Chrom▼Pure³

Video Calibration Report

Company:	FM-Audio	**Email:**	info@fm-audio.eu
URL:	www.fm-audio.eu	**Test Pattern Source:**	Built In
Color Analyzer:	Display 3 Pro II	**Reference Gamut:**	Rec. 709
Calibration Date:	10/21/2021 10:23 AM	**Target Gamma:**	2.22
		Color Intensity:	75%

Client Information

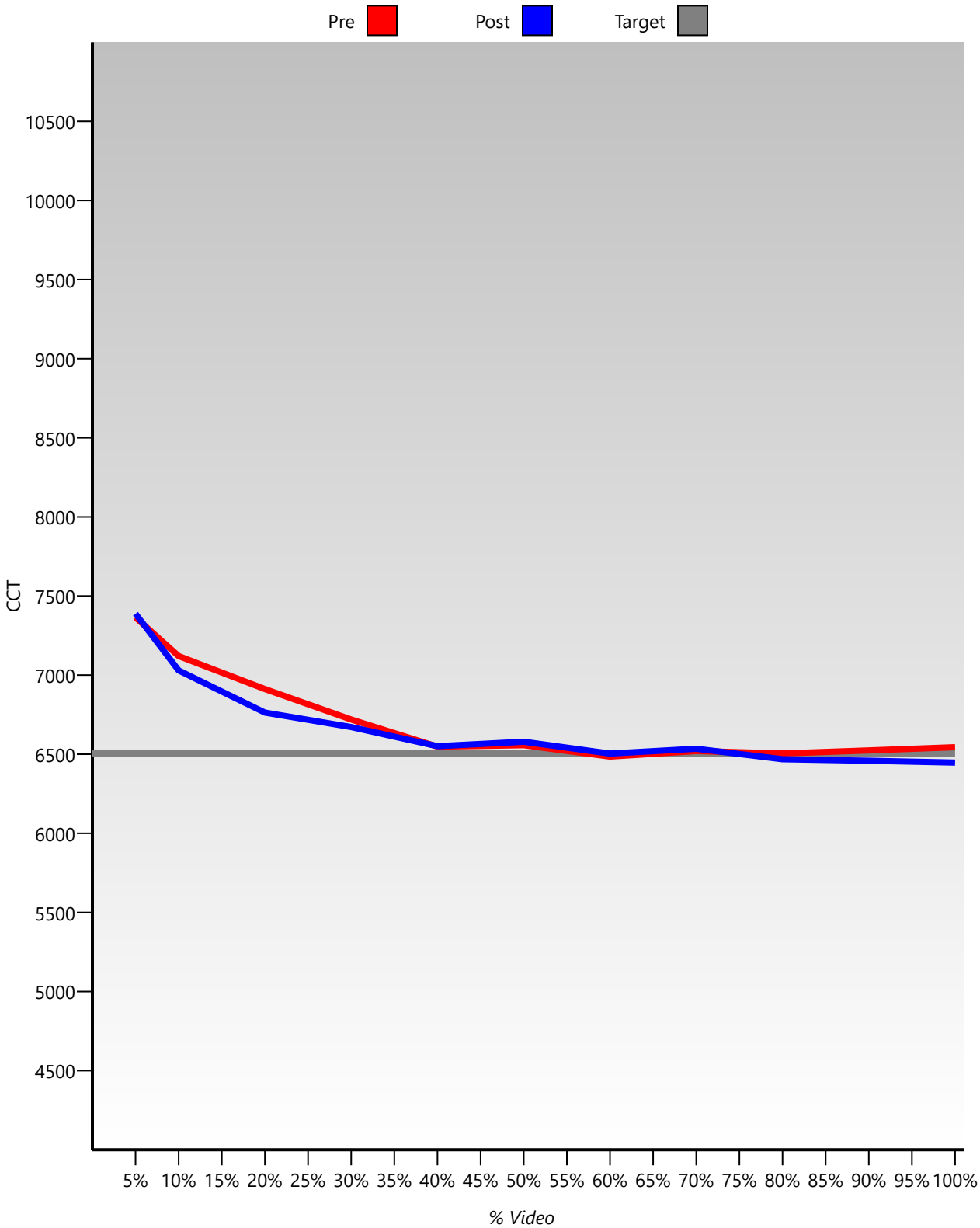**Name:**

Display: Sony VW890ES

Address:

Phone:

Email:

Correlated Color Temperature

Correlated Color Temperature (CCT) is a less precise measurement of the color of white. The target is 6505. Higher than 6505 is too blue. Lower is too red.

CIE Charts

These charts graphically map the accuracy of the display's color saturation and hue relative to the chosen standard
The closer the 'After' symbols are to the reference points, the more accurate the color. There are 2 chromaticity charts,
one showing before/after performance based on the 1931 xy system and another based on the 1976 u'v' system,
which is less well known, but more perceptually uniform.
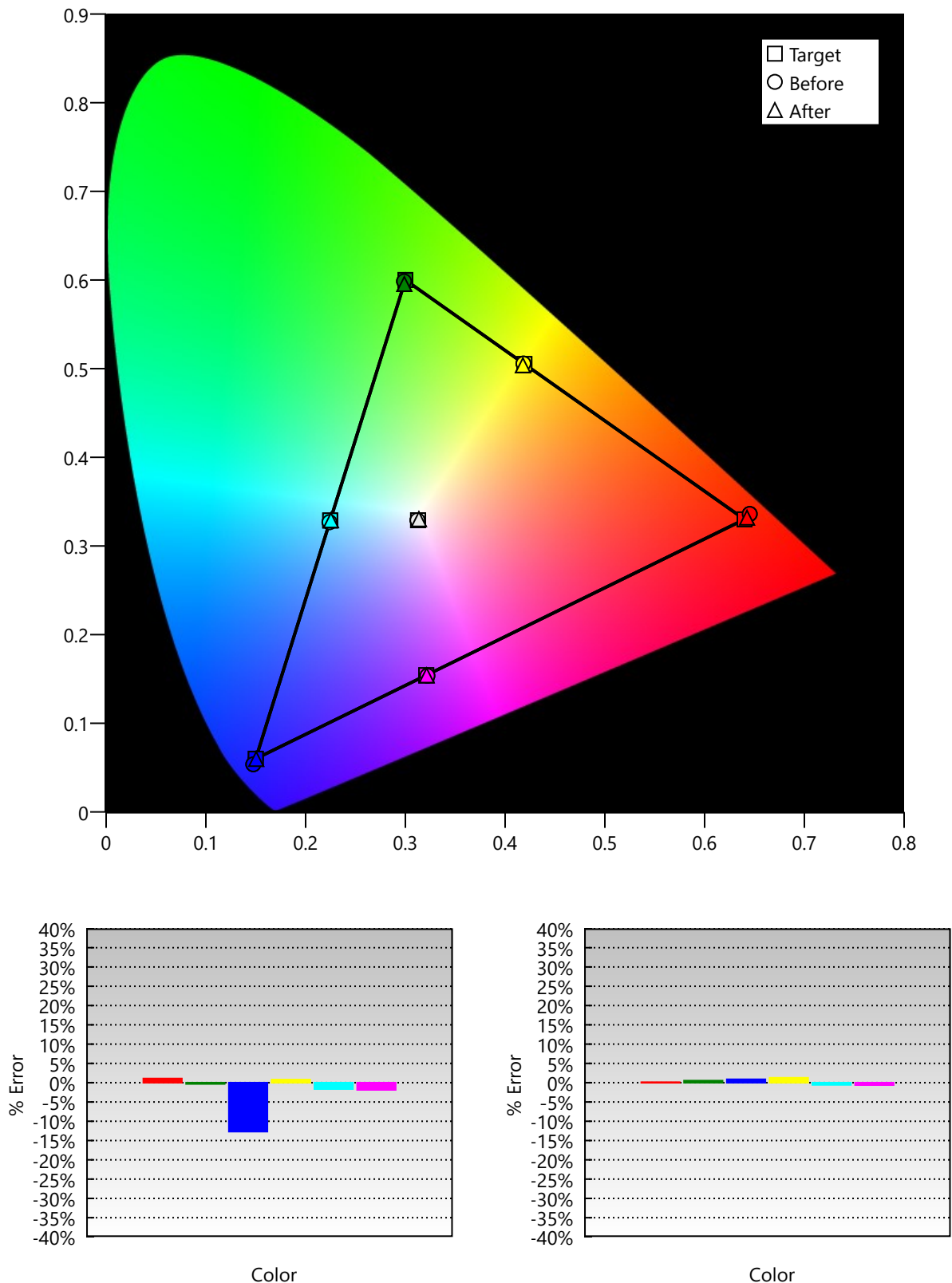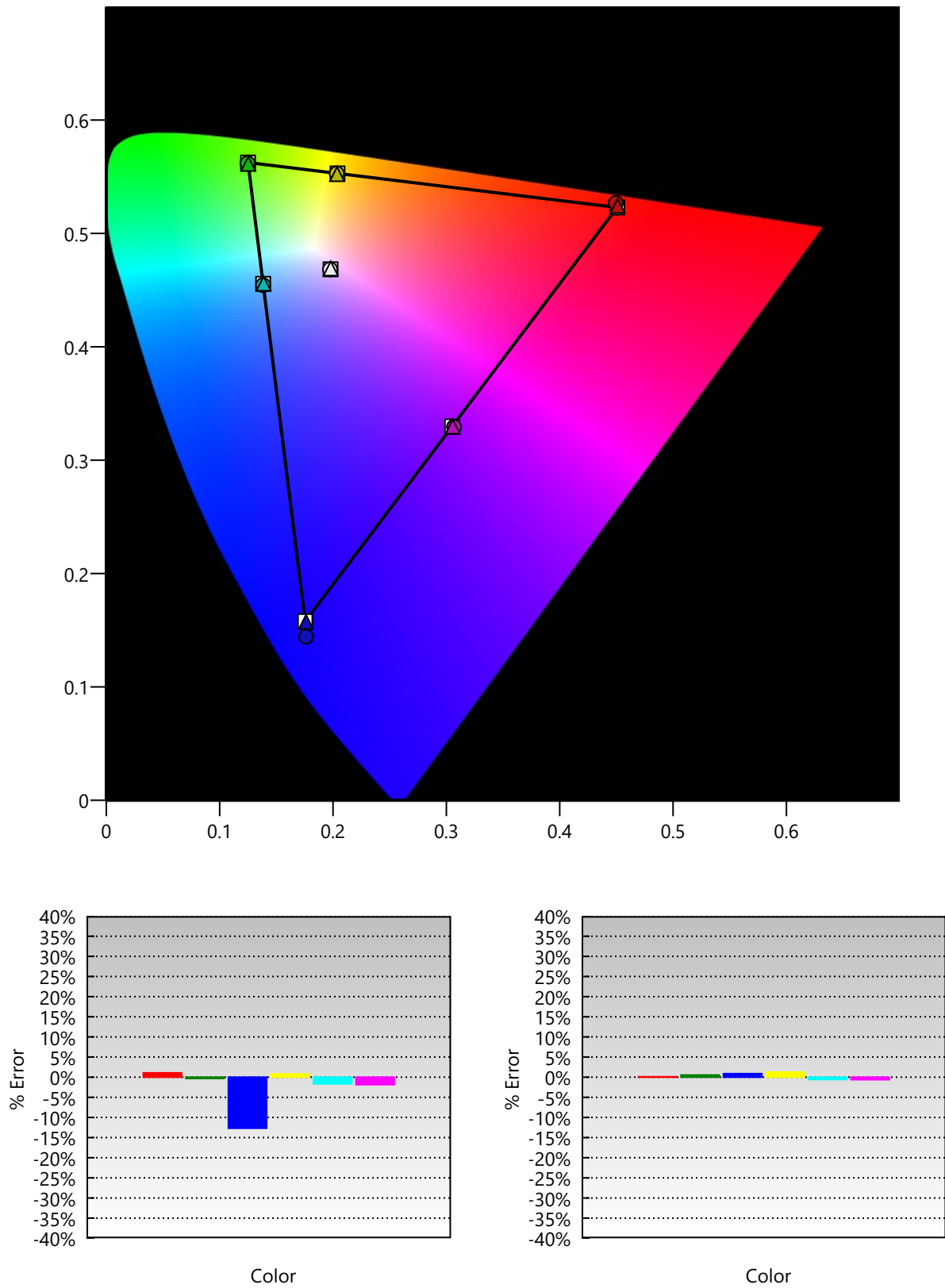
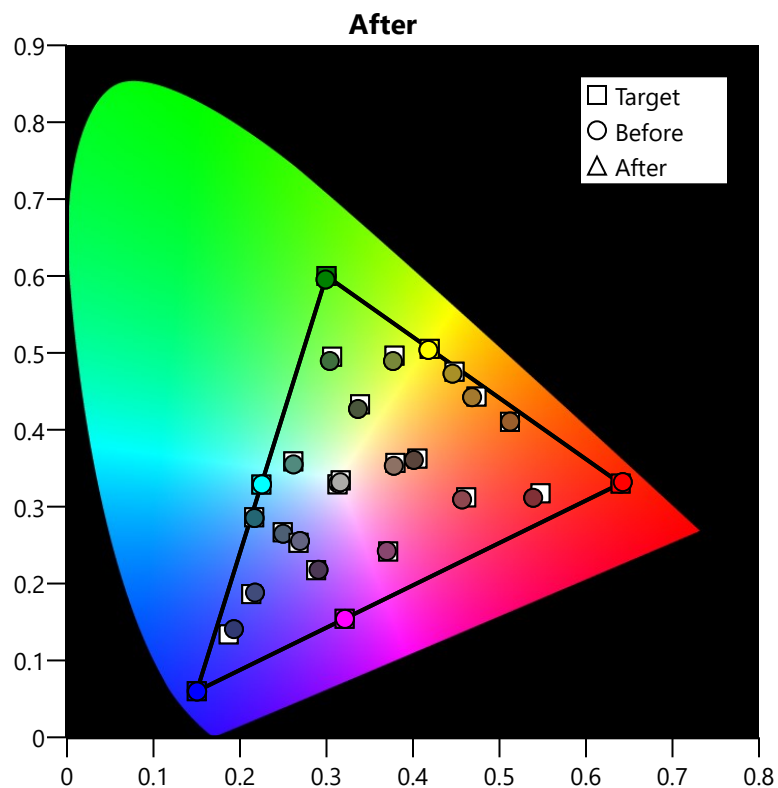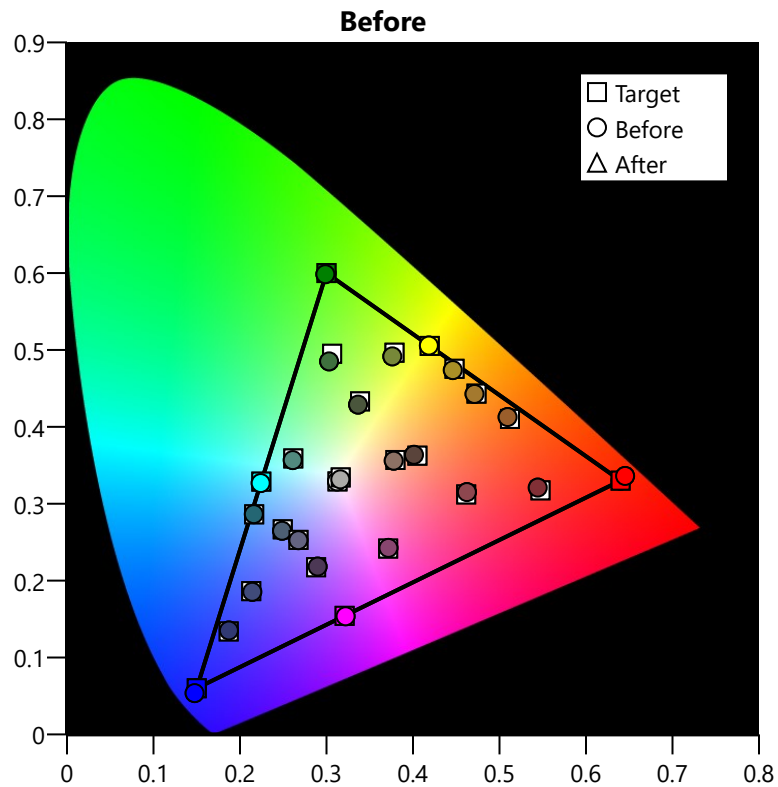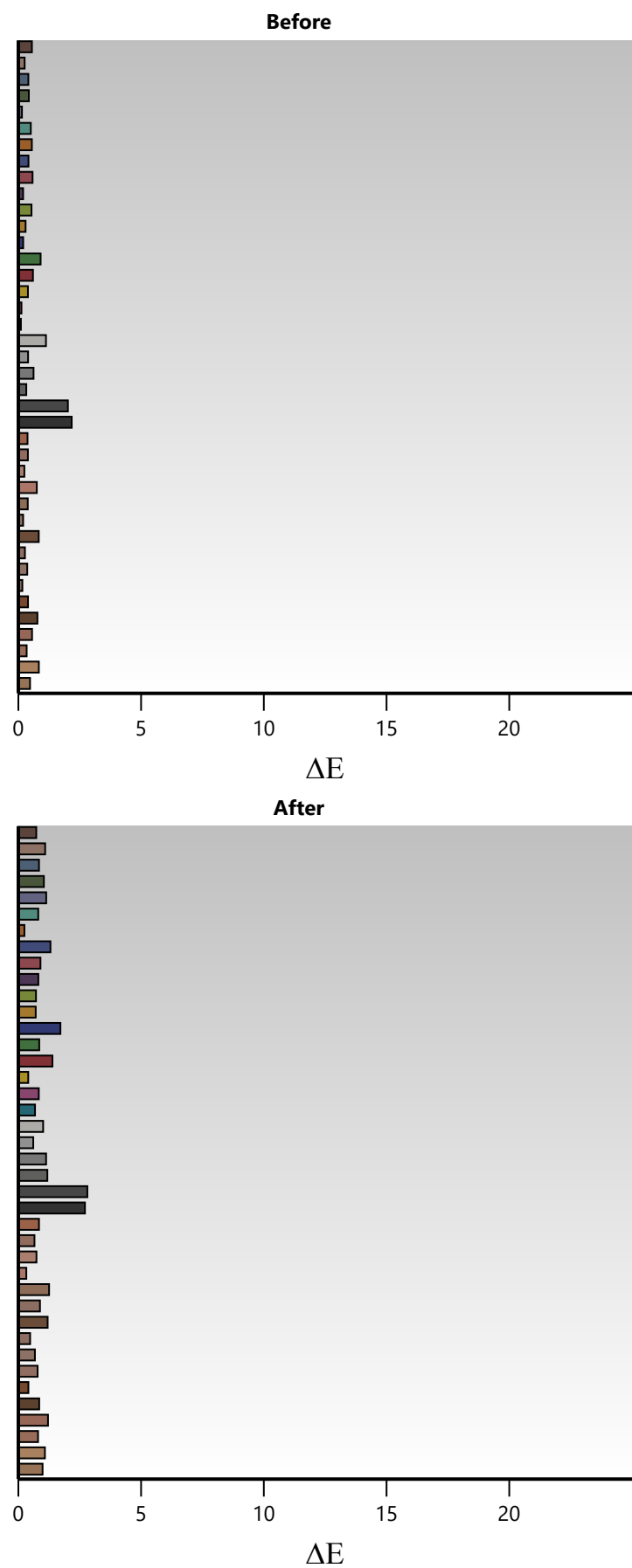## ColorChecker

The ColorChecker evaluates the real-world color performance of the display by measuring the accuracy of ordinary colors found in the natural world. It includes 24 natural colors plus 16 extra colors that sample a variety of human skin tones. These are important because human vision is especially sensitive to inaccurate skin tone reproduction.

Before

After

ColorChecker ΔE Performance

Before

ΔE

After

ΔE

Color	ΔE Before	ΔE After
Dark skin	0.6	0.8
Light skin	0.3	1.1
Blue sky	0.4	0.9
Foliage	0.5	1.1
Blue flower	0.2	1.2
Bluish green	0.5	0.8
Orange	0.6	0.3
Purplish blue	0.4	1.3
Moderate red	0.6	0.9
Purple	0.2	0.9
Yellow green	0.6	0.8
Orange yellow	0.3	0.7
Blue*	0.2	1.7
Green*	0.9	0.9
Red*	0.6	1.4
Yellow*	0.4	0.4
Magenta*	0.2	0.9
Cyan*	0.1	0.7
White*	1.2	1.0
Neutral 8	0.4	0.6
Neutral 6.5	0.7	1.2
Neutral 5	0.4	1.2
Neutral 3.5	2.1	2.8
Black	2.2	2.7
D7	0.4	0.9
D8	0.4	0.7
E7	0.3	0.8
E8	0.8	0.4
F7	0.4	1.3
F8	0.2	0.9
G7	0.9	1.2
G8	0.3	0.5
H7	0.4	0.7
H8	0.2	0.8
I7	0.4	0.4
I8	0.8	0.9
J7	0.6	1.2
J8	0.4	0.8
CP-Light	0.9	1.1
CP-Dark	0.5	1.0
Mean	**0.6**	**1.0**

ColorChecker Skin Tones ΔE Performance
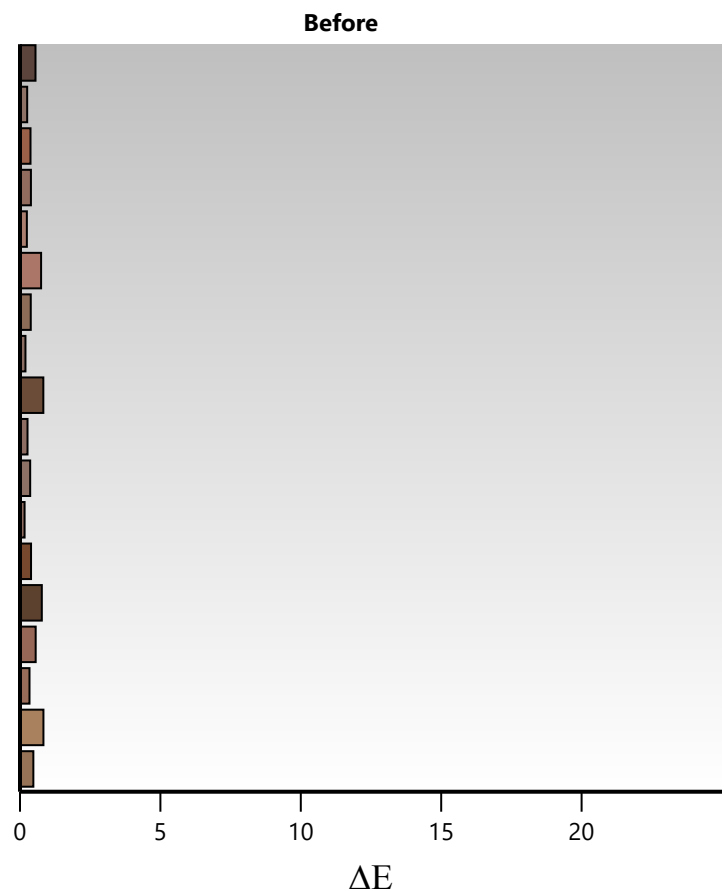
Before

Color	ΔE Before	After
Dark skin	0.6	0.8
Light skin	0.3	1.1
D7	0.4	0.9
D8	0.4	0.7
E7	0.3	0.8
E8	0.8	0.4
F7	0.4	1.3
F8	0.2	0.9
G7	0.9	1.2
G8	0.3	0.5
H7	0.4	0.7
H8	0.2	0.8
I7	0.4	0.4
I8	0.8	0.9
J7	0.6	1.2
J8	0.4	0.8
CP-Light	0.9	1.1
CP-Dark	0.5	1.0
Mean	**0.5**	**0.9**
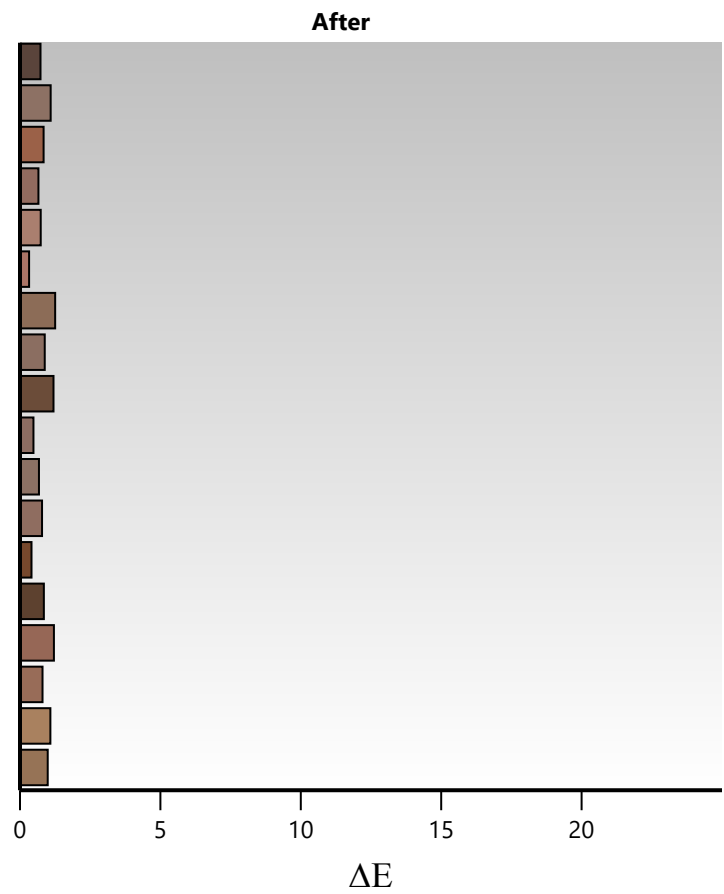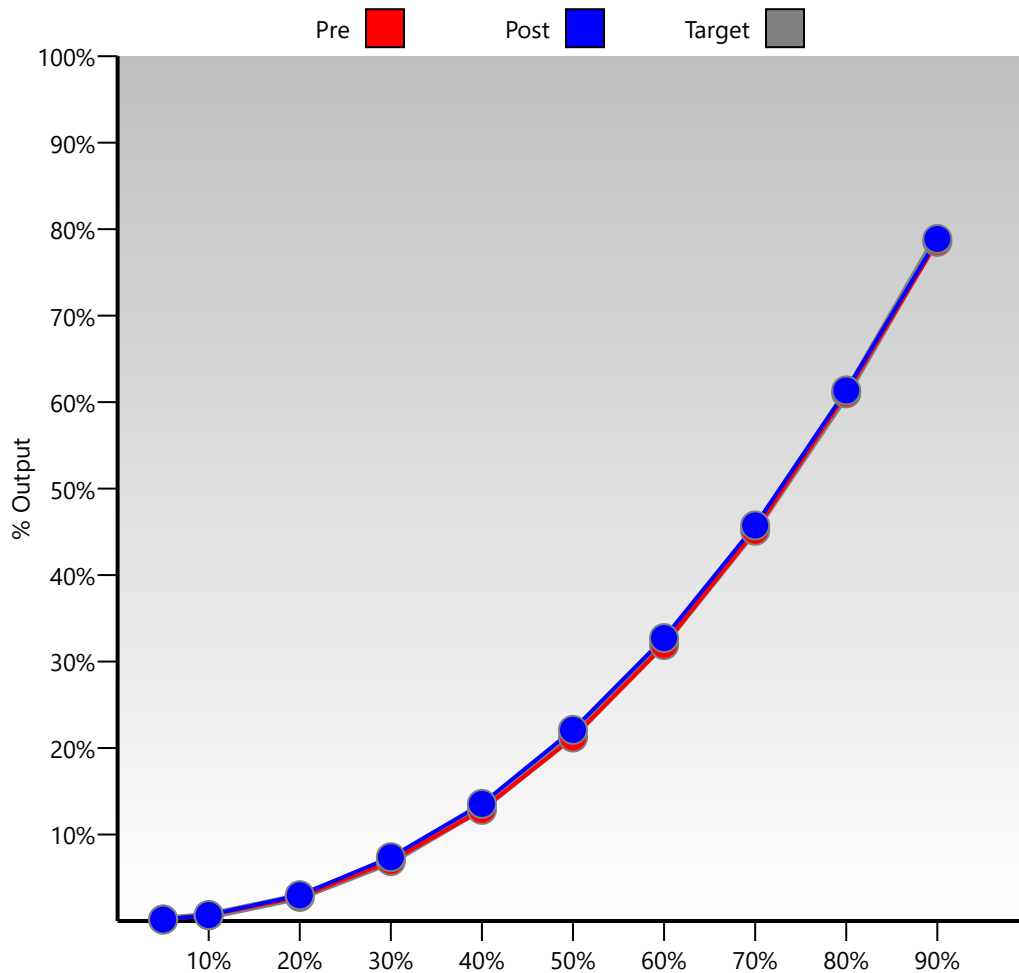
After

Gamma Output

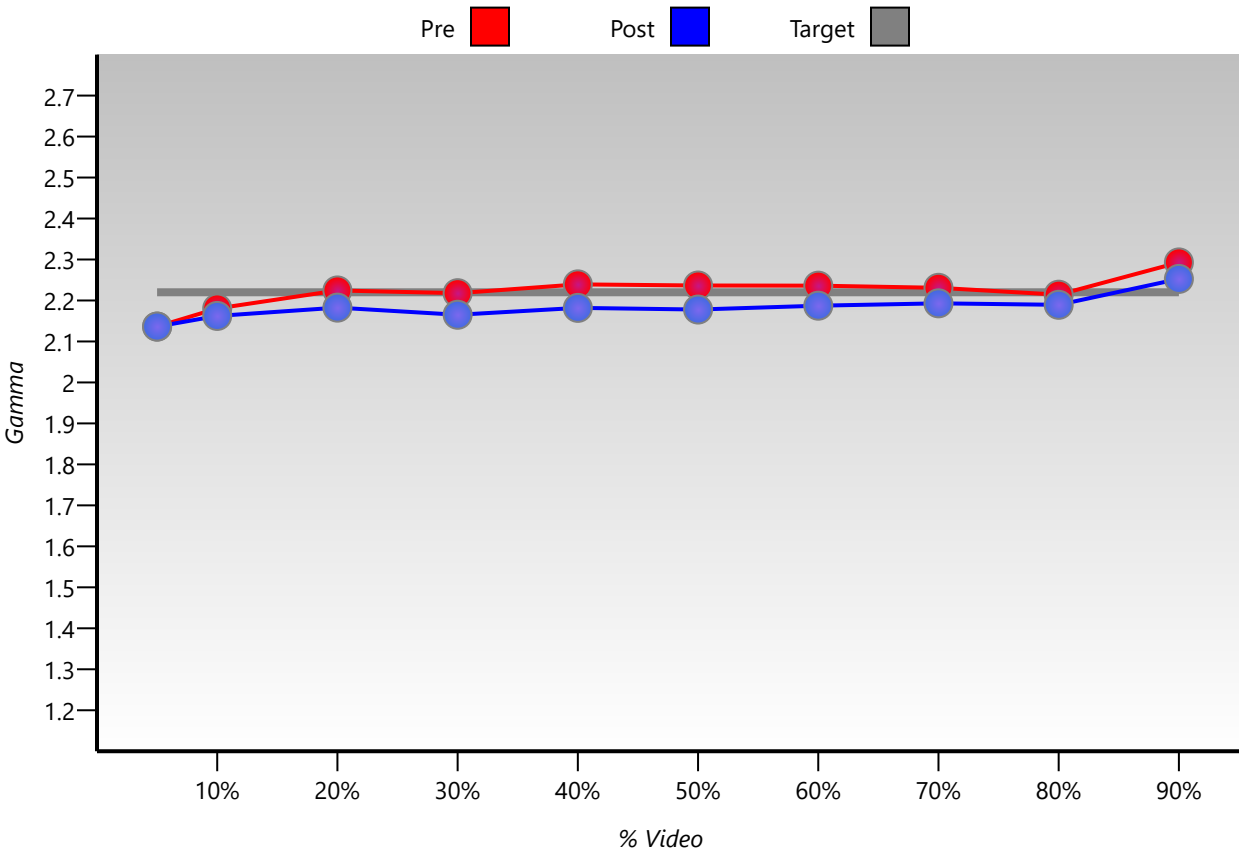|	Before			After		
	Output	**Gamma**	**Video**	**Output**	**Gamma**	**Video**
0%			0.0091			0.0091
5%	0.11 (0.2%)	2.14		0.11 (0.2%)	2.14	
10%	0.45 (0.7%)	2.18		0.46 (0.7%)	2.16	
20%	1.90 (2.8%)	2.22		1.98 (3.0%)	2.18	
30%	4.73 (6.9%)	2.22		4.90 (7.4%)	2.17	
40%	8.77 (12.8%)	2.24		9.00 (13.5%)	2.18	
50%	14.49 (21.2%)	2.24		14.69 (22.1%)	2.18	
60%	21.78 (31.9%)	2.24		21.75 (32.7%)	2.19	
70%	30.81 (45.1%)	2.23		30.41 (45.7%)	2.19	
80%	41.66 (61.0%)	2.21		40.79 (61.4%)	2.19	
90%	53.62 (78.5%)	2.29		52.44 (78.9%)	2.25	
100%	68.27 (100.0%)	0	68.3	66.48 (100.0%)	0	66.5
	Mean: 2.22			**2.18**		
	Contrast:		**7511**			**7314**

Gamma

Gamma describes the rate at which video output increases with signal input. This is not a a one-to-one relationship. If gamma is too high, the image will darken and shadow detail will suffer. If gamma is too low, contrast and depth suffer.

Luminance: cdm2   Target Gamma: 2.22

	Before			After		
	Output	**Gamma**	**Video**	**Output**	**Gamma**	**Video**
0%			0.0091			0.0091
10%	0.45 (0.7%)	2.18		0.46 (0.7%)	2.16	
20%	1.90 (2.8%)	2.22		1.98 (3.0%)	2.18	
30%	4.73 (6.9%)	2.22		4.90 (7.4%)	2.17	
40%	8.77 (12.8%)	2.24		9.00 (13.5%)	2.18	
50%	14.49 (21.2%)	2.24		14.69 (22.1%)	2.18	
60%	21.78 (31.9%)	2.24		21.75 (32.7%)	2.19	
70%	30.81 (45.1%)	2.23		30.41 (45.7%)	2.19	
80%	41.66 (61.0%)	2.21		40.79 (61.4%)	2.19	
90%	53.62 (78.5%)	2.29		52.44 (78.9%)	2.25	
100%	68.27 (100.0%)	0	68.3	66.48 (100.0%)	0	66.5
	Mean:	**2.22**		**2.18**		
	Contrast:		**7511**			**7314**

Grayscale ΔE Chart

This chart displays the color of white across the entire grayscale in raw xy data and Delta-E. White is defined as x0.3127, y0.3290. Delta E (dE or ΔE) measures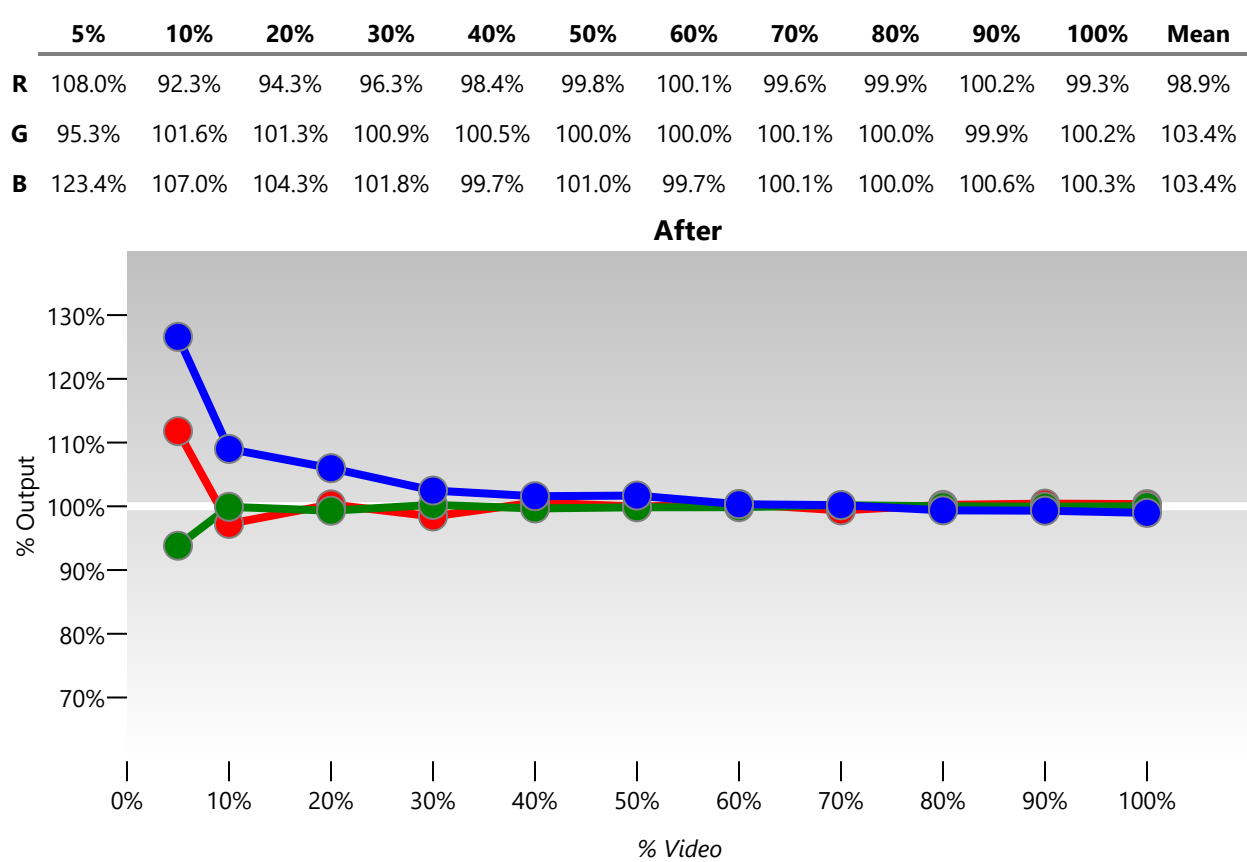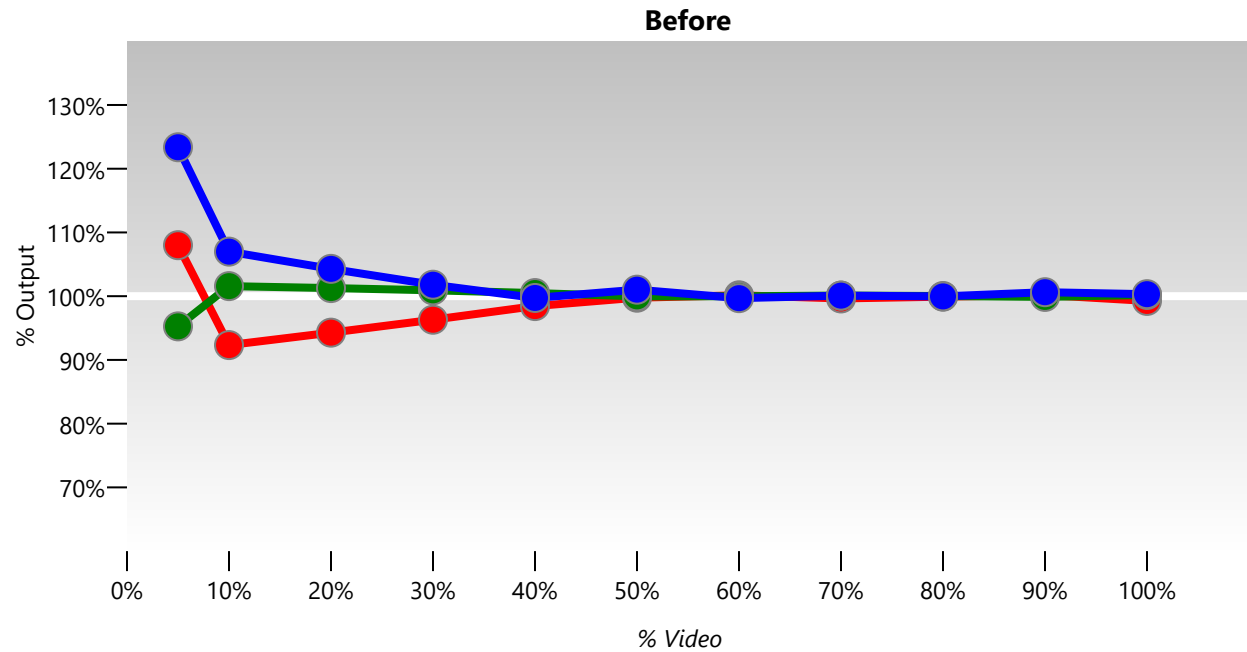 deviation from a color standard. The smaller the number, the less the deviation from the standard and the more accurate the color. Ideally, ΔE for white should not rise above 2.
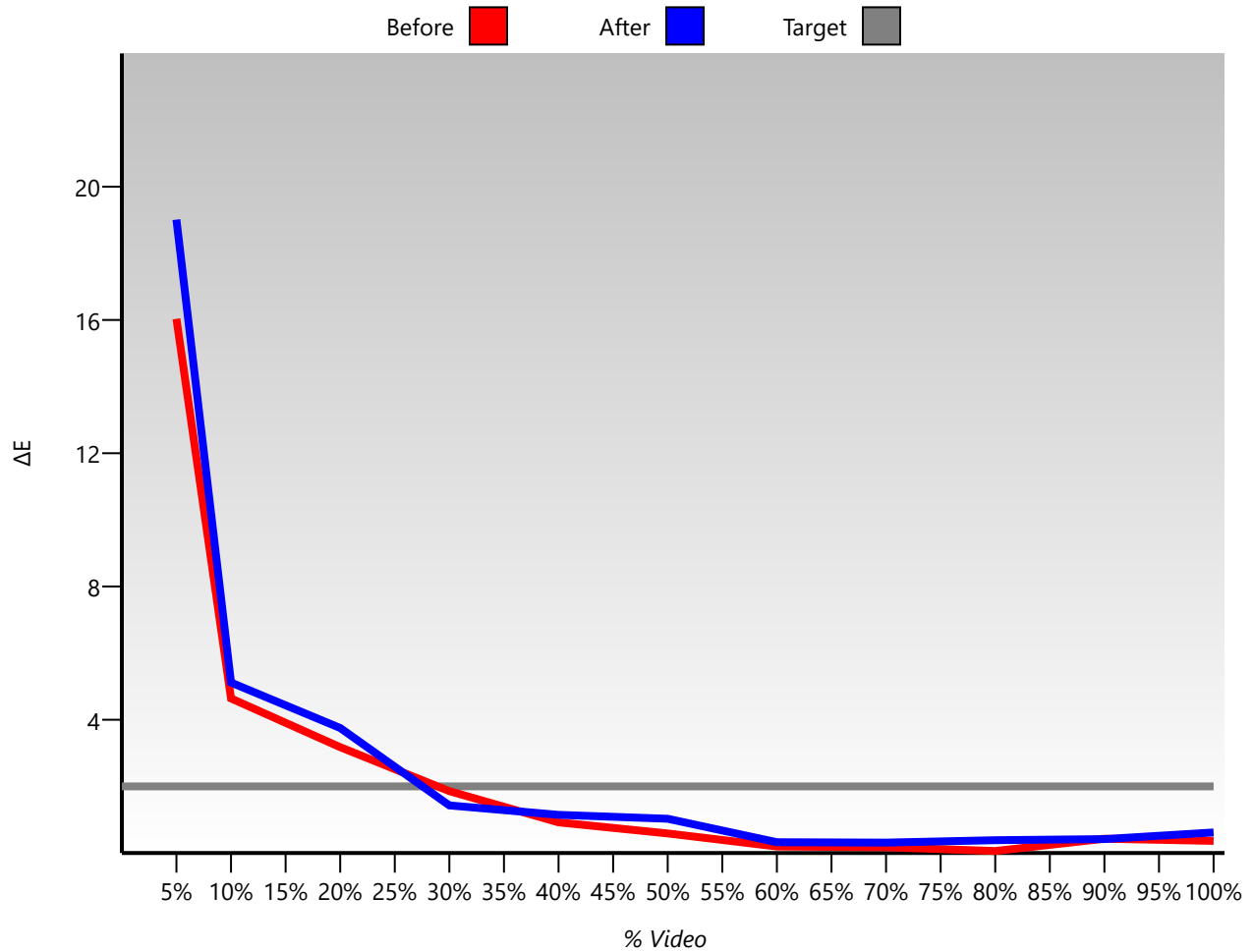
	Before			After		
	x, y	ΔE	CCT	x, y	ΔE	CCT
5%	0.304, 0.302	16.0	7,365	0.305, 0.298	19.0	7,388
10%	0.303, 0.323	4.6	7,120	0.305, 0.320	5.1	7,029
20%	0.306, 0.326	3.2	6,912	0.309, 0.322	3.8	6,763
30%	0.309, 0.328	1.9	6,719	0.310, 0.327	1.4	6,672
40%	0.312, 0.330	0.9	6,548	0.312, 0.327	1.1	6,551
50%	0.312, 0.328	0.6	6,557	0.312, 0.327	1.0	6,579
60%	0.313, 0.329	0.2	6,485	0.313, 0.329	0.3	6,504
70%	0.312, 0.329	0.2	6,520	0.312, 0.329	0.3	6,535
80%	0.313, 0.329	0.1	6,505	0.313, 0.330	0.4	6,468
90%	0.312, 0.328	0.4	6,524	0.313, 0.330	0.4	6,459
100%	0.312, 0.329	0.4	6,544	0.314, 0.330	0.6	6,447
Mean:		2.6	6,709		3.0	6,672

RGB Line Chart

This chart also displays gray scale performance, but breaks out the contributions of red, green, and blue. Ideally, all three colors should be within +- 4% from 100% across the entire range.

Before

	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	Mean
R	108.0%	92.3%	94.3%	96.3%	98.4%	99.8%	100.1%	99.6%	99.9%	100.2%	99.3%	98.9%
G	95.3%	101.6%	101.3%	100.9%	100.5%	100.0%	100.0%	100.1%	100.0%	99.9%	100.2%	103.4%
B	123.4%	107.0%	104.3%	101.8%	99.7%	101.0%	99.7%	100.1%	100.0%	100.6%	100.3%	103.4%

After

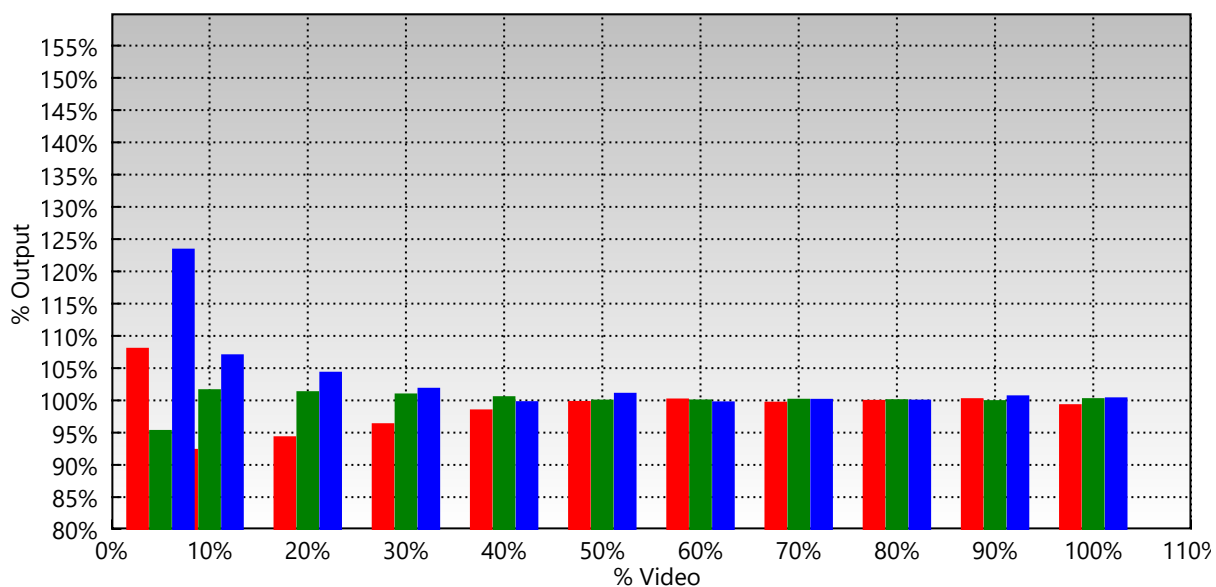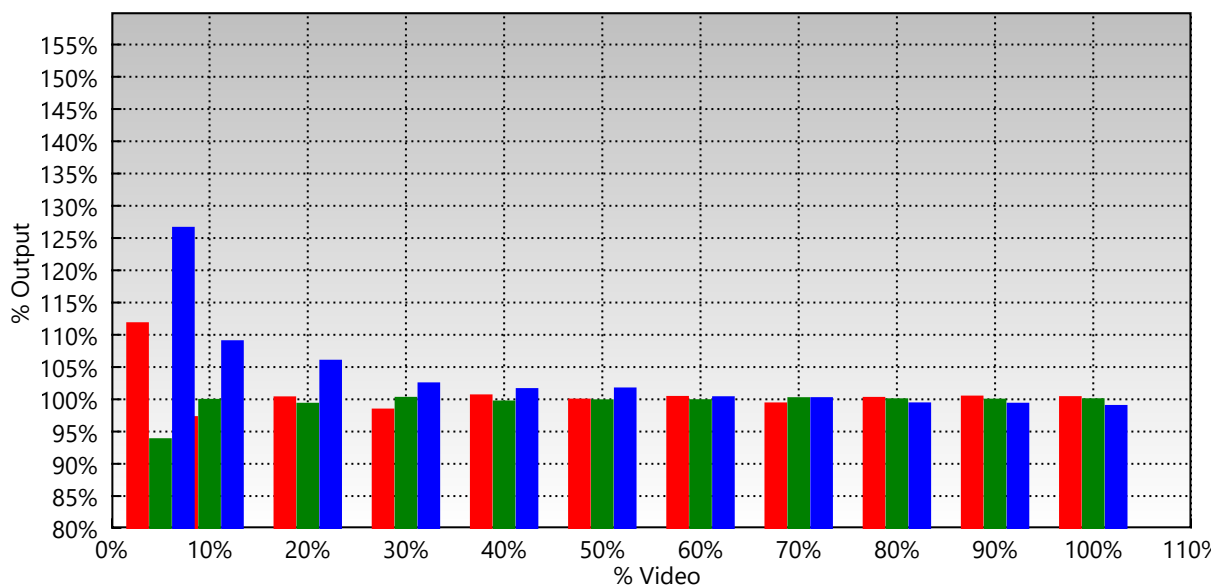|	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	Mean
R	111.8%	97.2%	100.3%	98.4%	100.6%	100.0%	100.4%	99.4%	100.2%	100.4%	100.3%	100.8%
G	93.8%	99.9%	99.3%	100.2%	99.7%	99.8%	99.9%	100.2%	100.0%	99.9%	100.0%	104.1%
B	126.6%	109.0%	106.0%	102.5%	101.6%	101.7%	100.3%	100.2%	99.4%	99.3%	99.0%	104.1%

RGB Bar Chart

This chart also displays gray scale performance, but breaks out the contributions of red, green, and blue. Ideally, all three colors should equal at 100% + - 4% across the entire range.


	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	Mean
R	108.0%	92.3%	94.3%	96.3%	98.4%	99.8%	100.1%	99.6%	99.9%	100.2%	99.3%	98.9%
G	95.3%	101.6%	101.3%	100.9%	100.5%	100.0%	100.0%	100.1%	100.0%	99.9%	100.2%	103.4%
B	123.4%	107.0%	104.3%	101.8%	99.7%	101.0%	99.7%	100.1%	100.0%	100.6%	100.3%	103.4%

	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	Mean
R	111.8%	97.2%	100.3%	98.4%	100.6%	100.0%	100.4%	99.4%	100.2%	100.4%	100.3%	100.8%
G	93.8%	99.9%	99.3%	100.2%	99.7%	99.8%	99.9%	100.2%	100.0%	99.9%	100.0%	104.1%
B	126.6%	109.0%	106.0%	102.5%	101.6%	101.7%	100.3%	100.2%	99.4%	99.3%	99.0%	104.1%

Primary/Secondary Colors Hue, Saturation, and Lightness Error

These charts display the before/after color errors of the primary/secondary colors in terms of the three visible components of color: Hue, Saturation, and Lightness (HSL). Ideally, all primary and secondary colors should have no more than 2% error in any component.
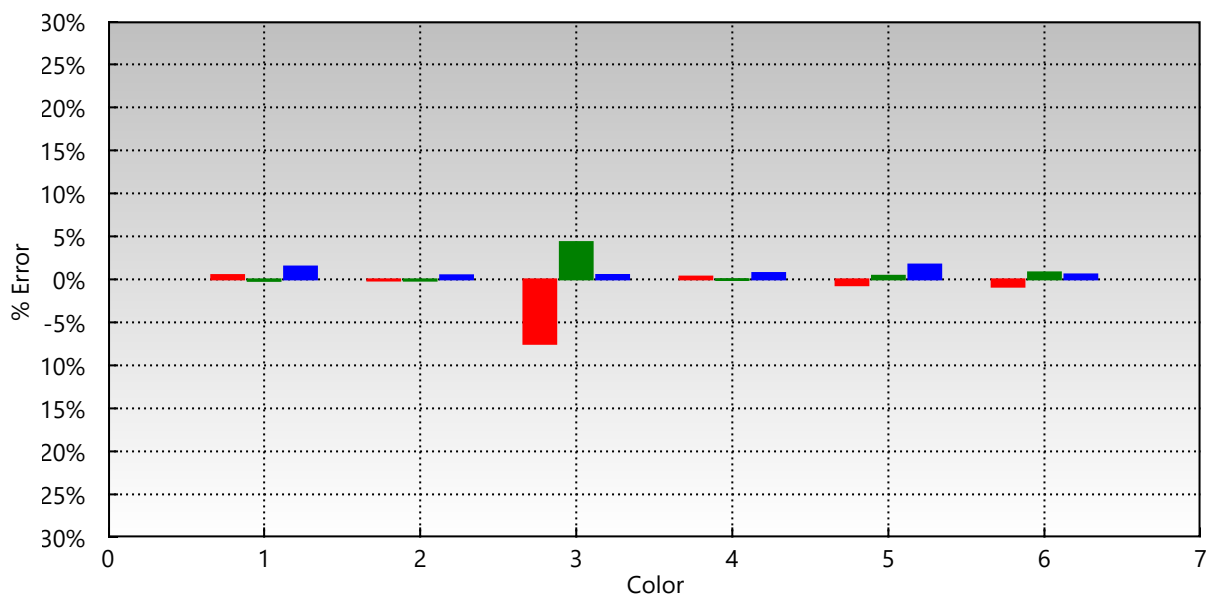
	Red	Green	Blue	Yellow	Cyan	Magenta
Lightness	0.5%	-0.1%	-7.5%	0.3%	-0.7%	-0.8%
Saturation	-0.2%	-0.1%	4.3%	0.0%	0.4%	0.8%
Hue	1.5%	0.5%	0.5%	0.7%	1.7%	0.6%
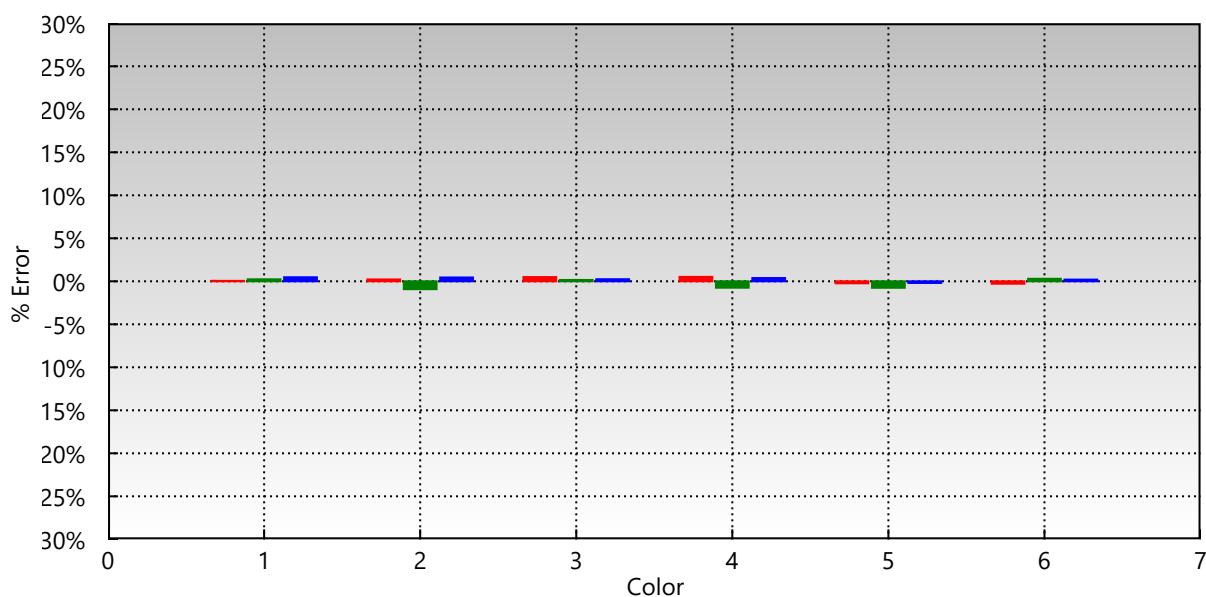
	Red	Green	Blue	Yellow	Cyan	Magenta
Lightness	0.1%	0.2%	0.5%	0.5%	-0.2%	-0.3%
Saturation	0.2%	-0.9%	0.2%	-0.7%	-0.8%	0.3%
Hue	0.5%	0.4%	0.2%	0.4%	-0.2%	0.2%

Primary/Secondary Colors dE Performance

The data below below shows the display's ability to accurately reproduce color as defined by the selected color difference model in ΔE units. CIE94 or CIEDE2000 should be 1.5 or less.
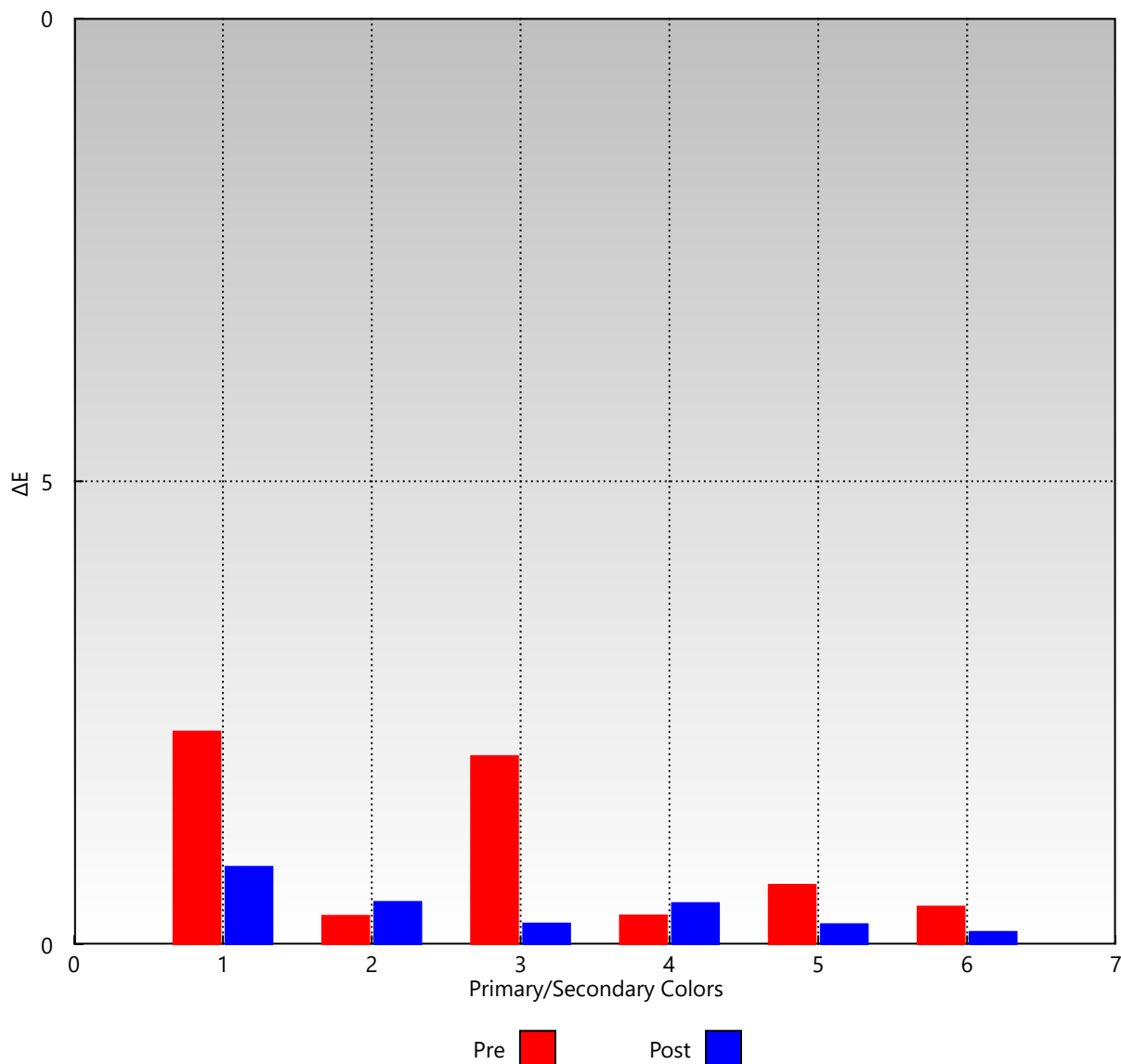
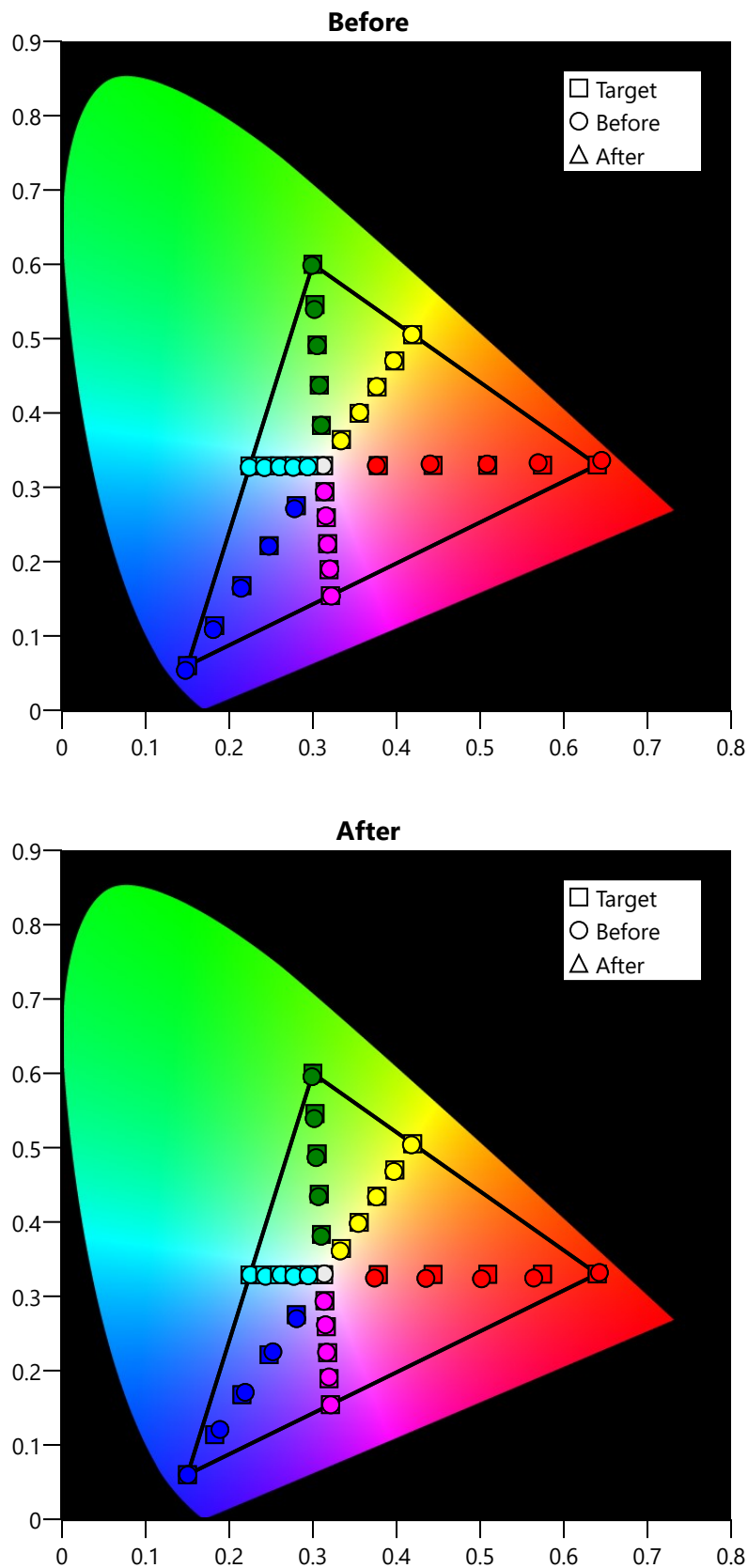|	Reference	Before		After	
	xyY	**xyY**	**ΔE**	**xyY**	**ΔE**
Red	0.6400, 0.3300, 0.1123	0.6452, 0.3361, 0.1135	2.3	0.6425, 0.3319, 0.1124	0.8
Green	0.3000, 0.6000, 0.3776	0.2987, 0.5985, 0.3764	0.3	0.2989, 0.5954, 0.3796	0.5
Blue	0.1500, 0.0600, 0.0381	0.1475, 0.0537, 0.0333	2.0	0.1505, 0.0597, 0.0384	0.2
Yellow	0.4193, 0.5052, 0.4899	0.4184, 0.5057, 0.4938	0.3	0.4178, 0.5038, 0.4961	0.4
Cyan	0.2247, 0.3288, 0.4157	0.2239, 0.3269, 0.4088	0.6	0.2254, 0.3290, 0.4133	0.2
Magenta	0.3209, 0.1542, 0.1504	0.3221, 0.1537, 0.1476	0.4	0.3213, 0.1540, 0.1495	0.1
White	0.3127, 0.3290, 1.0000	0.3121, 0.3291, 68.1178	0.3	0.3136, 0.3302, 66.5704	0.6
			Mean: 0.9		**Mean: 0.4**

Color Saturations

This shows the ability of the display to reproduce color accurately throughout the entire gamut, rather than just at the gamut boundary.

Before

After

Saturations ΔE

Before

After

Color	ΔE Before	ΔE After
Red	2.3	0.8
Green	0.3	0.5
Blue	2.0	0.2
Yellow	0.3	0.4
Cyan	0.6	0.2
Magenta	0.4	0.1
Red 80%	0.7	1.6
Red 60%	0.4	1.5
Red 40%	0.6	1.4
Red 20%	0.4	1.2
Green 80%	0.6	0.6
Green 60%	0.2	0.6
Green 40%	0.2	0.5
Green 20%	0.2	0.5
Blue 80%	1.1	1.6
Blue 60%	0.7	1.1
Blue 40%	0.1	1.1
Blue 20%	0.6	1.2
Yellow 80%	0.5	0.7
Yellow 60%	0.5	0.7
Yellow 40%	0.4	0.6
Yellow 20%	0.5	0.8
Cyan 80%	0.8	0.7
Cyan 60%	0.6	0.5
Cyan 40%	0.8	0.7
Cyan 20%	0.6	0.6
Magenta 80%	0.2	0.6
Magenta 60%	0.3	0.6
Magenta 40%	0.5	0.9
Magenta 20%	0.2	0.9
Mean	**0.6**	**0.8**