

10 things you need to know about...



- 1** 1080p/50 has finally arrived. It is an evolutionary, and more future-proof, HDTV image format, with 1920 pixel x 1080 lines and 50 frames progressively scanned
It overcomes limitations of the 1080i/25 scanning format (resolution, interlace artefacts, lack of processing headroom) and the 720p/50 format (resolution). 1080p/50 is supported today in many professional and consumer products and mainstream production devices will appear on the market soon. The EBU Strategic Programme SP-HIPS has investigated new studio compression formats and interfaces for 1080p/50 and has been actively encouraging the development of the 1080p/50 format.
- 2** 1080p/50 is quite similar to the 2k@48fps DCI/ISO format for digital cinema production and distribution
This medium where it is largely used for movie drama, but it is also suitable for the fast action events often needed for television production. Furthermore it's the best choice for live cinema transmissions in 2D or stereoscopic 3D as well.
- 3** Using 1080p/50 as a master HDTV production format allows very high quality 720p/50 and 1080i/25 to be easily derived for the short term of HDTV broadcasting
Because of its vertical/temporal and spatial resolution, 1080p/50 is an ideal master format for any kind of HDTV production. Today, 1080p/50 professional equipment is available over the full production, contribution and distribution signal chain.
- 4** EBU TECHNICAL recognises that manufacturers are investing in 1080p/50 equipment development.
One of the challenges is that the 1080p/50 signal requires a 3 Gbit/s baseband bit-rate: double that for 1080i/25 or 720p/50. 'HD-SDI' interfaces are available, but care need to be taken with coaxial cable lengths and the mapping format. Users might be advised to consider also alternative interfaces (optical HD-SDI or networks). Even Triax solutions are available today. (See EBU Report TR 002 'Advice on the use of 3 Gbit/s HD-SDI interfaces').
- 5** 1080p/50 production compression will require higher bit-rates than present HDTV formats
For currently used HDTV formats (1080i/25, 720p/50 and 1080p/25), the latest production compression formats operate at bitrates between 50 Mbit/s (the 'long GOP' compression format) and 100 Mbit/s or more (the I frame formats) in the production environment. For 1080p/50 a higher bit-rate will be required. The industry is now providing new compression systems, which maintain 1080p/50 quality in a multi-generation production environment. These compression formats were investigated by the EBU SP-HIPS project in the last year. (See EBU BPN 097, 098, 099).



6 Broadcasters can distribute studio-to-studio and intra-studio (contribution networks) as well as produce in 1080p/50, and very soon use 1080p/50 for broadcasting itself

New MPEG-4 H.264/AVC Level 4.2 encoders are available for contribution and distribution networks.

7 What bit-rate is required for broadcasting with MPEG-4 H.264/AVC?

The DVB Project has incorporated 1080p/50 in its recommended distribution compression formats, which may be used for future broadcasting. Perhaps surprising at first, initial tests at the EBU have shown that 1080p/50 will not require more bitrate than 1080i/25 for broadcasts, but naturally it will show better picture quality on large displays. This means better quality for the same price! Ask an EBU Engineer for the detail of the results. So, whilst production systems will require more bit-rate than older HDTV formats, distribution should require the same bit-rate as 1080i/25, and only about 15-20% more than 720p/50.

8 Broadcasters can use the MPEG-4 SVC system to provide 1080p/50 as a 'top up' signal in conjunction with an older HD format, for markets where both newer and older HD decoders exist

This is where a 1080p/50 'top-up' signal and 720p/50 is provided to the consumer at the same time. 1080i/25 can also be used as a base layer, but it is less efficient than the 720p/50 - 1080p/50 combination. New SVC receivers would be able to decode the 1080p/50 signal, whilst older receiver would only decode the 720p/50 (or 1080i/25) signal. Using SVC to broadcast 1080p/50 will require more bit-rate than straight single layer encoding in H.264/AVC, but exactly how much is the subject of study. EBU TECHNICAL and others are investigating the comparative bit-rates for SVC-derived 1080p/50 and H.264/AVC derived 1080p/50. The difference is likely to be of the order of perhaps 10%. Thanks to new coding and distribution technologies called "HVC" which are currently under development in MPEG as a successor of MPEG-4 H264/AVC it might be possible to broadcast the 1080p/50 signal at much lower bit-rates than any legacy HD formats today.

9 The good news for 1080p/50 broadcasting is that many consumer-type "1080p HD Ready" displays already exist

Such "1080p HD Ready" displays can normally display 1080p/50 images. 1080p is popular today because of its use with the 1080p/24-25 format of many BluRay movies. But consumers will need a new set-top-box that can decode MPEG-4 H.264/AVC Level 4.2 (or SVC as mentioned above) to show the benefit of 1080p/50 on their 1080p display.

10 Will broadcasters migrate to 1080p/50?

This is a question with two possible answers. At the technology side, during the last two years the most manufacturers upgraded here products with 3G technologies. This means, the equipment could be upgrade by just typing a new serial number or it`s a standard functionality which is implement for "free". Furthermore most of system infrastructure investments during the last years are 3G ready as well. But the market situations are more complex. Needing a new set top box may be a serious barrier, even if 1080p/50 displays are readily available. Displays are ever larger and larger. '4K' displays will soon be available. Broadcasters' HDTV archives of 1080i/25 or 720p/50 may not be of sufficiently high quality to be future proof. Broadcasters need to ensure that their archives retain the quality necessary to provide a compelling offering to viewers. The value of 1080p/50 is essentially the value of future proofing HDTV programme production, and of being ready to meet the needs of an ever more discerning viewing public that has 1080p displays.

