

LM-79-08 Test Report

For

ETI Solid State Lighting (Zhuhai) Ltd

No.1, Zhongzhu Road South, Science & Technology Innovation Coast, High Tech District, Zhuhai City,
Guangdong Prov., China 519085

LED High Bay Luminaire

Model Name(s):

502501###

Representative (Tested) Model:

502501610

Model Difference:

1. The first and second # indicated 5000K, can be 61-70, the third # indicated factory code, can be 0-9;
2. All is the same construction, except model design.

Prepare by:



Engineer: Alan Wang

Date: 2020-10-29

Review by:



Technical Lead: Vincent Yuan

Issue Date: 2020-11-25

Revised Date: N/A

Note:

1. The results contained in this report pertain only to the tested samples.
2. This report shall not be reproduced, no limited part or full, without approval of Dongguan New Testing Centre Co., Ltd
3. This report does not imply product certification, approval, or endorsement by NVLAP, or any agency of the Federal Government.

Client Information:

Client Name:	ETI Solid State Lighting (Zhuhai) Ltd
Brand Name:	Commercial Electric
Factory 1 Name:	ETI Solid State Lighting (Zhuhai) Ltd
Factory 1 Address:	No.1, Zhongzhu Road South, Science & Technology Innovation Coast, High tech District, Zhuhai City, Guangdong Prov., China 519085
Factory 2 Name:	NVC VIETNAM TECHNOLOGY AND LIGHTING COMPANY LIMITED
Factory 2 Address:	Lot CN23-1, Yen Phong Industrial park, Dong Phong commune, Yen Phong district, Bac Ninh province, Vietnam

Product Information:

Model Number:	502501####(###-610-709)
Product Type:	High-Bay Luminaires for Commercial and Industrial Buildings
Rating Input:	120-277Vac, 50/60Hz, 185W
Declared CCT:	5000K
Declared Light Output:	22000 lm
LED Manufacturer:	Samsung Electronics Co., Ltd
LED Model:	SPMWH1229AQ5SGRXXX
LED Quantity:	230 pcs

Test Information:

Standard Lamp:	Total Spectral Radiant Flux Standard Lamp, trace to NIST. 1. D908S for Gonio 2. D215S for Integrating Sphere
Date of Receipt Samples:	2020-10-11
Quantity of Receipt Samples:	1 pc
Sample Number:	201011001-S1

Laboratory Information:

Test Laboratory:	Dongguan New Testing Centre Co., Ltd
Laboratory Address:	3F, No. 1 the 1 st North Industry Road, Songshan Lake Science & Technology Park, Dongguan, Guangdong, China
Laboratory Contact Name:	Neil Zhong
Laboratory Contact E-mail:	Neil_zhong@ntc-cert.com

Report Information:

Issued Date of Test Report:	2020-10-25
Revised Date of Test Report:	N/A
Test Report No.:	NTCLR20100063
Remark (If applicable):	N/A

Test Specification:	
Date of Test	2020-10-28
Test Item	1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate 7. Fidelity Index 8. Gamut Index 9. Local Chroma Shift 10. THD and PF
Reference Standard	IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products ANSI C78.377-2017 Specifications for the Chromaticity of Solid State Lighting Products CIE 13.3-1995 Method of Measuring and Specifying Color Rendering Properties of Light Sources CIE 15-2004 Technical Report Colorimetry ANSI IES TM-30-18 IES Method for Evaluating Light Source Color Rendition ANSI C78.77-10-2014 Harmonic Emission Limits – Related Power Quality Requirements IES TM-15-11 Luminaire Classification System for Outdoor Luminaires Addendum A for IES TM-15-11 Backlight, Uplight, and Glare (BUG) Ratings

Test Methods:
1. Photometric and Electrical Measurements – Light Distribution Method: Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at $25\text{ }^{\circ}\text{C} \pm 1^{\circ}\text{C}$, measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at required Voltage and Frequency. It was stabilized before measurement was made. Luminous Flux, Luminaire Efficacy and Zonal Lumen were calculated from the software taken at 1° vertical intervals and 15° horizontal intervals.
2. Photometric and Electrical Measurements – Integrating Sphere Method: Photometric parameters were measured using an integrating sphere, as spectroradiometer and software. The ambient temperature condition inside the sphere was measured at $25\text{ }^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at require Voltage and Frequency. It was stabilized before measurement was made. Chromaticity Coordinates, Correlated Color Temperature and Color Rendering Index were calculated from the spectral radiant flux measurements taken at least 1 nm intervals over the rage of 380 to 780 nm.
3. THD and PF Measurements: The sample was tested according to the ANSI C82.77-2002, the sample was operated at requirement Voltage and Frequency, and was stabilized before measurement. The Total Harmonic Distortion was calculated from the Digital Power Meter.

Integrating Sphere Test Results:

Test Condition:

Test Ambient (°C)	Test Humidity (%)	Orientation	Stabilization Time (minute)	Test Time (minute)
25.4	41.0	Face Down	90	10

Electrical Data:

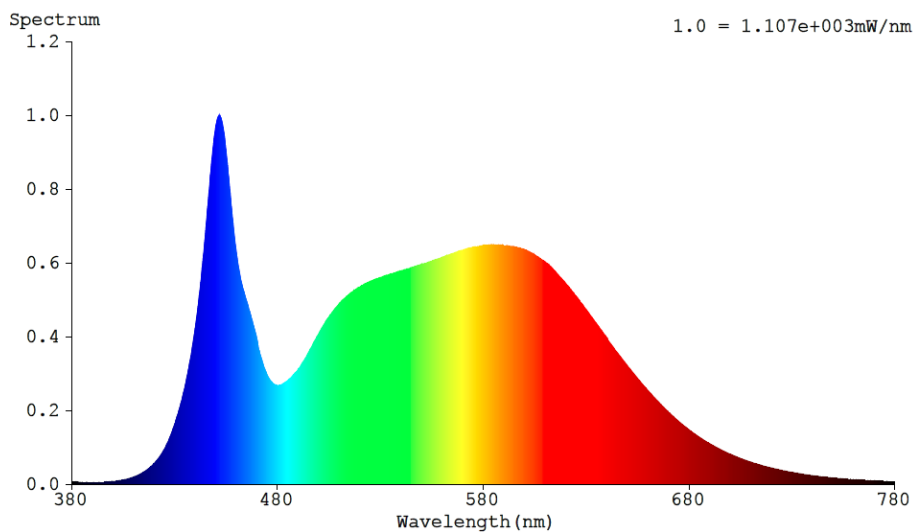
Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
120.0	60	1.474	176.72	0.9990

Color Data:

Parameter	Result
CCT(K)	4883
R _a	85
R _f	85
R _g	96
R _{cs, h1}	-11%
Chromaticity, (x, y)	(0.3490, 0.3591)
Chromaticity, (u', v')	(0.2112, 0.4888)
Duv	0.0022

Specify Color Rendering			
R1	83	R9	15
R2	90	R10	75
R3	94	R11	83
R4	84	R12	60
R5	83	R13	85
R6	85	R14	97
R7	89	R15	78
R8	70	-	-

Spectrum Diagram:



IES TM-30-18 Color Rendition Result:

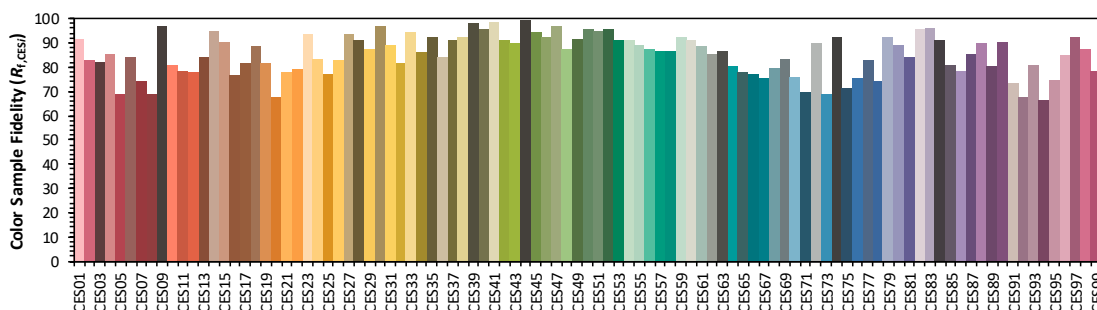
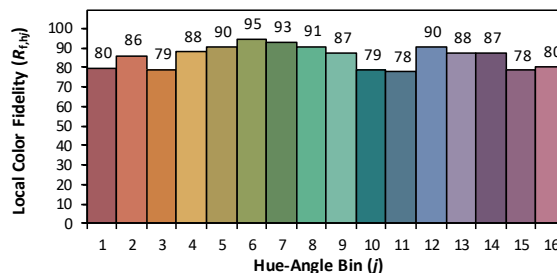
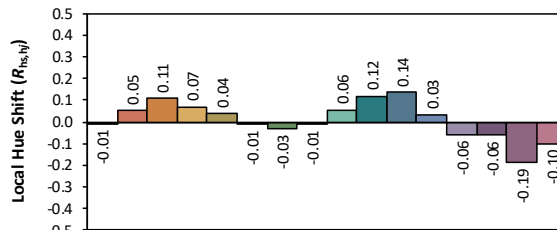
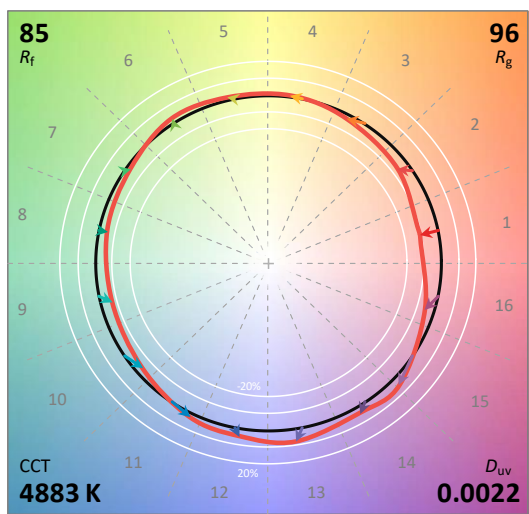
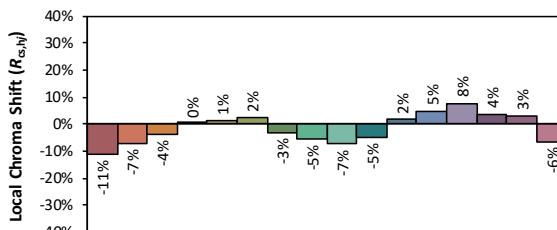
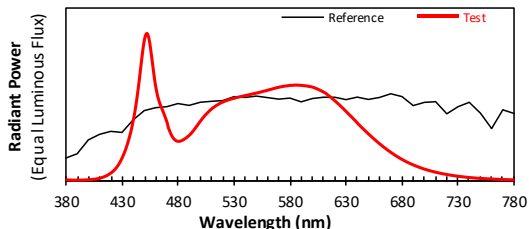
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: ETI Solid State Lighting (2

Date: 2020/10/29

Model: 502501###



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.3490
 y 0.3591
 u' 0.2112
 v' 0.4888

CIE 13.3-1995
(CRI)

R_a 85
 R_9 15

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

Spectrum Data:

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	0.0071	447	0.8113	514	0.5105	581	0.6474	648	0.3347	715	0.0508
381	0.0059	448	0.8744	515	0.5150	582	0.6480	649	0.3276	716	0.0491
382	0.0057	449	0.9289	516	0.5192	583	0.6480	650	0.3202	717	0.0477
383	0.0051	450	0.9703	517	0.5244	584	0.6491	651	0.3134	718	0.0463
384	0.0049	451	0.9928	518	0.5279	585	0.6496	652	0.3065	719	0.0449
385	0.0048	452	0.9993	519	0.5320	586	0.6490	653	0.2996	720	0.0435
386	0.0045	453	0.9836	520	0.5342	587	0.6487	654	0.2925	721	0.0421
387	0.0046	454	0.9527	521	0.5382	588	0.6486	655	0.2857	722	0.0408
388	0.0043	455	0.9035	522	0.5413	589	0.6481	656	0.2791	723	0.0395
389	0.0044	456	0.8472	523	0.5440	590	0.6473	657	0.2723	724	0.0383
390	0.0044	457	0.7891	524	0.5467	591	0.6471	658	0.2660	725	0.0370
391	0.0049	458	0.7294	525	0.5494	592	0.6458	659	0.2593	726	0.0359
392	0.0048	459	0.6737	526	0.5516	593	0.6451	660	0.2530	727	0.0348
393	0.0050	460	0.6292	527	0.5541	594	0.6446	661	0.2470	728	0.0337
394	0.0051	461	0.5904	528	0.5564	595	0.6433	662	0.2407	729	0.0326
395	0.0054	462	0.5594	529	0.5580	596	0.6422	663	0.2343	730	0.0316
396	0.0057	463	0.5342	530	0.5600	597	0.6403	664	0.2286	731	0.0306
397	0.0061	464	0.5136	531	0.5620	598	0.6394	665	0.2230	732	0.0297
398	0.0065	465	0.4943	532	0.5644	599	0.6378	666	0.2169	733	0.0287
399	0.0068	466	0.4763	533	0.5662	600	0.6358	667	0.2112	734	0.0279
400	0.0073	467	0.4563	534	0.5676	601	0.6338	668	0.2055	735	0.0268
401	0.0078	468	0.4367	535	0.5703	602	0.6309	669	0.2002	736	0.0261
402	0.0087	469	0.4155	536	0.5710	603	0.6277	670	0.1948	737	0.0252
403	0.0093	470	0.3938	537	0.5724	604	0.6248	671	0.1894	738	0.0244
404	0.0101	471	0.3624	538	0.5750	605	0.6213	672	0.1844	739	0.0236
405	0.0111	472	0.3425	539	0.5765	606	0.6176	673	0.1793	740	0.0229
406	0.0123	473	0.3237	540	0.5783	607	0.6142	674	0.1742	741	0.0222
407	0.0136	474	0.3081	541	0.5797	608	0.6102	675	0.1692	742	0.0214
408	0.0151	475	0.2949	542	0.5819	609	0.6067	676	0.1646	743	0.0207
409	0.0168	476	0.2847	543	0.5833	610	0.6023	677	0.1602	744	0.0201
410	0.0188	477	0.2775	544	0.5847	611	0.5983	678	0.1556	745	0.0195
411	0.0207	478	0.2720	545	0.5870	612	0.5940	679	0.1509	746	0.0189
412	0.0231	479	0.2692	546	0.5880	613	0.5881	680	0.1467	747	0.0183
413	0.0259	480	0.2677	547	0.5903	614	0.5817	681	0.1427	748	0.0178
414	0.0289	481	0.2679	548	0.5924	615	0.5759	682	0.1384	749	0.0172
415	0.0326	482	0.2696	549	0.5935	616	0.5696	683	0.1345	750	0.0167
416	0.0360	483	0.2729	550	0.5960	617	0.5631	684	0.1304	751	0.0162
417	0.0402	484	0.2765	551	0.5963	618	0.5572	685	0.1267	752	0.0158
418	0.0450	485	0.2806	552	0.5987	619	0.5511	686	0.1232	753	0.0152
419	0.0495	486	0.2858	553	0.6008	620	0.5442	687	0.1194	754	0.0148
420	0.0552	487	0.2909	554	0.6028	621	0.5378	688	0.1160	755	0.0143
421	0.0613	488	0.2972	555	0.6045	622	0.5305	689	0.1126	756	0.0139
422	0.0679	489	0.3036	556	0.6067	623	0.5236	690	0.1094	757	0.0135
423	0.0756	490	0.3103	557	0.6090	624	0.5170	691	0.1062	758	0.0131
424	0.0843	491	0.3174	558	0.6103	625	0.5095	692	0.1029	759	0.0127
425	0.0939	492	0.3270	559	0.6120	626	0.5028	693	0.1000	760	0.0124
426	0.1050	493	0.3354	560	0.6150	627	0.4952	694	0.0969	761	0.0120
427	0.1164	494	0.3449	561	0.6163	628	0.4879	695	0.0941	762	0.0117
428	0.1300	495	0.3552	562	0.6194	629	0.4800	696	0.0910	763	0.0112
429	0.1449	496	0.3658	563	0.6205	630	0.4727	697	0.0884	764	0.0109
430	0.1610	497	0.3758	564	0.6229	631	0.4650	698	0.0858	765	0.0106
431	0.1789	498	0.3867	565	0.6248	632	0.4570	699	0.0830	766	0.0102
432	0.1969	499	0.3972	566	0.6270	633	0.4498	700	0.0806	767	0.0099
433	0.2173	500	0.4068	567	0.6289	634	0.4420	701	0.0782	768	0.0096
434	0.2404	501	0.4170	568	0.6315	635	0.4348	702	0.0760	769	0.0094
435	0.2639	502	0.4267	569	0.6329	636	0.4272	703	0.0736	770	0.0091
436	0.2910	503	0.4356	570	0.6345	637	0.4190	704	0.0712	771	0.0088
437	0.3200	504	0.4451	571	0.6361	638	0.4114	705	0.0691	772	0.0085
438	0.3494	505	0.4523	572	0.6378	639	0.4038	706	0.0670	773	0.0082
439	0.3860	506	0.4604	573	0.6398	640	0.3962	707	0.0652	774	0.0080
440	0.4233	507	0.4678	574	0.6405	641	0.3862	708	0.0631	775	0.0078
441	0.4650	508	0.4758	575	0.6421	642	0.3790	709	0.0612	776	0.0075
442	0.5125	509	0.4819	576	0.6434	643	0.3715	710	0.0593	777	0.0074
443	0.5643	510	0.4892	577	0.6438	644	0.3636	711	0.0575	778	0.0071
444	0.6221	511	0.4949	578	0.6449	645	0.3564	712	0.0559	779	0.0071
445	0.6817	512	0.5004	579	0.6460	646	0.3493	713	0.0541	780	0.0071
446	0.7474	513	0.5052	580	0.6477	647	0.3419	714	0.0524	N/A	N/A

Goniophotometer Test Results:

Test Condition:

Test Ambient (°C)	Test Humidity (%)	Orientation	Stabilization Time (minute)	Test Time (minute)
25.0	38.4	Face Down	90	25

Electrical Data:

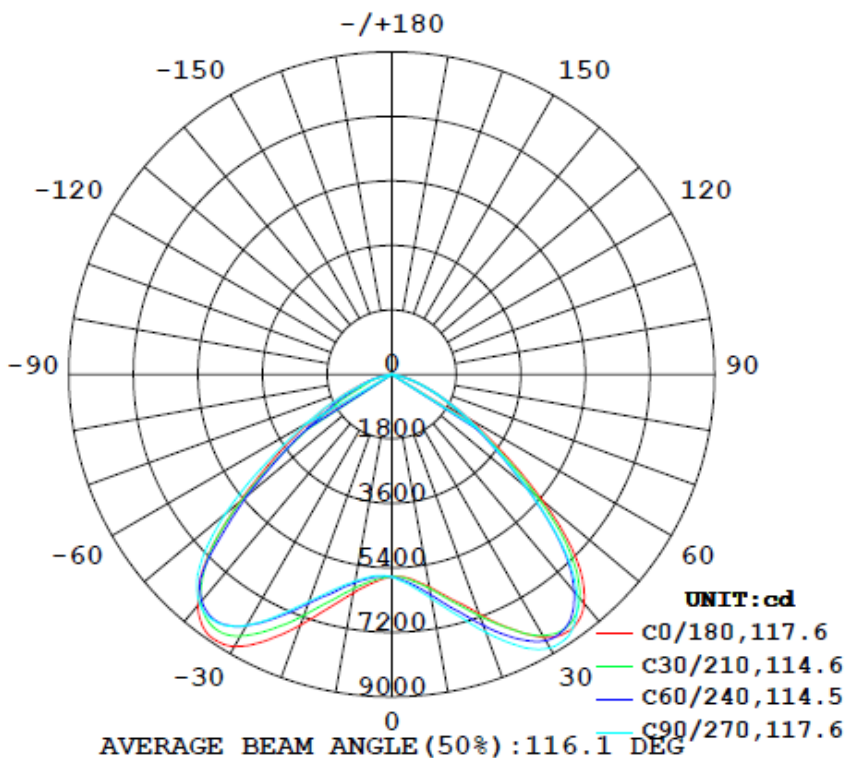
Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
120.0	60	1.474	176.72	0.9990

Goniophotometer Data:

Parameter	Results	
Total Luminous (lm)	22236.3	
Luminous Efficacy (lm/w)	125.83	
Zonal Lumens Distribution (20-50°)	64.6%	
Beam Angle (°)	116.1	
UGR	Viewed Crosswise	Viewed Endwise
	26.6	25.9

Luminous Intensity Distribution Diagram:

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM

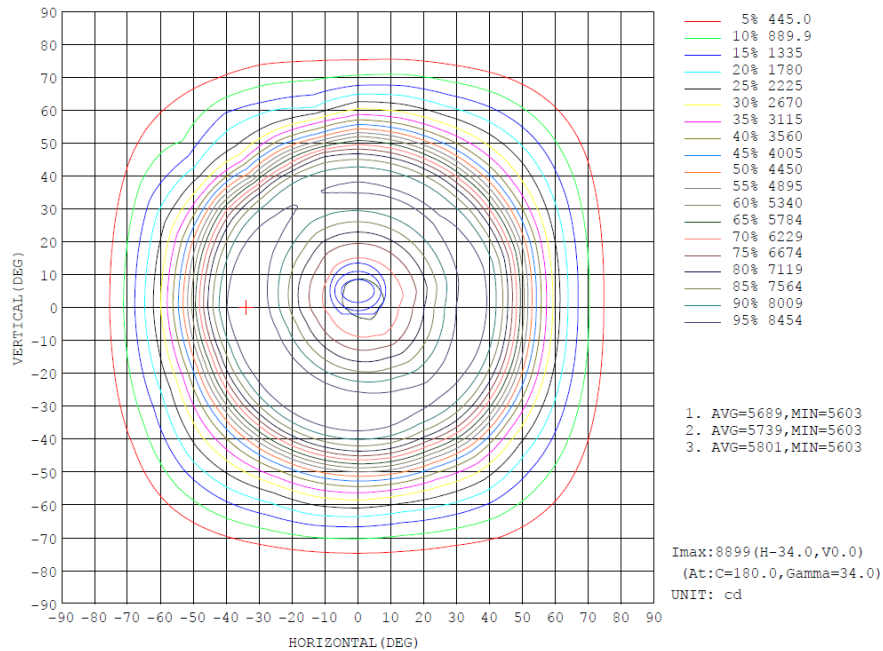


Zonal Flux Diagram:

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	lum, lamp
10	6022	6106	6348	6408	6196	6003	5858	5852	0- 10	561.5	561.5	2.52,2.52
20	7104	7228	7653	7775	7444	7025	6738	6794	10- 20	1892	2453	11,11
30	8479	8420	8813	8868	8768	8284	8084	8178	20- 30	3672	6125	27.5,27.5
40	8340	8049	8044	7876	8413	8158	8347	8216	30- 40	5347	11472	51.6,51.6
50	5514	5207	4884	4617	5531	4728	6070	5524	40- 50	5337	16809	75.6,75.6
60	2494	2461	2396	2326	2647	2064	2769	2644	50- 60	3281	20090	90.3,90.3
70	921.1	979.3	924.3	932.8	1031	918.4	959.9	1091	60- 70	1609	21699	97.6,97.6
80	89.12	96.08	50.19	9.698	89.81	80.88	100.1	108.2	70- 80	498.4	22197	99.8,99.8
90	3.263	3.152	2.198	1.963	1.571	1.961	3.069	3.340	80- 90	14.45	22212	99.9,99.9
100	1.364	0.8190	0.6541	1.671	3.102	2.707	3.042	3.901	90-100	2.282	22214	99.9,99.9
110	1.634	1.129	1.276	1.833	4.115	3.906	3.593	3.495	100-110	2.456	22217	99.9,99.9
120	2.273	2.104	2.313	2.364	4.524	5.044	4.465	3.991	110-120	2.858	22219	99.9,99.9
130	3.369	3.179	3.354	3.351	5.866	6.516	6.017	5.335	120-130	3.535	22223	99.9,99.9
140	4.453	4.151	4.567	4.410	6.233	7.393	7.150	6.251	130-140	3.956	22227	100,100
150	5.143	4.961	5.161	5.010	6.987	7.558	7.490	6.788	140-150	3.673	22231	100,100
160	5.943	5.437	5.159	5.854	8.090	8.580	7.640	7.491	150-160	2.993	22234	100,100
170	6.159	6.155	5.633	5.944	7.769	8.287	7.748	7.163	160-170	1.957	22236	100,100
180	7.052	7.187	6.839	6.733	7.108	7.314	6.793	6.654	170-180	0.6590	22236	100,100
DEG	LUMINOUS INTENSITY:cd Less than 35% Percent = 7.1 %									UNIT:lm		

Isocandela Diagram:



Uncorrected UGR Table:

UGR Table - Uncorrected

Reflectances										
Ceiling Cavity	70	70	50	50	30	70	70	50	50	30
Walls	50	30	50	30	30	50	30	50	30	30
Floor Cavity	20	20	20	20	20	20	20	20	20	20
Room Size										
X=2H Y=2H	UGR Viewed Crosswise					UGR Viewed Endwise				
	14.5	16.0	14.8	16.3	16.6	13.8	15.3	14.1	15.6	15.9
3H	15.2	16.6	15.6	16.9	17.2	14.5	15.9	14.9	16.2	16.6
4H	15.3	16.6	15.7	16.9	17.3	14.7	15.9	15.1	16.3	16.7
6H	15.3	16.5	15.7	16.8	17.2	14.6	15.8	15.0	16.2	16.6
8H	15.3	16.4	15.7	16.8	17.2	14.6	15.7	15.0	16.1	16.5
12H	15.2	16.3	15.7	16.7	17.1	14.6	15.6	15.0	16.0	16.4
4H	2H	14.8	16.1	15.2	16.4	16.8	14.1	15.4	14.5	15.8
	3H	15.7	16.7	16.1	17.1	17.5	15.0	16.1	15.4	16.5
	4H	15.8	16.7	16.3	17.2	17.6	15.2	16.1	15.6	16.5
	6H	15.8	16.6	16.3	17.1	17.5	15.1	16.0	15.6	16.4
	8H	15.8	16.5	16.2	17.0	17.4	15.1	15.9	15.6	16.3
8H	4H	15.7	16.4	16.2	16.9	17.4	15.1	15.7	15.6	16.2
	6H	15.8	16.6	16.3	17.0	17.5	15.2	15.9	15.6	16.4
	8H	15.8	16.4	16.3	16.9	17.4	15.1	15.7	15.6	16.2
	12H	15.8	16.3	16.3	16.8	17.3	15.1	15.6	15.6	16.1
	12H	15.7	16.2	16.2	16.7	17.3	15.0	15.5	15.6	16.0
12H	4H	15.8	16.5	16.3	16.9	17.4	15.1	15.8	15.6	16.3
	6H	15.8	16.3	16.3	16.8	17.3	15.1	15.6	15.6	16.1
	8H	15.7	16.2	16.2	16.7	17.3	15.0	15.5	15.6	16.0
	12H	15.8	16.5	16.3	16.9	17.4	15.1	15.8	15.6	16.3
	12H	15.8	16.3	16.3	16.8	17.3	15.1	15.6	15.6	16.1

Maximum UGR = 17.6

Corrected UGR Table:

UGR Table - Corrected

Reflectances										
Ceiling Cavity	70	70	50	50	30	70	70	50	50	30
Walls	50	30	50	30	30	50	30	50	30	30
Floor Cavity	20	20	20	20	20	20	20	20	20	20
Room Size										
X=2H Y=2H	UGR Viewed Crosswise					UGR Viewed Endwise				
	25.3	26.8	25.6	27.1	27.4	24.6	26.1	24.9	26.4	26.7
3H	26.0	27.4	26.4	27.7	28.0	25.3	26.7	25.7	27.0	27.4
4H	26.1	27.4	26.5	27.7	28.1	25.5	26.7	25.9	27.1	27.5
6H	26.1	27.3	26.5	27.6	28.0	25.4	26.6	25.8	27.0	27.4
8H	26.1	27.2	26.5	27.6	28.0	25.4	26.5	25.8	26.9	27.3
12H	26.0	27.1	26.5	27.5	27.9	25.4	26.4	25.8	26.8	27.2
4H	2H	25.6	26.9	26.0	27.2	27.6	24.9	26.2	25.3	26.6
	3H	26.5	27.5	26.9	27.9	28.3	25.8	26.9	26.2	27.3
	4H	26.6	27.5	27.1	28.0	28.4	26.0	26.9	26.4	27.3
	6H	26.6	27.4	27.1	27.9	28.3	25.9	26.8	26.4	27.2
	8H	26.6	27.3	27.0	27.8	28.2	25.9	26.7	26.4	27.1
8H	4H	26.5	27.2	27.0	27.7	28.2	25.9	26.5	26.4	27.0
	6H	26.6	27.4	27.1	27.8	28.3	26.0	26.7	26.4	27.2
	8H	26.6	27.2	27.1	27.7	28.2	25.9	26.5	26.4	27.0
	12H	26.6	27.1	27.1	27.6	28.1	25.9	26.4	26.4	26.9
	12H	26.5	27.0	27.0	27.5	28.1	25.8	26.3	26.4	26.8
12H	4H	26.6	27.3	27.1	27.7	28.2	25.9	26.6	26.4	27.1
	6H	26.6	27.1	27.1	27.6	28.1	25.9	26.4	26.4	26.9
	8H	26.5	27.0	27.0	27.5	28.1	25.8	26.3	26.4	26.8
	12H	26.6	27.3	27.1	27.7	28.2	25.9	26.6	26.4	27.1
	12H	26.6	27.1	27.1	27.6	28.1	25.9	26.4	26.4	26.9

Maximum UGR = 28.4

Luminous Distribution Intensity Data:

Table--1		C (DEG)																		UNIT: cd									
γ (DEG)	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270										
0	5650	5649	5645	5640	5654	5655	5655	5654	5659	5652	5648	5647	5650	5649	5645	5640	5654	5655	5655										
5	5716	5736	5747	5774	5851	5875	5902	5923	5934	5935	5923	5896	5827	5795	5766	5740	5679	5661	5648										
10	6022	6037	6064	6106	6242	6297	6348	6397	6411	6408	6382	6342	6196	6125	6062	6003	5899	5873	5850										
15	6499	6531	6562	6615	6793	6866	6933	6992	7028	7029	6999	6944	6735	6639	6535	6449	6297	6248	6218										
20	7104	7140	7171	7228	7440	7548	7653	7728	7766	7775	7755	7687	7444	7295	7147	7025	6806	6752	6738										
25	7820	7835	7837	7896	8116	8239	8360	8447	8487	8505	8476	8407	8176	8011	7831	7696	7467	7418	7406										
30	8479	8457	8416	8420	8579	8703	8813	8873	8874	8868	8868	8867	8768	8608	8426	8284	8091	8061	8084										
35	8702	8644	8568	8511	8542	8670	8741	8732	8720	8687	8702	8779	8891	8777	8638	8510	8441	8445	8463										
40	8340	8276	8145	8049	7912	8024	8044	7981	7926	7876	7922	8068	8413	8359	8279	8158	8251	8316	8347										
45	7276	7205	7036	6934	6652	6738	6713	6584	6472	6423	6520	6688	7301	7310	7247	6941	7198	7534	7567										
50	5514	5456	5287	5207	4875	4930	4884	4772	4634	4617	4709	4882	5531	5573	5453	4728	5286	5632	6070										
55	3748	3707	3507	3578	3352	3390	3423	3366	3231	3295	3347	3351	3877	3841	3424	2915	3472	3634	4209										
60	2494	2460	2347	2461	2349	2308	2396	2377	2227	2326	2380	2275	2647	2626	2057	2064	2178	2182	2769										
65	1591	1584	1533	1642	1554	1495	1573	1616	1511	1599	1615	1494	1740	1734	1217	1563	1483	1379	1743										
70	921	928	930	979	917	882	924	936	905	933	939	875	1031	1034	751	918	922	866	960										
75	415	428	450	487	413	409	417	415	394	393	384	355	486	490	449	461	543	478	466										
80	89.1	82.7	88.6	96.1	55.7	91.4	50.2	14.1	12.3	9.70	7.39	7.07	89.8	87.4	80.5	80.9	117	102	100										
85	3.78	4.27	4.71	4.98	3.66	3.25	2.76	2.36	2.03	1.83	1.57	1.53	1.59	1.55	1.28	1.84	2.93	3.92	4.16										
90	3.26	3.39	3.29	3.15	2.37	2.31	2.20	2.15	2.08	1.96	1.74	1.70	1.57	1.68	1.48	1.96	1.76	2.31	3.07										
95	1.28	1.14	0.99	0.89	0.77	0.66	0.72	1.14	1.51	2.04	1.93	1.90	2.27	2.44	1.99	2.23	2.01	2.30	3.05										
100	1.36	1.21	1.01	0.82	0.65	0.64	0.65	0.70	1.22	1.67	2.16	2.12	3.10	3.28	2.77	2.71	2.39	2.57	3.04										
105	1.45	1.25	1.03	0.80	0.85	0.89	0.91	0.94	0.96	1.76	2.06	2.35	3.88	4.06	3.55	3.34	2.87	2.98	3.31										
110	1.63	1.43	1.20	1.13	1.22	1.25	1.28	1.31	1.32	1.83	1.88	2.59	4.12	4.59	4.15	3.91	3.31	3.36	3.59										
115	1.64	1.68	1.67	1.61	1.70	1.75	1.77	1.83	1.81	1.81	2.59	1.93	3.48	3.38	4.67	4.56	3.82	3.87	3.96										
120	2.27	2.25	2.14	2.10	2.27	2.29	2.31	2.36	2.39	2.36	3.06	2.97	4.52	4.69	4.81	5.04	4.46	4.42	4.47										
125	2.82	2.64	2.60	2.63	2.74	2.79	2.84	2.84	2.92	2.87	3.31	3.32	5.36	5.36	4.79	5.68	5.22	5.11	5.14										
130	3.37	3.17	3.14	3.18	3.45	3.30	3.35	3.36	3.47	3.35	3.62	3.79	5.87	6.19	6.41	6.52	6.15	6.10	6.02										
135	3.94	3.78	3.72	3.66	3.99	3.84	3.98	3.99	3.96	3.84	4.00	3.84	6.17	6.65	7.02	6.44	6.90	6.91	6.74										
140	4.45	4.29	4.23	4.15	4.40	4.41	4.57	4.51	4.47	4.41	4.27	4.70	6.23	6.69	6.92	7.39	6.86	7.13	7.15										
145	4.84	4.83	4.62	4.59	4.79	4.89	4.99	4.95	4.87	4.65	4.58	4.86	6.49	6.97	6.87	7.53	7.28	7.30	7.16										
150	5.14	5.33	5.16	4.96	5.05	4.99	5.16	5.22	5.02	5.01	4.93	4.97	6.99	7.30	7.14	7.56	7.81	7.85	7.49										
155	5.54	5.81	5.73	5.23	5.30	5.18	5.12	5.46	5.36	5.44	5.55	5.28	7.41	7.61	7.92	7.79	7.92	8.02	7.47										
160	5.94	6.24	6.15	5.44	5.31	5.23	5.16	5.71	5.67	5.85	5.86	5.71	8.09	8.29	8.38	8.58	8.17	8.11	7.64										
165	5.91	6.14	6.11	5.78	5.65	5.39	5.40	5.86	5.90	5.96	5.89	5.90	8.16	8.27	8.50	8.70	8.70	8.29	7.87										
170	6.16	6.38	6.37	6.16	5.80	5.65	5.63	5.97	6.04	5.94	5.95	6.00	7.77	7.79	8.18	8.29	8.38	8.14	7.75										
175	6.69	6.92	6.88	6.78	6.55	6.41	6.12	6.42	6.55	6.68	6.72	6.79	7.71	7.71	7.98	8.01	7.95	7.79	7.33										
180	7.05	7.18	7.14	7.19	7.12	6.88	6.84	6.54	6.66	6.73	6.79	6.71	7.11	7.12	7.35	7.31	7.21	7.04	6.79										

Table--2

UNIT: cd

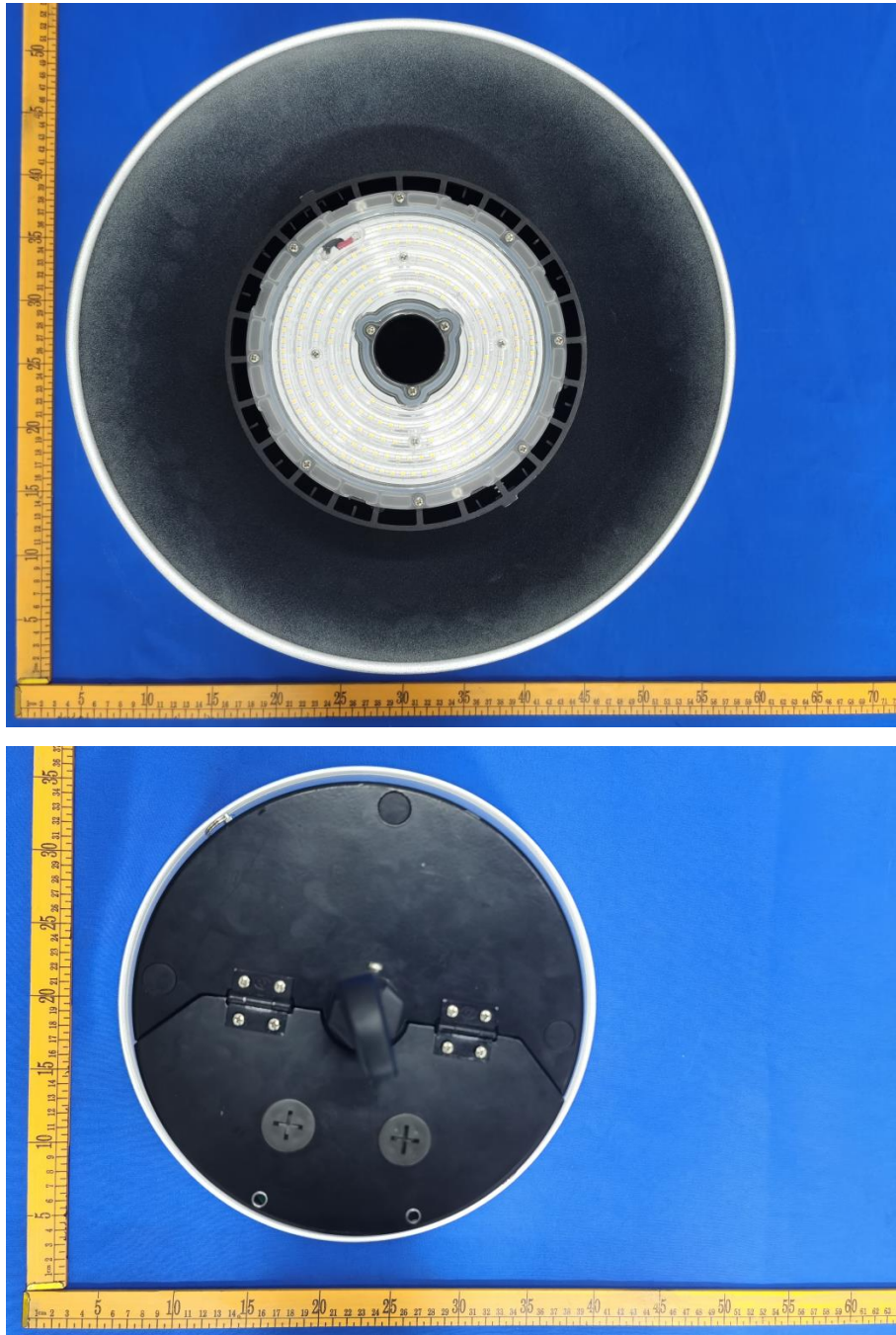
C (DEG)	285	300	315	330	345														
γ (DEG)	0	5654	5659	5652	5648	5647													
5	5637	5628	5629	5639	5637														
10	5848	5844	5852	5872	5889														
15	6221	6229	6249	6277	6300														
20	6738	6762	6794	6825	6865														
25	7435	7460	7513	7560	7588														
30	8103	8135	8178	8227	8270														
35	8461	8466	8487	8571	8647														
40	8305	8267	8216	8298	8428														
45	7484	7346	7238	7312	7504														
50	5932	5682	5524	5600	5831														
55	4109	3912	3803	3814	3980														
60	2760	2623	2644	2612	2640														
65	1810	1700	1770	1789	1737														
70	1065	1033	1091	1082	1051														
75	524	519	544	545	530														
80	104	103	108	110	118														
85	3.91	4.62	5.08	5.48	6.03														
90	2.49	3.09	3.34	3.48	3.63														
95	2.62	3.27	3.58	3.74	3.43														
100	2.87	3.58	3.90	3.35	2.55														
105	3.06	3.98	3.81	2.94	2.42														
110	3.33	4.06	3.49	3.07	2.76														
115	3.60	4.09	3.55	3.20	3.00														
120	4.05	4.26	3.99	3.74	3.66														
125	4.74	4.84	4.61	4.46	4.50														
130	5.70	5.63	5.33	5.10	5.28														
135	6.43	6.24	5.85	5.52	5.90														
140	6.83	6.48	6.25	6.05	6.25														
145	6.98	6.86	6.53	6.49	6.57														
150	7.30	7.04	6.79	6.74	7.00														
155	7.34	7.16	7.11	7.29	7.44														
160	7.47	7.48	7.49	7.77	7.91														
165	7.32	7.45	7.75	7.84	7.98														
170	7.23	7.20	7.16	7.41	7.68														
175	6.88	7.04	6.81	7.12	7.32														
180	6.70	6.51	6.65	6.77	6.81														

THD and PF Measurement Test Results:

Electrical Measurement:

Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor	iTHD(%)
277.0	60	0.6604	175.3	0.9583	8.43

Photo of Sample:



Equipment List:

Equipment ID	Equipment Name	Last Cal.	Due Cal.
NTC-F01-001	Goniophotometer System	2019-11-13	2020-11-12
NTC-F01-006	2.0 meter Integrating Sphere	2019-11-13	2020-11-12
NTC-F01-012	Standard Lamp	2019-11-13	2020-11-12
NTC-F01-013	Standard Lamp	2019-11-13	2020-11-12
NTC-F01-031	Digital Power Meter	2020-08-22	2021-08-21
NTC-F01-019	Temperature & Humidity Meter	2019-11-15	2020-11-14

*******End of Report*******