

Ultra High Definition Television: Threshold of a new age

ITU Recommendations on UHDTV standards agreed

Geneva, 24 May 2012 – ITU has announced a new Recommendation that represents a major advance in television broadcasting that will create an entirely new television broadcast environment with the advent of ‘Ultra High Definition Television’ or UHDTV. ITU’s Radiocommunication Sector (ITU-R) has developed the standard – or Recommendation – in collaboration with experts from the television industry, broadcasting organizations and regulatory institutions in its Study Group 6.

Ultra High Definition Television: A more defined future

The quality of television pictures that viewers see has improved dramatically since it was invented in the 1930s. A dim black and white screen in the corner of the room has become the sparkling ‘high definition’ colour picture that we see on today’s large ‘flat panel displays’.

But technology does not stand still. ITU-R Study Group 6 has now agreed a draft new Recommendation on the technical details for ‘Ultra High Definition Television’ or UHDTV which is now being submitted to Administrations for approval.

The ITU-R Recommendation lays out the quality standards for UHDTV in two steps. The advances made with each of these quality steps are roughly similar to the step from the old ‘standard definition television’ to ‘high definition television (HDTV)’. HDTV pictures today have the equivalent of between 1-2 megapixels. The first level of UHDTV picture levels has the equivalent of about 8 megapixels (3 840 x 2 160 image system), and the next level comes with the equivalent of about 32 megapixels (7 680 x 4 320 image system). As a shorthand way of describing them, they are sometimes called the ‘4K’ and ‘8K’ UHDTV systems.

Ultra high definition picture quality is accompanied by improved colour fidelity, and options for higher numbers of pictures per second than for today’s television systems.

ITU Secretary-General Hamadoun Touré praised the work of ITU-R Study Group 6. “UHDTV is an earth-shaking development in the world of television,” Dr Touré said. “Watching UHDTV in the near future will be a breath taking experience, and I look forward to it.”

David Wood, Chairman of ITU-R Working Party 6C (WP 6C), which developed the draft new Recommendation, said, “This is the dawn of a new age for television that will bring unprecedented levels of realism and viewer enjoyment. It’s a historic moment. Some years will pass before we see these systems in our homes, but come they will. The die is now cast, thanks to the untiring efforts of the international experts participating in WP6C.”

Chairman of ITU R Study Group 6 Christoph Dosch added, “This is clearly a major achievement for ITU-R Study Group 6 of which we can be proud. The

Recommendation means that organizations around the world can safely begin work to make UHDTV a reality.”

Director of ITU’s Radiocommunication Bureau François Rancy said, “I’ve personally seen the pictures with 8K UHDTV system, and it’s absolutely stunning – the sense of being there is superb. This agreement shows the great and continuing strength of the ITU-R and Study Group 6.”

A video on UHDTV development is at <http://youtu.be/hT2XluvAjwQ>

ITU-R definiert zwei UHDTV Formate

The ITU-R working party 6C has officially defined the parameter values for the next two generations of television formats.

Under their current name the two formats are the 4K and 8K UHDTV formats – Ultra High Definition Television.

The working party is the same group that defined the parameter values for HDTV and the 720p families in the late 1990s. WP6C is chaired by David Wood from the EBU Technology and Development Department.

Lieven Vermaele, EBU Director of Technology and Development commented: “Facilitating these superb pictures hasn’t been made possible overnight – this represents over ten years of technical discussion and experiment. It has been a long journey – but we are delighted to have arrived at this point and pleased that the EBU has been able to make a contribution to broadcasting history.”

The new formats take advantage of future displays’ greater colour range, have the option of ‘constant luminance’ encoding, and allow up to 120 pictures/second.

Discussions to broadcast these systems currently centre on the to date largely unused 22GHz satellite broadcast band, but terrestrial broadcasting may eventually be possible.

Tests of the UHDTV format will take place at the London Olympics.

ITU setzt Standards für Ultra HD

The 8K resolution demonstrated by the ITU in September 2011 will be trialled at the London Olympics.

The London Olympics will provide the first live trials of Ultra High Definition TV (UHDTV) based on standards finally agreed last week by the International Telecommunications Union (ITU) after a decade of research and development in which the EBU was heavily involved.

This was heralded a major milestone in the history of TV displays as momentous as the advent of color TV by the EBU.

“It has been a long journey, but we are delighted to have arrived at this point and pleased that the EBU has been able to make a contribution to broadcasting history,” said Lieven Vermaele, EBU director of technology and development.

The ITU has defined the UHDTV standards, 4K and 8K, as multiples of the existing 1080p1920 format defined in the ITU-R Rec. 709 standard. HD 1080p, at present often referred to as full HD, displays at a resolution of 1920 pixels wide by 1080 high in progressive scan, corresponding to a widescreen aspect ratio of 16:9. Various frame rates are supported including 24, 50 and 60.

4K is defined simply by doubling 1080p1920 in each direction to yield pictures with four times the spatial resolution, at 3840 pixels wide by 2160 high, which is 8 mega pixels. 8K then doubles up again to resolution 7680 wide by 4320 high, spatially 16 times 1080p, or 32 mega pixels. But, the ITU has also added support for a higher frame rate option of 120, which experiments have shown may be necessary for accurate portrayal of motion at these very high resolutions on large wall sized displays.

Without the corresponding increase in frame rate, there is a danger that UHDTV will display brilliant images of slow moving action, but then exhibit slight jerkiness for high speed shots in some sporting events for example.

The bandwidth implications of these standards will alarm some operators and broadcasters, for an 8K programme running at the full 120 frames per second would require 320 times the bit rate of current HD transmissions given that these are often not yet even 1080p, but usually either 720p or interlaced 1080i. But, as the EBU pointed out, these new standards are unlikely to start working their way into mainstream transmissions for the best part of a decade.

That will coincide with the introduction of new frameless displays in which picture size can vary, and that blend into the background when not in use. Some vendors of pay-TV software are already developing platforms in anticipation of Ultra HD delivery to such large screens. For example, UK-based conditional access and middleware vendor NDS has a platform called Surfaces that was first demonstrated delivering 4K UHDTV to large displays at IBC 2011 in Amsterdam.

Most broadcasters will first upgrade to full HD at 1080p, which will for now meet all quality expectations, certainly for screens up to 60 inches diameter. For example, in the UK, the Freeview HD platform used by the BBC and ITV has been specified to provide full HD capability.

But although UHDTV may be some years away for TV, the 4K version has already been adopted for digital cinematography and computer graphics, using slightly different resolutions than the new ITU standard. 4K is also supported by YouTube, the only video hosting service to do so, in a different version again, allowing uploading of 4K videos at a resolution of 4096 x 3072 pixels, or 12.6 megapixels.