To: CM Verholt, Chairman, IARU Region 1 EMC WG

Date: 28th August 2012

Dear Christian,

Subject: FprEN50561-1

As you know the RSGB has very serious concerns about IARU Region 1 EMC WG supporting the draft standard FprEN50561-1

The arguments made in the recent EMC WG Newsletter seem to us to overlook some key points:

- There is no way that the emissions from devices meeting this standard can satisfy the essential requirements of the EMC Directive outside the notched frequencies. IARU Region 1 EMC WG is therefore condoning overriding the Essential Requirements of the EMC Directive by backing the standard The action of the Commission is clearly contrary to the law of the EU and open to judicial review.
- The new emission levels, if sanctioned, will inevitably become the baseline for future standards. In this context I note that already some new draft standards are circulating referencing 50561 emission levels
- The EU/CENELEC's own EMC Consultant has confirmed his firmly held view that the standard is inappropriate. Despite being disregarded by CENELEC, he continues to oppose the draft.

You will be aware of much correspondence about this matter, but I attach as a glossary, three documents which paint a fuller picture of our concerns:

a) The input from German ADDX to DKE
b) The RSGB article to appear in RadCom shortly
c) The note by Peter Chadwick, IARU Technical Consultant, concerning his opposition to the draft.

As you will know, those at the Friedrichshafen meeting were in many cases not EMC specialists. The RSGB requests that a proper sounding of IARU Member Societies should be taken in the next two weeks, so that their own EMC specialists may form a view of the IARU EMC WG proposal.

We do hope that common sense will prevail here, and that IARU Region 1 will amend its position. I am copying this note to Region 1 Societies.

73

Don Beattie, G3BJ
On behalf of the RSGB EMC Committee

Comments to prEN50561-1

by ADDX e.V., Assoziation Deutschsprachiger Kurzwellenhörer
Scharsbergweg 14, 41189 Mönchengladbach
Joachim Gröger and Martin Hengemühle

General Comments

In considering this draft standard it is useful to remind oneself of the definition and purpose of standards. Helpful guidance can be obtained from ETSI which, while acknowledging that technical definition is never straightforward, laudably states: “Of crucial importance to our members is the quality of the standard itself and we pride ourselves on creating thorough, high quality, robust standards under a self-imposed regime of compromise avoidance”.

CENELEC provides equally clear direction in its Primer on Standards. This document explains that CENELEC's Internal Regulations require that, ”Standards should be based on consolidated results of science, technology and experience, and aimed at the promotion of optimum community benefits.” (p.15)

And: “It [the standard] codifies best practice and is usually state of the art” (p.17).

And in a similar vein CENELEC claim that its standards, “ are of the highest quality because all interested parties are invited to contribute to their development: manufacturers, consumers, environmentalists and anyone who has anything to say or is concerned by standards. ” (p.18)

In its elucidation of the principles of the New Approach, CENELEC underlines the role that standards play in ensuring that products meet regulatory requirements and importantly stresses the fact that, “Application of harmonized standards or other technical specifications remains voluntary. Manufacturers are always free to choose any technical solution that provides compliance with the essential requirements set by the Directive”. (p.32)

And further: “Only products fulfilling the essential requirements may be placed on the European market and put into service” (p.32)

The reader of the primer is repeatedly reminded of this overriding principle and that key is always “Applying a standard is voluntary, complying with the law is mandatory”. (p.39, p.44)

The draft standard fails against any and all of the foregoing criteria and requirements:

It is not robust, does not avoid uneasy compromise, does not reflect the state-of-the art, is not based on consolidated results of science and technology and does not take account of experience. It is of questionable quality as it is not evident that all interested parties have been invited to contribute to its development or have indeed done so. In conclusion, therefore, it is highly doubtful that it will promote optimum community benefits.

It also puts at risk a key element of the EU's Sustainable Development Strategy, namely the conservation and management of natural resources (the electromagnetic spectrum).
The reasons for this assessment are most importantly that the standard seeks to codify a technology and associated apparatus that does not a priori meet the essential requirements of the EMC directive.

The draft standard acknowledges this fact because it necessarily prescribes radio interference mitigation measures (selective notching) that purport to bring the apparatus into compliance. Good engineering practice and the law dictate the need to avoid all interference in the first place. Interference mitigation should always be a last resort and should therefore not be an inherent component of a technical equipment specification.

However, even with the inclusion of such mitigation measures the draft standard does not robustly ensure compliance of the relevant apparatus. There are at least two reasons for this. Firstly, as the harmful interference is not avoided 'at source' it continues to exist, in clear contravention of the EMC directive on all frequencies that are not covered by the mitigation measure, i.e. not 'notched'. The draft standard wrongfully singles out certain frequencies 'worthy' of purported protection through notching while leaving a still significant portion of the HF spectrum exposed. This, incidentally, raises the question of where CENELEC derives its authority to such rule making from?

Secondly, the authors of the draft standard ignore the widespread experience available which points to the inability of notching to provide adequate protection from emissions from the current generation of PLC devices.

It is widely known, and tacitly accepted by many administrations, that such devices operate at emission levels substantially (30-40dB) above EN55022 and that notching is failing to adequately protect radio services in these circumstances. This CENELEC draft proposal seeks to unacceptably establish such damagingly high emission levels as the new norm.

The draft standard envisages interference mitigation integral to the apparatus, such as static and adaptive notching facilities, whose reliability and efficacy is said to have been proven in a laboratory environment and limited field trials, albeit working only with comparatively strong broadcast signals, not attempting to protect the much lower signal levels customarily employed by other radio services, and using antennas that cannot be assumed to be representative of the receiving capabilities of all mains wiring systems in different localities. There is no real-life experience with such techniques in a multiple PLC apparatus environment but there are credible technical reasons to expect them to fail that test.

This draft standard represents yet another lamentable attempt at paving the way for interference causing powerline communication devices into the market place. It disregards the fundamental principles of interference control, ignores good engineering practice and, if adopted, would exclusively allow powerline communication apparatus to flout established emission limits designed to protect radio services from harmful interference. Solid arguments against the deployment of such apparatus have been presented repeatedly and often for over a decade. Ennobling this latest effort by reiterating these well known arguments would be futile and counterproductive.

From the foregoing it is beyond doubt that the draft standard would not achieve what it purports to do, which is to define the technical parameters for powerline communication apparatus that can operate in full compliance with the EMC directive, national legislation and relevant ITU regulations.

It is, therefore, unfit for purpose and should not be adopted.

The RSGB Position on Powerline Adaptors and the proposed European Standard FprEN50561

A Report to Members from the RSGB EMC Committee

There have been a number of significant developments in the attempt to create a new European Standard for Power Line Telecommunications devices. Below is an update on the situation. For the very latest news please check the RSGB website [1].

Powerline Telecommumications (PLT)

PLT technology involves the use of household mains wiring to carry high speed data using OFDM modulation in the 2-30MHz frequency range, with a number of devices now operating up into the VHF spectrum. Mains wiring is not designed to carry high frequency signals nor to prevent their radiation.

PLT devices assume the mains wiring presents a balanced load. However, for a number of reasons, there is a poor balance between conductors in the mains wiring. At HF much of the transmitted signal from a PLT device is radiated as interference. . The new Standard prEN50561-1 allows averaged conducted emission levels of 95dB(μV) over much of the HF spectrum, which results in high radiated interference levels.

Some history of PLT developments

When the RSGB first became involved in PLT in the late 1990's, there was a denial from the proponents of PLT that interference was an issue. Through a process of education and testing led by the Society, it became accepted that there ***was*** a problem with interference. In the 1990's, the discussion was focused on "Access" PLT – bringing broadband to the home over the mains distribution network. The limited number of trials which were carried out in this country (and elsewhere) showed that not only was there a significant interference potential (as the RSGB had warned) but that the performance of access PLT was unlikely to be competitive with the evolving DSL service. Almost all "trials" of access PLT have now closed down.

PLT chip manufacturers then turned their attention to in-house distribution of broadband, a major driver being IPTV (TV over the Internet) Tests showed that this was a viable technology but to be able to work in almost every situation the transmit power needed to be raised by up to 45dB above the present IT apparatus Standard which is CISPR22/EN 55022. There then followed a period where the interests of radio users and PLT protagonists argued to produce a Standard compatible with minimum interference to radio use. Successive CISPR (the global standards organisation) working groups failed to reach agreement and abandoned work to produce a draft. A joint working group of ETSI and CENELEC (both European standardisation organisations) working under a 2001 European Commission mandate also failed to reach agreement on a network Standard. In 2010 the European Commission then mandated CENELEC to prepare a European Standard for PLT networks, making clear that it expected a result. In the meantime the latest version of EN 55022 came into force (known as EN 55022:2006) which made it clear that PLT devices were covered by the Standard – not least because it contained a specific mains port measurement - and this was confirmed by the EU.

After some time, CENELEC produced a draft Standard (prEN50561) which was, as is required, put to the vote of national standardisations committees. Of the 31 national committees, ten voted in favour, the rest either opposing or abstaining. Under CENELEC rules, this caused the draft to be rejected due to its weighted voting process. CENELEC then embarked on a review of the draft at the Commission's request. Many pages of commentary were received from national committees, however the second draft Standard, due for vote shortly, is little changed from the one rejected in 2011.

Why is the Society still opposing acceptance of prEN50561-1 ?

Over the years, it has become accepted that PLT devices cause interference. For this reason the draft, voted on last year, included a number of requirements to reduce the effects of interference:

a) It required emissions in a number of frequency ranges to be limited by "permanent notching" broadly to the levels of the existing EN55022 Standard. This applies to all Amateur bands and to certain other frequencies relating to safety of life. Most Amateur bands have in fact been notched in PLT practice for many years.

b) It required emissions in broadcast bands to be either limited to the same level as in (a) or to employ a "dynamic notching" technology where the PLT device listens on the frequency band concerned and if signals are present above a certain threshold, reduces its emissions accordingly.

c) It required PLT devices to employ dynamic power control, whereby low attenuation mains circuits caused reduction of the level of signal injected into the cable.

The technologies in (b) and (c) have yet to be seen in mass-produced PLT devices, and their effectiveness is unproven in a multi-PLT device environment or in the presence of interference. At other frequencies, the proposed Standard allows emissions broadly up to 45dB higher than the existing Standard. This is to cater for the inherently noisy nature of a mains circuit and the desire of PLT manufacturers to offer a high confidence of service. This is about 7dB higher than current "first generation" devices.

The attraction of having emission "notches" in the amateur bands is helpful and has certainly reduced interference in these bands. However, research has shown that non-linearities in the wiring or connected devices could result in inter-modulation products which will not be attenuated by notching.

The RSGB has followed these discussions and has been actively involved in both the UK and European standardisation committees. The RSGB is concerned that the draft Standard represents an unacceptable way ahead. The reasons for its view are as follows:

a) The European EMC Directive requires that "Equipment shall be so designed and manufactured…so that… the electromagnetic disturbance generated does not exceed the level above which radio and telecommunications equipment or other equipment cannot operate as intended" This is a corner stone or "Essential Requirement" of the Directive. Yet the CENELEC committee, in advocating notching, appears to be accepting that elsewhere the effects of PLT are damaging to radio communications. To agree such a Standard would in effect set aside the "Essential Requirement" of the EMC Directive as it applies to the "un-notched" frequencies without, as is required, the necessary parliamentary and Council of Ministers review. The RSGB's view is that this is a fundamental breach of process, and open

to legal challenge. The EMC Consultant employed by the European Commission and CENELEC to advise on these issues is also of the view that the Standard does not meet the EMC Directive's Essential Requirements and has made the point that it is not the job of Standards to provide for mitigation of interference, and yet CENELEC has determined to discount that view.

b) The EU Commission has accepted that the existing Standard (EN55022) applies to PLT devices[2.] Any Standard that sets emissions at +45dB above the current applicable Standard could be seen as setting a new baseline for determining future emission Standards. This is to the grave detriment of both the radio spectrum and the integrity of the standardisation process.

The RSGB has consistently argued for prudence here. Partly as a result of campaigning through other European amateur radio societies, the 2011 vote on the earlier draft Standard was rejected. Now IARU Region 1 has changed its position and is supporting the draft, arguing that its only concern is about the amateur bands. IARU Region 1 argues that not to support the Standard risks a less favourable outcome for the Amateur Service. This was the majority view of those societies present at the EMC WG in Friedrichshafen, but it is not a view shared by many of those professionally engaged in this debate. Nor is it the view of just the UK Society. Although 10 countries voted in favour of the draft, the UK's opposition was supported by Switzerland and France, with Norway and Austria abstaining. It is also not the view of IARU's own Technical Consultant, who has confirmed his opposition to the draft Standard.

In summary the RSGB is opposing the draft Standard because:

a) it allows conducted emissions at high levels over major parts of the radio spectrum which can cause significant radiated interference to radio services
b) it contravenes the essential requirements of EMC Directive.

Whilst we welcome formal notching of the amateur bands and safety of life frequencies, and dynamic notching of broadcast bands, these technologies do not address the above primary issues, will only partly prevent interference and are as yet unproven.

The Society's position remains as follows:

- That any changes to the Essential Requirements of the EMC Directive must be through proper EU process, and not through the medium of a flawed Standard

- That EN55022 is currently the appropriate Harmonised EU Standard for PLT apparatus. Its requirements provide an adequate level of protection under the EMC Directive. The Directive applies to the state of apparatus when it is first placed on the market or taken into service.

- The Commission and national regulators must close off the loophole by which some manufacturers are getting round EN55022. That is, the use of unadopted and withdrawn "committee draft" papers that propose relaxations to the Standard by some 30dB across much of the HF spectrum. The use of such documents to support a technical assessment for EMC compliance purposes was condemned in Ofcom's own commissioned research but only disclosed under Freedom of Information rules after an appeal to the Information Commissioner.

- In the UK, Ofcom must put in place Regulations under the Wireless Telegraphy Act to enable it to deal with interference from PLT systems *in use.* Currently it has no such powers.

A catalogue of much of the correspondence on this issue can be found on the RSGB website and the Society continues to press for a Standard that meets the Essential Requirements of the EMC Directive.

1 http://www.rsgb.org/emc/rsgb-and-ofcom-correspondence.php

2 http://www.europarl.europa.eu/sides/getAllAnswers.do?reference=E-2009-2260&language=en

This article will appear in the October 2012 issue of RadCom.

From: G3RZP, IARU Technical Consultant

Gentlemen,

I regret to say (and so I have advised the IARU President in my capacity as IARU Technical Consultant) that in my professional opinion, this standard does not adequately protect the amateur or even other radio services. It totally fails to recognise the effects of IMD and harmonic production of the majority of power supplies, especially 'wall warts': I am aware that the protagonists happily denigrate the results of RSGB EMC measurements presented to the ITU as an IARU input paper, while they fail to present any arguments or measurements to gainsay those results.

The argument that there is no standard without the proposed one is dubious: EN55022 is applicable, although the PLT protagonists claim it does not allow them enough power.

Even EN55022/ CISPR22 does not really guarantee adequate protection for radio services: although CISPR is supposed to protect the radio services and arguably has to produce standards which are economically viable, it has not, in my professional opinion, produced standards which which adequately do so. Indeed, I would (and have) argued that CISPR is an organisation that is now well past its 'sell by' date. Comments made by the Chairman of that CENELEC committee at ETSI regarding exclusion bands has shown a lack of understanding of the realities of radio equipment, and indeed, of the almost impossible phase noise requirements of EMC signal generation. (I have an input paper for the next ETSI ERMEMC committee meeting on this subject)

I am saddened by the failure of RI to realise the realities: the idea that this standard is better than no standard is fallacious, insofar as the proper use of EN55022 would provide much better protection.

The arguments presented in favour of this standard are basically identical to ones in favour of discharging raw sewage from a city into a river because the towns downstream have fewer inhabitants and thus there is an economic advantage for the city in so doing. An even bigger one by allowing more discharge!
I am aware that my popularity in R1 will be rather low as a result of these opinions, but I am not prepared to prostitute my professional integrity for the sake of kowtowing to to professional and administration interests.

I am intending to retire next year: thus if I can leave the Amateur Services in a no worse situation, I will at have at least achieved something from 30 years of volunteering for RSGB and 15 years for IARU. Thus I don't not only don't care what R1 think or say, but have an opinion that doubts the expressed professional capability.

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Peter Chadwick, Sen. MIEEE, G3RZP
RSGB Life Vice President.