

Audemat FM-MC3.2 with Goldenear

Roswell Clark

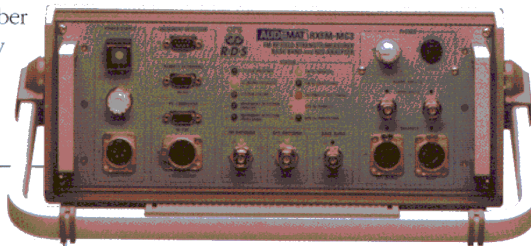
At some point in an engineer's career, questions such as "How does our signal compare to so-and-so?" or, "Have we increased multipath along the highway lately?" are likely to occur. Sometimes, these questions are asked on an ongoing basis. The task of collecting, quantifying and reporting the relevant descriptive information to management in an easily digestible form is a serious challenge.

A series of spot readings taken at various points in a general area can provide some idea of signal strength and perhaps be a basis for a competitive signal comparison. With some creativity and skill with a spreadsheet program, an interesting chart may be produced.

Depending on the circumstances, such as the number of carriers sampled and how these samples were taken, this process could take days, if not weeks, to

Performance at a glance

- Monitor up to 99 stations
- Optional Goldenear software for quality analysis
- Dynamic signal mapping
- Excellent manufacturer support
- Stores GPS data
- Overlay data on standard maps
- Full-color reports



compile. Hiring a consultant to gather the readings, either on the ground or from an airplane, has always been an option; however, the

money for outside consulting for every signal-integrity question that arises is usually not available.

Filling a need

How can the signal analysis needs of upper management be met while creating reports that make sense to those who would rather not attempt to digest reams of data? Either the engineer needs to create more time or get better tools.

The Audemat FM-MC3.2 is one such tool. While traditional signal strength meters can only sample one carrier at a time, the MC3.2 can simultaneously record up to 99 independent stations. With its internal GPS, it can also record the reading location while you take a leisurely drive through your market. After the readings are taken and stored, various color reports can be generated. One feature is the ability to overlay the GPS readings on a map of the area showing local highways and other landscape features. The signals are color-coded by signal intensity, so it is easy to see what the relative readings are at a glance. For those who insist on

numerical data, readings can be output as a chart or tables.

The setup is straightforward. There are some language translation curiosities, as the manufacturer is headquartered in France. A laptop computer connects to the MC3 for data collection and for measurement parameter setup. Information about the stations to be sampled is entered in descriptive fields including frequency and call letters. Each sample's frequency and trigger method are entered as separate parameters, along with the option to collect GPS information. The unit also comes with a clamp-on sensor that detects a chalk mark on a vehicle's tire for marking a distance-based measurement interval. Other triggers, such as pressing a computer key or timed interval triggers, can also be used.

Once programmed and installed in a vehicle, the MC3.2 takes care of everything as you drive through the areas of interest. Since a laptop communicates with the MC3 to store the collected data, a laptop power adapter is a good idea for extended driving.

The data collected from your driving tour, called a *campaign*, can later be manipulated to create various reports. The signal strength data can be overlaid onto a GPS-enabled map, a free download from a link on the Audemat website. Although downloading and overlaying the campaign on a single map was relatively easy, spanning the same campaign across several adjacent maps proved to be tricky. There is no built-in method to merge adjacent maps into a single larger map. This may not be an issue for some areas, but in our case, the campaign crossed multiple map regions. I first had to create a single map showing the entire coverage area.

To do this, I exported the maps to .BMP files and then merged the images into one larger image. I used PowerPoint, but any graphics program could do this. The collected data image was then placed on top of this composite image and resized manually. The end result proved to be very acceptable to management, and I was able to quickly provide a visual comparison of our competitor's and our signals in the market. When the mapping challenge was described to Audemat, they quickly responded with various solutions including burning CDs with the entire USA or specific regions of the USA. Functions similar to those of some of the familiar map sites, such as MapQuest, were also discussed as a possibility.

Field Report

Qualitative analysis

A separate component of the system, called Goldenear, performs a different type of analysis. While the signal reader measures multiple carriers and focuses the readings on a single parameter—signal strength, Goldenear takes a single carrier and records multiple parameters such as pilot, signal strength, RBDS, left audio, right audio, L+R, L-R and multipath. At the same time that the GPS and signal parameters are

being measured and stored, the station's audio is recorded onto the hard drive as a .WAV file.

Data for Goldenear is collected while a campaign is driven. Computer hot-keys can identify landmarks expected to have an influence on the signal. During campaign playback, these features can help explain abnormalities.

Completed campaigns can be viewed with the Goldenear reader, a separate program. The reader visually and audi-

bly recreates the campaign. Overlaying the results on a map is an interesting display option. As the campaign is played back, a marker that looks like a small car indicates where the audio and data were taken. In poor reception areas, the signal-quality readings can be viewed to help identify the source of the problem. Hearing the error and seeing the various signal parameters at the same time is helpful. The program also calculates a quality index that takes into account all of the readings to compute a relative quality rating from one to five, providing a reference of the overall signal in a given area. Goldenear and RF measurement data can be stored on a network to allow file sharing and campaign comparison to help before and after evaluations of a market or station.

The Audemat system should be considered part of an effective monitoring and measurement tool arsenal. The FM-MC3.2 with Goldenear complements such data collection tools as spectrum analyzers and tunable modulation monitors, to assist in identifying trouble spots and evaluating a market's signals. For a corporation considering market entry, the information gathered can identify competitive signal issues.

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