

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

In the Matter of)
)
AMENDMENT OF PART 15 REGARDING) **ET Docket No. 04-37**
NEW REQUIREMENTS AND)
MEASUREMENT GUIDELINES FOR)
ACCESS BROADBAND OVER POWER)
LINE SYSTEMS)

To: The Commission

**REPLY TO OPPOSITIONS
TO PETITION FOR RECONSIDERATION**

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*”).

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 Report ⁷ 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,

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