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 Ceiling Light

Model Name(s):
565461##

Representative (Tested) Model:
56546101

Model Difference: Where "##" denotes color temperature, 01-10 identifies CCT tunable to 3000K, 4000K and 5000K.

Prepare by:

Derek Lai

Engineer: Derek Lai
Date: 2019-05-05

Review by:

Vincent Yuan

Technical Lead: Vincent Yuan
Issue Date: 2019-05-14
Revised Date: N/A

Note:
1. The results contained in this report pertain only to the tested samples.
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3. This report does not imply product certification, approval, or endorsement by NVLAP, or any agency of the Federal Government.

Product Information:

Client Name:	ETI Solid State Lighting (Zhuhai) Ltd
Brand Name:	ETI, Commercial Electric
Model Number:	565461## (##=01-10)
Product Type:	Indoor, LED Light Engine
Rating Input:	120Vac, 60Hz, 14W
Declared CCT:	3000K, 4000K, 5000K
Declared Light Output:	900 lm
LED Manufacturer:	Samsung
LED Model:	SPMWHX228FXXXXXXXX for Nightlight SPMWHX229AXXXXXXXX for Ceiling Light
LED Quantity:	34 pcs for Nightlight 48 pcs for Ceiling Light

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:	2019-04-27
Quantity of Receipt Samples:	1 pcs
Sample Number:	190427001-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:	2019-05-14
Revised Date of Test Report:	N/A
Test Report No.:	NTCR19050001
Remark *(If applicable)*:	All test tested for 3000K.

Test Specification:	
Date of Test	2019-04-30
Test Item	1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate
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.

Integrating Sphere Test Results:

Test Condition:

Test Ambient (°C)	Test Humidity (%)	Orientation	Stabilization Time (minute)	Test Time (minute)
24.4	38.2	Face Down	90	10

Electrical Data:

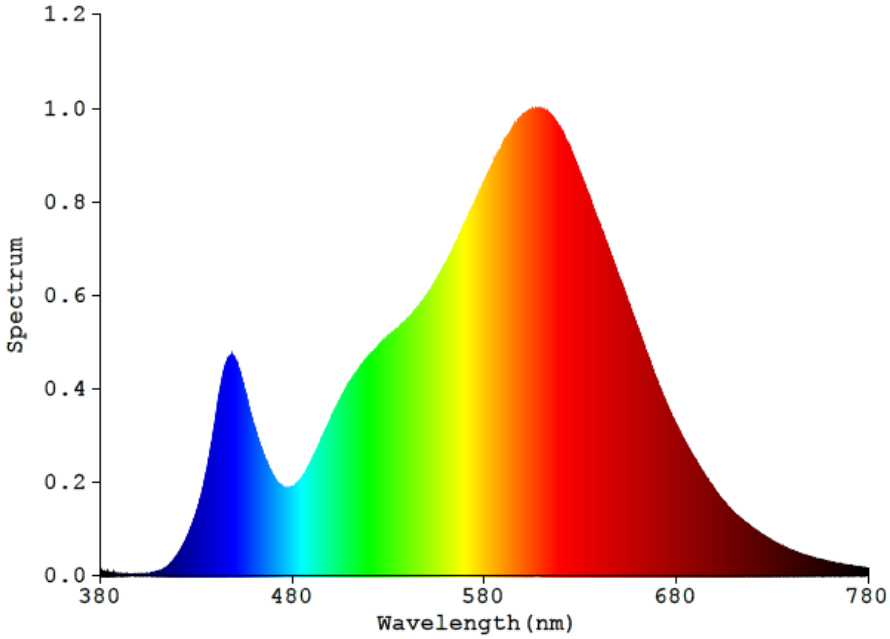
Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
120.0	60	0.1249	14.53	0.9685

Color Data:

Parameter	Result
CCT(K)	2983
Color Rendering Index (CRI)	85.5
R9	20
Chromaticity, x	0.4356
Chromaticity, y	0.3992
Chromaticity, u'	0.2518
Chromaticity, v'	0.5193
Duv	-0.00176

Special Color Rendering			
R1	85	R9	20
R2	92	R10	83
R3	97	R11	85
R4	85	R12	80
R5	85	R13	86
R6	91	R14	99
R7	85	R15	78
R8	65	-	-

Spectrum Diagram:



Goniophotometer Test Results:

Test Condition:

Test Ambient (°C)	Test Humidity (%)	Orientation	Stabilization Time (minute)	Test Time (minute)
24.4	38.2	Face Down	90	25

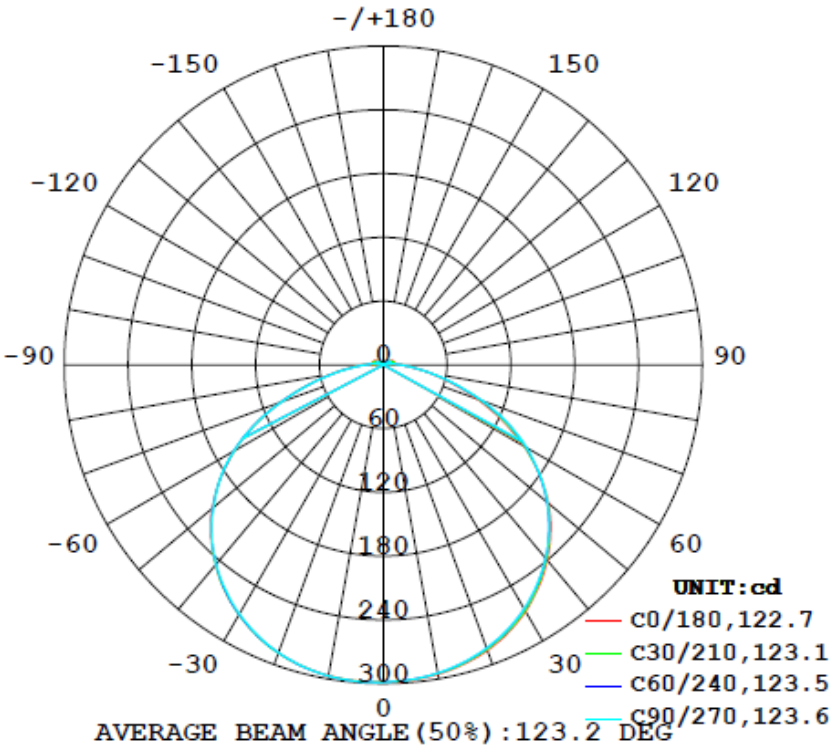
Electrical Data:

Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
120.0	60	0.1249	14.53	0.9685

Goniophotometer Data:

Parameter	Results
Total Luminous (lm)	1010.2
Luminous Efficacy (lm/w)	69.53
Zonal Lumens Distribution (0-60°)	73.0%
Beam Angle (°)	123.2

Luminous Intensity Distribution Diagram:

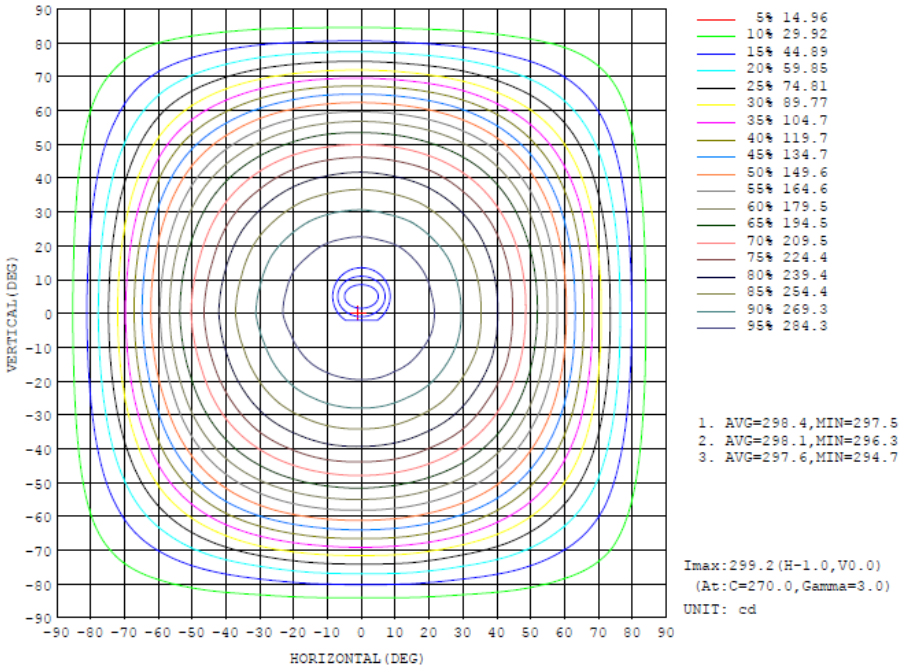


Zonal Flux Diagram:

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum,lamp
10	295.6	294.8	294.4	295.3	296.8	297.1	297.2	296.8	0- 10	28.38	28.38	2.81,2.81
20	286.0	284.6	283.7	285.6	288.3	288.4	288.1	287.4	10- 20	82.60	111.0	11,11
30	267.6	266.3	264.9	267.6	271.4	271.2	270.6	269.8	20- 30	128.6	239.5	23.7,23.7
40	239.7	238.4	237.3	240.9	245.6	244.8	244.8	243.2	30- 40	160.5	400.0	39.6,39.6
50	202.9	201.1	201.3	204.1	210.4	209.2	208.8	207.8	40- 50	173.6	573.6	56.8,56.8
60	152.3	154.9	155.7	158.7	161.5	161.8	162.3	160.4	50- 60	163.8	737.5	73,73
70	94.23	97.43	99.52	100.0	102.4	102.5	101.5	98.02	60- 70	128.4	865.8	85.7,85.7
80	43.98	45.68	45.59	45.49	49.27	48.02	47.31	45.18	70- 80	75.21	941.0	93.2,93.2
90	16.82	16.70	15.94	17.01	18.89	17.07	16.82	16.82	80- 90	31.98	973.0	96.3,96.3
100	11.59	2.090	6.211	1.639	11.15	1.177	7.100	2.584	90-100	10.57	983.6	97.4,97.4
110	10.44	7.688	3.004	7.657	10.05	7.536	1.321	8.186	100-110	6.424	990.0	98,98
120	8.498	6.819	7.128	6.723	8.444	6.472	6.028	6.818	110-120	7.235	997.2	98.7,98.7
130	4.968	5.829	6.048	5.809	5.026	5.355	4.937	5.740	120-130	5.375	1003	99.3,99.3
140	3.285	4.687	4.853	4.794	3.467	4.109	4.182	4.565	130-140	3.746	1006	99.6,99.6
150	1.987	2.091	3.850	2.293	2.295	1.865	2.964	1.883	140-150	2.159	1009	99.8,99.8
160	0.9231	1.821	2.217	2.655	1.188	2.276	1.786	1.634	150-160	1.101	1010	99.9,99.9
170	0.3138	0.3147	1.077	1.525	0.3777	1.677	0.9531	0.3515	160-170	0.4732	1010	100,100
180	0.1581	0.1647	0.1546	0.1509	0.1577	0.1640	0.1542	0.1505	170-180	0.0782	1010	100,100
DEG	LUMINOUS INTENSITY:cd Less than 35% Percent = 13.1 %									UNIT:lm		

Isocandela Diagram:



Luminous Distribution Intensity Data:

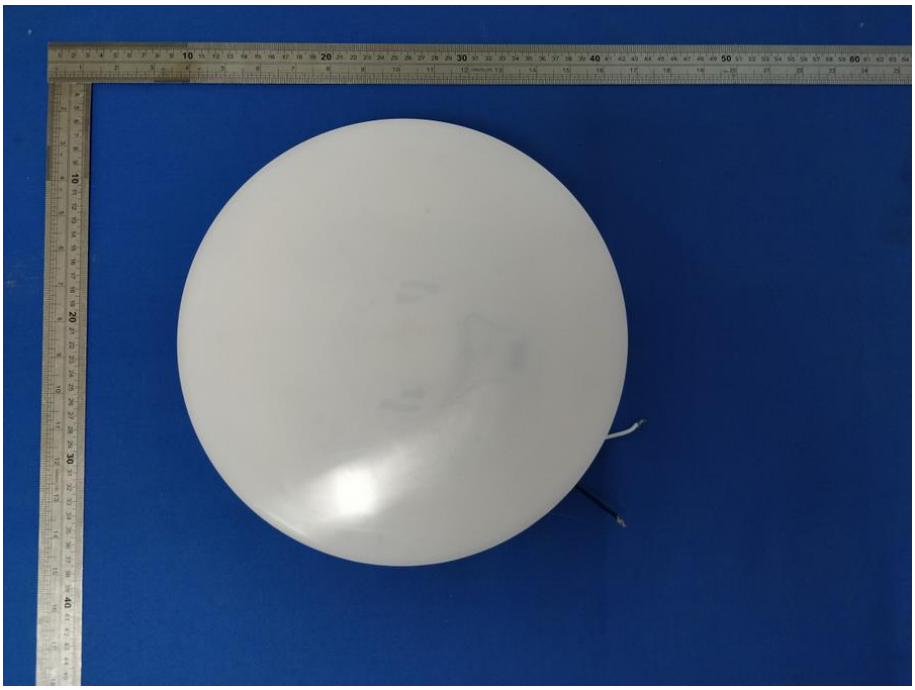
Table--1 UNIT: cd

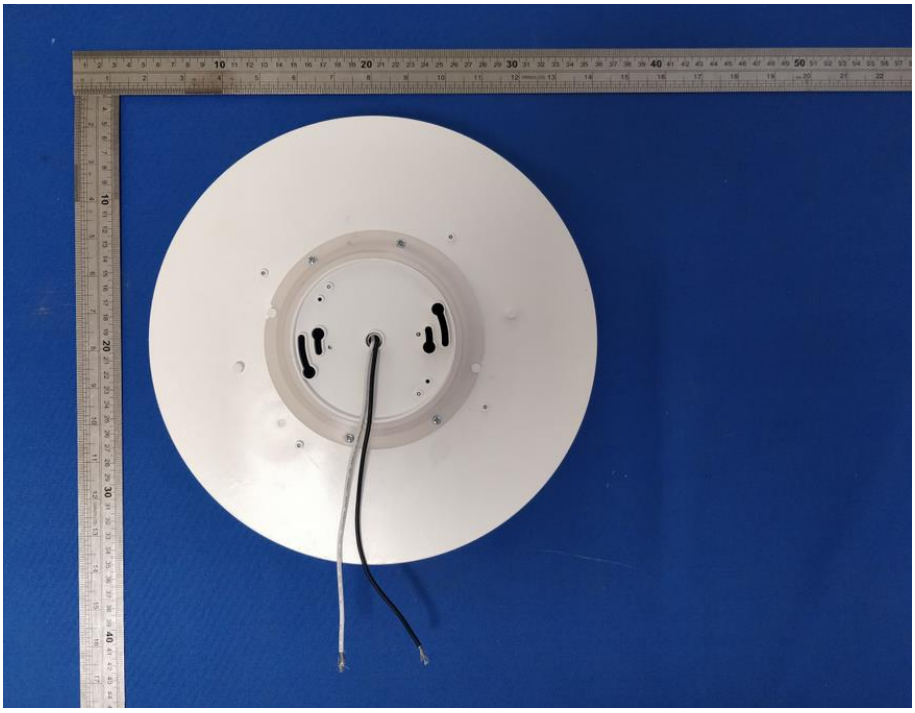
γ (DEG) \ C (DEG)	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270
0	299	299	299	299	299	299	299	299	299	299	299	299	299	299	299	299	299	299	299
5	298	298	297	297	297	297	297	297	297	298	298	298	298	298	299	299	299	299	299
10	296	295	295	295	295	294	294	295	295	295	296	296	297	297	297	297	297	297	297
15	292	292	291	291	290	290	290	290	291	291	292	293	294	293	294	294	294	294	294
20	286	286	285	285	284	284	284	284	285	286	286	287	288	288	289	288	288	288	288
25	278	278	277	277	276	276	275	276	277	278	279	280	281	281	281	281	281	280	280
30	268	268	267	266	265	265	265	266	266	268	269	270	271	271	271	271	271	271	271
35	255	255	254	254	252	252	252	253	254	256	257	258	260	259	260	259	259	259	259
40	240	240	238	238	237	237	237	239	239	241	242	244	246	245	245	245	245	244	245
45	223	223	221	221	220	221	220	222	222	224	225	227	229	228	229	228	229	229	228
50	203	202	201	201	201	201	201	202	203	204	206	207	210	208	209	209	209	209	209
55	179	179	179	179	179	179	179	181	182	183	184	185	188	187	187	187	188	188	188
60	152	153	153	155	155	155	156	157	158	159	159	159	162	161	162	162	163	163	162
65	123	125	126	127	128	129	129	129	130	131	130	129	133	133	134	133	134	134	133
70	94.2	96.6	96.8	97.4	98.4	99.5	99.5	99.8	100	100	99.6	99.9	102	101	102	102	103	103	101
75	66.6	69.1	68.7	69.7	69.0	70.6	69.9	70.4	69.9	70.0	69.8	70.7	73.0	71.3	73.1	73.0	73.2	72.3	72.0
80	44.0	45.8	45.1	45.7	45.1	46.1	45.6	45.7	45.1	45.5	45.7	46.8	49.3	47.5	48.4	48.0	48.3	47.4	47.3
85	27.1	28.2	27.5	27.6	27.1	27.4	27.1	27.4	27.2	27.9	28.0	28.9	30.5	29.3	29.8	29.3	29.2	28.5	28.4
90	16.8	17.5	16.7	16.7	16.0	16.3	15.9	16.5	16.3	17.0	17.0	18.0	18.9	17.7	18.1	17.1	17.2	16.5	16.8
95	0.07	0.00	3.86	10.1	11.5	11.6	11.3	11.7	11.6	10.5	4.12	0.00	2.20	4.51	5.21	11.1	11.7	11.4	11.8
100	11.6	9.25	10.6	2.09	1.01	4.80	6.21	5.09	1.39	1.64	9.20	9.00	11.1	8.83	7.93	1.18	2.80	6.12	7.10
105	11.0	8.77	10.2	8.33	3.45	0.95	0.21	0.90	3.13	7.77	10.1	8.59	10.6	8.43	9.95	7.23	2.52	0.72	0.26
110	10.4	8.02	9.10	7.69	7.29	4.07	3.00	3.67	6.95	7.66	9.07	7.96	10.1	7.86	9.02	7.54	6.68	3.47	1.32
115	9.62	7.15	8.14	7.24	7.06	7.10	7.47	7.09	6.93	7.15	8.06	7.17	9.43	7.14	8.04	6.99	6.67	6.76	6.47
120	8.50	6.17	7.41	6.82	6.57	6.62	7.13	6.73	6.48	6.72	7.29	6.30	8.44	6.26	7.19	6.47	6.00	6.22	6.03
125	5.36	4.52	6.77	6.37	6.12	6.25	6.65	6.40	6.08	6.33	6.67	4.38	7.17	4.71	6.52	5.99	5.71	5.69	5.29
130	4.97	5.03	6.14	5.83	5.61	5.91	6.05	5.93	5.66	5.81	6.11	4.62	5.03	4.64	5.90	5.36	5.27	5.06	4.94
135	4.17	4.48	4.85	5.33	5.21	5.58	5.42	5.44	5.22	5.32	5.20	4.03	4.27	3.99	4.76	4.85	4.88	4.54	4.47
140	3.28	4.60	3.08	4.69	4.79	5.00	4.85	4.92	4.80	4.79	3.24	4.18	3.47	4.25	2.75	4.11	4.20	4.40	4.18
145	0.46	1.27	3.26	3.95	4.33	4.31	4.33	4.48	4.41	4.18	3.20	1.70	0.29	1.49	3.05	3.35	3.63	3.97	3.83
150	1.99	3.12	3.00	2.09	3.69	3.73	3.85	3.82	3.91	2.29	2.42	2.91	2.29	2.93	2.35	1.87	3.20	3.33	2.96
155	1.40	2.76	3.31	2.00	1.75	2.28	2.68	2.44	1.87	2.77	2.65	2.81	1.73	3.03	2.35	2.52	1.42	1.71	2.08
160	0.92	1.89	1.71	1.82	2.28	1.90	2.22	2.39	2.59	2.65	2.69	1.93	1.19	1.99	2.49	2.28	2.15	2.03	1.79
165	0.54	1.71	1.81	1.06	1.63	1.79	2.22	2.28	2.10	1.90	1.98	2.29	0.76	2.08	2.22	1.80	1.71	1.76	1.81
170	0.31	0.82	0.42	0.31	1.57	1.08	1.08	1.62	1.63	1.53	1.65	1.20	0.38	0.99	1.64	1.68	1.69	1.46	0.95
175	0.20	0.37	0.54	0.95	1.32	1.35	1.08	1.11	1.24	1.20	0.99	0.63	0.32	0.32	0.54	0.81	0.90	0.85	0.82
180	0.16	0.16	0.17	0.16	0.16	0.15	0.15	0.14	0.15	0.15	0.15	0.16	0.16	0.16	0.16	0.16	0.16	0.15	0.15

Table--2 UNIT: cd

γ (DEG) \ C (DEG)	285	300	315	330	345
0	299	299	299	299	299
5	299	299	299	298	298
10	297	297	297	297	296
15	293	293	293	293	293
20	288	288	287	288	287
25	280	280	280	280	279
30	270	270	270	270	269
35	258	258	258	258	257
40	244	244	243	243	242
45	228	228	226	227	225
50	209	208	208	207	205
55	187	187	186	185	182
60	162	161	160	158	155
65	133	132	130	128	127
70	101	100.0	98.0	97.4	96.8
75	70.8	70.0	69.1	68.9	68.7
80	46.2	45.9	45.2	45.2	45.3
85	27.9	28.0	27.6	28.0	27.9
90	16.5	17.0	16.8	17.5	17.4
95	11.7	12.1	8.76	0.42	0.10
100	4.99	1.15	2.58	10.2	9.47
105	1.00	3.49	8.45	10.7	9.02
110	3.60	7.10	8.19	9.69	8.37
115	6.70	6.87	7.47	8.58	7.50
120	6.21	6.42	6.82	7.64	6.42
125	5.71	5.81	6.29	6.87	3.88
130	5.22	5.32	5.74	6.19	5.05
135	4.68	4.85	5.14	4.92	4.35
140	4.15	4.24	4.56	3.08	4.41
145	3.53	3.84	3.55	3.41	1.40
150	3.24	3.31	1.88	2.95	3.39
155	1.64	1.39	1.80	3.02	2.95
160	1.67	1.56	1.63	1.76	1.93
165	1.40	1.12	0.93	1.90	1.73
170	0.97	1.15	0.35	0.41	0.58
175	0.98	1.04	0.80	0.64	0.40
180	0.14	0.15	0.15	0.15	0.16

Photo of Sample:





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************

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: 86-769-89874553
Website: http://www.ntc-cert.com