

# Professionals against Powerline:

## The EMCIA gets involved

Over the last few years EMCIA members have become increasingly aware of the threats posed to society in general and to the EMC Industry in particular by Power Line Telecommunications – the high data rate version on the HF and VHF radio bands of course; not the low-rate version in accordance with EN50065 that operates with so little trouble.

Updates on PLT have been featured at most meetings of the EMCIA. In 2009 and 2010 the Standing Committee made inputs at short notice to a Consultation on the future duties of OFCOM, to a Parliamentary Committee on Broadband, and to an OFGEM Consultation on the ambitious plans for “Smart Grid”.

Keith Hodgkinson of BIS addressed the meeting in December 2010, but made only minimal reference to PLT!

EMCIA’s Chief Executive has pressed Trading Standards to take up certain open-and-shut cases of interference from domestic PLT in an attempt to pin down the relative responsibilities of BIS and OFCOM, and has written to Mark Prisk, Minister of State at BIS seeking a meeting to discuss the enforcement of the “Essential requirements” of the EMC Directive. Prisk is too busy! A letter to David Cameron that criticized OFCOM’s position and focused on the conflict of loyalties between their rôles as EMC regulators and as supporters of the telecommunications industry did not receive a meaningful reply.

Why is EMCIA so concerned?

Regular readers of this Journal will know much of the PLT story. Visitors to EMCUK in 2009 and to the website since then will have seen the “Greedy PLT booklet”. There is an excellent database at [www.compliance-club.com](http://www.compliance-club.com) and in the members-only section of [www.emcia.org](http://www.emcia.org), which has the full text of the letters sent to Downing Street and BIS.

In summary, however, high data rate PLT has claimed the right to ignore existing Emission Standards by a factor of around 40dB – about a 10,000 fold power excess – and used the Technical File (or EMC Assessment) route in the EMC Directive to bemuse and paralyse national regulatory authorities. This process has been supported by effective action to convince the officers of the European Commission that PLT is “good for business” and “a valuable driver for economic growth”.

EMCIA, as a recognised Trade body whose members are professionals involved in EMC design and test, and in the manufacture of the components and systems that underpin the 21<sup>st</sup> century Information Society, has identified the following key problems with PLT:-

- The high transmit level causes local interference to nearby short-wave radio reception. The number of victims is said to be small because complaints are few – but the interference is difficult to identify, the route for complaint is not well signposted, and Britons do not habitually complain. The level of complaints is best summarised by noting that PLT complaints logged by OFCOM are exceeded only by those due to deliberate abuse!
- This high transmit level will, as the number of PLT installations increases, raise the general background level of interference. It has already been demonstrated that even those bands protected from PLT do in fact suffer, due to “intermodulation” effects from rectifiers in the mains network. The radio transmissions from these millions of PLT devices will be propagated world-wide. There will be nowhere to hide from PLT interference, and radio communication and broadcasting will require unaffordable and unsustainable power levels.
- The effect on the credibility and future relevance of EMC Standards is also important. Credibility has already been seriously undermined. Why should the cost of any other product be raised to ensure compliance with the relevant Standards when there is the example of an industry marketing millions of non-conforming products? How can any EMC specialist advocate conformity to Standards so as to maintain a level playing field in the marketplace, when there is another player who has rewritten the rules to suit himself? The resulting upward creep of electromagnetic pollution will eventually nullify the advantage that PLT has seized and just leave a permanently damaged electromagnetic environment.
- A situation has been created where everyone is passing the buck on regulatory action. Trading Standards Officers, funded by local Councils, feel that their priority is Consumer Safety and that they have neither the budget nor the expertise to take action. If they do investigate then they conclude that there will soon be a Standard that will fix the problem, and that radio interference is for OFCOM to deal with. BIS say that the regulations allow OFCOM to handle EMC issues “insofar as action relates to the protection and management of the radio spectrum”. OFCOM say that there is no evidence of a significant problem, nor of a breach of the Essential Requirements of the EMC

**Directive.** Both statements have been widely derided. OFCOM's website refers complainants to the BBC, who are actually only concerned with interference to the BBC's own services, which for listeners in the UK do not use the HF band which is occupied by today's implementations of PLT. Most importantly to the EMCIA, OFCOM's updated statement on PLT found that *"there has not been a breach of the EMC requirements. Considerations ... were that the testing and analysis is complex and highly technical. For this reason there is uncertainty as to when products fail to meet the essential requirements."* This "complex and technical" process underpins the very existence of EMCIA and this view cannot be allowed to go unchallenged. The practical effect of the present positions of our regulators is that the "placing upon the market" requirements of the EMC Directive are not being enforced for this particular class of product.

- Smart metering and Smart Grid implementation has the potential for a hundred million in-home installations, together with access PLT to match. This would make the situation at least a hundred times worse – and Smart grid is a EU and UK Government priority. EMCIA experts have put together a report for the Smart Energy Special Interest Group covering all aspects of EMC likely to be of importance to the Smart Grid project, including a realistic assessment of the relative merits of LF and HF/VHF PLT.

At the May 2011 meeting of the EMCIA it was resolved to form a Working Group on PLT. The first action of the Group was to establish the Association's voting position at the UK's National Committee GEL210/11 on the proposed European PLT emission Standard FprEN50561-1. Details of this Standard are set out in the Table opposite, but in brutal summary it legitimises a maximum level of mains-borne emission a few dB **greater** than present-day usage and introduces "mitigation measures" most of which have not been demonstrated under real-world conditions, and which even if they do work as hoped would not approach the "protection of radio services" objectives of CISPR and the ITU-R. There are also test requirements that could be met by a design in which that feature provides no operational benefit.

**The Standard would sabotage the level playing field for interference that is inherent in today's EMC Standards and Regulatory Guidelines.**

EMCIA was one of the three organisations in the UK who voted "No" to the FprEN at the recent meeting of the BSI product EMC Committee, and consequently, in accordance with its rules, the UK abstained in the European vote.

As this issue goes to press, we learn that the CENELEC overall vote is also "No", taking us into uncharted waters. As well as the expected opposition from those concerned with the electromagnetic environment, the quality of the Standard and the credibility of the Standards-making process *there was opposition from PLT manufacturers*. Having been allowed to do as they like for many years, these Companies do not now want to be forced to conform. One cannot blame them: In a capitalist society it is proper for them to make money by exploiting innovation. The CISPR position - "must allow radio to function as intended" - has been equally proper. Today's situation is clearly the result of the failure of the Regulatory process; failure over the last fifteen years of the EU and of our OFCOM and BIS to enforce the existing Standard EN55022 unless or until it is changed.

The Regulatory position that "there will soon be a Standard that will make everything alright" is now obviously ill-founded, and there needs to be serious action by these regulators to bring PLT supporters into negotiations about a Standard recognising that substantial concessions on their part are necessary to allow their business to continue. Technically these concessions need not be difficult but they do require a significant mind-shift.

**The future course of PLT Standardisation is very uncertain, but the Association will continue to seek a broad-based Industry position with technical integrity. This will be promulgated using EMCIA's wide contacts and Trade Association status.**

#### **Note to other Editors:**

**The substance of this article has serious implications for the UK Electronics Industry. As such we would encourage you to reproduce the article in its entirety or any of the relevant parts.**

**If you would like to meet or discuss with any experts from EMCIA, please contact the Secretariat, Pam Hutley at [emcia@emcia.org](mailto:emcia@emcia.org) and we will be only too pleased to make the arrangements.**

#### **About EMCIA**

The EMCIA was formed in 2002 for the benefit of companies and organisations involved in Supplying, Designing, Testing and Manufacturing EMC products and services.

EMCIA is friendly trade association that's all about Networking, keeping you informed, providing marketing & promotional opportunities and hopefully assisting you to increase sales.

If you would like to join just email: [emcia@emcia.org](mailto:emcia@emcia.org)



[www.emcia.org](http://www.emcia.org)

# Overview of FprEN50561-1:2011 Power line communication apparatus used in low voltage installations – radio disturbance characteristics – limits and methods of measurement – Part 1: Apparatus for in-home use *With interposed comments in italics*

## 1 Scope

Applies to equipment that transmits in the frequency range 1.6065MHz to 30MHz, *leaving limits at higher (and lower) frequencies and in other environments to be set out at a later date.*

## 4 Conducted disturbances at AC mains power ports.

These exclude such ports also used for PLT, and are required to meet EN55022 class B limits.

## 5 Conducted disturbances at telecommunication/network ports.

These are required to meet EN55022 class B limits using EN55022 measurement methods.

*This raises questions about the reproducibility of the EN55022 test method under conditions of high symmetrical-mode emission on an associated PLT port; See reference.*

## 6 Conducted disturbances at PLT ports.

These are required to meet the equivalent of EN55022 class B mains port limits;

- between 150KHz and 1.6065MHz for **any** operating condition.
- within the “Permanently excluded frequency ranges” of Table A1. *These comprise Amateur and aeronautical bands.*
- within the “Permanently or dynamically excluded frequency ranges” of Table A2. *These comprise Broadcast bands.* As an alternative to permanent exclusion manufacturers may meet the **Dynamic Frequency Exclusion** requirements of para.6.2 in these ranges.
- When at least 15 minutes have elapsed since the last transmission of “user data”. *When PLT forms part of a multi-layer communication system this “user data” will not be the same as “end user data” and so the requirement may be of limited benefit.*

When all the above conditions are absent, the PLT function may employ the substantially enhanced symmetrical mode transmission signal of up to 105dB $\mu$ V (PK) or 95dB $\mu$ V (AV) in 9KHz bandwidth [Table 2]. These figures equate to 39dB in excess of EN55022. *This level is some 5dB higher than present PLT practice, and ignores the principal thrust of objections to PLT technology over the last 14 years.*

*Such a high level challenges the credibility of this Standard and of the whole fabric of EMC Standards, and provides a clear justification for future disregard of Emission Standards for all products and systems, and for the down-grading of EMC design and test. This will spoil the consumer’s experience of electronic equipment – and nullify the signal/interference advantage that PLT seeks to achieve with the present document.*

As mitigation, a **dynamic power control** function shall be implemented that is capable of reducing the transmission signal to 75dB $\mu$ V (PK) or 65dB $\mu$ V (AV) when the mains network transmission loss is sufficiently low. *The requirement is to be met with a test network [Figure 4] of flat frequency response and the manner of its function with a real-world irregular frequency response is totally unspecified.*

Additionally, in order to ensure the inherent symmetry of the PLT port it shall under all conditions comply with an unsymmetrical emission limit based on EN55022 but using a special ISN [para. 9.4 and annex B] of high longitudinal conversion loss.

### 6.2 Specific requirements for Dynamic frequency Exclusion

The Draft sets out requirements for the reduction of PLT power to EN55022 levels upon the detection of a “valid” broadcast signal. This reduction may be implemented according to the ETSI method [Annex C of FprEN50561-1] which may be subject to patent rights. *There has never been any demonstration of this method under conditions of interference from other sources, and there is no specification of an appropriate interference environment during the test.*

Alternatively “Cognitive frequency Exclusion” is introduced as an option without definition [para. 9.3] and “other options are under development.”

## 7 Radiated Disturbances

These are required to meet EN55022 class B limits that are specified at 30MHz and above.

*This raises questions about the reproducibility of the EN55022 test method under conditions of high symmetrical-mode emission on an associated PLT port.*

## Annex A Excluded frequencies

The tabulated frequencies that are to be protected by notches do not include those used for Standard frequency and Time/Radio Astronomy/Automatic link Establishment for long-distance HF services/Short range devices Notching (and band edge limitation) has been shown to be ineffective in some circumstances due to in-filling by intermodulation of the high levels of interference on other frequencies. Notching is incompatible with satisfactory protection of radio services in the presence of mass-market HF PLT at the maximum level allowed by this Standard.