

CENELEC/TC or SC 106X	Secretariat Germany	Date 2022-11-08
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TC or SC title: CENELEC TC106X - Electromagnetic fields in the human environment**A Background**

TC 106X deals with various aspects of the exposure of people to electromagnetic fields from 0 Hz to 300 GHz. Whilst, under the Frankfurt Agreement, the IEC develops standards on measurement and calculation methods to assess human exposure to electric, magnetic and electromagnetic fields, CENELEC TC 106X develops standards to demonstrate compliance with European Directives using the following types of standards:

- 1) product standards contain compliance criteria for products; they are intended to be listed as harmonised standards;
- 2) basic standards determine measurement and calculation methods that can be used to evaluate the level of the emitted electric, magnetic and electromagnetic fields generated by products or systems;
- 3) generic standards can apply to a range of different products e.g. low power products or products not covered by any other product standard;
- 4) product specific standards are specific to a particular product, family or range of products.

TC106X does not develop EMF exposure limits. EMF exposure limits are set by regulators.

B Business Environment**B.1 General**

TC106X develops standards that are used by the wireless, mobile, broadcasting, automotive and electrical power sectors for assessment of human exposure to electromagnetic fields. This includes the compliance assessment for all two-way radios, mobile phones, tablets and wireless devices, and electric power distribution including wireless power transfer and electric vehicles.

By 2020, the International Telecommunications Union (ITU) estimates in excess of 50 billion wireless connected devices in use globally. There are almost half a billion people in the 27 decrease countries of the European Union, and in many of these there are more mobile phones than people.

The Radio Equipment Directive (2014/53/EU) applies to all radio equipment which intentionally emits radio waves for the purpose of radio communication or radiodetermination, and to an electrical or electronic product which must be completed with an accessory, such as antenna, so as to intentionally emit radio waves.

On 02 February 2022, the European Commission presented a new Standardisation Strategy outlining an approach to standards within the Single Market as well as globally. This new Strategy aims to strengthen the EU's global competitiveness, to enable a resilient, green and digital economy and to enshrine democratic values in technology applications. Standards are the silent foundation of the EU Single Market and global competitiveness. They help manufacturers ensure the interoperability of products and services, reduce costs, improve safety and foster innovation.

Standards are an invisible but fundamental part of our daily life: from Wi-Fi frequencies, to connected toys or ski bindings, just to mention a few. Standards give confidence that a product or a service is fit for purpose, is safe and will

NOTE: This report is to be sent to dataservice@cencenelec.eu within 8 weeks following the TC meeting.

not harm people or the environment. Compliance with harmonised standards guarantees that products are in line with EU law.

B.2 Market demand

In light of the “Council Recommendation of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz)” it is even more important to consider the exposure of the general public to EMF. Therefore, there has been huge demand for, and take-up of TC 106X product standards. All mobile phones are SAR-tested to allow them to be put on the market and base stations are subject to pre- and post-market surveillance. TC 106X standards for these and other technologies allow manufacturers and suppliers to address significant public concerns about safety. Market surveillance authorities need state of the art standardized procedures to assess the compliance of products and authorities in charge of public health need reliable and standardized procedures to assess public exposure.

Directive 2013/35/EU of 26 June 2013 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields) requires standardised measurement procedures for a range of industrial technologies in order facilitate employers to demonstrate the safety of workers.

The radio equipment directive 2014/53/EU (RED) establishes a regulatory framework for placing radio equipment on the market. It ensures a single market for radio equipment by setting essential requirements for safety and health, electromagnetic compatibility, and the efficient use of the radio spectrum. It also provides the basis for further regulation governing some additional aspects. These include technical features for the protection of privacy, personal data and against fraud. Furthermore, additional aspects cover interoperability, access to emergency services, and compliance regarding the combination of radio equipment and software.

With the new developments in electric energy production, the necessity for new transmission and distribution lines, smart grid applications, the trend to electric vehicles and wireless power transfer constitute new sources for unintentional exposure, of the general public and of workers, to low frequency fields are added to the existing electrical infrastructure and today's level of exposure.

B.3 Trends in technology

Technology is rapidly evolving towards a world where most consumer, domestic, industrial, business, educational and medical applications and devices will be connected via the internet using a range of wireless technologies and networks. Radio emitters are becoming ubiquitous, and at the same time their power levels are tending to fall. The focus for the future is likely to be on simplified ways of compliance assessment for lower-powered emitters.

In the high frequency range, mobile phone technologies will use multiple frequency bands in a single device. RF communication modules (Wi-Fi, Bluetooth, etc.) are now integrated in many electronic equipment (e.g. laptop, camera, credit card reader, etc) appliances, vehicles, smart clothing. The internet of things, ultra highspeed communication, on-vehicle radars, non-destructive examination systems use radio wave. Communities in the developed and developing world are rapidly deploying smart sustainable cities using wireless technology to enable the essential communications (e.g. smart meters).

In the high frequency range wireless technologies and networks include radio and television broadcast, VHF and UHF mobile communications, 4G and 5G mobile, WiFi, Bluetooth, ZigBee and Near Field Communications.

Radio products migrate into non-radio products for control and monitoring functions.

The use of low frequency and high frequency Wireless Power Transfer as a technology has now evolved as a commercial reality enabling the charging of batteries supplying power to personal devices, vehicles and commercial equipment.

B.4 Market trends

EMF standardisation is beginning to address high-power industrial processes in detail for the first time, and the challenge here is to develop robust measurement and computational protocols that provide assurance of safety where appropriate but do not burden industry unduly.

To ensure compliance with the human exposure limits for electromagnetic fields, compliance and environmental assessment standards need to match the technology evolution, especially for body worn equipment and devices used in close proximity to the body.

Nearly all devices and corresponding networks will need to be assessed for compliance with the human exposure limits. Compliance assessment test procedures will need to be designed for maximum efficiency given the anticipated high volume of testing required whilst maintaining sufficient accuracy.

There is a pressing need for international standards characterizing the human exposure.

The manufacturing sector will use 5G new radio non-standalone networks. The higher bandwidth enables smart manufacturing strategies and more efficient production. The German Ministry for Economic Affairs and Energy forecasts a demand of between 5,000 to 10,000 5G campus networks in Germany by 2025, whereby the majority of these networks will be used by small and medium-sized enterprises⁴.

B.5 Ecological environment

The presence of unwanted levels of EMF in the living/working environments is often described as “Electromagnetic pollution”. In this sense, a normative action directed to control and assess these EMF levels is pointing in the direction of environment preservation.

B.6 Involvement of societal stakeholders

TC 106X has permanent representation from consumer groups (e.g. ANEC) and also business confederations (e.g. Digital Europe). National regulators are delegates to the Technical Committee.

B.7 Involvement of SMEs

NORMAPME has permanent representation in TC 106X.

C System approach aspects

The parent committee TC 106X operates largely by consensus, and the Officers spend a great deal of time developing this inclusive approach.

At WG level, convenors are free to invite outside experts with demonstrable experience; the TC usually allows the WGs to operate autonomously in the detailed drafting of standards whilst maintaining a strategic over-view of their direction and the option to intervene where necessary. This approach relies on the placement of very experienced WG convenors, and TC106X is careful in its choices in this respect.

TC 106X works jointly with other CLC/TCs (61, 26), and also other ESOs (ETSI) under agreed joint working procedures. It also liaises closely with IEC/TC 106.

TC 106X has acted to reduce the number of face-to-face meetings and works electronically as far as possible in order to reduce unnecessary travelling. The TC meets as needed, while the working groups meet more frequently, but these also are run increasingly by electronic means.

D Objectives and strategies (3 to 5 years)

Maintenance of existing standards, and updating in light of any changes in limits.

Development of new standards as technological and societal need arises.

Production of a series of occupational EMF standards for use with the EMF Directive.

European standards shall reflect the generally acknowledged state of art.

The transition to the new assessment approach of the European Commission has been a challenge the standards development.

E Action plan

- Plenary meetings once a year to keep up with the technology development

⁴ https://www.bmwi.de/Redaktion/EN/Publikationen/Digitale-Welt/guidelines-for-5g-campus-networks-orientation-for-small-and-medium-sized-businesses.pdf?__blob=publicationFile&v=2 (accessed on 15 August 2022)

- Launch programme of update of existing standards where the standards do not exist and there arises a societal need, develop new standards
- Monitor technological developments that may require new product standards
- Develop product standards to accompany any basic standards emerging from IEC/TC 106
- Ensure that existing standards remain valid as assessment techniques mature (e.g. continued validity of computational approaches as human body models develop).

Until 2025 TC106X intends to

- Review all harmonised standards to support the RED and the LVD
- Prepare guidance for manufacturers und users of non-radio equipment
- Update TC106X harmonised standards for 5G applications
- Prepare guidance on the measurement procedures for novel telecommunication devices in reasonably foreseeable conditions (examples: proximity sensing, electric and magnetic sensing device, multiple antennas, time averaging)
- Prepare guidance for the application of 5G radio equipment beyond harmonised standards

F Useful links to CENELEC web site

Work programme: <https://projex.cencenelec.eu/>

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