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

High Bay

Model Name(s):

502401##

Representative (Tested) Model:

50240161

Model Difference: ##=61-70, identifies 5000K

Prepare by：

Derek Lai

Engineer: Derek Lai

Date: 2019-08-20

Review by:

Vincent Yuan

Technical Lead: Vincent Yuan

Issue Date: 2019-08-23

Revised Date: N/A

Product Information:

Client Name:	ETI Solid State Lighting (Zhuhai) Ltd
Brand Name:	ETI
Model Number:	502401##(##=61-70)
Product Type:	High Bay Luminaires for Commercial and Industrial Buildings
Rating Input:	120-277Vac, 50/60Hz, 92W
Declared CCT:	5000 K
Declared Light Output:	12000 lm
LED Manufacturer:	Samsung
LED Model:	SPMWH1228FD5WARMXX
LED Quantity:	360 pcs
Driver Manufacturer:	ECU ELECTRONICS INDUSTRIAL CO., LTD
Driver Model:	YX-100-520mA

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:	2019-07-23
Quantity of Receipt Samples:	1 pcs
Sample Number:	190723001-S1

Laboratory Information:

Test Laboratory:	Dongguan New Testing Centre Co., Ltd
Laboratory Address:	3F, No. 1 the 1st North Industry Road, Songshan Lake Science & Technology Park, Dongguan, Guangdong, China
Laboratory Contact Name:	Neil Zhong
Laboratory Contact E-mail:	Neil_ntc@163.com

Report Information:

Issued Date of Test Report:	2019-08-23
Revised Date of Test Report:	N/A
Test Report No.:	NTCLR19080076
Remark *(If applicable)*:	N/A

TESTING
NVLAP LAB CODE 600150-0

Test Specification:

Date of Test	2019-07-26
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. 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

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 °C ± 1°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° horizonal 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 °C± 1°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	41.3	Face Down	90	10

Electrical Data:

Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
120.0	60	0.7894	94.24	0.9949

Color Data:

Parameter	Result
CCT(K)	5257
Ra	86.3
R9	25
Chromaticity, x	0.3382
Chromaticity, y	0.3457
Chromaticity, u'	0.2090
Chromaticity, v'	0.4807
Duv	-0.000145

Special Color Rendering			
R1	86	R9	25
R2	90	R10	76
R3	93	R11	87
R4	87	R12	68
R5	87	R13	87
R6	86	R14	96
R7	89	R15	82
R8	73	-	-

Spectrum Diagram:

NVLAP TESTING
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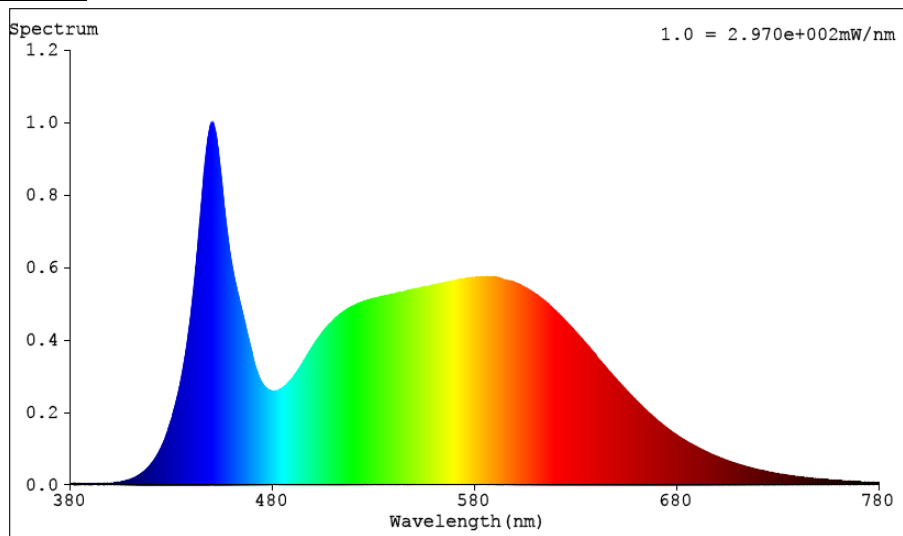
Goniophotemeter Test Results:

Test Condition:

Test Ambient (°C)	Test Humidity (%)	Orientation	Stabilization Time (minute)	Test Time (minute)
25.4	41.3	Face Down	90	25

Electrical Data:

Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
120.0	60	0.7894	94.24	0.9949

Goniophotometer Data:

Parameter	Results
Total Luminous (lm)	12712.9
Luminous Efficacy (lm/w)	134.90
Zonal Lumens Distribution (20-50°)	51.1%
Beam Angle (°)	102.7

Luminous Intensity Distribution Diagram:

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM

UNIT:cd
C0/180,103.1
C30/210,103.0
C60/240,102.4
C90/270,102.1

AVERAGE BEAM ANGLE(50%):102.7 DEG

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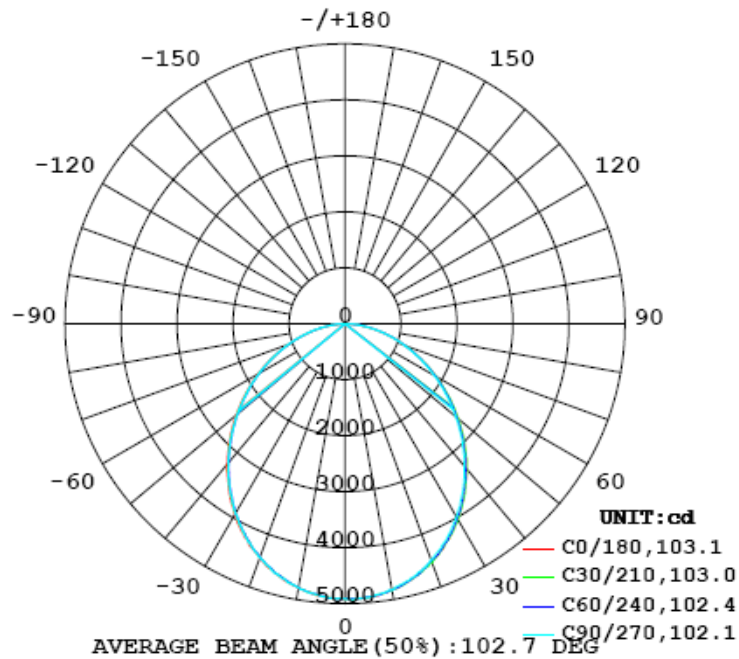
Zonal Flux Diagram:

ZONAL FLUX DIAGRAM:

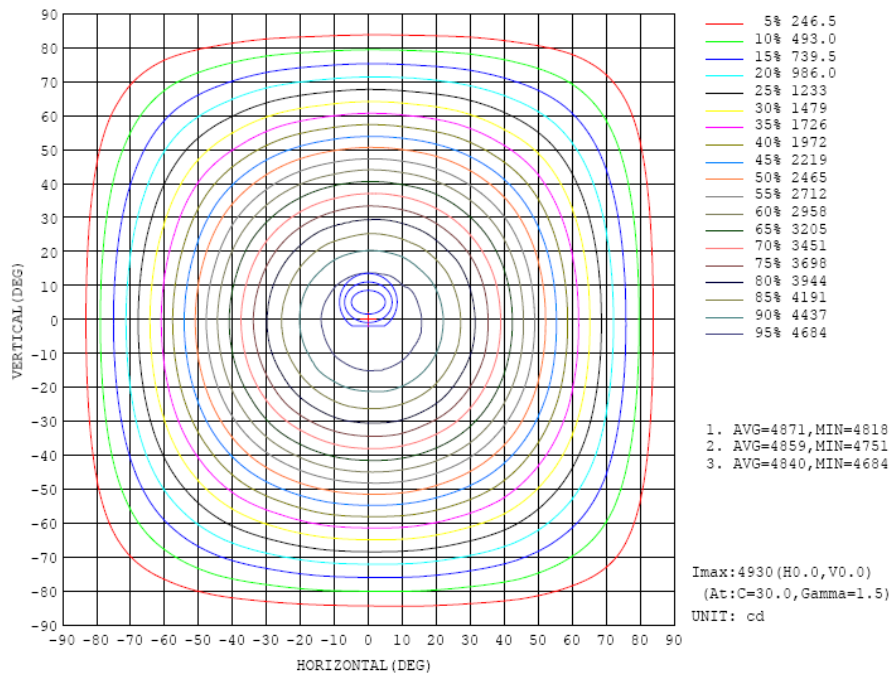| γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum,lamp
10	4826	4834	4831	4801	4799	4776	4792	4816	0- 10	464.1	464.1	3.65,3.65
20	4531	4537	4486	4466	4454	4429	4443	4482	10- 20	1316	1780	14,14
30	4029	4028	3979	3956	3937	3904	3912	3970	20- 30	1953	3733	29.4,29.4
40	3368	3388	3313	3287	3278	3235	3242	3312	30- 40	2279	6012	47.3,47.3
50	2633	2640	2585	2550	2542	2501	2506	2562	40- 50	2266	8277	65.1,65.1
60	1866	1891	1833	1818	1794	1746	1772	1813	50- 60	1956	10234	80.5,80.5
70	1131	1165	1124	1104	1074	1052	1071	1100	60- 70	1440	11674	91.8,91.8
80	474.2	515.8	496.8	471.2	427.5	431.6	457.9	470.7	70- 80	820.8	12494	98.3,98.3
90	3.163	0.2096	0.2203	0.2204	0.6823	0.7117	0.6886	0.7061	80- 90	207.8	12702	99.9,99.9
100	0.5075	0.4647	0.4710	0.5044	1.191	1.224	1.190	1.174	90-100	0.6998	12703	99.9,99.9
110	0.7378	0.6166	0.7195	0.7172	1.396	1.380	1.443	1.352	100-110	1.016	12704	99.9,99.9
120	1.138	0.9621	1.035	1.096	1.656	1.576	1.573	1.504	110-120	1.168	12705	99.9,99.9
130	1.610	1.830	1.502	1.975	2.254	2.610	2.267	2.422	120-130	1.468	12706	99.9,99.9
140	1.971	2.144	2.467	2.240	2.775	3.220	3.360	3.050	130-140	1.825	12708	100,100
150	2.246	2.240	2.476	2.447	3.364	3.720	3.857	3.710	140-150	1.768	12710	100,100
160	2.672	2.669	2.304	2.789	4.004	4.183	3.963	4.107	150-160	1.468	12712	100,100
170	3.071	3.073	2.928	3.053	3.898	4.143	4.091	4.014	160-170	0.9736	12713	100,100
180	3.590	3.659	3.570	3.562	3.592	3.666	3.580	3.569	170-180	0.3381	12713	100,100
DEG	LUMINOUS INTENSITY:cd				Less than 35% Percent = 14.0 %						UNIT:lm	

Isocandela Diagram:

5%   246.5
10% 493.0
15% 739.5
20% 986.0
25% 1233
30% 1479
35% 1726
40% 1972
45% 2219
50% 2465
55% 2712
60% 2958
65% 3205
70% 3451
75% 3698
80% 3944
85% 4191
90% 4437
95% 4684

1. AVG=4871,MIN=4818
2. AVG=4859,MIN=4751
3. AVG=4840,MIN=4684

Imax:4930(H0.0,V0.0)
(At:C=30.0,Gamma=1.5)
UNIT: cd

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Luminous Distribution Intensity Data:

Table--1 UNIT: cd

C(DEG) γ(DEG)	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270
0	4930	4915	4924	4922	4912	4921	4911	4908	4925	4896	4920	4906	4930	4915	4924	4922	4912	4921	4911
5	4908	4910	4909	4895	4902	4891	4903	4896	4889	4889	4883	4876	4884	4874	4880	4878	4875	4875	4887
10	4826	4830	4832	4834	4825	4824	4831	4811	4803	4801	4798	4805	4799	4782	4787	4776	4782	4779	4792
15	4707	4715	4707	4707	4698	4686	4689	4682	4662	4672	4651	4640	4643	4645	4635	4620	4635	4636	4645
20	4531	4533	4543	4537	4503	4510	4486	4495	4478	4466	4457	4450	4454	4441	4445	4429	4440	4439	4443
25	4283	4307	4295	4314	4298	4282	4267	4258	4248	4241	4217	4225	4225	4195	4199	4190	4200	4176	4201
30	4029	4042	4032	4028	4007	3998	3979	3976	3954	3956	3930	3940	3937	3926	3918	3904	3911	3889	3912
35	3712	3725	3733	3723	3690	3690	3666	3660	3640	3635	3622	3626	3619	3600	3594	3584	3578	3585	3595
40	3368	3397	3379	3388	3351	3343	3313	3303	3290	3287	3278	3278	3278	3245	3250	3235	3234	3231	3242
45	3016	3029	3022	3013	2987	2972	2956	2943	2930	2927	2920	2913	2914	2889	2891	2873	2864	2864	2881
50	2633	2655	2643	2640	2610	2598	2585	2569	2558	2550	2540	2538	2542	2512	2513	2501	2497	2488	2506
55	2246	2269	2262	2259	2236	2224	2203	2202	2177	2182	2161	2163	2164	2135	2145	2120	2123	2116	2134
60	1866	1902	1881	1891	1863	1861	1833	1838	1808	1818	1784	1798	1794	1767	1774	1746	1761	1749	1772
65	1495	1524	1509	1520	1496	1498	1470	1471	1450	1455	1430	1433	1430	1399	1413	1395	1405	1396	1414
70	1131	1159	1150	1165	1145	1145	1124	1127	1100	1104	1080	1079	1074	1055	1063	1052	1066	1055	1071
75	794	818	812	826	814	819	801	801	781	778	753	745	742	721	734	730	744	741	754
80	474	498	497	516	510	513	497	497	478	471	442	432	427	412	431	432	447	442	458
85	184	205	205	223	222	226	211	199	191	178	154	146	143	133	146	148	163	158	171
90	3.16	0.24	0.87	0.21	0.39	0.21	0.22	0.21	0.00	0.22	0.29	0.22	0.68	0.72	0.70	0.71	0.70	0.71	0.69
95	0.39	0.37	0.38	0.30	0.30	0.30	0.31	0.31	0.32	0.33	0.41	0.38	0.98	0.97	1.00	0.94	0.92	0.92	0.91
100	0.51	0.46	0.45	0.46	0.45	0.46	0.47	0.48	0.49	0.50	0.49	0.48	1.19	1.16	1.17	1.22	1.21	1.21	1.19
105	0.62	0.63	0.53	0.54	0.56	0.59	0.60	0.61	0.61	0.60	0.60	0.75	1.34	1.37	1.31	1.36	1.38	1.41	1.41
110	0.74	0.76	0.64	0.62	0.65	0.70	0.72	0.73	0.73	0.72	0.72	0.85	1.40	1.43	1.36	1.38	1.41	1.44	1.44
115	0.87	0.89	0.81	0.77	0.79	0.83	0.85	0.86	0.88	0.87	0.99	1.02	1.45	1.49	1.43	1.41	1.44	1.46	1.47
120	1.14	1.11	1.36	0.96	1.00	0.99	1.04	1.06	1.09	1.10	1.47	1.23	1.66	1.67	1.83	1.58	1.56	1.56	1.57
125	1.36	1.26	1.50	1.37	1.24	1.22	1.26	1.26	1.30	1.63	1.63	1.35	1.91	1.88	2.06	2.07	1.85	1.86	1.87
130	1.61	1.60	1.74	1.83	1.62	1.51	1.50	1.51	1.73	1.97	1.82	1.57	2.25	2.33	2.44	2.61	2.37	2.27	2.27
135	1.82	1.83	1.92	1.97	2.17	2.19	2.07	2.19	2.24	2.10	1.96	1.87	2.53	2.64	2.75	2.94	3.06	2.97	2.91
140	1.97	2.00	1.97	2.14	2.30	2.42	2.47	2.40	2.35	2.24	2.09	2.02	2.77	2.88	3.00	3.22	3.32	3.37	3.36
145	2.09	2.15	2.02	2.24	2.36	2.46	2.50	2.50	2.44	2.33	2.04	2.15	3.08	3.17	3.49	3.60	3.63	3.67	3.67
150	2.25	2.30	2.34	2.24	2.34	2.48	2.48	2.49	2.47	2.45	2.26	2.26	3.36	3.45	3.56	3.72	3.83	3.85	3.86
155	2.43	2.51	2.61	2.32	2.32	2.55	2.48	2.59	2.57	2.42	2.62	2.43	3.65	3.72	3.95	3.86	3.95	4.05	4.02
160	2.67	2.72	2.73	2.67	2.40	2.35	2.30	2.49	2.60	2.79	2.75	2.66	4.00	3.97	4.09	4.18	4.06	4.05	3.96
165	2.84	2.90	2.91	2.88	2.73	2.73	2.73	2.83	2.95	2.94	2.88	2.84	3.91	3.94	4.08	4.23	4.25	4.18	4.15
170	3.07	3.10	3.10	3.07	2.83	2.85	2.93	2.88	3.04	3.05	3.01	3.06	3.90	3.99	4.06	4.14	4.17	4.05	4.09
175	3.42	3.50	3.50	3.43	3.24	3.19	3.12	3.15	3.29	3.32	3.36	3.38	3.86	3.92	3.98	3.94	3.94	3.81	3.76
180	3.59	3.66	3.66	3.66	3.59	3.55	3.57	3.44	3.52	3.56	3.53	3.58	3.59	3.65	3.68	3.67	3.60	3.56	3.58

Table--2 UNIT: cd

C(DEG) γ(DEG)	285	300	315	330	345
0	4908	4925	4896	4920	4906
5	4878	4880	4878	4903	4912
10	4800	4800	4816	4820	4825
15	4643	4651	4678	4690	4693
20	4454	4471	4482	4505	4519
25	4208	4239	4247	4268	4274
30	3919	3944	3970	3998	4016
35	3604	3621	3647	3690	3709
40	3255	3279	3312	3338	3361
45	2888	2915	2945	2979	3001
50	2516	2542	2562	2599	2626
55	2144	2160	2187	2213	2237
60	1775	1811	1813	1853	1853
65	1411	1445	1451	1483	1485
70	1074	1101	1100	1124	1124
75	755	775	774	791	791
80	457	474	471	481	475
85	173	187	181	190	185
90	0.69	0.67	0.71	0.65	3.00
95	0.90	0.89	0.89	0.95	0.91
100	1.19	1.16	1.17	1.13	1.10
105	1.40	1.35	1.32	1.26	1.35
110	1.43	1.38	1.35	1.29	1.37
115	1.45	1.41	1.37	1.40	1.45
120	1.54	1.50	1.50	1.74	1.59
125	1.82	1.74	1.97	1.92	1.79
130	2.22	2.26	2.42	2.26	2.12
135	2.89	2.88	2.72	2.59	2.49
140	3.25	3.18	3.05	2.90	2.82
145	3.54	3.49	3.38	3.11	3.15
150	3.84	3.71	3.71	3.53	3.46
155	4.05	3.95	3.83	3.99	3.74
160	4.00	3.98	4.11	4.11	3.98
165	4.13	4.09	4.11	4.08	3.93
170	4.12	3.93	4.01	3.98	3.85
175	3.85	3.71	3.89	3.87	3.88
180	3.45	3.53	3.57	3.53	3.58

THD and PF Measurement Test Results:

Electrical Measurement:

Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor	iTHD(%)
277.0	60	0.3642	93.86	0.9304	15.91

TESTING
NVLAP LAB CODE 600150-0

Photo of Sample:

Laboratory: Dongguan New Testing Centre Co., Ltd
Address: 3F, No. 1 the 1st North Industry Road, Songshan Lake Science & Technology Park, Dongguan,
Guangdong, China
Tel: 86-769-22212079
Website: http://www.ntc-cert.com

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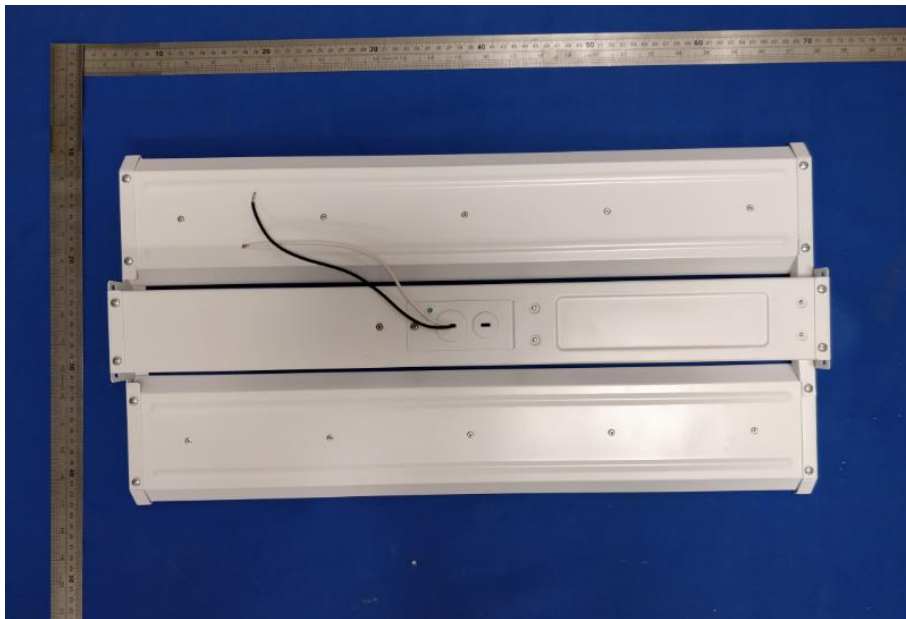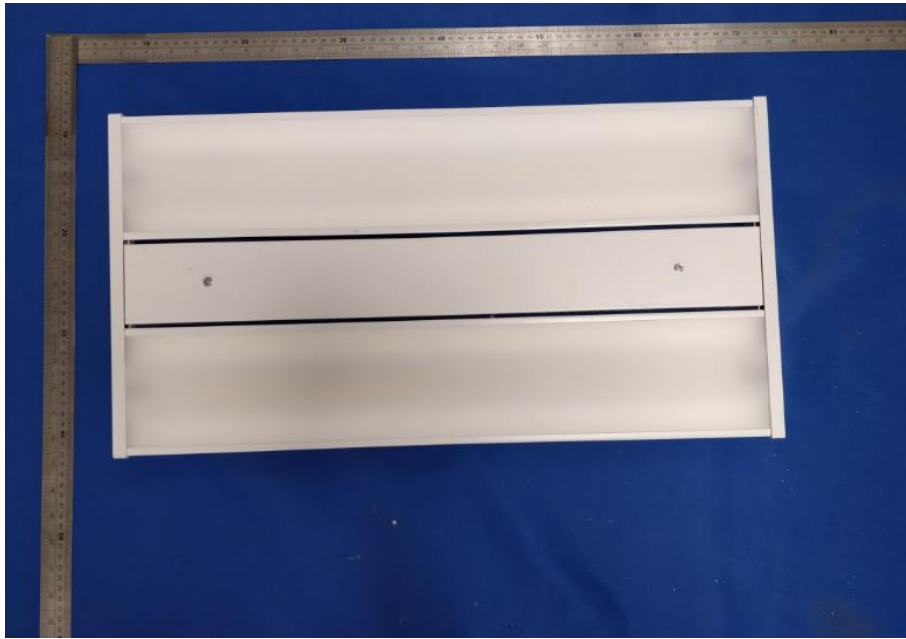
Equipment List:

Equipment ID	Equipment Name	Last Cal.	Due Cal.
NTC-F01-001	Goniophotometer System	2018-11-16	2019-11-15
NTC-F01-006	2.0 meter Integrating Sphere	2018-11-16	2019-11-15
NTC-F01-012	Standard Lamp	2018-11-13	2019-11-12
NTC-F01-013	Standard Lamp	2018-11-13	2019-11-12
NTC-F01-031	Digital Power Meter	2018-08-29	2019-08-28
NTC-F01-019	Temperature & Humidity Meter	2018-11-12	2019-11-11

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