

Ready to Answer the Call



Challenge

Over the last decade, demand for connectivity has changed dramatically in rural areas, and Wayne County in New York state is no exception. Public safety Emergency 9-1-1 services, VoIP services, and the rate of data transfer between locations had grown enormously, and the Office of Disaster Preparedness and Emergency Management also wanted to have the option to add video surveillance to monitor and provide information to first responders. The wireless broadband network they installed a decade ago performed well, but demand was outstripping capacity. In addition, the 5.8 GHz unlicensed frequency which was readily available years ago, was now a scarce resource, and they wanted to migrate to the 4.9 GHz frequency which is reserved for the exclusive use of public safety.

The services that Wayne County needed to support on the network include:

- Simulcast alerts to multiple locations
- SCADA monitoring and reporting
- 9-1-1 Dispatch
- 9-1-1 Redundant Backup connectivity



Wayne County officials were pleased with the performance of the network that was originally installed by Saia Communications of Buffalo, New York, and they contacted them to develop a solution that will meet their current needs without interrupting operations.

Solution

The original network designed by Saia Communications for Wayne County was essentially a hub and spoke architecture comprised on eight PTP links radiating from one central tower location. The tower was located at a high elevation and provided the best path to all eight locations, with the furthest being the 9.8 mile (15.8 km) link between the Brantling and Rose locations.

Because Wayne County wanted to migrate from the 5.8 GHz unlicensed frequency to the 4.9 GHz defined use frequency, and because they also needed an increase in throughput, Saia Communications provided a proposal to use the new PTP 650 from Cambium Networks. Once the hardware was installed, the Wireless Manager network management system from Cambium Networks would be used to enable the Wayne County IT team to monitor and optimize network performance.

Why Saia Communications chose Cambium Networks:

Reliable Performance –

The previous equipment provided excellent performance for a decade, and the customer needed more bandwidth and wanted to move to the 4.9 GHz public safety frequency.

Planning Software –

The LINKPlanner design software provided a preview of performance in the specific location, removing all guesswork from the process.

Easy Installation –

The equipment was able to be fully constructed, staged and tested in an offsite facility, and then the complete assembly was installed on site.

The plan was to install one link with the new technology and then decide whether it was suitable to migrate the rest of the network based on field performance.

Plan for Performance

The LINKPlanner design software provides the information that technicians need to model alternative solutions for constructing PTP links and select the solution that best meets their needs. The system provides detailed information on link performance in different modes of operation so that technicians know exactly what to expect when the connection is put in service.

LINKPlanner also accounts for the elevation and any obstructions between the two points. By using GPS coordinates for the source and destination of the link, the system provides a “top down” view of the network architecture, and also provides a “path profile” view of each individual link, showing the elevation, obstructions, Fresnel zone, and whether the link has Line of Sight (LOS), near Line of Sight (nLOS) or Non Line of Sight (NLOS) connectivity. These factors can significantly affect performance, and with LINKPlanner, all guesswork is removed, and technicians know exactly what performance to expect before ordering equipment.

The system also specifies equipment required by part number to implement the link. With this information in hand, Saia Communications is confident that their solution will work, and that Wayne County will be satisfied with the performance of their public safety network.

Summary	
Link Name	Brantling to Rose
Customer Company Name	Wayne County OEM
Link Type	Line-of-Sight
Equipment Type	PTP650
Maximum Obstruction	0 feet
Link Distance	9.849 miles
Free Space Path Loss	130.37 dB
Excess Path Loss	0.00 dB
User IP Throughput Expectation Aggregate	Aggregate 23.99 Mbps assuming PTP-650 Series running the 650-01-10 software
RF Frequency Band	4.9 GHz (4940 to 4990 MHz)
RF Channel Bandwidth	10 MHz

Project Summary for First Link

Results

When it came to installing the network, Saia Communications left nothing to chance. “Everything is programmed, cabled, grounded and tested in our Buffalo, New York facility before it goes out to the field to be installed,” says Mike Saia, Vice President of Saia Communications. “Once in the field, our climbers pull the entire dish, cabling, grounding, and piping up the tower as one assembly, making installation much faster. None of the actual work is done on the tower with the exception of running the Cat5 cable and aiming the reflector dish.”

PROFILE

Wayne County, NY is on the south shore of Lake Ontario, and is home to 100,000 residents in a 604 square miles (1,560 sq km) area. There are 15 towns and 9 villages in this rural area known for agriculture.

Saia Communications

(www.saiacomm.com) has been providing public safety communications solutions in the Buffalo, New York metropolitan area since 1979. They provide voice, data and video surveillance solutions for federal, state and local government agencies and local enterprise customers.

CHALLENGE

Demand for broadband connectivity exceeded the capacity of the 10 year old wireless broadband network. County Office of Disaster Preparedness and Emergency Management needed high throughput in the 4.9 GHz public safety spectrum to support 9-1-1 communication services and public safety communications infrastructure

SOLUTION

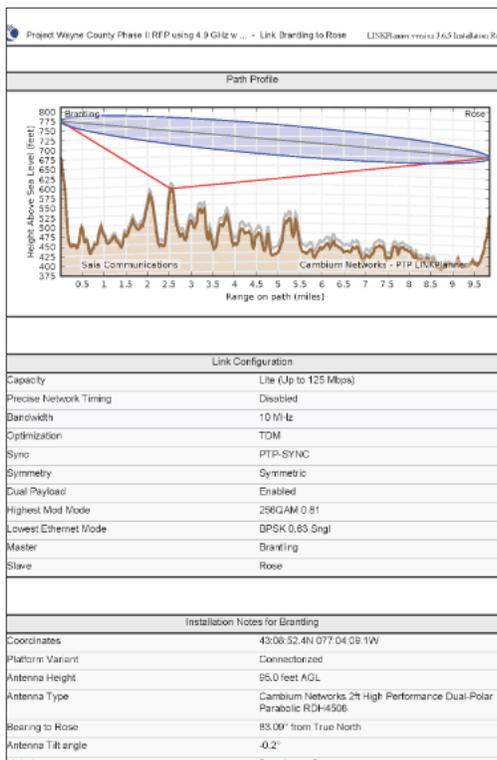
- PTP 650 links were installed to restore connectivity. The network was planned and installed in a matter of days.
- PTP 650 operates in the 4.9 – 6.05 GHz frequency band, including 4.9 GHz reserved for public safety
- PTP 650 provides up to 450 Mbps of low latency throughput for voice, video and data transfer.

Once the links are up, field technicians use the installation guide to clearly understand the precise requirements for space loss, link distance, azimuth, and elevation as they make precision adjustments. This knowledge from LINKPlanner helps them get the installation done right the first time.

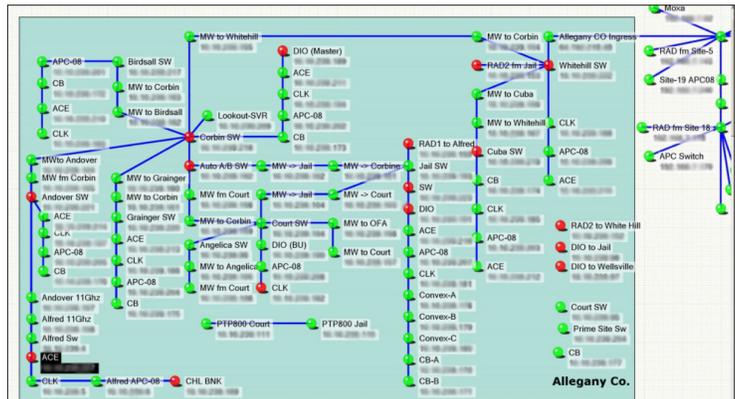
Once all of the links are established they will be integrated into the County’s Wireless Manager system to monitor performance in real time and assist in maintenance and troubleshooting.



Equipment staged at Saia Communications facility



LINKPlanner Path Profile Report and Image



Operations Center View of the Network Using Wireless Manager

Next Steps

Wayne County and Saia Communications were pleased with the performance of the first link. Since being installed, the remaining seven links have been designed using LINKPlanner and have been tested and staged at the Saia Communications facility nearby. Installation of these links is being scheduled for the coming weeks.

All eight links will be managed in the Wireless Manager software system, and have already been provisioned. This will enable technicians to start performance monitoring and alarm and event monitoring immediately at installation.

“Wayne County had a need to improve their public safety backbone infrastructure. They needed more throughput, low latency and high reliability. PTP 650 from Cambium Networks gives them what they need.”

MIKE SAIA, VICE PRESIDENT, SAIA COMMUNICATIONS