



BSI Standards Publication

3D displays

Part 62-12: Measurement methods for virtual-image type — Image quality

National foreword

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**3D displays –
Part 62-12: Measurement methods for virtual-image type – Image quality**

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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 Light measuring device (LMD).....	8
5 Measurement method of uniform-illuminated-flat-background effect on 3D virtual image	8
5.1 General.....	8
5.2 Measurement configuration of uniform-illuminated-flat-background effect on 3D virtual image	8
5.3 Illumination for uniform-illuminated-flat-background conditions	10
5.4 Measurement of contrast and chromaticity of a 3D virtual image against different uniform-illuminated-flat-backgrounds.....	11
5.4.1 General	11
5.4.2 Conditions	11
5.4.3 Procedures	13
5.4.4 Reports.....	15
6 Measurement method for ghost image.....	16
6.1 Measuring configuration for position estimation.....	16
6.2 Conditions.....	17
6.3 Procedures	18
6.4 Reports.....	19
7 Measurement methods for binocular misalignment.....	19
7.1 General.....	19
7.2 Conditions.....	20
7.3 Procedures	22
7.4 Reports.....	24
Annex A (informative) Measurement examples	25
A.1 Measurement example for ghost image.....	25
A.2 Measurement example for binocular misalignment	26
Bibliography	28

Figure 1 – Measuring configuration for evaluating uniform-illuminated-flat-background effect on image quality property of a 3D virtual image.....9

Figure 2 – Points for non-uniformity measurement on uniform-illuminated-flat-background..... 10

Figure 3 – Test images for measuring contrast and chromaticity properties affected by uniform-illuminated-flat-background change on 3D virtual image

12

Figure 4 – Measuring condition for contrast and chromaticity properties of 3D virtual image against different uniform-illuminated-flat-background conditions

13

Figure 5 – Measuring setup for ghost image

17

Figure 6 – Measurement of ghost image

18

Figure 7 – Test pattern and measuring configuration for evaluating binocular misalignment

21

Figure 8 – LMD positions for evaluating the binocular misalignment.....

Figure A.1 – Example of test image with ghost phenomenon	25
Figure A.2 – Example of captured test-image by imaging LMD for binocular misalignment	26
Table 1 – Example of measurement results for luminance and chromaticity values in different uniform-illuminated-flat-background conditions.....	16
Table 2 – LMD positions in xyz coordinates or nine measurements	22
Table 3 – Example of measurement results for horizontal and vertical binocular misalignment in degrees	24
Table A.1 – Example of measurement and calculation results for ghost image.....	25
Table A.2 – Example of LMD positions in xyz coordinates or nine measurements	27
Table A.3 – Example of measurement and calculation results for horizontal and vertical binocular misalignment in degrees	27

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3D DISPLAYS –

Part 62-12: Measurement methods for virtual-image type – Image quality

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IEC 62629-62-12 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
110/1736/FDIS	110/1759/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 62629 series, published under the general title *3D 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, or
- revised.

3D DISPLAYS –

Part 62-12: Measurement methods for virtual-image type – Image quality

1 Scope

This part of IEC 62629 specifies the standard measuring conditions and measurement methods for determining image quality for 3D displays that produce virtual images, such as 3D heads-up displays in which the 3D visual information is superimposed with the outside world. Eyewear displays are however beyond the scope of this document.

The scope of this document does not intend to include eyewear displays considering the difference between a head-up display and an eyewear display in the aspect of eye box size and field of view. The eye-tracking function is disabled in the image quality measurement of this document.

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 62629-1-2, *3D display devices – Part 1-2: Generic – Terminology and letter symbols*

IEC 62629-62-11:2022, *3D display devices – Part 62-11: Measurement methods for virtual-image type – Optical*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62629-1-2 and the following apply.

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

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

3.1.1

virtual image distance

distance from the centre between both eyes to the centre of the virtual image plane

Note 1 to entry: The centre of both eyes corresponds to the point where the half of the binocular spacing is located. The virtual image plane is the zero parallax plane.

3.1.2 field of view FOV

angle subtending the area of the virtual image as observed from the centre between both eyes

Note 1 to entry: The FOV is determined by finding the location of the edge point in the test pattern without looking for the edge in IEC 62629-62-11. However, if the edge of the 3D virtual image is unclear, the edge for field of view measurement is assumed to be less than 50 % of the center luminance value that is measured at the center position of the virtual image plane.

Note 2 to entry: The FOV is also determined based on the resolution (e.g. Michelson contrast). Since the edges obtained by these two criteria could be different, the luminance and resolution-based edges can be obtained.

3.1.3 eye box

<3D display – virtual image type> three-dimensional space within which the users place their both eyes and properly see the FOV

Note 1 to entry: The eye box size and field of view are quite different between eyewear displays (less than a few centimetres and about 100 degrees) and HUDs (head-up display) (tens of centimetres and about 10 degrees to 20 degrees). A displacement by eye rotation is comparable to eye box size for eyewear displays whereas this is much smaller for HUDs. As a result, the effect of selection of rotation point of LMD is noticeable for eyewear displays but that is negligible for HUDs.

Note 2 to entry: The edge of the eye box is determined based on the resolution (Michelson contrast) or the luminance. Since the edges obtained by these two criteria could be different, the luminance and resolution-based edges can be obtained.

3.1.4 binocular misalignment

unintended differences in vertical and horizontal positions observed by the left and right eyes for a 3D virtual object

Note 1 to entry: It is generally assumed that 3D virtual images reproduced using zero binocular disparity information is displayed at the same location when observed with the left and right eyes, however, the position difference of 3D virtual images occurs due to factors such as manufacturing and design errors of HUD optical system.

3.1.5 ghost image

unintended lower intensity duplication of an intended virtual image

Note 1 to entry: The term 'ghost image' is commonly used in automotive HUDs. It is extremely rare for multiple layers of ghost images to be observed in fact. The ghost image can be expressed as 'secondary image'. The measurement method introduced in this document corresponds to the case where the secondary image is observed.

3.1.6 designed eye to combiner distance

distance between the half mirror and a viewer that is considered at the design stage of a three-dimensional display producing three-dimensional virtual images such as three-dimensional HUD

3.2 Abbreviated terms

HUD	head-up display
IPD	inter pupillary distance
LMD	light measuring device