BS IEC 62906-5-5:2022



BSI Standards Publication

Laser displays

Part 5-5: Optical measuring methods of raster-scanning retina direct projection laser displays



National foreword

This British Standard is the UK implementation of IEC 62906-5-5:2022.

The UK participation in its preparation was entrusted to Technical Committee EPL/47, Semiconductors.

A list of organizations represented on this committee can be obtained on request to its committee manager.

Contractual and legal considerations

This publication has been prepared in good faith, however no representation, warranty, assurance or undertaking (express or implied) is or will be made, and no responsibility or liability is or will be accepted by BSI in relation to the adequacy, accuracy, completeness or reasonableness of this publication. All and any such responsibility and liability is expressly disclaimed to the full extent permitted by the law.

This publication is provided as is, and is to be used at the recipient's own risk.

The recipient is advised to consider seeking professional guidance with respect to its use of this publication.

This publication is not intended to constitute a contract. Users are responsible for its correct application.

© The British Standards Institution 2022 Published by BSI Standards Limited 2022

ISBN 978 0 580 99228 5

ICS 31.260

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 July 2022.

Amendments/corrigenda issued since publication

Date Text affected





Edition 1.0 2022-01

INTERNATIONAL STANDARD



Laser displays – Part 5-5: Optical measuring methods of raster-scanning retina direct projection laser displays

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ICS 31.260

ISBN 978-2-8322-1068-6

Warning! Make sure that you obtained this publication from an authorized distributor.

® Registered trademark of

CONTENTS

FC	FOREWORD					
1	Scope					
2	Norm	Normative references				
3	Term	Terms definitions and abbreviated terms				
·	3.1 Terms and definitions			7		
	3.2	Appres	viated terms	،ع ع		
٨	Standard measuring conditions			۰۵		
-	4.4. Other dead are accurate a province month of a distance					
	4.1	Standa	ard measuring environmental conditions	9		
	4.2	Coold	male system	9		
	4.3	Standa	and conditions of RS-RDP laser displays and light measuring devices	10		
	4.3.1	G	divetment of PS PDD leaser display	10		
	4.3.2	A	ajustinent of RS-RDP laser display	10		
	4.3.3	K	actedurements for inght measuring device	10		
F	4.4 Optio	Laser-	-salety requirements for measurement	12		
Э		ai mea	isunng methods	12		
	5.1	Gener	'al			
	5.2	Optica	al power at the primary colour wavelength			
	5.2.1	G	eneral	12		
	5.2.2	N	leasurement at exit window (measurement point 1)	12		
	5.2.3	N	leasurement at focal point (measurement point 2)	13		
	5.2.4	E	limination of the effect of other spectral powers	13		
	5.3	Eye-b	OX	14		
	5.3.1	G	eneral	14		
	5.3.2	E	ye-box measurement by 2D image sensor			
	5.3.3	Ε	ye-box measurement by goniometric spectroradiometer			
	5.4	Field	of view			
	5.4.1	G	eneral			
	5.4.2	F	OV measurement by 2D image sensor			
	5.4.3	F	OV measurement by goniometric spectroradiometer	17		
	5.5	Aspec	t ratio	17		
	5.6 Effective angular image resolution					
	5.6.1	G	eneral			
	5.6.2	N	leasuring methods of effective angular image resolution			
5.7 Retinal free focus range		22				
	5.7.1	G	ieneral	22		
	5.7.2	R	etinal free focus range measured by direct method	23		
	5.7.3	R	etinal free focus range measured by imaging method	24		
	5.8	Retina	al white illuminance	24		
	5.8.1	G		24		
	5.8.2	R	terinal white illuminance measurement using the method in 5.2.3	25		
	5.8.3	R	etinal white illuminance measurement using spectral irradiance meter .	25		
	5.9	Lumin	ance and chromaticity of virtual image	25		
	5.9.1	G		25		
	5.9.2	N	leasurement procedure	25		
	5.10 White chromaticity nonuniformity			26		
	5.10.	1 G				
	5.10.2 while chromaticity nonuniformity					
			This is a preview. Click here to purchase the full publication.			

IEC 62906-5-5:2022 © IEC 2022 - 3 -	
5.10.3 Virtual image chromaticity nonuniformity	26
6 Report	
Annex A (informative) Structure of RS-RDP laser displays	
A.1 General	
A.2 Example of mechanical structure	
A.3 Example of fundamental electro-optical structure of RS-RDP laser display	28
R 1 Conorol	
B.1 General B.2 Maxwellian view	30 30
B.3 Pinhole image on the retina in the Maxwellian view	
B.4 Laser image on the retina in the Maxwellian view	
Annex C (informative) Eyeball model and use of planar 2D sensor for measuring optical property	32
C.1 Human eveball structure, its optics and modelling for practical measurement.	32
C.2 Retinal sensor model	
C.3 Optical measuring method with planar 2D image sensor	37
Annex D (informative) Comparison of retinal illuminance with other displays	43
D.1 Projected area on retina	43
D.2 Retinal illuminance estimation for the conventional displays using natural viewing	45
D.3 Retinal illuminance estimation for RS-RDP laser display using Maxwellian viewing	46
D.4 Comparison of retinal illuminance between RS-RDP laser displays and the conventional displays	46
Bibliography	47
Figure 1 – Coordinate system and setup for planar measurements	10
Figure 2 – Two measurement points of optical power	14
Figure 3 – Measurement geometry of the eye-box	16
Figure 4 – Measurement geometry of the FOV	17
Figure 5 – Example of beam waist for Maxwellian view at the 2D image sensor plane	
Figure 6 – Example of measurement locations for effective angular image resolution	19
Figure 7 – Setup for measuring effective angular image resolution and retinal free focus range	20
Figure 8 – Test patterns for resolution measurement	21
Figure 9 – Example of contrast modulation plot	22
Figure 10 – Example of the measured results of retinal free focus range	24
Figure 11 – Nonuniformity measurement locations and box patterns	
Figure A.1 – Example of mechanical structure of RS-RDP laser display	
Figure A 2 – Example of electro-ontical structure of RS-RDP laser display	29
Figure B.1 – Maxwellian view (a) and normal viewing (b)	30
Figure B 2 – Pinhole (a) and laser beam (b) in the Maxwellian view	31
Figure C.1 – Cross-sectional human eveball structure	 20
Figure C_2 Schematic of the evolution and solved and entired information	_ردر در
Figure $C.2$ – Schematic of the eye with geometrical and optical information	33
angle for blue (465 nm), green (520 nm) and red (640 nm)	33
Figure 0.4 – Schematic eye optics	35