to interact on a daily basis with many internet service providers of all sizes. Oftentimes, customers will provide feedback and gladly tell me why they standardized on Cambium Networks as their wireless equipment vendor in the first place. The most common reason is that their networks are running smoothly and reliably; and because of this, they can sleep at night. Most importantly, they're able to grow their business by adding subscribers and increasing throughput packages rather than dealing with customer complaints and fixing problems.

Their end customers are happy because their internet service is fast and reliable. They can stream Netflix without buffering issues, play games without lagging, make VoIP calls without garbling and maintain VPN sessions without dropping. Network operators greatly appreciate the fact that Cambium Networks backs up its products with free technical support, direct contact with regional technical and sales managers, and access to information in the support portal and Community forum.

What PMP platforms does Cambium Networks offer?

Operators need the ability to cost effectively deploy fixed wireless networks across a wide range of scenarios with varying requirements for capacity, density, coverage and budgets. To address multiple scenarios, Cambium Networks offers three PMP platforms:

- PMP 450
- ePMP
- cnRanger (LTE)



PMP 450

ePMP

cnRanger

What are the main differentiators of each platform?

The PMP 450 platform is the highest-capacity platform, 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 and 2.4 GHz unlicensed bands as well as the 4.9 GHz band.



PMP 450m, enhanced with cnMedusa technology, provides MU-MIMO capabilities in 5 GHz & 3 GHz and is certified for use in the CBRS (U.S.) spectrum.

The ePMP platform is built on 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.

The cnRanger platform is also a standards-based product, but it is built upon LTE chipsets, thus taking advantage of highly evolved LTE protocol and performance characteristics. Compared to competing fixed LTE solutions, cnRanger reduces the cost and complexity typically associated with LTE networks.

What characteristics do the three platforms have in common?

All three platforms have been designed for high performance, scalability and reliability in harsh outdoor environments. Cambium Networks' advanced RF engineering and software techniques, such as dynamic filtering and frequency re-use (via GPS sync), have been applied to ensure interference mitigation.

Cambium Networks' highly efficient and evolved bandwidth scheduler algorithms have been applied in both the PMP 450 and ePMP platforms, ensuring the ability to serve the most subscribers with the highest possible capacity. The scheduler algorithm, in conjunction with GPS sync, enables stable performance with consistent latency and high capacity despite interference, and high real-world throughput as the number of subscribers increases. All three platforms are deterministic systems, meaning the systems transmit and receive when needed in order to optimize throughput.

Management and provisioning of all three platforms is a breeze with the award-winning cnMaestro™ network manager and the cnArcher™ smartphone installer app. Advanced wireless planning and RF propagation tools such as LinkPlanner™ and cnHeat™ enable network operators to design extensive, accurate wireless networks.



The cnRanger "Tyndall" SM supports 2.5 GHz bands 38, 40 and 41.

How do operators decide which access point models to use? Subscriber modules?

For the PMP 450 platform, there are two types of APs: standard 2x2 models and models featuring cnMedusa MU-MIMO technology. PMP 450m (enabled with cnMedusa) APs are available for 5 GHz and 3 GHz. PMP 450m is a good choice for sites requiring high density and higher throughput, and it enables up to four times as much capacity compared to the PMP 450i AP. PMP 450i 2x2 APs are available for 5 GHz, 3 GHz and 900 MHz. The “i” suffix indicates the newer design and higher processing power features. All SMs with the prefix “PMP 450” will work with any AP for the respective frequency. PMP 450b SMs are the most popular choice for service providers due to their cost-effectiveness and easy-to-install form factors. For more industrial and critical infrastructure applications, PMP 450i SMs are ideal. Older PMP 450 SMs can operate either on their own or be fitted into an offset reflector dish for increased gain.

The ePMP 3000 is a 4x4 MU-MIMO AC wave 2 AP with advanced filtering and small form-factor pluggable (SFP) port. Typically, it is sold with the 4x4 MU-MIMO sector antenna and a 4x4 horn antenna option will soon be available. The 3000L is a 2x2, lower-cost option of the AP. This model is designed for 2x2 operation and does not include the same filtering capabilities or SFP port.

The 2x2 3000L can be fitted with RF Elements TwistPort adapters for horn 2x2 antennas. First and second generation ePMP 1000 and ePMP 2000 APs are also available, and they are popular where 802.11n technology provides sufficient capacity. All ePMP SMs, including earlier generations and “elevated” third-party subscriber radios, will work with any ePMP APs. Force 300 SMs feature AC chipsets and can perform MU-MIMO operation when connected to an ePMP 3000.



The ePMP 3000L is a 2x2, lower-cost option of the AP that can be fitted with RF Elements TwistPort.

cnRanger LTE base station equipment is offered as a split architecture system with a separate rack-mounted baseband unit (BBU) and remote radio head (RRH). Each BBU can drive up to four 2x2 RRHs. The split system allows a high degree in deployment flexibility and ensures that operators can add new RRH units in new frequencies as the platform develops. Our “Tyndall” Category 4 SM supports 2.5 GHz bands 38, 40 and 41. As the cnRanger solution continues to roll out, expect to see information about new frequencies and SMs added to the Cambium Networks website.

How do operators decide which platform to use?

Deployment scenarios can vary widely in terms of capacity, subscriber density, coverage requirements and budget. Evaluating which of these factors are most important for the deployment will help the operator choose the appropriate platform. It is actually quite common for operators to deploy multiple Cambium Networks platforms in the same network in order to address various scenarios.

For long-term scalability and maximum subscriber density per sector, the PMP 450 is a strong choice due to PMP 450m’s 14x14 massive MU-MIMO capability. PMP 450 also delivers high throughput at lower latency and efficiently uses spectrum due to the avoidance of guard bands between channels.

ePMP 3000 is an excellent choice for deployments requiring high capacity and medium subscriber density per sector. Featuring 4x4 MU-MIMO, downlink beamforming and advanced RF filtering, the ePMP platform also offers outstanding scalability as well as a wide variety of SMs. Additionally, ePMP APs can connect to certain third-party SMs, which can be software flashed with ePMP software via Cambium Networks’ Elevate program. This allows operators to upgrade their network’s performance without the cost of truck rolls and new radios.

cnRanger is Cambium Networks’ only offering in the licensed 2.5 GHz band, making it a great choice for low-band spectrum use and taking advantage of the propagation advantages of LTE. It is a cost-effective, simplified implementation of LTE with the Evolved Packet Core (EPC) embedded within the baseband unit, resolving the complexity of traditional LTE networks.

Are the three platforms compatible with each other?

Due to the fundamental differences between chipsets and protocols utilized within each platform, they are not compatible with each other. In other words, one cannot attach ePMP subscriber modules (SM) or cnRanger user equipment (UE) to PMP 450 APs and vice versa. However, the ePMP and PMP 450 platforms can be synchronized together, enabling frequency re-use in a network consisting of both platforms.

Cambium Networks offers a tool for every job. When trying to decide which PMP product is right for your project, it is best to engage Cambium Networks' extensive team of regional sales and technical managers. The RSMs and RTMs are more than happy to answer any and all questions you may have.

[For additional information about all three of Cambium Networks' point-to-multipoint platforms, visit the PMP Distribution page on our website.](#)