SMPTE STANDARD

SMPTE 308M-2004
Revision of
SMPTE 308M-1998

for Television — MPEG-2 4:2:2 Profile at High Level

1 Scope

ISO/IEC 13818-2, commonly known as MPEG-2 video, includes specification of the MPEG-2 4:2:2 profile. Based on ISO/IEC 13818-2, this standard provides additional specification for the MPEG-2 4:2:2 profile at high level. It is intended for use in high-definition television production, contribution, and distribution applications. As in ISO/IEC 13818-2, this standard defines bit streams, including their syntax and semantics, together with the requirements for a compliant decoder for 4:2:2 profile at high level, but does not specify particular encoder operating parameters.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below.

ISO/IEC 13818-2:2000, Information Technology — Generic Coding of Moving Pictures and Associated Audio Information: Video

3 4:2:2 high profile

The MPEG-2 4:2:2 profile at main level is defined in ISO/IEC 13818-2. Only those additional parameters necessary to define the 4:2:2 profile at high level are specified in this standard.

3.1 Profile_and_level indication

The 4:2:2 high profile does not have a hierarchical relationship to other profiles. The profile_and_level_identification shall be 10000010 (see ISO/IEC 13818-2, table 8-4).

3.2 Syntactic constraints

Syntactic constraints for the 4:2:2 profile are specified in ISO/IEC 13818-2. No new constraints are specified for the 4:2:2 profile at high level (see ISO/IEC 13818-2, table 8-5).

3.3 Parameter constraints

The parameter constraints for the 4:2:2 profile at high level are the same as those for the main profile at the main level, except as follows:

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Upper bounds for sampling density: 1920 samples/line
1088 lines/frame
60 frames/s

Upper bounds for luminance sample rate: 62,668,800 samples/s

Upper bounds for bit rates: 300 Mbits/s

Additional constraints on bit rates:

At bit rates of 175 to 230 Mbits/s, no two consecutive frames shall be coded as nonintracoded pictures.

NOTE – The constraint that no two consecutive frames shall be coded as nonintracoded pictures describes a bit-stream which a compliant decoder is required to properly decode. It is understood that bit-stream splicing might result in consecutive nonintracoded pictures, but that operation of the decoder is not ensured in such a case.

At bit rates of 230 to 300 Mbits/s, only intracoded pictures shall be used for interlaced scan images and no two consecutive frames shall be coded as nonintracoded pictures for progressive scan images (see note).

VBV buffer size: 47,185,920 bits.

(See ISO/IEC 13818-2, tables 8-11, 8-12, 8-13, and 8-14.)

Annex A (informative)
Bit rates and GOP structures

A.1 Considerations

Combinations of bit rates and GOP structures allowed in this standard are based on the following considerations:

1) Higher bit rates are more expensive than lower bit rates to implement in codecs.

2) Longer GOP structures, such as IBBP, are more expensive than shorter GOP structures, such as I or IP, to implement in codecs.

3) Compliant decoders are required to implement the ranges of data rates and GOP structures specified in the standard.

4) The particular combination of maximum data rate and long GOP structures does not provide a practically necessary operating point.

5) Editing granularity of I-only coded interlaced scan is the same as IP coded progressive scan.

A.2 Combinations

The following combinations of bit rates and GOP structures are therefore allowed:

Bit rate	GOP (scan)
230 to 300 Mbits/s	I-only (interlaced scan) I-only or IP or IB (progressive scan)
175 to 230 Mbits/s	I-only, IP, or IB
Up to 175 Mbits/s	Any allowed GOP

See figure A.1.

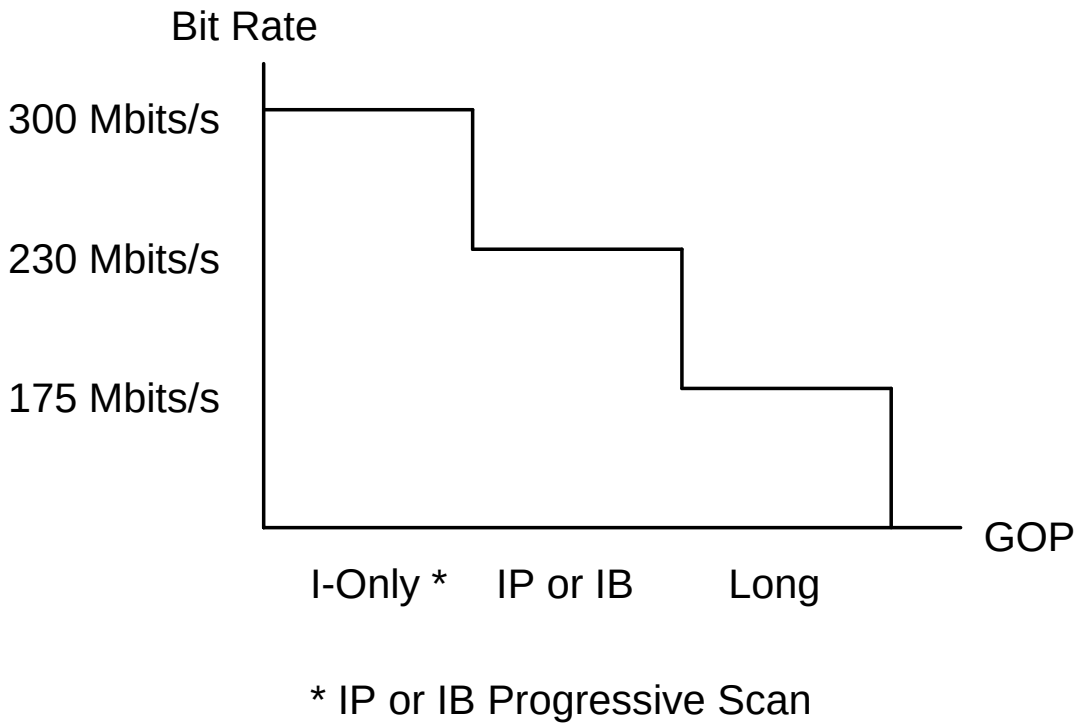

Figure A.1 – Bit rates and GOP structures

Annex B (informative)
Bibliography

ANSI/SMPTE 295M-1997, Television — 1920 x 1080 50-Hz — Scanning and Interface

SMPTE 240M-1999, Television — 1125-Line High-Definition Production Systems — Signal Parameters

SMPTE 274M-2003, Television — 1920 x 1080 Image Sample Structure, Digital Representation and Digital Timing Reference Sequences for Multiple Picture Rates

SMPTE 296M-2001, Television — 1280 x 720 Progressive Image Sample Structure — Analog and Digital Representation and Analog Interface