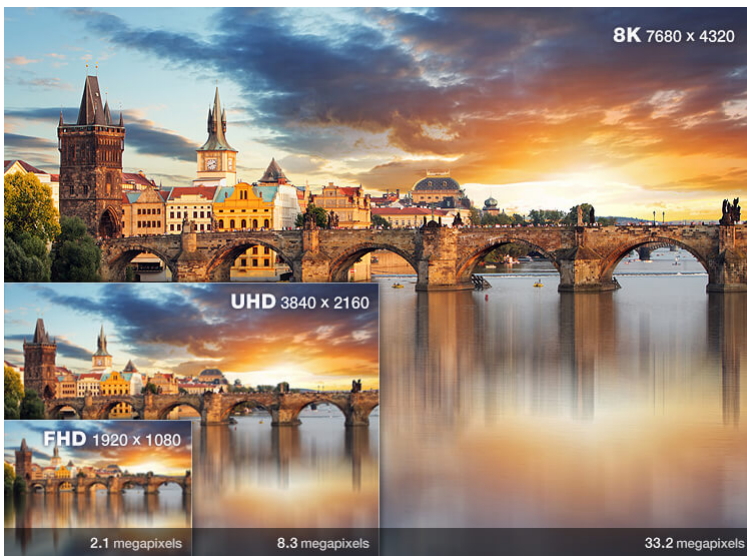




# 8K Resolution: The Future of Digital Displays

## What is 8K?

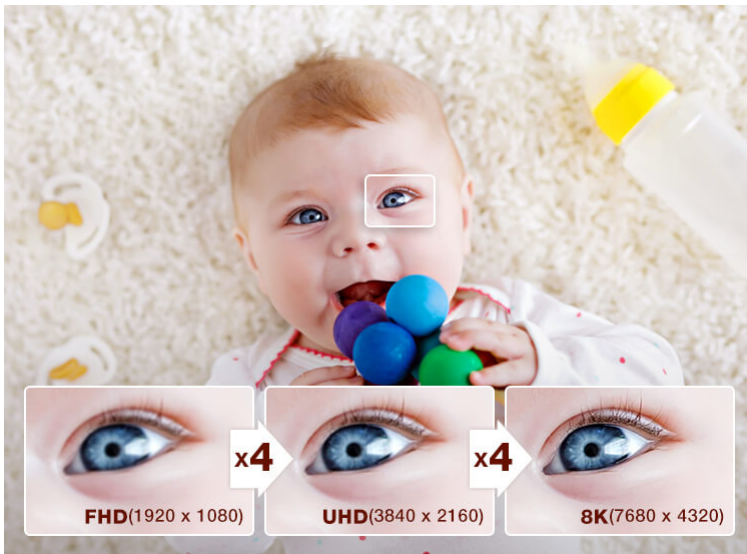
8K resolution, also known as 8K UHD, is the highest resolution of ultra-high definition television (UHDTV) currently available. It boasts an impressive pixel resolution of 7,680 x 4,320—also referred to as 4,320p or 33.2 megapixels.



To understand the scale of this, 8K is four times clearer than a 4K TV. 4K UHD uses a considerably smaller resolution of either 3,840 x 2,160p (for television and consumer media) or 4,096 x 2,160p (which is the DCI 4K used in cinemas).

4K UHD was already considered a big step forward in color realism and detailed imagery from full high definition (FHD), which used a resolution of just 1,920 x 1,080p. 8K UHD pushes the quality of displays even further forward.

Resolution is an important aspect of picture quality. A larger resolution creates a sharper image, giving the viewer greater detail. When you look closely at the same visuals but in different resolutions, you can see how the increased resolution improves quality.



Another way to compare scales of the resolution is the file sizes required to produce images of this quality. The raw footage of a 90-minute movie would average 6,000 GB for 4K UHD, whereas the detail required for 8K UHD would dramatically increase the file size to approximately 18,000 GB.

Although this currently poses an issue for streaming services and file transfer due to the size of data, some of the world's biggest broadcasters are moving towards 8K UHD and are working on solutions to increase wider adoption.

## Who is making 8K UHD content?

Despite the large file sizes and bandwidth required to store, transfer and stream 8K UHD video, native 8K content offers a drastic improvement to the image quality. This is why major content providers are investing in content production in this high resolution.

NHK—Japan's national public broadcasting organization—are leaders in research into the technology which they describe as "Super Hi-Vision". They are also one of a few companies who has managed to create a small broadcasting camera that is equipped with an 8K image sensor.

Korean Broadcasting System (KBS) has followed NHK's lead and are using the technology. For the 2018 PyeongChang Winter Olympics, KBS captured the event in 8K.

Sporting events are a great way to experiment with and showcase enhanced resolutions. For the 2018 FIFA World Cup, Brazilian television network Rede Globo (also known as Globo) broadcast games in 8K at Rio de Janeiro's Museu de Amanhã (Museum of Tomorrow) as part of an exhibition. NHK has also already revealed their plans for highly realistic 8K broadcasts of the 2020 Tokyo Olympics.





Although 8K UHD is not yet widely available, broadcasters and manufacturers are investing heavily in the technology. NHK began their roadmap for UHDTV back in 2012 and now, this December, they will launch an 8K channel.

With the spread of 8K content, 2018 is set to be the year when 8K is widely adopted.

The ability to upscale the existing 4K technology will also be a contributing factor to the growth and increased adoption of 8K UHD. For example, Samsung's Q9S uses artificial intelligence (AI) to improve lower resolution content. Using a proprietary algorithm, the display enhances existing images by creating detail, restoring edges and reducing noise. AI offers a potential solution to the lack of content filmed in 8K.

## What 8K devices are available?

Although the mainstream market is still focused on 4K UHD displays, 8K TVs are available for consumers to purchase and their adoption will continue to rise.

The 8K technology was first used in a TV screen at the International Consumer Electronics Show (CES) in 2012. Samsung debuted their 110" 8K 3D LCD TV at CES in 2015 and have continued to exhibit new innovations, such as a 98" curved model in 2016 and, most recently, the 85" QLED TV at this year's show.

Samsung Electronics is also set to launch 65", 75" and 85" 8K QLED TVs this September. Alongside the utilization of AI to combat the lack of high-resolution content, Samsung Electronics plans to support an 8K ecosystem.





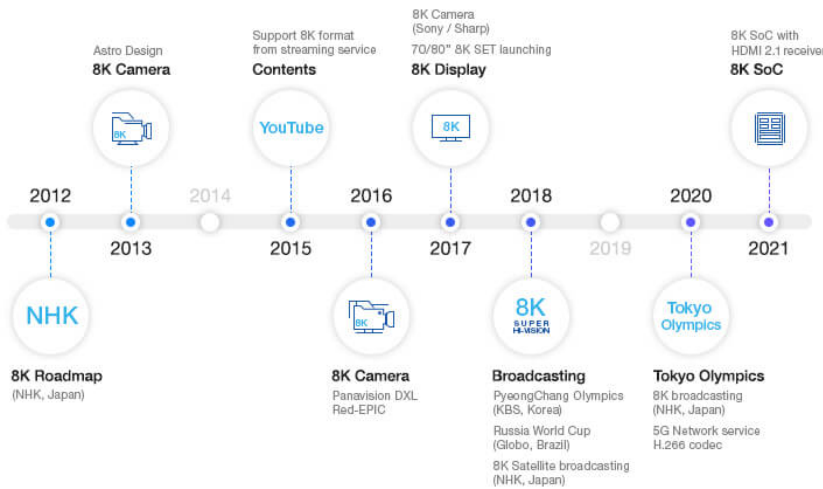
For 8K to become mainstream, the technology needs a supporting infrastructure—from production to broadcasting. 8K resolution uptake among camera and equipment makers as well as the adoption of 8K content by Hollywood studios will expedite an era of 8K TV.

Despite the teasers of 8K’s potential earlier in the decade, the technology was held back by the lack of cameras capable of recording video content in 8K resolution. The first 8K camera was not revealed until 2013 by Astro Design—the whole year later after the first 8K TV was introduced.

RED is the leading manufacturer of professional digital cameras and they are moving forward with 8K cameras. Their fourth evolution was unveiled in October 2017 as they continue to strive to improve dynamic range and reduce noise. Other manufacturers are also realizing the potential of the technology, with Cinemartin set to launch Fran—an 8K camera with 50MP sensor and a global shutter—later this year.

## When will 8K become mainstream?

Considering the time passed since the technology’s debut at trade shows, 8K’s adoption may appear slow. However, 8K is ready to enter the mainstream and its growth could happen faster than expected.

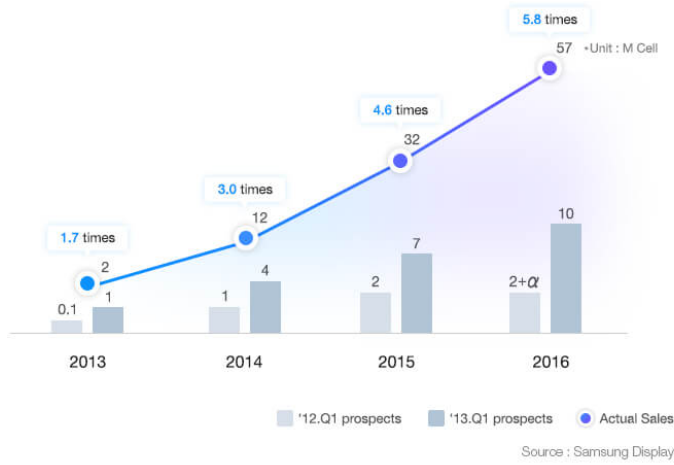


At the current rate of the 8K infrastructure development, the technology will remain the key trend in displays and television—and the mainstream adoption will be fast and likely to occur within the next two years.

One of the reasons why we predict that consumers will quickly upgrade to 8K is due to the unexpected readiness we saw with 4K. The transition from FHD to 4K happened way faster than projected—with sales exceeding projections nearly six-fold within a 4-year period.

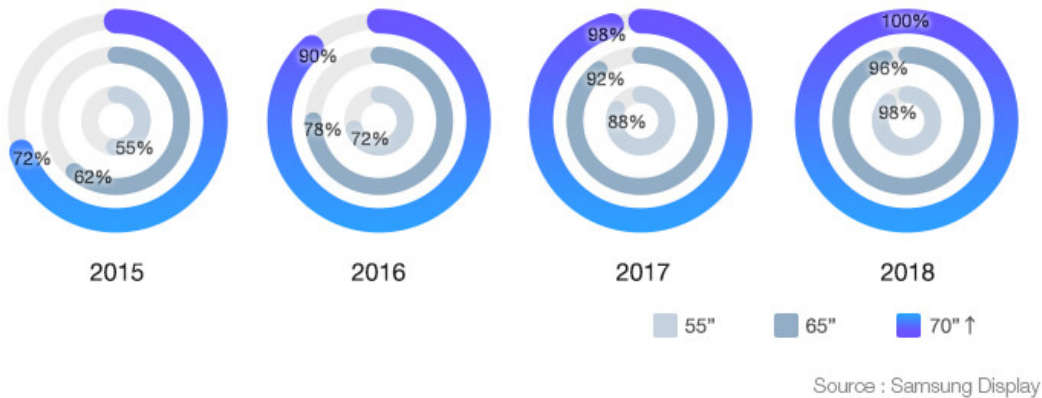


### 4K Prospects vs. Actual Sales



4K market grew much faster than expected, with actual sales exceeding projections nearly 6-fold in 2016.

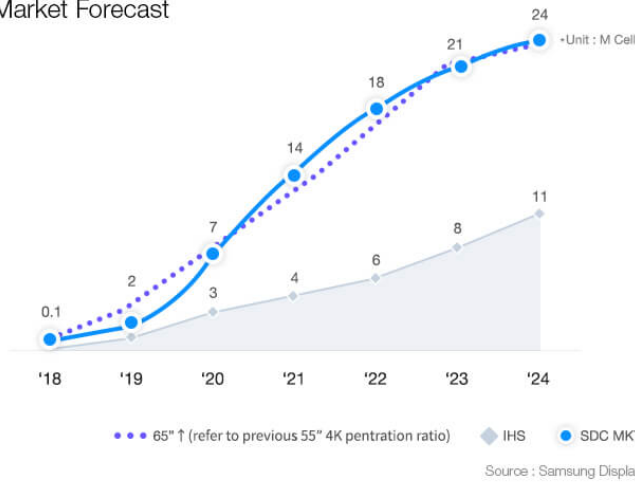
### 55" ↑ 4K Transition Ratio





For screens of 55" and larger, 4K adoption went even faster and quickly became ubiquitous. In 2018, 100% of the large units produced use at least 4K technology.

8K Market Forecast



According to IHS Markit's projections for 8K adoption, 8K sales will grow from just 0.1 million units in 2018 to 24 million by 2024.

The same is likely to happen again for 8K. Based on Samsung Display demand data, we expect over 7 million units sold by 2020.

## Conclusion

Ultra-high picture quality and hyper-realistic images will soon become the new normal, thanks to the rise of 8K.

If you're interested in learning more about 8K, this is the first part in our new series exploring the technology. Our next publication will look at the benefits of 8K.

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