



IEC/TC OR SC: <b>TC 100</b>	SECRETARIAT: <b>Japan</b>	DATE: <b>2019-02-22</b>
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**A. STATE TITLE AND SCOPE OF TC**

Audio, video and multimedia systems and equipment

TA 1: Terminals for audio, video & data services and content

TA 2: Colour measurement and management

TA 4: Digital system interfaces and protocols

TA 5: Cable networks for television signals, sound signals and interactive services

TA 6: Storage media, storage data structures, storage systems and equipment

TA 10: Multimedia e-publishing and e-book technologies

TA 15: Wireless power transfer (WPT)

TA 16: Active Assisted Living (AAL), wearable electronic devices and technologies, accessibility and user interfaces

TA 17: Multimedia systems and equipment for cars

TA 18: Multimedia home systems and applications for end-user networks

TA 19: Environmental and energy aspects for multimedia systems and equipment

TA 20: Analogue and digital audio

For the Scopes of TC100 and the TAs, see the TC100 web site <http://tc100.iec.ch>

## **B. MANAGEMENT STRUCTURE OF THE TC**

TC 100 has a unique and flexible organisation structure based on Technical Areas, replacing sub-committees, to achieve standardization in an efficient manner for addressing fast moving multimedia technology.

The technical work in TC 100 is exclusively done in Project Teams, related to each other by addressing a common topic e.g. technology or application, and are clustered in a Technical Area (TA) with a Technical Area Manager (TAM), a Technical Secretary (TS) and an Assistant Technical Secretary (ATS) for efficient project management. A TA is active as long as the projects that are being addressed are ongoing, and is disbanded when all the projects have been finished.

In addition, TC 100 has two advisory groups and a GMT:

AGS (Advisory Group on Strategy)

AGM (Advisory Group on Management)

GMT (General Maintenance Team)

TC 100 has established an Editing Committee to improve document quality and to advise editorial issues in TC 100.

## C. BUSINESS ENVIRONMENT

### General

The convergence of digital technology from diverse industries demands interoperability in the consumer and the professional marketplace. Within this marketplace, entertainment, communication and information technology equipment and systems are continuing to evolve.

Due to world-wide economic slow down, some of the electronic industry markets have been facing negative growth. However some markets show recovery and even rapid growth.

The worldwide market sizes of products relating to TC 100 in 2017 are:

(All comparison is an estimated average from 2017 to 2022 except Smart phone)

- Flat panel TV: 237 834 k unit (+1,1 %)
- 4K TV: 75 714 k unit (+14,0 %)
- 8K TV: 2 k unit (+340,8 %)
- TV with Internet capability: 55 967 k unit (+18,7 %)
- DVD/Blu-ray Disc recorder/player: 75 066 k unit (-4,2 %)
- 4K Blu-ray Disc recorder/player: 1 200 k unit (+40,6 %)
- Video camera: 6 464 k unit (-1,5 %)
- Audio set: 17 228 k unit (-3,3 %)
- Digital audio player: 29 688 k unit (-7,9 %)
- Home theatre system: 14 456 k unit (0,2 %)
- PC: 268 300 k unit (-5,0 %)
- Tablet terminal: 196 000 k unit (-4,2 %)
- Car navigation: 45 875 k unit (+1,7 %)
- Car audio: 91 815 k unit (+0,3%)
- Smart Phone: 1851 415 k unit (+3,0 %) (Comparison is from 2016 to 2017)

(Data provided by JEITA)

It is now a common practice that audio and video content is played by a PC (Personal Computer) and smartphone. In that regard, the PC and smartphone market is included in TC 100 business environment. Recently, smart phones are supplementing portable PCs in the mobile computing field and audio visual content is played on smart phones.

The TV market shows steady growth by the transition from analogue to digital, especially in developing countries. The new 4K TV and 8K TV of UHD TV is now in its expansion stage, these TVs include new technologies such as HDR. The video recorder and player have been equipped with high definition function by Blu-ray Disc. In addition, e-book and e-publishing products were also rapidly penetrating in the market but slowed down because the eBook player function is covered by smart phone or tablet terminal.

The market for multimedia systems and equipment for car grows steadily, its total sales are close to the total sales of home system. All of the existing TC 100 systems and equipment are the bases of the car systems and equipment, and some dedicated technologies for cars are applied such as drive monitor, drive recorder, car navigation and drive support system.

TC 100 standardizes specifications related to these industries and associated multimedia products indicated above.

Major world-wide companies marketing products related to TC 100 are AMD, Dolby, Fujitsu, Fuji-Xerox, Haier, Hitachi, HP, Intel, JVC Kenwood, LGE, Lenovo, Mitsubishi Electric, NEC, Nokia, Panasonic, Philips, Pioneer, Qualcomm, Samsung, Sharp, Sony, Toshiba, to name but a few.

## Market demand

### General

For equipment and systems, in particular, interoperability and connectivity are essential. The user cannot easily resolve incompatibility problems and, as a consumer, will not tolerate those products or systems that do not have these essential functions. Specifications that ensure these functions benefit both the manufacturer and the user. Therefore, standards are essential that address both consumer and professional equipment and systems. TC 100 addresses these standards as related to systems, performance of equipment connected to the system, and the protocol of system control and interfaces.

Some of the specifications covered in TC 100 are previously standardized in consortia or fora and proposed to TC 100 for international endorsement. Such a process will become a trend in ICT fast moving technology standardization. Therefore TC 100 has liaisons with consortia and fora such as SMPTE, AES, ECHONET, USB-IF and WPC, and others as deemed necessary from time to time.

### Worldwide and regional usage

TC 100 standards are respected and used worldwide. However, some standards are dedicated to regional use, for example, digital broadcasting receiver specifications are based on regional broadcasting specifications.

### Competing standards

TC 100 is continuing its efforts not to compete with existing standards developed by other organizations through effective liaison. In the past, there was some serious conflict between TC 100 and JTC 1, ITU-T, therefore TC 100 hold "High level ad-hoc meetings" to meet JTC 1 and ITU-T representatives and discuss the standardization work in each SDO to avoid conflict or duplication and to explore opportunities for developing complementary specifications.

### Ecological environment

Ecological environment considerations are common interests. The focus within the electronics industry is to comply with ongoing IEC standardization strategies. The ecological aspects relating to audio, video and multimedia equipment will evolve with increasing awareness on the disposal of product and efficient energy consumption usage.

In 2005, TC 100 started to develop a standard for methods of measurement for power consumption, aiming to highlight energy savings. Also expected is the standardization of methods of measurement for standby power consumption. To develop such measurement methods and energy efficiency related standards effectively, TC 100 established TA 12 in 2009 and TA 12 is merged to the new TA 19 along with the standards of environmental aspects of TA 13 and TA 14.

Due to the relatively short life cycle of PC and IT products, recycling and reuse of materials are important activities. Disposal of old battery chargers for mobile phones and AC power adaptors for PC are highlighted as social problems. In that regard to avoid such dedicated power adapters, USB specifications for common connector and power delivery are standardized in TA 18 and wireless power transfer in the context of multimedia products is standardized in TA 15.

One component of Smart Grid which enables reduction of CO<sub>2</sub>, is home energy networking. TC 100 has specified a conceptual model for Energy Saving System (ESS) in TA 19. Measuring methods of power consumption in network standby mode are under consideration.

#### D. MARKET DEMAND

The table below indicates customers of TC 100 publication by each Technical Area (TA).

	Examples of IS	Customers
TA 1	Digital broadcasting receiver specifications	TV, Set Top Box (STB) Manufacturers and IT industry
	Battery charging interface for mobile devices	Mobile device manufacturers
TA 2	IEC 61966 series (Colour measurement management)	Various kinds of Manufacturer (TV, Printer, Digital Camera, Scanner, Projector, etc.)
TA 4	Interfaces and protocols related to transmission, interconnection, encoding/decoding, synchronization and control of video, data and metadata	CE, PC, IT manufacturers, broadcasters and professional equipment manufacturers
	Requirements and measurement methods for electrical and physical characteristics	Testing Laboratories
TA 5	IEC 60728 Series (Cable system)	TV, STB Manufacturers, cable operators, cable- and cable system equipment manufacturers and cable system installers
TA 6	Professional tape-less camera recorder specifications	Broadcasters, Professional equipment manufacturers
	Portable CE products specifications	Manufacturers, Consumers
	Measuring methods for various recorders/players	Manufacturers, Consumers
	Time-code specification Audio archive system	Professional equipment manufacturers Library, Archive system providers and manufacturers
TA 10	e-Book specifications	CE, IT Manufacturers, Authoring tool manufacturers, Publishers Consumers
TA 15	Wireless Power Transfer for audio, video and multimedia systems and equipment	Manufacturers, Consumers
TA 16	Active Assisted Living (AAL), wearable electronic devices and technologies, accessibility and user interfaces	CE, IT and mobile device Manufacturers, Consumers, Life support service providers, Health Care Providers, Regulators
TA 17	VDR for road vehicle accidents, Drive monitoring system, car infotainment products	Consumer, Manufacture, Car industry
TA 18	Multimedia home server and gateway specifications Audio, video and multimedia interoperability specifications for end-user Networks USB interface	PC, CE device, IT system, Smart device and consumer/B2B electronics product manufactures, and Content service providers
TA 19	Measurement method for power consumption, energy efficiency and environmentally conscious design	CE, ITE, PC and Multimedia Audio & Video Manufacturers; Regulators, NGOs, Consumers
TA 20	Sound system equipment	Manufactures, Installers, Consumers
	Audio quality (AV lip sync, loudness, multichannel assignment)	Broadcasting studio, Manufactures, Installers, Consumers

	Audio and multimedia interface (analogue/digital audio interface, MIDI)	Manufactures, Installers, Consumers
TC 100	Audio, video and multimedia systems – General channel assignment of multi-channel audio	Manufacturers
	Multimedia home network configuration	Manufacturers

## E. TRENDS IN TECHNOLOGY AND IN THE MARKET

Standardization of audio, video and multimedia applications will be continuously achieved. However, the demands for social standardization regarding issues such as the environment, energy efficiency, and accessibility will be on the increase and some standards may therefore be referred to by regulatory agencies. Technical experts involved in standards development may become more diverse, not only as engineers from the manufacturer and user communities but also from regulatory agencies in the future. As the audio, video and multimedia market continues to expand, the customers for these standards will also become more diverse as market trends evolve.

- Digital television receivers

With the continuation of the analogue-to-digital transition, digital television receivers and set top boxes (STBs) will increase in the market. Digital broadcasting receiver specifications will be standardized and updated.

- IPTV, Internet TV and connected TV

Some IPTV related specifications have been standardized in TC 100 and other organizations such as ITU-T. As the future style of television, connected TV or smart television are expected. The research of current and planned connected TV services and products will be necessary. Standardization of the conceptual model and related specifications will come after the research.

- UHDTV

Recently ultra high definition television formats beyond HDTV have been discussed and some of them, so-called 4k or 8k video format, were specified in ITU-R. Accordingly, standardization of related specifications and measuring methods for the products capable of 4k and 8k signal reproduction will be considered. Also being considered in the transition to UHDTV are High Dynamic Range (HDR), Wide Colour Gamut (WCG), and High Frame Rate (HFR) technologies.

- HD recordings and cloud services

By diffusion of digital broadcasting and broadband network, High Definition (HD) television content will become more readily available. Additionally, audiovisual recording is increasingly processed by software and stored in HDD or memories rather than with hardware and packaged recording media. Furthermore, audiovisual content will be stored and accessed by using cloud service system. The standardization of recording file format, encoding rules for compression systems and cloud service related specifications will be necessary.

- Personal Computers

AV and multimedia presentation capability in PC is common in the market and PC related standardizations are required. Measuring methods of power consumption for PC, and interfaces such as USB are expected to be standardized.

- e-Book

With the advance of display technology, including new technologies such as OLED, an evolution is occurring in the publishing industry. e-Books and e-publishing are becoming increasingly popular; various types of e-reader devices and formats are being developed and launched in the marketplace.

- Smart phone

Smart phones have the capability to capture and render audio visual content and the market has grown very rapidly. Increasing access to Wi-Fi means that the smart phone has become not just a phone but a pocket computer, a camera, an e-reader, a music device, and a mobile TV while allowing connectivity for users. Interoperability and security must be fully addressed.

- Wearable devices

The market for wearable devices has grown rapidly. They frequently communicate via body networks or via a smart phone and transmit data for applications such as wellness or environment monitoring. These devices can be components of a health care system or an AAL system but are also being deployed in many other applications such as sports performance monitoring and environmental monitoring. Interoperability, privacy and security must be fully addressed because of the sensitive personal data involved.

- Wireless power transfer products

Wireless power transfer between CE devices are emerging technical trends and some products are introduced in the market, such as commercial products (smart phone, Wireless Pad and Cover, TV

accessory, Wireless charger for 3D glasses, Electric vehicle, On-line electric vehicle) and developed prototypes (Mobile device, Desktop, LED sign board, TV and OLED lighting device).

- Cyber physical systems (CPS)

CPS are interacting networks of physical and computational networks on which smart services are built. CPS support smart cities, personalized health care, power generation and delivery, smart manufacturing and similar applications. This impacts much on TC 100, audio visual and multimedia content, information and services became to be provided from servers as cyber entities through Internet, not from physical medium such as optical disc. TC 100 already started a study group to study CPS, which will result in a new TA regarding CPS.

- Networked AV products

Products, which have capability to connect to the home network through Ethernet and Internet, will increase in the market, which will enable users to playback content in various situations. Home network protocols and content protection related standards are expected.

- Ecological products

Energy efficient products will continue to gather attention in the market. Some report that users will tend to buy low power consumption products even in AV and multimedia. Therefore, a measurement method standard of power consumption for AV products will become increasing important. From an environmental point of view, the disposal of old battery chargers for mobile phones and AC power adaptors for PCs are viewed as social problems. In that regard, specifications for universal battery charger interface and an AC-DC power supply are expected.

- Accessible products

Products which are usable by people with the widest range of capabilities in terms of AAL.

- Car infotainment products

People use TC 100 systems and equipment in car. These are infotainment products such as AV and IT function of smartphone or tablet PC, portable AV devices, navigation system, drive recorder and car AV system. Some of them are extension of TC 100 products and some of them are dedicated TC 100 products for car with close relation with car system.

- AR/VR equipment and system

AR/VR equipment and system provide virtual information together with A/V information to people, enriched the content they experience in real world. Market of AR/VR equipment grow rapidly, requirements for specifications related to services, applications, networks, devices and equipment are expected.



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

TC 100 is both a product committee and a system committee. TC 100 attempts to focus on the customer role as a user of components while also addressing the supplier role as a developer of common platforms, for example, colour gamut standards.

Component committee (TC 100 role of a customer)	IEC SC 3C	Graphical symbols for use on equipment
	IEC TC 46	Cables, wires, waveguides, R.F. connectors, R.F. and microwave passive components and accessories
	IEC SC 48B	Connectors
	IEC TC 86	Fibre Optics
	IEC TC 110	Flat panel display devices
	IEC TC 124	Wearable Electronic Devices and Technologies
	ISO/IEC JTC 1/SC 23	Removable Digital Storage Media Utilizing Optical and/or Magnetic Recording
	ISO/IEC JTC 1/SC 25	Interconnection of IT equipment
	ISO/IEC JTC 1/SC 29	Coded Audio, Picture and Multimedia/Hypermedia information
	ISO/IEC JTC 1/SC 41	Internet of Things
System committee (TC 100 role of supplier)	ISO TC 42/WG 18	Photography/Digital imaging
	ISO TC 130	Graphic technology
Others (System to System)	ISO/IEC JTC 1/SC 25	Interconnection of IT equipment
	TC 9	Railway systems

TC 100 will investigate the role of TC 100 in the system such as Electric Vehicle, Smart Grid, Smart Cities and AAL. TC 100 actively contributed to the establishment of the new IEC System Committee SyC AAL.

**G. CONFORMITY ASSESSMENT**

Currently there are no TC 100 standards used in IEC CA systems. Almost all of the standards developed in TC 100 are not used for regulatory purposes. However, recent energy-efficiency-related standards, for example as IEC 62087 "Methods of measurement for the power consumption of audio, video and related equipment" are referred to by Energy Star Programmes and ErP. Such types of standard will increase. TC100 has produced many standards that include methods of measurement and a number that specify performance requirements.

**H. HORIZONTAL ISSUES**

Trustworthiness is a horizontal issue to be discussed throughout TC 100.

**I. 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
<p>To enrich human life with entertainment provided by audio, video and multimedia in home and networked environments. To pursue energy efficiency and address the options for accessibility and usability of audio, video and multimedia equipment</p>	<p>GENERAL: All TAs will continually monitor the existing standards and other publications within its responsibilities, using amendment, revision, stabilization and withdrawal to keep the corpus of standards relevant and no larger or more diverse than necessary.</p> <div style="border: 1px solid black; padding: 5px;"> <p>TA 1: Television receivers connected to the external network are expected to offer some options for accessibility.</p> <p>TA 1 will develop and revise Digital broadcasting receiver specifications for corresponding regions and IPTV terminal specifications according to the progress of technology.</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p>TA 2: TA 2 is addressing a market with rapid technology change. The TA will develop and maintain standards related to large gamut and high dynamic range contents and displays.</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p>TA 4: TA4 will</p> <ul style="list-style-type: none"> <li>• continue to add to existing multi-part standards to accommodate new developments for the transport of new A/V streams.</li> <li>• develop new standards for the transport of video, data (e.g., haptic, text, etc.) and metadata and for the interoperability of applications.</li> <li>• adapt the work of TA4 to faster, more flexible and more convenient technologies that affect the physical layer, in close co-operation with the originators of these technologies.</li> <li>• accommodate TA4 related interface and protocol standards to IP, IoT, and other commercialized technology-based networking and establish new liaisons with standards committees, industrial associations and engineering societies as appropriate to facilitate this work.</li> </ul> </div> <div style="border: 1px solid black; padding: 5px;"> <p>TA 5: The re-allocation of radio spectrum usage will require rapid development of improvements to the electromagnetic immunity of cable networks, affecting cable performance and connector characteristics. [JMW does not see mention of liaison with SC46A and SC46F.</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p>TA 6: TA 6 will develop standards on new storage media and technologies on file format and metadata and time labelling to facilitate interoperability of the content. The project plan is as follows:</p> <ul style="list-style-type: none"> <li>• formats of multimedia e-book content;</li> <li>• Blu-ray Disc and metadata for</li> </ul> </div>	<p>To enrich human life with entertainment provided by audio, video and multimedia in home and networked environments. To pursue energy efficiency and address the options for accessibility and usability of audio, video and multimedia equipment</p>

<p>audio archive;</p> <ul style="list-style-type: none"> <li>• MXF (Material eXchange Format);</li> <li>• BWF (Broadcast Wave Format);</li> <li>• Study on future time labelling.</li> </ul>
<p>TA 10: TA 10 will develop, in close liaison with other interested bodies, new standards for multimedia e-books, multimedia e-publishing, and the related technologies, including:</p> <ul style="list-style-type: none"> <li>• formats of multimedia e-book content;</li> <li>• minimum requirements for multimedia e-book players;</li> <li>• energy consumption;</li> <li>• user interfaces for multimedia e-book players;</li> <li>• e-publishing services;</li> <li>• guidelines for e-book distribution by interchangeable storage media;</li> <li>• accessibility.</li> </ul>
<p>TA 15: TA15 will strategically and continuously follow the technical development of international publications related to Wireless Power Transfer (WPT) for multimedia systems and equipment, and interoperability between the transmitting and receiving functions. Energy efficiency will also be addressed.</p>
<p>TA 16: Demographic studies indicate that the population will age considerably, with implications for multimedia technology. There is also a general demand for increased convenience and comfort. TA 16 will produce standards and other publications to help ensure that audio, video and multimedia equipment and systems are sufficiently accessible not only to elderly persons but also to persons in general with disabilities. This extends to emerging technologies for AAL including:</p> <ul style="list-style-type: none"> <li>• e-health;</li> <li>• telemonitoring;</li> <li>• wearable devices;</li> <li>• service robots;</li> <li>• smart homes.</li> </ul>
<p>TA 17: TA 17 will develop standards for TC100 infotainment systems and equipment for car use, and study the items related to car driving to develop standards. Also recognizing the car as one eco system, study that system from various aspects such as AAL, IoT to develop standards. Standardization examples are:</p> <ul style="list-style-type: none"> <li>• visual image system;</li> <li>• event driven data recorder;</li> <li>• UX system;</li> <li>• functional map data.</li> </ul>

<p>TA 18:</p> <ul style="list-style-type: none"> <li>• Develop standards for general system aspects, functions, data interfaces, control interfaces and IoT services for multimedia systems and end-user networks such as consumer electronics, personal computing and smart-mobile devices, home/cloud servers and gateways, and infotainment devices (video gaming etc.).</li> <li>• Standards to be developed will correspond to user and market needs including: broad market adoption, interoperability between systems and equipment, energy saving and environment sustainability, consumer ease-of-use, and emerging multimedia system applications (like CPS, VR/AR etc.) .</li> <li>• Increase the recognition of the work of IEC TC 100/TA 18 within consumer electronics sector, including liaisons with other technical committees, SDOs and industry consortium.</li> </ul>
<p>TA 19:</p> <ul style="list-style-type: none"> <li>• Extend multipart IEC 62087 incorporating up-to-date power consumption and energy efficiency measurement methods for the latest A/V, PC and multimedia technologies such as HDR. As HDR video is introduced to the marketplace, new test materials will be required for proper energy measurement by industry and policy makers.</li> <li>• Study and development of application-level networking standards as needed for energy efficiency and savings.</li> <li>• Revision of existing environmental design standards as required by industry and regulators to promote development of ecologically friendly products, for example by reducing product carbon footprint and greenhouse gas emissions.</li> </ul>
<p>TA 20: Preserve and develop international publications in the audio technical area within TC 100 scope. Standardization examples are:</p> <ul style="list-style-type: none"> <li>• sound system equipment;</li> <li>• audio quality;</li> <li>• audio and multimedia interface.</li> </ul>
<p>TC 100: AGS forms Study Sessions (SS) to discuss specific standardization themes in TC 100 deeply. and will continuously seek for new themes. So far identified are:</p> <ul style="list-style-type: none"> <li>• smart city;</li> </ul>

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| <ul style="list-style-type: none"> <li>• smart home;</li> <li>• smart education.</li> </ul> |
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In general terms, TC100 plans include:

- Reorganize TA structure, merge, disband and establish TAs. TC 100 AGS and AGM will discuss the new TA structure in every meeting and recommend to TC 100.
- Join and contribute to discussion in IEC SyC AAL, SyC LVDC, SyC SM, SyC Smart Cities and SyC Smart Energy, and SEG 8 Communication Technologies and Architectures of Electrotechnical Systems, SEG 9 smart home/office building systems, the relevant Task Groups established under AGS. Become a contributing member to relevant IEC systems committees.
- Continue strengthening liaison with ITU-T and JTC 1 possibly for IP home networking application and other general issues. A high level meeting among ITU-T, JTC 1 and TC 100 was held in 2008-11. TC 100 will continue the communication with those organizations through ITU-T, JTC 1 and TC 100 high level ad hoc meeting.

In the field of home network application for the next three to five years, IP networking technology will be adopted broadly and the standardization utilizing IP technology will increase in areas such as CPS, IoT and IPTV. The term "home" will be extended to include an automobile environment that will rely on IP networking and wireless technologies. Issues such as the protection of private information will become an important area. TC 100 will address issues related to multimedia security standardization. TC 100 will also address high quality content such as HDTV and 3D audio, home theatre and digital cinema which will become increasingly popular as will be the need to develop multimedia quality evaluation standards.

Note: The progress on the actions should be reported in the RSMB.