

# Ready. Steady. Ultra HD.

**SES White Paper**  
September 2015

The story of why Ultra HD is ready for primetime, and why SES is in the pole position.

## The Ultra HD Revolution

What do telecasts of haute couture shows, professional football events and nu metal rock concerts have in common?

It depends on when you were asked this question. If it was several years back, the answer would probably be: 'nothing very much'. However, in 2014, the answer would have been crystal clear: Ultra HD (also referred to as 4K)<sup>1</sup>.

At the end of 2014, two televised rock concerts took place featuring Linkin Park and Die Fantastischen Vier (The Fantastic Four), two highly popular bands acclaimed for pushing their respective musical genres to exciting new heights. What we saw at the concerts were the usual legions of screaming fans, the musicians performing their hearts out on stage, and the roadies in their black shirts running around to make sure sets went off without a hitch.

Yet, what weren't as obvious to those attending the concerts were the teams of satellite engineers, cameramen, lighting, and sound technicians working unobtrusively in the background. These concerts were making broadcast history, because they were being piped live to viewers in Ultra HD for the very first time.



<sup>1</sup> The simplest way of defining the difference between 4K and Ultra HD is this: 4K is a digital cinema standard with resolution of 4096 x 2160 pixels whereas Ultra HD in the TV industry is 4 times the resolution of HD that is 3840 x 2160 pixels.

## Welcome to the Age of Ultra HD

The Linkin Park concert was the overture to a slew of world premieres for Ultra HD, from the first demo channels to the first live and encrypted transmission.

In February 2015, SES – a pioneer in digital TV, HD and Ultra HD – successfully launched more Ultra HD demo channels in Europe. In April, SES delivered the first live linear Ultra HD broadcast to a cable system in the US. In June, it launched a demo channel enabling US cable operators to prepare their networks for Ultra HD trials. And in July, SES initiated the first-ever live and linear Ultra HD trial with the cable operator Armstrong.

### SES's many firsts in Ultra HD.

The next quantum leap came on 1 September 2015. SES started broadcasting the world's first global Ultra HD channel, Fashion One 4K. It is also the first regular English language free-to-air Ultra HD channel to broadcast in Europe, North America and Latin America.

A couple of days later, shopping channel pearl.tv became the first in Germany to broadcast Ultra HD on SES satellites. Following suit are High TV, an Ultra HD channel for North America which will air in mid-September and TERN's new Ultra HD channel which will launch in Europe in October this year. Both these channels will broadcast via SES satellites.

It's crystal clear: the future of TV has begun. And there's more to come, with SES set to announce further Ultra HD channels on its fleet in the next few months.

*Photo: Linkin Park concert in Berlin Nov 2014*



## More Vivid Than Real Life

What's the secret of Ultra HD's success?

More pixels, more colour, more brilliance: Ultra HD offers an immersive new viewing experience.

Ultra HD delivers 3840 x 2160 pixels, corresponding to four times HD resolution of 1080p full HD. This equates to eight million pixels compared to two million pixels per TV screen. Ultra HD delivers more colours, more contrast and better pixels, improving image clarity with finer detail, and greater texture.

Ultra HD delivers a larger field of view, which means the viewing distance for an immersive Ultra HD experience is 1.5 times the picture height compared to 3 times of that of HD. This enables viewers to figuratively 'walk' into the picture without seeing the grid-like structure of the image.

The result is a completely revolutionary viewing experience. Once seen, the impact of Ultra HD is never forgotten. To observers who've watched Ultra HD content, a common refrain is that it opens a completely new dimension.

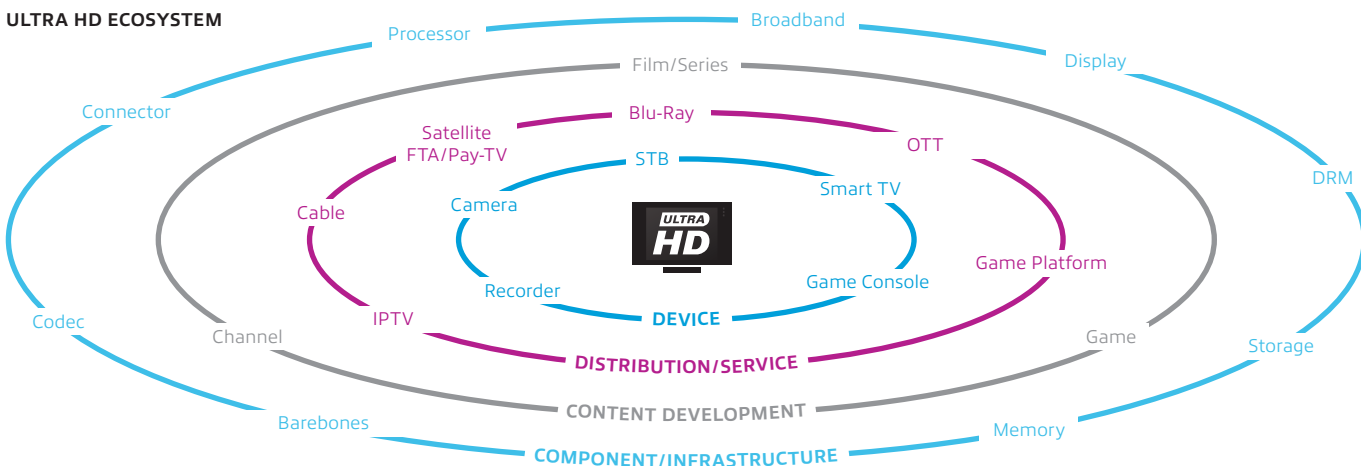
Once you've experienced Ultra HD, you'll settle for nothing less.

## The Virtuous Circle

Demos, content, high-technical standards, devices, delivery infrastructure – the elements that enable Ultra HD are falling into place. The dynamics driving Ultra HD development can be best described as a virtuous circle, composed of elements that mutually reinforce one another for bigger and better outcomes across business and consumer markets.

The crucial pieces of the Ultra HD ecosystem include the availability of screens and devices, the availability of content, and the technology that's used to transmit it.

### ULTRA HD ECOSYSTEM

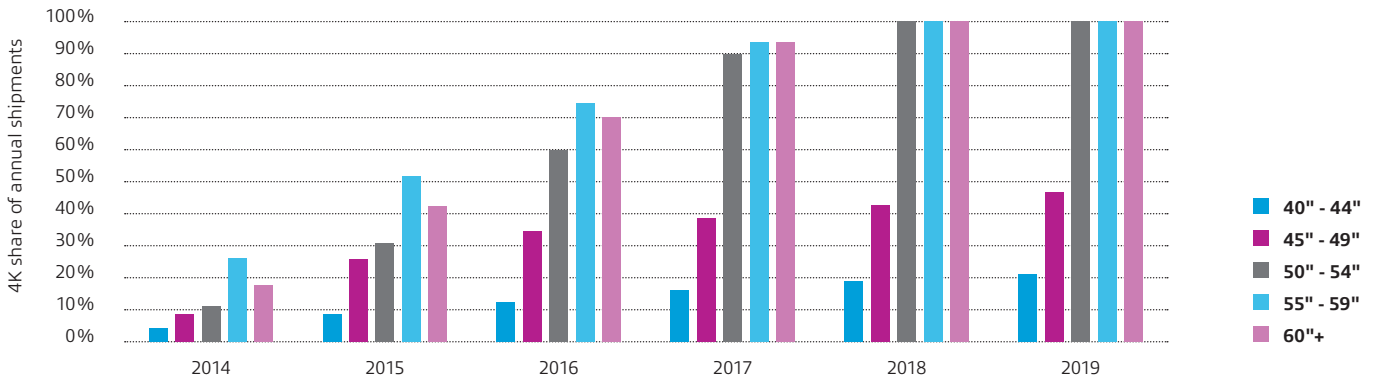


## Screens and Access Devices

Let's start with the screens. Prices of Ultra HD TV screens have fallen within reach of many households in 2015, thanks to an exponential increase in supply, a wider choice of screen

sizes and a big drop in the average price. Already, Ultra HD accounts for 13% of all TV unit shipments in 2015, rising to nearly half of all 50" and larger sets<sup>1</sup>.

### 4K TV SHIPMENT MIX BY SCREEN SIZE



Source: IHS, 2015

IHS data suggest that 15 million UHD screens were shipped in 2014 and there will be 31 million shipped this year, globally. Given the industry's experience with consumers' rapid switchover from SD (standard definition) to HD (high definition) when it was launched, expectations are high that Ultra HD – which takes the viewing experience to a whole new level – will be taken up just as enthusiastically.

Offering four times the resolution of 1080p HD, Ultra HD Blu-ray takes advantage of new additional technology features recently introduced to 4K TVs: High Dynamic Range (HDR) and Wider Colour Gamut (WCG). The result will be an at-home experience that matches what viewers can get at the cinema - with more colours, incredible contrast and uncompromised sound quality.

Further complementing Ultra HD-ready screens and access devices are plans by major manufacturers like Sony and Panasonic to release Ultra HD Blu-ray devices by the end of 2015.

### ULTRA HD SCREENS AND ACCESS DEVICES



<sup>1</sup> <http://www.digitaltvnews.net/?p=19031>





## Content Availability

What's the content that's going to fill the screens up?

Hollywood studios and major TV networks such as HBO have announced that they will shoot and produce all content on 4K, coming off the back of massive global successes like 'The Hobbit', 'Transformers: The Age of Extinction' and 'Game of Thrones'. Many studios are remastering old 35mm films, and more than 1,200 movies and TV shows are currently available in Ultra HD<sup>2</sup>, with cinemas having shown films shot in 4K for some time. 226 movies with a master copy in Ultra HD have been released, or are expected to be released, by the end of 2015<sup>3</sup>.

And then there are the broadcasting pioneers like Fashion One 4K and Pearl.tv channels, producing their own content for an enriching linear TV viewing experience.

Disrupters to the traditional broadcasting industry have added more impetus to Ultra HD's virtuous circle. Netflix and Amazon have thrown their respective hats into the ring by producing their own wildly successful, award winning 4K content like 'House of Cards' and 'Transparent'. And according to Northern Sky Research (NSR), Netflix's established Ultra HD subscriber base is already demonstrating higher average revenues per user (ARPU) as a result<sup>4</sup>. This is due to the fact that Netflix can sell the same content at a higher price when it is in Ultra HD.

In the wake of this big bang, the Ultra HD content universe can only get bigger.

<sup>2, 3</sup> Source: IHS

<sup>4</sup> <http://www.nsr.com/news-resources/the-bottom-line/ultrahd-an-ultra-growth-story/>

## Closing the Loop with Satellites

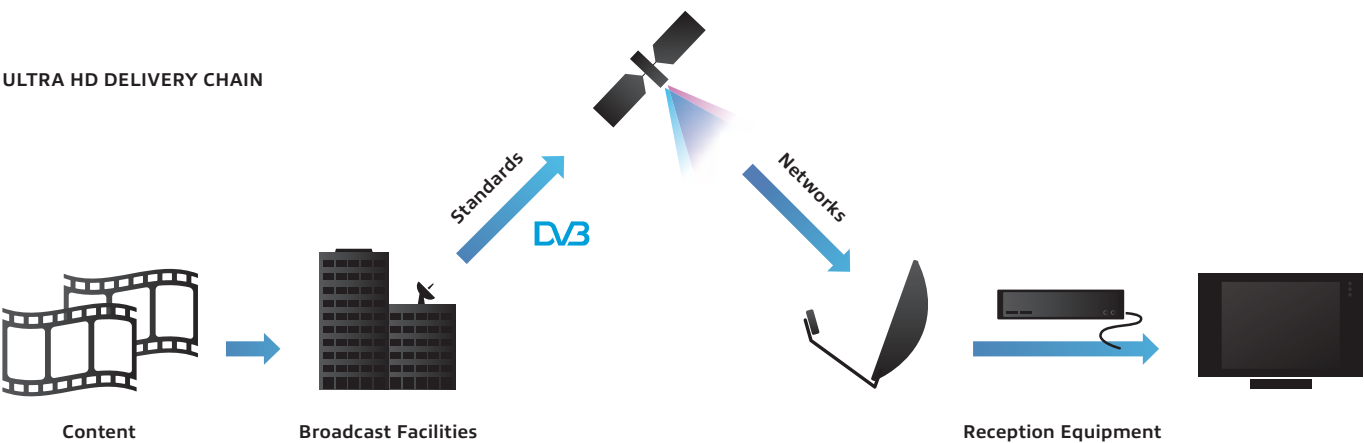
Finally, in order to close the loop of the virtuous circle, an optimal means of transmitting Ultra HD content to large audiences is required.

Satellites are a natural platform for broadcasting Ultra HD content, thanks to their bandwidth availability and footprints which cover countries and continents – enabling viewers to receive the same quality signal wherever they may be located within the satellite coverage area. And the best part is, satellites are Ultra HD ready and require no modification to accommodate Ultra HD transmissions.

One of the biggest challenges, however, is to translate the innovative technology into a viable business model. If an increase of the picture resolution by a factor of four translates into the same increase of the related capacity cost,

Ultra HD transmissions can become prohibitively expensive for broadcasters and service providers. The solution is an improved compression standard. The High Efficiency Video Coding (HEVC) standard has made inroads and already helps broadcasters already today to transmit Ultra HD at less than four times the HD capacity.

As one of the largest digital video platforms in the world, SES has supported these developments right from the start. Home to over 40 direct-to-home TV platforms and nearly 7,000 TV channels, reaching 312 million households and 1.1 billion people worldwide, SES is in the pole position to drive Ultra HD forward and expand its success in an ever growing and rapidly accelerating virtuous circle.



### CONTENT DELIVERY

#### SATELLITE IS LEADING INFRASTRUCTURE TO DELIVER ULTRA HD CONTENT

	CAPACITY	COVERAGE	LOW COST/HH	QUALITY
Satellite				
Terrestrial	n.a.	n.a.	n.a.	
Cable	n.a.		n.a.	
IPTV		n.a.		

## The Future is Bright

### What's next?

The big international consumer electronics show IFA in Berlin and the International Broadcasting Convention (IBC) in Amsterdam will see the introduction of two new elements driving the next phase of the Ultra HD development.

With LG Electronics and Dolby Laboratories, SES carried out the world's first broadcasting trials and demos of High Dynamic Range (HDR) and Wide Colour Gamut (WCG) technologies. Both these technologies are expected to become part of the official UHD broadcasting standards by 2017. They will bring a wider range of brightness and darkness levels and deliver more vivid and a larger variety of colours on the screen.

In a further step, Higher Frame Rate (HFR) technology is expected to become part of the UHD broadcast standards by 2019. It will increase the frequency of broadcast pictures from 50/60 to 100/120 frames per second.

Altogether these improvements will allow television pictures to represent our world in an ever more realistic manner and will make the TV viewing experience fully immersive.

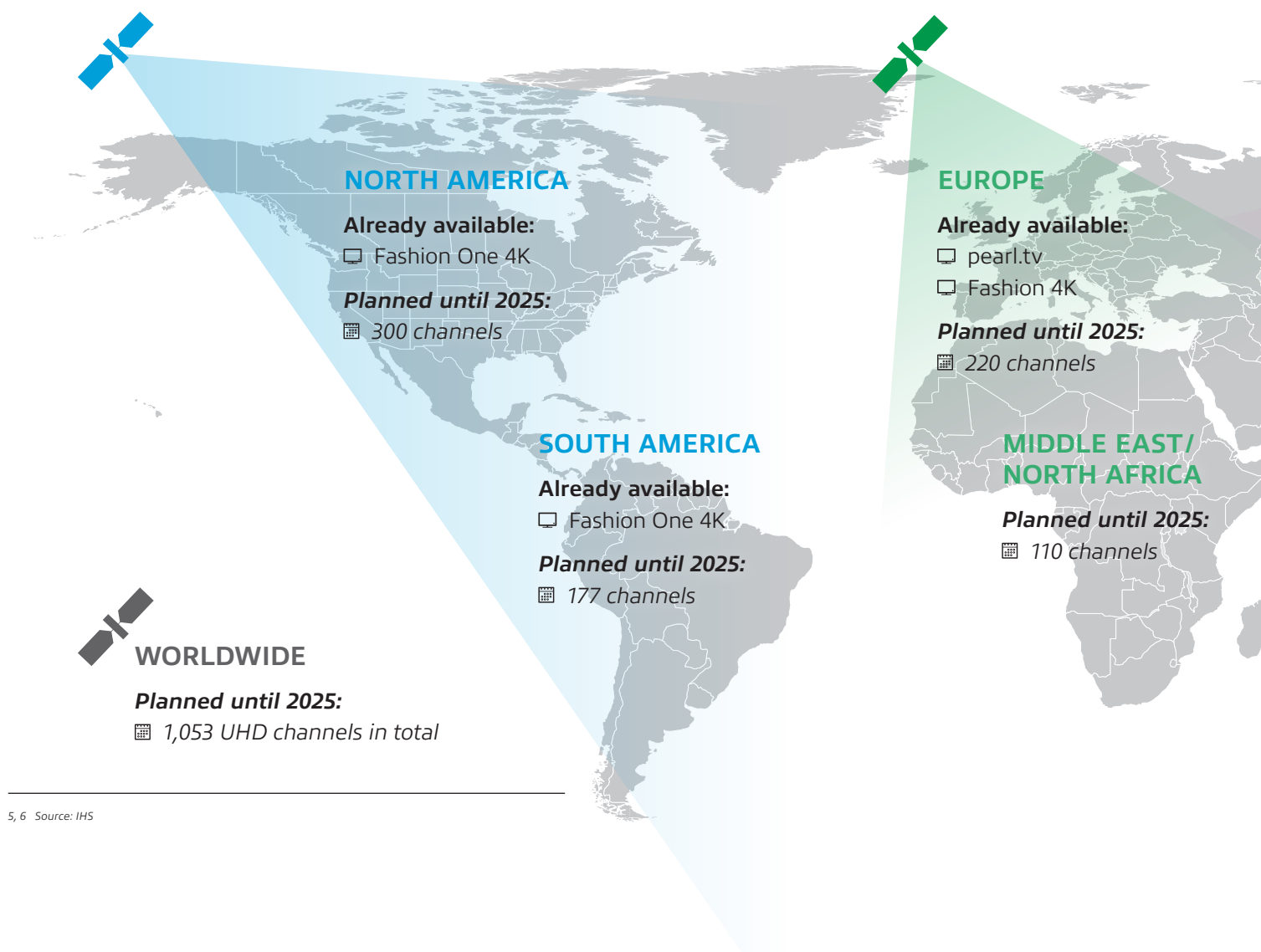
### What's more?

IHS expects the shipments of Ultra HD screens to increase drastically every year, leading to an estimated 74 million UHD screens to be shipped in 2019. Based on this, the number of Ultra HD equipped household will rise exponentially and grow up to 240 million worldwide by 2019. No more standard definition TVs will be sold in the world from 2016 onwards. HD TV sales will slowly decrease over the next few years, while full HD TV will stagnate. By 2020, Ultra HD TV sales will outstrip that of HD TVs globally<sup>5</sup>.

The number of Ultra HD channels, too, is expected to grow dramatically and reach more than 1,000 in 10 years. The US, Asia Pacific and Europe emerge as the three regions driving this growth – each averaging at least an annual growth rate of 20% until 2015<sup>6</sup>.

Once equipped, consumers will, of course, demand more and more Ultra HD content, causing content producers to sign up in droves for this revolutionary viewing experience. The addition of satellite is the final catalyst that completes the conditions needed for the emergence, and continuous expansion, of a genuine virtuous Ultra HD circle.

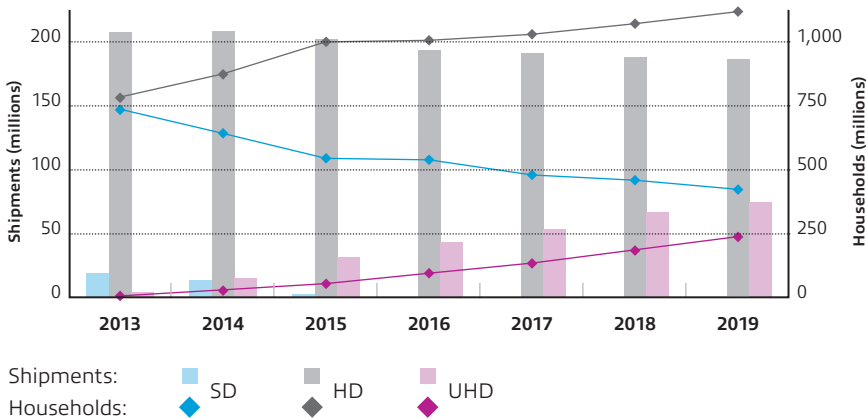
### ULTRA HD CHANNELS ON SATELLITE



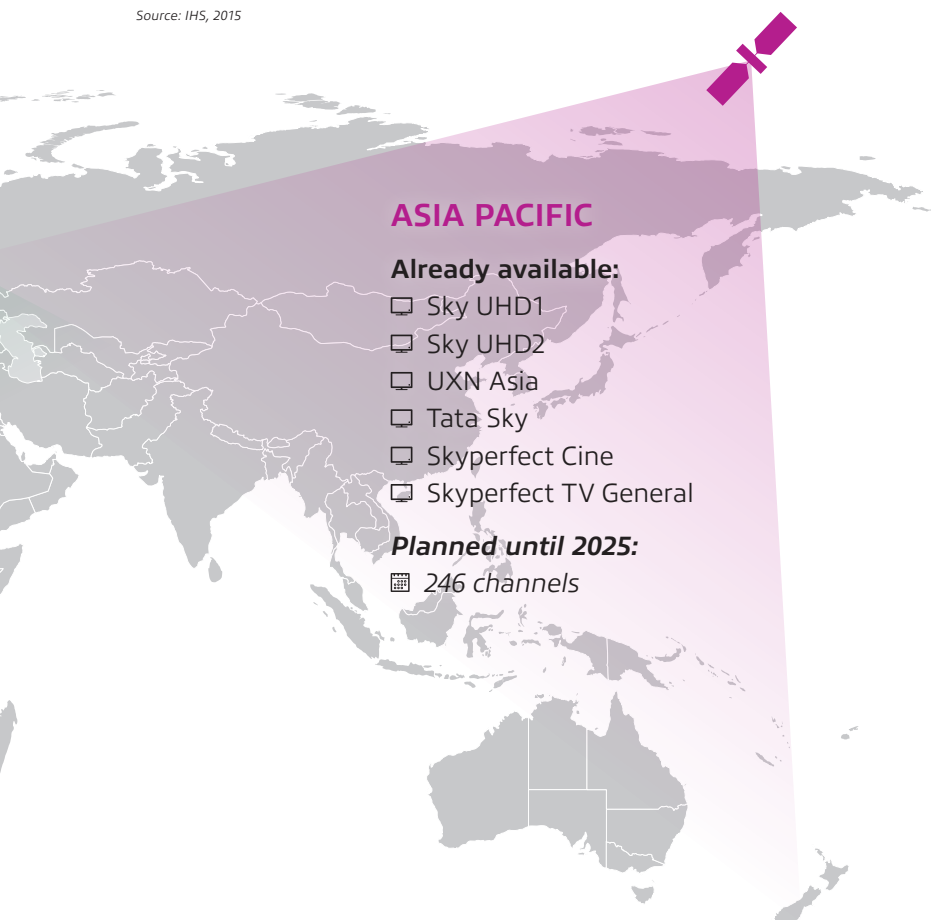


As the age of Ultra HD dawns upon billions of viewers across the planet, there's no turning back: be prepared for an ultra-attractive premium experience as our new way of life. Ready, steady, go.

#### WORLDWIDE 4K TV SET FORECAST



Source: IHS, 2015



## SES Milestones –

### Timeline of SES's recent achievements on the Ultra HD front

#### APRIL 2013

Launches its first Ultra HD demo broadcast via SES's prime European orbital position of 19.2 degrees East

#### APRIL 2014

Oversees world premiere of an Ultra HD broadcast of a live football match in the new compression standard HEVC

#### JUNE 2014

Three matches broadcast live in UHD via SES satellites during FIFA World cup

#### NOVEMBER 2015

Broadcast a live concert of Linkin Park in UHD on its dedicated demo channel

#### FEBRUARY 2015

Launched two additional UHD demonstration channels broadcast via 19.2 degrees East, 5 degrees East and 28.2 degrees east

#### APRIL 2015

Delivers world's first live and linear Ultra HD to cable system at NAB

#### JUNE 2015

New demo channel enables cable operators and content distributors to prepare their networks for Ultra HD trials

#### JULY 2015

First-of-its-kind architecture set to accelerate Ultra HD delivery to cable households

#### JULY 2015

Takes Ultra HD to Capitol Hill – demo event showcases capabilities of satellite

#### JULY 2015

Initiated the first-ever live and linear Ultra HD (UHD) trial with cable MSO Armstrong at NAB

#### SEPTEMBER 2015

Fashion One 4K/ Fashion 4K launched on SES satellites

#### SEPTEMBER 2015

pearl.tv 4K channel launches on SES satellites

#### SEPTEMBER 2015

SES to broadcast High TV in mid September

#### SEPTEMBER 2015

TERN's new Ultra HD channel will launch in October 2015 and will be broadcast via SES in Europe

# Ultra HD: The Next Generation Video Experience is here.

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Published in September 2015.

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