BUREAU OF INDIAN STANDARDS
ELECTRONICS AND INFORMATION TECHNOLOGY DEPARTMENT

14th Meeting of Electronic Display Devices and Systems Sectional Committee, LITD 04

Venue:	Hybrid Mode
Meeting Link:	https://bismanak.webex.com/bismanak/j.php?MTID=mab89f4304ac4908d36a7af8c020d66fb
Meeting No:	2514 101 4157
Password:	Litd1234
Date:	28 November 2024
Time:	11: 00 AM to 01:00 PM
Chairperson:	Shri P. V. G. Menon (Tata Projects Limited)
Member Secretary:	Shri Devansh Deolekar (Scientist-D, LITD)

MEETING AGENDA

ITEM 0: WELCOME ADDRESS

0.1 Welcome by Member Secretary
0.2 Opening Remarks by the Chairperson

ITEM 1: FORMAL CONFIRMATION OF THE MINUTES OF LAST MEETING

1.1 The minutes of the last meeting of LITD 04 sectional committee held on 16 June 2023 were circulated on 10 August 2023. No comments have been received on the minutes. The committee may formally confirm the minutes.

The committee may finally confirm the minutes

ITEM 2: SCOPE AND COMPOSITION OF LITD 04

2.1 **Scope:** To prepare Indian Standards relating to:

a) Electronic tubes including X-Ray and microwave tubes.

b) Electronic display devices and specific relevant components.

(Scope of IEC TC 110:

*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.***)**

The committee may please note and suggest.

2.2 LITD 04 is the National Mirror Committee and working groups for the following committees:

IEC TC 110 - Electronic Displays - Principle (P)

- IEC TC 110/WG 8 - Flexible Display Devices (FDD)
- IEC TC 110/WG 10 - Laser Displays
- IEC TC 110/WG 12 - Eyewear Display
- IEC TC 110/WG 13 - Optical Measurements of Electronic Displays (OPT)
- IEC TC 110/WG 18 - Organic Light Emitting Diode Displays (OLED)

Other Working groups of TC 110:

- WG 6 3D displays (3DD)
- WG 9 Touch and interactive displays
- WG 14 Durability test methods for electronic displays (DTM)
- WG 19 Display lighting unit (DLU)

The committee may please note.

2.3 The composition of "Electronic Display Devices and Systems Sectional Committee LITD 04 with attendance during the past 3 meetings is given in Annexure-1.

The committee may note and review the composition.

ITEM 3: PROGRAM OF WORK OF LITD 04

3.1 The program of work of LITD 04 is given in Annexure-2

The committee may please note.

ITEM 4: REVIEW OF STANDARDS

4.1 As per BIS rules, Indian Standards which are in existence for more than three years are to be reviewed for **Reaffirmation/Revision/Withdrawal**. The standards due for periodic review are listed in Annexure-3.

The committee may please note.

ITEM 5: DOCUMENTS UNDER DEVELOPMENT

5.1 Total 23 Documents are under in Wide Circulation Draft, Documents under development are mentioned in Annexure-4.

ITEM 6: INTERNATIONAL STANDARDIZATION ACTIVITIES

6.1 **IEC TC 110 – "Electronic Displays"** deals with 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. India is a participating member (P Member) of IEC TC 110 and has the obligation to vote and send response on all the documents emanating from this subcommittee. Details of the members

nominated in the working groups of the committees is given in Annexure-5**.** Based on the participation of members in the IEC meetings, it is proposed to review the nominations.

The committee may please review.

6.2 The committee's responsibilities encompass the review of standards published by IEC TC 110 Electronic Displays. In light of this, there's a proposal to establish a dedicated working group focusing on Letter symbols, essential ratings and characteristics, measuring methods, specifications for quality assurance and related test methods, and reliability. The primary objective of this working group is to conduct a comprehensive review of the standards that have been developed and are currently in development by IEC TC 110. Additionally, the working group will be tasked with nominating members to join the working groups of IEC TC 110.

The committee may kindly review and decide.

6.3 STANDARDS OF IEC TC 110 Electronic Displays.

6.3.1 A list of standards published by Electronic Displays along with harmonized status of standards published by LITD 04 are given in Annexure-6.

The committee may examine and identify the standards required to be adopted as National Standards

6.3.2 The ballots currently active have been listed in Annexure-7 The documents can be accessed through the Document repository on the BIS portal of designated experts.

Committee may please note.

ITEM 7: RESEARCH AND DEVELOPMENT PROJECTS FOR FORMULATION AND REVIEW OF INDIAN STANDARDS

7.1 BIS has launched the scheme of commissioning Research and Development projects for formulation and review of Indian Standards. No projects have been drafted by the committee so far.

The committee may deliberate.

ITEM 8: DATE AND PLACE FOR THE NEXT MEETING

ITEM 9: ANY OTHER BUSINESS

ANNEXURE 1

Composition and Attendance

S.No.	Organization	Member Name	Role
1.	Tata Projects Limited, Mumbai	Shri P. V. G. Menon	Chairperson
2.	Apple India Private Limited, Bengaluru	Shri Souvik Dutta	Principal Member
3.	Apple India Private Limited, Bengaluru	Shri Arvind Gupta	Alternate Member
4.	Bharat Electronics Limited, Bengaluru	Shri S. Senthil Kumar	Principal Member
5.	Directorate General Doordarshan, Prasar Bharti, New Delhi	Shri P P Bhattacharayya	Principal Member
6.	Directorate General Doordarshan, Prasar Bharti, New Delhi	Shri Abhishek Agrawal	Principal Member
7.	Directorate General Doordarshan, Prasar Bharti, New Delhi	Shri S Vadivazagan	Alternate Member
8.	Directorate General Doordarshan, Prasar Bharti, New Delhi	Shri Satyajeet Das	Alternate Member
9.	Directorate General of Quality Assurance, New Delhi	Shri Navin Tayal	Principal Member
10.	Electronic Industries Association of India, New Delhi	Shri Rajoo Goel	Principal Member
11.	Electronic Industries Association of India, New Delhi	Shri M P Dubey	Alternate Member
12.	Electronics Regional and Test Laboratory (North), New Delhi	Shri Manoj Kumar	Principal Member
13.	Epson India Private Limited, Kolkata	Shri Harish AK	Principal Member
14.	Epson India Private Limited, Kolkata	Shri Pravin Adaikkalam	Alternate Member
15.	Epson India Private Limited, Kolkata	Prof. Satyajeet Satpathy	Alternate Member
16.	Indian Institute of Technology Jodhpur, Jodhpur	Dr Ram Prakash	Principal Member
17.	Indian Institute of Technology Kanpur, Kanpur	Prof. Sudheer Kumar	Principal Member
18.	Manufacturers Association for Information Technology, New Delhi	Shri George Paul	Principal Member
19.	Manufacturers Association for Information Technology, New Delhi	Shri Rishi Kant Verma	Alternate Member
20.	Microwave Tube Research and Development Center, Bengaluru	Shri Santosh Kumar Jha	Principal Member

21.	Microwave Tube Research and Development Center, Bengaluru	Ms P. Durga Devi	Alternate Member
22.	Ministry of Defence, New Delhi	Shri P. S. Porwal	Principal Member
23.	Ministry of Defence, New Delhi	Gp. Capt. M K Pani	Alternate Member
24.	Ministry of Electronics and Information Technology, New Delhi	Mrs Asha Nangia	Principal Member
25.	Ministry of Electronics and Information Technology, New Delhi	Shri Saurabh Ranjan	Alternate Member
26.	Samsung India Electronics Private Limited, New Delhi	Shri Saurabh Nag	Principal Member
27.	Samtel Avionics Limited, Delhi	Shri Rajiv Sethi	Principal Member
28.	Samtel Avionics Limited, Delhi	Shri Punnet Kaura	Alternate Member
29.	Tata Consulting Engineers Limited, Navi Mumbai	Ms. D S Latha	Principal Member
30.	Texas Instruments (India) Private Limited, Bangalore	Shri Kartik Swaminathan	Principal Member
31.	Texas Instruments (India) Private Limited, Bangalore	Shri Amit Mittal	Alternate Member
32.	Texas Instruments (India) Private Limited, Bangalore	Shri Rajeev Khushu	Alternate Member
33.	In Personal Capacity	Dr. Harish Kumar Dwivedi	Personal Capacity

ANNEXURE 2

PROGRAM OF WORK

SI. No.	IS No.	TITLE	Degree of Equivalence
1	IS 10071: 1981	Methods of measurement for hot cathode gas - Filled tube	Modified/Technically Equivalent
2	IS 10503: 1983	Methods of measurement of colour television picture tubes	Modified/Technically Equivalent
3	IS 10961 (Part 1): 1988	Diagnostic X-ray Tube with Rotating Anode: Part 1 Type Dra 1	Indigenous
4	IS 10961 (Part 2): 1984	Diagnostic X-ray Tube with Rotating Anode: Part 2 Type Dra 2	Indigenous
5	IS 10961 (Part 3): 1984	Diagnostic X-ray Tube with Rotating Anode: Part 3 Type Dra 3	Indigenous
6	IS 10961 (Part 4): 1984	Diagnostic X-ray Tube with Rotating Anode: Part 4 Type Dra 4	Indigenous
7	IS 10961 (Part 5): 1984	Diagnostic X-ray Tube with Rotating Anode: Part 5 Type Dra 5	Indigenous
8	IS 13384 (Part 1): 1992	Cathode ray tube-based data display monitor - Specificaiton: Part 1 colour	Indigenous
9	IS 13384 (Part 2): 1997	Cathode ray tube-based data display monitor - Specificaiton: Part 2 monochrome	Indigenous
10	IS 13900: 1993	Generic specification for colour picture tube with electrostatic focussing and electromagnetic deflection for colour television receivers	Indigenous
11	IS 15934 (Part 1/Sec 1): 2021	Liquid Crystal Display Devices Part 1-1: Generic Specification	Identical under dual numbering
12	IS 15934 (Part 2): 2022	Liquid Crystal and Solid-State Display Devices Part 2 Liquid Crystal Display Modules Sectional Specification	Identical under dual numbering
13	IS 15934 (Part 3): 2022	Liquid Crystal Display Devices Part 3: Liquid Crystal Display LCD Cells Sectional Specification	Identical under dual numbering
14	IS 15934 (Part 3/Sec 1): 2021	Liquid Crystal Display Devices Part 3 Liquid Crystal Display LCD Cells Section 1 Blank Detail Specification	Identical under dual numbering

15	IS 15934 (Part 4): 2021	Liquid Crystal and Solid-State Display Devices Part 4 Liquid Crystal Display Modules and Cells Essential Ratings and Characteristics	Identical under dual numbering
16	IS 15934 (Part 4/Sec 1): 2021	Liquid Crystal Display Devices Part 4 Matrix Colour LCD Modules Section 1 Essential ratings and characteristics	Identical under dual numbering
17	IS 15934 (Part 5): 2011	Liquid crystal and solid - State display devices: Part 5 environmental, endurance and mechanical test methods	Identical under dual numbering
18	IS 15934 (Part 5/Sec 3): 2017	Liquid crystal display devices: Part 5 environmental, endurance and mechanical test methods: Sec 3 glass strength and reliability	Identical under dual numbering
19	IS 15934 (Part 6): 2014	Liquid Crystal and Solid-State Display Devices Part 6 Measuring Methods for Liquid Crystal Modules â€" Transmissive Type	Identical under dual numbering
20	IS 15934 (Part 10/Sec 1): 2016	Liquid crystal display devices: Part 10 environmental, endurance and mechanical test methods: Sec 1 mechanical	Identical under dual numbering
21	IS 16178: 2014	Display technologies LCD, PDP and OLED - Overview and explanation of differences in terminology	Identical under dual numbering
22	IS 16306 (Part 1): 2016	Organic light emitting diode (OLED) displays: Part 1 generic specifications	Indigenous
23	IS 18123: 2023	Electro technical Vocabulary: Electronic tubes	Identical under dual numbering
24	IS 1885 (Part 4/Sec 2): 1973	Electrotechnical vocabulary: Part 4 electron tubes: Sec 2 X - Ray tubes (First Revision)	Indigenous
25	IS 19019 (Part 1): 2023	Measurement of the electrical properties of microwave tubes Part 1: Terminology	Identical under dual numbering
26	IS 2032 (Part 9): 1969	Graphical symbols used in electrotechnology: Part 9 electron tubes (Other Than Microwave Tubes)	Modified/Technically Equivalent
27	IS 2032 (Part 13): 1971	Graphical symbols used in electrotechnology: Part 13 microwave tubes	Modified/Technically Equivalent
28	IS 2032 (Part 14): 1971	Graphical symbols used in electrotechnology: Part 14 microwave technology	Modified/Technically Equivalent
29	IS 2597 (Part 1): 1964	Code of practice for the use of electronic valves: Part 1 commercial rece4ing	Indigenous

		valves	
30	IS 2597 (Part 2): 1967	Code of practice for the use of electron tubes: Part 2 special quality rece4ing tubes	Indigenous
31	IS 2597 (Part 4): 1970	Code of practice for the use of electronic valves: Part 4 cathode - Ray tubes	Indigenous
32	IS 4147: 1981	Methods of measurements for electron tubes - Rece4ing and transmitting tubes (First Revision)	Indigenous
33	IS 4579: 1968	Methods of measurements on television picture tubes	Indigenous
34	IS 4697: 1968	Methods of measurements on geiger - Muller counter tubes	Indigenous
35	IS 5323: 1969	Letter Symbols and Abbreviations for Electron Tubes	Indigenous
36	IS 5627: 1987	Methods of measurement of radar and oscilloscope cathode - Ray tubes (First Revision)	Modified/Technically Equivalent
37	IS 5840 (Part 1): 1970	Dimensions of cathode - Ray tubes: Part 1 tube outlines	Indigenous
38	IS 5840 (Part 2): 1970	Dimensions of cathode - Ray tubes: Part 2 bases	Indigenous
39	IS 5840 (Part 3): 1970	Dimensions of cathode - Ray tubes: Part 3 EHT terminals	Indigenous
40	IS/IEC 60139: 2000	Preparation of outline drawings for cathode - Ray tubes, their components, connections and gauges	Identical under single numbering
41	IS 6134 (Part 1): 1978	Methods of measurements of electrical characteristics of microwave tubes: Part 1 common to all microwave tubes (First Revision)	Modified/Technically Equivalent
42	IS 6134 (Part 2): 1973	Methods of measurements on microwave tubes: Part 2 oscillator tubes	Modified/Technically Equivalent
43	IS 6134 (Part 3): 1973	Methods of measurements on microwave tubes: Part 3 amplifier tubes	Modified/Technically Equivalent
44	IS 6134 (Part 4): 1977	Methods of measurement of electrical characteristics of microwave tubes: Part 4 magnetrons	Modified/Technically Equivalent
45	IS 6134 (Part 5): 1980	Methods of measurement on microwave tubes: Part 5 parasitic noise	Modified/Technically Equivalent

46	IS 6134 (Part 6): 1981	Methods of measurement of electrical characteristics of microwave tubes: Part 6 low - Power oscillator klystrons	Modified/Technically Equivalent
47	IS 6134 (Part 7): 1981	Methods of measurement of electrical characteristics of microwave tubes: Part 7 high - Power klystrons	Modified/Technically Equivalent
48	IS 6134 (Part 8): 1981	Methods of measurement of electrical characteristics of microwave tubes: Part 8 gas - Filled microwave switching devices	Modified/Technically Equivalent
49	IS 6134 (Part 9): 1981	Methods of measurement of electrical characteristics of microwave tubes: Part 9 Backward-wave oscillator tube '0' type	Modified/Technically Equivalent
50	IS 6134 (Part 10): 1981	Methods of measurement of electrical characteristics of microwave tubes: Part 10 crossed - Field amplifier tubes	Modified/Technically Equivalent
51	IS 6136: 2023	Basic Requirements for Cathode Ray Tubes (First Revision)	Indigenous
52	IS/IEC 61965: 2003	Mechanical safety of cathode ray tubes	Identical under single numbering
53	IS 6214: 1971	Specification for phosphors for cathode ray tubes	Indigenous
54	IS/IEC 62341-1-2: 2014	Organic Light Emitting Diode OLED displays- Part 1-2: Terminology and letter symbols	Identical under dual numbering
55	IS/IEC 62341-2-1: 2015	Organic Light Emitting Diode OLED displays- Part 2-1: Essential ratings and characteristics of OLED display modules	Identical under dual numbering
56	IS/IEC 62341-5: 2009	Organic Light Emitting Diode OLED displays- Part 5: Environmental testing methods	Identical under dual numbering
57	IS/IEC 62341-5-2: 2019	Organic light emitting diode OLED displays Part 5-2: Mechanical endurance test methods	Identical under single numbering
58	IS/IEC 62341-5-3: 2019	Organic light emitting diode OLED displays Part 5-3: Measuring methods of image sticking and lifetime	Identical under single numbering
59	IS/IEC 62341-6-1: 2017	Organic light emitting diode OLED displays Part 6-1: Measuring methods of optical and electro-optical parameters	Identical under single numbering
60	IS/IEC 62341-6-2: 2015	Organic Light Emitting Diode OLED displays Part 6-2: Measuring methods of visual quality and ambient performance	Identical under dual numbering

61	IS/IEC 62341-6-3: 2017	Organic light emitting diode OLED displays Part 6-3: Measuring methods of image quality	Identical under single numbering
62	IS/IEC 62341-6-4: 2017	Organic light emitting diode OLED displays - Part 6-4: Measuring methods of transparent properties	Identical under dual numbering
63	IS 6757: 1972	Dimensions for high tension cable terminations for X - Ray tubes	Indigenous
64	IS 7144: 1973	Methods of measurements on camera tubes	Modified/Technically Equivalent
65	IS 7146 (Part 1): 1973	Methods of measurements on photosensitive devices: Part 1 basic considerations	Modified/Technically Equivalent
66	IS 7146 (Part 2): 1974	Methods of measurements on photosensitive devices: Part 2 phototubes	Modified/Technically Equivalent
67	IS 7146 (Part 3): 1974	Methods of measurements on photosensitive devices: Part 3 photo-conductive cells for use in the visible spectrum	Modified/Technically Equivalent
68	IS 7146 (Part 4): 1974	Methods of measurements on photosensitive devices: Part 4 photomultipliers	Modified/Technically Equivalent
69	IS 8441: 1977	Methods of measurements on incidental X - Radiation from electron tubes	Indigenous
70	IS 9883: 1981	Photometric and colorimetric methods of measurement of the light emitted by a cathode-ray tube screen	Modified/Technically Equivalent

ANNEXURE 3

Standards Due for Review

Sl. No.	IS No.	Title
1.	IS 15934 (Part 1/Sec 1): 2021	Liquid Crystal Display Devices Part 1-1: Generic Specification
2.	IS 15934 (Part 2): 2022	Liquid Crystal and Solid-State Display Devices Part 2 Liquid Crystal Display Modules Sectional Specification
3.	IS 15934 (Part 3): 2022	Liquid Crystal Display Devices Part 3: Liquid Crystal Display LCD Cells Sectional Specification

4.	IS 15934 (Part 5): 2011	Liquid crystal and solid - State display devices: Part 5 environmental, endurance and mechanical test methods
5.	IS 1885 (Part 4/Sec 2): 1973	Electrotechnical vocabulary: Part 4 electron tubes: Sec 2 X - Ray tubes (First Revision)
6.	IS 2597 (Part 1): 1964	Code of practice for the use of electronic valves: Part 1 commercial rece4ing valves
7.	IS 2597 (Part 2): 1967	Code of practice for the use of electron tubes: Part 2 special quality rece4ing tubes
8.	IS 2597 (Part 4): 1970	Code of practice for the use of electronic valves: Part 4 cathode - Ray tubes
9.	IS 4147: 1981	Methods of measurements for electron tubes - Rece4ing and transmitting tubes (First Revision)
10.	IS 5840 (Part 1): 1970	Dimensions of cathode - Ray tubes: Part 1 tube outlines
11.	IS 5840 (Part 2): 1970	Dimensions of cathode - Ray tubes: Part 2 bases
12.	IS 5840 (Part 3): 1970	Dimensions of cathode - Ray tubes: Part 3 EHT terminals
13.	IS/IEC 60139: 2000	Preparation of outline drawings for cathode - Ray tubes, their components, connections and gauges

ANNEXURE 4

DOCUMENTS UNDER DEVELOPMENT

SL. No	Document Number	Document Title	Doc Type	Document Stage
1	LITD/04/26535	Identical to IEC 60139: 2000 Preparation of outline drawings for cathode-ray tubes their components connections and gauges	New	P-Draft
2	LITD/04/21787	Identical To: IEC 60235-2:1972 Measurement of the electrical properties of microwave tubes Part 11: General measurements	New	WC-Draft
3	LITD/04/21788	Measurement of the Electrical Properties of Microwave Tubes Part 4: Magnetrons (First Revision)	Revision	WC-Draft
4	LITD/04/21789	Measurement of the electrical properties of microwave tubes Part 6: Low-power oscillator klystrons (First Revision)	Revision	WC-Draft
5	LITD/04/21790	Measurement of the electrical properties of microwave tubes Part 7: High-power klystrons (First Revision)	Revision	WC-Draft
6	LITD/04/21792	Measurement of the Electrical Properties of Microwave Tubes Part 8: Gas-Filled Microwave Switching Devices (First Revision)	Revision	WC-Draft
7	LITD/04/21794	Measurement of the Electrical Properties of Microwave Tubes Part 9: Backward-Wave Oscillator Tubes - '0' Type (First Revision)	Revision	WC-Draft
8	LITD/04/21795	Measurement of the Electrical Properties of Microwave Tubes Part 10: Crossed-Field Amplifier Tubes (First Revision)	Revision	WC-Draft
9	LITD/04/26255	Methods of Measurement for Hot Cathode Gas - Filled Tube (First Revision)	Revision	WC-Draft
10	LITD/04/26259	Methods of Measurement of Colour Television Picture Tubes (First Revision)	Revision	WC-Draft
11	LITD/04/26260	Methods of Measurement on Camera Tubes (First Revision)	Revision	WC-Draft
12	LITD/04/26261	Photometric and Colorimetric Methods of Measurement of the Light Emitted by a Cathode-Ray Tube Screen (First Revision)	Revision	WC-Draft
13	LITD/04/26262	Measurement of Photosensitive Devices Part 1: Basic Recommendations (First Revision)	Revision	WC-Draft
14	LITD/04/26263	Measurement of Photosensitive Devices Part 2: Methods of Measurement of	Revision	WC-Draft

		Phototubes (First Revision)		
15	LITD/04/26264	Measurement of Photosensitive Devices Part 3: Methods of Measurement of Photoconductive Cells for use in the Visible Spectrum (First Revision)	Revision	WC-Draft
16	LITD/04/26265	Measurement of Photosensitive Devices Part 4: Methods of Measurement for Photo-Multipliers (First Revision)	Revision	WC-Draft
17	LITD/04/26289	Organic Light Emitting Diode OLED Displays - Part 6-1: Measuring Methods of Optical and Electro-Optical Parameters (First Revision)	Revision	WC-Draft
18	LITD/04/26605	Identical To: IEC 61747-30-1:2012 Liquid Crystal Display Devices Part 30: Measuring Methods for Liquid Crystal Display Modules Section 1: Transmissive Type	New	WC-Draft
19	**LITD/04/26619**	**Specification for Diagnostic X-Ray Tube with Rotating Anode Part 2: Type DRA 2 (First Revision)**	**Revision**	**WC-Draft**
20	**LITD/04/26623**	**Specification for Diagnostic X-Ray Tube with Rotating Anode Part 3: Type DRA-3 (First Revision)**	**Revision**	**WC-Draft**
21	**LITD/04/26633**	**Specification for Diagnostic X-Ray Tube with Rotating Anode Part 4: Type DRA 4 (First Revision)**	**Revision**	**WC-Draft**
22	**LITD/04/26634**	**Specification for Diagnostic X-Ray Tube with Rotating Anode Part 5: Type DRA 5 (First Revision)**	**Revision**	**WC-Draft**
23	**LITD/04/26745**	**Generic Specification for Colour Picture Tube with Electrostatic Focussing and Electromagnetic Deflection for Colour Television Receivers (First Revision)**	**Revision**	**WC-Draft**

ANNEXURE 5

Presently following experts are nominated in the following working groups.

SL.NO.	WORKING GROUPS	EXPERT NOMINATED
1.	IEC TC 110/WG 8 - Flexible display devices (FDD)	Shri Sudhir Kumar
2.	IEC TC 110/WG 10 - Laser Displays	Shri Pravin Kumar Adaikkalam Shri Harish Anant Kalyan Shri Karthik Swaminathan Shri Amit Mittal
3.	IEC TC 110/WG 12 - Eyewear Display	Shri H.K. Dwivedi Shri Karthik Swaminathan Shri Amit Mittal

4.	IEC TC 110/WG 13 - Optical measurements of electronic displays (OPT)	Shri Harish Anant Kalyan Shri Karthik Swaminathan Shri Amit Mittal Shri Pravin Kumar Adaikkalam
5.	IEC TC 110/WG 18 - Organic light emitting diode displays (OLED)	Shri Sudhir Kumar

ANNEXURE 6

List of Published Standards by IEC TC 110 Electronic Displays

Sl.No.	Reference	Title
1	IEC 60067:1966	Dimensions of electronic tubes and valves
2	IEC 60100:1962	Methods for the measurement of direct interelectrode capacitances of electronic tubes and valves
3	IEC 60100:1962/AMD1:1969	Amendment 1 - Methods for the measurement of direct interelectrode capacitances of electronic tubes and valves
4	**IEC 60134:1961**	**Rating systems for electronic tubes and valves and analogous semiconductor devices**
5	IEC 60135:1961	Numbering of electrodes and designation of units in electronic tubes and valves
6	**IEC 60139:2000**	**Preparation of outline drawings for cathode-ray tubes, their components, connections and gauges**
7	IEC 60151-0:1966	Measurements of the electrical properties of electronic tubes and valves - Part 0: Precautions relating to methods of measurement of electronic tubes and valves
8	IEC 60151-1:1963	Measurements of the electrical properties of electronic tubes and valves - Part 1: Measurement of electrode current
9	IEC 60151-2:1963	Measurements of the electrical properties of electronic tubes and valves - Part 2: Measurement of heater or filament current
10	IEC 60151-3:1963	Measurements of the electrical properties of electronic tubes and valves - Part 3: Measurement of equivalent input and output admittances
11	IEC 60151-4:1963	Measurements of the electrical properties of electronic tubes and valves - Part 4: Methods of measuring noise factor
12	IEC 60151-5:1964	Measurements of the electrical properties of electronic tubes and valves - Part 5: Methods of measuring hiss and hum
13	IEC 60151-6:1965	Measurements of the electrical properties of electronic tubes and valves. Part 6: Methods of application of mechanical shock (impulse) excitation to electronic tubes

		and valves
14	IEC 60151-7:1964	Measurements of the electrical properties of electronic tubes and valves. Part 7: Measurement of equivalent noise resistance
15	IEC 60151-8:1966	Measurements of the electrical properties of electronic tubes and valves - Part 8: Measurement of cathode heating time and heater warm-up time
16	IEC 60151-8:1966/COR1:1967	Corrigendum 1 - Measurements of the electrical properties of electronic tubes and valves. Part 8: Measurement of cathode heating time and heater warm-up time
17	IEC 60151-9:1966	Measurements of the electrical properties of electronic tubes and valves. Part 9: Methods of measuring the cathode-interface impedance
18	IEC 60151-10:1966	Measurements of the electrical properties of electronic tubes and valves. Part 10: Methods of measurement of audio-frequency output power and distortion
19	IEC 60151-11:1966	Measurements of the electrical properties of electronic tubes and valves - Part 11: Methods of measurement of radio-frequency output power
20	IEC 60151-12:1966	Measurements of the electrical properties of electronic tubes and valves - Part 12: Methods of measuring electrode resistance, transconductance, amplification factor, conversion resistance and conversion transconductance
21	IEC 60151-13:1966	Measurements of the electrical properties of electronic tubes and valves - Part 13: Methods of measurement of emission current from hot cathodes for high-vacuum electronic tubes and valves
22	**IEC 60151-14:1975**	**Measurements of the electrical properties of electronic tubes and valves. Part 14: Methods of measurement of radar and oscilloscope cathode-ray tubes**
23	IEC 60151-15:1967	Measurements of the electrical properties of electronic tubes and valves. Part 15: Methods of measurement of spurious and unwanted electrode currents
24	IEC 60151-16:1968	Measurements of the electrical properties of electronic tubes and valves - Part 16: Methods of measurement for television picture tubes
25	**IEC 60151-17:1969**	**Measurements of the electrical properties of electronic tubes and valves. Part 17: Methods of measurement of gas-filled tubes and valves**

26	IEC 60151-18:1968	Measurements of the electrical properties of electronic tubes and valves. Part 18: Methods of measurement of noises due to mechanical or acoustic excitations
27	IEC 60151-19:1969	Measurements of the electrical properties of electronic tubes and valves - Part 19: Methods of measurement on corona stabilizers
28	IEC 60151-20:1969	Measurements of the electrical properties of electronic tubes and valves. Part 20: Methods of measurement of thyratron pulse modulators
29	IEC 60151-21:1969	Measurements of the electrical properties of electronic tubes and valves - Part 21: Methods of measurement of cross-modulation in electronic tubes and valves
30	IEC 60151-22:1970	Measurements of the electrical properties of electronic tubes and valves. Part 22: Methods of measurement for cold cathode counting and indicator tubes
31	IEC 60151-23:1970	Measurements of the electrical properties of electronic tubes and valves. Part 23: Methods of measurement of vacuum pulse modulator tubes and valves
32	IEC 60151-24:1971	Measurements of the electrical properties of electronic tubes and valves - Part 24: Methods of measurement of cathode-ray charge-storage tubes
33	**IEC 60151-25:1971**	**Measurements of the electrical properties of electronic tubes - Part 25: Methods of measurement of Geiger-Müller counter tubes**
34	IEC 60151-26:1971	Measurements of the electrical properties of electronic tubes and valves. Part 26: Methods of measurement for camera tubes
35	IEC 60151-27:1974	Measurements of the electrical properties of electronic tubes and valves. Part 27: Methods of measurement for inter modulation products in transmitting tubes
36	**IEC 60151-28:1978**	**Measurements of the electrical properties of electronic tubes - Part 28: Methods of measurement of colour television picture tubes**
37	**IEC 60235-1:1972**	**Measurement of the electrical properties of microwave tubes. Part 1: Terminology**
38	**IEC 60235-2:1972**	**Measurement of the electrical properties of microwave tubes - Part 2: General measurements**
39	IEC 60235-3:1972	Measurement of the electrical properties of microwave tubes. Part 3: Disk seal tubes
40	IEC 60235-4:1972	Measurement of the electrical properties of microwave tubes. Part 4: Magnetrons
41	IEC 60235-5:1972	Measurement of the electrical properties of microwave tubes. Part 5: Low-power oscillator klystrons

42	IEC 60235-6:1972	Measurement of the electrical properties of microwave tubes. Part 6: High-power klystrons
43	IEC 60235-7:1972	Measurement of the electrical properties of microwave tubes. Part 7: Gas-filled microwave switching devices
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57	IEC 60306-3:1970	Measurement of photosensitive devices. Part 3: Methods of measurement of photoconductive cells for use in the visible spectrum
58	IEC 60306-4:1971	Measurement of photosensitive devices. Part 4: Methods of measurement for photo-multipliers
59	**IEC 60441:1974**	**Photometric and colorimetric methods of measurement of the light emitted by a cathode-ray tube screen**

60	IEC 60562:1976	Measurements of incidental ionizing radiation from electronic tubes
61	**IEC 61747-1-1:2014**	**Liquid crystal display devices - Part 1-1: Generic - Generic specification**
62	IEC 61747-1-2:2014	Liquid crystal display devices - Part 1-2: Generic - Terminology and letter symbols
63	**IEC 61747-2:2015**	**Liquid crystal display devices - Part 2: Liquid crystal display modules - Sectional specification**
64	IEC 61747-2-1:2013	Liquid crystal display devices - Part 2-1: Passive matrix monochrome LCD modules - Blank detail specification
65	IEC 61747-2-2:2014	Liquid crystal display devices - Part 2-2: Matrix colour LCD modules - Blank detail specification
66	**IEC 61747-3:2015**	**Liquid crystal display devices - Part 3: Liquid crystal display (LCD) cells - Sectional specification**
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68	**IEC 61747-4:2012**	**Liquid crystal display devices - Part 4: Liquid crystal display modules and cells - Essential ratings and characteristics**
69	**IEC 61747-4-1:2014**	**Liquid crystal display devices - Part 4-1: Matrix colour LCD modules - Essential ratings and characteristics**
70	**IEC 61747-5-3:2009**	**Liquid crystal display devices - Part 5-3: Environmental, endurance and mechanical test methods - Glass strength and reliability**
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72	IEC 61747-6-2:2011	Liquid crystal display devices - Part 6-2: Measuring methods for liquid crystal display modules - Reflective type
73	IEC 61747-6-2:2011/COR1:2012	Corrigendum 1 - Liquid crystal display devices - Part 6-2: Measuring methods for liquid crystal display modules - Reflective type
74	**IEC 61747-10-1:2013**	**Liquid crystal display devices - Part 10-1: Environmental, endurance and mechanical test methods - Mechanical**
75	IEC 61747-10-2:2014	Liquid crystal display devices - Part 10-2: Environmental, endurance and mechanical test methods - Environmental and endurance
76	IEC 61747-20-1:2015	Liquid crystal display devices - Part 20-1: Visual inspection - Monochrome liquid crystal display cells (excluding all active-matrix liquid crystal display cells)

77	IEC 61747-20-2:2015	Liquid crystal display devices - Part 20-2: Visual inspection - Monochrome matrix liquid crystal display modules (excluding all active-matrix liquid crystal display modules)
78	IEC 61747-20-3:2016	Liquid crystal display devices - Part 20-3: Visual inspection - Active matrix colour liquid crystal display modules
79	IEC 61747-30-1:2012	Liquid crystal display devices - Part 30-1: Measuring methods for liquid crystal display modules - Transmissive type
80	IEC 61747-30-3:2019	Liquid crystal display devices - Part 30-3: Measuring methods for liquid crystal display modules - Motion artefact measurement of active-matrix liquid crystal display modules
81	IEC 61747-30-4:2016	Liquid crystal display devices - Part 30-4: Measuring methods for liquid crystal display modules - Dynamic backlight units
82	IEC 61747-30-5:2019	Liquid crystal display devices - Part 30-5: Optical measuring methods of transmissive transparent LCD modules
83	IEC 61747-40-1:2019	Liquid crystal display devices - Part 40-1: Mechanical testing of display cover glass for mobile devices - Guidelines
84	IEC 61747-40-1:2019 RLV	Liquid crystal display devices - Part 40-1: Mechanical testing of display cover glass for mobile devices - Guidelines
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86	IEC 61747-40-3:2015	Liquid crystal display devices - Part 40-3: Mechanical testing of display cover glass for mobile devices - Biaxial flexural energy to failure (ball drop)
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92	IEC 61988-2-1:2012	Plasma display panels - Part 2-1: Measuring methods - Optical and optoelectrical
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94	IEC 61988-2-4:2011	Plasma display panels - Part 2-4: Measuring methods - Visual quality: Image artifacts
95	IEC 61988-2-5:2012	Plasma display panels - Part 2-5: Measuring methods - Acoustic noise
96	IEC 61988-2-6:2015	Plasma display panels - Part 2-6: Measuring methods - APL dependent gamma and colour characteristics
97	IEC 61988-3-1:2005	Plasma display panels - Part 3-1: Mechanical interface
98	IEC 61988-3-2:2009	Plasma display panels - Part 3-2: Interface - Electrical interface
99	IEC 61988-4-1:2015	Plasma display panels - Part 4-1: Environmental testing methods - Climatic and mechanical
100	IEC 61988-4-2:2012	Plasma display panels - Part 4-2: Environmental testing methods - Panel strength
101	IEC 61988-5:2009	Plasma display panels - Part 5: Generic specification
102	**IEC 62341-1-1:2009**	**Organic light emitting diode (OLED) displays - Part 1-1: Generic specifications**
103	IEC 62341-1-2:2014	Organic light emitting diode (OLED) displays - Part 1-2: Terminology and letter symbols
104	IEC 62341-2-1:2015	Organic light emitting diode (OLED) displays - Part 2-1: Essential ratings and characteristics of OLED display modules
105	IEC 62341-5:2009	Organic light emitting diode (OLED) displays - Part 5: Environmental testing methods
106	IEC 62341-5-2:2019 RLV	Organic light emitting diode (OLED) displays - Part 5-2: Mechanical endurance test methods
107	**IEC 62341-5-2:2019**	**Organic light emitting diode (OLED) displays - Part 5-2: Mechanical endurance test methods**
108	IEC 62341-5-3:2019 RLV	Organic light emitting diode (OLED) displays - Part 5-3: Measuring methods of image sticking and lifetime
109	**IEC 62341-5-3:2019**	**Organic light emitting diode (OLED) displays - Part 5-3: Measuring methods of image sticking and lifetime**
110	IEC 62341-6-1:2022 RLV	Organic light emitting diode (OLED) displays - Part 6-1: Measuring methods of optical and electro-optical parameters
111	**IEC 62341-6-1:2022**	**Organic light emitting diode (OLED) displays - Part 6-1: Measuring methods of optical and electro-optical parameters**
112	**IEC 62341-6-2:2015**	**Organic light emitting diode (OLED) displays - Part 6-2: Measuring methods of visual quality and ambient performance**

113	**IEC 62341-6-3:2017**	**Organic light emitting diode (OLED) displays - Part 6-3: Measuring methods of image quality**
114	IEC 62341-6-3:2017/COR1:2019	Corrigendum 1 - Organic light emitting diode (OLED) displays - Part 6-3: Measuring methods of image quality
115	**IEC 62341-6-4:2017**	**Organic light emitting diode (OLED) displays - Part 6-4: Measuring methods of transparent properties**
116	IEC TS 62341-6-5:2019	Organic light emitting diode (OLED) displays - Part 6-5: Measuring methods of dynamic range properties
117	IEC 62595-1-1:2013	LCD backlight unit - Part 1-1: Generic specification
118	IEC 62595-1-2:2016	Display lighting unit - Part 1-2: Terminology and letter symbols
119	IEC TR 62595-1-3:2019	Display lighting unit - Part 1-3: Lighting units with arbitrary shapes
120	IEC TR 62595-1-4:2020	Display lighting unit - Part 1-4: Glass light guide plate
121	IEC TR 62595-1-5:2022	Display lighting unit - Part 1-5: Electrical signal interface of LED BLU
122	IEC 62595-2-1:2016	Display lighting unit - Part 2-1: Electro-optical measuring methods of LED backlight unit
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125	IEC 62595-2-4:2020	Display lighting unit - Part 2-4: Electro-optical measuring methods of laser module
126	IEC 62595-2-5:2021	Display lighting unit - Part 2-5: Measurement method for optical quantities of non-planar light sources
127	IEC 62629-1-2:2021	3D display devices - Part 1-2: Generic - Terminology and letter symbols
128	IEC 62629-1-2:2021 RLV	3D display devices - Part 1-2: Generic - Terminology and letter symbols
129	IEC 62629-12-1:2014	3D Display devices - Part 12-1: Measuring methods for stereoscopic displays using glasses - Optical
130	IEC 62629-12-2:2019	3D display devices - Part 12-2: Measuring methods for stereoscopic displays using glasses - Motion blur
131	IEC 62629-13-1:2017	3D Display devices - Part 13-1: Visual inspection methods for stereoscopic displays using glasses - Ghost image
132	IEC 62629-22-1:2016	3D display devices - Part 22-1: Measuring methods for autostereoscopic displays - Optical
133	IEC TR 62629-41-1:2019	3D Display devices - Part 41-1: Generic introduction of holographic display
134	IEC TR 62629-51-1:2020	3D display devices - Part 51-1: Generic introduction of aerial display

135	IEC 62629-52-1:2024	3D displays - Part 52-1: Fundamental measurement methods of aerial display - Optical
136	IEC 62629-62-11:2022	3D display devices - Part 62-11: Measurement methods for virtual-image type - Optical
137	IEC 62679-1-1:2014	Electronic paper displays - Part 1-1: Terminology
138	IEC 62679-2:2018	Electronic paper display - Part 2: Essential ratings and characteristics
139	IEC 62679-3-1:2014	Electronic paper displays - Part 3-1: Optical measuring methods
140	IEC 62679-3-2:2013	Electronic paper display - Part 3-2: Measuring method - Electro-optical
141	IEC 62679-3-3:2016	Electronic paper displays - Part 3-3: Optical measuring methods for displays with integrated lighting units
142	IEC 62679-4-2:2016	Electronic paper displays - Part 4-2: Environmental test methods
143	IEC TR 62679-5-1:2017	Electronic paper displays - Part 5-1: Legibility of EPD in spatial frequency
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146	IEC 62715-5-1:2017	Flexible display devices - Part 5-1: Measuring methods of optical performance
147	IEC TS 62715-5-2:2016	Flexible display devices - Part 5-2: Measuring methods of optical characteristics from the vantage point for curved displays
148	IEC 62715-5-3:2017	Flexible display devices - Part 5-3: Visual assessment of image quality and defects
149	IEC TS 62715-5-4:2019	Flexible display devices - Part 5-4: Measuring method of blur in flexible transparent displays
150	IEC TR 62715-5-61:2024	Flexible displays - Part 5-61: Overview of measurement and application scenarios of stretchable displays
151	IEC 62715-6-1:2018	Flexible display devices - Part 6-1: Mechanical test methods - Deformation tests
152	IEC 62715-6-1:2018 RLV	Flexible display devices - Part 6-1: Mechanical test methods - Deformation tests
153	IEC 62715-6-2:2017	Flexible display devices - Part 6-2: Environmental testing methods
154	IEC 62715-6-3:2020	Flexible display devices - Part 6-3: Mechanical test methods - Impact and hardness tests
155	IEC TR 62715-6-21:2022	Flexible display devices - Part 6-21: Mechanical test methods - Foldable durability test for foldable display set

156	IEC 62715-6-22:2023	Flexible display devices - Part 6-22: Crease and waviness measurement methods
157	**IEC TR 62728:2011**	**Display technologies - LCD, PDP and OLED - Overview and explanation of differences in terminology**
158	IEC 62906-1-2:2015	Laser display devices - Part 1-2: Vocabulary and letter symbols
159	IEC 62906-5-1:2021	Laser displays - Part 5-1: Measurement of optical performance for laser front projection
160	IEC 62906-5-2:2016	Laser display devices - Part 5-2: Optical measuring methods of speckle contrast
161	IEC 62906-5-3:2021	Laser display devices - Part 5-3: Measuring methods of image quality for laser projection displays
162	IEC 62906-5-4:2018	Laser display devices - Part 5-4: Optical measuring methods of colour speckle
163	IEC 62906-5-4:2018/COR1:2022	Corrigendum 1 - Laser display devices - Part 5-4: Optical measuring methods of colour speckle
164	IEC 62906-5-5:2022	Laser displays – Part 5-5: Optical measuring methods of raster-scanning retina direct projection laser displays
165	IEC 62906-5-6:2020	Laser displays - Part 5-6: Measuring methods for optical performance of projection screens
166	IEC 62906-5-7:2022	Laser displays - Part 5-7: Measuring methods of image quality affected by speckle for scanning laser displays
167	IEC 62908-1-2:2017	Touch and interactive displays - Part 1-2: Generic - Terminology and letter symbols
168	IEC TR 62908-1-3:2021	Touch and interactive displays - Part 1-3: General introduction of pen touch technology
169	IEC 62908-12-10:2023	Touch and interactive displays - Part 12-10: Measurement methods of touch displays - Touch and electrical performance
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171	IEC 62908-12-20:2019	Touch and interactive displays - Part 12-20: Measuring methods of touch displays - multi-touch performance
172	IEC 62908-13-10:2016	Touch and interactive displays - Part 13-10: Reliability test methods of touch displays - Environmental durability test methods
173	IEC TR 62977-1-31:2021+AMD1:2022 CSV	Electronic displays - Part 1-31: Generic - Practical information on the use of light measuring devices
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		devices
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177	IEC 62977-2-2:2020	Electronic displays - Part 2-2: Measurements of optical characteristics - Ambient performance
178	IEC TR 62977-2-3:2017	Electronic display devices - Part 2-3: Measurements of optical properties - multi-colour test patterns
179	IEC TR 62977-2-4:2018	Electronic displays - Part 2-4: Transparent displays - Overview of application scenarios
180	IEC TR 62977-2-5:2018	Electronic displays devices - Part 2-5: Transparent displays - Measurements of optical characteristics
181	IEC 62977-2-7:2024	Electronic displays - Part 2-7: Measurements of optical characteristics - Tiled displays
182	IEC 62977-2-11:2023	Electronic displays - Part 2-11: Measurement of optical characteristics - Local luminance and uniformity
183	IEC TS 62977-3-1:2019	Electronic displays - Part 3-1: Evaluation of optical performances - Colour difference-based viewing direction dependence
184	IEC 62977-3-4:2023	Electronic displays - Part 3-4: Evaluation of optical performances - High dynamic range displays
185	IEC 62977-3-5:2023	Electronic displays - Part 3-5: Evaluation of optical performance - Colour capabilities
186	IEC 62977-3-7:2022	Electronic displays - Part 3-7: Evaluation of optical performance - Tone characteristics
187	IEC 62977-3-9:2023	Electronic displays - Part 3-9: Evaluation of optical performance - Display sparkle contrast
188	IEC TR 62977-5-2:2021	Electronic displays - Part 5-2: Visual assessment - Colour discrimination according to viewing direction
189	IEC TR 63145-1-1:2018	Eyewear display - Part 1-1: Generic introduction
190	IEC 63145-1-2:2022	Eyewear display - Part 1-2: Generic - Terminology
191	IEC 63145-10:2023	Eyewear display - Part 10: Specifications
192	IEC 63145-20-10:2019	Eyewear display - Part 20-10: Fundamental measurement methods - Optical properties
193	IEC 63145-20-20:2019	Eyewear display - Part 20-20: Fundamental measurement methods - Image quality
194	IEC 63145-21-20:2022	Eyewear display - Part 21-20: Specific measurement methods for VR image quality - Screen door effect
195	IEC 63145-22-10:2020	Eyewear display - Part 22-10: Specific measurement methods for AR type - Optical properties
196	IEC 63145-22-20:2024	Eyewear display - Part 22-20: Specific measurement methods for AR type - Image quality

197	IEC 63145-22-20:2024/COR1:2024	Corrigendum 1 - Eyewear display - Part 22-20: Specific measurement methods for AR type - Image quality
198	IEC TR 63211-2-12:2020	Durability test methods for electronic displays - Part 2-12: Environmental tests - Environmental conditions of use, storage and transportation of electronic displays
199	IEC 63211-3-5:2020	Durability test methods for electronic displays - Part 3-5: Mechanical tests - Surface durability
200	IEC 60067A:1967	First supplement - Dimensions of electronic tubes and valves
201	IEC 60067B:1969	Second supplement - Dimensions of electronic tubes and valves
202	IEC 60067C:1970	Third supplement - Dimensions of electronic tubes and valves
203	IEC 60067D:1977	Fourth supplement - Dimensions of electronic tubes and valves
204	IEC 60067E:1986	Supplement E - Dimensions of electronic tubes and valves

- **Published as Indian Standard**

ANNEXURE 7

Active IEC/TC 110 BALLOTS

Reference	Type	Circulation Date	Closing Date
110/1709/DTRIEC TR 63340-1 ED1: Electronic displays for special applications - Part 1: General	DTR	2024-10-04	2024-11-29
110/1711/NPPNW 110-1711 ED1: Eyewear display - Part 40-10: Specific measurements of eyewear displays with ambient light sensors	NP	2024-10-18	2024-12-13
110/1690/CDVIEC 62341-6-1 ED4: Organic light emitting diode (OLED) displays - Part 6-1: Measuring	CDV	2024-11-01	2025-01-24