![Cambium Networks™]

The Right Technology for Wireless Expansion

CROATIA IS ON THE EASTERN COAST OF THE ADRIATIC SEA AND HAS a long coastline with more than a thousand islands. Tourism, services, industry, and agriculture drive the economy and support the population of 4 million people. Like other Eastern European countries, Croatia understands the vital importance of being connected to the global economy.

KRK sistemi

> "We wanted to offer connectivity services to the local community. With ePMP, we have a great business model that is a win for local government, a win for businesses, and a win for customers."
>
> - KRUNOSLAV IVANOVIĆ, CEO, KRK SISTEMI

Challenge

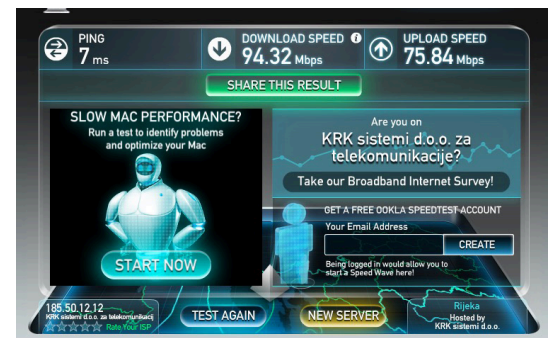**BACK IN 2002, KRUNOSLAV IVANOVIĆ WANTED TO BE SURE THAT THE CITY OF RIJEKA** and the rest of Croatia were fully connected to the Internet. His vision was to provide free WiFi access in public places in the city, and he formed KRK Sistemi to build and deploy the first free public WiFi in Europe. The city-wide WiFi network was popular with tourists and businesses, and Ivanović replicated the network in 10 more towns across Croatia.

Croatia map (source: Google)

As the reputation of KRK Sistemi spread, municipal agencies and businesses contacted Ivanović to provide them broadband connectivity to replace their E1 leased lines. "Our reputation spread by people telling other people about how much they liked the service from KRK Sistemi," said Ivanović. "By offering free WiFi in the towns, many businesses asked us to provide Internet access, Cloud services, and web hosting."

The network was built with low cost wireless broadband equipment, and KRK Sistemi brought on new clients. As demand for throughput grew, network performance began to struggle, and Ivanović knew that he had to take action to preserve the company's reputation and position KRK Sistemi for continued growth.

170 Mbps total throughput

Solution

"WE NEEDED A SOLUTION THAT WAS RELIABLE, REASONABLY priced, and could operate well under a heavy load," said Ivanović. After researching the options for wireless broadband technology, Ivanović decided to test the ePMP system from Cambium Networks. "We knew of Cambium Networks, and their high performance in the unlicensed frequency bands. The operating protocol in their PMP 450 is considered to be the best in the world. When we heard that they had taken that software and leveraged it into a lower cost solution, we simply had to test it for a comparison."

The test results showed a marked improvement with ePMP, and that led to a new deployment strategy for KRK Sistemi:

Wireless Backhaul	• Connect customers with ePMP PTP radios. • As capacity increases above 200 Mbps, replace the ePMP radios with a 450 Mbps PTP 650 link, and re-deploy the ePMP radios in a different location.
Wireless Access Network	• Replace older low cost equipment with ePMP access modules • Deploy ePMP access network as an infrastructure for public WiFi access network • Connect business and residential customers with ePMP

ePMP PTP Solutions	
Frequency	5 GHz
Throughput	220 Mbps
Range	40+ km

ePMP backhaul and Access Point

ePMP module with passive reflector connects a residence

About KRK Sistemi

www.krksistemi.hr

Provides data connectivity to government, business, and residential customers in Croatia. Provides free wireless Internet access in cooperation with cities and municipalities across the country. Also provides high speed data connectivity for business and residential customers.

Customers include:

• City governments

• Municipal agencies

• Business clients

• Residential access clients

Results

"IN CROATIA, THERE ARE A THOUSAND ISLANDS IN THE ADRIATIC

Sea, and we were challenged to create a half mile link over water," said Ivanović. "We had tried it with a low cost solution, and it just would not work going over water – the reflections made too much noise for the radio to handle. We tried the exact same locations with ePMP and the 50 km link provides 60 Mbps of throughput and is as solid as a rock.

"We had an IT customer who was so pleased with their service they recommended us to the local Port Authority. They were looking for a solution to provide broadband connectivity to the luxury yachts that are in port and at anchor. We provide connectivity for them and they too are satisfied with the connectivity we offer."

Ivanović shares his advice for others looking to start a business as a service provider. "You don't want your infrastructure to become your bottleneck. You want to build a network that will satisfy your current customers, and be ready to expand when satisfied customers tell their associates. You should choose technology that enables you to say "yes" when new opportunities come in the door."

ePMP Force 110 point to point backhaul links

ePMP Subscriber Module connects a Public WiFi Access Point

Why KRK Sistemi Chose Cambium Networks:

- **Reliable connectivity** that performs consistently
- **Reasonable price** for backhaul and access network equipment
- **Capacity** to continue to perform when system is operating under heavy demand conditions