

May 2, 2004

Federal Communications Commission
Washington, D.C.

Subject: *Notice of Proposed Rule Making* FCC 04-29 (ET Docket 04-37: Amendment of Part 15 regarding new requirements and measurement guidelines for Access Broadband over Power Line Systems)

Dear Commissioners:

I want to thank the Commission for this opportunity to comment in the matter of amendment of part 15 regarding new requirements and measurement guidelines for Access Broadband over Power Line (Access BPL) systems. Before offering my comments, I would like to briefly describe my background. I am a Registered Professional Engineer and hold B.S., M.S., and Ph.D. degrees in electrical engineering (EE). As a Professor of EE my research and teaching interests focus on power systems and electromagnetic fields; I also have several years of industrial experience in the design and analysis of antennas. In addition to my 25 years of professional experience, I have been a licensed amateur radio operator since 1968.

In paragraph 39 in its *NPRM* the Commission emphasizes that Access BPL systems would operate under Part 15 non-interference conditions; i.e., Access BPL operations must cease if harmful interference to licensed services is caused. The Commission is wise to emphasize this fundamental principle of Part 15. I fear, however, that the manufacturers of BPL equipment and the electric power companies do not truly appreciate this legal requirement, nor do they comprehend the very weak signal levels often employed by the Amateur Radio Service and other licensed services.

In paragraphs 40, 41, 42, and 43 the Commission proposes the following additional technical and administrative requirements for Access BPL:

1. Access BPL systems and devices should incorporate adaptive interference mitigation techniques, such as the capability to reduce power levels on a dynamic or remote controlled basis, and the ability to include or exclude specific operating frequencies or bands.
2. Access BPL devices should incorporate a shut-down feature that will deactivate units found to cause harmful interference.
3. Access BPL systems should be subjected to a notification requirement similar to that for power line carrier (PLC) systems.

These three proposals by the Commission are a good start in insuring that Access BPL system operators understand their obligation to cause no harmful interference to any

licensed service. I would like to comment on these specific ideas and suggest improvements for the Commission's consideration.

Performance standards for interference mitigation must be developed by the Commission for all current and future Access BPL systems. For example, interference mitigation should be available 24 hours a day, 7 days a week; mitigation should also be immediate upon receipt of a complaint. Furthermore, the Commission should require Access BPL systems to send a Morse-code identification of the name of the power company the BPL system is connected to, along with the exact location of the active BPL device, at regular time and frequency intervals (e.g., 10 minutes and 100 kHz, respectively).

Every Access BPL device should include a shut-down feature that will immediately deactivate the unit if adaptive mitigation techniques fail. A grace period of six months seems reasonable for all current Access BPL systems to be brought into compliance with this requirement.

Access BPL systems should definitely be subjected to a notification requirement as proposed by the Commission. This notification should include the exact locations of all of the Access BPL devices (injectors, extractors, and repeaters), the types of modulation used, and the frequency bands of operation. The Commission should require each power company operating an Access BPL system to maintain its own database because it is primarily the responsibility of the individual operators that their BPL systems not cause harmful interference. This information should be readily available to anyone having Internet service and there must be a severe penalty for failure to maintain the database. The basic information contained in such a notification system will have no impact regarding the proprietary nature of that data.

The Commission must make it perfectly clear that the electric power companies operating Access BPL systems are primarily responsible for complying with all of the regulations regarding unintentional radiators. Access BPL operators must understand that very low level signals are commonly and effectively used by the various licensed radio services and that if their BPL emissions block weak signals that otherwise would be useable, that constitutes harmful interference. The Commission must enforce severe penalties for failure to resolve a complaint in real time.

The deregulation of the electric power industry will likely tempt some power distribution companies (the owners and operators of the medium-voltage lines used for Access BPL) to shirk their duty in this regard. For example, a distribution company may argue that it is merely leasing its lines to the "real" Access BPL service provider and it (the power distribution company) bears little or no responsibility in resolving harmful interference complaints. (The statement in paragraph 28 of the *NPRM* "... Access BPL is sold only to utilities and service providers ..." clearly implies a possible distinction between the two entities.)

Unfortunately, many electric utilities place little or no importance in eliminating harmful radio-frequency interference generated by their 60-Hz power systems. The record of the

electric power industry in meeting its obligations regarding incidental radiation inspires no confidence that the industry will voluntarily meet its obligations regarding the unintentional radiation that will be generated by their Access BPL systems.

Although the Access BPL operators (i.e., the power companies) should be primarily responsible for complying with the Commission's regulations, the manufacturers of Access BPL systems must also bear some responsibility in this regard. Having the manufacturers share responsibility along with the power companies will help insure compliance by the entire Access BPL industry. In paragraph 39 of the *NPRM* the Commission states "... Access BPL providers would have a strong incentive to exercise the utmost caution in installing their systems to avoid harmful interference and ensure uninterrupted service to the customers." If the Access BPL operators truly have this incentive, then they will not oppose a Commission requirement that their BPL systems be field tested for rules compliance by an independent EMC company before initiation of service. The Commission should also specify and impose significant penalties for noncompliance.

Mobile stations related to public safety (police, fire, etc.) will surely suffer harmful interference from Access BPL systems, as will amateur mobile and portable stations. Since interference mitigation for mobile stations is not practical, the only solution appears to be an absolute limit on radiated emission levels sufficient to protect mobile and portable stations.

Volumes I and II of the NTIA Phase I Study were released only a few days ago, but even a cursory reading should alarm all parties that the current Part 15 limits are not sufficient. For example, the NTIA study calculated that interference "is likely" to mobile stations in areas extending to 30 meters and to fixed stations in areas extending to 55 meters from a single BPL device and the power lines to which it's connected. With "low to moderate desired signals levels" (exactly the levels often used by the Amateur Radio Service and others), the NTIA study stated that interference is likely at these receivers with areas extending to 75 meters for mobiles and 460 meters for fixed stations.

The NTIA report states that current Part 15 measurement techniques may "significantly underestimate" peak BPL field strength. Probably the most revealing statement of all in the report is the NTIA proposal that 41 frequencies of the "most sensitive and likely most severely affected federal systems" be protected. Apparently the NTIA is willing for the non-Federal services to take their chances against harmful interference by Access BPL systems. Although the NTIA may be permitted to have such an attitude toward the non-Federal services, the Commission must ensure that all licensed services are protected against harmful interference by all Access BPL systems.

Based upon the NTIA report, I strongly recommend that the Commission place an immediate moratorium on the deployment of new Access BPL systems or the expansion of existing Access BPL systems until Part 15 has been properly amended. This action would be very prudent on the Commission's part, rather than to allow additional

deployment under existing Part 15 regulations and the resulting extensive modifications to even more BPL devices and systems that would undoubtedly be required.

Finally, the Commission should impose the following requirement on all Access BPL operators: *Marketers of BPL services must give clear notice to consumers that in the event of any degradation of service caused by any properly operated radio transmitter, the Federal Communications Commission will not impose on the transmitting station quiet hours or any other restrictions in an attempt to alleviate the degradation of BPL service. Receipt of this notice must be acknowledged in writing prior to the signing of any contract for service.* Although the BPL vendors and power companies will likely oppose this requirement, it is perfectly reasonable and fair. The Commission must ensure that the public is informed of the secondary status of Access BPL systems and the fact that such systems have to accept any interference caused by the legal operation of licensed radio services.

In summary, I urge the amendment of Part 15 regarding new requirements for Access BPL systems as described herein so that the Commission can continue to “vigorously protect against harmful interference” as stated in the agency’s spectrum objectives.

Very truly yours,

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