

LEOTEK Electronics USA LLC

TEST REPORT

SCOPE OF WORK

ITE 5 year re-certification testing - Pedestrian Signal
Model: 430-6479-001X.

REPORT NUMBER

106110484CRT-001

ISSUE DATE

16-Jun-2025

PAGES

29



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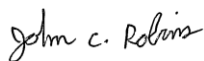
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Test Report			
Company Name	LEOTEK Electronics USA LLC	Test Location	Intertek Testing Services NA
Address	1955 Lundy Avenue	Lundy Avenue	3933 US Rt 11
	San Jose, CA 95131		Cortland, NY 13045
	USA		USA
Client Contact	Frank Saltani	Quote Number	Qu-01514896-1
Phone	408-380-1788 Ext. 202	Test Start Date	May 2, 2025
Email	frank@leotek.com	Completion Date	June 14, 2025

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

Spec	Test name	Clause	Hand	Walking Person	Count
ITE	Conditioning	6.4.2	Pass	Pass	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	Pass	Pass
ITE	Chromaticity	6.4.4.7	Pass	Pass	Pass
ITE	Color Uniformity	6.4.4.8	Pass	Pass	Pass
ITE	Luminous Intensity On-Axis	6.4.4.9	Pass	Pass	Pass
ITE	Luminous Intensity Off-Axis	6.4.4.10	Pass	Pass	Pass
ITE	Current Consumption	6.4.6.2	Pass	Pass	Pass
ITE	Power Consumption	6.4.6.3	Pass	Pass	Pass
ITE	Low Voltage Turn Off	6.4.6.4	Pass	Pass	Pass
ITE	Turn-On/Turn-Off Times	6.4.6.5	Pass	Pass	Pass
ITE	Default Condition	6.4.6.6		Pass	
ITE	Transient Voltage Immunity	6.4.6.7	Pass	Pass	Pass
ITE	Ring Wave Immunity	6.4.6.7.1	Pass	Pass	Pass
ITE	Electronic Noise	6.4.6.8	Pass	Pass	Pass
ITE	Power Factor & Total Harmonic Distortion	6.4.6.9, 10	Pass	Pass	Pass
ITE	Countdown Timing	6.4.6.11	Pass	Pass	Pass
ITE	Load Switch Compatibility	6.4.7.2	Pass	Pass	Pass
ITE	Off State Voltage Decay	6.4.7.3	Pass	Pass	Pass
ITE	Failed State Impedance	6.4.8.1	Pass	Pass	Pass

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



John Robins
Engineer
Lighting



Christopher W. Metcalf
Engineering Supervisor
Lighting

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Sample Information				
Date Rec.	Intertek ID	Description	Condition	Model No.
4/28/2025	CRT2504281023-001	16" Man/Hand/Count	Engineering	See Below
4/28/2025	CRT2504281023-002	16" Man/Hand/Count	Engineering	See Below

Further Sample Description

Intertek Sample Number	Description	Model Number	Serial Number
CRT2504281023-001-1	16" Man/Hand Overlay with Count	430-6479-001X	A2501002083
CRT2504281023-001-2	16" Man/Hand Overlay with Count	430-6479-001X	A2501002084
CRT2504281023-001-3	16" Man/Hand Overlay with Count	430-6479-001X	A2501002085
CRT2504281023-001-4	16" Man/Hand Overlay with Count	430-6479-001X	A2501002086
CRT2504281023-001-5	16" Man/Hand Overlay with Count	430-6479-001X	A2501002087
CRT2504281023-002-1	16" Man/Hand Overlay with Count	430-6479-001X	A2501002088

General Requirements

Intertek Sample Number	ETL Cert. Number	Label Identification	Lens Orientation	Color Coded Wires
CRT2504281023-001-1	NA	Pass	Pass	Orange/Blue/White
CRT2504281023-001-2	NA	Pass	Pass	Orange/Blue/White
CRT2504281023-001-3	NA	Pass	Pass	Orange/Blue/White
CRT2504281023-001-4	NA	Pass	Pass	Orange/Blue/White
CRT2504281023-001-5	NA	Pass	Pass	Orange/Blue/White
CRT2504281023-002-1	NA	Pass	Pass	Orange/Blue/White

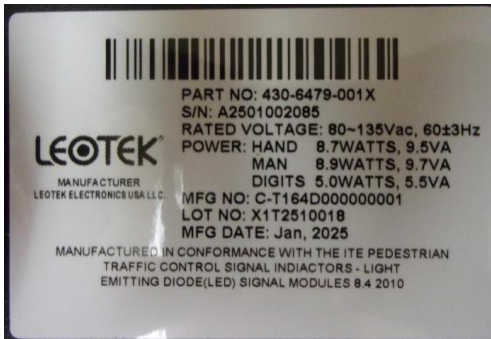
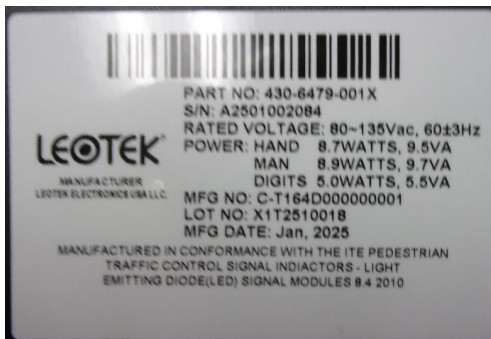
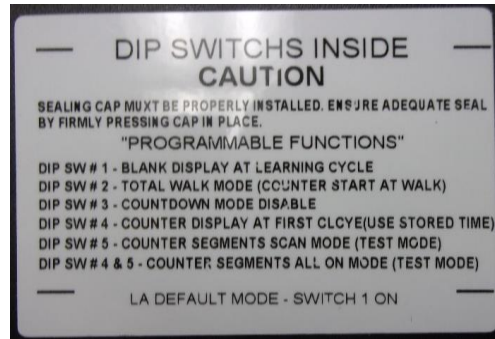
General Requirements

Intertek Sample Number	600V / 20 AWG Min.	Wire Length $\geq$ 39"	Service Rating +105°C	Clear/Frosted or Blacked Out Lens for Peds
CRT2504281023-001-1	600V / 18 AWG	Pass	Pass	Clear/Frosted
CRT2504281023-001-2	600V / 18 AWG	Pass	Pass	Clear/Frosted
CRT2504281023-001-3	600V / 18 AWG	Pass	Pass	Clear/Frosted
CRT2504281023-001-4	600V / 18 AWG	Pass	Pass	Clear/Frosted
CRT2504281023-001-5	600V / 18 AWG	Pass	Pass	Clear/Frosted
CRT2504281023-002-1	600V / 18 AWG	Pass	Pass	Clear/Frosted

Sample Modification Log		
Date	Modification description	
4/28/25	Front Cover:	C-A000000103
	Low Cover:	C-A000000104
	SPS:	PT-LAV106B01
		PT-LXC118700
	Barrier:	1100430000400
		1100430000500
	LED:	C115E0000001*72+126
		C115W0000001*68
	PCB:	C-E000000008
		C-E000000010

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.

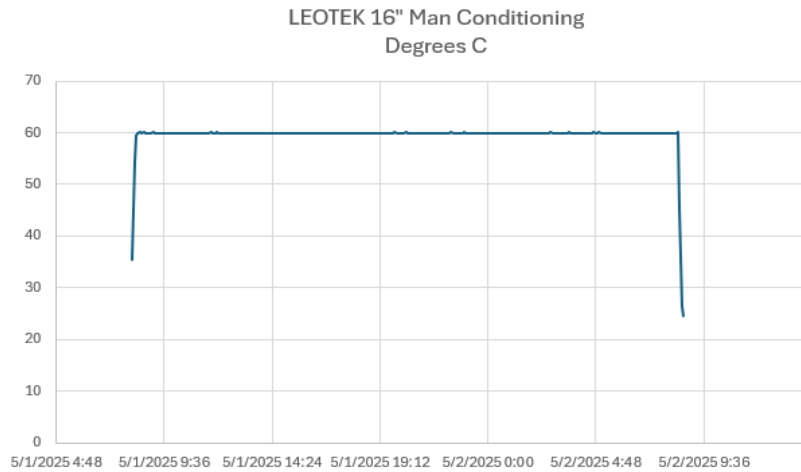
Results

Intertek Sample Number	Indication	Visual Inspection		Operational Check	
		Pre	Post	Pre	Post
CRT2504281023-001-1	Walking Person	Pass	Pass	Pass	Pass
CRT2504281023-001-2	Walking Person	Pass	Pass	Pass	Pass
CRT2504281023-001-3	Walking Person	Pass	Pass	Pass	Pass
CRT2504281023-001-4	Walking Person	Pass	Pass	Pass	Pass
CRT2504281023-001-5	Walking Person	Pass	Pass	Pass	Pass
CRT2504281023-002-1	Walking Person	Pass	Pass	Pass	Pass

Intertek Sample Number	Indication	Visual Inspection		Operational Check	
		Pre	Post	Pre	Post
CRT2504281023-001-1	Hand/Count	Pass	Pass	Pass	Pass
CRT2504281023-001-2	Hand/Count	Pass	Pass	Pass	Pass
CRT2504281023-001-3	Hand/Count	Pass	Pass	Pass	Pass
CRT2504281023-001-4	Hand/Count	Pass	Pass	Pass	Pass
CRT2504281023-001-5	Hand/Count	Pass	Pass	Pass	Pass
CRT2504281023-002-1	Hand/Count	Pass	Pass	Pass	Pass

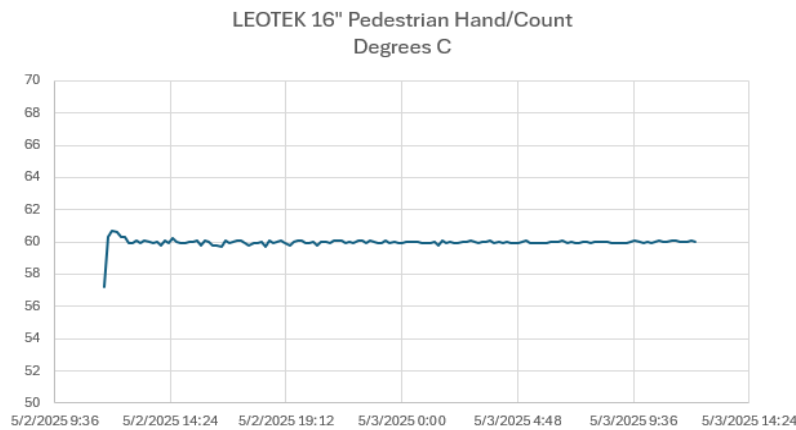
Results

Walking Person



Measured Voltage: 120 - 123 Vac

Hand/Count



Measured Voltage: 120 - 123 Vac

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:	1,2,38	Completion Date:	3-May-2025
Amb (°C):	N/A	RH%	N/A

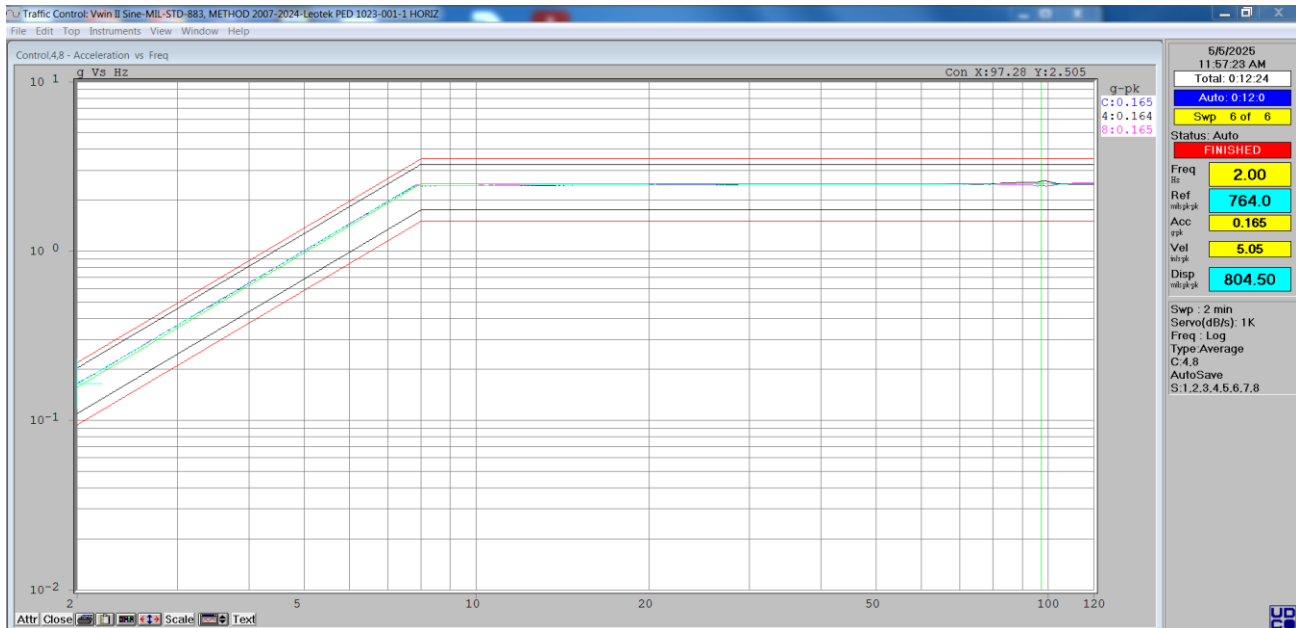
Mechanical Vibration

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
CRT2504281023-001-1	16" Man/Hand Overlay with Count	X	X	X	Pass	Pass
CRT2504281023-001-2	16" Man/Hand Overlay with Count	X	X	X	Pass	Pass
CRT2504281023-001-3	16" Man/Hand Overlay with Count	X	X	X	Pass	Pass
CRT2504281023-001-4	16" Man/Hand Overlay with Count	X	X	X	Pass	Pass
CRT2504281023-001-5	16" Man/Hand Overlay with Count	X	X	X	Pass	Pass
CRT2504281023-002-1	16" Man/Hand Overlay with Count	X	X	X	Pass	Pass

Sample Vibration Plot



Complies: ☒ YES ☐ NO

Tested By:	John Robins	Signature or initials:	
Engineer:	John Robins	Signature or initials:	
Reviewed By:	cwm	Signature or initials:	
Equipment Used:	4,9,10,11,12,13	Completion Date:	5-May-2025
Amb (°C):	22.2	RH%	51.9

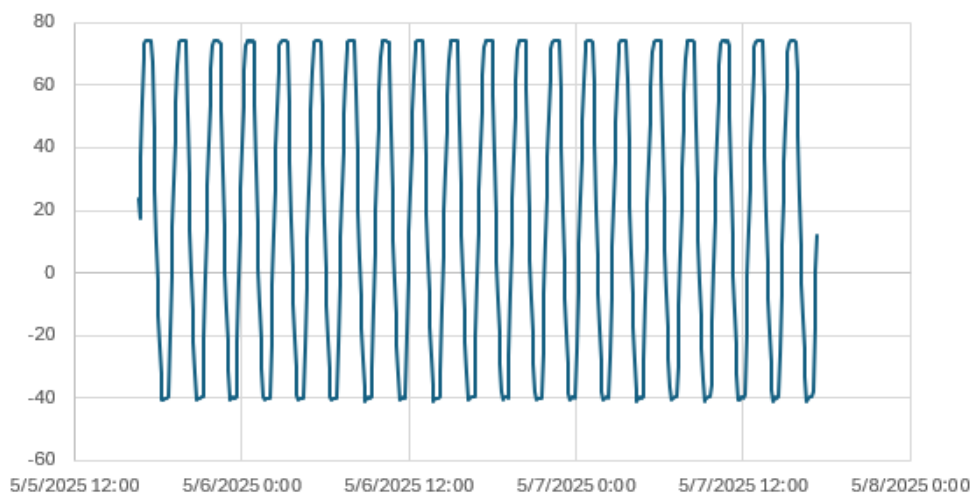
Temperature Cycling

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
CRT2504281023-001-1	16" Man/Hand Overlay with Count	Pass	Pass
CRT2504281023-001-2	16" Man/Hand Overlay with Count	Pass	Pass
CRT2504281023-001-3	16" Man/Hand Overlay with Count	Pass	Pass
CRT2504281023-001-4	16" Man/Hand Overlay with Count	Pass	Pass
CRT2504281023-001-5	16" Man/Hand Overlay with Count	Pass	Pass
CRT2504281023-002-1	16" Man/Hand Overlay with Count	Pass	Pass

LEOTEK 16" Man/Hand/Count Temperature Cycling
Degrees C



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:	1	Completion Date:	8-May-2025
Amb (°C):	N/A	RH%:	N/A

Moisture Resistance

The submitted pedestrian 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° ± 5°C (77° ± 9° 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
CRT2504281023-001-1	16" Man/Hand Overlay with Count	Pass	Pass
CRT2504281023-001-2	16" Man/Hand Overlay with Count	Pass	Pass
CRT2504281023-001-3	16" Man/Hand Overlay with Count	Pass	Pass
CRT2504281023-001-4	16" Man/Hand Overlay with Count	Pass	Pass
CRT2504281023-001-5	16" Man/Hand Overlay with Count	Pass	Pass
CRT2504281023-002-1	16" Man/Hand Overlay with Count	Pass	Pass

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 in.	20 minutes in.	30 minutes in.
CRT2504281023-001-1	44.6	28.6	28.1	28.0	28.5
CRT2504281023-001-2	41.1	28.6	27.6	27.4	27.7
CRT2504281023-001-3	46.3	27.6	27.4	27.2	27.2
CRT2504281023-001-4	42.6	27.2	27.1	26.9	27.0
CRT2504281023-001-5	44.5	26.8	26.7	26.9	27.1
CRT2504281023-002-1	42.0	28.1	28.3	28.5	28.7

* Water temperature is °C

Recorded rainfall rate:	4.4	in/hr
Recorded wind velocity:	49 to 52	mph

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>
Test Equipment Used:	24-28	Comp. Date:	30-May-2025
Amb (°C):	na	RH%	na

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 - Walking Person

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

Sample	CRT2504281023-001-4			CRT2504281023-001-5			CRT2504281023-002-1		
Walking Person	Luminance: Candela/Meter^2								
Position	80.1	120.1	135	80	120.1	135	80.1	120.1	135
1	7930	7934	7932	8626	8614	8614	8637	8616	8600
2	4201	4203	4202	3959	3953	3953	4267	4257	4249
3	4622	4624	4623	3864	3858	3858	4122	4112	4104
4	5557	5560	5559	5486	5478	5478	5890	5876	5865
5	4939	4941	4940	4430	4424	4424	4721	4710	4701
6	3601	3603	3602	4008	4002	4002	3929	3919	3912
7	3331	3333	3332	3646	3641	3641	3901	3892	3885
8	3352	3354	3353	3567	3562	3562	3342	3334	3328
9	4098	4100	4099	4039	4033	4033	4064	4054	4047
25°C Average	4626	4628	4627	4625	4618	4618	4764	4752	4743
74°C/49°C Average	4294	4296	4295	4262	4256	4256	4398	4388	4379
Luminance Uniformity Ratio	2.4 to 1.0			2.4 to 1.0			2.6 to 1.0		
Max. Average Lum. 6,600 cd/m^2	Pass			Pass			Pass		
Min. Average Lum. 2,200 cd/m^2	Pass			Pass			Pass		
Luminance Uniformity Ratio ≤ 5:1	Pass			Pass			Pass		

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	CRT2504281023-001-4			CRT2504281023-001-5			CRT2504281023-002-1		
Hand	Luminance: Candela/Meter^2								
Position	80.1	120.1	135.1	80.1	120.1	135.1	80.1	120.1	135.1
1	3228	3235	3271	3607	3587	3577	3441	3460	3448
2	3666	3674	3715	4139	4116	4104	4068	4091	4077
3	2718	2724	2754	2195	2183	2177	2593	2608	2599
4	3024	3031	3065	2572	2558	2551	2813	2829	2819
5	3193	3200	3236	3116	3099	3090	3052	3069	3058
6	3569	3577	3617	3694	3673	3663	3581	3601	3588
7	4537	4547	4598	4398	4374	4362	4805	4832	4815
8	4740	4750	4803	4682	4656	4643	4651	4677	4661
9	4719	4729	4782	4779	4752	4739	5354	5384	5365
25°C Average	3710	3719	3760	3687	3666	3656	3817	3839	3826
74°C/49°C Average	2181	2185	2210	2182	2170	2164	2271	2284	2276
Luminance Uniformity Ratio	1.7 to 1.0			2.2 to 1.0			2.1 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		

Sample	CRT2504281023-001-4			CRT2504281023-001-5			CRT2504281023-002-1		
Countdown	Luminance: Candela/Meter^2								
Position	80	120.1	135.1	80.1	120.1	135	80.1	120.1	135.1
1	2933	2934	2932	2842	2839	2841	3126	3124	3124
2	2846	2847	2845	2856	2853	2855	2918	2916	2916
3	2996	2997	2995	2920	2917	2919	3030	3028	3028
4	3538	3539	3537	3450	3446	3448	3853	3851	3851
5	3140	3141	3139	3132	3129	3131	3237	3235	3235
6	3249	3250	3248	3136	3133	3135	3290	3288	3288
7	3248	3249	3247	3366	3362	3364	3498	3496	3496
8	3523	3524	3522	3573	3569	3572	3805	3803	3803
9	3082	3083	3081	3024	3021	3023	3131	3129	3129
10	3163	3164	3162	3268	3265	3267	3187	3185	3185
11	3816	3817	3815	3648	3644	3647	3629	3627	3627
12	3652	3653	3651	3180	3177	3179	3417	3415	3415
13	3499	3500	3498	3428	3424	3426	3686	3684	3684
14	3787	3788	3786	3777	3773	3776	3798	3796	3796
25°C Average	3320	3320	3319	3257	3254	3256	3401	3398	3398
74°C/49°C Average	1966	1966	1965	1957	1955	1956	2130	2129	2129
Luminance Uniformity Ratio	1.3 to 1.0			1.3 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:	John Robins	Signature or initials:	
Engineer:	John Robins	Signature or initials:	
Reviewed By:	cwm	Signature or initials:	
Test Equipment Used:	34,35,36,37	Completion Date:	2-Jun-2025
Amb (°C):	23.1	RH%	42.1

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
CRT2504281023-001-4	Walking Person	0.333	0.353
	Hand	0.647	0.352
	Countdown	0.650	0.350
CRT2504281023-001-5	Walking Person	0.333	0.354
	Hand	0.648	0.352
	Countdown	0.649	0.350
CRT2504281023-002-1	Walking Person	0.332	0.353
	Hand	0.647	0.352
	Countdown	0.649	0.350

Measured Voltage 120VAC: See 6.4.4.2

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:	34,35,36,37	Completion Date:	2-Jun-2025
Amb (°C):	23.1	RH%	42.1

Color Uniformity 6.4.4.8

Nine color measurements were taken across the signal face for the hand and person and fourteen measurements were taken for the countdown across the signal face using a ½" spot diameter. The data was then calculated using the following equation to verify uniformity for the walking person.

$$\sqrt{(\Delta x)^2 + (\Delta y)^2} \leq 0.04$$

For the hand and countdown, the dominant wavelength of each color measurement taken must be within ± 3nm of the average.

Results: Walking Person

The walking person is compliant with the uniformity requirements.

Sample	CRT2504281023-001-4		CRT2504281023-001-5		CRT2504281023-002-1	
	Walking Person					
Location	x	y	x	y	x	y
1	0.332	0.352	0.327	0.346	0.335	0.357
2	0.331	0.352	0.333	0.352	0.334	0.357
3	0.330	0.347	0.335	0.356	0.335	0.354
4	0.334	0.353	0.330	0.349	0.333	0.354
5	0.335	0.359	0.329	0.350	0.331	0.352
6	0.331	0.352	0.335	0.359	0.330	0.353
7	0.335	0.355	0.335	0.356	0.330	0.350
8	0.330	0.350	0.333	0.356	0.330	0.350
9	0.339	0.362	0.338	0.360	0.331	0.348
Average	0.333	0.353	0.333	0.354	0.332	0.353

Results: Hand & Countdown

The hand and countdown are compliant with the uniformity requirements.

Sample	CRT2504281023-001-4			CRT2504281023-001-5			CRT2504281023-002-1		
	Hand								
Location	x	y	Dominant	x	y	Dominant	x	y	Dominant
1	0.646	0.354	604	0.646	0.353	605	0.646	0.353	605
2	0.647	0.353	605	0.648	0.352	605	0.647	0.352	605
3	0.647	0.353	605	0.647	0.352	605	0.647	0.352	605
4	0.648	0.351	605	0.650	0.350	605	0.649	0.350	605
5	0.652	0.348	606	0.649	0.350	605	0.649	0.350	605
6	0.647	0.352	605	0.647	0.352	605	0.647	0.353	605
7	0.647	0.352	605	0.647	0.353	605	0.648	0.352	605
8	0.646	0.354	604	0.657	0.353	605	0.647	0.352	605
9	0.646	0.354	604	0.645	0.354	604	0.645	0.355	604
Average	0.647	0.352	605	0.648	0.352	605	0.647	0.352	605

Sample	CRT2504281023-001-4			CRT2504281023-001-5			CRT2504281023-002-1		
	Countdown								
Location	x	y	Dominant	x	y	Dominant	x	y	Dominant
1	0.651	0.348	606	0.651	0.349	606	0.651	0.349	606
2	0.650	0.350	605	0.651	0.348	605	0.651	0.349	606
3	0.652	0.347	606	0.651	0.349	604	0.651	0.348	606
4	0.648	0.351	605	0.648	0.351	605	0.648	0.352	605
5	0.648	0.351	605	0.649	0.350	605	0.648	0.351	605
6	0.648	0.351	605	0.648	0.351	605	0.649	0.351	605
7	0.648	0.351	605	0.651	0.349	605	0.649	0.351	605
8	0.649	0.353	605	0.648	0.352	604	0.648	0.352	605
9	0.652	0.348	606	0.652	0.347	604	0.652	0.347	606
10	0.653	0.347	606	0.651	0.349	604	0.651	0.348	606
11	0.647	0.352	605	0.646	0.354	604	0.647	0.352	605
12	0.650	0.350	606	0.650	0.350	604	0.650	0.350	605
13	0.651	0.349	606	0.651	0.349	604	0.651	0.349	606
14	0.646	0.353	605	0.646	0.353	604	0.647	0.353	605
Average	0.650	0.350	605	0.649	0.350	604	0.649	0.350	605

Measured Voltage 120VAC:	see 6.4.4.2	Vac
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Complies:	☒ YES	☐ NO
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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:	34,35,36,37	Completion Date:	2-Jun-2025
Amb (°C):	23.1	RH%	42.1

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 3							
Sample	CRT2504281023-001-4			CRT2504281023-001-5		CRT2504281023-002-1	
Indication	Walking Person						
Location	HV						
Candela	83			81		82	
Measured Voltage:	120.16	Vac		120.16	Vac	120.18	Vac

Class 3							
Sample	CRT2504281023-001-4			CRT2504281023-001-5		CRT2504281023-002-1	
Indication	Hand						
Location	HV						
Candela	96			96		98	
Measured Voltage:	120.11	Vac		120.11	Vac	120.15	Vac

Class 3							
Sample	CRT2504281023-001-4			CRT2504281023-001-5		CRT2504281023-002-1	
Indication	Countdown						
Location	HV						
Candela	62			63		66	
Measured Voltage:	120.11	Vac		120.11	Vac	120.15	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>
Equipment Used:	20,21,22,23	Completion Date:	20-May-2025
Amb (°C):	22	RH%	35

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 3						
Sample	CRT2504281023-001-4		CRT2504281023-001-5		CRT2504281023-002-1	
Indication	Walking Person					
Angle	Candela					
15° Left	46		45		45	
15° Right	52		51		52	
15° Down	61		59		59	
Measured Voltage:	120.2	Vac	120.2	Vac	120.2	Vac

Class 3						
Sample	CRT2504281023-001-4		CRT2504281023-001-5		CRT2504281023-002-1	
Indication	Hand					
Angle	Candela					
15° Left	52		50		49	
15° Right	53		54		57	
15° Down	55		58		56	
Measured Voltage:	120.1	Vac	120.1	Vac	120.2	Vac

Class 3							
Sample	CRT2504281023-001-4			CRT2504281023-001-5		CRT2504281023-002-1	
Indication	Countdown						
Angle	Candela						
15° Left	28			29		29	
15° Right	34			33		35	
15° Down	34			34		33	
Measured Voltage:	120.1	Vac	120.1	Vac	120.2	Vac	

Requirements

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

Off-Axis Minimum Luminous Intensity - PTC SI 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 - PTC SI 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>
Equipment Used:	20,21,22,23	Completion Date:	20-May-2025
Amb (°C):	22	RH%	35

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
CRT2504281023-001-1	Walking Person	82.0	78.3	76.0
	Hand	82.1	75.8	78.0
	Hand/Countdown	120.2	114.1	121.0
CRT2504281023-001-2	Walking Person	82.5	78.3	76.8
	Hand	83.5	76.7	78.6
	Hand/Countdown	120.3	115.9	123.0
CRT2504281023-001-3	Walking Person	83.2	79.7	76.8
	Hand	83.4	76.3	78.2
	Hand/Countdown	120.3	114.8	121.8

Hand lists 9.1VA

Walking Person lists 9.2VA

Count lists 5.4VA

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. Measurements taken at initial power up.

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:	1,3,4	Completion Date:	20-May-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
CRT2504281023-001-1	Walking Person	9.0
	Hand	8.6
	hand/Countdown	13.5

CRT2504281023-001-2	Walking Person	10.0
	Hand	8.8
	hand/Countdown	13.6

CRT2504281023-001-3	Walking Person	9.1
	Hand	8.7
	hand/Countdown	13.5

Hand lists 8.7W

Walking Person lists 8.9W

Count lists 5W

The power consumption was not in excess of 120% of the label current values for ambient temperature of 25°C for the hand walking person. Measurements taken at initial power up.

Measured Voltage 120VAC:	120.0 - 120.3	Vac
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Complies:	☒ YES	☐ NO
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Tested By:	John Robins	Signature or initials:	
Engineer:	John Robins	Signature or initials:	
Reviewed By:	cwm	Signature or initials:	
Equipment Used:	1,3,4	Completion Date:	20-May-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)		
	Walking Person	Hand	Hand/Countdown
CRT2504281023-001-1	69	71	61
CRT2504281023-001-2	70	71	61
CRT2504281023-001-3	70	71	61

Complies: ☒ YES ☐ NO

Tested By:	John Robins	Signature or initials:	
Engineer:	John Robins	Signature or initials:	
Reviewed By:	cwm	Signature or initials:	
Equipment Used:	6,7,8	Completion Date:	14-May-2025
Amb (°C):	22.8	RH%	50.8

Turn-On/Turn-Off Times 6.4.6.5

Three pedestrian signal modules were measured to ensure compliance with the turn-on and turn-off requirements. The measurements were conducted using a two channel oscilloscope to measure the time delay between when the samples are energized at 120 Vac RMS and when the light output reaches 90% of full output. The same apparatus was used to measure the time delay between when the sample is de-energized and when the light output reaches 0% of full output.

Results

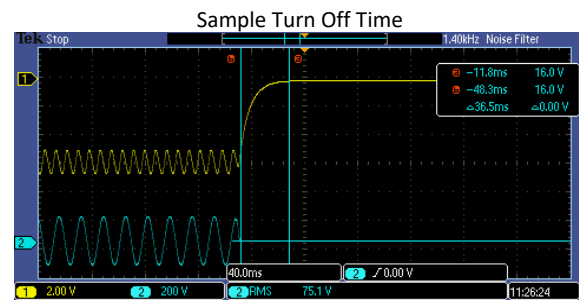
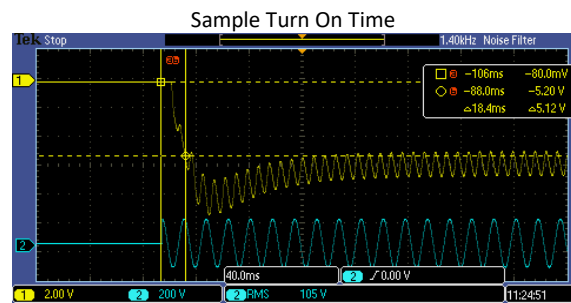
Sample	Turn "On"	Turn "Off"	Turn "On"	Turn "Off"
	Walking Person		Hand	
CRT2504281023-001-1	18.4	36.5	18.4	13.1
CRT2504281023-001-2	19.2	29.3	18.4	12.5
CRT2504281023-001-3	18.4	36.3	18.4	12.5

Measurements are in milliseconds.

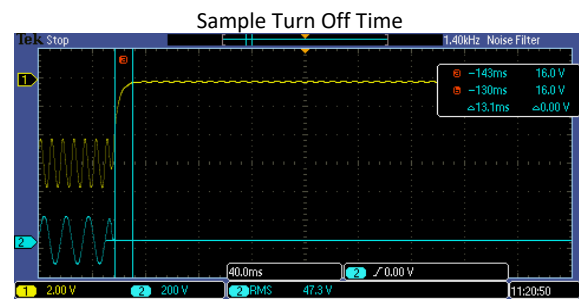
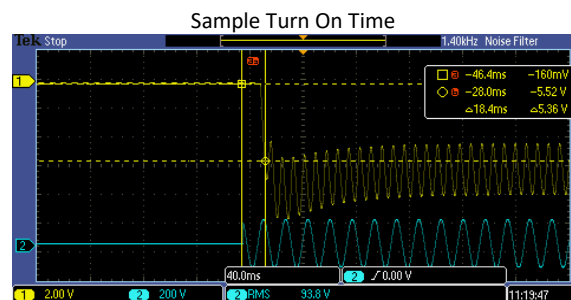
The "on" time and "off" time were within the 75ms requirement on all samples tested.

The countdown indication is not tested for turn on/turn off times.

Walking Person



Hand



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:	4,14,15,16,17	Completion Date:	15-May-2025
Amb (°C):	21.9	RH%	59.2

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 +/- 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 +/- 0.04 seconds	countdown 12 to 0
CRT2504281023-001-1	Pass	Pass
CRT2504281023-001-2	Pass	Pass
CRT2504281023-001-3	Pass	Pass

Display Digit	CRT2504281023-001-1	CRT2504281023-001-2	CRT2504281023-001-3
	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:	JR
Engineer:	John Robins	Signature or initials:	JR
Reviewed By:	cwm	Signature or initials:	cwm
Equipment Used:	4,14,16,17	Completion Date:	15-May-2025
Amb (°C):	21.9	RH%	59.2

Default Condition 6.4.6.6

Three samples were tested to verify the presence of the default condition. The module shall be connected such that the supply phase wire and neutral are connected to the phase wire of one indication and the phase wire of the other indication. The pedestrian signal shall default to the upraised hand. The supply phase and neutral wires are then switched, The pedestrian signal shall again default to the upraised hand.

Results

Sample	Default Condition	Result
CRT2504281023-001-1	Hand	Pass
CRT2504281023-001-2	Hand	Pass
CRT2504281023-001-3	Hand	Pass

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:	4	Completion Date:	5/15/2025
Amb (°C):	22.6	RH%	51

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 - Walking Person			
Sample	3 Positive Pulses	3 Negative Pulses	Results
CRT2504281023-001-1	x	x	Pass
CRT2504281023-001-2	x	x	Pass
CRT2504281023-001-3	x	x	Pass

Pedestrian Signal - Hand/Countdown			
Sample	3 Positive Pulses	3 Negative Pulses	Results
CRT2504281023-001-1	x	x	Pass
CRT2504281023-001-2	x	x	Pass
CRT2504281023-001-3	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:		Signature or initials:	
Equipment Used:	2,4,18,19	Completion Date:	19-May-2025
Amb (°C):	21.9	RH%	45

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
CRT2504281023-001-1									
Walking Person	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Hand/Count	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
CRT2504281023-001-2									
Walking Person	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Hand/Count	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
CRT2504281023-001-3									
Walking Person	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Hand/Count	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

Complies: ☒ YES ☐ NO

Tested By:	Rex Williams			Signature or initials:	<i>R.W.</i>
Engineer:	John Robins			Signature or initials:	<i>JR</i>
Reviewed By:	cwm			Signature or initials:	<i>cwm</i>
Equipment Used:	29-33			Completion Date:	30-May-2025
Amb (°C):	24.9	RH%	45.5		

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: 106110484MIN-014

Complies: ☒ YES ☐ NO

Tested By:	Simon Khazon	Signature or initials:	See Report
Engineer:	Simon Khazon	Signature or initials:	See Report
Reviewed By:	Uri Spector	Signature or initials:	See Report
Equipment Used:	See Report	Completion Date:	14-Jun-2025
Amb (°C):	See Report	RH%:	See Report

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.

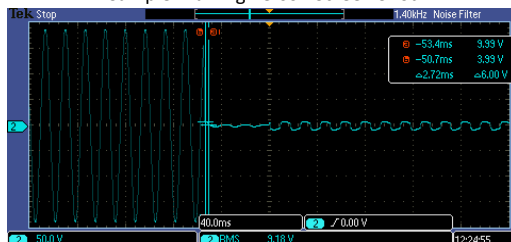
Results

Pedestrian Signal		
Sample	Indication	Decay Time (mS)
CRT2504281023-001-1	Walking Person	Less than 5
	Hand	Less than 5
	Hand/Countdown	Less than 5

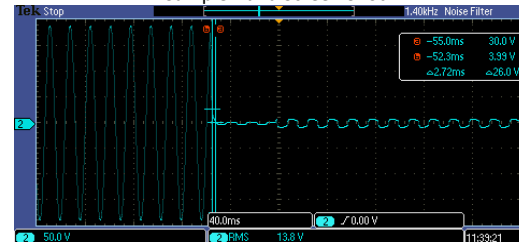
Pedestrian Signal		
Sample	Indication	Decay Time (mS)
CRT2504281023-001-2	Walking Person	Less than 5
	Hand	Less than 5
	Hand/Countdown	Less than 5

Pedestrian Signal		
Sample	Indication	Decay Time (mS)
CRT2504281023-001-3	Walking Person	Less than 5
	Hand	Less than 5
	Hand/Countdown	Less than 5

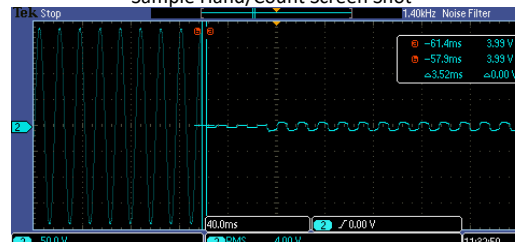
Sample Walking Person Screen Shot



Sample Hand Screen Shot



Sample Hand/Count Screen Shot



Measured Voltage: 1358 Vac

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:	4,14,15	Completion Date:	14-May-2025
Amb (°C):	22.8	RH%	50.8

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)(%)
CRT2504281023-001-1						
Walking Person	120.0	77.3	8.8	0.95	1.1	16.2
Hand	120.0	75.0	8.5	0.95	1.5	16.8
Hand/Countdown	120.0	115.0	13.6	0.98	0.9	10.6
CRT2504281023-001-2						
Walking Person	120.0	77.3	8.8	0.95	1.2	16.4
Hand	120.0	75.6	8.6	0.95	1.4	16.6
Hand/Countdown	120.1	116.6	13.8	0.98	1.1	11.0
CRT2504281023-001-3						
Walking Person	120.0	78.1	8.9	0.95	1.1	16.7
Hand	120.1	75.6	8.6	0.95	1.4	16.8
Hand/Countdown	120.0	116.6	13.8	0.98	1.1	11.2
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:	3,4,5	Completion Date:	14-May-2025
Amb (°C):	22.6	RH%	51

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
CRT2504281023-001-1	Walking Person	92.4	77.3	75.4
	Hand	88.3	75.0	73.7
	Hand/Countdown	152.4	115.0	108.8
CRT2504281023-001-2	Walking Person	42.2	77.3	75.6
	Hand	89.2	75.6	74.3
	Hand/Countdown	155.0	116.6	110.3
CRT2504281023-001-3	Walking Person	93.6	78.1	76.3
	Hand	89.2	74.6	74.4
	Hand/Countdown	155.1	116.6	110.3

Current measurements are in mA

Pedestrian Signal				
Sample	Indication	80 Vrms	120 Vrms	135 Vrms
CRT2504281023-001-1	Walking Person	7.3	8.8	9.6
	Hand	6.9	8.5	9.3
	Hand/Countdown	12.1	13.6	14.3
CRT2504281023-001-2	Walking Person	7.3	8.8	9.6
	Hand	7.0	8.6	9.4
	Hand/Countdown	12.3	13.8	14.5
CRT2504281023-001-3	Walking Person	7.4	8.9	9.7
	Hand	7.0	8.6	9.4
	Hand/Countdown	12.3	13.8	14.5

Power measurements are in watts.

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:	3,4,5	Completion Date:	14-May-2025
Amb (°C):	22.9	RH%	52.6

Equipment list				
#	Intertek ID No.	Description	Manufacturer	Calibration Due
1	H204	Thermal Chamber	Thermotron	12-Jun-2025
2	M207	Multimeter	Fluke	14-Oct-2025
3	A206	Current Transformer	Pearson	1-Jun-2025
4	L176	Thermometer	Testo	19-Jul-2025
5	M297	Power Analyzer	Yokogawa	29-May-2025
6	O045	Optometer	UDT	11-Apr-2026
8	T1546	Digital Thermometer	Dickson	9-May-2025
9	L250	Signal Conditioner	PCB Piezotronics	16-Dec-2025
10	V393	Vibration Controller	Unholtz-Dickie	28-May-2025
11	M299	Accelerometer	PCB Piezotronics	8-Jul-2025
12	L242	Accelerometer	PCB Piezotronics	26-Feb-2026
13	M284	Accelerometer	PCB Piezotronics	26-Feb-2026
14	E470	Oscilloscope	Tektronix	10-Oct-2025
15	V244	High Voltage Diff. Probe	Tektronix	9-May-2026
16	NA	PMT	Optronic Labs Inc	Used with cal'd Equip.
17	NA	High Voltage Supply	Optronic Labs Inc	Used with cal'd Equip.
18	NA	Power Supply	Northeast Scientific Inc	VBU
19	NA	Capacitor	na	VBU
20	O109	Goniometer	Optroniks	4-Mar-2016
21	L235	25M Detector	GigaHertz Optik	17-Apr-2026
22	O091	Power Analyzer	Yokogawa	11-Jun-2025
23	L252	Hygrometer	Testo	3-Jun-2025
24	N1316	Stopwatch	Fisher Scientific	19-Mar-2026
25	L224	IR Thermometer	Fluke	10-Oct-2025
26	N1154	Rain Guage	Cole-Parmer	14-Feb-2026
27	T937	TC Thermometer	Fluke	16-Jan-2026
28	Y255	Anemometer	Pacer Instruments	20-Sep-2025
29	L284	Digital Hygrothermometer	Testo	8-May-2026
30	W147	Wave Module E503	Keytek	21-Aug-2025
31	W148	Coupler/Decoupler E551	Keytek	21-Aug-2025
32	W149	Control Center E504	Keytek	21-Aug-2025
33	E480	Oscilloscope	Tektronix	19-Mar-2026
34	L252	Hygrometer	Testo	3-Jun-2025
35	M226	Multimeter	Fluke	7-Oct-2025
36	O757	Spectra Scan PR740	Photo Research	28-Jun-2025
37	L188	Distance Meter	Fluke	6-Dec-2025
38	621-R	Thermal Chamber	Thermotron	11-Jun-2026
Note: For measurement uncertainty, refer to the calibration certificates for all the test equipment located in the equipment files				