



BSI Standards Publication

Electronic displays

Part 2-4: Transparent displays - Overview of application scenarios

National foreword

This Published Document is the UK implementation of IEC TR 62977-2-4:2018.

The UK participation in its preparation was entrusted to Technical Committee EPL/47, Semiconductors.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2018
Published by BSI Standards Limited 2018

ISBN 978 0 580 98044 2

ICS 31.260; 31.120

Compliance with a British Standard cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 30 November 2018.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------



IEC TR 62977-2-4

Edition 1.0 2018-11

TECHNICAL REPORT



**Electronic displays –
Part 2-4: Transparent displays – Overview of application scenarios**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 31.120; 31.260

ISBN 978-2-8322-6244-3

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD..... 4

1 Scope..... 6

2 Normative references 6

3 Terms, definitions and abbreviated terms 6

 3.1 Terms and definitions..... 6

 3.2 Abbreviated terms..... 7

4 Application scenarios..... 7

 4.1 General..... 7

 4.2 Performance aspects 7

 4.3 Application cases..... 8

 4.4 Intended visual information and unwanted contributions from ambient light..... 9

 4.4.1 General 9

 4.4.2 Visual information on screen..... 9

 4.4.3 Visual information behind the screen 10

 4.4.4 Intended and disturbing components of light (case 1) 10

 4.4.5 Transmissive transparent display (case 2)..... 11

 4.4.6 Emissive transparent display (case 3)..... 12

5 Component specifications – For measurement..... 13

 5.1 Spectral radiance..... 13

 5.2 Object/scene..... 14

 5.3 Display 14

 5.4 Emissive transparent display..... 14

 5.5 Transmissive transparent display..... 15

 5.6 Precautions during the measurements..... 15

Bibliography..... 19

Figure 1 – Two objects (i.e. a scenery) located behind and seen through a transparent display..... 11

Figure 2 – On-screen contrast generated by electrically controlled transmittance, T_H and T_L 11

Figure 3 – Luminance image of a detail of Figure 1..... 12

Figure 4 – Two objects (i.e. a scenery) located behind and seen through a transparent emissive display (emission shown in green for illustration)..... 12

Figure 5 – Example of light which is supposed to be transmitted independently of the state of the emission, by a transmittance T_e 13

Figure 6 – Details of Figure 4..... 13

Figure 7 – Emissive and transmissive display screen between the observer and the object/scene 14

Figure 8 – Illustration of the effect of diffraction (left) and scattering (right)..... 16

Figure 9 – Transparent display's scheme for OLED and LCD without background ambient illumination..... 17

Figure 10 – Transparent display's on-screen performance affected by ambient illuminance 17

Table 1 – Application cases	9
Table 2 – Illustration and explanation of intended and disturbing light components in the case of transparent display screens (TDS).....	10

Currently in preview, click buy full version

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRONIC DISPLAYS –**Part 2-4: Transparent displays –
Overview of application scenarios**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, accept IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

The main task of IEC technical committees is to prepare International Standards. However, a technical committee may propose the publication of a technical report when it has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

IEC TR 62977-2-4, which is a Technical Report, has been prepared by IEC technical committee 110: Electronic display devices.

The text of this Technical Report is based on the following documents:

Enquiry draft	Report on voting
110/972/DTR	110/988A/RVDTR

Full information on the voting for the approval of this technical report can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62977 series, published under the general title *Electronic displays*, can be found on the IEC website.

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

ELECTRONIC DISPLAYS –

Part 2-4: Transparent displays – Overview of application scenarios

1 Scope

This part of IEC 62977, which is a Technical Report, provides a comprehensive overview of application scenarios for transparent displays of the two major display technologies (liquid crystal (LC) and organic light emitting diode (OLED) displays) and introduces the observation and illumination aspects that are taken into account for the establishment of appropriate measurement methods.

This document only considers direct view displays, it does not include projection displays (eye-projection and projection to screens.)

2 Normative references

There are no normative references in this document.

3 Terms, definitions and abbreviated terms

For the purposes of this document, the following terms, definitions and abbreviated terms apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1 Terms and definitions

3.1.1

AR

augmented reality

overlay of real objects and scenes with artificial visual information

3.1.2

intended visual information

visual information to be presented intentionally

Note 1 to entry: Visual information that is not intended can sometimes be observed, for example reflection of ambient images.

3.1.3

unwanted contributions from ambient light

visual information that is unintentionally generated (by e.g. reflection of ambient light sources) and superimposed over the intended visual information, thus creating disturbing visual effects