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Power consumption of high dynamic range television sets

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National foreword

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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POWER CONSUMPTION OF HIGH DYNAMIC RANGE TELEVISION SETS

FOREWORD

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IEC TR 63274, which is a Technical Report, has been prepared by Technical Area 19: Environmental and energy aspects for multimedia systems and equipment, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

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

DTR	Report on voting
100/3348/DTR	100/3397/RVDTR

Full information on the voting for the approval of this Technical Report can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

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- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

High dynamic range (HDR) video is emerging as a new technology that affects the entire video ecosystem from production and processing, through to distribution and presentation. HDR television sets potentially have higher peak luminance level capabilities, and HDR video signals can represent pictures with much higher luminance levels than was the case in traditional analogue and digital video systems.

Current television set power consumption measurement methods, including those standardized in the IEC 62087 series (see [1][1], [2]and [3]), consider only televisions that accept a traditional, standard dynamic range (SDR) signal. It is likely that an HDR-capable television's power consumption will differ when presented with an HDR signal versus an SDR signal.

IEC TC100 TA19 has identified a standardization opportunity related to the method of measuring the power consumption of HDR television sets, including the development of a related HDR test signal.

This document assesses the current HDR technology for the parameters relevant for TV power consumption and sets the groundwork for the subsequent development of a measurement standard for the power consumption of HDR TV sets.

1 Numbers in square brackets refer to the Bibliography.

POWER CONSUMPTION OF HIGH DYNAMIC RANGE TELEVISION SETS

1 Scope

This document introduces high dynamic range video technology, describes current television set power consumption measurement methods, discusses the HDR TV market, analyses HDR TV power measurement challenges, and considers a path forward for HDR TV power measurement standards development.

2 Normative reference

There are no normative references in this document.

3 Terms, definitions and abbreviated terms

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

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

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

3.1 Terms and definitions

3.1.1
electro-optical transfer function
EOTF
mathematical function for transferring an electrical signal into a desired optical signal

EXAMPLE EOTFs are typically non-linear and monotonic and aim to incorporate behaviour of the human visual system, e.g. on a display device. Some are absolute, addressing luminance values directly, while others are of relative nature.

3.1.2
high dynamic range video
HDR video
capability of components in a video pipeline to capture, process, transport or display luminance levels and tone gradations that exceed capabilities of conventional SDR imaging pipelines components

Note 1 to entry: An HDR video signal typically uses a greater bit depth, luminance and colour volume than standard dynamic range (SDR) video. It also typically utilizes different tone curves such as perceptual quantizer (PQ) as specified in SMPTE ST 2084 [4] or hybrid log gamma (HLG) specified in ITU-R BT.2100 [5] instead of gamma, as used with SDR. When the HDR video signal is rendered on an HDR display, it is possible to see greater luminance ranges and wider colour gamuts

Note 2 to entry: HDR video can provide an enhanced viewer experience and can more accurately reproduce scenes that include, within the same image, dark areas and bright highlights, such as emissive light sources and reflections.