IEC/TC OR SC:	SECRETARIAT:	DATE:
TC 110	**Japan**	**2016-11-06**

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 display devices

Scope: Standardization, in the field of electronic display devices 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

Remarks:

The following are some trends. However, <u>it is not necessary to update the scope</u> because the current scope has already covered these trends.

a) Beginning from the standardization related to liquid crystal display (LCD) devices and plasma display panels (PDP), TC 110 has extended the objectives to organic light emitting diode (OLED) displays, 3D display devices (3DDD), electronic paper display devices (EPD) and flexible display devices (FDD). All of these newly added subjects are important in the market, and most of them are developing further.

b) The newly added challenges in 2013—touch and interactive displays (TID) and laser display devices (LDD)—are also key technologies in this field and are making advances.

c) Wearable displays, such as wristwatch type displays, head-mount displays or near eye displays, are emerging products which have come under the spotlight. TC 110 has already created test method documents for EPD, OLED and other display devices which are used for wristwatch type displays and has also started discussion related to the other wearable displays, including near eye displays.

d) The evolution of the products and the components of displays is rapid and remarkable, including higher energy efficiency, higher image quality and diversified products, such as transparent displays and 4K and 8K displays.

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 Baoping Wang (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 and Maintenance Team:

       WG 2: Liquid crystal display devices

       WG 5: Organic light emitting diode displays (OLED)

       WG 6: 3D Display Devices (3DDD)

       WG 7: Electronic Paper displays (EPD)

       WG 8: Flexible display devices (FDD)

       WG 9: Touch and interactive displays (TID), set up in 2013

       WG 10: Laser display devices (LDD), set up in 2013

       PT 62595: Display lighting unit (DLU)

       PT 62977: Common test methods for electronic display devices (provisional title)

       AHG 12 Eyewear display (EWD)

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.

       TC 110 is discussing the restructuring of the Working Groups for more effective and efficient standardization.

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 billions dollars and is steadily increasing at a rate of several percent per annum, 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.

Among display technologies, LCD retains the largest share. Shipment volumes of LCD TV, LCD monitor and notebook PC maintain stable growth, whereas shipment of Tablet PCs and smart phones is rapidly increasing. The market for OLED is also expanding rapidly, particularly in handheld mobile 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 specification, the following are noteworthy.

1) Screen sizes in TVs, PC monitors and mobile displays continue to increase.

2) Display resolution also continues to improve. Displays with 4K resolution are on the increase; particularly in the large-size TV market (4K resolution refers to those display devices having a horizontal resolution on the order of 4,000 pixels). Pixel density is also increasing in smartphones, reaching 2560 × 1440 (QHD) and even 4K (UHD) in high-end devices.

3) Several technologies for expanding display colour gamut have been proposed.

4) Curved displays are a conspicuous new product. Curved TVs aim to provide a uniform viewing distance from edge-to-edge.

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", 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 display devices (LDD) are penetrating into the market with the rapidly improving performance of the RGB laser diodes and the speckle reduction technology. LDD is the best solution to achieve the widest colour gamut of BT.2020.

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 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.

Near-eye displays are receiving a lot of attention. It is likely that these devices will eventually become more prominent in the market.

Electronic display devices have become essential components of man–machine interfaces and consequently the production volumes of these devices have increased steadily to meet the increasing demand. 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, including those covering the reuse and recycle of these displays and their components, the reduction of related waste material and energy consumption. TC110 will continue to review these needs as industry practices and government

regulations develop.

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 or near-eye displays, other wearable displays, and all the rest. Standards are required for all aspects of electronic display devices such as terms and definitions, measurement methods and customer detail specifications, which include both functional specifications and assessment specifications (product qualification and test specifications). It is now necessary to begin harmonizing the many standards for different electronic display devices.

The likely customers of the Standards are as follows;

Suppliers: Manufacturers of materials, components, panels, and sets related to electronic display devices, such as LCD, OLED, 3DDD, EPD, FDD, TID, LDD

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

Customers: Distributors, public offices, and end customers

Academia

Great progress has been made with front-plane and back-plane display technologies, and still further substantial improvements are expected in terms of finer pixel structures, increased energy efficiency and image quality enhancements in areas including contrast, colour, uniformity, moving quality, viewing angle and reliability.

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 characteristics, such as viewing angle 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.

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

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:

Component Committee	IEC/TC 47	Semiconductor devices
System Committee	IEC/TC 100	Audio, video and multimedia systems and equipment
Others	IEC/TC 76	Optical radiation safety and laser equipment
	IEC/TC 77	Electromagnetic compatibility
	IEC/TC 86/SC 86C	Fibre optic systems and active devices
	IEC/TC 111	Environmental standardization for electrical and electronic products and systems
	IEC/TC 119	Printed electronics
	IEC/CIS/H	Limits for the protection of radio services
	IEC/CIS/I	Electromagnetic compatibility of information technology equipment, multimedia equipment and receivers
	ISO/TC 159/SC 4	General ergonomics principles
	CIE	International Commission on Illumination

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.

TC 110 (WG 2, WG 5, WG 6, WG 8 and WG 9) has set up Liaison D relationship with SID's ICDM, which is an international committee for display metrology, also creates standards for display metrology. .

With reference to clause 6.7 of Part 2 of the ISO/IEC directives, are all you 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 of TC 110 include test specifications, reproducible test requirements, and test methods. Our publications are in line with the requirements related to conformity assessment aspects. We keep away from conformity assessment requirements.

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
The following new subjects will be addressed:	Management proposal from the AGS (AG-11)	Target date (review date)
- Transparent displays (measuring methods in common)	Discussion in PT 62977 (Common optical measurement) and cooperation of WG 5 (OLED) and WG 2 (LCD)	2019 (2016)
- Near-eye displays or head-mount displays	Discussion in a study group and WGs, such as WG 6 (3DDD)	2020 (2016)
- Laser displays (life time of the devices, retina direct projection, optical performance and image qualities)	Discussion in WG 10 (LDD)	2019 (2016)
- Touch and interactive (pressure touch, multi-touch, hovering, haptic, proximity, motion recognition, etc.)	Discussion in WG 9 (TID)	2019 (2016)
- Display lighting unit (LED light bars, interfaces, front light unit, etc.)	Discussion in PT 62595 (DLU)	2019 (2016)
Common test method standards which are commonly applied to display devices, in general, will be created:	Administrative discussion in AGS and technical discussion in HHG	The target date (review date)
- Common optical measurements		
- Basic properties		2018 (2016)
- Advanced test charts		2019 (2016)
- Transparent displays		2019 (2016)
- Other common test methods		2020 (2016)

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