

ICS 31.120
CCS L 53



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 43590.507-2025

**Laser display devices - Part 5-7: Measuring methods of image
quality affected by speckle for scanning laser displays
(English Translation)**

Issued on: April 25, 2025

Implemented on: August 1, 2025

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

Table of Contents

Preface	
Introduction	
1 Scope	
2 Normative references	
3 Terms, definitions, abbreviations and symbols	
3.1 Terms and Definitions	
3.2 Abbreviations	
3.3 Symbols	
4 Standard measurement conditions	
4.1 General	
4.2 Standard measurement environment conditions	
4.3 Standard measurement darkroom conditions	
4.4 Standard DUT Conditions	
4.5 Standard LMD requirements	
4.6 Screen Requirements	
5 Standard measuring devices and coordinate systems	
5.1 Direct measurement device	
5.2 Diffuse reflectance standard measurement device	
5.3 Full screen measurement device	
6 Measurement methods	
6.1 Wavelength/spectrum and photometry/chromaticity	
6.2 Monochromatic Speckle Contrast and Color Speckle	
6.3 Image Resolution Affected by Speckle	
6.4 Inhomogeneity	
Appendix A (informative) Spectral accuracy required to maintain a specific accuracy in chromaticity	
A.1 Overview	
A.2 Wavelength Accuracy	
Appendix B (Informative) Modulation contrast CM (brightness contrast of grid pattern)	
Appendix C (Informative) Example of Speckle Data for Grid Patterns	
Reference	

Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document is part 5-7 of GB/T 43590 "Laser display devices". GB/T 43590 has published the following parts.

- Part 1-2.Terms and text symbols;
- Part 5-1.Test methods for optical performance of laser front projection displays;
- Part 5-2.Optical measurement method for speckle contrast;
- Part 5-3.Laser projection display (screen) image quality test method;
- Part 5-4.Optical test method for colored speckle;
- Part 5-6.Test methods for optical properties of projection screens;
- Part 5-7.Test method for image quality of laser scanning displays under the influence of speckle.

This document modifies IEC 62906-5-7:2022 "Laser displays - Part 5-7.Graphics of laser scanning displays affected by speckle" Image Quality Testing Methods.

The technical differences between this document and IEC 62906-5-7:2022 and their reasons are as follows.

- Added the applicable scope (see Chapter 1), which meets the requirements of my country's document preparation;
- Added normative reference GB/T 43590.102 (see 3.1) to coordinate with my country's standard system;
- IEC 60825-1 (see 4.1) was replaced by the normative reference GB/T 7247.1 to adapt to my country's technical conditions;
- Replaced IEC 62471 (alparts) (see 4.1) with the normative reference GB/T 30117 (all parts) to adapt to my country Technical conditions;
- Replaced IEC 62906-5-2 [see 4.51) and 6.2.1] with the normative reference GB/T 43590.502 to adapt to my country's technology condition;
- Replaced IEC 62906-5-4 [see 4.51), 5.2, 6.2.1, 6.2.3, 6.3.3] with the normative reference GB/T 43590.504, Adapt to the technical conditions of our country;
- The normative reference GB/T 43590.506 replaces IEC 62906-5-6 (see 5.1) to adapt to my country's technical conditions.

The following editorial changes were made to this document.

--- In order to coordinate with the existing standards, the name of the standard is changed to "Laser display devices Part 5-7.Laser scanning display on the speckle effect Image quality test method under ";

--- Changed the symbol unit of brightness "LH, LL" in 3.3 to "cd/m²". The symbol unit "lm" in international documents is the unit of luminous flux.

Bit, which belongs to the misuse of unit;

--- Changed the third paragraph of 6.1 from "The calculated value of the centroid wavelength λ_C of the multi-longitudinal mode spectrum in Figure 5 is 445.26nm" to "The calculated value of the centroid wavelength λ_C of the multi-longitudinal mode spectrum in Figure 5 is 445.26nm" the calculated value of the centroid wavelength λ_C of the mode spectrum is 455.26nm", the original value "445.26nm" is different from the value "455.26" in Figure 5 According to the current status of related products, it is more reasonable to use "455.26nm" as the value;

--- Deleted the first paragraph of 6.3.4 "In the commonly used chromaticity diagram, the illuminance value corresponds to a unique chromaticity point" and "u'v' can be used" Y color space to better understand color speckle", because the two are not related to the context and are easily ambiguous;

--- Changed Figure B.2 in Appendix B, because the dots in Figure B.2 of the international document should be at integer points in the horizontal direction, and their horizontal coordinates the axis direction is opposite to the normal direction;

--- Changed Figure C.2 in Appendix C, because the dots in Figure B.2 of the international document should be at integer points in the horizontal direction, in the horizontal direction the interval between 0 and 5 should be 5 grids, and the direction of its horizontal coordinate axis is opposite to the normal direction.

Introduction

The new display industry is a strategic, basic and leading industry for national economic and social development. Laser display devices are new display the core components of the technology. In order to meet the production, manufacturing, inspection and import and export trade needs of laser display device products in my country, the laser display Device series standard. GB/T 43590 is intended to consist of the following parts.

--- Part 1-2.Terminology and text symbols. The purpose is to establish the preferred terms, definitions and symbol.

--- Part 5-1.Test method for optical performance of laser front projection display. The purpose is to establish the laser light source or containing laser light source Test method for

optical performance of mixed light source front projector displays.

--- Part 5-2.Optical measurement method for speckle contrast. The purpose is to establish the optical properties of laser light sources and mixed light containing laser light sources.

A method for measuring the monochromatic speckle contrast of laser display devices with laser sources.

--- Part 5-3.Laser projection display (screen) image quality test method. The purpose is to establish the laser projector and screen combination Testing method for image quality of full-frame laser projection display (screen).

--- Part 5-4.Optical test method for colored speckle. The purpose is to establish an optical test method for colored speckle of laser display devices.

method.

--- Part 5-5.Optical test methods for laser raster scanning retinal direct projection displays. The purpose is to establish Scanning retinal direct projection display optical testing method.

--- Part 5-6.Test methods for optical performance of projection screens. The purpose is to establish the laser projection display screen based on the photometric characteristics Test method for optical performance of screen.

--- Part 5-7.Test method for image quality of laser scanning display under the influence of speckle. The purpose is to establish the image quality of laser scanning display under the influence of speckle noise.

A test method for the image quality of laser scanning displays on screens with no visible fluorescent light.

--- Part 5-11.Optical test methods for laser light source modules. The purpose is to establish the optical performance of laser display device light source modules Test method.

--- Part 5-12.Opto-mechanical module test method. The purpose is to establish the performance test method of laser display opto-mechanical module.

--- Part 5-16.Test methods for wavelength conversion components for laser display. The purpose is to establish the performance of wavelength conversion components for laser display.

Can test methods.

--- Part 5-18.Optical test method for fiber optic scanning laser display using grid type. The purpose is to establish the optical performance of fiber optic scanning devices using grid type.

An optical test method for laser beam scanning imaging during format scanning.

Laser display devices Part 5-7.Laser scanning displays under the influence of speckle