



IEC 62906-5-3

Edition 1.0 2021-02

INTERNATIONAL STANDARD



**Laser display devices –
Part 5-3: Measuring methods of image quality for laser projection display**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 31.260

ISBN 978-2-8322-9316-4

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 Standard measuring conditions.....	7
4.1 General.....	7
4.2 Environmental conditions	7
4.3 Power supply	7
4.4 Warm-up time	7
4.5 Dark ambient conditions.....	7
4.6 Measuring equipment.....	7
5 Installation and adjustment of the DUT	8
5.1 Placement of the projection device and screen	8
5.2 Focusing and alignment of the LPD.....	8
6 Test patterns	10
6.1 Full screen patterns	10
6.2 Checkerboard patterns.....	10
7 Measuring methods	10
7.1 Luminance uniformity.....	10
7.1.1 Purpose.....	10
7.1.2 Measuring conditions.....	11
7.1.3 Patterns.....	11
7.1.4 Measuring method	11
7.1.5 Report	12
7.2 Contrast ratio uniformity.....	12
7.2.1 Purpose.....	12
7.2.2 Measuring conditions.....	12
7.2.3 Patterns.....	12
7.2.4 Measuring method	12
7.2.5 Report	13
7.3 Viewing direction	13
7.3.1 Purpose.....	13
7.3.2 Measuring conditions.....	13
7.3.3 Patterns.....	14
7.3.4 Measuring method	14
7.4 Chromaticity uniformity	14
7.4.1 Purpose.....	14
7.4.2 Measuring conditions.....	14
7.4.3 Patterns.....	15
7.4.4 Measuring method	15
7.4.5 Report	15
7.5 Image resolution	15
7.5.1 Purpose.....	15
7.5.2 Measuring conditions.....	15

7.5.3 Measuring method 16

7.5.4 Calculation 16

7.5.5 Report 17

Bibliography..... 18

Figure 1 – Example of an image pattern with width W and height H9

Figure 2 – Example of DUT setup 9

Figure 3 – Full screen patterns 10

Figure 4 – Examples of checkerboard patterns 10

Figure 5 – Measurement points..... 11

Figure 6 – Set-up for viewing direction measurement..... 14

Figure 7 – Example of contrast modulation measurement 17

INTERNATIONAL ELECTROTECHNICAL COMMISSION

LASER DISPLAY DEVICES –**Part 5-3: Measuring methods of image quality
for laser projection displays**

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, access to 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.

IEC 62906-5-3 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
110/1269/FDIS	110/1285/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/standardsdev/publications.

A list of all parts in the IEC 62906 series, published under the general title *Laser display devices*, 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,
- replaced by a revised edition, or
- amended.

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.

LASER DISPLAY DEVICES –

Part 5-3: Measuring methods of image quality for laser projection displays

1 Scope

This document specifies the standard measurement conditions and measuring methods for determining the parameters of image quality for full-frame laser projection displays integrating the projection devices and screens. The front and rear projection screens are included in this document. Other display devices, such as raster-scanned (flying spot) projection devices, are not included.

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 60050-845, *International Electrotechnical Vocabulary (IEV) – Part 845: Lighting*

IEC 60825-1, *Safety of laser products – Part 1: Equipment classification and requirements*

IEC TR 60825-8, *Safety of laser products – Part 8: Guidelines for the safe use of laser beams on humans*

IEC 62341-6-3:2017, *Organic light emitting diode (OLED) displays – Part 6-3: Measuring methods of image quality*

IEC 62471-5, *Photobiological safety of lamps and lamp systems – Part 5: Image projectors*

IEC 62906-1-2, *Laser display devices – Part 1-2: Vocabulary and letter symbols*

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

ISO/CIE 19476, *Characterization of the performance of illuminance meters and luminance meters*

CIE 63, *The spectroradiometric measurement of light sources*