Before the
Federal Communications Commission
Washington DC 20554

In the Matter of	
Inquiry Regarding Carrier Current Systems, Including Broadband over Power Line Systems	ET Docket No. 03-104

COMMENTS OF CURRENT TECHNOLOGIES, LLC

Philip L. Verveer
Willkie Farr & Gallagher
1875 K Street, NW
Washington, DC 20006 USA
202-303-1117

Mitchell Lazarus
Fletcher, Heald & Hildreth, P.L.C.
1300 North 17th Street, 11th Floor
Arlington, VA 22209
703-812-0440
Counsel for Current Technologies, LLC

July 7, 2003

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Current Technologies, LLC files these comments in response to the Commission's Notice of Inquiry in the above-captioned proceeding.[1]

A. Summary

The Commission has consistently identified broadband access as vital to national productivity and economic opportunity. With this proceeding, the Commission will accelerate the delivery of broadband access nationally, empowering broadband deployment in billions of electrical outlets in residences and businesses throughout the United States. Broadband over Power Line (BPL) will ultimately rank as one of the Commission's significant achievements, continuing its heritage as a technologically innovative regulator in promoting vital services such as cellular telephony, PCS services, direct broadcast satellite services, and the public Internet.

Today only a minority of the approximately 110 million U.S. homes and millions of small businesses have broadband service, predominantly via DSL or cable. In areas where cable has yet to be upgraded, or where DSL's technical reach is not effective, BPL offers the only practical choice. As an effective competitor to DSL and cable, BPL will accelerate the availability of broadband access and increase the quality and value of services offered to consumers. Moreover,

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

BPL serves another critical purpose: improving the nation's electrical distribution systems by adding intelligence to energy providers' extensive networks, enabling these providers to make power distribution more economical and efficient through the development of applications to manage energy demand.

For this proceeding, we respectfully suggest five goals: (1) adopt BPL rules quickly, both to deliver the benefits of ubiquitous and competitive broadband service, and to help the BPL industry maintain access to capital markets, which is essential to providing service; (2) analyze BPL interference using real-word scenarios, taking into account the radio-frequency noise already present in the environment; (3) minimize technical regulation to that needed for ensuring licensed services do not encounter actual, harmful interference; (4) minimize non-technical regulation; and (5) establish practical measurement procedures that reflect actual potential for harmful interference, while retaining the present option of full-scale, on-site testing at representative installations.

Certain technical characteristics of BPL systems minimize their interference potential. The rules should reflect these. First, BPL devices are point-source emitters. The entire power line does not act like an antenna. Second, BPL emissions cannot aggregate significantly. For each transformer and the cluster of homes that it serves, an Access and an In-House system together entail only two devices transmitting at any moment; and BPL signals do not propagate well. Fears that many devices operating at once will combine to raise the noise floor are unwarranted. Third, the relatively wide bandwidth of BPL devices (compared with PC-type digital devices) has little bearing on interference, because every receiver is sensitive to emissions only in its own passband.

Finally, the regulations should not distinguish between Access and In-House BPL. The two types of devices carry out similar functions and have similar emissions characteristics, and should be subject to the same rules. And the Commission should not partition the spectrum between Access and In-House systems. That is best handled by the market.

The vision of BPL is now becoming a reality. BPL is operational in small deployments throughout the U.S., and will continue to roll out pursuant to existing Commission rules, bringing the benefits of broadband access to many who lack it today -- without causing harmful interference to licensed services today or in the future. The Commission should initiate a Notice of Proposed Rulemaking to catalyze BPL by adopting the minimum rules necessary for prompt, safe implementation.

B. About Current Technologies

Current Technologies, headquartered in Germantown, Maryland, was founded in July 2000 for the purposes of developing and implementing BPL technology.[2] Power line networks and home power line wiring were not designed for carrying voice or data signals. Historically, several factors precluded use of power lines as a communications medium: the complex physical topology of home wiring, physical properties of electrical cabling, the rapidly changing noise environment due to appliances connected to the wires, signal barriers created by step-down

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[2] 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 recently 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.

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 economically cleared. Current Technologies has developed, and is now demonstrating, its proprietary BPL technology with electric utilities in the United States, including the operation of its low-voltage and medium-voltage integrated system in (1) suburban Maryland, just outside Washington, D.C., with Potomac Electric Power Company, and (2) suburban Cincinnati, Ohio, with Cinergy Corp. Pursuant to its experimental license, Current Technologies is operating its BPL equipment at dozens of transformer locations, enabling approximately 700 homes and serving more than 200 households with BPL broadband access. Current Technologies expects to launch commercial service later this year.

C. About BPL

A BPL system might traverse three components of the electric distribution 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; (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.

Historically the distribution transformer has been a problem for BPL because it is a poor conduit for high frequency digital signals. A BPL system must be able to send radio-frequency signals through or around the transformer without compromising the necessary electrical isolation between the medium-voltage distribution line, on the one hand, and the low-voltage

service line and premises wiring, on the other. That problem has now been solved, both technically and economically.

The Notice identified two types of BPL installations.

"Access BPL" uses (1) the medium-voltage lines to deliver broadband data from the Internet (or other broadband network) to and throughout a neighborhood over a distance spanning up to dozens of distribution transformers, and (2) the subscriber's 240/120-volt low-voltage lines to carry the data from the local distribution transformer to a point in the home. To do this, Current Technologies installs a digital device at a "backhaul point," where it injects the radio-frequency signal onto the medium-voltage line, and another at the transformer near the subscriber's home, where it couples the radio-frequency signal between the medium-voltage and low-voltage lines, effectively (and safely) bypassing the transformer. These digital devices and associated coupling mechanisms are mounted either high on the pole or enclosed in a curb-side transformer housing. Current Technologies connects the backhaul point to the Internet and other networks using traditional telecommunications media such as fiber.[3]

"In-House BPL" can use any number of "power-line modems" plugged into electrical outlets.[4] Each modem connects to a computer over ordinary Ethernet or USB wires, or to several computers over a Wi-Fi link. Together the modems form a local area network, in much the same

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[3] ***Technical Note***. Current Technologies' implementation uses OFDM modulation. (We expect most providers will use typical broadband modulations such as direct sequence spread spectrum and OFDM.) Security relies on encryption, aided by physical isolation -- *i.e.*, the difficulty and danger of gaining physical access to power distribution lines. Multiple layers of encryption are possible at the physical layer and at higher network layers.

[4] The term "In-House BPL" is something of a misnomer. The signal goes beyond the user's residence to the transformer, and from there to every other house sharing the same transformer.

way as a wired or Wi-Fi network. Collectively the modems can be used to distribute broadband delivered to the home by DSL, cable, or Access BPL, as well as for printer and file sharing.

Access and In-House BPL can be marketed, installed, and maintained separately, and can also be interconnected into one system so that the local area network integrated is seamlessly into the wide area network.

D. Benefits of BPL: Ubiquity and Competition

BPL makes possible the long-sought "third wire" (along with telephone and cable) for last-mile delivery of broadband communications services to residences and small businesses. Unlike DSL and broadband cable systems, electric wires go into almost every room of every home and business in the country. BPL can take broadband service to places where DSL and broadband cable cannot reach. In areas already served by DSL or cable, BPL will increase competition, which in turn will bring better service and lower prices. BPL requires only a simple installation at the pole-top or pad-mount transformer for each cluster of 5-8 homes, allowing rapid deployment across wide areas. Once the transformer device is in place, each customer need only plug a power-line modem into any outlet, bringing the benefits of simple connection to the network and simple installation in the home or office -- and no separate truck roll for each customer. BPL shows excellent economies for both data and voice-over-IP, over a very wide range of distances and data rates.

1. Ubiquity

This proceeding is a major step toward 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."[5]

Dial-up access may be adequate for casual browsing, shopping, and email. But the revolutionary promise of the Internet lies in having always-on broadband information resources available everywhere. Ubiquitous broadband allows people to work when and where they choose, collaborating across a continent as though in adjacent cubicles. Those who share interests, no matter how esoteric, can form communities all over the globe. News and entertainment escape the limitations of TV channels and paper. The local town library expands to rival those at the great universities, and beyond. Top-flight education, no longer tied to particular buildings and campuses, becomes available everywhere.

These have long been the promises of the Internet. But there has been a bottleneck at the "last mile" -- more precisely, the last few hundred meters -- that separate the end user from the high-speed network. Access to the Internet's full capability requires broadband wherever the user is located. Neither DSL nor cable can currently do that.[6] At least for now, technical and economic considerations limit the two most widespread broadband technologies to the urban-suburban core.[7] Even though 88% of the nation's *zip codes* report at least one high-speed

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

[6] Technologies other than DSL and cable account for only 10% of high-speed Internet access. *High-Speed Services for Internet Access: Status as of December 31, 2002*, Industry Analysis and Technology Division, Wireline Competition Bureau at Table 7 (released June 2003). This fraction includes non-DSL wireline (such as T-1 and ISDN), fiber, satellite, and fixed wireless.

[7] Recent data bear out the relationship between broadband availability and population density:

subscriber,[8] the percentage of *households* having access to broadband services is far lower, especially outside the major population centers.

Early proponents of the Internet promised to share the advantages of the informational "haves" with the "have-nots." Geography was supposed to become irrelevant. When the whole country had access to all the information in the country, it was said, rural areas and Indian lands would lose their economic disadvantage. Someone living in the tiniest, poorest town in New Mexico could compete on equal terms with the residents of Boston and San Francisco.

So far, it has not worked out that way. The economic constraints that limit last-mile broadband have given a continuing advantage to those in and near the urban centers. But BPL can change that. By delivering broadband to many of those unserved by other broadband technologies, BPL can help to bring the advantages of the Internet to the people who need them most.

Moreover, BPL enables utilities to offer enhanced power distribution services such as automated meter reading, outage detection, power quality monitoring, load management, and substation monitoring. These capabilities directly support the Nation's homeland security

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> High population density has a positive association with reports that high-speed subscribers are present, and low population density has an inverse association. For example, as of December 31, 2002, high-speed subscribers are reported to be present in 99% of the most densely populated zip codes and in 60% of zip codes with the lowest population densities.

Id. at 4 (footnote omitted).

[8] *Id*. at 4 & Table 12.

priorities, by providing an economical and efficient means of protecting an important part of U.S. critical infrastructure.

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 needs can be met."[9] Multiple platforms also foster competition because they impede anticompetitive coordination among providers.[10]

We expect an immediate benefit to consumers, because competition from BPL should put direct, downward pressure on broadband pricing. Experience with wireless phone service showed the Commission that having only two providers does not generate enough competition to constrain prices. Wireless rates remained high despite competition between two cellular providers in each market, and dropped only when PCS offered additional competition.[11] Similarly, broadband prices will drop when the predominant DSL-cable duopoly faces additional competition from BPL and other alternatives.

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

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

[11] *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.[12] 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."[13]

Chairman Powell put it bluntly to Congress: "[B]roadband deployment is the central communications policy objective in America today."[14] 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.[15]

Other commissioners agreed.[16]

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[12] *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).

[13] 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.

[14] *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).

[15] *Id*.

[16] *Competition Issues in the Telecommunications Industry, Hearings Before the Senate Committee on Commerce, Science, and Transportation*, 108th Cong, 1st Sess. (Jan. 14, 2003) (statements of FCC Commissioners Jonathan S. Adelstein, Kevin J. Martin, Michael J. Copps).

In short, BPL delivery directly supports the Commission's policy of promoting competition among broadband platforms.

E. Goals for This Proceeding

The Commission has a long history of innovation through far-seeing regulation. Every few years a Commission proceeding opens the way to a new technology that markedly improves Americans' lives. An obscure 1960s tariff challenge called *Carterfone Device* created the market for a huge variety of desktop telephones, fax machines, PBXs, modems, and countless other telephone-related devices.[17] Beginning in the late 1970s, the *Computer Inquiry* proceedings cleared and paved the runway that launched the consumer Internet. A technical rulemaking in 1985, little noticed at the time, ultimately led to Wi-Fi, Bluetooth, ultra-wideband, and other means of separating communications from wires.[18] The PCS rulemaking freed Americans to communicate at will, without regard to location.[19]

The outcomes from the present proceeding -- ubiquitous broadband Internet access -- promise to be as great. To achieve those benefits, we suggest the Commission adopt the following goals:

1. Adopt BPL rules quickly. Timeliness is critical. Consumers will benefit most if the price cuts from added competition occur promptly. Congress specifically instructed the

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[17] *Carterfone Device*, 3 F.C.C.2d 420 (1968), *recon. denied*, 14 F.C.C.2d 571 (1968).

[18] *Spread Spectrum and Other Wideband Emissions*, 101 F.C.C.2d 419 (1985).

[19] *See generally* GEN Docket No. 90-314.

Commission to adopt measures promoting broadband competition on a "timely basis."[20] And prompt regulation is essential for access to capital markets. The regulatory uncertainty of a drawn-out proceeding may limit the ability of BPL service providers and technology developers to raise capital. And, once the broadband market is saturated, all broadband competitors will be significantly inhibited in raising capital to deploy their networks and market their services. There is a limited time window during which Commission action can have disproportionately beneficial effects in promoting broadband competition.

2. Use real-world interference analyses. We are starting with a noisy radio-frequency environment, and the Commission must take that into account in assessing the impact of BPL. No BPL regulation can "re-quiet" the environment back to the pristine state that some commenters prefer. Even before the comment due date, this docket showed over 1500 filings, many very similar, most grossly overstating the interference potential of BPL. These are written with little or no understanding of BPL technology. Current Technologies agrees with the need to prevent *added* real-world harmful interference to licensed services. We urge the Commission to carry out its analyses using models and parameters that accurately reflect both the likely emissions from BPL and the interference susceptibility of other services under actual operating conditions.[21]

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[20] Telecommunications Act of 1996, Sec. 706, *supra*.

[21] A similar issue arose in the recent ultra-wideband (UWB) proceeding, where wireless PCS carriers claimed interference from UWB transmitters into their handsets based on tests in anechoic chambers. The Commission did not dispute the test results, but determined that UWB would not interfere with PCS in the radio-frequency environments in which the handsets are actually used. *See Ultra-Wideband Transmission Systems*, 17 FCC Rcd 7435 at paras. 152-163 (2002) (First R&O).

3. Minimize technical regulation. The Commission has often said it prefers technology-neutral regulation.[22] Here, 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.

4. Minimize non-technical regulation. BPL is a unique offering. There is no *a priori* reason to regulate it like any other service. Moreover, BPL is a nascent technology having few U.S. commercial customers at this writing, and no widely accepted technology standards. Yet it must compete with mature, extensively deployed services. Applying unnecessary rules to BPL in the interest of achieving some ill-defined parity with other services could cripple instead of catalyzing its viability as a broadband competitor. The Commission should regulate BPL no more than necessary to prevent radio interference.

5. Minimize testing costs and delays. Our experience at measuring emissions from BPL-equipped homes shows it to be a difficult task, due primarily to two factors. One is changing ambient noise, because BPL signals are typically close to the measurable threshold. The other is the highly variable nature of electric distribution network configurations, including the home electrical environment. To help alleviate these problems, the Commission should

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[22] *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).

allow manufacturers to use multiple, streamlined, laboratory-based measurement procedures where analysis can show these to reflect actual interference potential. But the Commission should not mandate test procedures that introduce new uncertainties as to the likely interference from any particular device. And the Commission should always retain the option of full-scale, on-site testing at representative installations as the most direct way of assessing the impact of BPL on the radio-frequency environment.

F. Technical Rules

1. Properties of BPL

The technical rules should reflect these realities of BPL emissions:

(a) POINT-SOURCE EMISSIONS. Some parties to this proceeding assume the entire length of a BPL-equipped power line emits radio-frequency noise, and hence evoke the frightening image of a miles-long transmitting antenna. That is simply wrong. BPL emissions come 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. In that respect it is much like other common sources of radio-frequency noise, such as computers and household appliances.[23] BPL uses the wires only as a conducted transmission medium, and has no more inherent propensity for causing interference than does any other unintentional digital emitter.

(b) NO AGGREGATION. Some parties likewise assume that noise signals from multiple BPL devices will aggregate harmfully. One or two BPL devices may not be a problem, they say, but additive emissions from tens of thousands over a small area will raise the noise floor. That,

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[23] Even the Commission incorrectly characterizes BPL signals as radiating from the wires as though they were antennas. *E.g.* Notice at paras. 21, 23.

too, is incorrect. An Access BPL system has one medium-voltage device at each transformer, but only one of those on a BPL distribution leg -- typically many blocks long -- can transmit at a time. Low-voltage devices, including user modems, may be closer together, but the HomePlug standard allows only one such device served by a given transformer to transmit at a time. The total emissions from all the houses served by one transformer add up to only one modem.[24] And when the signals from devices at one transformer reach the next transformer, they are too attenuated to add significantly.[25] There is no harmful aggregation.

(c) MINIMAL EFFECT OF WIDE BANDWIDTH. Some parties claim that BPL devices are more interfering than other unintentional emitters, such as computers or appliances, because they emit over a wide bandwidth. But emissions outside a victim receiver's passband have no significant effect on interference to that receiver. For example, a two-way radio with a 12.5 kHz receiver bandwidth is not affected by an interference source at frequencies outside that bandwidth. The overall bandwidth of a BPL system has no bearing on its propensity to interfere with any given receiver. In principle, perhaps, the higher bandwidth might be said to impact more receivers from a given BPL system. But it does not happen that way. Because BPL emissions are local to

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[24] The Commission acknowledged that a similar property of certain ultra-wideband systems prevents aggregated emissions from those devices. *Ultra-Wideband Transmission Systems*, 17 FCC Rcd 7435 at para. 234, *referring to* para. 228 (2002) (First R&O).

[25] To evaluate aggregation, we compare the aggregated signal at a victim receiver from several emitters some distance away to the signal from a single emitter nearby. Suppose a BPL-equipped transformer is located on a pole 9 meters above the receiver. We compare its interference potential to that from 10 other BPL-equipped transformers, each 100 meters away. The total signal at the receiver *from all 10 distant BPL devices combined* is only 8% of the signal from the device overhead. Thus, only the nearest device produces significant signal at the receiver. There is no relevant aggregation.

a point source and do not aggregate, even a wide bandwidth has little effect on a system's potential for interference to the overall population of receivers.

2. Emissions limits

We urge the Commission to identify and adopt emissions limits aimed at preventing actual BPL interference in the context of the existing radio-frequency environment. So far as possible, the rules should be framed to promote innovation and competition. There should be no regulation of BPL except that aimed at real risks of significant interference. In particular, the Commission should recognize that a BPL device mounted high on a pole or inside a metal curbside enclosure can safely be allowed somewhat higher emissions levels than a device used inside a residence.

The facts laid out in the preceding section support these approaches:

- Rules to limit interference should consist of a field strength specification at a particular distance. Manufacturers and providers should have full flexibility in how they achieve compliance.
- Field strength specifications should allow higher emissions in parts of the spectrum where they do not threaten interference.
- Conducted emissions should not be regulated at all, outside the AM broadcast band, because they have no direct bearing on interference.[26] Even an implementation that results in high conducted emissions should be unobjectionable so long as the radiated emissions stay within limits.
- Because Access BPL devices are either mounted high on a pole or enclosed within a metal curb-side housing, they should be permitted at

[26] Notice at para. 20. Today most plug-in receivers use switching power supplies and filters at the AC input that eliminate any realistic concerns about interference from conducted emissions introduced by way of the power cord.

least Class A emissions in both commercial and residential areas.[27] (At 30-88 MHz, where many BPL systems will operate, Class A is only 27 *billionths* of a watt.[28]) As an extra precaution, the Commission may wish to hold Access BPL to Class B in the TV and FM bands in residential areas.

- Because current In-House BPL devices transmit one at a time, there is no basis for setting their limits below Class B, which any receiver should be expected to tolerate.

3. Access BPL vs. In-House BPL

The Commission should not draw any regulatory distinction between Access BPL and In-House BPL. These terms distinguish components having different purposes to the end user; but that has no direct bearing on interference potential. As explained above, for each transformer and the cluster of homes that it serves, an Access and an In-House system together entail only two devices transmitting at any moment.[29] They carry out similar communications functions and can be expected to have similar radio-frequency characteristics. Accordingly, they should be subject to the same rules. Moreover, some providers may wish to offer integrated systems that deliver both Access and In-House functions, and may want to install devices that participate in both. That would be difficult under disparate rules.

Similarly, the Commission should not attempt to divide spectrum use between Access and In-House systems.[30] Any such partitioning is best handled by industry consensus, if it proves

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[27] Class A emissions high on a pole, 9 meters above a victim receiver, are lower than Class B at 3 meters (within 1 dB). *Compare* 47 C.F.R. Secs. 15.109(a) and (b) (distance conversions pursuant to 47 C.F.R. Sec. 15.31(f)(1)).

[28] 47 C.F.R. Sec. 15.109(b) (90 uV/m at 10m).

[29] This assumes the In-House system, like HomePlug, permits only one modem to transmit at a time.

[30] *See* Notice at para. 15.

necessary at all. The only rationale for partitioning we can see is to foster compatibility. In principle, partitioning would allow a consumer to sign up for any Access service and purchase any In-House system, knowing they would not interfere with one another. But this comes at a great cost in flexibility. In the wireless networking arena, consumers seem able to sort out the compatibility issues among standards set by such industry groups such as the Wi-Fi Alliance, the various IEEE 802 Working Groups, and the Bluetooth Special Interest Group. There should be even less confusion in the BPL arena, where a utility participating in Access service can easily inform customers which In-House devices are compatible.

4. Measurement Procedures

Current Technologies has worked extensively with FCC engineers on the problems of measuring emissions from BPL-equipped homes. Those problems can be significant. Because of the very low signal levels involved, it is difficult even to confirm that the readings obtained are due to BPL. When on-site measurements are taken outdoors at an appropriate distance from the house or pole-mounted device under test, changing interference from other sources -- typically licensed transmitters operating at power levels far higher than BPL -- routinely contaminates the results.

Accordingly, in addition to the option of on-site testing, Current Technologies would welcome standardized, reproducible test configurations that expedite emissions testing of BPL devices. Unfortunately, the present early stage of BPL development has not yet provided the industry with enough practical experience, under a broad enough range of operating conditions, to arrive at such test configurations. Therefore we ask the Commission to collaborate with the BPL industry to develop standardized, reasonably representative, reproducible, laboratory-based

configurations that can be constructed in a lab for testing both In-House and Access systems, and that do not arbitrarily reduce permissible BPL power levels below those to be set out in the emissions limits. These models do not have to give results identical to any particular real house, but need only be reasonably representative. Collaboration -- and a fully transparent development process -- are important to ensure the outcomes neither improperly discriminate among alternative BPL implementations nor disadvantage the BPL industry as a whole.[31]

In a close analogy, the Commission requires testing of ground-penetrating radars on a 20-inch bed of dry sand.[32] In practice these radars are used on all types of soil, and their emissions vary according to soil type. But the use of sand establishes a workable and reproducible procedure that reasonably represents operations in the field. In the same way, a suitable configuration representing a BPL-equipped house can greatly simply compliance measurements. But even if such a model is approved, on-site measurements remain the gold standard. Manufacturers must still retain the option of on-site testing, to allow for cases in which some incompatibility between the model and the BPL device yields misleading readings.

Equipment authorization.[33] BPL devices marketed for mounting on a pole or enclosure in a curbside housing should be subject only to verification, as they are now.[34] There is no need for

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[31] Notice at para. 23. Current Technologies notes that early development work may show it is too early for the industry to agree on such standards, in which case the Commission should defer the matter to a more propitious time. The development of testing models should not become a precondition to adoption of BPL technical rules.

[32] *Ultra-Wideband Transmission Systems*, 17 FCC Rcd 7435 at Appendix F, para. 1 (2002).

[33] Notice at para. 26.

[34] 47 C.F.R. Sec. 15.101(a) (table).

a change. Pole- and enclosure-mounted BPL equipment must always be professionally installed, and offers little potential for interference. Equipment that plugs into outlets or otherwise attaches to the 240/120 service and house wiring should be subject either to verification or Declaration of Conformity. There is no precedent for requiring certification. Indeed, the Commission does not subject any unintentional radiators to certification (except radar detectors, which the Commission found to pose a specific interference threat).[35]

CONCLUSION

The American public needs BPL, both to provide ubiquitous, low-cost broadband access where it is not otherwise available, and also to provide meaningful competition to existing broadband service platforms. Field experience shows the technology meets customers' needs, is cost-effective, and is ready to deploy more widely in the coming months.

The Commission should move expeditiously to issue a Notice of Proposed Rulemaking, in which it should propose the minimum regulation necessary to prevent interference.

Respectfully submitted,

Philip L. Verveer
Willkie Farr & Gallagher
1875 K Street, NW
Washington, DC 20006 USA
202-303-1117

Mitchell Lazarus
Fletcher, Heald & Hildreth, P.L.C.
1300 North 17th Street, 11th Floor
Arlington, VA 22209
703-812-0440
Counsel for Current Technologies, LLC

July 7, 2003

[35] 47 C.F.R. Sec. 15.101(a) (table).

SERVICE LIST

Chairman Michael Powell
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Commissioner Kathleen Q. Abernathy
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Commissioner Michael J. Copps
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Commissioner Kevin J. Martin
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Edmond J. Thomas, Chief, OET
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Julius P. Knapp, Deputy Chief, OET
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Bruce A. Franca, Deputy Chief, OET
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

James D. Schlichting, Deputy Chief, OET
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Michael J. Marcus
Associate Chief (Technology), OET
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Alan J. Scrime, Chief
Policy and Rules Division
Office of Engineering & Technology
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Rashmi Doshi, Chief
Laboratory Division
Federal Communications Commission
7435 Oakland Mills Rd
Columbia MD 21046-1609

Geraldine A. Matise, Deputy Chief
Policy and Rules Division
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Ira R. Keltz, Deputy Chief
Policy and Rules Division
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Lisa A. Gaisford, Chief of Staff, OET
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Karen E. Rackley, Chief
Technical Rules Branch
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

John A. Reed
Technical Rules Branch
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Anh Wride
Technical Rules Branch
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554