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colour inside

Electronic displays –
Part 5-2: Visual assessment – Colour discrimination according to viewing direction

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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The text of this Technical Report is based on the following documents:

Draft	Report on voting
110/1227/DTR	110/1251A/RVDTR

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 Technical Report 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 62977 series, published under the general title *Electronic displays*, 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 "http://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- withdrawn,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
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INTRODUCTION

Current display measurement standards use mainly simple patterns for physical measurement methods to characterize display performance. Recent studies have introduced multiple colour test patterns to simulate real images based on physical measurements. Such types of physical measurements are commonly used and are an essential method of the industry. Often, humans can perceive a structural similarity [1][1] as much as physical factors (colour, luminance, etc.). This document describes a method of structural sensitivity assessment dependent on the viewing direction, interpretation of assessment results, and correlation between assessment results and physical measurements. This correlation value can be used as the basis for determining one aspect of the viewing direction range of a display, which has relevance from a visual quality point of view. However, it should be noted that several characteristics (e.g. contrast ratio, resolution, and colour shift) are simultaneously changing in the assessment of the viewing direction.

This visual assessment approach has the benefit of obtaining direct human response to variations for any given task. However, it can be challenging with this approach to get reproducible experimental results due to different colour matching functions (CMFs), differences in observer experience, observer fatigue, attitudes toward experiments, human adaptation to different experimental environments (including illumination conditions, surround, or other environmental factors), content-dependent differences, and other variables. Therefore, the uncertainty for these visual assessment methods can be higher compared to instrumentation-based evaluation methods. Accordingly, this document should be seen as a limited constrained model to help understand some of the various human responses to the experiment. It can be used as an indicator of such response and to provide a framework to guide the acquisition of performance data by way of reliable instrumentation-based measurement methods.

[1] Numbers in square brackets refer to the Bibliography.

ELECTRONIC DISPLAYS –

Part 5-2: Visual assessment – Colour discrimination according to viewing direction

1 Scope

This part of IEC 62977, which is a Technical Report, describes the visual assessment method of the viewing direction characteristics of display devices. This document reviews the visual assessment of viewing direction by using special test patterns to estimate colour changes, image structure, and image luminance.

Experimental results are shown to reveal the effectiveness of this kind of visual assessment.

This method is a valuable tool for identifying image quality issues, but physical measurements will be used to confirm display performance specifications.

NOTE The visual assessment results will depend on the test pattern parameters and display setup conditions. As the viewing direction changes, characteristics such as contrast ratio, resolution, and device colour-shift simultaneously change in the perceived image.

2 Normative references

There are no normative references in this document.