1992: EMC in Europe

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INTRODUCTION

Since November 1987, the European Commission (EC) has been evaluating the EC Directive on Electromagnetic Compatibility (EMC). A Council Directive was issued on 3 May 1989 which addressed standardization of member states' laws relating to EMC. The first draft of this Directive was published at that time. The Directive on Electromagnetic Compatibility applies to all electrical devices, and mandates tests on RF emissions and immunity from electromagnetic disturbance.

Beginning in 1992, all EC countries will conform to these uniform regulations and technical standards, and compliance with these requirements will be indicated to buyers by a special label on any product marketed in the EC. These regulations will be binding within the 12 member states, in accordance with the 1957 Treaty of Rome. This treaty stipulates that member states are liable, if necessary, to abolish national laws or other technical regulations contrary to EC law.

HISTORY OF EMC IN THE EC

Historically, technical standards adopted by separate countries, known as European Norms (ENs), addressed many areas of daily life. EMC was not, however, regulated by an EN. Several countries, including Germany, the UK and France, had mandated requirements for manufacturers and electrical importers. Other countries, including Portugal, Spain and Greece, had no binding legal requirements regarding EMC and one could sell whatever one liked. Thus, until 1989, the EC consisted of 12 member states whose legal standards on EMI emissions and immunity were very different. With the increasing concentration of electrical and electronic systems, this situation became intolerable. As part of the creation of Europe's Internal Market, the EC Directive on EMC, which includes many ENs, was developed by the European Committee for Electrotechnical Standardization (CENELEC). The Directive was a joint effort of the EC Commission and the European Parliament, in cooperation with associations of the member states and relevant professional groups, such as the European Computer Manufacturers Association (ECMA). Finally, after 18 months of discussion, the EC Directive on EMC was published under Directive 89/336/EC in the *Official Journal of the European Communities*.

Beginning in 1992, all EC countries will conform to uniform regulations and technical standards concerning EMC.

GOALS OF THE EC DIRECTIVE ON EMC

The EC Directive consists of 13 Articles and 3 Annexes and applies to all electrical devices manufactured or sold in the EC, or imported into the EC.

Annex III states that the Directive applies to:

- Domestic radio and television receivers
- Industrial manufacturing equipment
- Mobile radio equipment
- Mobile radio and commercial radiotelephone equipment
- Medical and scientific apparatus
- Information technology equipment (ITE)
- Domestic appliances and household electronic equipment
- Aeronautical and marine radio apparatus
- Educational electronic equipment
- Telecommunication networks and apparatus
- Radio and television broadcast transmitters
- Lights and fluorescent lamps

Article 4 of the Directive regulates the so-called "protection requirements" of the document. All devices listed above should be constructed and manufactured in such a way that:

a) Emissions do not prevent radio and telecommunications equipment and other apparatus from operating as intended; and

b) The devices must have an adequate level of intrinsic immunity to electromagnetic interference which enables the apparatus to operate as intended.

The Directive therefore mandates tests for immunity as well as emissions. The newly required immunity tests represent a definite broadening of the legal standards on EMC which existed in some EC states in the past. Notably, the majority of the electrotechnical industry was of the opinion that no legal regulations should be imposed on the immunity of a device because it is an important quality feature and therefore in the manufacturer's own interest to control. Nevertheless, the European Commission insisted on legislating the immunity testing.

EUROPEAN NORMS (ENs)

The European organization responsible for the establishment of ENs in the electrotechnical field is the CENELEC, headquartered in Brussels. In Autumn 1988, CENELEC was requested by the EC to create the missing ENs in time for the start of the single market in 1992. In Spring 1989, CENELEC formed the TC 110 (technical committee) to develop ENs. According to the project schedule of this working group, it intends to complete all missing ENs by year-end, 1991.

Hopefully, the TC 110 will base its immunity directives work on IEC standards as published in IEC 801. By doing so, the EC immunity standards will agree with those in the USA and Japan. The IEC 801 consists of six parts, of which Sections 801-2 (electrostatic discharge requirements) and 801-3 (radiated electromagnetic field requirements) seem to have the best chances of acceptance as ENs. The final version of EN 55 101-2 and EN 55 101-3 have not been completed yet. The following ENs already exist: EN 55 011 for industrial, scientific and medical apparatus; EN 55 014 for domestic appliances; and EN 55 022 for information technology equipment, including electronic data processing and telecommunications systems. These ENs generally correspond to the IEC/CISPR Publications 11, 14 and 22, which are valid world-wide.

COMPLIANCE WITH THE EC DIRECTIVE ON EMC

As previously stated, existing national standards, norms and certification procedures which contravene either the EC Directive on EMC or the ENs on EMC must be withdrawn by the states. Additionally, member states must inform the EC Commission of the deposition site and the numbers of national standards which correspond to the ENs. This information will be published in the *Official Journal of the European Communities*.

On the other hand, the legislature in each EC state can adopt special regulations and measures if necessary. In each case the member state must notify the European Commission. Justification must be presented for these special measures and the Commission has the right to re- fuse them. In the case of such a refusal, the member state has neither the right to further execute this special measure nor to ask for compliance with it.

The member nations are also entitled to establish their own regulations on fields not addressed by harmonized standards. In such cases, the corresponding deposition sites are supplied to the EC Commission, and also published in the *Official Journal of the European Communities*. This is mandated in Article 7.

Article 8 describes the procedure developed to handle a controversy. The Directive 83/189/EEC sets up a "Standing Committee" to which both a member state and the EC Commission can appeal.

DECLARATION OF CONFORMITY

Article 10 is of special interest to manufacturers. In paragraph 10.1 the procedure is described for cases in which only harmonized standards were used while examining an apparatus. The manufacturer of the product designed to be marketed in the EC, or by an EC-based authorized representative (e.g., the importer) is entitled to issue an EC Declaration of Conformity. This declaration, together with the EMC test report, must be retained for 10 years after the product is offered for sale.

Furthermore, the EC conformity mark for EMC has to be affixed to the examined object or the accompanying documentation. If no harmonized standards exist, or if the product is tested according to non-harmonized standards, a third party opinion is necessary in order to sell the apparatus in the EC. This opinion includes a certification, if not an examination, by the third party.

For telecommunication devices, an approval and examination is always needed by a third party. This procedure applies to all apparatus which are covered by EC Directive 86/361/EEC. Only notified laboratories are entitled to issue EC Declarations of Conformity and EC conformity marks for telecommunication devices. A third party certification involves approval delays, an important

consideration for manufacturers.

NOTIFIED LABORATORIES

The Commission has published a list, supplied by member states, of test organizations, called notified laboratories, which are entitled to issue opinions and third party certifications. The list is published in the *Official Journal of the European Communities*, and updated on a regular basis.

Organizations must fulfill the following conditions in order to be acknowledged as notified laboratories by the EC Commission (Annex II of the Directive):

- Availability of personnel and of the necessary means and equipment.
- Technical competence and professional integrity of personnel.
- Independence -- in performing the tests and verifications, preparing the reports, and issuing the certificates -- of staff and technical personnel in relation to all groups directly or indirectly concerned with the product in question.
- Maintenance of professional secrecy by personnel.
- Possession of civil liability insurance, unless such liability is covered by the State under national law.

Annex I of the Directive details the EC Declaration of Conformity. The following information must be included in the Declaration:

- A description of the apparatus to which the declaration refers.
- Reference to the specifications under which conformity is declared, and where appropriate, to the national measures implemented to ensure conformity of the apparatus with the provisions of the Directive.
- Identification of the signatory empowered to bind the manufacturer or the authorized representative.
- Where appropriate, reference to the EC examination certificate issued by a notified laboratory.

THE EC CONFORMITY MARK

The EC conformity mark consists of the letters CE and the year in which the mark was affixed for the first time (Figure 1).

This mark should, where appropriate, be accompanied by the distinctive letters used by the notified laboratory issuing the EC examination certificate. (The EC mark also indicates conformity with requirements of other Directives.)

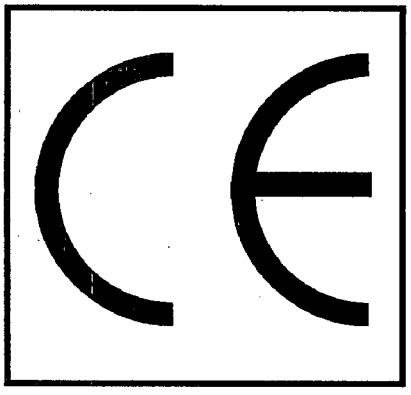

FIGURE 1. *The EC Conformity Mark.*

CONCLUSIONS

The EC Directive on EMC will become valid on January 1, 1992. Then, for the first time in history, Western Europe will be guided by one uniform regulation. By that time, the technical regulations on EMC, as specified in the ENs, will be completed. They will be based mainly on CISPR and IEC regulations, so that the EC regulations will not differ substantially from accepted procedures world-wide.

Each electrical device covered by the Directive and sold in the EC must comply with the Directive, and carry the conformity mark and a declaration of conformity.

In many cases, the manufacturers of the device, or their EC-based representatives, can execute their own EMC examinations in order to obtain the declaration of conformity. In some cases a third party examination and certification by a notified laboratory is required.

How a laboratory is determined to be a certified laboratory is still unclear and currently is handled differently in each country. Nevertheless, the market for independently qualified EMC test labs and test labs grows, since not all manufacturers can afford their own labs.

While many areas of uncertainty still exist, EMC is now understood to be a major part of environmental protection. The procedure on how to correct what had become an intolerable situation is mandated. Manufacturers are legally bound to comply, and to develop their products in conformity with the EC rules.

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