

LEOTEK Electronics USA LLC

TEST REPORT

SCOPE OF WORK

Intertek Traffic Signal ITE Program Certification Testing
of 5yr 8" Clear and Tinted Yellow Balls.

REPORT NUMBER

106110477CRT-001Y

ISSUE DATE

28-Mar-2025

PAGES

21

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-01514889-1
Phone	408-380-1788 Ext. 202	Test Start Date	February 21, 2025
Email	frank@leotek.com	Completion Date	March 27, 2025

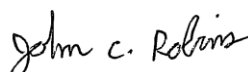
Standard(s)
ITE, Circular Signal Supplement, dated June 27, 2005.

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-001Y.

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


JOHN C. ROBBINS
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	CRT2502170837-8	5yr 8" Yellow Tinted Ball	Engineering	See Below
2/17/25	CRT2502170837-12	5yr 8" Yellow Tinted Ball	Engineering	See Below

Note: Clear lenses provided.

Further Sample Description

Intertek Sample Number	Description	Model Number	Serial Number
CRT2502170837-012-7	8" Yellow Ball Tinted	433-3130-901XL	A2412011760
CRT2502170837-012-8	8" Yellow Ball Tinted	433-3130-901XL	A2412011761
CRT2502170837-012-9	8" Yellow Ball Tinted	433-3130-901XL	A2412011762
CRT2502170837-008-1	8" Yellow Ball Clear	433-3170-901XL	A2412011757
CRT2502170837-008-2	8" Yellow Ball Clear	433-3170-901XL	A2412011758
CRT2502170837-008-3	8" Yellow Ball Clear	433-3170-901XL	A2412011759

General Requirements

Intertek Sample Number	ETL Cert. Number	Label Identification	Lens Orientation	Color Coded Wires
CRT2502170837-012-7	NA	Pass	Pass	yellow/white
CRT2502170837-012-8	NA	Pass	Pass	yellow/white
CRT2502170837-012-9	NA	Pass	Pass	yellow/white
CRT2502170837-008-1	NA	Pass	Pass	yellow/white
CRT2502170837-008-2	NA	Pass	Pass	yellow/white
CRT2502170837-008-3	NA	Pass	Pass	yellow/white

General Requirements

Intertek Sample Number	600V / 20 AWG Min.	Wire Length $\geq$ 39"	Service Rating +105°C
CRT2502170837-012-7	NA	Pass	Pass
CRT2502170837-012-8	NA	Pass	Pass
CRT2502170837-012-9	NA	Pass	Pass
CRT2502170837-008-1	NA	Pass	Pass
CRT2502170837-008-2	NA	Pass	Pass
CRT2502170837-008-3	NA	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-E000000017
	Connector: CNRP4-A2001WRBS04P
	LED: LEDLXY-LTPLC08EAS
	Thermistor: C-F000000025
	2nd Lens: PPCTSL-LENS008B
	SPS: _5y SPS _C-D000000002
	Power Clip _C-A000000092
	Connect Cable: C-G000000020
	Fresnel Lens: PPCTSL-FL08A2
	O-ring: _8" _PRBTSL-LG0806
	Gasket: _8" Gasket_AF1040100001
	Front Cover Tinted: PPCTSL-FC08YN1Z
	Front Cover Clear: PPCTSL-FC08WN1Z

Picture(s)



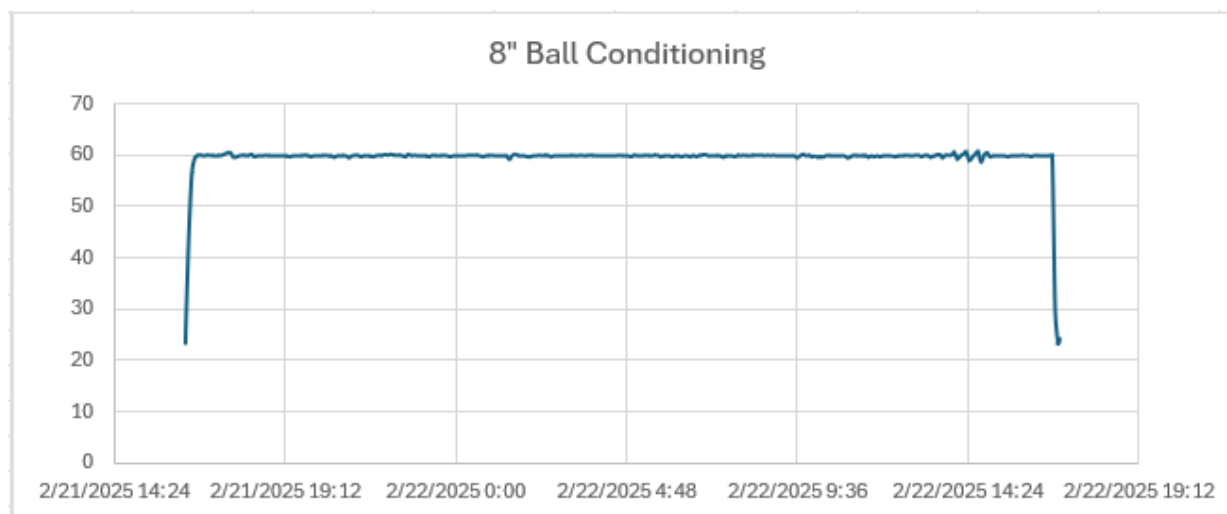
Note: The client supplied clear lenses for the modules, The clear lens model number is 433-3170-901XL.

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
CRT2502170837-012-7	8" Yellow Ball Tinted	Pass	Pass	Pass	Pass
CRT2502170837-012-8	8" Yellow Ball Tinted	Pass	Pass	Pass	Pass
CRT2502170837-012-9	8" Yellow Ball Tinted	Pass	Pass	Pass	Pass
CRT2502170837-008-1	8" Yellow Ball Clear	Pass	Pass	Pass	Pass
CRT2502170837-008-2	8" Yellow Ball Clear	Pass	Pass	Pass	Pass
CRT2502170837-008-3	8" Yellow Ball Clear	Pass	Pass	Pass	Pass



Measured Voltage: 120.1 Vac

Complies: ☒ YES ☐ NO

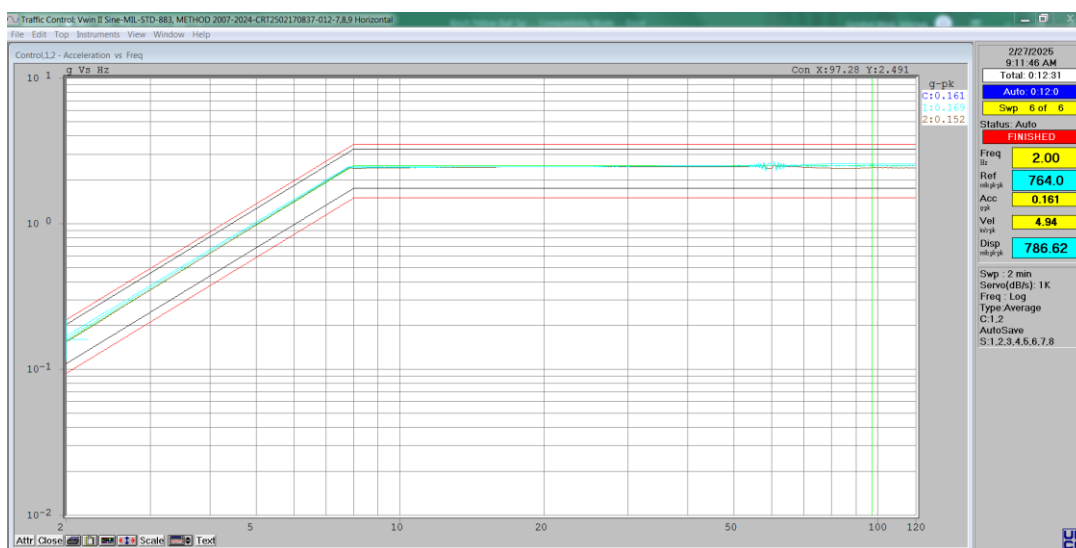
Tested By:	John Robins	Signature or initials:	
Engineer:	John Robins	Signature or initials:	
Reviewed By:	cwm	Signature or initials:	
Equipment Used:	10,11	Completion Date:	22-Feb-2025
Amb (°C):	NA	RH%:	NA

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
CRT2502170837-012-7	8" Yellow Ball Tinted	X	X	X	Pass	Pass
CRT2502170837-012-8	8" Yellow Ball Tinted	X	X	X	Pass	Pass
CRT2502170837-012-9	8" Yellow Ball Tinted	X	X	X	Pass	Pass
CRT2502170837-008-1	8" Yellow Ball Clear	X	X	X	Pass	Pass
CRT2502170837-008-2	8" Yellow Ball Clear	X	X	X	Pass	Pass
CRT2502170837-008-3	8" Yellow Ball Clear	X	X	X	Pass	Pass



Complies: ☒ YES ☐ NO

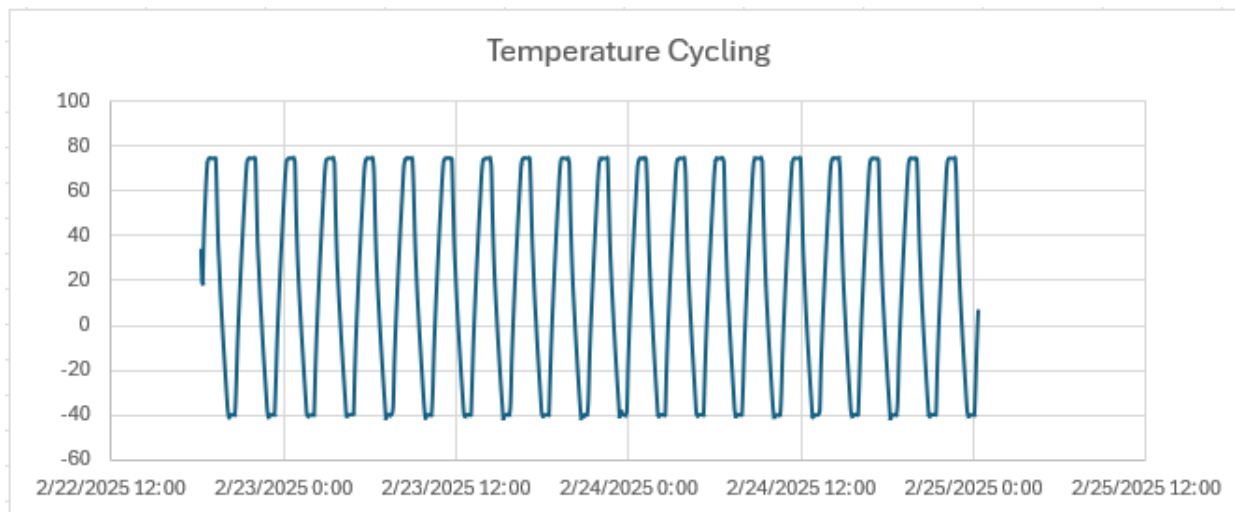
Tested By:	Gordon West	Signature or initials:	<i>Gordon West</i>
Engineer:	John Robins	Signature or initials:	<i>John Robins</i>
Reviewed By:	cwm	Signature or initials:	<i>cwm</i>
Equipment Used:	1,2,3,4,5	Completion Date:	27-Feb-2025
Amb (°C):	22.3	RH%	52

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
CRT2502170837-012-7	8" Yellow Ball Tinted	Pass	Pass
CRT2502170837-012-8	8" Yellow Ball Tinted	Pass	Pass
CRT2502170837-012-9	8" Yellow Ball Tinted	Pass	Pass
CRT2502170837-008-1	8" Yellow Ball Clear	Pass	Pass
CRT2502170837-008-2	8" Yellow Ball Clear	Pass	Pass
CRT2502170837-008-3	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
CRT2502170837-012-7	8" Yellow Ball Tinted	No moisture or damage	Operates as expected
CRT2502170837-012-8	8" Yellow Ball Tinted	No moisture or damage	Operates as expected
CRT2502170837-012-9	8" Yellow Ball Tinted	No moisture or damage	Operates as expected
CRT2502170837-008-1	8" Yellow Ball Clear	No moisture or damage	Operates as expected
CRT2502170837-008-2	8" Yellow Ball Clear	No moisture or damage	Operates as expected
CRT2502170837-008-3	8" Yellow Ball Clear	No moisture or damage	Operates as expected

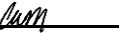
Requirement: Signal Still Operational and No Moisture In The Housing

Intertek Sample Number	Sample Temp. at start (°C)	Water Temperature 25C +/- 5C			
		Start	10 minutes	20 minutes	30 minutes
CRT2502170837-012-7	37.0	22.5	21.5	21.6	21.4
CRT2502170837-012-8	37.0	22.5	21.5	21.6	21.4
CRT2502170837-012-9	37.4	22.2	21.6	21.7	21.8
CRT2502170837-008-1	37.4	22.2	21.6	21.7	21.8
CRT2502170837-008-2	37.8	21.8	22.7	23.6	23.5
CRT2502170837-008-3	37.8	21.8	22.7	23.6	23.5

* 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:	17, 18, 19, 20, 21	Completion Date:	21-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	CRT2502170837-012-7					Target Input voltage		Measured Input Voltage		H, V Lum. Intensity		Vac Variation Factor		MMLI Factor
Module	8" Ball					80Vac		79.9	Vac	591.5	Candela	0.993		0.946
Color:	Yellow					120Vac		120.2	Vac	595.8	Candela	1.000		5/35 Factor
Lens Type:	Tinted					135Vac		135.2	Vac	598.4	Candela	1.004		0.973
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	136	137	137	138	137	138	128	129	129	130	130	131	41
12.5U	7.5	123	125	124	126	125	127	116	118	117	119	118	120	33
7.5U	2.5	219	221	221	222	222	223	207	209	209	210	210	211	78
7.5U	7.5	188	192	189	194	190	194	178	182	179	183	180	184	62
7.5U	12.5	145	150	146	151	146	151	137	142	138	143	138	143	45
2.5U	2.5	397	405	400	408	402	410	376	383	379	386	380	388	168
2.5U	7.5	335	348	338	351	339	352	317	329	319	332	321	333	139
2.5U	12.5	246	261	248	263	249	264	233	247	234	249	236	250	94
2.5U	17.5	160	172	161	173	162	174	151	162	153	164	153	164	53
2.5U	22.5	90	97	91	98	91	99	85	92	86	93	86	93	29
2.5D	2.5	758	770	764	775	767	779	717	728	723	734	726	737	402
2.5D	7.5	641	665	646	669	649	672	607	629	611	633	614	636	328
2.5D	12.5	451	482	455	485	457	488	427	456	430	459	432	461	226
2.5D	17.5	281	304	283	306	284	308	266	288	268	290	269	291	131
2.5D	22.5	139	153	140	155	141	155	132	145	133	146	133	147	70
2.5D	27.5	69	77	70	77	70	78	65	73	66	73	66	74	37
7.5D	2.5	754	759	760	765	763	768	714	719	719	724	722	727	316
7.5D	7.5	640	647	644	652	647	655	605	612	610	617	612	619	262
7.5D	12.5	453	459	456	463	458	465	429	435	432	438	434	440	176
7.5D	17.5	283	287	285	289	287	290	268	272	270	274	271	275	103
7.5D	22.5	145	148	146	149	147	150	137	140	138	141	139	142	53
7.5D	27.5	74	75	74	76	74	76	70	71	70	71	70	72	29
12.5D	2.5	389	387	391	389	393	391	368	366	370	368	372	370	123
12.5D	7.5	332	328	335	331	336	332	314	310	317	313	318	314	98
12.5D	12.5	244	241	246	242	247	243	231	228	233	229	234	230	70
12.5D	17.5	163	160	164	162	165	162	154	152	155	153	156	154	41
12.5D	22.5	96	95	96	95	97	96	90	90	91	90	92	91	21
12.5D	27.5	56	54	56	55	56	55	53	51	53	52	53	52	12
17.5D	2.5	208	208	209	209	210	210	197	197	198	198	199	199	57
17.5D	7.5	181	182	182	183	183	184	171	172	172	173	173	174	45
17.5D	12.5	140	142	141	143	142	143	133	134	134	135	134	136	33
17.5D	17.5	100	101	101	102	101	102	95	95	95	96	96	97	16
17.5D	22.5	65	66	65	66	65	66	61	62	62	63	62	63	8
22.5D	2.5	138	138	139	139	140	140	131	131	132	132	132	132	41
22.5D	7.5	119	120	120	121	120	122	113	114	113	115	114	115	33
22.5D	12.5	92	92	92	93	93	93	87	87	87	88	88	88	25
22.5D	17.5	68	68	69	68	69	69	64	64	65	65	65	65	12
27.5D	2.5	80	80	81	81	81	81	76	76	76	76	77	77	29
27.5D	7.5	71	71	71	71	72	72	67	67	68	67	68	68	21

Luminous Intensity 6.4.4.1 through 6.4.4.4

Sample:	CRT2502170837-012-8				Target Input voltage		Measured Input Voltage			H, V Lum. Intensity		Vac Variation Factor		MMLI Factor	
Module	8" Ball				80Vac		79.9		Vac		584.4		Candela	0.993	0.938
Color:	Yellow				120Vac		120.1		Vac		588.7		Candela	1.000	5/35 Factor
Lens Type:	Tinted				135Vac		135.1		Vac		590.4		Candela	1.003	0.99
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	142	143	143	144	144	144	133	134	134	135	135	135	41	
12.5U	7.5	128	132	129	133	129	133	120	124	121	124	121	125	33	
7.5U	2.5	228	232	230	233	230	234	214	217	215	219	216	219	78	
7.5U	7.5	195	204	196	206	197	206	183	191	184	193	184	193	62	
7.5U	12.5	151	160	152	161	152	162	141	150	142	151	143	152	45	
2.5U	2.5	406	415	409	418	410	419	381	389	384	392	385	393	168	
2.5U	7.5	340	361	343	364	344	365	319	339	321	341	322	342	139	
2.5U	12.5	251	274	253	276	254	277	236	257	237	259	238	259	94	
2.5U	17.5	165	184	166	185	166	186	154	173	155	174	156	174	53	
2.5U	22.5	95	108	95	109	96	109	89	101	89	102	90	102	29	
2.5D	2.5	760	777	766	782	768	785	713	728	718	734	721	736	402	
2.5D	7.5	636	679	640	684	642	686	596	637	600	641	602	643	328	
2.5D	12.5	451	497	454	501	456	502	423	466	426	469	427	471	226	
2.5D	17.5	280	321	282	323	283	324	263	301	265	303	265	304	131	
2.5D	22.5	142	167	143	169	144	169	133	157	134	158	135	159	70	
2.5D	27.5	72	86	73	87	73	87	68	81	68	82	68	82	37	
7.5D	2.5	765	778	770	783	773	785	717	729	722	735	725	737	316	
7.5D	7.5	643	672	648	677	650	679	603	630	608	635	609	637	262	
7.5D	12.5	454	486	457	489	459	491	426	456	429	459	430	460	176	
7.5D	17.5	283	312	285	314	286	315	265	293	267	295	268	296	103	
7.5D	22.5	148	167	149	168	149	168	138	156	140	157	140	158	53	
7.5D	27.5	76	85	77	86	77	86	71	80	72	81	72	81	29	
12.5D	2.5	409	411	412	414	414	416	384	386	387	389	388	390	123	
12.5D	7.5	348	355	350	358	351	359	326	333	328	336	329	337	98	
12.5D	12.5	255	264	257	266	258	267	239	248	241	250	242	251	70	
12.5D	17.5	171	179	172	180	173	181	160	168	162	169	162	170	41	
12.5D	22.5	101	109	102	109	102	110	95	102	95	103	96	103	21	
12.5D	27.5	59	63	60	64	60	64	56	59	56	60	56	60	12	
17.5D	2.5	223	224	224	225	225	226	209	210	210	211	211	212	57	
17.5D	7.5	193	197	194	199	195	199	181	185	182	187	183	187	45	
17.5D	12.5	149	156	151	157	151	157	140	146	141	147	142	147	33	
17.5D	17.5	107	113	107	113	108	114	100	106	101	106	101	107	16	
17.5D	22.5	70	75	70	75	70	75	65	70	66	70	66	71	8	
22.5D	2.5	147	148	148	149	149	150	138	139	139	140	139	140	41	
22.5D	7.5	126	130	127	131	127	131	118	122	119	123	120	123	33	
22.5D	12.5	98	101	99	102	99	103	92	95	92	96	93	96	25	
22.5D	17.5	73	76	73	76	73	76	68	71	69	71	69	72	12	
27.5D	2.5	86	87	87	87	87	87	81	81	81	82	81	82	29	
27.5D	7.5	76	77	76	78	77	78	71	72	72	73	72	73	21	

Luminous Intensity 6.4.4.1 through 6.4.4.4

Sample:	CRT2502170837-012-9				Target Input voltage		Measured Input Voltage			H, V Lum. Intensity		Vac Variation Factor		MMLI Factor
Module	8" Ball				80Vac		80.0	Vac		581.1	Candela	0.993		0.958
Color:	Yellow				120Vac		120.1	Vac		585.2	Candela	1.000		5/35 Factor
Lens Type:	Tinted				135Vac		135.2	Vac		586.8	Candela	1.003		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	139	140	140	141	141	142	134	135	134	135	135	136	41
12.5U	7.5	126	129	127	130	127	130	121	124	121	124	122	125	33
7.5U	2.5	225	227	226	229	227	229	215	218	217	219	217	220	78
7.5U	7.5	194	199	195	200	196	201	186	191	187	192	187	193	62
7.5U	12.5	150	156	151	157	152	158	144	150	145	151	145	151	45
2.5U	2.5	399	408	401	411	402	412	382	391	385	394	386	395	168
2.5U	7.5	336	355	338	358	339	359	322	340	324	343	325	344	139
2.5U	12.5	247	271	249	273	250	273	237	259	238	261	239	262	94
2.5U	17.5	163	180	164	182	164	182	156	173	157	174	157	175	53
2.5U	22.5	94	104	95	105	95	105	90	100	91	101	91	101	29
2.5D	2.5	738	751	743	757	745	759	707	720	712	725	714	727	402
2.5D	7.5	620	655	625	660	626	662	594	628	598	632	600	634	328
2.5D	12.5	440	481	443	484	444	486	422	461	425	464	426	465	226
2.5D	17.5	275	309	277	311	278	312	264	296	266	298	266	299	131
2.5D	22.5	141	160	142	161	142	162	135	153	136	154	136	155	70
2.5D	27.5	72	82	72	83	72	83	69	79	69	79	69	80	37
7.5D	2.5	750	753	756	758	758	760	719	722	724	727	726	729	316
7.5D	7.5	639	641	644	646	645	647	612	614	617	619	618	620	262
7.5D	12.5	458	459	461	462	462	463	439	439	442	442	443	444	176
7.5D	17.5	291	290	293	292	294	292	279	277	281	279	282	280	103
7.5D	22.5	152	153	153	154	154	154	146	146	147	147	147	148	53
7.5D	27.5	78	79	79	80	79	80	75	76	75	77	76	77	29
12.5D	2.5	407	402	409	405	411	406	390	385	392	388	393	389	123
12.5D	7.5	350	341	352	344	353	345	335	327	337	329	338	330	98
12.5D	12.5	261	252	263	254	264	254	250	241	252	243	253	244	70
12.5D	17.5	176	168	177	169	178	170	169	161	170	162	170	163	41
12.5D	22.5	105	101	106	102	106	102	100	97	101	98	101	98	21
12.5D	27.5	61	59	62	59	62	59	59	56	59	57	59	57	12
17.5D	2.5	220	220	222	222	222	222	211	211	212	212	213	213	57
17.5D	7.5	192	193	193	195	194	195	184	185	185	186	186	187	45
17.5D	12.5	150	152	151	153	152	153	144	145	145	146	145	147	33
17.5D	17.5	108	109	109	109	109	110	103	104	104	105	104	105	16
17.5D	22.5	71	72	71	72	71	72	68	69	68	69	68	69	8
22.5D	2.5	145	146	146	147	147	147	139	140	140	140	140	141	41
22.5D	7.5	126	127	127	128	127	129	121	122	121	123	122	123	33
22.5D	12.5	98	99	99	100	99	100	94	95	95	96	95	96	25
22.5D	17.5	73	73	74	74	74	74	70	70	71	71	71	71	12
27.5D	2.5	85	86	86	86	86	87	82	82	82	83	83	83	29
27.5D	7.5	76	76	76	77	77	77	73	73	73	74	73	74	21

Luminous Intensity 6.4.4.1 through 6.4.4.4

Sample:	CRT2502170837-008-1				Target Input voltage		Measured Input Voltage			H, V Lum. Intensity		Vac Variation Factor		MMLI Factor
Module	8" Ball				80Vac		79.9	Vac		631.1	Candela	0.996	0.944	
Color:	Yellow				120Vac		120.0	Vac		633.4	Candela	1.000	5/35 Factor	
Lens Type:	Clear				135Vac		135.1	Vac		634.8	Candela	1.002	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	153	156	153	156	154	157	144	147	145	148	145	148	41
12.5U	7.5	137	145	138	145	138	145	129	137	130	137	130	137	33
7.5U	2.5	248	253	249	254	250	255	234	239	235	240	236	241	78
7.5U	7.5	212	225	212	226	213	226	200	212	201	213	201	213	62
7.5U	12.5	163	177	164	178	164	178	154	167	155	168	155	168	45
2.5U	2.5	440	456	441	458	442	459	415	431	417	432	417	433	168
2.5U	7.5	364	404	365	405	366	406	344	381	345	383	346	384	139
2.5U	12.5	266	311	267	312	267	313	251	294	252	295	252	295	94
2.5U	17.5	172	210	173	211	173	211	163	198	163	199	164	199	53
2.5U	22.5	99	122	100	122	100	122	94	115	94	115	94	116	29
2.5D	2.5	808	836	811	839	813	841	763	789	766	792	768	794	402
2.5D	7.5	671	742	674	745	675	747	634	701	636	704	637	705	328
2.5D	12.5	471	550	473	552	474	553	445	519	446	521	447	522	226
2.5D	17.5	288	360	289	361	289	362	272	340	273	341	273	342	131
2.5D	22.5	147	188	147	189	148	189	139	178	139	178	140	179	70
2.5D	27.5	75	96	76	96	76	97	71	91	71	91	72	91	37
7.5D	2.5	822	833	825	836	827	837	776	786	779	789	781	791	316
7.5D	7.5	695	720	697	723	699	724	656	680	658	682	660	684	262
7.5D	12.5	497	516	498	518	499	519	469	488	471	489	472	490	176
7.5D	17.5	307	329	309	330	309	331	290	311	291	312	292	312	103
7.5D	22.5	161	176	161	176	162	177	152	166	152	166	153	167	53
7.5D	27.5	83	91	83	91	83	92	78	86	78	86	79	87	29
12.5D	2.5	446	443	448	444	449	445	421	418	423	420	424	421	123
12.5D	7.5	383	380	384	381	385	382	362	359	363	360	364	361	98
12.5D	12.5	285	281	286	282	287	282	269	265	270	266	271	267	70
12.5D	17.5	190	188	191	189	191	189	179	178	180	178	180	179	41
12.5D	22.5	113	114	113	115	113	115	106	108	107	108	107	109	21
12.5D	27.5	66	66	66	67	66	67	62	63	62	63	63	63	12
17.5D	2.5	240	241	241	242	242	243	227	228	228	229	228	229	57
17.5D	7.5	209	214	209	215	210	215	197	202	198	203	198	203	45
17.5D	12.5	163	169	163	170	164	170	154	160	154	160	154	160	33
17.5D	17.5	116	122	117	122	117	122	110	115	110	115	110	116	16
17.5D	22.5	76	81	76	81	77	81	72	76	72	76	72	77	8
22.5D	2.5	158	160	158	160	159	161	149	151	150	151	150	152	41
22.5D	7.5	136	142	137	142	137	143	129	134	129	134	129	135	33
22.5D	12.5	106	111	107	111	107	111	100	104	101	105	101	105	25
22.5D	17.5	79	82	80	82	80	82	75	77	75	77	75	77	12
27.5D	2.5	93	94	93	95	94	95	88	89	88	89	88	89	29
27.5D	7.5	82	85	82	85	82	85	77	80	78	80	78	80	21

Luminous Intensity 6.4.4.1 through 6.4.4.4

Sample:	CRT2502170837-008-2				Target Input voltage		Measured Input Voltage			H, V Lum. Intensity		Vac Variation Factor		MMLI Factor
Module	8" Ball				80Vac		80.0	Vac		593.4	Candela	0.996		0.963
Color:	Yellow				120Vac		120.1	Vac		596.0	Candela	1.000		5/35 Factor
Lens Type:	Clear				135Vac		135.1	Vac		598.7	Candela	1.005		0.99
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	140	141	141	142	142	142	135	136	136	136	136	137	41
12.5U	7.5	127	130	128	130	128	131	122	125	123	125	124	126	33
7.5U	2.5	226	228	227	229	228	230	217	220	218	221	219	222	78
7.5U	7.5	193	200	194	201	195	202	186	192	187	193	188	194	62
7.5U	12.5	149	156	150	157	151	157	144	150	144	151	145	152	45
2.5U	2.5	408	416	410	417	412	419	393	400	395	402	396	404	168
2.5U	7.5	344	359	346	361	347	362	331	346	333	347	334	349	139
2.5U	12.5	253	271	255	272	256	273	244	261	245	262	246	263	94
2.5U	17.5	166	179	166	180	167	181	160	172	160	173	161	174	53
2.5U	22.5	94	103	94	104	95	104	90	99	91	100	91	100	29
2.5D	2.5	772	782	775	786	779	789	743	753	746	756	749	760	402
2.5D	7.5	653	678	655	681	658	684	628	652	631	655	634	658	328
2.5D	12.5	461	493	463	495	465	498	444	475	446	477	448	479	226
2.5D	17.5	288	315	289	316	290	318	277	303	278	305	279	306	131
2.5D	22.5	144	163	145	164	145	164	139	157	139	157	140	158	70
2.5D	27.5	72	83	72	83	73	84	69	80	70	80	70	81	37
7.5D	2.5	768	777	771	780	775	784	739	748	743	751	746	754	316
7.5D	7.5	647	665	650	668	653	671	623	640	626	643	629	646	262
7.5D	12.5	459	477	461	479	464	481	442	459	444	461	446	463	176
7.5D	17.5	288	301	289	302	291	304	277	290	279	291	280	292	103
7.5D	22.5	149	159	149	159	150	160	143	153	144	153	144	154	53
7.5D	27.5	76	82	76	82	77	83	73	79	73	79	74	80	29
12.5D	2.5	401	402	403	403	405	405	386	387	388	388	389	390	123
12.5D	7.5	341	344	342	346	344	347	328	331	330	333	331	334	98
12.5D	12.5	250	256	251	257	253	258	241	246	242	247	243	248	70
12.5D	17.5	167	171	168	172	169	173	161	165	162	166	163	166	41
12.5D	22.5	99	103	99	104	100	104	95	99	96	100	96	100	21
12.5D	27.5	58	60	58	60	58	60	56	58	56	58	56	58	12
17.5D	2.5	216	216	217	217	218	218	208	208	209	209	210	210	57
17.5D	7.5	188	191	189	192	189	193	181	184	182	185	182	185	45
17.5D	12.5	145	150	146	151	147	151	140	144	141	145	141	146	33
17.5D	17.5	104	108	104	108	105	109	100	104	100	104	101	105	16
17.5D	22.5	68	71	68	71	68	72	65	68	65	69	66	69	8
22.5D	2.5	143	144	144	145	145	145	138	139	139	139	139	140	41
22.5D	7.5	124	126	124	126	125	127	119	121	119	122	120	122	33
22.5D	12.5	95	98	96	98	96	98	92	94	92	94	93	95	25
22.5D	17.5	71	72	71	73	71	73	68	70	68	70	69	70	12
27.5D	2.5	83	84	84	84	84	85	80	81	81	81	81	82	29
27.5D	7.5	74	74	74	75	75	75	71	72	72	72	72	72	21

Luminous Intensity 6.4.4.1 through 6.4.4.4

Sample:	CRT2502170837-008-3	Target Input voltage	Measured Input Voltage	H, V Lum. Intensity	Vac Variation Factor	MMLI Factor
Module	8" Ball	80Vac	80.0 Vac	580.9 Candela	0.992	0.950
Color:	Yellow	120Vac	120.1 Vac	585.8 Candela	1.000	5/35 Factor
Lens Type:	Clear	135Vac	135.1 Vac	588.4 Candela	1.004	0.989

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	139	139	141	140	141	140	132	132	134	133	134	133	41
12.5U	7.5	126	127	128	128	128	129	120	121	121	122	122	122	33
7.5U	2.5	223	226	225	228	226	229	212	215	214	216	215	217	78
7.5U	7.5	191	198	193	200	194	201	182	188	183	190	184	191	62
7.5U	12.5	148	155	150	157	150	157	141	148	142	149	143	149	45
2.5U	2.5	402	404	405	408	407	409	382	384	385	387	387	389	168
2.5U	7.5	342	348	345	350	346	352	325	330	328	333	329	334	139
2.5U	12.5	255	259	257	261	258	262	242	246	244	248	245	249	94
2.5U	17.5	167	172	169	174	169	174	159	164	160	165	161	166	53
2.5U	22.5	95	99	96	100	97	101	91	94	91	95	92	96	29
2.5D	2.5	760	764	766	771	770	774	722	726	728	732	731	736	402
2.5D	7.5	645	658	651	664	653	667	613	625	618	631	621	633	328
2.5D	12.5	461	475	465	479	467	481	438	452	442	455	444	457	226
2.5D	17.5	288	303	290	305	292	306	274	287	276	290	277	291	131
2.5D	22.5	146	155	147	156	147	157	138	147	139	148	140	149	70
2.5D	27.5	74	79	74	79	74	80	70	75	70	75	71	76	37
7.5D	2.5	761	777	767	783	770	787	723	738	729	744	732	747	316
7.5D	7.5	636	676	642	682	645	685	605	643	610	648	612	651	262
7.5D	12.5	446	490	450	494	452	496	424	465	427	469	429	471	176
7.5D	17.5	278	312	281	315	282	316	264	297	267	299	268	301	103
7.5D	22.5	144	163	145	165	146	165	137	155	138	157	139	157	53
7.5D	27.5	74	83	75	84	75	84	71	79	71	80	72	80	29
12.5D	2.5	404	411	407	414	409	416	383	390	387	393	388	395	123
12.5D	7.5	339	359	341	362	343	364	322	341	324	344	326	346	98
12.5D	12.5	245	269	247	271	248	272	233	256	235	258	236	259	70
12.5D	17.5	163	181	165	182	166	183	155	172	157	173	157	174	41
12.5D	22.5	96	107	97	108	98	108	92	102	92	102	93	103	21
12.5D	27.5	57	61	57	61	58	61	54	58	55	58	55	58	12
17.5D	2.5	219	221	220	223	221	224	208	210	209	212	210	213	57
17.5D	7.5	189	194	191	196	192	197	180	185	181	186	182	187	45
17.5D	12.5	146	153	147	154	148	155	139	145	140	146	141	147	33
17.5D	17.5	104	110	105	111	106	111	99	104	100	105	100	106	16
17.5D	22.5	68	72	68	72	69	73	64	68	65	69	65	69	8
22.5D	2.5	146	147	147	148	148	148	138	139	140	140	140	141	41
22.5D	7.5	125	128	126	129	127	130	119	122	120	123	121	123	33
22.5D	12.5	96	100	97	101	98	101	92	95	92	96	93	96	25
22.5D	17.5	71	74	72	75	72	75	68	70	68	71	68	71	12
27.5D	2.5	85	85	86	86	86	87	81	81	81	82	82	82	29
27.5D	7.5	75	76	76	76	76	77	72	72	72	73	72	73	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:	12,13,14,15,25,26,27	Completion Date:	14-Mar-2025
Amb (°C):	20	RH%	36

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	CRT2502170837-012-7	CRT2502170837-012-8	CRT2502170837-012-9
Location	Luminance	Luminance	Luminance
1	9932	14561	6802
2	23924	29636	26923
3	33771	28916	33159
4	21129	22121	19687
5	13460	14781	12494
6	31903	36431	31059
7	51690	48279	50557
8	14032	15614	16228
9	9240	7423	9160
Average	23231	24196	22897
Intensity Ratio	5.6	6.5	7.4

8" Yellow Ball Clear			
Sample	CRT2502170837-008-1	CRT2502170837-008-2	CRT2502170837-008-3
Location	Luminance	Luminance	Luminance
1	7444	15664	8590
2	23190	27723	22983
3	30125	28372	27267
4	28357	24636	21513
5	16514	13853	13343
6	34095	33097	38625
7	52191	58272	49013
8	16102	16443	15800
9	8621	9519	7932
Average	24071	25287	22785
Intensity Ratio	7.0	6.1	6.2

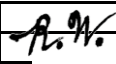
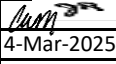
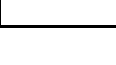
Luminance measurements are in cd/m²

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:

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

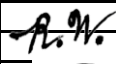
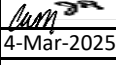
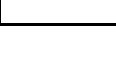
		Chromaticity Coordinates	
Color	Sample	x	y
Yellow (Tinted)	CRT2502170837-012-7	0.575	0.423
	CRT2502170837-012-8	0.576	0.423
	CRT2502170837-012-9	0.575	0.423

		Chromaticity Coordinates	
Color	Sample	x	y
Yellow (Clear)	CRT2502170837-008-1	0.570	0.426
	CRT2502170837-008-2	0.571	0.425
	CRT2502170837-008-3	0.571	0.425

The chromaticity measurements meet the requirements of the referenced specification.

Measured Voltage: 120.0 - 120.3 Vac

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

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

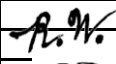
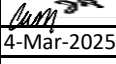
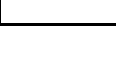
8" Yellow Ball Tinted									
Sample	CRT2502170837-012-7			CRT2502170837-012-8			CRT2502170837-012-9		
Location	x	y	Dominant	x	y	Dominant	x	y	Dominant
1	0.574	0.424	590	0.576	0.422	590	0.575	0.423	590
2	0.575	0.423	590	0.577	0.422	590	0.575	0.424	590
3	0.575	0.423	590	0.574	0.424	590	0.574	0.424	590
4	0.576	0.422	590	0.577	0.422	590	0.574	0.424	590
5	0.576	0.422	590	0.576	0.422	590	0.576	0.423	590
6	0.576	0.422	590	0.578	0.421	591	0.577	0.422	590
7	0.577	0.421	591	0.577	0.421	591	0.577	0.421	591
8	0.573	0.425	590	0.574	0.425	590	0.574	0.424	590
9	0.574	0.424	590	0.573	0.425	590	0.575	0.424	590
Average	0.575	0.423	590	0.576	0.423	590	0.575	0.423	590

8" Yellow Ball Clear									
Sample	CRT2502170837-008-1			CRT2502170837-008-2			CRT2502170837-008-3		
Location	x	y	Dominant	x	y	Dominant	x	y	Dominant
1	0.571	0.425	590	0.571	0.425	590	0.573	0.423	590
2	0.569	0.426	590	0.571	0.425	590	0.570	0.426	590
3	0.570	0.426	590	0.571	0.425	590	0.570	0.426	590
4	0.570	0.426	590	0.572	0.425	590	0.570	0.426	590
5	0.570	0.426	590	0.571	0.425	590	0.571	0.425	590
6	0.571	0.425	590	0.573	0.424	590	0.573	0.423	590
7	0.573	0.423	590	0.574	0.423	590	0.573	0.423	590
8	0.567	0.429	589	0.570	0.426	590	0.570	0.426	590
9	0.568	0.428	589	0.571	0.425	590	0.569	0.427	589
Average	0.570	0.426	590	0.571	0.425	590	0.571	0.425	590

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

Measured Voltage: 120.0 - 120.3 Vac

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
CRT2502170837-012-7	595.8	581.2	0.98
CRT2502170837-012-8	588.7	555.4	0.94
CRT2502170837-012-9	585.2	580	0.99

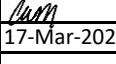
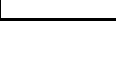
measurements in cd

8" Yellow Ball Clear			
Sample	Pre Abrasion	Post Abrasion	Percentage
CRT2502170837-008-1	633.4	603.4	0.95
CRT2502170837-008-2	596	569.7	0.96
CRT2502170837-008-3	585.8	570.2	0.97

measurements in cd

Measured Voltage:	120.15	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:	12,13,14,15,16	Completion Date:	17-Mar-2025
Amb (°C):	20	RH%	44

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
CRT2502170837-012-7	52.0	51.2	56.2
CRT2502170837-012-8	53.6	52.8	58.2
CRT2502170837-012-9	53.3	52.7	57.8

Label lists 6.5VA

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:	10,22,24	Completion Date:	3/25/2025
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%
CRT2502170837-012-7	120.1	51.6	6.0	0.97	1.01	9.9
CRT2502170837-012-8	120.1	53.8	6.2	0.97	0.98	9.5
CRT2502170837-012-9	120.1	53.1	6.2	0.97	0.98	10.1
Requirement	NA	NA	NA	≥ 0.90	≤ 20%	≤ 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:	22,23,24			Completion Date:	3/24/2025
Amb (°C):	24.3	RH%	21.5		

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	O109		Goniometer	Optroniks	04-Mar-2026
13	L235		25M Photocell	Instrument Systems	17-Apr-2025
14	L254		Hygrometer	Testo	03-Jun-2025
15	O091		Power Analyzer	Yokogawa	11-Jun-2025
16	F363A		Push-Pull Meter	Amada	08-May-2025
17	L224		IR Thermomter	Fluke	10-Oct-2025
18	T1319		Thermometer	Fluke	30-Jul-2025
19	N1154		Rain Gauge	Cole Parmer	14-Feb-2026
20	Y255		Anemometer	Pacer Instruments	20-Sep-2025
21	M296		Stopwatch	Traceable	22-Jan-2026
22	A206		Current Transformer	Pearson	01-Jun-2025
23	L176		Thermometer	Testo	19-Jul-2025
24	M297		Power Analyzer	Yokogawa	29-May-2025
25	H138		Thermal Chamber	Despatch	Used with cal'd Equip.
26	T1546		Digital Thermometer	Dickson	
27	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					