

SEMI D81-0721

TEST METHOD FOR DIMMING PROPERTIES OF FLAT PANEL DISPLAYS

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NOTICE: Paragraphs entitled ‘NOTE:’ are not an official part of this Standard or Safety Guideline and are not intended to modify or supersede the official Standard or Safety Guideline. These have been supplied by the global technical committee to enhance the usage of the Standard or Safety Guideline.

1 Purpose

- 1.1 The performance of the dimming technology affects the image quality of the display.
- 1.2 Even though there are several measuring methods for display luminance, they are not enough to represent the luminance of small sizes are formed less than 10% of the active area.
- 1.3 The new measurement methods propose to measure the luminance characteristics of dimming technology that operates according to the signal from small sizes.

2 Scope

- 2.1 This Standard is applicable to the color electronic display devices.

NOTICE: SEMI Standards and Safety Guidelines do not purport to address all safety issues associated with their use. It is the responsibility of the users of the Documents to establish appropriate safety and health practices, and determine the applicability of regulatory or other limitations prior to use.

3 Referenced Standards and Documents

3.1 *ICDM Standards*¹

IDMS V1.03B — Information Display Measurement Standard

3.2 *IEC Standards*²

IEC TS 62341-6-5 — Measuring Methods of Dynamic Range Properties

NOTICE: Unless otherwise indicated, all documents cited shall be the latest published versions.

4 Terminology

4.1 *Abbreviations and Acronyms*

- 4.1.1 *DUT* — display under test
- 4.1.2 *FOV* — field of view
- 4.1.3 *LMD* — light measuring device

4.2 *Definitions*

- 4.2.1 *active area* — the physical surface of the display that exhibits information via electrically generated images.
- 4.2.2 *dimming consistency* — the luminance characteristics operated according to the signal from various small sizes.
- 4.2.3 *field of view* — the area that is observable through the eyepiece of an LMD equipped with an eyepiece.

¹ International Committee for Display Metrology, <https://www.sid.org/Chapters.aspx>

² International Electrotechnical Commission, 3 rue de Varembé, Case Postale 131, CH-1211 Geneva 20, Switzerland; Telephone: +41.22.919.02.11, Fax: +41.22.919.03.00, <http://www.iec.ch>

5 Summary of Test Method

5.1 Measuring Conditions

5.1.1 Environmental Conditions

5.1.1.1 The following environmental conditions are required to make accurate measurement.

- Temperature: $25 \pm 2^\circ\text{C}$.
- Humidity: 25% to 85% relative humidity.
- Air flow: no wind.
- Dark room: The luminance contribution from the background illumination shall be less than 0.01 cd/m^2 when display under test (DUT) is turned off.

5.1.1.2 When any of these conditions is not met, they shall be noted on the report.

5.2 Measurement Setup

5.2.1 Measuring Equipment Conditions

5.2.1.1 In this Standard, a light measuring device (LMD) such as spectral radiometer, at least from 380 to 780 nm wavelength ranges or a filter photometer shall be used.

5.2.1.2 The luminance accuracy of the instrument shall be within $\pm 2\%$.

5.2.1.3 The measuring equipment shall consist of DUT, LMD, signal generator, and control PC (if used) as shown in Figure 1. The test pattern locations are identified by locations P_0 to P_8 in the active area and the measuring point is only P_0 , as illustrated in Figure 2.

5.3 Measuring Distance

5.3.1 The measuring distance could be set to 300 mm or 500 mm. For the small size display, it is recommended that the measuring distance of LMD would be set to include over 500 pixels of display at 2° field of view (FOV). The calculated distance should be noted on the report.

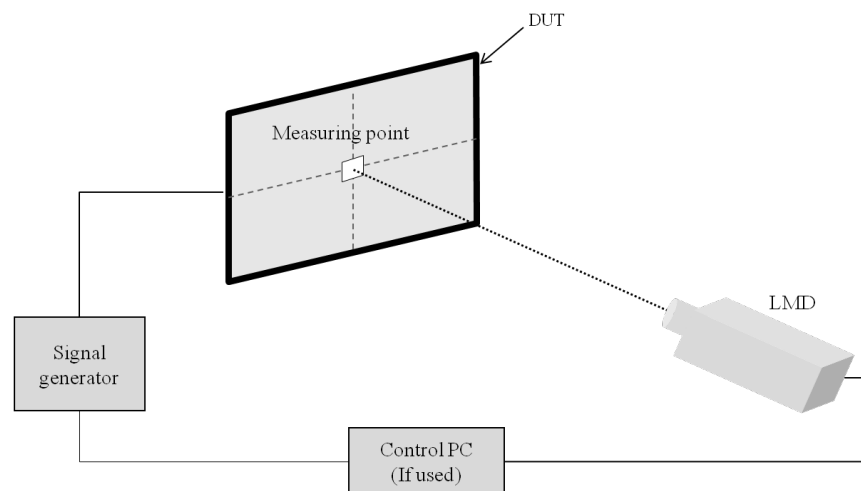


Figure 1
Measurement Setup