

Turn to USB-Based Spectrum Analyzers to Conquer Interference

This article discusses how communications provider SaskTel is utilizing real-time spectrum analyzers to track down interference from European DECT wireless handsets.

DECT stands for Digital Enhanced Cordless Technology, although some might suggest that the “E” actually stands for European. And, in fact, the DECT standard for cordless telephone systems did originate in Europe. Due in part to this development path, there are slight differences in the frequency ranges for European DECT phones and their North American counterparts. The differences may be slight, but they are significant if you are an information and communications technology (ICT) provider like SaskTel.

Like other cell service providers across North America, SaskTel faces ongoing problems with European DECT phones. When people move from Europe to the Canadian province of Saskatchewan, where SaskTel supports more than 614,000 cell service customers, they often bring their DECT phones with them. From a consumer perspective the phones work fine, and they generally have no idea that approximately 10 MHz of the unlicensed spectrum used by their wireless handsets overlaps with SaskTel’s licensed spectrum.

For SaskTel and its customers, however, it’s a different story. “Interference shrinks the footprint of a cell site, it degrades the download and the upload speeds, and when it shrinks the footprint of the site, it’s kind of a snowball effect,” says John Davidson, technical assistant in SaskTel’s technology division. “In some cases, the phones have to transmit with more power to get back to the site, and that in turn affects more and more phones in the area.

“And it might not just affect one site,” Davidson adds. “Depending on the number of phones in the area it might affect a number of sites in a city setting. The ability to track down the source of interference and do it quickly and in a timely fashion is important.”

By monitoring changes in receive total wideband power (RTWP) at its cell sites, SaskTel can determine when



1. SaskTel interference hunters use “broomstick” antennas and USB-based real-time spectrum analyzers to track down sources of interference.

interference is occurring and the general location using a tool called splunk. They then dispatch Davidson or other engineers and technicians with test equipment and vehicles to start the hunt. The vehicles are typically equipped with traditional swept-tune spectrum analyzers along with a variety of directional antennas (Fig. 1).

But when it came to European DECT phones, tracking down interference sources was hardly quick or timely using this equipment. The problem, according to Davidson, was that “if the phone was not transmitting at the time your spectrum analyzer sweeps across that frequency, you wouldn’t know that it was there.

“The issue is that DECT phones change frequencies,” he explains. “You could zoom in on what you thought was

interfering frequency and it could change frequencies. We would lose a lot of time that way trying to figure out exactly where the DECT phone was, and why it wasn't on the frequency we thought it was. On top of it, if there was SaskTel phone in close proximity to the DECT phone, it would actually switch frequencies."

In one case a couple of years ago, Davidson was able to ascertain that interference was coming from an apartment building near a hospital, but from there found that it was impossible to pinpoint the location of the European DECT phones. "So, I ended up getting into the apartment building and knocked on every door, which was very time-consuming," he recalls.

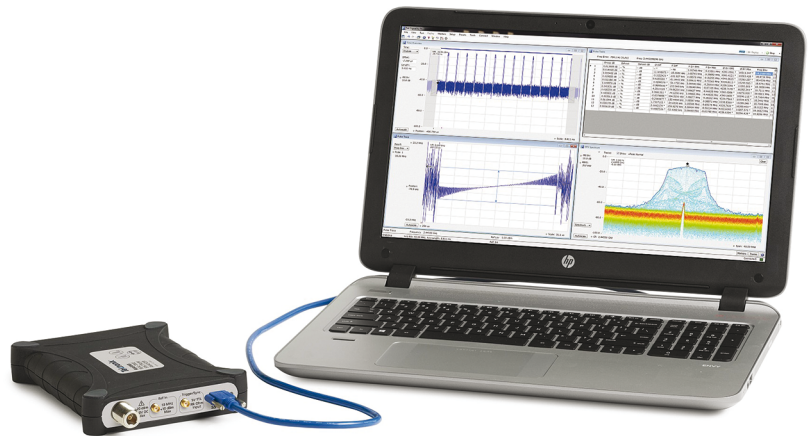
HAPPY HUNTING

Looking for a better solution, Davidson and some colleagues attended a show in nearby Saskatoon where they attended a presentation on new USB-based real-time spectrum analyzers. These instruments combine high performance in a compact package and are operated via a software application running on a laptop or tablet.

"We were impressed with the USB instruments—especially the price point," Davidson says. "In our business, we don't need desktop spectrum analyzers anymore. We have a lab, and we can of course take our equipment in there, but mostly we travel around. The size was good and the price was good."

Davidson continued to be impressed once he added a USB-based analyzer to his interference hunting arsenal. "The real-time spectrum analyzer makes it easy to find DECT phones because you can see in real time what the phone is doing, as opposed to just recording or seeing the signal when your spectrum analyzer happens to sweep through it," he says. "The real-time spectrum analyzer is a real benefit to tracking these down easily," he says.

Gone too are the days of knocking on apartment doors. "Now we can tell by the graphs from the RTWP and splunk that interference is coming from a European DECT phone



2. SaskTel is adopting USB-based real-time spectrum analyzers such as the Tektronix RSA306B shown here to track down sources of interference.

and you just get in the truck and basically drive right up to it," Davidson notes.

Going back to the hospital example, he says a real-time spectrum analyzer would have saved him many hours: "If I would have had the real-time spectrum analyzer at the time, it would have been real obvious where the signal was coming from. I could have then gotten access to the apartment building and gone right up to the apartment where it was coming from. At that point we didn't have it, and this took a long time."

OTHER APPLICATIONS

USB-based spectrum analyzers such as the Tektronix RSA306B that SaskTel is using (*Fig. 2*) include displays like DPX and spectrograms. The team uses these features to track down other sources of interference that were previously hard to spot. One example was an intermodulation effect that was created when a couple of antennas in town were updated.

SaskTel is in the process of equipping more members of its interference hunting team with these instruments. From Davidson's perspective, it can't happen fast enough. "We also use these tools for other forms of interference, which could be anything from cellular amplifiers to internet cameras to garage door openers," he explains. "We currently have two units—one here in Saskatoon and one in the south. For the price of them, it would be nice for everyone to have one."