SMPTE ST 2080-3:2017

SMPTE STANDARD

Reference Viewing Environment for Evaluation of HDTV Images

Table of Contents

Approved
April 13, 2017

Foreword

SMPTE (the Society of Motion Picture and Television Engineers) is an internationally-recognized standards developing organization. Headquartered and incorporated in the United States of America, SMPTE has members in over 80 countries on six continents. SMPTE's Engineering Documents, including Standards, Recommended Practices, and Engineering Guidelines, are prepared by SMPTE's Technology Committees. Participation in these Committees is open to all with a bona fide interest in their work. SMPTE cooperates closely with other standards-developing organizations, including ISO, IEC and ITU.

SMPTE Engineering Documents are drafted in accordance with the rules given in its Standards Operations Manual.

SMPTE ST 2080-3 was prepared by Technology Committee 10E.

Intellectual Property

At the time of publication no notice had been received by SMPTE claiming patent rights essential to the implementation of this Engineering Document. However, attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. SMPTE shall not be held responsible for identifying any or all such patent rights.

Introduction

This section is entirely informative and does not form an integral part of this Engineering Document.

The creation of television images that are intended to follow a standard of consistency in reproduction requires definition of a reference display, of a controlled viewing environment, and of a set of measurement procedures to enable consistent calibration of both display and environment. This document specifies a controlled viewing environment referred to as the Reference Viewing Environment.

1 Scope

This standard specifies the reference viewing environment for picture quality evaluation of HDTV images.

2 Conformance Notation

Normative text is text that describes elements of the design that are indispensable or contains the conformance language keywords: "shall", "should", or "may". Informative text is text that is potentially helpful to the user, but not indispensable, and can be removed, changed, or added editorially without affecting interoperability. Informative text does not contain any conformance keywords.

All text in this document is, by default, normative, except: the Introduction, any section explicitly labeled as "Informative" or individual paragraphs that start with "Note:"

The keywords "shall" and "shall not" indicate requirements strictly to be followed in order to conform to the document and from which no deviation is permitted.

The keywords, "should" and "should not" indicate that, among several possibilities, one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required; or that (in the negative form) a certain possibility or course of action is deprecated but not prohibited.

The keywords "may" and "need not" indicate courses of action permissible within the limits of the document.

The keyword “reserved” indicates a provision that is not defined at this time, shall not be used, and may be defined in the future. The keyword “forbidden” indicates “reserved” and in addition indicates that the provision will never be defined in the future.

A conformant implementation according to this document is one that includes all mandatory provisions ("shall") and, if implemented, all recommended provisions ("should") as described. A conformant implementation need not implement optional provisions ("may") and need not implement them as described.

Unless otherwise specified, the order of precedence of the types of normative information in this document shall be as follows: Normative prose shall be the authoritative definition; Tables shall be next; then formal languages; then figures; and then any other language forms.

3 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this engineering document. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this engineering document are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

SMPTE ST 2080-1:2014, Reference White Luminance Level and Chromaticity for HDTV

ISO/CIE 11664-1 (2007), Colorimetry — Part 1: CIE standard colorimetric observers

4 Terms and Definitions

For the purposes of this document, the following terms and definitions apply.

4.1 diffuse reflection

reflection of light in many directions.

Note 1 to entry: Light reflected from an illuminated surface that produces a perfectly diffuse reflection will have the same luminance from all viewed directions

4.2 information display

display not performing the function of a reference display.

Note 1 to entry: Examples include computer displays for edit or color grading systems and continuity monitors.

4.3 reference display

display intended for use in making critical aesthetic decisions concerning the image parameters of the signal being evaluated or corrected.

Note 1 to entry: Specification of a reference display is outside the scope of this document.

4.4 reference viewing environment

room or a portion thereof that is designed for critical viewing of images on a reference display.

Note 1 to entry: When used with a calibrated reference display, images can be consistently evaluated between environments and over time.

4.5 surround

the area visible to the observer from or behind a plane coincident with and surrounding but not including the reference display(s)

Note 1 to entry: A surround of defined luminance/illuminance is necessary for the correct perception of contrast in the displayed image. The surround provides a fixed neutral visual reference that prevents the eye from changing adaptation level.

5 Viewing characteristics

5.1 Adaptation Time

The observer shall be visually adapted to the viewing environment. The time allowed for the observer's adaptation should be at least 10 minutes.

Note: At the operating levels specified for HDTV displays, including the surround illumination level specified in Section 6.5 below, the eye is in photopic response (cone cells). Ten minutes is sufficient time for human cone cells to adapt. Refer to Kalloniatis and Luu.