Joint Collaborative Team on Video Coding (JCT-VC)
of ITU-T SG 16 WP 3 and ISO/IEC JTC 1/SC 29/WG 11
15th Meeting: Geneva, CH, 23 Oct. – 1 Nov. 2013

Document: JCTVC-O0356

Title:	**Summary of contributions on source video test materials**
Status:	Input Document to JCT-VC
Purpose:	Report
Author(s) or Contact(s):	Teruhiko Suzuki 2-10-1, Osaki, Shinagawa-ku , Tokyo, 141-8610 JAPAN
	Tel: +81-50-3750-2740 Email: teruhikos@jp.sony.com
Source:	Sony Corp.

Abstract

This contribution summarizes the input contributions on source video test materials.

1 Summary

The purposes of each proposals are as follows.

1) For verification test

  JCTVC-O0332, JCTVC-O0360 and JCTVC-O0354

2) To add 16 bit to CTC

  JCTVC-O0069

3) To add CTC for screen content coding

  JCTVC-O0172, JCTVC-O0354, JCTVC-O0222, JCTVC-O0256 and JCTVC-O0268

Recommendations:

- JCTVC-O0332, JCTVC-O0360 and JCTVC-O0354 should be reviewed during verification test planning

- JCTVC-O0069 should be reviewed to update RExt CTC for 16 bit video

- JCTVC-O0172, JCTVC-O0222, JCTVC-O0256 and JCTVC-O0268 should be reviewed to update RExt CTC for screen content coding

Natural video:

Sequence	Owner	Resolution	Bit depth	Frame rate	Color Sampling	Color space	Duration	Capturing	Comments
Fruit Stall	Sony (O0069)	1920x1080	16	24p	4:4:4	RGB Linear gamut	10s	Sony F65 RAW	Cropped from 4K source High dynamic range

Sequence	Owner	Resolution	Bit depth	Frame rate	Color Sampling	Color space	Duration	Capturing	Comments
Bubbles	Sony (O0069)	4096x2160	16	24p	4:4:4	RGB BT.709 color gamut	5s	Sony F65 RAW	High dynamic range
Shuffling	Sony (O0069)	4096x2160	16	24p	4:4:4	RGB BT.709 color gamut	5s	Sony F65 RAW	Confirming licensing term High dynamic range
Book	BBC (O0332)	3840x2160	10?	50p	4:2:0	YUV BT.709 color gamut	10s	Sony F55 XAVC (4096x2160, 10 bit, 4:2:2)	Complex paper motion Recommend for Verification test
Park and buildings	BBC (O0332)	3840x2160	10?	50p	4:2:0	YUV BT.709 color gamut	10s	Sony F55 XAVC (4096x2160, 10 bit, 4:2:2)	Sharp lines Panning Aliasing
Vehicles	BBC (O0332)	3840x2160	10?	50p	4:2:0	YUV BT.709 color gamut	10s	Sony F55 XAVC (4096x2160, 10 bit, 4:2:2)	Recommended for Verification Test
Calendar and plants	BBC (O0332)	3840x2160	10?	50p	4:2:0	YUV BT.709 color gamut	10s	Sony F55 XAVC (4096x2160, 10 bit, 4:2:2)	Complex motion
Men and plants	BBC (O0332)	3840x2160	10?	50p	4:2:0	YUV BT.709 color gamut	10s	Sony F55 XAVC (4096x2160, 10 bit, 4:2:2)	Complex motion
4Ever_Sed of	4EVER (O0360)	3840x2160	8 & 10	60p	4:2:0	YUV		25sec	Sony F65 Raw	Licensing tbc Carousel Complex motion Very detail texture Candidate for Verificatin test
4Ever_Man ege	4EVER (O0360)	3840x2160	8 & 10	60p	4:2:0	YUV		12sec	Sony F65 Raw	Licensing tbc Sharp lines, edges, panning, etc Candidate for Verificatin test

Medical content:

Sequence	Owner	Resolution	Bit depth	Frame rate	Color Sampling	Color space	Duration	Capturing	Comments
Doppler	Siemens (O0172)	800x600	8	12p	4:4:4	RGB	1s	Medical mixed (ultrasonic	Mono + color

Name	Source	Resolution	Bit	Rate	Chroma	Color	Duration	Content	Notes
								image + screen content)	
FetalHeart	Siemens (O0172)	800x600	8	40p	4:4:4	RGB	2.25s (90 frames)	Medical mixed (ultrasonic image + screen content)	Monochrome
19Segments	Siemens (O0172)	800x600	8	30p	4:4:4	RGB	3s	Medical mixed (ultrasonic image + screen content)	Multiple screens
Cardiac	Siemens (O0172)	512x512	12	N/A	4:0:0	Monochrome	281	Computed tomography (CT) image, continuous-tone 3D image volumes	Candidate for high bit depth CTC
Longrun	Siemens (O0172)	512x512	12	N/A	4:0:0	Monochrome	1463	Computed tomography (CT) image, continuous-tone 3D image volumes	Candidate for high bit depth CTC
MR_Axial 1	Siemens (O0172)	256x256	14	N/A	4:0:0	Monochrome	42	Magnetic resonance (MR) image, continuous-tone 3D image volumes	Candidate for high bit depth CTC
MR_Axial 2	Siemens (O0172)	512x512	14	N/A	4:0:0	Monochrome	13	Magnetic resonance (MR) image, continuous-tone 3D image volumes	Candidate for high bit depth CTC
MR_Coronal	Siemens (O0172)	448x512	14	N/A	4:0:0	Monochrome	45	Magnetic resonance (MR) image, continuous-tone 3D image volumes	Candidate for high bit depth CTC
AX_Head	Siemens (O0172)	1240x960	16	N/A	4:0:0	Monochrome	496	Angiography (AX) image, continuous-tone 2D X-ray projections	Head rotation Candidate for high bit depth CTC
Seq1_1	CRAN (O0354)	1920x1080	8	60p	4:2:2	YCbCr BT.709?	10s	Stortz endoscopic camera	Surgery video Candidate for Verificatin test
Seq1_2	CRAN (O0354)	1920x1080	8	60p	4:2:2	YCbCr BT.709?	10s	Stortz endoscopic camera	Surgery video Candidate for Verificatin test
Capture0011	PSNC (O0354)	1920x1080	10	25p	4:2:2	YCbCr BT.709?	45s to 1 min 47s ?	Stortz Image 1 HD	Surgery video Candidate for Verificatin test
Capture001	PSNC	1920x1080	10	25p	4:2:2	YCbCr	45s to 1	Stortz Image 1	Surgery

Sequence	Owner	Resolution	Bit depth	Frame rate	Color Sampling	Color space	Duration	Capturing	Comments
3	(O0354)					BT.709?	min 47s ?	HD	video Candidate for Verificatin test
Capture0016	PSNC (O0354)	1920x1080	10	25p	4:2:2	YCbCr BT.709?	45s to 1 min 47s ?	Stortz Image 1 HD	Surgery video Candidate for Verificatin test

Screen content:

Sequence	Owner	Resolution	Bit depth	Frame rate	Color Sampling	Color space	Duration	Capturing	Comments
Basketball_Screen	Apple (O0222)	2560x1440	8	60p	4:4:4	"gbrp" format (Green-Blue-Red planar)	8-20s ?		Mixture of natural video (50p) and moving and still graphics (60p)
BigBuckBunnyStudio	Apple (O0222)	1920x1080	8	60p	4:4:4	"gbrp" format (Green-Blue-Red planar)	8-20s ?		Blender and un-rendered model (Blender sequence is 24p)
KimonoError1	Apple (O0222)	2560x1440	8	60p	4:4:4	"gbrp" format (Green-Blue-Red planar)	8-20s ?		Mixture of natural video (24p) and moving and still graphics
KimonoError2	Apple (O0222)	2560x1440	8	60p	4:4:4	"gbrp" format (Green-Blue-Red planar)	8-20s ?		Mixture of natural video (24p) and moving and still graphics
MissionControlClip1	Apple (O0222)	2560x1440	8	60p	4:4:4	"gbrp" format (Green-Blue-Red planar)	8-20s ?		Mixture of natural video (50p and 60p) and moving and still graphics
MissionControlClip2	Apple (O0222)	2560x1440	8	60p	4:4:4	"gbrp" format (Green-Blue-Red planar)	8-20s ?		Mixture of natural video (50p and 60p) and moving and still graphics
MissionControlClip3	Apple (O0222)	1920x1080	8	60p	4:4:4	"gbrp" format (Green-Blue-Red planar)	8-20s ?		Mixture of natural video (50p and 60p) and
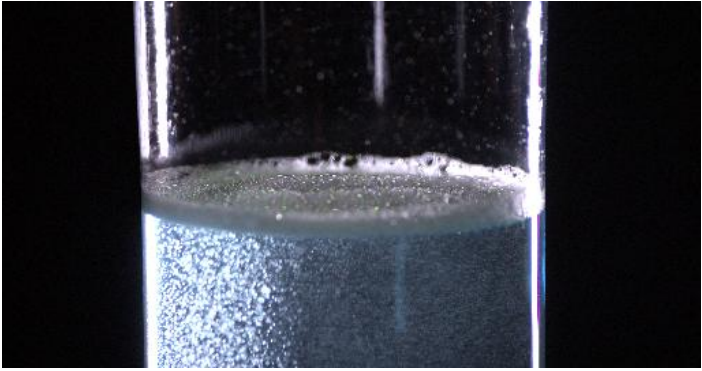
									moving and still graphics
Sc_flyingGraphics	Huawei (O0256)	1920x1080	8	60p	4:4:4	RGB & YUV		produced by saving the desktop pixel data from memory directly to a file	
Sc_desktop	Huawei (O0256)	1920x1080	8	60p	4:4:4	RGB & YUV		produced by saving the desktop pixel data from memory directly to a file	
Sc_realtimeData	Huawei (O0256)	1920x1080	8	60p	4:4:4	RGB & YUV		produced by saving the desktop pixel data from memory directly to a file	
Sc_console	Huawei (O0256)	1920x1080	8	60p	4:4:4	RGB & YUV		produced by saving the desktop pixel data from memory directly to a file	
Sc_VideoTesting	Huawei (O0256)	1920x1080	8	60p	4:4:4	RGB & YUV		produced by saving the desktop pixel data from memory directly to a file	
Sc_SocialnetworkMap	Huawei (O0256)	1920x1080	8	60p	4:4:4	RGB & YUV		produced by saving the desktop pixel data from memory directly to a file	
Sc_cg2twist_tunnel	Tongi Univ (O0268)	1280x720	8	30p	4:4:4	RGB	10s	captured from a computer graphics card HDMI output	

2 Natural video materials

[JCTVC-O0069](#) AHG5 and AHG18: 16-bit Test Sequences for Range Extensions [K. Sharman, N. Saunders, J. Gamei (Sony)]

This contribution proposes 16 bit test materials. One HDTV sequence and Two 4K sequences are provided. The sequences are captured by Sony F65 (RAW). Proposed test sequences and licensing statement are summarized below.

Fruit stall		
	Resolution	1920x1080
	Bit depth	16
	Color sampling	4:4:4
	Color space	RGB Linear gamut
	Frame rate	24p
	Duration	10s (240 frames)
	Capture	Sony F65
	Processing	F65 RAW Crop to HD Linear gamut

Bubbles		
	Resolution	4096x2180
	Bit depth	16
	Color sampling	4:4:4
	Color space	RGB BT.709 gamut
	Frame rate	24p
	Duration	5s (120 frames)
	Capture	Sony F65
	Processing	F65 RAW HFR BT.709 gamut

Shuffling		
Rights to be confirmed	Resolution	4096x2180
	Bit depth	16
	Color sampling	4:4:4
	Color space	RGB BT.709 gamut
	Frame rate	24p
	Duration	5s (120 frames)
	Capture	Sony F65
	Processing	F65 RAW BT.709 gamut

Usage and Copyright

To use these materials, users should register with the content holder, Sony, to get access to the ftp site. Copy of the zip files are password protected using the same password obtained from completing the form.

JCTVC-O0332 UHD test sequences [R. Weerakkody, M. Naccari, M. Mrak (BBC)] [late]

This contribution presents UHD (3840×2160) source material produced by BBC R&D which is available for non commercial use, including HEVC testing and verification. The set consists of the material captured using Sony F55 camera and is available in 4:2:0 format (Rec. 709).

All sequences are captured using Sony F55 camera in XAVC mode (4096×2160, 10-bit, 4:2:2). Captured sequences are decoded, cropped and downsampled using ffmpeg.

Coding performance analysis with HEVC (HM 12.0) and AVC (JM 18.5) are included (8 bit video are used for this test).

Proposed test sequences and licensing statement are summarized below.

Book		
	Resolution	3840x2180
	Bit depth	10?
	Color sampling	4:2:0
	Color space	YUV BT.709 gamut
	Frame rate	50p
	Duration	10s (500 frames)
	Capture	Sony F55
	Processing	F55 XAVC mode (4096x2160, 10 bit, 4:2:2 compressed by AVC) Down sampled by ffmpeg BT.709 gamut

Park and buildings		
	Resolution	3840x2180
	Bit depth	10?
	Color sampling	4:2:0
	Color space	YUV BT.709 gamut
	Frame rate	50p
	Duration	10s (500 frames)
	Capture	Sony F55
	Processing	F55 XAVC mode (4096x2160, 10 bit, 4:2:2 compressed by AVC) Down sampled by ffmpeg BT.709 gamut

Vehicles		
	Resolution	3840x2180
	Bit depth	10?
	Color sampling	4:2:0
	Color space	YUV BT.709 gamut
	Frame rate	50p
	Duration	10s (500 frames)
	Capture	Sony F55
	Processing	F55 XAVC mode (4096x2160, 10 bit, 4:2:2 compressed by AVC) Down sampled by ffmpeg BT.709 gamut

Calendar and plants		
	Resolution	3840x2180
	Bit depth	10?
	Color sampling	4:2:0
	Color space	YUV BT.709 gamut
	Frame rate	50p
	Duration	10s (500 frames)
	Capture	Sony F55
	Processing	F55 XAVC mode (4096x2160, 10 bit, 4:2:2 compressed by AVC) Down sampled by ffmpeg BT.709 gamut

Date Saved: 2013-10-29

Men and plants		
	Resolution	3840x2180
	Bit depth	10?
	Color sampling	4:2:0
	Color space	YUV BT.709 gamut
	Frame rate	50p
	Duration	10s (500 frames)
	Capture	Sony F55
	Processing	F55 XAVC mode (4096x2160, 10 bit, 4:2:2 compressed by AVC) Down sampled by ffmpeg BT.709 gamut

Copyright and Use Information

The video sequences provided above and all intellectual property rights therein remain the property of the BBC.

The BBC is making available the video sequences for use under the *Creative Commons Attribution-NonCommercial 3.0 licence*.

You are free to use, share (to copy, distribute and transmit) or remix (to adapt) the BBC video sequences, provided that:
- **No-commercial**- you may not use these video sequences for commercial purposes; and
- **Attribution**- you attribute the work to the BBC by indicating that the video sequences (or elements thereof) were produced by the BBC. Your attribution must not be in any way that suggests that the BBC endorses you or your use of the video sequences.

JCTVC-O0360 Proposed additional UHD test sequences [P. Philippe] [late]

This contribution presents 3840×2160 source material produced by the 4Ever project which will be available for non-commercial use, including HEVC testing and verification. The set consists of 2 sequences described hereunder.

Proposed test sequences and licensing statement are summarized below.

4Ever_Sedof		
	Resolution	3840x2180
	Bit depth	8 and 10 bits
	Color sampling	4:2:0
	Color space	YUV BT.709
	Frame rate	60p
	Duration	25s (1500 frames)
	Capture	Sony F65 Raw
	Processing	F65 Raw BT.709 Gamut

4Ever_Manege		
	Resolution	3840x2180
	Bit depth	8 and 10 bits
	Color sampling	4:2:0
	Color space	YUV BT.709
	Frame rate	60p
	Duration	12s (714 frames)
	Capture	Sony F65 Raw
	Processing	F65 Raw BT.709 Gamut
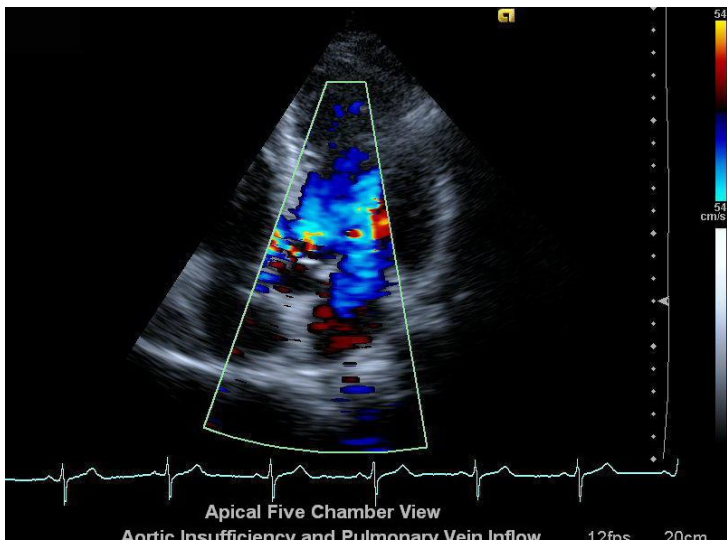
3 Medical content
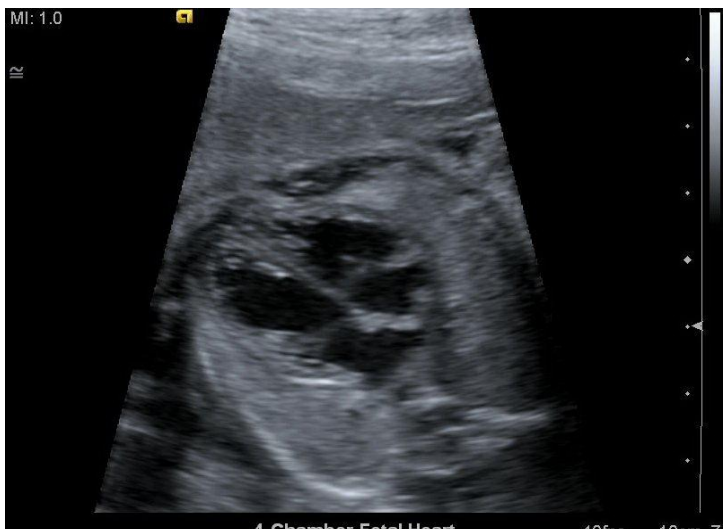
JCTVC-O0172 **AHG22: Sequences with medical mixed content and medical visual content with bit depth beyond 10 bits for HEVC development [P. Amon, A. Hutter, U.-E. Martin, B. Heigl (Siemens)]**
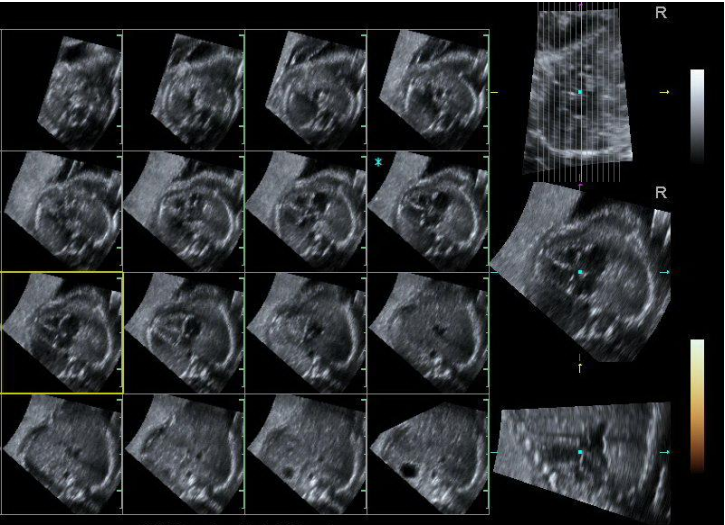
Medical test materials are proposed (same as JCTVC-N0179). The proposed set contains medical mixed content (i.e., 8-bit 2D+t RGB image data) and medical visual content with bit depth beyond 10 bits (i.e., 12-bit and 16-bit monochrome 3D volume image data).

Proposed test sequences and licensing statement are summarized below.
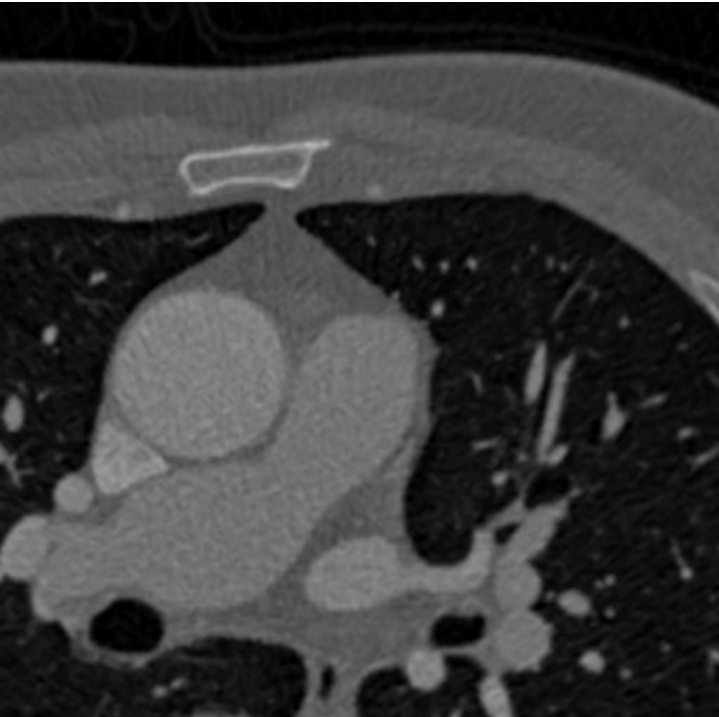
Medical mixed content:
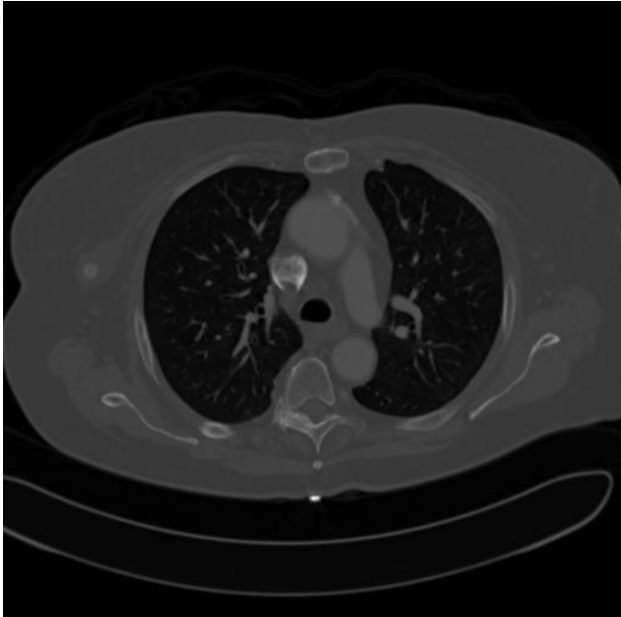
Doppler		
	Resolution	800x600
	Bit depth	8
	Color sampling	4:4:4
	Color space	RGB
	Frame rate	12p
	Duration	1s
	Capture	
	Processing	Ultrasonic image + screen content

FetalHeart		
	Resolution	800x600
	Bit depth	8
	Color sampling	4:4:4
	Color space	RGB
	Frame rate	40p
	Duration	2.25s (90 frames)
	Capture	
	Processing	Ultrasonic image + screen content

Date Saved: 2013-10-29
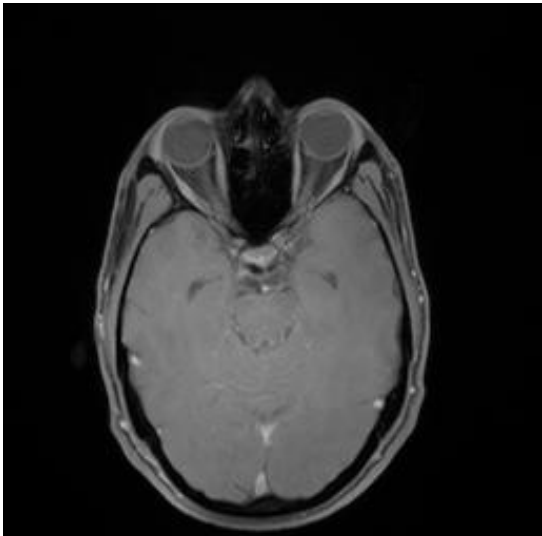
19Segments		
 20 Week - Fetal Heart	Resolution	800x600
	Bit depth	8
	Color sampling	4:4:4
	Color space	RGB
	Frame rate	30p
	Duration	3s
	Capture	
	Processing	Ultrasonic image + screen content
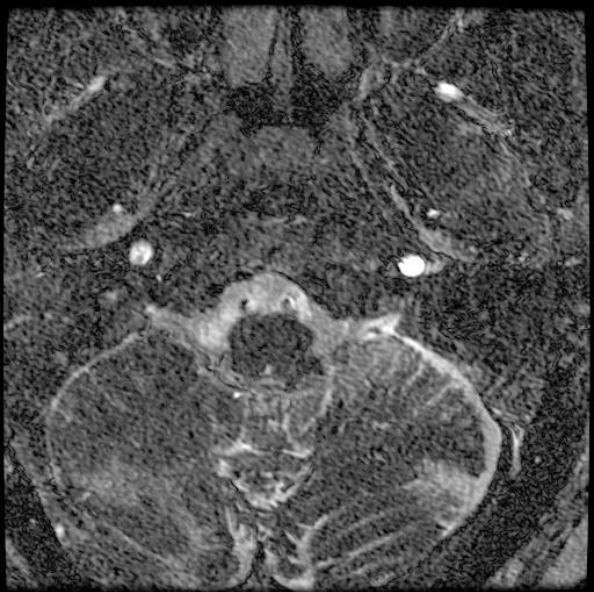
CT image:
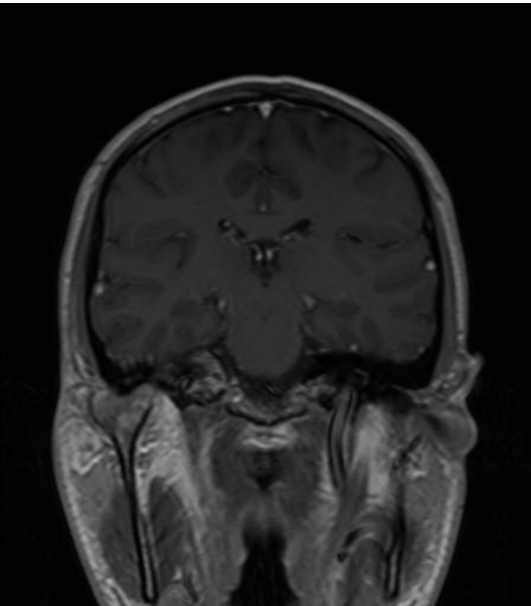
Cardiac		
	Resolution	512x512
	Bit depth	12
	Color sampling	4:0:0
	Color space	Monochrome
	Frame rate	N/A
	Duration	281 frames
	Capture	
	Processing	Computed tomography (CT) image, continuous-tone 3D image volumes

Longrun		
	Resolution	512x512
	Bit depth	12
	Color sampling	4:0:0
	Color space	Monochrome
	Frame rate	N/A
	Duration	1461 frames
	Capture	
	Processing	Computed tomography (CT) image, continuous-tone 3D image volumes

MR image:

MR Axial 1		
	Resolution	256x256
	Bit depth	16
	Color sampling	4:0:0
	Color space	Monochrome
	Frame rate	N/A
	Duration	42 frames
	Capture	
	Processing	Magnetic resonance (MR) image, continuous-tone 3D image volumes

MR Axial 2		
	Resolution	256x256
	Bit depth	16
	Color sampling	4:0:0
	Color space	Monochrome
	Frame rate	N/A
	Duration	13 frames
	Capture	
	Processing	Magnetic resonance (MR) image, continuous-tone 3D image volumes

MR_Coronal		
	Resolution	448x512
	Bit depth	16
	Color sampling	4:0:0
	Color space	Monochrome
	Frame rate	N/A
	Duration	45 frames
	Capture	
	Processing	Magnetic resonance (MR) image, continuous-tone 3D image volumes

AX image:

MR_Coronal		
	Resolution	1240x960
	Bit depth	16
	Color sampling	4:0:0
	Color space	Monochrome
	Frame rate	N/A
	Duration	496 frames
	Capture	
	Processing	Angiography (AX) image, continuous-tone 2D X-ray projections

Copyright information

JCTVC-O0354 Selected medical imaging sequences for HEVC development [Didier Nicholson, Piotr Pawałowski, Jean-Marie Moureaux]

Medical test materials are proposed. The proposed set contains 8-bit Y'CbCr 4:2:2 video content. The proposed sequences are related to surgery, an application identified as one of the most critical, as far as quality is concerned.

This contribution also proposes to consider to use PROMETEE for the visual quality assessment for medical video sequences quality assessement.

Proposed test sequences and licensing statement are summarized below.
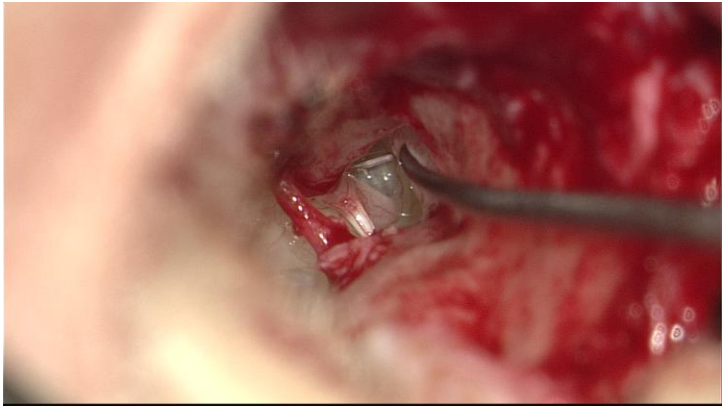
Video set #1 - Resection of the left uncinate process and discovery of the aspergilloma of the left maxillary sinus

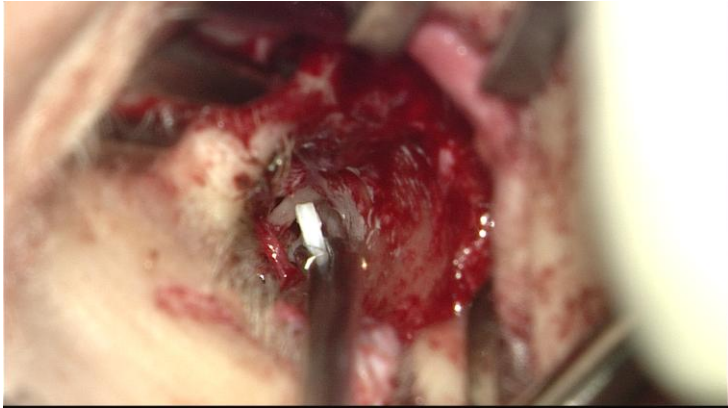| Seq1_1		
	Resolution	1920x1080
	Bit depth	8
	Color sampling	4:2:2
	Color space	YCbCr
	Frame rate	60p
	Duration	10s
	Capture	Stortz endoscopic camera
	Processing	Video was captured from a Storz endoscopic camera with S1 camera head and image control unit Image 1 HUB. Video were captured from the DVI output of the control unit. A VITEC HDMI2SDI Extensor converter converted DVI to 3G-SDI, and a BlueFish Supernova was used to capture and record video directly to disk.

Seq1_2		
	Resolution	1920x1080
	Bit depth	8
	Color sampling	4:2:2
	Color space	YCbCr
	Frame rate	60p
	Duration	10s
	Capture	Stortz endoscopic camera
	Processing	Video was captured from a Storz endoscopic camera with S1 camera head

	and image control unit Image 1 HUB. Video were captured from the DVI output of the control unit. A VITEC HDMI2SDI Extensor converter converted DVI to 3G-SDI, and a BlueFish Supernova was used to capture and record video directly to disk.

Video set #2 - video files were recorded during a single surgery, showing different steps of Stapedotomy in otosclerosis.

Capture0011		
	Resolution	1920x1080
	Bit depth	10
	Color sampling	4:2:2
	Color space	YCbCr
	Frame rate	25p
	Duration	45s to 1 min 47 s ?
	Capture	Stortz Image 1 HD
	Processing	Image was captured using Storz Image 1 HD. Video was acquired from the DVI-D output of the control unit of the microscope. The video format of the feed coming out of the unit was 1080p60. The signal was then put through a DVI-to-HDMI adapter and then through Gefen EXT HDMI1.3 3GSDI S scaler. The scaler was converting the signal to 1080i50, however the actual content was PsF. Such signal was conveyed through SDI to the BlackMagic HyperDeck Shuttle video recorder containing a SSD. The

		saved file is progressive 1080p25.

Capture0013		
	Resolution	1920x1080
	Bit depth	10
	Color sampling	4:2:2
	Color space	YCbCr
	Frame rate	25p
	Duration	45s to 1 min 47 s ?
	Capture	Stortz Image 1 HD
	Processing	Image was captured using Storz Image 1 HD. Video was acquired from the DVI-D output of the control unit of the microscope. The video format of the feed coming out of the unit was 1080p60. The signal was then put through a DVI-to-HDMI adapter and then through Gefen EXT HDMI1.3 3GSDI S scaler. The scaler was converting the signal to 1080i50, however the actual content was PsF. Such signal was conveyed through SDI to the BlackMagic HyperDeck Shuttle video recorder containing a SSD. The saved file is progressive 1080p25.

Capture0016		
	Resolution	1920x1080
	Bit depth	10
	Color sampling	4:2:2
	Color space	YCbCr
	Frame rate	25p
	Duration	45s to 1 min 47 s ?
	Capture	Stortz Image 1 HD
	Processing	Image was captured using Storz Image 1 HD. Video was acquired from the DVI-D output of the control unit of the microscope. The video format of the feed coming out of the unit was 1080p60. The signal was then put through a DVI-to-HDMI adapter and then through Gefen EXT HDMI1.3 3GSDI S scaler. The scaler was converting the signal to 1080i50, however the actual content was PsF. Such signal was conveyed through SDI to the BlackMagic HyperDeck Shuttle video recorder containing a SSD. The saved file is progressive 1080p25.

Copyright information

Date Saved: 2013-10-29

CRAN – Universite de Lorraine remain the owners of the test sequences and any and all intellectual property rights and/or copyrights therein. The test sequence may only be used for the purposes of development of the standards currently contemplated by this Joint Collaborative Team. The test sequence may not be copied or distributed against payment of royalties. CRAN – Universite de Lorraine 's liability with respect to the test sequences is excluded to the widest possible extent. This includes but is not limited to any liability for Siemens AG's ownership of the test sequences and/or any and all intellectual property rights and/or copyrights, as well as any liability for the infringement of third party intellectual property rights and/or copyrights. Furthermore, CRAN – Universite de Lorraine make no warranties whatsoever with regard to the test sequences' fitness for any purpose.
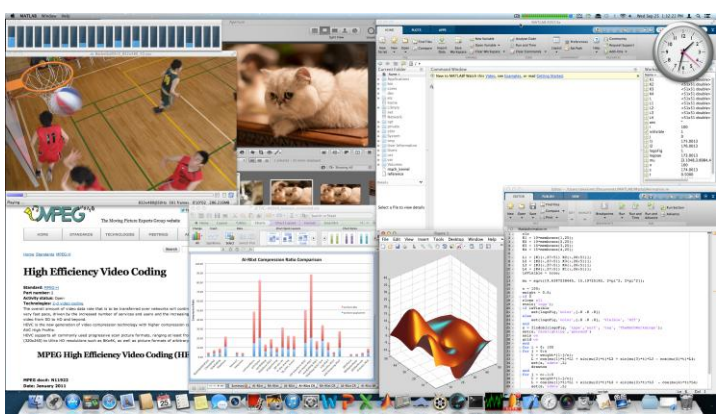

PSNC (Poznań Supercomputing and Networking Center)

CRAN (Centre de Recherche en Automatique de Nancy) – Universite de Lorraine.
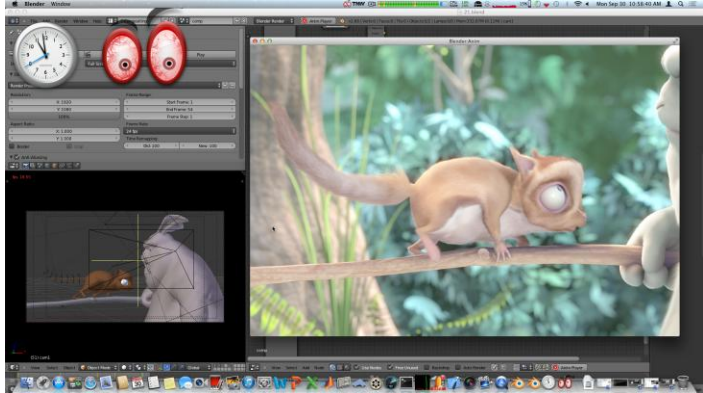
4   Screen content

JCTVC-O0222 New test sequences for Screen Content coding [Alexis Tourapis, David Singer, Krasimir Kolarov (Apple)] [late]
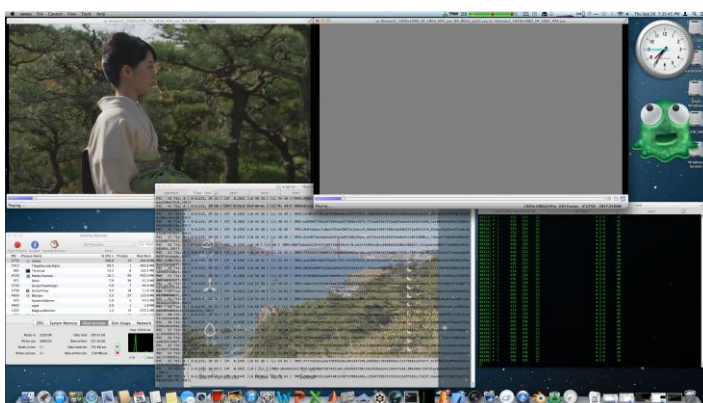
This contribution proposes several new 4:4:4 screen content sequences. The primary application represented by these sequences is mixed video/graphics content and screen sharing. The sequences included are at either 1920x1080 or at 2560x1440 resolution and all have been captured at 60fps and in the RGB format (8 bits).

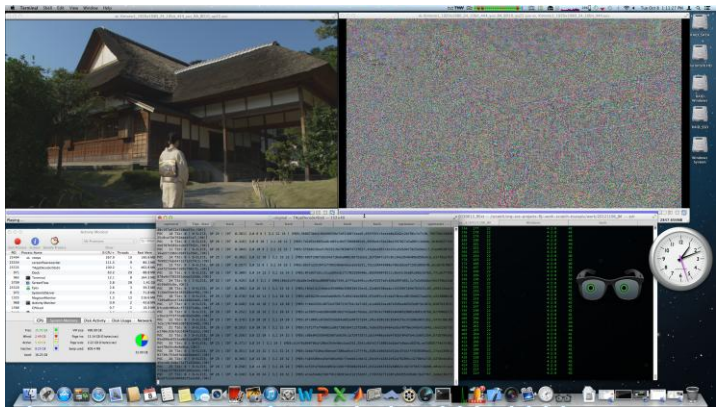Proposed test sequences and licensing statement are summarized below.

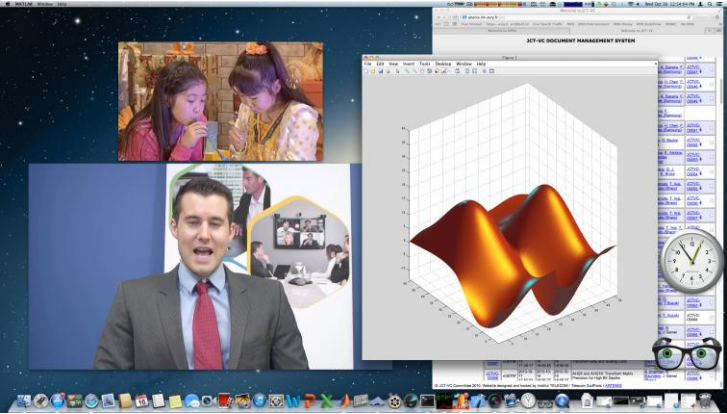| Basketball_Screen		
	Resolution	2560x1440
	Bit depth	8
	Color sampling	4:4:4
	Color space	RGB
	Frame rate	60p
	Duration	10s
	Capture	
	Comments	a mixture of live video content at 50Hz, mixed with a variety of moving and still graphics and text content at 60Hz. Moving graphics include a moving clock, an animated 3D Matlab figure, and system utilization plots among others. The original video content, without compression, but with

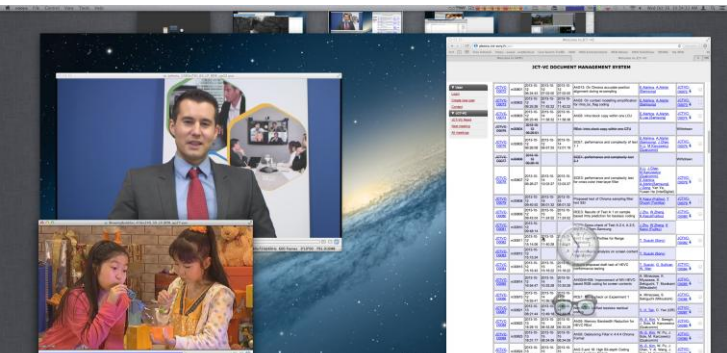| some scaling and frame replication to 60Hz, was used for this particular video sequence. |
|---|

BigBuckBunny		
	Resolution	2560x1440
	Bit depth	8
	Color sampling	4:4:4
	Color space	RGB
	Frame rate	60p
	Duration	10s
	Capture	
	Comments	the un-rendered model and the final rendering within Blender of one segment from the Big Buck Bunny Open Movie. Both un-rendered and rendered versions are in motion, while also the sequence includes additional graphics elements that are in motion. The Blender sequence is in reality a 24Hz sequence.

KimonoError1		
	Resolution	2560x1440
	Bit depth	8
	Color sampling	4:4:4
	Color space	RGB
	Frame rate	60p
	Duration	10s
	Capture	
	Comments	a compressed and scaled version of the Kimono video sequence is presented, as well as its residual error versus the

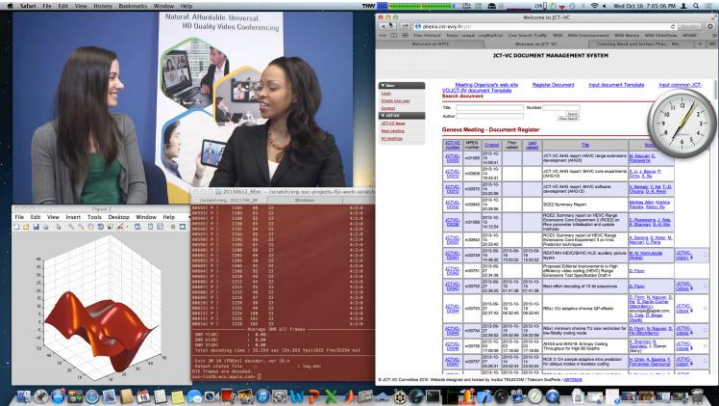|	
	original uncompressed sequence. It should be noted that the Kimono sequence is a 24Hz. The presentation of the residual signal is done in real-time using the Vooya player. Additional moving elements include scrolling text, as well as window resizing among others.

KimonoError2		
	Resolution	2560x1440
	Bit depth	8
	Color sampling	4:4:4
	Color space	RGB
	Frame rate	60p
	Duration	10s
	Capture	
	Comments	a variant of the previous clip, where though the contrast of the residual image has been increased so as to emphasize the differences between the compressed and original versions of the Kimono sequences. Other elements remain similar within the sequence.

MissionControlClip1		
	Resolution	2560x1440
	Bit depth	8
	Color sampling	4:4:4
	Color space	RGB
	Frame rate	60p
	Duration	10s
	Capture	
	Comments	emulates the presence of a video conferencing screen session with the inclusion of two video conference like clips (pre-compressed and scaled), in addition to moving graphics and scrolling text. The clips BlowingBubbles_416x240_50.yuv and Johnny_1280x720_60.yuv were used for the generation of the compressed video content [1]. The clip includes a MissionControl transition and desktop object rearrangements.

MissionControlClip2		
	Resolution	2560x1440
	Bit depth	8
	Color sampling	4:4:4
	Color space	RGB
	Frame rate	60p
	Duration	10s
	Capture	

---

[1] All compression was performed using the HEVC standard and the HM software.

	MissionControlClip3	
	Resolution	1920x1080
	Bit depth	8
	Color sampling	4:4:4
	Color space	RGB
	Frame rate	60p
	Duration	10s
	Capture	
	Comments	includes the video sequence KristenAndSara_1280x720_60.yuv (again pre-compressed and scaled) and similar graphics information, and is of lower resolution. Scrolling text is also present in the video sequence, in addition to a particular Mac OS X transition effect.

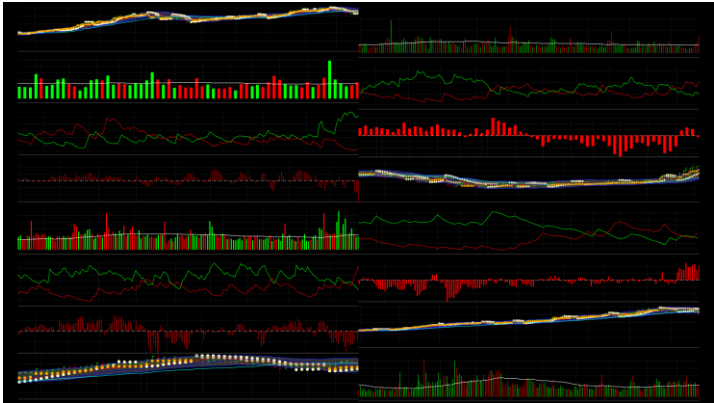**Copyright information**
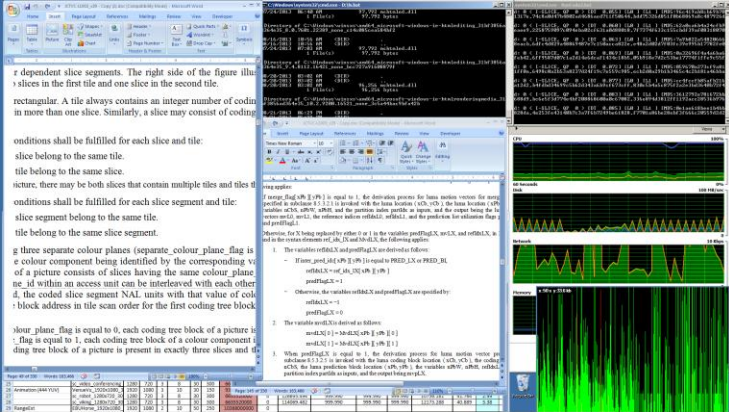
JCTVC-O0256 AHG8: New 4:4:4 test sequences with screen content [H. Yu, W. Wang, X. Wang, J. Ye, Z. Ma (Huawei)]
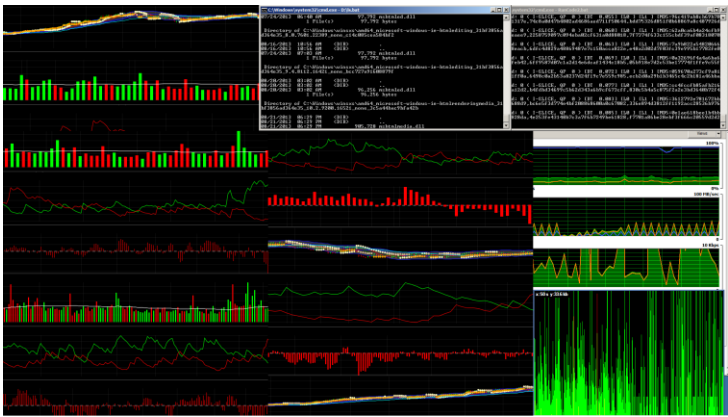
This contribution proposes several new 4:4:4 screen content sequences. The primary application represented by these sequences is mixed video/graphics content and screen sharing. The sequences

included are at either 1920x1080 or at 2560x1440 resolution and all have been captured at 60fps and in the RGB format (8 bits). The original RGB sequences as well as their YUV version, color format conversion information, and copyright statement, have been uploaded to the folder /testsequences/FrExt-candidate-sequences/screen_content at ftp.tnt.uni-hannover.de.

Proposed test sequences and licensing statement are summarized below.

Sc_flyingGraphics		
	Resolution	1920x1080
	Bit depth	8
	Color sampling	4:4:4
	Color space	RGB & YUV
	Frame rate	60p
	Duration	
	Capture	produced by saving the desktop pixel data from memory directly to a file
	Comments	These new sequences have typical characteristics of screen content such as high contrast, moving texts, moving graphics, switching windows, mixture of computer generated graphics and nature video and etc.

Sc_desktop		
	Resolution	1920x1080
	Bit depth	8
	Color sampling	4:4:4
	Color space	RGB & YUV
	Frame rate	60p
	Duration	
	Capture	produced by saving the desktop pixel data from memory directly to a file
	Comments	These new sequences have typical

Date Saved: 2013-10-29

	characteristics of screen content such as high contrast, moving texts, moving graphics, switching windows, mixture of computer generated graphics and nature video and etc.

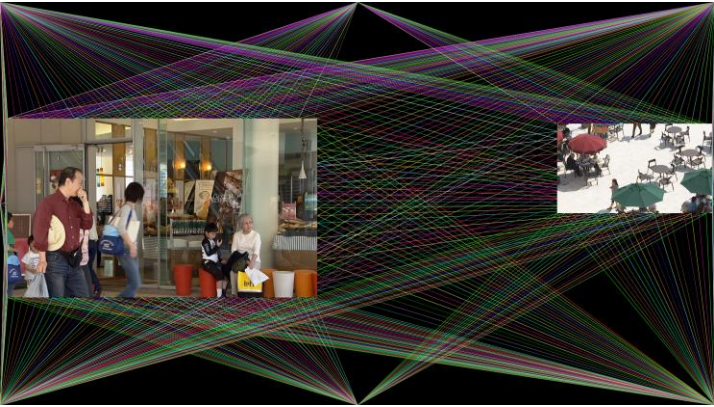| Sc_realtimeData		
	Resolution	1920x1080
	Bit depth	8
	Color sampling	4:4:4
	Color space	RGB & YUV
	Frame rate	60p
	Duration	
	Capture	produced by saving the desktop pixel data from memory directly to a file
	Comments	These new sequences have typical characteristics of screen content such as high contrast, moving texts, moving graphics, switching windows, mixture of computer generated graphics and nature video and etc.

Sc_console		
	Resolution	1920x1080
	Bit depth	8
	Color sampling	4:4:4
	Color space	RGB & YUV
	Frame rate	60p
	Duration	
	Capture	produced by saving the desktop pixel data from memory directly to a file

Comments	These new sequences have typical characteristics of screen content such as high contrast, moving texts, moving graphics, switching windows, mixture of computer generated graphics and nature video and etc.

Sc_videoTesting		
	Resolution	1920x1080
	Bit depth	8
	Color sampling	4:4:4
	Color space	RGB & YUV
	Frame rate	60p
	Duration	
	Capture	produced by saving the desktop pixel data from memory directly to a file
	Comments	These new sequences have typical characteristics of screen content such as high contrast, moving texts, moving graphics, switching windows, mixture of computer generated graphics and nature video and etc.

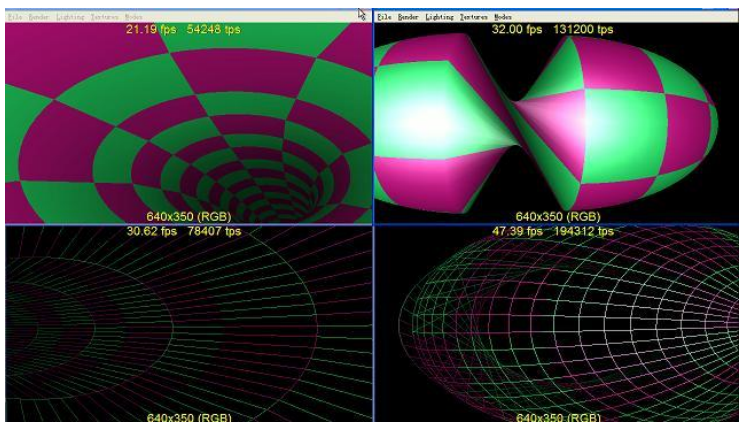| Sc_socialNetworkMap	
Resolution	1920x1080
Bit depth	8
Color sampling	4:4:4
Color space	RGB & YUV
Frame rate	60p
Duration	
Capture	produced by saving the desktop pixel data from memory directly to a file
Comments	These new sequences have typical characteristics of screen content such as high contrast, moving texts, moving graphics, switching windows, mixture of computer generated graphics and nature video and etc.

Copyright information

The test sequences and all intellectual property rights therein remain the property of their respective copyright holders. This material can only be used for the purpose of academic research and development of standards. This material cannot be distributed with charge. The owner makes no warranties with respect to the material and expressly disclaims any warranties regarding its fitness for any purpose.

Owners of these sequences: Huawei Technologies

Production: Huawei Technologies

JCTVC-O0268 AhG8: New 4:4:4 screen content test sequence [Tao Lin, Kailun Zhou (Tongji Univ.)]

This contribution proposes one RGB screen content video sequence. Proposed test sequence and licensing statement are summarized below.

sc_cg2twist_tunnel	
	Resolution	1280x720
	Bit depth	8
	Color sampling	4:4:4
	Color space	RGB
	Frame rate	30p
	Duration	10s
	Capture	captured from a computer graphics card HDMI output
	Comments	Feature of the test sequence: • Typical 3D computer graphics • Fast spinning twist • Fast moving tunnel • Texture-mapped • Light-shaded using Gouraud shading • Underneath wireframe rendering • Perspective-corrected • Specular highlights enabled

Conditions of Use – Copyright and Release Notes

The sequence has been generated by Tongji University, and all intellectual property rights remain with Tongji University. The material shall be used for research, development, experiment, publication, and demo of video coding technologies purposes only under the following conditions of use: 1) do not alter any picture of the test sequences except to resize it; 2) do not use only portions of any picture; 3) any publication or demo using the test sequence must mention or display the acknowledgement of "by courtesy of Tongji University".

This copyright and permission notice shall be duplicated whenever the data are copied or distributed.

The material cannot be distributed with charge. Tongji University makes no warranties with respect to the material and expressly disclaims any warranties regarding its fitness for any purpose. Unless the above conditions are agreed to by the recipient, no permission is granted for any use, copying, modification, and distribution of the data. By using the sequence the user agrees to the conditions of this copyright and disclaimer

Date Saved: 2013-10-29

5 Coding performance analysis

[JCTVC-O0258](#) AHG8: Results from coding 4:4:4 screen content sequences [H. Yu, Z. Ma, J. Ye, X. Wang, W. Wang (Huawei)] [late]

This contribution presents the latest investigation results on screen content coding. In the investigation, the coding performance of HM12.0_RExt4.1 was studied and evaluated against the coding results from some modified versions of HM12.0_RExt4.1 where additional coding tools had been added to the base software. Based on the outcome of our investigation, this contribution suggests further development of HEVC extensions for coding screen content.