

Before the
Federal Communications Commission
Washington, D.C. 20554

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

Reply Comments of Scott D. Prather and Anne H. Prather

Introduction

In response to the Federal Communication Commission’s Notice of Inquiry regarding Broadband over Power Lines (BPL, FCC Proceeding #03-104), Scott D. Prather, licensee of amateur radio station N7NB and Anne H. Prather, licensee of amateur radio station KA9EHV, wish to provide the following reply comments for consideration by the Commission.

Through the BPL NOI, the Commission has expressed considerable interest in allowing electric utilities and other interested parties to provide broadband data communications services to homes and businesses using the existing power line infrastructure as a transmission medium. Industry consortia have indicated their desire for the FCC to make modifications to the existing FCC Part 15 rules pertaining to unintentional radiators in order to facilitate the deployment of BPL.

While the Commission’s interest in revising Part 15 to accommodate requests from the BPL industry is understandable, any decision to move forward with rule changes must take into account the potential interference aspects of BPL. Several of the comments made by the BPL industry concerning interference are of great concern to us, and they are addressed individually in the Rebuttal section that follows:

Rebuttals

Amperion

We found some of the comments in Amperion’s filing to be very troubling. Specifically, Amperion made the following statement¹:

“We would also like to recognize the fact that FCC Order 97, Section 157 essentially places the burden on BPL opponents to justify why a new entrant or technology that may provide more affordable telecommunications to a broader base of customers, should not be approved. Comments filed thus far have not come close to meeting this

1. Comments of Amperion Corporation, Page 11

burden, and remain unsubstantiated and speculative without direct evidence that BPL equipment causes interference in excess of approved limitations established by FCC guidelines.”

Essentially, Amperion is categorically dismissing any comments made concerning the interference potential of BPL simply because such claims are, as they put it, unsubstantiated. However, we would like to point out that the BPL industry has not made an effort to include incumbent spectrum users within the 2-80 MHz range that have the greatest potential to be affected by BPL. Instead, they have focused on interference to services such as broadcasting and cellular phones. We would welcome the opportunity to participate in actual field trials to obtain data that would prove conclusively the interference potential of BPL to users within the 2-80 MHz spectrum. It is the responsibility of BPL proponents to make such test areas available and publicly notify potentially affected users in the 2-80 MHz range so that they can assess the impact of BPL.

Satius, Inc.

Satius’ comment filing with the Commission is an excellent example of how manufacturers of BPL equipment are out of touch with the real-world interference potential of the equipment that they propose to build. The Satius filing substantiated their need for minimal regulation in the following statement²:

“One of the Commission’s concerns with current PLC systems is that the equipment harmonics may interfere with the analog radio and television bands. Other frequency bands that contain DSP over radio transmitters and receivers will have less effect from digital PLC equipment. Satius asserts that its technology should be regulated as a DSP power line transmitter, similar to DSP radio transmitters, whereby the signal emission can be limited and stabilized, *but as unintentional carrier current systems without the concomitant frequency band limitations of radio transmitters.*” (italics were in the original text).

According to our reading of this statement, Satius is saying that transmitting equipment based on Digital Signal Processing (DSP) that operates as an unintentional radiator should be exempt from any of the frequency band restrictions associated with a conventional transmitter. In a perfect world where carrier current signals do not radiate from their intended transmission line, this statement might be taken seriously. However, in the real world the signals generated by Satius’ DSP power-line transmitter will radiate quite easily with relatively low propagation loss unless extensive measures are taken to utilize the power grid as a balanced transmission line. Their statement clearly indicates that they are only concerned with the potential for interference to licensed services such as AM & FM broadcast, television, cellular radio, etc., all of which are outside the proposed frequency range for BPL. They seem to have given no consideration to the possibility that there may be licensed users within the BPL spectrum (between 2 and 80 MHz) that could be affected by their technology.

2. Comments of Satius, Inc., Page 3

PLCA

PLCA made the following statement concerning claims of interference from BPL³:

“...PLCA understands that several of its members will offer comments in this proceeding. For its part, the PLCA urges the Commission to give primary consideration to actual field tests and surveys of entities offering and testing BPL services and products. The Commission must discount speculative and self-serving comments offered by parties who seek only to hinder the deployment of BPL technology”

In response to this statement, we couldn't agree more! We would like to see the interference issue addressed in independent, rigorous field tests conducted in randomly-chosen locations that cover a wide range of potential operating environments. We would like to see these tests pass peer review so that we know that the data are valid and can be utilized in formulating equipment designs that minimize interference.

Electric Broadband

We found some of Electric Broadband's comments to be very disturbing. For example, they made the following statement⁴:

“Regarding mitigation techniques, as with any digital device, there are a variety of mitigation techniques that can be used and are being used to meet the emissions limits. As the Commission is aware, technology companies routinely employ well-established techniques to reduce unwanted emissions, ranging from simple methods such as shielding, to complex software and circuitry. Likewise, third parties must be held responsible for taking steps to mitigate their vulnerability to interference. The Commission recently recognized as much in proposing that receiver standards, not just transmitter standards, be used in order to enable more users and more technologies to share radio spectrum....”

Of all the comments we read from BPL proponents, this one was the most troubling specifically because it takes the recent FCC receiver standards NPRM completely out of context and uses it in an attempt to reduce regulation on an unlicensed service. BPL is regulated under Part 15, and as such (1) Must not cause harmful interference and (2) Must tolerate any interference it receives from licensed users⁵. The Commission never intended a Part 15 device to dictate standards for other licensed services. In addition, even if we accept Electric Broadband's comments as written, they still have no merit, because a receiver cannot reject interference that is present on-channel. While there are complex

3. Comments of the PowerLine Communications Association, Page 2

4. Comments of Electric Broadband, Page 6

5. FCC Part 15.5 (a) and 15.5 (b). 15.4 (a) of the rules clearly indicates that an intentional or unintentional radiator has no vested or recognizable right to continued use of any frequency just because the equipment is certified. Section (b) clearly indicates both intentional and unintentional radiator must not cause any harmful interference.

schemes such as spread spectrum that can mitigate some of the effects of on-channel interference, existing users in the 2-80 MHz range may not be authorized to use these interference mitigation techniques, nor may they have the bandwidth to do so even if it was allowed. This statement from Electric Broadband should serve as a red flag that the BPL industry is completely out of touch with the reality of the interference they may cause and their responsibility under FCC Part 15 to eliminate such interference.

In another portion of their filing, Electric Broadband made this statement⁶:

“While it may appear counterintuitive, higher emissions limits for BPL may tend to minimize the impact on other users. Higher limits would enable electric utilities and their service partners to construct BPL systems at lower expense and with higher throughput. This would enable them to sign up more customers faster. The sooner they do, the sooner they will extend fiber to serve those customers, converting increasing portions of their systems from RF to photonic technology.”

By making this statement, it's clear that Electric Broadband sees the power line infrastructure as an expedient intermediate in the process of providing a ubiquitous universal Internet connection, rather than the end of this process. Yet BPL stands to leave a legacy behind it--a legacy of poorly used, interference-generating equipment and an HF spectrum rendered useless in the areas where BPL was deployed. If BPL were truly a nascent technology capable of revolutionizing the world on Internet connectivity, it might well be worth the cost to the HF spectrum. Instead, the BPL industry is publicly stating that there are better ways to achieve a universal Internet connection.

Phonex Broadband Corporation

Phonex was one of the few BPL proponents who acknowledge the need for protection to incumbent users. In their filing, they stated the following⁷:

“Phonex recognizes the need for protecting licensed radio users from harmful interference.

The current FCC Part 15 Rules already specify the radiated limits for carrier current and digital devices. In addition to specifying limits, Section 15.5 of FCC Part 15 Rules specifies that operation of such devices are on the condition that no harmful interference is caused. FCC Part 15 Rules therefor already in place to control interference potential and legally stop its use when a device is causing harmful interference.”

What Phonex does not address is the reality of mitigating interference from Part 15 devices. For example, if BPL causes interference to an amateur station, shortwave broadcast receiver, etc., what mechanism will be in place to require the utility supplying the BPL service to correct the problem? Based on the utility companies less than stellar record

6. Comments of Electric Broadband, Page 9

7. Comments of Phonex Broadband Corporation, Pages 2 and 3

of resolving interference complaints from basic aspects of their physical infrastructure such as dirty insulators, corroded connections, etc., we are left wondering how they could possibly address far more complex interference issues such as those caused by BPL. And who will make the determination as to what constitutes harmful interference? Will BPL operators claim that as long as they are within the Part 15 radiated emission limits they are not causing harmful interference, even if they render communications useless on some (if not all) frequencies within the bandwidth of BPL?

Summary

One common theme concerning interference was noted in virtually all the comments filed by BPL proponents, that being that they felt Part 15 adequately protects spectrum users. We would like to point out that Part 15 was never intended to protect spectrum users from a broadband technology such as BPL. Part 15 was originally intended to limit emissions from point-source devices, such as receiver local oscillators and the like. When BPL is deployed, the power grid will serve as a massive antenna array, and within many urban areas there will be no escape from the interference to sensitive receivers in the 2-80 Mhz range. The emission limits allowed by Part 15 are well above what's required to create substantial interference to sensitive receivers, such as those used by the amateur service.

While BPL proponents are quite willing to rely on Part 15 to define what they consider to be the allowable radiated noise floor for BPL, very few of these same proponents acknowledge that the rules also require a Part 15 operator to take steps beyond simply meeting emission limits. Part 15 also requires an operator to take all steps necessary to eliminate harmful interference to licensed services. For the most part, it appears that the BPL industry has no interest in observing this portion of Part 15, because such compliance would be contrary to their business case. Instead, we see one example (Electric Broadband) of a BPL proponent that is actually trying to place the burden of interference mitigation on the affected licensed users, effectively reversing the entire spirit and intent of Part 15 to suit their purposes. The Commission is reminded that Part 15 devices are unlicensed, and as such have no right under the existing rules to place any burden on affected users. The mere fact that this was suggested should cause the Commission to question the BPL industry and the way they plan to interface with licensed services when interference issues arise.

In conclusion, the comments of BPL manufacturers and industry consortia seem far more concerned with putting money quickly into the appropriate pockets than they are with ushering in a pioneering new technology. We applaud and encourage the Commission's interest in promoting new and robust communications technology. However, the regulation of an RF-based service such as BPL must be carefully crafted to support the need for usable access to this unique portion of the radio spectrum by incumbent licensed users.

Respectfully Submitted,

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