

Top Performer in a Noisy and Competitive Market



“Immediately, the ePMP 2000 increased link quality for all CPEs, and reduced packets drop problems. Overall performance was good before ePMP 2000, but now, performance is absolutely great!”

- VINICIUS POHASKY
DO NASCIMENTO,
GERENTE DE
REDES, GUAÍBA
TELECOM

Challenge

BRAZIL'S GUAÍBA TELECOM PROVIDES HIGH-SPEED connectivity to business customers nationwide, and residential subscribers in the Southern Zone that includes Porto Alegre, Eldorado do Sul, Guaíba, Barra do Ribeiro, and Sertão Santana. By offering wireless broadband Internet solutions for streaming video, voice, and data services that satisfy their customers' need for connectivity, Guaíba Telecom is expanding its operations annually.

“We operate in a competitive market,” says Vinicius Pohasky do Nascimento, Gerente de Redes, Guaíba Telecom. “To differentiate, it’s important to find equipment that offers the best performance – with the speed, capacity, and reliability that end customers need.”

When Guaíba began operations in 2005, they chose inexpensive 802.11-based equipment without synchronization functions. “The original equipment offered acceptable performance for small networks, with a maximum of 30 Subscriber Modules (SM) per Access Point (AP) and low bandwidth demand. This was OK for a small number of users surfing the Internet, but as time passed and we grew to have more than 5,000 subscribers, we could see that connection problems were increasing as more customers were loaded on to the network.”

To manage latency issues, connection delays, and packet losses and sustain customer satisfaction, they limited the numbers of subscribers per AP. Damage control wasn’t enough – Guaíba Telecom needed a solution that would keep up with the growing demand.

Solution

GUAÍBA TELECOM DISCOVERED THE EPMP™ WIRELESS BROADBAND SYSTEM FROM Cambium Networks. The first generation ePMP 1000 series provides GPS synchronization, enabling network operators to synchronize their networks and re-use scarce spectrum. The ePMP 2000 solution adds new interference tolerance capabilities to improve network performance in crowded spectrum.

The ePMP 2000 Access Point (AP) includes Hypure™ technology, featuring smart Beamforming and Intelligent Filtering in addition to the ePMP 1000 AP’s GPS synchronization, frequency re-use, and scalability. Furthermore, because the ePMP 2000 AP is compatible with existing ePMP SMs, simply changing the AP boosts performance across the whole network without dispatching to the customer locations.



ePMP 2000 Distribution Network Solution	
Frequency	5 GHz
Throughput	100 Mbps in a 20 MHz channel
Hypure Technology	Smart Beamforming and Intelligent Filtering for interference mitigation

Planning the network is important. To ensure the best network performance, Guaíba Telecom used Cambium’s free LINKPlanner software tool to run a topology analysis and detailed coverage area study. They installed the new sector and aligned customer antennas according to the specific design criteria established with the planning tools. They also used a Spectrum Analysis tool to set the best frequency channel on the APs.

Below is a screen shot of the downlink and uplink performance of the ePMP 1000 system.

The screenshot shows the Cambium Networks ePMP 1000 Performance page. The top navigation bar includes the Cambium Networks logo, the device ID 'EPMPAP0501', and the 'Access Point' label. A sidebar on the left contains navigation options: Home, Quick Start, Configuration, Monitor, Performance (selected), System, Wireless, GPS, Network, System Log, and Tools. The main content area displays a table of performance metrics for three different MAC addresses (00:04:56:C0:28:A2, 00:04:56:C0:4E:BE, and 00:04:56:C4:BF:2A). Below this table are two columns of performance data: 'Downlink Packets Per MCS' and 'Uplink Packets Per MCS'. At the bottom, there are two summary boxes for 'Downlink Frame Time' (Total Frame Time Used: 40.9%) and 'Uplink Frame Time' (Total Frame Time Used: 100%).

MAC Address	14411518807 1844674407	0	14411518807 1844674407	0	0	92738	24
00:04:56:C0:28:A2	14411518807 1844674407	0	14411518807 1844674407	0	0	92738	24
00:04:56:C0:4E:BE	14411518807 1844674407	0	14411518807 1844674407	0	0	1844674407371	24
00:04:56:C4:BF:2A	13957	16690	0	263029	40689	31	0

Downlink Packets Per MCS	
MCS 15 - 64-QAM 5/6	916778 (17.9%)
MCS 14 - 64-QAM 3/4	719934 (14%)
MCS 13 - 64-QAM 2/3	967167 (18.9%)
MCS 12 - 16-QAM 3/4	1664197 (32.5%)
MCS 11 - 16-QAM 1/2	385309 (7.5%)
MCS 10 - QPSK 3/4	54724 (1.1%)
MCS 9 - QPSK 1/2	111734 (2.2%)
MCS 7 - 64-QAM 5/6	26269 (0.5%)
MCS 6 - 64-QAM 3/4	87383 (1.7%)
MCS 5 - 64-QAM 2/3	48595 (0.9%)
MCS 4 - 16-QAM 3/4	22650 (0.4%)
MCS 3 - 16-QAM 1/2	51279 (1%)
MCS 2 - QPSK 3/4	20360 (0.4%)
MCS 1 - QPSK 1/2	48192 (0.9%)

Uplink Packets Per MCS	
MCS 15 - 64-QAM 5/6	81267 (2.6%)
MCS 14 - 64-QAM 3/4	282217 (9.1%)
MCS 13 - 64-QAM 2/3	1025679 (33%)
MCS 12 - 16-QAM 3/4	1115876 (35.9%)
MCS 11 - 16-QAM 1/2	440601 (14.2%)
MCS 10 - QPSK 3/4	72593 (2.3%)
MCS 9 - QPSK 1/2	24218 (0.8%)
MCS 7 - 64-QAM 5/6	6983 (0.2%)
MCS 6 - 64-QAM 3/4	16001 (0.5%)
MCS 5 - 64-QAM 2/3	13076 (0.4%)
MCS 4 - 16-QAM 3/4	7037 (0.2%)
MCS 3 - 16-QAM 1/2	8762 (0.3%)
MCS 2 - QPSK 3/4	5514 (0.2%)
MCS 1 - QPSK 1/2	5888 (0.2%)

Downlink Frame Time	
Total Frame Time Used	40.9%

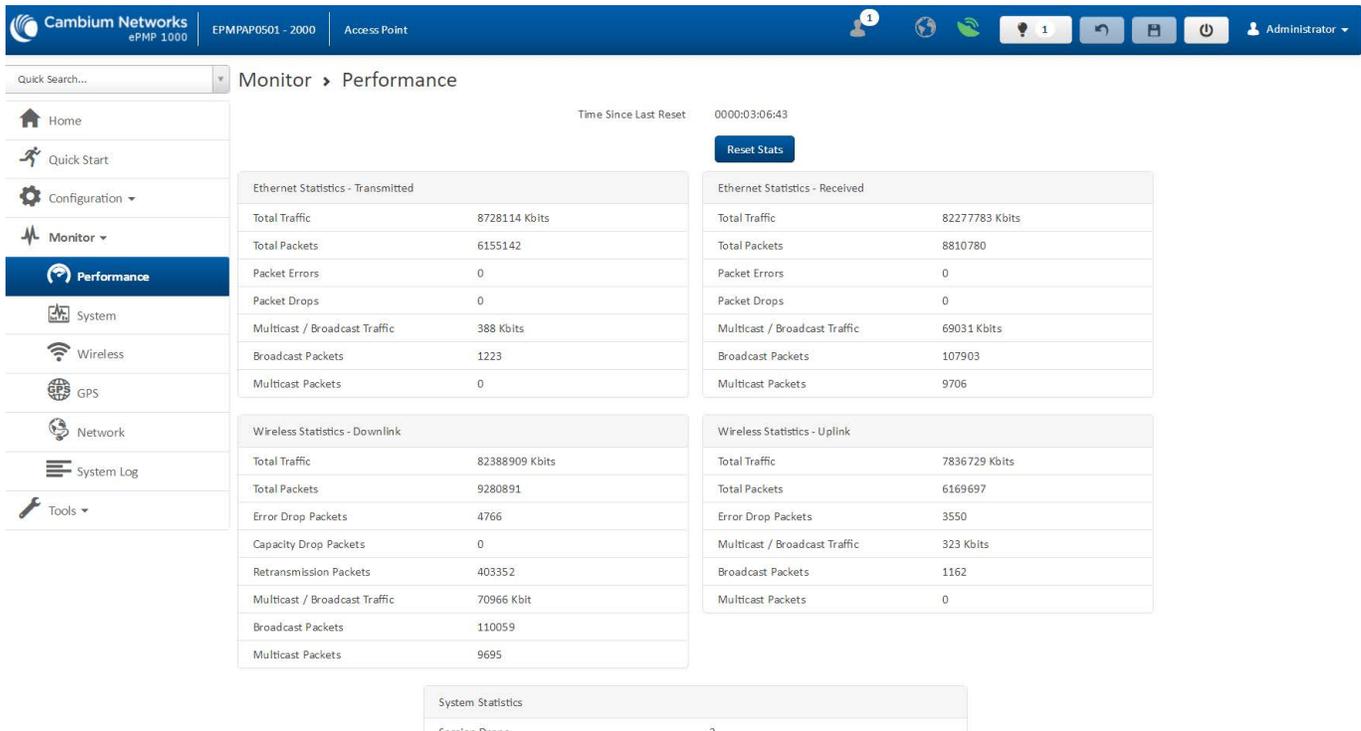
Uplink Frame Time	
Total Frame Time Used	100%

Results

THE SCREEN SHOT BELOW SHOWS THE DOWNLINK AND UPLINK performance of the ePMP 2000 AP installed at the exact same location. The system with beamforming was able to achieve significantly higher modulations and throughput.

“We wanted to test the ePMP 2000,” said Vinicius Pohasky do Nascimento. “We started by replacing one ePMP 1000 sector in an area of high interference. Immediately, the ePMP 2000 increased link quality for all CPEs, and reduced packets drop problems. Overall performance was good before ePMP 2000, and now, performance is absolutely great!”





“All customers want the ability to stream video. Now that we can achieve higher throughput, and we can sell higher bandwidth plans. We now have confidence that our network will perform. We can guarantee service delivery, stability, maximum of SMS per sector, and easily manage the network.”

The increase in throughput and reliability delivered the following business results:

- More customers subscribing to higher tier bandwidth plans
- More subscribers per AP, reducing the cost of infrastructure
- More efficient use of spectrum, reducing the need to find or purchase frequencies
- Reduced number of customer problems and maintenance calls

Guaíba Telecom has no difficulty in differentiating their service quality to customers, and now thrives in a competitive environment.

Next Steps

GUAÍBA TELECOM PLANS TO EXPAND THEIR INFRASTRUCTURE

with ePMP 2000 Access Points, improving network performance in crowded or noisy locations. Vinicius Pohasky do Nascimento summarizes, “With Cambium Networks as our partner, we are pleased with the new equipment and technology that really works and makes a difference for our business.”

Guaíba Telecommunications

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Why Guaíba Telecommunications chose Cambium Networks

- **High capacity throughput** – meeting bandwidth demand across a large and growing customer base
- **Scalability and frequency re-use** – growing the network as the subscriber base expands
- **Hypure technology** – smart antennas and beamforming that performs in a noisy environment