Title: 4K - Resolving the Name
Author: David Meyer
Date: Rev1.0, 8th Mar 2013

4K – Resolving the Name

Introduction

The evolution of 4K as a consumer format was inevitable. What was not inevitable was what we call it, and the inconsistency that would follow. 4K, UltraHD, UHD, 2160p? There are in fact different formats and ambiguous applications hindering this from being as simple as it should be.

I now call for clarity of both technical and consumer level nomenclature for the different variations of this format, to settle any confusion and provide unambiguous differentiation of products.

Background

The name '4K' was first applied to the next evolution in consumer HD mostly because that's what HDMI called it in their 1.4 specification back in 2009. Then last year the Consumer Electronics Association (CEA) formed the *4K Working Group*, of which I am a contributor. First on the agenda was what to call "4K", even though that name was already out of the bag. Long story short, we settled on "UltraHD", with the group quickly renamed to the *UltraHD Working Group*. It was a clear choice as it was deemed consumer friendly, and immediately implied an evolutionary status over Full-HD, the (unofficial) marketing term for 1080p.

However any new naming treaty still does not address one major point of confusion and differentiation within the format – the fact that there are two distinct ratios for 4K/UltraHD. Plus, none of us in the industry ever really used the term Full-HD. We'd always say 1080p, often suffixed with the other crucial piece of information – frame rate.

History of 4K

So where did the term 4K come from? Answer – Digital Cinema, often called D-Cinema. The format was defined by SMPTE as a fixed 4,096 pixels wide, with the active vertical resolution then being variable depending on the aspect ratio of the content (aka movie). That's in the software, but of course hardware (eg; a projector) can't then be made with a variable Vres, so they employ a fixed 2,160 pixels in height. They then simply don't use them all when driving content with aspect ratios greater than 1.89:1.

This is a simple and logical evolution on '2K' D-Cinema, which still accounts for around 98% of all D-cinemas in deployment. 2K hardware resolution is 2,048 x 1,080 pixels. 4K is precisely double in each dimension. The consumer version of 2K D-Cinema is of course 1920 x 1080, better known simply as 1080p.

Progression to Consumer

It doesn't seem likely that we'll ever see widespread 4,096 Hres content make it to the consumer domain. However HDMI included the 4096 x 2160 format in the 4K spec as it's a SMPTE standard. In fact it was included as a 24fps format only, true to its cinematic roots. However the main focus of the 4K specification in HDMI 1.4 was the true consumer formats to come – 3840 x 2160p, precisely double 1080p in width and height. Frame rates are limited to the 24-30 range due to existing bandwidth limitations of HDMI.

The 1080p Example

So we've established that 1080p is the consumer version of 2K, horizontally trimmed to a neat 1.78:1 aspect ratio. We never had any problem with the term '1080p' at a technical or industry level, but admittedly consumers did not

need to get bogged down by such things. The term '*Full-HD*' was a great adoption to address this marketing need. It was not technical, in fact not even really definitive, but it did the trick. At no point were the lines blurred with the term 2K – that stayed in the commercial space. Admittedly we never had the 2048 x 1080 format to deal with in the consumer space either, alleviating the temptation for the cross-over. Please leave it that way!

The Proposal

What I propose for broad consideration is this;

1. The name '**4K**' be applied officially & exclusively in the 'Pro-sumer' space, being strictly 4096 x 2160, at 24fps per the SMPTE standard, or other frame rates in the demand arises.
2. The term '**2160p**' be adopted as the technical reference term for 3840 x 2160p format. This is a natural, linear and all-defining evolution of the decades long established practice of referencing vertical resolution, interlaced or progressive (which is now arguably redundant at this level), suffixed by frame rate. It would then be unambiguous, and we'd know exactly what is being referred to in any given context.
3. The term '**UltraHD**' should then be applied concurrently as the consumer friendly marketing term for 2160p, as distinct from 4K. Exactly the same as how Full-HD was applied in reference to 1080p.

That is, 4K is used exclusively for the video format with active Hres of 4096 pixels, and 2160p (technical) or UltraHD (consumer) to be applied exclusively for the 3840 Hres format. After all, 3840 pixels wide can hardly be called 4K anyway. It's 3.8K! Nobody wants a law suit for short delivery of pixels!

Example

To this end, Sony's VPL-VW1000ES projector, with native 4096 x 2160 resolution panel, could legitimately be called a **4K** projector, specifically avoiding the term UltraHD. Used consistently we would then all know instantly what that means. By comparison, under this proposed naming regime Sony's XBR-84X900 TV would be referred to as **UltraHD** (but not 4K), as it's native pixel count is 3840 x 2160. I'm not singling out Sony for any reason other than they happen to have at least one display product in each of these discrete ratios, making for a clear example.

Conclusion

Using the terms '4K' and 'UltraHD' are each non-definitive. As such they leave room for confusion and lack of distinction between the different formats on offer. 2160p is far more accurate and definitive, particularly when suffixed with frame rate, which then enables us in the know to calculate bandwidth requirements etc. However it is not consumer friendly. BUT there is room for all three names;

- **4K** for 4096 x 2160
- **2160p** for 3840 x 2160
- **UltraHD** as the consumer friendly marketing name for 2160p

I for one would be very happy with this. It would be far easier to educate on the bandwidth implications of a 2160p24 vs 2160p60 source, for example (ie; double through HDMI), rather than having to deal solely with the relatively non-descriptive name 'UltraHD'.