



TECHNICAL COLUMNS

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BPL: THE NEW KID ON THE BLOCK

By RON HRANAC

"They're heeere"

We have a new competitor in the high-speed data arena: BPL, or broadband over power line. This technology goes by other names, including access BPL, power line communications (PLC), power line telecommunications (PLT) and power line broadband (PLB), although the previously mentioned BPL is the most common. In mid-December, the Federal Communications Commission adopted a Report and Order in ET Docket 04-37, which revises Part 15 of the FCC's rules to regulate the deployment of BPL technology.

Competition

From the consumer's perspective, competition in general is a win-win. High-speed data, known in the popular media as "broadband," is available using cable modem technology, digital subscriber line (DSL), satellite, terrestrial wireless, fiber and, with the recent tweaks to Part 15, BPL.

Competition gives the consumer more choices, lower prices and often better service as well. It also keeps incumbents on their toes, forcing them to do a better job. Direct broadcast satellite's (DBS's) impact on cable is a good example.

From our perspective, BPL is another competitor that we need to be aware of, and one that we must take seriously. Granted, it's likely to be awhile before any major deployments take place (to date, deployments have for the most part been limited to a handful of trials and a couple of commercial rollouts), but they will happen.

One thing in our favor is the momentum of cable modem deployment, which, according to NCTA, was at 17.3 million subscribers and growing, or about 23 percent of basic cable subs, in the United States alone as of March 2004. DSL also has good momentum, tracking along at somewhat more than half of the cable modem sub count. These two services combined represent a formidable challenge to any newcomer, but don't discount the power companies' deep pockets. And power lines are pretty much everywhere.

How BPL works

How does it work?

BPL is a carrier current system that in the most common deployments uses radio frequencies in the roughly 2-80 MHz spectrum to transmit high-speed data over power lines. Various approaches are employed to get the data around transformers and other devices that previously made it difficult or impossible to achieve high data rates on power lines—check out <http://computer.howstuffworks.com/bpl.htm> and www.arrl.org/tis/info/HTML/plc for more information.

Overcoming noise and other impairments is accomplished by using spread spectrum, orthogonal frequency division multiplex (OFDM) or other advanced techniques.



The theory is that a customer simply plugs a BPL modem into any convenient electrical outlet in the house where service is available. Pretty neat, huh?

Are there any downsides to BPL, other than the fact that it's a competitor that's likely to give us a run for the money?

Well, it depends.

Interference

If you've followed BPL during the last year or two, you've probably read or heard about interference concerns. Despite claims to the contrary by some of the power companies participating in trials and the manufacturers of BPL equipment, the amateur radio community has documented numerous cases of harmful interference to ham operators. For the record, I'm a ham radio operator and a member of the American Radio Relay League's EMC Committee, so I've been following this whole thing quite closely. Let me state emphatically that I'm not opposed to BPL, just potential interference that it may cause.

You see, power lines are intended for the transmission of 60 Hz electricity, not 2-80 MHz RF. At those higher frequencies, power lines become quite efficient radiators! The concern of ARRL and others is that BPL signals have the potential to interfere with licensed over-the-air services such as amateur radio, shortwave broadcasts (BBC, Voice of America, etc.), government and military communications and so forth.

There are ways to reduce the interference potential, which includes notching affected frequencies. Notching in some cases has helped, but in others it has done little or no good.

The FCC, which is tasked with the role of regulating television, radio, wire, satellite and cable communications in the 50 states, U.S. territories and the District of Columbia, has interestingly been quite a cheerleader and promoter of BPL.

Where documented harmful interference to licensed over-the-air services has occurred and complaints have been filed with the Commission, the complaints were routed to the Office of Engineering and Technology rather than the Enforcement Bureau and never were formally acknowledged. Some of the harmful interference persisted for months, until the BPL trial was concluded. No enforcement action was taken. Interference has occurred as far as a mile from the BPL source. Yikes!

What's this got to do with cable?

Think about it for a minute. If some flavors of BPL can interfere with nearby radio communications—including, in some cases, radios nearly a mile from the source—what do you suppose might happen to a cable network's plant that's located only a few feet from the power lines? Instead of a point source of interference that exists with, say, a 27 MHz CB transmission, a power line carrying BPL is a continuous radiator over its entire length.

My take on it is that we'll have no recourse but to tighten up our plants even more should BPL interference prove to be a problem. After all, the argument can be made that our networks are supposed to be shielded from the over-the-air environment, and BPL interference will be just another form of ingress. Licensed over-the-air users such as ham operators are supposed to be protected from harmful interference from Part 15 devices and technology, but cable operators really won't have much of a leg to stand on.

Before someone accuses me of crying wolf, please note that I'm not aware of any documented interference to a cable network from BPL, so in the end it may turn out to be a nonissue. But I suspect that we may see at least some cases when BPL becomes more widespread. Time will tell.

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