EBU Technical Statement – D94-2002
Use of MPEG 4:2:2 P@ML compression standards and specific application ranges in mainstream television production

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The EBU has listed in Technical Statement D84-1999[1] and D85-1999[2] the general interoperability requirements for television installations intended for complex programme production and postproduction which use MPEG-2 4:2:2P@ML [3] compression.

SMPTE Standard 356M[4], together with the linked standard SMPTE 328M [5] and Recommended practice SMPTE RP202 [6], defines a set of bit-stream constraints for MPEG 4:2:2P@ML intended for use in the D10 format VTR.

In order to clarify for EBU members the application and use of these SMPTE Standards, the EBU explicitly defines the following set of user requirements and further constraints on the technical parameters:

User requirements MPEG-2 4:2:2P@ML compression:

- The EBU stresses that the application environment for the SMPTE 356M standard shall include, as well as the conventional VTR type scenarios, also the VTR-to-Server, Server-to-Server (NLE), Archive and networked environments;
- Encoders for MPEG-2 4:2:2P@ML, 50 Mbit/s, I-frame bit streams must provide a picture quality which is close to or better than that published within the EBU/SMPTE Task Force report. [7]
- Operations such as exchange via data-transparent interfaces (e.g. SDTI, Networks or Files) and simple picture manipulation (e.g. simple hard cuts) should be possible without re-encoding the Content;

Technical constraints on SMPTE 356M and SMPTE RP202 to achieve this are:

- The video encoding algorithm should use I-frame only compression and a constrained number of bytes per GOP (Group of Pictures); the maximum coded frame size shall be 250,000 bytes net;
- A single bit rate at 50 Mbit/s should be used for mainstream TV production; Consequently, the sequence_header bit_rate_value of SMPTE 356M has to be set to 1E848h;
- The video encoding algorithm shall encode 608-lines in accordance with SMPTE RP202(608i of Table 1 in SMPTE RP202). This requires that the vertical_value in the MPEG-2 sequence header be set to 608 lines;

The EBU encourages the manufacturers of equipment using MPEG 4:2:2P@ML compression to support the standards and additional constraints mentioned above.

Bibliography

[1] EBU Technical Statement D84-1999 Use of 50 Mbit/s MPEG compression in television programme production

[2] EBU Technical Statement D85-1999 Constraints on MPEG 4:2:2 P@ML compression to ensure interoperability in television production

[3] ISO/IEC 13818-2:1996, Information Technology - Generic Coding of Moving Pictures and Associated Audio information: Video

[4] SMPTE 356M Type D-10 Stream Specifications-MPEG-2 4:2:2P@ML for 525/60 and 625/50

[5] SMPTE 328M-2000 MPEG-2 Video Elementary Stream Editing Information

[6] SMPTE RP 202 Video Alignment for MPEG-2 Coding

[7] Report of EBU/SMPTE task Force