

Before the
Federal Communications Commission
Washington, D.C.

In the Matter of
including Broadband over
Power Line Systems.

Carrier Current Systems,
ET Docket No. 03-104.

Amendment of Part 15 regarding new requirements
and measurement guidelines for Access Broadband
over Power Line Systems.

ET Docket No. 04-37.

Comments of the IEEE Power System Relaying Committee

Introduction:

The Power System Relaying Committee (“PSRC”) of the Institute of Electronic and Electrical Engineers (“IEEE”) submits these comments on the Commission’s Notice of Proposed Rule Making (“NPRM”) in Docket Nos. 03-104 and 04-37. The PSRC provides expertise in the form of guides, standards, recommended practices and papers to the power system protection personnel supporting electric service providers. Power system protection personnel are responsible for continuity of safe electrical service, by minimizing outages and equipment damage due to both natural and man-made electrical disturbances.

In these comments, the PSRC seeks to clarify that the NPRM does not apply to Power Line Carrier Systems used by electric power utilities on their transmission lines. PSRC is also concerned with the safety aspects of making the measurements recommended in the rule making.

The NPRM Should not Apply to Traditional Utility Power Line Carrier Systems.

Power Line Carrier Systems are a subset of Carrier Current Systems and are defined in Section 15.3(t) of the Commission’s rules:

Power line carrier systems. An unintentional radiator employed as a carrier current system used by an electric power utility entity on transmission lines for protective relaying, telemetry, etc. for general supervision of the power system. The system operates by the transmission of radio frequency energy by conduction over the electric power transmission lines of the system. The system does not include those electric lines which connect the distribution substation to the customer or house wiring.

These systems are essential for maintaining electric utility service reliability and are subject to special provision under Section 15.113.

PSRC believes that a clarification in the definition of “Access BPL” will better establish the difference between Access BPL and Power Line Carrier Systems, avoiding any confusion upon the implementation of BPL. The proposed change will also clarify that there are no changes in Part 15 intended by the NPRM to apply to current or future installations of Power Line Carrier.

Current NPRM definition:

15.3 (ff) Access Broadband over power line (Access BPL): A carrier current system that transmits radio frequency energy by conduction over electric power lines owned, operated, or controlled by an electric service provider. The electric power lines may be aerial (overhead) or underground.

Proposed definition:

15.3 (ff) Access Broadband over power line (Access BPL): A carrier current system that transmits broadband radio frequency energy by conduction over electric power distribution lines owned, operated, or controlled by an electric service provider, for the purpose of data transmission. The electric power distribution lines may be exposed, underground or otherwise contained.

This proposed definition clarifies that a narrow band signal used for power system protection and control purposes rather than data transmission is not considered Access BPL.

Additionally it includes power lines that may be of a distribution voltage inside a building. Hi-rise structures may use distribution voltage conductors within the building with step down transformers at various floors. These cables are neither underground nor overhead.

Access BPL System Notification Requirement:

Paragraph 42 proposes notification requirements for Access BPL systems that would involve a publicly accessible database. However, the Commission, in its April 29, 2003, Report and Order in ET Docket No. 02-98 (FCC 03-105) at paragraph 9, has recognized the industry/user consensus that the database containing Power Line Carrier data should not be public in order to minimize potential security risks to the electric grid; hence, the databases for Power Line Carrier and Access BPL must separate. PSRC has no recommendation or preference on which entity maintains the Access BPL database.

Measurement Guidelines:

In question (b) of paragraph 46, the Commission asks if it is practical and safe to make *in-situ* measurements at antenna heights up to the heights of an overhead medium voltage power line when operating 10 meters from the power line. The same distance is specified (a horizontal distance of 10 meters) in section 2b of the Measurement Guidelines proposed in Appendix C, section 2b. Appendix C, sections, 1.5 and 1.6 indicates that the loop antenna be 1 meter in height for less than 30 Mhz and 1 to 4 meters for 30 MHz. These sections should be clarified to 1 meter above ground and 1 to 4 meters above ground respectively. For safety reasons, we do not recommend making measurements at the height of the power line.

While utilities have their own safety regulations, 10-meter separation from an energized 69 kV (or lower) distribution line is adequate only when the test person is using non-conductive equipment. Utility workers use fiberglass tools, non-conductive bucket trucks etc. The test loops recommended in the NPRM are metallic and therefore conductive. Additionally, there can be coupling between the test equipment, pick-up loop, earth and the distribution line. Differences in voltages between points a person can contact are a safety concern. Therefore, again, we do not recommend making measurements at the height of the power line. Using isolated or ungrounded test equipment, rubber-insulating blankets, and high voltage gloves may be appropriate under certain situations. But noting works better than increased distances from the conductor in reducing the dangers of direct contact and flashover.

Appendix C, section 2b states, “If necessary, due to ambient emissions, measurements may be performed at a distance of 3 meters.” This is repeated in Appendix C, section 3a and 3b. It is not clear if this test is to be at the same antenna height of 1 to 4 meters above ground or at the height of the conductor. Note that the slant distance is not dramatically different between a 10 and 3 meter horizontal distance. Making this measurement at the height of the conductors without special personal protection devices, special test equipment, and a clear understanding of the hazards involved, is a dangerous recommendation. Again, we do not recommend making measurements at the height of the power line. Measurement techniques using greater distances are safer. However, we recognize that there are issues in the accuracy of measurements vs. distance.

Distribution circuits can be located on the same “right-of-way” as higher voltage transmission lines. In addition to the safety concerns mentioned in the preceding paragraphs, the electromagnetic field due to the close proximity of these higher voltage transmission lines may make field strength measurements impossible or erroneous. Special techniques or equipment may be necessary to make field measurements at these locations useful. It may be practical to make the measurements at a different location in order to characterize the Access BPL emissions.

A review of ANSI/IEEE STD 430-1986 (“IEEE Standard Procedures for the Measurement of Radio Noise from Overhead Power Lines and substations”) may be instructive. This standard states that measurements are to be made at the closest distance of 15 meters laterally from the conductor with a loop antenna no higher than 2 meters above the ground. At the substation measurements should be at least 3 meters from any

large metal objects (non energized) and a lateral distance of 10 meters from an energized bus. The standard also contains a section for "Precautions in Measurements". However, due to the distances stated, there is little mention of personnel safety.

While the FCC does not have the responsibility to establish safe work practices around the power system, worker safety in such potentially dangerous situations should not be ignored. The FCC should recommend that measurements be made using utility safe work practices.

Additionally, the FCC should recommend that the effects of the power system on the accuracy of measurements be recognized. Appropriate equipment, location, and techniques should be used to assure that the electromagnetic environment does not affect the accuracy of the Access BPL measurements.

In the case of a distribution circuit in a building, conductors similar to buried cable are generally used. If the cable is shielded and grounded, distances of 3 meters should be adequate. Grounding of the test equipment may produce measurement errors.

Summary:

PSRC appreciates the opportunity to clarify the differences between Access BPL and Power Line Carrier. Additionally, we hope that we have raised an awareness that safety must be considered when making field strength measurements and that the accuracy of the measurements may be affected by the electrical environment.

Respectfully submitted,
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