

Highlands' goal - Improve broadband connectivity

In-depth network visibility was the key

**For years, Highlands has relied on ZCorum's diagnostics tools to help them become the provider of choice in their community.**

For years the little mountain community of Highlands, North Carolina was strictly a summer/fall town. The population in summer could reach well over 18,000. Today all that has changed. Highlands has visitors year round, and their permanent population continues to grow with well-educated and well-off executives and retirees from Atlanta, Charlotte, and other large cities in the area.

As the community has developed, one of Highland Cable Group's top priorities was to improve broadband connectivity and provide the best service to their community. With subscribers needing reliability for telecommuting, digital learning, and more, they knew that providing consistent, reliable internet service was imperative. Having the ability to see current issues or potential problems was to be the key.

“We pulled up a customer's modem in TruVizion and saw bad codeword errors. We entered it into PreEqualization Analyzer, and immediately saw that the readings were consistent with water in a drop. The tools pointed us right where the problem was. TruVizion and PreEqualization Analyzer save us a lot of time.”

- Rick Yinger, Network Engineer for Highlands Cable Group

## THE BOTTOM LINE

Highlands is impressed with the regular addition of new features in the tools and the support they're receiving from ZCorum. Highlands uses all the features in each of the diagnostics tools in tandem with each other to gain a complete and clear picture of their plant. They are prepared for any situation, whether it's unpredictable daily temperature changes, to a full-blown pandemic. Their plant remains stable and user satisfaction is high. Highlands has long relied on their relationship with ZCorum, and these diagnostics tools have helped them become the provider of choice in their community.

Highlands came to ZCorum for help in gaining a clearer view of their network, and the tools to more accurately troubleshoot their growing subscriber base. When they first started using TruVizion, ZCorum's diagnostics software for cable and fiber networks, they were “blown away” by all the information that was available all on one platform. This detailed look into their network gave them new ways of spotting trouble, such as the ability to see codeword errors. This was a feature they had never had before with other tools, and they soon realized the depth of information they could see regarding their network's performance.

“We use the codeword errors panel a lot. We've even set our tolerance levels on it pretty high. That way the modem will turn red pretty quickly, even if it's generating very few uncorrectable errors,” said Rick Yinger, Highland Cable Group's Network Engineer.

It's something that we monitor quite closely because that puts a pretty big tell on what's going on at a particular location."

Another feature they had never had before was the ability to look at a 90-day history of modems and keep a watch list of possible trouble spots. By drilling into modems in TruVizion and comparing to other modems on the same street or area, Highlands could see key metrics for every modem over a period of 90 days. They could quickly see if there were any patterns of recurring trouble modems or groups of modems. This helped narrow down granular data on what was occurring over time, allowing them to keep on top of any intermittent modem and network issues that can be so hard to detect.



"We've had many cases when using TruVizion for tracking where we've found swings in the RF levels that we wouldn't have noticed without the 90-day history and the watch list features in TruVizion," said Yinger.

Highlands has a climate that is much cooler than the rest of the American South. This cooling is caused by its altitude. Up in the mountains, Highlands was getting large temperature swings during the day — sometimes a 50 or 60-degree difference from morning to afternoon. That can make a big change on a cable plant. While using TruVizion, they noticed quite a huge swing in RF levels as the temperatures changed so dramatically over the course of the day. They would then go back and look at the RF levels over 7 days and 90 days, and how they varied during the day. Highlands says this feature is one of the things that helped them tremendously. Without the ability to track and look back, they wouldn't know what these RF levels were doing.

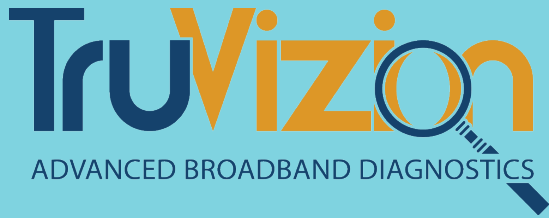
Highlands' positive experience using TruVizion led them to look at PreEqualization Analyzer, ZCorum's proactive network maintenance tool, to step up to a proactive maintenance strategy for their plant. Adding PreEqualization Analyzer, Highlands found they could now pinpoint the location of hidden problems caused by micro-reflections and group delay and proactively make corrections to reduce future issues. They knew that having pre-equalization turned on in their CMTS was compensating for these upstream impairments. But with ZCorum's tool they could clearly see the severity and location of those impairments. Even though their subscribers might not be experiencing a reduction in service quality yet, the yellow and red modems on the map were a sure sign that a future problem was developing.

## The Paired Approach

Highlands is now using TruVizion and PreEqualization Analyzer in tandem, and they have fine-tuned their routine maintenance program to look at both tools first thing every morning.

"We'll start TruVizion and see either low modem readings or bad codeword errors," explained Yinger. "Anytime we see red on the screen, we immediately go over to PreEqualization Analyzer and look at a snapshot of that modem. We can then pinpoint whether we need to roll out a bucket truck or just a service truck on it."

# DIAGNOSES PROBLEMS QUICKLY AND EFFICIENTLY



Yinger tells this recent story about one of their subscribers having issues with their VoIP service.

“We got a call from the customer that they were having voice clipping. The first thing we did was to pull up the customer’s modem in TruVizion, and we saw he was getting some bad downstream codeword errors. His downstream SNR on one of the four bonded channels was also out of spec. It was 12 or 14 DB lower on that particular channel. So, that immediately told us there was something wrong, and we needed to look at it in PreEqualization Analyzer to narrow down the location and cause. We pulled up PreEqualization Analyzer and immediately saw readings that were very consistent with what you would see if there was water in a cable drop. The application told us it was likely an in-home or near-home problem, and that there was a micro-reflection with an echo cavity of roughly 200-feet. This was about the length of a drop. We rolled a truck out there and went straight to the tap, knowing that it was probably the customer’s drop. As soon as our technician unscrewed the drop from the tap he said ‘Yes, there’s water in it. Let’s go ahead and replace it.’

“**The tools pointed us right where the problem was. Both TruVizion and Pre-Equalization Analyzer save us a lot of time.**”

*- Rick Yinger*

So, we didn’t have to waste time going through the house and taking a bunch of readings. The tools pointed us right where the problem was. TruVizion and PreEqualization Analyzer save us a lot of time every day. In this particular situation we could also see in both tools that the neighbor just one house down from him wasn’t having any issues at all. It was just localized with the single drop. In other cases, the Correlation Group feature in PreEqualization Analyzer lets us know if an issue is impacting multiple subscribers, and the approximate location of the fault.”

Highlands’ repair technicians are also able to use both diagnostics tools in the field on their mobile devices. As a result they have seen the number of tech support calls and truck rolls decrease significantly. They first pull up TruVizion and check for any red modems. Once they’ve pinpointed an area that needs further investigation they switch to PreEqualization Analyzer to narrow down the problem. They are then able to determine whether it’s likely an issue at the home, like a bad drop or a problem with in-house wiring, or something further out in the plant like a bad amplifier. They often can get issues corrected before they become a real problem, without their subscribers ever knowing anything was wrong.

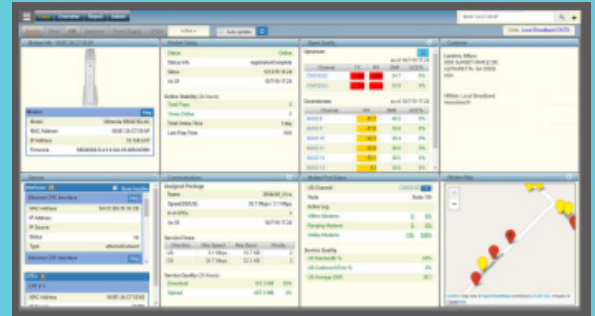
Highlands’ repair technicians are also using the diagnostics tools out in the field and as a result they have seen the number of tech support calls and truck rolls decrease significantly. They pull up TruVizion and check for any red modems, then check to see if there are any correlation groups. Once they’ve pinpointed an area that needs further checking they switch the area over to PreEqualization Analyzer to narrow down the problem area. They then make a determination, whether it’s a bad drop or a problem with the in-house wiring, a bad amplifier or another problem. They then drive right to the area and get the issues corrected before it becomes a real problem. Most of the time their subscribers never know anything was wrong.

## Highlands' Biggest Challenge

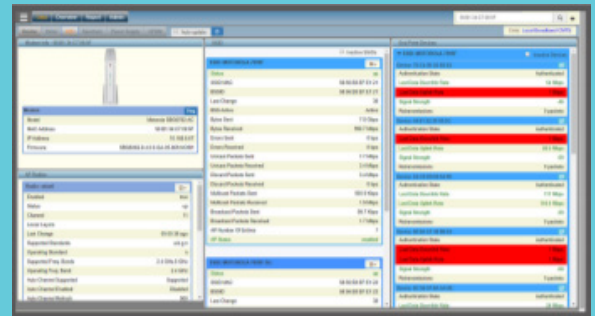
The 2020 world pandemic raised new problems for Highlands—how to keep their subscribers online and in touch with the world while ensuring that they would be safe during the pandemic. Highlands also had to ensure acceptable limits for their employees, especially their field technicians. Highlands realized they could reduce potential exposure by limiting the times they would go into a customer's home. ZCorum's diagnostics tools helped them determine when an issue was located somewhere outside the home, so they could get repairs completed without any compromise to the customer's or the employee's safety.

"These challenges were foremost in our minds during the pandemic," said Yinger. "There's no framework or formula for a situation like this, but we have experience dealing with the unexpected, and our subscribers understand that times like these are not common. They thank us for helping them stay connected and safe. And ZCorum's tools help us with that."

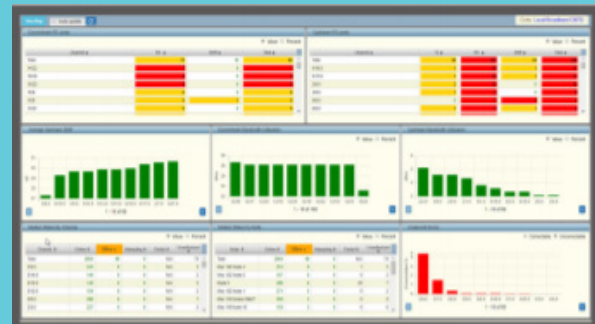
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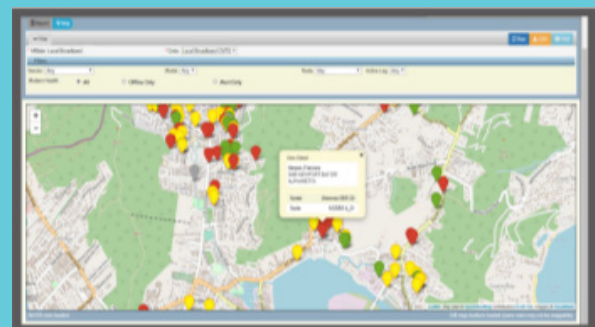
Modem Diagnostics



WiFi Diagnostics



CMTS Diagnostics



Dynamic Mapping

## About ZCorum

ZCorum is the leading provider of innovative diagnostics and managed broadband solutions to telecommunications companies, helping them reduce costs, increase operational efficiency and improve the subscriber experience. For more information, visit [ZCorum.com](http://ZCorum.com).



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