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Electronic displays –
Part 2-8: Measurements of optical characteristics – Reflective displays

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FOREWORD

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IEC 62977-2-8 has been prepared by IEC technical committee 110: Electronic displays. It is an International Standard.

The text of this International Standard is based on the following documents:

Draft	Report on voting
110/1745/FDIS	110/1764/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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

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

- reconfirmed,
- withdrawn, or
- revised.

INTRODUCTION

All documents published by IEC TC 110 that are written on the measurement for electronic displays refer to a set of methods and procedures that are similar to one another. These measurement methods are sometimes identical. This document is written for reflective displays by referring to IEC 62977-2-2 and is intended to identify these methods and to describe them together with suitable precautions and diagnostics. Therefore, this document can be a reference for forthcoming standards to make the work of the involved experts more efficient and to avoid reduplication of efforts.

Introduction of the common optical measurement methods (COMM) is also related to a structure where each kind of optical measurement finds its unambiguous position for identification of similarities to other methods or for clarification of distinctions. This structural classification together with a general taxonomy is supposed to make the process of standards production easier, faster and thus more effective.

This document describes the common optical measurement methods applicable to the reflective displays. However, the contents overlap with some parts of the existing standards which are developed in TC 110 (IEC 61747-6-2:2011 and IEC 62679-3-1:2014), in which the documents describe the optical measurement methods of the individual display technologies, such as LCD and E-paper. This document is intended to be used as common optical measurement methods for the reflective direct view type and a reference document for future standards. In addition, the present document can be used in the revisions of the existing standards (IEC 61747-6-2:2011 and IEC 62679-3-1:2014) in their maintenance time by referring to this document to the largest extent possible.

The characteristics and the measurement methods of electronic displays in the IEC 62977 series are summarized in Table 1.

Table 1 – Measurement structure from optical quantities, to evaluations and to results (top down)

Variables	**Time**		**Location** (x, y)	**Direction** (θ, φ)	**Test pattern, electrical driving, input signal**	**Illumination conditions**	**Temperature, humidity**
Data sampling condition	Fast	Slow	Slow	**Slow**[a]	**Slow**[a]		
Results	transitions from one optical state to another state	temporal stability (uniformity)	uniformity	**uniformity**[a]	**static pattern**[a] characteristic function (electro-optic transfer function, EOTF) characteristic values (e.g. threshold, saturation),	darkroom **indoor**[a] **outdoor**[a]	**standard environmental conditions**[a]
Evaluations 1st order	turn-on, turn-off, delay (latency) time periods, temporal modulations				luminance **reflectance**[a] **contrast**[a] **chromaticity**[a] threshold, saturation values, steepness of transitions, etc.		
Evaluations 2nd order	flicker prediction, moving picture response time, etc.				EOTF from which the exponent gamma is evaluated **chromaticity and colour gamut area**[a] **colour gamut volume**[a]		
[a] Indicates the characteristics and measurement methods which are written in this document							

ELECTRONIC DISPLAYS –

Part-2-8: Measurements of optical characteristics – Reflective displays

1 Scope

This part of IEC 62977 specifies standard measurement conditions and methods for determining the optical characteristics of reflective direct view displays that render real 2D images on a flat panel. This document applies to flat panel displays operated in a reflective mode with any integrated light sources turned off during measurement. The input signal is unbounded and encodes either monochrome or colour images.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62977-2-1:2021, *Electronic displays – Part 2-1: Measurement of optical characteristics – Fundamental measurements*

IEC 62977-2-2:2020, *Electronic displays – Part 2-2: Measurement of optical characteristics – Ambient performance*

ISO/CIE 11664-1, *Colorimetry – Part 1: CIE standard colorimetric observers*

ISO/CIE 11664-2, *Colorimetry – Part 2: CIE standard illuminants*

ISO/CIE 11664-4, *Colorimetry – Part 4: CIE 1976 L*a*b* Colour space*

ISO/CIE 23539, *Photometry – The CIE system of physical photometry*

CIE 015, *Colorimetry*