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Dynamic metadata high dynamic range impacts on TV power consumption

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CONTENTS

FOREWORD 4
INTRODUCTION 6
1 Scope 7
2 Normative references 7
3 Terms, definitions and abbreviated terms 7
3.1 Terms and definitions 7
3.2 Abbreviated terms 11
4 Dynamic metadata high dynamic range video 12
4.1 Introduction to dynamic metadata HDR video 12
4.1.1 Overview 12
4.1.2 Dolby Vision® 13
4.1.3 HDR10+ 13
4.2 Market relevance of dynamic metadata HDR video 14
4.2.1 Dolby Vision® market snapshot 14
4.2.2 HDR10+ market snapshot 15
4.3 Consumer availability of dynamic metadata HDR video technologies in TVs 15
5 Dynamic metadata HDR TV power consumption research 16
5.1 Overview 16
5.2 Dynamic metadata test media 16
5.3 Dynamic metadata laboratory tests 21
5.3.1 General 21
5.3.2 General research method 21
5.3.3 Phase I testing: assessing the overall impact of dynamic metadata 22
5.3.4 Phase II testing: next level of detail 23
5.3.5 Phase III: in-depth testing with one TV 30
6 Summary 32
Annex A (informative) Test material workflows 34
Bibliography 36

Figure 1 – Occurrence of linear and non-linear signal encodings in context of a typical display processing pipeline and how they can be used to compute APL and APL' 8
Figure 2 – Power use with dynamic metadata 25
Figure 3 – Screen-average dynamic luminance with dynamic metadata vs static metadata 26
Figure 4 – Relative efficiency of TVs when playing different content formats 27
Figure 5 – Normalized comparison of LED TVs playing Table 1 UHD Dolby Vision® and HDR10+ 5 min test clips 29
Figure 6 – Phase III test results by content category 32

Table 1 – Static and dynamic metadata test media 17
Table 2 – HDR10+ test media metadata 18
Table 3 – Dolby Vision® test media metadata 19
Table 4 – Results of phase I testing 22
Table 5 – Summary of phase I testing 23
Table 6 – Characteristics of TV models used for the test media validation 23

Table 7 – 4K real-world content used for tests 24
Table 8 – Phase II: real world content (streamed movies/series) 24
Table 9 – Phase III: HDR10+ and SDR using non-test clips 30
Table 10 – Phase III: test clips only 30
Table 11 – Phase III test results 31
Table A.1 – Workflow details 35

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DYNAMIC METADATA HIGH DYNAMIC RANGE IMPACTS ON TV POWER CONSUMPTION

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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.

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INTRODUCTION

HDR technologies affect the entire video ecosystem from production and processing, through to distribution and presentation. HDR-capable television sets typically have higher peak luminance and better low-luminance capabilities than non-HDR TVs and can take advantage of HDR video signals which typically represent scenes with much higher luminance and more detailed low-luminance levels than was possible in traditional analogue and digital non-HDR video systems.

As the luminance range of an HDR signal might not match the luminance range capabilities of the display device, the signal must be adjusted before being displayed. This luminance adjustment is called tone-mapping and is implemented as a processing step in the TV. The tone mapping process can be improved with metadata, which describes the properties of the content to be displayed.

Dynamic metadata based HDR tone-mapping approaches and behaviours are seeing an ever-increasing application in consumer televisions; however, representative standardized test content for measurement of the power consumption impact of those technologies on televisions is not available. To prepare objective test materials (video clips), a study of power and luminance behaviour was conducted, the results of which are described in Clauses 5 and 6.

This document assesses the impact of dynamic HDR on TV luminance and power consumption using two technologies currently in deployment.

A small sample of TVs that supported the two technologies were studied using "representative" content prepared by PT100-24 members. Test results show that dynamic metadata HDR content, delivered to a dynamic metadata capable TV, can provide pictures with even greater dynamic range (higher peak luminance and more detailed luminance levels with wider colour gamut) than static HDR at the same or lower TV power consumption versus static HDR or SDR content delivered to that same TV.

DYNAMIC METADATA HIGH DYNAMIC RANGE IMPACTS ON TV POWER CONSUMPTION

1 Scope

This document presents a study of the impact of high dynamic range (HDR) technologies with "dynamic metadata" on TV luminance and power consumption. It compares the power consumption of content with dynamic metadata to the same content without dynamic metadata. Non-dynamic "static metadata" HDR technologies such as HDR10 and non-metadata HDR such as HLG, were previously studied in IEC TR 63274:2021.

This document also reviews the current HDR TV market and analyses existing HDR TV power measurement methods and considerations for any changes to those power measurement standards.

While this document studies the results of content that include Dolby Vision® and HDR10+ dynamic metadata, any comparison of these two technologies is outside of the scope of this document.

2 Normative references

There are no normative references in this document.