



D7.2 INITIAL MARKET IMPACT PLAN



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Author(s)	Wolfgang Lempp, with contributions from the project partners
EC Project Officer	Mr. Miguel Montarelo-Navajo, Miguel.MONTARELO-NAVAJO@ec.europa.eu
Abstract	This document contains a plan for dissemination activities based on initial discussions with industry and the HDR4EU user group. It also includes an outline IPR Management Strategy.
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1. Introduction

The term HDR is being used today by different market participants for different technologies. To provide some context, it is helpful to look back into recent history to understand the driving forces behind today's push towards HDR.

Only 20 years ago, the only relevant display technologies that mattered in the area of media and entertainment were film projection and CRT monitors / TV. Film was a high dynamic range technology in a wider sense, but the cinema environment was not very bright. Cinema projection was standardised to be 14 footlambert/48 nits, to match the tone curve of the film process as well as to avoid the strobing associated with a 24 fps capture rate and the 48 fps flicker rate of a butterfly shutter. Or, more precisely, the standardised maximum brightness gave the director of photography a framework for composition and lighting that allowed him to avoid unpleasant strobing. The density range of film print however allowed for very deep blacks and a dynamic range in excess of 10,000:1 (Fig. 1).

The brightness of CRTs was limited, too, mainly to avoid the emission of harmful x-rays from the screen. Specialist CRTs have been designed with extremely high dynamic range, using a thick face plate to reduce internal scatter. But a standard TV delivered a contrast of less than 1000:1 (Fig. 1). This was adequate because the real dynamic range limitation at the time came from the electronic cameras and telecine devices, which were of course generating all the content. It was also adequate for the convenience of watching TV in a dim / low light environment, while film was traditionally viewed in a blacked out room.

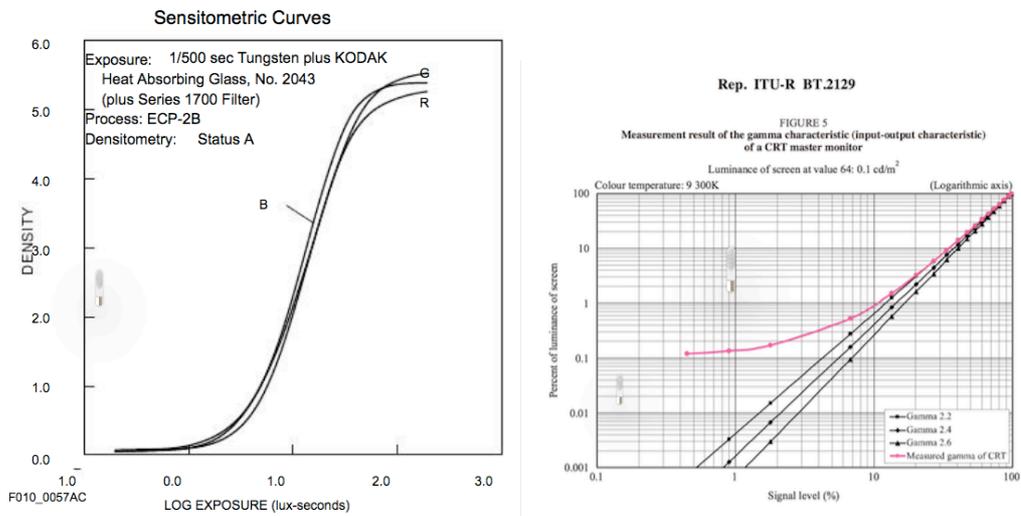


Fig. 1: Dynamic range of motion picture print film and CRT

With the arrival of digital cinema and flat screen TVs, the technical challenge was not to achieve higher brightness, but to achieve plausible black levels. The DCI, the initiative by the Hollywood Studios to formulate a digital cinema standard from the outset, had to accept a dynamic range of less than 2000:1 as a realistic target for digital cinema performance. For reasons of compatibility, the maximum brightness was kept at 48 nits, and there was not even an attempt at providing for higher screen brightness in the future.

At the same time, LCD technology of the day struggled to achieve a dynamic range better than 400:1. It was not until 2005 when the Canadian start-up Brightside demonstrated a high-brightness-high-contrast monitor with local backlight. This water-cooled prototype showed for the first time how additional brightness, together with deep blacks, could improve not only the appearance of high dynamic range content, but of conventionally mastered content, too. It did

not however attempt to directly answer the question in which way to use the extended dynamic range and higher brightness.

Almost absent from the discussion about high dynamic range is the role of flare, which occurs in any real environment as soon as there is some illumination. It is present when content is captured with a camera through a lens, it is generated inside the display device itself, it mixes with the image on the screen both when it is projected or self-illuminating, and finally it occurs within our eyes when we watch. And of course it accumulates from different sources (Fig. 2).

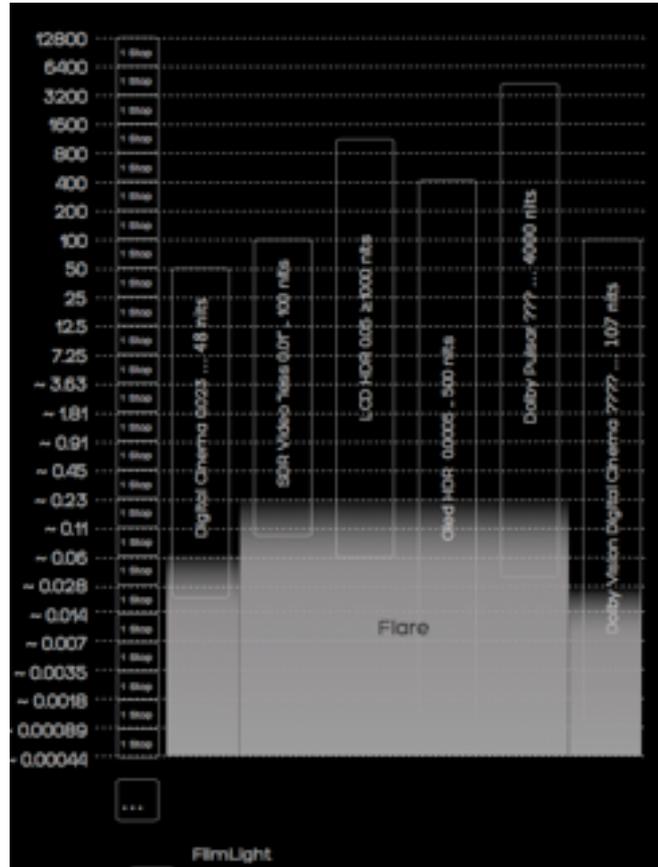


Fig. 2: Flare affecting real dynamic range

A display manufacturer has no good reason to dwell on this fact. Instead, the “infinite” dynamic range of an OLED TV is a major selling point. For a quality HDR experience however, it can be a major distraction, and it needs to be considered when discussing the relative merits of different HDR implementations.

And clearly, the trade-off between brightness and true dynamic range is more complicated than the technical specifications of any particular system would imply. While the first generation of HDR technology has largely opted for maximum compatibility with existing viewing conventions, the jury is still out with regards to the best use of HDR in cinema, at home and on the move.

This presents an opportunity for the consortium in terms of shaping the agenda for “HDR in the real world”, and this document tries to summarise the rationale behind and the plans for providing a wider perspective to HDR than the industry is currently allowing itself to take.