

NPRM ET Docket No 04-37
Comments by Ford Peterson April 30, 2004.

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For the FCC to allow the imposing of 2 MHz to 80 MHz RF signals on existing power lines is unconscionable. The documentation surrounding unwanted interference related to BPL is mounting daily. The evidence provided by the ARRL, and now the NTIA, that BPL causes unacceptable levels of interference to existing licensed and FCC protected services is a source of dire concern.

From the NTIA study, page vi:

"Assuming that co-frequency BPL devices are deployed at a density of one per km² 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. "

If allowed, BPL, in its current and proposed form(s), will likely cause existing communication infrastructure to be significantly degraded.

The ARRL, and now the NTIA, have provided incontrovertible proof that power lines will radiate RF when RF signals are imposed on them. BPL is simply not compatible with existing modulation detection methodologies. The degradation of communications links caused by BPL related 'noise' will compromise many, often already marginal communications links.

Further study needed:

Studies to date have failed to document the effect of unwanted RF signals appearing in the 'mid' to 'upper' HF regions during periods of peak sunspot cycles. The propagation of RF signals at 14 MHz to 54 MHz is worldwide in scope. From my Minnesota location, I have communicated with stations in Japan who are using less than 1 watt of RF power, at 28 MHz, during periods of peak ionospheric activity. BPL signals will propagate well beyond the scope of NTIA's initial concerns. And the cumulative affect of thousands, possibly millions, of BPL devices during these peak periods (roughly every 4 out of 11 years) cannot be thoroughly documented using empirical methods for another few years. However, computer modeling does demonstrate the effects of BPL related interference. Even though we are entering a period of low ionospheric activity, the real noise 'burden' will not be fully demonstrated in practice for another few years. The point being, BPL is not a 'national' issue. BPL is clearly an international problem, which is likely to cause RF noise pollution worldwide.

Part 15 Testing Procedures:

The NTIA report touches on the inability of existing Part 15 testing procedures to accurately document the radiation coming from RF imposed on power lines.

From NTIA Study "Executive Summary," page vi:

"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. "

Accordingly, the NTIA produced a recommendation as to proper procedures for sensing noise emanating from power lines.

From NTIA Study "Executive Summary," page vi:

"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."

NPRM 04-37, paragraph 45, suggests the use of a magnetic loop antenna.

". Consistent with existing FCC measurement procedures, measurements below 30 MHz must be performed with a magnetic loop antenna."

The NTIA study fallaciously concludes that a 'rod' or a 'loop' antenna at a 10 meter height should be used for sampling BPL noise levels. I submit that existing sampling methods, including the NTIA's sampling methods, use antenna structures that are substantially reduced in sensitivity than a typical 'HF station' antenna in daily use by a typical user of the spectrum. Existing HF users are using antennas with a minimum of 0 dBd gain. Most 'typical' users of the HF spectrum are using antennas exhibiting 4 dBd to 8 dBd (and more) of gain. The NTIA study recommends the use of antennas that exhibit gains of -25 dBd to -40 dBd. Therefore, typical users are using antenna structures that are 1,000 times more sensitive than the sampling antennas recommended in the NTIA study. At a minimum, the FCC should strengthen Part 15 rules to require the use of standard gain antennas so as to properly identify the noise levels experienced by a typical licensed and heretofore protected user of the spectrum.

Mitigation methodologies proposed by the FCC NPRM:

From ET Docket 04-37, paragraph 39:

" Thus, operations must cease if harmful interference to licensed services is caused."

The NPRM is suggesting a major paradigm shift in the notion of protected spectrum. In part, the FCC's mandate is to protect licensed users from malicious, intentional or not, signals from interfering with communications. The NPRM suggests shifting the mitigation burden from the FCC to the heretofore protected user. Although the NPRM outlines an elaborate array of systems designed to facilitate mitigation, the fact is that the burden has been shifted to an individual user of protected spectrum.

If this new rule change becomes the 'new deal,' the FCC will have effectively changed the definition of a Part 15 "STOP" sign to a "YIELD" sign. This is unconscionable. The 'transmitting' station would have no way to recognize if the 'receiving' user is being interfered with and would further have no method of mitigating the situation at great distance. For example, from my Minnesota

location, an attempt to communicate with a Pennsylvania station located in a BPL installation area is being overcome by BPL noise. We are not able to communicate. How am I, located in Minnesota, going to be able to identify the station that cannot hear? The faulty BPL equipment is located in Pennsylvania. But it is interfering with my ability to communicate-without my knowledge or ability to know, the offensive BPL device has caused harmful interference with my transmission.

The FCC must return to its previous position of protecting licensed spectrum users by ensuring that offensive equipment is not allowed to be deployed.

Paragraph 40 of the NPRM states:

"First, we are proposing to require that Access BPL systems and devices incorporate capabilities that would allow the operator to modify system performance to mitigate or avoid harmful interference to radio services."

The NPRM then continues to identify hardware mitigation methods to facilitate the mitigation of harmful interference. Once again, the method defies all logic.

BPL does not interfere with transmitters, it interferes with receivers. The noise emitted from BPL devices masks the desired received signal to the point of unintelligibility. Apparently, the FCC believes that the utility company running a BPL system can have an operator with an 800 toll free number available 24 hours a day, 7 days a week. When a licensed user of spectrum wants to use, for example, 14.1 MHz, they call the utility and ask them to stop interfering with 14.1 MHz? The reasoning defies all logic.

Additionally, the offensive signals prohibit the reception of signals. No license is required to 'receive' signals. A license is required to 'transmit' signals. The licensed user's communications are being interfered with at the other end of the communications link.

FCC enforcement complexities:

The natural progression of mitigation problems will result in the FCC becoming involved to resolve disputes. It does not take a stretch of logic to imagine the following scenario:

Licensed user complains to the local utility that its BPL signals are interfering with protected communications. Some time later, the utility sends out a crew to evaluate the complaint (meanwhile the interference continues). The crew concludes that its FCC approved tools for measuring interference results in a conclusion that they are not interfering. The user can demonstrate otherwise since his/her equipment is considerably more sensitive to the noise. The mitigation procedure is now at a stand-still.

What recourse is available to resolve these differences of opinion? The FCC will likely get involved through the exchange of letters, threats of sanctions against the utility, more letters exchanged describing the situation, more threats, and eventually what? A fine? Meanwhile, the licensed user is unable to use his/her equipment in a satisfactory manner. The total time between the initial complaint to the utility and a fine could be months, if not years later. The energy (and expense) by all involved is just one of the costs of allowing BPL systems.

Conclusion:

Until BPL equipment manufacturers can demonstrate, to the satisfaction of all involved, that the equipment will NEVER interfere with protected spectrum communications, the BPL systems should not be permitted.