

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  
 )

PERSONAL COMMENTS OF KEVIN L. ANDERSON  
REGARDING THE NOI ON BROADBAND OVER POWER LINE (BPL) SYSTEMS

#### I. OVERVIEW

I wish to express my distress and concern on the NOI before the Commissioners to "expedite" any rulemaking on the authorization, support, or expansion of the initiative known as Broadband over Power Line (BPL), which is also known as PLC (Power Line Communications) or PLT (Power Line Telecommunications). As both a daily listener to international "shortwave" broadcasters (e.g., the World Service of the BBC, Radio Netherlands, Voice of America) in the High Frequency (HF) portions of the spectrum, and a duly-licensed operator (K9IUA, licensed since 1993) in the FCC-administered Amateur Radio Service (ARS), I, and others like me (including up to 650,000 licensed ARS operators in the U.S., as well as unknown numbers of similar operators in Canada and the world, and the countless uncounted listeners to "shortwave" radio), will be adversely - permanently I believe • effected by a "rollout" of BPL. While BPL may be sanctioned in Part 15 of FCC rules on low-power intentional emitters, the currently permitted emission limits and testing requirements permitted for BPL, as documented by the Amateur Radio Relay League (ARRL) and numerous international agencies and organizations, when matched with the frequencies involved (2 to 30 MHz, as well as possibilities above 30 MHz) and the transmission system (overhead power lines and household wiring designed for 60 Hz power distribution), would lead to widespread, unavoidable, and detrimental interference for the type and size of system discussed. I am distressed that the FCC, which administers numerous wireless licensed services, and coordinates with military agencies, both national and international, on the use of the radio spectrum below 30 MHz, a spectrum that is otherwise purposely sought because of its ability to propagate a signal over great distances, even at low power levels, would knowingly, and without sufficient testing and review, wish to even proceed with such a system. I am bothered that the Commissioners would seek to support a short-term solution, that of BPL to spread a "rollout" of this broadband technology, especially given other ample broadband alternatives already available, which is laden with problems already identified by countries more urban in population than that of the United States. This strikes me as a very short sighted and temporary solution that is unnecessary. I therefore urge the FCC to put on hold any sanction or rollout of BPL, and further urge a review, and intensive testing, of the technology, including a review of current test procedures and emission limits for Part 15 devices in the High Frequency (under 30 MHz) spectrum.

## II. DISCUSSION

### A. COMMENTS ON THE USE OF POWERLINES AS HF TRANSMISSION LINES

Electrical power transmission lines are designed specifically for the transmission of alternating current electrical power, and not for the transmission of High Frequency (HF) information.

The current design of the electrical grid, with its hierarchical voltage levels and transformers to "down step" the voltage, lack of a common system-wide ground (return path), and the use of wires exposed to the elements of weather, are all acceptable for the transmission of 60 Hz alternating current electricity. And, most certainly true, the system has proven acceptable for the limited transmission of data and voice communications, primarily at low (below 2 KHz) frequencies, for both system control and carrier-current local "AM" radio.

But when you look at the engineering of the system, it quickly becomes evident that this same system will promote electromagnetic disaster when used at frequencies above 2 Mhz as proposed for BPL. This will be particularly catastrophic for users of the High Frequency radio spectrum in urban areas (the same target for population exposure that, I'm sure, is desirable for BPL) due to concentration of interference. At the frequencies and bandwidths proposed, the electric grid becomes an antenna system, and not a transmission system. The significant amount of exposed line, couplings at transformers, and exposed connections (due to a one-break toggle system on light switches) in the home, will provide endless points for "antennas" to exist that will broadcast the BPL signals in place of proper data transmissions.

I am not an expert on these matters, so I commend instead to the Commissioners a careful review of the literature on this dilemma of transmission lines versus antennas as already studied by such international radio organizations in the United States, the Netherlands, Finland, etc., as the Amateur Radio Relay League (ARRL), the Radio Society of Great Britain (RSGB, and so on. They provide ample evidence and engineering discussions of all the issues involved, which corroborate the ill-natured use of the electrical grid for a rollout of BPL on any large scale.

I have, however, had experience with radio interference as provided from power lines and commercial electrical equipment. As an amateur radio operator, I have needed to contact the local power company on numerous occasions (not here in Dubuque, Iowa, where I currently live, but in Rock Island, Illinois, where I lived from 1988 until 2000). Both street lamps and bad transformers have been the source of strong radio interference in the HF spectrum, sometimes so strong as to obliterate the reception of even loud radio signals. Street lamps in need of repair, particularly the high-frequency sodium vapor lights that are becoming increasingly popular for their low energy use, are particularly bad for creating HF radio interference when their starters go bad, and the light goes into a restart mode every other minute. And poorly designed electrical devices, particularly touch lamps, can cause significant interference • and they don't need to be in your own house to do this: a touch lamp in a neighbors home or street lamps several blocks away can be the source of interference • again both due to the propagation possible at HF radio frequencies and the inter-connected

nature of power transmission lines.

My experience in dealing with these interference issues suggests that we will have equal or more problems with BPL. While I have been successful in working with the local power company to get them to replace or repair the faulty equipment causing interference, it was at the same time always an exercise to get it done. They usually weren't quick to get out and make the needed repairs, even if they were obligated to, during many seasons of the year. While not futile conversations, they were nonetheless long, frustrating ones. If I can't expect a local power company to maintain their aging power grid for purposes of providing power, how can I expect them to be up-to-date in their maintenance of the system for BPL? I can easily imagine the "finger pointing" that will take place when interference problems are reported: The power company will say it is the problem of the franchise or utility providing the BPL service; the BPL utility will say it is a problem of the poor maintenance or design in the power company. (A very similar "finger-pointing exercise" I understand for people trying to use DSL for their ISP, and solving problems that come up with that system • and if these various service providers can't get along, how can we expect the BPL ISP and power company to get along?)

This leads me to believe that the system will not be as well managed and implemented as you would hope, and that we will all have multiple levels of technical and maintenance issues to deal with that won't be easily solved. And in the meantime, the radio frequency interference created by BPL will "ruin" or cause problems to at least two major uses of the HF spectrum that I participate in • "shortwave" listening and amateur radio.

#### B. COMMENTS FROM THE VIEWPOINT OF INTERNATIONAL (SHORTWAVE) BROADCAST LISTENING

Since the 1970s I have been a regular listener to international "shortwave" broadcasts from the various governments and entities that have been providing such services since the 1920s. These include the Voice of America (VOA), the World Service of the BBC, Radio Canada International (RCI) and CBC, Radio Netherlands, Radio Vlanderland International (RVI), Deutsche Welle (DW), Radio Australia, and Radio New Zealand International, to name just a few. It is a rare evening when I don't spend at least two hours with the shortwave radio turned on and tuned to one of these broadcasters. I find it valuable to hear the activities of other countries, particularly the news that is not important enough to be covered by U.S. commercial news companies and broadcasters. And as a professional geographer, I find it valuable to get many perspectives of the world from the eyes and viewpoints of these other countries • after all, no matter how much people might want to believe otherwise, the U.S. is not the only country on this Earth, and we are not the majority of the population. Not to mention the interesting music, to name just another item of interest to listen for in addition to news, that these broadcasters provide • much of which will not make the radio stations that we can otherwise listen to on the U.S. domestic AM and FM bands.

My listening to these international broadcasters, and the information and entertainment that I receive from these radio sources, is just as important to me - and on many days I feel exceedingly more important -

than the service and information I receive by "Internet" or through the types of "piped" services that BPL will provide.

The potential radio frequency interference that BPL can provide will be particularly tough on listeners of these international "shortwave" broadcasters. We have had a good period in international radio in the U.S., particularly with the use of satellite communications by the international broadcasters to relay programs from their place of production to regional for-hire shortwave transmission facilities, in having the ability to listen to rather strong, high-power broadcasts of these international broadcasters. Transmission facilities in Sackville (NB), Canada, and Antigua and Bonaire in the Atlantic and Caribbean, have often been used by these broadcasters to present good strong signals to listeners in the U.S. But due in large part to the same downturn in the economy that we are experiencing in the United States, which in turn reduces the government revenues available to support services, these broadcasters in the various European and other countries have experienced a similar loss in income to pay for the broadcast of signals. To save money, many of these broadcasters have stopped hiring these regional transmission centers to provide these easy-to-receive strong signals, or have reduced the number of hours of directed broadcasts in English, which in turn forces us international listeners to look to receiving more distant, and therefore less strong, radio signals. The possible "noise" levels that BPL may provide as interference could very easily remove entirely the possibility of receiving these more distant broadcasts from the international radio services. And this BPL interference will not be limited strictly to a local areas, but instead, as I will note further below, can provide an increased level of background interference ("noise") that can propagate for consider distances, effecting radio broadcasters and listeners in Canada, Mexico, and other locales.

I urge the Commissioners of the FCC to review further the Part 15 rules regarding testing and emission limits of the HF frequencies, particularly in mind of awareness and protection for the identified "bands" of spectrum that are internationally administered and coordinated for these government and private broadcasters. In particular, I urge the Commissioners to not encourage the rollout of BPL technology until these interference issues can be resolved, particularly since you'd be trading the potential benefit of broadband, yet "wired" services, for the alternative benefit, and already proven benefit, of an existing broadband, "broadcast" technology. The loss of reception that BPL might bring will severely reduce the availability of alternative news and entertainment sources that international "shortwave" broadcasting has provided to listeners around the world for 60 years.

#### C. COMMENTS FROM THE VIEWPOINT OF THE AMATEUR RADIO SERVICE

Operators in the U.S. Amateur Radio Service are required by our own rules (see for example 97.103(d)) to not cause interference to any radio communication or signal. We are also obligated to use the minimum amount of power, as stipulated in 97.313(a), necessary to carry out the desired communications. Amateur radio operators take great pride in having a clean, usable radio signal that allows for communications without disrupting other operators. Those who do otherwise are frowned upon, and violate the rules for the radio service

they are licensed for.

I commonly operate my HF transceiver at 5 watts or less of transmitted power to the antenna. This is what is known as "QRP" operations, named for the Q-Signal for "shall I reduce power" (QRP). At this level, even with modest antennas, I have communicated with stations around the world using both phone (SSB) and digital (CW or Morse code) methods. I carry on this communication on a regular basis, propagation permitting. This is in contrast to both the "normal" 100 watts that most U.S. amateur radio operators are using, as well as the legal limit of 1,500 watts that I can use on many of the spectrum bands I am licensed to operate on. By operating at these "QRP" levels, I am following the rules and intent of the radio service for which I am licensed.

What makes these low-power communications possible are both the natural results of propagation at High Frequency (HF), and the use of sensitive receivers. Ham radio receivers are far more sensitive than most radios used by consumers.

But what also makes this possible is the current lack of background "noise" or interference, natural or otherwise, that would hinder communication!

What will amateur radio operators do with the interference provided BPL systems? Why increase our power, of course. If we are subjected to the interference levels that are expected to happen (as shown in tests that the ARRL and other international amateur radio organizations have conducted, which will generate all kinds of "noise"), the natural response will be to increase our power output to levels that overcome the noise that a station might be fighting with due to noise levels created by BPL interference. We would be in our right to do this according to FCC rules, as this would become the new minimum power necessary to conduct our communication.

But this would not be very neighborly. Our lower-power signals are already propagating around the world at current levels. Increasing our power output just to make sure we are putting out a sufficiently strong signal to overcome local noise levels (which is what BPL primarily is - a noise level that makes hearing the signal harder) will in turn present louder signals for everyone to hear. We will be interfering with amateur radio operators potentially around the world with our louder signals, interfering with people who have just as much right to be there as we are. And we won't necessarily know that we are interfering with them, as the noise from BPL will prevent our hearing these relatively "weaker" signals coming from elsewhere.

Our (United States') temporary solution of permitting BPL will in turn lead to widespread, world-wide interference due to the reasonable response of licensed operators. And this is not even accounting yet for the higher noise levels that people outside the U.S. would receive directly from BPL due to the propagation of the "noise." Nor does this account for the potential interference to BPL itself from otherwise legalized amateur radio service operators by our transmissions that "leak" INTO the BPL transmission system.

I commend to the Commissioners for their review the numerous studies completed by the ARRL and other international radio organizations

(including those in Japan, United Kingdom, The Netherlands, Germany, Austria, Finland, etc.) about the extent of potential detrimental effect to amateur radio operations, and other HF radio operations, from BPL. Those studies are very detailed, and alone should be enough to show the impractical and negative nature of BPL.

#### D. COMMENTS FROM THE VIEWPOINT OF OTHER USERS OF THE HIGH FREQUENCY SPECTRUM

As was noted in at least one other comment already submitted to the FCC regarding Docket 03-104, there are countless other services and existing users of the High Frequency spectrum proposed for use in BPL. These include the military and its affiliate radio services, the maritime services, Part D Citizens Band, radio astronomy (particularly 21 MHz measurements of Jupiter), international government (e.g., embassy) communications, and international aviation communications. These are in addition to the international "shortwave" broadcast bands and amateur radio services band segments already noted in my earlier remarks. Most of these segments of the spectrum are internationally coordinated by the ITU and other organizations, for which the FCC is our representative. Many of these uses are dealing with Health, Welfare, and Public Safety matters. All of these represent an existing system of "broadband" users of the radio spectrum that deserve protection.

BPL has the potential of interfering with all of these, many with detrimental and permanent effect. The High Frequency spectrum does not end at our United States border, nor at the 200-mile international limit, but literally spans the globe. Radio frequency signals, even low power ones, can propagate considerable distance at these frequencies.

BPL Part 15 devices can be "blocked" to avoid certain frequencies. For example, the HomePlug system had such blocks put into the place for the ARS frequency bands, with positive effect. It is conceivable to put blocks in the system to protect all of the above frequencies, and I would urge the FCC to enforce such limitations on frequency use by BPL. These frequency segments are all well documented and identified.

BPL devices, if implemented, should be limited to use only those segments of frequency that lie OUTSIDE ALL OF THESE recognized spectrum areas. The United States needs to be a "good neighbor" in regard to international communications.

### III. SUMMARY

Part 15 of FCC rules gives limits on emission, as well as stipulates who can be interfered with by radio emissions. Most existing users of the High Frequency spectrum are licensed operations, both domestic and international, who are protected from Part 15 emitters. Before the FCC can permit enhanced rollout of a BPL system, the Commission must review the Part 15 rules to both make sure they are up-to-date with respect to the proposed system in regard to the needed testing and enforcement, and to insure that current permitted operations are not adversely interfered with.

My review of the literature and test results for PLT transmissions

suggest that the potential interference from BPL will be considerable and permanently detrimental to a large number of spectrum users, both national and international.

The implementation of BPL, encouraged primarily by commercial interests for its ability to enhance broadband communications, will only be short-term. There is no way that this one piece of technology, given the entire range of broadband systems current or planned, will solve the endless and growing need for bandwidth. Any economic gain that might come will be short-lived and only benefit a few users (such as those companies selling the technology and/or purchasing ISP connections to the BPL system).

The adverse effect will be widespread. The potential number of "losers" will far outnumber the "gainers." The effective loss of the High Frequency spectrum to the full range of national and international users will be permanent and detrimental.

I respectively disagree with the supporters of BPL, and with the Commissioners of the FCC, about the potential for BPL and its need. I respectively request that you put a halt to any rollout of the system, and in turn request further, more stringent, review of the technology. Part 15 rules need to be reviewed, and further limitations on emission limits and identification of frequencies that need to be blocked must be considered. The uses of the High Frequency spectrum below 30 MHz are widespread - Amateur Radio Service, international "shortwave" broadcasters, the military, aviation, and the maritime service, to name a few. You need to put in place the needed measures to insure the viability of all those services, both licensed and unlicensed, who benefit from radio communications in the spectrum to be impacted by BPL. The permanent losses to these systems, all in the name of a short-term economic benefit, will be considerable, unnecessary, and a show of a global lack of good will.

Respectively submitted,

Kevin L. Anderson, Ph.D.  
491 Wartburg Place  
Dubuque, Iowa 52003-7771  
k9iua@juno.com  
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