

**WRITTEN COMMENTS OF THE AMHERST ALLIANCE**

**IN FCC DOCKET 03-104:**

**BROADBAND TRANSMISSIONS OVER POWER LINES**

**May 23, 2003**

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**UNITED STATES OF AMERICA**

**Before the**

**FEDERAL COMMUNICATIONS COMMISSION**

**Washington, DC. 20554**

**In the Matter of** )  
 )  
**Inquiry Regarding Carrier** ) **ET Docket No. 03-104**  
**Current Systems, including** )  
**Power Line Broadband Systems** )  
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**WRITTEN COMMENTS OF THE AMHERST ALLIANCE**

THE AMHERST ALLIANCE is a Net-based, nationwide citizens' advocacy group. We were founded on September 17, 1998, in Amherst, Massachusetts, for the central purpose of providing support for establishment of a Low Power FM Radio Service by the FCC.

Since the Commission established such a Service in January of 2000, our advocacy has expanded to other goals -- and other forums:

- Blunting the worst aspects of Congressional legislation to restrict LPFM
- Stopping, and in time reversing, the trend toward media ownership deregulation
- Persuading the FCC to test and evaluate *all* Digital Radio options, not just IBOC
- Protecting small Webcasters from ruinous new royalty fees and paperwork

Similarly, our core Membership and unofficial constituency has diversified beyond aspiring LPFM broadcasters and their supporters among the general public. Today, our constituencies include:

- Licensed LPFM stations
- Current Part 15 broadcasters
- Aspiring LPFM broadcasters
- Aspiring LPAM broadcasters
- Amateur Radio Service operators (“hams”)
- Concerned citizens

In addition, we have formally aligned ourselves, on specific issues, with licensed Class A broadcasters, both commercial and Non-Commercial Educational, and with small Webcasters.

Amherst files these Written Comments today *in opposition to* the expanded use of broadband transmissions over power lines (BPL).

Our basic concerns are fourfold:

- (1) Displacement of important established uses on various radio frequencies
- (2) Possible invasion of privacy and other threats to computer security
- (3) Need for research regarding electromagnetic effects, including health effects
- (4) Need for research on U.S. obligations under international agreements

### **Displacement Of Important Established Uses On Various Radio Frequencies**

The generation of signal interference by BPL is an established scientific fact. This interference will erode, and in some places even eliminate, the viability of important established uses on various radio frequencies.

In general, small users of short wave radio are at the greatest risk for serious -- indeed, potentially devastating -- interference from BPL. Various groups of citizens use the short wave portion of the radio spectrum for diverse purposes:

- Amateur and professional radio astronomers study radio emissions, in the decameter frequency range, from the planet Jupiter and other parts of the universe
- Short wave listeners receive foreign broadcasts
- Amateur Radio Service operators communicate on the high frequency (HF) bands
- Participants in the various Military Affiliate Radio Systems (MARS)
- Citizens Band users operate on the Class D Citizens Band in the 27 MHz spectrum

### ***Radio Astronomy***

Amateur and professional radio astronomers receive naturally generated radio emissions, in the decameter radio frequency range, from the planet Jupiter and elsewhere in the universe.

Much of this activity is conducted by professional astronomers, to generate professional work product, but some of this activity is also educational. The Radio JOVE project empowers students to receive emissions from Jupiter on 20.1 MHz, using special receivers that they build from kits. Radio astronomy amateurs around the world pursue the studies for the pure joy of it, and/or to prepare themselves for future careers as scientific professionals, and in the process they sometimes uncover knowledge that professional astronomers have not discovered.

In the worlds of business, government and academia, there have always been tensions between those seeking resources for technology -- *applied* research -- and those seeking resources for pure research and education.

Given the way that most humans think and feel, and especially their usual difficulties in practicing deferred gratification, technology is typically accorded the lion's share of the resources when a tug-of-war develops with pure research and education. Yet wise institutions and societies have always found ways to reserve *some* of their resources for activities, including pure research and education, whose practical benefits lie in the future -- and, often, cannot even be identified until they appear. *Wise* minds, which should not be confused with minds that are merely intelligent, have traditionally recognized that tomorrow's technology springs from today's pure research and education -- just as, in a different context, tomorrow's prosperity springs from today's investments.

If, as a consequence of BPL interference, professional radio astronomers are restricted to areas far removed from power lines, radio astronomy amateurs disappear completely, and the allure of mysterious signals from Jupiter is banished from the classroom, we will have taken the bird in hand of immediate gratification in trade for an entire flock of birds in the bush.

### ***Short Wave Radio Listeners***

Many Americans listen to short wave radio in order to learn about other cultures, political environments, and foreign languages. Many of these listeners use simple and inexpensive radios in their residences to listen to short wave radio broadcasts sent directly sent from points around the world. This experience expands intellectual, emotional, cultural and spiritual horizons for people who may never be able to explore all of these other nations and cultures in person.

An educational purpose is also served in a more direct context. Children and teenagers are often introduced to electronics and radio by building simple and inexpensive short wave radio kits. These kits allow the children to explore the world of nations and cultures in an exciting new way -- and, perhaps, to begin exploring the world of science as well.

What is the cost of denying this opportunity to the next generation of children, and the next and the next and the next, as a tradeoff for the immediate gratification of one more way to access The Internet?

### *Amateur Radio*

BPL interference could degrade the quality of Amateur Radio operations, perhaps to the point of destroying all or most of their usefulness.

In theory, Amateur Radio operators could go to much higher legal output power levels, such as 10,000 watts, in order to *partially* overcome the BPL interference. However, this response would be undesirable for the following reasons:

- Increased Radio Frequency Interference (RFI) with consumer electronics
- Increased human exposure to high intensity Radio Frequency fields
- Modest improvement in received signal strength, which yields only modest benefits in overcoming BPL interference
- Increased electric power usage, which could exceed residential power capacity
- Increased chance of fire, due to arcing from indoor antennas (which are common because many amateurs live in “planned communities” and/or apartments which ban any outside antennas)
- In a case of “role reversal”, increased interference to BPL operation

Like short wave radios, and some radio astronomy equipment, Amateur Radio Service equipment and activities serve an important *educational* purpose. A “ham” set is often a person’s first step toward a lifelong involvement with science, communications or both.

However, Amateur Radio Service equipment and activities provide more immediate benefits to society as well. The Amateur Radio Service is called the Amateur Radio *Service* for a reason. “Hams” train regularly to serve as the only remaining line of communication in and out of, and within, a disaster area -- and they are often called upon to put this training to use, sometimes at great personal risk. It is no accident that the first news to come out of Chernobyl after the meltdown was provided by “hams”.

In the wake of September 11, how shortsighted would it be for the FCC to discourage, through tolerance of BPL interference, the development of skilled radio amateurs who may be the first and only “eyes and ears” for emergency personnel after the explosion of a terrorist nuclear bomb -- or, for that matter, after the onset of the next major earthquake?

### ***Military Affiliate Radio Systems (MARS)***

The various military services of the United States each operate a Military Affiliate Radio System (MARS). There is a separate MARS for the U.S. Army, the U.S. Navy and Marine Corps, and the U.S. Air Force.

Each MARS is staffed and operated by the combined forces of: (1) certain registered Amateur Radio operators (“hams”); and (2) certain designated personnel in the U.S. military.

Working together, over U.S. military short wave frequencies, the “ham” volunteers and the military personnel cooperate to relay morale-boosting messages to military personnel, based both inside and outside of the United States, from their relatives and friends.

The Amateur Radio volunteers in each MARS operate from Amateur Radio stations in their own homes. However, as noted above, for their MARS transmissions they operate on *military* short wave frequencies, rather than the different radio frequencies that are reserved for Amateur Radio operators alone. In keeping with this approach, each “ham” volunteer also has a separate call sign, different from the normally applicable Amateur Radio call sign, which is assigned to him or her exclusively for MARS purposes.

Thus, Amateur Radio operators who participate in MARS are *doubly* vulnerable to interference from BPL. Their usual Amateur Radio activities are vulnerable to BPL interference -- and their *MARS* activities, conducted over *military* short wave frequencies, are vulnerable to BPL interference as well.

This means, of course, that *the nation* is also doubly vulnerable. In addition to losing some or all of the emergency preparedness capabilities of the “regular” Amateur Radio Service, America could simultaneously lose an important practical and psychological link between our citizens in military service and the people “on the home front” who care about them.

Such double disruption seems particularly untimely in light of recent U.S. military deployments in the Middle East and Southwest Asia, looming threats to South Korea and Taiwan, and the continuing threat of megadisasters through terrorism and/or natural forces.



The continued viability of the MARS operations will depend, directly, on the more than 5,000 individual “hams” who have volunteered to assist with the relay of personal messages. However, the continued viability of the MARS operations will *also* depend, *indirectly*, on the continued effective operation of the National Traffic System (NTS) of the American Radio Relay League (ARRL). *All* “hams”, *including* the 5,000 individuals who have volunteered to help the MARS operation, frequently rely on the NTS as the basic “infrastructure” for relaying radio messages -- known as radiograms -- throughout the nation and the world.

Thus, the MARS networks will not work effectively, or even work at all, *unless* the FCC protects from interference *both* the military short wave frequencies used for MARS activities *and* the less specialized radio frequencies that are reserved for the Amateur Radio Service in general.

We at Amherst do not know whether there are *other* radio frequencies, used by the U.S. military for *other* vitally important activities, which may *also* be subject to disruption from BPL interference. We strongly suggest that the FCC should find out.

### ***Citizens Band***

Many individuals use Class D Citizens Band radio transceivers to communicate locally and also on the highways. These radios operate in the 27 MHz frequency range, AM signals at 4-watt power levels. Use of CB Radios will be inhibited, and in many cases blocked completely, by interference from BPL.

CB Radios are currently embedded in certain American subcultures -- notably, interstate truckers and local residents of rural areas -- and their demise will not be taken lightly by these subcultures. In addition, CB Radios have become part of the broader cultural history of the United States. Who can forget *Smokey and the Bandit* or C.W. McCall's "Convoy"? "Let them truckers roll, Ten Four!"

On a more practical level, CB Radios are used daily for reporting, and responding to, weather conditions, traffic conditions, traffic accidents and other emergencies, on and off the highway. The volunteer group, REACT, has for decades organized networks of mobile individuals with CB Radios and a willingness to help in addressing various emergencies. State troopers and other law enforcement have often used CB Radios to communicate with truckers, and other drivers, for the same purpose.

### **Possible Invasion Of Privacy And Other Threats To Computer Security**

Because broadband transmissions are a two-way street -- "bi-directional", in technical parlance, rather than "uni-directional" -- information flows in and out of broadband computers. The outgoing signals can then be intercepted and decoded by people with the right expertise and equipment.

The abuses could range from unauthorized surveillance of personal E-Mail to theft of information and/or identity. Sabotage might also be possible, through incoming signals.

Unauthorized surveillance has already occurred, “in the real world”, through interception of wireless conversations. The potential abuses through BPL interception are greater.

In this regard, we refer the Commission to the May 5, 2003 Written Comments in this Docket by Gayle Norberg, professional E.E.

**Need For Research On Electromagnetic Effects,  
Including Health Effects**

If BPL transmissions are ever authorized at all, they should be authorized *only* after:

(1) The potential for interference with radio astronomy, short wave radio equipment, Amateur Radio Service equipment and CB Radio equipment has been tested and measured, in experiments involving actual users of the affected frequencies;

*And*

(2) The potential effects of BPL electromagnetic radiation on the health of exposed humans and animals has been fully assessed;

*And*

(3) To the extent necessary for the protection of equipment and living things, effective and appropriate countermeasures, such as possible shielding of power lines, have been identified, evaluated and implemented.

With respect to the protection of equipment from interference or damage:

BPL interference could, in theory, be mitigated by banning BPL emissions in the frequency ranges used by short wave broadcasters, Amateur Radio operators and CB Radio operators. However, this policy would not protect amateur and professional radio astronomers, who use a wide range of decameter frequencies. Also, there are additional uses of short wave frequencies, such as marine two-way communications, that would require added protection.

With respect to the possible effects of BPL electromagnetic radiation on the health of human beings, and other living things:

On May 1, 2003, FCC Chairman Powell announced a new “Environmental and Historic Preservation Agenda” for the Commission. Included on this Agenda was an announcement that the Commission will be *considering* the issuance of a Notice Of Inquiry on the possible health effects of exposure to electromagnetic radiation. This NOI is, in our collective opinion, long overdue -- and could serve as an excellent vehicle for assessing the possible effects on health from BPL transmissions, among many other forms of electromagnetic radiation.

**Need For Research On U.S. Obligations  
Under International Agreements**

Short wave broadcasts, Amateur Radio operations and scientific research are all activities that are unrestrained by national boundaries and subject, in some cases, to certain international agreements. We advise the Commission to identify the applicable international agreements and determine whether authorization of widespread BPL transmissions would violate any of them.

## CONCLUSIONS

For the reasons set forth herein, we urge the FCC not to proceed with authorization of BPL transmissions. If authorization is ever granted, it should be done *only* after: (1) comprehensive testing and evaluation of BPL interference with various radio frequencies; (2) thorough assessment of possible health risks to humans and other living things from exposure to BPL electromagnetic radiation; and (3) to the extent necessary, development and adoption of effective and appropriate countermeasures for the protection of equipment and living things.

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**Dated:** \_\_\_\_\_  
**May 23, 2003**