HQV Benchmark Version 2.0 score card

Standard Definition (NTSC)

Setup

Before you begin your test, make sure to set your equipment per the table below in order to test the appropriate component in your video system.

I want to test:	Blu-ray Disc player should be set to:
The video processor in the TV	1080i noise reduction OFF
The Blu-ray Disc player	1080p noise reduction ON

Remember: **p** (progressive) to test the player and **i** (interlaced to test the image on the TV.

About the Performance Evaluations

The HQV Benchmark 2.0 has expanded into 4 classes of tests to include additional video and image processing functions. The Adaptive Enhancement section is optional as some products do not include these features.

HD test and scoring description

Circle your score

Test Class 1. Video Conversion

The Video Conversion section has a total of 90 points for scoring performance.

Chapter 1. Video Resolution

Dial (Score either 5, 4, 2 or 0)	
Dial arm is smooth without artifacts above 5 degrees	**5**
Dial arm is smooth without artifacts above 10 degrees	**4**
Dial arm is smooth without artifacts above 20 degrees	**2**
Artifacts above 30 degrees	**0**
Dial with Static Pattern (Score either 5, 2 or 0)	
Mesh is stable and dial quality is as before. There may be a small halo around dial on the mesh.	**5**
Mesh is stable but some degradation of the dial or noticeable artifacts around the dial on the mesh	**2**
Mesh is flickering or dial quality has degraded	**0**
Gray Bars (Score either 5, 3, 2, 1 or 0)	
No artifacts on all gradients and all bars	**5**
Artifacts only on darkest bars	**3**
Artifacts on second darkest bars	**2**
Artifacts on third gradient level bars	**1**
Artifacts on brightness gradient levels	**0**
Flag (Score either 5, 3 or 0)	
No artifacts on edges and strips on the flag	**5**
Occasional stair stepping artifacts on the edges and strips on the flag	**3**
Noticeable stair stepping artifacts on the edges and strips on the flag	**0**

Chapter 2. Film Resolution

Stadium 2:2 (Score either 5, 3 or 0)	
No moiré pattern observed in stands within less than 1/2 second	**5**
No moiré pattern observed in stands within less than 1 second	**3**
Moiré pattern observed in stands intermittently or constantly through the clip	**0**
Stadium 3:2 (Score either 5, 3 or 0)	
No moiré pattern observed in stands within less than 1/2 second	**5**
No moiré pattern observed in stands within less than 1 second	**3**
Moiré pattern observed in stands intermittently or constantly through the clip	**0**

HD test and scoring description (cont.)

Circle your score

Chapter 3. Overlay on Film

Horizontal Text Scroll (Score either 5, 3 or 0)

No flickering artifacts on the text or stair stepping artifacts can be observed in the strings	**5**
Some flickering artifacts on the text or stair stepping artifacts can be observed in the strings during initial start of text scroll	**3**
Flickering artifacts on the text or stair stepping artifacts can be observed in the strings during most of the clip	**0**

Vertical Text Scroll (Score either 5, 3 or 0)

No flickering artifacts on the text or stair stepping artifacts can be observed in the strings	**5**
Some flickering artifacts on the text or stair stepping artifacts can be observed in the strings during initial start of text scroll	**3**
Flickering artifacts on the text or stair stepping artifacts can be observed in the strings during most of the clip	**0**

Chapter 4. Response Time

In order to receive the indicated points, the system must lock at all three speeds of the test within the specified time.

Transition

3:2 Lock (Score either 5, 2 or 0)

Take less than 1/2 second to transition from 2:2 to 3:2	**5**
Takes more than 1/2 second to transition from 2:2 to 3:2	**2**
Takes more than one second to transition from 2:2 to 3:2	**0**

2:2 Lock (Score either 5, 2 or 0)

Take less than 1/2 second to transition from 3:2 to 2:2	**5**
Takes more than 1/2 second to transition from 3:2 to 2:2	**2**
Takes more than one second to transition from 3:2 to 2:2	**0**

Chapter 5. Multi-Cadence

The 2:2 and 3:2 clips are not scored as they are separately included in another section.

2:2:2:4 24 FPS DVCAM Video (Score either 5, 3 or 0)

No shimmering seen on the cup lines or shredding in the newspapers. The rectangular indicator lines are stable within 1/2 second.	**5**
No shimmering seen on the cup lines or shredding in the newspapers. The rectangular indicator lines are stable within 1 second.	**3**
Shimmering can be seen on the cup lines or shredding in the newspapers. The rectangular indicator lines are flickers constantly or intermittently during the test.	**0**

2:3:3:2 24 FPS DVCAM Video (Score either 5, 3 or 0)

No shimmering seen on the cup lines or shredding in the newspapers. The rectangular indicator lines are stable within 1/2 second.	**5**
No shimmering seen on the cup lines or shredding in the newspapers. The rectangular indicator lines are stable within 1 second.	**3**
Shimmering can be seen on the cup lines or shredding in the newspapers. The rectangular indicator lines are flickers constantly or intermittently during the test.	**0**

3:2:3:2:2 24 FPS Vari-speed (Score either 5, 3 or 0)

No shimmering seen on the cup lines or shredding in the newspapers. The rectangular indicator lines are stable within 1/2 second.	**5**
No shimmering seen on the cup lines or shredding in the newspapers. The rectangular indicator lines are stable within 1 second.	**3**
Shimmering can be seen on the cup lines or shredding in the newspapers. The rectangular indicator lines are flickers constantly or intermittently during the test.	**0**

5:5 12 FPS Animation (Score either 5, 3 or 0)

No shimmering seen on the cup lines or shredding in the newspapers. The rectangular indicator lines are stable within 1/2 second.	**5**
No shimmering seen on the cup lines or shredding in the newspapers. The rectangular indicator lines are stable within 1 second.	**3**
Shimmering can be seen on the cup lines or shredding in the newspapers. The rectangular indicator lines are flickers constantly or intermittently during the test.	**0**

HD test and scoring description (cont.)

Circle your score

6:4 12 FPS Animation (Score either 5, 3 or 0)

No shimmering seen on the cup lines or shredding in the newspapers. The rectangular indicator lines are stable within 1/2 second.	**5**
No shimmering seen on the cup lines or shredding in the newspapers. The rectangular indicator lines are stable within 1 second.	**3**
Shimmering can be seen on the cup lines or shredding in the newspapers. The rectangular indicator lines are flickers constantly or intermittently during the test.	**0**

8:7 8 FPS Animation (Score either 5, 3 or 0)

No shimmering seen on the cup lines or shredding in the newspapers. The rectangular indicator lines are stable within 1/2 second.	**5**
No shimmering seen on the cup lines or shredding in the newspapers. The rectangular indicator lines are stable within 1 second.	**3**
Shimmering can be seen on the cup lines or shredding in the newspapers. The rectangular indicator lines are flickers constantly or intermittently during the test.	**0**

Chapter 6. Color Upsampling Errors

Interlace Chroma Problem (ICP) (Score either 5, 2 or 0)

No visible color lines can be observed in the dark region around the color bars of patch. The color bars should be smooth.	**5**
Very faint color lines can be observed in the dark region around the color bars of patch. The color bars have some mild stair stepping.	**2**
Highly observable color lines in the dark region around the color bars of patch and within the color bars	**0**

Red Flower – ICP

The red flower provides a natural image to view the artifact. The artifact can be observed around the outer leaf edge.

Chroma Upsampling Error (CUE) – Film (Score either 5, 2 or 0)

No visible color lines can be observed in the dark region around the color bars of patch. The color bars should be smooth.	**5**
Very faint color lines can be observed in the dark region around the color bars of patch. The color bars have some mild stair stepping.	**2**
Highly observable color lines in the dark region around the color bars of patch and within the color bars	**0**

Red Flower – CUE

The red flower provides a natural image to view the artifact. The artifact can be observed around the outer leaf edge.

Total score for section 1:

Test Class 2. Noise and Artifact Reduction

The Noise and Artifact Reduction test section has a total of 60 points for scoring performance.

Chapter 1. Random Noise

Random noise can originate in source content such as image sensor noise and film grain noise or is created during signal transmission and processing. The noise characteristic can vary in size and strength. These sequences evaluate the temporal noise reduction of the video processor.

Clouds (Score either 5, 2 or 0)

This test is for low to medium setting

Noise well reduced and details not softened or smeared	**5**
Noise lightly reduced and details not softened or smeared	**2**
Noise not reduced or details softened or smeared	**0**

Trees at Sunset (Score either 5, 2 or 0)

This test is for medium to high setting

Noise well reduced and details not softened or smeared	**5**
Noise lightly reduced and details not softened or smeared	**2**
Noise not reduced or details softened or smeared	**0**

Yellow Rose (Score either 5, 2 or 0)

This test is for low to medium setting

Noise well reduced and details not softened or smeared	**5**
Noise lightly reduced and details not softened or smeared	**2**
Noise not reduced or details softened or smeared	**0**

HD test and scoring description (cont.)

Circle your score

Roller Coaster and River Boat (Score either 5, 2 or 0)
This test is for low to medium setting

Noise well reduced and details not softened or smeared	**5**
Noise lightly reduced and details not softened or smeared	**2**
Noise not reduced or details softened or smeared	**0**

Chapter 2. Compression Artifacts

Scrolling Text (Score either 5, 3 or 0)

Noise around the edge of the characters is significantly reduced and the characters are not softened. As well, the blocks in the background are softened and not distinct.	**5**
Noise between the characters is substantially (not fully) reduced around the edge of the characters. As well, the blocks in the background are softened and not distinct.	**3**
No noise is reduced around the characters or in the background	**0**

Roller Coaster (Score either 5, 3 or 0)

Noise around the edge of the structures and coaster are significantly reduced and blocks in the sky are softened and not distinct without loss of detail	**5**
Noise around the edge of the structures and coaster and blocks in the sky are reduced but not fully	**3**
No noise is reduced around objects or details are smeared or softened	**0**

Ferris Wheel (Score either 5, 3 or 0)

Noise around the edge of the structures and coaster are significantly reduced and blocks in the sky are softened and not distinct. No detail is lost.	**5**
Noise around the edge of the structures and coaster and blocks in the sky are reduced but not fully	**3**
No noise is reduced around objects or details are smeared or softened	**0**

Bridge Traffic (Score either 5, 3 or 0)

Noise around the edge of the bridge and cars are significantly reduced and without loss of detail in either the road, structure, or vegetation	**5**
Noise around the edge of the bridge and cars are somewhat reduced but not fully or some loss of detail in either the road, structures, or vegetation	**3**
No noise is reduced around objects or details are smeared or softened	**0**

Chapter 3. Upscaled Compression Artifacts

With increasing viewing of internet video content on large screen HD displays, the poor quality of low bandwidth video is more distracting and objectionable due to scaled up compression artifacts. It is highly desirable to reduce these artifacts so that the content can be better enjoyed. These sequences are used to evaluate the noise reducer's ability to process upscaled images. The sequences are SD resolution compressed at 2 Mbits and then upscaled to 1080P. As the images are scaled up, the noise artifacts are much larger and more visible requiring the noise reducer to detect and process a larger area. The results should be similar to the native HD sequences although softer. The noise reducer may need to be set at the higher settings to be effective.

Text Pattern (Score either 5, 3 or 0)

Noise around the edge of the characters is significantly reduced and the characters are not softened. As well, the blocks in the background are softened and not distinct.	**5**
Noise between the characters is substantially (not fully) reduced around the edge of the characters. As well, the blocks in the background are softened and not distinct.	**3**
No noise is reduced around the characters or in the background	**0**

Roller Coaster (Score either 5, 3 or 0)

Noise around the edge of the structures and coaster are significantly reduced and blocks in the sky are softened and not distinct without loss of detail	**5**
Noise around the edge of the structures and coaster and blocks in the sky are reduced but not fully	**3**
No noise is reduced around objects or details are smeared or softened	**0**

Ferris Wheel (Score either 5, 3 or 0)

Noise around the edge of the structures and coaster are significantly reduced and blocks in the sky are softened and not distinct. No detail is lost.	**5**
Noise around the edge of the structures and coaster and blocks in the sky are reduced but not fully	**3**
No noise is reduced around objects or details are smeared or softened	**0**

HD test and scoring description (cont.)

Circle your score

Bridge (Score either 5, 3 or 0)

Noise around the edge of the bridge and cars are significantly reduced and without loss of detail in either the road, structure, or vegetation	**5**
Noise around the edge of the bridge and cars are somewhat reduced but not fully or some loss of detail in either the road, structures, or vegetation	**3**
No noise is reduced around objects or details are smeared or softened	**0**

Total score for section 2:

Test Class 3. Image Scaling and Enhancements

The image scaling and enhancement section has a total of 30 points for scoring performance.

Chapter 1. Scaling and Filtering

Luminance Frequency Bands (Score either 5, 2 or 0)

Uniform and full amplitude on all bands and without ringing or ghosting of the lines outside the pattern	**5**
Some non-uniform or attenuation only on the highest band or mild faint ringing or ghosting	**2**
Some non-uniformity or attenuation on any bands or heavy ringing or ghosting	**0**

Chrominance Frequency Bands (Score either 5, 2 or 0)

Uniform and full amplitude on all bands and without ringing or ghosting of the lines outside the pattern	**5**
Some non-uniform or attenuation only on the highest band or mild faint ringing or ghosting	**2**
Some non-uniformity or attenuation on any bands or heavy ringing or ghosting	**0**

Vanishing Text (Score either 5, 2 or 0)

Outlines around the characters are smooth without any striping or stepping artifacts	**5**
Slight striping or stair stepping on the edge of the characters or ringing artifacts around the characters	**2**
Noticeable striping or stair stepping on the edge of the characters or ringing artifacts around the characters	**0**

Chapter 2. Resolution Enhancement

Video content may be of low resolution or low detail or may have been upsampled from lower resolution sources. Content of this nature would appear soft. Even high resolution images may look soft when captured with low quality optics and sensors or when they have been filtered. Image detail can be enhanced by such techniques as sharpening, transition enhancement, unsharp mask, and local contrast enhancement. These techniques can provide benefits but may have visual artifacts. These test sequences assess how well the technology works and in adapting to content of varying quality.

Brook, Mountain, Time Elapsed Flower, Red Hair, Wood Grain, Bridge (Score either 15, 10, 5 or 0)

The score is based on evaluating sequence of images. Note that fine detail would not be observable on small screens or displays that are not full HD resolution.

Fine details are more distinct and 3 dimensional. No bright or dark outlines are introduced around characters or objects.	**15**
Fine details are more distinct and 3 dimensional. Some bright or dark outlines are introduced around characters or objects.	**10**
Fine details are more distinct and 3 dimensional but mild bright or dark outlines appear around characters and objects	**5**
No enhancement of detail was observed or the enhancement looks course and artificial	**0**

Total score for section 3:

HD test and scoring description (cont.)

Circle your score

Test Class 4. Adaptive Processing

The adaptive processing section has a total of 30 points for scoring performance.

Chapter 1. Contrast Enhancement

Theme Park (Score either 5, 2 or 0)	
The overall image contrast expanded without loss of detail in the white or dark regions	**5**
The overall image contrast expanded with slight loss of detail in the white or dark regions	**2**
The overall image contrast expanded with moderate to high loss of detail in the white or dark regions	**0**
Driftwood (Score either 5, 2 or 0)	
The overall image contrast is expanded without loss of detail in the white or dark regions	**5**
The overall image contrast is expanded with slight loss of detail in the white or dark regions	**2**
The overall image contrast is expanded with moderate to high loss of detail in the white or dark regions	**0**
Beach at Dusk (Score either 5, 2 or 0)	
The darker beach and vegetation area has more detail without increasing overall brightness or loss of detail in the bright regions	**5**
The darker beach and vegetation area has more detail but overall brightness increased or some loss of detail in the bright regions	**2**
Overall contrast increased but with loss of detail in dark and bright area	**0**
White and Black Cats (Score either 5, 2 or 0)	
Overall contrast is reduced so more detail is visible in the bright and dark areas	**5**
Detail is improved on either one of the dark or bright area without loss of detail in the other area	**2**
Overall contrast remains the same or is increased and detail is loss in either the bright or dark areas	**0**

Chapter 2. Skin Tone Correction

Skin tones (Score either 10, 7, 3 or 0)	
The off hue skin tone appears substantially closer to the original skin tone and does not affect other colors	**10**
The off hue skin tone is somewhat corrected but hue differences are still discernable. Others colors are not affected.	**7**
The off hue skin tones are somewhat corrected but hue differences are still discernable. Affects other colors.	**3**
No improvement can be observed	**0**

Total score for section 4:

TOTAL (Maximum score: 210)