Before the
Federal Communications Commission
Washington DC 20554

In the Matter of	
Carrier Current Systems, Including Broadband over Power Line Systems	ET Docket No. 03-104
Amendment of Part 15 Regarding New Requirements and Measurement Guidelines for Access Broadband over Power Line Systems	ET Docket No. 04-37

COMMENTS OF CURRENT TECHNOLOGIES, LLC

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Pursuant to Section 1.415 of the Commission's Rules, Current Technologies, LLC, a leading provider of broadband over power line (BPL) services, files these Comments in the above-captioned proceeding.[1]

A. Summary

Americans need multiple ways to bring reliable, economical broadband access to homes and small businesses -- not only to reach places that are not presently served, but also to add and accelerate competition in areas where broadband access is currently available. BPL is ready to help to fill these needs, and Current Technologies is already doing so commercially.

Just a week ago, President Bush noted: "Power lines were for electricity; power lines can be used for broadband technology."[2] Apparently with the present proceeding in mind, he went on to urge

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[1] *New Requirements and Measurement Guidelines for Access Broadband over Power Line Systems*, 19 FCC Rcd 3335 (2004) (Notice).

[2] Remarks at American Association of Community Colleges Annual Convention, Minneapolis, Minnesota (April 26, 2004). http://www.whitehouse.gov/news/releases/2004/04/20040426-6.html

the adoption of technical standards for BPL.[3] We welcome President Bush's call, as well as the National Telecommunications and Information Administration's willingness to build a foundation on which to facilitate BPL deployment.[4] And we applaud the Commission for its role in encouraging the prompt development and deployment of BPL, and particularly for its swift progress from the Notice of Inquiry (NOI) to the present Notice. Current Technologies looks forward to the swift adoption of rules that promote BPL while balancing the legitimate requirements of licensed users.

There is widespread misunderstanding as to how BPL works, no doubt complicated by the several different technical approaches in use. As a result, many filings in the NOI docket incorrectly characterize BPL and raise concerns about its effects on licensed radio communications. As Current Technologies has shown earlier in the proceeding, and reiterates below with regard to its own specific solution, properly designed BPL has no harmful effect on licensed communications.

BPL is lawful today. From a regulatory standpoint, BPL involves nothing more than coupling digital devices to power distribution lines. The Commission confirmed in both the NOI and the Notice that the present Part 15 rules permit BPL operation.[5] Current Technologies' BPL equipment complies in full with those rules, which were developed to protect the licensed services from interference. The

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[3] *Id*.

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

[5] Notice at para. 6; *Inquiry Regarding Carrier Current Systems, Including Broadband over Power Line Systems*, 18 FCC Rcd 849 at para. 1 (2003).

rules work: The past few years' field experience with properly designed and operated BPL systems confirms the technology does not cause harmful interference.

Current Technologies equipment is non-interfering for several reasons: inherently low power; emissions only from the immediate vicinity of the coupling device (not the entire power line); nearby devices not operating simultaneously on the same frequency; and distribution of energy over a wide bandwidth, only a tiny fraction of which can affect an individual narrowband receiver. Any one of these factors will adequately protect licensed users. The combination merely adds redundant safety. We are confident that other vendors' systems, if properly designed and carefully implemented, will likewise be compatible with other uses of the spectrum.

We accept the Commission's proposal that BPL equipment be designed to implement remotely programmed adaptive interference mitigation measures, including a shut-down feature. As noted above, extensive real-world experience with the Part 15 limits shows they offer adequate protection to licensed services. We endorse the mitigation measures anyway, in a spirit of responsive compromise, being confident they will not be needed in actual operation. Because these measures represent a new concept that requires new technology, BPL providers should have 36 months after the rules become effective to purchase devices that can be remotely configured or disabled.

We also accept in principle the Commission's proposal for a database of BPL systems to aid in correcting interference. But we request in the strongest terms that the database not be available to the public. Disclosure of the database would compromise electric utility security, give other broadband providers an unfair competitive advantage, and very likely promote frivolous interference complaints. Instead, we propose that the database be held in confidence by a trusted and technically qualified third

party. Complaints of suspected BPL interference would be directed to that entity, which would investigate, notify potentially responsible BPL providers, and if necessary coordinate the implementation of mitigation measures.

The Commission has often said it prefers technology-neutral regulation.[6] The Commission should establish the emissions limits and other criteria (if any) needed to prevent actual, additional, harmful interference to licensed services, but then let BPL manufacturers and providers decide how best to achieve those limits. Regulatory flexibility will let this newly emerging industry develop and adapt as needed to meet consumers' changing demands.

Finally, Current Technologies endorses the technical proposals in the Notice, including a requirement for verification and the measurement guidelines.

B. About Current Technologies

Current Technologies, headquartered in Germantown, Maryland, was founded in July 2000 for the purposes of developing and implementing BPL technology.[7] Historically, several factors precluded use of power lines as a communications medium: the complex physical topology of home wiring,

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[6] *E.g.*, "We do not believe that the public interest would be served if we were to adopt technical requirements that would tend to favor one technology over another." *Government Transfer Bands*, 17 FCC Rcd 9980 at para. 123 (2002). *See also Redesignation of the 17.7-19.7 GHz Frequency Band*, 17 FCC Rcd 24248 at para. 27 n. 84 (2002); *Year 2000 Biennial Regulatory Review -- Cellular Radiotelephone Service*, 17 FCC Rcd 18401 at para. 45 (2002).

[7] Current Technologies was founded by the Associated Group, LLC, which is the general partner of a private investment fund focusing on private and public investments in telecommunications, media, Internet, and related technology and service companies. Associated was formed as a successor to, and by the managers of, The Associated Group, Inc. (AGI), which had been a multi-billion dollar publicly traded company. AGI specialized in investing in, advising, and operating emerging and established companies in numerous industries, including cable, competitive local telecommunications, cellular and PCS telephony, and broadcasting until it was sold in January 2000.

physical properties of electrical cabling, the rapidly changing noise environment due to appliances connected to the wires, signal barriers created by step-down distribution transformers, effects of multiple phases, and the impact of underground vs. overhead topologies and the mixture of both -- not to mention hazards posed by the electric distribution system itself. These hurdles have now been cleared. Current Technologies has developed, and is now commercially deploying, its end-to-end, proprietary BPL technology in Ohio in conjunction with its affiliate, Current Communications, and Cinergy Broadband, LLC, a subsidiary of Cinergy Corp. The Current-Cinergy commercial deployment constitutes the largest scale commercial roll-out of BPL technology in the U.S. Current previously (in 2003) conducted two successful pre-commercial pilots of its technology: one with Cinergy in Cincinnati, and one with Potomac Electric Power Company (Pepco) in suburban Maryland, just outside Washington, D.C. These pilots collectively passed more than 700 homes and served more than 200 households and several small businesses with multiple-megabit download and upload speeds at every electric outlet in the customer premises.

The Notice asks whether there are entities that plan to own or operate Access BPL over the electric power lines, but would not be electrical power providers or a subsidiary of the incumbent provider.[8] The answer is yes. Current Technologies' affiliate, Current Communications, is one such company. It specializes in designing and operating BPL networks, as well as providing broadband services, and works closely with the utility and obtains utility company approval before installing its equipment on any electric distribution infrastructure.

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[8] Notice at para. 32.

C. The Public Will Benefit from Accelerated Roll-Out of BPL.

President Bush said recently: "It's important that we stay on the cutting edge of technological change, and one way to do so is to have a bold plan for broadband."[9] This was not news to the Commission, which just a few days earlier had stated:

> [T]he availability of infrastructure capable of transmitting broadband or advanced services [is] critical to the future of our nation. Advanced services already play a vital role, and will continue to do so throughout the 21st century, in the nation's economy and the life of its people.[10]

Where just a few years ago the Commission often referred to the "promise" of broadband deployment,[11] today that promise is speedily becoming a reality. By mid-2003, almost 21 million broadband lines were serving U.S. residences and small business.[12] But broadband is not yet a reality for everyone. As of January of this year, almost 80% of American homes still did not have broadband access, with 35.7 million homes (32%) still on dial-up only and 51.8 million homes (47%) with no

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[9] Excerpt: "We ought to have a universal, affordable access for broadband technology by the year 2007, and then we ought to make sure as soon as possible thereafter, consumers have got plenty of choices when it comes to purchasing the broadband carrier. See, the more choices there are, the more the price will go down. And the more the price goes down, the more users there will be. And the more users there will be, the more likely it is America will stay on the competitive edge of world trade. . . . It's important that we stay on the cutting edge of technological change, and one way to do so is to have a bold plan for broadband." Full text: http://www.whitehouse.gov/news/releases/2004/03/20040326-9.html

[10] *Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion*, GN Docket No. 04-54, Notice of Inquiry, FCC 04-55 at para. 2 (released March 17, 2004).

[11] *E.g., Regulatory Requirements for Incumbent LEC Broadband Telecommunications Services*, 16 FCC Rcd 22745 at para. 4 (2001).

[12] *High-Speed Services for Internet Access: Status as of June 30, 2003*, Industry Analysis and Technology Division Wireline Competition Bureau at Table 3 (released December 2003).

Internet access at all.[13] Although the Commission has found broadband subscribers are most likely to reside in a densely populated area and to be part of a high-income household,[14] there are still millions of broadband have-nots in densely populated neighborhoods that simply lack access to cable modem or DSL.[15] Both technologies can serve only limited areas. Today's DSL technology restricts service to a far smaller area around the local switching office than conventional voice service can reach. This leaves out many potential subscribers even in urban and close-in suburban areas. Economic factors effectively place a similar limitation on broadband cable. An old-fashioned, one-way, video cable system requires a major upgrade to carry two-way broadband, an expense that makes economic sense only in certain areas.

Access BPL can provide broadband service where DSL and broadband cable do not reach. In areas already served by DSL or cable, Access BPL will increase competition, which will help to force down prices, improve service, and increase levels of service. BPL also helps consumers indirectly by lowering the cost and increasing the reliability of electric power distribution.

1. Ubiquity

Access BPL, in principle, can be offered anywhere there is electric power. That includes almost every home and business in the country. As we explain below, the roll-out of Current Technologies' BPL solution requires only a simple installation at the pole-top or pad-mount transformer

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[13] *Cable/Satellite & Telecom Cross Industry Insights*, Morgan Stanley Equity Research (April 12, 2004).

[14] *Id*. at 4 & Table 14; *id*. 5 & Table 15.

[15] *Id*. at 4 & Table 14; *id*. 5 & Table 15.

for each small cluster of homes, usually 3-8 residences, allowing rapid deployment across wide areas. Once the transformer assembly is in place, each customer need only plug a power-line modem into any outlet to begin accessing the Internet -- without a separate truck roll. Current Technologies is already supporting both data and voice-over-IP on its BPL systems, over a very wide range of distances and data rates. "Next generation" chipsets, already in development and offering up to 100 Mbps net user throughputs, will enable BPL to offer real-time digital video and other higher bandwidth applications by late 2005 or early 2006.

The present proceeding is a major step toward bringing these advantages to more people, helping to achieve the long-sought goal of universal broadband access to the Internet. We agree with the Commission: "[U]biquitous broadband will bring valuable new services to consumers, stimulate economic activity, improve national productivity, and advance economic opportunity for the American public."[16]

2. Competition

In places where other broadband technologies are available, BPL will create needed competition. The Commission has noted that development and deployment of multiple platforms "promote[s] competition in the provision of broadband capabilities, ensuring that public demands and

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[16] *Appropriate Framework for Broadband Access to the Internet over Wireline Facilities*, 17 FCC Rcd 3019 at para. 1 (2002).

needs can be met."[17] Multiple platforms also foster competition because they impede anticompetitive coordination among providers.[18] As the Chairman put it earlier this year,

> [W]e have a historic opportunity to bring multiple pipes to consumers and, thereby, take a big bite out the "last mile" problems that have plagued competition and invited heavy monopoly regulation.[19]

Competition from BPL should put direct, downward pressure on broadband pricing. Many areas have only DSL or cable available, and hence no competition at all for broadband. Even in markets with both DSL and cable, experience with wireless phone service shows that the presence of just two providers does not generate enough competition to constrain prices. Wireless rates remained high despite competition between two cellular providers in each market, but dropped sharply when PCS offered additional competition.[20] Thus, even in markets now offering both DSL and cable, broadband prices will likely drop when the duopoly faces additional competition from BPL and other alternatives.

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[17] *Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities*, 17 FCC Rcd 4798 at para. 6 (2002).

[18] *Review of Regulatory Requirements for Incumbent LEC Broadband Telecommunications Services*, 16 FCC Rcd 22745 at para. 30 (2001).

[19] Chairman Michael K. Powell, remarks to the Silicon Flatirons Symposium, University of Colorado School of Law, Boulder, Colorado (Feb. 8, 2004).

[20] *1998 Biennial Regulatory Review*, 17 Comm. Reg. 404 at para. 83 (1999) ("[T]he introduction of new [PCS] providers and the end of the cellular duopoly has led to substantial consumer benefits through reductions in the price of service and in new and enhanced services"); *Petition for Forbearance for Broadband Personal Communications Services*, 13 FCC Rcd 16857 at para. 22 (1998) ("The most recent evidence indicates that prices for mobile telephone service have been falling, especially in geographic markets where broadband PCS has been launched.") (citation footnote omitted).

The Commission acknowledges that competition among broadband platforms also serves congressional goals.[21] Indeed, Section 706 of the Telecommunications Act of 1996 specifically charges the Commission with "encourag[ing] the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans" by "regulatory forbearance, measures that promote competition . . . , or other regulating methods that remove barriers to infrastructure investment."[22]

Chairman Powell put it bluntly to Congress: "[B]roadband deployment is the central communications policy objective in America today."[23] The Chairman broke down that objective into specific goals:

> First, get [broadband] built -- everywhere. . . . Second, [adopt] a minimally regulated environment. Third, promote multiple platforms for the delivery of broadband internet. The biggest obstacle to so many policy goals in the phone context is the last mile problem. Our goal is to encourage multiple pipes to the home in the future broadband world.[24]

Other commissioners agreed.[25]

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[21] *Appropriate Framework for Broadband Access to the Internet over Wireline Facilities*, *supra*, at para. 4 n.8 (2002), *citing* 47 U.S.C. Sec. 230(b)(2).

[22] Telecommunications Act of 1996, Pub. L. No. 104-104, Sec. 706, 110 Stat. 56 (1996), *cited in Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities*, *supra*, at para. 4.

[23] *Competition Issues in the Telecommunications Industry, Hearings Before the Senate Committee on Commerce, Science, and Transportation*, 108th Cong., 1st Sess. (Jan. 14, 2003) (statement of FCC Chairman Michael K. Powell).

[24] *Id*.

[25] *Competition Issues in the Telecommunications Industry, Hearings Before the Senate Committee on Commerce, Science, and Transportation*, 108th Cong, 1st Sess. (Jan. 14,

Access BPL directly supports the Commission's policy of promoting competition among broadband platforms.

3. Enhanced power distribution

Finally, Access BPL enables utilities to implement enhanced power distribution services such as automated meter reading, automated power outage and restoration detection, power quality monitoring, load management, and demand side management. These capabilities directly support the Nation's homeland security priorities by providing an economical and efficient means of protecting an important part of U.S. critical infrastructure. For the utilities, enhanced power distribution services extract added value from the installed electric distribution infrastructure by using it more efficiently. Many utilities have been slow to deploy automated meter reading, for example, despite its advantages, largely because relaying data from thousands of meters to a central point has entailed significant expense. BPL solves the problem at very low cost.

Local energy consumers will also benefit. Power outage prevention, detection, and restoration capabilities can help to prevent or minimize localized power incidents. Automated meter reading makes possible time-of-day pricing, which lets consumers and businesses save money by scheduling energy-intensive tasks outside peak hours. On a larger scale, the August 2003 blackout that shut down several states and parts of Canada highlighted unexpected fragilities in the interstate transmission grid, and prompted political leaders to call for more investment and attention to improvement in power distribution generally. Several of the investigating task force's 46 recommendations entail

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2003) (statements of FCC Commissioners Jonathan S. Adelstein, Kevin J. Martin, Michael J. Copps).

communications and record-keeping, which BPL can facilitate.[26] More generally, access BPL offers utilities a cost-efficient way to leverage their huge investment in infrastructure to improve and maintain security and reliability of power distribution, as well as providing the internal communications needed to keep electricity flowing to consumers.

D. BPL Broadband Delivery Is an Overlay on Existing, Ubiquitous Power Lines.

A BPL provider seeking to construct a network for broadband delivery can build on a ubiquitous network of transmission wires.

An Access BPL system can use either an overhead or underground electric distribution system, or a combination of both. It typically traverses three components of the network: (1) the "medium-voltage" distribution lines (usually 600-40,000 volts) that run through a neighborhood from an electric substation to the local step-down distribution transformer near the customer's premises; (2) the distribution transformer, typically serving 3-8 residences, which reduces the medium voltage to 240/120 volts for household or office use; and (3) the 240/120 volt service lines to the premises and the inside premises wiring. Current Technologies installs a digital device at a neighborhood "backhaul point," where it injects the radio-frequency signal onto the medium-voltage line through a coupling device, and another at the transformer near the subscriber's home, where it again couples the radio-frequency signal between the medium-voltage and low-voltage lines, effectively (and safely) bypassing the transformer.

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[26] *Final Report on the August 14, 2003 Blackout in the United States and Canada: Causes and Recommendations*, U.S.-Canada Power System Outage Task Force at 141-42 (released April 2004).

The backhaul point connects to the Internet and other networks using traditional telecommunications media, often fiber.

For safety, medium voltage lines must be suspended roughly 10 meters in the air or buried underground. An Access BPL device that connects to an overhead medium-voltage line is likewise overhead, mounded on a pole 10 meters up. The transformer bypass device for an underground cable is collocated with the transformer, typically located at curbside on a concrete pad inside a solid metal housing.

It takes only the installation of these relatively inexpensive Access BPL devices for Current Technologies to place broadband data on the existing electrical infrastructure from the neighborhood backhaul point to the consumer's computer or IP telephone.

E. Current Technologies' Implementation of BPL is Non-Interfering.

We strongly agree with the Commission that the interference concerns raised by other spectrum users can be adequately addressed.[27] The amateur radio community has been especially outspoken about interference issues -- understandably so, in view of the amateurs' routine practice of receiving low signal levels. But the discussion has been complicated by misunderstandings about how BPL works -- and complicated further by the existence of several different technical approaches to BPL, each of which works differently. As a result, the debate has generated a number of critical statements that should not be true for any properly designed BPL, and are certainly not true for Current Technologies' implementation. We are confident that real-world experience will show BPL is not a factor in reception of licensed communications. As we and others have explained in the NOI docket, and as the

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[27] Notice at para. 31.

Commission recognized in the Notice,[28] properly designed BPL systems -- including Current Technologies' installations -- do not present the issues that concern other spectrum users.[29]

We explain below the several factors that keep Current Technologies' BPL equipment from interfering with licensed services (in addition to its inherently low power): point-source emissions; no simultaneous operation of nearby devices; no harmful aggregation; and the distribution of BPL energy over a wide bandwidth. Any one of these factors is sufficient. The fact that all operate simultaneously provides redundant levels of protection.

1. Current Technologies' BPL radiates from widely separated isolated points, not from an entire power line.

Access BPL devices do not use power lines as antennas. They use power lines to *conduct* data signals, not to radiate them. Current Technologies' BPL emissions radiate almost entirely from a short segment of line immediately adjacent to where the BPL device is attached. From a few meters away, the signal closely resembles that from a point source, much like other common sources of radio-frequency noise such as computers and household appliances.

Figure 1 shows measured data taken directly under a medium-voltage power line with a Current BPL Access unit installed and operating. Lines on the graph compare the measured data to hypothetical emissions from a point source ($1/R^2$) and from a long length of power line ($1/R$). The plot plainly shows the emissions falling off in point source fashion even directly under the power line itself.

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[28] Notice at para. 31.

[29] The representations here are true of Current Technologies' system, and should also be true for other well-designed implementations. At the very least, Current Technologies provides an "existence proof" that non-interfering BPL is possible.

This has two important consequences. First, emissions decay very rapidly away from the BPL device. Second, an Access BPL system does not create a city-sized antenna. In Current Technologies' implementation, a BPL system radiates only from isolated points -- and very few of those, as we see below.[30]

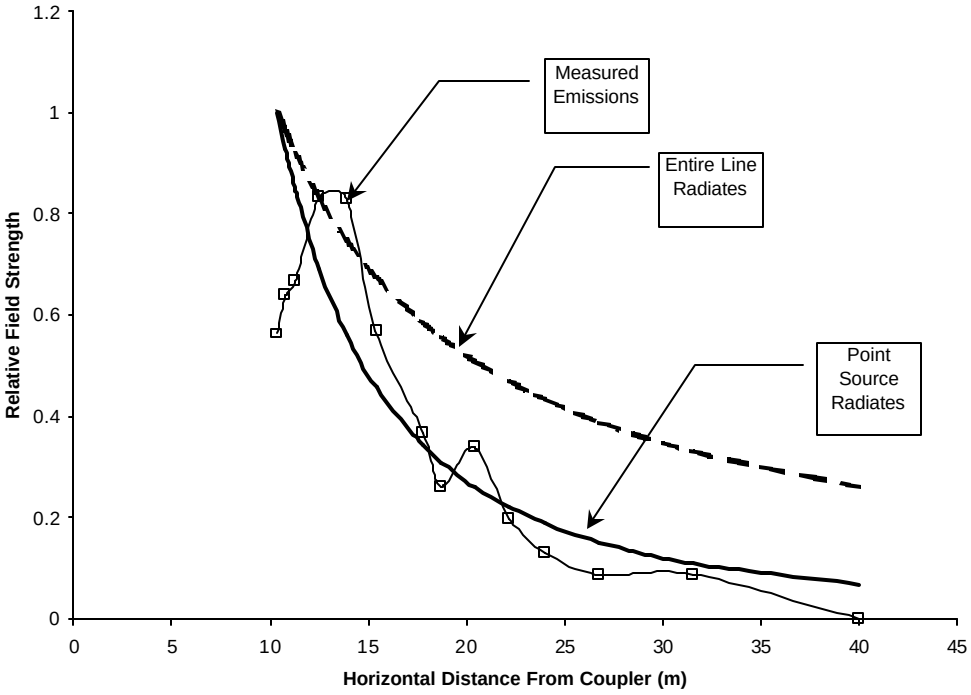

Figure 1

[30] If additional protection were needed, it would come from the growing practice of burying power lines. An underground line is well shielded by the surrounding soil, and by the common technique of wrapping the ground wire around the distribution line. About 40% of residential lines are now underground, and many areas require all new lines to be buried.

2. Only one interconnected Current Technologies device can operate at a time on a given frequency.

Some BPL opponents assume thousands of BPL devices will operate simultaneously over a small area. That, too, is incorrect. In Current Technologies' Access BPL system, only one device on a medium-voltage distribution leg -- typically hundreds of meters long -- can transmit at a time. Thus, at any instant, the total emissions from all devices on medium-voltage wires over a span of many blocks add up to only one device. Low-voltage devices, including end user modems, may be closer together; but the HomePlug® standard, which Current Technologies leverages on low-voltage and in-home wiring, likewise allows only one device served by a given transformer to transmit at a time. Again, the total emissions from all devices on low-voltage wires served by one transformer add up to only one device.

In short: *only two BPL devices at most can operate simultaneously in conjunction with a given transformer* -- one medium-voltage device and one low-voltage device. (As noted above, only one medium-voltage device at a time can operate over an entire cell.) Moreover, in Current Technologies' implementation, the low- and medium-voltage devices operate at different frequencies, so they cannot affect the same narrowband receiver. Transformers are typically spaced several tens to hundreds of meters apart. As a result, the geographic density of devices operating at any instant is extremely sparse -- far lower than PCs, power supplies, PDAs, and other popular devices.

3. Current Technologies' emissions do not aggregate harmfully.

Some BPL opponents assume that noise signals from multiple BPL devices will aggregate in such a way that additive emissions will raise the noise floor and interfere with communications. As

noted above, however, Current Technologies' BPL devices operating at a given instant are well separated. Only two devices at most -- on different frequencies -- can operate on a given BPL segment, or cell, each of which covers several hundred meters. And emissions drop off rapidly with distance. As a result, emissions cannot accumulate in a victim receiver. The "cumulative" emissions from BPL devices are no greater than those from commonplace unintentional emitters.

4. BPL bandwidth has no effect on interference.

Some parties refer to the relatively high bandwidth of BPL signals as exacerbating interference. In fact, however, over the range of frequencies contemplated for BPL -- below about 50 MHz[31] -- the bandwidth of an interfering signal has no significant effect. Most receivers in this range have relatively narrow passbands, typically 25 kHz or less. The emissions outside a victim receiver's passband have no significant effect on interference to that receiver. Thus, a potential victim receiver is not more likely to encounter interference from a BPL system simply because the BPL system may have a wider overall frequency range than the particular receiver.

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Again, any one of these factors suffices to protect licensed services. The interference potential of even a city-wide system consisting of Current Technologies' BPL equipment is no worse than widely scattered unintentional emitters of the kind found in every home and office. The entire BPL system, miles in extent, comes down to nothing more than isolated point sources, tens or hundreds of meters apart, whose emissions decay rapidly with distance. If the more alarming interference scenarios

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[31] Notice at para. 5.

described in the NOI docket had any validity, then the proliferation of cash registers, PCs, hair dryers, and untold millions of other emission sources would have shut down radio communications long ago.

F. Interference Mitigation Techniques Should Be Mediated Through a Trusted Third Party.

Section 15.5(c) of the Commission's Rules requires a Part 15 device to cease operation if it causes harmful interference to an authorized radio service.[32] That provision rarely need be invoked. Because the vast majority of Part 15 devices are consumer products, and being mindful of the difficulties a licensee would have in identifying an interfering device, let alone causing it to be turned off, the Commission sets Part 15 emissions limits low enough to make harmful interference extremely improbable.

BPL devices are amenable to more flexible forms of interference prevention. Unlike most Part 15 devices, each BPL device is fixed at a particular location; and once the location of an offending device is known, the party that operates it is easily determined. The Commission can thus impose *post hoc* interference mitigation measures: "adaptive interference mitigation techniques," such as modifying power levels on a dynamic or remote controlled basis, perhaps as to specific frequencies or bands,[33] and a "shut-down feature" to deactivate units causing harmful interference that do not respond to lesser measures.[34]

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[32] 47 C.F.R. Sec. 15.5(c)

[33] Notice at para. 40.

[34] Notice at para. 42.

At the outset, Current Technologies notes that applying these measures to BPL devices would be intrusive and discriminatory. In a radio-frequency environment that includes hundreds of millions of digital emitters, it would be unfair to single out BPL devices alone as being subject to special remedial procedures. And, for the reasons shown above, they are no more likely to cause interference than other digital emitters.

1. Grandfathering

The Commission asks for comment on the time period for implementing the above measures, and whether earlier-installed BPL equipment must be brought into compliance.[35] The record suggests that BPL providers are at different stages of readiness to comply with the requirements.[36] To avoid substituting regulatory fiat for the forces of the marketplace, the Commission should allow BPL providers a minimum period after the effective date of the rules of 36 months before they must purchase BPL devices that can be remotely configured or disabled. Devices purchased before that date should be grandfathered. BPL technology is advancing so rapidly that early equipment is likely to be replaced on a rapid schedule. There are not likely to be enough older devices in service at the expiration of the

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[35] Notice at para. 42.

[36] Notice at para. 26.

three-year period to constitute a significant threat.[37] Requiring their premature replacement would cause economic distortion with little or no regulatory benefit.[38]

2. Notification requirement

As part of the interference mitigation program, the Commission proposes that each Access BPL operator submit information on its system to an industry-operated entity. That entity would maintain a publicly accessible database to help identify Access BPL devices that cause interference, and facilitate implementing interference mitigation and avoidance measures. The information submitted would include location of the installation, type of modulation, and frequency bands.[39]

Current Technologies agrees such a database could be useful, subject to one crucial condition: *it must not be accessible to the public*. (We show below how the database can serve its purpose nonetheless.) Confidentiality of the database is essential for three reasons:

(a) UTILITY SECURITY. Information about a BPL system conveys knowledge about the underlying utility facilities. Electrical utilities have always been extremely cautious about disclosing technical details of their operations -- and all the more so in recent times.

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[37] On a similar basis, the Commission declined to require the prompt upgrade or replacement of non-E911-capable CMRS handsets, on a finding that the costs of a "crash" replacement program would not yield corresponding benefits. *Compatibility with Enhanced 911 Emergency Calling Systems*, 14 FCC Rcd 17388 at paras. 38-39 (1999).

[38] The next generation of BPL local area networking equipment, mentioned earlier, is expected to incorporate all of the Commission-proposed mitigation features. That equipment should be commercially available in early 2006 or sooner.

[39] Notice at para. 43.

(b) BROADBAND COMPETITION. Other broadband providers would gain valuable competitive information from the BPL database, including the information needed to determine where a BPL operator intends to expand next. DSL and cable modem providers could use that information to unfairly target potential BPL customers with pre-emptive promotional offers.

(c) FRIVOLOUS INTERFERENCE COMPLAINTS. Publicly available BPL operating data would likely encourage at least a few spectrum users experiencing communications problems to complain first to the local BPL provider, even before addressing more likely causes of interference or applying elementary mitigation measures at the receiver. Knowing the frequencies and locations of the nearest BPL devices, and experiencing interference on some those frequencies, a spectrum user may prefer to file against the BPL provider rather than undertake the effort needed to find out where the interference actually originates. We speak from experience. Current Technologies, which operates a BPL trial in Potomac, Maryland, received complaints from third parties who cited interference allegedly emanating from our BPL system, beginning very soon after the appearance of highly publicized reports of a trial deployment. Not only did the alleged interference occur at locations much too far from the trial deployment area for Current's BPL system to have been the source, but the complaints involved frequencies well outside the operating range of Current's equipment.

A publicly accessible database is similarly likely to generate complaints that lack a minimal showing to connect the BPL system with the received interference. But even these could nonetheless require the BPL provider to alter its operations or even cut off service. The proposed rules do not offer a ready way to identify such complaints.

3. Designation of a "trusted third party"

The problems of maintaining BPL database security and weeding out implausible interference complaints are amenable to the same solution. The Notice proposes that Access BPL providers file their system information with an FCC/NTIA "recognized industry-operated entity." We suggest instead that the information reside with a trusted, technically qualified third party having the confidence of both the Access BPL industry and the communities of licensed spectrum users, with experience in operating comparable databases. This might be an organization such as the United Telecom Council, or an established commercial frequency coordinator, or possibly a non-profit entity set up specifically for the purpose.[40]

The entity would have two related functions. First, it would receive and maintain the information required to be supplied by Access BPL providers on BPL system locations, modulations, and frequencies. The entity would be charged with protecting this information from public disclosure. Second, the entity would receive and process interference complaints from other spectrum users, using the database to identify potentially responsible Access BPL providers.

The complaint process might work like this:

(a) A spectrum user suspecting BPL interference lodges a complaint with the third-party entity described above, possibly via an Internet website. The complaint must provide information reasonably necessary to identify the source, including date(s) and time(s) of interference, receiver location, frequency, receiver modulation, antenna type, gain, and azimuth, and a description of the interference.

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[40] Current Technologies conditions its proposal for a trusted third party on identification of a suitable entity for the role acceptable to the Commission.

(b) Using the BPL database, and applying interference criteria developed for the purpose, the third-party entity makes an initial determination as to whether any BPL device in operation might plausibly cause the interference. If not, it so notifies the complainant. *E.g.*, "The Access BPL emitter nearest to your location, operating on the frequency you identified, is 60 kilometers distant from your location and is unlikely to be the source of the interference you reported."

(c) If one or more BPL emitters could be the source of the interference, the entity forwards the complaint to the appropriate BPL provider. In response, the provider may (i) contest the report, *e.g.*, "Not us -- we turned off that frequency a month earlier"; or (ii) accept responsibility and undertake mitigation measures; or (iii) request assistance in determining whether its equipment is the cause of the interference.

(d) With the cooperation of both the complainant and the BPL provider, the entity may coordinate experiments to help determine whether a suspected BPL device in fact is the cause of reported interference. Experiments might consist, for example, of momentarily turning off the BPL device to see if that interrupts the interference.

(e) If the BPL provider accepts responsibility for the interference, or experiments show a BPL device is the likely cause, the BPL provider must promptly undertake mitigation measures. The entity follows up with the complainant to confirm that those measures correct the interference. If the complainant remains aggrieved after the entity concludes the interference has been corrected, the complainant can invoke existing complaint procedures at the Commission.

We submit that placing responsibility for maintaining the database and handling interference complaints with a trusted third party is the best way to address the legitimate concerns of both the BPL industry and others sharing the spectrum.

G. Technical Issues

Current Technologies supports the technical proposals in the Notice.

1. Equipment authorization. We concur with the proposal to require verification for BPL equipment.[41] This is consistent with the principle that professionally-installed devices are generally subject to verification.[42] Especially in the industry's early phases, equipment can be expected to evolve rapidly as performance improves and costs drop. Subjecting each device change to the Class I/Class II regime required for certified devices would slow innovation to no purpose.[43] Verification will adequately protect the public.

2. Measurement guidelines. Current Technologies supports the measurement guidelines laid out in the Notice.[44] Although we continue to favor the eventual development of reproducible test configurations for use in the laboratory to reduce the cost and uncertainty of compliance testing,[45] we acknowledge that *in situ* testing is likely to be the rule for the foreseeable future. The proposed requirement for taking measurements at specified distances along the power line will help to detect the power-line-as-antenna effects that concern the amateur community. The use of

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[41] Notice at para. 44.

[42] For unintentional radiators, see 47 C.F.R. Sec. 101(a). The same is generally true of intentional radiators as well.

[43] *See* 47 C.F.R. Sec. 2.1043.

[44] Notice at paras. 45-46 & Appendix C.

[45] Comments of Current Technologies, LLC, ET Docket No. 03-104 at 18-19 (filed July 7, 2003).

three representative sites for each of overhead and surface-mount installations strikes a reasonable balance between thoroughness and cost

3. Antenna height. We concur with the proposal that scanning antenna heights range from 1 to 4 meters. The range should not go higher, to avoid the safety hazards arising from proximity to exposed high voltages on overhead lines.

H. Preliminary Response to NTIA Report

In April 2004, the National Telecommunications and Information Administration (NTIA) released the first of two expected reports on BPL.[46] Current Technologies is pleased that NTIA shares the Commission's goal of deploying BPL to further promote broadband availability to all Americans. In particular, NTIA recognizes that "[t]imely and successful completion of the Commission's BPL docket will lay the foundation for meeting the President's vision" for broadband availability, specifically including BPL.[47]

Current Technologies has worked hard from the beginning to ensure its equipment is fully compatible with licensed radio communications. We will complete our review of the NTIA Report and make a substantive response within the pleading cycle.

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[46] NTIA Report.

[47] Letter from Michael D. Gallagher, Acting Assistant Secretary for Communications and Information, to Michael K. Powell, Chairman, Federal Communications Commission (April 27, 2004).

I. Proposed Rule Language

To implement the ideas offered above (and to clarify certain other parts of the proposed wording), we suggest these changes to the rule language offered in the Notice for Section 15.109. Added material is shown in double underline:

> (e) Carrier current systems, including BPL systems, used as unintentional radiators or other unintentional radiators that are designed to conduct their radio frequency emissions via connecting wires or cables and that operate in the frequency range of 9 kHz to 30 MHz, including devices that deliver the radio frequency energy to transducers, such as ultrasonic devices not covered under Part 18 of this Chapter, shall comply with the radiated emission limits for intentional radiators provided in Section 15.209 for the frequency range of 9 kHz to 30 MHz. As an alternative, carrier current systems used as unintentional radiators and operating in the frequency range of 525 kHz to 1705 kHz may comply with the radiated emission limits provided in Section 15.221(a). At frequencies above 30 MHz, the limits in paragraph (a), (b) or (i) of this Section, as appropriate, continue to apply. For all BPL systems, the requirements of this paragraph and paragraph (a) of this section shall also apply to the emissions from all residential low-voltage lines from the distribution transformer to all in-building wiring.
>
> (f) Access BPL systems shall incorporate adaptive interference mitigation techniques such as dynamic or remote reduction in power and adjustment in operating frequencies, in order for Access BPL installations to avoid causing harmful interference arising from site-specific, localized use of the same spectrum by licensed services. Access BPL systems shall incorporate a shut-down feature to deactivate units found to cause harmful interference that cannot be remedied by the adaptive interference mitigation techniques described in the preceding sentence . Implementation of the adaptive interference mitigation techniques or shut-down feature in a particular case follows the procedures set out in paragraph (g)(2).
>
> (g) (1) Entities operating Access Broadband over Power Line systems shall supply to a Federal Communications Commission/National Telecommunications and Information Administration recognized industry-operated entity, information on all existing, changes to existing and proposed Access BPL systems for inclusion in a data base. Such information shall include the installation locations, frequency bands of operation, and type of

modulation used. No notification to the FCC is required. The recognized industry-operated entity shall not disclose the information supplied. It shall have the technical qualifications needed to carry out the functions described in paragraph (g)(2).

(2) A licensee suspecting harmful interference due to Access BPL operation may provide the particulars to the recognized industry-operated entity, which shall determine whether an Access BPL installation is a plausible cause of the interference, and if so, shall provide the particulars to the Access BPL provider, which may make a response to the entity. In disputed or uncertain cases the entity may coordinate suitable experiments, such as momentarily turning off the suspected Access BPL device to confirm it is the cause of the interference. If the entity concludes the Access BPL operation is a likely cause of the interference, the Access BPL provider must undertake the measures described in paragraph (f).

CONCLUSION

As President Bush said last week, "There needs to be technical standards to make possible new broadband technologies, such as the use of high-speed communication directly over power lines."[48] Whether those technical standards are the present Part 15 rules or a minor modification, regulatory certainty is vital to catalyzing rapid commercial introduction. Access BPL will increase the reach of broadband services into areas where they are not now available, and will bring down costs in the areas presently served. If implemented under the proposed rules, with the small changes we suggest, BPL can deliver these benefits with no significant risk of interference to other services, and

[48] Remarks at American Association of Community Colleges Annual Convention, Minneapolis, Minnesota (April 26, 2004). http://www.whitehouse.gov/news/releases/2004/04/20040426-6.html

with assurance that any interference that does occur will be promptly investigated and corrected. We urge the Commission to adopt such rules at the earliest possible date.

Respectfully submitted,

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May 3, 2004

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