

UHDTV is the higher resolution and otherwise improved extension of HDTV, for which DVB has developed consumer delivery formats for broadcast and broadband. It may eventually become the 'normal' form of television. UHDTV was first specified in 2012 with the ITU-R Recommendation BT.2020. Its options included two levels of spatial resolution: 8 Megapixels (aka 4K) and 33 Megapixels (aka 8K), sometimes called respectively UHD-1 and UHD-2. DVB is currently focusing on UHD-1.

DVB UHD-1 Phase 1

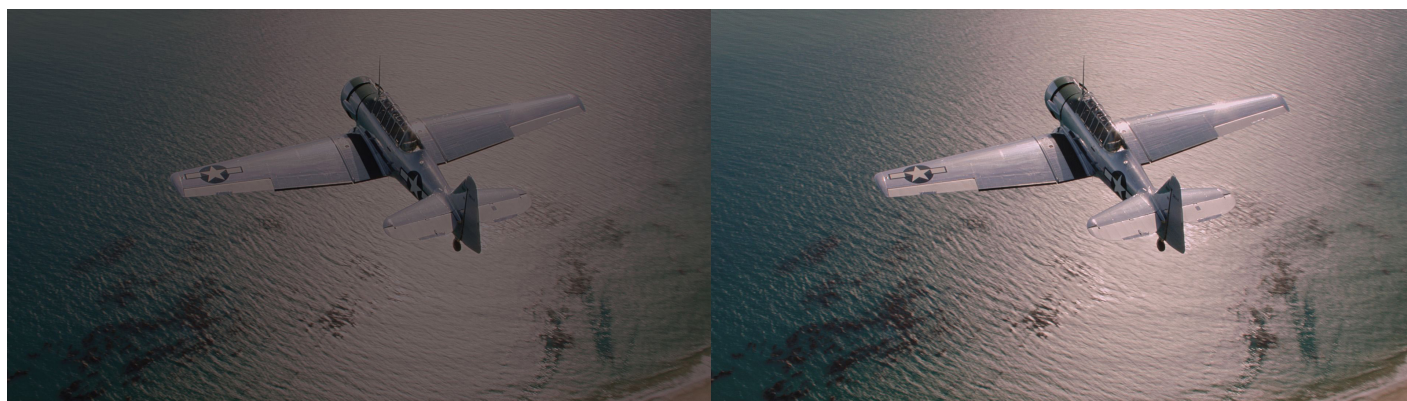
DVB responded to its members' demands, which initially were for a 4K system without other potential features such as High Dynamic Range, High Frame Rate, or Next Generation Audio. In 2014 DVB agreed the specification for DVB UHD-1 Phase 1, which was first used by DirecTV later in the year. DVB Members expressed the wish for additional features to be included in the next consumer delivery formats, to be available in later years, DVB UHD-1 Phase 2.

DVB UHD-1 Phase 2: adding HDR and HFR

DVB Members plan different timescales for the introduction of UHD-1 Phase 2 services. One group needs a system which includes High Dynamic Range (HDR) capability for services from 2017, and a second group needs a system that also includes High Frame Rate (HFR) for services from 2019. The DVB Phase 2 specification, enabling both, was agreed in 2016.

High Dynamic Range

High Dynamic Range (HDR) will allow an increase in the quality of the image for the new generations of TV sets that allow higher peak screen brightness. The image quality benefit is somewhat different to that from increased resolution. It is sometimes said to be adding 'sparkle' to the image.



Without HDR

With HDR

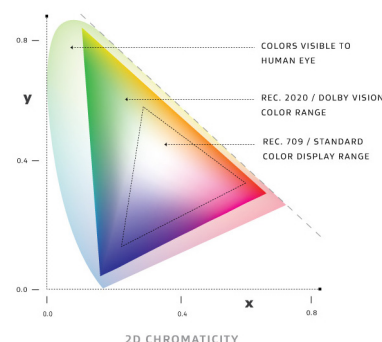
images: Dolby

The DVB UHD-1 Phase 2 specification allows for two HDR systems. Each is seen as having different advantages. They are the HLG10 (Hybrid Log Gamma, ten bits per sample) system and the PQ10 (Perceptual Quantizer, ten bits per sample) system. TV set makers can include one or other or both in UHD-1 receivers.

Wider Colour Gamut

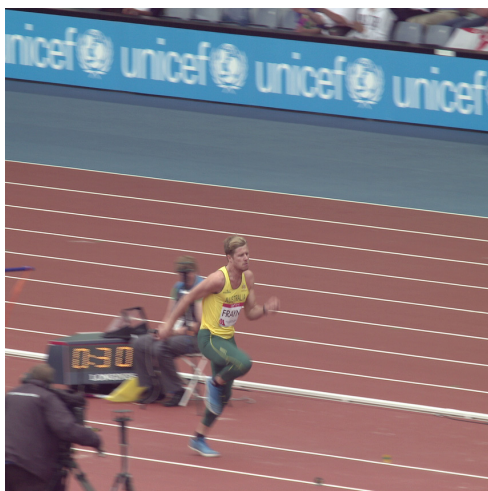
TV displays form images using combinations of three primary colours embedded in the TV display. DVB UHD-1 systems allow for future UHDTV displays that will use a new set of colour primaries, termed BT. 2020.

This much **wider range of colours** will have the capability to reproduce deeper colours and thereby further increase the realism of the viewing experience.



High Frame Rate

High Frame Rate (HFR) is another new feature that will enhance the quality of the UHDTV image in certain cases. This is not the same as the 'High Frame Rate' used for some movie productions, which involves 48 FPS rather than 24 FPS. HFR for TV involves frame rates of up to 120 FPS. HFR will sharpen objects in motion in an image, adding to the sense of reality of the image.



Without HFR



With HFR

images: BBC

Developing receiver decoder ICs that will cope with HFR will take time and the current prediction is that consumer receivers that support HFR may be practical from 2019 onwards, assuming that services are available.

Next Generation Audio

Next Generation Audio (NGA) was first specified in ITU-R in 2014 with Recommendation BT.2051. This new concept for sound delivery is based on providing a number of audio or sound elements together with instructions (metadata) to the receiver about what to do with them.

There is no doubt that NGA would enhance the UHD-1 experience. This may come from giving the viewer more clues to the 'point of origin' of a sound in his 'sound stage'. This will become more valuable with larger screen sizes. The NGA systems would also allow the viewer to personalize the sound experience, and it may also allow more additional sound services to be provided. The DVB specification for NGA allows for two methods of encoding the signals: AC-4 and MPEG-H Audio. Each is claimed to have advantages.

Next Steps

DVB Members have also requested the tools needed to provide DVB UHD-1 over IP. The DVB-DASH specification, agreed in 2015, already supports UHD-1 Phase 1 delivery. It is currently being extended to support HDR, HFR and NGA. It may provide for OTT or hybrid delivery of UHD-1.

The DVB process involves first agreeing 'commercial requirements' for any new system – what it needs to do to be commercially successful. This is followed by the development of the specification. This is, in turn, followed by a check that the commercial requirements have been met.