

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** )  
 )

**To: The Commission**

**COMMENTS of Nikolaus E. Leggett**  
**N3NL Amateur Radio Operator**

The following is a set of comments from Nikolaus E. Leggett, an amateur radio operator (Extra Class licensee – call sign N3NL), inventor (U.S. Patents # 3,280,929 and 3,280,930 and one electronics invention patent application pending), and a certified electronics technician (ISCET and NARTE). I also have a Master of Arts degree in Political Science from the Johns Hopkins University (May 1970). My comments discuss the impact of the Broadband over Power Line (BPL) technology on small users of the short wave spectrum.

**Small Users of Short-wave**

The following groups of citizens use the short-wave radio spectrum for a diverse set of purposes:

- Amateur and professional radio astronomers observing radio emissions from the planet Jupiter in the decameter frequency range.
- Short wave listeners receiving foreign broadcasts
- Amateur radio operators communicating on the high frequency (HF) bands.

- Citizens band users on Class D Citizens Band in the 27 MHz spectrum.

All of these citizen users of the short wave spectrum will be negatively impacted by the BPL technology.

### **Physics of BPL Interference**

Since BPL transmits a wide range of short-wave frequency signals on an unshielded cable or wire, these signals will be radiated into the surrounding environment. This is a physical fact. Unshielded wires radiate radio frequency emissions. Indeed, electric power lines would serve as an excellent “long wire” antenna for radiating radio interference. This interference will reduce the opportunity for citizens to receive signals, especially low power signals, on the short wave spectrum. In many situations, use of the short-wave spectrum will be completely blocked.

### **Radio Astronomy**

Amateur and professional radio astronomers receive natural radio emissions from the planet Jupiter in the decameter radio frequency range. One of the especially interesting projects is the Radio JOVE project where students receive Jupiter emissions on 20.1 MHz using special receivers that they build from kits. This kind of educational experimentation would be blocked by the BPL technology. Is it worthwhile shutting off the student scientists in order to create a new Internet transmission system?

Other amateur and professional radio astronomers study Jupiter using receivers operating on various frequencies in the short-wave spectrum. Does the Commission want to set up a situation where only observatories at great distances from electric power lines can receive Jupiter emissions and the amateur radio astronomers are shut out completely?

## **Short Wave Radio Listening**

Many people listen to short wave radio in order to learn about other cultures, political environments, and foreign languages. Many of these listeners use inexpensive simple radios in their residences to listen to short wave radio broadcasts directly sent from around the World. The most interesting short-wave radio stations are the weaker stations operated by smaller nations. I have used short wave myself to obtain information about foreign political views. For example, when Apollo 11 landed on the Moon, it was interesting to note that the Peoples' Republic of China short wave broadcasting had no coverage of the event. In general, the short-wave broadcasts contain valuable indirect information about different nations. This is useful for political science and international studies. Even the United States government conducts such political studies of broadcasting through its Foreign Broadcast Information Service (FBIS).

Children 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 in an exciting new way. Is the Commission willing to shut off this youthful exploration? We already have several technologies in the marketplace that provide excellent Internet service, reducing any need for BPL. I used this type of radio to get started in electronics. Future generations will not have this advantage. They will only be able to read about the eras when the short-wave window on the World was available for exploration.

## **Amateur Radio**

My first amateur radio station used a one-tube low power transmitter (running about 15 Watts output power) and a simple receiver. I operated on the 80-meter and 40-meter amateur radio frequency bands. This simple type of low power (QRP) amateur radio station will be blocked by the BPL technology. The wonderful direct international pipeline of the short wave

bands will be closed by the roaring static of the BPL system. Does the Commission support the effective shutting down of the amateur radio short wave bands?

In theory, amateur radio operators could go to much higher legal output power levels such as 10,000 Watts to partially overcome the BPL interference, but this regulatory modification would be undesirable for the following reasons:

- Increased radio frequency interference (RFI) with consumer electronics
- Increased human exposure to high intensity RF fields
- Modest improvement in received signal strength yielding little benefit in overcoming BPL interference
- Increased electric power usage – exceeding residential power capacity
- Increased chance of fire due to arcing from indoor antennas (many amateurs live in developments which ban any outside antennas)
- Increased interference to BPL operation

### **Citizens Band**

Many U.S. Citizens use Class D Citizens Band radio transceivers to communicate locally. These radios operate in the 27 MHz frequency range using low power (4-Watt) AM signals. This citizens band will be inhibited and in many cases blocked by BPL interference. Is the Commission willing to eliminate the Citizens Band for the sake of BPL?

### **Correcting BPL**

In theory, BPL could be civilized by requiring that no emissions be allowed in the frequency ranges used by short wave broadcasting, amateur radio, and Citizens Band radio. However this does not accommodate radio astronomy that uses a wide range of decameter

frequencies. Also, there are additional users of short wave such as marine two-way communication that must also be accommodated.

An equally nasty problem is the vulnerability of BPL to interference from amateur radio stations. Their open wire system will be quite vulnerable to overload interference from legally operated amateur radio stations. This situation would result in much hostility from users of the BPL system.

### **Litigation**

If BPL blocks or seriously degrades the short wave radio spectrum, there will be litigation on the subject. This is because the short wave spectrum is a very unique resource. On short wave radio you can directly contact distant foreign nations without any intermediate repeater or relaying technology. Short wave listeners, radio astronomers, or amateur radio operators who are denied access to short wave because of BPL operation will sue the utilities that are operating the BPL. In their arguments they will point out that a special natural international communications pipeline is being shut off for the convenience of some Internet provider. These providers do not even want to use short-wave radio frequencies. These Internet providers are merely emitting radio smog as a byproduct of the operation of their wire-based systems. In the case of radio astronomy, very valuable research and educational activity is being cut off.

On the other side, amateur radio operators will be sued because their short wave (high frequency) transmissions will interfere with the unshielded BPL systems. Even though the amateurs are operating legally in full compliance with the Commission's rules they will be sued because of a basic defect in the BPL design. That defect is that the BPL system is unshielded and hence exposed to fundamental overload from the amateur radio stations.

It is not possible to predict the results of all of this litigation. However, as a social scientist, I can predict that there will be a lot of angry former users of the short wave radio spectrum. In addition, there will be many angry customers of BPL who will be receiving amateur radio interference. This situation does not produce good public relations for anyone involved.

### **Recommended Actions**

The Commission should not proceed with BPL until it has conducted tests of this technology with short wave listeners, amateur radio operators, amateur radio astronomers, and professional radio astronomers. I have heard reports that these short wave users have been excluded from the current tests of BPL. I hope that these reports are not correct. The FCC should insist that all impacted users should be directly and formally involved in the tests. If these users were excluded from the tests, they would presumably have an additional basis for litigation of the BPL rules.

In the past the Commission has insisted on protecting the integrity of the spectrum. The Commission should establish the same requirement for the short wave radio spectrum so current users of the spectrum can continue to use it.

**Respectfully submitted,**

**Nickolaus E. Leggett, N3NL**  
**1432 Northgate Square, Apt. 2A**  
**Reston, VA 20190-3748**  
**(703) 709-0752**  
[nleggett@earthlink.net](mailto:nleggett@earthlink.net)

**May 2, 2003**