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Comment on BPL,

also called PLT or PLC

(Data communication via normal powerlines)

ET Docket 03-104 released 28. April 2003 by FCC

This document is presented on behalf of radio amateurs world wide, especially representing 4000 radio amateurs in Austria. It is intended to answer several questions of FCC-NOI on broad band powerline BPL. Since BPL is using a frequency range of 2-80 Mhz (short wave) all global communication in this frequency spectrum is affected, even communication abroad.

Introduction

BPL will not solve the growing need for broadband access, because it will need a high speed backbone net. Often DSL is used to bring the service to the pole. In rural and remote areas BPL will never be deployed due to commercial restrictions, however a 110Volt powerline is installed. BPL uses the misinterpretation that BPL will provide service everywhere you have power lines.

Experience

The author has many years experience as engineer in telecommunications and electronics and as CEO of Austrian branch office of a well known multinational U.S. company. Detailed studies have been conducted by Mike Zwingl , president of Austrian Amateur Radio Society, at 3 different large scale field trials in Austria. Studies have been made in theory and practice and have been documented by means of digital video.

Topics and Questions answered

This document will answer and comment questions number 18 –25 raised in NOI . Especially questions about compliance, measurements and level of harmful interference caused by BPL.

Compliance

First we have to ask the question: What is the purpose of compliance procedures?

The procedure should ensure that no technical apparatus enters the market, that could cause or will cause interference to radio or other electrical systems. In case of BPL units it is almost certain, that it will cause harmful interference to licensed radio services, as long as BPL modem is being used as intended and radio users are living nearby in an distance closer than two miles. If FCC leaves the procedure to demonstrate compliance to the manufacturer, and measurement methods recommended have a huge level of uncertainty due to near field measurements made in different distances, it makes the entire procedure obsolete. No product should be allowed in the market, that could not easily demonstrate an operation without

causing radiation. Therefore experts know, that leaving it to network operators to demonstrate the compliance of the entire network, but not showing compliance of the individual modem (apparatus), will not at all ensure radio services to operate as intended (ITU rec !)

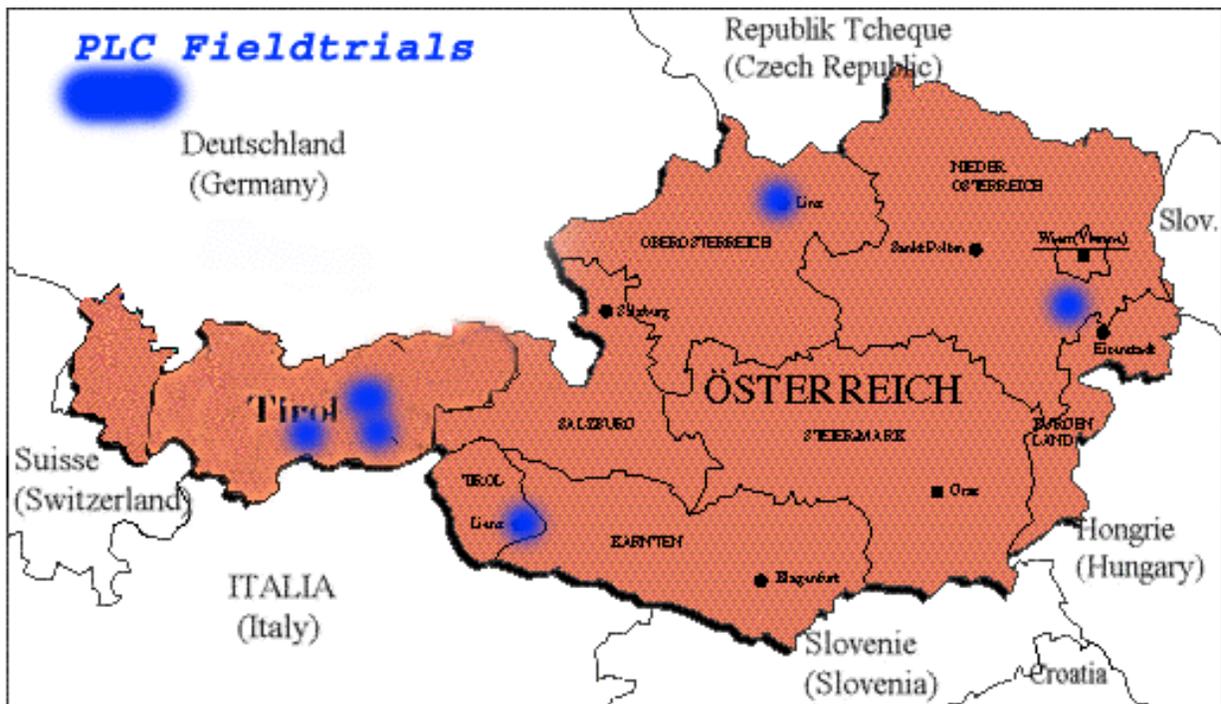
Results of European field trials:

Out of 4 trials in different cities across the country in Austria (no test took place in rural areas, where DSL is not available!) only one is still available. Most trials in Germany & Netherlands were terminated meanwhile, due to technical and commercial problems.

The trial in NEUNKIRCHEN, Austria was stopped because of problems with ASCOM's CE-mark compliance. Two more ASCOM trials in Austria are being on hold, due to financial uncertainties with Modem supplier and one trial site in LINZ is still commercially active.

All 4 trials generated more than 70 (!) complaints of radio users and amateurs for harmful interference. The ministry of Technology asked for immediate correction of these cases, but utility companies deny to solve the EMC-problems due to uncertain legal situation.

See picture below for BPL trial locations in Austria:



Measurements:

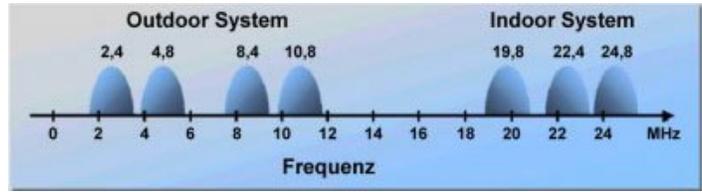
Some measurements have been made in Austria and surprisingly most of the results are confidential. The figures 1-2 have been made in the city Innsbruck in western part of Austria. All official measurements from the ministry show strong levels of interference and often the radiated PLC signals are much stronger than radio signals.

Figure 1: red line shows BPL

Figure 2: red line shows BPL radiation higher than radio signals



Bandwidth used by one discrete BPL carrier



All figures above show the effect of ASCOM BPL systems

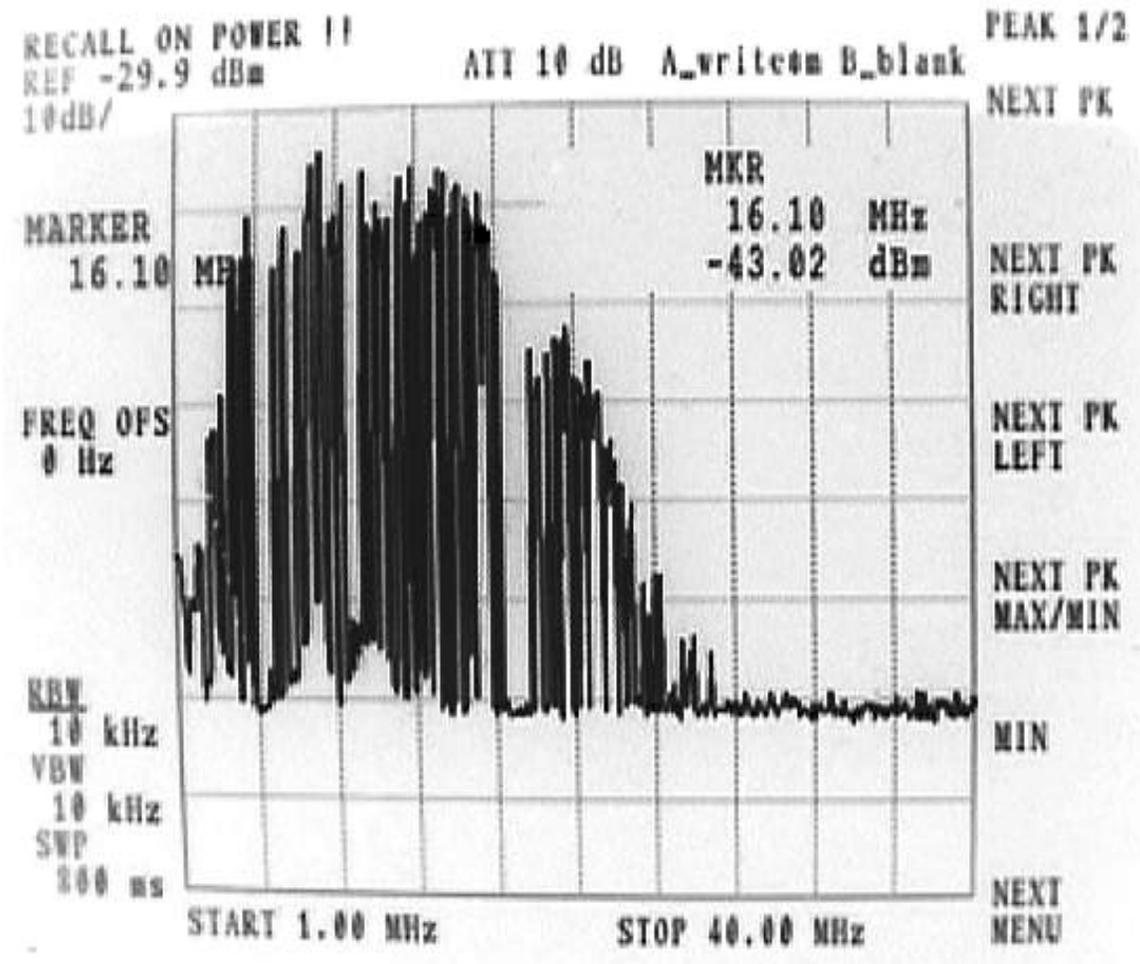


Figure 5: Spectrum used by MainNet BPL system-
 spread spectrum DSS frequency hopping 2-26Mhz

Planning parameters for short wave broadcasting and Amateur Radio Service:

Planning parameters for short wave broadcasting service are described in ITU-R recommendations and show, that after the deployment of PLC all transmitters would need an increase of 30db in power. Since broadcasting transmitters today use already up to 500kW, a further increase can be considered impossible. Therefore the Signal to Noise ratio will be insufficient for analogue and digital (DRM) radio broadcasting. (for details see study of radio Netherlands and BBC)

Video/Audio files

Several detailed Video files are available at <http://www.powerline-plc.info/downloads.html> to show the level of interference caused by BPL systems in real world.

The systems operated in these field trials claim to be within the EMC limits of EN55022A, And still the level of harmful interference is huge.

White Papers of BBC research

The effect of BPL on reception of radio and the increase of noise floor worldwide due to cumulative effects of BPL are described in White papers from BBC research. Also the effect on communications with airplanes is alarming.

See reference:

<http://www.bbc.co.uk/rd/pubs/whp/whp004.html>

<http://www.bbc.co.uk/rd/pubs/whp/whp063.html>

<http://www.bbc.co.uk/rd/pubs/whp/whp055.html>

<http://www.bbc.co.uk/rd/pubs/whp/whp013.html>

<http://www.bbc.co.uk/rd/pubs/whp/whp012.html>

Interference from Inhouse PLC

Inhouse PLT raises the same issues as access BPL, but currently some systems (Intellon) use notches in the spectrum to protect amateur radio service. This is a great improvement and shows the way into the right direction to prevent most likely interference, but in general the physics are not different for INHOUSE PLT. All frequencies used between 4,3 and 21 Mhz are suffering harmful interference, depending on the proximity and LCL factor of the cabling. Inhouse PLT is also operating in a totally uncontrolled environment, so network parameters will change all the time.

See Intellon chipset spectrum

below:

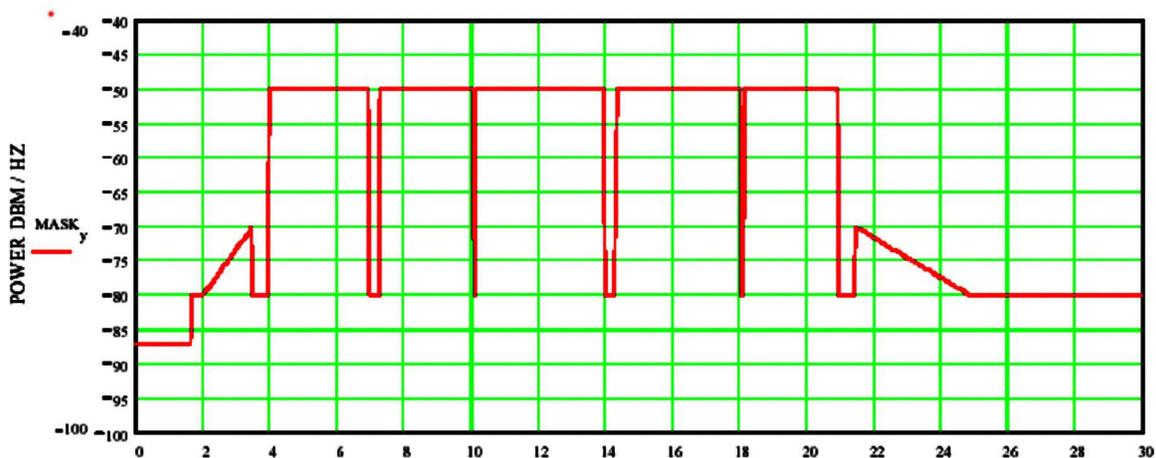
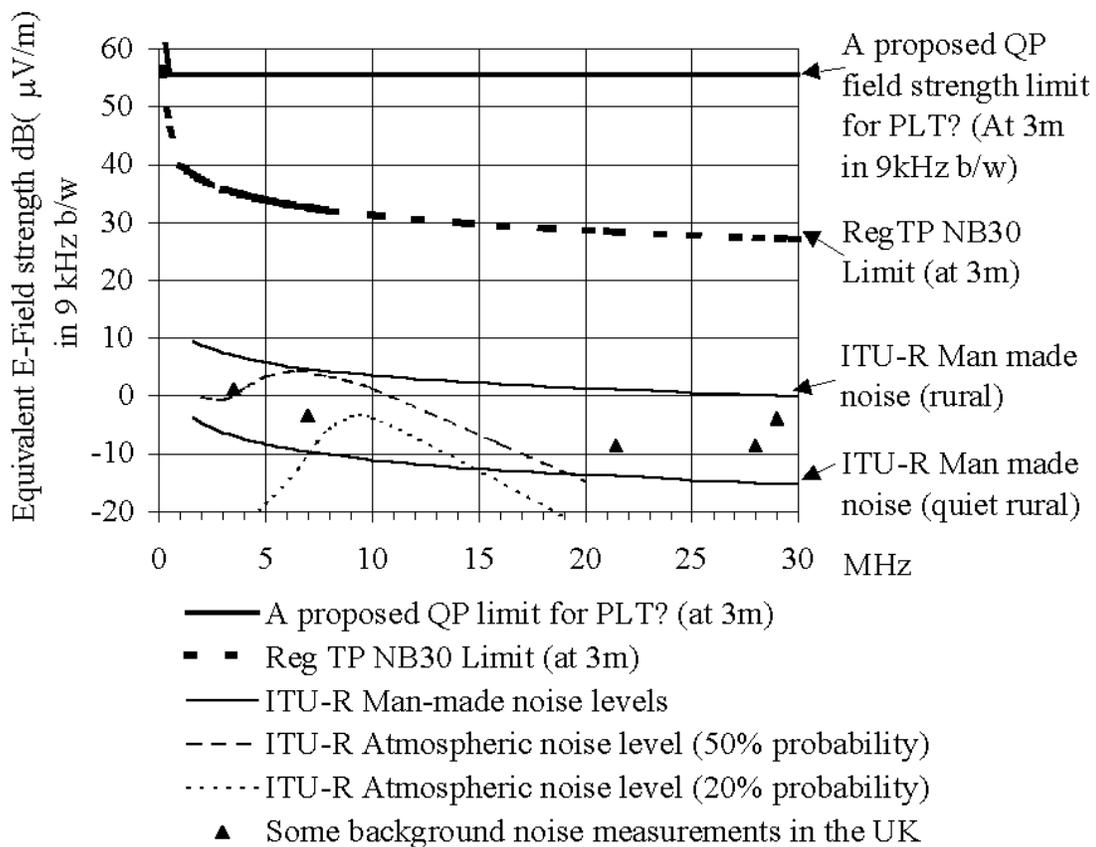


Figure 2. Test Signal PSD Mask

ITU radio regulations

Since short wave spectrum is so valuable to the world, it cannot be regulated by one countries government. Therefore ITU was founded and even countries like Iraq, Afghanistan, Cuba, etc are obeying the ITU regulations. It could be considered fatal for the civilized world, if UAS and Europe are now starting to neglect these international contracts.

By these important contracts all national authorities are responsible for taking necessary steps to prevent harmful interference to allocated radio services and to prevent pollution of the spectrum. Even now the FCC part15 and EN55022 is only a compromise and does not fully achieve these goals. An even more relaxed EMC limit is unacceptable under terms and conditions of ITU regulations.



Recommendation

Since all studies clearly show that a coexistence of BPL and radio service is not possible, FCC should seek for frequency allocations for BPL according to ITU rules. This is the only correct procedure for introduction of an “so important service” as “broadband to the home”

BPL should be considered another “wireless” radio data service, because judged by physics, this is what it represents most!

All other statements are just political statements or “wishful thinking”

Conclusion

BPL or PLT or PLC is an interesting but old idea that in history suffered from problems with radiation and interference. Since technology has evolved some needs for future broadband communications can be seen, but given the existing wiring structure does not allow BPL to use the same frequency range as existing radio services. Therefore rigid coordination of allocated frequency range and power is important. BPL will not solve the existing problems of offering broadband data services in remote areas. The dream of having a DSL like service on all power lines is simply commercially not feasible. Utility companies will offer these services only in densely populated communities in order to make profit and offer shareholder value.

The Austrian Amateur Radio Society therefore strongly recommends to the FCC and U.S. authorities to NOT RELAX the LIMITS for FCC part 15 in general or for BPL in specific.

Otherwise FCC will sacrifice the entire HF spectrum for a very questionable short term effect, that cannot be reversed in future.

For additional questions please contact:

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