

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

DOCKET FILE COPY ORIGINAL

In the Matter of)

AMENDMENT OF PART 15 REGARDING)
NEW REQUIREMENTS AND)
MEASUREMENT GUIDELINES FOR)
ACCESS BROADBAND OVER POWER)
LINE SYSTEMS)

ET Docket No. 04-37

RECEIVED

To: The Commission

APR - 1 2005

**REPLY TO OPPOSITIONS
TO PETITION FOR RECONSIDERATION**

Federal Communications Commission
Office of Secretary

ARRL, the National Association for Amateur Radio, also known as the American Radio Relay League, Incorporated (ARRL), by counsel and pursuant to Section 1.429(g) of the Commission's rules [47 C.F.R. § 1.429(g)], hereby respectfully submits its Reply to the Oppositions of Ambient Corporation (Ambient) and the United Power Line Council (UPLC) to the Petitions for Reconsideration filed in this proceeding.¹ Both Oppositions defend the Commission's *Report and Order*² in the captioned proceeding. In reply to the arguments set forth in the Ambient and UPLC Oppositions, ARRL states as follows.

1. Ambient's Opposition is little more than a report on the development of its own BPL hardware. It suggests, however, that the *Report and Order* has provided an "important incentive for continuing study" of enhancements in the capabilities of Access

¹ ARRL is contemporaneously filing a separate Consolidated Reply to the Opposition filed by Ameren Energy Communications, Virginia Electric and Power Company, and Tucson Electric Power Company (AEC/VEPCO/TEPC); the Opposition of Homeplug Power Line Alliance (Homeplug); and the Opposition of Intellon Corporation (Intellon). ARRL is also separately and contemporaneously submitting a reply to the Opposition filed by Current Technologies LLC, which addresses different or additional arguments.

² Carrier Current Systems, including Broadband over Power Line Systems, *Report and Order*, ET Docket No. 04-37, 19 F.C.C.R. 21,265 ("*Report and Order*").

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BPL as well as its “interference mitigation capabilities”. Ambient attaches its March 3, 2005 progress report relative to its test systems operated pursuant to an Experimental License, WD2XEQ. It apparently is of the view that its test operations are a “success” in terms of last-mile competitive access and “public safety” needs of utilities in maintaining the power grid.³ Ambient states that the Commission’s goal in this proceeding should be to “ensure that its interference protection rules and policies do not inadvertently hinder development and deployment” of BPL capabilities.

2. Ambient’s priorities and spectrum manners are evident not only in this last statement, but as well in its atrocious record of harmful interference and unresponsiveness to verified interference complaints in its BPL test operations. Attached hereto as *Exhibit A* is the most recent iteration of a necessarily repeated interference complaint involving Ambient’s test site at Briarcliff Manor, NY. The interference to Amateur Radio communications at that site has been unresolved for a period of an **entire year**. Ambient has proven unable or unwilling to resolve the interference problems cooperatively.⁴ Interference throughout the Amateur 14.0-14.35 MHz band in certain parts of the system persists after repeated complaints, despite a Commission staff visit to the site after many months. Ambient’s Opposition indicates exactly what its actions demonstrate in its BPL deployment to date: Ambient believes that the potential future benefit of BPL justifies whatever harmful byproduct there is in terms of interference to

³ ARRL cautions any utilities making use of this technology for protection or regulation of the power grid that reliance on BPL systems is clearly misplaced and dangerous. BPL is not protected from interference and is therefore not reliable as a means of regulation of the power grid. Even low levels of transmitted RF energy have been shown in ARRL tests to disrupt BPL packets, and at power levels typical of licensed mobile transmitters, the packets are precluded entirely.

⁴ In fact, Ambient has utilized the technique of receiving an interference complaint about a particular segment of a BPL installation, notching that segment, and then reporting to the Commission that it cannot verify the problem. But for the personal observations of the interference at the Briarcliff Manor BPL test site that Ambient later denied, the scheme would not have been exposed.

licensed radio services. Ambient's test operations forms an obvious, empirical rebuttal to the Commission's baseless assertion in the *Report and Order* that BPL has a "low" interference potential, and its erroneous presumption that BPL providers have some "incentive" to remedy BPL harmful interference when it occurs. Both of these fundamental premises have proven false.

3. Ambient touts the Commission's list of what Ambient calls "protections" from interference. Those interference mitigation techniques are, as discussed in ARRL's Petition for Reconsideration, either inapplicable to BPL interference to Amateur Radio, or ineffective in dealing with the fundamental incompatibility between geographically proximate BPL systems and Amateur Radio stations. They are an illusion. Ambient restates the Commission's improper "balancing test" between the predicted future "public benefits" of BPL and the "concerns of licensed users". There is no balancing to be done in the case of compatibility between unlicensed devices and licensed radio services. Unlicensed devices are not entitled to operate if they cause harmful interference to licensed radio services, and they cannot be authorized at all, consistent with Section 301 of the Communications Act of 1934, as amended, if they have, as does BPL, a significant interference potential to licensed services. The record, fairly read (including the Commission's own field studies, which were kept carefully under wraps until after the release of the *Report and Order*), conclusively establishes that incompatibility.

4. UPLC's Opposition is inconsistent. It first suggests, at page 1, that the *Report and Order* "struck the right balance between protecting against potential interference and promoting the public interest in BPL deployment." That, as discussed above, the Commission did not do, nor should it have. It is an improper test in considering whether

or not to authorize an unlicensed device or system. The premise of Part 15 is that such devices and systems, in order to be consistent with Section 301 of the Communications Act, should have no substantial interference potential.⁵ In *Restricted Radiation Devices*, 13 RR 1543 (1956) the Commission held that:

Part 15 is based on the rationale that if radiation can be kept within certain fixed limitations, a general assumption can be made that such operations will normally not cause interference to interstate communications or otherwise will have interstate effects bringing such operations within the purview of those which must be licensed under Section 301 of the Communications Act. Accordingly, it is the Commission's position that these operations, as long as they do not exceed certain radiation limitations and do not in particular situations cause actual interference, may lawfully be carried on without a license.⁶

Id., at 1544.

Shortly thereafter, in *Low Power Communication Devices*, 13 RR 1546e (1957), the Commission noted that the establishment of radiated emission levels sufficiently low to prevent instances of interference to licensed services and the

⁵ Section 301 of the Communications Act requires licensing precisely to avoid interference *ab initio*, rather than on a case-by-case basis *post hoc*, such as through so-called "mitigation" techniques. Section 302(a) of the Communications Act gives the Commission jurisdiction to establish reasonable regulations governing interference potential of devices, but that jurisdiction does not detract from or modify the absolute obligation of Section 301 to license devices for the transmission of energy or communications or signals by radio. Furthermore, Section 302(a) was enacted for the specific purpose of allowing FCC to regulate interference potential of the devices or systems at the manufacturer or pre-deployment stage, rather than when the devices and systems are embedded in the field. It is clear from the legislative history of that statutory provision that Congress expected FCC to exercise that jurisdiction to limit interference potential, not to address the enforcement of interference from RF devices and systems in the field, which long ago was determined to be unworkable. The impracticality of post-deployment enforcement of the non-interference provision in Section 15.5 of the Commission's rules is the other reason why the Commission cannot authorize certain Part 15 devices and systems. BPL operators have no appreciation for their obligation to cease operation of the systems in the event of interference to a licensed radio service, and every reason to deny that they are causing preclusive or other harmful interference.

⁶ Section 301 of the Communications Act of 1934, as amended states, in relevant part, that:

No person shall use or operate *any apparatus* for the transmission of energy or communications or signals by radio...except in accordance with this Act *and with a license in that behalf granted* under the provisions of the Act.

prevention of interference (rather than the mitigation of it after the fact) was the *sine qua non* of authorizing unlicensed RF devices:

The Commission recognizes that in permitting operation without an individual license, the user must be required to take precautionary measures in order to minimize the likelihood of interference to the authorized radio services. Such precautions, in fact, constitute the foundation for the regulation of restricted radiation devices.

That case dealt with precisely the same circumstances that the Commission has created in the instant docket proceeding. The Commission rejected the suggestion that maximum radiation limits should be viewed as “norms” which require a supplemental cooperative program of interference elimination between the operator of an interfering low power device and an interfered with licensed service. That regulatory scheme was appropriate for consideration in adopting rules for interactions between and among licensed services, the Commission held, but it could not, irrespective of the merits of such a plan, be fitted into the framework of Part 15 of the rules, which determine the conditions under which no license will be required under Section 301 for the operation of RF devices. The fixed maxima of radiation for the various devices are the limits of radiation at which they can generally be expected to operate without, by their interference potentials, affecting interstate and foreign commerce. The additional requirement that they do not cause interference is in recognition of the fact that even at appropriately and extremely low radiated emission limits, they will in some special circumstances cause interference and thus their continued unlicensed operation would be illegal under Section 301. So, obviously, the Commission’s “balancing test” applied with respect to BPL, is improper. The future possible public benefits in unlicensed BPL systems are irrelevant under Section 301.

5. UPLC then shifts its argument. It claims at page 2 of its filing that the Commission balanced the “potential for interference against the magnitude of the risk of its occurrence.” That is still not a reasonable test for unlicensed devices, as discussed above, but in fact that is not what the Commission did. It did not, for example, ever determine the real “potential for interference.” It merely assumed that such potential would be low, and in making that assumption, it was forced to ignore its own undisclosed field measurements, which compelled the contrary conclusion as a technical matter. It also had to completely disregard the empirical results of NTIA’s field measurements, which were extensive, and which determined that the risk of interference was substantial. The NTIA study, released April 27, 2004 even established that access BPL systems created vast interference contours, which were voluminous. That Report⁷ concludes that at current Part 15 levels, the interference contour of Access BPL systems to land vehicle, boat, and fixed stations receiving moderate to strong desired radio signals in the frequency range 1.7-80 MHz is likely in areas extending to 30 meters, 55 meters and 230 meters respectively. Where the desired signal strength is low to moderate (as is the case with Amateur HF communications), the interference contours extend to distances extending to 75 meters, 100 meters and 460 meters from the power lines.⁸ Further, interference to aircraft reception of moderate to strong desired radio signals is likely to occur at heights up to 6 km altitude within 12 km of the center of the BPL deployment.⁹ A reading of the NTIA and FCC’s own findings would lead a reasonable person who has not prejudged the BPL interference issue based on preconceived policy determinations to

⁷ See, *Potential Interference from Broadband over Power Line (BPL) Systems to Federal Government Radiocommunications at 1.7-80 MHz*, NTIA Technical Report 04-413 (Phase 1 Study) released April 27, 2004.

⁸ *Id.*, Executive Summary, at p. vi.

⁹ *Id.*

conclude that these interference contours are far too large. It would also have to conclude that the interference potential of BPL in the extraordinarily sensitive HF and low-VHF bands is prohibitively high.

6. As to the “magnitude of the risk of its occurrence” this is exactly the same concept as the potential for interference to licensed services. Assuming that what UPLC meant to argue was that the Commission balanced the likelihood of interference against the seriousness of the interference to licensed services if it does occur, the Commission did not balance that either. ARRL showed at Exhibit C of its Petition for Reconsideration that the NTIA graphs included in NTIA’s letter of September 13, 2004, reprinted in ARRL’s Reconsideration Exhibit C (and which were cited by the Commission in the *Report and Order*), showed that the probability of harmful interference at 4 MHz from BPL operation is essentially 100 percent at distances up to 200 meters from a BPL-carrying power line, increasing to 400 meters at 20 MHz and continuing at that distance through 30 MHz. This means that at those distances, the likelihood of harmful interference to Amateur Radio operations is 100 percent in the Amateur 3.5, 7, 10, 14, 18, 21, 24 and 28 MHz bands, all of which are heavily occupied with Amateur communications 24 hours per day, 7 days per week. Because of the proximity of Amateur stations to power lines, the risk of interference to the Amateur Service from BPL is extremely high, and the amount of communications degradation is well beyond what could be tolerated by licensed radio Amateurs. Experiences at test sites validate the NTIA data.

7. UPLC claims that it was not necessary for the Commission to require advance consultation by BPL system operators with Amateur Radio operators because “implicitly

BPL operators have every incentive to consult in advance with local licensees.” Its sole citation of authority for this absurd premise is that BPL is unlicensed and must not cause harmful interference. However, a BPL operator has a far greater incentive to merely deny that there is any interference, harmful or otherwise, and so far, the Commission has given every indication that it will indulge them. Furthermore, in the next paragraph, UPLC asks that the Commission delete the requirement that BPL operators eliminate the advance notice requirement upon commencement of operation. It is readily apparent that the BPL operators would prefer not to allow radio Amateurs to make any baseline measurements of ambient noise prior to BPL startup. That is the only way to objectively measure the degradation of the HF environment due to BPL, other than on-off tests after the fact. On-off tests are not required by the rules where interference complaints arise. Neither do BPL operators have any intention of consulting in advance with local licensees. They are asking the Commission to eliminate the only advance notice requirement to those same licensees that might trigger a dialog with them before the spectrum pollution begins.

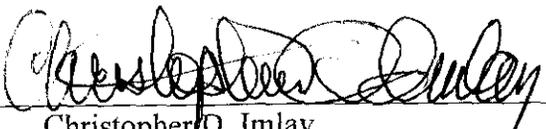
8. Finally, UPLC asserts, without any attempt at justification, that “claims of interference from BPL are speculative” and that restricting BPL operations in other bands (besides the government bands that are excluded by the *Report and Order*) “will impair BPL performance and discourage its deployment.” The first contention is patently false. There is nothing speculative about the interference complaints. Every complaint filed by ARRL has been thoroughly validated and ARRL stands squarely behind every allegation made in every unadjudicated complaint filed with the Commission to date. If the BPL “industry” really believes that the “interference complaints are speculative” in the face of the overwhelming evidence of harmful interference at test sites to date, there can be no

prediction that they can be relied on to address interference complaints as they arise, if this flawed technology somehow finds a foothold in the marketplace. The simple answer experienced to date is that it cannot. As to the alleged harm to the BPL industry from the exclusion of Amateur allocations, UPLC cannot offer any evidence of it. The rebuttal, however, is easy: Current Technologies' BPL system makes no use of HF Amateur allocations and uses the Homeplug standard.¹⁰ Its system is apparently not "impaired," nor does its configuration "limit BPL deployment." UPLC's claim is frivolous.

Therefore, for all of the above reasons, ARRL, the National Association for Amateur Radio, again requests that the Commission reconsider, rescind and re-study in further proceedings the rules governing Access Broadband Over Power Line systems in accordance with ARRL's Petition for Reconsideration, and in this case specifically, consistent with the issues discussed hereinabove.

Respectfully submitted,

**ARRL, THE NATIONAL ASSOCIATION FOR
AMATEUR RADIO**

By: 
Christopher D. Imlay
Its General Counsel

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April 1, 2005

¹⁰ The HomePlug standard, however, does not exclude the Amateur 5 MHz allocations and the interference potential remains in that band.

EXHIBIT A

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**RE: Interference Complaint, Ambient Corporation
 Broadband Over Power Line System at Briarcliff
 Manor, New York; Request for Cessation of Operation
 Pursuant to Experimental Authorization WD2XEQ,
 File No. 0050-EX-ML-2003.**

Gentlemen:

I have Mr. Franca's letter dated February 10, 2005, concerning the December 17, 2004 and January 7, 2005 letters from this office, on behalf of ARRL, the National Association for Amateur Radio, also known as the American Radio Relay League, Incorporated (ARRL). The December, 2004 and January, 2005 ARRL correspondence followed an ARRL October 12, 2004 complaint of interference and request for an instruction by the Commission to Ambient Corporation to cease the unlawful operation of a Broadband over Power Line (BPL) trial system located in Briarcliff Manor, Westchester County, New York, on power lines owned and operated by Consolidated

Edison. Mr. Franca's letter necessitates further response, and ARRL renews its request that this BPL system be shut down without further delay.

Mr. Franca's letter first discusses the harmful interference reported in ARRL's December 17, 2004 correspondence, and cites Mr. Alan Crosswell's interference complaints over various periods extending back to March of 2004. The letter claims that Commission staff engineers conducted tests at the Briarcliff Manor site and confirmed interference on the 14 MHz band. Ambient claimed that Mr. Crosswell thereafter noticed a reduction in noise in the 14 MHz band, due to alleged notching of the BPL noise in that segment. ARRL and Crosswell, in the meantime, had reported BPL interference appearing in the 3.5 MHz Amateur band.

Your letter next asserts that, in response to ARRL's December, 2004 and January, 2005 complaints, Commission engineers, on January 18, 2005, conducted monitoring on 14.275 MHz at the BPL site, making measurements at three locations: 333 North State Road, 465 North State Road, and the intersection of North State Road and Chappaqua Road. In addition, they allegedly monitored the 1.3 mile stretch of North State Road which included three BPL locations. No "significant signals" were noted on 14.275 MHz, your letter states, and none approaching the levels stated in the ARRL letters on that frequency. Using a 14 MHz whip antenna, reportedly, the signal levels were between -100 dBm and -94 dBm. Equivalent S-meter readings are, your letter states, S-4 to S-5.

The letter concludes that there were no BPL signal levels observed, or effects, which "appeared to have the potential" to seriously degrade, obstruct or repeatedly interrupt mobile amateur communications at the specified locations, and therefore you conclude that no changes are required to the BPL system at Briarcliff Manor.

Leaving alone your conclusion (which we believe to be substantially flawed) that an S-4 to S-5 signal level or minus 100 dBm of BPL noise in a good quality Amateur Radio HF receiver is not sufficient to seriously disrupt, degrade, obstruct or repeatedly interrupt Amateur Radio communications, your letter requires a response in other respects. A reasonable reader of your letter would erroneously conclude that a comprehensive evaluation of the interference potential at Briarcliff Manor had been undertaken; it would further appear that ARRL's demonstration of interference, the measurements taken by ARRL staff, and the interference complained of by Mr. Crosswell were insubstantial because they were allegedly not verified by Commission staff on January 18, 2005. Neither conclusion would be accurate.

First of all, as in prior cases where the Commission allegedly visited BPL test sites to evaluate Part 15 compliance or interference complaints (none of which has apparently resulted in any Commission remedial action with respect to any BPL system) no one from the Commission has ever contacted the complainant. Mr. Crosswell was in this instance never consulted or asked to accompany any Commission staff person in connection with the measurements allegedly conducted on January 18, 2005 or otherwise. Had that been done, it would have clearly expedited the review, and there would be no questions of fact left unaddressed. The ongoing interference from the Ambient BPL

system at Briarcliff Manor along Dalmeny Road (which has been complained of to the Technical Research Branch, OET since September of 2004) which persists to the present time, would have been measured. As it stands, that did not occur.

Second, it is clearly not reasonable to have measured only the 14.275 MHz frequency. As is the case with many BPL systems, attempts at remedial "notching" or cessation of use of a band segment merely moves the interference to another segment. Alternatively, the "notching" by the BPL system operator is incomplete, and portions of the band notched remain victim of preclusive interference. Your Technical Research Branch has known of interference within the entire 14.000-14.350 MHz band since early in 2004.

Third, your letter would seem to lead the reader to conclude that there was no interference, but fails to acknowledge that the December interference complaint was verified by a member of the Commission's staff. Riley Hollingsworth, Esquire, of the Commission's Enforcement Bureau. Mr. Hollingsworth personally visited the site in December and witnessed the interference complained of in the ARRL's December, 2004 complaint. He reported his experience to your staff. There is no reference to that fact in your letter. That Ambient Corporation, after the ARRL complaints but before the Commission's visit may have made some modifications of the Briarcliff Manor system before your staff visit on January 18, 2005 is a fact nowhere mentioned by Ambient or in your letter. The simple fact is that in December of 2004, ARRL staff measured interference-level BPL emissions at distances three-fourths of a mile from a BPL modem at Briarcliff Manor. One would have hoped that the investigation of the complaint would have involved both the complainant and measurements at both areas cited in the multiple and repeated complaints, rather than just one.

Your staff apparently did not visit the location in Briarcliff Manor, where harmful interference levels were cited, which was along Dalmeny Road. ARRL staff had, in December of 2004, measured BPL interference levels at 14 dB over ambient noise levels. Was there some reason that only part of the interference area was visited? Or was Dalmeny Road visited by your staff in January? If so, we would like to know the results of that inspection.

ARRL Laboratory staff revisited the Briarcliff Manor site on February 18, 2005, after the December, 2004 and January, 2005 complaints. At the locations your staff measured, along North State Road, the system is operating at a reduced signal level from that measured in December of 2004. For some distance in that area, approximately 100 meters along a power line, there remain emissions which would substantially preclude Amateur communications. Along Dalmeny Road, however, the interference is still present at levels essentially unchanged from those measured in December of 2004. ***The interference from BPL emissions appear throughout the 20-meter Amateur band along Dalmeny Road.*** ARRL is constrained to note that, had the Commission contacted the complainant (or, alternatively, ARRL, whose technical staff would have been, and would be, pleased to accompany Commission staff in their investigation at Briarcliff Manor at

any time convenient to the Commission) the interference levels would have been demonstrated.

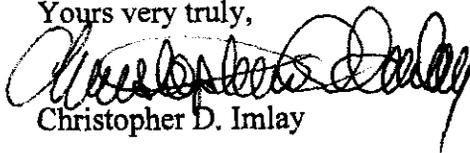
The Commission's failure to conduct a thorough investigation of this matter, and the tenor of your February 10, 2005 letter, lead to speculation that the Commission is really not interested in finding the interference that exists at Briarcliff Manor or at other BPL test sites or in enforcing the Part 15 rules. Ambient's apparent tactic of making changes in the system after receiving interference complaints and then denying that the interference problems complained of ever existed is not helpful. Neither was the notable refusal of Ambient's engineer to participate with ARRL in a demonstration of the interference at Briarcliff Manor while on-site there in December, 2004. It appears that Ambient is unwilling or unable to effectively address interference from its system. It further appears that the Commission, for policy reasons, is unwilling to objectively evaluate the interference problems that BPL systems inevitably cause. It is not possible, however, for the Commission or Ambient to deny the ongoing, serious interference problems at Briarcliff Manor. A member of the Commission's Enforcement Bureau staff personally witnessed it at both locations complained of in December of 2004, and ARRL prepared a video recording of the interference, which was uploaded to the ARRL web site, and the URL reported to you in our letter of January 7, 2005. Your February 10, 2005 letter, however, makes no reference to either fact.

Most recently, on March 11, 2005, ARRL laboratory staff again visited the Briarcliff Manor test site. As is shown by the attached engineering statement, the emissions from the system along Dalmeny Road continue to contribute 14 dB of degradation of ambient noise in the 14 MHz Amateur band. Furthermore, at the substation located in the 100 block of Woodside Avenue, the RF emission levels from the BPL system were measured at between 20 dB over the Commission's Part 15 permitted levels.

Based on the foregoing, ARRL again restates its insistence that the Commission enforce its rules and shut this non-compliant system down without further delay. The refusal to do so highlights the completely arbitrary and baseless findings in the Commission's Report and Order in Docket 04-37.

Kindly address all communications on this subject to the undersigned counsel, except that any further investigation of the Briarcliff Manor system should include the participation of Mr. Alan Crosswell, a local complainant.

Yours very truly,



Christopher D. Imlay

cc: George Y. Wheeler, Esquire
(via U.S. Mail)
Riley Hollingsworth, Esquire, FCC

EXHIBIT A

Interference Assessment and Field Strength Measurements Made in Briarcliff Manor, NY: March 11, 2005

Report prepared by: Ed Hare, ARRL Laboratory Manager, w1rfi@arrl.org

1. Background

1.1 In a series of email correspondence with the FCC in the Fall of 2004, Alan Crosswell, a licensed operator in the Amateur Radio Service, N2YGK, filed complaints with the FCC about interference to operation of his mobile amateur station in various parts of Briarcliff Manor, NY. This interference has conclusively been demonstrated to be caused by the operation of the broadband over power lines (BPL) system. This system is operated by Con Ed, the local electric utility company, Earthlink, the involved ISP and Ambient, the manufacturer of the BPL equipment. This system is being operated under a nationwide experimental license issued to Ambient, WD2XEQ.

1.2 Although Ambient has attempted on several occasions to resolve this interference, to date, it has not completely eliminated interference from this system. Each attempt to mitigate the interference either falls short of the mark, or simply moves interference from one amateur band to another.

1.3 On February 18, 2005, strong interference from this system on the 20-meter amateur band was found by Ed Hare, the ARRL Laboratory Manager. This interference was also witnessed by a member of the FCC Enforcement Bureau staff. ARRL filed a subsequent formal complaint of harmful interference to the system. Ambient responded to the FCC, indicating that it could not find any interference on the 20-meter amateur band. The FCC subsequently investigated this system and did not find interference along North State Road, one of the locations for which interference reports had been filed. There apparently was no inspection of the interference noted along Dalmeny Road.

2. Present Status of the BPL system in Briarcliff Manor, NY

2.1 On March 11, 2005 Mr. Hare went to Briarcliff Manor to assess the interference levels present at that date. He found that along most of North State Road, at this time, no strong BPL signals were heard in Amateur spectrum. Some weak BPL signals were heard at various points along this road, but at lower levels than previously witnessed. These weak signals in the 20-meter amateur band were most evident in the 100 block of North State Road. In quiet locations, these signals could be sufficient to disrupt communications in the Amateur Radio Service, but this location is near two shopping plazas, with a relatively high level of ambient noise.

2.2 In the fall of 2004, ARRL had also provided information to the FCC about measurements made along Dalmeny Road. These measurements showed 14 dB of

degradation of the local ambient noise levels at that location. These were reported as harmful interference to amateur spectrum by Mr. Crosswell. Measurements made by Mr. Hare on March 11 confirmed that the degradation to communications along Dalmeny Road is essentially unchanged from the earlier measurements. The interference Dalmeny Road was also witnessed by the member of the FCC Enforcement Bureau staff in February.

3. Use of Amateur Spectrum in Briarcliff Manor, NY

3.1 Mr. Hare also drove ARRL's mobile measurement set through various locations in Briarcliff Manor. ARRL's present findings in Briarcliff Manor show that the BPL system there is still using Amateur spectrum. Along Chappaqua Road and Fuller Street, for examples, ARRL found that the BPL system was operating at "full legal limit" on the 60-meter and/or 17-meter Amateur bands. Fixed or mobile Amateur operation on this spectrum in these areas would be impossible due to the very strong local BPL signals resulting in received signal levels in excess of -100 dBW (S9+).

3.2 In the spectrum reshuffle needed to eliminate interference on one or more amateur bands in one section of town, interference has been created in other amateur bands in other sections of town. Normal mobile amateur operation on any spectrum the BPL system is using is no longer possible in these areas and there is no practical way to eliminate such harmful interference without continuing the shuffling of problems from one area or amateur band to another.

4. Part-15 Emissions Limits Are Exceeded by the BPL System in Briarcliff Manor.

4.1 The source of the weak BPL signals heard in the 100 block of North State Road was traced to the nearby electric utility substation located along Park Road. Mr. Hare noted that the BPL signal strength along Woodside Road running past the substation was extremely high in the un-notched spectrum it was using. At a location just across from the substation, along a public road bordered by houses and small business, Mr. Hare made measurements of the BPL signal strength. The road in this location is narrow, so these measurements were made 5 meters horizontally from the power lines, using a calibrated loop antenna located on the roof of the mobile test vehicle (1.5 meters in height). The power lines are estimated to be at a height of 10 meters at this location. This is a slant-range distance of 9.9 meters to the power line.

4.2 A field strength at the measurement location of as much as 68 dBuV/m was observed. This is the strongest BPL signal measured to date by ARRL staff. Extrapolated at 20 dB/distance decade, this is a field strength of 58.4 dBuV/m at 30 meters¹. During testing, this spectrum was simultaneously monitored with a separate receiver and the signals heard were positively identified as Ambient/DS2 BPL. No over-the-air signals could be identified in the spectrum where the BPL signal was strong.

¹ Extrapolated at 40 dB/distance decade, this is a field strength of 48.7 dBuV/m.

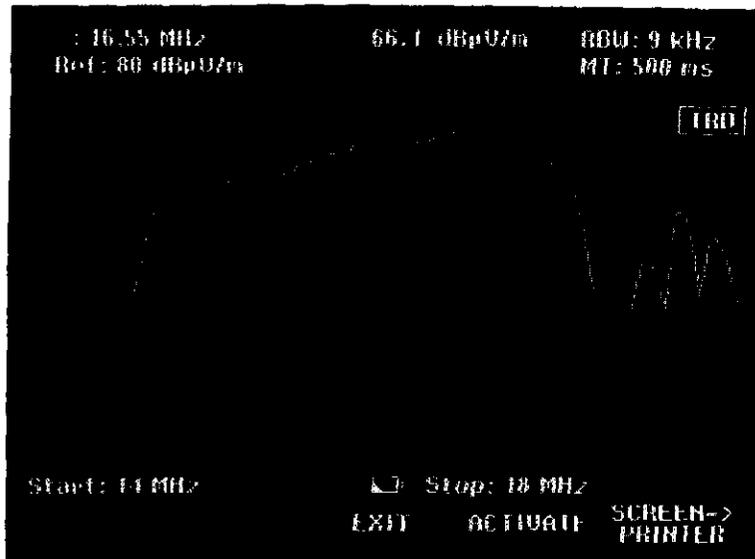


Figure 1 – This sweep of 14 to 18 MHz was taken on the street across from the Con Ed substation containing the head end for the BPL system in Briarcliff Manor, NY. These data include the antenna factors of the AH Systems 563B active loop antenna used to make the measurements. The measurement was made in a 9 kHz bandwidth with a CISPR quasi-peak detector. Depending on distance extrapolation used, this system exceeds the FCC limits by at least 20 dB.

1:19:05	INSTRUMENT STATUS	1:59:12 AM
Instrument	: FS123 100170	
Start Frequency	: 14 MHz	
Stop Frequency	: 18 MHz	
Reference Level	: 80 dBµV/m	
Reference Offset	: 0.0 dB	
RF Attenuator Setting	: 0 dB	
Preamplifier	: On	
Dynamic Range	: Low Distortion	
RF Input Reference	: 50 Ohm	
Resolution Bandwidth	: 9 kHz (CISPR)	
Video Bandwidth	: 3 MHz	
Measurement Time	: 500 ms	
Trace Mode	: Clear / Write	
Detector	: Quasi Peak	
Trigger Mode	: Free Run	
Trigger Level	:	
Trigger Delay	:	
External Reference	: Disabled	
Transducer	: AH563B	
Transducer (dB)	:	

Figure 2 – This shows the configuration of the Rohde and Schwarz spectrum analyzer during the testing show in Figure 1.

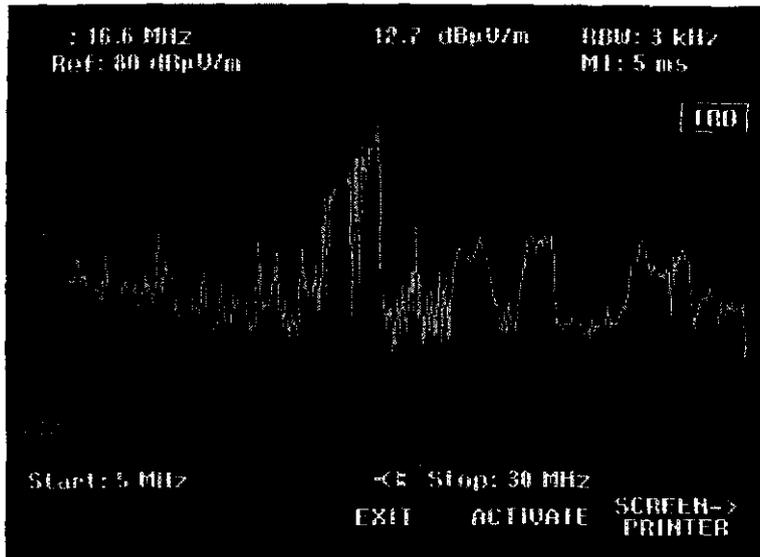


Figure 3 – This shows the spectrum between 5 and 30 MHz at the test location. These data were taken in a 3 kHz bandwidth with a peak detector. In addition to the extremely strong BPL signals seen at this location, other BPL signals from elsewhere in the system are also observed near 20, 22 and 27 MHz.

1/19/96	INSTRUMENT STATUS	10:21:22 AM
Instrument	: ESH23 400478	
Start Frequency	: 5 MHz	
Stop Frequency	: 30 MHz	
Reference Level	: 30 dBµV/m	
Reference Offset	: 0.0 dB	
RF Attenuator Setting	: 0 dB	
Preamplifier	: On	
Dynamic Range	: Low Distortion	
RF Input Reference	: 50 Ohm	
Resolution Bandwidth	: 3 kHz	
Video Bandwidth	: 3 MHz	
Measurement Time	: 5 ms	
Trace Mode	: Clear / Write	
Detector	: Peak	
Trigger Mode	: Free Run	
Trigger Level	:	
Trigger Delay	:	
External Reference	: Disabled	
Transducer	: AH563D	
Transducer (dB)	: --	

Figure 4 – This shows the configuration of the Rohde and Schwarz spectrum analyzer during the testing show in Figure 3.

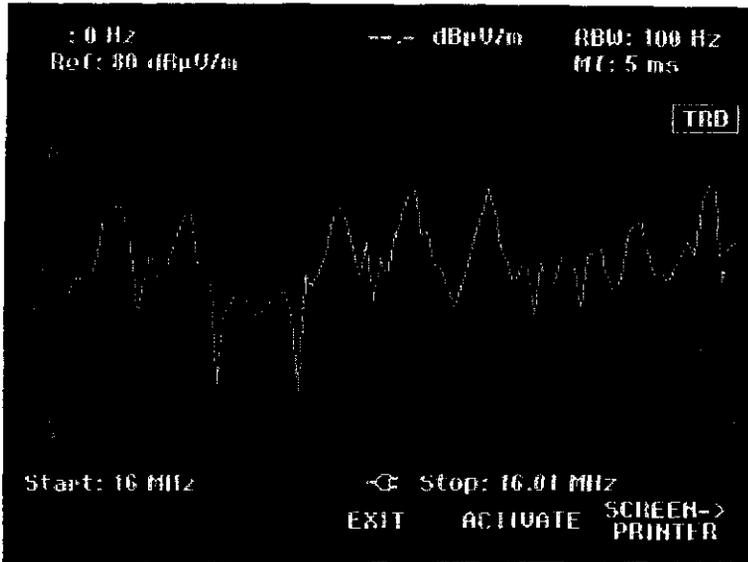


Figure 5 – This spectral display of a 10 kHz span shows the characteristic 1.1-kHz spaced carriers seen in DS2-based modems and BPL systems.

1/19/05	INSTRUMENT STATUS	10:21:22 AM
Instrument	: FSH23 - 100478	
Start Frequency	: 16 MHz	
Stop Frequency	: 16.01 MHz	
Reference Level	: 80 dBuV/m	
Reference Offset	: 0.0 dB	
RF Attenuator Setting	: 0 dB	
Preamplifier	: On	
Dynamic Range	: Low Distortion	
RF Input Reference	: 50 Ohm	
Resolution Bandwidth	: 100 Hz	
Video Bandwidth	: 3 MHz	
Measurement Time	: 5 ms	
Trace Mode	: Clear / Write	
Detector	: Peak	
Trigger Mode	: Free Run	
Trigger Level	: ---	
Trigger Delay	: ---	
External Reference	: Disabled	
Transducer	: AH563B	
Transducer (dB)	: ---	

Figure 6 – This shows the configuration of the Rohde and Schwarz spectrum analyzer during the testing show in Figure 5.

5. Test Equipment Used

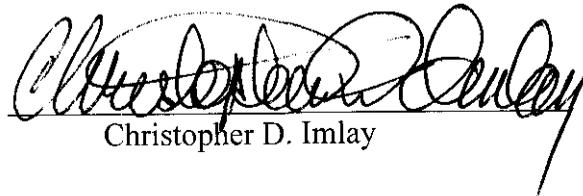
Rohde and Schwarz FSH2 Spectrum Analyzer with EMC Option	New
AH Systems SAS56B active loop antenna	March 11, 2004
Tektronix 2701 Step Attenuator	Self-calibrate January 5, 2005

CERTIFICATE OF SERVICE

I, Christopher D. Imlay, do hereby certify that I caused to be mailed, via first class U.S. Mail, postage prepaid, a copy of the foregoing **REPLY TO OPPOSITIONS TO PETITIONS FOR RECONSIDERATION**, to the following, this 1st day of April, 2005.

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