TV Energy Assessment System

Energy Efficiency Test Report

LG UN55FD

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1. Test Specifics

Test Information	
Test Start Date	10-Mar-2021
Tester Name	ryan
Lab Name	demo
Lab Address	111 s st
Background Ambient Light (lx)	
Humidity (%)	10
Temperature (°C)	
TV Model Info	
Make	lg
Model	un55fd
Model Year	2020
Serial Number	555ddd
Software Version	1.1.1
Manufacture Year	2020
Manufacture Month (1-12)	
Screen Width (in)	
Screen Height (in)	
Screen Diagonal (in)	
Screen Area (sq in)	1700
Pixel Rows	1080
Pixel Columns	1920
Total Pixels	2073600
Technology Type	
TV Configuration	
Wake by Cast	
Remote Start	
Wake by Smart Speaker	
Standby Notes	
High Contrast Ratio	
MDD Availability	
MDD Configuration	

2. Compliance

This section calculates Standby and On Mode compliance levels according to ENERGY STAR Televisions Version 9.0 Draft 2 with September 9 HCR Limited Topic Proposal

2.1 Standby Summary

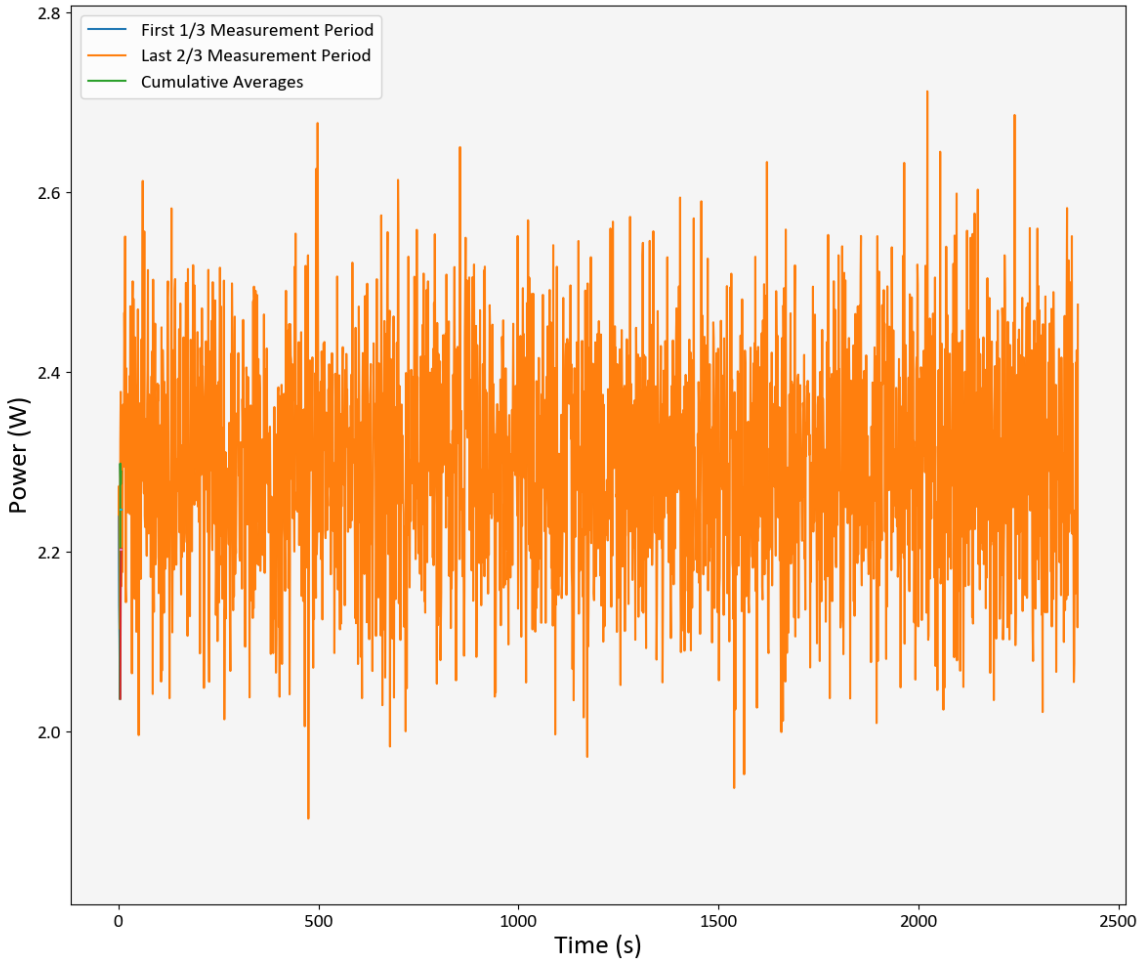
standby_active_low was not run for the full required test time

PPS Measurement	Test Name	Wake Time (s)	Power Limit (W)	Avg Power (W)	Result
$P_{PARTIAL-ON-MODE}$	partial_on_mode	9.0	1	2.2	Incomplete
$P_{PARTIAL-ON-MODE}$	standby_active_low	9.0	1	2.3	Incomplete

The measured power must be less than or equal to the power limit to comply.

The standby test did not meet all of the following stability criteria laid out in CTA/ANSI-2037-C:
"After the UUT has been powered down, begin measuring power at intervals of 1 second or shorter. Continue measuring power until the cumulative average of all data points taken during the last third of the measurement period fall within +/- 1% or +/- 10 mW, whichever is greater, of the average of the last two thirds of the total measurement period. The total measurement period shall not be less than 60 minutes, and not greater than 240 minutes. Determine the average power by calculating the average power reading during the last two thirds of the total measurement period."

2.1.1 Standby Chart


First 1/3 Measurement Period
Last 2/3 Measurement Period
Cumulative Averages
Power (W)
Time (s)
2.8
2.6
2.4
2.2
2.0
0
500
1000
1500
2000
2500

2.2 On Mode Summary

PPS Measurement	Test Name	Preset Picture	ABC	Illuminance (lx)	Avg Luminance (cd/m2)	Power Limit (W)	Avg Power (W)	Power Limit Difference (Limit - Power)
	default	aps	off	N/A	1.5		3.0	
$P_{oa\_Default}$*				N/A	20.0	45.6	158.0	-112.4
	brightest	vivid	off	N/A	1.8		3.6	
$P_{oa\_Brightest}$*				N/A	20.0	45.2	158.0	-112.8
	hdr10	standard	off	N/A	2.0		3.9	
P_{oa_HDR10}*				N/A	10.0	54.8	74.2	-19.4
Average				N/A				-81.5

* PPS Measurement evaluated at certification limit for luminance

Average Power Limit Difference must be positive to comply.

PPS Measurement Power and Luminance Calculation
If PPS is evaluated with ABC on, measured power and luminance are equal to the average of the four ABC On test value.s
If PPS is evaluated with ABC off, measured power and luminance are are equal to the ABC off test values.
PPS Measurement Luminance values which fall below the certification limit for luminance (20 nits for Default and Brightest, 10 for HDR) are raised to the certification limit and power values are interpolated to the certification limit.

TV Information
TV Area: 1700.0 sq. in.
Total Pixels: 2073600
Is HCR TV: False
Adjustment Factor: 0.764

Adjustment Factor Calculation
adjustment_factor = HCR_Coeff * 0.0469 * total_pixels$^{0.1946}$ / 1.0413

HCR Coefficient Calculation
HCR_Coeff = 1.12 If HCR TV, else 1

Equations Used For Compliance Determination
For reference purposes only

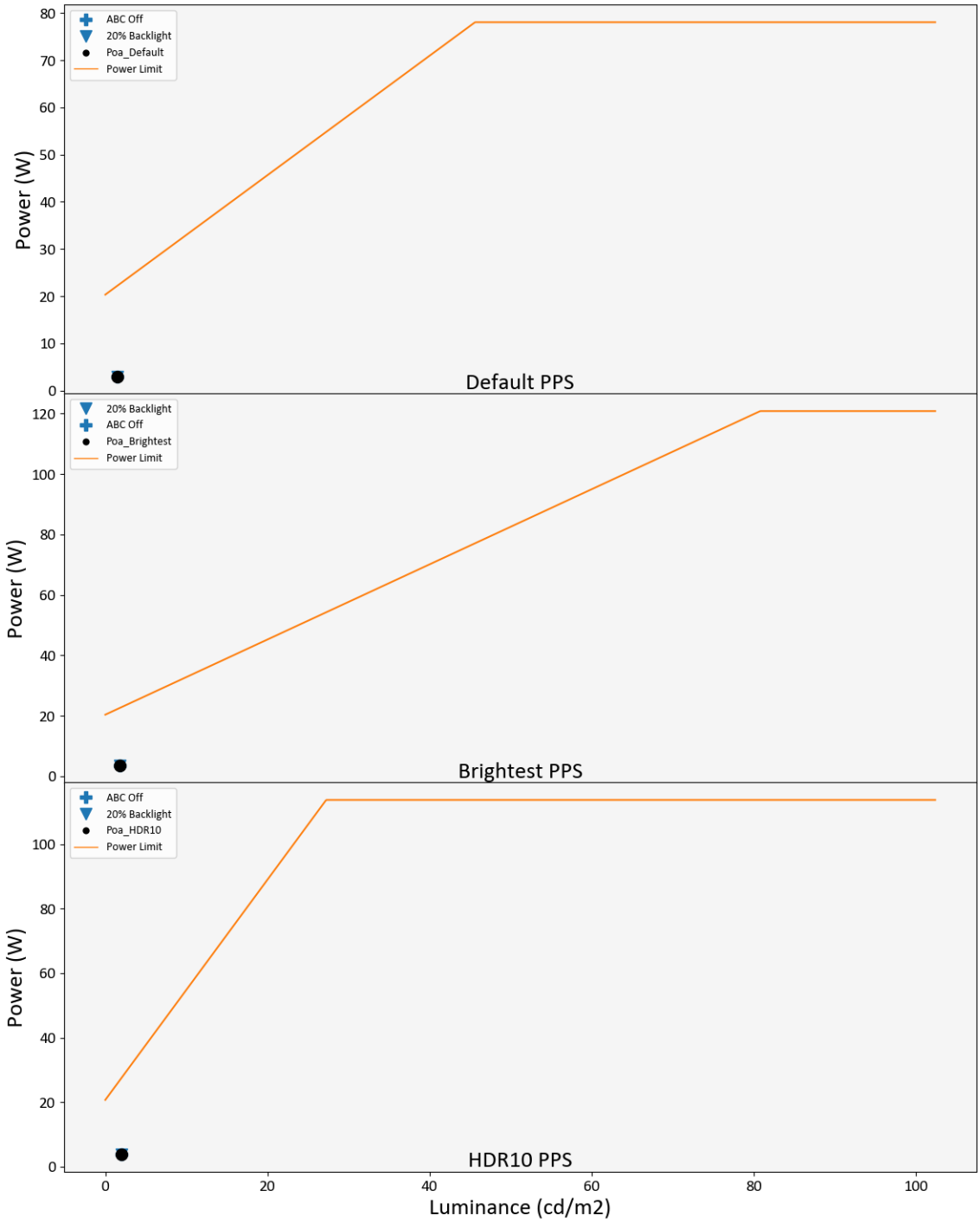
Default PPS Power Limit Function
Minimum of:
• adjustment_factor*0.94*((0.001*area+0.57)*luminance + 0.005*area + 18.97)
• adjustment_factor*1.15*((0.025*area)+46.590)

Brightest PPS Power Limit Function
Minimum of:
• adjustment_factor*0.94*((0.001*area+0.54)*luminance + 0.005*area + 19.84)
• adjustment_factor*1.15*((0.057*area)+40.704)

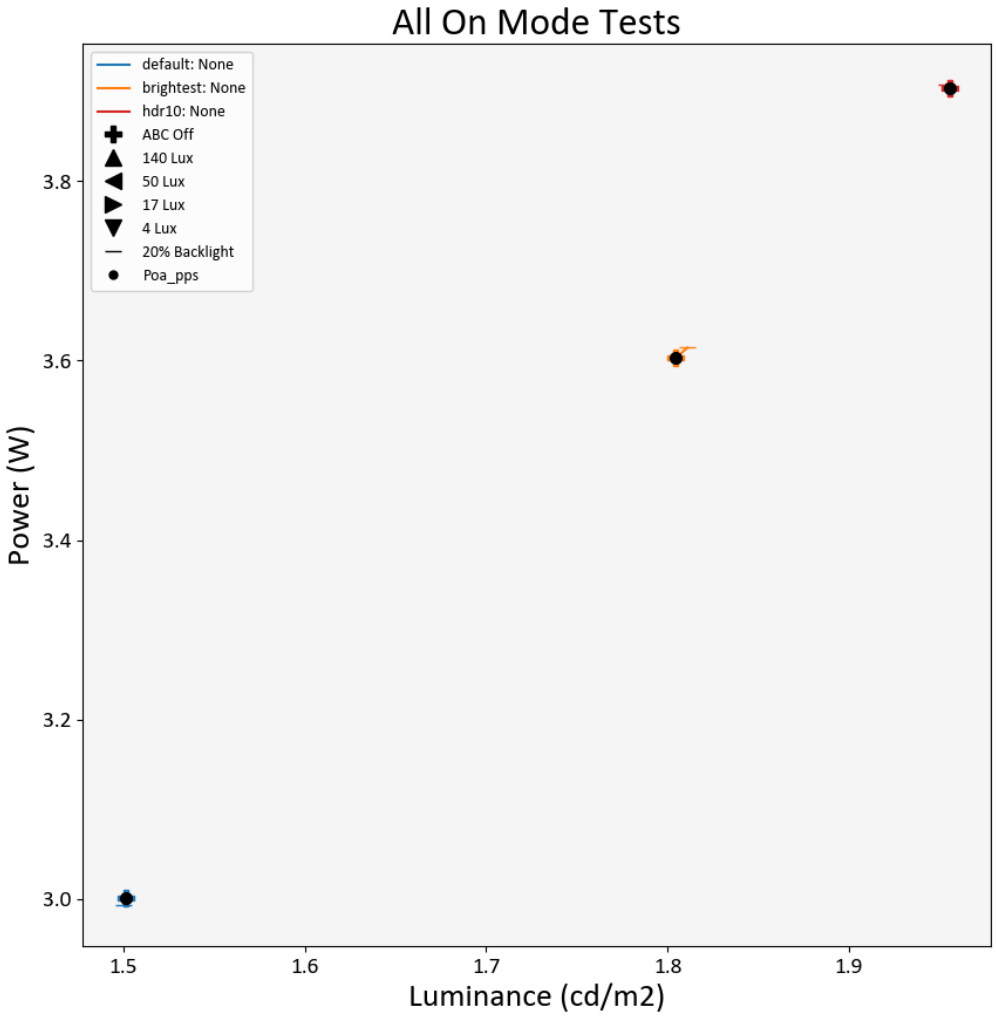
HDR Default PPS Power Limit Function
Minimum of:
• adjustment_factor*0.94*((0.002*area+1.87)*luminance + 0.007*area + 17.11)

- adjustment_factor*1.15*((0.058*area)+31.607)

2.2.1 On Mode Charts



2.3 All On Mode Tests Chart

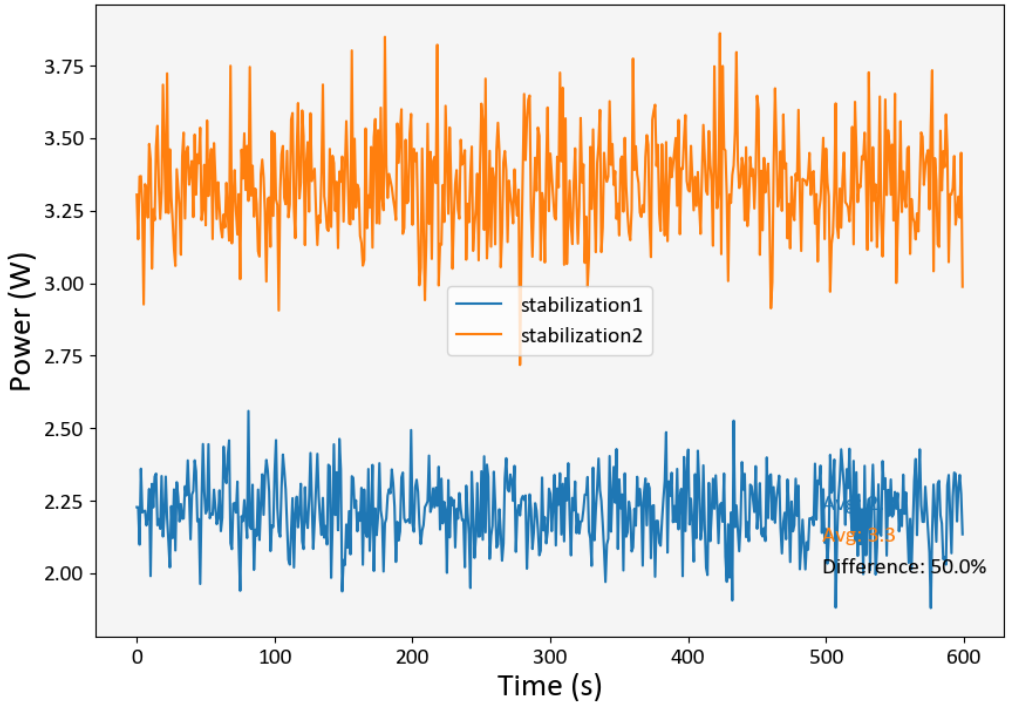


3. Supplemental Test Results

These test results are not used for compliance determination. They provide visibility into TV stabilization and other metrics possibly related to energy efficient design.

3.1 Stabilization

Test Name	Test Time (s)	Video	Avg APL' (%)	ABC	Illuminance (lx)	Preset Picture	Avg Luminance (cd/m2)	Avg Power (W)
stabilization1	600	IEC SDR	34.5	off	N/A	aps	1.1	2.2
stabilization2	600	IEC SDR	34.5	off	N/A	aps	1.7	3.3

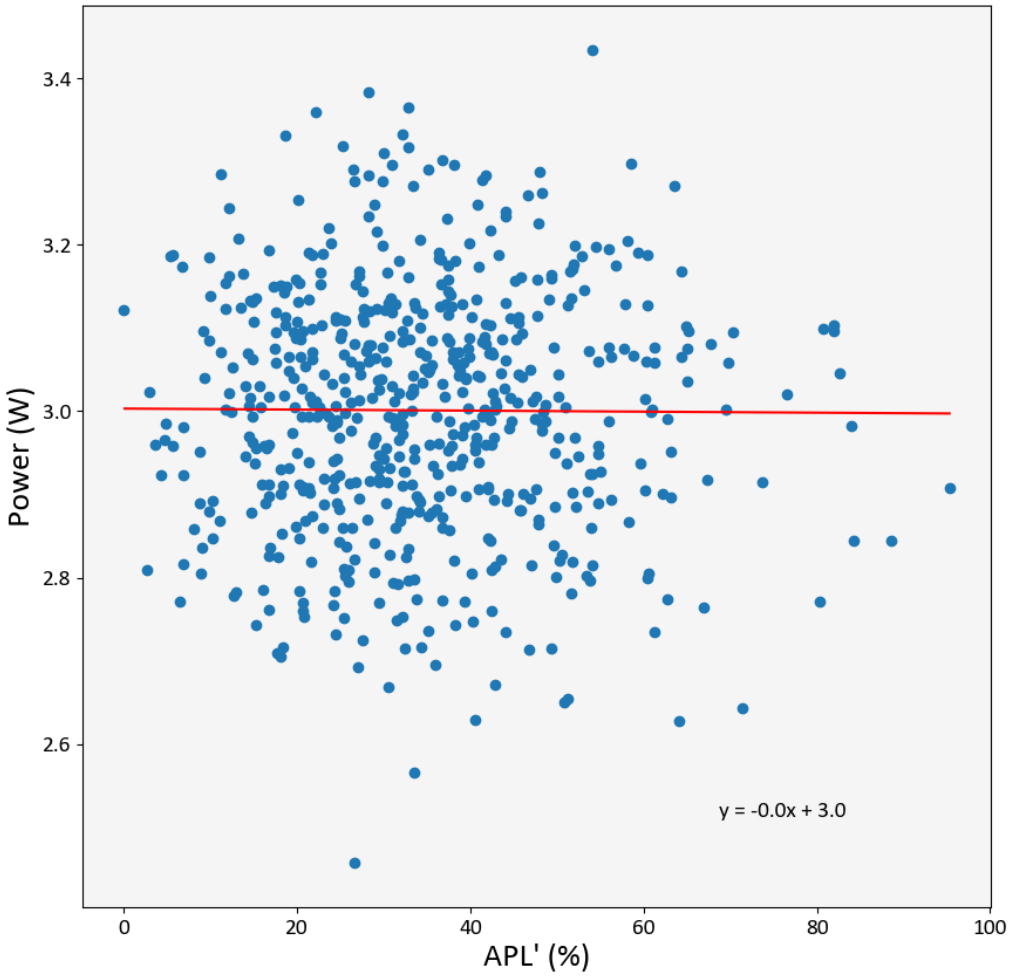


3.2 APL' vs Power Charts

These charts provide information about the relationship between APL', pre-gamma Average Picture Level as defined in IEC 62087, and TV power level. This data shows the extent to which the tested TV scales power to picture level, an indication of the level of local dimming performed. These charts are not used for compliance determination.

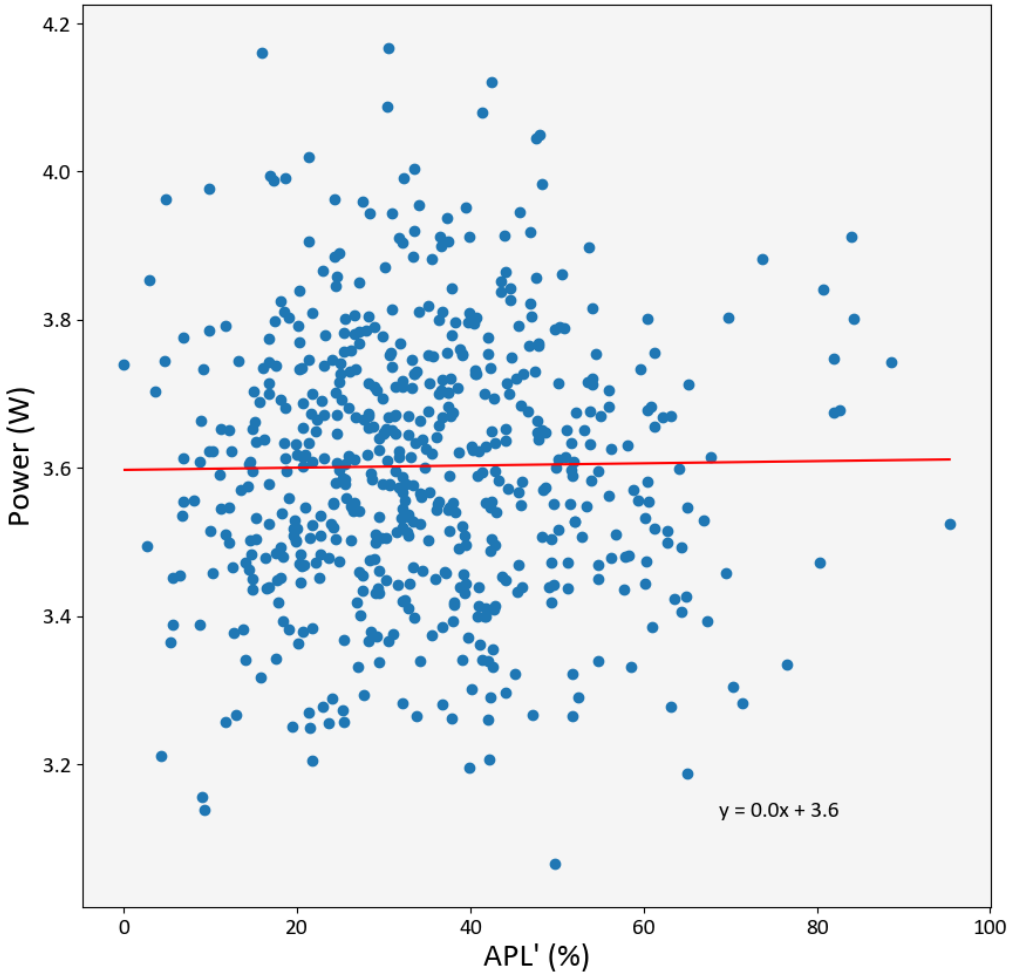
3.2.1 Default PPS: SDR

Test Name	Test Time (s)	Video	Avg APL' (%)	ABC	Illuminance (lx)	Preset Picture	Avg Luminance (cd/m2)	Avg Power (W)
default	600	IEC SDR	34.5	off	N/A	aps	1.5	3.0



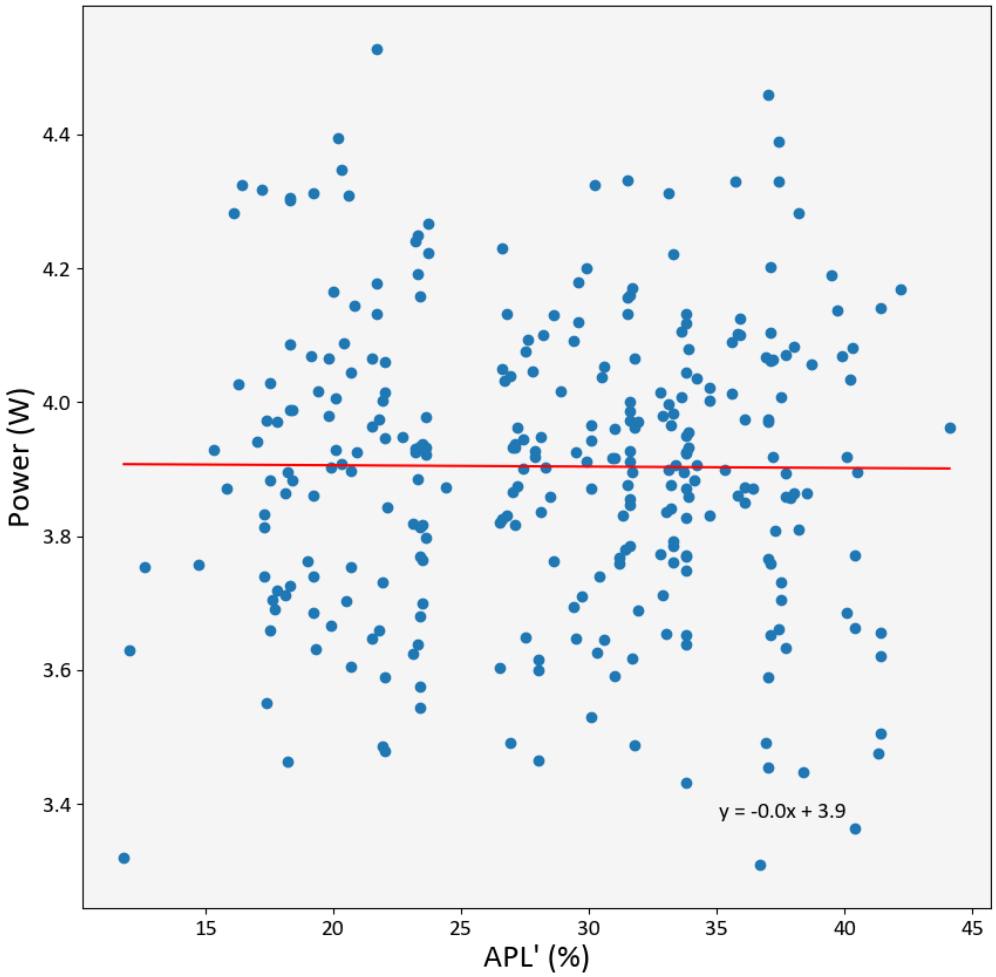
3.2.2 Brightest PPS: SDR

Test Name	Test Time (s)	Video	Avg APL' (%)	ABC	Illuminance (lx)	Preset Picture	Avg Luminance (cd/m2)	Avg Power (W)
brightest	600	IEC SDR	34.5	off	N/A	vivid	1.8	3.6



3.2.3 Default PPS: HDR

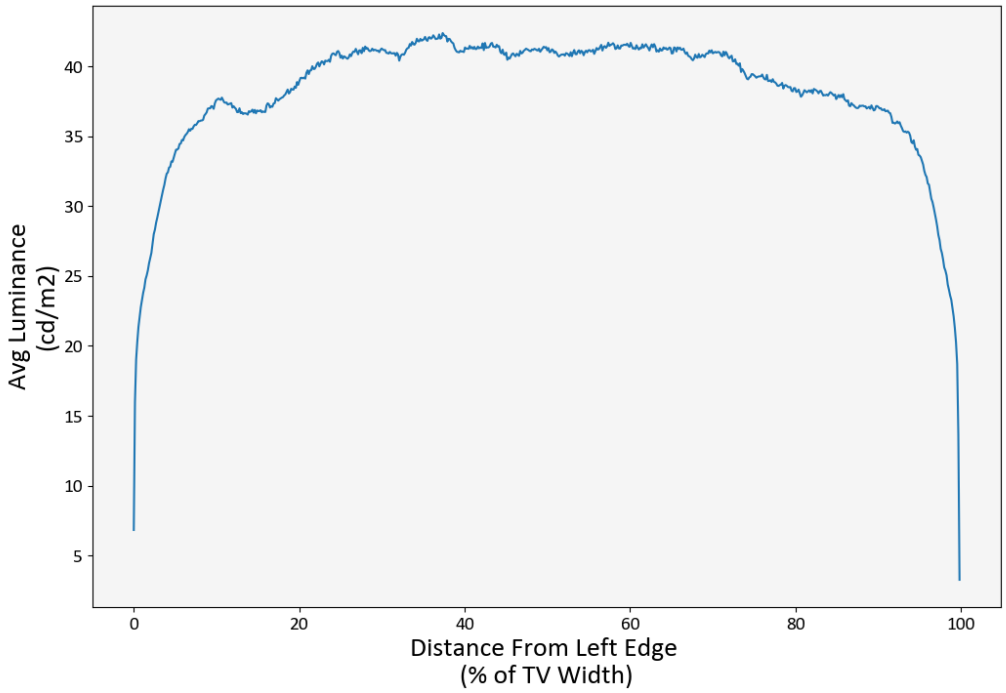
Test Name	Test Time (s)	Video	Avg APL' (%)	ABC	Illuminance (lx)	Preset Picture	Avg Luminance (cd/m2)	Avg Power (W)
hdr10	300	CLASP HDR10	28.7	off	N/A	standard	2.0	3.9



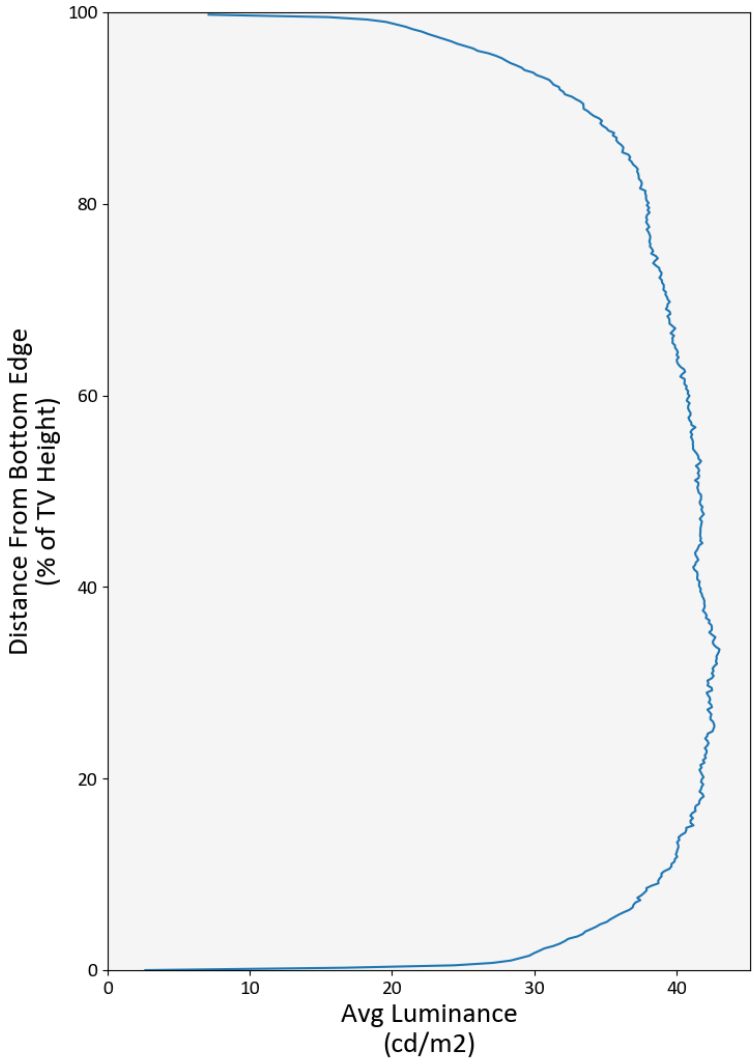
3.3 Gray Pattern Uniformity

This optional test is performed primarily to understand how much luminance drops-off towards the edge of the display due to pixel-level light directionality. The data examined has been corrected for image distortion (e.g. fish-eye effect) and vignetting. This data is not used for compliance determination.

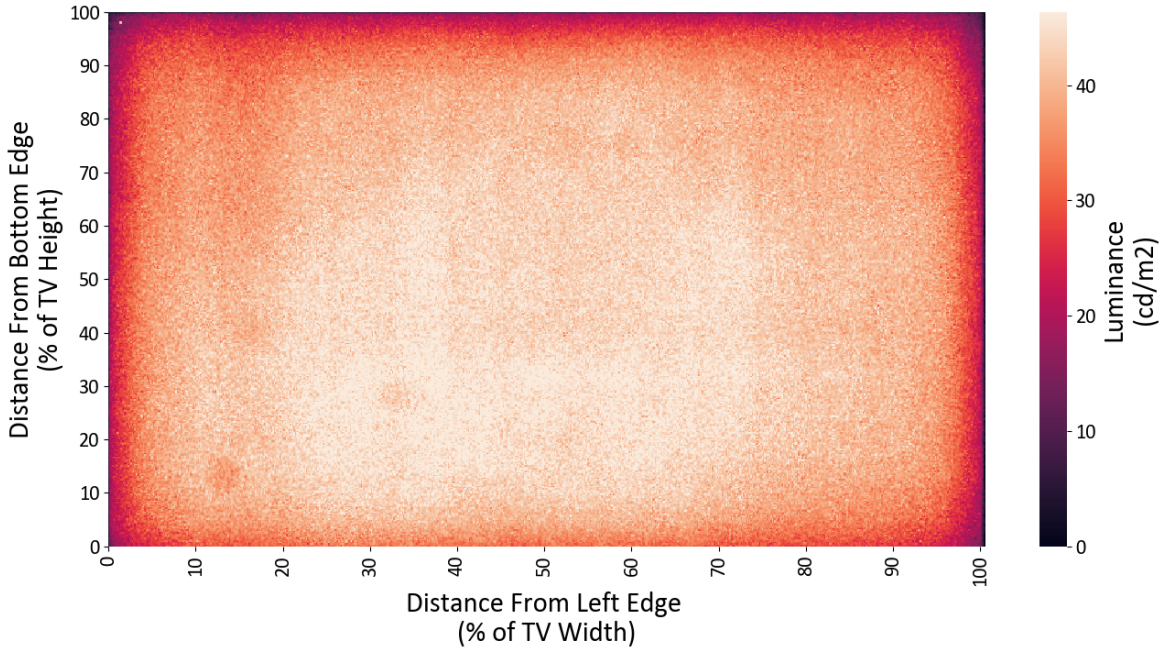
Average Luminance Along TV's Horizontal Axis



Average Luminance Along TV's Vertical Axis



Luminance Heatmap



4. Test Results Table

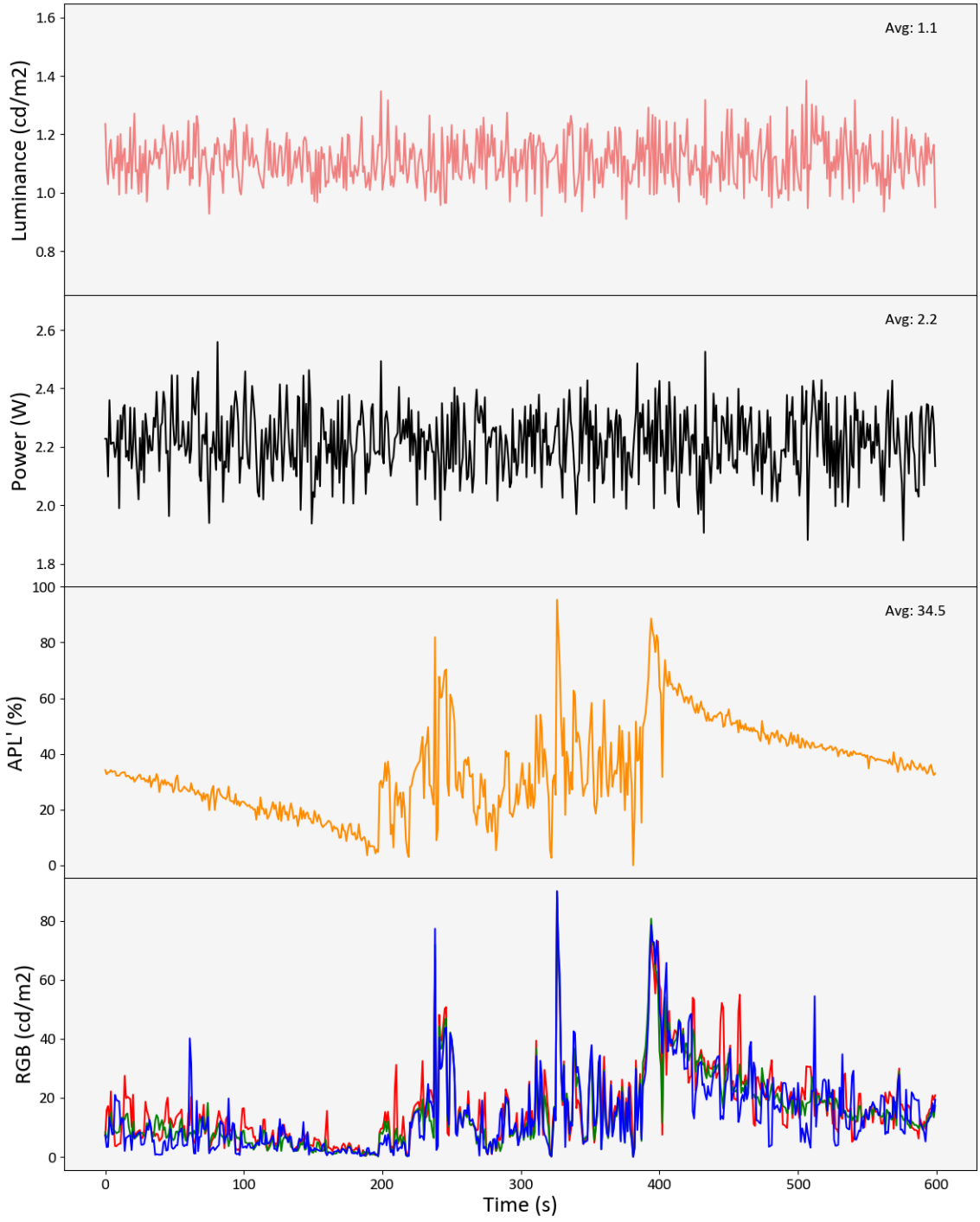
Summary results of all tests in tabular format.

Test Name	Test Time (s)	Video	Avg APL' (%)	ABC	Illuminance (lx)	Preset Picture	Wake Time (s)	Avg Luminance (cd/m2)	Avg Power (W)
stabilization1	600	IEC SDR	34.5	off	N/A	aps		1.1	2.2
stabilization2	600	IEC SDR	34.5	off	N/A	aps		1.7	3.3
default	600	IEC SDR	34.5	off	N/A	aps		1.5	3.0
brightest	600	IEC SDR	34.5	off	N/A	vivid		1.8	3.6
hdr10	300	CLASP HDR10	28.7	off	N/A	standard		2.0	3.9
default_low_backlight	600	IEC SDR	34.5	off	N/A	aps		1.5	3.0
brightest_low_backlight	600	IEC SDR	34.5	off	N/A	vivid		1.8	3.6
hdr10_low_backlight	300	CLASP HDR10	28.7	off	N/A	standard		2.0	3.9
partial_on_mode	9		0.0		N/A		9.0	-1.0	2.2
standby_active_low	2400		0.0		N/A		9.0	-1.0	2.3

5. Plots of All Tests

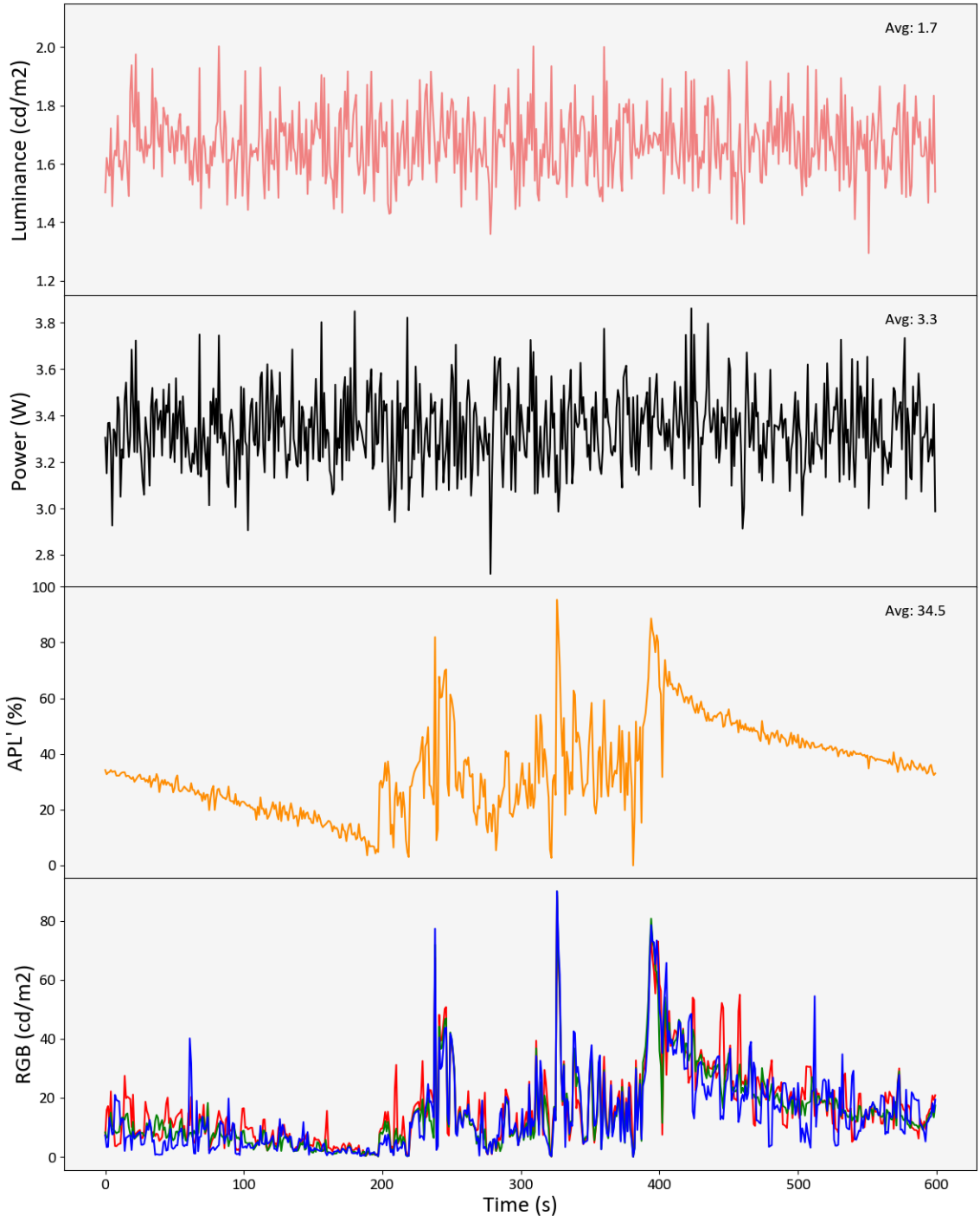
Test 2.1 - stabilization1

Test Name	Test Time (s)	Video	Avg APL' (%)	ABC	Illuminance (lx)	Preset Picture	Avg Luminance (cd/m2)	Avg Power (W)
stabilization1	600	IEC SDR	34.5	off	N/A	aps	1.1	2.2



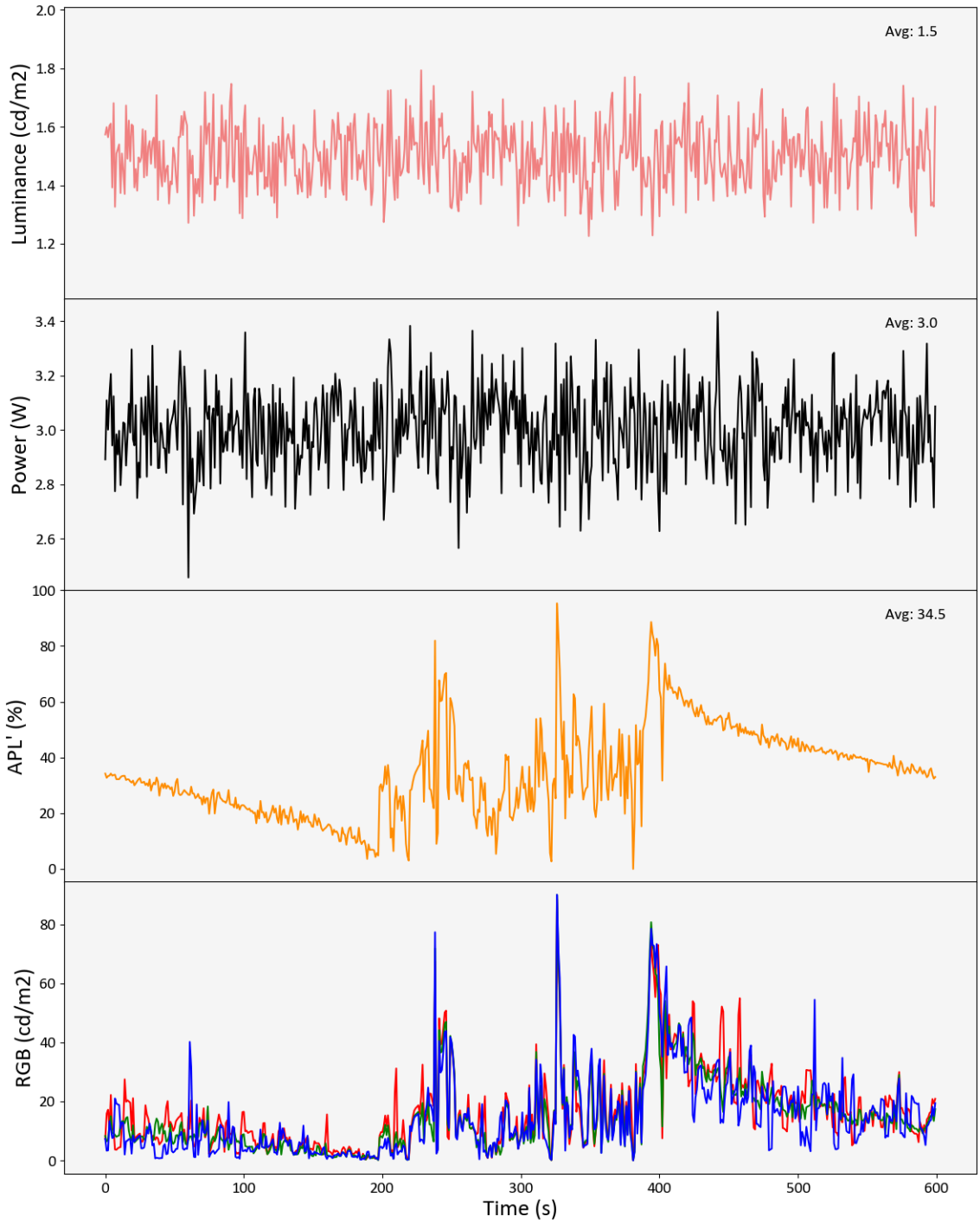
Test 2.2 - stabilization2

Test Name	Test Time (s)	Video	Avg APL' (%)	ABC	Illuminance (lx)	Preset Picture	Avg Luminance (cd/m2)	Avg Power (W)
stabilization2	600	IEC SDR	34.5	off	N/A	aps	1.7	3.3



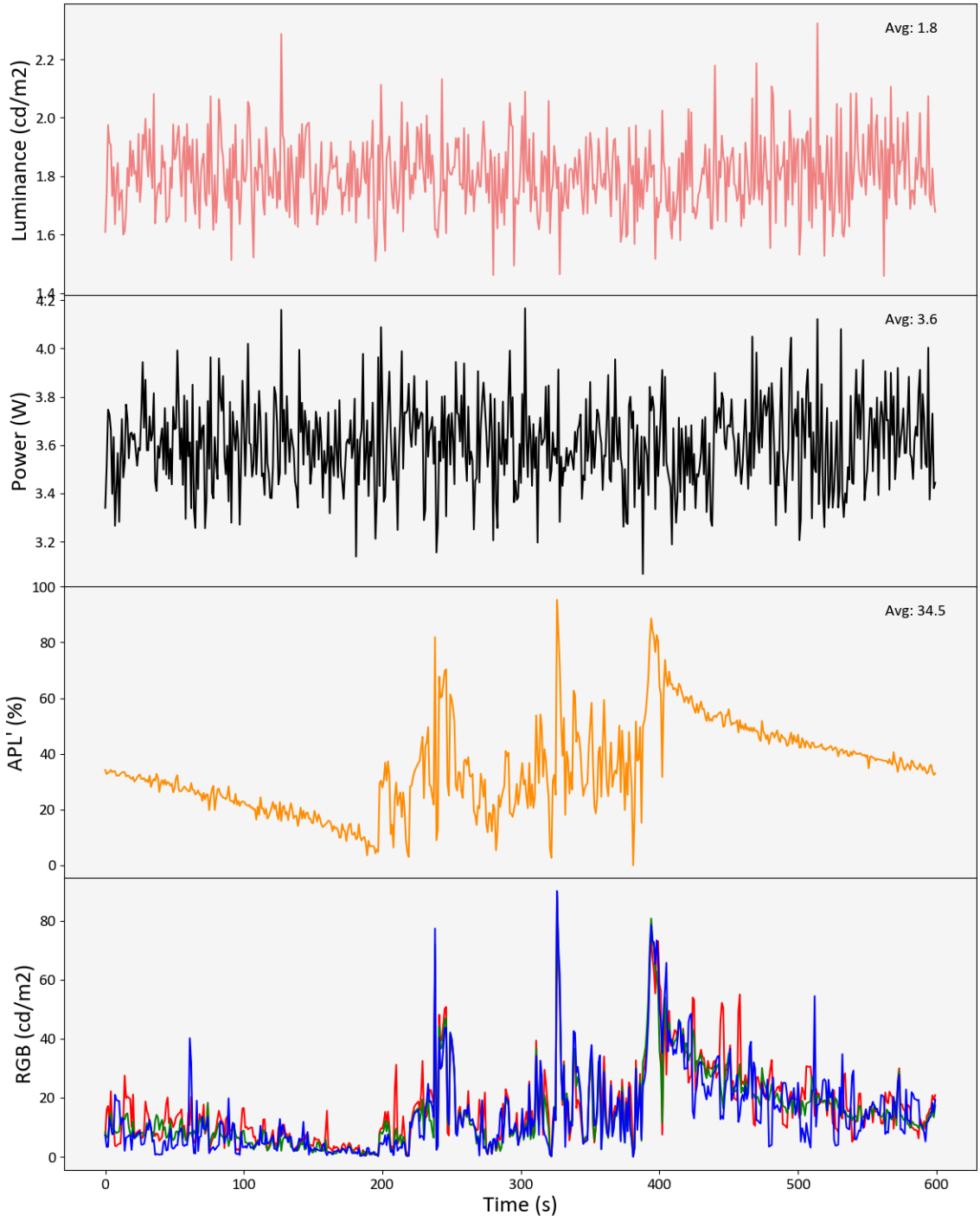
Test 4 - default

Test Name	Test Time (s)	Video	Avg APL' (%)	ABC	Illuminance (lx)	Preset Picture	Avg Luminance (cd/m2)	Avg Power (W)
default	600	IEC SDR	34.5	off	N/A	aps	1.5	3.0



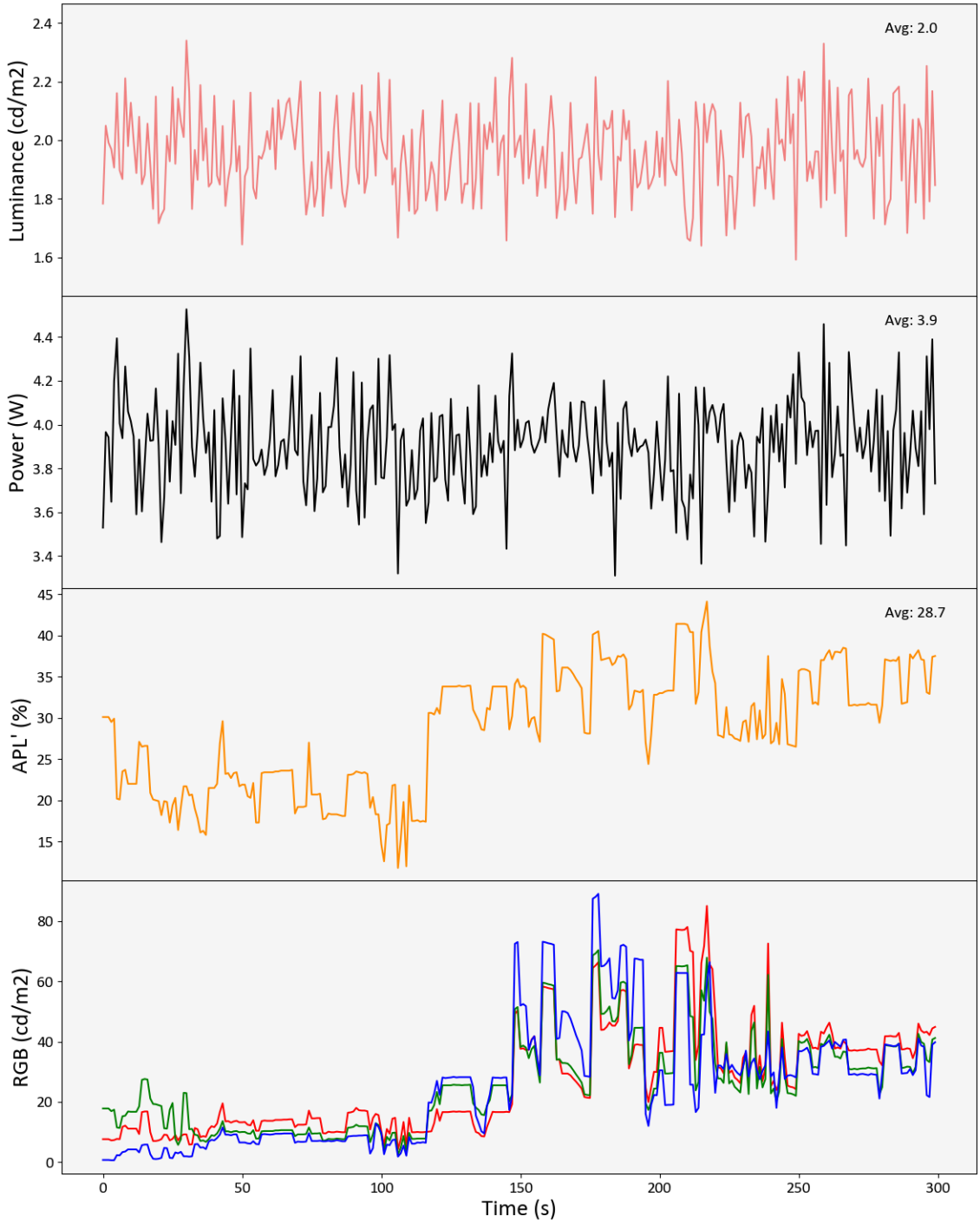
Test 5 - brightest

Test Name	Test Time (s)	Video	Avg APL' (%)	ABC	Illuminance (lx)	Preset Picture	Avg Luminance (cd/m2)	Avg Power (W)
brightest	600	IEC SDR	34.5	off	N/A	vivid	1.8	3.6



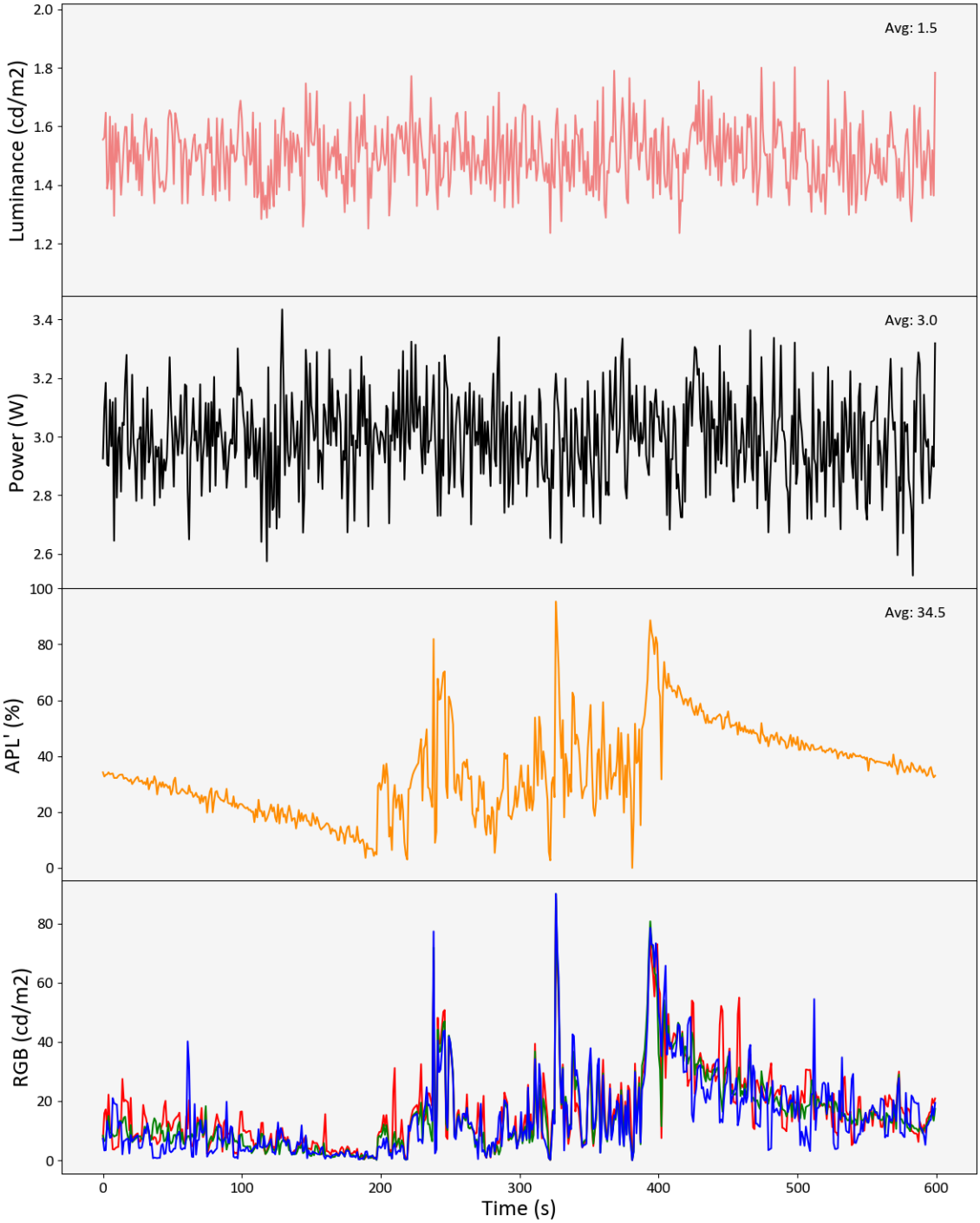
Test 6 - hdr10

Test Name	Test Time (s)	Video	Avg APL' (%)	ABC	Illuminance (lx)	Preset Picture	Avg Luminance (cd/m2)	Avg Power (W)
hdr10	300	CLASP HDR10	28.7	off	N/A	standard	2.0	3.9



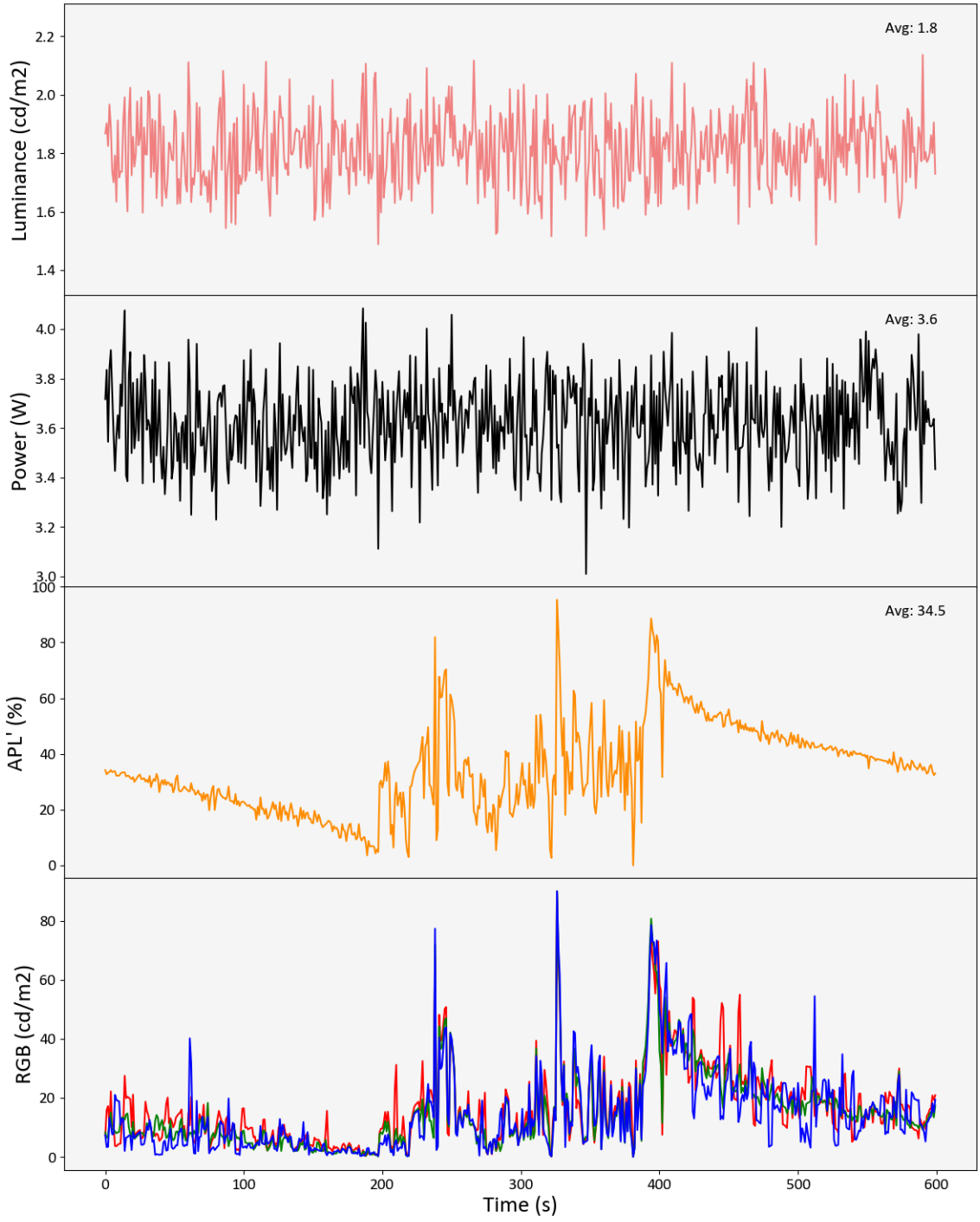
Test 7 - default_low_backlight

Test Name	Test Time (s)	Video	Avg APL' (%)	ABC	Illuminance (lx)	Preset Picture	Avg Luminance (cd/m2)	Avg Power (W)
default_low_backlight	600	IEC SDR	34.5	off	N/A	aps	1.5	3.0



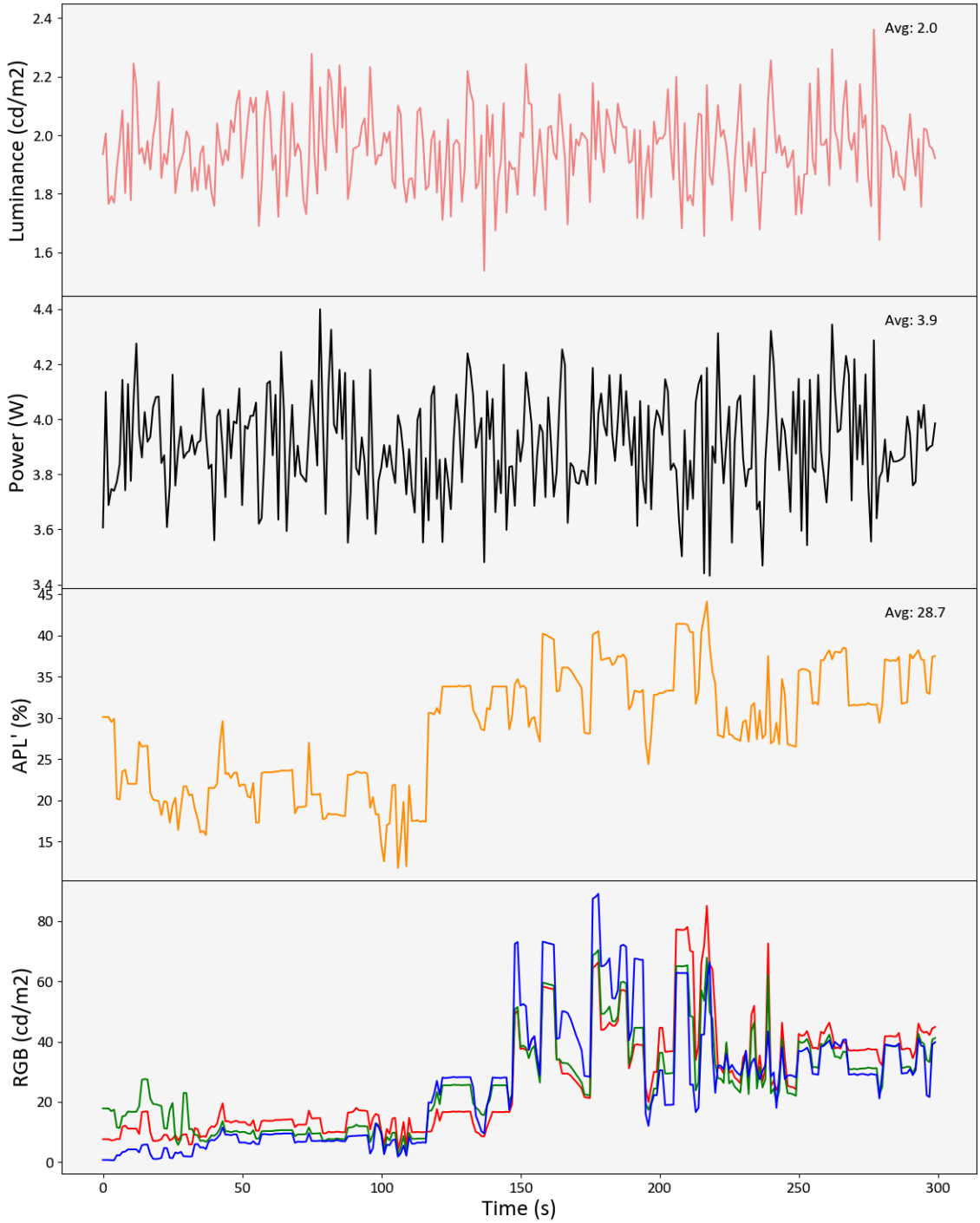
Test 8 - brightest_low_backlight

Test Name	Test Time (s)	Video	Avg APL' (%)	ABC	Illuminance (lx)	Preset Picture	Avg Luminance (cd/m2)	Avg Power (W)
brightest_low_backlight	600	IEC SDR	34.5	off	N/A	vivid	1.8	3.6



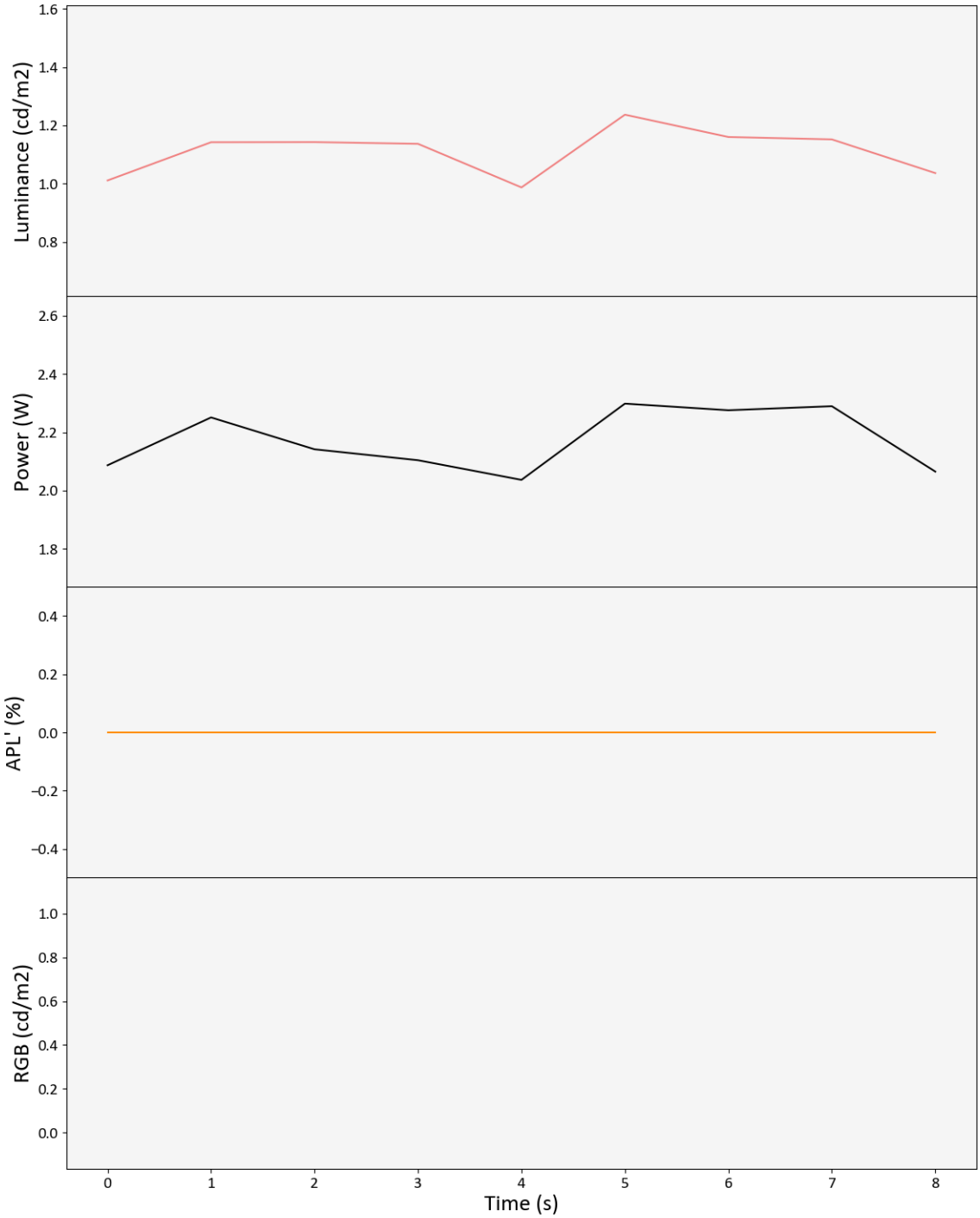
Test 9 - hdr10_low_backlight

Test Name	Test Time (s)	Video	Avg APL' (%)	ABC	Illuminance (lx)	Preset Picture	Avg Luminance (cd/m2)	Avg Power (W)
hdr10_low_backlight	300	CLASP HDR10	28.7	off	N/A	standard	2.0	3.9



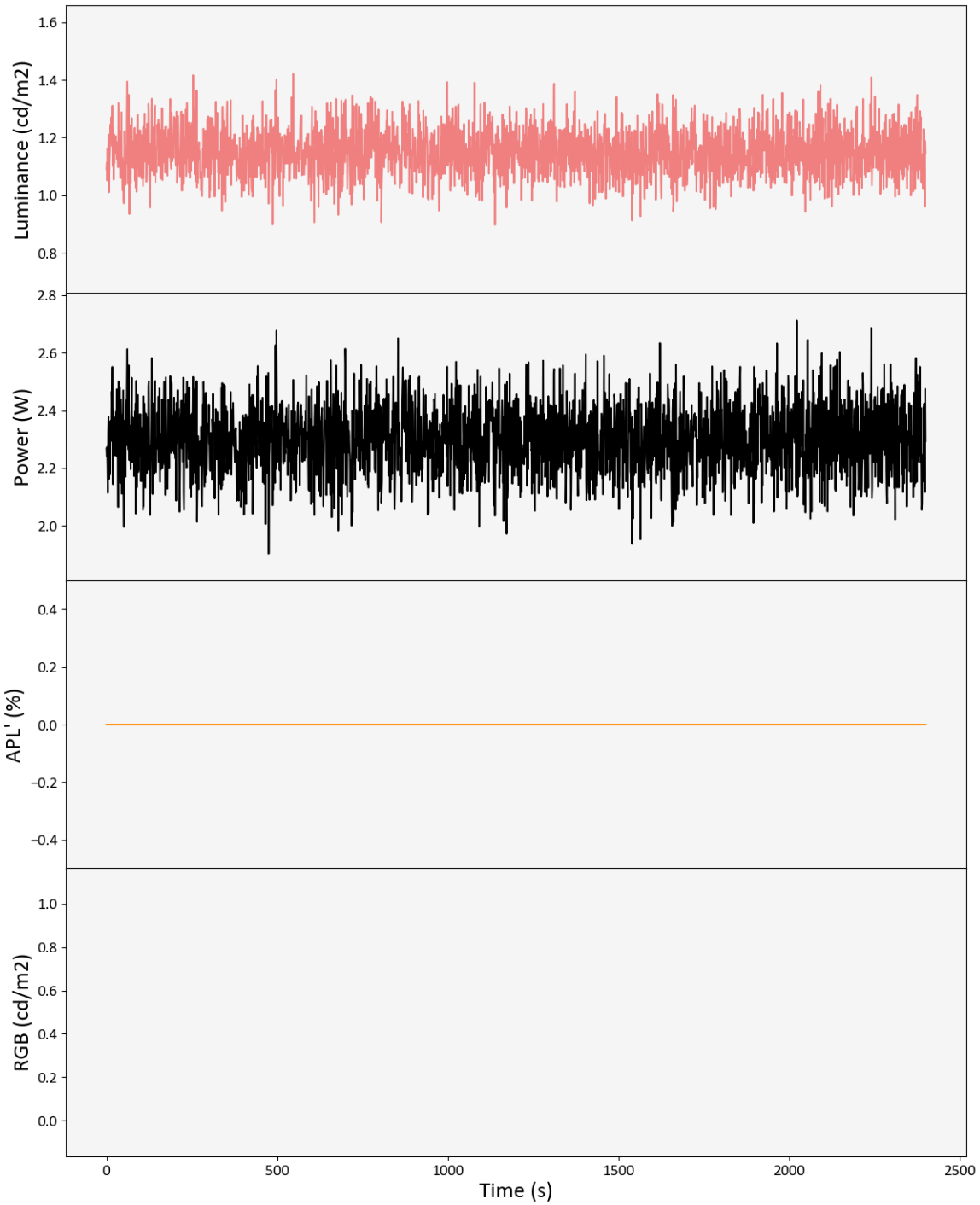
Test 10 - partial_on_mode

Test Name	Test Time (s)	Avg APL' (%)	Illuminance (lx)	Wake Time (s)	Avg Luminance (cd/m2)	Avg Power (W)
partial_on_mode	9	0.0	N/A	9.0	-1.0	2.2



Test 11 - standby_active_low

Test Name	Test Time (s)	Avg APL' (%)	Illuminance (lx)	Wake Time (s)	Avg Luminance (cd/m2)	Avg Power (W)
standby_active_low	2400	0.0	N/A	9.0	-1.0	2.3



6. Appendix

6.1 Setup Images

Tag: 2

Tag: 2

6.2 Brightest PPS Determination Table

These measurements are taken with a the camera photometer playing the first minute of the IEC SDR clip with any ABC setting disabled.

PPS Name	Luminance (cd/m^2)
default SDR	10.0
brightest	30.0
movie	20.0
natural	25.0
dynamic	15.0