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

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

To: The Commission

COMMENTS OF SOUTHERN LINC, SOUTHERN TELECOM, INC., AND SOUTHERN COMPANY SERVICES, INC.

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Dated: July 7, 2003

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EXECUTIVE SUMMARY

Broadband over Power Line ("BPL") uses the existing medium- and low-voltage electric wiring to provide broadband connectivity to consumers. Southern LINC, Southern Telecom, Inc., and Southern Company Services, Inc. (collectively referred to herein as "Southern") – subsidiaries of Southern Company, the holding company for five electric utility operating companies – support the FCC's efforts to promote development of BPL. Southern is particularly interested in the potential for BPL to provide the utility operating companies with communications connectivity to every utility customer and to devices connected to the electric grid in order to improve the quality and reliability of electric service to Southern's customers and to reduce operating costs.

BPL can also provide a new facilities-based platform for the delivery of broadband communications services to consumers. In addition, the availability of a broadband communications port at every electric outlet opens the potential for a multitude of new applications and devices that would benefit from easy communications access.

BPL systems are a form of carrier current system that may be operated under Part 15 of the FCC's Rules. However, commercial development of these systems would greatly benefit from the removal of regulatory uncertainty. For example, equipment installed on medium-voltage electric lines should be defined as Class A digital devices. Standardized measurement procedures should also be adopted based on representative installations and statistical measures to help ensure that a high probability exists that the

system as a whole will comply with the applicable emissions limits. Finally, Southern recommends that the Commission continue to rely on radiated emissions testing for Access BPL to the exclusion of conducted emissions testing.

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Pursuant to Section 1.415 of the FCC's Rules, Southern Communications Services, Inc. d/b/a Southern LINC, Southern Telecom, Inc., and Southern Company Services, Inc. (collectively referred to herein as "Southern") hereby submit their Comments on the FCC's *Notice of Inquiry* in the above-captioned matter.[1] By this *NOI*, the FCC has requested information on a number of technical issues related to the development of Broadband over Power Line ("BPL") systems. BPL systems are new types of carrier current systems, operated under Part 15 of the FCC's Rules, that use existing electric power lines to provide high-speed communications services. The FCC has initiated this inquiry to evaluate the state of BPL technology and determine whether changes are needed to Part 15 to facilitate deployment of this technology.

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[1] In re Inquiry Regarding Carrier Current Systems, including Broadband over Power Line Systems, ET Docket No. 03-104, *Notice of Inquiry*, 18 FCC Rcd. 8498 (2003) *("NOI").*

I. INTRODUCTION

Southern LINC, Southern Telecom, Inc., and Southern Company Services, Inc. are wholly-owned subsidiaries of Southern Company, which is a registered holding company under the Public Utility Holding Company Act of 1935, as amended. Southern Company, through five electric utility subsidiaries, Alabama Power Company, Georgia Power Company, Gulf Power Company, Mississippi Power Company, and Savannah Electric and Power Company (collectively referred to herein as the "Operating Companies"), provides retail and wholesale electric service throughout a 120,000 square mile service territory in Georgia, most of Alabama and parts of Florida and Mississippi. Southern LINC provides Commercial Mobile Radio Service to business, government, and consumer subscribers, as well as serving Southern Company's operating utility companies. Southern Telecom, Inc. provides long-haul and metropolitan dark fiber and other infrastructure assets in support of competitive telecommunications services**.** Southern Company Services, Inc. provides administrative and other functions, including internal telecommunications services, in support of Southern Company and its Operating Companies.

Southern very much appreciates the leadership role the FCC has assumed by initiating this inquiry. The technology for BPL is now near commercial development with numerous field trials underway.[2] Investment in this technology would benefit,

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[2] Southern Telecom, Inc. was granted an Experimental License (Call Sign WC2XZG) on August 29, 2002 to test various configurations of BPL equipment available from several vendors in order to gauge customer acceptance and general compliance with the Commission' s Part 15 Rules.

however, from the removal of regulatory uncertainty and the clarification or modification of any rules that unnecessarily inhibit deployment.

A. BPL Will Improve Utility Operations and Customer Service

Southern has been following the development of BPL for a number of years because of the potential for this technology to support a number of initiatives that could result in significant benefits to Southern's electric consumers. BPL offers the potential for Southern's Operating Companies to have communications connectivity to every customer and, at least theoretically, to every device connected to the power grid. At a macro level, this connectivity would provide Southern with the ability to better monitor and control electric system operations, which would, in turn, improve the reliability of service to its customers and reduce costs.

Although often taken for granted, the quality of electric service is becoming as important as the continuous availability of power. In some high technology manufacturing operations (for example, fabrication of silicon microchips), variations in power quality can have deleterious effects on the sensitive manufacturing equipment and, consequently, on the quality of the finished product. Southern's ability to cost effectively deploy more monitoring devices throughout its power network would permit it to more closely analyze variations in power quality and take immediate corrective measures.

By using existing medium- and low-voltage electric distribution plant, intelligent pathways can be created to allow for increased automation of electric operations. Southern's Operating Companies currently serve over four million electric customers in Southern Company's four-state operating territory. At present, the primary means by

which Southern identifies the location and extent of a system outage is through trouble calls initiated by its customers. With the installation of intelligent devices on the power grid and the use of BPL, Southern would be able to immediately identify the areas affected by an outage and, depending on the devices placed on the network, the most likely point at which a circuit is down or a piece of equipment is malfunctioning. Just being able to identify with more precision the location of an electric system fault could save minutes, if not hours, of time in restoring service. A communications pathway coextensive with its electric grid would also mean that Southern could install equipment with the capability to remotely control additional aspects of the power grid without dispatching a crew. All of these activities mean higher reliability in electric service, better quality electric service, and reduced operating cost. As a regulated utility, such cost reductions would benefit Southern's ratepayers.

B. BPL Will Provide a New Facilities-Based Platform for Broadband Competition

Southern is also interested in the potential for BPL to provide a communications platform for the delivery of competitive broadband services to consumers. As discussed more fully below, BPL provides the opportunity for additional facilities-based competition without significant construction.

Southern believes that additional broadband Internet access services would be welcomed in the marketplace, given the limited choices available today in many areas of the country. According to the FCC’s most recent statistics, 29% of the zip codes in the

United States are served by no broadband services providers or at most one.[3] Moreover, in a number of states, the percentage of zip codes with one or fewer broadband providers exceeds 40%.[4] Thus, while broadband access appears to be increasing nationally, significant areas of the country today still lack any type of broadband access or any competition among broadband service providers. Access BPL could help to further increase the availability of broadband connections and improve the competitiveness of the broadband access market.

C. BPL Creates the Potential for New and Innovative Services

The potentially ubiquitous nature of BPL creates the opportunity for any number of new and innovative services beyond mere connectivity to the "public" Internet. With BPL, a broadband platform can be created to virtually any location served with electric outlets. Since electric outlets are a common and widespread feature of everyday life, the prospects for and availability of new broadband devices and services running over BPL systems are limited only by the imagination.

That imagination begins with the utilities themselves. For a utility's own customer service department, broadband connectivity to each customer would permit automatic meter reading, time-of-use pricing for electric services (with the potential for "smart" appliances to automatically adjust operations to pricing signals transmitted by the

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3 *High Speed Servs. for Internet Access: Status as of December 31, 2002*, Industry Analysis and Technology Division, Wireline Competition Bureau, FCC, at Table 12 (June 2003).

4 Alaska, 78%; Arkansas, 53%; Hawaii, 51%; Idaho, 45%; Iowa, 56%; Kansas, 54%; Kentucky, 52%; Minnesota, 41%; Montana, 56%; Nebraska, 56%; New Mexico, 48%; North Dakota, 84%; Oklahoma, 41%; South Dakota, 64%; Vermont, 41%; West Virginia, 56%; Wyoming, 45%.

power utility), and delivery of electronic bills or account information. Both the business and the customers would benefit from greater efficiencies, cost savings, and improved information exchange.

Thinking beyond the utilities themselves, third parties could use this virtual private network to deliver information to consumers, whether or not they have full Internet access, simply by furnishing customers with BPL-enabled devices. One can imagine devices that would allow a local appliance repair shop to monitor the "health" of BPL-enabled appliances and schedule a service call before the consumer even knows the appliance is failing. In a BPL-connected world, a refrigerator equipped with a BPL modem and on-the-door display is no longer just a big, cold food box. It could become a message center.

While many such applications could be provided over what is commonly understood as the "public" Internet, BPL offers a bigger vision, that of another last mile connection to the home that supports multiple devices with ease and simplicity. Today, the last-mile connection for Internet access is typically to a single port or gateway at the home (*e.g.*, the cable or DSL modem). Connection of remote devices within the home requires either extension of coaxial cable or Ethernet (Cat 5) cable to each location where connectivity is desired, or deployment of a dedicated wireless network (*e.g.*, so-called "Wi-Fi" equipment operating on an unlicensed basis). With BPL, the potential for any electric outlet to become a broadband port to the outside world suddenly makes a number of applications very consumer friendly and cost-effective since there is no need for additional in-house construction or investment in broadband connectivity other than the incremental cost of the appliance itself.

II. BPL USES EXISTING LOW- AND MEDIUM-VOLTAGE ELECTRIC WIRING TO PROVIDE BROADBAND CONNECTIVITY

A. Access BPL is a Facilities-Based Service That Can Be Implemented in a Number of Network Architectures

In the *NOI*, the FCC distinguished "In-House BPL" from "Access BPL." In-House BPL has been defined as the use of BPL technology to provide networking between personal computers and peripheral devices using the home's low-voltage electric wiring as the transmission medium. Access BPL has been defined as the use of BPL technology to provide "last-mile" connectivity between users and the Internet using medium-voltage electric distribution wiring as the transmission medium. Southern will limit the present Comments to Access BPL.

Access BPL utilizes the existing electric power grid as the foundation for the delivery of broadband communications services directly to homes and businesses without significant construction activity. Like other facilities-based broadband services, such as DSL or cable modem, the service is provided to the customer by utilizing the additional signal-carrying capacity of existing facilities.

There are at present two principle means of using BPL to provide broadband Internet access that rely upon two different network architectures: (1) a customer may receive broadband services by either plugging a small, inexpensive modem into any electric outlet in the home or business and connecting that modem to the Universal Serial Bus ("USB") or Ethernet port of a computer; or (2) by installing an 802.11 ("Wi-Fi") transceiver in an expansion port of the computer and connecting wirelessly to a Wi-Fi transceiver mounted on utility plant and using BPL on the medium-voltage distribution lines to provide back-haul of signals to an aggregation point, such as at the electric

substation. In either architecture, communications signals are transmitted along the electric power lines using RF energy imposed on the lines through safe inductive coupling techniques. Although one of the major impediments to the deployment of BPL has been devising techniques to efficiently pass the BPL signals through or around step-down electric transformers, which tend to act as natural filters of these signals, a number of safe and effective technologies have now been developed to overcome these difficulties, including, as mentioned above, the use of Wi-Fi transceivers to wirelessly provide the "last hundred meters" of service to the customer.

There are three distinct components to an Access BPL system:

1. Medium voltage (1,000 to 40,000 volts) distribution lines from the electric substation to each neighborhood;
2. Electric transformers close to consumer locations to step-down the voltage to 220/110 volts; and
3. Feeder lines from the transformer into fuse boxes or circuit breakers in homes or businesses, for delivery of electricity to outlets and fixtures within the premises.

Implementation of BPL offers the potential for widespread, economical extension of broadband communications capability to anyone served with an electric outlet.[5] Because there is no need to install additional lines, BPL can be deployed without the need to trench along or through city streets, one of the most costly, time-consuming, and

[5] Penetration rate of electric service to households in the United States is about 99%, compared with 95% for telephone service and 67% for cable television. *1990 Decennial Census of Housing*, U.S. Bureau of the Census; *Telephone Subscribership in the United States*, Industry Analysis and Technology Division, Wireline Competition Bureau (May 2002); In re Annual Assessment of the Status of Competition in the Mkt. for the Delivery of Video Programming, MB Docket No. 02-145, *Ninth Annual Report*, 17 FCC Rcd. 26901 (2002) (cable systems are

controversial aspects of bringing new, facilities-based competitive services to consumers. Moreover, distribution of BPL signals within the home or building has been facilitated through the commercial availability of consumer equipment conforming to industry standards for such in-building networking using existing power lines.[6] This relative ease of facilities deployment, combined with use of existing standardized technology, make BPL a very attractive and viable facilities-based option in the broadband market.

B. Access BPL Is a Competitive Broadband Platform That Would Benefit From Removal of Regulatory Uncertainty

Over a year ago, Chairman Powell predicted the advent of BPL as an alternative broadband delivery platform:

> Somebody is going to [figure out how to] use the electrical grid as a broadband platform. … Think about it. If every electrical plug becomes a broadband port, that would be huge.[7]

That prediction is about to become a reality, with a number of equipment developers and electric utilities ready to deploy limited test networks using this technology. The FCC has already issued a number of Experimental Licenses related to BPL, and data generated in these and other trials has proven that the technology is viable and potentially competitive with other broadband platforms.

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estimated to pass 78-97% of households in the U.S., depending on whether one considers all households or just households with television receivers).

6 The HomePlug standard has been adopted by a number of manufacturers to permit in-building networking over power lines. See http://www.homeplug.org. As noted above, however, Southern's Comments relate only to use of BPL on the electric distribution network outside the home or office.

7 The FCC's Powell on Broadband Rules, Business Week Online (Feb. 22, 2002). http://www.businessweek.com/bwdaily/dnflash/feb2002/nf20020222_3120.htm (last visited June 29, 2003).

BPL will support the FCC's well-articulated policies in furtherance of competition among broadband platforms.[8] The FCC has outlined the following "overarching principles" for developing regulatory policies in connection with broadband services:

1. Consistent with statutory mandates, the FCC's primary policy goal is to encourage the ubiquitous availability of broadband to all Americans.

2. Broadband services should exist in a minimal regulatory environment that promotes investment and innovation in a competitive market.

3. The FCC seeks to create a rational framework for the regulation of competing services that are provided via different technologies and network architectures.[9]

The FCC has specifically noted that it will "seek to remove regulatory uncertainty that in itself may discourage investment and innovation."[10] Chairman Powell also noted:

> As we policymakers are all quick to acknowledge, broadband deployment is the central communications policy objective in America. … Many of these commenters have been calling, in particular, for the Commission to provide regulatory certainty and clarify in the provision of broadband Internet access services by limiting unnecessary or unduly burdensome regulatory costs on service providers.
>
> …[O]ur greatest challenge in promoting broadband is deciding how best to stimulate enormous private sector

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8 *See* In re Appropriate Framework for Broadband Access to the Internet Over Wireline Facilities, Universal Service Obligations of Broadband Providers, CC Docket No. 02-33, *Notice of Proposed Rulemaking*, 17 FCC Rcd. 3019 (2002*) ("Wireline Broadband NPRM"). See also* Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities; Internet Over Cable Declaratory Ruling; Appropriate Regulatory Treatment for Broadband Access to the Internet Over Cable Facilities, GN Docket No. 00-185, *et al., Declaratory Ruling and Notice of Proposed Rulemaking*, 17 FCC Rcd. 1498 (2002) *("Cable Modem Declaratory Ruling"), appeal pending sub. nom. Brand X Internet Services v. FCC*, Nos. 02-70518, et al. (9th Cir.).

9 *Cable Modem Declaratory Ruling* at ¶¶ 4-6.

10 *Id.* at ¶ 5.

> investment. In order to overcome this challenge, we must…now clarify the regulatory classification and treatment of these new services, so companies – incumbents and competitors alike – know what to expect and can make prudent decisions to build and enter these new markets.
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> …Because the capital for infrastructure investment will have to come primarily from the private sector, the FCC must try to minimize the cost of bringing broadband services to the public by minimizing regulatory costs. These regulatory costs can be just as significant a barrier to deployment as the challenge of raising capital in the dark of a recession.[11]

Through this *NOI* and any resulting rulemaking proceedings, the FCC will help to remove regulatory uncertainty and encourage the availability of broadband via infrastructure that is already ubiquitous.

Congress and the FCC have repeatedly recognized that regulation has a chilling effect on the deployment of new technologies, raises costs of services to consumers, and diverts funds that could be used to create new content and applications.[12] Section 7 of the Communications Act of 1934 states that it is the policy of the United States to encourage the provision of new technologies and services to the public, and it sets a one year limit for the FCC to determine whether a new technology or service presented in a petition or application is in the public interest.[13] Section 706 of the Telecommunications Act of

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11 *Wireline Broadband NPRM*, Separate Statement of Chairman Michael K. Powell.

12 *See, e.g.*, In re TCI Cablevision of Oakland County, Inc., CSR-4790, *Memorandum Opinion and Order*, 12 FCC Rcd. 21396, 21441-42 (1997) (regulatory over-reaching by local authorities will discourage competition and new services); and In re 2000 Biennial Regulatory Review: Spectrum Aggregation Limits for CMRS, WT Docket No. 01-14, *Report and Order*, 16 FCC Rcd. 22668, 22677-79 (2001) (Congress and the Commission consistently prefer deregulation over regulation).

13 47 U.S.C. § 157 (2000).

1996 implores the FCC to encourage and accelerate deployment of broadband by "removing barriers to infrastructure investment."[14] The Telecommunications Act of 1996 also encourages utility entry into telecommunications by relaxing certain provisions of the Public Utility Holding Company Act of 1935 to permit registered utility holding companies to provide telecommunications and related services through separate corporate affiliates. Thus, it is entirely appropriate for the Commission to explore ways of eliminating unnecessary barriers to the deployment of BPL.

III. SIGNIFICANT PROGRESS HAS BEEN MADE IN DEVELOPING BPL EQUIPMENT FOR THE MARKETPLACE

A. Spectrum to be Used for Access BPL

Although the *NOI* notes that experimental licenses have been granted to parties under Part 5 of the FCC's Rules to evaluate BPL equipment that operates across the range of 1.7 to 80 MHz, Southern believes that commercial deployment of BPL will be primarily located in the 1.705 to 50 MHz band. To the best of Southern's knowledge, all companies currently developing equipment for Access BPL limit operations to 50 MHz at the top end. Consequently, it is not anticipated that Access BPL will operate on any frequencies allocated for television broadcasting. It is possible that Access BPL will share some of the same spectrum as In-House BPL, but the characteristics of In-House BPL are quickly becoming standardized, with the expectation that Access BPL will be deployed in such a manner as to be compatible with In-House BPL systems.

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[14] 47 U.S.C. § 157, Historical and Statutory Notes.

B. Spectrum Sharing Between Access BPL and In-House BPL

Southern does not believe it will be necessary for the FCC to designate specific spectrum for use by Access BPL or In-House BPL. As noted above, the characteristics of In-House BPL are becoming standardized, and Access BPL systems can be designed to avoid conflict with In-House BPL systems or, in some network architectures, to be fully compatible with In-House BPL. If the FCC were to designate discrete frequency bands for each type of BPL, it might unnecessarily foreclose innovative network designs.

C. Data Transmission Speeds, Protocols, and Modulation Techniques

Southern's research indicates that, depending on the particular vendor's design, data transmission rates for Access BPL can range from 250-500 kbps on the low end to speeds that are about twice as fast as the current generation of cable modems. It is also important to note that Access BPL systems are generally designed to provide symmetrical transmission rates, meaning that in contrast to DSL and cable modem subscribers, BPL users will be able to upload data at the same rate as they can download. The availability of high data rates on both the upstream and downstream paths makes BPL ideally suited for some of the newer applications on the Internet, such as IP telephony and multi-player interactive video games.

Testing so far has focused on providing Ethernet-based services using standard Internet type protocols (*e.g.*, TCP/IP). Different vendors use different modulation schemes, but the particular modulation scheme used seems to have no effect on the ability of the system to comply with the FCC's Part 15 emissions limits.

D. Anticipated Timeframe for Commercial Deployment of Access BPL

Southern believes a number of utilities will conduct field and market trials of Access BPL in 2004, and depending on the success of these trials, will commence commercial deployment in 2005. Based on the state of the technology, the need to conduct marketing trials, and the need to carefully assess all aspects of the technology and back-office systems prior to any large-scale deployment, Southern anticipates that deployment of Access BPL in the 2004-05 timeframe will generally be limited installations.

It should be noted that despite recent press reports of commercial BPL deployment, Southern understands that these are limited deployments still aimed at testing the equipment and market acceptance. True "commercial deployment" will only occur once the BPL technology and back-office systems have been perfected and there is evidence that consumers will pay commercially reasonable rates for this service.

E. Standards

Southern is not aware of any generally-accepted standards specifically applicable to Access BPL. Although the HomePlug standard is available for In-House BPL systems and could have relevance to certain types of Access BPL systems, it is not intended as a standard for Access BPL, *per se*.

The lack of standards for Access BPL is likely due to the number of proprietary technologies that are currently vying for acceptance within the utility industry from a number of technology suppliers, none of whom has a dominant position in this market. As a result, little incentive exists among the technology companies to agree on a common

standard until there has been further "shake-out" among technology companies in this sector or until the utilities begin to rally around a single technology. Neither scenario appears likely in the near term because electric systems have unique configurations that would have to be taken into consideration in the BPL standardization process and because continuing regulatory uncertainty – discussed below – regarding Access BPL does not inspire confidence among industry players to engage in a standard-setting process. This absence of standards-setting can be contrasted with the experience in the telephone and cable industries, which used existing communications media to develop broadband data platforms and had strong industry support toward developing standards. Until the regulatory issues associated with BPL are clarified and utilities become comfortable making the significant investment that will be needed to launch commercial BPL service, standard-setting will probably receive little effort and attention.

IV. COMPATIBILITY OF ACCESS BPL WITH LICENSED RADIO SERVICES

A. Status of Access BPL Under the FCC's Rules

As part of its general re-write of Part 15 in 1989, the FCC drew a distinction between “intentional” and “unintentional” radiators and reclassified carrier current systems by these new definitions.[15] Carrier current systems designed to use receivers that operate by conduction directly from the electric power lines are defined as unintentional radiators, and those that are designed with receivers that receive signals over-the-air due

[15] In re Revision of Part 15 of the Rules Regarding the Operation of Radio Frequency Devices Without an Individual License, ET Docket No. 87-389, *First Report and Order*, 4 FCC Rcd. 3493 (1989).

to radiation of the signals from the lines are classified as intentional radiators.[16] Under the regulations applicable to unintentional radiators, carrier current systems operating below 30 MHz are exempt from the conducted emissions limits of Part 15, except in the AM broadcast band at 535-1705 kHz.[17] There are no conducted emissions limits for carrier current systems operating above 30 MHz.

The rules adopted in 1989 also set radiated emissions limits for carrier current systems operating below 30 MHz, whether operated as intentional or unintentional radiators, according to the radiated emissions limits for an intentional radiator.[18] Thus, for BPL systems operating between 1.705 and 30 MHz, the radiated emission limit is 30 microvolts per meter measured at a distance of 30 meters.[19] For carrier current systems above 30 MHz, the rules adopted in 1989 impose the general limits on unintentional radiators.[20] For BPL systems operating between 30 and 88 MHz, the rules generally impose a field strength limit of 100 microvolts per meter measured at a distance of 3 meters, except for any devices that would be classified as "Class A digital devices."[21] By

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16 47 C.F.R. § 15.3(f) (2002).

17 47 C.F.R. § 15.107(c) and 207(c) (2002). Conducted emissions from carrier current systems in the AM band are limited to 1000 uV.

18 Section 15.109(e) provides an alternative limitation for an unintentional radiator operating in the AM band: these systems may comply with the radiated emissions limits specified in Section 15.221(a) for carrier current systems using "leaky coaxial cable" as the radiating element.

19 47 C.F.R. § 15.209(a) (2002).

20 The general emission limits for unintentional radiators are specified at 47 C.F.R. § 15.109(a) (2002).

21 47 C.F.R. § 15.109(a).

contrast, the limit for Class A devices in the 30-88 MHz band is 90 microvolts per meter measured at a distance of 10 meters.[22]

In 1999, the FCC proposed to amend the conducted emission limits as part of its biennial regulatory review under Section 11 of the Communications Act.[23] Although a few commenters to an earlier *Notice of Inquiry* had requested changes to the limitations applicable to carrier current systems, the FCC concluded that there was insufficient information concerning new power line carrier ("PLC") systems to justify changes.[24] The FCC stated that it would consider changes to these standards at a later date if additional information justifying a change in regulations were forthcoming.[25] The FCC did, however, request comment on alternatives to the measurement requirements for radiated emissions from carrier current systems.[26]

In its May 2002 *Report and Order* on the 1998 Biennial Review, the FCC noted that "there is substantial development under way of new broadband delivery systems that use power line communication technologies."[27] In order to allow for a "better and more complete decision," the FCC decided to defer to a further proceeding the consideration of new limits and measurement procedures for carrier current system devices.[28]

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22 47 C.F.R. § 15.109(b) (2002).

23 In re 1998 Biennial Regulatory Review – Conducted Emissions Limits Below 30 MHz for Equip. Regulated under Parts 15 and 18 of the Commission's Rules, ET Docket No. 98-80, *Notice of Proposed Rule Making*, 14 FCC Rcd. 18180 (1999).

24 *Id.* at 18186.

25 *Id.* at 18190-91.

26 *Id.* at 18190.

27 In re 1998 Biennial Regulatory Review – Conducted Emissions Limits Below 30 MHz for Equip. Regulated under Parts 15 and 18 of the Commission's Rules, ET Docket No. 98-80, *Report and Order*, 17 FCC Rcd. 10806, 10809-10 (2002).

28 *Id.* at 10810.

B. Access BPL Systems Are Designed to Comply With Part 15

The existing Part 15 rules impose on Access BPL systems significant limitations intended to protect licensed users of the spectrum. Moreover, Part 15 rules include specific prohibitions on Part 15 devices causing "harmful interference."[29] Despite the early protests of a number of amateur radio licensees, companies that are developing Access BPL technologies or intending to deploy Access BPL fully understand that these systems are subject to a number of regulatory conditions intended to prevent harmful interference.

The mere *potential* for interference should not be sufficient for the FCC to further restrict Access BPL deployment. Contrary to the contentions of the radio amateurs, the FCC's Rules in Part 15 do not impose a burden on the developer or user of a Part 15 device to demonstrate that the device will operate on an interference-free basis under all circumstances. Having to "prove a negative" such as this would impose an impossible burden and effectively eliminate the potential for unlicensed devices to share spectrum with other radio services. In fact, Southern expects to participate in additional testing in the future to determine whether the Part 15 rules can be further relaxed with respect to BPL without creating harmful interference to other spectrum users. Southern believes that testing will show that these rules can be relaxed, which could greatly facilitate the provision of BPL to less populated areas.

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[29] "Harmful interference" is functionally defined as "[a]ny emission, radiation or induction that endangers the functioning of a radio navigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radiocommunications service operating in accordance with this chapter." 47 C.F.R. § 15.3(m) (2002).

As explained below, one of the more critical considerations is the method or methods by which compliance may be measured. Unless recognized, easily repeatable methods for measuring compliance exist, parties will lack confidence that their systems do, in fact, comply with Part 15. It is unnecessary, however, to define frequency bands to be avoided by Access BPL or to make other modifications to Part 15 in order to further protect licensed services. Southern is not aware of any reported cases of harmful interference from the use of this technology.[30] Access BPL is still at the initial stages of deployment, and to erect additional barriers to BPL operation at this point could signal the end of this promising new broadband access platform.

V. APPLICATION OF THE FCC'S RULES TO ACCESS BPL

A. Access BPL Equipment on Medium Voltage Lines Should be Defined as a Class A Computing Device

As noted above, BPL systems are constrained by the existing limitations on radiated emissions applicable to carrier current systems. Application of these limitations to BPL systems is also imprecise due to the regulatory distinction between "Class A" digital devices and "Class B" digital devices. That is, a Class B digital device, which is subject to more restrictive limitations on radiated emissions, is defined as a digital device "that is marketed for use in a residential environment notwithstanding use in commercial, business and industrial environments. Examples of such devices include, but are not

[30] A number of radio amateurs have commented that interference from electric power lines is difficult to identify and correct, and they suggest that Access BPL will be of the same type. These concerns are unfounded, however, because there are a multitude of locations on a normally functioning electric power system where RF noise can be detected by sensitive amateur radio receivers. By contrast, Access BPL will involve identifiable RF devices on discrete power lines and operating on specific radio frequencies or bands of frequencies.

limited to, personal computers, calculators, and similar electronic devices that are marketed for use by the general public."[31]

By contrast, a Class A digital device is one "that is marketed for use in a commercial, industrial or business environment, exclusive of a device which is marketed for use by the general public or is intended to be used in the home."[32] While certain components of a BPL system, such as the BPL modem used by the subscriber, are clearly intended to be marketed for use by the general public, most of the components in a BPL system will not be marketed to the general public.

The Office of Engineering and Technology ("OET") has explained that in determining whether a particular device should be classified as Class A or Class B, the FCC normally considers three questions:[33]

1. Is the marketing of the device restricted in such a manner that it is not sold to residential users?

BPL equipment to be installed on or near medium voltage power lines will necessarily be marketed to electric power utilities. Because of safety and ownership issues, members of the general public would have no ability to install BPL equipment on medium voltage power lines. Thus, advertising, sale, and distribution of outdoor BPL equipment will be restricted by marketers to users in a commercial, industrial, or business environment.

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31 47 C.F.R. § 15.3(i) (2002).

32 47 C.F.R. § 15.3(h) (2002).

33 *Understanding the FCC Regulations for Computers and Other Digital Devices*, OET Bulletin No. 62, p. 8-9 (Dec. 1993) (edited and reprinted Feb. 1996).

2. Does the application for which the device is designed generally preclude operation in residential areas?

OET Bulletin 62 indicates that Class A devices are those which are highly unlikely to be used in a residential environment, where Class B limitations would help to protect against interference being caused to a neighbor's house or apartment.[34] Medium voltage power lines are typically located on electric transmission or distribution poles or in underground conduit systems located on or adjacent to the public right-of-way. Overhead lines, by their very nature, are usually located at least ten meters away from homes and apartment buildings. Moreover, the buildings themselves would provide shielding to consumer devices that might be susceptible to interference. Signals on medium voltage lines in underground conduit systems are further attenuated due to the conduit system and surrounding earth.[35]

3. Is the price of the device high enough that there is little likelihood that it would be used in a residential environment, including a home business?

This factor seems to be directed to devices that, by their nature, might be usable in a home environment but are unlikely to be purchased for use in the home due to high cost. As noted above, however, BPL components intended to be installed on medium voltage power lines will not be useful to or useable by consumers in their homes. Thus, regardless of cost – and they are unlikely to be inexpensive due to the need for these devices to operate in extreme weather and electrical conditions – these devices are not the type that any consumer would install or use in a residential environment. In light of the

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34 *Id*. at 3.

35 Part 15 already acknowledges the attenuation of radio signals from transmitting devices that are located underground, such as in tunnels and mines. *See, e.g.*, 47 C.F.R. § 15.211 (2002) (operation of "tunnel radio systems").

factors discussed above, BPL components used outside the home and intended to be installed on or in close proximity to medium voltage power lines should be considered Class A digital devices and subject to the higher limits for such devices.

B. Measurement Procedures Should Be Standardized and Based on Representative Installations

As noted in the *NOI*, radiated emissions measurements for carrier current systems can be time-consuming and difficult because of the variations in wiring and installations.[36] The FCC's Rules contain no specific test methods for carrier current systems, leading to uncertainty as to whether a given installation would be deemed compliant with the emissions limitations of Part 15.

Southern, therefore, encourages the Commission to adopt standardized measurement procedures that permit testing at a number of representative configurations. Because of the wide variety of potential installations, test procedures could incorporate statistical measures to help ensure that a high probability exists that the system as a whole will comply with the emissions limits.

Southern also recommends that emissions testing of Access BPL be based on average peak measurements, not quasi-peak measurements. The quasi-peak measuring method was developed in the 1930s to measure interference to broadcast radio reception.[37] Accordingly, although quasi-peak measuring has evolved over the years, it is not clear whether it is the best method for analyzing the interference potential of something as advanced as Access BPL. Southern believes that the Commission should

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36 *NOI* at ¶ 23.

37 Edwin L. Bronaugh, *The Quasi-Peak Detector*, IEEE EMC Society Newsletter Online, Summer 2001 (available at http://www.ieee.org/organizations/pubs/newsletters/emcs/summer01/index.htm).

closely investigate this issue and give strong consideration to allowing testing of Access BPL to based on average peak measurements.

C. Testing for Access BPL Should Be Limited to Radiated Emissions

In the *NOI*, the Commission asks whether conducted emissions limits alone would be sufficient to control harmful interference from BPL systems.[38] To the contrary, Southern believes that *radiated* emissions limits alone should be used to limit harmful interference from Access BPL systems.

As noted above, and depending on frequency band, carrier current systems can be subject to both radiated emissions testing and conducted emissions testing. Conducted emissions limits are intended to prevent RF energy from devices connected to AC power lines from being carried along those lines to other devices connected to the same AC power lines. Conducted emissions limits are also intended to limit the potential for AC power lines to act as antennas for long wavelength frequencies (*i.e.*, those below 30 MHz) and interfering with devices located some distance from the lines due to the low propagation loss of frequencies in this range.[39] Unintentional radiators, such as Access BPL, are exempt from conducted emissions limits for all frequencies below 30 MHz except the AM broadcast band at 535-1705 kHz,[40] and there are no conducted emissions limits for carrier current systems operating above 30 MHz.

Because Access BPL systems are expected to operate above 1.705 MHz, conducted emissions limits will not apply. Access BPL, by its very nature, involves

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38 *NOI* at ¶ 23.

39 In re 1998 Biennial Regulatory Review – Conducted Emission Limits Below 30 MHz for Equipment Regulated under Parts 15 and 18 of the Commission's Rules, ET Docket No. 98-80, *Report and Order*, 17 FCC Rcd. 10806 (2002).

40 47 C.F.R. §§15.107(c) and 15.207(c) (2002).

placing RF energy onto electric power lines, so measurement of radiated emissions is the most direct way of understanding the interference potential of the system. Southern, therefore, recommends that the Commission continue to rely on radiated emissions testing for Access BPL to the exclusion of conducted emissions testing.

VI. CONCLUSION

Access BPL can provide more efficient operation of electric power systems and improved reliability for consumers. This broadband platform also offers the potential for greater access to broadband services, improvements in the competitiveness of the broadband services marketplace, and the potential for new products and services that would benefit from having a broadband connection available at any electric outlet. However, to make the investment to bring this technology to the market, utilities must have some regulatory certainty on the technical and operational requirements for these systems. Southern therefore urges the Commission to confirm the status of Access BPL under Part 15 and to clarify the measurement procedures for assessing compliance of Access BPL with the relevant Part 15 limits.

WHEREFORE, THE PREMISES CONSIDERED, Southern respectfully requests the FCC to take action in this docket consistent with the views expressed herein.

Respectfully submitted,

SOUTHERN LINC, SOUTHERN TELECOM, INC., AND SOUTHERN COMPANY SERVICES, INC.

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Dated: July 7, 2003

CERTIFICATE OF SERVICE

I, Mary Malone, do hereby certify that on this 7th day of July, 2003, I caused a copy of the foregoing "Comments of Southern Linc, Southern Telecom, Inc., and Southern Company Services, Inc." to be mailed via first-class mail to each of the following:

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