CEN, CENELEC, ESMIG, Eurelectric and ORGALIME joint workshop

“Electromagnetic Interference in the Cenelec-A band”

12 September 2013
09:30 AM – 04:00 PM
CEN-CENELEC Meeting Centre

1 Registration and welcome coffee
Robert Denda and Willem Strabbing welcomed all participants. Participants introduced themselves.

2 Introduction
Per Hallberg – Eurelectric gave an introduction to Eurelectric, see presentation Item 1. He mentioned the Draft TS 62578 Ed.2.0 from IEC TC22 caused concerns with several stakeholders and could become a barrier to the implementation of smart systems. The meeting will serve to define the EMI problem; discuss the different viewpoints and define a roadmap to overcome the problem.

Willem Strabbing – ESMIG made an overview of the Agenda and emphasized that the morning of the workshop was meant for defining the EMI problem and the afternoon for exchanging ideas about possible solutions.

3 Overview of usage of PLC in the 2-150kHz range
Guillaume Blondel – CLC/SC 205 A gave an overview of use of PLC in the 2-150 kHz range. See presentation Item 3
The main SC 205A standard for PLC communication is EN 50065-1 standard. This standard covers the physical layer of PLC, providing limits for the injected signal emission levels and spurious emissions out of the operational band as well as designates frequency ranges out of 2 – 150 kHz to different applications.

4 Frequencies usage, point of view from Smart Metering
Bernd Schulz – CLC/TC13 offered a smart metering point of view on frequency usage, see presentation Item 4
According to TC 13, a standard would have to fulfill the following requirements:

General requirements
• To fill the gap in EMC requirements for the frequency range 2 to 150 kHz
• Agreement of compatibility levels

Use of PLC technologies
• Protect the CENELEC Band to allow narrowband PLC technology to be used for Smart Meter / Smart Grid applications

Metrology
• Specify EMC environment in terms of maximum emission levels and evolve standards for type testing of meters with conducted disturbances
• Revision of TC 13 meter type test standards (EN 50470, IEC 62052/53) with respect to
Conducted disturbances based on IEC 61000-4-19

TC 13 furthermore recommended involvement of IEC TC 8 to find an acceptable balance between cost and benefit for users of electrical energy. The phenomena are not yet well known. Propose research programmes to study the EMC disturbances, check for EU funding.

**Conclusion:** Standardization gap must be closed. TC 13 is ready to cooperate further, with TC 77 A liaison and IEC ACEC. Protect CLC A Band.

5 **Summary of potential emitters and affected devices**

Gerhard Bartak – CLC/SC 205 A, IEC/SC 77A, CLC/TC 8X gave an overview of the results of measurement on emissions in the frequency range 2 – 150 kHz and investigations on related electromagnetic interference (EMI) cases, with different types of equipment each, see presentation Item 5. More and more electrical equipment are recognized as figuring as a source or victim of EMI, thus showing a quite broader EMC problem than focusing to automated meter reading using power line communication for data transmission (AMR-PLC).

A differentiation must be made between an intentional signal for information transmission, and a non-intentional disturbance which is a side product of applied control technology, both causing EMI depending on the frequency and the level.

Study Report II from CENELEC SC 205 A shows quite high levels of emissions in the considered frequency range and, concerning EMI cases, gives overviews

- of electrical equipment figuring as a source or victim of EMI as well as of EMI effects (malfunction, loss of communication of mains communicating systems (MCS), accelerated ageing of components, reduction of lifetime)
- of specific EMI parameters in the considered frequency range (conducted and radiated interference path discontinuity, ageing effect, shunting effect etc.)

Current standardisation shows lacking compatibility levels, emission limits only for two groups of equipment (lighting equipment and induction cookers) and only small, incomprehensive consideration of the specific 2-150 kHz EMI parameters.

**Conclusion:** Efforts are needed to harmonise the shared co-existing utilization of frequencies in the 2-150 kHz range, with appropriately completed standardization and/or regulation.

6 **Point of view from the inverter manufacturers**

Benno Weis - CLC/TC 22X (presentation Item 6)

Mr. Weis pointed to the vast potential for energy savings from power electronics in light of the M495 mandate and the ErP Directive, asking for standards to define minimum efficiencies for energy using products. Products (AICs) already make use of filters to reduce the emission at switching frequency. Producing larger filters would not only be costly, but also create low frequency resonances, and reduce the energy efficiency of the equipment.

Designing inverters according to the IEC TC22 draft 62578 would have solved the majority of interference cases reported in the SC205 Study report II. ACEC appreciates the TS62578 as useful contribution and recommends to use the proposed design guidelines until mandatory limits are agreed in SC77A and CISPR.

TC 22 has received very few reports of interference cases in the frequency range between 20kHz and 1/10/2013
150kHz and will continue to contribute to EMI solutions in SC77A and CISPR. The next steps on TS62578 will be discussed during the next TC22 plenary meeting end of September 2013.

7 **Point of view of electric equipment and smart meters manufacturers**

*Marc Cumps - Orgalime* presented the point of view from the industry value chain, see presentation Item 7a. Various factors are involved in defining a solution to EMI cases. Should work be done on the reduction of the emission levels of appliances or should their immunity increase? And who will bear the cost for this? EMI cases occur partly due to a lack of standardized specifications for emissions and immunity and hence create legal uncertainty. If this is the case the compatibility levels should be elaborated within the standardization community with the involvement of all stakeholders and industry segments. Questions to be addressed during the workshop: Does the market need a standard solution that becomes prescriptive for all or can it be settled on a voluntary basis?

**Conclusion:** A roadmap should be adopted, and the standardization work should be started accordingly. Present adopted roadmap to EMC officials.

*Willem Strabbing – ESMIG* proposed to focus on the existing CEN/CLC standards, which form a basis for many developments already done, see presentation 7b. The solution should be horizontal and cover all devices that may cause or experience disturbances. Regulators and the European Commission should support the solution and moreover, give it a mandatory status.

8 **Analysis of the issue from a user point of view**

*Robert Denda – Eurelectric* presented the regulatory framework in view of smart meter roll out, see presentation 8. The EMI problem in the Cenelec A-Band raises particular concern with regards to the ongoing and upcoming investments that need to be done in Smart Meter and Smart Grid projects, increased pressure on customer services, the integration of Smart Grids and the impact on the Cost Benefit Analyses Member States have already performed for the roll out of smart meters.

**Conclusion:** There is a strong need for regulatory protection either through a harmonized standard, frequency management by design, and/or the application of filters.

9 **Requirements for potential solutions from a frequency spectrum point of view**

*Guillaume Blondel – CLC/SC SC 205A report on interferences in the frequency band 2-150 KHz*, see presentation 9a. Use of the A-band is of utmost importance for Smart Meter and Smart Grid roll-outs, imposed by the 2009/72/EC Directive.

**Conclusion:** IEC SC 77A shall define compatibility levels to provide sufficient margin for PLC. The use of the frequency band is a regulation issue, so DSO’s could, possibly via Eurelectric, ask the EC to protect the A-band through regulation.

*Jean Luc Detrez – CLC/TC 210* presented the mitigated point of view from a horizontal committee position), see presentation 9b. Seen the few reported interference cases and limited amount of products concerned, national Committees are divided over the need for new product emission requirements. IEC SC77A is already working on the completion of the 61000 series concerning testing immunity from differential-mode disturbances and signals in the frequency range 2 – 150 kHz as well as on compatibility levels. Frequency management on the mains could be a solution to avoid classical interferences; however regulators are not keen on getting involved in frequency management.

1/10/2013
Conclusion: Further research must show what the actual extent of the problem is and the interferences models present. Solutions are being investigated at various levels.

10 Road map to reach a solution on the issue
   With regard to the necessary distinction between non-intentional emissions (disturbances) and intentional emissions (signals), the recognitions from Study Report II related to existing high emission levels, proven EMI cases and the recognized specific EMI parameters the present standardization situation:
   • an overview of options for finding a concept for coexistence of both groups of electrical equipment was given, thus highlighting the need for effective rules for a shared utilization of the frequency range in the sense of EMC.
   • questions left open were highlighted (need for consideration in Generic Standards, standards vs. regulation, appropriate amendment of terminology).

Conclusion: Current IEC and Cenelec standards need to be completed; equipment design needs to be adjusted with high quality components and rules for frequency utilization must be set.

The EMC consultant (Brian Jones) commented that currently the potentially disturbing technology is developed in isolation. There is a potential conflict between the EMC directive and the Energy Efficiency requirements, but the protection requirements of the EMC Directive are not qualified by caveats.

Technical solutions will have to be found by the technical bodies, but this will be difficult. The EMC Directive protects the power line communications in the CENELEC Bands. Harmonised standards are voluntary, but they establish the state of the art.

B. Round-table discussion on potential road map and required actions: Chaired by Gunnar Lorenz, EURELECTRIC, Panel: all presenters

Gunnar Lorenz invited different speakers to give brief statement on how to continue. It was more or less agreed that right ahead of the mass smart meter roll out, a need for setting compatibility levels and the setting of emission limits as well as adapted immunity requirements were given and the Cenelec – A frequency band must be protected. Yet, it is important to take note of the actions planned in standardization by IEC 77 A, as well as the ACEC Recommendation. Some suggested action parallel to the work of SC 77A should be avoided. In addition, the European Commission should be notified that standards are to be completed which should be harmonized with the EMC directive in order to give them a “near mandatory” status.

11 Closing of the workshop
A. Conclusion of the workshop: Robert Denda – Eurelectric / Willem Strabbing – ESMIG, see presentation 11.

Participants agreed on the following steps towards a solution:
• International level: compatibility levels, ongoing technical work by SC 77A. Action plan by the end of this year. Cenelec Bands A-D will be covered.
• Ongoing work on EN 50160 concerning completion with regard to 2 – 150 kHz is welcome.

1/10/2013
• First define compatibility levels for 2 – 150 kHz and then, based on these, emission levels and completed immunity requirements
• Urgency at European level. European Directive and Cenelec frequency band -> Tackle problem at regulatory level in Europe, in parallel continue and push standardization work at international level.
• Will give results of today’s Workshop to Commission.
• EMCD might need some improvement (also terminology). However communication services are already protected by current directive. Installation rules should be reviewed. Start studies on this issue.
• Requirements on equipment design to mitigate ageing effect needs to be done at the different product committees. Likewise, installation rules should consider the recognitions from Study Report II. TCs shall be informed.
• Right measurement methodology needs further research.
• Further measurements and reporting on detected problems to CLC/SC205A and IEC/SC77A.
• Proposal to launch further research programs (funding by EU) on safety and long-term reliability.

B. Closing remarks: Jens Erdmann – CEN-CENELEC Management Centre thanked everyone for their active participation to the workshop and reminded the principle that standardization shall be made as much as possible at international level (IEC/CISPR) and that CENELEC has to respect the principles of the Dresden Agreement. All participants will receive the presentations and minutes by email.