

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

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
	)	
Carrier Current Systems, including Broadband over Power Line Systems	)	ET Docket No. 03-104
	)	
	)	

SECOND MEMORANDUM OPINION AND ORDER

Adopted: April 16, 2013

Released: April 17, 2013

By the Commission: Commissioner McDowell not participating.

I. INTRODUCTION

1. In this Second Memorandum Opinion and Order (BPL Second MO&O), we address a petition for reconsideration filed by the national association for Amateur Radio, formally known as the American Radio Relay League (ARRL).<sup>1</sup> ARRL seeks reconsideration of the Commission’s *Second Report and Order (BPL Second Order)* in the above proceeding relating to Access Broadband over Power Line (Access BPL) systems.<sup>2</sup> We conclude that our 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.<sup>3</sup> We deny 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.

<sup>1</sup> ARRL Petition for Reconsideration of *Second Report and Order* filed on Dec. 20, 2011 (Petition). In support of ARRL’s petition, James E. Whedbee filed a pleading titled “Informal Request in the nature of a Petition for Reconsideration and Formal Comments of James Edwin Whedbee in Support of Petition for Reconsideration filed by ARRL” on Dec. 28, 2011. He requests a complete rescission of the BPL rules and did not raise any substantive issues other than those raised by ARRL and raised previously by Mr. Whedbee himself. That pleading is also denied as discussed herein.

<sup>2</sup> *Second Report and Order* in ET Docket Nos. 04-37, 03-104 (*Amendment of Part 15 Regarding New Requirements and Measurement Guidelines for Access Broadband Over Power Line Systems, Carrier Current Systems*), 26 FCC Rcd 15712 (2011) (*BPL Second Order*).

<sup>3</sup> A “smart grid” electricity network includes an intelligent monitoring system that keeps track of all electric power flowing in the system from suppliers to consumers and provides real-time or near-real-time load information to permit improved transmission management. It also can utilize two-way digital technology to control appliances at consumers’ homes to reduce peaks and even out demand, to save energy, to reduce cost, and to increase reliability and transparency.

## II. BACKGROUND

2. The Commission adopted rules for Access BPL systems in 2004<sup>4</sup> and affirmed those rules on reconsideration in 2006.<sup>5</sup> ARRL challenged the BPL rules in the United States Court of Appeals for the District of Columbia.<sup>6</sup> In *ARRL v. FCC*, the Court directed the Commission to: 1) place in the record unredacted versions of several staff technical studies which the Commission had placed in the record in redacted form and had considered in promulgating the rules; 2) provide a reasonable opportunity for public comment on those studies; and 3) provide a reasoned explanation of its choice of the extrapolation factor<sup>7</sup> for use in measuring radiated emissions from Access BPL systems. In response, the Commission placed the identified staff studies in the record *in toto* and issued a *Request for Further Comment and Further Notice of Proposed Rulemaking* in this proceeding (*BPL RFC/FNPRM*).<sup>8</sup> Subsequently, in the *BPL Second Order*, the Commission completed its action addressing the Court's concerns. In particular, considering comments responsive to previously redacted information in the studies it relied on, the Commission affirmed the BPL rules. It also: 1) further explained its rationale for the 40-dB-per-decade extrapolation factor for frequencies below 30 MHz;<sup>9</sup> 2) modified the rules to increase the required "notch filtering" capability for systems operating below 30 MHz from 20 dB to 25 dB; 3) established a new alternative procedure for determining site-specific extrapolation factors, and 4) adopted a definition for the "slant-range distance"<sup>10</sup> used in the BPL measurement guidelines to further clarify its application. As part of this

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<sup>4</sup> *Report and Order* in ET Docket Nos. 04-37, 03-104 (*Amendment of Part 15 Regarding New Requirements and Measurement Guidelines for Access Broadband Over Power Line Systems, Carrier Current Systems*), 19 FCC Rcd 21265 (2004) (*BPL First Order*).

<sup>5</sup> *Memorandum Opinion and Order* in ET Docket Nos. 04-37, 03-104 (*Amendment of Part 15 Regarding New Requirements and Measurement Guidelines for Access Broadband Over Power Line Systems; Carrier Current Systems, including Broadband over Power Line Systems*), 21 FCC Rcd 9308 (2006) (*BPL First MO&O*).

<sup>6</sup> *American Radio Relay League Incorporated, v. Federal Communications Commission*, 524 F.3d 227 (D.C. Cir. 2008) (*ARRL v. FCC*).

<sup>7</sup> Because the field strength of radiated emissions decreases with increasing distance from the emitter (due to propagation losses), an "extrapolation" factor is used to adjust measurement results to account for the difference in attenuation when measurements are made at a distance other than the standard distance specified in the rules. The extrapolation factor used in measuring radiated emissions from Access BPL systems is the same as that used with measurements of radiated emissions on frequencies under 30 MHz from other RF sources. See 47 C.F.R. § 15.31(f)(2).

<sup>8</sup> *Request for Further Comment and Further Notice of Proposed Rulemaking* in ET Dockets No. 04-37 and 03-104 (*Amendment of Part 15 Regarding New Requirements and Measurement Guidelines for Access Broadband Over Power Line Systems; Carrier Current Systems, including Broadband over Power Line Systems*), 24 FCC Rcd 9669 (2009) (*BPL RFC/FNPRM*).

<sup>9</sup> "Decade," a 10 to 1 range, refers to the ratio of the specified measurement distance to the actual measurement distance. An extrapolation factor of 40 dB per decade treats emissions as if they attenuate at a rate inversely proportional to the square of the distance from the emitter ( $1/R^2$ ). See 47 C.F.R. § 15.31(f)(2).

<sup>10</sup> Because Access BPL devices are mounted on overhead power lines and the measurement antenna is generally at a lower height closer to the ground, the actual distance from the power line to the measurement antenna is greater than the horizontal distance from the power line pole on which the BPL device is mounted to the measurement antenna. The correct distance for measurement is therefore the "slant range" diagonal distance measured from the center of the measurement antenna to the nearest point of the overhead power line carrying the Access BPL signal being measured, rather than the horizontal distance that would normally be used for measurements. Although the definition for slant-range distance was not part of the BPL rules adopted in 2004, its use was mandated in the BPL Measurement Guidelines and the concept was discussed at length in conjunction with the NTIA measurement height correction factor in the *BPL First Order*. *BPL First Order* at 21309-21310, paras. 107-110 and at 21339-21343, Appendix C. See also *BPL Second Order* at 15755, para. 88, and at 15780-15785, Appendix E.

action, the FCC also rejected ARRL's newly raised request for mandatory notching of all amateur bands at notch depths of at least 35 dB,<sup>11</sup> and found no basis that would warrant modification of the Access BPL rules or otherwise provide additional protection for the amateur radio service.<sup>12</sup>

3. ARRL petitioned for reconsideration of the *BPL Second Order*, arguing that the rules fail to acknowledge the substantial interference potential of Access BPL systems relative to amateur radio high frequency (HF) communications, and reiterating its previous request for full-time notching (frequency avoidance) of all amateur frequency allocations.<sup>13</sup> One individual amateur radio licensee, James Edwin Whedbee, filed in support of ARRL.<sup>14</sup> Four parties filed in opposition of the ARRL Petition.<sup>15</sup>

### III. DISCUSSION

4. In its Petition, ARRL again requests that we 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.<sup>16</sup> It bases this request on its contention that we 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.<sup>17</sup> As discussed below and as supported by the record, ARRL makes these arguments based on the same reasoning and facts that we considered and disposed of previously in the *BPL First Order*, the *BPL First MO&O*, and the *BPL Second Order*. We are, again, unpersuaded by its arguments and we deny its Petition.

5. 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. We have 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.<sup>18</sup>

6. 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

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<sup>11</sup> Frequency "notching" refers to the practice of frequency avoidance, where the frequency in question is "filtered out", or notched.

<sup>12</sup> *BPL Second Order* at 15725-15726, para. 29, and at 15735, para. 45.

<sup>13</sup> The HF band covers frequencies from 3 to 30 MHz.

<sup>14</sup> Comment of James E. Whedbee.

<sup>15</sup> See Opposition of Current Group, LLC (Current), Joint Opposition of the Edison Electric Institute and the Utilities Telecom Council (EEI and UTC), and Opposition of HomePlug Powerline Alliance (HomePlug).

<sup>16</sup> ARRL's previous request was for notch depths of at least 35 dB, but in light of the Commission's changes to the notch depth requirements in the BPL rules adopted in the *BPL Second Order*, it now accepts the Commission's determination with respect to notch depth while still requesting full-time notching of amateur frequencies at all locations, rather than the as-needed notching specified in the BPL rules.

<sup>17</sup> ARRL Petition at para. 21.

<sup>18</sup> *BPL Second Order* at 15714, para. 3, and at 15735, para. 45.

25 dB;<sup>19</sup> 2) established a new alternative procedure for determining site-specific extrapolation factors,<sup>20</sup> and 3) adopted a definition for the “slant-range distance” used in the BPL measurement guidelines to further clarify its application.<sup>21</sup> As indicated above, the Commission also explained its rationale for and affirmed its use of a 40-dB-per-decade extrapolation factor for frequencies below 30 MHz.<sup>22</sup>

7. ARRL is not specifically requesting reconsideration of these above 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,<sup>23</sup> which we considered and rejected in the *BPL Second Order*.<sup>24</sup> In support of this request, ARRL makes several arguments, which we will consider sequentially below.

8. 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.<sup>25</sup> We note 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*.<sup>26</sup> 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.<sup>27</sup> In this regard, we note that the Commission 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.]<sup>28</sup> 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.”<sup>29</sup> We further observe that

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<sup>19</sup> *BPL Second Order* at 15734, para. 43.

<sup>20</sup> *Id.*, at 15760-15761, paras. 98-100.

<sup>21</sup> 47 C.F.R. § 15.3(hh).

<sup>22</sup> *BPL Second Order* at 15746-15747, paras. 71-73.

<sup>23</sup> ARRL states that notch depth (25 dB or 35 dB) is not as important as full-time permanent notching of all amateur bands. ARRL Petition at fn. 10.

<sup>24</sup> *BPL Second Order* at 15735, para. 45.

<sup>25</sup> ARRL Petition at paras. 10-12.

<sup>26</sup> *BPL Second Order* at 15726-15741, paras. 30-57.

<sup>27</sup> ARRL Petition at para. 2.

<sup>28</sup> *BPL Second Order* at 15727-15728, para. 32.

<sup>29</sup> *Id.* Although in fn. 14 of its Petition ARRL continues to disagree with our findings regarding the BriarCliff Manor experimental BPL system, repeating its argument that, after the above BriarCliff Manor video clip#5 was (continued....)

we pointed out with in-depth analyses in the *BPL Second Order* that we 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.”<sup>30</sup> ARRL has made no new argument with respect to this contention that was not already considered and disposed of in our earlier decisions.

9. 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.<sup>31</sup> We 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.<sup>32</sup> This determination is now long-since established and ARRL did not submit any new information in its reconsideration petition here.

10. 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.<sup>33</sup> We note that the emission limits for Access BPL are the same as the general emission limits in Section 15.209 of the rules for other Part 15 intentional radiators,<sup>34</sup> which have been in existence in various forms for over 50 years; furthermore, as we discussed in the *BPL Second Order*, “to minimize the potential for harmful interference, facilitate its resolution where it may occur, and address cases where its possible occurrence could impact critical

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recorded on Aug. 17, 2004, our Enforcement Bureau (EB) staff responding in 2005 to interference complaints filed at the end of 2004 did not go to the location where the interference was reported, we note that the three locations our EB staff went to measure the emission levels were identified as the worst locations by the complainant, Mr. Alan Crosswell. At the location identified by ARRL as untested by EB staff (*i.e.*, along Dalmeny Road), Mr. Crosswell had reported prior to the staff’s visit that he had noticed a reduction in noise after fixes had been implemented by the BPL operator as compared to the original noise level reported. Consequently, the staff reasonably focused its attention on the other three worst locations (*i.e.*, along North State Road), rather than along Dalmeny Road. This situation was partly identified in the Feb 10, 2005 letter from Bruce Franca, FCC Office of Engineering and Technology to Chris Imlay, counsel to ARRL. We acknowledge that Ambient continued to operate at BriarCliff Manor under an experimental license for a period of time after 2005, and interference situations may have occurred as it tested trial equipment from different generations of BPL technology. This does not reflect on the efficacy of properly installed and functioning equipment that is fully compliant with our rules.

<sup>30</sup> *BPL Second Order* at 15721, para. 19.

<sup>31</sup> ARRL Petition at para. 2. Carrier current systems such as BPL use alternating current (AC) electric power lines to carry communications by coupling very low power RF signals onto the AC electric wiring. Carrier current systems are exempt from conducted emission limits in the rules. 47 C.F.R. § 15.107(c).

<sup>32</sup> *BPL First Order* at 21279-21280, para. 33 and fn. 67. The Commission explained that “conducted emissions are measured by connecting the Equipment under Test (EUT) to a Line Impedance Stabilization Network (LISN) that simulates the impedance of the power network while sourcing power to the EUT. Such a LISN would have to be capable of sourcing 1,000 volts to 40,000 volts to an Access BPL system. Furthermore, measuring instruments such as spectrum analyzers, voltmeters, etc. would also be connected to this LISN, thus high voltage hazards could affect both test equipment and test personnel.”

<sup>33</sup> ARRL Petition at para. 3.

<sup>34</sup> 47 C.F.R. § 15.209.

services, we adopted additional regulatory measures<sup>35</sup> beyond the emissions limits in the Part 15 rules.”<sup>36</sup> With regard to the ambient noise levels (noise floor), the Commission discussed these issues at length in the *BPL Second Order*<sup>37</sup> 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.<sup>38</sup>

11. ARRL disagrees with the Commission’s conclusion in the *BPL Second Order*<sup>39</sup> 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.<sup>40</sup> ARRL argues that this treatment of different licensed radio services is arbitrary and capricious on its face.<sup>41</sup> We note 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.)<sup>42</sup> Although ARRL has repeatedly requested to have all amateur HF and VHF allocations<sup>43</sup> 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, we noted 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.<sup>44</sup> We find 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.

12. 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. We note that 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.<sup>45</sup> The Commission also addressed ARRL’s repeated argument that BPL causes preclusive interference over large areas<sup>46</sup> in the *BPL Second Order*.<sup>47</sup> ARRL did not bring any new information or

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<sup>35</sup> 47 C.F.R. § 15.609-615.

<sup>36</sup> *BPL Second Order* at 15720, para. 15.

<sup>37</sup> *BPL Second Order* at 15731-15739, paras. 41-55.

<sup>38</sup> *BPL Second Order* at 15733-15734, para. 43.

<sup>39</sup> *BPL Second Order* at 15738-15739, paras. 54-55.

<sup>40</sup> ARRL Petition at para. 13.

<sup>41</sup> ARRL Petition at para. 14.

<sup>42</sup> *BPL First Order* at 21287-21288, para. 49.

<sup>43</sup> The HF band covers frequencies from 3 MHz to 30 MHz and the VHF band covers frequencies from 30 MHz to 300 MHz.

<sup>44</sup> *BPL First Order* at 21287-21288, 21289, paras. 49 and 53, *BPL Second Order* at 15729-15730, para. 37.

<sup>45</sup> *BPL First Order* at 21282-21283, para. 39 and fn. 85, NTIA Phase 1 Study, Volume 1, at 5-5 to 5-15.

<sup>46</sup> *BPL Second Order* at 15723-15724, para. 25.

argument to this issue on reconsideration.

13. 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*,<sup>48</sup> ARRL claims that the Commission ignores the ubiquitous<sup>49</sup> nature of amateur radio and such a decision completely fails to prevent interference to mobile stations.<sup>50</sup> 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. We note that 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,"<sup>51</sup> 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."<sup>52</sup> ARRL did not bring any new information to this issue on reconsideration.

14. ARRL also states that on Dec. 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),<sup>53</sup> 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.<sup>54</sup> 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.<sup>55</sup> We observe that 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. We notice that 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

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<sup>47</sup> *BPL Second Order* at 15725-15726, para. 29, stating that "...ARRL's [contentions]... are in some aspects consistent with our own assessments, in other aspects incorrect, and, importantly, in many aspects do not account for the real world conditions affecting the propagation of RF emissions at HF frequencies."

<sup>48</sup> *BPL Second Order* at 15737, para. 51.

<sup>49</sup> Were it significant to our resolution of this issue, we would note that ARRL is overly enthusiastic in characterizing amateur radio operations as "ubiquitous." According to Webster, "ubiquitous" means "existing or being everywhere at the same time; constantly encountered." <http://www.merriam-webster.com/dictionary/ubiquitous>. While mobile amateurs may potentially operate over appreciable parts of the overall landscape, there is nothing to suggest that at any given time, the cumulative geographic area in which actively operating amateur radio operations are occurring is anything other than minute; compare this to the extent of the potential area of operations of BPL that ARRL would have us significantly diminish.

<sup>50</sup> ARRL Petition at para. 16.

<sup>51</sup> *BPL Second Order* at 15733, para. 43.

<sup>52</sup> *BPL Second Order* at 15733-15734, para. 43.

<sup>53</sup> ARRL complained, *inter alia*, that these IBEC systems did not notch amateur bands nor did they notch the aeronautical bands specified in Section 15.615(f)(1), even though IBEC specified in the BPL database that the notches were implemented.

<sup>54</sup> ARRL Petition at para. 8.

<sup>55</sup> ARRL Petition at para. 16.

its BPL operations,<sup>56</sup> 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.

15. ARRL further disagrees with the Commission's assumption in the *BPL Second Order*<sup>57</sup> 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. We reiterate 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".<sup>58</sup> 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,<sup>59</sup> IBEC and other operators were not obligated to notch, or continue to notch, the amateur bands on a full-time, system-wide basis. We do 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.

16. 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.<sup>60</sup> In accordance with the Court's mandate, we analyzed all relevant information and explained in great detail in the *BPL Second Order* that we are 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.<sup>61</sup> In its instant Petition, ARRL specifically argues that we did not discuss an OFCOM study on In-House BPL in our consideration of Access BPL interference potential.<sup>62</sup> 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.<sup>63</sup>

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<sup>56</sup> IBEC suffered heavy financial loss from the April 2011 tornadoes that affected most of its BPL major coverage regions, and the final closure of all of its Access BPL operations in North America occurred in Jan. 2012. See <http://www.telecompetitor.com/ibec-shutdown-deals-latest-blow-to-bpl/>.

<sup>57</sup> *BPL Second Order* at 15740-15741, para. 57.

<sup>58</sup> *Id.*

<sup>59</sup> ARRL Petition at para. 8.

<sup>60</sup> ARRL Petition at paras. 3-4.

<sup>61</sup> *BPL Second Order* at 15754-15755, para. 87 and fn. 224.

<sup>62</sup> ARRL Petition at paras. 3-4.

<sup>63</sup> United Kingdom Office of Communications (OFCOM) Report published in June 2010 titled *The Likelihood and Extend of Radio Frequency Interference from In-Home PLT*. The report clearly states that "the focus of this study is on in-home PLT devices, which provide a network within the home, rather than access PLT devices, which provide (continued....)"



17. ARRL repeats its argument that the BPL database<sup>64</sup> contains many errors that undermine the usefulness of the database as a tool for interference mitigation.<sup>65</sup> We note that 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,<sup>66</sup> and UTC affirmed that the database has been and is being reviewed periodically to ensure that the information is currently accurate.<sup>67</sup> We also note 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, changes in business plans, etc. We expressed our 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.<sup>68</sup> While we expect the BPL database to be maintained to accurately indicate the status of BPL operations, we 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 Section 15.615(a) of the Commission's rules are brought to our attention, we will consider taking enforcement action as appropriate.

18. 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.<sup>69</sup> 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.<sup>70</sup> We reiterate that while we did not adopt ARRL's suggested procedure involving the number of measurement points along the power line,<sup>71</sup> our new method for

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a data connection to the home” and that “there is likely to be significant variation associated with differences in house wiring conventions, construction techniques and materials. The results ... need to be considered with this in mind.” OFCOM report at p. 3 and 8.

<sup>64</sup> The BPL rules require that a publicly accessible database of Access BPL systems be established for licensed users to identify BPL operations in their area before the systems commence operation so that they have an opportunity to alert the BPL operator of their presence before the system is activated. 47 C.F.R. § 15.615(a).

<sup>65</sup> ARRL Petition at paras. 6-7 and Exhibit A.

<sup>66</sup> *BPL Second Order* at 15761-15762, para. 101.

<sup>67</sup> UTC comments to *RFC/FNPRM* at p. 8. ARRL also complains that the basis for the Commission's reference in para. 57, fn. 144 of the *BPL Second Order* at 15740 to 125 zip codes rather than the 200 that it found in the BPL database is not explained. We note that UTC provided this number verbally to Commission staff, based on the fact that at that time UTC was waiting for several database members to update their information, and that the number of zip codes in operation was expected to be close to 125, once update was completed. This discrepancy is not decisionally significant.

<sup>68</sup> *BPL Second Order* at 15761-15762, para. 101.

<sup>69</sup> ARRL Petition at para. 19.

<sup>70</sup> Instead of making measurements at “each measurement distance” from (*i.e.*, perpendicular to) the power line, ARRL now slightly tweaks its original suggestion by specifying that “measurements [should be]...made at 4 horizontal distances perpendicular to the line at specified distances *along* the line, and the maximum value is used at each horizontal distance is used in the calculation.” ARRL Petition at fn. 51. This is still the same measurement principle that ARRL suggested previously. *BPL Second Order* at 15759-15760, para. 96 and fn. 248. This procedure however is not what the published IEEE Standard P1775-2010 adopted, which we ultimately prescribed.

<sup>71</sup> ARRL Petition at para. 19 and fn. 51. *See also*, *BPL Second Order* at 15760, fn. 248.

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.<sup>72</sup> 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."<sup>73</sup> 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,<sup>74</sup> which we also noted was an improvement over current practices,<sup>75</sup> and ARRL makes no new arguments here.

19. ARRL further argues that since the Commission acknowledged in the *BPL Second Order*<sup>76</sup> 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.<sup>77</sup> 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.<sup>78</sup> We again observe that we have addressed ARRL's concerns with the alternative method for determining site-specific extrapolation factors at length in the *BPL Second Order*,<sup>79</sup> and ARRL makes no new arguments here.

20. 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.<sup>80</sup> 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.<sup>81</sup> However, we note 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).<sup>82</sup> Here, ARRL agrees with the Commission that the slant-range method may be a

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<sup>72</sup> *BPL Second Order* at 15772-15779, Appendix D. If this straight-line criteria is not satisfied, measurements must be taken at multiple points away from the power lines until the criteria is met.

<sup>73</sup> ARRL Petition at para. 19.

<sup>74</sup> *BPL Second Order* at 15759-15761, paras. 96-100.

<sup>75</sup> This procedure is an improvement over the current procedure for determining site-specific extrapolation factors in Section 15.31(f)(2) of the rules, which requires only two measurement points without any specific separation distance. 47 C.F.R. § 15.31(F)(2). *See also*, *BPL Second Order* at 15760-15761, para. 99.

<sup>76</sup> *BPL Second Order* at 15733-15734, para. 43.

<sup>77</sup> ARRL Petition at para. 18.

<sup>78</sup> *BPL Second Order* at 15760, para. 98.

<sup>79</sup> *BPL Second Order* at 15758-15761, paras. 93-100.

<sup>80</sup> ARRL Petition at para. 20. *BPL Second Order* at 15757, para. 91.

<sup>81</sup> *BPL Second Order* at 15746-15747, paras. 71-73.

<sup>82</sup> *BPL Second Order* at 15741-15758, paras. 58-92. *See* ARRL Petition at para. 20. ARRL has submitted that the correct extrapolation factor is close to 20 dB per decade in the region beyond the distance calculated by the formula  $\text{Wavelength}/(2*\text{Pi})$  from the radiating BPL system. For example, for a 2 MHz signal, this distance would be (continued....)

slight improvement over using horizontal distance,<sup>83</sup> 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.<sup>84</sup> It also re-argues that NTIA recommended a 5 dB correction factor to address this deficiency but the Commission chose not to adopt it.<sup>85</sup> We note that the Commission disposed of the issue regarding receive antenna height and correction factor in both the *BPL First Order* and *BPL Second Order*.<sup>86</sup> ARRL did not bring any new information on reconsideration here.

21. 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.<sup>87</sup> We do not believe that we 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 we 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.<sup>88</sup> ARRL did not bring any new information on reconsideration here.

22. 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.<sup>89</sup> 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*.<sup>90</sup> 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 Section 1.106(p)(3) of the Commission rules.<sup>91</sup> As discussed, we largely agree with these oppositions and deny the petition for reconsideration for the reasons stated above.

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24 meters and for a 20 MHz signal, the distance would be 2.4 meters. In the *BPL Second Order*, the Commission showed by graphs and calculations how the slant-range distance makes a difference in the actual extrapolation factor, as compared to using horizontal distance with respect to using a 20 dB per decade value versus a 40 dB per decade value. *BPL Second Order* at 15780-15785, Appendix E.

<sup>83</sup> ARRL Petition at para. 19. *See also* fn. 10, *supra*.

<sup>84</sup> ARRL Petition at para. 19.

<sup>85</sup> NTIA later determined, and the Commission agreed, that the height correction is not needed for frequencies below 30 MHz. *BPL First Order* at 21305, para. 96, and at 21310, para. 110.

<sup>86</sup> *BPL First Order* at 21310, para. 110, *BPL Second Order* at 15729, para. 36 and fn. 83.

<sup>87</sup> ARRL Petition at para. 21.

<sup>88</sup> *BPL Second Order* at 15735, para. 45.

<sup>89</sup> Current Opposition at p. 2.

<sup>90</sup> EEI/UTC Opposition at p. 2.

<sup>91</sup> HomePlug Opposition at p. 2. We note that Section 1.106 only deals with petitions for reconsideration in non-rulemaking proceedings. 47 C.F.R. § 1.106. Petitions for reconsideration in rulemaking proceedings are governed by 47 C.F.R. § 1.429. Under this provision, petitions that rely on arguments that have been fully considered and rejected by the Commission within the same proceeding may be dismissed or denied as appropriate. *Id.* § 1.429(l)(3).

23. Accordingly, IT IS ORDERED, pursuant to authority 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. Sections 154(i), 301, 302a, 303(e), 303(f), 303(r), 405, and Section 1.429 of the Commission's rules, 47 C.F.R. Section 1.429, that the Petition for Reconsideration filed by ARRL IS DENIED.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch  
Secretary