

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of)	
)	
Inquiry Regarding Carrier Current Systems, Including Broadband Over Power Line Systems)	ET Docket No. 03-104
)	

To: The Commission

**REPLY COMMENTS OF
JAMES M. TALENS**

Filed: August 20, 2003

Introduction

Pursuant to Section 1.415 of the Federal Communications Commission's (FCC or Commission) Rules, 47 C.F.R. §1.415, I hereby submit these Reply Comments in the above-captioned proceeding.¹ I am an attorney and an electrical engineer, and I have been an Amateur Radio operator licensed by the Commission since 1960. I have also had the honor of working for the FCC for 22 years in a variety of capacities, and more recently was Of Counsel at a large Washington, DC law firm. Among other activities, I currently provide telecommunications consulting services to a number of domestic and international clients.

A number of proponents of broadband power line (BPL) service in this proceeding have failed to demonstrate that their systems will not cause harmful radio frequency interference to a variety of licensed communications services, particularly the Amateur Radio Service. They also in some cases make remarkably inaccurate or misleading statements. But in all cases they rely more on policy posturing and unsubstantiated conclusions to justify their hopes of engaging in what they view as a lucrative adjunct to their mandate of providing electrical power to our Nation.²

¹ *In the Matter of Inquiry Regarding Carrier Current Systems, Including Broadband Over Power Line Systems*, ET Docket No. 03-104, 68 Fed. Reg. 28182 (June 2, 2003), *corrected* 68 Fed. Reg. 32720 (June 2, 2003) [dates corrected].

² It is patently clear that the electric utility companies of our country should focus their business energies on correcting their principal infrastructure problems rather than endeavoring to enter a new, competitive business line that is both unproven and likely exceedingly damaging.

The Electric Utility Company Comments

In its Comments, Florida Power & Light Company (FPL) states that BPL “does not pose significant risks . . . [to] amateur radio operators, or other forms of commercial communications”³ However, FPL’s Comments include no technical showing to support this claim, whereas the American Radio Relay League (ARRL) in its Comments has presented a compelling technical study making it quite clear that deployment of BPL will adversely impact Amateur Radio Service operations, among other services.⁴

Moreover, FPL seems to be pushing the horses out of the gate even before the spectators have arrived, because it claims that BPL vendors’ “demonstrated sincere efforts” are sufficient to warrant immediate certification of BPL equipment and deployment of its services.⁵ It is not clear what FPL is referring to in the way of sincere efforts, but hopefully the Commission will rely upon demonstrated technical conclusions rather than FPL’s sincerity to assess the risk of interference to licensed HF and VHF operations.

Further, like other utility companies in this proceeding, FPL has ignored the critical issue of susceptibility of BPL equipment to interference from Amateur Radio and other licensed operations. That susceptibility was the very reason the Amateur Radio community was denied access to certain low-frequency channels used by electric utility

³ FPL Comments at 7. Indeed, FPL would be well advised to consider that there are thousands of users of the high frequency (HF) and very high frequency (VHF) bands who must be countenanced before ubiquitous deployment of BPL can even be imagined. *See, e.g.,* www.monitoringtimes.com/html/mtopHF.html.

⁴ ARRL Comments, Exhibits A and C.

⁵ FPL Comments at 7-8.

companies for power-line carrier (PLC) solutions.⁶ The Commission found that separation distances in the order of 950 meters would be required to avoid harmful interference from even a 1-watt EIRP Amateur Radio transmitter.⁷ The impact of ubiquitously deployed BPL equipment in an environment of several hundred thousand Amateur Radio operators and millions of other transmitters (many operating at more than 10 kW EIRP levels) reeks of potential disaster. Perhaps this is the reason FPL and others have sidestepped the issue. But such a situation cannot be permitted to unfold – for consumers who would face massive degradation of service, for Amateur Radio operators who would be unfairly blamed, or for the Commission that would face untold public and Congressional criticism for having created an environment of intractable interference and unreliability.

For its part, Power Line Communications Association (PLCA) urges the Commission to conduct “actual field tests and surveys of entities offering and testing BPL services and products.”⁸ But then it prejudices those tests by asking the Commission “to discount speculative and self-serving comments by [anyone who would hinder]. . . BPL technology.”⁹ The Commission should indeed rely upon no less than professional

⁶ *Report and Order in ET Docket No. 02-98*, 68 Fed. Reg. 33020 (May 14, 2003).

⁷ *Id.* at para. 18. The potential for interference to and from BPL is enormous. As ARRL noted in its Comments, an Amateur Radio station operating at 1500 watts and using a 3-element parasitic Yagi antenna would produce a peak field strength 100 feet away in the main antenna lobe of approximately 30 V/m. Most industry standards for immunity of consumer-grade electronics require that the equipment be non-responsive to fields of approximately 3 V/m. However, there is nothing in the record to suggest that BPL will not operate in excess of this immunity threshold, particularly in view of the ability of power lines to act as exceedingly efficient (and even directive) antenna arrays. *See* ARRL Comments at 18.

⁸ PLCA Comments at 2.

⁹ *Id.*

technical studies to reach its conclusions regarding the extent to which BPL will cause interference. Participants in site studies should include representatives of affected services, such as Amateur Radio and public safety service providers. PLCA's suggestion that the views of any such affected entities should be discounted is regrettable.

United Power Line Council (UPLC) exemplifies the level of misrepresentation offered by some members of the electric power community on the issue of interference by BPL. UPLC categorically states, "Nor is there any indication from the trials that BPL systems would cause interference."¹⁰ Surprisingly, it adds, "Therefore, it would not be appropriate to require notching or other mitigation techniques to avoid interference to licensed operation, cable TV or DSL services that operate in proximity with BPL systems."¹¹ As ARRL has suggested in its Comments, utilities have resisted opening their doors to technical observation of their test sites, especially to Amateur Radio operators.¹² Under these circumstances, UPLC surprisingly persists in claiming that "[It] is pleased to respond [to the Commission's NOI] that there has been no interference reported in any of the field trials by its members."¹³ Quite to the contrary, of course, it is readily demonstrable that Amateurs whose antennas are located closer than 30 meters from a radiating power line will need up to 100 dB of suppression of spurious

¹⁰ UPLC Comments at 12.

¹¹ *Id.*

¹² ARRL Comments at 16. The test sites were mysteriously shut down, even to Commission staff members.

¹³ UPLC Comments at 9. "The UPLC reiterates its general response that BPL systems have not caused interference." UPLC Comments at 12. Such a claim is simply unsubstantiated and enormously misleading to the Commission and the public. See also HPA Comments at 8, *infra*.

BPL emissions to operate free of harmful interference.¹⁴ It follows, therefore, that UPLC's assertion that Part 15 need not be changed to protect against interference from BPL to licensed services is just wrong.

One commenter, Homeplug Powerline Alliance (HPA), announces that it plans a 50 Mbps system to carry entertainment signals throughout home environments.¹⁵ It asserts that additional Part 15 requirements are not needed because other Part 15 devices have become ubiquitous.¹⁶ But other Part 15 devices are not necessarily in every home, do not necessarily use HF and VHF frequencies, and are not necessarily connected to the power-lines for transmission. The technical limits that have proven useful or safe for a predefined set of devices currently embraced by Part 15 simply do not generally apply to BPL systems.

Unlike many of its allies in this proceeding, HPA at least recognizes the legitimate concerns of licensed spectrum users, and to that extent recommends limitations on interference potential rather than on technologies.¹⁷ However, HPA appears to want to place the burden of addressing interference on the innocent existing licensee rather than, *ab initio*, on the new entrant in an already crowded and heavily used radio spectrum.¹⁸ This theory turns logic on its head, and must not be considered seriously. To the contrary, BPL operators must show in advance of their deployment that they will not cause harmful interference, whether in the form of increased ambient radio noise or

¹⁴ ARRL Comments at 16.

¹⁵ HPA Comments at 5-7.

¹⁶ *Id.*

¹⁷ *Id.*

¹⁸ *Id.* at 6-9.

discrete signals, in the conduction or radiation mode or for in-house or outside environments. The only possible way to achieve this protection is through compliance with newly developed Part 15 rules, mandatory filtering or other means that will protect extant spectrum licensees from damage as BPL is deployed, if it in fact can be safely deployed at all.

Finally, review of Comments submitted by Main.net Communications Ltd. (MCL) reveals an interesting set of claims of non-interference that are largely argued on the basis of measurement technique validation studies – not interference studies. Indeed, MCL proposes that

The principle of having technology neutral regulation in the telecommunication sector requires the same radio protection aims for all telecommunications systems, independent whether they operate on telecom wiring or on power lines. [sic]¹⁹

This is patently absurd. Telecom “wiring” can be coaxial cable or other transmission lines that inherently prevent radiation of the radio frequency energy they are designed to transport. HF and VHF-based BPL are carried on power lines that act like antennas, not transmission lines. The signals will radiate everywhere, oftentimes in patterns that can produce huge signal densities.²⁰ Further, MCL itself does not report that any of the tests it cites have been monitored for HF or VHF spectrum interference potential.²¹ One such

¹⁹ MCL Comments, Appendix A, Conclusion.

²⁰ See ARRL Comments 7-11.

²¹ MCL does not report to the Commission that recordings were made of BPL field trials in Austria that revealed widespread noise creation. *Id.* at 16. Even more telling, see articles by Diethard Hansen, founder and president of EES (1991) Switzerland and Germany in Compliance Engineering Magazine (<http://www.ce-mag.com/archive/03/ARG/hansen1> and [hansen2.html](http://www.ce-mag.com/archive/03/ARG/hansen2)) that survey the situation in Europe, noting, *inter alia*, strong opposition in Germany and many other countries to the

test, in Manassas, Virginia, to the best of my knowledge, has not been the subject of a study of any kind involving those whose services might be adversely affected.

Of greatest significance, MCL claims that in its currently installed systems “notches can be defined remotely, so that the system will not transmit in any frequencies where there is an official request regarding interference.”²² MCL implicitly would deploy ubiquitous systems and simply sit back to field interference complaints. One might wonder who would be able to determine the exact source of the increase in background noise level or the spurious birdies circulating across a receiver passband. The opposite must occur: BPL must bear the burden of demonstrating that it does not cause interference when deployed, and the Commission must protect its licensees from the harm that would come from BPL.

The ARRL Comments

Quite apart from infirmities of the electric utility comments in this proceeding is the overarching issue of preservation of Amateur Radio Service as a national resource in the event commercial communications facilities are damaged or

deployment of BPL and test results demonstrating serious problems of mutual incompatibility between BPL and other licensed radio services. For example,

PLC interference has been identified as other background ambient in bands <30 MHz, receiver jamming (desensitization), and time-variant EMI. It takes wireless experts to confirm that the cause is PLC and not other EMI. Normally at continuous wave (CW), amplitude modulation (AM), and single sideband (SSB), the whole receive spectrum is experiencing a massive noise-floor increase (which sounds like an old steam locomotive sometimes), resulting in total blocking. Sensitivity is wiped out. Figures 1 and 2 illustrate actual PLC signals.

The interference issue for BPL in Europe remains a hot topic and there is ample evidence to conclude that BPL is nowhere near ready for deployment.

²² *Id.* at 7.

destroyed by a natural occurrence or terrorist attack. ARRL has provided the Commission with a study proving that BPL poses a huge threat to Amateur Radio operations.²³ By increasing the ambient noise level, weak signals will no longer be receivable in any area where BPL is deployed. The impact on emergency preparedness cannot be overemphasized.

In addition, Amateur Radio stations will unavoidably cause interference to BPL receivers. Ubiquitous deployment of BPL will mean large-scale consumer dissatisfaction with reception of data and a nightmarish public relations challenge for Amateur Radio operators, the Commission and Congress.

Conclusion

The utility companies commenting in this proceeding have failed to show that their BPL systems can operate at HF and VHF frequencies without causing harm to Amateur Radio and other services. Such harm will seriously undermine the ability of Amateur Radio to fulfill its mandate under the Communications Act and the Commission's Rules as a national volunteer emergency communications resource. That consequence cannot be permitted to happen. Based on the record, the Commission should terminate this proceeding with a finding that BPL is simply not technically compatible with existing services and would be detrimental to the public interest.

Respectfully submitted,

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²³ *Id.*, Attachment A.

