



Samsung S23 Ultra Main Camera Evaluation Report

02.03.2026

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Executive Summary

DUT details



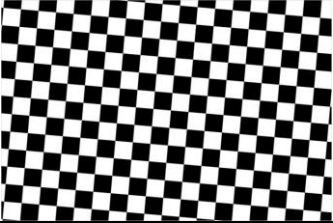
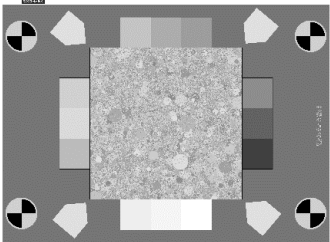


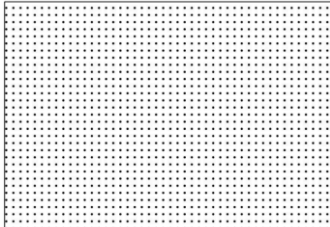
Brand	Samsung
Model	Galaxy S23 Ultra
Resolution	4000 x 3000
Pixel size	1,2um
F No.	F1,7
EFL	23mm
Sensor size	1/1,3"
Shutter control	Rolling Shutter

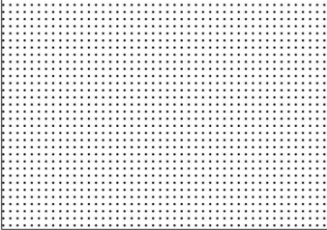


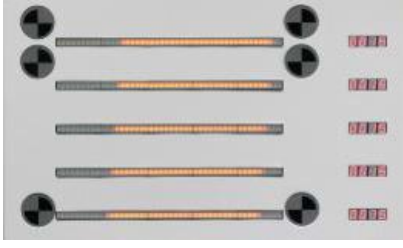
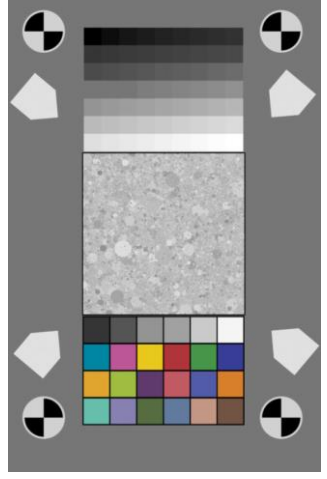
Testing Conditions

SW Version	UP1A.231005.007.S918BXXU7CXK4
Image resolution	4000 x 3000
Video resolution	3840 x 2160
Video framerate	30fps
3A control	Auto

Measurement Description

Note: All measurements were performed using Analyzer by DXOMARK Lab solution and strictly followed DXOMARK's standardized laboratory protocols.

Image Quality Metrics	Test Chart	Test Conditions
SFR		<ul style="list-style-type: none"> • D65 1000lux
Texture Preservation		<ul style="list-style-type: none"> • D65 10000lux • D65 1000lux • D55 100lux • D50 100lux • 4000K 100lux • 4000K 1lux • 2700K 100lux • 2700K 10lux
SNR		<ul style="list-style-type: none"> • D65 10000lux • D65 1000lux • D55 100lux • D50 100lux • 4000K 100lux • 4000K 1lux • 2700K 100lux • 2700K 10lux
Color Fidelity		<ul style="list-style-type: none"> • D65 10000lux • D65 1000lux • D55 100lux • D50 100lux • 4000K 100lux • 4000K 1lux • 2700K 100lux • 2700K 10lux
Distortion and Lateral Chromatic Aberration		<ul style="list-style-type: none"> • D65 2000lux

<p>Vignetting and Color Lens Shading</p>		<ul style="list-style-type: none"> • D65 1000lux • 4000K 500lux • 2700K 10lux
<p>Visual Video Noise</p>		<ul style="list-style-type: none"> • D65 1000lux • 4000K 100lux • 2700K 10lux
<p>Perceptual Testing</p>		<ul style="list-style-type: none"> • D65 1000lux • 4000K 100lux • 2700K 10lux • 2700K 1lux
<p>Timing</p>		<ul style="list-style-type: none"> • D65 1000lux • 4000K 100lux • 2700K 10lux
<p>HDR</p>		<ul style="list-style-type: none"> • Ref: left=right=10EV • Test1: left=1EV, right=10EV • Test2: left=0,1EV, right=10EV

Results

SFR

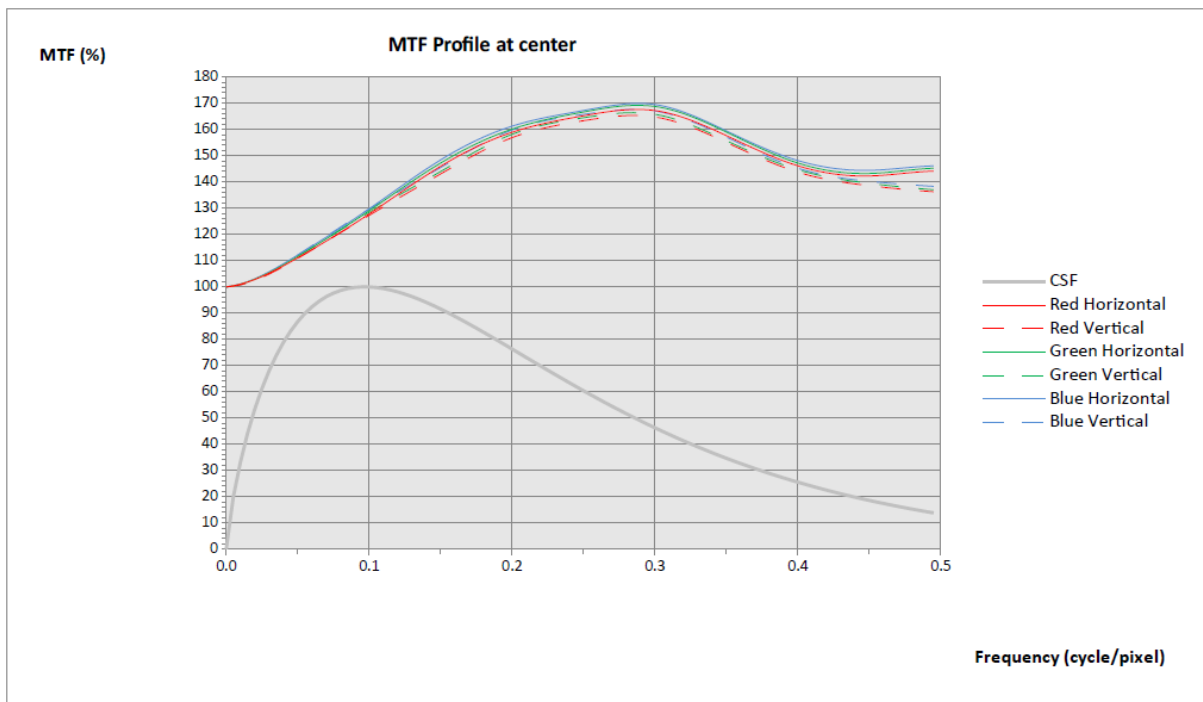
Measurement results:

- Overview:

This table contains the values of the MTF of the green channel, expressed in cycles/pixel

	Acutance	Limiting resolution (MTF 10%)	Blur (MTF 50%)	Ringing
		cycles/pixel	cycles/pixel	
Center	1,22	0,50	0,50	30,70%
All corners (mean)	0,90	0,50	0,50	11,99%

- Details:

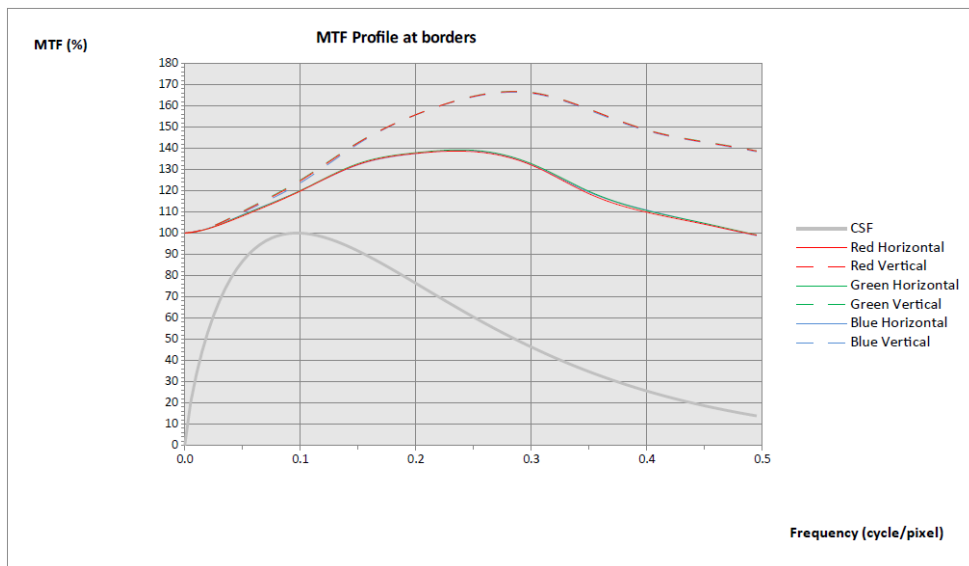
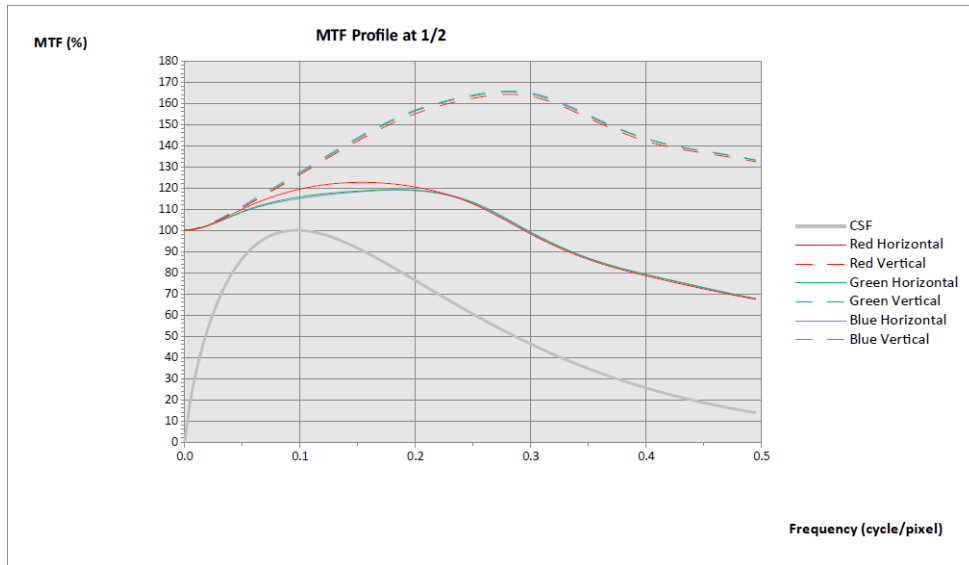


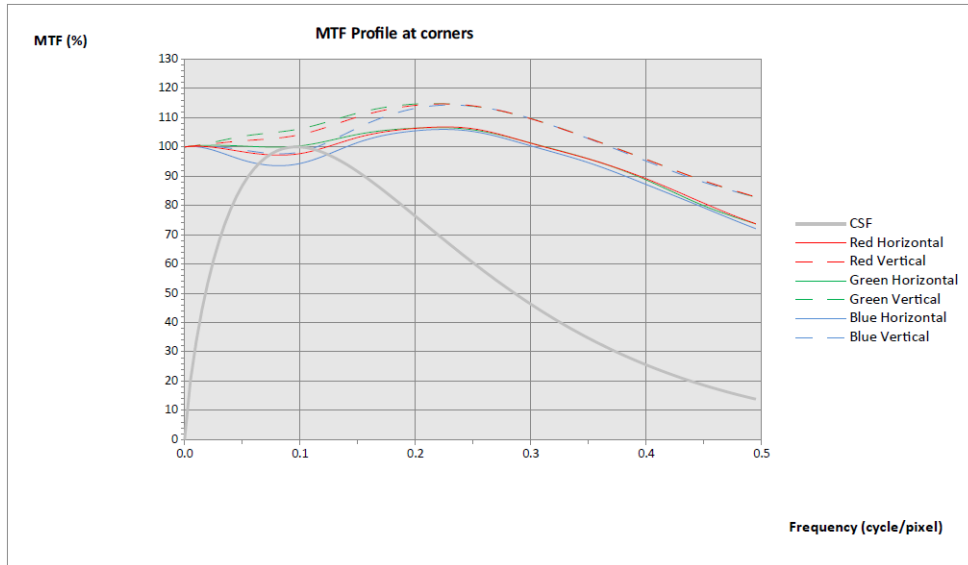
	Acutance		
	R	G	B
Center	1,21	1,22	1,23
All corners (mean)	0,89	0,90	0,87

Conversion factor between cycles/pixels and cycles/degrees for viewing conditions

Pixel/Degree

41,23





Texture Preservation

Measurement results:

Texture Acutance

	2700K	4000K	D50	D55	D65
1 lux		1,346			
10 lux	1,733				
100 lux	1,995	2,060	2,120	2,152	
1000 lux					2,293
10000 lux					2,148

Edge Acutance

	2700K	4000K	D50	D55	D65
1 lux		1,065			
10 lux	1,349				
100 lux	1,314	1,325	1,371	1,320	
1000 lux					1,273
10000 lux					1,192

Visual Noise

	2700K	4000K	D50	D55	D65
1 lux		3,48			
10 lux	3,02				
100 lux	2,87	2,68	3,2	3,59	
1000 lux					1,99
10000 lux					2,88

SNR

Measurement results:

- Standard deviation for Grey Level = 128 (interpolated)

	Std. Dev.				
	2700K	4000K	D50	D55	D65
1 lux		0,6			
10 lux	0,66				
100 lux	4,01	3,77	3,92	3,45	
1000 lux					2,64
10000 lux					1,53

- SNR for Grey Level = 128 (interpolated)

	SNR				
	2700K	4000K	D50	D55	D65
1 lux		46,62			
10 lux	45,75				
100 lux	30,08	30,61	30,27	31,38	
1000 lux					33,72
10000 lux					38,46

Color Fidelity

Measurement results:

- White balance accuracy

White balance accuracy (Mean Δab)

	2700K	4000K	D50	D55	D65
1 lux		7,87			
10 lux	8,59				
100 lux	11,72	2,72	1,11	1,21	
1000 lux					0,77
10000 lux					0,68

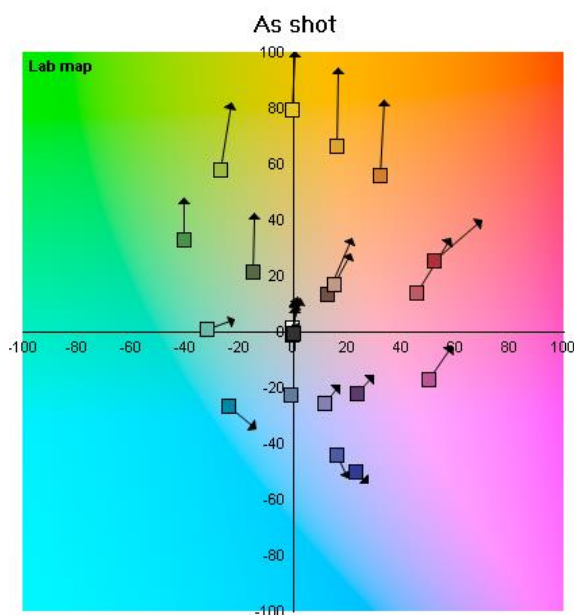
- Color rendering

Color rendering (Mean Δab)

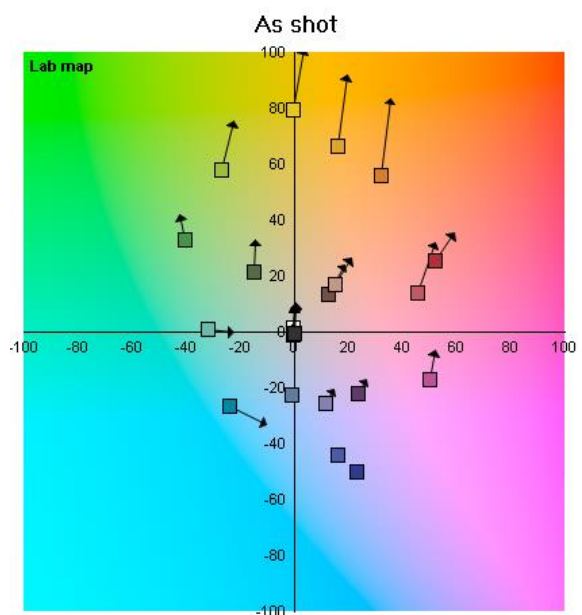
	2700K	4000K	D50	D55	D65
1 lux		4,68			
10 lux	11,08				
100 lux	14,60	7,75	8,21	7,39	
1000 lux					7,71
10000 lux					10,19

- Color fidelity 2D Lab map

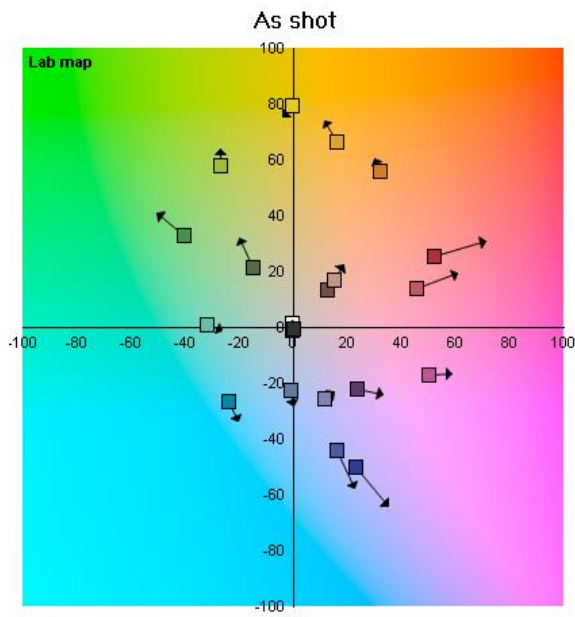
Illuminance: 2700K 100lux



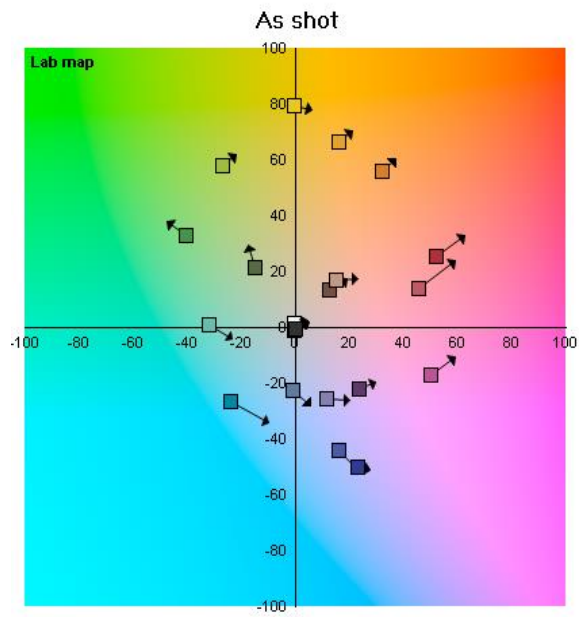
Illuminance: 2700K 10lux



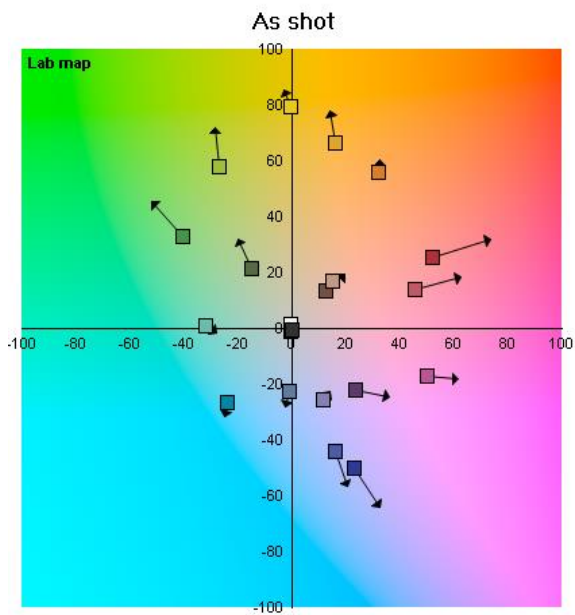
Illuminance: 4000K 100lux



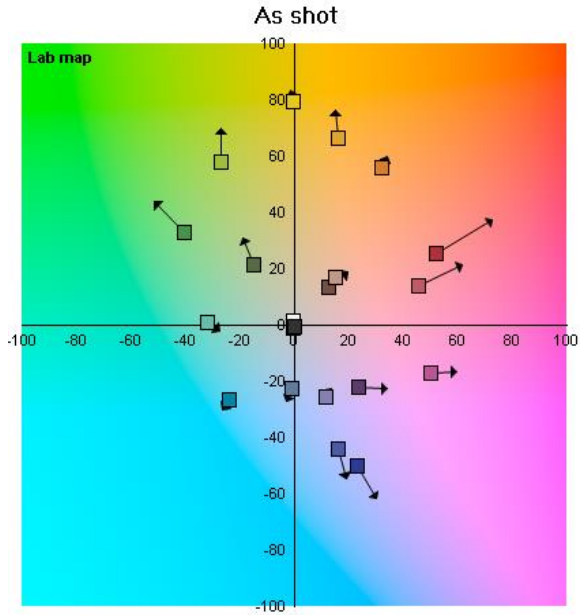
Illuminance: 4000K 1lux



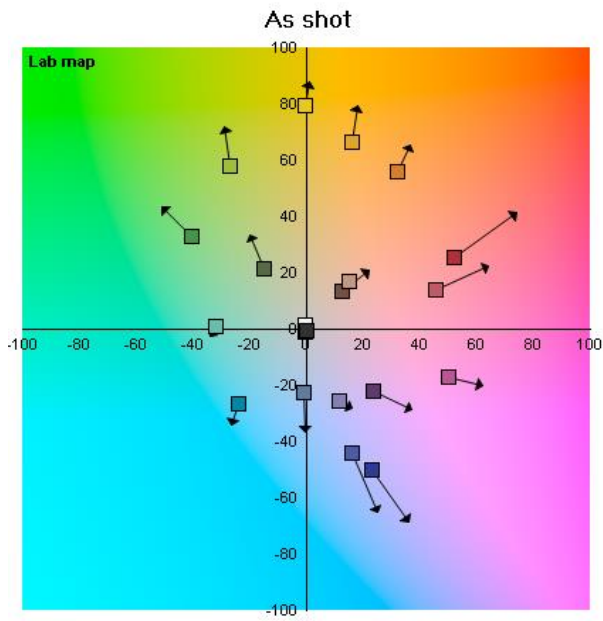
Illuminance: D50 100lux



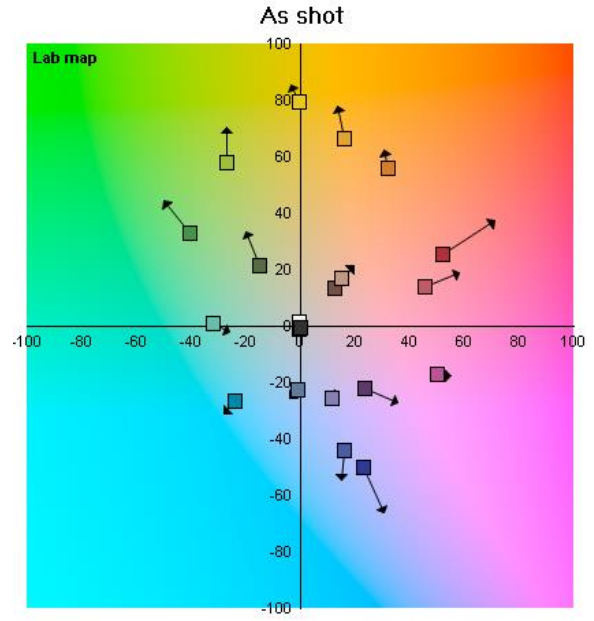
Illuminance: D55 100lux



Illuminance: D65 10000lux



Illuminance: D65 1000lux



Distortion

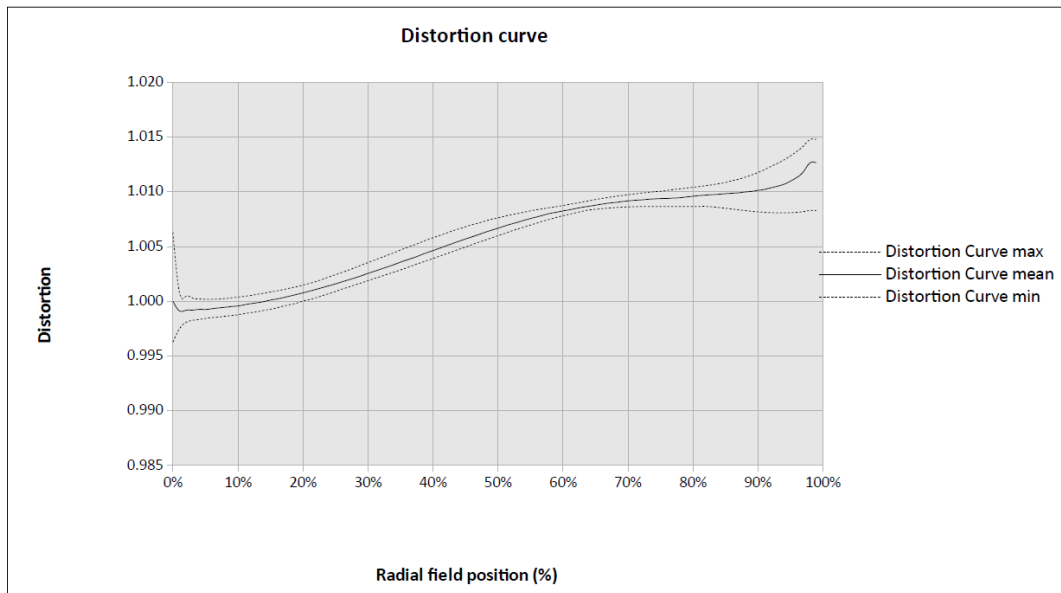
Measurement results:

- Geometric Distortion

Maximum	-0,18%
Mean	0,11%
TV distortion	0,23%

- Distortion profile

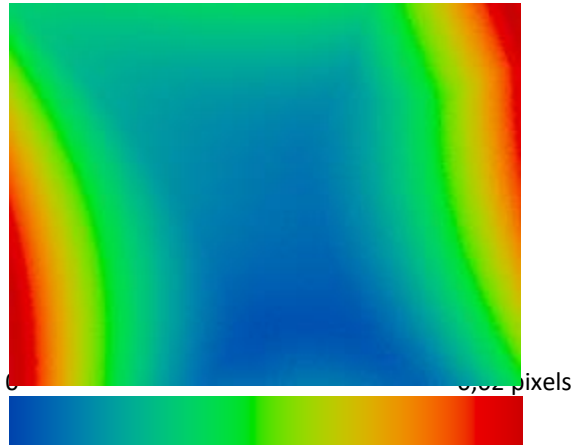
This curve displays the magnification in the field, with the center value normalized to 1.



Lateral Chromatic Aberration

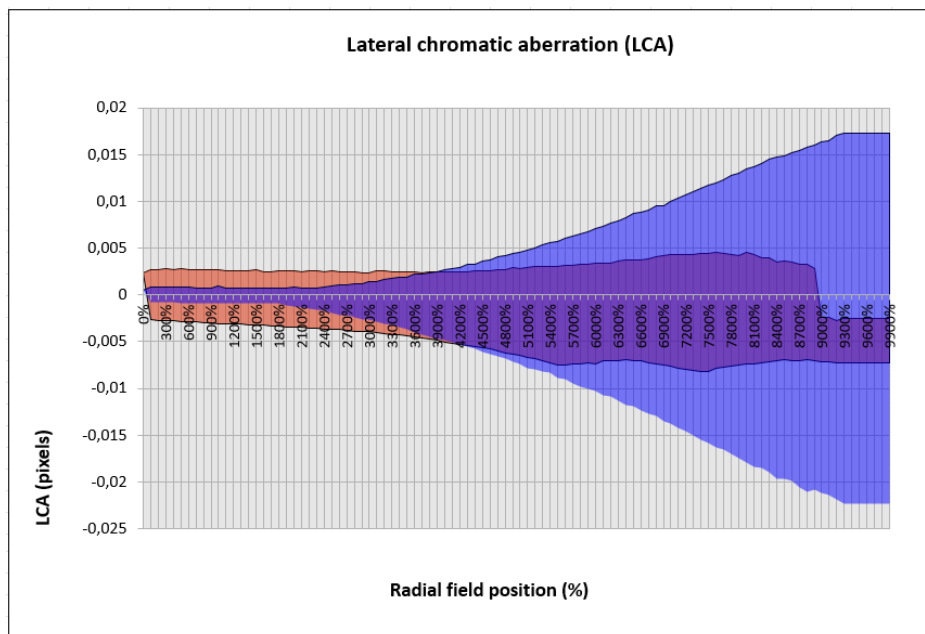
Measurement results:

- LCA in pixels



- Lateral Chromatic Aberration profile

These curves display the span (min to max) of the spatial shift between the R and B color planes and the G color plane.



Vignetting and Color Lens Shading

Measurement results:

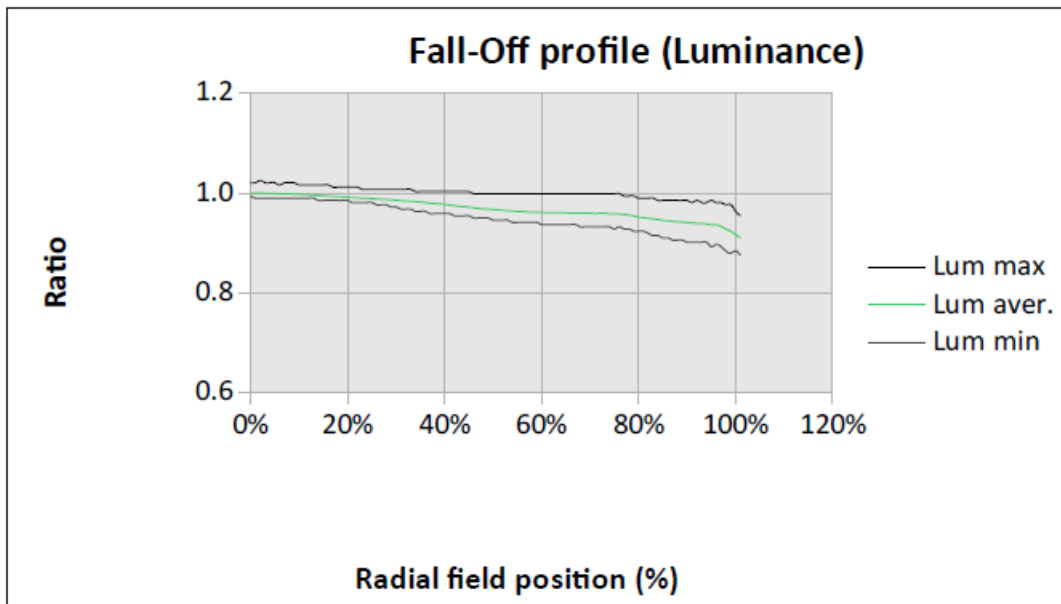
- **D65 1000lux**

- Geometry

	Red	Green	Blue	Luminance
Off-Centering (%)	2,4%	2,4%	2,4%	2,4%
Grey level at vignetting center	226	226	226	226

- Fall-off profile luminance Channel

	Red	Green	Blue	Luminance
Max. attenuation	7,7%	7,7%	7,6%	7,7%
Max amplification	0,0%	0,0%	0,0%	0,0%



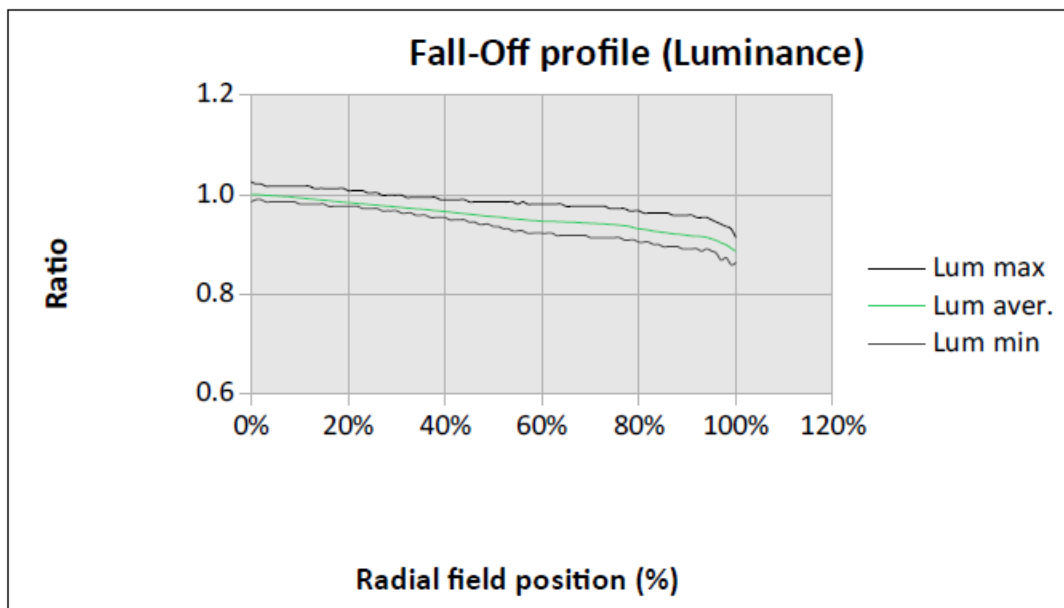
- **4000K 500lux**

- Geometry

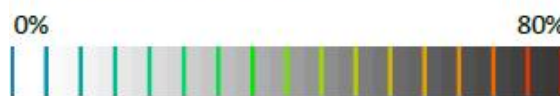
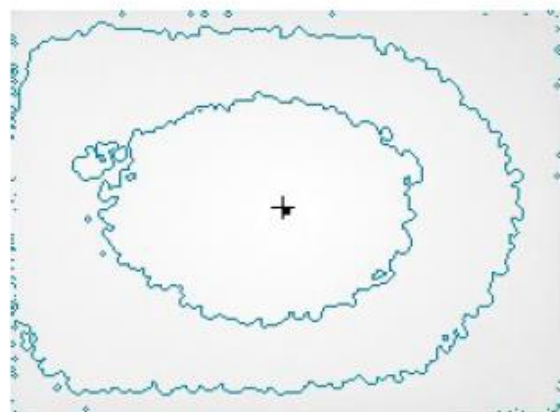
	Red	Green	Blue	Luminance
Off-Centering (%)	1,8%	1,6%	1,3%	1,6%
Grey level at vignetting center	223	222	218	222

- Fall-off profile luminance Channel

	Red	Green	Blue	Luminance
Max. attenuation	10,7%	10,7%	10,9%	10,7%
Max amplification	0,0%	0,0%	0,0%	0,0%



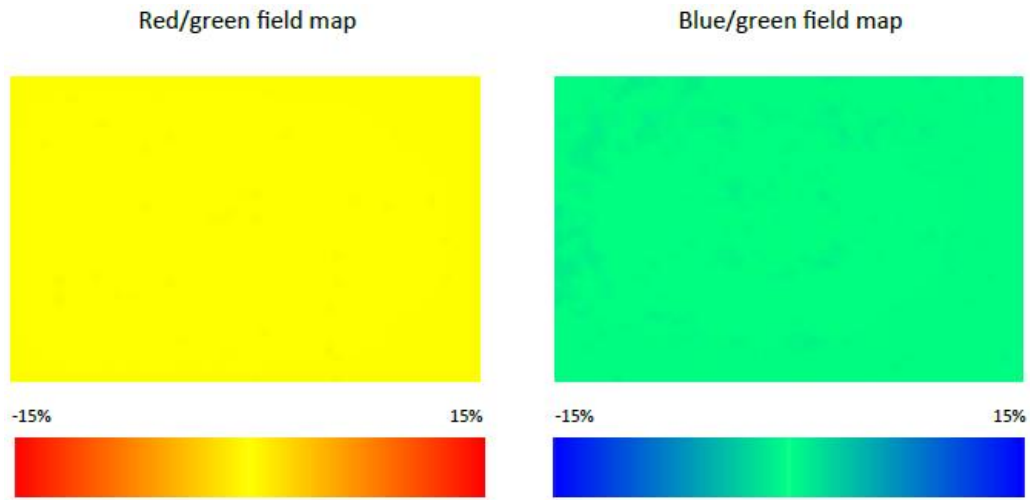
. : image center + : vignetting center



Max fall-off value : **11%**

- Color vignetting by channel

These maps display the variation in the field of the red and blue channels with respect to the green channel.



	Red	Blue
Max. attenuation	-0,4%	-0,7%
Max amplification	0,5%	0,9%

- 2700K 10lux

- Geometry

	Red	Green	Blue	Luminance
Off-Centering (%)	4,8%	5,9%	7,9%	5,9%
Grey level at vignetting center	162	141	113	145

- Fall-off profile luminance Channel

	Red	Green	Blue	Luminance
Max. attenuation	23,5%	25,7%	28,3%	25,2%
Max amplification	0,0%	0,0%	0,0%	0,0%

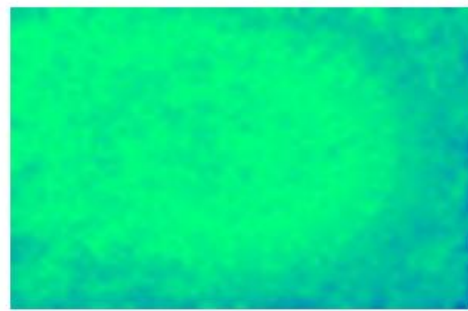
Red/green field map



-15% 15%



Blue/green field map



-15% 15%



	Red	Blue
Max. attenuation	-1,2%	-9,0%
Max amplification	3,3%	2,3%

Visual Video Noise

Measurement results:

- **Spatial Noise**

	D65 1000lux	4000K 100lux	2700K 10lux
VarL_L50	0,14	0,2	0,26
VarA_L50	0,04	0,03	0,14
VarB_L50	0,04	0,01	0,09
ChromaticityIndex_L50	0,34	0,19	0,48
ObjectiveNoise_L50	0,59	0,67	1,2

- **Temporal Noise**

	D65 1000lux	4000K 100lux	2700K 10lux
VarL_L50	0,37	0,36	0,06
VarA_L50	0,09	0,06	0,19
VarB_L50	0,13	0,08	0,32
ChromaticityIndex_L50	0,37	0,28	0,9
ObjectiveNoise_L50	0,77	0,71	0,76



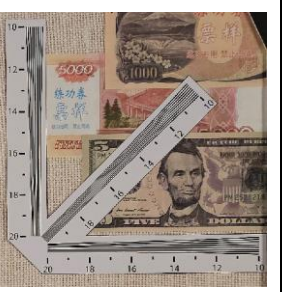

Perceptual Testing

Measurement results:



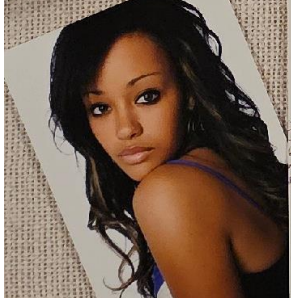





- Detail preservation

D65 1000lux	4000K 100lux	2700K 10lux	2700K 1lux
			
0,61	0,54	0,58	0,41
			
0,55	0,49	0,47	0,43
			
0,63	0,51	0,60	0,47

- Resolution




D65 1000lux	4000K 100lux	2700K 10lux	2700K 1lux
			
Horizontal 19,5 Vertical 19,5 Diagonal 20	Horizontal 19,5 Vertical 19,5 Diagonal 20	Horizontal 19,5 Vertical 20 Diagonal 20	Horizontal 17,5 Vertical 17,5 Diagonal 18

- Noise

D65 1000lux	4000K 100lux	2700K 10lux	2700K 1lux
			
1,97	2,91	3,74	2,7
			
1,91	4,1	3,29	2,76

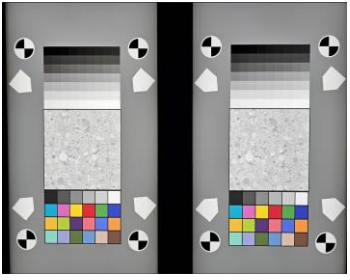


Timing

Measurement results:

	D65 1000lux	4000K 100lux	2700K 10lux
			
Exposure time	11 ms	21 ms	40,5 ms
Rolling shutter	14,39 ms	14,55 ms	14,35 ms

HDR

Measurement results:

Reference		Test 1		Test 2	
					
Left	Right	Left	Right	Left	Right
10EV	10EV	1EV	10EV	0,1EV	10EV

		Left sample	Left reference	Left Difference	Right sample	Right reference	Right difference
Reference	Exposure - Grey level 18%	142,71	142,71	-	140,17	140,17	-
	HDR Texture acutance	0,85	0,85	-	0,9	0,9	-
	Local contrast - Entropy(bits)	7,8	7,8	-	7,68	7,68	-
	Color - Mean Δab	-	-	-	-	-	-
	Visual noise JND mean	4,52	4,52	0	4,87	4,87	0
Test 1	Exposure - Grey level 18%	67,82	142,71	-74,9	162,44	140,17	22,27
	HDR Texture acutance	1,02	0,85	0,17	0,91	0,9	0,01
	Local contrast - Entropy(bits)	7,47	7,8	-0,34	7,52	7,68	-0,15
	Color - Mean Δab	-	-	8,63	-	-	6,35
	Visual noise JND mean	5,63	4,52	1,11	5,17	4,87	0,29
Test 2	Exposure - Grey level 18%	9,29	142,71	-133,42	160,61	140,17	20,44
	HDR Texture acutance	1,28	0,85	0,43	0,88	0,9	-0,02
	Local contrast - Entropy(bits)	5,59	7,8	-2,21	7,49	7,68	-0,19
	Color - Mean Δab	-	-	16,25	-	-	5,9
	Visual noise JND mean	6,83	4,52	2,31	5,01	4,87	0,13

Note: Color consistency - Mean Δab is exposure compensated