FINAL
DRAFT

AMENDMENT

ISO/IEC 13818-2:2000 FDAM 3

ISO/IEC JTC **1**

Secretariat: **ANSI**

Voting begins on:
2009-03-11

Voting terminates on:
2009-05-11

Information technology — Generic coding of moving pictures and associated audio information: Video —

AMENDMENT 3: New level for 1080@50p/60p

Technologies de l'information — Codage générique des images animées et du son associé: Données vidéo —

AMENDEMENT 3: Nouveau niveau pour 1080@50p/60p

Please see the administrative notes on page iii

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

Reference number
ISO/IEC 13818-2:2000/FDAM 3:2009(E)

© ISO/IEC 2009

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS

Not for Resale

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

Copyright notice

This ISO document is a Draft International Standard and is copyright-protected by ISO. Except as permitted under the applicable laws of the user's country, neither this ISO draft nor any extract from it may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, photocopying, recording or otherwise, without prior written permission being secured.

Requests for permission to reproduce should be addressed to either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Reproduction may be subject to royalty payments or a licensing agreement.

Violators may be prosecuted.

© ISO/IEC 2009 – All rights reserved

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

In accordance with the provisions of Council Resolution 21/1986, this document is **circulated in the English language only**.

--`,,```,,,,````-`-`,,`,,`,`,,`---

© ISO/IEC 2009 – All rights reserved

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 13818-2:2000/Amd.3:2009 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information,* in collaboration with ITU-T. The identical text is published as ITU-T Rec. H.262 (2000)/Amd.3 (2009).

© ISO/IEC 2009 – All rights reserved
Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

INTERNATIONAL STANDARD

ITU-T RECOMMENDATION

INFORMATION TECHNOLOGY — GENERIC CODING OF MOVING PICTURES AND ASSOCIATED AUDIO INFORMATION: VIDEO

AMENDMENT 3

Level for 1080@50p/60p

1) Clause 8 Table 8-3

In Clause 8, replace Table 8-3 with:

Table 8-3 – Level identification

Level identification	Level
1011 to 1111	(Reserved)
1010	Low
1001	(Reserved)
1000	Main
0111	(Reserved)
0110	High 1440
0101	(Reserved)
0100	High
0011	(Reserved)
0010	HighP
0000 and 0001	(Reserved)

2) Subclause 8.3

Replace Subclause 8.3 with:

8.3 Relationship between defined levels

The Low, Main, High-1440, High and HighP levels have a hierarchical relationship. Therefore the parameter constraints of a 'higher' level equal or exceed the constraints of 'lower' levels (e.g. for a given profile, a Main level decoder shall be able to decode a bitstream conforming to Low level restrictions). The order of hierarchy is given in Table 8-3.

--`,,```,,,,````-`-`,,`,,`,`,,`---

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

The different parameter constraints for levels are given in Table 8-8.

Table 8-8 – Parameter constraints for levels

Syntactic Element	Level				
	Low	Main	High-1440	High	HighP
f_code[0][0] (forward horizontal)	[1:7]	[1:8]	[1:9]	[1:9]	[1:9]
f_code[1][0][a] (backward horizontal)	[1:7]	[1:8]	[1:9]	[1:9]	[1:9]
frame_rate_code	[1:5]	[1:5]	[1:8]	[1:8]	[1:8]
picture_structure	'01', '10', '11'	'01', '10', '11'	'01', '10', '11'	'01', '10', '11'	'11'
frame_pred_frame_dct	[0:1]	[0:1]	[0:1]	[0:1]	1
Sample Density	Table 8-11				
Luminance Sample Rate	Table 8-12				
Maximum Bit Rate	Table 8-13				
Buffer Size	Table 8-14				
Frame picture					
f_code[0][1] (forward vertical)	[1:4]	[1:5]	[1:5]	[1:5]	[1:5]
f_code[1][1][a] (backward vertical)	[1:4]	[1:5]	[1:5]	[1:5]	[1:5]
Vertical vector range[b]	[–64:63,5]	[–128:127,5]	[–128:127,5]	[–128:127,5]	[–128:127,5]
Field picture					
f_code[0][1] (forward vertical)	[1:3]	[1:4]	[1:4]	[1:4]	NA[c]
f_code[1][1][a] (backward vertical)	[1:3]	[1:4]	[1:4]	[1:4]	NA[c]
Vertical vector range[b]	[–32:31,5]	[–64:63,5]	[–64:63,5]	[–64:63,5]	NA[c]

a) For Simple profile bitstreams which do not include B-pictures, f_code[1][0] and f_code[1][1] shall be set to 15 (not used).

b) This restriction applies to the final reconstructed motion vector. In the case of dual prime motion vectors, this restriction applies to all the following values:

vector'[0][0][1]
((vector'[0][0][1] * m[parity_ref][parity_pred])//2)
((vector'[0][0][1] * m[parity_ref][parity_pred])//2")" + e[parity_ref][parity_pred]
((vector'[0][0][1] * m[parity_ref][parity_pred])//2")" + dmvector[1]
((vector'[0][0][1] * m[parity_ref][parity_pred])//2")" + e[parity_ref][parity_pred] + dmvector[1]

c) In this table, 'NA' indicates a constraint that does not apply due to a constraint on the value of picture_structure.

--`,,```,,,,````-`-`,,`,,`,`,,`---
Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

3) Subclause 8.5 Table 8-11

In Subclause 8.5, replace Table 8-11 with:

Table 8-11 - Upper bounds for sampling density

Level	Spatial resolution layer		Profile						
			Simple	**Main**	**SNR**	**Spatial**	**High**	**4:2:2**	**Multi**
HighP	Enhancement	Samples/line Lines/frame Frames/sec		1920 1088 60					
	Lower	Samples/line Lines/frame Frames/sec		- - -					
High	Enhancement	Samples/line Lines/frame Frames/sec		1920 1088 60			1920 1088 60	1920 1088 60	1920 1088 60
	Lower	Samples/line Lines/frame Frames/sec		- - -			960 576 30	- - -	1920 1088 60
High-1440	Enhancement	Samples/line Lines/frame Frames/sec		1440 1088 60		1440 1088 60	1440 1088 60	- - -	1440 1088 60
	Lower	Samples/line Lines/frame Frames/sec		- - -		720 576 30	720 576 30	- - -	1440 1088 60
Main	Enhancement	Samples/line Lines/frame Frames/sec	720 576 30	720 576 30	720 576 30		720 576 30	720 608 a) 30	720 576 30
	Lower	Samples/line Lines/frame Frames/sec	- - -	- - -	- - -		352 288 30	- - -	720 576 30
Low	Enhancement	Samples/line Lines/frame Frames/sec		352 288 30	352 288 30			- - -	352 288 30
	Lower	Samples/line Lines/frame Frames/sec		- - -	- - -			- - -	352 288 30
In the case of single layer or SNR scaled coding, the limits specified by 'Enhancement layer' apply. a) 512 lines/frame for 525/60, 608 lines/frame for 625/50									

4) Subclause 8.5 Table 8-12

In Subclause 8.5, replace Table 8-12 with:

Table 8-12 – Upper bounds for luminance sample rate (samples/s)

Level	Spatial resolution layer	Profile						
		Simple	Main	SNR	Spatial	High	4:2:2	Multi-view
HighP	Enhancement		125 337 600					
	Lower		–					
High	Enhancement		62 668 800			62 668 800 (4:2:2) 83 558 400 (4:2:0)	62 668 800	62 668 800

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

	Lower		–			14 745 600 (4:2:2) 19 660 800 (4:2:0)	–	62 668 800
High-1440	Enhancement		47 001 600		47 001 600	47 001 600 (4:2:2) 62 668 800 (4:2:0)	–	47 001 600
	Lower		–		10 368 000	11 059 200 (4:2:2) 14 745 600 (4:2:0)	–	47 001 600
Main	Enhancement	10 368 000	10 368 000	10 368 000		11 059 200 (4:2:2) 14 745 600 (4:2:0)	11 059 200	10 368 000
	Lower	–	–	–		– 3 041 280 (4:2:0)	–	10 368 000
Low	Enhancement		3 041 280	3 041 280			–	3 041 280
	Lower		–	–			–	3 041 280
NOTE – In the case of single layer or SNR scaled coding, the limits specified by 'Enhancement layer' apply.								

5) Subclause 8.5 Table 8-13

In Subclause 8.5, replace Table 8-13 with:

Table 8-13 – Upper bounds for bit rates (Mbit/s)

Level	Profile						
	Simple	Main	SNR	Spatial	High	4:2:2	Multi-view
HighP		80					
High		80			100 all layers 80 middle + base layer 25 base layer	300	– 130 both layers 80 base layer
High-1440		60		60 all layers 40 middle + base layers 15 base layer	80 all layers 60 middle + base layers 20 base layer	–	– 100 both layers 60 base layer
Main	15	15	– 15 both layers 10 base layer		20 all layers 15 middle + base layer 4 base layer	50	– 25 both layers 15 base layer
Low		4	– 4 both layers 3 base layer			–	– 8 both layers 4 base layer
NOTES 1 This table defines the maximum rate of operation of the VBV for a coded bitstream of the given profile and level. This rate is indicated by bit_rate (see 6.3.3). 2 This table defines the maximum permissible data rate for all layers up to and including the stated layer. For multi-layer coding applications, the data rate apportioned between layers is constrained only by the maximum rate permitted for a given layer as stated in this table. 3 1 Mbit = 1 000 000 bits							

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

6) Subclause 8.5 Table 8-14

In Subclause 8.5, replace Table 8-14 with:

Table 8-14 – VBV buffer size requirements (bits)

Level	Layer	Profile						
		Simple	Main	SNR	Spatial	High	4:2:2	Multi-view
HighP	Enhancement 2 Enhancement 1 Base		 9 781 248					
High	Enhancement 2 Enhancement 1 Base		 9 781 248			12 222 464 9 781 248 3 047 424	 47 185 920	– 15 898 480 9 787 248
High-1440	Enhancement 2 Enhancement 1 Base		 7 340 032		7 340 032 4 882 432 1 835 008	9 781 248 7 340 032 2 441 216	 –	– 12 222 464 7 340 032
Main	Enhancement 2 Enhancement 1 Base	 1 835 008	 1 835 008	– 1 835 008 1 212 416		2 441 216 1 835 008 475 136	 9 437 184	– 3 047 424 1 835 008
Low	Enhancement 2 Enhancement 1 Base		 475 136	– 475 136 360 448			–	– 950 272 475 136

NOTES

1 The buffer size is calculated to be proportional to the maximum allowable bit rate, *rounded down* to the nearest multiple of 16 × 1024 bits. The reference value for scaling is the Main profile, Main level buffer size.

2 This table defines the *total* decoder buffer size required to decode all layers up to and including the stated layer. For multi-layer coding applications, the allocation of buffer memory between layers is constrained only by the maximum size permitted for a given layer as stated in this table.

3 The syntactic element corresponding to this table is vbv_buffer_size (see 6.3.3).

7) Subclause 8.6 Table 8-15

In Subclause 8.6, replace Table 8-15 with:

Table 8-15 – Forward compatibility between different profiles and levels

Profile and Level indication in bitstream	Decoder																	
	HP @ HL	HP @ H-14	HP @ ML	Spatial @ H-14	SNR @ ML	SNR @ LL	MP @HP L	MP @ HL	MP @ H-14	MP @ ML	MP @ LL	SP @ ML	4:2:2 P @ ML	4:2:2 P @ HL	MVP @ HL	MVP @ H-14	MVP @ ML	MVP @ LL
HP@HL	X																	
HP@H-14	X	X																
HP@ML	X	X	X															
Spatial@H-14	X	X		X														
SNR@ML	X	X	X	X	X													

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

SNR@LL	X	X	X	X	X	X												
MP@HPL							X											
MP@HL	X						X	X						X[c)]	X			
MP@H-14	X	X		X			X	X	X					X[c)]	X	X		
MP@ML	X	X	X	X	X		X	X	X	X			X[b)]	X[c)]	X	X	X	
MP@LL	X	X	X	X	X	X	X	X	X	X	X	X[a)]	X[b)]	X[c)]	X	X	X	X
SP@ML	X	X	X	X	X		X	X	X	X		X	X[b)]	X[c)]	X	X	X	
ISO/IEC 11172-2	X	X	X	X	X	X	X	X	X	X	X	X	X[b)]	X[c)]	X	X	X	X
4:2:2@ML													X	X[c)]				
4:2:2@HL														X				
MVP@HL															X			
MVP@H-14															X	X		
MVP@ML															X	X	X	
MVP@LL															X	X	X	X

X indicates that the decoder shall be able to decode the bit stream including all relevant lower layers.

a) SP@ML decoders are required to decode MP@LL bitstreams.

b) A 4:2:2 profile@Main level decoder shall be able to decode Main profile@Main level, Main profile@Low level and Simple profile@Main level bitstreams, as well as ISO/IEC 11172-2 constrained system parameter bitstreams.

c) A 4:2:2 profile@High level decoder shall be able to decode 4:2:2P@ML, MP@HL, MP@H-14, MP@ML, MP@LL and SP@ML, as well as ISO/IEC 11172-2 constrained system parameter bitstreams.

8) Subclause E.2 Table E.20

In Subclause E.2, replace Table E.20 with:

Table E.20 – Abbreviations for profile and level names

Profile	<profile abbreviation>	Level	<level abbreviation>
Simple	SP	Low	LL
Main	MP	Main	ML
SNR Scalable	SNR	High-1440	H-14
Spatially Scalable	Spt	High	HL
High	HP	HighP	HPL
Multi-view	MVP		
ISO/IEC 11172-2 constrained parameters			ISO/IEC 11172-2

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

9) Subclause E.2 Table E.21

In Subclause E.2, after Table E.20, add Table E.21 as follows:

Table E.21 – Main profile @ HighP level

No. of layers	layer id	Scalable mode	Maximum sample density (H/V/F)	Maximum sample rate	Maximum total bit rate /1000000	Maximum total VBV buffer	Profile and level indication
1	0	Base	1920/1088/60	125 337 600	80	9 781 248	MP@HPL

--`,,```,,,,````-`-`,,`,,`,`,,`---

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ICS 35.040

Price based on 7 pages

© ISO/IEC 2009 – All rights reserved
Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale