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# The Introduction of UHD TV

2015.09

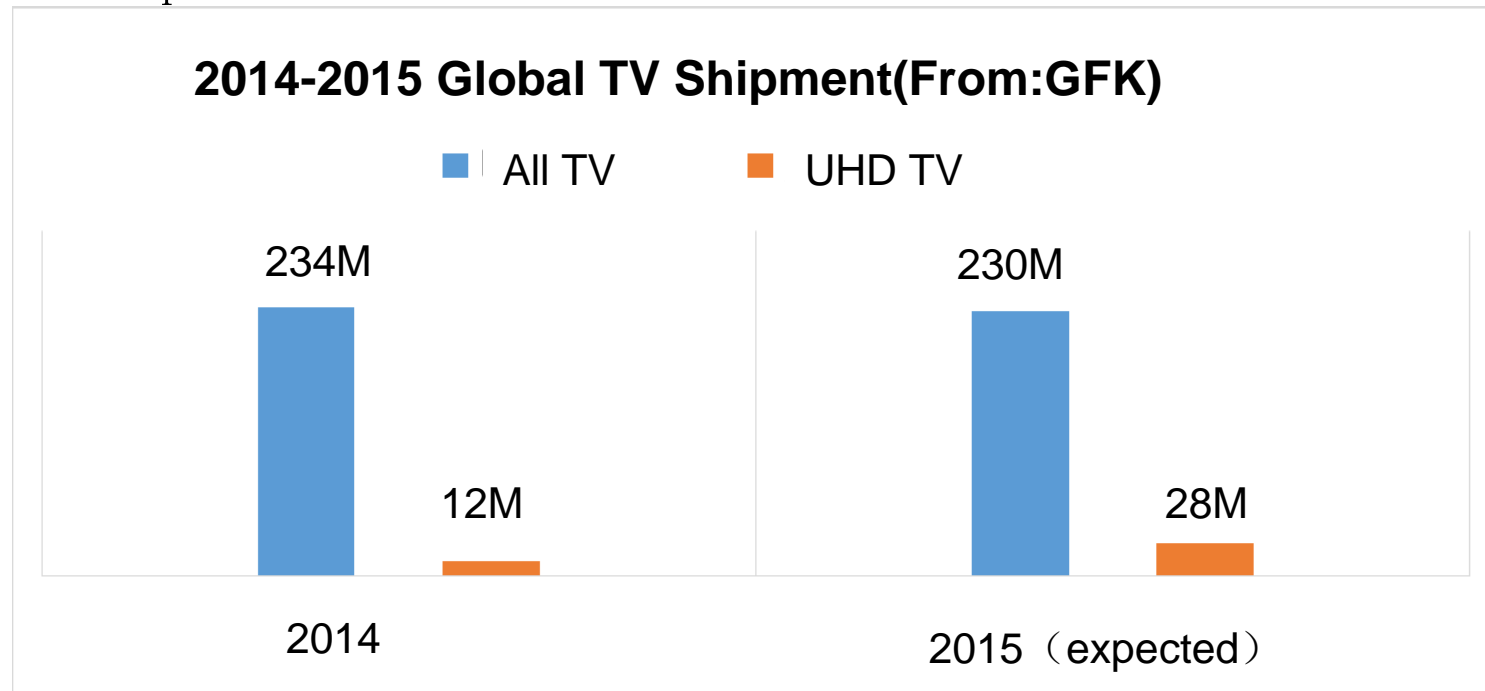
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# 1. The Industry of UHD TV

## UHD TV Shipment

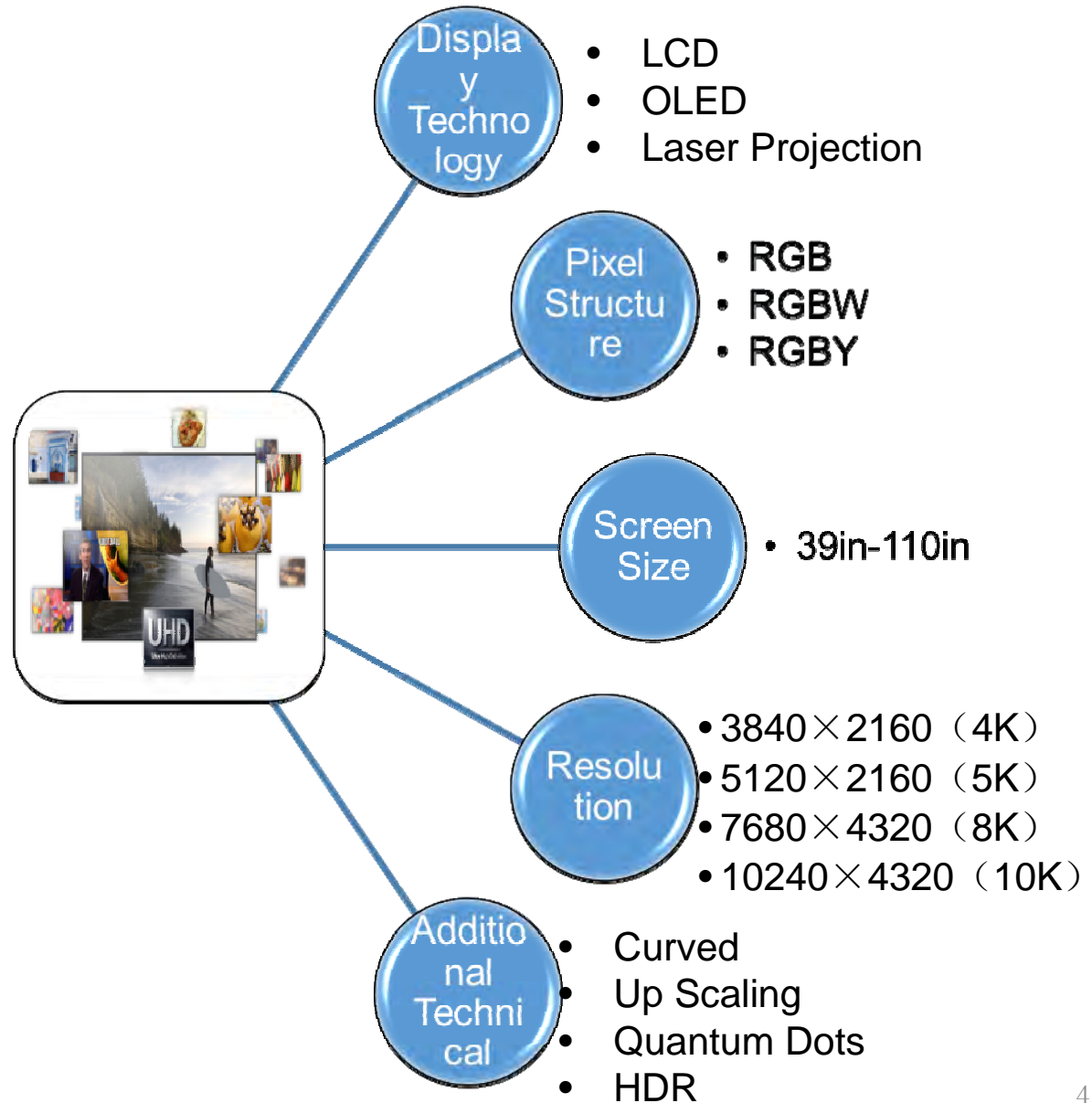


In 2012 ,UHD TV began to enter the market, and favored widely by consumers for high-definition . GFK expected after experiencing the 2014 World Cup, in 2015 global TV retail volume will be reduced by nearly 4 million units, down nearly 2%. In contrast UHD TV set sales will rise, expected to exceed 28 million units, of which the largest part is likely to sell in China, 40% of households will have ultra-high-definition television.

# 1. 超高清电视产业

## UHD TV Products

Currently, more than 99% of UHD TV on sales are 4K UHD LCD TV. 4K UHD LCD TV is mainly divided into the traditional RGB pixel structure and RGBW / RGBY new pixel structure of the two products.



# 1. The Industry of UHD TV

## UHD TV Broadcasting (Transmission Technology)

### Satellite transmission

- In 2014, China, Malaysia, India, Luxembourg, Germany, Russia, the Czech Republic and other countries have successfully tested a satellite signal transmission 4K UHD video. 2016 Rio Olympic Games on the occasion, Japan will again launch a new satellite, used to transmit 4K TV signals.

### Terrestrial transmission

- In 2014, Japan Kansai TV, Czech CRa, France HD Forum, the British BBC, Technicolor and other US agencies successfully tested on the ground UHD broadcasts. British BBC also on the World Cup and Commonwealth Games were UHD broadcast.

### Cable and fiber transmission

- In February of 2013, Japan KDDI and JCOM jointly developed UHDTV image transmission technology, that can transmit 1080p, 4K and higher 8K. In the same year, Spanish Telefonica company demonstrated the use of fiber transmission 100M 4K technology, laboratory demonstrated by the US cable TV network transmission 4K UHD technology. In October of 2014, Vodafone New Zealand branch of undersea fiber cable transmission test 4K television signals and succeed

### Internet transmission

- In 2013, Japan OKI Electric Industry Company successfully adopt IPv6 technology 4K UHDTV transmission from Singapore to Tokyo and Philippines, the video bit rate up to 120Mbps. In April, China Tianjin IPTV broadband network radio and television use tested 4K UHD broadcast technology. In January and March of 2014, the United States YouTube and Elemental Technologies company have demonstrated respectively VP9 and HEVC encoding techniques 4K UHD Internet-based streaming technology

### Mixed broadcast technology

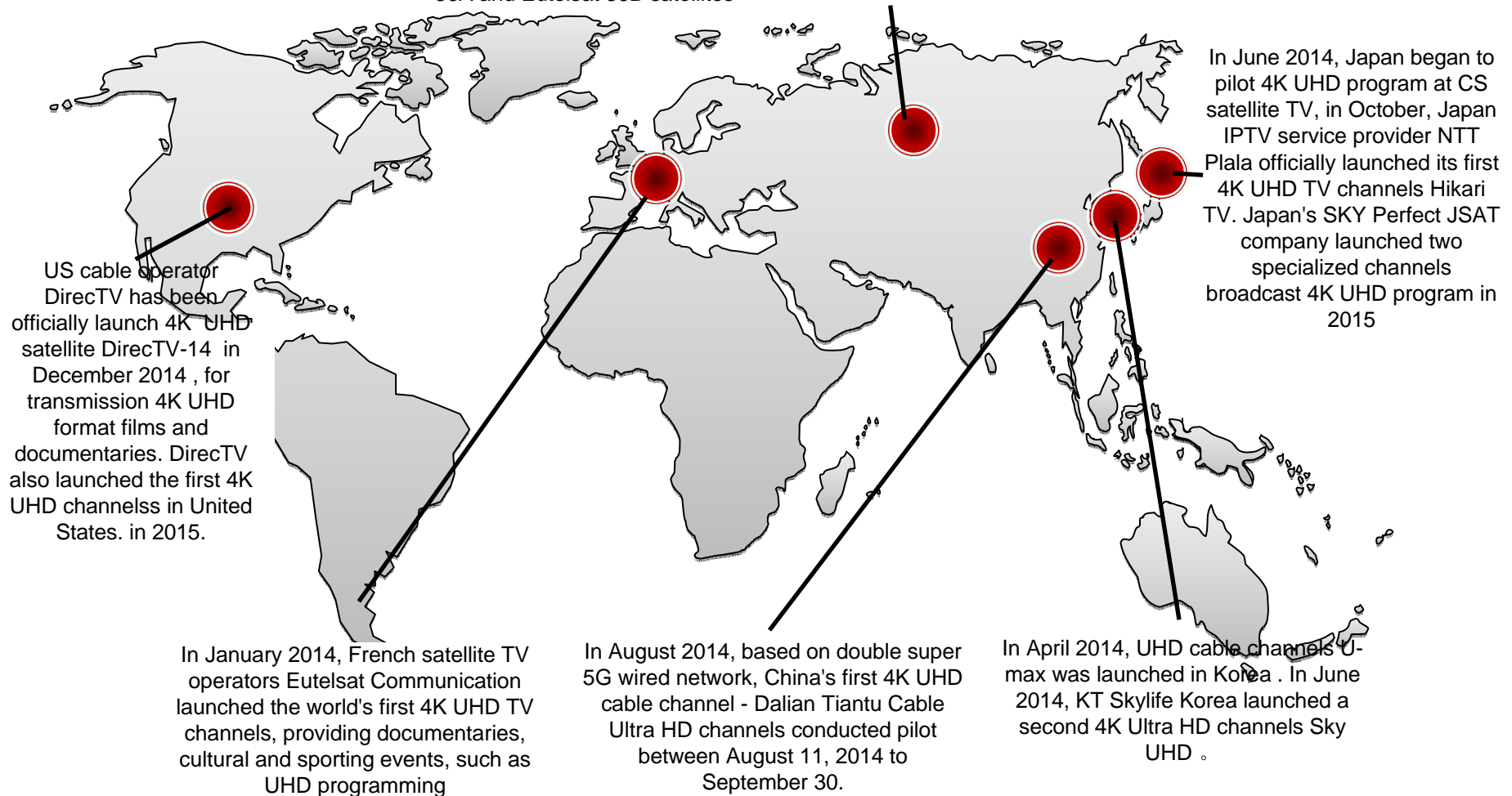
- In October 2014, Polish public broadcaster TVP tested 4K UHD signal transmission via HbbTV. HbbTV is a mixed broadcast technology, which can transmit radio and Internet data.

# 1. The Industry of UHD TV



## UHD TV Broadcasting (TV channels)

In February 2014, the Russian satellite TV operator NTV-Plus Sochi broadcasted Winter Olympics opening ceremony live for the first time UHD satellite broadcasting. In July, Russia's Tricolor TV station broadcasted 4K UHD TV signals by Eutelsat 36A and Eutelsat 36B satellites

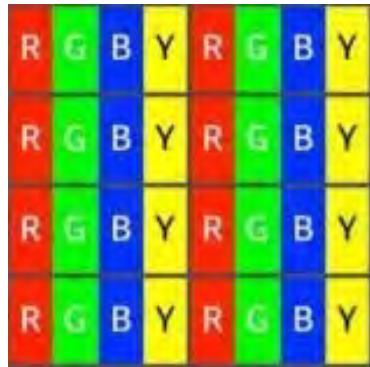


### 3. The Test Item of UHD TV

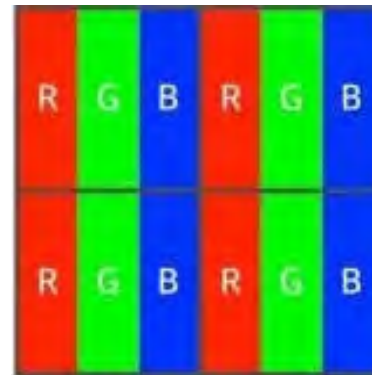
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#### Evaluation of Clarity

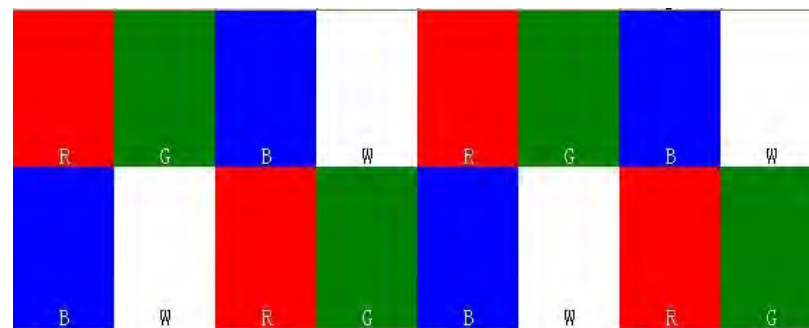
UHD TV have different types of pixel structure.



RGBY pixel structure



RGB pixel structure



RGBW pixel structure

### 3. The Standard of UHD TV

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#### International Standards

- 2006-6, The international telecommunication union wireless communications department (ITU-R) released 《ITU-R BT.1769 Parameter values for an expanded hierarchy of LSDI image formats for production and international programme exchange》, raised the “ $3840 \times 2160$ ” & “ $7680 \times 4320$ ” two picture format for the first time。
- 2012-5, The international telecommunication union R6C working group passed the new generation of UHDTV standards, that is the resolution of UHDTV including  $4K \times 2K$  (  $3840 \times 2160$  ) &  $8K \times 4K$  (  $7680 \times 4320$  ) two specifications。 This is the first time defines the resolution of the UHD TV specification by standard.
- 2012-8, The international telecommunication union wireless communications department (ITU-R) released 《ITUR BT.2020Parameter values for ultra-high definition television systems for production and international programme exchange》, Specifies the UHD TV used for the parameters of the international programme production and exchange



### 3. The Standard of UHD TV

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#### The Definition of UHD TV by International Standard

ITU-R BT. 2020:

	8K	4K
Pixel count Horizontal × vertical	7 680 × 4 320	3 840 × 2 160

- Refer to this, the 4K UHD means the sub-pixel number = 11520 x 2160 or 24.9M
- Both Traditional RGB or improved RGBW are two different technology, both of them meet the standard



16:9
21:9

- In addition to 16:9 format, 21:9 format also getting more and more popular which is better for film mode;
- As a result, the following two resolution can also be seen as UHD:
  - 1) 5K UHD TV (5120\*2160)
  - 2) 10K UHD TV (10240\*4320)

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***THANKS***