

TECHNICAL SPECIFICATION

**Organic light emitting diode (OLED) displays –
Part 6-5: Measuring methods of dynamic range properties**





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**Organic light emitting diode (OLED) displays –
Part 6-5: Measuring methods of dynamic range properties**

INTERNATIONAL
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ORGANIC LIGHT EMITTING DIODE (OLED) DISPLAYS –

Part 6-5: Measuring methods of dynamic range properties

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- the required support cannot be obtained for the publication of an International Standard, despite repeated efforts, or
- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC TS 62341-6-5, which is a technical specification, has been prepared by IEC technical committee 110: Electronic displays.

The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
110/1017/DTS	110/1063A/RVC

Full information on the voting for the approval of this technical specification 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 62341 series, published under the general title *Organic light emitting diode (OLED) 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 "<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- withdrawn,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.

ORGANIC LIGHT EMITTING DIODE (OLED) DISPLAYS –

Part 6-5: Measuring methods of dynamic range properties

1 Scope

This part of IEC 62341 specifies the standard measurement conditions and dynamic range properties for OLED display panels and modules. More precisely, this document focuses on the specific aspects of the dynamic range properties.

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 62341-1-2:2014, *Organic light emitting diode (OLED) displays – Part 1-2: Terminology and letter symbols*

3 Terms, definitions, and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62341-1-2 and the following 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>

3.1.1

dynamic range coverage

capability of the representable dynamic range relative to the reference input signal

EXAMPLE IEC sRGB, BT.1886, BT.2100, BT.2020, SMPTE ST.2084.

3.2 Abbreviated terms

APL average picture level

CIE Commission Internationale de l'Eclairage (International Commission on Illumination)

DUT device under test

LMD light measuring device

4 Standard measuring equipment and coordinate system

4.1 Light measuring devices

The system configurations and/or operating conditions of the measuring equipment shall comply with the structure specified for each item.

To ensure reliable measurements, the following requirements apply to the light measuring equipment:

- 1) Luminance meter^[1]: the instrument's spectral responsivity shall comply with the CIE photopic luminous efficiency function with a CIE- f_1' value no greater than 3 % [2].
- 2) Spectroradiometer: the wavelength range shall be at least from 380 nm to 780 nm, and the wavelength scale accuracy shall be less than $\pm 0,5$ nm.

Errors from spectral stray light within a spectroradiometer can be significant and shall be corrected. A simple matrix method may be used to correct the stray light errors, by which stray light errors can be reduced by one to two orders of magnitudes. Details of this correction method are discussed in the referred document [3]. If the obtained luminance is lower than the LMD limitation, the lower limit of the LMD shall be recorded with the measured luminance.

- 3) Gonio photometric systems: the DUT or LMD can be driven by rotating around a horizontal axis and vertical axis; angle accuracy shall be better than $0,5^\circ$.

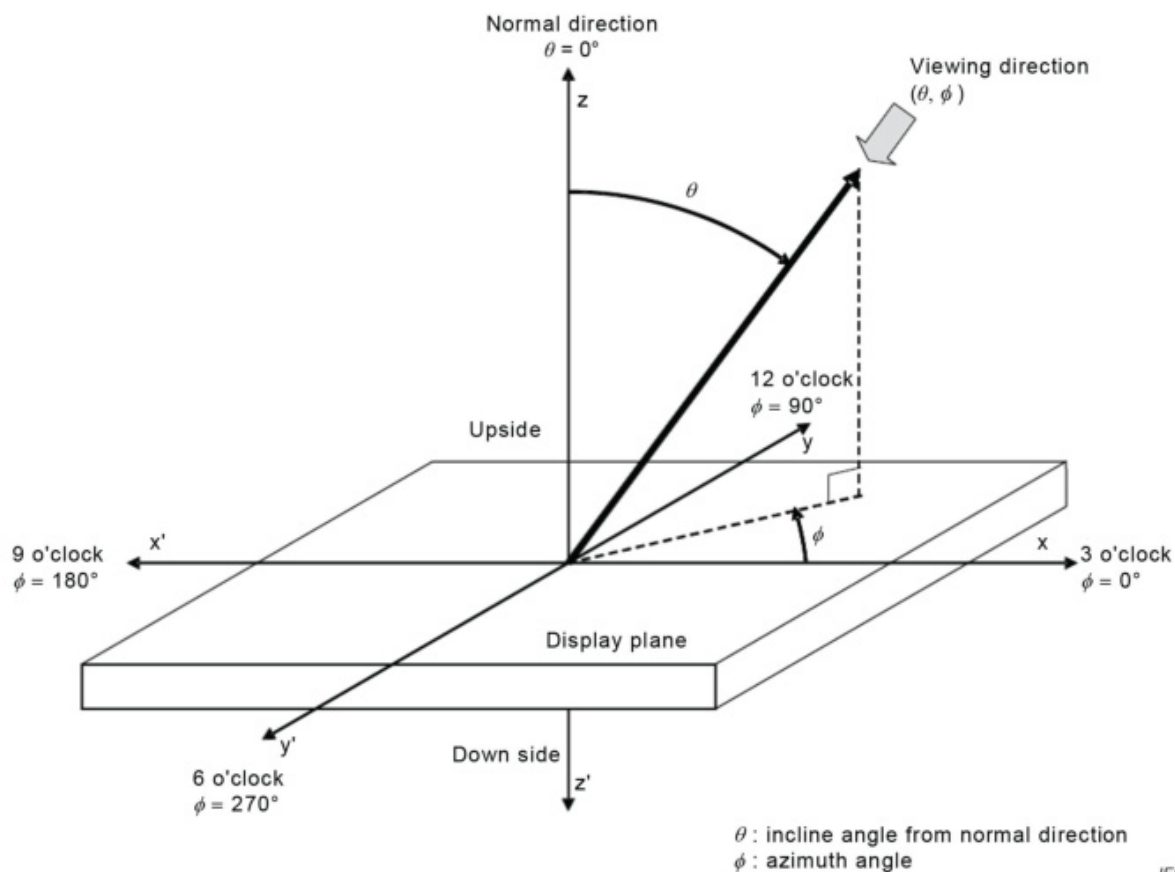
Care shall be taken to ensure that the LMD has enough sensitivity and dynamic range to perform the required task. Before measuring the DUT, the LMD specification shall be checked.

Low luminance measurement is very important for dynamic measurement.

4.2 Viewing direction coordinate system

The viewing direction is the direction under which the observer looks at the spot of interest on the DUT (see also IEC 62341-1-2:2014, Figure A.2). During the measurement, the LMD replaces the observer, looking from the same direction at a specified spot (i.e. measuring spot, measurement field) on the DUT. The viewing direction is conveniently defined by two angles: the angle of inclination θ (related to the surface normal of the DUT) and the angle of rotation ϕ (also called azimuth angle) as illustrated in Figure 1. The azimuth angle is related to the directions on a watch-dial as follows: $\phi = 0^\circ$ is referred to as the 3-o'clock direction ("right"), $\phi = 90^\circ$ as the 12-o'clock direction ("top"), $\phi = 180^\circ$ as the 9-o'clock direction ("left") and $\phi = 270^\circ$ as the 6-o'clock direction ("bottom").

¹ Numbers in square brackets refer to the Bibliography.



Key

- 3 o'clock: right edge of the screen as seen by the user
- 6 o'clock: bottom edge of the screen as seen by the user
- 9 o'clock: left edge of the screen as seen by the user
- 12 o'clock: top edge of the screen as seen by the user

NOTE This is equivalent to the direction of measurement by the angle of inclination, θ , and the angle of rotation (azimuth angle), ϕ , in a polar coordinate system.

Figure 1 – Representation of the viewing direction

5 Measuring conditions

5.1 Standard measuring environmental conditions

Measurements shall be carried out under the following standard environmental conditions:

- temperature: 25 °C ± 3 °C,
- relative humidity: 25 % RH to 85 % RH,
- atmospheric pressure: 86 kPa to 106 kPa.

When different environmental conditions are used, they shall be noted in the measurement report.

5.2 Power supply

The power supply for driving the DUT shall be adjusted to the rated voltage ±0,5 %. In addition, the frequency of the power supply shall provide the rated frequency ±0,2 %.

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