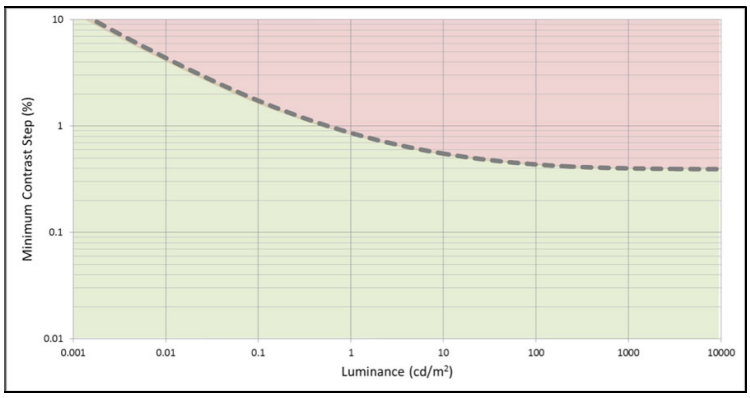
DID YOU KNOW THAT…?

OUR 4K MONITORS NOW FEATURES HDR (HIGH DYNAMIC RANGE) PROCESSING. THIS TECHNOLOGY IS AVAILABLE IN THE SERIES-LM9000 KROMA BY AEQ MONITORS.

Before 2014, a 4K video signal simply doubled Full-HD's horizontal and vertical resolution. Then several proposals were made to offer not only more, but also better pixels, displaying higher quality images by means of enhanced brightness, higher contrast and many more different possible colors.

In order to be able to represent a greater number of colors, it is necessary to increase the quantity of bits used to produce images. Changing from 8 to 10 bits to represent each RGB value has made possible to multiply by 64 the number of different available colors.

In order to enhance brightness and contrast, HDR (High Dynamic Range) technology was developed. It consists on a new video signal processing aimed to increase the dynamic range of the darkest and brightest areas of the picture. This processing is based on the fact that, when there is little light, human eye can distinguish small light increments, while it needs larger differences when illumination is higher. The Barten ramp, depicted in figure 1, shows this human eye's behavior. According this, it turns out that fewer bits can be assigned to high brightness values while a larger number of them are assigned to low brightness values.



HDR is able to make pictures displayed on the screen look closer to what we see in real life.

There are two possible ways to implement HDR, named PQ and HLG.

PQ (Perceptual Quantization SMPTE ST.2084) is a standard defining the brightness level that a monitor should display. It established an electro-optical transfer function (EOTF) where each digital word is assigned a brightness value. It uses static meta-data (according to SMPTE ST.2086) whenever their contents don't change during the length of the video clip, or dynamic meta-data (SMPTE ST.2094) when contents can change, indicating the maximum and minimum brightness values for each frame as well as for the entire contents.

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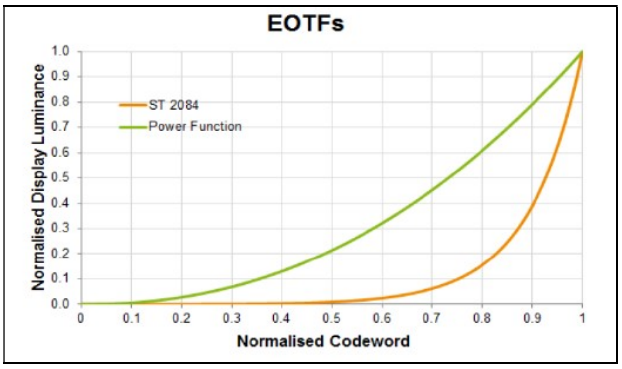

HLG (Hybrid Log-Gamma), on the other hand, is another specification facing PQ to become the industry standard for 4K. It doesn't require the use of meta-data; processing simply consists on leaving the brightness values below 100 or 120cd/m2 unchanged while a certain transfer function is applied to higher values.

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Meanwhile the industry doesn't place a clear bet on any of both proposals, they offer both HDR implementations so each production center's engineering department may choose one according to its preferences and applications. Three different PQ presets have been programmed, each one of them being more adequate for a different panel brightness range.

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