

March 28, 2004

Reply Comments

by Clark Rory Davis, RF Communications Engineer

In the Matter of
Carrier Current systems, including Broadband over Power Line Systems
ET Docket No. 04-37

As an FCC licensed RF communications engineer employed by a maritime communications firm, as a user of broadband internet for my work and leisure, and as an amateur radio operator, I have strong reservations regarding widespread implementation of Access Broadband over Power Line technology using the HF and low VHF radio spectrum, and the use of the nation's power grid as a transmission medium for a communications infrastructure.

I believe that the reliance upon power transmission lines to carry Internet data is not in the best interest of either the existing licensed and unlicensed users of the HF radio spectrum, nor the intended users of the Access BPL system.

As has been stated by many of the other commenters to the NOI and NPRM, the potential for interference to existing licensees which provide invaluable service to the general public in times of disaster is too great to ignore. With increased allowances of unintended radiation over current Part 15 standards, the HF frequency bands could effectively become too noisy to permit effective, reliable communication over distances greater than 20-25 miles by VHF radio without the use of terrestrial repeaters or satellites. If the effect of BPL is to drive amateurs and other services away from the use of HF for communication, a valuable resource to the nation will be lost. The cost to replace existing systems with alternative technology such as satellite equipment or advanced communication systems such as spread spectrum radio is too great to be borne by the average user of Single Sideband radio, the current method used by the majority of nonmilitary users of the HF spectrum. Access BPL could render obsolete most of the HF radio equipment currently in use.

The use of spread-spectrum and multicarrier systems such as OFDM used in Access BPL will certainly raise the RF noise floor by a significant amount. This has been demonstrated by the American Radio Relay League in their BPL demonstration videos and documentation from other sources. Merely "notching out" the protected frequencies in the BPL transmission equipment will not eliminate interference. Since the powerline conductors are exposed to the elements, corrosion in the transmission conductor splices or the use of dissimilar metals in the transmission towers creates semiconductor junctions which act as nonlinear elements in the system which cause intermodulation distortion (spurious products) which will extend outside the transmitted bandwidth, and may extend into the high VHF and UHF spectrum as well as within the HF spectrum, and may cause interference to licensed services well outside the BPL bandwidth.

Dirty or damaged insulators cause coronal discharge (arcing) which can also act as a generator of RF energy, which can mix with the BPL signal to produce undesired signals as well. It will also have a damaging effect on the Access BPL service itself. As it stands today, power companies have a difficult time addressing RF noise issues affecting licensed users of the RF spectrum caused by coronal discharge. How can they be expected to improve their level of service on this issue without significant increases in operating cost, just to maintain usable Access BPL service?

Regarding the use of unshielded, widely separated balanced or unbalanced conductors found in power transmission line systems carrying medium to high voltage AC as the transmission path for the Access BPL signal, I strongly urge the FCC engineering staff to conduct their own tests as to the viability of this aspect, their findings be made public before the final determination of the rule, and the Commission not rely solely upon the possibly biased findings of the Access BPL consortium or its opponents.

Compared to other transmission methods, e.g. optical fiber, buried shielded coaxial cable, the BPL transmission method is extremely vulnerable to damage caused by manmade or natural catastrophic events which render it useless in disaster situations. Considering that powerline outages are frequent and inevitable during severe weather such as hurricanes or heavy snowstorms, a communications infrastructure that relies upon this fragile medium, especially to provide critical communication such as medical assistance or command and control functions is simply not realistic. A single lightning strike may cause enough damage to disrupt service to entire neighborhoods, or even whole communities for a significant amount of time.

In rural areas where Access BPL would seem to be a viable solution, power service is often interrupted for days and sometimes weeks at a time in the winter months. Even in the 21st century, rural residents must resort to the use of wood-burning stoves to heat their homes, and kerosene or gas lanterns for lighting because repair crews are often overwhelmed by the number of downed lines in their service areas and cannot get to all of the affected areas in a timely manner. For example, in a particular area of eastern Washington State a few years ago, power was out for three weeks following a massive ice storm which felled hundreds of trees across powerlines throughout the area and made roads impassable. This was in a relatively well-populated area. However, telephone service was relatively unaffected due to the buried telephone cables which were installed throughout the area in the late 1960's and early 1970's.

As broadband internet becomes more widely implemented, users will begin to rely upon it as their primary method of business and personal communication. With the expansion of Voice over IP technology, many are abandoning the POTS ("Plain Old Telephone Service") in favor of cheaper IP phone calls, while cable companies are providing telephone service using VOIP as well, and customers are abandoning the copper pairs of the telcos for this new technology. I believe the same would happen in the case of Access BPL except for one thing. That is that the level of reliability of service, given the fragile nature of the transmission medium, will never approach that of the POTS, or wireline services currently in place. If customers are mistakenly led into believing that BPL could replace POTS for their communication needs, extended outages could result in literally billions of dollars in business lost during those periods, not to mention the loss of access to emergency services such as 911. The cost in lives could be significant.

To summarize, I think that widespread implementation of Access BPL is a very bad idea, and the United States should follow the lead of Japan, Austria, and other countries in abandoning this system in favor of a more reliable and spectrum compatible solution.

Sincerely,

Clark Rory Davis
308 Bogie Dr.

Slidell, LA 70460
n7cr@bellsouth.net