Doomed to Fail: FprEN 50561-1

PLC (Powerline Communication) is able to disturb radio services and to render a valuable natural resource useless, but still the PLC-Lobby and the European Commission try to push through this unfit-for-purpose and superfluous technology against technical reason and by circumventing sound standards. The first part of this article [1] addressed the history, subject and hazards of the draft standard FprEN 50561-1. This second part proves that it is unnecessary and inadmissible ...

The European Committee for Electrotechnical Standardisation CENELEC explains on its Website [2] what mandates are and how they are prepared:

"A standardisation request (mandate) is a demand from the European Commission to the European standardisation organisations (ESOs) to draw up and adopt European standards in support of European policies and legislation ... Draft mandates are drawn up by the Commission services through a process of consultation with a wide group of interested parties (social partners, consumers, SMEs, relevant industry associations, etc.). Before being formally addressed to the ESOs, they are submitted for opinion to the Member States in the Standing Committee of the 98/34/EC Directive ... The standardisation requests which are issued by the European Commission and which are accepted by the ESOs, are available in the database of mandates."

The draft standard FprEN 50561-1 [3] includes the following statement:

"This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association ..."

However, the mentioned database of mandates contains no information at all concerning a mandate for the draft standard FprEN 50561-1. A request for information on that mandate addressed to *Pedro Ortún Silván* (Director for Service Industries, European Commission), *Elena Santiago Cid* (Director General, CEN/CENELEC) and *Antonio Tajani* (Vice-President, European Commission) in October 2012 remained unanswered. Eventually, another source presented a document [4] which CENELEC obviously would like to interpret as a standardisation request. It is the formally prepared version of a simple letter dated 7 May 2010 [5] whereby Pedro Ortún Silván *"invites"* CENELEC to prepare a *"modified version"* - applying only to PLC - of the standard EN 55022: 2006 with the justification that otherwise the PLC specific third part of the standard EN 50529 to be produced under mandate M 313 [6] could not be completed.

This letter issues expressly neither a *"mandate"* nor a *"standardisation request"*, a preparation in the way intended for a mandate by CENELEC did not take place, it does not in the least meet the formal requirements for a mandate laid down in the *"Vademecum on European Standardisation"* and it is not even listed in the database of mandates issued by the European Commission.

The description of mandate M 313 points out that harmonised standards have already been produced which certainly cover electrical and electronic

by Karl Fischer, DJ5IL
Friedenstr. 42, 75173 Pforzheim, Germany
www.cq-cq.eu - DJ5IL@cq-cq.eu

appliances but not fixed *installations* like, for example, *telecommunication networks*. It also states that such installations increasingly disturb radio services:

"Since the entry into force of the EMC Directive, a number of harmonised standards have been produced covering the electromagnetic compatibility of electrical and electronic appliances. No harmonised standards, however, have been developed covering the electromagnetic compatibility of fixed installations, such as, for instance, telecommunication networks. While this situation so far may have been satisfactory, such installations increasingly cause interference to radio services..."

In order to address these interference problems the mandate commissions the development of a set of EMC standards not for *appliances* but for *installations,* and in the narrower sense for *telecommunication networks*. Therefore it is entitled ...

"EMC harmonised standards for telecommunication networks."

... and it is made eminently clear and stressed that this mandate does not concern standards for equipment connected to these networks:

"This mandate does not concern the preparation of harmonised standards relating to the electromagnetic compatibility of equipment to be connected to the networks."

The commissioned standards are meant to be *technology-neutral* and to cover installations which make use of power lines, coaxial cables or telephone wires for data transmission:

"These standards should cover the types of networks, which are currently operational or which are under development, including, but not limited to those using power lines, coaxial cables and classical telephone wires ... The standards produced under this mandate should form a comprehensive, technology-neutral set".

Furthermore, it is urged that they observe existing standards which were developed under the EMC Directive for equipment connected to these networks and EN 55022 is one of these standards:

"These standards should be coherent with generic standards. They should take into account any other harmonised standards (produced under either Directive 89/336/EEC or Directive 99/5/EC) relating to the electromagnetic compatibility of equipment to be connected to the networks."

It follows that a *"modified version"* of the standard EN 55022:2006 like the draft standard FprEN 50561-1 is expressly not part of the mandate M 313 because this draft standard covers equipment but not installations and in the narrower sense telecommunication networks. On the contrary the mandate M 313 even stipulates the observance of the existing standard EN 55022. As a result a valid mandate for the draft standard FprEN 50561-1 actually does not exist.

Also, the justification put forward in the letter written by Pedro Ortún Silván for a modified version of EN 55022 is absolutely unacceptable because it is based on the PLC-Lobby's claim that there would be no current standard applicable to PLC devices. However, contrary to that false assertion the standard EN 55022 clearly covers all *"information technology equipment"* and, of course, it is also intended for PLC devices and applicable without any problem. That fact was confirmed even by the former European Commissioner Günter Verheugen in his answer [7] to a request in 2009:

"PLC are subject of the European standard EN 55022 published under the EMC Directive ..."

The current standard EN 55022:2006 [8] also applies to PLC devices and their mains plugs have to be assessed according to the **flowchart for selecting test method**. This flowchart is included in the normative Annex C on page 54 of the standard. It explicitly describes the mains port as one possible type of telecommunication port which has to be tested in PLC devices for compliance with the prescribed limits. This aspect of the flowchart has been maintained by the creator of this standard CISPR/I also in the face of strong pressure from the PLC industry with a view to putting a stop to interpretative trickery. It shows that CISPR/I regard it as imperative that the established limits for the mains ports should be applied, whatever their additional function is. This approach has a solid technical foundation because their emissions standards exist to protect the radio spectrum and are based on values for mains decoupling factors [9] which were determined by extensive measurements in real low-voltage mains grids and still today are deemed to be valid and representative.

Though this important flowchart has an expressly *"normative"* function it is notoriously ignored not only by the PLC-Lobby, therefore it is depicted on page 3 of this article. At first it asks if the EUT port concerned is a telecommunication port according to definition 3.6. This clearly applies to the mains plug of a PLC modem which combines the functionality of a mains port and of a telecommunication port. Then it asks for the port type and because it is *"Mains"* the test method defined in section 9.3 is stipulated. Accordingly with an interconnected AMN (*"Artificial Mains Network"*) the conducted disturbances have

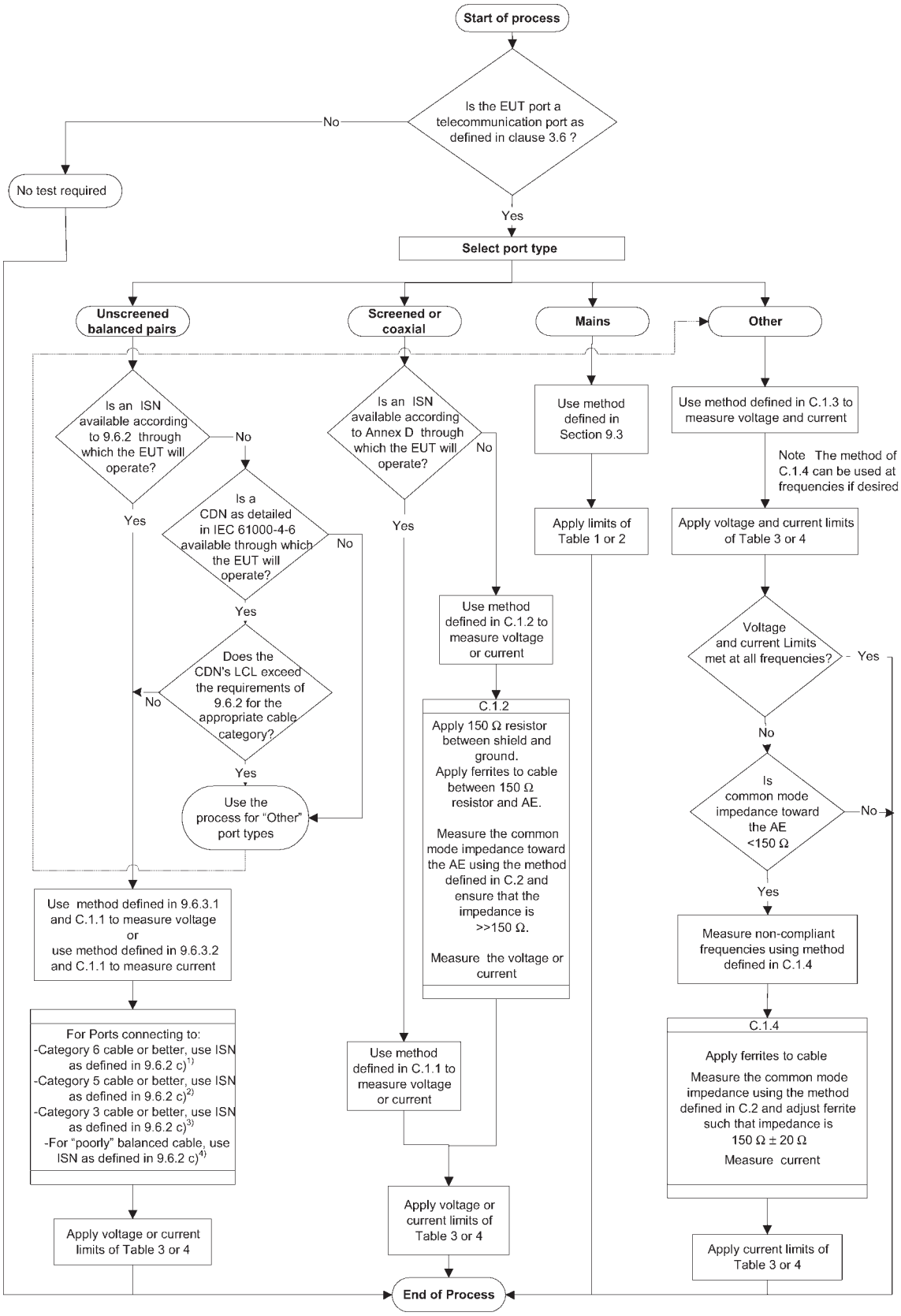

Figure C.6 - Flowchart for selecting test method
(Source: EN 55022:2006, Annex C (normative), p. 54)

to be measured between phase and ground as well as between neutral and ground and neither measurement is allowed to exceed the limits given in tables 1 and 2. With that the limit e.g. for class B devices between 5 and 30 MHz is **50 dB(µV) (AV)**. In compliance with this limit at most twice this voltage is possible between phase and neutral, that is 6 dB more, and so this standard effectively limits the signal voltage fed into the mains grid by a PLC modem to **56 dB(µV) (AV)**. It must be emphasized time and again that the current EN 55022:2006 stipulates exactly the same limits as the superseded version from 1998. The only substantial difference is this added flowchart with the purpose to clarify the selection of test method and to close a loophole in the interpretation of the definitions which has been exploited by the PLC industry in order to exceed these limits.

In addition to the current standard EN 55022 the proposed new standard EN 50561-1 is supposed to be applied only to PLC devices and the draft prescribes:

"When user data is being transmitted by the PLC port the disturbances from the PLC port may exceed the disturbance limits of Table 1 at frequencies between 1,6065 MHz and 30 MHz provided that within
- all the excluded frequency ranges given in Table A.1, the level of the transmitted signals shall comply with the disturbance limits given in Table 1 using the methods and procedures given in 9.1,
- all the excluded frequency ranges given in Table A.2, the level of the transmitted signals shall comply either with the disturbance limits given in Table 1 using the methods and procedures given in 9.1, or with the dynamic frequency exclusion requirements given in 6.2. ... The maximum transmitted signal from the PLC port shall not exceed the maximum values given in Table 2 measured using the methods and procedures given in 9.2."

Consequently FprEN 50561-1 allows the limit of 50 dB(µV) (AV) according to EN 55022:2006 to be exceeded outside the *"excluded frequency ranges"* provided the signal voltage fed into the mains grid does not exceed the limits given in table 2 of the draft. But with values between 65 and 95 dB(µV) (AV) these limits are again 9 to 39 dB above the factual limit of 56 dB(µV) (AV) according to EN 55022:2006, which means a nearly 10000-fold increase in the maximum permissible disturbance power level !

With the adoption of FprEN 50561-1 the technology-neutrality urged by mandate M 313 would be violated and therefore the mandate could not be fulfilled, because PLC would be granted an unjustifiable special status compared with other network technologies with substantially higher limits concerning conducted disturbances at the mains ports. Furthermore, both standards would be contradictory and a standards conflict would exist which is inadmissible according to the CENELEC *"Internal Regulations Part 2: Common Rules for Standardization Work"* of July 2012 which lay down in 11.2.1.1:

"The content of a European Standard does not conflict with the content of any other EN (and HD for CENELEC)."

The fact that consistency or the avoidance of contradictions and conflicts is a basic principle of standardisation work and that the creation of a standards conflict is an absolute taboo is emphasized by the following quote from the publication *"Making European Standards"* by CEN/CENELEC:

"The European Standard (EN) is the reference in standardization. EN is a normative document ... that cannot be in conflict with any other CEN or CENELEC standard."

A new standard EN 50561-1 could only exist without contradictions alongside the current EN 55022 if the latter would exhibit a standardisation gap. This, however, is demonstrably not the case. CENELEC possibly under pressure from the European Commission and disregarding their own Internal Regulations appears to be trying to limit the intended scope of a current standard (EN 55022) by circumventing it only for a specific technology (PLC) through a new standard (EN 50561-1). Therefore, the draft standard FprEN 50561-1 which conflicts with EN 55022 is definitely inadmissible !

Conclusion:

The assertion included in the draft standard CENELEC FprEN 50561-1 that it has been prepared under a mandate of the European Commission is false - actually there is no valid mandate. There is also no necessity for a modified version of the standard EN 55022 applying only to PLC devices. Furthermore, such a modified version would infringe the technology-neutrality stipulated by mandate M 313. Finally, this draft standard contradicts the current standard EN 55022 and so it infringes an accepted basic principle of standardisation work as well as the CENELEC Internal Regulations and therefore it is inadmissible.

The European Commission does not seem to be aware of the fact that with good reason there are standards which do not only serve to facilitate trade and to promote competition. One example is the current standard EN 55022 with the sole purpose to protect radio services from interfering emissions emanating from all information technology equipment by

defining limits and methods of measurement for the radio disturbance characterstics of these devices.

As a justification for the relaxation of these limits - and this is the true intention behind the draft standard FprEN 50561-1 - the European Commission and the PLC-Lobby over and over again argue that up to now there has been no *"significant number of disturbance cases*". But the purpose of an EMC standard is just not to push up the limits until disturbance cases appear in *"significant number"* but instead to prevent such scenario by keeping the limits low enough so that disturbances rarely occur and any violation of this principle demonstrates a low sense of responsibility. Would we like to live in a world where, for example, the limits for nuclear radiation are pushed up until a *"significant number"* of cases of the acute radiation syndrome appear ? Certainly not ! Furthermore, all those who ask for a relaxation of the limits are definitely not in the position to judge the number of *"disturbance cases"* - they think of *"disturbance complaints"* and we know from experience that the number of *"complaints"* is much lower than the number of real *"cases"*.

PLC has an inglorious and notorious history of causing radio interference e.g. in the USA, the United Kingdom, Austria and Germany. Complaints by the regulators are few simply because PLC is boosted by political reasons and pressure from the PLC-Lobby and at the same time the regulating authority in many countries ironically is subordinate to the department of commerce, which is interested in flourishing trade but not in the protection of radio services.

European Commission and national administrations seem to favour a sort of postponed interference management where the protection of radio services is merely an option. This attitude does not only show a lacking sense of responsibility, it is also discriminating, shortsighted and dangerous. What happens for example if harmful interference is caused by the cumulated disturbances of numerous PLC networks ? Which devices have to be shut down ? How to get rid of the harmful interference ? In fact, the protection of radio services is not merely an option but an obligation which is embodied in the ITU Radio Regulations as well as in the EMC Directive.

references

1. http://cq-cq.eu/DJ5IL_rt004e.pdf
2. http://ec.europa.eu/enterprise/policies/european-standards/standardisation-requests/index_en.htm
3. http://cq-cq.eu/EN50561_Draft.pdf
4. http://cq-cq.eu/TC210_SEC0645_INF.pdf
5. http://cq-cq.eu/Ortun_Silvan.pdf
6. http://cq-cq.eu/M313.pdf
7. http://www.europarl.europa.eu/sides/getAllAnswers.do?reference=E-2009-2260&language=en
8. http://cq-cq.eu/EN55022-2006.pdf
9. CISPR 16-4-4 *"Statistics of complaints and a model for the calculation of limits for the protection of radio services"*

DJ5IL_rt005e.pdf
Original version: 29.11.2012
Revisions: 24.09.2013