Most rules and regulations to protect against radiofrequency interference (RFI) seem to be based on the narrowband concept. For example, a highly stable computer clock which may fail to pass a certain standard, may be spread-spectrum modulated and pass. This may be fine for protecting a radio receiver (whose channel bandwidth is a small percentage of the carrier frequency), but inadequate to protect a wideband circuit, such as a video signal processor. (Spread-spectrum modulation merely redristibutes the same power over a wider bandwidth.) New rules and regulations may be needed to cope with the emergence of wideband technologies. From this point of view, it is the opinion of the undersigned that most, if not all, electromagnetic compliance rules, including Part 15, merit a thorough review and, perhaps, drastic revision.

By nature, BPL is a wideband technology. The fact that its signals are transported over power lines, which can be excellent antennae, raises the question of its immunity from harmful interference by pre-exisiting radio services legitimately operating within the frequency spectrum required for its succeful implementation. Moreover, harmful interference by BPL to other radio services is also an issue which needs to be addressed before BPL is widely deployed.

Analysis of the potential for harmful interference by and to BPL could be very complicated[1]. Even in the ideal case of a perfectly balanced system[2] comprised of two power lines transporting the BPL signal (where BPL signals are not supposed to radiate), one has to consider the near-field patterns (which would probably be mostly reactive fields, that is, electromagnetic fields whose electric and magnetic vectors are such that negligible radiation results negligible Poynting vector in this case). Conversely, even in the ideal case of a perfectly-balanced tranmission of BPL, any radiator within the reactive region of the BPL's transmission media may interfere with the BPL signals. At lower frequencies, the reactive region may extend to several hundred feet.

In a more realistic situation, however, the perfect balance condition is not expected to hold. As the power lines sway and deform in the wind, severe imbalances may occur, facilitating unintentional transmission and reception of electromagnetic radiation. In such a case, which is very realistic, the potential for interference to and by BPL greatly increases. It should be expected that any imbalance extending over a significant fraction of wavelength would result in radiation at that wavelength (or, conversely, efficient reception).

The above considerations also apply to the in-house distribution of BPL. Additionally,however, the in-house wiring may be unbalanced by construction.

It is apparent that compliance with Part 15 regulations cannot protect other radio services from harmful interference by BPL or vice-versa (see footnote). As rules should reflect practical situations, if BPL is to be deployed as advertised, the pertinent rules will have to be revised.

1See, for example, < http://www.arrl.org/tis/info/HTML/plc/files/C63NovPLC.pdf >.

2Another factor complicating the analysis of even a pervectly balanced BPL system may be the possibility of “moding” at higher BPL frequencies. This becomes even more important in a more realistic situation.

Part 15 regulations were not designed to cope with the potential of harmful interference to or by BPL. The potential for interference by BPL is different than the one by, say, an electric motor (which Part 15 may address adequately). The electric motor is a lumped entity (its dimensions measured in wavelengths at frequencies of potential interference), while BPL is a distributed arrangement. Therefore, all extrapolation methods used during the measurements of RFI compliance of the electric motor may not be realistic in the case of BPL.

BPL, as described in FCC's document ET 03-104, will be using frequencies one or two decades higher than the ones used by campus AM distribution systems and the grid monitoring and control systems deployed by utility companies. Consequently, the experiences learned from the deployment of these two systems may not (and probably will not) be applicable to BPL.

Radio services offer an important benefit to society, namely the ability to communicate without wires or other medium. This benefit should not be encroached because it serves important needs (e.g. communicating with vehicles and aircraft or spacecraft, radioastronomy, and emergency communications, such as the ones provided by amateur radio). The FCC should be adequately equipped to protect those services from harmful interference. The proposed deployment of BPL may, therefore, necessitate rewriting of compliance rules.

As a radio amateur, I am well aware of the immense usefulness of amateur radio. The fact that amateur radio has been the only means of communicating during natural disasters cannot be overestimated. Furthemore, amateur radio has been in the forefront of communications. Let us not forget OSCAR-3, the world's first free-access telecommunications satellite, which preceded it commercial counterpart by a month. Today, radio amateurs successfully negotiate issues such as doppler shift and tracking, which are virtually unknown to users of commercial satellites (amateur satellites are placed in elliptical orbits, unlike commercial ones, which are placed in geosynchronous orbits).

For all these reasons, therefore, I would urge great caution before BPL is widely deployed. Moreover, it may be time to take another careful look at existing compliance rules, including Part 15.

Respectfully,

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