

and could take steps to mitigate the interference, than for Access systems where the interference would affect a wider area and therefore be more problematic to mitigate? Would higher emissions for In-House systems result in any interference effects in other houses or apartments sharing the same local low voltage distribution by the RF signal being distributed on the low voltage side of the transformer? What limits should be specified, given the above considerations?

- Should the part 15 rules specify both radiated emission limits and conducted emission limits for BPL systems, or would one type of limits be sufficient to control interference from both low speed and high speed BPL? Since all carrier current systems inject RF signals into the power line for communication purposes, would conducted emission limits be more appropriate to protect authorized radio services?

12. *Measurement methods.* We seek comment on measurement methods for all types of carrier current systems, including new high-speed Access and In-House BPL devices. Because existing carrier current systems use the power line wiring inside a building to transfer information and data, the radiated emissions from RF energy conducted onto the power lines tend to vary from location to location, based on the installation's AC wiring and the loading placed on that wiring. In effect, since the installation's wiring functions as an antenna, that wiring becomes part of the system to be evaluated. As such, measurements to demonstrate compliance with the rules are not normally made at a standard open area test site, because the measurement of each system is unique to its location.

13. Currently, there are no specific test methods in our rules for carrier current systems, rather, measurement procedures have been left to the discretion of the party performing the tests, and thus measurements can be subjective and inconsistent. Furthermore, Access BPL equipment presents unique measurement challenges because it is typically installed on utility poles and operated over medium voltage lines. We therefore request comment and input on the following questions:

- How should the measurement procedures for testing existing low-speed carrier current systems be developed in order to avoid the burden of selecting representative installations and to promote consistency and repeatability of test results? Is it possible to develop a standardized measurement method for testing in a laboratory or at

an open area test site using some characterized wiring assembly or artificial impedance network? If so, how?

- How should measurement procedures for testing new BPL systems, both Access and In-House, be developed in order to promote consistency with measurements of existing carrier current systems and repeatability of test results?

- Conducted emissions testing is usually performed using a line impedance stabilization network (LISN), which is an artificial power line network that provides a specified load impedance in a given frequency range. This device is also used to isolate the equipment from the AC supply and to facilitate measurements. If conducted emission limits alone are sufficient to control harmful interference from BPL systems, how should the measurement procedure be specified? How should the characteristics of a line impedance stabilization network be specified for testing both In-House and Access BPL systems?

- Existing literature is inconclusive on the degree of difference in radiated emissions from houses and buildings when In-House PLC signals are injected in common mode (phase/neutral to an RF ground) versus differential mode (phase to neutral). Is there data available that shows radiated emission levels from houses and other buildings, located in the United States, for both types of signal injection? Is the difference sufficiently large as to justify separate conducted limits for common mode and differential mode signals? Alternatively, should a LISN be defined to simultaneously measure the total effect of the common-mode and differential-mode contributions in proportion to their expected respective contributions to radiated emissions? What should be the characteristics of that LISN?

- How should In-House BPL systems be tested for compliance, given that they use the building's wiring as an antenna? The impedance characteristics of in-house wiring changes each time an appliance is turned on or off, which makes modeling this varying impedance a challenging task. Is it possible to develop a standardized measurement method for testing In-House BPL in a laboratory or at an open area test site using a specialized LISN or some characterized wiring assembly? If so, how? Would the same method of measurement be sufficient to test both traditional carrier current system and new high speed In-House BPL?

- How should Access BPL systems be tested for compliance, given that they generally operate in an environment

where signals travel on overhead medium voltage lines? Could a standardized measurement method be developed for testing Access BPL in a laboratory or at an open area test site, using a specialized LISN or some characterized pole and wiring assembly? If so, how?

- Are there any international standards that should be investigated for possible adoption in order to facilitate the development of BPL products for a global marketplace?

14. Currently, equipment operating as carrier current systems, such as power line intercom systems, lamp remote controls, low speed power line telephone adaptors, etc. are subject to the *Verification* procedure under our equipment authorization program. The low speed systems have not been a source of harmful interference to radio communications. In addition, it appears that use of the *Verification* procedure has been adequate to ensure that such systems comply with the rules. However, the multiple-carrier transmission nature of the new high speed BPL technology could pose increased risk of harmful interference, and thus new BPL devices may need a higher degree of oversight to ensure that authorized users are not subject to interference. Accordingly, we seek comment on the following questions:

- Would the new high speed Access and In-House BPL equipment pose a higher risk of interference to licensed radio services than the traditional carrier current systems?

- Unlike In-House BPL equipment, which usually involves multiple units of a standard module working together, Access BPL may involve two or more different types of components to form the complete system (e.g., Access BPL medium voltage coupler, Access BPL adaptor module, etc.). What components of an Access BPL system should be subject to equipment authorization?

- Should the new Access and In-House BPL equipment be required to comply with either the *Certification* procedure or the *Declaration of Conformity* under our equipment authorization program, which warrants additional oversight, or should they be covered under our *Verification* procedure like the traditional carrier current systems?

15. The Commission believe that the new high speed BPL technology could be used to assist the utilities by adding intelligent networking capabilities to the electric grid, allowing various interconnected and network-addressable BPL components to work together in improving efficiency in activities such as energy management, power outage