I feel compelled to offer several comments on ET Docket 04-37 concerning amendment of Part 15 requirements and measurement standards for Broadband over Power Line systems (BPL). I am an electronic engineer with 30+ years of experience designing and fielding complex systems for the Department of Defense. After carefully reading the Docket, I respectfully offer the following thoughts for you consideration.

1. I must take exception to the contention that BPL technology can be considered point-source emitters for Part 15 compliance purposes. BPL devices are not analogous to classic Part 15 devices that traditionally are not intended to serve a wide geographical area. The entire point of BPL is to inject radio frequency energy into existing power distribution lines, which are ubiquitously unshielded cables strung on elevated poles and supported by insulators, spanning large distances. BPL technology supporters would like us to believe (and perhaps would like to believe themselves) that the laws of physics can be suspended by enthusiasm, and these power lines will not act as antennas. Physically and electrically, I believe power lines would make good to excellent antennas at HF frequencies. A simple long wire antenna is physically indistinguishable from a power line conductor except that the long wire antenna is not being used to transmit 60Hz AC power. The best outcome that can be expected is that the power lines act as a leaky transmission line for BPL signals. I therefore strongly agree with the Commission’s position that BPL systems must be evaluated in-situ, but I would submit that emissions from BPL must be evaluated not just in the vicinity of the coupling and repeater equipment (point-source emitter) but several wavelengths (at least 5) in a radius around the active BPL device. Since BPL proposes to use frequencies as low as 3 MHz, this will require in-situ measurements along the power line as far as 400 meters to each side of each active BPL device. Because of the complex far field pattern of the power lines at higher frequencies, similar measurement distances will be needed at these frequencies as well. To accomplish this adequately will require far more than the survey of "three overhead and three underground locations" as proposed in the Docket.

2. A much better definition of “harmful” interference level is needed to support Part 15 evaluation and measurement of BPL technology. Because of the complex frequency-adaptive and modulation schemes proposed for competing BPL technologies, the unintentional radiated power at any given frequency and bandwidth will be highly time varying. Licensed users of the HF and VHF spectrum use a variety of modulation schemes and channel bandwidths. A brief burst of BPL energy at a user’s frequency may be nothing more than an annoyance to some, while the same burst by cause loss of lock and communications breakdown for other users. Even for simple AM or FM voice communications, a single “lost” word can create serious consequences (air traffic communications and emergency service communications). I cannot discount the possibility that mutli-BPL systems over wide areas may together raise the HF and VHF noise floor sufficiently to cause harm to all licensed users over extremely large geographical areas. BPL has the potential to be come the radio frequency equivalent of "light pollution" that has so adversely affected the science of astronomy

in this country, except that it will adversely affect far more user communities. Before meaningful Part 15 standards can be established, a much more quantitative definition of "harmful interference" will be required.

3. Measurement criteria must include “margin” for degradation of system compliance over time and with environmental conditions. In my own work, I have seen too many examples of equipment that “just met spec” at the factory, but quickly degraded once in the field. That’s why we must build in margin to the original specifications.

4. BPL proponents suggest interference to licensed users can be minimized by adaptive frequency notching, adaptive power control and other similar means. I do not disagree that this is technically feasible. I fine it incredibly naive, however, to believe that BPL operators would actually burden their financial enterprise with such complexities. I fear that the burden of proof of interference will fall upon the licensed user, and that there will be no real-time means to raise a complaint and get a real-time remedy. The licensed user will have a better chance of proving the existence of ghosts or UFO’s than proving interference evidence to the BPL provider sufficient to initiate corrective action. In fact, the adaptive features of BPL make it all the more likely that harmful interference complaints will be “gamed” by the BPL provider. Therefore, I believe the Part 15 requirements must not distinguish between any specific frequencies for BPL compliance. The system must be compliant across the entire spectrum at the maximum RF power level the equipment is capable of running.

5. Finally, and perhaps most importantly, I believe the Commission needs to consider the susceptibility of BPL systems to unintentional or even malicious interference and disruption by strong RF sources. In most communications systems, the law of reciprocity applies. If the transmit side of BPL radio frequency system can interfere with another licensed user because of the characteristics of its transmission medium, it is reasonable to assume that the receive side will be equally susceptible to conducted and radiated emissions. As study the Docket, my blood ran cold when I read paragraph 13, stating that BPL will "improve the provision of electric power service and advance homeland security," and "would allow electric utilities to better monitor and control electric system operations ..." In the world we live in today, I would hope the Commission would not go on record and endorse a broad band technology which may very well prove to be extremely susceptible to disruption by terrorists and malcontents, adversely affecting not only individual citizens but critical infrastructure.

I thank you for considering these thoughts in your deliberations for Docket 04-37.

Shawn T Donley

2 May 2004