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

In the Matter of Amendment of Part 15 Regarding New Requirements and Measurement Guidelines for Access Broadband Over Powerline Systems	)	**ET Docket No. 04-37**
By W. Lee McVey, P.E.,	)	
To: The Commission	)	

COMMENT

My comments were planned to incorporate, as appropriate, the results of field tests conducted by the National Telecommunications and Information Administration.

Since only the first part of their study has been completed, and the release of its data occurring only a few days ago on April 27, there has not been sufficient time to read and interpret the results of the study.

Apparently, too, the Commission has decided not to respond to several Motions for extension of the Comment period on the above matter, even though the NTIA study was released only 5 business days prior to closure of public comments.

As a result, I have submitted as an Appendix to my Comments, the Executive Summary of the NTIA Phase 1 report. I have done this to ensure that the Commission receives, as part of the formal Comment proceedings, at least a summary of the NTIA study and its many caveats of what deployment of ABPL at existing Part 15 levels may mean for essential federal, state and local government communications. And, in particular, aircraft communications and air traffic control.

It is particularly of concern that a second, even more critical NTIA Phase 2 study has yet to be completed, that will predict the effects of larger-scale ABPL deployments at existing Part 15 limits on distant communication systems. This will be particularly important to determine the effects of ABPL at existing Part 15 levels on distant air traffic control, emergency, and national security communications.

The NTIA Phase 1 study results document adverse effects on federal communications in the vicinity of ABPL repeater devices at existing Part 15 levels. As a result, the Commission should, at this time, effect a significant reduction in permitted radiation levels from power system equipment. Since federal communications must be permitted to occur without vicinity constraints, limiting operation of ABPL systems to greater than a given distance from federal facilities offers no solution to mobile unit or aircraft operation near or above ABPL-equipped power lines.

It is reasonable to expect that responsible rulemaking proceedings take into account existing credible technical data, and, within reason, results of ongoing studies deemed relevant to the matter at hand. The NTIA results summarized thus far clearly warrant a

significant reduction in permissible Part 15 radiation from power system equipment. And, depending on its outcome, the NTIA Phase 2 study may require additional limitations, when the cumulative effects of large, wide-spread systems are carefully modeled.

Since the Phase 1 study demonstrated potentially serious impact to aircraft communications, deployments of ABPL systems should be restrained to emission levels that will not effect aircraft communications in the interest of public safety and homeland security. It does not require a vivid imagination to envision the potential outcomes should an aircraft have its instrument or voice communications impaired, on approach to one of the Washington, D.C. airports, while crossing over Manassas, VA, where a city-wide deployment of ABPL is underway.

Respectfully Submitted,

/s/

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Appendix: Executive Summary to NTIA Phase 1 Study on the Effects of Access BPL

APPENDIX: NTIA Phase 1 Study on the Effects of Access BPL

EXECUTIVE SUMMARY

On April 23, 2003, the Federal Communications Commission (Commission or FCC) adopted a Notice of Inquiry (NOI) seeking information on potential interference from Broadband over Power Line (BPL) systems and associated changes that may be needed to accommodate BPL systems in Part 15 of the Commission's rules.[1] As described in the NOI, "access" BPL systems transmit Internet and other data at radio frequencies over neighborhood power lines and use electrical outlets in BPL users' premises as data ports for computers and other devices. "In-house" BPL systems use indoor wiring for networking within the user's premises.

In its response to the NOI, the National Telecommunications and Information Administration (NTIA) described Federal Government usage of the 1.7-80 MHz frequency range, identified associated interference concerns, and outlined the studies it planned to conduct to address those concerns.[2] NTIA reviewed relevant studies and regulations in order to help refine the scope and priorities for its studies. NTIA parsed its planned studies into two time phases, first addressing technical issues of the most immediate importance. As reported herein, Phase 1 defines interference risks to radio reception in the immediate vicinity of overhead power lines used by "access" BPL systems. It also suggests means for reducing these risks and identifies techniques for mitigating local interference should it occur. Phase 2 of NTIA's studies will evaluate the effectiveness of NTIA's Phase 1 recommendations and address potential interference via ionospheric propagation of BPL emissions from mature large-scale deployments of BPL networks.

NTIA reviewed the comments submitted in response to the NOI in order to characterize existing and potential future BPL systems and deployments. Simple BPL deployment models were addressed in the Phase 1 interference risk analyses. NTIA also developed more sophisticated deployment models for use in future studies.

NTIA summarized technical and operating parameters of over fifty-nine-thousand (59,000) Federal Government frequency assignments in the 1.7-80 MHz frequency range. This information may help operators of BPL systems in development of BPL frequency plans. NTIA then defined representative radio systems for consideration in interference analyses: (1) a land vehicular receiver; (2) a shipborne receiver; (3) a receiver using a rooftop antenna (e.g., a base or fixed-service station); and (4) an aircraft receiver in flight. Federal communications require exceptional protection on frequencies amounting to about 5.4% of the 1.7-80 MHz frequency range. NTIA will address the associated protection requirements in on-going studies.

NTIA executed three two-week measurement campaigns and used Numerical Electromagnetic Code (NEC) software to characterize BPL signal radiation and propagation. These efforts revealed that BPL systems generate the highest electric field strength near the BPL device for horizontal-parallel polarized signals. However, these systems generate peak vertically-polarized field strength under and adjacent to the power lines and at impedance discontinuities at substantial distances from the BPL device. BPL systems generate peak field strength having horizontal-perpendicular polarization at small distances (e.g., less than 30 meters) from both the BPL device and power lines. Thus, measurements intending to demonstrate compliance with the Part 15 field strength limits should not focus solely on the BPL device.

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[1] *Inquiry Regarding Carrier Current Systems, including Broadband over Power Line Systems*, Notice of Inquiry, ET Docket No. 03-104, April 28, 2003 ("BPL Inquiry").

[2] Comments of the National Telecommunications and Information Administration, BPL Inquiry, August 13, 2003.

Using NEC, NTIA evaluated interference risks in terms of the geographic extent of locations where interference may occur to radio reception at four frequencies used by outdoor, overhead BPL systems conforming to existing Part 15 rules. Interference to land vehicle, boat, and fixed stations receiving moderate-to-strong radio signals is likely in areas extending to 30 meters, 55 meters, and 230 meters, respectively, from one BPL device and the power lines to which it is connected. With low-to-moderate desired signal levels, interference is likely at these receivers within areas extending to 75 meters, 100 meters and 460 meters from the power lines. Assuming that co-frequency BPL devices are deployed at a density of one per km^2 within a circular area of 10 km radius, interference to aircraft reception of moderate-to-strong radio signals is likely to occur below 6 km altitude within 12 km of the center of the BPL deployment. Interference likely would occur to aircraft reception of weak-to-moderate radio signals within 40 km of the center of the BPL deployment area. However, at two of the four BPL frequencies considered with the assumed power lines, NTIA predicted smaller areas over which interference is likely.

Critical review of the assumptions underlying these analyses revealed that application of existing Part 15 compliance measurement procedures for BPL systems results in a significant underestimation of peak field strength. Underestimation of the actual peak field strength is the leading contributor to high interference risks. As applied in current practice to BPL systems, Part 15 measurement guidelines do not address unique physical and electromagnetic characteristics of BPL radiated emissions. Refining compliance measurement procedures for BPL systems will not impede implementation of BPL technology because BPL networks reportedly can be successfully implemented under existing field strength limits.[3] Accordingly, NTIA does not recommend that the FCC relax Part 15 field strength limits for BPL systems. Further based on studies to date, NTIA recommends several "access" BPL compliance measurement provisions that derive from existing Part 15 measurement guidelines. Among these are requirements to: use measurement antenna heights near the height of power lines; measure at a uniform distance of ten (10) meters from the BPL device and power lines; and measure using a calibrated rod antenna or a loop antenna in connection with appropriate factors relating magnetic and electric field strength levels at frequencies below 30 MHz.

NTIA suggested several means by which BPL interference can be prevented or eliminated should it occur. Mandatory registration of certain parameters of planned and deployed BPL systems would enable radio operators to advise BPL operators of anticipated interference problems and suspected actual interference; thus, registration could substantially facilitate prevention and mitigation of interference. BPL devices should be capable of frequency agility (notching and/or retuning) and power reduction for elimination of interference. NTIA further recommends that BPL developers consider several interference prevention and mitigation measures, including: routine use of the minimum output power needed from each BPL device; avoidance of locally used radio frequencies; differential-mode signal injection oriented to minimize radiation; use of filters and terminations to extinguish BPL signals on power lines where they are not needed; and judicious choice of BPL signal frequencies to decrease radiation.

[3] Comments of PowerWAN, Inc., BPL Inquiry, July 3, 2003 at 8-9; Comments of Amperion, Inc., BPL Inquiry, July 7, 2003 at ¶4.8; Reply Comments of PowerComm Systems, Inc., BPL Inquiry, August 20, 2003 at ¶40.