



IEC/TC OR SC: TC 110	SECRETARIAT: Japan	DATE: 2019-11-08
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Please ensure that this form is annexed to the Report to the Standardization Management Board (if it has been prepared during a meeting) or sent to the Central Office promptly after its contents have been agreed by the committee.

A. STATE TITLE AND SCOPE OF THE 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, please describe the impact of these changes, if any, on the scope or work activities of other TCs. Please also list the TCs that would be impacted.

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

Title: Electronic displays

Scope: Standardization, in the field of electronic displays and specific relevant components, of terms and definitions, letter symbols, essential ratings and characteristics, measuring methods, specifications for quality assurance and related test methods, and reliability

Note: Where actual or potential overlap in scope with other TCs/SCs such as IEC/TC 47, SC 62B, TC 76, TC 77, TC 100, TC 111, TC 119 and TC 124 exists, coordination through liaison or JWG with the concerned TCs/SCs should be maintained or actively pursued.

It is not necessary to update the scope. The current scope covers all the subjects including those described in item H,

B. MANAGEMENT STRUCTURE OF THE TC

Describe the management structure of the TC which should be automatically integrated by CO (use of an organizational chart is acceptable) and, if relevant (for example, an unusual structure is used), provide the rationale as to why such a 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 during the time. When does the TC intend to review its current management structure? In the future, will the TC change the current structure (for instance, due to new and emerging technologies, product withdrawal or change in regulations)? Please describe.

Please ensure that the overview includes the following groups:

- any joint working groups with other committees
- any special groups like advisory groups and editing groups

Officers:

Chair: Mr Xiaolin Yan (CN)

Secretary: Mr Yoshi Shibahara (JP)

Assistant Secretary: Mr Kei Hyodo (JP), Mr Shin-ichi Uehara (JP)

Technical Officer: Ms Suzanne Yap Geok Sim

Working Groups (WG) , Project Team, Maintenance Team, ad-hoc group, and advisory groups:

WG 6: 3D Display Devices (3DDD)

WG 8: Flexible display devices (FDD)
WG 9: Touch and interactive displays (TID)
WG 10: Laser displays (LD)
WG 12: Eyewear display (EWD)
WG 13: Optical measurements of electronic displays (OPT)
WG 14: Durability test methods for electronic displays (DTM), set up in 2019-10
PT 62341: Organic light emitting diode displays (OLED), transformed from WG 5 in 2018-10
PT 62595: Display lighting unit (DLU)
MT 61747: Liquid crystal display devices (LCD), transformed from WG 2 in 2018-10
AG 11: Advisory Group on Strategy (AGS)
AG 15: Advisory Group for Project allocation (AGP), set up in 2018-01
AHG 16: Electronic displays for special applications (SPA), set up in 2018-10

Remarks:

AG 11: The Advisory Group on Strategy (AGS) has been set up since 2013 to advise TC 110 on strategic business plans, specifically identifying and making recommendations on the TC 110 grand roadmap, WG structure and establishment of projects in accordance with market needs.

TC 110 reviews the management structure every year based on the recommendations of AG 11.

AG 15: The Advisory Group on Project allocation (AGP) has been set up since 2018-01, to advise TC 110 Secretary for allocation of new proposals.

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.

Worldwide revenue from electronic displays is a hundred and several tens of billion dollars and is steadily increasing with TV and mobile displays leading this growth. Demand for in-vehicle displays is also increasing, and commercial, medical and other fields represent further important markets for electronic displays. The average annual growth rate on panel area base is about 4%, while OLED TV, public displays, automotive displays and near eye displays are achieving the high growth.

Among display technologies, LCD retains the largest share. Shipment volumes of TV, monitor, notebook PC, and smart phones maintain stable growth. The market for OLED is also expanding rapidly, particularly in handheld mobile applications and also in TV applications. OLED is currently the second largest technology, having overtaken PDP in 2012. PDP shipment is decreasing and is fading from the display market. Laser display devices have attracted attention due to their efficiency and sharp light spectrum.

Regarding display performance and specifications, the following points are noteworthy.

- 1) The screen sizes of TVs, PC monitors and mobile displays continue to increase.
- 2) The pixel density in display screens for TV and mobile phones also continue to increase.
- 3) "High dynamic range (HDR)" TV has been introduced to the market in association with the provision of HDR contents.
- 4) Several technologies for expanding the dynamic ranges and the colour gamuts of displays have been proposed.
- 5) Flexible displays, such as foldable smart phones and rollable TV, attract attention as new products.

3D displays have seen gains in certain markets, and are now seeking further expansion into other applications and technologies.

Having established a market for "E-reader", electronic paper displays (EPDs) are evolving to incorporate improvements in image quality and features such as built-in illumination.

Touch panel technology has achieved rapid market penetration, first in smartphones and tablets, and then notebook PCs. Worldwide revenue for touch panels has exceeded several tens of billions dollars and is growing at over ten percent annually.

Laser displays have expanded its market, and also expected as a main stream of the projector market. It has been started from hybrid laser display (laser with phosphor), and RGB-type laser displays are also coming up with the evolution of the visible laser diode.

Flexible displays have been attracting much attention. Non-flat displays employing a flexible substrate have been introduced to the market and growth is expected. Flexible displays that can be bent or folded, for example foldable smart phone or PC, are also highly anticipated.

In terms of new trends, growth in transparent displays is predicted, with wearable or head-up displays anticipated as upcoming key products.

AR/VR technologies using eyewear displays are receiving a lot of attention of B2B and B2C markets. It is likely that these devices will eventually become more prominent in the market.

Digital signage or public displays are also important applications of electronic displays.

Electronic displays have become essential components of Human-Machine Interfaces (HMI) and consequently the production volumes of these displays have increased steadily to meet the increasing demand. Further growth is expected due to the expansion of application of displays,

being pushed by smart house, smart office, connected industries, remote office, drone, security camera, and others.

In the meantime, government regulations, to deal with their impact on the environment have been formulated in many countries. The electronic display industry strives to comply with the various government regulations, in those covering the reuse and recycle of these displays and their components, the reduction of related waste material and energy consumption, and health impact on the end users from e.g. flicker and short wavelength light. TC110 will continue to review these needs as industry practices and government regulations develop.

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.

The market for electronic displays encompasses a variety of products, such as notebook and tablet PCs, monitors, TV sets, cellular phones, electronic signage, head-up displays, head-mount displays, eyewear displays, other wearable displays, and all the rest. Standards are required for all aspects of electronic displays such as terms and definitions, measurement methods and customer detail specifications, which include both functional specifications and assessment specifications (product qualification and test specifications). To enable customers to objectively evaluate different technologies, it is now necessary to begin harmonizing or consolidating the many standards for different electronic displays.

The likely customers of the Standards are as follows;

Suppliers: Manufacturers of materials, components, panels, modules, and products related to electronic displays

Testing: Manufacturers of test equipment, testing body, certification bodies

Customers: Distributors, public offices, and end customers

Academia

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.

Great progress has been made with front-plane and back-plane display technologies, and still further substantial improvements are expected in terms of pixel structures, reduced power consumption and image quality enhancements in areas including contrast, colour, uniformity, moving image quality, viewing direction dependence, tone and colour reproduction, and reliability of displays.

Other components, including films and glasses, continue to see improvements in terms of reliability, strength and optical properties. Various kinds of film are used in display devices to boost optical performance, such as viewing direction dependence and optical efficiency.

Quantum dot is a hot topic, with photoluminescent quantum dots being introduced in some products as a down converter in order to improve efficiency and expand the colour gamut of the display. Electroluminescent quantum dot technology is also expected as a new emissive element,

Flexible front-plane, flexible back-plane, flexible touch panel and other flexible components are being realised. Their respective reliabilities are also being tested across various potential applications.

Capacitive-based designs are the major touch panel technology. Sensitivity, accuracy and precision, reporting rate, applicability to larger panels, optical properties, reliability and power consumption are all seeing improvements.

Developments in electronic display technologies are too numerous to comprehensively list here. The future will see the emergence of many new ideas, technologies and applications.

The optical performance of AR/VR technologies using eyewear displays has been improved rapidly.

Mini and micro LED attracts attention as a new display technology.

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?

The TCs and organizations that are relevant to TC 110 are as follows:

IEC Internal liaisons	IEC/TC 47	Semiconductor devices
	IEC 62/SC 62B	Diagnostic imaging equipment
	IEC/TC 76	Optical radiation safety and laser equipment
	IEC/TC 77	Electromagnetic compatibility
	IEC/TC 100	Audio, video and multimedia systems and equipment
	IEC/TC 100/TA 2	Colour measurement and management
	IEC/TC 100/TA 19	Environmental and energy aspects for multimedia systems and equipment
	IEC/TC 111	Environmental standardization for electrical and electronic products and systems
	IEC/TC 119	Printed electronics
	IEC/TC 124	Wearable electronic devices and technologies
Liaison ISO	ISO/TC 22/SC 39	Road vehicles / Ergonomics
	ISO/TC 159/SC 4	General ergonomics principles
	ISO/TC 172	Optics and photonics
Liaison A	CIE	International Commission on Illumination
Liaison C	ICDM (with IEC/TC 110/ WG 6, WG 8 and WG 9)	SID (Society of Information Display)'s International Committee for Display Metrology

The Systems work in multiple TCs. However, the performances and the specifications of display devices can be discussed independently. Hence, Systems Evaluation Group (SEG), Systems Committee (SyC), or Systems Resource Group are not necessarily required.

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.

The standards developed in TC 110 are in line with the requirements related to conformity assessment aspects, and may include test specifications, reproducible test requirements, and test methods. TC 110 publications can be used in conformity assessment systems, but they do not include requirements related to conformity assessment other than requirements which are necessary to provide repeatable and reproducible conformity assessment results.

H. 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
Restructuring of WGs for more efficient and integrated standardization	Effective operation of new groups (WG 13, PT 63211)	2020-10 Review
	Effective operation of AG 15 (Advisory Group for Project allocation)	2020-10 Review
Developing new application area	Orientation of AHG 16 (Electronic displays for special applications)	2020-10 Review
Addressing the following new subjects;	<ul style="list-style-type: none"> PWI 110-8 Measuring methods of haptic devices PWI 110-14 Test method of lifetime of laser display devices PWI 110-17 Measurement method of holographic display - optical PWI 110-22 Volumetric display (including head-up display, projection mapping, drone display, stacked transparent screen, etc.) PWI 110-23 Essential ratings and characteristics of flexible displays PWI 110-24 Measuring methods of finger print recognition performance – under-display optical imaging fingerprint sensing PWI 110-25 Measuring method of pen touch performance PWI 110-26 Measuring methods of image quality of raster-scanning laser display devices PWI 110-30 Measurement of autostereoscopic display – image quality PWI 110-31 Aerial display PWI 110-32 Bending stiffness test methods PWI 110-34 Measuring methods of fingerprint recognition performance - On-display transparent optical imaging fingerprint 	2020-10 review

	sensing	
PWI 110-35	Measurement of optical performance for laser raster scanning display	
PWI 110-36	Future of IEC 63145-30: Durability test methods of eyewear display	
PWI 110-37	Future of IEC 63145-201: Optical components of eyewear display	
PWI 110-38	Future of IEC 63145-40: Measurement methods of specific functions with sensors for eyewear display	
PWI 110-39	Future of IEC 63145-23: Contact lens type	
PWI 110-40	Future of IEC 63145-50: User interaction	
PWI 110-42	Measurements of tiled displays	
PWI 110-45	Measuring methods of crimp force	
PWI 110-46	Specific measurement methods for VR type	
PWI 110-47	Emissive micro display device	
PWI 110-48	Corrective lens for AR/VR	
PWI 110-49	Spatial resolution	
PWI 110-50	Measuring method of image retention of OLED displays	
PWI 110-51	Measuring method of local luminance and uniformity of OLED displays	
PWI 110-52	Quantum dots used in display lighting unit (DLU)	
PWI 110-53	Mechanical tests of electronic displays – Static tests	
PWI 110-54	Optical measurement methods for automotive displays	
Note: The progress of the actions should be reported in the RSMB.		