



IEC/TC OR SC: 77	SECRETARIAT: Germany	DATE: 2017-12-06
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A. STATE TITLE AND SCOPE OF TC

ELECTROMAGNETIC COMPATIBILITY

- TC 77: Electromagnetic compatibility
- SC 77A: Low frequency phenomena
- SC 77B: High frequency phenomena
- SC 77C: High power transient phenomena

It is the task of TC 77 and its SCs to prepare standards, technical specifications and technical reports in the field of electromagnetic compatibility (EMC), with particular emphasis on general application and use by product committees and the electrical industry (Horizontal function).

The scope covers the following aspects of EMC:

- immunity and related items, over the whole frequency range: basic and generic standards;
- emission in the low frequency range ($f \leq 9$ kHz, e.g. harmonics and voltage fluctuations): basic, generic and product family standards;
- emission in the high frequency range ($f > 9$ kHz): disturbances not covered by but in co-ordination with CISPR (e.g. mains signalling).

Product immunity standards are not included. However, at the request of product committees TC 77 may also prepare such standards under the co-ordination of ACEC.

TC 77 has a safety horizontal function: Electromagnetic phenomena influences in so far as functional safety aspects are involved. Related activities are coordinated with ACOS.

Scope of **TC 77**: Standardization in the field of electromagnetic compatibility with regard to generic immunity standards, to the description/classification of electromagnetic environments, to installation measures and to functional safety.

Scope of **SC 77A**: Standardization in the field of electromagnetic compatibility with regard to low frequency phenomena ($f \leq 9$ kHz, see note).

Note This limit frequency can be adapted to a higher frequency according to the phenomena or equipment.

Date of establishment: March 1981, first meeting February 1983 (Current title and scope since May 1992)

Scope of **SC 77B**: Standardization in the field of electromagnetic compatibility with regard to high frequency continuous and transient phenomena ($f > 9$ kHz, see note).

Note This limit frequency can be adapted to a lower or higher frequency according to the phenomena or equipment.

Date of establishment: March 1981, first meeting February 1983 (Current title and scope since May 1992)

Scope of **SC 77C**: Standardization in the field of electromagnetic compatibility to protect civilian equipment,

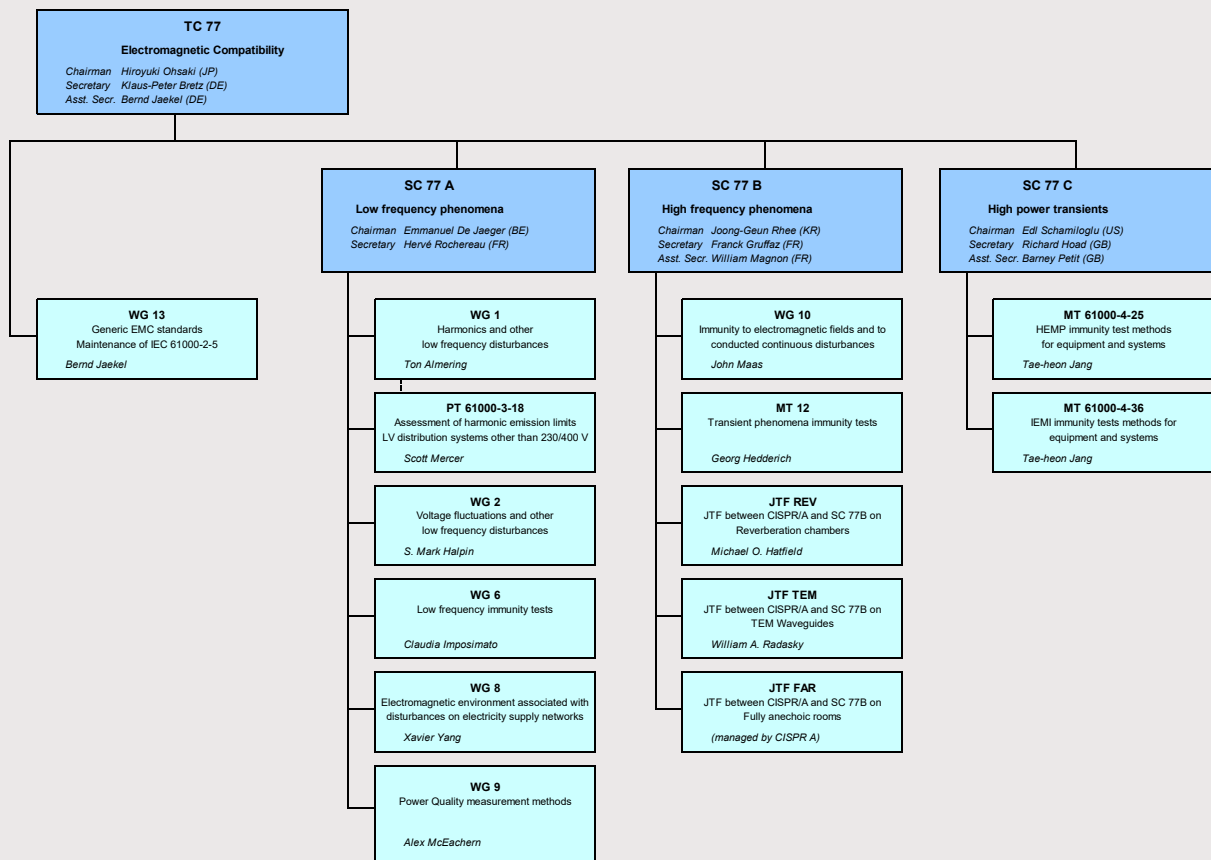
systems and installations from threats by man-made high power transient phenomena including the electromagnetic fields produced by nuclear detonations at high altitude (High Altitude Electromagnetic Pulse (HEMP) and sources of Intentional Electromagnetic Interference (IEMI).

Note High power conditions are achieved when the peak incident electromagnetic field exceeds 100 V/m.

Date of establishment: November 1991, first meeting May 1992

B. MANAGEMENT STRUCTURE OF THE TC

The management structure of TC 77 is shown in the following chart:



C. BUSINESS ENVIRONMENT

The external business environment in EMC standardization is strongly influenced by new technologies and industrial trends that create a hostile “electromagnetic environment“:

- power and microelectronics with increasing operating frequencies;
- increasing density of electrical, electronic and radio communication equipment operating close to each other;
- simultaneous operation of power and communication equipment when connected to the same grid (e.g. mains signalling);
- IT equipment getting closer to high power equipment (e.g. in the smart grid).

This situation creates strong needs for definition and description of the electromagnetic environment and for test and mitigation methods.

Internal business environment: by having developed and further promoting and expanding a good structural concept for EMC standards by TC 77 (Basic, Generic and Product family standards), the basic standards of this committee have become the most widely used standards by product committees of the IEC and by other international and regional standardization organizations.

D. MARKET DEMAND

Direct customers of the standards developed by TC 77 are EMC experts and product committees of the IEC, i.e. the whole industry manufacturing or using electronic products. The standards are also the basis for regional or national EMC regulations.

The need for EMC standards prepared by TC 77 has increased in view of the European Council Directive on the approximation of the laws of the member states relating to electromagnetic compatibility, the so-called EMC Directive. Most of the EMC standards of IEC undergo parallel vote in CENELEC. TC 77 and its sub-committees have undertaken to deliver in particular basic EMC standards and low frequency emission standards, which are now widely used in many regions of the world.

Interested and affected parties are usually represented through the National Committees (P-Members). Additional coordination with other TC's of the IEC and also with organizations outside the IEC is performed by means of liaisons or through ACEC (Advisory Committee on Electromagnetic Compatibility). These organizations are increasingly using basic standards of TC 77. Considering merging technologies, further coordination with ISO in the field of basic standards would be of further benefit to the industry.

Although the most important standards have been completed in recent years, the area covered by TC 77 is still a developing standardization area, due to continuous changes in the electromagnetic environment and the emergence of new electromagnetic services or interference situations that may affect compatibility with/of equipment and systems.

It should be noted that IEC EE considers EMC testing within the CB scheme. This also shows the significant market demand.

In addition it has to be highlighted that the deregulation of the electricity supply industry increases the demand for standards on measurement methods and measuring equipment of the power quality parameters. Electricity regulators recognize the standards developed by TC 77 (mainly SC 77A) and use them.

E. TRENDS IN TECHNOLOGY AND IN THE MARKET

Technical progress, increased use of electronic and communication equipment and miniaturization have an impact on the work of TC 77 with regard to:

- cost saving by harmonizing test methods, for worldwide use and for use by product committees,
- reliable operation of equipment despite the presence of electromagnetic disturbances,
- elimination of trade barriers by harmonizing the EMC requirements, and
- meeting the needs of regional regulations.

Recent history has shown that electrical and electronic products and installations can withstand the changes in the electromagnetic environment only if appropriate levels of immunity are designed into these deliverables. Technology trends are also developing to produce even smaller, smarter products using higher clock frequencies and lower supply voltages, which consume less electrical energy for their increasing performance. These technology trends are driven by the worldwide global market which exists today and by basic objectives such as energy efficiency. The latter trend is reflected in the worldwide activities to transform the conventional electricity supply system into a smart grid with its combination of energy supply and accompanying communication and information transfer to appliances. The increasing usage of electrical/electronic and programmable electronic equipment for safety-related systems requires consideration of electromagnetic disturbance issues.

Another trend is an increasing interest of different countries concerning measures for the protection of civilian equipment and systems against the harmful effects from High Power Transient Phenomena (especially HEMP and IEMI). This interest is addressed in the publications of SC 77C.

F. SYSTEM APPROACH ASPECTS (REFERENCE - AC/33/2013)

TC 77 strictly follows IEC Guide 107 and its system approach for EMC standards. The EMC standards developed by TC 77 and its sub-committees are Basic, Generic or Product Family EMC Standards. The Basic and Generic standards coming from TC 77 serve as a basis for EMC product standards in the entire IEC and in other standards committees of the world (e.g. ISO, CENELEC and ANSI). EMC standardization is de facto a system approach activity because it takes account of the interaction between equipment within systems as well as interaction between systems and/or installations.

G. CONFORMITY ASSESSMENT

Many of the standards written by TC 77 include test methods and test specifications. They consider the issue of reproducible test performance and contain uncertainty considerations. In this respect the standards can be used for purposes of conformity assessment.

These standards do not address requirements related to conformity assessments or to conformity assessment schemes. In this respect they are fully in line with clause 33 of the ISO/IEC Directives, Part 2.

H. 3-5 YEAR PROJECTED STRATEGIC OBJECTIVES, ACTIONS, TARGET DATES

It is the main objective of TC 77 to create EMC standards which reflect the needs of the modern state of the art for electrical and electronic products. These standards and other EMC deliverables shall take into account the continuous changes in the electromagnetic environment and challenges resulting from the introduction of new technologies. In this respect the set of basic immunity standards will be expanded to cover all electromagnetic phenomena relevant for electrical and electronic products and systems. This objective includes the goal to provide user-friendly standards to measure emission and to test the immunity of products with both aspects considering requirements which are aimed at ensuring the electromagnetic compatibility of products, systems and installations.

The EMC standards and other deliverables created by TC 77 shall meet the following requirements:

- are easy to understand and to be adopted by product committees,
- contain comprehensive information on EMC test methods, test equipment and test setups,
- contain general information and recommendations on test levels (if appropriate),
- make reference to the electromagnetic environment (if appropriate), taking into account the continuous changes therein, and
- reflect the impact of electromagnetic phenomena as realistic, reliable and reproducible as much as possible.

It is the strategy of TC 77 to improve EMC standardization in a way that a uniform set of common EMC standards will be used in the entire world. EMC standards different from TC 77 standards, which exist in some countries of the world due to historical reasons are in the process of being withdrawn and superseded by TC 77 standards as far as these standards have comparable scopes.

It is also the strategy of TC 77 to coordinate the activities needed for fulfilling its objectives with CISPR, which is the case as demonstrated by joint activities on some subjects of common interest.

STRATEGIC OBJECTIVES 3-5 YEARS

ACTIONS TO SUPPORT
THE STRATEGIC OBJECTIVES

TARGET DATE(S)
TO COMPLETE THE
ACTIONS

TC 77: update and amend installation and mitigation guidelines	IEC 61000-5-1 and IEC 61000-5-2	2019
SC77A: To close the gaps in the Low Frequency Emission standards portfolio and update the Low Frequency Basic Standards portfolio	SC 77A: development of specific/appropriate emission requirements for generators (distributed generation) in IEC 61000-3 series	2018
	SC 77A: to revise IEC 61000-3-6, 3-7, 3-13 and 3-14 with the contribution of CIGRÉ and CIRED (Note: WG CIGRÉ – CIRED final report in 2018).	2019
	SC 77A: to review the phenomena of the electromagnetic environment in the frequency range below 150 kHz and close the gaps by specifying appropriate compatibility levels for all conducted disturbances (IEC 61000-2-2 and IEC 61000-2-12). The first step 2-30 kHz has been completed in 2017, the second, 30-150 kHz is intended to be completed in 2018.	2018
	SC77A: to make sure that the Compatibility levels in the frequency range 2-150 kHz are converted into Emission limits. In liaison/cooperation with CISPR for the 9-150 kHz range.	2019
	SC77A: To seek for the completeness of IEC 61000-3-2 by addressing the 100-120 V systems (currently under consideration). A TR is to be developed in a dedicated PT, as a preliminary action	2020
	SC 77B: to consider conducted disturbances induced by broadband signals (IEC 61000-4-31) as well as test methods for immunity against radiation sources in close proximity (IEC 61000-4-39).	
	SC 77C: to consider the incorporation of geomagnetic disturbances within the scope of SC 77C and if acceptable to consider development of guidance for this phenomenon.	2020
Note: The progress on the actions should be reported in the RSMB.		