



REPORT

545 E. Algonquin Rd., Arlington Heights, IL 60005

Project No. G103017649

Date: February 5, 2018

REPORT NO. 103017649CHI-067

TEST OF ONE MULTIPLES WW MODULE, 80CRI 3000K

MODEL NO. EMO830WWW
LED MODEL NO. CITIZEN CLU028-1203
DRIVER MODEL NO. LTF DA18W440C40BF

RENDERED TO

GENERATION BRANDS
7400 LINDER AVE.
SKOKIE IL 60077

TEST: Electrical and Photometric tests as required to the IESNA test standard.

AUTHORIZATION: The testing performed was authorized by signed quote number Qu-00779063-2.

STANDARDS USED: The following American National Standards or Illuminating Engineering Society of North America Test Guides were used in part or totally to test each specimen:

IESNA LM-79 - 2008: Electrical and Photometric Measurements of Solid State Lighting

ANSI NEMA ANSLG C78.377: 2012: Specifications of the Chromaticity of Solid State Lighting Products

DESCRIPTION OF SAMPLE: The client submitted one production sample of model number EMO830WWW. The sample was received by Intertek on January 22, 2018, in undamaged condition and one sample was tested as received. The sample designation was AH01222018114900-067.

DATES OF TESTS: January 26, 2018 through February 5, 2018.

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SUMMARY

Model No.: EMO830WWW
 Description: Multiples WW Module, 80CRI 3000K

Criteria	Result	
	Sphere	Goniometer
Total Lumen Output (Lumens)	1611	1610
Total Power (W)	18.52	18.68
Luminaire Efficacy (LPW)	86.99	86.19

Criteria	Result
Power Factor	0.981
Current ATHD %	11.43
Correlated Color Temperature (CCT - K)	3028
Color Rendering Index (CRI - Ra)	82.0
Color Rendering Index (CRI - R9)	4.9
DUV	0.001
Chromaticity Coordinate (x)	0.436
Chromaticity Coordinate (y)	0.406
Chromaticity Coordinate (u')	0.249
Chromaticity Coordinate (v')	0.522

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Date Calibrated	Calibration Due Date	Date Used
Yokogawa Power Meter	WT210	146919	07/10/17	07/10/18	02/05/18
Omega Newport Thermometer	DPI8-C24	146920	10/04/17	10/04/18	02/05/18
LSI High Speed Mirror Goniometer	6440T	146928	VBU	VBU	02/05/18
Newport Thermohygrometer	iServer	146382	03/22/17	03/22/18	02/05/18
Pacific, AC power supply	118-ACX	CHI0358	VBU	VBU	02/05/18
Labsphere 2M Sphere & Spectroradiometer	CDS1100	146137	VBU	VBU	01/26/18
Elgar AC Power Supply	CW1251M	146113	VBU	VBU	01/26/18
Sorenson DC Power Supply	XFR150-8	146847	VBU	VBU	01/26/18
Yokogawa Power Analyzer	WT1600	146767	04/05/17	04/05/18	01/26/18
Omega Temperature	MDSi8	146873	07/20/17	07/20/18	01/26/18
Newport Thermohygrometer	iTHX-M	146382	07/14/17	07/14/18	01/26/18



TEST METHODS

Seasoning in Sample Orientation – LED Products

No seasoning was performed in accordance with IESNA LM-79.

Photometric and Electrical Measurements – Integrating Sphere Method

A Labsphere Model CDS 1100 CCD Array Spectroradiometer and Two Meter or Ten Foot Sphere was used to measure correlated color temperature, chromaticity coordinates, and the color rendering index for each SSL unit.

Ambient temperature was measured at a position inside the sphere. Each SSL unit was operated on the client provided driver at the rated input voltage in its designated orientation. Each SSL unit was allowed to stabilize for at least thirty minutes before measurements were made. Electrical measurements including voltage, current, and power were measured using the Xitron or Yokogawa Power Analyzer.

The calibration of the sphere photometer-spectroradiometer system is traceable to the National Institute of Standards and Technology.

Photometric and Electrical Measurements – Distribution Method

A LSI Type C High Speed Model 6440 Mirror Goniometer was used to measure the intensity (candelas) at each angle of distribution for each sample.

Ambient temperature was measured equal to the height of the sample mounted on the Goniometer equipment. Each sample was operated at input rated voltage in its designated orientation. Each sample was allowed to stabilize for at least thirty minutes before measurements were made. Electrical measurements including voltage, current, and power were measured using the Xitron or Yokogawa Power Analyzer.

Some graphics were created with Photometrics Plus software.

BUG Ratings (Backlight, Uplight, Glare) – for Outdoor Fixtures Only

Zonal Lumens were calculated and grouped using the formula in IESNA TM-15-11 for each zone as defined in the BUG addendum. The maximum lumen rating in each zone was compared against the BUG zonal requirements of Energy Star. Photometric Toolbox software was used to calculate results.



RESULTS OF TEST

Photometric and Electrical Measurements at Ambient Temperature (25°C +/- 1°C) - Integrating Sphere Method

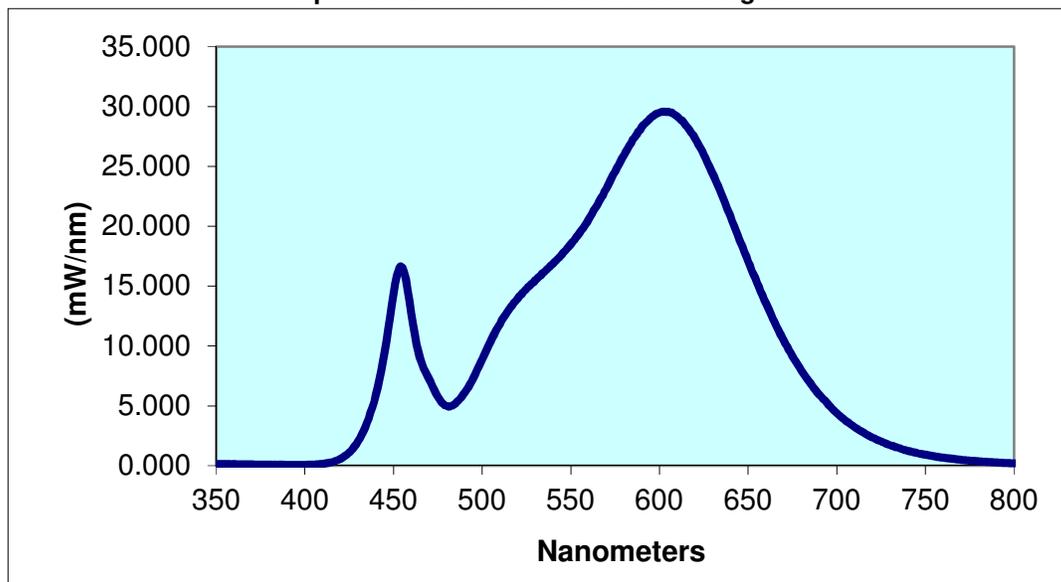
Intertek Sample No.	Base Orientation	Input Voltage {VAC}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
AH01222018114900-067	Horizontal	120.0	157.4	18.52	0.981	11.43	1611	86.99

Correlated Color Temperature (K)	CRI -Ra	CRI -R9	DUV	CIE 31' Chromaticity Coordinate (x)	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
3028	82.0	4.9	0.001	0.436	0.406	0.249	0.522

Spectral Distribution over Visible Wavelengths

nm	mW/nm								
350	0.131	440	5.911	530	15.50	620	27.35	710	3.237
355	0.150	445	9.527	535	16.18	625	25.99	715	2.774
360	0.142	450	14.40	540	16.87	630	24.39	720	2.370
365	0.135	455	16.56	545	17.65	635	22.67	725	2.026
370	0.121	460	12.76	550	18.50	640	20.82	730	1.730
375	0.107	465	8.966	555	19.44	645	18.94	735	1.474
380	0.097	470	7.237	560	20.57	650	17.08	740	1.252
385	0.086	475	5.758	565	21.79	655	15.30	745	1.072
390	0.076	480	4.979	570	23.15	660	13.59	750	0.915
395	0.077	485	5.212	575	24.57	665	11.97	755	0.788
400	0.082	490	6.067	580	25.96	670	10.50	760	0.678
405	0.099	495	7.314	585	27.25	675	9.168	765	0.583
410	0.159	500	8.873	590	28.30	680	7.971	770	0.498
415	0.293	505	10.47	595	29.03	685	6.920	775	0.431
420	0.571	510	11.83	600	29.48	690	5.956	780	0.366
425	1.113	515	13.02	605	29.56	695	5.155		
430	2.031	520	13.97	610	29.18	700	4.406		
435	3.570	525	14.78	615	28.40	705	3.767		

Spectral Data Over Visible Wavelengths



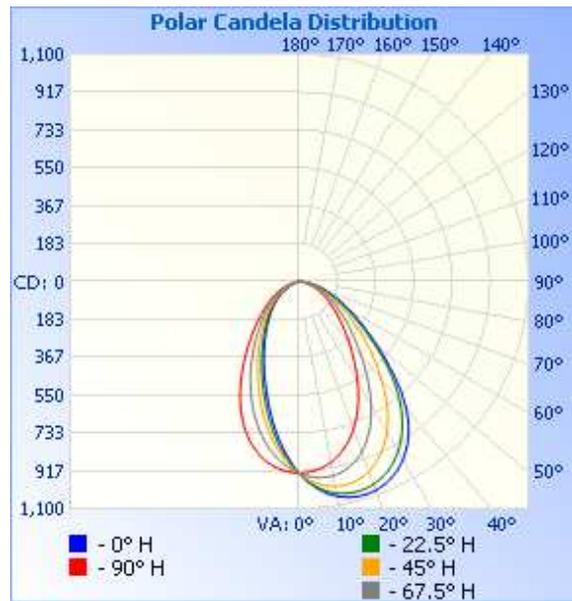
RESULTS OF TEST (cont'd)

Photometric and Electrical Measurements at Ambient Temperature (25°C +/- 1°C) – Distribution Method

Intertek Sample No.	Base Orientation	Input Voltage {VAC}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Absolute Luminous Flux (Lumens)	Lumen Efficacy (LPW)
AH01222018114900-067	UP	120.1	158.5	18.68	0.981	1610	86.19

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	930	930	930	930	930
5	1007	1000	982	953	918
10	1056	1041	1007	954	888
15	1078	1055	1007	930	836
20	1076	1045	980	879	762
25	1049	1011	923	798	668
30	996	950	842	691	561
35	915	864	736	572	456
40	799	751	612	460	365
45	646	615	492	366	289
50	499	473	385	289	230
55	377	352	293	227	182
60	284	258	218	176	141
65	209	186	160	132	104
70	150	130	112	92	70
75	101	84	71	55	40
80	58	45	37	26	19
85	20	14	11	8	7
90	0	0	0	0	0

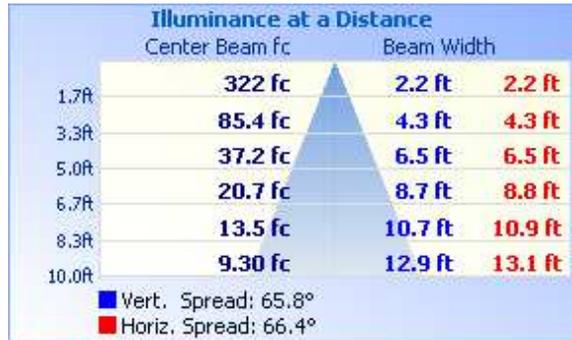


RESULTS OF TEST (cont'd)

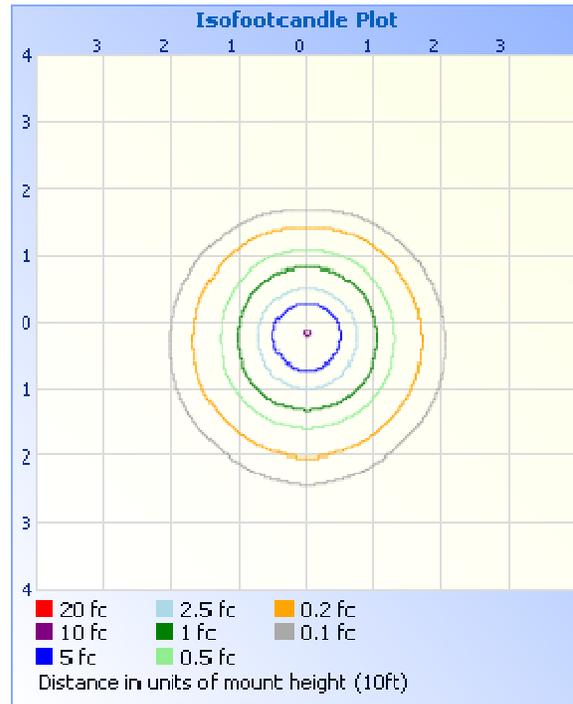
Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



Isoillumination Plot



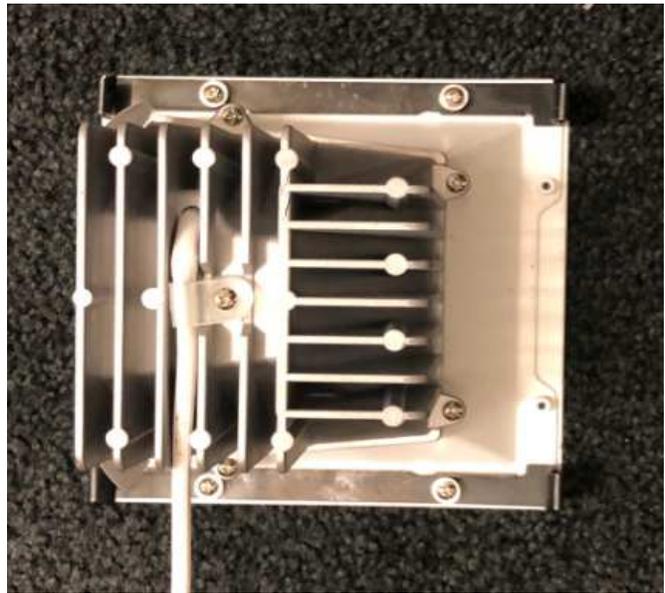
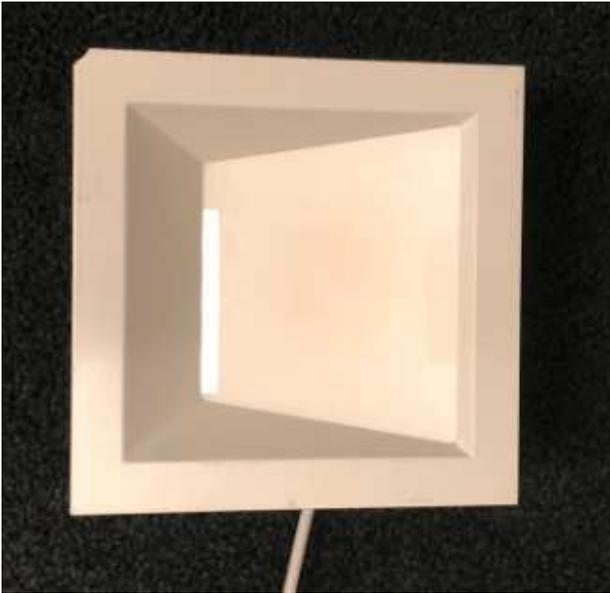
Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	640.8	39.8
0-40	968.7	60.2
0-60	1434	89.1
60-90	176.3	10.9
0-90	1610	100.0
90-180	0.0	0.0
0-180	1610	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	86.6	5.4
10-20	234.5	14.6
20-30	319.7	19.9
30-40	327.8	20.4
40-50	273.1	17.0
50-60	192.1	11.9
60-70	114.2	7.1
70-80	51.1	3.2
80-90	10.9	0.7

PICTURES (not to scale)



CONCLUSION

The results tabulated in this report are representative of the actual test samples submitted for this report only. The data is provided to the client for further evaluation. Compliance to the referenced specification requirements was not determined in this report.

In Charge Of Tests:



Hector Huitron
Associate Engineer
Lighting Division

Attachment: None

Report Reviewed By:



Timothy Quigley
Engineer
Lighting Division