

LEOTEK Electronics USA LLC

TEST REPORT

SCOPE OF WORK

Intertek Traffic Signal ITE Program Certification Testing
of 15yr 8" Clear and Tinted Yellow Balls.

REPORT NUMBER

106115748CRT-001Y

ISSUE DATE

4-Apr-2025

PAGES

DOCUMENT CONTROL NUMBER

NA
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Test Report			
Company Name	LEOTEK Electronics USA LLC	Test Location	Intertek Testing Services NA
Address	1955 Lundy Avenue	Address	3933 US Rt 11
	San Jose, CA 95131		Cortland, NY 13045
			USA
Client Contact	Frank Saltani	Quote Number	Qu-01514894-1
Phone	408-380-1788 Ext. 202	Test Start Date	February 21, 2025
Email	frank@leotek.com	Completion Date	April 4, 2025

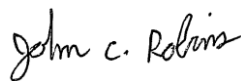
Standard(s)
ITE, Circular Signal Supplement, dated June 27, 2005.

Spec.	Test name	Clause	Tinted	Clear
			Result	
ITE	Conditioning	6.4.2	Pass	Pass
ITE	Mechanical Vibration	6.4.3.1	Pass	Pass*
ITE	Temperature Cycling	6.4.3.2	Pass	Pass
ITE	Moisture Resistance	6.4.3.3	Pass	Pass*
ITE	Luminous Intensity	6.4.4.1, 2,3,4	Pass	Pass
ITE	Luminance Uniformity	6.4.4.5	Pass	Pass
ITE	Chromaticity	6.4.4.6	Pass	Pass
ITE	Color Uniformity	6.4.4.7	Pass	Pass
ITE	Lens Abrasion	6.4.5.2	Pass	Pass
ITE	Current Consumption	6.4.6.1	Pass	Pass
ITE	Low Voltage Turn Off	6.4.6.2	Pass**	
ITE	Turn-on/Turn-off Times	6.4.6.3	Pass**	
ITE	Transient Voltage Immunity	6.4.6.4	Pass**	
ITE	Electronic Noise	6.4.6.5	Pass**	
ITE	Power Factor	6.4.6.6	Pass	Pass*
ITE	Total Harmonic Distortion	6.4.6.7	Pass	Pass*
ITE	Load Switch Compatibility	6.4.7.1	Pass**	
ITE	Off State Voltage Decay	6.4.7.2	Pass**	
ITE	Failed State Impedance	6.4.8	Pass**	

*The client states the clear lens model is exactly the same as the tinted model with the exception of the lens. As a result, the electrical testing for the clear is covered by the tinted results.

**Covered under Dialight test report 105587577CRT-002Y.

Results Key	
Pass	Compliant
Fail	Non-compliant
TBD	Compliance not determined
NT	Not tested in this project
NA	Test not applicable


John C. Robins
Engineer
Lighting


Christopher W. Metcalf
Engineering Supervisor
Lighting

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Sample Information				
Date Rec.	Intertek ID	Description	Condition	Model No.
2/17/25	CRT2502170837-013	15yr 8" Yellow Tinted Ball	Engineering	See Below
2/17/25	CRT2502170837-009	15yr 8" Yellow Clear Ball	Engineering	See Below

Note: Clear lenses provided.

Further Sample Description

Intertek Sample Number	Description	Model Number	Serial Number
CRT2502170837-013-7	8" Yellow Ball Tinted	433-3130-901XL15	A2412011818
CRT2502170837-013-8	8" Yellow Ball Tinted	433-3130-901XL15	A2412011819
CRT2502170837-013-9	8" Yellow Ball Tinted	433-3130-901XL15	A2412011820
CRT2502170837-009-1	8" Yellow Ball Clear	433-3170-901XL15	A2412011815
CRT2502170837-009-2	8" Yellow Ball Clear	433-3170-901XL15	A2412011816
CRT2502170837-009-3	8" Yellow Ball Clear	433-3170-901XL15	A2412011817

General Requirements

Intertek Sample Number	ETL Cert. Number	Label Identification	Lens Orientation	Color Coded Wires
CRT2502170837-013-7	NA	Pass	Pass	yellow/white
CRT2502170837-013-8	NA	Pass	Pass	yellow/white
CRT2502170837-013-9	NA	Pass	Pass	yellow/white
CRT2502170837-009-1	NA	Pass	Pass	yellow/white
CRT2502170837-009-2	NA	Pass	Pass	yellow/white
CRT2502170837-009-3	NA	Pass	Pass	yellow/white

General Requirements

Intertek Sample Number	600V / 20 AWG Min.	Wire Length $\geq$ 39"	Service Rating +105°C
CRT2502170837-013-7	600V / 18 AWG	Pass	Pass
CRT2502170837-013-8	600V / 18 AWG	Pass	Pass
CRT2502170837-013-9	600V / 18 AWG	Pass	Pass
CRT2502170837-009-1	600V / 18 AWG	Pass	Pass
CRT2502170837-009-2	600V / 18 AWG	Pass	Pass
CRT2502170837-009-3	600V / 18 AWG	Pass	Pass

Sample Modification Log	
Date	Modification description
2/21/25	AC Cable: Yellow/White_C-G000000017
	Waterproof Cable Gland : NYLCGL-H203BM
	Back Cover: C-A000000098
	Heat Sink: C-A000000093
	Metal PCB: C-E000000013
	Connector: CNRP4-A2001WRBS04P
	LED: LEDLXA-NCSA219BT01
	Thermistor: C-F000000023
	2nd Lens: C-F000000023
	SPS: 15y SPS_C-D000000001
	Power Clip_C-A000000092
	Fresnel Lens: PPCTSL-FL12C
	O-ring:_8" _PRBTSL-LG0806
	Gasket:_8" Gasket_AF1040100001
	Front Cover Tinted: PPCTSL-FC08YN1Z
	Front Cover Clear: PPCTSL-FC08WN1Z

Picture(s)



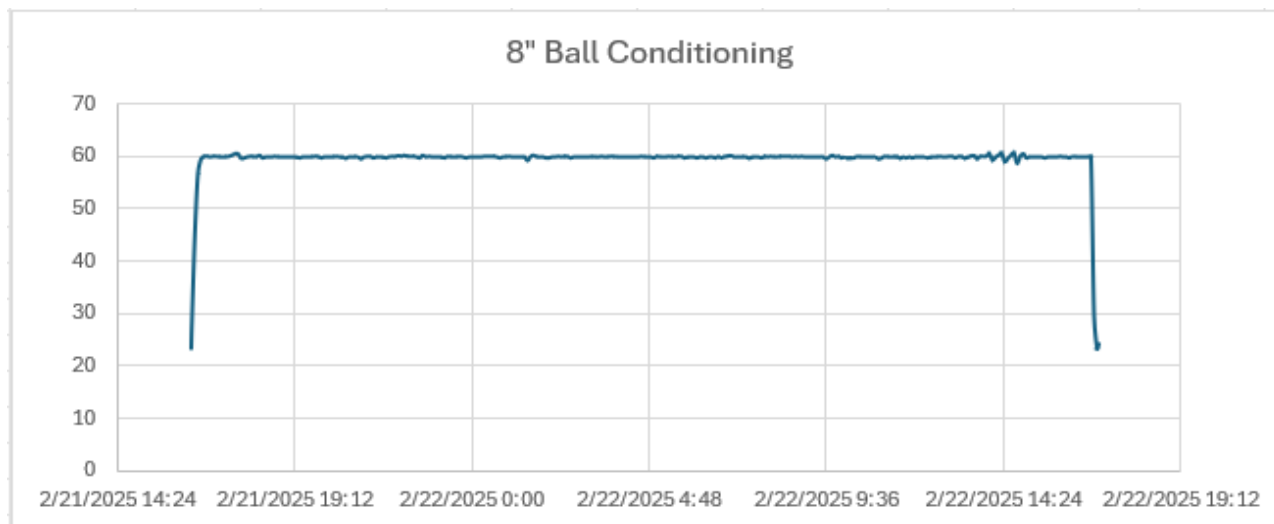
Note: The client supplied clear lenses for the modules, The clear lens model number is 433-3170-901XL15.

Conditioning 6.4.2

The submitted LED signal modules were subjected to conditioning prior to the environmental tests. The samples were energized for a minimum of 24 hours, at 100% duty cycle in an ambient temperature of +60°C (+140°F). At the conclusion of the test, the modules shall be visually inspected for damage and checked for proper operation.

Results

Intertek Sample Number	Description	Visual Inspection		Operational Check	
		Pre	Post	Pre	Post
CRT2502170837-013-7	8" Yellow Ball Tinted	Pass	Pass	Pass	Pass
CRT2502170837-013-8	8" Yellow Ball Tinted	Pass	Pass	Pass	Pass
CRT2502170837-013-9	8" Yellow Ball Tinted	Pass	Pass	Pass	Pass
CRT2502170837-009-1	8" Yellow Ball Clear	Pass	Pass	Pass	Pass
CRT2502170837-009-2	8" Yellow Ball Clear	Pass	Pass	Pass	Pass
CRT2502170837-009-3	8" Yellow Ball Clear	Pass	Pass	Pass	Pass



Measured Voltage: 120.1 Vac

Complies: ☒ YES ☐ NO

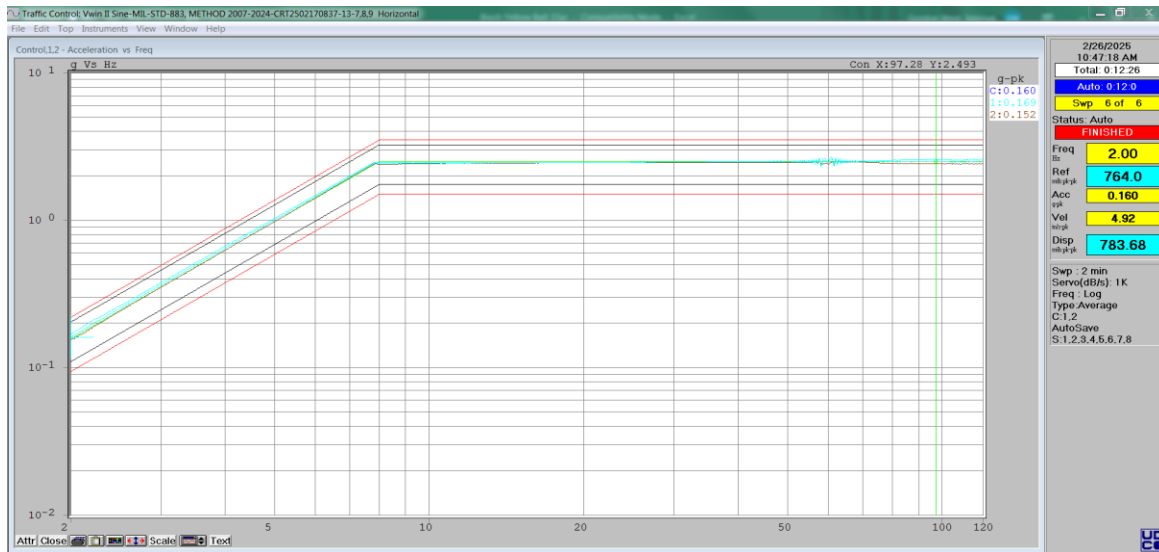
Tested By:	John Robins	Signature or initials:	
Engineer:	John Robins	Signature or initials:	
Reviewed By:	cwm	Signature or initials:	
Equipment Used:	10,11	Completion Date:	22-Feb-2025
Amb (°C):	NA	RH%	NA

Mechanical Vibration 6.4.3.1

The submitted LED signal modules were securely mounted in traffic signal housings and vibrated along each axes for three 4 minute sweep cycles at a displacement of 0.764" from 2 to 8 Hz and 2.5 Gs from 8 to 120 Hz. Testing was conducted in accordance with MIL-STD-883, method 2007. At the conclusion of the test, the modules shall be visually inspected for damage and checked for proper operation.

Results

Intertek Sample Number	Description	x-axis lateral	y-axis horizontal	z-axis vertical	Visual Inspection	Operational Check
CRT2502170837-013-7	8" Yellow Ball Tinted	X	X	X	Pass	Pass
CRT2502170837-013-8	8" Yellow Ball Tinted	X	X	X	Pass	Pass
CRT2502170837-013-9	8" Yellow Ball Tinted	X	X	X	Pass	Pass
CRT2502170837-009-1	8" Yellow Ball Clear	X	X	X	Pass	Pass
CRT2502170837-009-2	8" Yellow Ball Clear	X	X	X	Pass	Pass
CRT2502170837-009-3	8" Yellow Ball Clear	X	X	X	Pass	Pass



Complies: ☒ YES ☐ NO

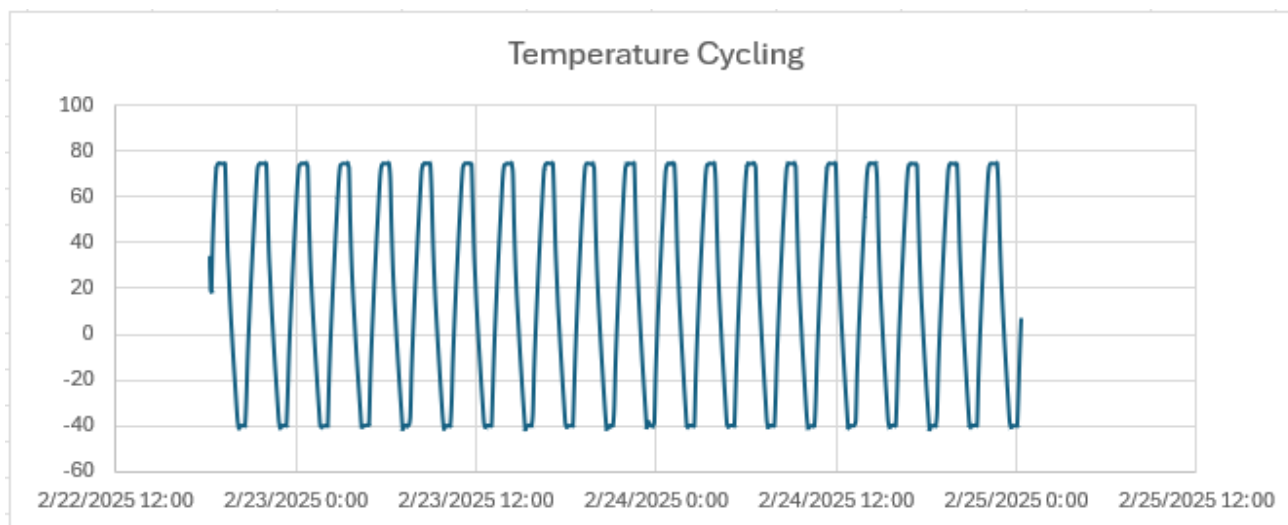
Tested By:	Gordon West	Signature or initials:	<i>Gordon West</i>
Engineer:	John Robins	Signature or initials:	<i>John Robins</i>
Reviewed By:	cwm	Signature or initials:	<i>cwm</i>
Equipment Used:	1,2,3,4,5	Completion Date:	26-Feb-2025
Amb (°C):	22.3	RH%	43

Temperature Cycling 6.4.3.2

The submitted tinted and clear LED signal modules were subjected to temperature cycling according to MIL-STD-883, Method 1010. Twenty cycles were performed with a 30 minute transfer time between temperature extremes and a 30 minute dwell time at the extremes. The temperature cycled between -40°C and +74°C. The samples were non-operating. At the conclusion of the test, the module shall be free of damage and moisture and be fully operational.

Results

Intertek Sample Number	Description	Visual Inspection	Operational Check
CRT2502170837-013-7	8" Yellow Ball Tinted	Pass	Pass
CRT2502170837-013-8	8" Yellow Ball Tinted	Pass	Pass
CRT2502170837-013-9	8" Yellow Ball Tinted	Pass	Pass
CRT2502170837-009-1	8" Yellow Ball Clear	Pass	Pass
CRT2502170837-009-2	8" Yellow Ball Clear	Pass	Pass
CRT2502170837-009-3	8" Yellow Ball Clear	Pass	Pass



Complies: ☒ YES ☐ NO

Tested By:	John Robins	Signature or initials:	
Engineer:	John Robins	Signature or initials:	
Reviewed By:	cwm	Signature or initials:	
Equipment Used:	10	Completion Date:	25-Feb-2025
Amb (°C):	NA	RH%	NA

Moisture Resistance 6.4.3.3

The submitted tinted and clear LED signal modules were subjected to the rain and blowing rain test per MIL-STD-810F, Test Method 506.4, Procedure I. The test was performed on standalone modules without a protective housing. The rainfall rate was 1.7 mm/min (4in/hr) and the droplet size shall predominantly be between 0.5mm and 4.5mm (0.02 to 0.18 in). The samples were oriented such that the lens is directed towards the wind source when at a zero rotation angle. The samples were rotated at a rate of 4 degrees per minute along the vertical axis, from an orientation of -60 to +60 degrees during the test. The duration of the test is 30 minutes, and the samples were energized throughout the test. The water temperature was $25^{\circ} \pm 5^{\circ}\text{C}$ ($77^{\circ} \pm 9^{\circ}\text{F}$) and the wind velocity was 80 km/hr (50 mph). At the conclusion of the test, the module shall be free of damage and moisture and be fully operational.

Results

Intertek Sample Number	Description	Visual Inspection	Operational Check
CRT2502170837-013-7	8" Yellow Ball Tinted	No moisture or damage	Operates as expected
CRT2502170837-013-8	8" Yellow Ball Tinted	No moisture or damage	Operates as expected
CRT2502170837-013-9	8" Yellow Ball Tinted	No moisture or damage	Operates as expected
CRT2502170837-009-1	8" Yellow Ball Clear	No moisture or damage	Operates as expected
CRT2502170837-009-2	8" Yellow Ball Clear	No moisture or damage	Operates as expected
CRT2502170837-009-3	8" Yellow Ball Clear	No moisture or damage	Operates as expected

Requirement: Signal Still Operational and No Moisture In The Housing

Intertek Sample Number	Sample Temp. at start (°C)	Water Temperature 25C +/- 5C			
		Start	10 minutes	20 minutes	30 minutes
CRT2502170837-013-7	40.7	20.2	20.2	20.5	20.3
CRT2502170837-013-8	40.6	23.6	21.5	20.7	20.3
CRT2502170837-013-9	40.6	23.6	21.5	20.7	20.3
CRT2502170837-009-1	40.4	25.9	22.6	21.6	21.4
CRT2502170837-009-2	40.4	25.9	22.6	21.6	21.4
CRT2502170837-009-3	40.7	20.2	20.2	20.5	20.3

* Water temperature is °C

Recorded rainfall rate:	4.3	in/hr
Recorded wind velocity:	48-52	mph

Complies: ☒ YES ☐ NO

Tested By:	Brittany James	Signature or initials:	
Engineer:	John Robins	Signature or initials:	
Reviewed By:	cwm	Signature or initials:	
Equipment Used:	12, 13, 14, 15, 16	Completion Date:	25-Mar-2025
Amb (°C):	N/A	RH%	N/A

Luminous Intensity 6.4.4.1 through 6.4.4.4

The intensity distribution tests on the submitted LED traffic signal modules were performed with the Intertek 25 meter Goniophotometer. The goniophotometer was in accordance with the goniometer described in Section 11.02 (Test Apparatus) of the Institute of Transportation Engineers' Vehicle Traffic Control Signal Heads Standard Test Method. The calibration of the goniophotometer is traceable to the National Institute of Standards and Technology. The LED modules were operated at 120 volts AC. The alignment of the LED module was performed in accordance with Section 11.03 (Alignment of Optical Unit for Test) of the Institute of Transportation Engineers' Vehicle Traffic Control Signal Heads Standard Test Method.

The submitted LED signal modules were tested for maintained minimum luminous intensity at each of 78 points indicated in Table 1, of the referenced specification. These measurements were recorded at an ambient temperature of 25°C. The yellow LED signal modules were operated on a 12 ½ % duty cycle for 1 hour (5 second "on" / 35 seconds "off" duty cycle). A measurement was taken at the end of the duty cycle and the module was then operated at a 100% duty cycle until stabilized. A factor was generated to rate the stable data back to the end of the 12½% duty cycle. A relative luminous intensity measurement is taken in a region from 0 to 7.5° down, and from 7.5° left to 7.5° right. The measurement is taken at 80 Vac, 120 Vac and 135 Vac. When the 80 Vac and 135 Vac factors are applied to the photometric data the units shall still meet the photometric requirements of each model.

A diminution factor was measured by using the submitted samples. The modules were mounted in a dual compartment temperature chamber with the lensed portion in one compartment and all portions behind the lens within the other compartment. At room ambient temperature (both inside and outside the chamber) and in calm air outside the chamber, the modules were energized per the conditions described above and a single on-axis reading (IA) taken and recorded. With the modules off, the chamber was heated to 74°C behind the lens and 49°C in front of the lens, and allowed to stabilize. Following stabilization, the modules were energized per the above cycle and the single on-axis reading (IH) taken and recorded. A diminution factor was calculated (IH/IA).The readings recorded initially were factored by the diminution factor.

Luminous Intensity 6.4.4.1 through 6.4.4.4

Sample	CRT2502170837-013-7				Target Input voltage		Measured Input Voltage			H, V Lum. Intensity		Vac Variation Factor		MMLI Factor
Module	8" Ball				80Vac		80.0		Vac		723.2		Candela	1.036
Color:	Yellow				120Vac		120.1		Vac		740.7		Candela	5/35 Factor
Lens Type:	Tinted				135Vac		135.1		Vac		750.3		Candela	0.996
Photometric Test Distance: 25 meters														
Max	1230	25°C		25°C		25°C		74°C/49°C		74°C/49°C		74°C/49°C		
Vertical	Horizontal	Rated 80Vac		Measured 120Vac		Rated 135Vac		Rated 80Vac		Measured 120Vac		Rated 135Vac		Table 1
Angle	Angle	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Minimum
Up/Down	Left/Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Candela
12.5U	2.5	128	132	131	135	133	137	133	136	136	140	138	142	41
12.5U	7.5	118	120	121	123	122	125	122	124	125	127	127	129	33
7.5U	2.5	181	185	186	189	188	192	188	191	192	196	195	198	78
7.5U	7.5	160	168	164	172	166	174	166	174	170	178	172	180	62
7.5U	12.5	122	130	125	134	127	135	127	135	130	138	131	140	45
2.5U	2.5	402	413	412	423	417	428	416	427	427	438	432	443	168
2.5U	7.5	342	371	350	380	355	384	354	384	363	393	368	398	139
2.5U	12.5	252	283	258	290	261	294	261	293	267	300	270	304	94
2.5U	17.5	159	185	163	189	165	192	165	191	169	196	171	198	53
2.5U	22.5	89	107	91	110	92	111	92	111	94	114	96	115	29
2.5D	2.5	885	901	906	923	918	935	916	933	938	956	950	968	402
2.5D	7.5	767	804	786	824	796	834	795	833	814	853	824	864	328
2.5D	12.5	572	620	586	635	594	644	593	642	607	658	615	666	226
2.5D	17.5	360	402	369	412	373	417	373	416	382	427	387	432	131
2.5D	22.5	197	236	202	242	205	245	205	245	209	251	212	254	70
2.5D	27.5	86	105	88	107	89	109	89	108	91	111	92	113	37
7.5D	2.5	755	752	773	771	783	781	782	779	801	798	811	808	316
7.5D	7.5	683	671	700	687	709	696	707	695	725	712	734	721	262
7.5D	12.5	529	528	541	541	548	548	547	547	561	560	568	568	176
7.5D	17.5	354	352	362	361	367	365	366	365	375	373	380	378	103
7.5D	22.5	215	218	220	224	223	227	222	226	228	232	230	235	53
7.5D	27.5	101	109	104	112	105	113	105	113	107	116	109	117	29
12.5D	2.5	305	302	313	310	317	314	316	313	324	321	328	325	123
12.5D	7.5	281	271	288	277	292	281	291	280	298	287	302	291	98
12.5D	12.5	228	218	234	223	237	226	236	226	242	231	245	234	70
12.5D	17.5	158	149	162	153	164	155	164	154	168	158	170	160	41
12.5D	22.5	99	96	101	98	102	99	102	99	105	101	106	103	21
12.5D	27.5	55	55	56	56	57	57	57	57	58	58	59	59	12
17.5D	2.5	157	157	161	160	163	162	162	162	166	166	169	168	57
17.5D	7.5	142	144	145	147	147	149	147	149	150	152	152	154	45
17.5D	12.5	113	117	116	120	117	121	117	121	120	124	121	125	33
17.5D	17.5	82	84	84	86	85	87	85	87	87	89	88	91	16
17.5D	22.5	56	58	57	59	58	60	58	60	59	61	60	62	8
22.5D	2.5	109	109	112	112	113	113	113	113	116	116	117	117	41
22.5D	7.5	101	100	104	103	105	104	105	104	107	106	109	108	33
22.5D	12.5	83	83	85	85	86	86	86	86	88	88	89	89	25
22.5D	17.5	59	61	61	62	61	63	61	63	63	64	63	65	12
27.5D	2.5	59	58	60	60	61	61	61	61	62	62	63	63	29
27.5D	7.5	54	55	55	56	56	57	56	56	57	58	58	59	21

Luminous Intensity 6.4.4.1 through 6.4.4.4

Sample:	CRT2502170837-013-8				Target Input voltage		Measured Input Voltage			H, V Lum. Intensity		Vac Variation Factor		MMLI Factor	
Module	8" Ball				80Vac		80.0		Vac		719.4		Candela	0.982	1.007
Color:	Yellow				120Vac		120.1		Vac		732.9		Candela	1.000	5/35 Factor
Lens Type:	Tinted				135Vac		135.1		Vac		738.7		Candela	1.008	0.98
Photometric Test Distance: 25 meters															
Max	1230	25°C		25°C		25°C		74°C/49°C		74°C/49°C		74°C/49°C			
Vertical	Horizontal	Rated 80Vac		Measured 120Vac		Rated 135Vac		Rated 80Vac		Measured 120Vac		Rated 135Vac		Table 1	
Angle	Angle	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Minimum	
Up/Down	Left/Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Candela	
12.5U	2.5	127	131	129	133	130	134	128	132	130	134	131	135	41	
12.5U	7.5	116	120	118	122	119	123	117	121	119	123	120	124	33	
7.5U	2.5	183	187	186	190	188	192	184	188	188	192	189	193	78	
7.5U	7.5	161	169	164	172	166	173	163	170	166	173	167	175	62	
7.5U	12.5	123	133	125	136	126	137	124	134	126	137	127	138	45	
2.5U	2.5	404	412	412	420	415	423	407	415	415	423	418	426	168	
2.5U	7.5	346	369	352	376	355	379	348	372	355	379	358	382	139	
2.5U	12.5	254	281	258	286	261	289	256	283	260	288	262	291	94	
2.5U	17.5	162	185	165	188	167	190	164	186	167	190	168	191	53	
2.5U	22.5	90	107	92	109	93	110	91	108	93	110	93	111	29	
2.5D	2.5	870	886	886	902	893	910	876	892	892	909	899	916	402	
2.5D	7.5	750	787	764	802	770	808	756	793	770	808	776	814	328	
2.5D	12.5	559	612	569	623	574	628	563	616	573	628	578	633	226	
2.5D	17.5	352	399	358	406	361	409	354	402	361	409	364	412	131	
2.5D	22.5	193	234	197	239	199	240	195	236	198	240	200	242	70	
2.5D	27.5	85	105	86	106	87	107	85	105	87	107	88	108	37	
7.5D	2.5	737	753	751	767	757	773	742	759	756	773	762	779	316	
7.5D	7.5	663	674	675	686	680	692	667	679	680	692	685	697	262	
7.5D	12.5	505	540	515	550	519	554	509	544	519	554	523	558	176	
7.5D	17.5	337	361	344	368	346	371	340	364	346	371	349	374	103	
7.5D	22.5	202	225	206	229	208	231	204	227	208	231	209	233	53	
7.5D	27.5	95	113	97	115	98	116	96	114	98	116	98	117	29	
12.5D	2.5	303	305	309	311	311	313	305	307	311	313	313	316	123	
12.5D	7.5	273	275	279	280	281	282	275	277	281	282	283	284	98	
12.5D	12.5	220	225	224	229	226	231	221	226	226	231	227	233	70	
12.5D	17.5	150	154	153	157	154	159	151	156	154	159	155	160	41	
12.5D	22.5	93	100	95	102	96	102	94	101	96	102	96	103	21	
12.5D	27.5	52	57	53	58	54	58	53	57	54	58	54	59	12	
17.5D	2.5	154	155	157	158	159	159	156	156	158	159	160	160	57	
17.5D	7.5	139	143	141	146	142	147	140	144	142	147	144	148	45	
17.5D	12.5	110	117	113	119	113	120	111	118	113	120	114	121	33	
17.5D	17.5	80	85	81	86	82	87	80	85	82	87	83	88	16	
17.5D	22.5	54	58	55	60	56	60	55	59	56	60	56	60	8	
22.5D	2.5	108	108	110	110	111	111	108	109	111	111	111	112	41	
22.5D	7.5	99	99	101	101	101	102	99	100	101	102	102	103	33	
22.5D	12.5	80	83	82	84	83	85	81	83	82	85	83	86	25	
22.5D	17.5	57	60	58	62	59	62	58	61	59	62	59	63	12	
27.5D	2.5	58	58	59	59	60	59	59	58	60	59	60	60	29	
27.5D	7.5	53	54	54	55	55	56	54	55	55	56	55	56	21	

Luminous Intensity 6.4.4.1 through 6.4.4.4

Sample:	CRT2502170837-013-9					Target Input voltage		Measured Input Voltage		H, V Lum. Intensity		Vac Variation Factor		MMLI Factor
Module	8" Ball					80Vac		80.1 Vac		718.1 Candela		0.985		1.019
Color:	Yellow					120Vac		120.1 Vac		729.1 Candela		1.000		5/35 Factor
Lens Type:	Tinted					135Vac		135.1 Vac		734.1 Candela		1.007		1.00
Photometric Test Distance: 25 meters														
Max	1230	25°C		25°C		25°C		74°C/49°C		74°C/49°C		74°C/49°C		
Vertical	Horizontal	Rated 80Vac		Measured 120Vac		Rated 135Vac		Rated 80Vac		Measured 120Vac		Rated 135Vac		Table 1
Angle	Angle	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Minimum
Up/Down	Left/Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Candela
12.5U	2.5	130	132	132	134	132	135	132	134	134	136	135	137	41
12.5U	7.5	119	122	120	124	121	124	121	124	123	126	124	127	33
7.5U	2.5	187	190	190	193	191	195	191	194	194	197	195	198	78
7.5U	7.5	165	173	167	176	169	177	168	177	171	179	172	181	62
7.5U	12.5	126	136	128	138	129	139	128	139	130	141	131	142	45
2.5U	2.5	410	419	416	426	419	429	418	427	424	434	427	437	168
2.5U	7.5	352	375	357	381	360	384	359	382	364	388	367	391	139
2.5U	12.5	258	289	262	293	263	295	263	294	267	299	268	301	94
2.5U	17.5	165	188	168	191	169	193	168	192	171	195	172	196	53
2.5U	22.5	92	110	93	112	94	112	94	112	95	114	96	115	29
2.5D	2.5	884	901	898	915	904	921	901	918	915	932	921	939	402
2.5D	7.5	766	811	777	824	783	829	780	827	792	839	798	845	328
2.5D	12.5	569	632	577	641	581	646	580	644	589	654	593	658	226
2.5D	17.5	362	411	367	417	370	420	369	418	374	425	377	428	131
2.5D	22.5	196	246	199	250	200	251	200	250	203	254	204	256	70
2.5D	27.5	86	110	87	112	88	113	88	112	89	114	89	115	37
7.5D	2.5	769	781	780	793	786	799	783	796	795	808	801	814	316
7.5D	7.5	686	703	697	714	701	719	699	716	710	727	715	732	262
7.5D	12.5	527	563	535	572	538	576	537	574	545	583	549	587	176
7.5D	17.5	349	384	354	390	356	392	355	391	361	397	363	400	103
7.5D	22.5	209	239	212	243	214	244	213	244	216	247	218	249	53
7.5D	27.5	98	121	100	123	100	124	100	124	101	126	102	127	29
12.5D	2.5	319	321	324	326	326	328	325	327	330	332	332	335	123
12.5D	7.5	287	293	292	297	294	299	293	299	297	303	300	305	98
12.5D	12.5	231	239	234	243	236	245	235	244	239	248	240	249	70
12.5D	17.5	157	166	159	169	160	170	160	169	162	172	163	173	41
12.5D	22.5	97	107	98	109	99	110	99	109	100	111	101	112	21
12.5D	27.5	54	60	55	61	55	62	55	61	56	62	57	63	12
17.5D	2.5	161	160	163	163	164	164	164	163	166	166	168	167	57
17.5D	7.5	144	148	146	150	147	151	147	151	149	153	150	154	45
17.5D	12.5	115	121	117	123	118	123	117	123	119	125	120	126	33
17.5D	17.5	83	88	85	89	85	90	85	90	86	91	87	92	16
17.5D	22.5	57	60	57	61	58	61	58	61	59	62	59	62	8
22.5D	2.5	111	112	113	113	114	114	113	114	115	115	116	116	41
22.5D	7.5	103	104	104	105	105	106	105	105	106	107	107	108	33
22.5D	12.5	84	86	85	87	86	88	85	88	87	89	87	90	25
22.5D	17.5	60	63	60	64	61	65	61	65	62	66	62	66	12
27.5D	2.5	60	60	61	61	62	61	62	61	63	62	63	63	29
27.5D	7.5	55	57	56	57	56	58	56	58	57	59	57	59	21

Luminous Intensity 6.4.4.1 through 6.4.4.4

Sample:	CRT2502170837-009-1				Target Input voltage		Measured Input Voltage			H, V Lum. Intensity		Vac Variation Factor		MMLI Factor
Module	8" Ball				80Vac		80.0 Vac			752.8 Candela		0.979		0.955
Color:	Yellow				120Vac		120.1 Vac			769.1 Candela		1.000		5/35 Factor
Lens Type:	Clear				135Vac		135.0 Vac			773.8 Candela		1.006		1.00
Photometric Test Distance: 25 meters														
Max	1230	25°C		25°C		25°C		74°C/49°C		74°C/49°C		74°C/49°C		
Vertical	Horizontal	Rated 80Vac		Measured 120Vac		Rated 135Vac		Rated 80Vac		Measured 120Vac		Rated 135Vac		Table 1
Angle	Angle	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Minimum
Up/Down	Left/Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Candela
12.5U	2.5	137	141	140	144	141	145	131	135	134	137	135	138	41
12.5U	7.5	124	129	127	132	128	133	119	123	121	126	122	127	33
7.5U	2.5	192	196	196	200	197	201	183	187	187	191	188	192	78
7.5U	7.5	167	180	171	184	172	185	160	172	163	176	164	177	62
7.5U	12.5	127	142	130	145	130	146	121	135	124	138	125	139	45
2.5U	2.5	421	437	430	447	433	450	402	418	411	427	413	429	168
2.5U	7.5	355	397	363	406	365	409	339	380	346	388	348	390	139
2.5U	12.5	257	310	263	317	264	319	246	296	251	303	252	305	94
2.5U	17.5	163	205	167	210	168	211	156	196	159	201	160	202	53
2.5U	22.5	90	120	92	123	93	124	86	115	88	118	89	118	29
2.5D	2.5	925	957	946	978	951	984	884	914	903	934	909	940	402
2.5D	7.5	794	867	811	886	816	891	758	828	775	846	779	852	328
2.5D	12.5	588	678	600	693	604	697	561	648	573	662	577	666	226
2.5D	17.5	368	443	376	453	379	456	352	424	360	433	362	435	131
2.5D	22.5	199	265	203	271	205	273	190	253	194	259	196	260	70
2.5D	27.5	86	121	88	123	89	124	82	115	84	118	85	118	37
7.5D	2.5	795	801	812	818	817	823	760	765	776	782	781	786	316
7.5D	7.5	713	724	728	740	733	745	681	692	696	707	700	711	262
7.5D	12.5	550	574	561	587	565	590	525	549	536	561	540	564	176
7.5D	17.5	367	392	374	400	377	403	350	374	358	382	360	385	103
7.5D	22.5	222	242	227	248	228	249	212	231	217	237	218	238	53
7.5D	27.5	104	124	106	126	107	127	99	118	102	121	102	121	29
12.5D	2.5	325	323	332	330	334	332	311	308	317	315	319	317	123
12.5D	7.5	296	292	303	299	304	300	283	279	289	285	291	287	98
12.5D	12.5	239	236	245	241	246	243	229	226	234	231	235	232	70
12.5D	17.5	165	165	169	168	170	169	158	157	161	161	162	162	41
12.5D	22.5	104	106	106	109	107	109	99	102	102	104	102	105	21
12.5D	27.5	57	60	58	61	59	62	55	57	56	59	56	59	12
17.5D	2.5	166	168	170	172	171	173	159	161	162	164	163	165	57
17.5D	7.5	148	155	152	159	152	160	142	148	145	152	146	153	45
17.5D	12.5	119	128	121	131	122	132	113	122	116	125	116	126	33
17.5D	17.5	86	93	88	95	88	95	82	89	84	91	84	91	16
17.5D	22.5	58	64	59	65	60	66	56	61	57	62	57	63	8
22.5D	2.5	116	117	119	120	120	120	111	112	113	114	114	115	41
22.5D	7.5	107	109	109	111	110	112	102	104	104	106	105	107	33
22.5D	12.5	87	91	88	93	89	94	83	87	85	89	85	89	25
22.5D	17.5	62	67	63	68	64	68	59	64	60	65	61	65	12
27.5D	2.5	63	63	64	64	65	64	60	60	62	61	62	61	29
27.5D	7.5	57	59	59	60	59	61	55	56	56	58	56	58	21

Luminous Intensity 6.4.4.1 through 6.4.4.4

Sample:	CRT2502170837-009-2				Target Input voltage		Measured Input Voltage			H, V Lum. Intensity		Vac Variation Factor		MMLI Factor
Module	8" Ball				80Vac		80.0 Vac			759.8 Candela		0.981		1.035
Color:	Yellow				120Vac		120.1 Vac			774.9 Candela		1.000		5/35 Factor
Lens Type:	Clear				135Vac		135.0 Vac			786.1 Candela		1.014		0.98
Photometric Test Distance: 25 meters														
Max	1230	25°C		25°C		25°C		74°C/49°C		74°C/49°C		74°C/49°C		
Vertical	Horizontal	Rated 80Vac		Measured 120Vac		Rated 135Vac		Rated 80Vac		Measured 120Vac		Rated 135Vac		Table 1
Angle	Angle	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Minimum
Up/Down	Left/Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Candela
12.5U	2.5	134	137	137	140	139	142	139	142	142	145	144	147	41
12.5U	7.5	122	126	124	129	126	130	126	131	129	133	131	135	33
7.5U	2.5	187	192	191	196	194	199	194	199	198	203	200	206	78
7.5U	7.5	165	176	168	179	171	182	171	182	174	186	177	188	62
7.5U	12.5	125	137	128	139	130	141	130	142	132	144	134	146	45
2.5U	2.5	413	425	421	433	427	440	428	440	436	449	442	455	168
2.5U	7.5	350	383	357	391	362	397	363	397	370	405	375	411	139
2.5U	12.5	258	295	263	301	267	305	267	306	272	312	276	316	94
2.5U	17.5	163	193	166	197	168	200	168	200	172	204	174	207	53
2.5U	22.5	91	113	93	115	94	117	94	117	96	119	97	121	29
2.5D	2.5	921	950	939	969	953	983	954	984	973	1003	987	1018	402
2.5D	7.5	794	852	810	869	821	882	822	882	838	900	851	913	328
2.5D	12.5	593	662	605	676	613	685	614	686	626	700	635	710	226
2.5D	17.5	370	432	378	441	383	447	383	447	391	456	397	463	131
2.5D	22.5	202	257	206	262	209	266	209	266	213	271	216	275	70
2.5D	27.5	87	113	89	115	90	117	91	117	92	119	94	121	37
7.5D	2.5	796	806	812	822	824	833	825	834	841	851	853	863	316
7.5D	7.5	716	727	730	742	740	752	741	753	756	768	767	779	262
7.5D	12.5	548	582	559	594	567	603	568	603	579	615	587	624	176
7.5D	17.5	365	389	372	397	378	403	378	403	385	411	391	417	103
7.5D	22.5	220	243	224	248	227	251	228	252	232	257	235	260	53
7.5D	27.5	103	122	105	124	107	126	107	126	109	129	111	131	29
12.5D	2.5	325	326	331	333	336	337	336	338	343	344	348	349	123
12.5D	7.5	295	294	301	300	305	304	305	304	311	311	316	315	98
12.5D	12.5	239	241	244	245	247	249	247	249	252	254	256	258	70
12.5D	17.5	163	165	166	169	169	171	169	171	172	175	175	177	41
12.5D	22.5	101	107	103	109	104	110	104	110	107	113	108	114	21
12.5D	27.5	56	60	57	61	58	62	58	62	59	64	60	64	12
17.5D	2.5	166	167	169	170	172	172	172	173	175	176	178	179	57
17.5D	7.5	148	155	151	158	153	160	153	160	157	163	159	166	45
17.5D	12.5	118	126	121	128	122	130	122	130	125	133	127	135	33
17.5D	17.5	85	91	87	93	88	94	88	94	90	96	91	97	16
17.5D	22.5	58	62	59	64	60	64	60	64	61	66	62	67	8
22.5D	2.5	116	116	118	118	120	120	120	120	122	122	124	124	41
22.5D	7.5	107	108	109	110	110	112	110	112	112	114	114	116	33
22.5D	12.5	87	90	89	92	90	93	90	93	92	95	93	96	25
22.5D	17.5	62	66	63	67	64	68	64	68	65	69	66	70	12
27.5D	2.5	63	62	64	64	65	64	65	65	66	66	67	67	29
27.5D	7.5	57	59	59	60	59	61	59	61	61	62	61	63	21

Luminous Intensity 6.4.4.1 through 6.4.4.4

Sample:	CRT2502170837-009-3	Target Input voltage	Measured Input Voltage	H, V Lum. Intensity	Vac Variation Factor	MMLI Factor
Module	8" Ball	80Vac	80.0 Vac	752.2 Candela	0.975	1.013
Color:	Yellow	120Vac	120.1 Vac	771.3 Candela	1.000	5/35 Factor
Lens Type:	Clear	135Vac	135.1 Vac	784.7 Candela	1.017	0.995

Photometric Test Distance: 25 meters

Max	1230	25°C		25°C		25°C		74°C/49°C		74°C/49°C		74°C/49°C		
Vertical	Horizontal	Rated 80Vac		Measured 120Vac		Rated 135Vac		Rated 80Vac		Measured 120Vac		Rated 135Vac		Table 1
Angle	Angle	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Candela	Minimum
Up/Down	Left/Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Candela
12.5U	2.5	135	138	139	141	141	144	137	140	141	143	143	146	41
12.5U	7.5	123	128	126	131	128	133	125	129	128	133	130	135	33
7.5U	2.5	193	198	198	203	201	206	196	200	201	205	204	209	78
7.5U	7.5	168	182	173	187	176	190	170	185	175	190	178	193	62
7.5U	12.5	128	144	131	148	133	151	129	146	132	150	135	153	45
2.5U	2.5	422	441	432	452	440	460	427	446	438	458	446	466	168
2.5U	7.5	352	404	361	415	367	422	357	410	366	420	372	427	139
2.5U	12.5	255	318	262	326	267	331	259	322	265	330	270	336	94
2.5U	17.5	161	212	165	218	168	221	163	215	168	220	170	224	53
2.5U	22.5	89	126	91	129	93	131	90	128	92	131	94	133	29
2.5D	2.5	912	941	935	965	951	982	924	953	948	978	964	995	402
2.5D	7.5	777	854	797	876	811	891	788	865	808	887	822	903	328
2.5D	12.5	575	675	590	692	600	704	583	683	598	701	608	713	226
2.5D	17.5	361	441	370	452	376	460	365	447	375	458	381	466	131
2.5D	22.5	195	266	200	273	203	277	197	269	202	276	206	281	70
2.5D	27.5	84	123	86	126	88	128	85	124	87	127	89	130	37
7.5D	2.5	789	790	809	810	823	824	799	801	820	821	834	835	316
7.5D	7.5	710	710	728	728	740	741	719	720	737	738	750	751	262
7.5D	12.5	547	560	561	575	571	584	555	568	569	582	579	592	176
7.5D	17.5	368	381	378	390	384	397	373	386	382	396	389	402	103
7.5D	22.5	222	233	227	239	231	243	225	236	230	242	234	247	53
7.5D	27.5	103	119	106	122	108	124	105	120	107	123	109	126	29
12.5D	2.5	327	321	335	329	341	335	331	325	340	333	346	339	123
12.5D	7.5	300	291	308	298	313	303	304	294	312	302	318	307	98
12.5D	12.5	242	232	248	238	252	242	245	235	251	241	255	245	70
12.5D	17.5	170	160	174	164	177	167	172	162	176	166	179	169	41
12.5D	22.5	106	102	108	105	110	106	107	103	110	106	112	108	21
12.5D	27.5	58	58	59	60	60	61	58	59	60	61	61	62	12
17.5D	2.5	165	165	169	170	172	172	167	168	171	172	174	175	57
17.5D	7.5	147	153	151	157	154	160	149	155	153	159	156	162	45
17.5D	12.5	117	126	120	129	122	131	118	127	121	130	123	133	33
17.5D	17.5	85	91	87	93	88	95	86	92	88	94	90	96	16
17.5D	22.5	57	63	59	64	60	65	58	63	60	65	61	66	8
22.5D	2.5	115	115	118	118	120	120	116	117	119	120	121	122	41
22.5D	7.5	105	107	108	109	110	111	107	108	109	111	111	113	33
22.5D	12.5	85	89	88	91	89	92	87	90	89	92	90	94	25
22.5D	17.5	61	65	63	66	64	68	62	66	64	67	65	69	12
27.5D	2.5	62	62	64	63	65	64	63	62	65	64	66	65	29
27.5D	7.5	57	58	58	59	59	60	58	59	59	60	60	61	21

Complies:	☒ YES	☐ NO
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Tested By:	Matthew Benninger	Signature or initials:	
Engineer:	John Robins	Signature or initials:	
Reviewed By:	cwm	Signature or initials:	
Test Equipment Used:	23,24,25,26,28,29,30	Completion Date:	3-Apr-2025
Amb (°C):	20	RH%	44

Luminance Uniformity

Luminance measurements were taken at nine locations across the signal face. A spot size of one inch was used. The luminance meter was translated from side to side and up and down remaining normal to the sample surface. The measurements were used to determine luminance uniformity. The measurements were taken after operating on the same duty cycle used during the photometric test.

Results

The ratio between the maximum and the minimum luminance was less than 10 to 1. Data follows.

8" Yellow Ball Tinted			
Sample	CRT2502170837-013-7	CRT2502170837-013-8	CRT2502170837-013-9
Location	Luminance	Luminance	Luminance
1	24957	25784	23909
2	38673	37987	34349
3	22738	22498	27171
4	33617	29298	37707
5	17782	17229	20863
6	28639	26565	31167
7	47391	39064	37668
8	22475	21859	25687
9	14739	16464	19393
Average	27890	26305	28657
Intensity Ratio	3.2	2.4	1.9

8" Yellow Ball Clear			
Sample	CRT2502170837-009-1	CRT2502170837-009-2	CRT2502170837-009-3
Location	Luminance	Luminance	Luminance
1	22212	19571	19935
2	33906	37310	31509
3	26572	27801	27649
4	34377	30056	29811
5	17716	17843	15393
6	30651	31541	30807
7	48185	48336	36009
8	26666	21650	22354
9	16080	14027	15162
Average	28485	27571	25403
Intensity Ratio	3.0	3.4	2.4

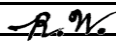
Luminance measurements are in cd/m2

Same 60 minute warm-up used for luminous intensity

Test distance is 19 feet with ¼ degree aperture using the PR 740

Measured Voltage:	120.0 - 120.3	Vac
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Complies: ☒ YES ☐ NO

Tested By:	Rex Williams	Signature or initials:	
Engineer:	John Robins	Signature or initials:	
Reviewed By:	cwm	Signature or initials:	
Equipment Used:	6-9	Completion Date:	4-Mar-2025
Amb (°C):	25.6	RH%	14.9

Chromaticity 6.4.4.6

The chromaticity measurements were performed on the submitted LED Traffic Signal Modules with the spectroradiometer. The samples were operated at nominal input voltage and ambient temperature during the measurements. The measurements were taken from 380-780nm in 2nm increments.

The chromaticity measurements were taken at nine locations across the signal face. A spot size of one inch was used with the samples operating on the same duty cycle used during the photometric test. The spectro-radiometer was translated from side to side and up and down remaining normal to the sample surface. The average of the measurements are recorded.

Results

		Chromaticity Coordinates	
Color	Sample	x	y
Yellow (Tinted)	CRT2502170837-013-7	0.573	0.425
	CRT2502170837-013-8	0.573	0.425
	CRT2502170837-013-9	0.574	0.424

		Chromaticity Coordinates	
Color	Sample	x	y
Yellow (Clear)	CRT2502170837-009-1	0.560	0.434
	CRT2502170837-009-2	0.559	0.435
	CRT2502170837-009-3	0.560	0.434

The chromaticity measurements meet the requirements of the referenced specification.

Measured Voltage:	120.0 - 120.3	Vac
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Complies: ☒ YES ☐ NO

Tested By:	Rex Williams	Signature or initials:	<i>R.W.</i>
Engineer:	John Robins	Signature or initials:	<i>J.R.</i>
Reviewed By:	cwm	Signature or initials:	<i>cwm</i>
Equipment Used:	6-9	Completion Date:	4-Mar-2025
Amb (°C):	25.6	RH%	14.9

Color Uniformity 6.4.4.7

Three samples of each model were tested. Nine color measurements were taken at different locations on the traffic signal face. The measurements were taken after operating on the same duty cycle used during the photometric test.

Results

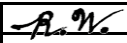
8" Yellow Ball Tinted									
Sample	CRT2502170837-013-7			CRT2502170837-013-8			CRT2502170837-013-9		
Location	x	y	Dominant	x	y	Dominant	x	y	Dominant
1	0.578	0.420	591	0.575	0.423	590	0.575	0.422	590
2	0.572	0.425	590	0.572	0.426	590	0.571	0.426	590
3	0.573	0.424	590	0.572	0.425	590	0.572	0.425	590
4	0.570	0.427	590	0.571	0.426	590	0.570	0.427	590
5	0.573	0.425	590	0.573	0.424	590	0.577	0.421	591
6	0.576	0.421	590	0.576	0.422	590	0.578	0.420	591
7	0.577	0.421	591	0.577	0.421	591	0.577	0.420	591
8	0.568	0.429	589	0.570	0.427	589	0.572	0.425	590
9	0.566	0.431	589	0.568	0.429	589	0.571	0.426	590
Average	0.573	0.425	590	0.573	0.425	590	0.574	0.424	590

8" Yellow Ball Clear									
Sample	CRT2502170837-009-1			CRT2502170837-009-2			CRT2502170837-009-3		
Location	x	y	Dominant	x	y	Dominant	x	y	Dominant
1	0.558	0.437	588	0.567	0.428	589	0.563	0.432	589
2	0.560	0.434	588	0.557	0.436	588	0.560	0.434	588
3	0.561	0.433	588	0.560	0.434	588	0.559	0.435	588
4	0.560	0.434	588	0.555	0.438	588	0.558	0.436	588
5	0.568	0.427	589	0.559	0.435	588	0.566	0.428	589
6	0.563	0.432	589	0.561	0.434	588	0.562	0.433	588
7	0.566	0.429	589	0.564	0.430	589	0.565	0.430	589
8	0.557	0.437	588	0.552	0.441	587	0.557	0.436	588
9	0.550	0.443	587	0.551	0.442	587	0.553	0.440	587
Average	0.560	0.434	588	0.559	0.435	588	0.560	0.434	588

The color uniformity measurements meet the requirements of the referenced specification.

Measured Voltage:	120.0 - 120.3	Vac
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Complies: ☒ YES ☐ NO

Tested By:	Rex Williams	Signature or initials:	
Engineer:	John Robins	Signature or initials:	
Reviewed By:	cwm	Signature or initials:	
Equipment Used:	6-9	Completion Date:	4-Mar-2025
Amb (°C):	25.6	RH%	14.9

Lens Abrasion Resistance 6.4.5.2

A lens was mounted in the abrasion test fixture with the lens facing upwards. An abrading pad was cycled back and forth (1 cycle) for twelve cycles at $10\text{cm} \pm 2\text{cm}$ per second over the test surface of the lens. The abrading pad shall not be less than $2.5\text{cm} \pm 0.1\text{cm}$ square, constructed of 0000 steel wool rubber cemented to a rigid base shaped to the contour of the lens. The "grain" of the pad was perpendicular to the direction of motion. The abrading pad support was equal in size to the pad and the center of the support surface was within $\pm 2\text{mm}$ of parallel to the lens surface. The density of the abrading pad was such that when the pad was mounted to its support and is resting unweight on the lens, the base of the pad was no closer than 3.2mm to the lens at its closest point. When mounted on its support and resting on the lens, the abrading pad was weighted such that a pad pressure of $14\text{kPa} \pm 1\text{kPa}$ exists at the center and perpendicular to the face of the lens. A pivot was used to follow the contour of the lens.

Results

A single intensity point was measured before and after the abrasion. In all samples tested the abraded lens intensity measurement was at least 90% of the un-abraded lens intensity measurement.

8" Yellow Ball Tinted			
Sample	Pre Abrasion	Post Abrasion	Percentage
CRT2502170837-013-7	740.7	700.5	0.95
CRT2502170837-013-8	732.9	701.8	0.96
CRT2502170837-013-9	729.1	712.3	0.98

measurements in cd

8" Yellow Ball Clear			
Sample	Pre Abrasion	Post Abrasion	Percentage
CRT2502170837-009-1	769.1	703.4	0.91
CRT2502170837-009-2	774.9	731.7	0.94
CRT2502170837-009-3	771.3	755.7	0.98

measurements in cd

Measured Voltage:	120.03	Vac		
Measured Weight:	8	lbs		
Abrasion Pad	4	Sq. In		
Pad Pressure	2.1	psi	14.5	Kpa

Complies: ☒ YES ☐ NO

Tested By:	Matthew Benninger	Signature or initials:	
Engineer:	John Robins	Signature or initials:	
Reviewed By:	cwm	Signature or initials:	
Equipment Used:	23,24,25,26,27	Completion Date:	4-Apr-2025
Amb (°C):	20	RH%	42

Current Consumption 6.4.6.1

Three samples were measured for current flow in amperes. The measured current values are supplied for comparison of Product Quality Assurance current measurements on production modules. Current measurements were taken at start up.

Results

Measurements are in (mA)

8" Yellow Ball			
Sample	-40°C	25°C	74°C
CRT2502170837-013-7	52.0	52.5	60.6
CRT2502170837-013-8	51.6	52.3	59.5
CRT2502170837-013-9	52.8	53.5	61.3

Label lists 6.9VA

The current consumption was not in excess of 120% of the design qualification current values for an ambient temperature of 25°C.

Measured Voltage:	120.0 - 120.3	Vac
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Complies: ☒ YES ☐ NO

Tested By:	John Robins	Signature or initials:	
Engineer:	John Robins	Signature or initials:	
Reviewed By:	cwm	Signature or initials:	
Equipment Used:	10,17,21	Completion Date:	26-Mar-2025
Amb (°C):	NA	RH%	NA

Power Factor & Total Harmonic Distortion 6.4.6.6 & 6.4.6.7

Three tinted samples were measured for power factor and total harmonic distortion. A commercially available power analyzer was used to perform these measurements.

Results

8" Yellow Ball						
Sample	Voltage	Current (mA)	Power (W)	Power Factor	THD V%	THD I%
CRT2502170837-013-7	120.0	52.7	6.2	0.98	1.1	7.8
CRT2502170837-013-8	120.1	52.4	6.1	0.98	1.1	7.8
CRT2502170837-013-9	120.0	53.7	6.3	0.98	1.1	7.8
Requirement	NA	NA	NA	≥ 0.90	$\leq 20\%$	$\leq 20\%$

Measurements taken after a minimum 60 minute warmup.

Complies: ☒ YES ☐ NO

Tested By:	John Robins	Signature or initials:	
Engineer:	John Robins	Signature or initials:	
Reviewed By:	cwm	Signature or initials:	
Equipment Used:	10,17,21,22	Completion Date:	24-Mar-2025
Amb (°C):	24.9	RH%	24.2

Equipment list					
#	Intertek ID No.		Description	Manufacturer	Calibration Due
1	M359	--	Digit Hygro-Thermometer	Testo 608-H1	12-Aug-2025
2	V393	--	Shaker Controller	Unholtz-Dickie 100291109	28-May-2025
3	L195	CH1-4	Signal Conditioner	PCB Piezotronics 482C	25-Apr-2025
4	L221	CH1A	Accelerometer	PCB Piezotronics M35A60/ACS	29-Jan-2026
5	L222	CH2A	Accelerometer	PCB Piezotronics M35A60/ACS	29-Jan-2026
6	O757		Spectra Scan PR740	Photo Research	30-Apr-2025
7	D589		Digital Multimeter	Fluke	22-Apr-2025
8	L282		Hygro-Thermometer	Testo	5-Apr-2025
9	L268		Tape Measure	Crescent	9-Dec-2027
10	H204		Thermal Chamber	Thermotron	12-Jun-2025
11	M207		Multimeter	Fluke	14-Oct-2025
12	L224		IR Thermomter	Fluke	10-Oct-2025
13	T1319		Thermometer	Fluke	30-Jul-2025
14	N1154		Rain Gauge	Cole Parmer	14-Feb-2026
15	Y255		Anemometer	Pacer Instruments	20-Sep-2025
16	M296		Stopwatch	Traceable	22-Jan-2026
17	M297		Power Analyzer	Yokogawa	29-May-2025
18	H138		Thermal Chamber	Despatch	Used with cal'd Equip.
19	T1546		Digital Thermometer	Dickson	09-May-2025
20	O756		Flex Optometer	UDT	29-Mar-2025
21	A206		Current Transformer	Pearson	01-Jun-2025
22	L176		Thermometer	Testo	19-Jul-2025
23	O109		Goniometer	Optroniks	04-Mar-2026
24	L235		25M Photometer	Instrument Systems	17-Apr-2025
25	L254		Hygrometer	Testo	03-Jun-2025
26	O091		Power Analyzer	Yokogawa	11-Jun-2025
27	F363A		Push-Pull Meter	Imada	08-May-2025
28	H138		Thermal Chamber	Despatch	Used with cal'd Equip.
29	T1546		Digital Thermometer	Dickson	09-May-2025
30	O756		Flex Optometer	UDT	29-Mar-2025
Note: For measurement uncertainty, refer to the calibration certificates for all the test equipment located in the equipment files.					