

## RECOMMENDATION ITU-R BT.1737

**Use of the ITU-T Recommendation H.264 (MPEG-4/AVC) video source-coding method to transport high definition TV programme material**

(Question ITU-R 12/6)

(2005)

**Scope**

This Recommendation specifies the use of the video source-coding method as per ITU-T Recommendation H.264 (ISO/IEC standard 14496-10), also known as MPEG-4/AVC, for the transport of high definition TV (HDTV) programme material for a variety of broadcasting applications.

The ITU Radiocommunication Assembly,

*considering*

- a) that there are applications where it is desired to transport HDTV programme material in a virtually transparent fashion, i.e. introducing minimal visible artefacts, using a reduced bit rate;
- b) that Recommendation ITU-R BT.709 Part 2 specifies the parameters for a family of HDTV video systems based on the use of a common image format of 1 080 active lines (interlaced and progressive) and 1 920 pixels per active line;
- c) that ITU-T Recommendation H.264<sup>1</sup> specifies the algorithms for the advanced bit rate reduction coding method;
- d) that the ITU-T Recommendation H.264 specifications are applicable to a variety of video systems, and they are increasingly used for various applications,

*recommends*

**1** that when it is necessary to transport HDTV programme material in a virtually transparent fashion using a reduced bit rate, the 1 080 × 1 920 HDTV signal of Recommendation ITU-R BT.709 Part 2 (interlaced or progressive) should be source-coded in ITU-T Recommendation H.264, down to the bit rate available in the channel, with the parameters of levels 4 and 4.2 (the informative Appendix 1 provides an indication of the source-coding parameters and minimal tools for various members of the image systems in Recommendation ITU-R BT.709 Part 2; it also provides an indication of the bit rate for transport of the programme material so coded);

**2** that, if the available bit rate is particularly low, the HDTV signal may be horizontally downsampled to 1 440 samples per active line prior to source coding.

NOTE 1 – Recommendation ITU-T H.264 is available in electronic form at the following address:  
<http://www.itu.int/md/R03-SG06-C-0225/en>.

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<sup>1</sup> ISO/IEC Standard 14496-10, commonly called MPEG-4/AVC.

## Annex 1

### Example parameters and minimal tools to source-code various members of the image systems in Recommendation ITU-R BT.709 using ITU-T Recommendation H.264

This Annex shows example parameters and tools of the ITU-T Recommendation H.264 source-coding method that would be used to compress various members of the image systems specified in Recommendation ITU-R BT.709, Part 2. It also provides an indication of the bit rates for the transport of those signals when so source coded.

TABLE 1

**Example parameters of ITU-T Recommendation H.264 source-coding for HDTV**

| Rec. ITU-R BT.709 family member                     | Level | Profile    | Application  | Bit rate (Mbit/s)    |
|-----------------------------------------------------|-------|------------|--------------|----------------------|
| 1 920 × 1 080 × 60/50i<br>1 920 × 1 080 × 24/25/30p | 4     | High 4:2:2 | Contribution | 20-30 <sup>(1)</sup> |
|                                                     | 4     | High 4:2:2 | Distribution | 16-20                |
|                                                     | 4     | High 10    | SNG          | 10-15 <sup>(1)</sup> |
|                                                     | 4     | High       | Emission     | 8-12                 |
| 1 920 × 1 080 × 60/50p                              | 4.2   | High 4:2:2 | Contribution | 30-40 <sup>(1)</sup> |
|                                                     | 4.2   | High 4:2:2 | Distribution | 25-30 <sup>(1)</sup> |
|                                                     | 4.2   | High 10    | SNG          | TBD                  |
|                                                     | 4.2   | High       | Emission     | TBD                  |

<sup>(1)</sup> Bit rate indicated is tentative.

TABLE 2

**Profiles and suggested coding tools**

| Coding tools                         | High | High 10 | High 4:2:2 | High 4:4:4 |
|--------------------------------------|------|---------|------------|------------|
| Main profile tools                   | X    | X       | X          | X          |
| 4:2:0 chroma format                  | X    | X       | X          | X          |
| 8-bit sample bit depth               | X    | X       | X          | X          |
| 8 × 8 vs. 4 × 4 transform adaptivity | X    | X       | X          | X          |
| Quantization scaling matrices        | X    | X       | X          | X          |
| Separate $C_b$ and $C_r$ QP control  | X    | X       | X          | X          |
| Monochrome video format              | X    | X       | X          | X          |
| 9- and 10-bit sample bit depth       |      | X       | X          | X          |
| 4:2:2 chroma format                  |      |         | X          | X          |
| 11- and 12-bit sample bit depth      |      |         |            | X          |
| 4:4:4 chroma format                  |      |         |            | X          |
| Residual colour transform            |      |         |            | TBD        |
| Predictive lossless coding           |      |         |            | TBD        |