

International Telecommunication Union



Report ITU-R BT.2245-6
(04/2019)

HDTV and UHDTV including HDR-TV test materials for assessment of picture quality

BT Series
Broadcasting service
(television)



International
Telecommunication
Union

Foreword

The role of the Radiocommunication Sector is to ensure the rational, equitable, efficient and economical use of the radio-frequency spectrum by all radiocommunication services, including satellite services, and carry out studies without limit of frequency range on the basis of which Recommendations are adopted.

The regulatory and policy functions of the Radiocommunication Sector are performed by World and Regional Radiocommunication Conferences and Radiocommunication Assemblies supported by Study Groups.

Policy on Intellectual Property Right (IPR)

ITU-R policy on IPR is described in the Common Patent Policy for ITU-T/ITU-R/ISO/IEC referenced in Resolution ITU-R 1. Forms to be used for the submission of patent statements and licensing declarations by patent holders are available from <http://www.itu.int/ITU-R/go/patents/en> where the Guidelines for Implementation of the Common Patent Policy for ITU-T/ITU-R/ISO/IEC and the ITU-R patent information database can also be found.

Series of ITU-R Reports

(Also available online at <http://www.itu.int/publ/R-REP/en>)

Series	Title
BO	Satellite delivery
BR	Recording for production, archival and play-out; film for television
BS	Broadcasting service (sound)
BT	Broadcasting service (television)
F	Fixed service
M	Mobile, radiodetermination, amateur and related satellite services
P	Radiowave propagation
RA	Radio astronomy
RS	Remote sensing systems
S	Fixed-satellite service
SA	Space applications and meteorology
SF	Frequency sharing and coordination between fixed-satellite and fixed service systems
SM	Spectrum management

***Note:** This ITU-R Report was approved in English by the Study Group under the procedure detailed in Resolution ITU-R 1.*

Electronic Publication
Geneva, 2019

© ITU 2019

All rights reserved. No part of this publication may be reproduced, by any means whatsoever, without written permission of ITU.

REPORT ITU-R BT.2245-6

**HDTV and UHDTV including HDR-TV test materials
for assessment of picture quality**

(Question ITU-R 81-1/6)

(2011-2014-2016-2017-04/2018-10/2018-2019)

Introduction

This Report contains lists of HDTV, UHDTV including HDR-TV test materials and related information for assessment of picture quality of television systems. This Report is informatively referred to by Recommendation ITU-R BT.1210.

TABLE OF CONTENTS

	<i>Page</i>
1 Test materials of high definition television (HDTV)	3
2 Test materials of ultra-high definition television (UHDTV), HDR-TV and high definition television (HDTV)	18
Annex 1 – Supplementary information on test materials.....	33
1 HDTV test materials for the 1 920×1 080/59.94/I, 4:4:4 and 4:2:2, 10-bit and 1 920×1 080/59.94/P, 4:2:2, 10-bit formats listed in Tables 1-2 and 1-3.....	33
1.1 Image characteristics	33
1.2 Production conditions	34
1.3 Status for use of test materials	34
2 HDTV test materials for the 1 920 × 1 080/50/I, 4:2:2, 10-bit formats listed in Tables 1 to 4	34
2.1 Image characteristics	34
2.2 Production conditions	35
2.3 Status for use of test materials	36
3 UHDTV/HDTV test materials listed in Table 5.....	36
4 UHDTV and HDR-TV test materials listed in Table 6	38
5 HDR test materials listed in Tables 7 and 8	39
5.1 Image characteristics	39

	<i>Page</i>
5.2 Production conditions	39
5.3 Status for use of test materials	39
Attachment 1 to Annex 1 – Thumbnails of the HDTV test materials.....	40
Attachment 2 to Annex 1 – Attributes to be evaluated	91
Annex 2 – Choice of statistics that can serve to characterize materials	105
1 Introduction	105
2 Statistics of test materials	105
2.1 Entropy of PCM data	105
2.2 AC energy	105
2.3 Spectral entropy	106
2.4 Motion vector.....	106
2.5 Motion-compensated prediction error power	107
2.6 Criticality by rate-buffer occupancy method	107
2.7 Criticality by fixed quantizer method	107
Annex 3 – Status for use of test materials.....	111
Annex 4 – File formats for test materials.....	111
1 TIFF file for HDTV RGB 4:4:4 (10 bits)	111
2 YUV file for HDTV YC _B C _R 4:2:2 (10 bits)	112
3 Raw file for UHD TV RGB 4:4:4 (12 bits)	115
4 OpenEXR file format for 100 cd/m² and 1000 cd/m² linear HD images.....	115

1 Test materials of high definition television (HDTV)

TABLE 1
1 920 × 1 080 HDTV still pictures

Scene No.	Title	Contents	Representative of	Attributes to be examined	Motion	Source	Statistic	Copyright status	Delivery format	Provider name
1	Woman	Bust shot of a woman with a red flower against uniform background	Studio still portrait	False contour, Y/C phase difference Flesh tint and texture reproduction	Still	Slide	See Attachment 1 to Annex 2	See Annex 3	Slide/ CD-ROM	ITE
2	Yacht harbour	Long shot of a yacht harbour with highly detailed yachts	Outdoor still	Waveform distortion Aliasing Sharpness	Still	Slide	See Attachment 1 to Annex 2	See Annex 3	Slide/ CD-ROM	ITE
3	Sweaters and bag	Loose shot of sweaters, towels of various colours, a leather bag, metal pitcher, etc.	Studio still Textured objects	Texture reproduction Lustre	Still	Slide	See Attachment 1 to Annex 2	See Annex 3	Slide/ CD-ROM	ITE
4	Eiffel tower	Long shot of Eiffel tower and landscape of Paris behind it	Outdoor still	Resolution Sensation of reality	Still	Slide	See Attachment 1 to Annex 2	See Annex 3	Slide/ CD-ROM	ITE
5	A hat shop	Scene of a stall and a couple talking beside it	Drama	Gray scale reproduction Interlace artefacts	Still	Slide	See Attachment 1 to Annex 2	See Annex 3	Slide/ CD-ROM	ITE
6	A couple in the snow	Loose contre-jour shot, of a couple facing each other in the snow	Contre-jour scene	Gray scale reproduction Uniformity Large area flicker	Still	Slide	See Attachment 1 to Annex 2	See Annex 3	Slide/ CD-ROM	ITE
7	Guide board	Full shot of a guide board written in various kinds of characters of different sizes	Outdoor still	Waveform distortion Registration legibility	Still	Slide	See Attachment 1 to Annex 2	See Annex 3	Slide/ CD-ROM	ITE
8	Tulip garden	Wide shot of a garden with red and yellow tulips of various sizes	Highly saturated colours	Chrominance/luminance resolution Colour reproduction	Still	Slide	See Attachment 1 to Annex 2	See Annex 3	Slide/ CD-ROM	ITE
9	Chromakey	A woman sitting against blue back with detailed flowers	Chromakey	Chromakey process False contour	Still	Slide	See Attachment 1 to Annex 2	See Annex 3	Slide/ CD-ROM	ITE

ITE: The Institute of Image Information and Television Engineers, 3-5-8 Shibakoen, Minato-ku, Tokyo 105-0011, Japan, Phone: +81 3 3432 4677, Fax: +81 3 3432 4675, E-mail: ite@ite.or.jp .

(Distributor: NHK Engineering Service, Inc., 1-10-11 Kinuta, Setagaya-ku, Tokyo 157-8540 Japan, Phone: +81 3 5494 2400, Fax: +81 3 5494 2152, <http://www.nes.or.jp/en/index.html>)

TABLE 2

1 920 × 1 080/59.94/I, 4:4:4 and 4:2:2, 10-bit HDTV pictures (see Annex 1)

Scene No.	Title	Content	Representative of	Attributes to be examined	Camera motion	Source	Copyright status	Delivery format	Provider name
101	Ginkgo trees	Loose shot of roadside trees and tight shot of green leaves	Outdoor shooting dissolve	Digital coding Motion reproduction Resolution	Dolly in/ dolly out	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
102	Truck train	Pan shot of a passing colourful truck train	Outdoor shooting	Standard conversion Motion reproduction Colour reproduction Texture	Pan	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
103	Cosmos flowers	Pan up shot of waving flowers and pan shot of a strolling woman	Outdoor shooting	Colour reproduction Digital coding Resolution	Pan up/Pan	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
104	Red leaves (pan up)	Pan up shot from a strolling woman to red leaves under collared leaves	Outdoor shooting	Colour reproduction Digital coding Resolution	Pan up	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
105	Sunlight through leaves	Pan down shot from sunlight through red leaves to a Japanese garden	Outdoor shooting Subtitle	Colour reproduction Digital coding Motion reproduction Resolution Contrast	Pan down	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
106	Red leaves (pan down)	Pan down shot from red leaves to a strolling woman	Outdoor shooting	Colour reproduction Digital coding Resolution	Pan down	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
107	Woman at harbour (circle dolly)	Circle dolly shot of a woman at a harbour	Outdoor shooting Subtitle	Motion reproduction Skin colour	Circle dolly	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
108	Fountain (follow)	Follow shot of a strolling woman at a fountain	Outdoor shooting	Digital coding Motion reproduction Skin colour	Follow	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
109	Fountain (dolly)	Dolly shot of a strolling woman at a fountain	Outdoor shooting Subtitle	Digital coding Motion reproduction	Dolly	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
110	Studio concert (confetti)	Dolly shot of a music concert under varying lighting in confetti	Music	Digital coding Resolution Gray scale reproduction Colour reproduction	Dolly	Camera	See Annex 3	Consecutively numbered TIFF files	ITE

TABLE 2 (continued)

Scene No.	Title	Content	Representative of	Attributes to be examined	Camera motion	Source	Copyright status	Delivery format	Provider name
111	Studio concert	Dolly shots of a series of performers at a music concert under varying lighting	Music	Digital coding Gray scale reproduction Colour reproduction	Dolly	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
112	Drama set (day)	Dolly and tight shots of a woman entering and leaving a Japanese living room	Drama	Standards conversion Resolution Colour reproduction Texture	Dolly/follow	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
113	Drama set (night)	Follow shot of a woman passing in front of a Japanese lantern at night	Drama	Contrast Texture Noise reduction	Follow	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
114	Basketball	Long shot of a basketball game with spectators (1/100 s shutter)	Sports Subtitle	Standards conversion Digital coding Motion reproduction	Pan	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
115	Evening scene (zoom out)	Zoom out shot from a Ferris wheel in the evening	Outdoor shooting	Standards conversion Resolution Gray scale reproduction	Zoom out	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
116	Evening scene (fixed)	A Ferris wheel and high-rise buildings in the evening	Outdoor shooting Subtitle	Gray scale reproduction Motion reproduction	Fixed	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
117	Night scene (fixed)	A Ferris wheel and high-rise buildings at night	Outdoor shooting Subtitle	Gray scale reproduction Contrast Noise reduction	Fixed	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
118	Horse racing (dirt)	Long and tight shots of racehorses on a dirt course.	Outdoor shooting	Digital coding Motion reproduction	Pan	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
119	Horse racing (turf)	Long shot of racehorses on a grass course	Outdoor shooting	Digital coding Motion reproduction	Pan	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
120	Woman at harbour (dolly in, zoom back)	Dolly in, zoom back shot of a woman at a harbour	Outdoor shooting	Skin colour Texture	Dolly in, zoom back	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
121	Torch bearer	Follow shot of torchbearers running at a track corner	Outdoor shooting	Digital coding Standards conversion Resolution	Follow	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
122	Children's dance	Tight shot of children dancing on the grass of an athletic field	Outdoor shooting	Digital coding Resolution Texture	Pan	Camera	See Annex 3	Consecutively numbered TIFF files	ITE

TABLE 2 (continued)

Scene No.	Title	Content	Representative of	Attributes to be examined	Camera motion	Source	Copyright status	Delivery format	Provider name
123	Children's dance (loose shot)	Loose shot of children dancing on the grass	Sports	Digital coding Resolution Texture	Pan	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
124	March	Pan up from athletes to the audience	Sports	Digital coding Resolution	Pan up	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
125	Marathon (pan up)	Pan up shot of crowds of marathon runners	Sports	Digital coding Resolution	Pan up	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
126	Marathon (fixed)	Tight shot of crowds of marathon runners	Sports	Digital coding Resolution	Fixed	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
151	Rotating disk 59.94/I	A rotating disk with still pictures at 59.94/I	Studio production	Digital coding Standards conversion Motion reproduction Resolution Legibility	Fixed	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
152	Rotating disk 59.94/I with 1/120 s shutter	A rotating disk with still pictures at 59.94/I (1/120 s shutter)	Studio production	Digital coding Standards conversion Motion reproduction Resolution Legibility	Fixed	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
153*	Rotating disk 50/I	A rotating disk with still pictures at 50/I (normal shutter speed)	Studio production	Digital coding Standards conversion Motion reproduction Resolution Legibility	Fixed	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
154*	Rotating disk 50/I with 1/100 s shutter	A rotating disk with still pictures at 50/I (1/100 s shutter)	Studio production	Digital coding Standards conversion Motion reproduction Resolution Legibility	Fixed	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
155	Pendulum 59.94/I	Pendulum (normal shutter speed)	Studio production	Digital coding Standards conversion Motion reproduction Resolution	Fixed	Camera	See Annex 3	Consecutively numbered TIFF files	ITE

TABLE 2 (continued)

Scene No.	Title	Content	Representative of	Attributes to be examined	Camera motion	Source	Copyright status	Delivery format	Provider name
156	Pendulum 59.94/I with 1/120 s shutter	Pendulum (1/120 s shutter)	Studio production	Digital coding Standards conversion Motion reproduction Resolution	Fixed	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
157*	Pendulum 50/I	Pendulum shot at 50/I (normal shutter speed)	Studio production	Digital coding Standards conversion Motion reproduction Resolution	Fixed	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
158*	Pendulum 50/I with 1/100 s shutter	Pendulum shot at 50/I (1/100 s shutter)	Studio production	Digital coding Standards conversion Motion reproduction Resolution	Fixed	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
159	Colourful world A	Toy train passing through colourful objects	Studio production	Digital coding Texture Resolution Legibility Colour reproduction	Pan, fixed	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
160	Colourful world B	Pan shots of colourful objects.	Studio production	Digital coding Texture Resolution Colour reproduction	Pan	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
161	Black dress	A woman dressed in black walks in front of a white wall and a black wall	Studio production	Gray scale reproduction Contrast Skin colour	Pan follow, fixed	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
162	White dress	A woman dressed in white walks in front of a black wall and a white wall	Studio production	Gray scale reproduction Contrast Skin colour	Pan follow, fixed	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
163	Woman with bouquet	Close shot of a woman with bouquet	Studio production	Contrast Skin colour	Fixed	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
164	Flash photography	A woman under continuous flash lights	Studio production	Digital coding Standards conversion	Fixed	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
165	Fountain (chromakey)	Mixing a woman and fountains by chromakey	Studio production Outdoor shooting	Digital coding Motion reproduction Skin colour	Fixed	Camera	See Annex 3	Consecutively numbered TIFF files	ITE

TABLE 2 (*end*)

Scene No.	Title	Content	Representative of	Attributes to be examined	Camera motion	Source	Copyright status	Delivery format	Provider name
166	Night port (camera gain: normal)	Zoom out from a night port (normal camera gain)	Outdoor shooting	Digital coding Contrast Noise reduction	Zoom out	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
167	Night port (camera gain: +6 dB)	Zoom out from a night port (camera gain: +6 dB)	Outdoor shooting	Digital coding Contrast Noise reduction	Zoom out	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
168	Night port (camera gain: +12 dB)	Zoom out from a night port (camera gain: +12 dB)	Outdoor shooting	Digital coding Contrast Noise reduction	Zoom out	Camera	See Annex 3	Consecutively numbered TIFF files	ITE
169	Glasses	Pouring drinks into glasses	Studio production	Colour reproduction	Pan/fixed	Camera	See Annex 3	Consecutively numbered TIFF files	ITE

* The field frequency is 50 Hz.

TABLE 3

1 920 × 1 080/59.94/P, 4:2:2, 10-bit HDTV pictures (see Annex 1)

Scene No.	Title	Content	Representative of	Attributes to be examined	Camera motion	Source	Copyright status	Delivery format	Provider name
201	Ginkgo trees	Loose shot of roadside trees and tight shot of green leaves	Outdoor shooting Dissolve	Digital coding Motion reproduction Resolution	Dolly in/ dolly out	Camera	See Annex 3	Consecutively numbered YUV files	ITE
202	Truck train	Pan shot of a passing colourful truck train	Outdoor shooting	Standard conversion Motion reproduction Colour reproduction Texture	Pan	Camera	See Annex 3	Consecutively numbered YUV files	ITE
203	Cosmos flowers	Pan up shot of waving flowers and pan shot of a strolling woman	Outdoor shooting	Colour reproduction Digital coding Resolution	Pan up/pan	Camera	See Annex 3	Consecutively numbered YUV files	ITE
204	Red leaves (pan up)	Pan up shot from a strolling woman to red leaves under collared leaves	Outdoor shooting	Colour reproduction Digital coding Resolution	Pan up	Camera	See Annex 3	Consecutively numbered YUV files	ITE
205	Sunlight through leaves	Pan down shot from sunlight through red leaves to a Japanese garden	Outdoor shooting Subtitle	Colour reproduction Digital coding Motion reproduction Resolution Contrast	Pan down	Camera	See Annex 3	Consecutively numbered YUV files	ITE
206	Red leaves (pan down)	Pan down shot from red leaves to a strolling woman	Outdoor shooting	Colour reproduction Digital coding Resolution	Pan down	Camera	See Annex 3	Consecutively numbered YUV files	ITE
207	Woman at harbour (circle dolly)	Circle dolly shot of a woman at a harbour	Outdoor shooting Subtitle	Motion reproduction Skin colour	Circle dolly	Camera	See Annex 3	Consecutively numbered YUV files	ITE
208	Fountain (follow)	Follow shot of a strolling woman at a fountain	Outdoor shooting	Digital coding Motion reproduction Skin colour	Follow	Camera	See Annex 3	Consecutively numbered YUV files	ITE
209	Fountain (dolly)	Dolly shot of a strolling woman at a fountain,	Outdoor shooting Subtitle	Digital coding Motion reproduction	Dolly	Camera	See Annex 3	Consecutively numbered YUV files	ITE
210	Studio concert (confetti)	Dolly shot of a music concert under varying lighting in confetti	Music	Digital coding Resolution Gray scale reproduction Colour reproduction	Dolly	Camera	See Annex 3	Consecutively numbered YUV files	ITE

TABLE 3 (continued)

Scene No.	Title	Content	Representative of	Attributes to be examined	Camera motion	Source	Copyright status	Delivery format	Provider name
211	Studio concert	Dolly shots of a series of performers at a music concert under varying lighting	Music	Digital coding Gray scale reproduction Colour reproduction	Dolly	Camera	See Annex 3	Consecutively numbered YUV files	ITE
212	Drama set (day)	Dolly and tight shots of a woman entering and leaving a Japanese living room	Drama	Standards conversion Resolution Colour reproduction Texture	Dolly/follow	Camera	See Annex 3	Consecutively numbered YUV files	ITE
213	Drama set (night)	Follow shot of a woman passing in front of a Japanese lantern at night	Drama	Contrast Texture Noise Reduction	Follow	Camera	See Annex 3	Consecutively numbered YUV files	ITE
214	Basketball	Long shot of a basketball game with spectators (1/100 s shutter)	Sports Subtitle	Standards conversion Digital coding Motion reproduction	Pan	Camera	See Annex 3	Consecutively numbered YUV files	ITE
215	Twilight scene (zoom out)	Zoom out shot from a Ferris wheel in the evening	Outdoor shooting	Standards conversion Resolution Gray scale reproduction	Zoom out	Camera	See Annex 3	Consecutively numbered YUV files	ITE
216	Twilight scene (fixed)	A Ferris wheel and high-rise buildings in the evening	Outdoor shooting Subtitle	Gray scale reproduction Motion reproduction	Fixed	Camera	See Annex 3	Consecutively numbered YUV files	ITE
217	Night scene (fixed)	A Ferris wheel and high-rise buildings at night	Outdoor shooting Subtitle	Gray scale reproduction Contrast Noise reduction	Fixed	Camera	See Annex 3	Consecutively numbered YUV files	ITE
218	Horse racing (dirt)	Long and tight shots of racehorses on a dirt course.	Outdoor shooting	Digital coding Motion reproduction	Pan	Camera	See Annex 3	Consecutively numbered YUV files	ITE
251	Rotating disk 59.94/P	A rotating disk attached with still pictures (normal shutter speed)	Studio production	Digital coding Standards conversion Motion reproduction Resolution Legibility	Fixed	Camera	See Annex 3	Consecutively numbered YUV files	ITE
252	Rotating disk 59.94/P with 1/120 s shutter	A rotating disk attached with still pictures (1/120 s shutter)	Studio production	Digital coding Standards conversion Motion reproduction Resolution Legibility	Fixed	Camera	See Annex 3	Consecutively numbered YUV files	ITE

TABLE 3 (continued)

Scene No.	Title	Content	Representative of	Attributes to be examined	Camera motion	Source	Copyright status	Delivery format	Provider name
253*	Rotating disk 24/P	A rotating disk attached with still pictures shot at 24/P (normal shutter speed)	Studio production	Digital coding Standards conversion Motion reproduction Resolution Legibility	Fixed	Camera	See Annex 3	Consecutively numbered YUV files	ITE
254*	Rotating disk 24/P with 1/48 s shutter	A rotating disk attached with still pictures shot at 24/P (1/48 s shutter)	Studio production	Digital coding Standards conversion Motion reproduction Resolution Legibility	Fixed	Camera	See Annex 3	Consecutively numbered YUV files	ITE
255	Pendulum 59.94/P	Pendulum (normal shutter speed)	Studio production	Digital coding Standards conversion Motion reproduction Resolution	Fixed	Camera	See Annex 3	Consecutively numbered YUV files	ITE
256	Pendulum 59.94/P with 1/120 s shutter	Pendulum (1/120 s shutter)	Studio production	Digital coding Standards conversion Motion reproduction Resolution	Fixed	Camera	See Annex 3	Consecutively numbered YUV files	ITE
257*	Pendulum 24/P	Pendulum shot at 24/P (normal shutter speed)	Studio production	Digital coding Standards conversion Motion reproduction Resolution	Fixed	Camera	See Annex 3	Consecutively numbered YUV files	ITE
258*	Pendulum 24/P with 1/48 s shutter	Pendulum shot at 24/P (1/48 s shutter)	Studio production	Digital coding Standards conversion Motion reproduction Resolution	Fixed	Camera	See Annex 3	Consecutively numbered YUV files	ITE
259	Colourful world A	Toy train passing through colourful objects	Studio production	Digital coding Texture Resolution Legibility Colour reproduction	Pan, fixed	Camera	See Annex 3	Consecutively numbered YUV files	ITE
260	Colourful world B	Pan shots of colourful objects	Studio production	Digital coding Texture Resolution Colour reproduction	Pan	Camera	See Annex 3	Consecutively numbered YUV files	ITE
261	Black dress	A woman dressed in black walks in front of a white wall and a black wall	Studio production	Gray scale reproduction Contrast Skin colour	Pan follow, fixed	Camera	See Annex 3	Consecutively numbered YUV files	ITE

TABLE 3 (*end*)

Scene No.	Title	Content	Representative of	Attributes to be examined	Camera motion	Source	Copyright status	Delivery format	Provider name
262	White dress	A woman dressed in white walks in front of a black wall and a white wall	Studio production	Gray scale reproduction Contrast Skin colour	Pan follow, fixed	Camera	See Annex 3	Consecutively numbered YUV files	ITE
263	Woman with bouquet	Close shot of a woman with bouquet	Studio production	Contrast Skin colour	Fixed	Camera	See Annex 3	Consecutively numbered YUV files	ITE
264	Flash photography	A woman under continuous flash lights	Studio production	Digital coding Standards conversion	Fixed	Camera	See Annex 3	Consecutively numbered YUV files	ITE
265	Fountain (chromakey)	Mixing a woman and fountains by chromakey	Studio production Outdoor shooting	Digital coding Motion reproduction Skin colour	Fixed	Camera	See Annex 3	Consecutively numbered YUV files	ITE

* The frame frequency is 24 Hz.

ITE: The Institute of Image Information and Television Engineers, 3-5-8 Shibakoen, Minato-ku, Tokyo 105-0011, Japan, Phone: +81 3 3432 4677, Fax: +81 3 3432 4675, E-mail: ite@ite.or.jp.

(Distributor: NHK Engineering Service, Inc., 1-10-11 Kinuta, Setagaya-ku, Tokyo 157-8540 Japan, Phone: +81 3 5494 2400, Fax: +81 3 5494 2152, <http://www.nes.or.jp/en/index.html>)

TABLE 4

1 920 × 1 080/50/I, 4:2:2, 10-bit HDTV pictures (see Annex 1)

Scene No.	Title	Content	Representative of	Attributes to be examined	Camera motion	Source	Copyright status	Delivery format	Provider name
301	Harvest wheat fields	Spacious wheat fields	Outdoor shooting	Resolution Digital coding	Pan	Camera1	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
302	Crossroad	Shopping street with crowded people and transformations	Outdoor shooting	Motion reproduction	Pan follow Fixed	Camera1	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
303	Basketball game	Basketball game	Sports	Motion reproduction Digital coding	Fixed Pan	Camera2	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
304	Beijing opera	Beijing opera actresses and actors in costume with bright rich colours	Drama	Digital coding Resolution Colour reproduction	Fixed	Camera2	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
305	Bicycle race	The starting and one thrust of the bicycle race	Sports	Digital coding Motion reproduction	Fixed Pan follow	Camera2	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
306	Equestrianism	Scene of the equestrianism	Sports	Digital coding Motion reproduction	Fixed Pan follow	Camera2	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
307	Football game	Scene of a football game	Sports	Digital coding Motion reproduction	Fixed Pan follow	Camera2	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
308	Swimming	Scene of a swimming game	Sports	Digital coding Motion reproduction	Fixed Pan follow	Camera2	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
309	Water polo game	Scene of a water polo game	Sports	Digital coding Motion reproduction	Fixed Pan follow	Camera2	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
310	Synchronized swimming	Scene of a synchronized swimming game	Sports	Digital coding Motion reproduction	Fixed Zoom in	Camera2	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP

TABLE 4 (continued)

Scene No.	Title	Content	Representative of	Attributes to be examined	Camera motion	Source	Copyright status	Delivery format	Provider name
311	Folk dance	Scene of dancing and singing actresses with fresh colourful dresses	Studio	Digital coding Motion reproduction	Fixed	Camera2	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
312	Scrolling characters	Scrolling to top characters and dancing	Studio production	Digital coding Motion reproduction Resolution	Fixed	Camera2	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
313	Scrolling characters	Scrolling to left characters and dancing	Studio production	Digital coding Motion reproduction Resolution	Fixed	Camera2	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
314	The silk dancing team	Parade of people dancing with ribbon belts in square matrix.	Outdoor shooting	Digital coding Motion reproduction Colour reproduction	Fixed Pan	Camera2	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
315	Northwest Waist drum dancing teams	Yangko dance and waist drum in parade	Outdoor shooting	Digital coding Motion reproduction Colour reproduction	Fixed Pan	Camera2	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
316	Fireworks	Fireworks and cheering and dancing people celebrating national day during night	Outdoor shooting	Digital coding	Fixed	Camera2	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
317	Effects	Film clips of a drama party	Effects	Digital coding Colour reproduction	--	Computer	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
318	3d animations	Animations	Animations	Digital coding colour reproduction	--	Computer	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
351	Skin colour of lady1	A lady with flowers and fruits	Studio	Skin colour Colour reproduction Texture	Fixed	Camera1	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
352	Chromakey (portrait)	A half-length lady portrait in front, with colourful fruits and glass container on the right side. The background is with standard blue colour.	Studio	Chromakey Colour reproduction	Fixed	Camera1	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP

TABLE 4 (continued)

Scene No.	Title	Content	Representative of	Attributes to be examined	Camera motion	Source	Copyright status	Delivery format	Provider name
353	Chromakey (scene)1	On a table with its cloth, there are glass vase, glass fishbowl, colourful wool ball and smog. Above all these, there is a dangling rolling birdcage.	Studio	Chromakey	Zoom in	Camera1	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
354	Rotating birdcage1	The background is standard blue colour. There is a plush toy bird in the rolling birdcage.	Studio	Chromakey Motion reproduction	Zoom out	Camera1	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
355	Nine-dragon screen	A relief screen with nine-dragon in traditional china style	Outdoor shooting	Resolution	Pan	Camera1	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
356	Flower garden	A tour bus travelling in the garden with detailed rich colours	Outdoor shooting	Digital coding Resolution Colour reproduction	Pan follow Fixed	Camera2	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
357	Field of flowers	Brightening red flowers and golden flowers on the up and down hills	Outdoor shooting	Resolution Colour reproduction	Pan	Camera1	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
358	Amusement park	People whirling up and down in the amusement park---typical scene of this spot	Outdoor shooting	Digital coding Motion reproduction	Fixed Zoom in and out	Camera1	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
359	City plaza	Actresses wearing dresses with stripe walking in the city plaza with crisscross style	Outdoor shooting	Resolution Standards conversion	Pan follow	Camera1	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
360	Skiing	Sportsmen with bright-coloured ski suit in the ski field	Sports	Motion reproduction Luminance level	Pan follow	Camera2	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
361	Hebei bangzi	Performance of opera of china	Studio production	Colour reproduction	Pan follow	Camera2	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
362	Hebei Bangzi with noises (S/N = 65 dB)	Adding noise of S/N = 65 dB to the above scene	Noise, signal Processing	Performance of digital signal Processing	Pan follow	Camera2	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP

TABLE 4 (continued)

Scene No.	Title	Content	Representative of	Attributes to be examined	Camera motion	Source	Copyright status	Delivery format	Provider name
363	Hebei Bangzi with noises (S/N = 53 dB)	Adding noise of S/N = 53 dB to the above scene	Noise, signal Processing	Performance of digital signal Processing	Pan follow	Camera2	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
364	Hebei Bangzi with noises (S/N = 45 dB)	Adding noise of S/N = 45 dB to the above scene	Noise, signal Processing	Performance of digital signal Processing	Pan follow	Camera2	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
365	Textiles and Household articles	Textiles of cotton, linen and wool; product of leather, glass, plastic and wood.	Studio still Textured objects	Texture reproduction	Still	Camera2	See Annex 3	TIFF file	CCTV&A BP
366	Food and containers	Vegetables, fruits, bread, porcelain, metalwork, etc.	Studio still	Texture reproduction	Still	Camera2	See Annex 3	TIFF file	CCTV&A BP
367	Rotating birdcage2	The background is with standard blue colour. There is a plush toy bird and two porcelain containers in the rolling birdcage.	Studio	Chroma key Motion reproduction	Zoom in and out	Camera2	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
368	Flowerbed	Flowers on the stairs	Outdoor shooting	Colour resolution	Pan slow	Camera2	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
369	Rotating disc (speed 1)	A rotating disk attached with still pictures	Circle motion	Motion reproduction Resolution	Fixed	Camera2	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
370	Rotating disc (speed 2)	Idem. Increased speed	Circle motion	Motion reproduction Resolution	Fixed	Camera2	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
371	Rotating disc (speed 3)	Idem. Increased speed	Circle motion	Motion reproduction Resolution	Fixed	Camera2	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
372	Dialogue in a Studio	A scene of a woman with a scarf of slender stripe and a male host with thin check suit in the studio. The background is rich in colour and detail.	Studio	Resolution Digital coding	Zoom in	Camera2	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP

TABLE 4 (*end*)

Scene No.	Title	Content	Representative of	Attributes to be examined	Camera motion	Source	Copyright status	Delivery format	Provider name
373	Beijing Opera actress and Noises	Entropy of the picture changes with the varying noises	Studio production	Digital coding	Zoom in	Camera2	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
374	Autumn leaves	Yellow leaves playing in fall wind	Outdoor shooting	Motion reproduction	Fixed	Camera3	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
375	Roses	Roses of various colours under small and tiny water mist	Studio	Digital coding	Fixed	Camera4	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
376	Skin colour of lady2	Lady portrait in half-length, emphasizing face skin. There are fresh flowers on the right side.	Studio	Resolution Colour reproduction	Fixed	Camera4	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
377	Horizontal title	Horizontal crawling characters	Studio production	Resolution	--	Computer	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
378	Vertical title	Vertical crawling characters	Studio production	Resolution	--	Computer	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP
379	Flying title	Flying characters	Studio production	Resolution	--	Computer	See Annex 3	Consecutively numbered TIFF files	CCTV&A BP

CCTV&ABP: China Central Television & Academy of Broadcasting Planning. SARRFT. No.2 Fuxingmenwai Street, Beijing, China. Phone: +86 10 86093947, Fax: +86 10 86092720, E-mail: abp@abp2003.cn.
<http://www.abp2003.cn/BZGL/XgyjcgList>.

2 Test materials of ultra-high definition television (UHDTV), HDR-TV and high definition television (HDTV)

TABLE 5

7 680 × 4 320 (8k), 3 840 × 2 160 (4K), 1 920 × 1 080 (2K) still pictures

Scene No.	Title	Content	Camera motion	Source	Attributes to be examined	Copyright status	Delivery format	Provider name
1	Books	Many books on bookshelves	Still	Camera	See Attachment 2 to Annex 1	Annex 3	Raw file (8K, 4K) Tiff file (2K)	ITE
2	MusicBox	Antique music boxes	Still	Camera	See Attachment 2 to Annex 1	Annex 3	Raw file (8K, 4K) Tiff file (2K)	ITE
3	Moss	Japanese moss garden	Still	Camera	See Attachment 2 to Annex 1	Annex 3	Raw file (8K, 4K) Tiff file (2K)	ITE
4	Kimono	Japanese traditional garment	Still	Camera	See Attachment 2 to Annex 1	Annex 3	Raw file (8K, 4K) Tiff file (2K)	ITE
5	StainedGlass	Hand painted stained glass	Still	Camera	See Attachment 2 to Annex 1	Annex 3	Raw file (8K, 4K) Tiff file (2K)	ITE
6	Butterflies	Colourful butterflies	Still	Camera	See Attachment 2 to Annex 1	Annex 3	Raw file (8K, 4K) Tiff file (2K)	ITE
7	ChromaKey	A doll, a model ship, and small flowers against blue back	Still	Camera	See Attachment 2 to Annex 1	Annex 3	Raw file (8K, 4K) Tiff file (2K)	ITE
8	Sea	Emerald green sea	Still	Camera	See Attachment 2 to Annex 1	Annex 3	Raw file (8K, 4K) Tiff file (2K)	ITE
9	Flowers	Colourful real flowers	Still	Camera	See Attachment 2 to Annex 1	Annex 3	Raw file (8K, 4K) Tiff file (2K)	ITE
10	Ship	Sailing vessel	Still	Camera	See Attachment 2 to Annex 1	Annex 3	Raw file (8K, 4K) Tiff file (2K)	ITE

ITE: The Institute of Image Information and Television Engineers, 3-5-8 Shibakoen, Minato-ku, Tokyo 105-0011, Japan, Phone: +81 3 3432 4677, Fax: +81 3 3432 4675, E-mail: ite@ite.or.jp.
(Distributor: ITE, <http://www.ite.or.jp/en/>)

TABLE 6

3840 × 2160/50/P, 4:4:4, 16-bit UHDTV pictures**(these materials can be used for HDR-TV test. The necessary information can be found in Annex 1 Tables 18 to 20)**

Scene No.	Title	Content	Camera motion	Source	Attributes to be examined	Copyright status	Delivery format	Provider name
1	The scene outside of the steel factory	A worker wearing high saturation colour work clothes looks outside the steel factory.	Fixed	Camera	See Attachment 2 to Annex 1	Annex 3	Tiff files (4K)	CCTV&ABP
2	The scene inside of the steel factory	Steel factory view and a worker wearing high saturation colour work clothes.	Pan slow	Camera	See Attachment 2 to Annex 1	Annex 3	Tiff files (4K)	CCTV&ABP
3	Still object	On a table with its cloth, there are glass vase, metal work and chinaware. There is a shelves back of the table.	Fixed	Camera	See Attachment 2 to Annex 1	Annex 3	Tiff files (4K)	CCTV&ABP
4	Coffee shop	A girl reading in the coffee shop.	Fixed	Camera	See Attachment 2 to Annex 1	Annex 3	Tiff files (4K)	CCTV&ABP
5	Street of the town in the night	Several children with lantern play in the street of the town.	Fixed	Camera	See Attachment 2 to Annex 1	Annex 3	Tiff files (4K)	CCTV&ABP
6	Colourful lantern	Some colourful lanterns in the night.	Fixed	Camera	See Attachment 2 to Annex 1	Annex 3	Tiff files (4K)	CCTV&ABP
7	Moth orchid	Bright-coloured Moth orchid.	Fixed	Camera	See Attachment 2 to Annex 1	Annex 3	Tiff files (4K)	CCTV&ABP
8	Fresh flowers	Colourful fresh flowers.	Fixed	Camera	See Attachment 2 to Annex 1	Annex 3	Tiff files (4K)	CCTV&ABP
9	Dance	Several dancers dance on the stage.	Fixed	Camera	See Attachment 2 to Annex 1	Annex 3	Tiff files (4K)	CCTV&ABP
10	Bamboo	Bamboo wavering in the sky.	Zoom	Camera	See Attachment 2 to Annex 1	Annex 3	Tiff files (4K)	CCTV&ABP
11	Girls dance by the river side	Girls dance by the river side.	Fixed	Camera	See Attachment 2 to Annex 1	Annex 3	Tiff files (4K)	CCTV&ABP
12	Skin colour	A girl in national costume.	Fixed	Camera	See Attachment 2 to Annex 1	Annex 3	Tiff files (4K)	CCTV&ABP
13	A sightseeing boat in the night	A sightseeing boat in the Huangpu River at night.	Pan slow	Camera	See Attachment 2 to Annex 1	Annex 3	Tiff files (4K)	CCTV&ABP
14	Chroma key	On a table with its cloth, there are glass vase, glass fishbowl, flowers and smog. Above all these, there is a dangling rolling birdcage.	Zoom in	Camera	See Attachment 2 to Annex 1	Annex 3	Tiff files (4K)	CCTV&ABP
15	Textile	On a table with its cloth, there are flowers, silk scarf and colourful wool ball. In the background, there are different colour wool.	Pan	Camera	See Attachment 2 to Annex 1	Annex 3	Tiff files (4K)	CCTV&ABP
16	Dining Table	There are wine glass, cups, teapot, candlestick and tableware in the dining table.	Pan	Camera	See Attachment 2 to Annex 1	Annex 3	Tiff files (4K)	CCTV&ABP

TABLE 6 (*end*)

Scene No.	Title	Content	Camera motion	Source	Attributes to be examined	Copyright status	Delivery format	Provider name
17	Fruit	Fresh fruits such as grapes, apples, oranges, mangos, watermelon, pineapple, etc.	Pan	Camera	See Attachment 2 to Annex 1	Annex 3	Tiff files (4K)	CCTV&ABP
18	White tulips	A close-up of white tulips in side backlighting.	Fixed	Camera	See Attachment 2 to Annex 1	Annex 3	Tiff files (4K)	CCTV&ABP
19	Tulips garden	The tulips garden in water spraying.	Pan slow	Camera	See Attachment 2 to Annex 1	Annex 3	Tiff files (4K)	CCTV&ABP
20	Flowers in close-up	Flowers rich in colour in close-up.	Fixed	Camera	See Attachment 2 to Annex 1	Annex 3	Tiff files (4K)	CCTV&ABP
21	Dusk	The ferry's wheel and buildings by the riverside in the dusk.	Zoom in	Camera	See Attachment 2 to Annex 1	Annex 3	Tiff files (4K)	CCTV&ABP
22	Night View	The ferry's wheel and yachts in the evening.	Zoom in	Camera	See Attachment 2 to Annex 1	Annex 3	Tiff files (4K)	CCTV&ABP
23	The ferry's wheel	The ferry's wheel in the evening.	Zoom out	Camera	See Attachment 2 to Annex 1	Annex 3	Tiff files (4K)	CCTV&ABP

CCTV&ABP: China Central Television & Academy of Broadcasting Planning. SARRFT. No.2 Fuxingmenwai Street, Beijing, China. Phone: +86 10 86093947, Fax: +86 10 86092720, E-mail: abp@abp2003.cn.
<http://www.abp2003.cn/BZGL/XgyjcgList>.

TABLE 7

1 920 × 1 080 (2K) still pictures, 100 cd/m²

Scene No.	Title	Content	Camera motion	Source	Attributes to be examined	Copyright status	Delivery format	Provider name
1	abbaye_de_beauport	Ruins of the Abbey of Beauport, Arches, grass, overexposed background.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
2	acropolis	Ruins of the acropolis, Athens. Textured walls, clear blue sky.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
3	ancient_corinth	Temple ruins of Corinth, Athens. Dark foliage, textured walls, sky partially cloudy.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
4	arches	A series of arches leading to a sea view. Part sun, part shade.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
5	arizona	A contrasty view from a mountain into the distance. Fish-eye lens. Sky with some clouds, haze.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
6	athens	Sunset view of temple with vegetation. Strong contrast with sky.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
7	athensB	View of the Acropolis close to sunset. Train in the foreground.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
8	athensC	Suburbs. Much detail available in this image.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
9	balloon_fiesta	A field with deflated balloons. Early morning atmosphere.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
10	bird	A bird stretching its wings. Taken in a zoo.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor

Technicolor: Technicolor Research and Licensing, 975 Avenue des Champs Blancs, 35576 Cesson-Sévigné, France. Contact: Erik Reinhard (erik.reinhard@technicolor.com).

TABLE 7 (continued)

Scene No.	Title	Content	Camera motion	Source	Attributes to be examined	Copyright status	Delivery format	Provider name
11	blossom	Blossom, lit from behind.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
12	blossom	Closeup of a flower. Delicate texture.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
13	bridge	Bridge over railroad. Long Ashton, UK. Snow cover.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
14	bronze	Group of bronze statues with grass backdrop. Strong greens.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
15	bull	Head of grazing bull. Subdued greens.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
16	butterfly	A butterfly on flowers.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
17	canon	Ancient cannon. Over-exposed sky.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
18	canyon	Grand canyon, Arizona. Fisheye lens. Strong contrasts.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
19	carnac	A field with megalithic stones and sheep. Carnac, France.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
20	cdg	Train station of Charles De Gaulle airport, Paris.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
21	chipmunk	A chipmunk on reddish soil.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
22	cookaburra	The head of a cookaburra. Note the reflection of the photographer in its eye.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
23	diros_boatB	A boat packed with materials floating on clear water	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
24	epidavros_reconstructionC	A reconstructed section of a temple in Epidavros, Greece.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
25	farm	A winter landscape.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
26	feeding_swallow	A swallow feeding a chick in full flight. Clear blue sky.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
27	fern	A fern leaf in wintry conditions.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor

TABLE 7 (continued)

Scene No.	Title	Content	Camera motion	Source	Attributes to be examined	Copyright status	Delivery format	Provider name
28	flower_field	A field with wild flowers.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
29	flowers	Purple flowers growing on a wall.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
30	flying_balloon	Balloon flying over Somerset landscape.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
31	fougeres	A street in Fougères, France.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
32	fougeresB	A section of Fougères castle under a cloudy sky.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
33	freiheit	A bell.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
34	guillemots	Guillemots on a rocky outcrop.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
35	guillemotsB	A guillemot about to land.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
36	guillemotsC	A guillemot stretching its wings.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
37	hydrants	A row of fire hydrants.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
38	keysersberg	Streetview of Keysersberg, France.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
39	konstanz	Railway station of Konstanz, Germany.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
40	konstanzB	Harbourview of Konstanz, Germany. Calm weather and unusual lighting.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
41	konstanzC	View of the Bodensee, Germany.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
42	leaf	An autumn leaf on a defocused background.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
43	loet	Loet Vanderveen statue, bronz.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
44	long_ashton	Winterview over Long Ashton, UK.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
45	lundy_bay	Lundy Island, UK.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor

TABLE 7 (continued)

Scene No.	Title	Content	Camera motion	Source	Attributes to be examined	Copyright status	Delivery format	Provider name
46	lundy_light_house	Light house on Lundy Island, UK.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
47	mainau	Church interior.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
48	mainauB	Rose garden.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
49	mainauC	Bodensee, seen from Mainau, Germany.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
50	mani_tuktuk	A tuk-tuk in Greece.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
51	mus	A sparrow looking down from a roof. Clear blue sky.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
52	nafplio	Palamidi, Venetian palace, Nafplio, Greece. Fish eye lens.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
53	new_delhi	A street in New Delhi, India.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
54	orchid	A close-up of an orchid.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
55	organ	St. Helen's Church, Lundy, UK.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
56	pidgeons	Pidgeons sunbathing.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
57	pillars	Inside Mont St. Michel, France.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
58	psihro_cave	Psihro Cave, Crete, Greece. Photo was processed to leave only the entrance visible.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
59	puffin	The head of a puffin.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
60	puffinC	A puffin floating in the sea.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
61	raglan	A view of Raglan Castle, Wales, UK.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
62	ringed_bird	A ringed bird on a blurred background.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor

TABLE 7 (end)

Scene No.	Title	Content	Camera motion	Source	Attributes to be examined	Copyright status	Delivery format	Provider name
63	robin	A robin on a branch in a snowy landscape.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
64	roof	The sculpted roof of a railway station.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
65	seal	A seal swimming.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
66	seals	A pair of seals sunbathing.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
67	sheep	A Soay sheep.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
68	ship	A beached shipwreck. Haze in the distance. Heavy cloudcover.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
69	some_flowers	A small number of flowers growing on a wall.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
70	st_michaels_mount	A contrasty view of St. Michaels Mount, Cornwall, UK.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
71	stone_henge	Stone henge, shot into the light.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
72	theatre	An open-air theatre in Athens, Greece.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
73	tour_eiffel	A section of the Eiffel Tour, strongly backlit by an even grey sky.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
74	tunnel	A tunnel	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
75	vw	A planter with a variety of plants.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
76	well	An old well.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
77	westonbirt	Autumn colours in Westinbirt Arborethum,UK.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
78	workshop	A workshop.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
70	zaragoza	A night scene in Zaragoza, illuminated by sodium lights.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor

TABLE 8

1 920 × 1 080 (2K) still pictures, 1000 cd/m²

Scene No.	Title	Content	Camera motion	Source	Attributes to be examined	Copyright status	Delivery format	Provider name
1	antelopeB	A Loet Vanderveen statue.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
2	arboretumA	Autumn colours. Fisheye lens.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
3	arboretumB	Autumn leaves.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
4	bahamasB	Garden in the Bahamas, shot into the light.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
5	bahamasC	Swimming pool in the Bahamas.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
6	barn	The interior of a barn.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
7	bayou_cafe	A gloomy view of Savannah, GA.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
8	bell_pepper	Some bell peppers.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
9	blavenavon	Mining in Blaenavon. Fisheye lens.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
10	blue_flowersB	A couple of purple/blue flowers	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor

Technicolor: Technicolor Research and Licensing, 975 Avenue des Champs Blancs, 35576 Cesson-Sévigné, France. Contact: Erik Reinhard (erik.reinhard@technicolor.com)

TABLE 8 (continued)

Scene No.	Title	Content	Camera motion	Source	Attributes to be examined	Copyright status	Delivery format	Provider name
11	bridges	A backstreet in Savannah, GA.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
12	bristol_balloons	A pair of colourful balloons.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
13	bristol_blue	Bristol Blue glassware.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
14	broadmeadB	Night scene of Broadmead shopping centre, Bristol, UK.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
15	bromelia	A flower with an unusual green backdrop.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
16	carpenters_arms	A pub in Lacock, UK.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
17	castle_coombeE	A view of Castle Coombe, UK.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
18	château_des_marais	Evening at a castle.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
19	cheetah	A Loet Vanderveen statue.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
20	church_st	Church St. Station, Orlando, FL.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
21	circe_du_soleil	Circe du Soleil tent, Orlando, FL.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
22	conservatory	A conservatory, Rochester, NY.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
23	cows	Some cows.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
24	disney_boatB	Cruise ship.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
25	epcot	Epcot centre, Bay Lake, FL.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
26	epidavros_theatre	Epidavros theatre, Greece. Fisheye lens.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor

TABLE 8 (continued)

Scene No.	Title	Content	Camera motion	Source	Attributes to be examined	Copyright status	Delivery format	Provider name
27	exmouth_coast	A gloomy view of the coast near Exmouth, UK.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
28	famagusta_shops	A row of shops in Famagusta, Northern part of Cyprus.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
29	famagusta_venetian_palace	Outdoor seating near the Venetian Palace, Famagusta, Northern part of Cyprus.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
30	flowerC	Close-up of a flower.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
31	flowerD	Dark red flowers.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
32	flowerE	Flowers. Unusual colours.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
33	flower_pot	Pot of flowers.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
34	fort	Fort near St. Malo, France.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
35	garage	Night scene of a garage.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
36	glastonbury_abbey B	Glastonbury Abbey.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
37	gnomes	A collection of gnomes in the forest.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
38	goliath	A stuffed toy.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
39	green_glass_sharp	A glass object.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
40	grey_elephant	A Loet Vanderveen statue.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
41	haliotis	A seashell showing iridescent colours.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
42	harbourB	Harbour entrance of Konstanz, Germany.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
43	heathrow	A waiting area at Heathrow Airport, UK.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor

TABLE 8 (continued)

Scene No.	Title	Content	Camera motion	Source	Attributes to be examined	Copyright status	Delivery format	Provider name
44	hellfire	A piece of music equipment.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
45	hibiscus_young	A hibiscus flower.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
46	hologram	A hologram.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
47	honda	A pressure washer engine.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
48	house_of_blues	House of Blues sign, Orlando, FL.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
49	interieure_chateau	Interior of Fougères castle, France.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
50	ipitonga	A shop window.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
51	kinderboerderij	A snowy farm under dark clouds.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
52	klompen	Clogs.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
53	kloostergangB	Cloister of Mt. St. Michel, France.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
54	knossos_frescoC	A fresco in Knossos, Crete, Greece.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
55	ksc	A collection of rockets at Kennedy Space Center, FL.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
56	la_vapeur_du_triouxC	A steam train. Paimpol, France.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
57	lemon	A lemon	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
58	lipstick	A shop window.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
59	llanthony_priory	Llanthony Priory, Wales, UK.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
60	long_ashtonG	Sunrise in Long Ashton, UK.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor

TABLE 8 (continued)

Scene No.	Title	Content	Camera motion	Source	Attributes to be examined	Copyright status	Delivery format	Provider name
61	mauritshuis	The Mauritshuis, Den Haag, The Netherlands. Due to high winds, the clouds show some ghosting artefacts.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
62	menhirs_f22	Modern menhirs in A Coruña, Spain	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
63	morning_fogB	The sun peeking through the morning fog.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
64	nicosia_icon	A golden icon in Nicosia, Cyprus.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
65	nicosia_near_green_line	A ruin in Nicosia, Cyprus	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
66	opera	l'Opera, Paris, France, at night.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
67	park_ave	A street in Winter Park, FL.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
68	pillars	A room in the abbey of Mt. St. Michel, France.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
69	polasekB	A statue of Albin Polasek. Winter Park, FL.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
70	quiberon_hotel	The façade of a hotel in Quiberon, France.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
71	railway_bridge	A bridge over a railway.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
72	railway_station	Railway station of Charles de Gaulle Airport, Paris, France.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
73	rainbowD	A rainbow over Nottingham, UK.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
74	rajah_rammohun_roy	Statue of Rajah Rammohun Roy, Bristol, UK.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
75	red_flower	Red passion flower.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
76	redsB	A collection of snooker balls.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor

TABLE 8 (continued)

Scene No.	Title	Content	Camera motion	Source	Attributes to be examined	Copyright status	Delivery format	Provider name
77	refectory	The refectory of Mt. St. Michel, France.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
78	ridderzaal	Ridderzaal, Den Haag, The Netherlands. Ghosting in the clouds.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
79	river_boat	View of a river boat in Savannah, GA.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
80	rose_garden	Rose garden, Mainau, Germany.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
81	rosgartenstrasse	Street view in Konstanz, Germany.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
82	roundaboutB	Night view of Stokes Croft Roundabout, Bristol, UK.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
83	salamis_statues	Statues in Salamis, Northern part of Cyprus.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
84	secret_lake	Night view of Secret Lake, Casselberry, FL.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
85	secret_lake	Secret Lake, Casselberry, FL.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
86	shopping_street	Mt. St. Michel, France.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
87	staircase	Staircase in a castle.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
88	stanton_drewB	Stones forming a stone circle at Stanton Drew, UK.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
89	steam_engine	Steam engine, Orlando, FL.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
90	still_life	A collection of transparent objects.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
91	street	A close-up of some tarmac.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
92	sunbeam_breadB	Baker's van in Savannah, GA.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
93	sunriseD	A sunrise.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor

TABLE 8 (*end*)

Scene No.	Title	Content	Camera motion	Source	Attributes to be examined	Copyright status	Delivery format	Provider name
94	sunsetN	A sunset.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
95	tank	A tank in the harbour of Bristol, UK.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
96	tour_surienneB	A room in Fougere Castle, France.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
97	tower	The rafters of a tower in a castle.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
98	truck	A truck in the harbour of Bristol, UK.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
99	tuebingen_1	A night view of Tuebingen, Germany.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
100	wadworth	A pub sign in Castle Coombe, UK.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
101	walkwayB	Interior of the abbey of Mt. St. Michel, France.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
102	wheel	A wheel for hoisting goods. Mt. St. Michel, France.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
103	white_flower	A white flower.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
104	wild_flowersB	A meadow with wild flowers.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
105	window	A window in the abbey of Mt. St. Michel, France.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
106	windowB	A window and a statue, Mt. St. Michel, France.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor
107	zaragoza_mallC	A covered walkway in Zaragoza, Spain.	Still	Camera	See Attachment 2 to Annex 1	Annex 3	OpenEXR file (.exr), (2K)	Technicolor

Annex 1

Supplementary information on test materials

1 HDTV test materials for the 1 920×1 080/59.94/I, 4:4:4 and 4:2:2, 10-bit and 1 920×1 080/59.94/P, 4:2:2, 10-bit formats listed in Tables 1-2 and 1-3

1.1 Image characteristics

Table 9 summarizes the characteristics of the new test materials. The materials are categorized into three series. “Materials A” are 1 920×1 080/59.94/I, 4:4:4, 10-bit format including four sequences at 50/I. “Materials B” are 1 920×1 080/59.94/P, 4:2:2, 10-bit format including four sequences at 24/P. “Materials C” are 1 920×1 080/59.94/I, 4:2:2, 10-bit down-sampled format from “Materials A”.

The materials for each series contain two types of scenes according to the purpose of usage for evaluation, i.e. “attribute-general” or “attribute-specific”. “Attribute-general” materials are similar to typical broadcast programme content, and “attribute-specific” materials are for specific evaluations.

TABLE 9
Image characteristics

Series	Materials A		Materials B		Materials C	
Video standard	Part 2 of Rec. ITU-R BT.709					
Number of pixels	1 920×1 080					
Bit depth	10-bit					
Signal format	RGB		YCbCr		YCbCr	
Colour sampling	4:4:4		4:2:2 ⁽³⁾		4:2:2 ⁽¹⁾	
Scanning	Interlace		Progressive		Interlace	
Frame rate	29.97 Hz (59.94/I) ⁽²⁾		59.94 Hz (59.94/P) ⁽³⁾		29.97 Hz (59.94/I) ⁽⁴⁾	
File format	Consecutively numbered TIFF files		Consecutively numbered YUV files		Consecutively numbered TIFF files	
Duration	Title (1 s) + Test Sequence (15 s)		Title (1 s) + Test Sequence (15 s)		Title (1 s) + Test Sequence (15 s)	
Number of files	480 (400 for 50/I)		960 (384 for 24/P)		480 (400 for 50/I)	
Number of sequences	45		33		45	
	General: 26	Specific: 19	General: 18	Specific: 15	General: 26	Specific: 19
List of sequences	Table 2		Table 3		Table 2	

⁽¹⁾ Down-sampled from Materials A.

⁽²⁾ Including four sequences at 50/I, 4:4:4.

⁽³⁾ Including four sequences at 24/P, 4:4:4.

⁽⁴⁾ Including four sequences at 50/I, 4:2:2.

1.2 Production conditions

1.2.1 Equipment used for test materials

Table 10 lists the equipment used for shooting and recording test materials.

TABLE 10
Equipment used for shooting and recording

Camera	HDTV camera (HDC-1500, Sony), see Table 11
Lens	Cinema lens (Canon or Fujinon)
Recorder	Uncompressed HDTV hard disk recorder (HR-7401, ASTRODESIGN, Inc.)

TABLE 11
Camera specifications

Pickup device	Three 2/3-inch type 2.2-megapixel HD progressive CCD
Effective picture elements	1 920 (H) × 1 080 (V)
Built-in filters	ND: clear, 1/4 ND, 1/8 ND, 1/16 ND, 1/64 ND CC: cross, 3 200K, 4 300K, 6 300K, 8 000K
Sensitivity	F10 at 2 000 lx (3 200K, 89.9% reflectance)
Signal-to-noise ratio	54 dB (Typical)
Horizontal resolution	1 000 TV lines
Registration	Within 0.02% (all zones, without lens)

1.2.2 Scrolling subtitle

Sequences indicating “Subtitles” in the column “Representative of” in Table 3 contain superimposed scrolling-subtitles. The speed of scrolling is 300 pixels/s vertically and 600 pixels/s horizontally.

1.3 Status for use of test materials

Usage restrictions fall under the category of “commercially restricted” as described in Annex 3.

2 HDTV test materials for the 1 920 × 1 080/50/I, 4:2:2, 10-bit formats listed in Tables 1 to 4

2.1 Image characteristics

Table 12 summarizes the characteristics of the new test materials. 1 920 × 1 080/50/I, 4:2:2, 10-bit format.

The materials for each series contain two types of scenes according to the purpose of usage for evaluation, i.e. “attribute-general” or “attribute-specific”. “Attribute-general” materials are similar to typical broadcast programme content, and “attribute-specific” materials are for specific evaluations.

TABLE 12

Image characteristics

Video standard	Recommendation ITU-R BT.709	
Number of pixels	1 920 × 1 080	
Bit depth	10-bit	
Signal format	$YC_B C_R$	
Colour sampling	4:2:2	
Scanning	Interlace	
Frame rate	25 Hz (50/I)	
File format	Consecutively numbered TIFF files	
Duration	Test sequence (10 s~48 s)	
Number of files	250~1 200	
Number of sequences	47	
	General:19	Specific:28
List of sequences	Table 4	

2.2 Production conditions**2.2.1 Equipment used for test materials**

Table 13 lists the equipment used for shooting and recording test materials.

TABLE 13

Equipment used for shooting and recording

Camera	HDTV camera1 (SRW-9000, Sony), see Table 14 HDTV camera2 (HDC-F950, Sony), see Table 15 HDTV camera3 (HDW-750P, Sony), see Table 16 HDTV camera4 (ARRI D21, RED ONE), see Table 17
Lens	Cinema lens (Canon or Fujinon)
Recorder	Uncompressed HDTV hard disk recorder (JiuHeCheng, Inc.)

TABLE 14

Camera1 specifications

Pickup device	Three 2/3-inch type 2.2-megapixel HD progressive CCD
Effective picture elements	1 920 (H) × 1 080 (V)
Built-in filters	ND: clear, 1/2ND, 1/4 ND, 1/16 ND, 1/64 ND CC: cross, 3 200 K, 4 300 K, 6 300 K
Sensitivity	—
S/N	55 dB (Typical)
Horizontal resolution	1 000 TV lines
Registration	Within 0.02% (all zones, without lens)

TABLE 15

Camera2 specifications

Pickup device	Three 2/3-inch type 2.2-megapixel FIT CCD
Effective picture elements	1 920 (H) × 1 080 (V)
Built-in filters	ND: clear, 1/4 ND, 1/8 ND, 1/16 ND, 1/64 ND CC: cross, 3 200 K, 4 300 K, 6 300 K, 8 000 K
Sensitivity	F10 at 2 000 lx (3 200 K, 89.9% reflectance)
S/N	54 dB (Typical)
Horizontal resolution	1 000 TV lines
Registration	Within 0.02% (all zones, without lens)

TABLE 16

Camera3 specifications

Pickup device	Three 2/3-inch type 2.2-megapixel FIT CCD
Effective picture elements	1 920 (H) × 1 080 (V)
Built-in filters	ND: clear, 1/4 ND, 1/16 ND, 1/64 ND CC: cross, 3 200 K, 4 300 K, 6 300 K
Sensitivity	F10 at 2 000 lx (3 200 K, 89.9% reflectance)
S/N	54 dB (Typical)
Horizontal resolution	1 000 TV lines
Registration	Within 0.02% (all zones, without lens)

TABLE 17

Camera4 specifications

Pickup device	Single Super 35 mm type 6.2-megapixel progressive CMOS
Effective picture elements	1 920 (H) × 1 080 (V)
Sensitivity	ISO 100-500 base ISO 200
Horizontal resolution	1 440 TV lines

2.3 Status for use of test materials

Usage restrictions fall under the category of “commercially restricted” as described in Annex 3.

3 UHDTV/HDTV test materials listed in Table 5

The test materials are provided in three formats: UHDTV formats specified in Recommendation ITU-R BT.2020 with 7 680 × 4 320 pixels and 3 840 × 2 160 pixels and HDTV format specified in Recommendation ITU-R BT.709 with 1 920 × 1 080 pixels. The specifications of each format are listed in Table 18.

TABLE 18

Format specifications

Resolution	UHDTV (Rec. ITU-R BT.2020)		HDTV (Rec. ITU-R BT.709)
Image size (horizontal × vertical)	7 680 × 4 320 pixel	3 840 × 2 160 pixel	1 920 × 1 080 pixel
Aspect ratio	16:9 (square pixel)		
Sampling ratio	RGB 4:4:4		
Bit depth	12 bits for each colour signal		10 bits for each colour signal
Quantization	Rec. ITU-R BT.2020		Rec. ITU-R BT.709
System colourimetry	Rec. ITU-R BT.2020		Rec. ITU-R BT.709
File format	12 bit RAW		16 bit TIFF

A digital single-lens reflex camera H4D-200MS from Hasselblad was used to shoot the test materials. Table 19 shows the specifications. The camera provides both single shot mode and multi shot mode. Single shot mode is a shooting mode which is used in standard single-sensor cameras with the Beyer type colour filter. The colour pixel information is obtained by interpolating process called demosaicing performed to the pixel values containing either R, G, or B information. Whereas a multi shot mode obtains the corresponding pixel values of every colour information of each pixel by shooting the image for 4 times accurately shifting the CCD sensor by one pixel on vertical and horizontal directions. Multi shot mode can obtain faithful colour information without any false colour, however, it is only applicable to still objects.

The camera native images were trimmed to 7 680 × 4 320 pixels and developed in the Recommendation ITU-R BT.2020 colour space by a raw converter software (Hasselblad Phocus ver. 8.1). The downscaling of the 3 840 × 2 160 and 1 920 × 1 080 images were also processed by the same converter software. The Rec. ITU-R BT.2020 RGB values of 1 920 × 1 080 images was transformed to the Rec. ITU-R BT.709 RGB values by a 3 × 3 matrix multiplication and then clipped to the range's extremes.

It should be noted that the 3 840 × 2 160 and 1 920 × 1 080 images were produced from oversampled images but the 7 680 × 4 320 images are constrained by the camera performance currently available. It is desirable that the 7 680 × 4 320 images are also produced from oversampled images in the future.

TABLE 19

Camera specifications

	Hasselblad H4D-200MS
Image sensor	CCD (49.1 × 36.7 mm)
Effective pixels	8 176 × 6 132 pixel
Colour definition	16 bits
Shooting mode	Single shot, 4-shot and 6-shot
ISO speed range	ISO 50, 100, 200, 400 and 800
Shutter speed	128 seconds to 1/800 second

4 UHDTV and HDR-TV test materials listed in Table 6

Table 20 summarizes the characteristics of the new test materials. 3840 × 2160/50/P, 4:4:4, 16-bit format.

The materials are produced from RAW files. The files are processed by PQ1000 curve and HLG curve.

TABLE 20

Format specifications

Resolution	UHDTV (Rec. ITU-R BT.2100)
Image size (horizontal × vertical)	3 840 × 2 160 pixel
Aspect ratio	16:9 (square pixel)
Sampling ratio	RGB 4:4:4
Bit depth	16bits for each colour signal
System colourimetry	Rec. ITU-R BT.2020
File format	Consecutively numbered TIFF files
EOTF / Peak Brightness	PQ/1000nit, HLG

TABLE 21

Equipment used for shooting, recording and colour grading

Camera	4K Camera (PMW-F55, Sony), see Table 22
Lens	Cinema lens (ARRI/ZEISS Master Prime)
Recorder	RAW Recorder Unit (AXS-R5, Sony)
Picture Monitor	Multi Waveform Monitor (BVM-X300, Sony)
Waveform Monitor	Multi Waveform Monitor (LV 5490, LEADER)
Colour Grading System	Colour Grading System (DaVinci Resolve Studio V.12.5, Blackmagic Design)

TABLE 22

Camera specifications

Pickup device	Single Super 35mm type 8.9-megapixel progressive CMOS
Effective picture elements	4 096 (H) × 2 160 (V)
Built-in filters	ND: clear, 0.9(1/4 ND), 1.8 (1/64 ND) CC: 3 200K, 4 300K, 5500K
Sensitivity	ISO 320-5000, base 1250
Shutter speed	1/24 seconds to 1/6000 second

5 HDR test materials listed in Tables 7 and 8

5.1 Image characteristics

Table 23 summarizes the characteristics of the test materials. The images are stored in linear format, i.e. without gamma or other encoding curves applied. They are losslessly compressed using the Piz compressor. See <https://www.openexr.com/> for further information on OpenEXR and the Half format. The images use ITU-R BT.709 colorimetry, but are stored in an ITU-R BT.2100 container.

Two datasets are provided, one for which each image has a peak luminance of 100 cd/m^2 and a second dataset for which each image has a peak luminance of $1\,000 \text{ cd/m}^2$. These datasets are primarily constructed to develop, test and evaluate tone mapping and inverse tone mapping algorithms, but may be suitable for other purposes, including for example 4K upscaling.

TABLE 23
Format specifications

Resolution	HDTV
Image size (horizontal × vertical)	1 920 × 1 080 pixel
Aspect ratio	16:9 (square pixel)
Sampling ratio	RGB 4:4:4
Bit depth	16-bit floating point in Half format for each colour channel
System colourimetry	Rec. ITU-R BT.2100 container ; Rec. ITU-R BT.709 data
File format	OpenEXR (.exr)
EOTF	No EOTF applied; data is linear
Peak luminance	100 / 1000 cd/m^2

5.2 Production conditions

The materials for the $1\,000 \text{ cd/m}^2$ dataset are produced from multiple exposures, combined into a single high dynamic range image in software. The materials for the 100 cd/m^2 dataset are produced from single exposures. Table 24 summarizes the production conditions. The software used is Photosphere by Greg Ward (<https://anywhere.com>) and Adobe Photoshop (<https://www.adobe.com/products/photoshop.html>). The files are scaled and cropped to HD format (1 920 × 1 080 pixels) and encoded in the OpenEXR format. Each file encodes a red, green and blue channel in the Half format, which provides 1024 values per f -stop, 30 f -stops, and an additional 10 f -stops with reduced precision in the darks.

TABLE 24
Equipment used for shooting and post-processing (including colour grading)

Camera	Nikon D2h, Nikon D7100
Lens	A variety of lenses were used
Post-processing	Photosphere (https://www.anywhere.com) Adobe Photoshop (https://www.adobe.com/products/photoshop.html)

5.3 Status for use of test materials

Usage restrictions fall under the category of “commercially restricted” as described in Annex 3.

Attachment 1 to Annex 1

Thumbnails of the HDTV test materials

TABLE 25

**Test materials for HDTV 1920 × 1080/59.94/I, 4:4:4 and 4:2:2, 10-bit format
(attribute-general)**

Scene No.	Title	Thumbnail
101	Ginkgo trees	
102	Truck train	
103	Cosmos flowers	
104	Red leaves (pan up)	
105	Sunlight through leaves	
106	Red leaves (pan down)	
107	Woman at harbour (circle dolly)	
108	Fountain (follow)	

TABLE 25 (continued)

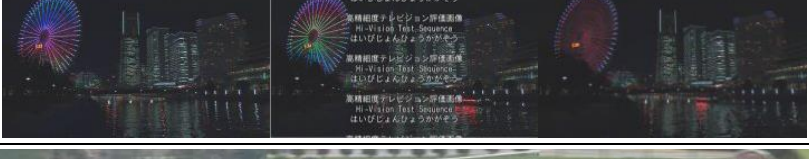
Scene No.	Title	Thumbnail
109	Fountain (dolly)	
110	Studio concert (confetti)	
111	Studio concert	
112	Drama set (day)	
113	Drama set (night)	
114	Basketball	
115	Evening scene (zoom out)	
116	Evening scene (fixed)	
117	Night scene (fixed)	
118	Horse racing (dirt)	

TABLE 25 (end)

Scene No.	Title	Thumbnail
119	Horse racing (turf)	
120	Woman at harbour (dolly in, zoom back)	
121	Torch bearer	
122	Children's dance	
123	Children's dance (loose shot)	
124	March	
125	Marathon (pan up)	
126	Marathon (fixed)	

TABLE 26

Test materials for HDTV 1920 × 1080/59.94/I, 4:4:4 and 4:2:2, 10-bit format (attribute-specific)

Scene No.	Title	Thumbnail
151	Rotating disk 59.94/I	
152	Rotating disk 59.94/I with 1/120 sec. shutter	
153	Rotating disk 50/I	
154	Rotating disk 50/I with 1/100 sec. shutter	
155	Pendulum 59.94/I	
156	Pendulum 59.94/I with 1/120 sec. shutter	
157	Pendulum 50/I	
158	Pendulum 50/I with 1/100 sec. shutter	
159	Colourful world A	
160	Colourful world B	

TABLE 26 (continued)

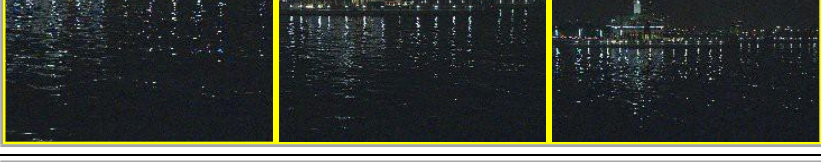
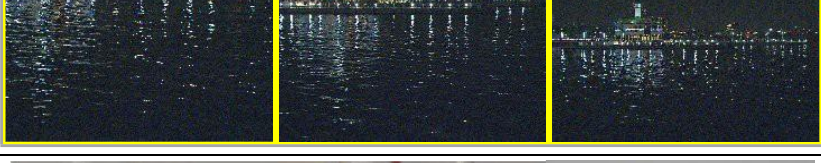
Scene No.	Title	Thumbnail
161	Black dress	
162	White dress	
163	Woman with bouquet	
164	Flash photography	
165	Fountain (chromakey)	
166	Night port (camera gain: normal)	
167	Night port (camera gain: +6 dB)	
168	Night port (camera gain: +12 dB)	
169	Glasses	

TABLE 27

Test materials for HDTV 1 920 × 1 080/59.94/P, 4:2:2, 10-bit format (attribute-general)

Scene No.	Title	Thumbnail
201	Ginkgo trees	
202	Truck train	
203	Cosmos flowers	
204	Red leaves (pan up)	
205	Sunlight through leaves	
206	Red leaves (pan down)	
207	Woman at harbour (circle dolly)	
208	Fountain (follow)	
209	Fountain (dolly)	
210	Studio concert (confetti)	

TABLE 27 (continued)

Scene No.	Title	Thumbnail
211	Studio concert	
212	Drama set (day)	
213	Drama set (night)	
214	Basketball	
215	Twilight scene (zoom out)	
216	Twilight scene (fixed)	
217	Night scene (fixed)	
218	Horse racing (dirt)	

TABLE 28

Test materials for HDTV 1 920 × 1 080/59.94/P, 4:2:2, 10-bit format (attribute-specific)

Scene No.	Title	Thumbnail
251	Rotating disk 59.94/P	
252	Rotating disk 59.94/P with 1/120 sec. shutter	
253	Rotating disk 24/P	
254	Rotating disk 24/P with 1/48 sec. shutter	
255	Pendulum 59.94/P	
256	Pendulum 59.94/P with 1/120 sec. shutter	
257	Pendulum 24/P	
258	Pendulum 24/P with 1/48 sec. shutter	
259	Colourful world A	
260	Colourful world B	

TABLE 28 (end)

Scene No.	Title	Thumbnail
261	Black dress	
262	White dress	
263	Woman with bouquet	
264	Flash photography	
265	Fountain (chromakey)	

TABLE 29

Test materials for HDTV 1 920 × 1 080/50/I, 4:2:2, 10-bit format (attribute-general)

Scene No.	Title	Thumbnail
301	Harvest wheat fields	
302	Crossroad	
303	Basketball game	
304	Beijing Opera	
305	Bicycle race	
306	Equestrianism	
307	Football game	
308	Swimming	
309	Water polo game	
310	Synchronized swimming	
311	Folk dance	

TABLE 29 (end)

Scene No.	Title	Thumbnail
312	Scrolling characters	
313	Scrolling characters	
314	The silk dancing team	
315	Northwest Waist drum dancing teams	
316	Fireworks	
317	Effects	
318	3D Animations	

TABLE 30

Test materials for HDTV 1 920 × 1 080/50/I, 4:2:2, 10-bit format (attribute-specific)

Scene No.	Title	Thumbnail
351	Skin colour of lady	
352	Chromakey (portrait)	
353	Chromakey (scene)	
354	Rotating birdcage	
355	Nine-dragon screen	
356	Flower garden	
357	Field of flowers	
358	Amusement park	
359	City plaza	
360	Skiing	
361	Hebei Bangzi	

TABLE 30 (continued)

Scene No.	Title	Thumbnail
362	Hebei Bangzi with noises (S/N = 65 dB)	
363	Hebei Bangzi with noises (S/N = 53 dB)	
364	Hebei Bangzi with noises (S/N = 45 dB)	
365	Textiles and household articles	
366	Food and containers	
367	Rotating birdcage	
368	Flowerbed	
369	Rotating disc (speed 1)	
370	Rotating disc (speed 2)	
371	Rotating disc (speed 3)	
372	Dialogue in a Studio	

TABLE 30 (end)

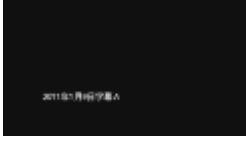
Scene No.	Title	Thumbnail
373	Beijing Opera actress and noises	
374	Autumn leaves	
375	Roses	
376	Skin colour of lady	
377	Horizontal title	
378	Vertical title	
379	Flying title	

TABLE 31
Test materials for UHDTV/HDTV

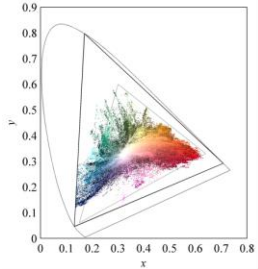
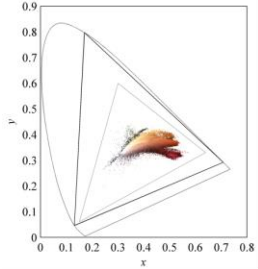
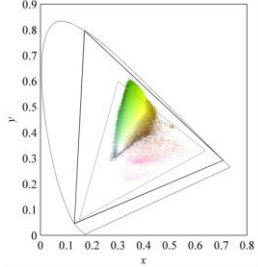
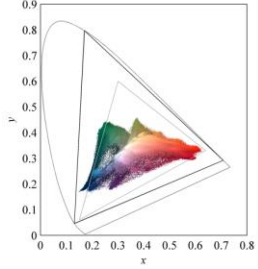
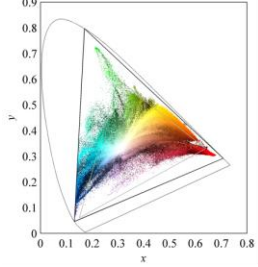
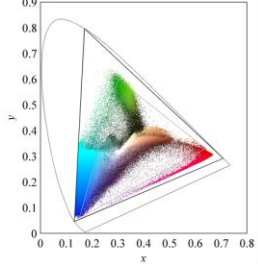
Scene No.	Title	Thumbnail	Chromaticity distribution
1	Books		
2	MusicBox		
3	Moss		
4	Kimono		
5	StainedGlass		
6	Butterflies		

TABLE 31 (end)

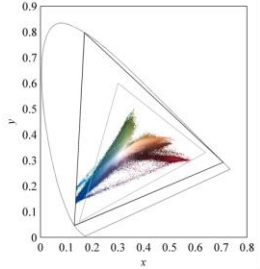
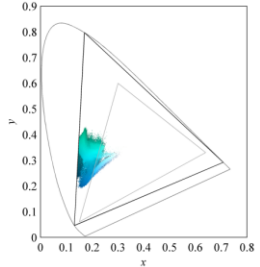
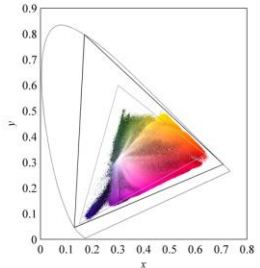
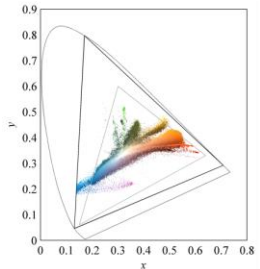
Scene No.	Title	Thumbnail	Chromaticity distribution
7	ChromaKey		
8	Sea		
9	Flowers		
10	Ship		

TABLE 32

Test materials for 3 840 × 2 160/50/P, 4:4:4, 16-bit UHD TV pictures

Scene No.	Title	Thumbnail
1	The scene outside of the steel factory	
2	The scene inside of the steel factory	
3	Still object	
4	Coffee shop	
5	Street of the town in the night	
6	Colourful lantern	
7	Moth orchid	
8	Fresh flowers	
9	Dance	
10	Bamboo	
11	Girls dance by the river side	

TABLE 32 (continued)

Scene No.	Title	Thumbnail
12	Skin colour	
13	A sightseeing boat in the night	
14	Chromakey	
15	Textile	
16	Dining Table	
17	Fruit	
18	White tulips	
19	Tulips garden	
20	Flowers in close-up	
21	Dusk	
22	Night view	

TABLE 32 (end)

23	The ferry's wheel		
----	-------------------	--	--

TABLE 33

Thumbnails for 100 $\frac{cd}{m^2}$ images in HD size, EXR format. Colorimetry: ITU-R BT.709 content in an ITU-R BT.2020 container (see Table 7)

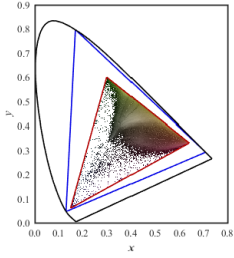
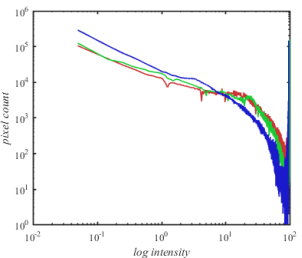
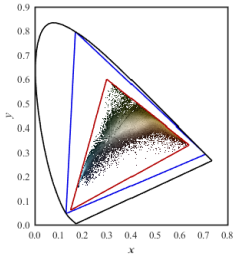
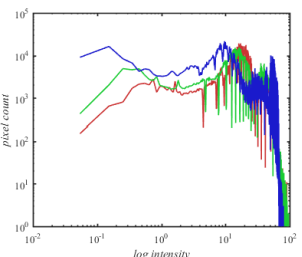
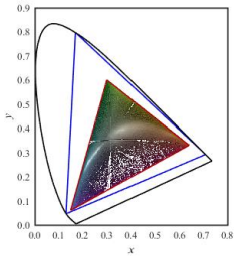
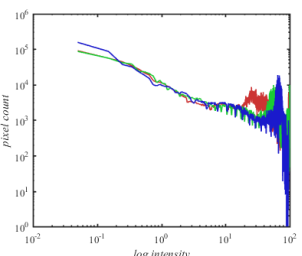
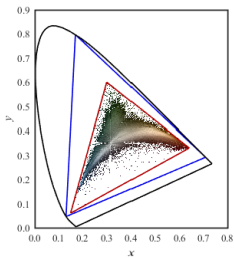
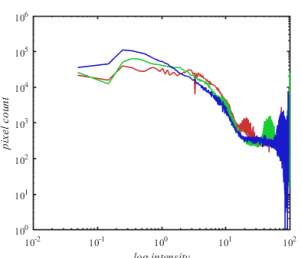
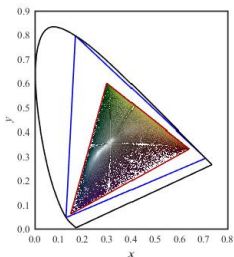
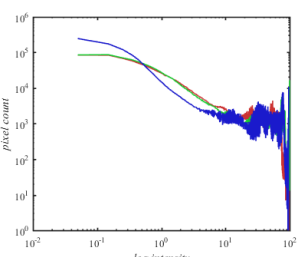
1: abbaye_de_beauport			
2: acropolis			
3: ancient_corinth_apolloB			
4: arches			
5: arizona			

TABLE 33 (continued)

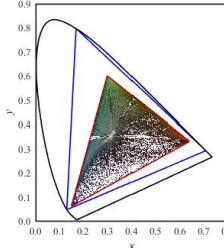
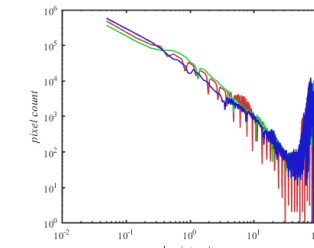
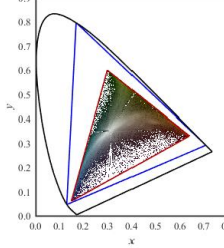
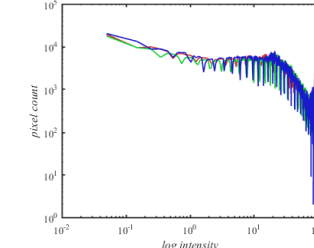
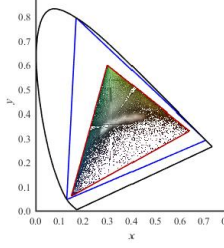
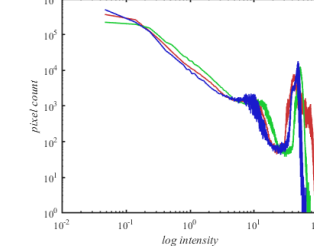
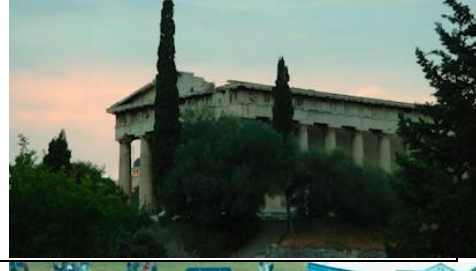
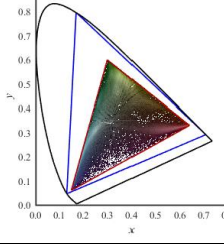
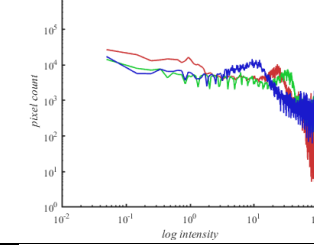
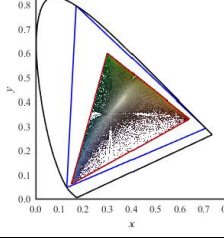
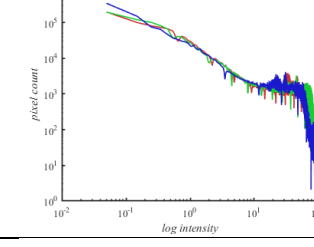
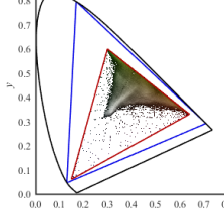
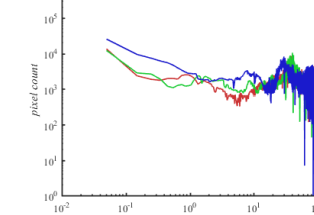
6: athensB			
7: athensC			
8: athens			
9: balloon_fiesta			
10: bird			
11: blossomB			

TABLE 33 (continued)

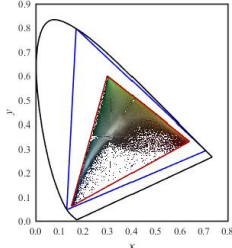
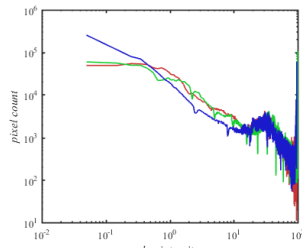
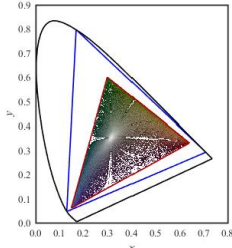
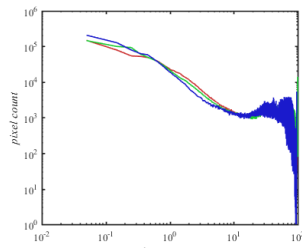
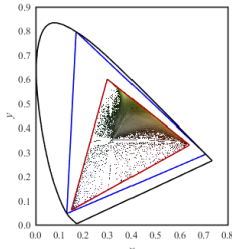
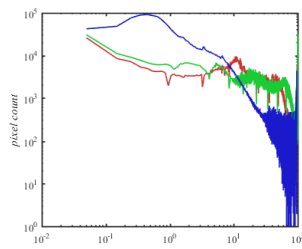
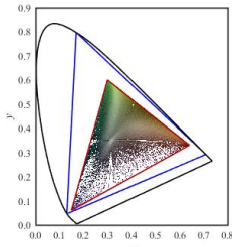
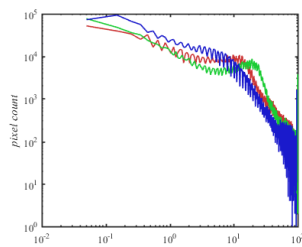
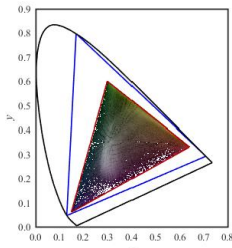
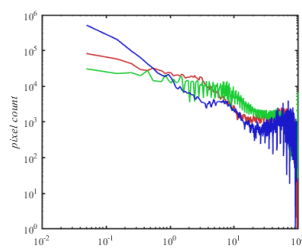
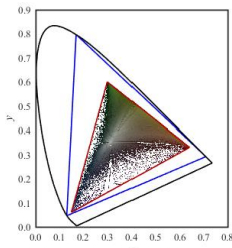
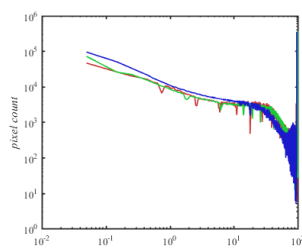
12: blossom			
13: bridge			
14: bronze			
15: bull			
16: butterfly			
17: canon			

TABLE 33 (continued)

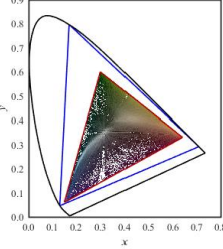
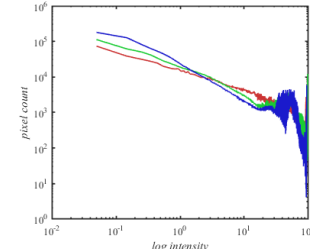
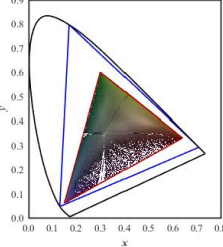
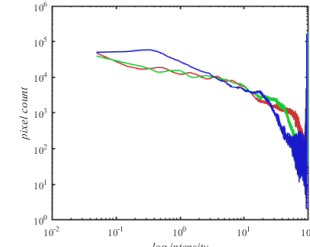
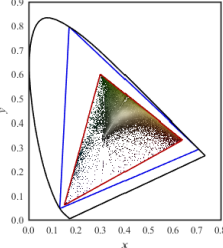
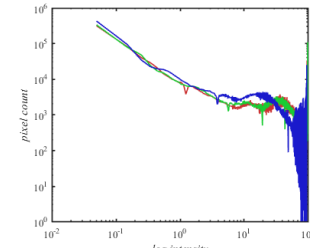
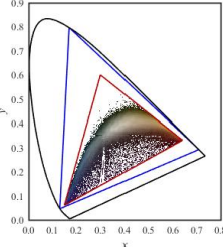
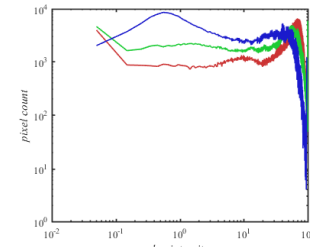
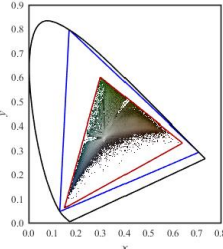
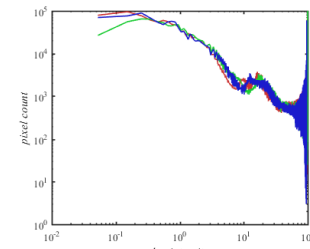
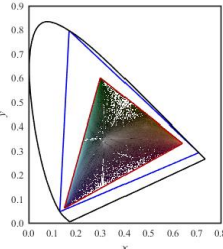
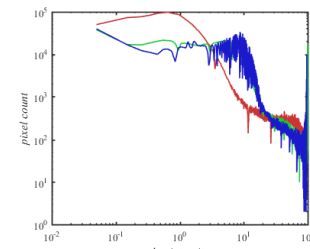
18: canyon			
19: carnac			
20: cdg			
21: chipmunk			
22: cookaburra			
23: diros_boatB			

TABLE 33 (continued)

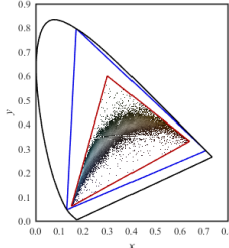
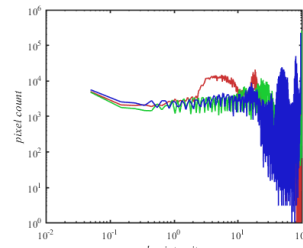
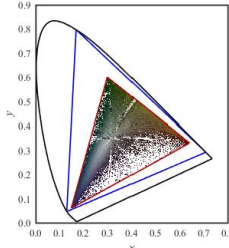
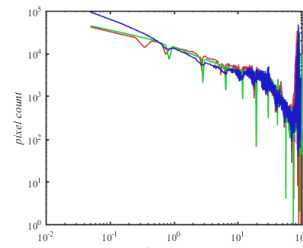
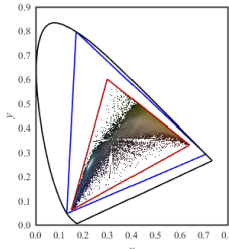
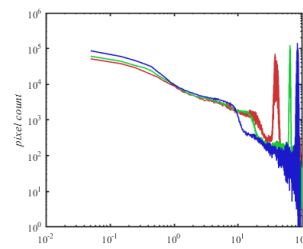
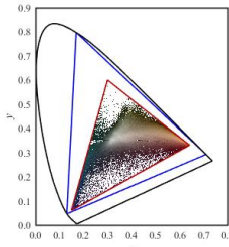
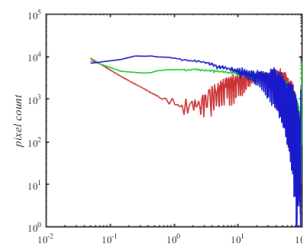
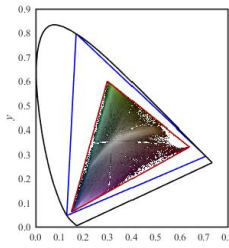
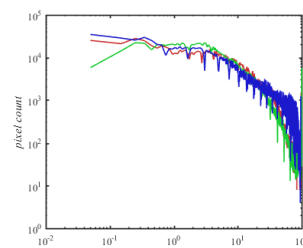
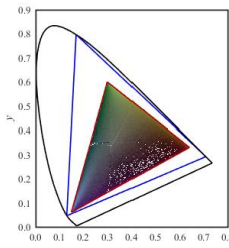
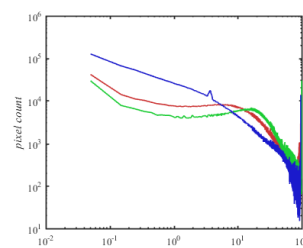
24: epidavros_reconstructionC			
25: farm			
26: feeding_swallow			
27: fern			
28: flowers			
29: flower_field			

TABLE 33 (continued)

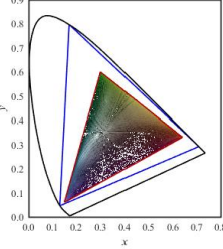
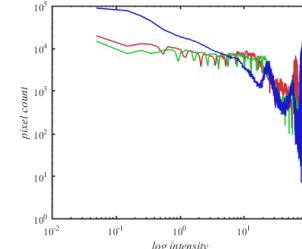
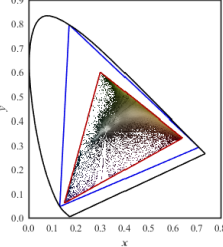
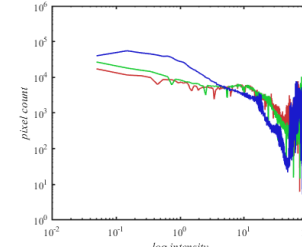
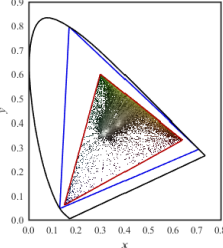
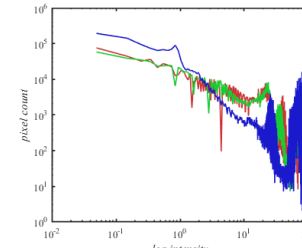
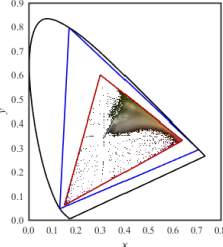
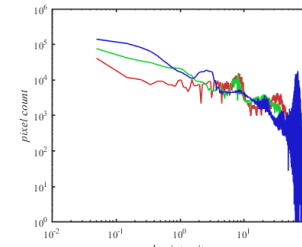
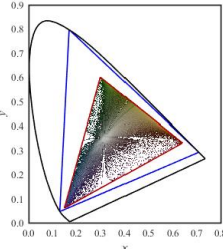
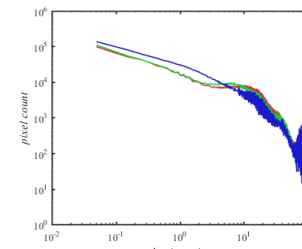
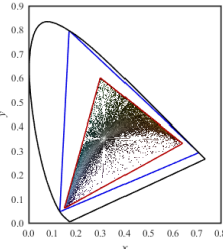
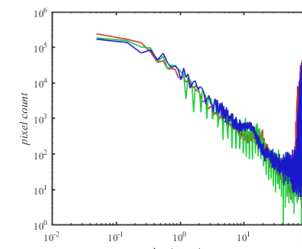
30: flying_balloon			
31: fougeresB			
32: fougeres			
33: freiheit			
34: guillemotsB			
35: guillemotsC			

TABLE 33 (continued)

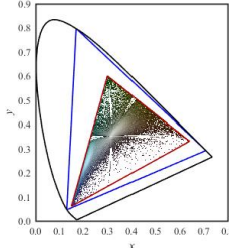
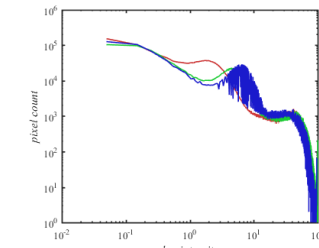
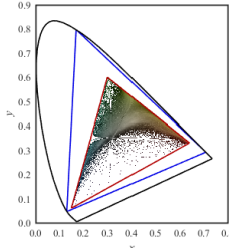
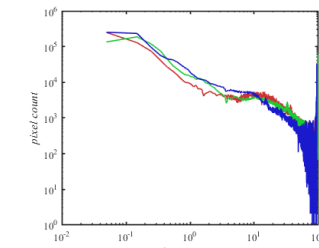
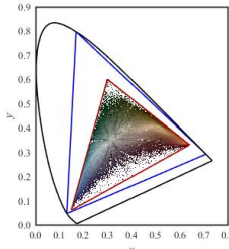
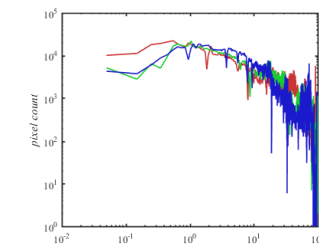
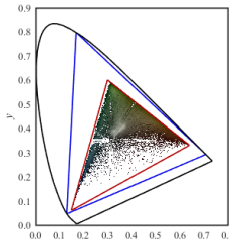
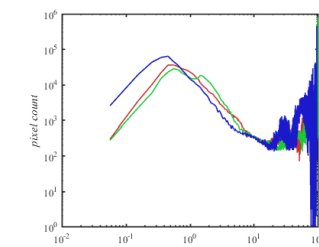
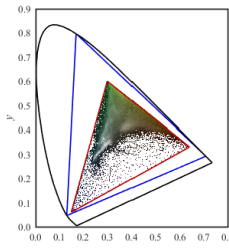
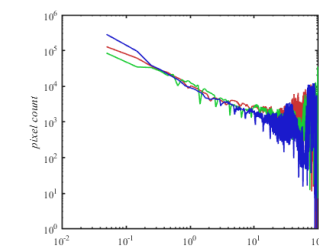
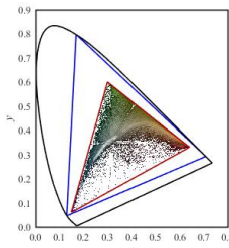
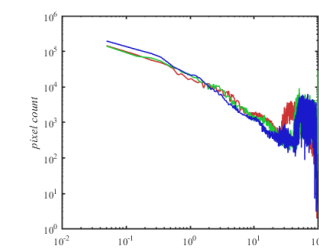
36: guillemots			
37: hydrants			
38: keyzersberg			
39: konstanzB			
40: konstanzC			
41: konstanz			

TABLE 33 (continued)

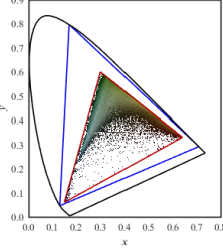
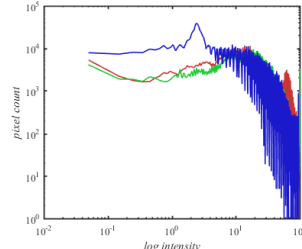
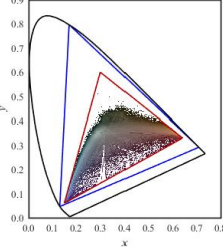
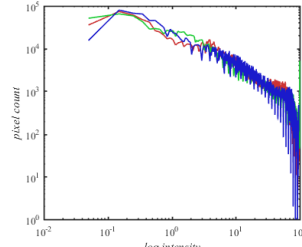
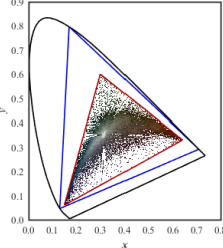
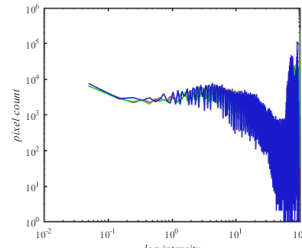
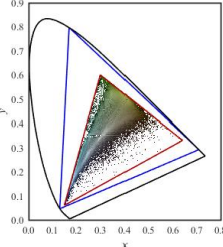
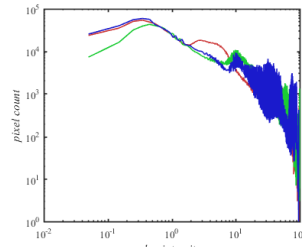
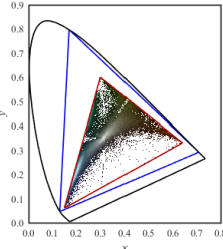
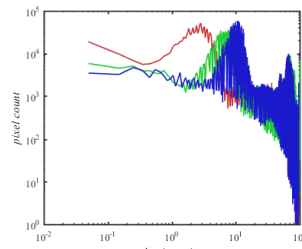
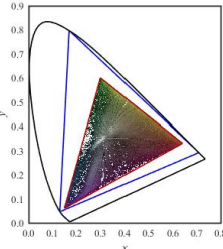
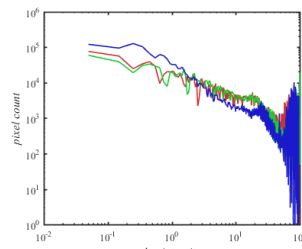
42: leaf			
43: loet			
44: long_ashton			
45: lundy_bay			
46: lundy light house			
47: mainauB			

TABLE 33 (continued)

48: mainauC			
49: mainau			
50: mani_tuktuk			
51: mus			
52: nafplio			
53: new_delhi			

TABLE 33 (continued)

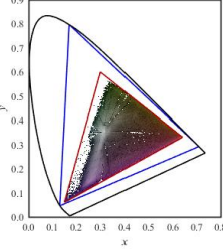
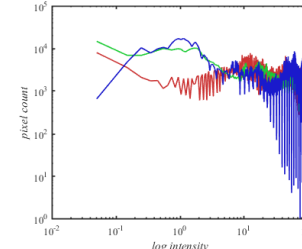
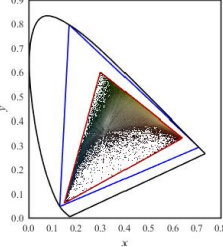
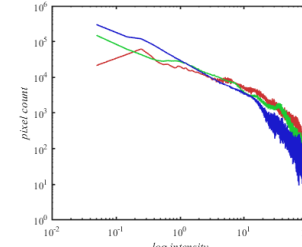
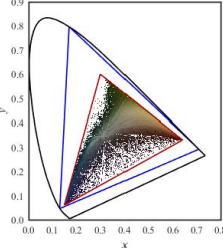
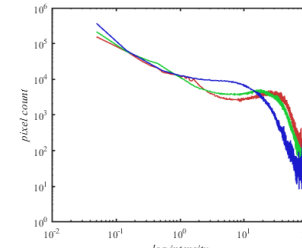
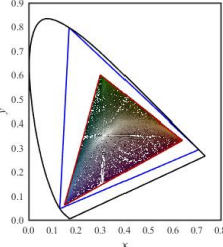
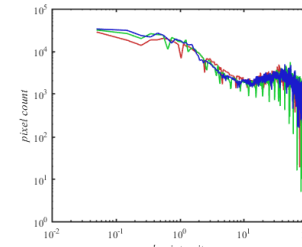
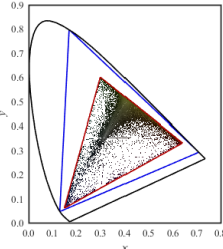
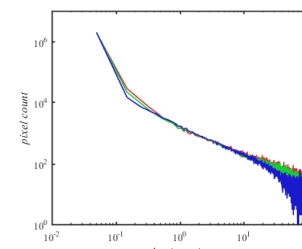
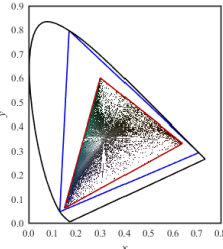
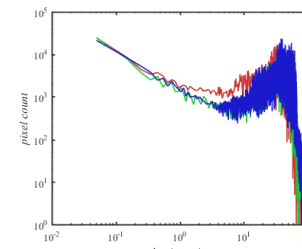
54: orchid	 A color triangle plot showing the distribution of colors in the orchid image. The x-axis is labeled 'x' and ranges from 0.0 to 0.8. The y-axis is labeled 'y' and ranges from 0.0 to 0.9. The plot shows a dense cluster of points within a triangular boundary, with a color gradient from dark purple to light yellow.	 A log intensity plot showing the pixel count versus log intensity for the orchid image. The x-axis is labeled 'log intensity' and ranges from 10^{-2} to 10^2. The y-axis is labeled 'pixel count' and ranges from 10^0 to 10^5. The plot shows a sharp peak at low intensity, followed by a gradual decline.	 A photograph of a white orchid with purple and yellow spots on its petals.
55: organ	 A color triangle plot showing the distribution of colors in the organ image. The x-axis is labeled 'x' and ranges from 0.0 to 0.8. The y-axis is labeled 'y' and ranges from 0.0 to 0.9. The plot shows a dense cluster of points within a triangular boundary, with a color gradient from dark brown to light yellow.	 A log intensity plot showing the pixel count versus log intensity for the organ image. The x-axis is labeled 'log intensity' and ranges from 10^{-2} to 10^2. The y-axis is labeled 'pixel count' and ranges from 10^0 to 10^5. The plot shows a sharp peak at low intensity, followed by a gradual decline.	 A photograph of the interior of a church, showing a large organ and a stained glass window.
56: pigeons	 A color triangle plot showing the distribution of colors in the pigeons image. The x-axis is labeled 'x' and ranges from 0.0 to 0.8. The y-axis is labeled 'y' and ranges from 0.0 to 0.9. The plot shows a dense cluster of points within a triangular boundary, with a color gradient from dark brown to light yellow.	 A log intensity plot showing the pixel count versus log intensity for the pigeons image. The x-axis is labeled 'log intensity' and ranges from 10^{-2} to 10^2. The y-axis is labeled 'pixel count' and ranges from 10^0 to 10^5. The plot shows a sharp peak at low intensity, followed by a gradual decline.	 A photograph of two pigeons on the ground, one with a reddish-brown head and the other with a grey head.
57: pillars	 A color triangle plot showing the distribution of colors in the pillars image. The x-axis is labeled 'x' and ranges from 0.0 to 0.8. The y-axis is labeled 'y' and ranges from 0.0 to 0.9. The plot shows a dense cluster of points within a triangular boundary, with a color gradient from dark brown to light yellow.	 A log intensity plot showing the pixel count versus log intensity for the pillars image. The x-axis is labeled 'log intensity' and ranges from 10^{-2} to 10^2. The y-axis is labeled 'pixel count' and ranges from 10^0 to 10^5. The plot shows a sharp peak at low intensity, followed by a gradual decline.	 A photograph of a row of stone pillars, likely part of a classical building.
58: psihro_cave	 A color triangle plot showing the distribution of colors in the psihro_cave image. The x-axis is labeled 'x' and ranges from 0.0 to 0.8. The y-axis is labeled 'y' and ranges from 0.0 to 0.9. The plot shows a dense cluster of points within a triangular boundary, with a color gradient from dark brown to light yellow.	 A log intensity plot showing the pixel count versus log intensity for the psihro_cave image. The x-axis is labeled 'log intensity' and ranges from 10^{-2} to 10^2. The y-axis is labeled 'pixel count' and ranges from 10^0 to 10^5. The plot shows a sharp peak at low intensity, followed by a gradual decline.	 A photograph of a cave interior, showing a large, dark, and somewhat abstract structure.
59: puffinC	 A color triangle plot showing the distribution of colors in the puffinC image. The x-axis is labeled 'x' and ranges from 0.0 to 0.8. The y-axis is labeled 'y' and ranges from 0.0 to 0.9. The plot shows a dense cluster of points within a triangular boundary, with a color gradient from dark brown to light yellow.	 A log intensity plot showing the pixel count versus log intensity for the puffinC image. The x-axis is labeled 'log intensity' and ranges from 10^{-2} to 10^2. The y-axis is labeled 'pixel count' and ranges from 10^0 to 10^5. The plot shows a sharp peak at low intensity, followed by a gradual decline.	 A photograph of a puffin swimming in the water.

TABLE 33 (continued)

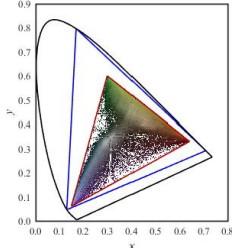
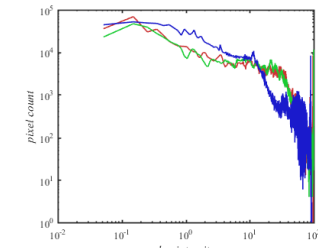
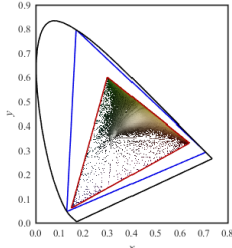
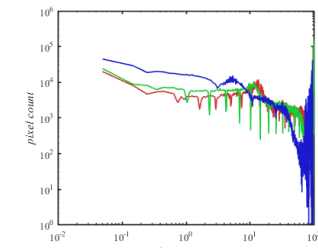
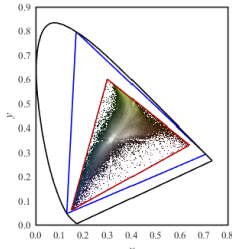
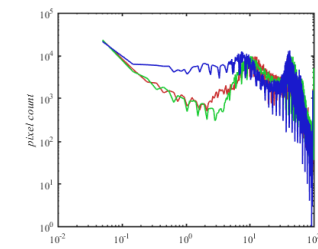
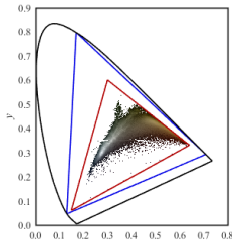
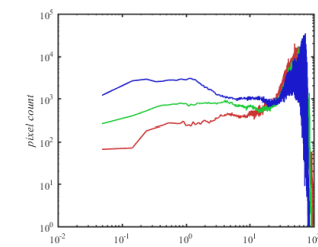
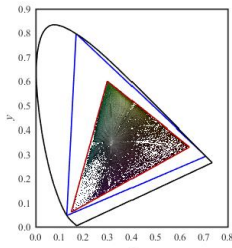
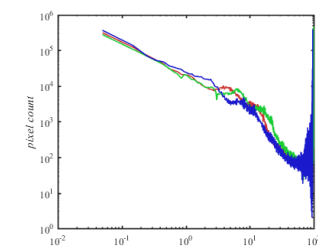
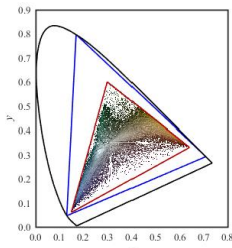
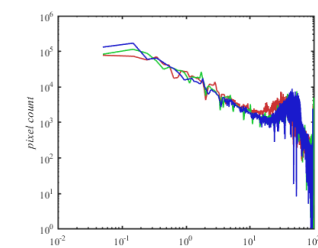
60: puffin	 A color space plot showing the distribution of colors for the puffin image. The x and y axes range from 0.0 to 0.8. The plot shows a dense cluster of points forming a triangular shape, with a color bar on the right indicating the mapping from color space to intensity.	 A log intensity plot showing the pixel count versus log intensity for the puffin image. The x-axis is log intensity (log base 10) ranging from 10⁻² to 10². The y-axis is pixel count ranging from 10⁰ to 10⁵. The plot shows a sharp peak at high intensities, indicating a high contrast image.	 A photograph of a puffin, showing its characteristic black and white plumage and a large, bright orange beak.
61: raglan	 A color space plot showing the distribution of colors for the raglan image. The x and y axes range from 0.0 to 0.8. The plot shows a dense cluster of points forming a triangular shape, with a color bar on the right indicating the mapping from color space to intensity.	 A log intensity plot showing the pixel count versus log intensity for the raglan image. The x-axis is log intensity (log base 10) ranging from 10⁻² to 10². The y-axis is pixel count ranging from 10⁰ to 10⁵. The plot shows a sharp peak at high intensities, indicating a high contrast image.	 A photograph of a stone building, likely a castle or fortress, with a prominent tower and a bridge leading to it.
62: ringed_bird	 A color space plot showing the distribution of colors for the ringed_bird image. The x and y axes range from 0.0 to 0.8. The plot shows a dense cluster of points forming a triangular shape, with a color bar on the right indicating the mapping from color space to intensity.	 A log intensity plot showing the pixel count versus log intensity for the ringed_bird image. The x-axis is log intensity (log base 10) ranging from 10⁻² to 10². The y-axis is pixel count ranging from 10⁰ to 10⁵. The plot shows a sharp peak at high intensities, indicating a high contrast image.	 A photograph of a small bird, likely a ringed plover, standing on a rocky surface.
63: robin	 A color space plot showing the distribution of colors for the robin image. The x and y axes range from 0.0 to 0.8. The plot shows a dense cluster of points forming a triangular shape, with a color bar on the right indicating the mapping from color space to intensity.	 A log intensity plot showing the pixel count versus log intensity for the robin image. The x-axis is log intensity (log base 10) ranging from 10⁻² to 10². The y-axis is pixel count ranging from 10⁰ to 10⁵. The plot shows a sharp peak at high intensities, indicating a high contrast image.	 A photograph of a robin perched on a bare, light-colored branch.
64: roof	 A color space plot showing the distribution of colors for the roof image. The x and y axes range from 0.0 to 0.8. The plot shows a dense cluster of points forming a triangular shape, with a color bar on the right indicating the mapping from color space to intensity.	 A log intensity plot showing the pixel count versus log intensity for the roof image. The x-axis is log intensity (log base 10) ranging from 10⁻² to 10². The y-axis is pixel count ranging from 10⁰ to 10⁵. The plot shows a sharp peak at high intensities, indicating a high contrast image.	 A photograph of a modern building's roof structure, featuring a series of parallel, dark, curved beams.
65: seals	 A color space plot showing the distribution of colors for the seals image. The x and y axes range from 0.0 to 0.8. The plot shows a dense cluster of points forming a triangular shape, with a color bar on the right indicating the mapping from color space to intensity.	 A log intensity plot showing the pixel count versus log intensity for the seals image. The x-axis is log intensity (log base 10) ranging from 10⁻² to 10². The y-axis is pixel count ranging from 10⁰ to 10⁵. The plot shows a sharp peak at high intensities, indicating a high contrast image.	 A photograph of two seals resting on a rocky shore near the water.

TABLE 33 (continued)

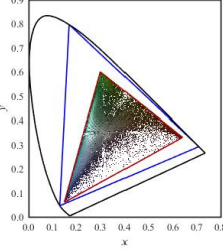
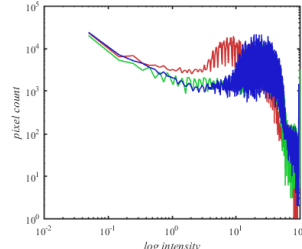
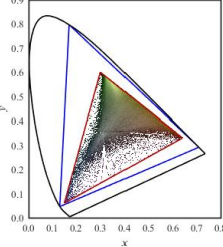
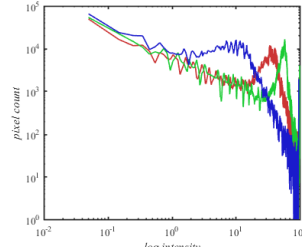
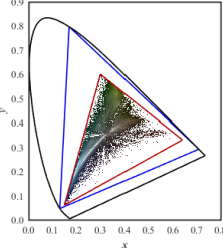
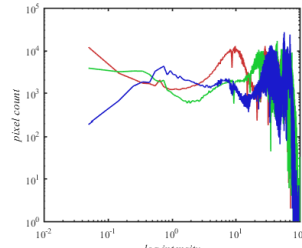
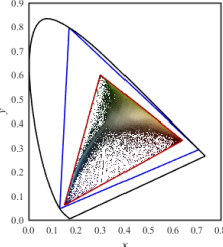
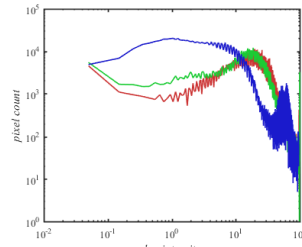
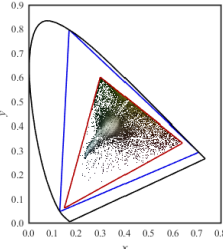
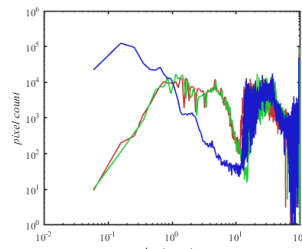
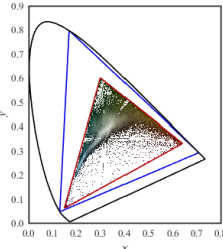
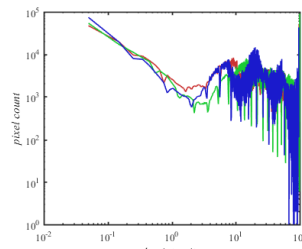
66: seal			
67: sheep			
68: ship			
69: some_flowers			
70: stone_henge			
71: st_michaels_mount			

TABLE 33 (continued)

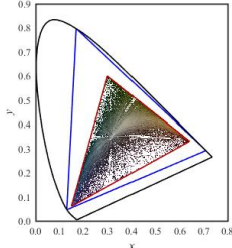
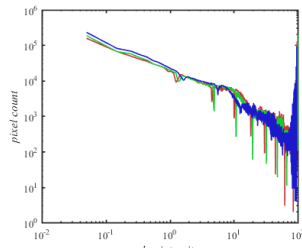
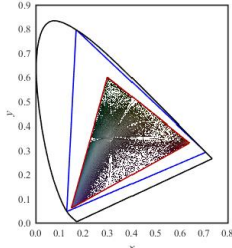
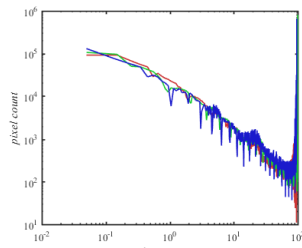
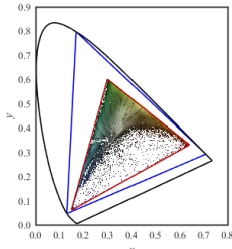
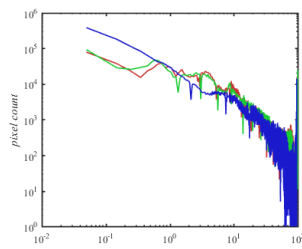
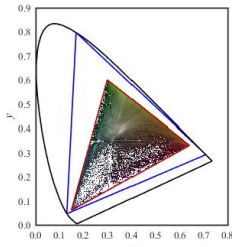
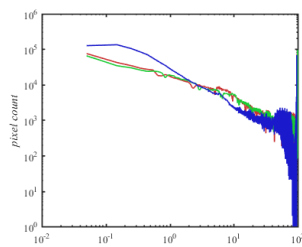
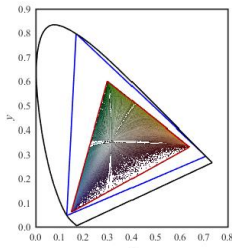
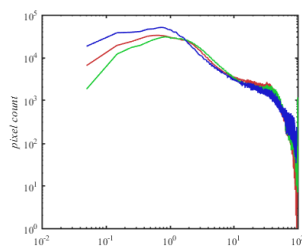
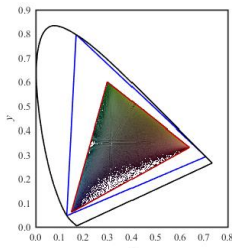
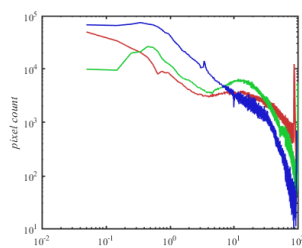
72: theatre			
73: tour_eifel			
74: tunnel			
75: vw			
76: well			
77: westonbirt			

TABLE 33 (end)

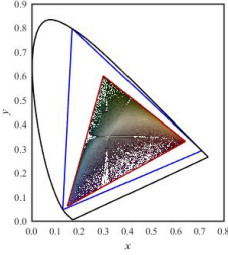
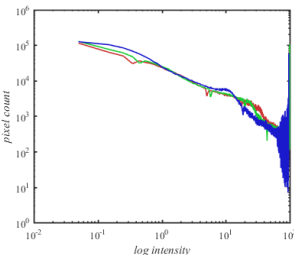
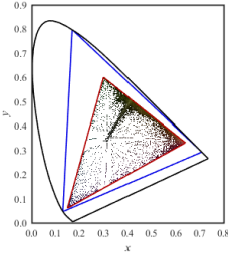
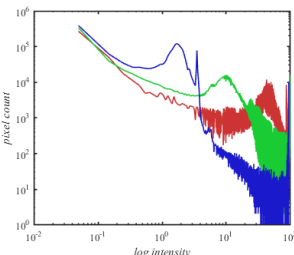
78: workshop	 A color triangle plot showing the distribution of colors in the 'workshop' scene. The x-axis is labeled 'x' and ranges from 0.0 to 0.8. The y-axis is labeled 'y' and ranges from 0.0 to 0.9. The plot shows a dense cluster of points forming a triangular shape, with a blue line tracing the boundary of the distribution.	 A log-log plot showing the distribution of pixel counts versus log intensity for the 'workshop' scene. The x-axis is labeled 'log intensity' and ranges from 10⁻² to 10². The y-axis is labeled 'pixel count' and ranges from 10⁰ to 10⁶. The plot shows a blue line representing the distribution, with a red line indicating a reference or comparison.	 A photograph of a workshop scene, showing various tools, equipment, and materials in a dimly lit environment.
79: zaragoza	 A color triangle plot showing the distribution of colors in the 'zaragoza' scene. The x-axis is labeled 'x' and ranges from 0.0 to 0.8. The y-axis is labeled 'y' and ranges from 0.0 to 0.9. The plot shows a dense cluster of points forming a triangular shape, with a blue line tracing the boundary of the distribution.	 A log-log plot showing the distribution of pixel counts versus log intensity for the 'zaragoza' scene. The x-axis is labeled 'log intensity' and ranges from 10⁻² to 10². The y-axis is labeled 'pixel count' and ranges from 10⁰ to 10⁶. The plot shows a blue line representing the distribution, with a red line indicating a reference or comparison.	 A photograph of a zaragoza scene, showing a brightly lit interior with ornate architectural details and warm lighting.

TABLE 34

Thumbnails for 1000 cd/m² images in HD size, EXR format. Colorimetry: ITU-R BT.709 content in an ITU-R BT.2020 container (see Table 8)

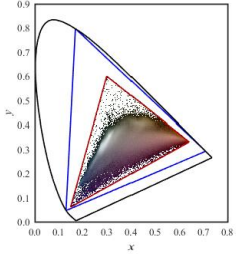
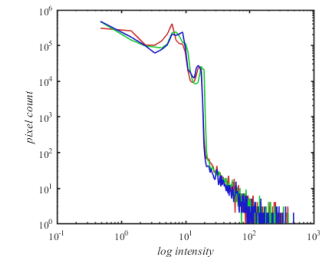
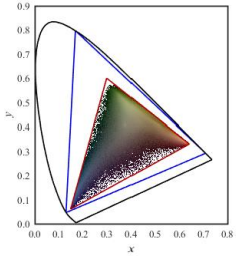
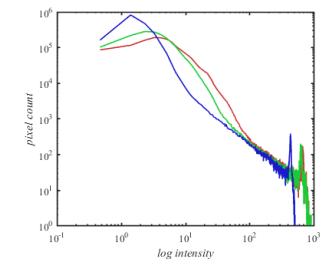
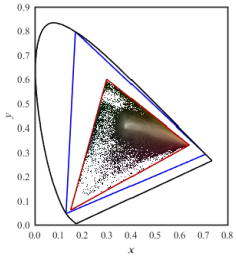
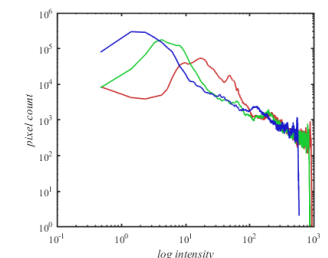
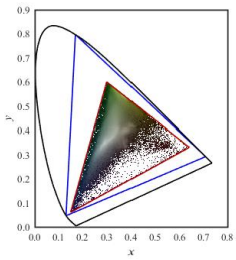
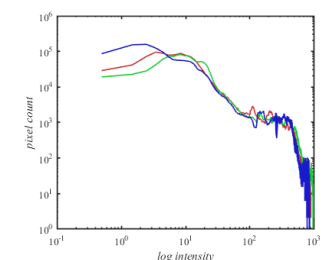
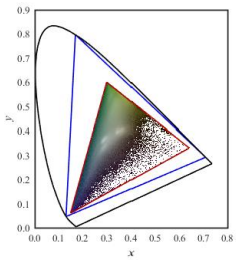
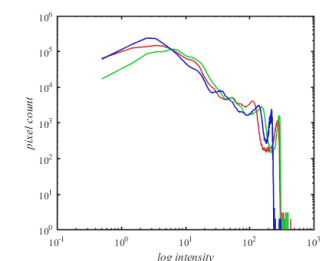
1: antelopeB			
2: arboretumA			
3: arboretumB			
4: bahamasB			
5: bahamasC			

TABLE 34 (continued)

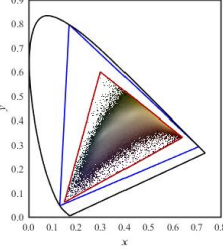
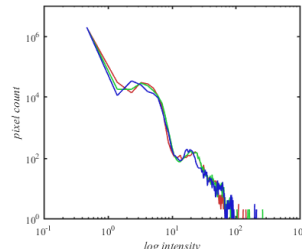
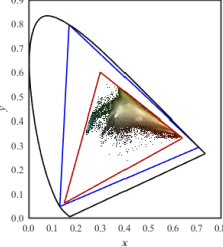
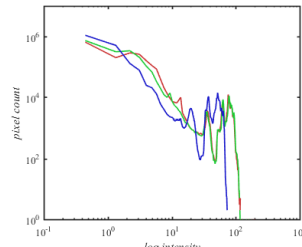
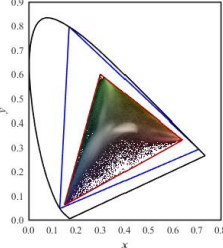
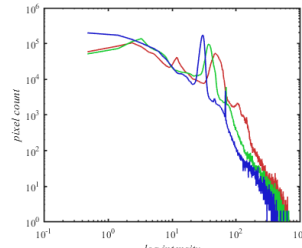
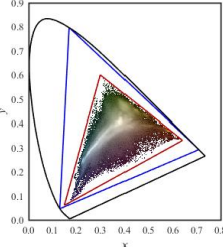
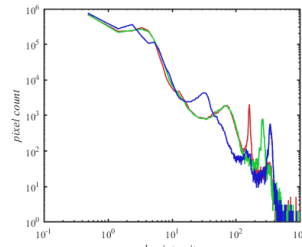
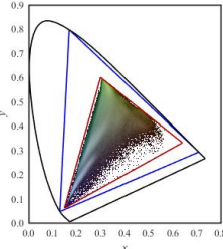
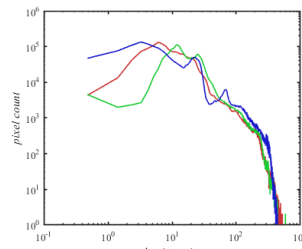
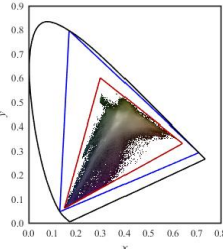
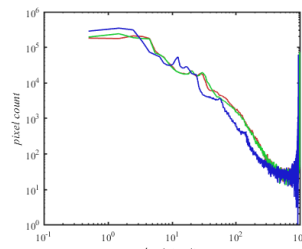
6: barn			
7: bayou_cafe			
8: bell_pepper			
9: blaenavon			
10: blue_flowerB			
11: bridges			

TABLE 34 (continued)

12: bristol_balloons			
13: bristol_blue			
14: broadmeadB			
15: bromelia			
16: carpenters_arms			
17: castle_coombeE			

TABLE 34 (continued)

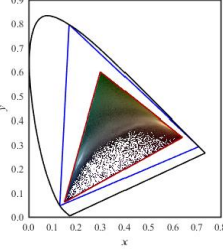
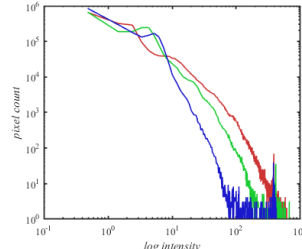
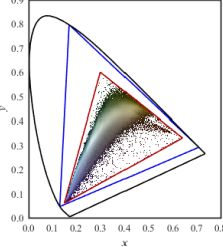
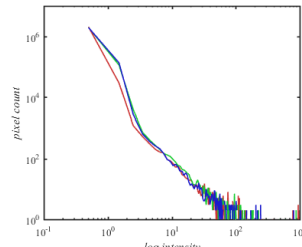
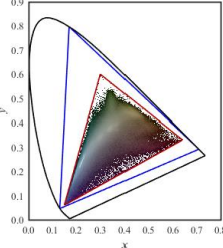
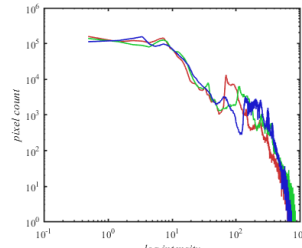
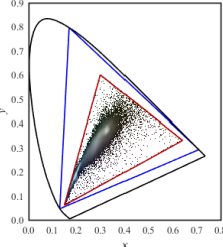
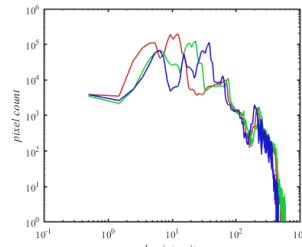
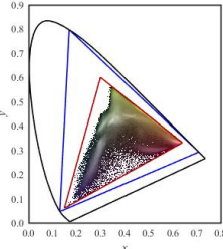
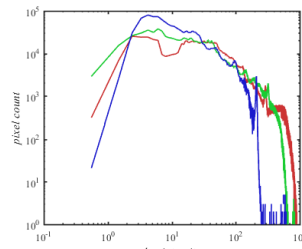
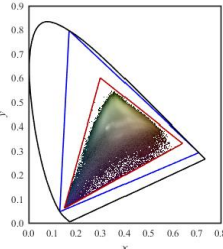
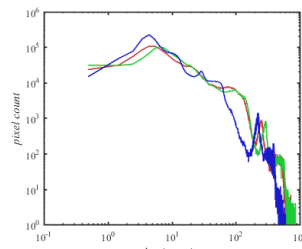
18: chateau_des_marais			
19: cheetah			
20: church_st			
21: circe_du_soleil			
22: conservatory			
23: cows			

TABLE 34 (continued)

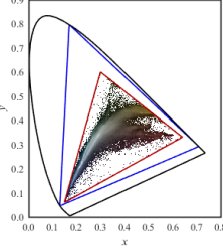
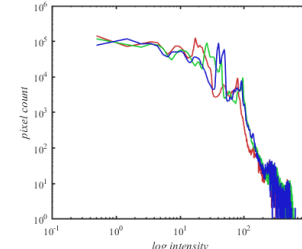
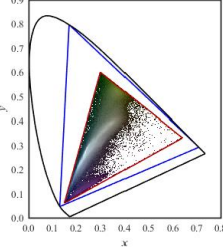
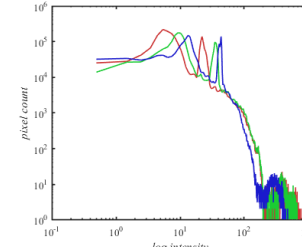
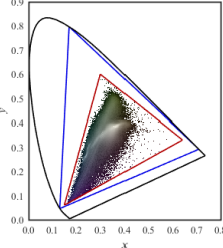
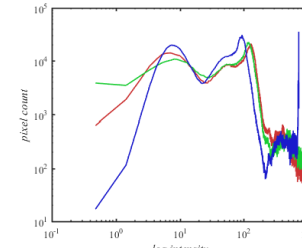
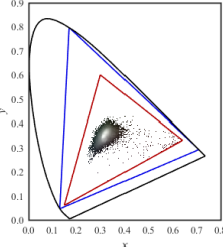
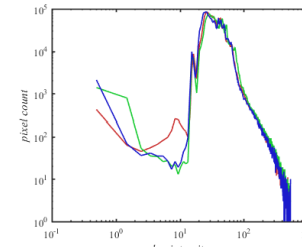
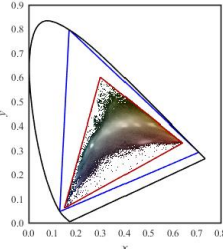
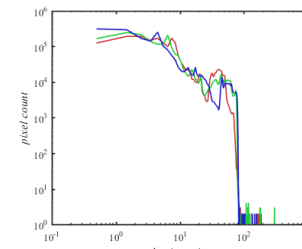
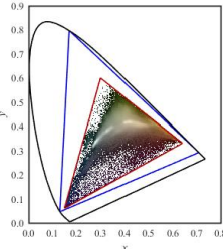
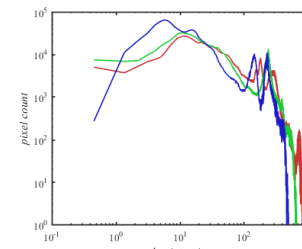
24: disney_boatB			
25: epcot			
26: enidavros_theatre			
27: exmouth_coast			
28: famagusta_shops			
29: famagusta_venetian			

TABLE 34 (continued)

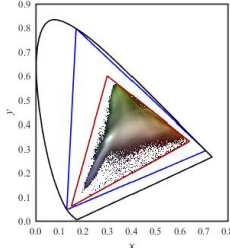
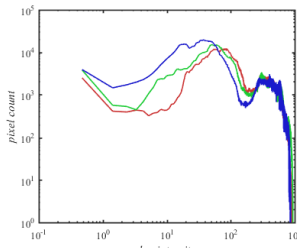
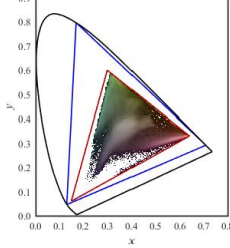
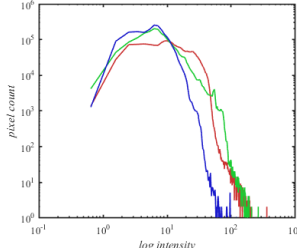
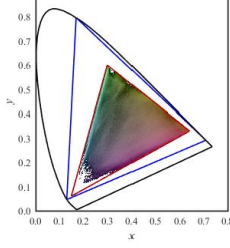
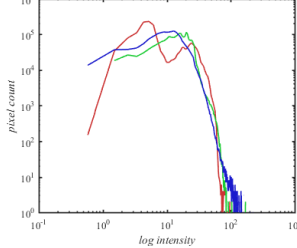
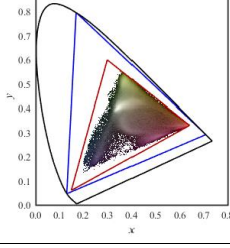
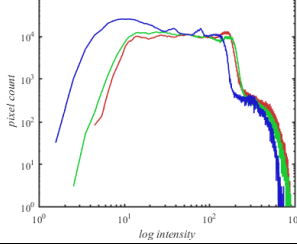
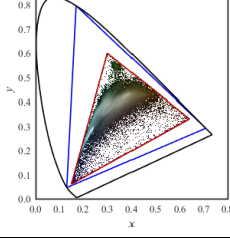
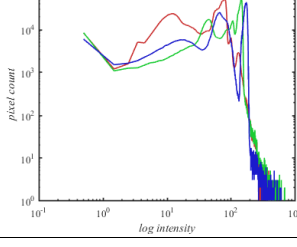
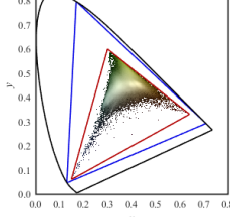
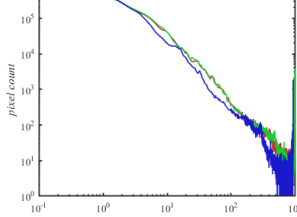
30: flowerC			
31: flowerD			
32: flowerE			
33: flower_pot			
34: fort			
35: garage			

TABLE 34 (continued)

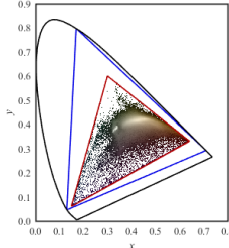
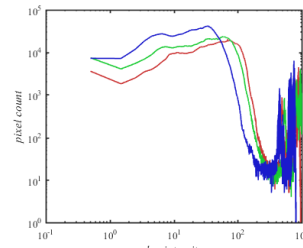
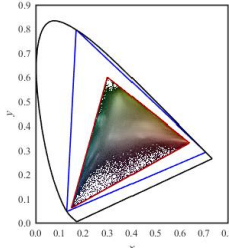
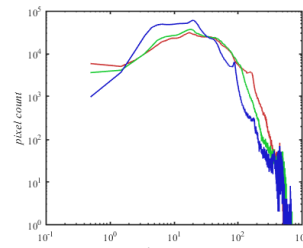
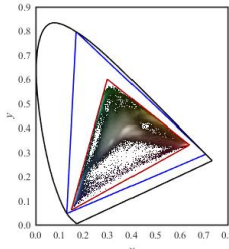
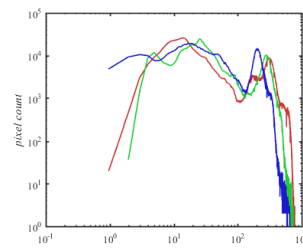
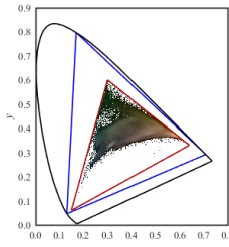
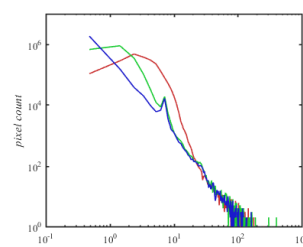
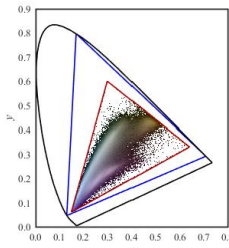
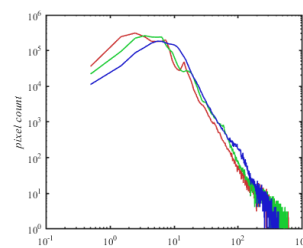
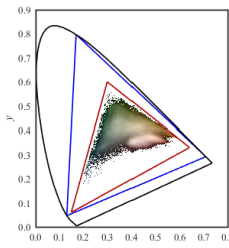
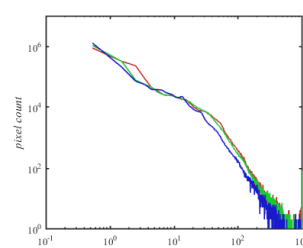
36: glastonbury_abbeyB			
37: gnomes			
38: goliath			
39: green_glass_charm			
40: grey_elephant			
41: haliotis			

TABLE 34 (continued)

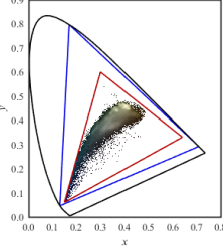
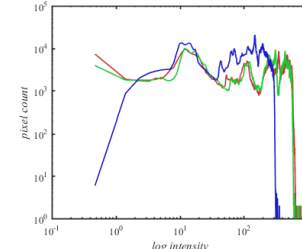
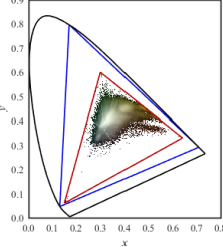
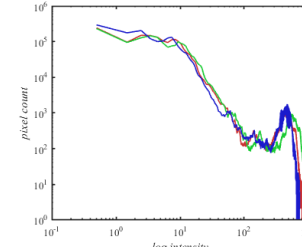
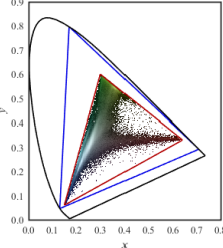
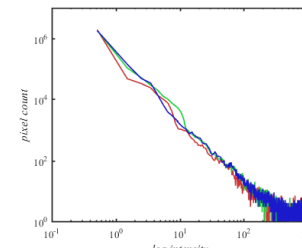
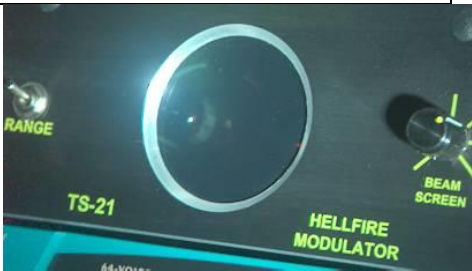
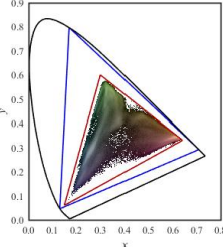
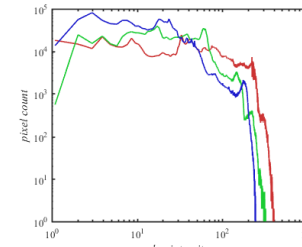
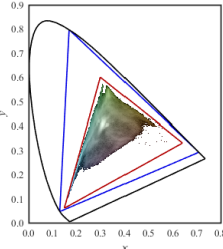
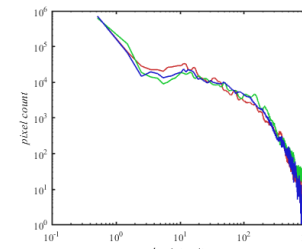
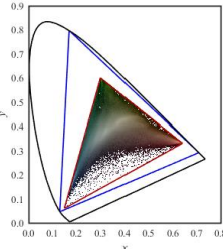
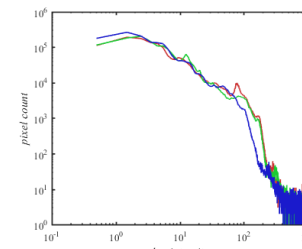
42: harbourB			
43: heathrow			
44: hellfire			
45: hibiscus_young			
46: hologram			
47: honda			

TABLE 34 (continued)

48: house_of_blues			
49: interieure_chateau			
50: ipitonga			
51: kinderboerderij			
52: klompen			
53: kloostergangB			

TABLE 34 (continued)

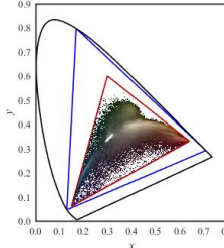
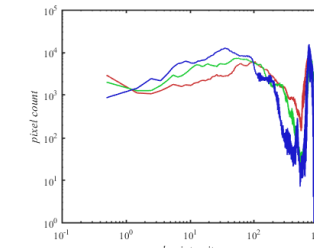
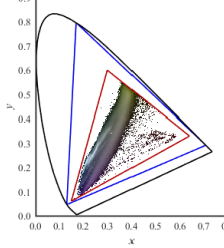
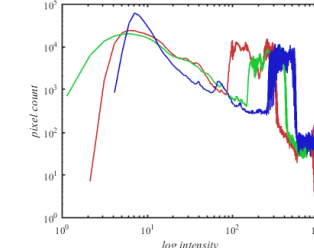
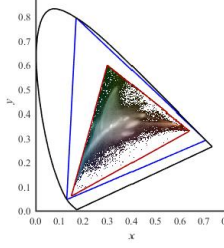
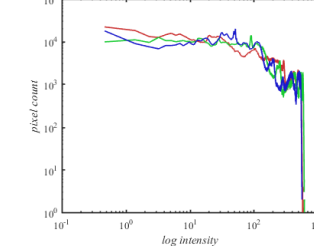
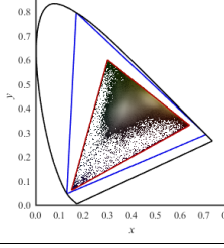
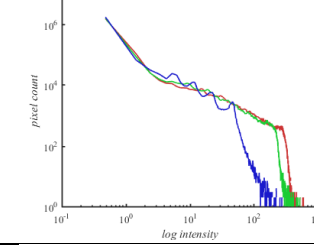
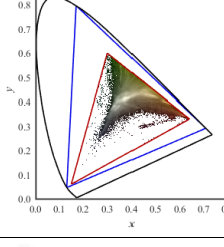
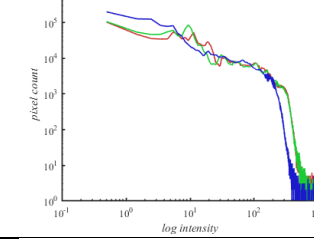
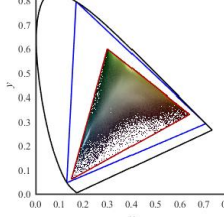
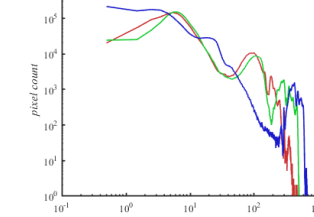
54: knossos_frescoC			
55: ksc			
56: la_vapeur_du_trioux			
57: lemon			
58: lipstick			
59: llanthony_priority			

TABLE 34 (continued)

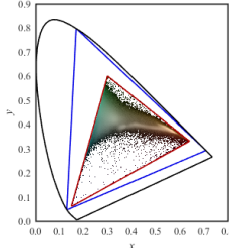
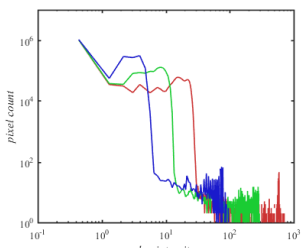
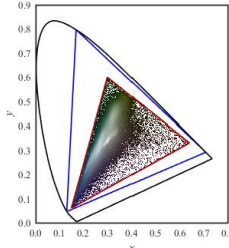
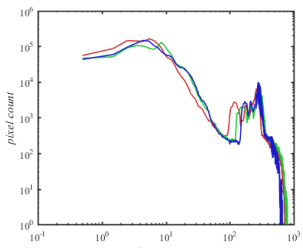
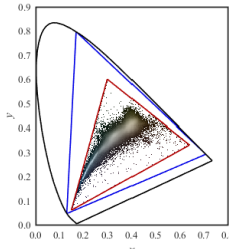
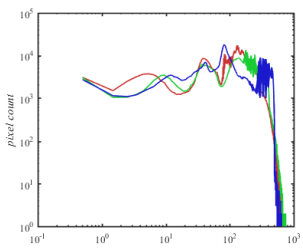
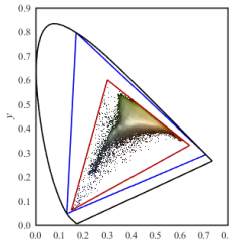
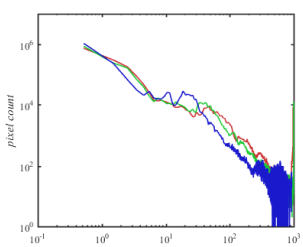
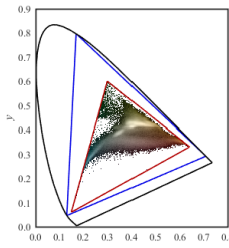
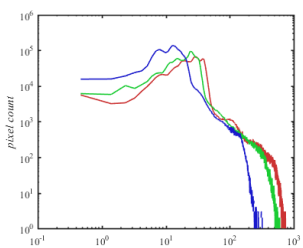
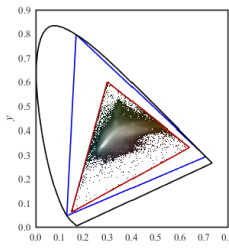
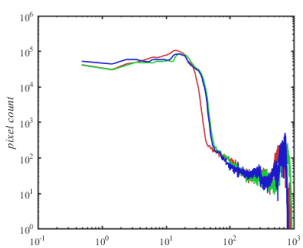
60: long_ashtonG			
61: mauritshuis			
62: menhirs_f22			
63: morning_fogB			
64: nicosia_icon			
65: nicosia_near_green_line			

TABLE 34 (continued)

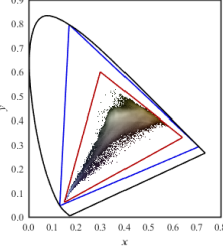
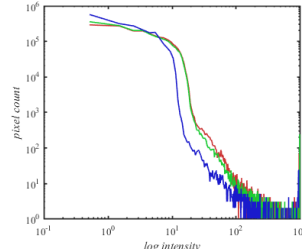
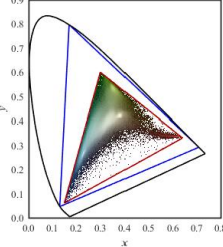
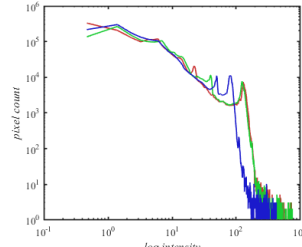
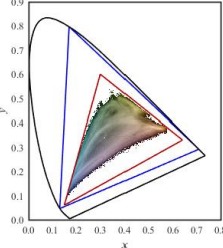
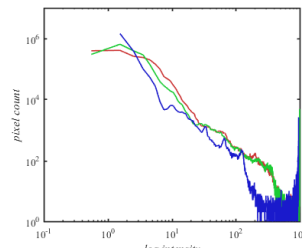
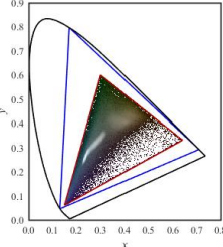
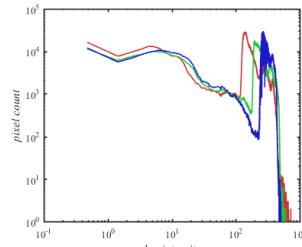
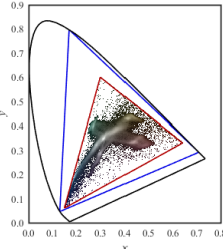
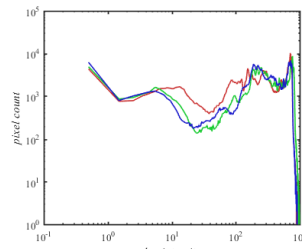
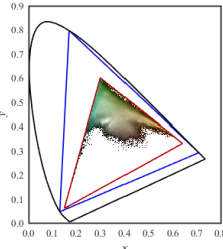
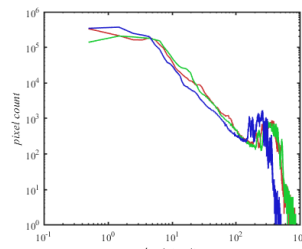
66: opera			
67: park_ave			
68: pillars			
69: polasekB			
70: quiberon_hotel			
71: railway_bridge			

TABLE 34 (continued)

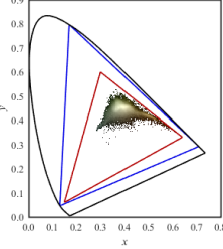
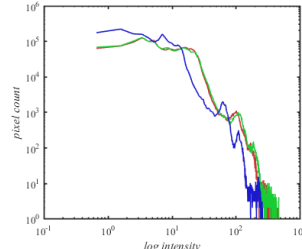
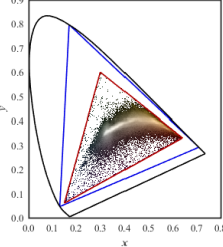
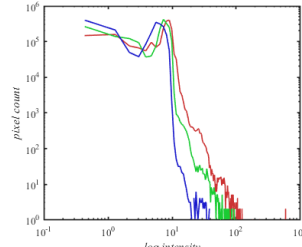
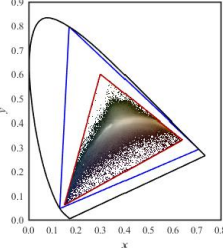
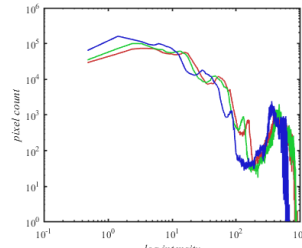
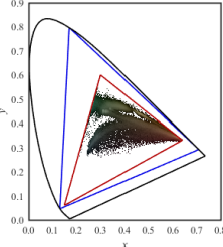
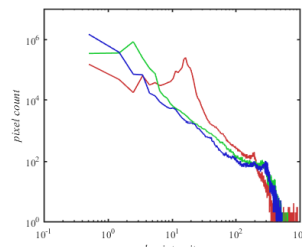
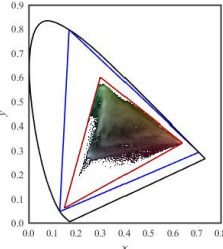
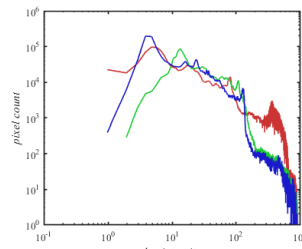
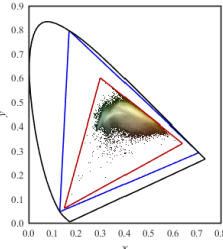
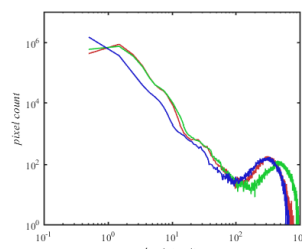
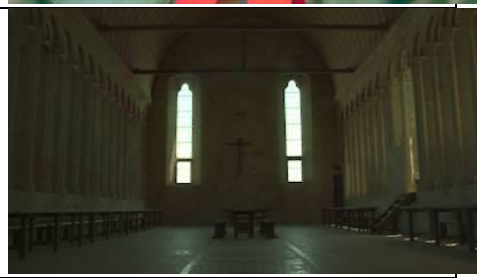
72: railway_station			
73: rainbowD			
74: rajah_rammohun_roy			
75: redsB			
76: red_flower			
77: refectory			

TABLE 34 (continued)

78: ridderzaal			
79: river_boat			
80: rose_garden			
81: rosgartenstrasse			
82: roundaboutB			
83: salamis_statues			

TABLE 34 (continued)

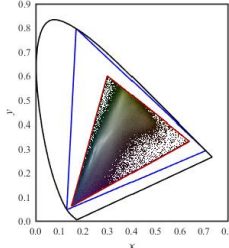
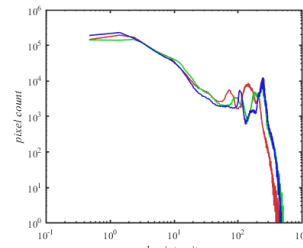
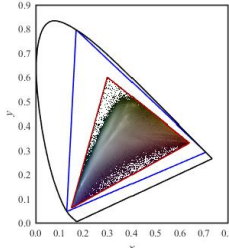
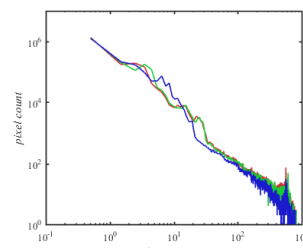
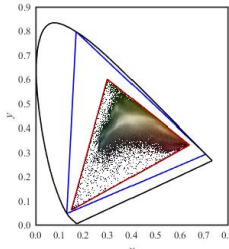
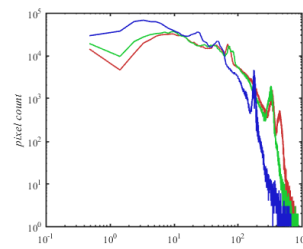
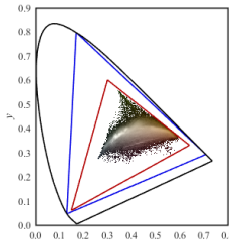
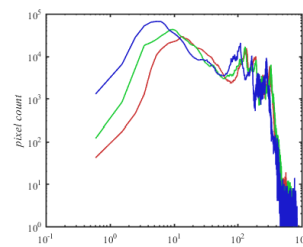
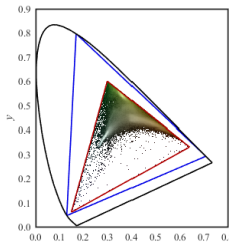
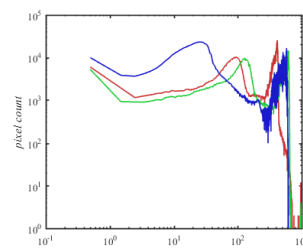
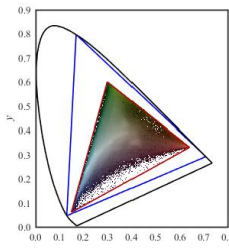
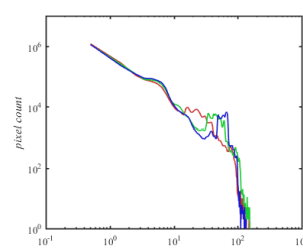
84: secret_lakeC			
85: secret_lake			
86: shopping_street			
87: staircase			
88: stanton_drewB			
89: steam_engine			

TABLE 34 (continued)

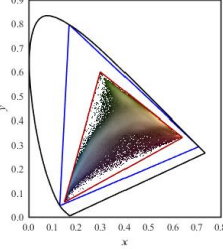
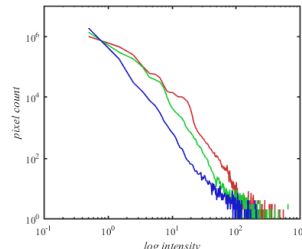
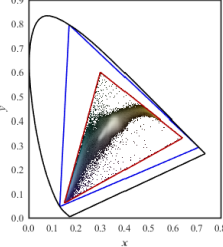
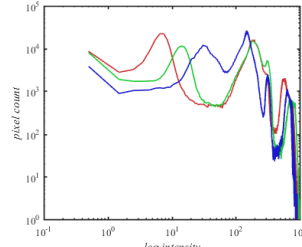
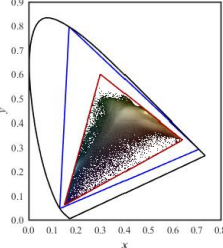
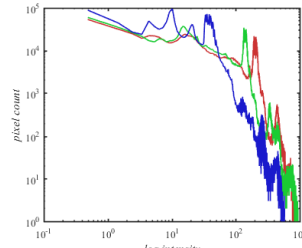
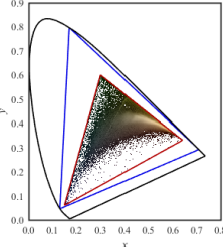
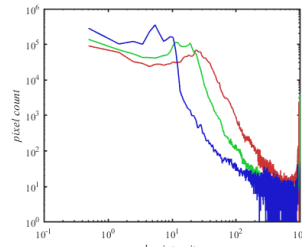
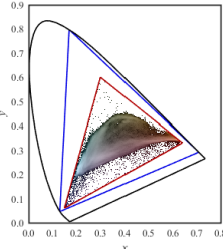
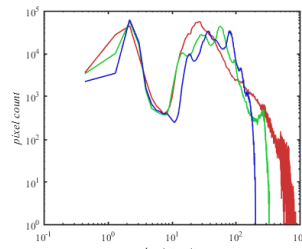
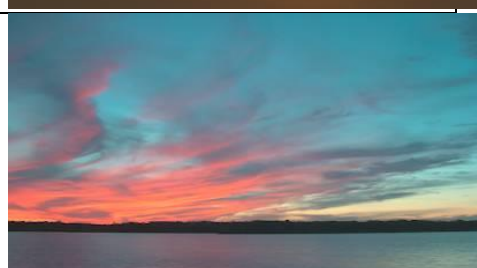
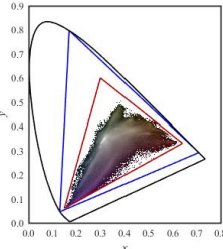
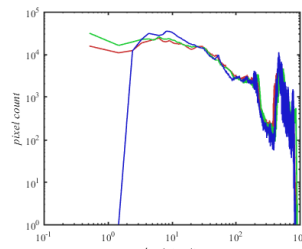
90: still_life			
91: street			
92: sunbeam_breadB			
93: sunriseD			
94: sunsetN			
95: tank			

TABLE 34 (continued)

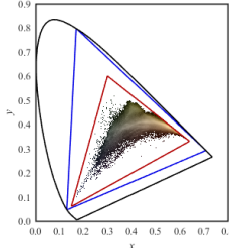
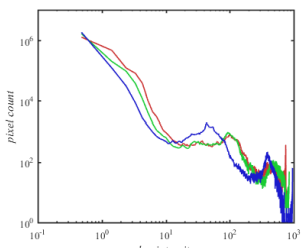
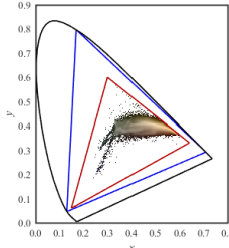
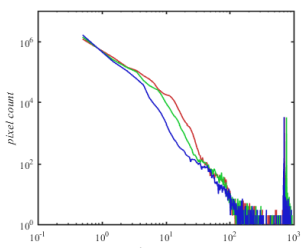
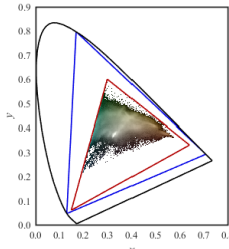
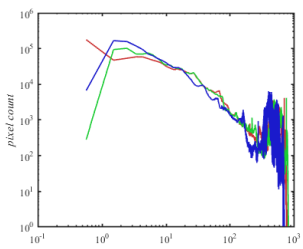
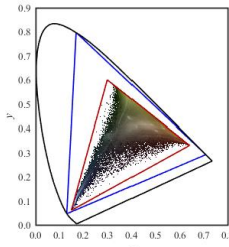
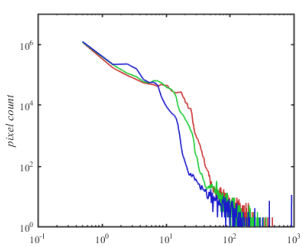
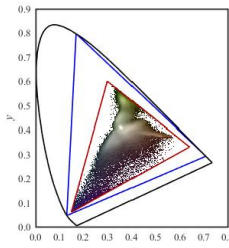
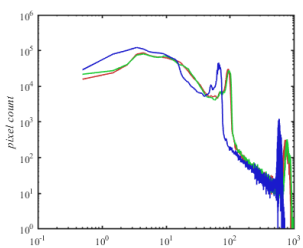
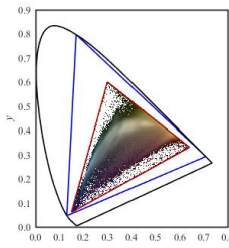
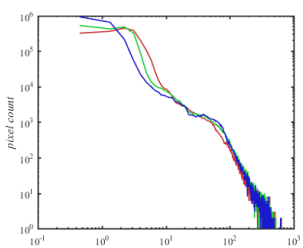
96: tour_surienneB			
97: tower			
98: truck			
99: tuebingen_1			
100: wadworth			
101: walkwayB			

TABLE 34 (end)

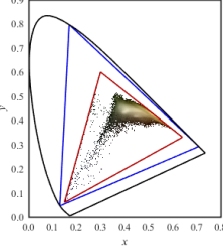
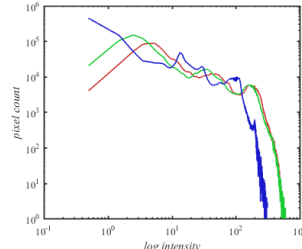
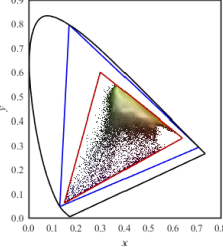
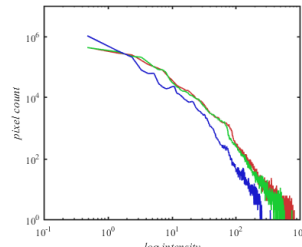
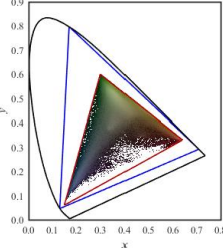
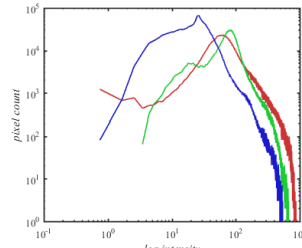
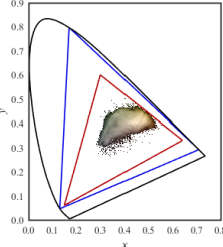
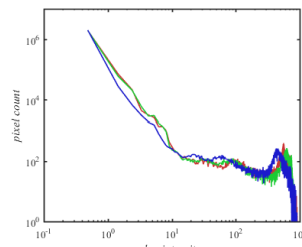
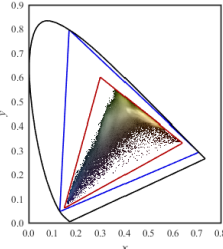
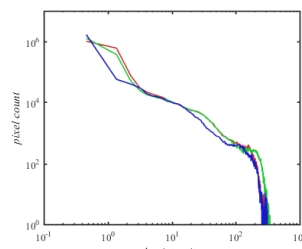
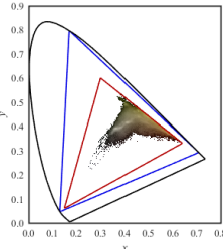
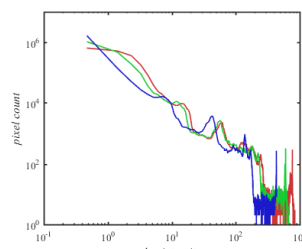
102: wheel			
103: white_flower			
104: wild_flowersB			
105: windowB			
106: window			
107: zaragoza_mallC			

TABLE 35 (*end*)**1 920 × 1 080/59.94/I, 4:4:4, 10-bit HDTV pictures (see Table 2)**

Scene no. Attributes	151	152	153*	154*	155	156	157*	158*	159	160	161	162	163	164	165	166	167	168	169
Digital coding	√	√	√	√	√	√	√	√	√	√				√	√	√	√	√	
Standards conversion	√	√	√	√	√	√	√	√						√					
Motion reproduction	√	√	√	√	√	√	√	√							√				
Resolution	√	√	√	√	√	√	√	√	√										
Gray-scale reproduction											√	√							
Contrast											√	√	√			√	√	√	
Colour reproduction									√	√									√
Skin colour											√	√	√		√				
False contour																			
Texture									√	√									
Noise reduction																√	√	√	
Legibility	√	√	√	√					√	√									

* The field frequency is 50 Hz.

TABLE 36

1 920 × 1 080/59.94P, 4:2:2 10-bit HDTV pictures (see Table 3)

[illegible]

TABLE 36 (end)

1 920 × 1 080/59.94/P, 4:2:2, 10-bit HDTV pictures (see Table 3)

Scene no. Attributes	251	252	253*	254*	255	256	257*	258*	259	260	261	262	263	264	265
Digital coding	√	√	√	√	√	√	√	√	√	√				√	√
Standards conversion	√	√	√	√	√	√	√	√						√	
Motion reproduction	√	√	√	√	√	√	√	√							√
Resolution	√	√	√	√	√	√	√	√	√						
Gray-scale reproduction											√	√			
Contrast											√	√	√		
Colour reproduction									√	√					
Skin colour											√	√	√		√
False contour															
Texture									√	√					
Noise reduction															
Legibility	√	√	√	√					√	√					

* The frame frequency is 24 Hz.

TABLE 37

1 920 × 1 080/50/I, 4:2:2, 10-bit HDTV pictures (see Table 4)

[illegible]

TABLE 37 (continued)

[illegible]

TABLE 38

Test materials for UHDTV/HDTV (see Table 5)

No.	1	2	3	4	5	6	7	8	9	10
Image resolution	*	*		*	**	*	*		**	**
Gray-scale reproduction		**			*	*		*		**
Colour reproduction			**	*	*	*		**	*	
Digital coding	*		**	**			*			
Readability	*	**			**					
Sense of presence			*	*	**			**		*
Wide-colour-gamut					*	*		*	*	

* Highly recommended.

**** Recommended.**

TABLE 39

3 840 × 2 160/50/P, 4:4:4, 16-bit UHDTV pictures (see Table 6)

[illegible]

TABLE 40 (continued)

[illegible][illegible]

TABLE 40 (*end*)

Attributes	Scene no.	79
Digital coding		√
Standards conversion		√
Resolution		
Gray-scale reproduction		
Contrast		√
Colour reproduction		√
Skin colour		
Texture		
Noise reduction		√
Inverse tone mapping		√
Up-conversion		√
4K upscaling		√

TABLE 41

1000 $\frac{cd}{m^2}$ images in HD size, EXR format. Colorimetry: ITU-R BT.709 content in an ITU-R BT.2020 container (see Table 8)

[illegible]

TABLE 41 (end)

Scene no. Attributes	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104
Digital coding				√	√	√		√	√	√					√	√		√	√		√					√
Standards conversion				√	√	√		√	√	√					√	√		√	√		√					√
Resolution																										
Gray-scale reproduction																										
Contrast	√		√	√	√	√	√	√	√		√	√		√	√	√		√	√	√	√			√		
Colour reproduction				√						√		√		√						√	√		√			√
Skin colour																										
Texture	√	√			√			√		√	√		√	√				√					√			√
Noise reduction				√		√			√		√	√			√										√	
Tone mapping	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Down-conversion	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
4K upscaling	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

Scene no. Attributes	105	106	107
Digital coding	√	√	√
Standards conversion	√	√	√
Resolution			
Gray-scale reproduction			
Contrast	√	√	√
Colour reproduction			
Skin colour			
Texture	√	√	
Noise reduction			
Tone mapping	√	√	√
Down-conversion	√	√	√
4K upscaling	√	√	√

Annex 2

Choice of statistics that can serve to characterize materials

1 Introduction

Many test sequences for subjective assessment are described in this Report, and have been used in various evaluation tests. These sequences contain many different attributes as a whole, while each sequence provides a few attributes. It is important in actual evaluation tests to choose the sequences suitable for the test purposes. Statistics are useful in choosing proper sequences for the assessment purpose, as well as in analysing the quality degradation of the system to be evaluated.

In selecting the statistics described below, it is considered that there are increasing opportunities to conduct the evaluation tests of digital bit-rate reduction systems, the picture quality of which is generally sensitive to the picture contents, and therefore proper test materials must be used in the evaluation tests.

2 Statistics of test materials

2.1 Entropy of PCM data

This entropy, E , represents the amount of information of a picture. It is defined by equation (1):

$$E = - \sum_{i=I_{min}}^{I_{max}} P(i) \times \log_2 P(i) \quad \text{bit/pixel} \quad (1)$$

where:

I_{min} : minimum level of the video signal

I_{max} : maximum level of the video signal

$P(i)$: probability occurrence for the video signal level i .

2.2 AC energy

This represents the degree of picture activity, such as fineness, and is defined to be the square sum of the DCT coefficients except for the DC coefficient, as shown below:

$$AC = \left[\frac{1}{N} \sum_{k=1}^N ac_k \right] / AC_{max} \quad (2)$$

where:

$$ac_k = \sum_{m=0}^7 \sum_{n=0}^7 C(m,n)^2 - C(0,0)^2$$

and $C(m, n)$ denotes the DCT coefficients and N the number of blocks in a field (or frame). AC_{max} is a normalizing factor and the theoretically maximum value of AC energy is taken here, which is obtained with such a picture that a half area within a block is black and the rest of the area within the block is white.

AC energy is calculated under several conditions, i.e. intra/inter-frame/field. Figure 1a) shows examples of the AC energy for intra-frame (frame DCT) and field DCT with motion-compensated frame difference (field DCT-MCFD).

2.3 Spectral entropy

This represents the degree of randomness of the DCT coefficients, and is useful to estimate the necessary bit rate of a DCT-based bit reduction system. It is defined by equation (3):

$$SE = \frac{1}{N} \sum_{k=1}^N (se_k)^2 \quad (3)$$

where:

$$se_k = - \sum_{m=0}^7 \sum_{n=0}^7 \frac{|C(m,n)|}{A} \log_2 \left[\frac{|C(m,n)|}{A} \right]$$

$$A = \sum_{m=0}^7 \sum_{n=0}^7 |C(m,n)|$$

Spectral entropy is calculated under several conditions, i.e. intra/inter-frame/field. Figure 1b) shows examples of the spectral entropy.

2.4 Motion vector

This represents a motion of an object by a two-dimensional parameter on a block-by-block basis. Block matching is one of the commonly used methods for motion estimation.

To express the degree of motion of the picture, two kinds of statistics are used, i.e. mean magnitude of the vectors averaged over a frame/field and standard deviation within the frame/field. They are calculated separately in horizontal and vertical directions as follows:

$$\mu_X = \frac{1}{N} \sum_{k=1}^N |X_k| \quad \text{and} \quad \mu_Y = \frac{1}{N} \sum_{k=1}^N |Y_k| \quad (4)$$

$$\sigma_X^2 = \left[\frac{1}{N} \sum_{k=1}^N X_k^2 \right] - \mu_X^2 \quad \text{and} \quad \sigma_Y^2 = \left[\frac{1}{N} \sum_{k=1}^N Y_k^2 \right] - \mu_Y^2 \quad (5)$$

where:

- X_k and Y_k : horizontal and vertical components of the vector in a block
- μ_X and μ_Y : mean magnitude of X_k and Y_k averaged over a field
- σ_X and σ_Y : standard deviation of X_k and Y_k , respectively.

The mean magnitudes represent the degree of motions as a whole, while the standard deviations represent the degree of non-uniform motions.

Figures 1c) and 1d) show examples of the motion vector, calculated using block matching.

2.5 Motion-compensated prediction error power

The motion-compensated frame/field-difference signal, i.e. prediction error, is expressed by equation (6):

$$e_k(x, y) = f_0(x, y) - f_1(x - u_k, y - v_k) \quad (6)$$

where $e_k(*)$, $f_0(*)$ and $f_1(*)$ denote the motion-compensated frame/field-difference signal in the k -th block, the current frame/field signal, and the previous frame/field signal, respectively, while u_k and v_k the horizontal and vertical components of motion vector in the block.

The power of the prediction error, EP , is defined to be the mean square value of the difference signals as follows:

$$EP = \frac{1}{N} \sum_{k=1}^N ep_k \quad (7)$$

where:

$$ep_k = \frac{1}{X \times Y} \sum_{x=1}^X \sum_{y=1}^Y e(x, y)^2$$

X and Y denote horizontal and vertical sizes of a block.

This statistic value could be useful to estimate whether the sequence is critical for a bit reduction system using motion compensation.

Figure 1e) shows an example of the motion-compensated prediction error power.

2.6 Criticality by rate-buffer occupancy method

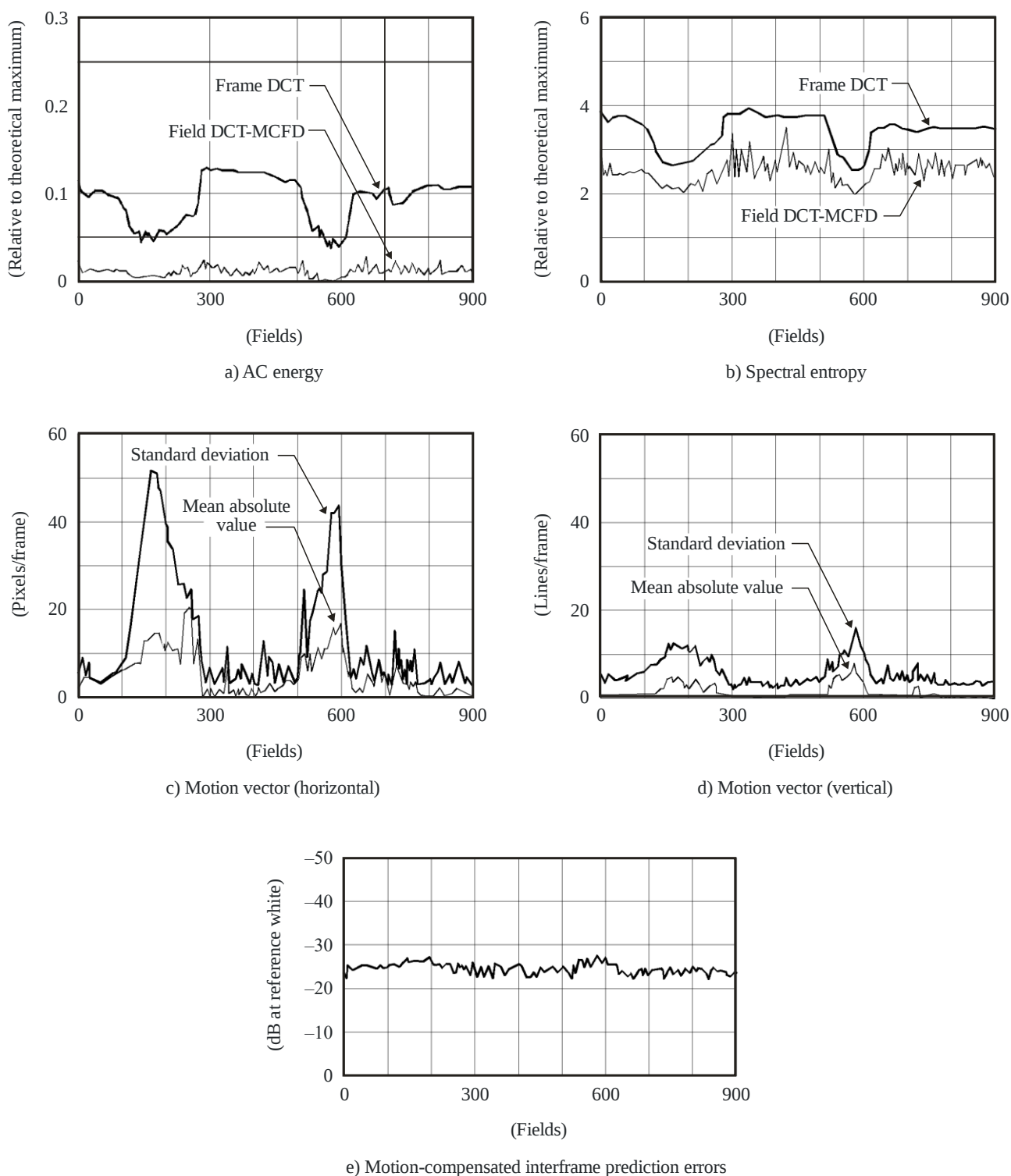
The Independent Television Commission of the United Kingdom and the EBU conducted a study on criticality under the RACE MOSAIC project. The MPEG-1 + coding algorithm with subjectively optimized quantizers was used to measure the criticality of broadcast programmes and test sequences. The criticality was calculated by means of a parallel processing computer using the rate-buffer occupancy, and was expressed in terms of bit/pixel. An example of criticality measurement is shown in Fig. 2.

2.7 Criticality by fixed quantizer method

This criticality is defined as “the number of output bits per pixel from MPEG-2 encoder with a fixed quantizer”. The quantizer characteristics are linear and comply with the MPEG-2 standard. The parameter value of “quantizer_scale” gives a quantizer step closely related to picture quality.

FIGURE 1

Example of statistics of motion sequences



Report BT.2245-01

NOTE 1 – The results are shown only for the luminance signals of the scene “Soccer action”. The ordinate of each chart indicates the statistic value, and the abscissa the field number, counting from the beginning of the sequence (900 fields correspond to 15 s). It can be seen that there are two large horizontal motions around the field numbers 200 and 600, which suppress fine detail components due to the integration effect of the camera, resulting in reduced AC energy and spectral entropy.

Examples of the criticality are shown in Fig. 3. The criticality was measured in each frame under the following condition: quantizer_scale = 12 (q_scale_code = 6 and q_scale_type = 0), field-based forward prediction and intra macroblock refreshment with a cycle of 0.5 s. Figure 3a) shows the fluctuation of the criticality over a 5 s interval. The criticality distribution of broadcast television programmes was measured on an NHK channel for one week, a total of 130 h, from 15 through 22 February 1995. In the measurement, composite NTSC signals were converted into component Y/C signals. The frequency of occurrence of the criticality for television programmes was calculated every 5×10^{-3} bit/pixel. The criticality distribution for different programme genres is shown in Fig. 3b). Sports programmes are relatively critical, while drama programmes are less critical. The statistical distribution of the criticality for overall television programmes is shown in Fig. 3c). This Figure also shows the criticality for test sequences.

FIGURE 2
Criticality measurement result of rate-buffer occupancy method

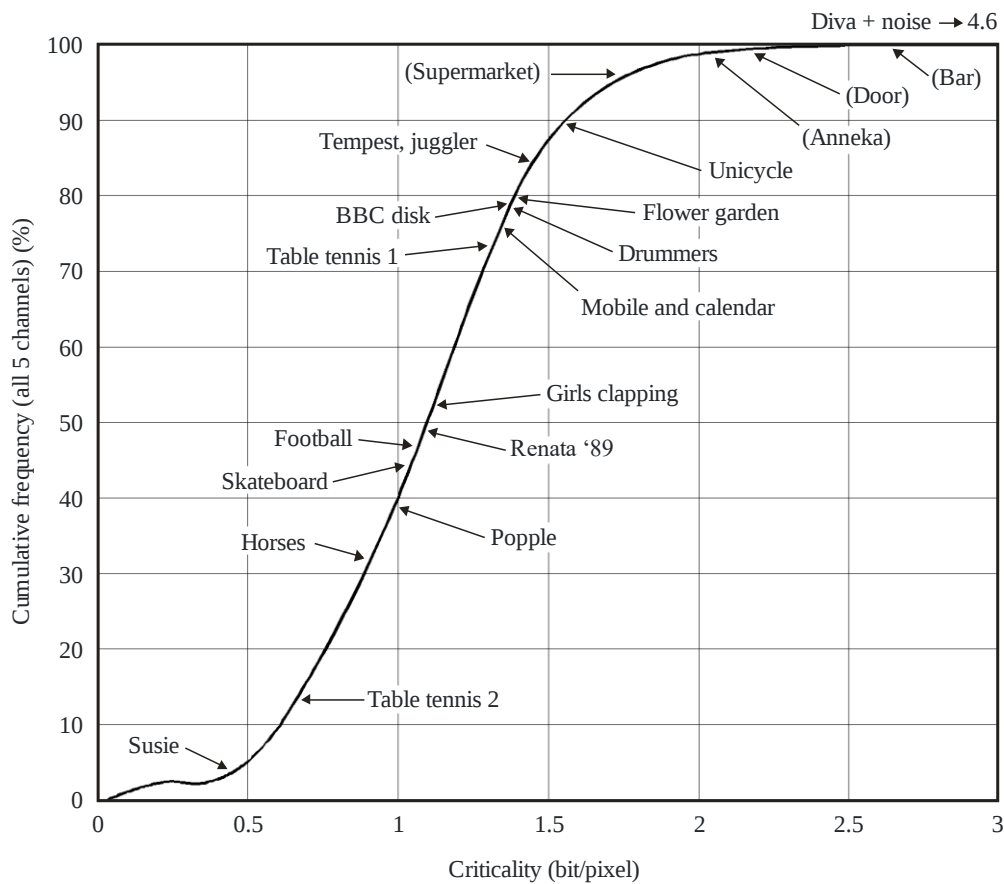
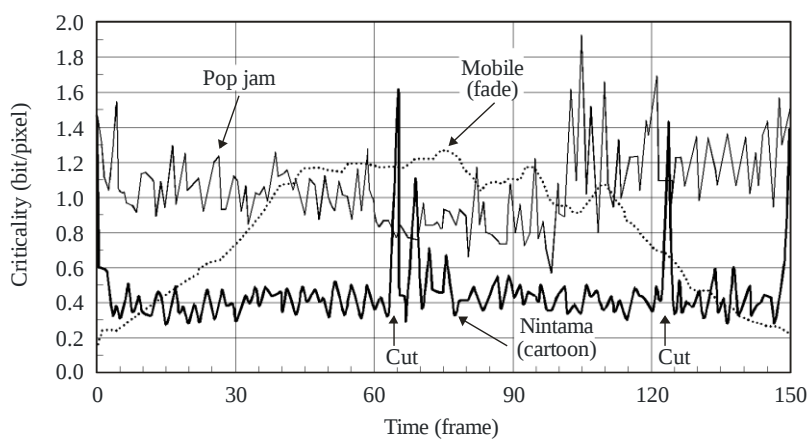
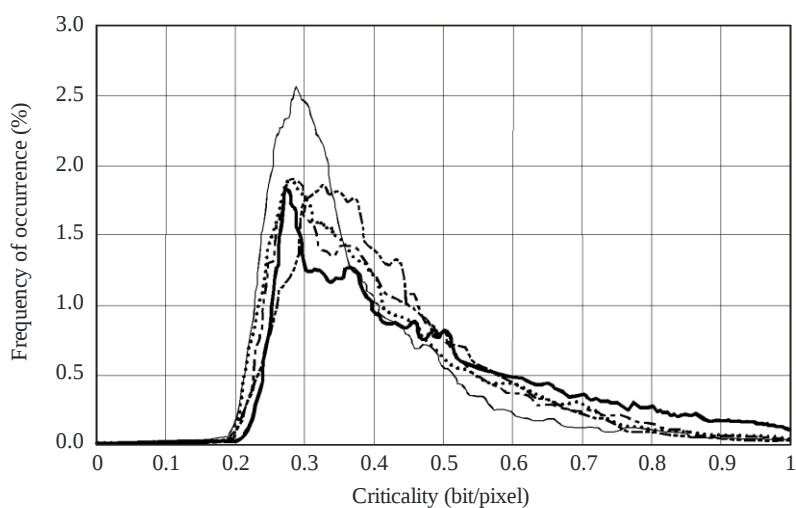


FIGURE 3

Criticality measurement results of fixed quantizer method

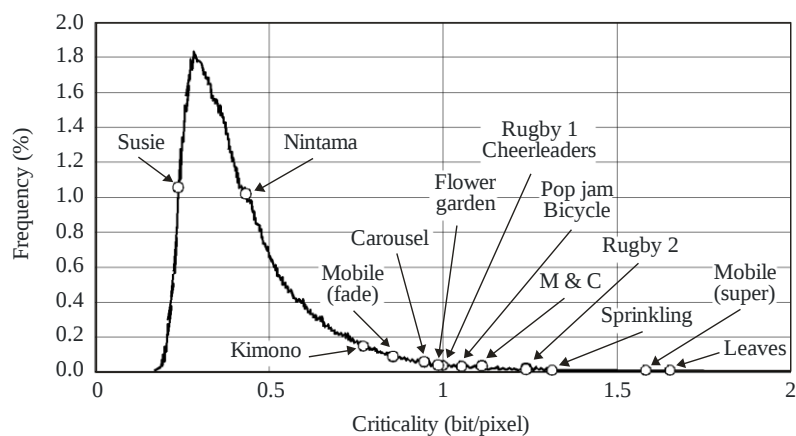


a) Fluctuation of criticality for 5 s interval



b) Criticality distribution for classified television programmes

— Drama Culture - · - · - Variety
 - - - - - News — Sports



c) Distribution of criticality for television programmes and criticality of test sequences

q_scale_code = 6

Annex 3

Status for use of test materials

Use of the test materials described in Tables 1, 2, 3 and 4 is restricted to the following purposes.

- a) Technical evaluations, including:
 - research and development of equipment and systems;
 - testing of equipment during development and production processes;
 - testing of transmission conditions for broadcasting and telecommunication;
 - maintenance of equipment.
- b) Technical demonstrations, including:
 - presentations at technical conferences and workshops;
 - presentation of performance and functionality of equipment at exhibitions.

Inclusion in commercial products and promotional demonstration of commercial products are not permitted.

NOTE 1 – Usage restrictions as proposed above can be considered as falling under the following category:

Commercial restricted

The test materials may be used for research projects, to verify equipment specifications, and public demonstrations of commercial products. Inclusion in commercial products is not allowed. Reproductions for distribution may only be made by the copyright holder or authorized distributor.

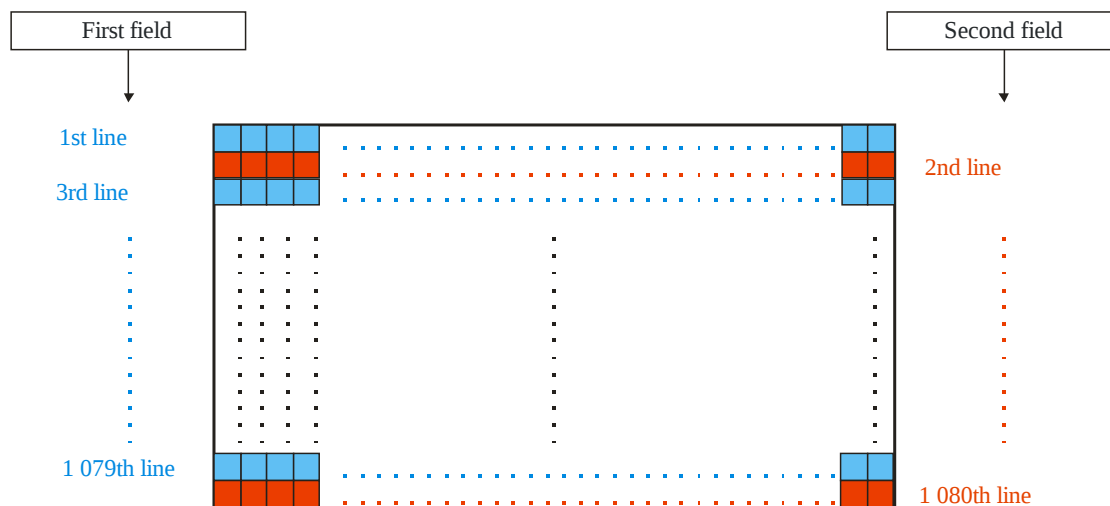
Annex 4

File formats for test materials

1 TIFF file for HDTV RGB 4:4:4 (10 bits)

The video data of two interlaced video fields are combined once into a frame and then recorded in a single Tagged Image File Format (TIFF) file (specified by Adobe Developers Association). Consequently, each file contains the TIFF header and tag information as well as pixel data of the full image size (1 920 × 1 080 pixels, RGB). The number of files corresponds to the video length. The first field in each frame is mapped into odd lines (including the first line of the frame data) and the second one is mapped into even lines. This is the so called “top field first” and is illustrated in Fig. 4.

FIGURE 4
Structure of video data



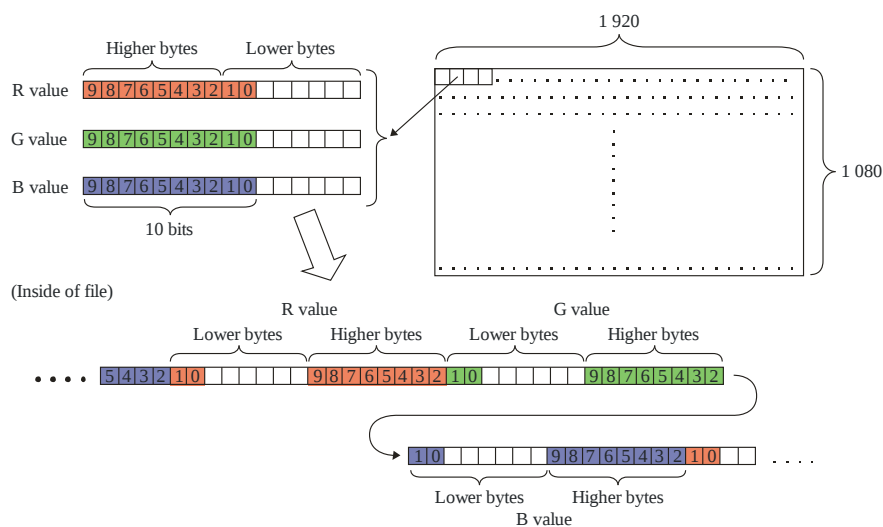
Report BT.2245-04

Pixel values of RGB components in the TIFF file are treated as 16-bit integers. Since the actual pixel value only has 10 bit depth, it is stored in the higher 10 bits of the 16-bit integer and the remaining 6 bits are set to “0”.

Byte order in the TIFF file is low-to-high (little endian). The arrangement of pixel data in the file is illustrated in Fig. 5.

Filename is formatted as “sXXX_NNNNN.tif” where XXX means a three digit scene number while NNNNNN indicates a six digit frame number.

FIGURE 5
Data arrangement for RGB 4:4:4 (10 bits)



Report BT.2245-05

2 YUV file for HDTV YC_BC_R 4:2:2 (10 bits)

Video data of full image size (1 920 × 1 080 pixels and YC_BC_R) are stored in a single file without header or timing information.

Two video fields are combined into a frame for interlaced video content before it is stored into the file. See Fig. 4 for the video data structure.

The Y component of video data contains $1\,920 \times 1\,080$ samples as seen in Fig. 6 while each of the C_B and C_R components has $960 \times 1\,080$ samples. The horizontal positions of C_B and C_R samples are aligned to those of odd samples in the Y component.

Sample values in the file are arranged in order of C_B , Y, C_R , Y, ... Three 10-bit sample values are stored in the higher 30 bits of a 4 byte (32 bits) integer and the remaining lower 2 bits are set to “0”. As a result, 12 data samples within six pixels, i.e. 6 Y samples and 3 pairs of C_B and C_R samples, are packed into the sixteen byte data in the file shown in Fig. 7.

Filename is formatted as “sXXX_NNNNN.yuv10” where XXX means the three digit scene number while NNNNNN indicates the six digit frame number.

FIGURE 6
Sampling positions in frame

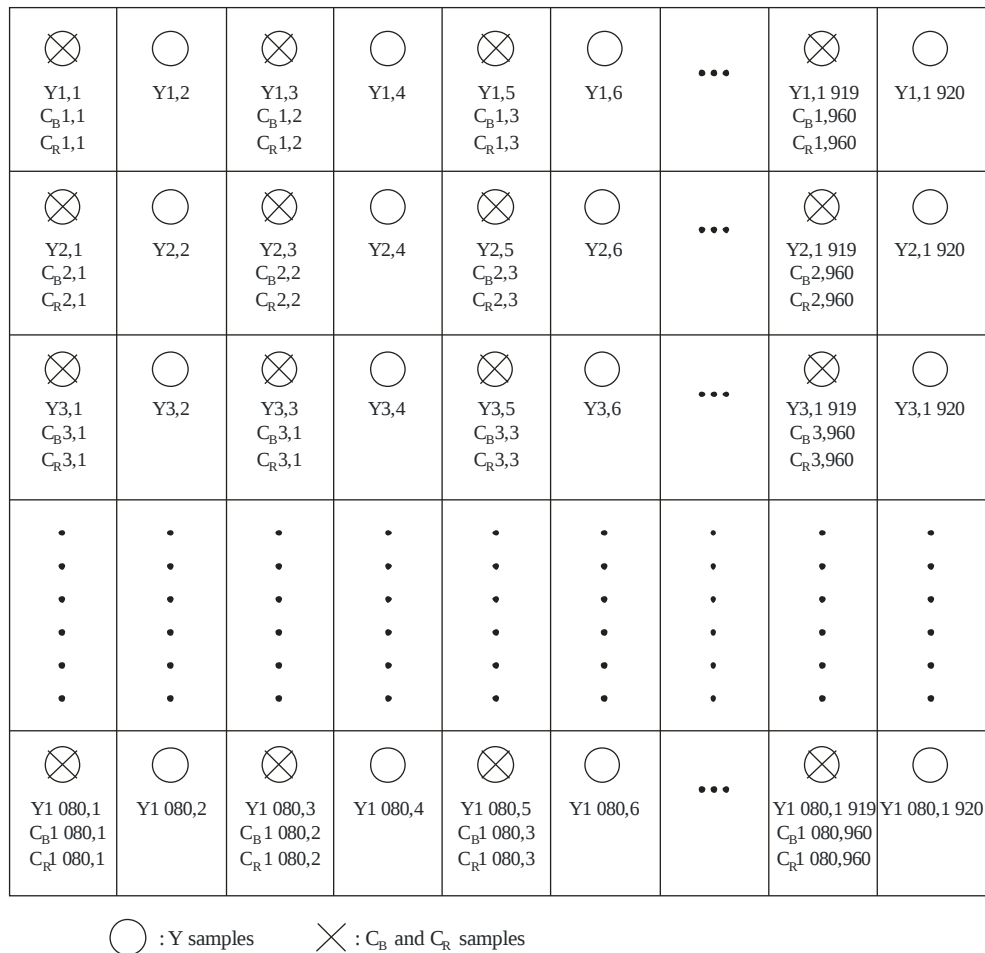
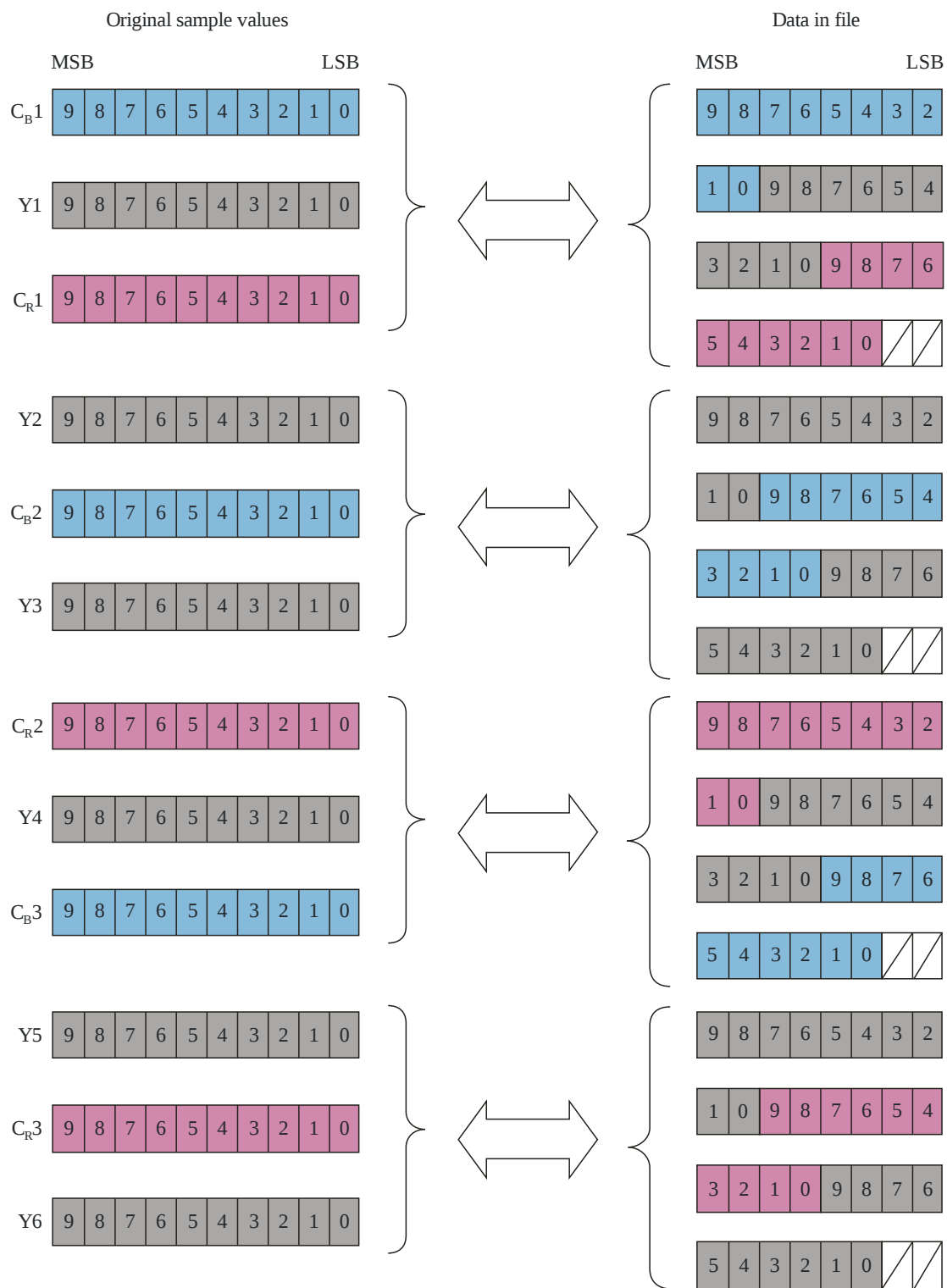
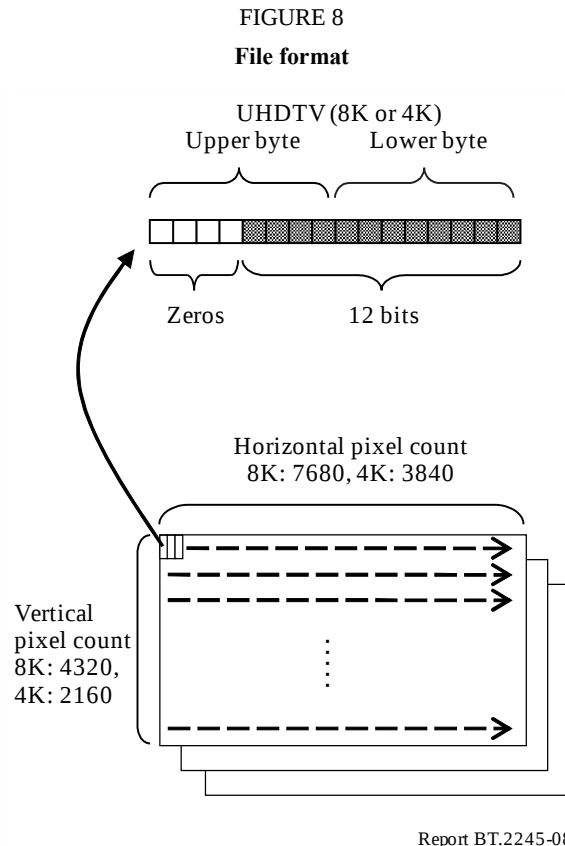


FIGURE 7

Data arrangement for YC_BC_R 4:2:2 (10 bits)

3 Raw file for UHDTV RGB 4:4:4 (12 bits)

Figure 8 illustrates the file formats. Each 8K or 4K image consists of three raw files separated by the colour channel. The size of each raw file is 66 355 200 bytes for 8K images and 16 588 800 bytes for 4K images, respectively, using 2 bytes in the big-endian format for each pixel. The 2K images are individually recorded in an uncompressed 16 bit TIFF format. The size of each file is 12 441 600 bytes for 2K images with the header information. The six least significant digits are zero-padded.



4 OpenEXR file format for 100 cd/m^2 and 1000 cd/m^2 linear HD images

Images stored in the OpenEXR file format (see <https://openexr.org>) encode linear data between 0 cd/m^2 and 100 cd/m^2 or between 0 cd/m^2 and 1000 cd/m^2 , dependent on which of the two datasets is considered. The images are HD sized, having coordinates ranging from (0,0) to (1919, 1079). The images have three color channels, namely “B”, “G”, and “R”. The magic number recorded in the header of each image is 0x01312f76. The version field is 0x00000002, indicating that the images are encoded according to OpenEXR version 2 with a single-part scan line. Compression follows the PIZ scheme, which is lossless and ACES compatible.