

# Spears & Munsil Ultra HD Benchmark (2023) 【Disk1】

## Configuration: Dolby Vision (Default)

Dolby Vision (Analysis)

Perceptual

Absolute

Relative

## Configuration: HDR10+

### Configuration: HDR10

Peak Luminance (cd/m<sup>2</sup>)

350

600

1000

2,000

4000

10,000

## Audio Format (A/V Sync):

Dolby Atmos

Dolby TrueHD

DTS:X

DTS-HD MA

## Video Setup: Baseline

Brightness

Contrast

Color and Tint

Sharpness

Color Temp

Framing

Bias Light

Color Space Evaluation

Color Space Evaluation HFR

Color Space Evaluation HD

## Video Setup: Optical Comparator

Fixed

Red

Green

Blue

10%

20%

30%

40%

50%

60%

70%

80%

90%

## A/V Sync

Framerate  
23.976  
59.94

Resolution  
HD  
Ultra HD

Continuous  
Side-to-Side  
Sync-One2 Calibration  
Sync-One2

## Advanced Video: Evaluation

Dynamic Range High  
Dynamic Range Low  
Scaling  
Scaling HD  
Scaling 2.39:1  
Scaling 2.39:1 HD  
EOTF ST2084  
EOTF Combined  
Image Cropping  
Geometry  
1:1 Pixel Horizontal  
1:1 Pixel Vertical  
1:3 Pixel Diamond  
Single Pixel Checkerboard  
Variable Checkerboard  
Variable Checkerboard (Alt)  
Dots Black  
Dots White

## Advanced Video: Evaluation Color

Dynamic Range High Red  
Dynamic Range High Green  
Dynamic Range High Blue  
Dynamic Range Low Red  
Dynamic Range Low Green  
Dynamic Range Low Blue  
Clipping (cd/m<sup>2</sup>)  
Clipping (Code Value)  
Hue Shift  
HSV Sweep BT.709|BT.2020  
HSV Sweep P3D65|BT.2020  
HSV Sweep BT.2020  
Color and Tint Red  
Color and Tint Green  
Color and Tint Blue  
HDR Color Bars

Color Bars  
Tartan Bars  
Chroma Alignment  
Chroma Align (Num)  
Chroma Align (Num) HD  
Chroma Upsampling Eval  
Variable Checkerboard  
Variable Checkerboard (Alt)  
Zone Plate  
Monotonicity YCbCr  
Monotonicity RGB

### **Advanced Video: Ramps**

Gamut  
P3D65|BT.2020  
BT.2020

Ramp  
Stimulus  
Stimulus Steps  
White  
Red  
Green  
Blue  
Cyan  
Magenta  
Yellow

Saturation  
Saturation Steps  
Red  
Green  
Blue  
Cyan  
Magenta  
Yellow

Tone Mapping  
White

### **Advanced Video: Resolution**

Resolution  
Multiburst  
Wedge  
Zone Plate  
Luma:  
Non-Linear                      Linear ST 2086  
  
Chroma (64):                      Chroma (502):  
Chroma                                      Chroma

Chroma Crossed  
Crossed  
Cb  
Cr

Chroma Crossed  
  
Cb  
Cr

RGB Legal:

Cb  
Red  
Blue  
Magenta

Cr  
Green  
Cyan  
Yellow

### Advanced Video: Aspect Ratio

1.33:1  
1.43:1  
1.67:1  
1.78:1  
1.85:1  
1.896:1  
2:1  
2.2:1  
2.35:1  
2.39:1  
2.55:1  
2.76:1

### Advanced Video: Panel

Pixel Aging  
Peak Luminance  
Luminance Loading  
FALD Zone Counter  
Dynamic Contrast  
Spatio-Temporal Noise  
Starfield Low  
Starfield Medium  
Viewing Angle  
Viewing Angle Dots  
Large-area Uniformity 0%  
Large-area Uniformity 100%

### Advanced Video: Contrast Ratio

Simultaneous (0 / 20 cd/m<sup>2</sup>):  
Alignment  
4x4 Checkboard  
4x4 Checkboard (Alt)

### Simultaneous (0 / 10K cd/m<sup>2</sup>):

Alignment  
4x4 Checkerboard  
4x4 Checkerboard (Alt)

**Sequential:**

Alignment  
On - 100%  
Off - 0%  
Off - Single Pixel  
Off - White Surround  
Off - Peak  
Off - Corner Box  
Off - Spatio-Temporal Noise  
Off - Starfield Low  
Off - Starfield Medium

**Advanced Video: PCA**

On  
Off - 1  
Off - 2  
Off - 3  
Off - 4  
Off - 5  
Off - 6  
Off - 7  
Off - 8  
Off - 9

**Advanced Video: ADL**

Stimulus		
	40%	
	100%	
	On:	Off:
	1%	1%
	2%	2%
	3%	3%
	4%	4%
	5%	5%
	10%	10%
	15%	15%
	20%	20%
	25%	25%
	30%	30%

**Advanced Video: Motion**

Motion Resolution Half Cosine  
Motion Resolution Square  
Quantization Rotate RGB  
Quantization Rotate CMY  
Quantization Rotate YCbCr  
Quantization Motion  
Quantization 2D Cb  
Quantization 2D Cr

Luma Wedge  
xXx Parade  
Stock Ticker (23.976)  
Stock Ticker (24)  
Color Smearing  
Motion Interpolation  
Sarah on a Hammock

#### **Advanced Video: Motion HFR**

Motion Resolution Half Cosine  
Motion Resolution Square  
Quantization Rotate RGB  
Quantization Rotate CMY  
Quantization Rotate YCbCr  
Quantization Motion  
Quantization 2D Cb  
Quantization 2D Cr  
Luma Wedge  
xXx Parade  
Stock Ticker (59.94)  
Stock Ticker (60)  
Color Smearing  
Motion Interpolation  
Sarah on a Hammock

#### **Advanced Video: Specialty**

Dolby Vision  
    Perceptual  
    Absolute  
HDR10  
    Peak Luminance (cd/m<sup>2</sup>)  
        0  
        350  
        600  
        1000  
        2,000  
        4,000  
        10,000  
        Dynamic Range High  
        Dynamic Range Low  
        Clipping (cd/m<sup>2</sup>)  
        Clipping (Code Value)  
        Tone Mapping  
        Hue Shift

#### **Analysis: Grayscale**

Size  
    Field  
    Window  
        Alignment

0%	1%	2%	3%	4%
5%	10%	15%	20%	25%
30%	35%	40%	45%	50%
55%	60%	65%	70%	75%
80%	85%	90%	95%	100%

**Analysis: cd/m<sup>2</sup>**

Size

Field  
Window

1  
10  
100  
203  
350  
600  
1000  
2000  
4000  
10,000

**Analysis: Peak vs. Size**

1%  
2%  
5%  
10%  
25%  
50%  
75%  
100%

**Analysis: ColorChecker**

White  
Gray 80  
Gray 65  
Gray 50  
Gray 35  
Dark Skin  
Light Skin  
Blue Sky  
Foliage  
Blue Flower  
Bluish Green  
Orange  
Purplish Blue  
Moderate Red  
Purple  
Yellow Green  
Orange Yellow  
Blue  
Green

Red  
Yellow  
Magenta  
Cyan

**Analysis: Saturation Sweeps**

Gamut

P3D65|BT.2020

BT.2020

Stimulus: 58%

Grayscale: 100%

Red: 20% 40% 60% 80% 100%

Green: 20% 40% 60% 80% 100%

Blue: 20% 40% 60% 80% 100%

Cyan: 20% 40% 60% 80% 100%

Magenta: 20% 40% 60% 80% 100%

Yellow: 20% 40% 60% 80% 100%

**Analysis: Gamut**

Gamut

UHDA-P3D65|BT.2020

P3D65|BT.2020

BT.2020

Stimulus: 100%

White

Red

Green

Blue

Cyan

Magenta

Yellow

White 100



# Spears & Munsil Ultra HD Benchmark (2023) 【Disk 2】

**Configuration: Dolby Vision**

**Configuration: HDR10+**

**Configuration: HDR10**

Peak Luminance (cd/m<sup>2</sup>):

350

600

1000

2000

4000

10,000

## **Motion**

Color Smearing

Near-black Overdrive

## **Motion HFR**

Color Smearing

Near-black Overdrive

## **Skin Tones**

Alex

Alexandra

Gabriela

Jacely

Jennie

Joy

Monette

Yoko

3x3 Matrix

Group

## **Demonstration Material**

Dolby Vision:

10,000 BT.2020

HDR10+:

10,000 BT.2020

Advanced HDR by Technicolor:

1000 BT.2020

HDR10:

10,000 BT.2020  
2000 BT.2020  
1000 BT.2020  
600 BT.2020  
HDR Analyzer  
HDR VS. SDR  
Graded vs. Ungraded

Hybrid Log Gamma:  
1000 BT.2020

SDR:  
BT.709

# Spears & Munsil Ultra HD Benchmark (2023) 【Disk 3】

## Configuration

Color Space  
BT.709  
BT.2020

## Audio Format (A/V Sync)

Dolby Atmos  
Dolby TrueHD  
DTS:X  
DTS-HD MA

## Audio Levels and Bass Management:

Audio Format  
Dolby  
DTS

Base Layer  
5.1  
7.1  
9.1

Top Layer  
2  
4  
6

## Video Set Up: Baseline

Brightness  
Contrast  
Color and Tint  
Sharpness  
Color Temp  
Framing  
Gamma  
Backlight  
Bias Light  
Color Space Evaluation  
Color Space Evaluation HFR  
Color Space Evaluation HD

## Video Set Up: Optical Comparator

Fixed  
Red  
Green  
Blue  
10%  
20%  
30%

40%  
50%  
60%  
70%  
80%  
90%

#### **Audio: Levels**

Pink Noise 500 Hz to 2 kHz (-30 dBFS)  
Pink Noise 30 Hz to 80 Hz (-40 dBFS LFE)  
Base Layer  
Top Layer

#### **Audio: Bass Management**

Filtered Pink Noise 30 Hz to 50 Hz (-30 dBFS)  
Filtered Pink Noise 30 Hz to 50 Hz (-40 dBFS LFE)  
Base Layer  
Top Layer

#### **Audio: Panning**

Circular:  
Base Layer  
Top Layer  
Base layer and Top Layer  
Diagonal:  
Top Front Left to Top Rear Right  
Top Front Right to Top Rear Left  
Front Left to Right Surround Rear  
Front Right to Left Surround Rear

#### **Audio: Rattle Test**

Low Frequency (-10 dBFS):  
500 Hz to 200 Hz Sweep  
200 Hz to 15 Hz Sweep

#### **Audio: A/V Sync**

Framerate  
23.976  
59.94  
Resolution  
Hd  
Ultra HD  
Continuous  
Side-to-Side  
Sync-One2 Calibration  
Sync-One2

#### **Advanced Video: Evaluation**

Dynamic Range High  
Dynamic Range Low

Scaling  
Scaling HD  
Scaling 2.39:1  
Scaling 2.39:1 HD  
Image Cropping  
Geometry  
1:1 Pixel Horizontal  
1:1 Pixel Vertical  
1:3 Pixel Diamond  
Single Pixel Checkerboard  
Variable Checkerboard  
Variable Checkerboard (Alt)  
Dots Black  
Dots White

### **Advanced Video: Evaluation Color**

Dynamic Range High Red  
Dynamic Range High Green  
Dynamic Range High Blue  
Dynamic Range Low Red  
Dynamic Range Low Green  
Dynamic Range Low Blue  
Clipping (RGBWK)  
Clipping (Code Value)  
HSV Sweep  
Color and Tint Red  
Color and Tint Green  
Color and Tint Blue  
SDR Color Bars  
Color Bars  
Tartan Bars  
Chroma Alignment  
Chroma Align (Num)  
Chroma Align (Num) HD  
Chroma Upsampling Eval  
Variable Checkerboard  
Variable Checkerboard (Alt)  
Zone Plate  
Monotonicity YCbCr  
Monotonicity RGB

### **Advanced Video: Ramps**

Ramp  
    Stimulus  
    Stimulus Steps  
        White  
        Red  
        Green  
        Blue  
        Cyan

Magenta  
Yellow

### Advanced Video: Resolution

Resolution

Multiburst  
Wedge  
Zone Plate

Luma:

NonLinear

Linear Gamma 2.4

Chroma (64):

Chroma (502):

Chroma

Chroma

Chroma Crossed

Chroma Crossed

Cb

Cb

Cr

Cr

RGB Legal:

RGB Legal:

Cb

Cr

Red

Green

Blue

Cyan

Magenta

Yellow

### Advanced Video: Aspect Ratio

1.33:1  
1.43:1  
1.67:1  
1.78:1  
1.85:1  
1.896:1  
2:1  
2.2:1  
2.35:1  
2.39:1  
2.55:1  
2.76:1

### Advanced Video: Panel

Dynamic Contrast  
Spatio-Temporal Noise  
Starfield Low  
Starfield Medium  
Viewing Angle  
Viewing Angle Dots  
Large-area Uniformity 0%  
Large-area Uniformity 100%

### Advanced Video: Contrast Ratio

Simultaneous (0 / 50%):  
Alignment

4x4 Checkerboard  
4x4 Checkerboard (Alt)

Simultaneous (0 / 100%):

Alignment  
4x4 Checkerboard  
4x4 Checkerboard (Alt)

Sequential:

Alignment  
On - 100%  
Off - 0%  
Off - Single Pixel  
Off - White Surround  
Off - Peak  
Off - Corner Box  
Off - Spatio-Temporal Noise  
Off - Starfield Low  
Off - Starfield Medium

#### **Advanced Video: PCA**

On  
Off - 1  
Off - 2  
Off - 3  
Off - 4  
Off - 5  
Off - 6  
Off - 7  
Off - 8  
Off - 9

#### **Advanced Video: ADL**

Stimulus

40%  
100%

On:	Off:
1%	1%
2%	2%
3%	3%
4%	4%
5%	5%
10%	10%
15%	15%
20%	20%
25%	25%
30%	30%

#### **Advanced Video: Motion**

Motion Resolution Half Cosine

Motion Resolution Square  
Quantization Rotate RGB  
Quantization Rotate CMY  
Quantization Rotate YCbCr  
Quantization Motion  
Quantization 2D Cb  
Quantization 2D Cr  
Luma Wedge  
xXx Parade  
Stock Ticker (23.976)  
Stock Ticker (24)  
Motion Interpolation  
Sarah on a Hammock

#### **Advanced Video: Motion HFR**

Motion Resolution Half Cosine  
Motion Resolution Square  
Quantization Rotate RGB  
Quantization Rotate CMY  
Quantization Rotate YCbCr  
Quantization Motion  
Quantization 2D Cb  
Quantization 2D Cr  
Luma Wedge  
xXx Parade  
Stock Ticker (59.94)  
Stock Ticker (60)  
Motion Interpolation  
Sarah on a Hammock

#### **Advanced Video: Skin Tones**

Alex  
Alexandra  
Gabriella  
Jacely  
Jennie  
Joy  
Monette  
Yoko  
3x3 Matrix  
Group

#### **Advanced Video: Gamma**

Combined  
1.9  
2.0  
2.1  
2.2  
2.3  
2.4



2.5

2.6

### Analysis: Grayscale

Size

Field

Window

Equal Energy

Alignment

0% 1% 2% 3% 4%

5% 10% 15% 20% 25%

30% 35% 40% 45% 50%

55% 60% 65% 70% 75%

80% 85% 90% 95% 100%

### Analysis: Gamut

Size

Field

Window

Equal Energy

Stimulus: 100%

White 75

Red

Green

Blue

Cyan

Magenta

Yellow

White

Analysis: Color Checker

White

Gray 80

Gray 65

Gray 50

Gray 35

Black

Dark Skin

Light Skin

Blue Sky

Foliage

Blue Flower

Bluish Green

Orange

Purplish Blue

Moderate Red

Purple

Yellow Green

Orange Yellow

Blue

Green  
Red  
Yellow  
Magenta  
Cyan  
100% Red  
100% Green  
100% Blue  
100% Cyan  
100% Magenta  
100% Yellow  
2E  
2F  
2K  
5D  
7E  
7F  
7G  
7H  
7I  
7J  
8D  
8E  
8F  
8G  
8H  
8I  
8J

### Analysis: Saturation Sweeps

Stimulus: 75%  
Grayscale: 0% 100%  
Red: 20% 40% 60% 80% 100%  
Green: 20% 40% 60% 80% 100%  
Blue: 20% 40% 60% 80% 100%  
Cyan: 20% 40% 60% 80% 100%  
Magenta: 20% 40% 60% 80% 100%  
Yellow: 20% 40% 60% 80% 100%

### Analysis: Luminance Sweeps

Saturation: 100%  
Grayscale: 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%  
Red: 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%  
Green: 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%  
Blue: 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%  
Cyan: 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%  
Magenta: 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%  
Yellow: 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%