

LEOTEK Electronics USA LLC

TEST REPORT

SCOPE OF WORK

Intertek Traffic Signal ITE Program Certification Testing
of 12" count pedestrian signal.

REPORT NUMBER

106110627CRT-001

ISSUE DATE

30-Apr-2025

PAGES

25



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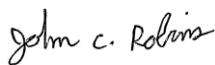
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Test Report			
Company Name	LEOTEK Electronics USA LLC	Test Location	Intertek Testing Services NA
Address	1955 Lundy Avenue San Jose, CA 95131	Address	3933 US Rt 11 Cortland, NY 13045 USA
Client Contact	Frank Saltani	Quote Number	Qu-01514897-3
Phone	408-380-1788 Ext. 202	Test Start Date	February 21, 2025
Email	frank@leotek.com	Completion Date	April 30, 2025

Standard(s)
ITE Pedestrian Traffic Control Signal Indicators Dated August 4, 2010.

Spec	Test name	Clause	Result
ITE	Conditioning	6.4.2	Pass
ITE	Mechanical Vibration	6.4.3.1	Pass
ITE	Temperature Cycling	6.4.3.2	Pass
ITE	Moisture Resistance	6.4.3.3	Pass
ITE	Luminance & Luminance Uniformity	6.4.4.2 - 6.4.4.6	Pass
ITE	Chromaticity	6.4.4.7	Pass
ITE	Color Uniformity	6.4.4.8	Pass
ITE	Luminous Intensity On-Axis	6.4.4.9	Pass
ITE	Luminous Intensity Off-Axis	6.4.4.10	Pass
ITE	Current Consumption	6.4.6.2	Pass
ITE	Power Consumption	6.4.6.3	Pass
ITE	Low Voltage Turn Off	6.4.6.4	Pass
ITE	Turn-On/Turn-Off Times	6.4.6.5	NA
ITE	Default Condition	6.4.6.6	NA
ITE	Transient Voltage Immunity	6.4.6.7	Pass
ITE	Ring Wave Immunity	6.4.6.7.1	Pass
ITE	Electronic Noise	6.4.6.8	Pass
ITE	Power Factor & Total Harmonic Distortion	6.4.6.9, 10	Pass
ITE	Countdown Timing	6.4.6.11	Pass
ITE	Load Switch Compatibility	6.4.7.2	Pass
ITE	Off State Voltage Decay	6.4.7.3	Pass

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.
2/17/2025	CRT2502170813-005	12" Count	Engineering	See Below

Further Sample Description

Intertek Sample Number	Description	Model Number	Serial Number
CRT2502170837-005-1	12" Count	430-7773-001X	A501002119
CRT2502170837-005-2	12" Count	430-7773-001X	A501002120
CRT2502170837-005-3	12" Count	430-7773-001X	A501002121
CRT2502170837-005-4	12" Count	430-7773-001X	A501002122
CRT2502170837-005-5	12" Count	430-7773-001X	A501002123
CRT2502170837-005-6	12" Count	430-7773-001X	A501002124

General Requirements

Intertek Sample Number	ETL Cert. Number	Label Identification	Lens Orientation	Color Coded Wires
CRT2502170813-005-1	NA	Pass	Pass	white/orange/blue
CRT2502170813-005-2	NA	Pass	Pass	white/orange/blue
CRT2502170813-005-3	NA	Pass	Pass	white/orange/blue
CRT2502170813-005-4	NA	Pass	Pass	white/orange/blue
CRT2502170813-005-5	NA	Pass	Pass	white/orange/blue
CRT2502170813-005-6	NA	Pass	Pass	white/orange/blue

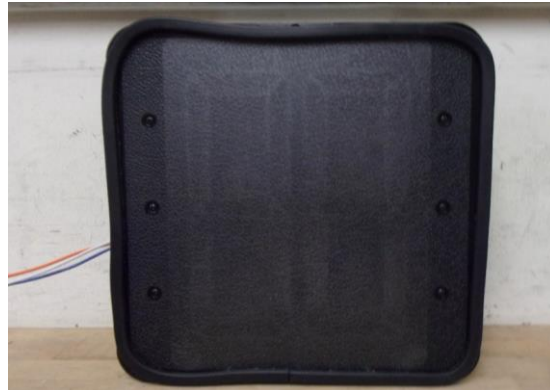
General Requirements

Intertek Sample Number	600V / 20 AWG Min.	Wire Length $\geq$ 39"	Service Rating +105°C	Clear/Frosted or Blacked Out Lens for Peds
CRT2502170813-005-1	600V / 18AWG	Pass	Pass	Clear/Frosted
CRT2502170813-005-2	600V / 18AWG	Pass	Pass	Clear/Frosted
CRT2502170813-005-3	600V / 18AWG	Pass	Pass	Clear/Frosted
CRT2502170813-005-4	600V / 18AWG	Pass	Pass	Clear/Frosted
CRT2502170813-005-5	600V / 18AWG	Pass	Pass	Clear/Frosted
CRT2502170813-005-6	600V / 18AWG	Pass	Pass	Clear/Frosted

Sample Modification Log	
Date	Modification description
2/21/25	Front Cover: 4798431002700
	Low Cover: C-A000000108
	SPS: PT-LAV106B01
	Barrier: 1100430000400
	LED: C115E0000001*72
	PCB: C-F000000006

Sample Information

Picture(s)

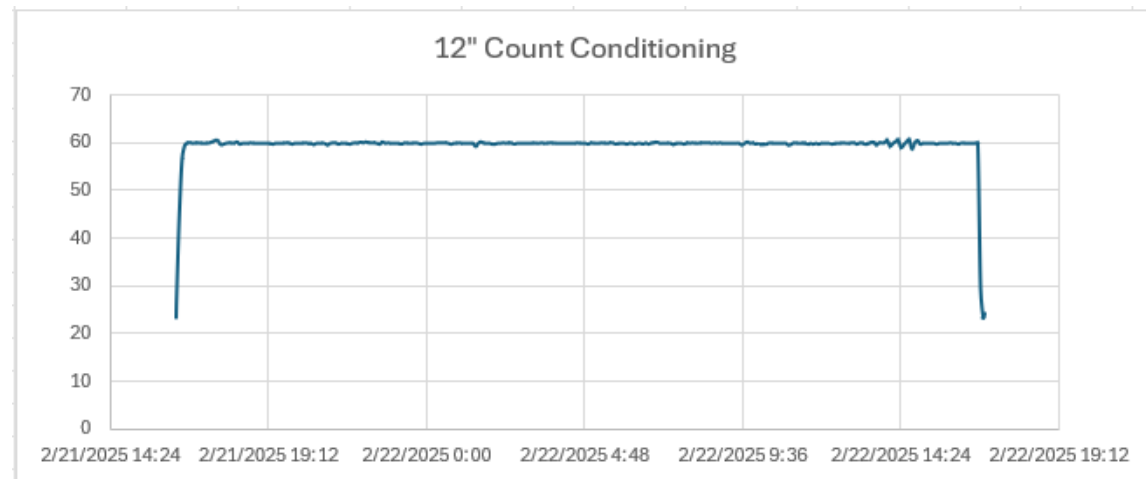


Conditioning

The pedestrian signal modules were conditioned before all other testing. The samples were placed in an environmental chamber and operated at nominal voltage for 24 hours at a temperature of 60 degrees C. Each indication was subjected to the 24 hour test. At the conclusion of the test, the modules shall be visually inspected for damage and checked for proper operation.

Results

Intertek Sample Number	Indication	Visual Inspection		Operational Check	
		Pre	Post	Pre	Post
CRT2502170837-005-1	Countdown	Pass	Pass	Pass	Pass
CRT2502170837-005-2	Countdown	Pass	Pass	Pass	Pass
CRT2502170837-005-3	Countdown	Pass	Pass	Pass	Pass
CRT2502170837-005-4	Countdown	Pass	Pass	Pass	Pass
CRT2502170837-005-5	Countdown	Pass	Pass	Pass	Pass
CRT2502170837-005-6	Countdown	Pass	Pass	Pass	Pass



Measured Voltage: 120 - 122 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:	6,7	Completion Date:	22-Feb-2025
Amb (°C):	NA	RH%	NA

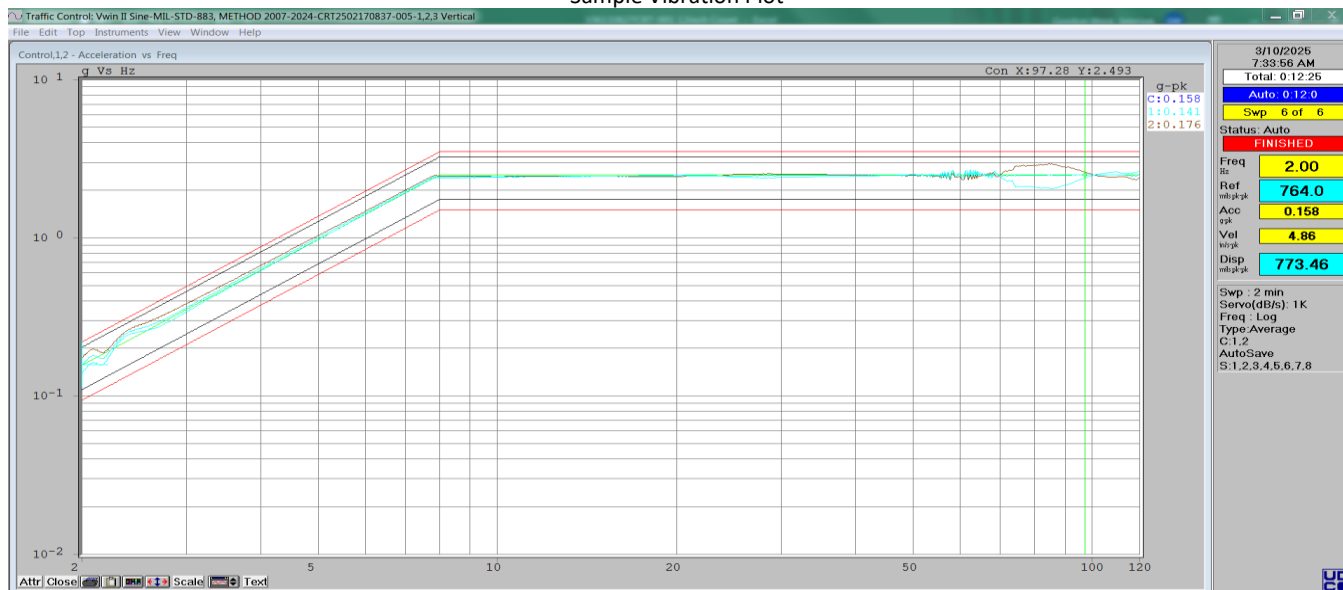
Mechanical Vibration

The submitted pedestrian 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. The modules were energized before and after each axis sweep. The modules were visually inspected after testing. Testing was conducted in accordance with MIL-STD-883, method 2007. At the conclusion of the test, the module shall be free of damage and fully operational.

Results

Intertek Sample Number	Description	x-axis lateral	y-axis horizontal	z-axis vertical	Visual Inspection	Operational Check
CRT2502170837-005-1	12" Count	X	X	X	Pass	Pass
CRT2502170837-005-2	12" Count	X	X	X	Pass	Pass
CRT2502170837-005-3	12" Count	X	X	X	Pass	Pass
CRT2502170837-005-4	12" Count	X	X	X	Pass	Pass
CRT2502170837-005-5	12" Count	X	X	X	Pass	Pass
CRT2502170837-005-6	12" Count	X	X	X	Pass	Pass

Sample Vibration Plot



Complies:



YES



NO

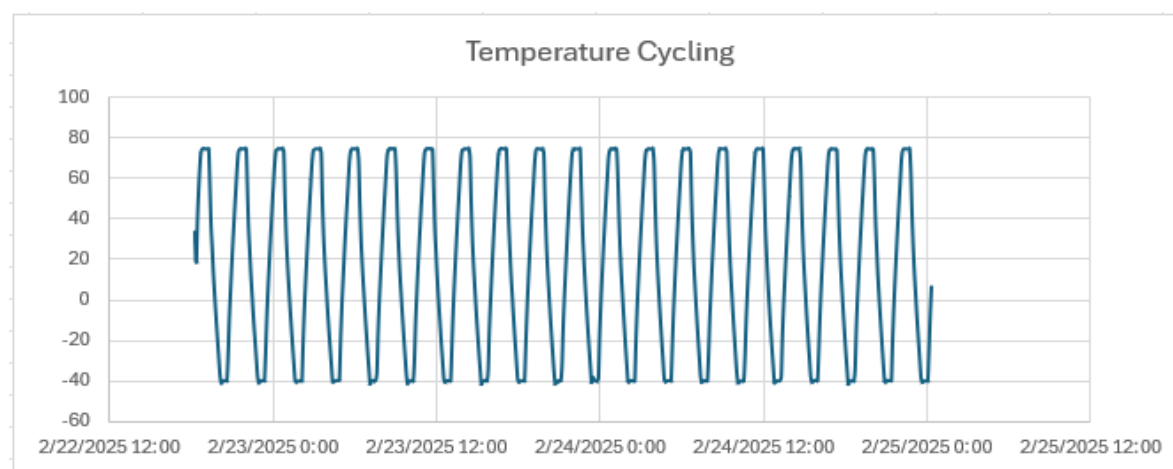
Tested By:	Gordon West	Signature or initials:	<i>Gordon West</i>
Engineer:	John Robins	Signature or initials:	<i>John Robins</i>
Reviewed By:	cwm	Signature or initials:	<i>cwm</i>
Equipment Used:	1,2,3,4,5	Completion Date:	10-Mar-2025
Amb (°C):	22.8	RH%	3843

Temperature Cycling

The submitted pedestrian 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
CRT2502170837-005-1	12" Count	Pass	Pass
CRT2502170837-005-2	12" Count	Pass	Pass
CRT2502170837-005-3	12" Count	Pass	Pass
CRT2502170837-005-4	12" Count	Pass	Pass
CRT2502170837-005-5	12" Count	Pass	Pass
CRT2502170837-005-6	12" Count	Pass	Pass



Complies: ☒ YES ☐ NO

Tested By:	John Robins	Signature or initials:	<i>JR</i>
Engineer:	John Robins	Signature or initials:	<i>JR</i>
Reviewed By:	cwm	Signature or initials:	<i>cwm</i>
Equipment Used:	6	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
CRT2502170837-005-1	12" Count	No moisture or damage	Operates as expected
CRT2502170837-005-2	12" Count	No moisture or damage	Operates as expected
CRT2502170837-005-3	12" Count	No moisture or damage	Operates as expected
CRT2502170837-005-4	12" Count	No moisture or damage	Operates as expected
CRT2502170837-005-5	12" Count	No moisture or damage	Operates as expected
CRT2502170837-005-6	12" Count	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
CRT2502170837-005-1	36.2	24.9	25.9	25.8	25.4
CRT2502170837-005-2	36.2	24.9	25.9	25.8	25.4
CRT2502170837-005-3	38.2	24.8	25.0	25.1	23.4
CRT2502170837-005-4	40.7	22.1	22.6	22.8	23.4
CRT2502170837-005-5	40.6	23.6	23.5	23.3	22.2
CRT2502170837-005-6	40.6	23.6	23.5	23.3	22.2

* 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:	25, 26, 27, 28, 29	Completion Dates:	18-Apr-2025
Amb (°C):	N/A	RH%	N/A
			23-Apr-2025

Luminance & Luminance Uniformity 6.4.4.2 - 6.4.4.5 & 6.4.4.6

Three pedestrian signal modules were operated at 120 Vac in ambient conditions. The luminance was measured using a direct viewing module calibrated with a NIST traceable luminance standard. Measurements were taken at nine locations on each signal, after a 60 minute warm up. A spot size of 12mm (0.5 inch) was used for the measurements.

A relative luminance measurement is taken at the lowered voltage of 80vac and again at the elevated voltage of 135vac and the resulting normalized factors are applied to the luminance data taken at 25°C. When the factors are applied to the photometric data, the units shall still meet the photometric requirements for each model.

A diminution factor was measured by using the submitted samples three pedestrian signal modules of each model 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 (I_A) 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 (I_H) taken and recorded. A diminution factor was calculated (I_H/I_A).

The readings were factored by the diminution factor to generate the 74°C/49°C data.

The luminance values taken are then used to verify luminance uniformity, the ratio between maximum and minimum luminance shall be less than 5:1.

Results - Hand & Countdown

The data at 25°C and 74°C/49°C complies with the luminance and uniformity requirements of the referenced specification. See

Sample	CRT2502170837-005-4			CRT2502170837-005-5			CRT2502170837-005-6		
Countdown	Luminance: Candela/Meter^2								
Position	80	120.1	135.3	80.3	120.1	135.2	80.1	120.1	135.2
1	3263	3262	3261	3206	3206	3215	3052	3055	3058
2	3401	3400	3399	3004	3004	3012	3136	3139	3142
3	3492	3491	3490	3018	3018	3026	3050	3053	3056
4	2916	2915	2914	3027	3027	3035	2962	2965	2968
5	3157	3156	3155	3168	3168	3177	2953	2956	2959
6	3429	3428	3427	3317	3317	3326	3269	3272	3275
7	3143	3142	3141	3305	3305	3314	3161	3164	3167
8	3217	3216	3215	3150	3150	3158	3182	3185	3188
9	2877	2876	2875	2994	2994	3002	3013	3016	3019
10	3886	3885	3884	4058	4058	4069	3873	3877	3881
11	3402	3401	3400	3172	3172	3181	3087	3090	3093
12	2862	2861	2860	2920	2920	2928	2879	2882	2885
13	3728	3727	3726	3609	3609	3619	3376	3379	3382
14	3308	3307	3306	3124	3124	3132	3143	3146	3149
25°C Average	3292	3291	3289	3219	3219	3228	3153	3156	3159
74°C/49°C Average	2304	2304	2303	2161	2161	2167	2211	2213	2216
Luminance Uniformity Ratio	1.4 to 1.0			1.4 to 1.0			1.3 to 1.0		
Max. Average Lum: 4,200 cd/m^2	Pass			Pass			Pass		
Min. Average Lum. 1,400 cd/m^2	Pass			Pass			Pass		
Luminance Uniformity Ratio ≤ 5:1	Pass			Pass			Pass		

Luminance measurements are in cd/m2

60 minute warm-up

Test distance is 9.5 feet with ¼ degree aperture using the PR 740

Complies: ☒ YES ☐ NO

Tested By:	Brittany James	Signature or initials:	
Engineer:	John Robins	Signature or initials:	
Reviewed By:	cwm	Signature or initials:	
Test Equipment Used:	34, 35,36,37	Completion Date:	23-Apr-2025
Amb (°C):	26.8	RH%	24

Chromaticity 6.4.4.7

The chromaticity measurements were performed on the submitted Pedestrian Signal Module with the spectroradiometer. The samples were operated at nominal input voltage and ambient temperature for 60 minutes before measurements were taken. Measurements were taken at 9 locations across the signal face for the hand and person and 14 locations for the countdown using a ½ inch spot size. The measurements were taken from 380-780nm utilizing a 2.0nm bandwidth.

Results

The walking person, hand and 88 were compliant with the chromaticity requirements.

Sample	Indication	Chromaticity Coordinates	
		x	y
CRT2502170837-005-4	Countdown	0.649	0.351
CRT2502170837-005-5	Countdown	0.649	0.350
CRT2502170837-005-6	Countdown	0.649	0.351

Measured Voltage 120VAC: See 6.4.4.2

Complies: ☒ YES ☐ NO

Tested By:	Brittany James	Signature or initials:	<i>Bj</i>
Engineer:	John Robins	Signature or initials:	<i>JR</i>
Reviewed By:	cwm	Signature or initials:	<i>cwm</i>
Test Equipment Used:	34, 35,36,37	Completion Date:	23-Apr-2025
Amb (°C):	26.8	RH%	24

Color Uniformity 6.4.4.8

Fourteen color measurements were taken for the countdown across the signal face using a ½" spot diameter. The dominant wavelength of each color measurement taken must be within ± 3nm of the average.

Results: Countdown

The countdown is compliant with the uniformity requirements.

Sample	CRT2502170837-005-4			CRT2502170837-005-5			CRT2502170837-005-6		
	Countdown								
Location	x	y	Dominant	x	y	Dominant	x	y	Dominant
1	0.649	0.351	605	0.652	0.348	606	0.649	0.350	605
2	0.649	0.350	605	0.649	0.350	605	0.649	0.350	605
3	0.649	0.351	605	0.650	0.349	606	0.650	0.350	605
4	0.650	0.350	605	0.650	0.350	606	0.650	0.350	605
5	0.648	0.351	605	0.649	0.351	605	0.648	0.352	605
6	0.648	0.351	605	0.648	0.351	605	0.649	0.350	605
7	0.648	0.351	605	0.648	0.351	605	0.649	0.351	605
8	0.647	0.353	605	0.646	0.353	605	0.648	0.352	605
9	0.649	0.351	605	0.654	0.345	607	0.649	0.351	605
10	0.650	0.350	605	0.650	0.350	606	0.649	0.350	605
11	0.648	0.352	605	0.647	0.352	605	0.648	0.352	605
12	0.650	0.349	606	0.651	0.349	606	0.650	0.350	606
13	0.650	0.350	605	0.650	0.349	606	0.650	0.350	605
14	0.647	0.353	605	0.647	0.352	605	0.648	0.351	605
Average	0.649	0.351	605	0.649	0.350	605	0.649	0.351	605

Measured Voltage 120VAC:	see 6.4.4.2	Vac
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Complies:	☒ YES	☐ NO
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Tested By:	Brittany James	Signature or initials:	<i>Bj</i>
Engineer:	John Robins	Signature or initials:	<i>JR</i>
Reviewed By:	cwm	Signature or initials:	<i>cwm</i>
Test Equipment Used:	34, 35, 36, 37	Completion Date:	23-Apr-2025
Amb (°C):	26.8	RH%	24

Luminous Intensity On-Axis 6.4.4.9

On axis Luminous Intensity measurement shall be made after the module has been operated under the test conditions for a minimum of 60 minutes at a 100 percent duty cycle. The single point measurement shall be made using a photometer located on and normal to the physical axis of the module lens at a distance of at least 9 meters from the lens surface.

Results

Class 2							
Sample	CRT2502170837-005-4			CRT2502170837-005-5		CRT2502170837-005-6	
Indication	Countdown						
Location	HV						
Candela	65			64		65	
Measured Voltage:	120.1	Vac	120.1	Vac	120.1	Vac	

Requirements

Class	Size
1	(9" x 9")
2	(12" x 12")
3	(16" x 18")

On-Axis Minimum Luminous Intensity - PTCSI LED Pedestrian Traffic Signal			
Class	Luminous Intensity (candela)		
	Walking Person	Hand	Countdown "88"
1	12	11	--
2	28	26	27
3	42	38	27

Maximum Permissible Luminous Intensity - PTCSI LED Pedestrian Traffic Signal			
Class	Luminous Intensity (candela)		
	Walking Person	Hand	Countdown "88"
1	36	33	--
2	126	114	81
3	126	114	81

Complies: ☒ YES ☐ NO

Tested By:	Matthew Benninger	Signature or initials:	<i>MB</i>
Engineer:	John Robins	Signature or initials:	<i>JR</i>
Reviewed By:	cwm	Signature or initials:	<i>cwm</i>
Test Equipment Used:	30,31,32,33	Completion Date:	21-Apr-2025
Amb (°C):	20	RH%	31

Luminous Intensity Off-Axis 6.4.4.10

Off axis Luminous Intensity measurement shall be made after the module has been operated under the test conditions for a minimum of 60 minutes at a 100 percent duty cycle. Three separate measurements shall be made using a photometer located (1) 15 degrees left, (2) 15 degrees right and (3) 15 degrees below the physical axis of the module lens at a distance of at least 9 meters from the lens surface. The photometer shall be oriented so that it is directed at the center of the modules lens.

Results

Class 2						
Sample	CRT2502170837-005-4		CRT2502170837-005-5		CRT2502170837-005-6	
Indication	Countdown					
Angle	Candela					
15° Left	30		29		30	
15° Right	29		30		29	
15° Down	35		34		35	
Measured Voltage:	120.1	Vac	120.1	Vac	120.1	Vac

Requirements

Class	Size
1	(9" x 9")
2	(12" x 12")
3	(16" x 18")

Off-Axis Minimum Luminous Intensity - PTCSI LED Pedestrian Traffic Signal			
Class	Luminous Intensity (candela)		
	Walking Person	Hand	Countdown "88"
1	6	5.5	--
2	14	13	13.5
3	23	19	13.5

Maximum Permissible Luminous Intensity - PTCSI LED Pedestrian Traffic Signal			
Class	Luminous Intensity (candela)		
	Walking Person	Hand	Countdown "88"
1	36	33	--
2	126	114	81
3	126	114	81

Complies: ☒ YES ☐ NO

Tested By:	Matthew Benninger	Signature or initials:	<i>MB</i>
Engineer:	John Robins	Signature or initials:	<i>JR</i>
Reviewed By:	cwm	Signature or initials:	<i>cwm</i>
Test Equipment Used:	30,31,32,33	Completion Date:	21-Apr-2025
Amb (°C):	20	RH%	31

Current Consumption

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)

Sample	Indication	-40°C	25°C	74°C
CRT2502170837-005-1	Countdown	62.3	65.1	72.1
CRT2502170837-005-2	Countdown	62.2	62.5	70.1
CRT2502170837-005-3	Countdown	62.3	68.9	67.4

Count lists 7.9VA

The current consumption was not in excess of 120% of the label current values for an ambient temperature of 25°C for the hand walking person and countdown.

Measured Voltage 120VAC:	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:	6,13,15	Completion Date:	27-Mar-2025
Amb (°C):	N/A	RH%	N/A

Power Consumption 6.4.6.3

Three samples were measured for power consumption in watts. The measured power values are supplied for comparison of Product Quality Assurance power measurements on production modules.

Results

Sample	Indication	25°C
CRT2502170837-005-1	Countdown	7.6
CRT2502170837-005-2	Countdown	7.4
CRT2502170837-005-3	Countdown	7.7

Count lists 7.5Watts

Measurements are in watts, taken after a minimum 60 minute warmup.

Measured Voltage 120VAC:	120.0 - 120.3	Vac
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Complies: ☒ YES ☐ NO

Tested By:	John Robins	Signature or initials:	<i>JR</i>
Engineer:	John Robins	Signature or initials:	<i>JR</i>
Reviewed By:	cwm	Signature or initials:	<i>cwm</i>
Equipment Used:	6,13,15	Completion Date:	27-Mar-2025
Amb (°C):	N/A	RH%	N/A

Low Voltage Turn Off 6.4.6.4

Three samples were measured to ensure compliance with the low voltage turn-off requirement. Each sample was fully illuminated at the nominal operating voltage. The applied voltage was then reduced to the point where there was no visible illumination.

Results

There was no visible illumination when the applied voltage was less than 35Vac RMS.

Sample	Low Voltage Turn "Off" (Vac RMS)
	Count
CRT2502170837-005-1	61
CRT2502170837-005-2	61
CRT2502170837-005-3	61

Complies: ☒ YES ☐ NO

Tested By:	John Robins	Signature or initials:	<i>JR</i>
Engineer:	John Robins	Signature or initials:	<i>JR</i>
Reviewed By:	cwm	Signature or initials:	<i>cwm</i>
Equipment Used:	7,14	Completion Date:	10-Apr-2025
Amb (°C):	27.3	RH%	18

Transient Voltage Immunity 6.4.6.7

Three pedestrian signal modules were subjected to 3 positive and 3 negative 1000V 7.5 joule pulses across their input leads at a rate of 0.5 pps in accordance with NEMA TS 2-2003 section 2.1.8. The pulses were the discharge from a 15μF capacitor. The devices were then energized with rated voltage to verify proper operation.

Results

The signal modules withstood the applications of the transient voltage without damage or operational deterioration.

Pedestrian Signal - Countdown			
Sample	3 Positive Pulses	3 Negative Pulses	Results
CRT2502170837-005-1	x	x	Pass
CRT2502170837-005-2	x	x	Pass
CRT2502170837-005-3	x	x	Pass

Measured Voltage:	1000	Vdc
Measured Capacitance:	15.8 - 16.6	μF

Complies: ☒ YES ☐ NO

Tested By:	John Robins	Signature or initials:	
Engineer:	John Robins	Signature or initials:	
Reviewed By:	cwm	Signature or initials:	
Equipment Used:	7,14,23,24	Completion Date:	10-Apr-2025
Amb (°C):	27.3	RH%	18

Ring Wave Immunity 6.4.6.7.1

Three pedestrian signal modules were energized and a ring wave with a peak of 3KV was applied. Five negative and five positive surges were applied at phase angles 0°, 90°, 180° and 270° for a total of 40 pulses. A pulse was applied every 20 seconds. The sample was operating throughout the test. The surge generator produced a 100 kHz ring wave. The short circuit current was 100A.

Results

Phase Angle	0°		90°		180°		270°		
Indication	5 Neg.	5 Pos.	5 Neg.	5 Pos.	5 Neg.	5 Pos.	5 Neg.	5 Pos.	Result
CRT2502170837-005-1									
Countdown	✓	✓	✓	✓	✓	✓	✓	✓	Pass
CRT2502170837-005-2									
Countdown	✓	✓	✓	✓	✓	✓	✓	✓	Pass
CRT2502170837-005-3									
Countdown	✓	✓	✓	✓	✓	✓	✓	✓	Pass

Complies: ☒ YES ☐ NO

Tested By:	Brittany James	Signature or initials:	
Engineer:	John Robins	Signature or initials:	
Reviewed By:	cwm	Signature or initials:	
Equipment Used:	16, 17, 18, 19, 20	Completion Date:	9-Apr-2025
Amb (°C):	24.7	RH%	17.1

Electronic Noise 6.4.6.8

Three LED traffic signal modules were operated at 120 VAC/60Hz throughout the test. Emissions measurements were taken to compare values to applicable requirements.

Results

The emissions complied with the requirements of the referenced specification. The testing was performed at our Fridley, MN office. See report: 106110627MIN-014

Complies: ☒ YES ☐ NO

Tested By:	Jayden Alstad	Signature or initials:	See Report
Engineer:	Jayden Alstad	Signature or initials:	See Report
Reviewed By:	Uri Spector	Signature or initials:	See Report
Equipment Used:	See Report	Completion Date:	See Report
Amb (°C):	See Report	RH%:	See Report

Power Factor & Total Harmonic Distortion 6.4.6.9 & 6.4.6.10

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

Results

Indication	Voltage	Current (mA)	Power (W)	Power Factor	THD(V)(%)	THD(I)(%)
CRT2502170837-005-1						
Countdown	120.0	62.8	7.5	0.99	0.83	9.4
CRT2502170837-005-2						
Countdown	120.0	63.3	7.5	0.99	0.86	9.3
CRT2502170837-005-3						
Countdown	120.0	62.0	7.4	0.99	0.91	8.6
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:	<i>JR</i>
Engineer:	John Robins	Signature or initials:	<i>JR</i>
Reviewed By:	cwm	Signature or initials:	<i>cwm</i>
Equipment Used:	13,14,15	Completion Date:	4-Apr-2025
Amb (°C):	25.3	RH%	29.4

Countdown Timing 6.4.6.11

Three countdown modules were measured for compliance with the established countdown timing parameters. The countdown display shall be connected to a countdown controller set to a flashing period of 1.2 seconds for 10 cycles and energized at normal operating voltage. The countdown digit display shall be measured in seconds using a photomultiplier tube. The module shall be considered a failure if the digits display time and/or the interval from the light up of one number to the light up of the subsequent number is not 1 second $\pm$ 0.04 seconds, and/or the countdown module fails to count down from 12 to 0 under these test conditions.

Results

Sample	Pass/Fail	Pass/Fail
	1.0 $\pm$ 0.04 seconds	countdown 12 to 0
CRT2502170837-005-1	Pass	Pass
CRT2502170837-005-2	Pass	Pass
CRT2502170837-005-3	Pass	Pass

Display Digit	CRT2502170837-005-1	CRT2502170837-005-2	CRT2502170837-005-3
	Seconds	Seconds	Seconds
12	1.00	1.00	1.00
11	1.00	1.00	1.00
10	1.00	1.00	1.00
9	1.00	1.00	1.00
8	1.00	1.00	1.00
7	1.00	1.00	1.00
6	1.00	1.00	1.00
5	1.00	1.00	1.00
4	1.00	1.00	1.00
3	1.00	1.00	1.00
2	1.00	1.00	1.00
1	1.00	1.00	1.00
0	0.99	0.99	0.98

Complies: ☒ YES ☐ NO

Tested By:	John Robins	Signature or initials:	<i>JR</i>
Engineer:	John Robins	Signature or initials:	<i>JR</i>
Reviewed By:	cwm	Signature or initials:	<i>cwm</i>
Equipment Used:	14,19,21	Completion Date:	10-Apr-2025
Amb (°C):	26.8	RH%	21.5

Load Switch Compatibility 6.4.7.2

Three samples were connected to a variable AC voltage supply. The sample was monitored for sufficient current draw to ensure proper load switch operation while the voltage is varied from 80V rms to 135 V rms.

Results

The load switch data is provided to the client to determine if the current draw is acceptable. The referenced ITE specification does not list a minimum current draw requirement. As a result, the Caltrans Standard Specifications dated 2010, Section 86-4.01D(2)(a) must be followed listing a minimum power consumption requirement of 5 watts for pedestrian traffic signal modules.

Pedestrian Signal				
Sample	Indication	80 Vrms	120 Vrms	135 Vrms
CRT2502170837-005-1	Countdown	87.9	62.8	60.7
CRT2502170837-005-2	Countdown	89.4	63.3	61.1
CRT2502170837-005-3	Countdown	87.5	62.0	60.0

Current measurements are in mA

Pedestrian Signal				
Sample	Indication	80 Vrms	120 Vrms	135 Vrms
CRT2502170837-005-1	Countdown	6.8	7.5	8.1
CRT2502170837-005-2	Countdown	6.9	7.5	8.2
CRT2502170837-005-3	Countdown	6.8	7.4	8.0

Power measurements are in watts.

Complies: ☒ YES ☐ NO

Tested By:	John Robins	Signature or initials:	
Engineer:	John Robins	Signature or initials:	
Reviewed By:	cwm	Signature or initials:	
Equipment Used:	13,14,15	Completion Date:	4-Apr-2025
Amb (°C):	25.3	RH%	29.4

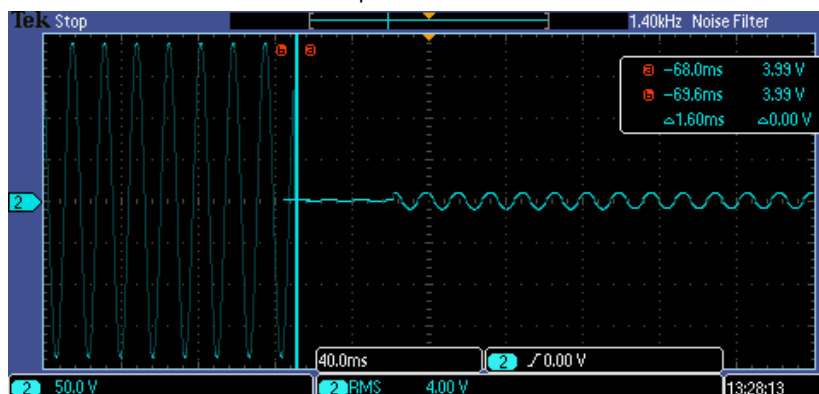
Off State Voltage Decay 6.4.7.3

Three samples were operated from a 135V AC voltage supply. A 19.5 k-ohm resistor was wired in series in the hot line between the LED signal monitor and the AC power supply. A single-pole-single-throw switch was wired in parallel across the 19.5 k-ohm resistor. A 220 k-ohm shunt resistor was wired between the hot line connection and the neutral line connection on the LED signal module. The single-pole-single-throw switch was closed, shorting out the 19.5 k-ohm resistor, allowing the AC power supply to illuminate the LED signal module. Next the switch was opened and the voltage across the 220 k-ohm shunt resistor was measured for a decay to a value equal to or less than 10V rms within a time period equal to or less than 100 milliseconds. The test was repeated a sufficient number of times to ensure testing occurs at the peak of the AC line voltage cycle.

Results

Pedestrian Signal		
Sample	Indication	Decay Time (mS)
CRT2502170837-005-1	Countdown	Less than 5
CRT2502170837-005-2	Countdown	Less than 5
CRT2502170837-005-3	Countdown	Less than 5

Sample Screen Shot



Measured Voltage: 135 Vac

Complies: ☒ YES ☐ NO

Tested By:	John Robins	Signature or initials:	JR
Engineer:	John Robins	Signature or initials:	JR
Reviewed By:	cwm	Signature or initials:	cwm
Equipment Used:	14,19,22	Completion Date:	9-Apr-2025
Amb (°C):	27.3	RH%	18

Equipment list				
#	Intertek ID No.	Description	Manufacturer	Calibration Due
1	M359	Digit Hygro-Thermometer	Testo	12-Aug-2025
2	L250	Signal Conditioner	PCB Piezotronics	16-Dec-2025
3	V393	Vibration Controller	Unholtz-Dickie	28-May-2025
4	L221	Accelerometer	PCB Piezotronics	29-Jan-2026
5	L222	Accelerometer	PCB Piezotronics	29-Jan-2026
6	H204	Thermal Chamber	Thermotron	12-Jun-2025
7	M207	Multimeter	Fluke	14-Oct-2025
8	L224	IR Thermometer	Fluke	10-Oct-2025
9	T1319	Thermometer	Fluke	30-Jul-2025
10	N1154	Rain Gauge	Cole Parmer	14-Feb-2026
11	Y255	Anemometer	Pacer Instruments	20-Sep-2025
12	M296	Stopwatch	Traceable	22-Jan-2026
13	A206	Current Transformer	Pearson	1-Jun-2025
14	L176	Thermometer	Testo	19-Jul-2025
15	M297	Power Analyzer	Yokogawa	29-May-2025
16	W149	Surge Control Center	ECAT	21-Aug-2025
17	W147	Ring Wave Surge Network	ECAT	21-Aug-2025
18	W148	Mains Coupler/Decoupler	ECAT	21-Aug-2025
19	E480	Oscilloscope	Tektronix	19-Mar-2026
20	L285	Hygro-Thermometer	Testo	22-Apr-2025
21	NA	PMT Module	Optronic Laboratories Inc	VBU
22	V244	High Voltage Probe	Tektronix	25-Apr-2025
23	NA	Power Supply	Northeast Scientific Inc	VBU
24	NA	Capacitor	unknown	VBU
25	T937	Thermometer	Fluke	16-Jan-2026
26	Y255	Anemometer	Pacer Instruments	20-Sep-2025
27	N1154	Rain Gauge	Cole Parmer	14-Feb-2026
28	M296	Stopwatch	Traceable	22-Jan-2026
29	L224	IR Thermometer	Fluke	10-Oct-2025
30	O109	Goniometer	Optroniks	4-Mar-2026
31	L235	25M Detector	Instrument Systems	19-Apr-2026
32	O091	Power Analyzer	Yokogawa	11-Jun-2025
33	L252	Hygrothermometer	Testo	3-Jun-2025
34	L254	Hygro-Thermometer	Testo	3-Jun-2025
35	0757	PR740 Spectrometer	Photo Research	30-Apr-2025
36	M207	Multimeter	Fluke	14-Oct-2025
37	L268	Tape Measure	Crescent	9-Dec-2027
Note: For measurement uncertainty, refer to the calibration certificates for all the test equipment located in the equipment files.				