

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

In the Matter of)	
)	
CARRIER CURRENT SYSTEMS)	ET Docket No. 03-104
INCLUDING BROADBAND OVER)	
POWER LINE SYSTEMS)	
)	
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 OF ARRL, THE NATIONAL ASSOCIATION FOR AMATEUR RADIO
TO OPPOSITION OF THE EDISON ELECTRIC INSTITUTE AND THE UTILITIES
TELECOM COUNCIL TO PETITION FOR RECONSIDERATION**

ARRL, the national association for Amateur Radio, formally known as the American Radio Relay League, Incorporated (ARRL), by counsel and pursuant to Section 1.429 of the Commission’s rules (47 C.F.R. §1.429), hereby submits its Reply to the *Opposition of the Edison Electric Institute and the Utilities Telecom Council to the Petition for Reconsideration of ARRL, the National Association for Amateur Radio* (the “Opposition”) filed on or about July 17, 2012. Therein, the Edison Electric Institute (EEI) and the Utilities Telecom Council (UTC) principally concern themselves with ARRL’s argument that full-time notching of Amateur allocations by unlicensed Broadband over Power Line (BPL) systems must be required pursuant to revised Part 15 rules. In addressing this main point, EEI/UTC make some startling allegations, none of which is supported by the record in this proceeding. By way of brief reply, ARRL states as follows:

1. EEI/UTC argue that ARRL's Petition for Reconsideration of the Commission's Second Report and Order¹ rehashes arguments raised before and rejected by the Commission. Thus, they claim, ARRL's Petition is procedurally flawed. Their argument seems to be that because ARRL has not submitted "new evidence" its Petition should be dismissed pursuant to 47 U.S.C. § 405(a)(2). EEI/UTC substantially misread the statute, however. That section addresses only the issue of whether and when a petition for reconsideration is a prerequisite for judicial review. There is nothing procedurally infirm about ARRL's Petition. ARRL, surely enough, has been forced to reargue a number of issues throughout this proceeding repeatedly. It has had no choice but to do so, since the Commission has consistently avoided them and has failed to acknowledge that which ARRL knows to be fact and which the record in this proceeding amply bears out: (1) that BPL is a significant interference source vis-à-vis Amateur Radio stations absent full-time mandatory notching of Amateur bands; (2) that the present rules have no effect on, and in most respects no application to, BPL interference to Amateur Radio; and (3) that the Commission has demonstrated that it is unable or unwilling to remedy *post hoc* those interference instances that have occurred.

2. It is difficult to address the EEI/UTC Opposition because it consists in the main of unsupported statements parroting the 2nd R&O that are belied by the record, none of which rebut the specific points made in ARRL's Petition for Reconsideration. However, there are some statements that call for rebuttal. EEI/UTC say that ARRL cannot have it both ways: ARRL cannot argue that Access BPL is a failed technology but at the same time insist that BPL has a substantial interference potential. In fact, there is no inconsistency: Access BPL is thus far a failed technology as a broadband delivery mechanism, putting the lie to all of the outlandish

¹ *Second Report and Order* (the 2nd R&O), FCC 11-160, released October 24, 2011, 76 Fed. Reg. 71892 *et seq.*

claims made by the Commission for years that BPL was the “third pipeline to the home.”² However, the flawed and inadequate rules that the Commission has enacted that purport to regulate BPL are still in place, and the technology can be used for smart grid control and for in-premises applications, if nothing else. In each and every deployment at which a BPL company did not notch Amateur Radio allocations, there has been interference. This interference has not been resolved by any Commission action at any deployment whatsoever. At the more than thirty deployments that ARRL staff have visited and measured, many systems have been operating with excessive radiated emissions. Complaints are filed with the Commission but they have been consistently allowed to languish for years at a time.³ Presumably, EEI, UTC and Current Group LLC envision some potential future applications for Access BPL; otherwise there is no reason for their participation in this proceeding at this point. If so, and if there is ever any resurgence in Access BPL, be it for power grid communications or otherwise, the rules will have to be changed in order to insure compatibility with incumbent radio services.

3. Among the most outlandish statements⁴ made by EEI/UTC is the sweeping generality on page two of its Opposition, that the “FCC’s approach of mitigating BPL interference through

² Yet, most recently, at Paragraph 14 of the 2nd R&O, the Commission claimed that it has in this proceeding “established a regime of rules for Access BPL systems that will provide a robust environment for the development and deployment of this important (sic) new (sic) technology.” It also claimed, based on the profoundly inaccurate BPL database, that there are 125 BPL systems operating in the United States. ARRL challenges the Commission to specify which of those 125 BPL systems are actually operational at the present time.

³ The most recent example of this is ARRL’s December 10, 2010 interference complaint with respect to an IBEC system in southwestern Virginia. ARRL staff inspected this system prior to the interference complaint and again in November of 2011. The inspections revealed that the system was not notched on either Amateur frequencies or on United States government frequencies, in continued violation of the Commission’s unenforced rules. In the year and a half since the complaint was filed, the Commission has done nothing whatsoever in response to it. Yet, in the 2nd R&O in this proceeding at paragraph 15, the Commission stated that the stated objective of the BPL rules is to ensure “...that any instances of harmful interference that may occur can be quickly identified and resolved.” It is unclear how much longer than one and a half years the Commission considers a quick response to an instance of harmful interference.

⁴ EEI/UTC also argue that ARRL has been opposed to Access BPL “since FCC first proposed it” and has sought rules that “would prevent its deployment or at least cripple it.” *This is absolutely false*, as anyone who had read any of ARRL’s filings in this proceeding would know. ARRL has consistently noted that it is not opposed to BPL; it is opposed only to BPL interference. One reason why BPL has not succeeded is because of the obvious interference potential that exists under the present rules. As ARRL has said repeatedly and consistently, if full-time notching of

notching individual frequencies rather than the entire Amateur band has been proven effective and has been enforced by the FCC.” None of this statement is true in any respect whatsoever. There *is no* FCC approach of mitigating BPL interference through notching individual frequencies. No notching is required; only the capability of doing so has ever been required. How the claimed FCC approach is “effective” is not explained, because in the BPL deployments that were not notched on all Amateur bands, there has been reported interference and it has not been resolved other than by the BPL system shutting down of its own accord. And there has been no enforcement action by the Commission that has had any effect on any interference complaint or any complaint of overpower operation, *even where the offending emissions are on United States government frequencies on which no BPL emissions are permitted.*

4. EEI/UTC claim that the Commission, having previously refused to implement full-time Amateur band notching, need not now revisit the matter. However, EEI/UTC misperceive the Commission’s post-remand obligation in this proceeding. The United States Court of Appeals for the District of Columbia Circuit⁵ instructed the Commission to disclose the previously hidden documents on which the Commission relied, and to provide an opportunity for public comment on them. The documents included interference analyses resulting from field tests of BPL installations conducted by the Commission’s own Technical Branch staff. The content of the finally released documents clearly invalidated the Commission’s prior, consistent contentions that the rules governing Access BPL were sufficient; and that Access BPL operating in accordance with those reaffirmed rules has only a “small” risk of harmful interference that can be managed and corrected as needed on a case-by-case basis. Because these prior Commission findings were clearly invalidated by these studies (on which the Commission said it relied), a

Amateur bands to a reasonable notch depth is implemented, the Amateur Service will be somewhat better protected against BPL interference and ARRL can “get out of the way.”

⁵ *American Radio Relay League, Inc. v. FCC*, 524 F.3d 227 (D.C. Cir. 2008).

regulatory solution was called for. The comments submitted in response to the *Request for Further Comment and Further Notice of Proposed Rule Making*⁶ post-remand in this docket proposed such, including full-time Amateur band notching. Full-time notching is a win-win solution⁷ to the presently inadequate BPL rules. It is a solution that flows directly from the FCC's test results of BPL deployments that were finally disclosed by Court order. Yet, the Commission did not agree to do this in the 2nd R&O. The Commission never provided a logical explanation why Amateur stations, located in residential areas in very close proximity to overhead power lines⁸ in grid configurations throughout entire municipalities should not be protected from BPL interference, while at the same time those services which are routinely located outside residential areas, typically much farther from overhead medium voltage power lines than are Amateur stations, are protected *ex ante* by full-time, full band notching requirements. The Commission's illogical refusal to protect the licensed radio service with the greatest expectation of and need for interference protection from Access BPL in the 2nd R&O (when at the same time full time, all Amateur band notching is already an industry standard and is not a burden on any BPL deployment at all) makes it fair for ARRL to argue the point on Reconsideration. Disparate treatment of licensed radio services is arbitrary and capricious on its face, given the record in this proceeding.⁹ There is a more compelling case for full-time notching

⁶ *Request for Further Comment and Further Notice of Proposed Rule Making*, FCC 09-60, 24 FCC Rcd. 9669, 74 Fed. Reg. 42631, released July 17, 2009.

⁷ It is a win-win because the majority of BPL systems have implemented full-time, all-Amateur-band notching. It therefore cannot be argued that it is a burden on BPL systems to have to do so (to a reasonable notch depth) by rule as a means of protecting the Amateur Service.

⁸ The Commission's Technical Research Branch concluded that 53 percent of Amateur Radio operators who responded to an ARRL survey reported that their antennas were located within 30 meters of an overhead medium-voltage power line, and 31% reported that their antennas were within 15 meters of an overhead power line. There is no intervening attenuation of the BPL signal before it reaches the outdoor, high-gain Amateur Radio antenna, typically in the same or a higher horizontal plane as the power line. This makes EEI/UTC's argument at page 5 of their Opposition that there is "significant variability in propagation below 30 MHz" which "probably affected many of ARRL's own measurements as well as the studies it cited" appear rather absurd.

⁹ It is impossible to rationalize the implicit finding of the Commission that protection of Amateur Radio communications from interference is somehow accomplished by the adopted rules without full time full-band

of Amateur bands than there is for any other service in terms of preventing interference from Access BPL systems. Because the 2nd R&O concluded otherwise, it is certainly ripe for discussion on reconsideration.

5. In its non-specific, unsupported contention that the interference potential of BPL is “low and manageable,” EEI/UTC claim that the Commission in the 2nd R&O “balanced the risk of interference against the public interest in the promotion of BPL.” Assuming *arguendo* that the Commission did that (rather than merely denying the interference potential of BPL despite overwhelming evidence to the contrary from its own staff) there was *never any need* to balance those two factors. Promoting BPL can easily be done while at the same time protecting the Amateur Service. BPL interests are not prejudiced one *iota* by implementing a full time notching requirement. Nowhere in the four corners of EEI/UTC’s Opposition can the argument be found that a rule requirement for full-time notching (to a notch depth of at least the 25 dB that the 2nd R&O ordered that such systems be universally *capable* of implementing) is the *least bit* burdensome or preclusive for any BPL system. The reason for that is that notching Amateur bands is now an industry practice and standard adopted by most (but not all) members of the industry. There is no justification, therefore, for an argument that promotion of BPL need be balanced against interference protection for the Amateur Service. Both can be accomplished at the same time.

6. We are far past the point that EEI/UTC can credibly argue that BPL has a “low and manageable” interference potential absent full time Amateur band notching. Even the Commission grudgingly concluded at paragraph 14 of the 2nd R&O that there is “some” potential

notching, while protection of other licensed services necessitates such notching. Those other services (1) are typically located further away from power lines; (2) use receivers of considerably less sensitivity than Amateur receivers, and (3) typically utilize desired received signals with signal strengths higher than those of the Amateur Service.

for interference to licensed radio services within “short” distances from power lines radiating BPL emissions. The NTIA Phase 1 BPL study made it clear that the interfering signal ranges of BPL signals, even if operated at normal Part 15 levels, are excessive.¹⁰ The Commission’s technical branch concluded that interference to licensed mobile radio receivers is very likely for very long distances along a power line. The studies also show that systems operating at the Part 15 emission limits will be 25-35 dB stronger than the median values of man-made noise at 30 meters distance.¹¹ The United Kingdom’s Office of Communications (Ofcom)¹² concluded in 2010 that if demand increases, there will be *a high probability of interference* to some existing spectrum users at both HF and VHF by 2020 if BPL device features do not change from those currently implemented; and that over the next 5 to 10 years, *users of sensitive radio systems may increasingly suffer interference from BPL devices* unless within this timescale, “*in addition to the existing practice of notching [Amateur] bands,*” interference mitigation features such as power control and smart notching are implemented in BPL devices.

7. EEI/UTC claim that the Commission adequately explained away its Technical Branch’s studies (which are completely at variance with the conclusions in the 2nd R&O) rings hollow. The Court of Appeals held that the Technical Branch’s studies were relied on by the Commission in adopting its BPL rules.¹³ EEI/UTC, however, claim that ARRL drew different

¹⁰ The NTIA study concluded that, at current Part 15 radiated emission levels, the interference contour of Access BPL systems to land vehicle, boat, and fixed stations receiving low to moderate desired radio signals in the frequency range 1.7-80 MHz is likely in areas extending to 75 meters, 100 meters and 460 meters from the power lines respectively. 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.

¹¹ The radiated emission limits for BPL are as much as 25 dB greater than the generally accepted median levels of ambient noise in typical residential environments and over 45 dB greater than the quiet rural environment that represents the more quiet times and frequencies within an Amateur band.

¹² See, *The Likelihood and Extent of Radio Frequency Interference from In-Home PLT Devices*, at <http://www.emcia.org/documents/pltreport.pdf>.

¹³ The Court held that “...the challenged orders indicate that the five staff studies were never fully disclosed for comment even though they were, according to the Commission, a central source of data for its critical determinations” (*Slip Op.* at 17) and that the studies “consist of staff-prepared scientific data that the Commission’s

and incorrect conclusions from the staff studies than did the Commission, and that the Commission had other data, such as that from its “work with the Manassas system” which showed allegedly different performance characteristics than those systems that ARRL had found to be interference sources.¹⁴ That cryptic explanation suggests that the Commission had some other data on which it relied but which it did not disclose. Since the Commission admitted that it relied on the Technical Branch studies, and since the studies speak for themselves¹⁵ with respect to the high interference potential from BPL to Amateur Radio, it is impossible to evaluate what some other, still-undisclosed findings of the Commission might have shown.

8. EEI/UTC quote the Commission to say that full time notching was not necessary because either “propagation conditions limit the range of the Access BPL emissions or else there is no licensed Amateur station present and operating on the frequencies on which such emissions appear.” Though there are areas where at any given time there are no Amateur stations operating, the argument ignores the ubiquitous nature of Amateur Radio. The location of Amateur stations is never static, and the BPL operator cannot know where an Amateur station will be located and operating at any given time. There is *always* the potential for interference from a BPL system that is not notched on Amateur bands, at significant distances from power lines carrying BPL. At any given location, Amateur stations are likely to be located within the substantial interference distance from an overhead power line carrying BPL. As to the argument that interference will

partial reliance made ‘critical factual material’.” (*Id.*) As well, the Court held that “[i]t would appear to be a fairly obvious proposition that studies upon which an agency relies in promulgating a rule must be made available during the rulemaking in order to afford interested persons meaningful notice and an opportunity for comment.... Where, as here, an agency’s determination ‘is based upon a complex mix of controversial and uncommented on data and calculations, there is no APA precedent allowing an agency to cherry-pick a study on which it has chosen to rely in part.” (*Slip Op.* at 15).

¹⁴ The inspection of the Manassas system by FCC staff was spotty and incomplete and was not done in conjunction with ARRL technical staff. Radio amateurs residing in Manassas continued to suffer interference to mobile Amateur communications through large portions of the town for more than two years. The Commission took no action to resolve it and only the commercial failure of the system resolved the interference there.

¹⁵ Among other things, the Technical Branch found that there was virtually no decay of a BPL signal 230 meters from a coupler along the power line.

somehow be propagation limited, within typical distances between power lines and Amateur stations, the NTIA Phase I study put the lie to that.¹⁶

9. ARRL need not debate with EEI/UTC the issue of notch depth. Notch depth is meaningless as an interference mitigation tool unless and until there is full-time, all-Amateur-band notching required in the rules (and unless and until there is some meaningful enforcement of the BPL rules as modified). The increase from 20 dB to 25 dB of notch depth is still far below what the state of the art allows, which is closer to 30-35 dB. The statement by EEI/UTC that the increase “fails to satisfy ARRL” is correct, because the increased requirement is an illusion. It accomplishes nothing except to allow the Commission to claim that it has done something to address the severe interference potential of BPL systems that do not notch Amateur bands all the time. In fact, it has to date done nothing to address the root problem with the BPL rules, or to enforce the non-interference requirement of the Part 15 rules. EEI/UTC, at footnote 21 of their Opposition quote the Commission’s ridiculous finding that BPL operators have a “strong incentive” to take steps to ensure that they avoid causing interference to local radio services, including Amateurs. IBEC was cited as one of the companies that took effective steps to do this. IBEC, however, falsely represented to ARRL that it was notching all Amateur bands full time. It ceased doing so at various locations and interference resulted at those locations. If the Commission imposes full-time mandatory notching of Amateur bands in the BPL rules, the 25

¹⁶ The Commission, at paragraph 43 of the 2nd R&O, states that it “acknowledge(s) ARRL’s point that the modeling in the *NTIA Phase 1 Study* predicts that Access BPL emissions on frequencies below 30 MHz that are at the Part 15 limit would raise the mobile radio noise floor at 15 MHz and 25 MHz by 30 dB in 59% of residential locations.” However, the Commission claims that the noise level varies by location. The same NTIA study predicted that the interference contour of a BPL system to a fixed Amateur station trying to receive low-to-moderate signals at HF (the normal situation) could expect to receive interference at a distance of 460 meters — a distance of nearly five football fields — from the power lines, even assuming that the BPL devices met the radiated emission limits in existing Part 15 regulations. ARRL’s experience and extensive field investigations, many of which have been reported to the Commission, are entirely consistent with this finding.

dB notch depth will be more helpful than was the former 20 dB requirement. If it does not, the change is meaningless.

10. Conversely, EEI/UTC's argument concerning the 40 dB/decade of distance extrapolation factor is largely a non-issue if the Commission modifies the BPL rules to require full-time notching of Amateur bands. ARRL will address this issue in its reply to the Current Group, LLC and the HomePlug Powerline Alliance Oppositions. However, it should be noted that ARRL did not "insist" on a 20 dB/decade factor, or any other number. ARRL "insisted" only on a scientifically valid number. The Commission has yet to recognize, however, that there is no good science supporting a 40 dB/decade extrapolation factor at distances in the region beyond wavelength/2Pi of distance from radiating BPL systems. Rather, in that region, the accurate extrapolation factor is closer to 20 dB/decade.

Therefore, for all of the above reasons, ARRL, the national association for Amateur Radio, again respectfully requests that the Commission reconsider and modify the rules governing Access Broadband over Power Line systems in accordance with ARRL's Petition for Reconsideration.

Respectfully submitted,

**ARRL, THE NATIONAL ASSOCIATION FOR
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CERTIFICATE OF SERVICE

I, Christopher D. Imlay, do hereby certify that I caused to be served, via electronic mail a copy of the foregoing **REPLY TO OPPOSITION TO PETITION FOR RECONSIDERATION** to the following, this 27th day of July, 2012.

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