

MODER Magdalena (ENTR)

From: John Ronan [jronan@tssg.org]
Sent: lundi 29 septembre 2003 12:54
To: BREFORT Thierry (ENTR)
Cc: John Ronan
Subject: Power Line Communications Systems

Monday September 29th 2003

Dear Sir,

As a Radio Spectrum user I welcome this opportunity to make a submission on the subject of Power Line Communications.

From my own research, it appears that recent measurements made in the UK at Creif by the UK radio authority and measurements made by Ofcom in Switzerland suggest that the second generation PLC systems DO seem to give rise to interference problems.

The Swiss measurements showed that the system measured in Fribourg failed to meet the German NB30 limits, which it seems are a compromise limit that actually fails to provide reasonable protection for the reception of HF broadcast stations indoors (<http://www.bbc.co.uk/rd/pubs/whp/whp063.html>).

It must therefore be questioned whether any standard based on NB30 limits would protect the many diverse applications including Broadcasting (DRM has just been launched), Aeronautical, Radio Astronomy, Armed Forces and Amateur Radio services, many of which will have no alternative if PLC is permitted to create interference. In addition, shortwave radio is used for point to point links in many poorer developing countries as well as supporting the communications effort of the Red Cross as well as other Aid organisations.

Any raising of the noise floor would ensure that only the strongest HF radio signals could possibly be heard above the PLC, thus there will be significant impact on all but the most powerful HF communications services.

When HF signals are injected in electrical conductors, electromagnetic radiation results.

Radiation can be limited by:

- a) shielding (as in coaxial cables)
- b) in principle, using balanced lines (telephone, UTP network, antenna feeders)

On the other hand, several factors favour radiation:

- a) poor shielding
- b) poor impedance matching
- c) imbalance of open lines.

Cable networks radiate VHF/UHF energy when shielding fails, and also because of improper termination (poor impedance matching). Telephone lines (unshielded twisted pairs) radiate because of lack of shielding and imperfect balance. Power lines are neither shielded nor balanced and all kinds of appliances are connected to the mains by the end users hence they represent the 'worst case' scenario. Also the gain of a power line radiator increases rapidly with frequency - a radiating conductor with relatively low emissions as 0.1MHz can have emissions tens of dB higher at HF (Calculated Levels from Broadband Over Power Line Systems and their Impact on Amateur Radio Communications Circuits, Ed Hare, ARRL, July 2003). DSL systems use a twisted balanced pair of conductors and as a result create negligible amounts of radio interference when operating correctly.

The introduction of PLC systems would make a mockery of existing EMC legislation requiring manufacturers of electronic and electrical equipment to meet rigid emission limits designed to protect the 'noise floor' of the radio spectrum.

The ARRL has clearly demonstrated the interference effects of PLC on Amateur Radio communications (it must be assumed that the other services mentioned above suffer the same interference), and has also demonstrated harmful interference from low power HF transmitters into the PLC network using PLC test sites in the US. This has also been discussed in Compliance Engineering Magazine (<http://www.ce-mag.com/archive/03/ARG/hansen2.html>).

Interference from PLC is very difficult to trace, when a licensed radio service causes interference it can be quickly identified and the issue addressed. In the USA, a division of the FAA reported that it had to cease operations on one aeronautical band (3013khz) at one of its facilities (Half Moon Bay, California) due to interference from PLC products and the FCC was unable to resolve the issue.

http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6514683399

The BBC is also concerned about interference to it's short wave broadcasts, especially as most receivers use inefficient internal antennas and are often places close to mains power wiring ("Do EMC Limits protect Broadcasting as intended", <http://www.bbc.co.uk/rd/pubs/whp/whp055.html>).

PLC is offered as an alternative 'last mile' technology yet current PLC implementations are impractical over roughly 300m, they require intrusive work in the customers premises to allow the PLC signals to 'avoid' metering and transformer systems, offer limited bandwidth, and most likely will not scale well as consumer demand increases.

There are other more practical solutions to the last mile problem. The most obvious being unlicensed wireless systems for example 'WiFi', and they are relatively easy to deploy.

In conclusion, it seems that Article 4a of the current EMC directive may not be respected if PLC is widely deployed and if interference is widespread, consumers may resort to litigation in order to return the radio spectrum to its 'pre PLC' noise levels, which would be unfortunate, and, may I add quite unnecessary.

I would urge that the Commission initiate further studies of recent advances in broadband technologies in order that the telecommunications infrastructure and information societies in general can be extended into the rural regions of the current EU15 and the new acceding states.

Best Regards,

John Ronan, MSc.

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