SMB/6941/R

STRATEGIC BUSINESS PLAN (SBP)

IEC/TC OR SC:	SECRETARIAT:	DATE:
TC106	**Germany**	**23 Jul 2019**

NOTE: THIS DOCUMENT CONTAINS THE STRATEGIC BUSINESS PLAN OF IEC TC 106. THE BOXES IN GREY PROVIDE THE IEC GUIDANCE FOR THE UNDERSTANDING OF THE RESPECTIVE CATEGORY OF THE STRATEGIC BUSINESS PLAN.

A. STATE TITLE AND SCOPE OF TC

Are there any new or emerging trends in technology that will impact the scope and work activities of the TC? Please describe briefly.

Do you need to update your scope to reflect new and emerging technologies? If yes, will these changes impact another TC's scope or work activities?

If yes, describe how these will impact another TC(s) and list the TC(s) it would impact

TC 106 Title

Methods for the assessment of electric, magnetic and electromagnetic fields associated with human exposure

TC 106 Scope

To prepare international standards on measurement and calculation methods to assess human exposure to electric, magnetic and electromagnetic fields. The task includes:

– characterisation of the electromagnetic environments with regard to human exposure;
– measurement methods, instrumentation and procedures;
– calculation methods;
– assessment methods for the exposure produced by specific sources (in so far as this task is not carried out by specific product committees);
– basic standards for other sources;
– assessment of uncertainties.

It covers the frequency range from 0 Hz to 300 GHz. It applies to basic restrictions and reference levels.

Excluded are:

– the establishment of exposure limits (see AC/38/2009 of 2009-11-27);
– mitigation methods which have to be dealt with by the relevant product committees;
– electrical safety (however, the issue of contact current related to the indirect effect of human exposure to electromagnetic fields is included).

B. MANAGEMENT STRUCTURE OF THE TC

Describe the management structure of the TC (use of an organizational chart is acceptable) (should be integrated by CO automatically) and, if relevant (for example an unusual structure is used), provide the rationale as to why this structure is used.

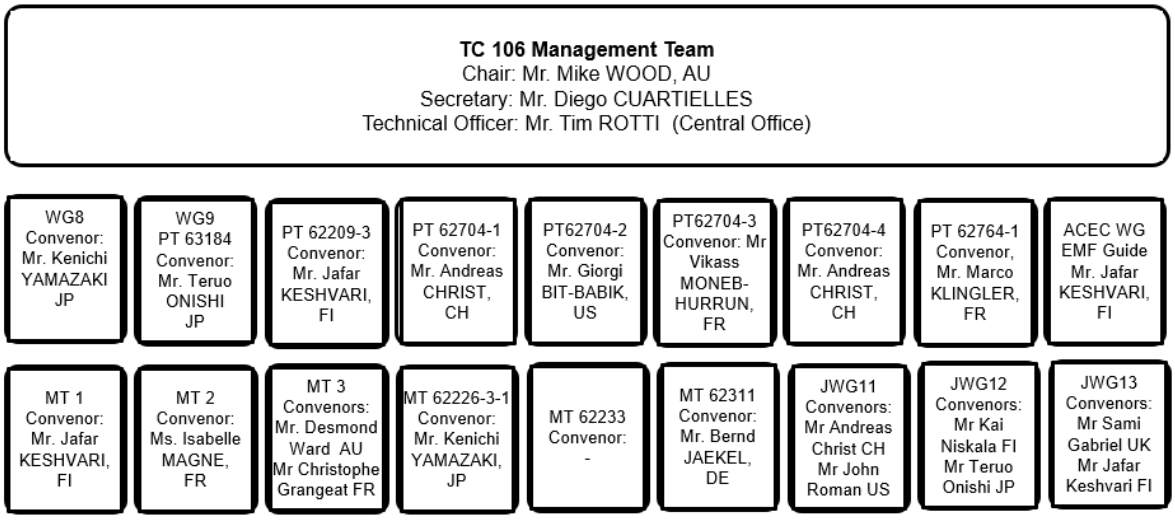
Note: Check if the information on the IEC website is complete.

When was the last time the TC reviewed its management structure? Describe any changes made. When does the TC intend to review its current management structure? In the future, will the TC change the current structure, for example due to new and emerging technologies, product withdrawal, change in regulations etc. Please describe.

Make sure the overview includes:

- any joint working groups with other committees,
- any special groups like advisory groups, editing groups, etc.

Structure of TC 106



TC 106 chose a flat management structure. All convenors report directly to TC106.
Note: Some TC106 experts will also be members of the ACEC (EMC Advisory Committee) Working Group on the EMF Guide development.

C. BUSINESS ENVIRONMENT

Provide the rationale for the market relevance of the future standards being produced in the TC.

If readily available, provide an indication of global or regional sales of products or services related to the TC/SC work and state the source of the data.

Specify if standards will be significantly effective for assessing regulatory compliance.

Market Relevance

The standards developed by TC106 are used globally by the wireless, mobile, broadcasting, regulators and government agencies, automotive and electrical power sectors for assessment of human exposure to electromagnetic fields. This includes the compliance assessment for all mobile phones, tablets, wireless devices, IoT, Wi-Fi and wireless networks, and electric power distribution including wireless power transfer and electric vehicles.

Sales of Products or Services

The total number of mobile subscriptions at the end of 2018 is approximately 7.9 billion and is forecast to be 9.2billion in 2025. The total number of IoT connections in 2018 is 9.1 billion and is forecast to be over 25 billion in 2025.

The GSMA Mobile Economy 2019 Report shows that mobile continues to make a significant contribution to socioeconomic development around the world. In 2018, mobile technologies and services generated $3.9 trillion of economic value (4.6% of GDP) globally, a contribution that will reach $4.8 trillion (4.8% of GDP) by 2023 as countries increasingly benefit from the improvements in productivity and efficiency brought about by increased take-up of mobile services. Further ahead, 5G technologies are expected to contribute $2.2 trillion to the global economy over the next 15 years.

Source: GSMA Mobile Economy 2019 Report
https://www.gsmaintelligence.com/research/?file=b9a6e6202ee1d5f787cfebb95d3639c5&download

The sales of services related to mobile base stations can be described by using mobile traffic. The Ericsson Mobility report (December 2018) shows that as monthly usage per smartphone continues to increase, total mobile data traffic is predicted to rise at a compound annual growth rate (CAGR) of 31 percent over the forecast period, reaching 136 exabytes (EB) per month by the end of 2024.It is expected that 25 percent of mobile data traffic worldwide will be carried by 5G networks at that time. This is 1.3 times more than the total traffic in 2018. The mobile base station infrastructure has to accommodate this increase in traffic.

In 2024, it is projected that 5G will reach 40 percent population coverage and 1.5 billion subscriptions, making it the fastest generation ever to be rolled out on a global scale

Source: Ericsson Mobility Report, November 2018, https://www.ericsson.com/assets/local/mobility-report/documents/2018/ericsson-mobility-report-november-2018.pdf

Assessing Regulatory Compliance

The TC106 standards will be significantly effective for assessing the regulatory compliance for human exposure of mobile phones, wireless devices, broadcasting equipment, power distribution including wireless power transfer and electric vehicles.

D. MARKET DEMAND

Provide a list of likely customers of the standards (suppliers, specifiers, testing bodies, regulators, installers, other TC/SC's etc.). Do not specify company names, only categories of customers.

Likely Customers of the Standards

Direct customers of standards that are developed by TC 106 include national regulatory bodies, test laboratories, manufacturers, operators, consumers and local planning bodies.

Specifically, for the low frequency range customers include electric power utilities, domestic and industrial appliance manufacturers. For the high frequency range, customers of TC 106 standards include all manufacturers of RF and microwave equipment, particularly manufacturers of wireless networks, mobile phones and base station equipment.

- Mobile telecommunications, wireless and broadcast equipment manufacturers and suppliers
- Electric Power Utilities and equipment suppliers
- Equipment designers and installers
- Laboratories and test houses
- Mobile and broadcast operators
- Regulators and government agencies
- Facilities and building management,
- Installers and contractors
- Automotive

The list of IEC Technical Committees (TCs) that make reference to TC 106 standards includes (but is not limited to) the following:

- TC 9 : Electrical equipment and systems for railways
- TC 27 : Industrial electroheating and electromagnetic processing
- TC 29 : Electroacoustics
- TC 34 : Lamps and related equipment
- SC 62A : Common aspects of electrical equipment used in medical practice
- SC 62B : Diagnostic imaging equipment
- TC 69 : Electric road vehicles and electric industrial trucks
- TC 77 : Electromagnetic compatibility
- TC 78 : Live working
- TC 96 : Transformers, reactors, power supply units, and combinations thereof
- TC 100 : Audio, video and multimedia systems and equipment
- TC 124 : Wearable electronic devices and technologies
- CISPR : International special committee on radio interference
- ISO/TC 150/SC 6 : Active implants
- ANEC : European Association for the co-ordination of consumer representation in standardization
- ITU-R/SG1 : Radiocommunication Sector/Study Group 1 - Spectrum Management
- ITU-R/SG5 : International telecommunication Union - Standardization Bureau - Study Group

E. TRENDS IN TECHNOLOGY AND IN THE MARKET

If any, indicate the current or expected trends in the technology or in the market covered by the products of your TC/SC.

Trends in the Technology

In addition to mobile, radio and television broadcast, and personal communications used today, technology is rapidly evolving towards a world in 2025 where most consumer, domestic, industrial, business, educational and medical applications and devices will be connected using a range of IoT, wireless technologies and networks.

In the high frequency range, mobile phone and wireless technologies are evolving quickly and multiple frequency bands are commonly being used in a single device. In addition, RF communication and wireless modules including IoT are now integrated in everyday electronic equipment, and commercial and industrial systems (e.g. notebook, camera, credit card reader, vehicle, security cameras, home entertainment systems etc), appliances, vehicles and millimetre wave applications including ultra-highspeed communication, on-vehicle radars, non-destructive examination systems.

Communities in the developed and developing world are rapidly deploying smart sustainable cities using wireless technology to enable the essential communications. The International Telecommunications Union (ITU) forecasts in excess of 50 billion connected devices by 2025.

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

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.

Automated driver-less cars testing started in Gothenburg (Sweden), Singapore (Singapore), Pittsburgh (USA), Amsterdam (Netherlands), Perth (Australia), Boston (USA). Tokyo (Japan) plans for driver-less vehicles at the Olympics in 2020.

Electric mobility from personal e-transporters to electric vehicles have already entered the market and will continue to grow in popularity.

Trends in the Market

The use of mobile telephones, wireless technologies and the evolution of the Internet of Things has rapidly increased in the past 10 years and is expected to continue throughout the world. Novel and evolving products are marketed at a high rate which provides a pressing need to develop new or to revise existing international standards for the characterization of human exposure. These standards address wireless devices intended to be operated in close proximity to the body, e.g., mobile telephones and wireless devices, and for the characterisation of human exposure in the vicinity of wireless networks and base-stations including rooftop mobile base stations with multiple services, small cells, and the new 5G networks (where much of the public concern is directed).

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 to ensure international standards characterizing the human exposure of mobile and wireless technologies continue to be developed and maintained.

By 2025, EVs and HEVs will account for an estimated 30% of all vehicle sales. (source: https://www.jpmorgan.com/global/research/electric-vehicles)

OPEC estimates that annual EV sales reach 80 million by 2040 and three out of every five cars sold in 2040 would be electric. (source: OPEC – World Oil Outlook)

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

Does your TC/SC have a need for a systems approach?

If so:

- Will the Systems work be in a single TC or in multiple TCs?
- Will a Systems Evaluation Group (SEG), Systems Committee (SyC), or Systems Resource Group be required?
- Is your TC/SC work of relevance to ISO?
- Is or are there fora or consortia working in parallel to IEC? Is there a chance to integrate this work in your TC/SC?

This should not only be restricted to the customer/supplier relationships with other TC/SCs indicating types of co-operation (e.g. liaisons, joint working groups) but be of a more generic nature.

If there is no need for a systems approach as outlined in AC/33/2013, is it intended a TC would not be requested to report on general systems approach considerations such as customer/supplier relationships, liaisons, joint WGs, etc. as referenced in the system approach matrix illustrated in slide 14 of the presentation attached to AC/37/2006?

Not applicable to TC 106.

G. CONFORMITY ASSESSMENT

With reference to clause 6.7 of Part 2 of the ISO/IEC directives, are all your publications in line with the requirements related to conformity assessment aspects?

Will the TC/SC publications be used for IEC Conformity Assessment Systems (IECEE, IECEx, IECQ, IECRE)?

Will any of your standards include test specifications, reproducible test requirements, and test methods?

Are there likely to be special conformity assessment requirements generated by any standards projects? If yes, list which projects.

Conformity Assessment Aspects

TC 106 standards may be used for conformity assessment. The exposure limits are established by national regulators. The standards developed by TC 106 can be used for measurement and calculation of the physical quantities that have to be

assessed for the conformity assessment of electrotechnical product with the view of exposure to electromagnetic fields and to contact currents.

Use for IEC Conformity Assessment Systems

IECEE: IEC 62233, 62311

IECEx: n/a

IECQ: n/a

IECRE: n/a

Reproducible Test Specifications, Test Requirements, Test Methods

TC 106 documents include requirements for procedures to assess the exposure of humans to electromagnetic fields in order to produce repeatable and reproducible conformity assessment results.

Special conformity assessment requirements

TC 106 documents do not include requirements related to conformity assessment other than requirements which are necessary to provide repeatable and reproducible conformity assessment results. The assessment requirements for radio products are exposure limits. The development of exposure limits is excluded from the scope of TC106 (see AC/38/2009 of 2009-11-27). Exposure limits are established by national regulators. The respective conformity assessment requirements are regulated by national governments.

H. Standards development collaboration with other Standards Organizations

Since its establishment, TC106 has collaborated closely on EMF compliance assessment standards with the IEEE International Committee on Electromagnetic Safety Technical Committee 34 (ICES TC34).

Initial collaborations were via liaison representatives. Since 2005, the two technical committees, often with common members, arranged joint meetings; thus avoiding work duplication.

Since 2007, IECTC106 and IEEE/ICESTC34 collaboration has intensified; with joint working group meetings commonplace.

There is agreement between IECTC106 and IEEE/ICESTC34 that two organizations shall work jointly on EMF related compliance assessment standards; avoiding unnecessary duplication.

As a result of this IEC-IEEE collaboration there several joint working groups currently developing dual -logo SAR measurement and 5G assessment standards.

To facilitate the wider joint delegate participation and the creation and adoption of dual-logo standards, IECTC106 and IEEE/ICESTC34 will endeavour to host joint committee meetings in Asia, Europe and North America- as circumstances permit.

F. 3-5 Year Projected Strategic Objectives, Actions, Target Dates

Strategic objectives 3-5 years	Actions to support the strategic objectives	Target date(s) to complete the actions	Status (not started, in progress, complete)	Progress report
Wireless Power Transfer – Implement exposure assessment standards for Wireless Power Transfer equipment and devices	Establish Working Committee Identify assessment requirements & current gaps Determine if new IEC standard is required of if existing standard can be adapted Develop a Technical Report followed by an IS	2015 - Establish Working Group 2017 - Technical report 2018 – Establish Project Team 2019 – CD 2021 - IS	complete In Progress	Working Group completed report (106/416/DTR), NWIP was submitted Project team commenced development of draft CD using TR as the base document

5G Assessment Methods for Devices- Measurement procedure for the evaluation of power density related to human exposure to radio frequency fields from wireless communication devices operating between 6 GHz and 100 GHz	Identify new assessment requirements for 5G Conduct gap analysis on existing IEC Standards Develop Technical Report Develop Full IS Collaboration with MT3	2016 – Formed AHG 2017 – Technical Report 2020/21- new IS and supporting case studies with prototype devices followed by commercial devices	Complete In Progress	AHG disbanded, NWIP adopted, call for experts will be launched for joint IEEE/IEC projects. IEEE/IEC Joint Working Groups established Draft CD's under development
5G Assessment Methods for Networks Measurement procedure for the evaluation of power density related to human exposure to radio frequency fields from wireless communication devices operating between 6 GHz and 100 GHz	Revision of Technical Report 62669 with updated case studies including 5G and small cells supporting IEC 62232ED2 Identify new assessment requirements for 5G networks Liaison with JWG12	2018 – 19 Draft update 62669 Update 62232	Completed In progress	Publication April 2019 Draft update 2021
Body Worn Device Compliance – Review assessment methods and applicability of existing IEC Standards	Review and update the MT1 business plan	Revise standards as applicable – 2017/18	In progress	IEC62209-2 is being updated; a joint IEEE/IEC WG will be established to combine IEC62209-1 and 62209-2
Smart Sustainable Cities – Review compliance assessment requirements and applicability of IEC Standards	Monitor activities Identify gaps in current IEC standards		Not started Look to start	Look at the systems groups in IEC 5G activity and liaisons Other liaisons IEEE IoT working group
EMF Guide - for developing consistent and quality standards for the assessment of human exposure	Confirmed Ad Hoc Group in 2015 in Stresa Identify requirements and gaps for the EMF Guide on developing consistent and quality standards for assessment of human exposure	2017 – complete draft EMF Guide and report back to TC106 plenary.	In progress	This project is transfered to ACEC and will be supported also by experts from TC106

Contact currents Address methods for assessment of contact current related to human exposures to electric, magnetic and electromagnetic fields; not including electrical shock.	Establish working group Determine measuring methods for contact currents Determine an electrical circuit that represents the characteristics of human response	2015 Establish working group in Stresa (Italy) 2017 – Technical report	Complete	IEC 63167 published June 2018.
Automotive Determining procedures for the measurement of field levels generated by electronic and electrical equipment in the automotive environment with respect to human exposure.	Develop procedures for the measurement of field levels generated by electronic and electrical equipment in the automotive environment with respect to human exposure.	2019 – Completed Technical Specification 2022 – Establish Part 1 of an International standard	To be published In progress	Technical Specification completed

Note: this table provides a description of the current and future work program for TC106.

TC106 Supporting Activities

IEC Young Professionals – TC 106 is committed to supporting the IEC Young Professionals Program and development and mentoring of new talent.

IEC Master Plan – TC106 supports the IEC Masterplan and participates on the IEC Council Board Taskforce on Internal Transformation.