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**6712-01**

**FEDERAL COMMUNICATIONS COMMISSION**

**47 CFR Parts 15**

**[ET Docket No. 04-37 and 03-104; FCC 13-53]**

**Broadband Over Power Lines**

**AGENCY:** Federal Communications Commission.

**ACTION:** Final rule.

**SUMMARY:** This document addressed a petition for reconsideration filed by the national association for Amateur Radio, formally known as the American Radio Relay League (ARRL). ARRL seeks reconsideration of the Commission's Second Report and Order in this proceeding relating to Access Broadband over Power Line (Access BPL) systems. The Commission concludes that its previous decisions in this proceeding strike an appropriate balance between the dual objectives of providing for Access BPL technology -- which has potential applications for broadband and Smart Grid uses -- while protecting incumbent radio services against harmful interference.

**DATES:** Effective **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

**FOR FURTHER INFORMATION CONTACT:** Anh Wride, Office of Engineering and Technology, 202-418-0577, [Anh.Wride@fcc.gov](mailto:Anh.Wride@fcc.gov).

**SUPPLEMENTARY INFORMATION:** This is a summary of the Commission's Second Memorandum Opinion and Order, ET Docket No. 04-37 and 03-104, FCC 13-53, adopted April 16, 2013 and released April 17, 2013. The full text of this document is available for inspection and copying during normal business hours in the FCC Reference Center (Room CY-A257), 445 12th Street, SW., Washington, DC 20554. The complete text of this document also may be purchased from the Commission's copy contractor, Best Copy and Printing, Inc., 445 12<sup>th</sup> Street, SW., Room, CY-B402, Washington, DC 20554. The full text may also be downloaded at:

www.fcc.gov. People with Disabilities: To request materials in accessible formats for people with disabilities (braille, large print, electronic files, audio format), send an e-mail to fcc504@fcc.gov or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (tty).

### **Summary of Report and Order**

1. In the Second Memorandum Opinion and Order (BPL Second MO&O), the Commission addressed a petition for reconsideration filed by the national association for Amateur Radio, formally known as the American Radio Relay League (ARRL). ARRL seeks reconsideration of the Commission's Second Report and Order (BPL Second Order) in this proceeding relating to Access Broadband over Power Line (Access BPL) systems. The Commission concludes that its previous decisions in this proceeding strike an appropriate balance between the dual objectives of providing for Access BPL technology -- which has potential applications for broadband and Smart Grid uses -- while protecting incumbent radio services against harmful interference. The Commission denies the ARRL petition for reconsideration; it does not raise new arguments based on new information in the record or on the Commission's new analysis of limited points as directed by the Court, nor does it demonstrate any errors or omissions in the Commission's previous decisions.

2. In its Petition, ARRL again requested that the Commission modify the Access BPL rules to adopt mandatory, full-time notching of all amateur radio allocations (amateur bands), this time requesting notch depths of at least 25 dB. It bases this request on its contention that the Commission should acknowledge: 1) the unique and substantial interference potential of Access BPL systems relative to amateur radio HF communications; 2) the inapplicability and/or inadequacy of the BPL rules with respect to amateur radio interaction; 3) the clear necessity of mandatory, full-time notching by Access BPL systems of amateur radio allocations to notch depths of at least 25 dB; and 4) the absence of any negative effect on BPL systems of the obligation to maintain full-time notching of amateur bands. As discussed and as supported by the

record, ARRL makes these arguments based on the same reasoning and facts that the Commission considered and disposed of previously in the BPL First Order, the BPL First MO&O, and the BPL Second Order. The Commission, again, is unpersuaded by ARRL's arguments and denies its Petition.

3. Throughout this proceeding and in its judicial appeal, the ARRL has argued that more restrictive technical standards are needed to protect the amateur radio service from interference caused by radiofrequency (RF) emissions from Access BPL systems. The Commission has specifically rejected as unnecessary these repeated requests by ARRL for tighter emissions controls on Access BPL operations, more stringent interference mitigation measures, and requirements for avoidance of BPL operations in the amateur bands.

4. The only changes adopted in the BPL Second Order were minor adjustments to the rules as proposed in the BPL RFC/FNPRM. Specifically, the Commission: 1) modified the rules to increase the required notch filtering capability for systems operating below 30 MHz from 20 dB to 25 dB; 2) established a new alternative procedure for determining site-specific extrapolation factors, and 3) adopted a definition for the "slant-range distance" used in the BPL measurement guidelines to further clarify its application. As indicated, the Commission also explained its rationale for and affirmed its use of a 40-dB-per-decade extrapolation factor for frequencies below 30 MHz.

5. ARRL is not specifically requesting reconsideration of these minor modifications to the rules that were adopted in the BPL Second Order. Rather, ARRL is reiterating its previous request for mandatory full-time permanent notching of all amateur radio allocations, which the Commission considered and rejected in the BPL Second Order. In support of this request, ARRL makes several arguments, which the Commission considered sequentially.

6. First, ARRL disagrees with the Commission's analyses and conclusions on the staff studies and their bearing on the adequacy of the Access BPL rules. ARRL argues that in the BPL Second Order the Commission discounts its own study conducted by its Technical Research

Branch (TRB) by mischaracterizing the results and by attempting to distance itself from TRB's studies and recommendations. The Commission notes that in the BPL Second Order, the Commission discussed this issue at length, and explained its rationale with respect to each point of this same argument that ARRL first raised in its comments to the BPL RFC/FNPRM. ARRL makes no new argument here. ARRL here contends that TRB's studies (i.e., all of the 2003 and 2004 field studies and the July 2009 released documents) used scientifically valid methodologies and the Commission did not rebut them as a technical matter. ARRL specifically did not agree with the Commission's assessment in the BPL Second Order regarding the video files of the now-defunct BriarCliff Manor experimental BPL system (BriarCliff Manor video#5) recorded on August 17, 2004 that were part of the released July 2009 staff materials. In this regard, the Commission notes that it explained in detail the particulars of that experimental BPL system and the reasons why it did not rely on TRB's technical findings, stating that "...it does not appear that any of the mitigating features that are required in the rules had been applied to this experimental BPL system" [at the time the video clip was made.] In particular, the Commission noted that "our staff did contact the licensee about interference from that system several times over the course of its operation and the operator took steps first to cease operation on the amateur frequencies and then to install new equipment that had notching capability. Subsequent examination of that system by field agents of our Enforcement Bureau (EB) found no interference, which substantiates the effectiveness of our rules when properly observed." The Commission further observed that it pointed out with in-depth analyses in the BPL Second Order that it simply did not draw the same conclusions from the released studies and materials as ARRL did, and that "in some cases, ARRL simply (and incorrectly) draws different conclusions from the ...[staff studies and] presentations than we do." ARRL has made no new argument with respect to this contention that was not already considered and disposed of in our earlier decisions.

7. ARRL also repeats its disagreements with the Commission's assessment of the nature of Access BPL technology. It questions the Commission's reasons for not imposing conducted

emission limits on Access BPL and instead atypically imposing only radiated emission limits. It contends that according to several BPL standards, the actual conducted emission level for BPL is approximately 30 dB higher than the conducted emission levels for other part 15 devices that are not carrier current systems. Note that the Commission discussed this issue in the BPL First Order in which it explained that because Access BPL signals are transported on medium voltage power lines of up to 40,000 volts, there would be extreme safety issues for test personnel involved in connecting test equipment that would have to be able to measure conducted emissions in such high voltage lines. This determination is now long-since established and ARRL did not submit any new information in its reconsideration petition here.

8. ARRL also argues that the BPL Second Order did not address why the emission limits for BPL are set at levels as much as 25 dB greater than the generally-accepted median levels of ambient noise in typical environments and more than 45 dB greater than the quiet rural environment that represent the more quiet times and frequencies within an amateur band. The Commission notes that the emission limits for Access BPL are the same as the general emission limits in § 15.209 of the rules for other part 15 intentional radiators, which have been in existence in various forms for over 50 years; furthermore, as was discussed in the BPL Second Order, “to minimize the potential for harmful interference, facilitate its resolution where it may occur, and address cases where it’s possible occurrence could impact critical services, the Commission adopted additional regulatory measures beyond the emissions limits in the part 15 rules.” With regard to the ambient noise levels (noise floor), the Commission discussed these issues at length in the BPL Second Order and provided additional protection for all licensed services, including amateur service, by requiring an increase of 5 dB in the notching capability of Access BPL systems.

9. ARRL disagrees with the Commission’s conclusion in the BPL Second Order that BPL systems increase the noise floor only within a relatively short distance (15-400 meters) from the power lines; it complains that this “unquantifiable increase in noise floor” is apparently not

acceptable to the Commission when the victim operates in a U.S. Government frequency band (e.g., aeronautical service) but is acceptable when the victim is an amateur radio station. ARRL argues that this treatment of different licensed radio services is arbitrary and capricious on its face. The Commission notes here that in both the BPL First Order and the BPL Second Order, the Commission discussed at length the reasons for its decision to designate only certain frequencies used by “critical” Federal Government services as recommended by NTIA, as being excluded from Access BPL usage (only 2% of the spectrum within the 1.7-80 MHz band qualify as excluded frequencies.) Although ARRL has repeatedly requested to have all amateur HF and VHF allocations be included with critical Federal Government services, the Commission found, and still finds, that amateur radio frequencies do not warrant the special protection afforded to frequencies reserved for international aeronautical and maritime safety operation. In this regard, the Commission notes that amateur frequencies are generally used for routine communications and hobby activities, notwithstanding the fact that amateurs may on occasion assist in providing emergency communications. The Commission finds that the recently released information in the staff unredacted studies did not provide any new information not already known to the Commission and ARRL did not bring any new information on this issue on reconsideration.

10. ARRL next points to issues regarding the interference potential from Access BPL systems to amateur radio operations. It argues that in the BPL First Order at paragraph 39, the Commission was wrong in stating that BPL is not an efficient radiator, and that BPL interference actually permeates large areas because overhead unshielded power lines exist throughout residential areas, not just along one line of one roadway. The Commission addressed this issue in the BPL First Order, making reference to the NTIA Phase 1 Study in which NTIA agrees with the Commission that these systems are not efficient radiators, nor are their emissions cumulative such that they permeate areas in which they are located. The Commission also addressed ARRL’s repeated argument that BPL causes preclusive interference over large areas in the BPL Second Order. ARRL did not bring any new information or argument to this issue on reconsideration.

11. In requesting reconsideration of the Commission's decision to decline its request for full-time permanent notching of amateur bands in the BPL Second Order, ARRL claims that the Commission ignores the ubiquitous nature of amateur radio and such a decision completely fails to prevent interference to mobile stations. It argues that a mobile amateur station should not have to drive outside an entire city or community in order to be able to communicate. The Commission discussed the issue of mobile communications in detail along with the variability of levels in HF communications, stating in part that "...the significant variability in background noise levels limits the reliability of HF signals below 30 MHz such that BPL emissions at...[the limit required in the rules]...should not generally be considered harmful interference;" however, "to take a more conservative approach [the Commission] decided to provide additional protection to mobile stations by increasing the required notch depth from 20 dB to 25 dB." ARRL did not bring any new information to this issue on reconsideration.

12. ARRL also states that on December 29, 2010, it submitted a BPL interference complaint jointly to the Commission's Enforcement Bureau (EB) and Office of Engineering and Technology (OET) regarding some BPL systems operated by International Broadband Electric Communications (IBEC), and on February 10, 2011, it submitted a request to OET to set aside the certification grants for the equipment used by these IBEC BPL systems. ARRL argues that because no action has been taken on these complaints, the rules should require permanent notching of amateur frequencies since post hoc enforcement of interference issues is not adequate. Over the years, the Commission has investigated and taken action on BPL complaints where it appeared that it was warranted. In the early period of BPL development, before the rules were in place and compliant equipment was in use, some of our investigations took time to complete. After the rules were established in 2004, there were fewer incidences of interference complaints and we have had cooperation from the BPL system operators to resolve them. Before the Commission could take action on ARRL's December 2010 interference complaint and February 2011 request regarding IBEC, IBEC had started the shut-down of all its BPL operations,

making investigation of its operations as they related to the complaints moot. This anomalous case cannot be extrapolated to conclude that the Commission does not have the capability and/or readiness to enforce its BPL rules. To the contrary, the Commission has diligently investigated previous complaints about interference from BPL systems.

13. ARRL further disagrees with the Commission's assumption in the BPL Second Order that the BPL operator has a strong incentive to voluntarily utilize full notching of the amateur bands in the vicinity of amateur radio operators for interference mitigation unless full-time permanent notching of amateur bands throughout a BPL system is required by the rules. The Commission reiterates here, to the contrary, that "[g]iven that identification and resolution of harmful interference can involve expenditures of staff time and resources for Access BPL providers and possibly the temporary disruption of service to their subscribers, these providers have a strong incentive to take a priori steps to ensure that they avoid causing interference to the local radio services, including amateurs". ARRL has not provided a basis for reconsideration of this position. As for ARRL's complaint that IBEC BPL systems in operation in North Carolina, Virginia and Pennsylvania at one time did voluntarily notch amateur bands but stopped doing so, IBEC and other operators were not obligated to notch, or continue to notch, the amateur bands on a full-time, system-wide basis. The Commission does not see a reason to consider the IBEC experience involving a single interference complaint for a system that was ultimately shut down to be a basis for imposing a mandatory notching requirement. In any event, ARRL fails to relate that in the decision which it challenges here we merely noted the likely incentive for BPL operators to notch where that provides the most efficacious approach for dealing with potential interference issues. We clearly did not rely on voluntary, full-time, system-wide notching as a basis for our rules at that time nor do we now.

14. ARRL next contends that the Commission ignored several sources that point to a high probability of interference from Access BPL to existing HF and VHF spectrum users. In accordance with the Court's mandate, the Commission analyzed all relevant information and

explained in great detail in the BPL Second Order that it is not persuaded by ARRL's technical submissions, including the reports and technical standards referenced in its numerous filings, that our assessment of the interference potential from BPL operations was incorrect or inappropriate, or that modifications to the BPL emissions limits and other technical rules to provide additional protection for the amateur service are warranted. In its instant Petition, ARRL specifically argues that the Commission did not discuss an OFCOM study on In-House BPL in our consideration of Access BPL interference potential. However, that report was not given significant weight in our deliberations because it specifically covers In-House BPL, the operating characteristics of which are significantly different from those of Access BPL and therefore render that report not substantively relevant to the issues under consideration in the present proceeding.

15. ARRL repeats its argument that the BPL database contains many errors that undermine the usefulness of the database as a tool for interference mitigation. In the BPL Second Order the Commission encouraged the database administrator, the Utilities Telecom Council (UTC) to be diligent in its management of the database and other interested parties to work with UTC in providing information to ensure that the records in the database are accurate and up-to-date, and UTC affirmed that the database has been and is being reviewed periodically to ensure that the information is currently accurate. The Commission also notes that there could be some period of time between the date a BPL operator enters information into the BPL database regarding a near-future deployment and the actual deployment date, which might depend on business conditions, financial obligations, change in business plans, etc. The Commission expressed its expectation that UTC periodically contact its BPL database members to ensure that obsolete information is removed or updated and we have counseled UTC on its obligations. While the Commission expects the BPL database to be maintained to accurately indicate the status of BPL operations, it nonetheless note that an Access BPL system that ceases to operate without updating its database information does not pose an increased potential for unanticipated interference. If any specific cases of BPL operators failing to provide information to the database

in a timely fashion as required by §15.615(a) of the Commission's rules are brought to our attention, the Commission will consider taking enforcement action as appropriate.

16. ARRL next takes issue with the alternative procedure for determining site-specific extrapolation factors for BPL systems adopted in the BPL Second Order. ARRL again complains that measurements at four points are inadequate to establish a reliable extrapolation factor. ARRL again repeats its original argument that measurements should be made along the power line for each measurement distance from that line, and that the maximum value at each distance from that line for each frequency be used for the calculation. The Commission reiterates that while it did not adopt ARRL's suggested procedure involving the number of measurement points along the power line, our new method for determining site-specific extrapolation factors follows the IEEE Standard P1775-2010 that requires measurements to be made at a minimum of four points; however, depending on the specific installation site, this method could require measuring many more data points in order to establish a straight line with a minimum 0.9 regression coefficient of multiple correlation. This multiple-point requirement and the resultant potentially numerous measurements counter ARRL's repeated concern that having measurements at "only four points" is "woefully inadequate." The Commission has analyzed and rejected ARRL's proposal in the BPL Second Order in favor of the procedure published in the IEEE Standard P1775-2010, which the Commission also noted was an improvement over current practices, and ARRL makes no new arguments here.

17. ARRL further argues that since the Commission acknowledged in the BPL Second Order that there is variability in the attenuation of emissions from BPL systems across individual sites that are not captured by a uniform extrapolation factor, full-time notching of amateur bands is called for. However, this is one of the stated reasons for which the Commission adopted the alternative procedure for determining site-specific extrapolation factors. The Commission noted that the option to use site-specific values can substantially alleviate the measurement concerns associated with the standard extrapolation factor and the variability in attenuation rates that may

be observed in the field, and particularly where measurements at a site may plainly not appear to conform to the 40-dB-per-decade standard. The Commission again observes that it has addressed ARRL's concerns with the alternative method for determining site-specific extrapolation factors at length in the BPL Second Order, and ARRL makes no new arguments here.

18. ARRL also continues to dispute the Commission's decision to retain the existing 40-dB-per-decade value for the standard distance extrapolation factor for BPL systems. The Commission discussed this issue at length in the BPL Second Order and concluded that there is no single "correct" value for an extrapolation for RF emissions from power lines due to a multitude of reasons and that there is no basis for changing from the longstanding 40-dB-per-decade standard. However, the Commission notes that by explicitly providing that "slant-range" distance is to be used in conjunction with the extrapolation factor when calculating the emission levels, the existing 40-dB-per-decade extrapolation factor produces values that are closer to what ARRL calculates using what it believes to be the correct extrapolation factor (20 dB per decade). Here, ARRL agrees with the Commission that the slant-range method may be a slight improvement over using horizontal distance, but again repeats its previous argument that radiated emission levels above the power lines are stronger than they are at near-ground levels and contends that BPL emission measurements should be made at the level of the power lines, not close to the ground as specified in the BPL Measurement Guidelines because such measurement would not capture the worst-case emissions. It also re-argues that NTIA recommended a 5 dB correction factor to address this deficiency but the Commission chose not to adopt it. The Commission disposed of the issue regarding receive antenna height and correction factor in both the BPL First Order and BPL Second Order. ARRL did not bring any new information on reconsideration here.

19. Finally, ARRL contends that there would not be any negative effect on BPL systems if the Commission were to implement full-time notching of amateur radio allocations to notch depths of at least 25 dB and therefore argues that its request would not be burdensome to the BPL

industry. The Commission does not believe that it should require all BPL systems to permanently notch specific frequencies at a certain notch depth just because the technology is capable of doing so. As stated in the BPL Second Order, to require that BPL systems permanently avoid all the amateur radio frequencies would unnecessarily restrict BPL operations and leave unused valuable Access BPL capacity in areas/locations where no amateur operations are present that could receive interference. ARRL did not bring any new information on reconsideration here.

20. In its opposition to the Petition, Current Group LLC (Current) contends that the ARRL Petition is largely a rehash of previous filings, and that the Commission should find that the Petition has failed to make a prima facie case for reconsideration and summarily deny it. Similarly, the Edison Electric Institute and the Utilities Telecom Council (EEI/UTC) argue that as a procedural matter, the ARRL's request for full-time notching of the entire amateur band has been rejected before and may not be raised again in reconsideration of the BPL Second Order. The HomePlug Powerline Alliance (HomePlug) also states that ARRL's arguments have already been fully considered by the Commission no less than three times in this proceeding and its Petition should be denied or dismissed pursuant to §1.106(p)(3) of the Commission rules. As discussed, the Commission largely agrees with these oppositions and denies the petition for reconsideration for the reasons stated.

### **Ordering Clauses**

21. Pursuant to authority contained in contained in sections 4(i), 301, 302, 303(e), 303(f), 303(r), and 405 of the Communications Act of 1934, as amended, 47 U.S.C. 154(i), 301, 302a, 303(e), 303(f), 303(r), 405, and 1.429 of the Commission's rules, 47 CFR Section 1.429, that the Petition for Reconsideration filed by ARRL IS DENIED.

22. The Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this Second Memorandum Opinion and Order, including the Final Regulatory Flexibility Certification, to the Chief Counsel for Advocacy of the Small Business Administration.

**Report to Congress**

23. The Commission will not send a copy of this Second Memorandum Opinion and Order pursuant to the Congressional Review Act, see 5 U.S.C. 801(a)(1)(A), because the Commission did not adopt any new rules here.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch,  
Secretary.

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