

LM-79-08 Test Report

For

LIGHT EFFICIENT DESIGN, LLC**(Brand Name: N/A)**

188 S.Northwest Highway, Cary, IL60013, USA

LED Lamps

Model name(s): LED-8145M30C-A

Representative (Tested) Model: LED-8145M30C-A

Model Different: All construction and rating are the same, except CCT

Test & Report By:

Garman Mo

Engineer: Garman Mo

Date: May.23,2018

Review By:

Univ Xie

Manager: Univ Xie

Note: 1.The results contained in this report pertain only to the tested samples.

2.This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Laboratory: Standard-Tech Co., Ltd Testing Center
NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

Address: Standard-Tech Building, No.6 Guanhong Road,Guangzhou Science City, Guangzhou 510663, China

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1.1 Product Information:

Organization Name	LIGHT EFFICIENT DESIGN, LLC		
Brand Name	N/A		
Model Number	LED-8145M30C-A		
SKU (if available)	N/A		
Type of Luminaire (for integral lamps, list base type and lamp type)	LED Lamps		
Rated Voltage / Frequency	220 -347Vac, 50/60 Hz		
Nominal Power	45W		
Rated Initial Lamp Lumen	--		
Declared CCT	3000K		
LED Manufacturer	SAMSUNG ELECTRONICS CO., LTD		
LED Model	SPMWH1228FD5WAV0SE		
Sample Number	GZE1801030-H-Z1		
Luminaire Aperture (for downlights)	--	in. mm mm s	
Luminaire Length	--		
Luminaires Width	--		
Number of Units (modular products)	N/A		
Photo			
			

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1.2 Test Specifications:

Date of Receipt	May.15,2018
Date of Test	May.16,2018
Test item	<ol style="list-style-type: none"> 1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate 7. Electrical Parameters
Reference Standard	<ol style="list-style-type: none"> 1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products 2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products 3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources 4. CIE 15-2004 Technical Report Colorimetry 5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source 6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems
Reference Work Instruction	QD25

1.3 Test Methods**1) Photometric and Light Distribution Measurement – Goniophotometer Method:**

Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, 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 277 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals.

2) Chromaticity Measurement – Sphere-Spectroradiometer Method:

Chromaticity parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. 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 277 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral power distribution taken at 5 nm intervals over the range of 380 to 780 nm.

3) Electrical Measurements:

Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample was operated at 277 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Voltage, frequency, current, power, power factor and total harmonic distortion were measured by and read from the power meter.

2.1 Electrical, Photometric and Chromaticity Measurements
(Refer to Work Instruction QD25)

Test date	2018-05-16	Test Ambient:	25.2 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	LED-8145M30C-A		

Electrical Measurement:

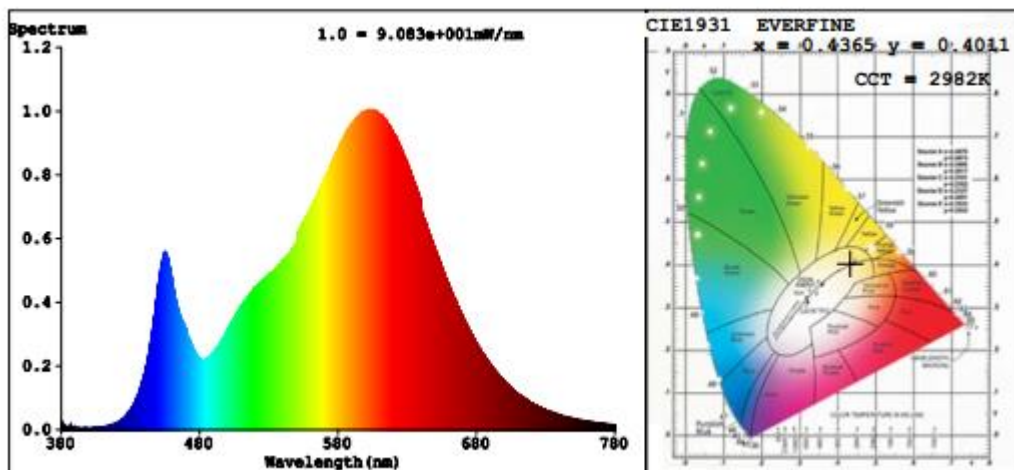
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE180103	277.0	60	0.1662	44.11	0.9581	12.22
0-H-Z1	347.0	60	0.1389	44.00	0.9126	15.86

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	277.0	R1	81	R9	5
Frequency (Hz)	60	R2	92	R10	82
CCT (K)	2982	R3	94	R11	77
Duv	-0.0011	R4	78	R12	72
Chromaticity (x, y)	x=0.4365 y=0.4011	R5	81	R13	84
Chromaticity (u', v')	u'=0.2516 v'=0.5201	R6	90	R14	98
Color Rendering Index (CRI)	81.8	R7	81	R15	73
R9	5	R8	57	--	--

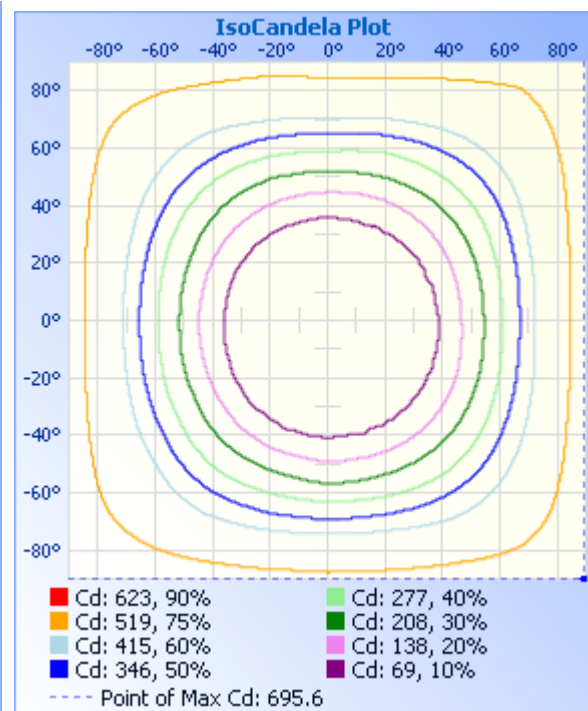
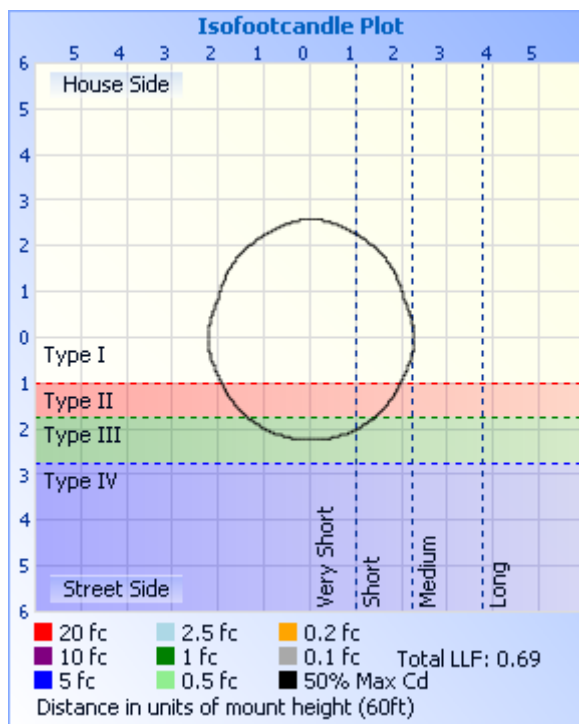
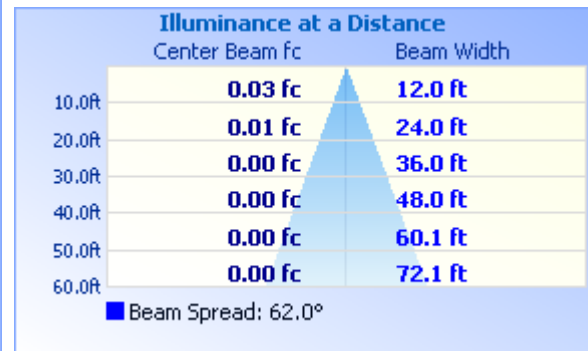
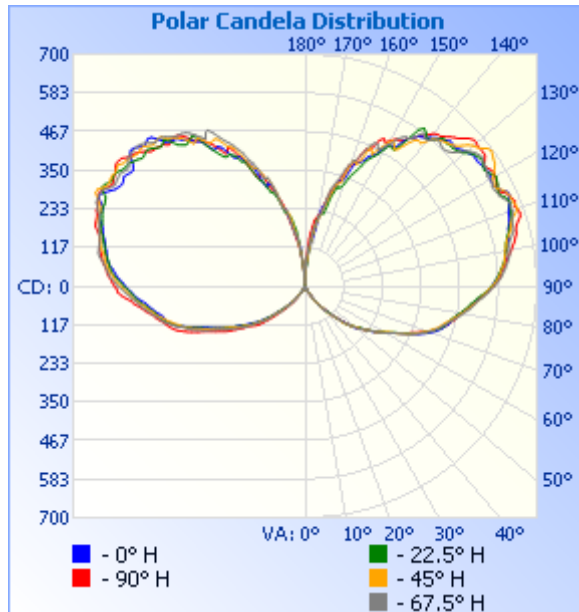
Photometric Measurement – Goniophotometer Method:

Parameter	Result	
Test Voltage (V)	277.0	347.0
Frequency (Hz)	60	60
Total Luminous (lm)	5354.5	5324.0
Luminous Efficacy (lm/W)	121.39	121.00
Most worst Luminous/Highest Watts	120.70	
Beam Angle (°)	319.8	--
Center Beam Candle Power (cd)	3	--

Spectral Power Distribution & Chromaticity Diagram

Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	7.9	0.1%
0-40	41.0	0.8%
0-60	340.2	6.4%
60-90	1,344.8	25.1%
70-100	1,670.2	31.2%
90-120	1,985.0	37.1%
0-90	1,685.0	31.5%
90-180	3,669.7	68.5%
0-180	5,354.8	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	0.3	0.0%	90-100	648.9	12.1%
10-20	1.5	0.0%	100-110	677.9	12.7%
20-30	6.2	0.1%	110-120	658.3	12.3%
30-40	33.0	0.6%	120-130	586.1	10.9%
40-50	100.3	1.9%	130-140	473.3	8.8%
50-60	198.9	3.7%	140-150	338.6	6.3%
60-70	323.4	6.0%	150-160	198.0	3.7%
70-80	458.6	8.6%	160-170	77.6	1.4%
80-90	562.8	10.5%	170-180	11.1	0.2%

Photometric Data


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Candela Table - Type C

	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	360
0	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
1	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3
2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
7	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
8	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
9	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	4	4
10	4	4	4	4	3	4	3	3	3	3	3	3	3	3	4	4	4
11	4	4	4	4	4	4	4	3	3	3	3	3	3	3	4	4	4
12	4	4	4	4	4	4	4	4	3	3	3	3	3	4	4	4	4
13	5	5	5	5	4	4	4	4	4	4	3	4	4	4	4	5	5
14	5	5	5	5	5	5	4	4	4	4	4	4	4	4	5	5	5
15	6	6	6	5	5	5	5	4	4	4	4	4	4	5	5	5	6
16	6	6	6	6	5	5	5	5	5	4	4	4	5	5	5	6	6
17	7	7	7	7	6	6	6	5	5	5	5	5	5	6	6	6	7
18	7	8	7	7	7	6	6	6	5	5	5	5	5	6	6	7	7
19	8	9	8	8	8	7	7	6	6	5	5	6	6	7	7	8	8
20	9	10	9	9	8	8	7	7	7	6	6	6	6	7	8	8	9
21	10	10	10	10	9	9	8	7	7	7	7	7	7	8	8	9	10
22	10	11	11	11	11	9	9	8	8	7	7	8	8	9	10	10	10
23	12	12	12	12	11	10	10	9	8	8	8	8	9	10	11	11	12
24	13	13	13	13	12	12	11	10	9	9	9	9	10	11	12	13	13
25	14	14	15	14	14	13	12	11	10	10	10	10	11	12	13	14	14
26	15	16	16	16	15	14	13	12	11	11	11	11	12	13	14	15	15
27	17	17	17	17	19	16	14	13	12	11	12	12	13	14	15	16	17
28	19	19	18	20	23	18	16	14	13	13	13	13	15	16	16	18	19

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29	21	21	20	29	27	24	17	16	15	13	14	14	16	17	18	20	21
30	26	25	23	30	30	28	18	17	17	15	15	16	18	19	20	24	26
31	32	31	36	36	33	30	20	19	18	17	16	18	22	25	26	33	32
32	38	41	46	43	37	36	24	22	20	17	18	20	26	29	38	39	38
33	46	48	53	47	46	41	38	26	23	20	19	27	31	39	45	48	46
34	55	57	58	52	54	49	42	32	30	28	29	30	38	48	51	53	55
35	61	62	62	61	62	55	49	42	35	35	34	38	46	50	63	68	61
36	73	70	63	68	67	58	55	47	43	47	44	43	53	59	61	65	73
37	75	78	81	76	74	69	58	55	50	47	48	58	60	64	70	77	75
38	81	79	79	82	79	77	63	59	58	56	59	60	67	81	83	78	81
39	92	84	83	88	85	84	79	68	64	58	60	73	73	76	81	80	92
40	94	101	93	95	93	88	77	70	67	75	76	80	82	82	86	88	94
41	99	104	113	107	103	99	89	75	76	74	81	78	90	96	102	103	99
42	110	107	118	116	108	112	99	86	82	76	80	84	95	100	116	107	110
43	121	118	122	121	120	116	108	94	86	88	85	105	102	104	113	114	121
44	128	131	132	132	129	126	116	100	94	99	107	108	112	112	120	126	128
45	138	138	140	140	136	135	124	110	104	103	108	111	124	127	128	134	138
46	149	154	158	151	149	149	134	122	111	111	114	119	134	138	141	140	149
47	159	166	166	161	159	161	146	131	116	122	123	129	146	151	158	152	159
48	172	173	174	173	170	172	161	143	131	134	138	143	156	164	169	163	172
49	181	181	183	183	181	180	171	155	145	141	150	156	167	172	174	172	181
50	194	187	189	191	190	186	179	165	151	152	160	162	179	178	181	183	194
51	201	195	196	202	199	194	185	175	160	164	167	169	188	185	189	196	201
52	205	201	204	209	208	207	194	184	170	174	175	178	194	191	198	203	205
53	213	209	214	217	216	217	203	192	180	182	186	188	198	198	205	207	213
54	224	222	225	225	224	225	213	202	187	191	196	199	204	209	217	214	224
55	232	233	232	234	232	233	223	211	193	202	207	210	214	218	225	223	232
56	245	240	242	242	243	244	229	222	204	210	215	220	226	227	231	234	245
57	254	251	254	251	251	252	237	230	214	220	222	229	236	234	242	241	254
58	265	260	262	262	264	260	246	239	222	228	231	239	248	245	252	249	265
59	273	269	271	272	274	273	258	249	231	237	239	247	260	254	262	260	273
60	284	277	278	282	282	284	266	258	245	245	249	258	273	266	270	269	284

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61	293	290	286	290	291	295	275	269	257	258	258	270	282	281	279	280	293
62	303	300	298	302	300	305	287	278	270	269	269	279	290	289	289	288	303
63	313	310	315	315	311	317	299	289	279	281	281	289	303	297	296	301	313
64	325	323	327	328	322	330	309	302	288	291	293	300	312	306	309	309	325
65	340	336	341	344	334	342	322	312	297	303	304	314	322	318	320	325	340
66	354	351	353	354	346	352	334	323	310	315	319	329	338	328	334	338	354
67	369	362	364	369	360	364	345	333	319	327	331	340	355	344	345	354	369
68	382	377	373	380	372	381	358	346	332	339	343	353	369	358	361	366	382
69	396	387	387	391	386	394	371	356	346	353	356	366	384	371	373	379	396
70	406	400	395	400	397	403	384	371	362	369	371	377	397	382	389	392	406
71	418	409	406	411	410	414	392	386	377	381	384	385	410	397	400	406	418
72	426	421	414	418	420	424	403	397	394	393	391	398	419	408	410	416	426
73	433	430	424	428	430	431	414	408	407	405	399	411	426	418	419	425	433
74	440	437	428	433	438	439	421	418	414	416	411	421	432	426	427	429	440
75	447	442	435	443	447	446	432	427	424	426	419	431	438	436	432	433	447
76	451	448	443	449	453	455	443	436	431	437	429	442	444	442	437	439	451
77	455	452	453	458	461	461	450	445	436	443	438	449	453	449	442	449	455
78	460	458	460	466	466	468	458	454	440	449	448	454	461	453	450	455	460
79	466	466	470	475	472	475	465	461	447	456	459	464	466	459	457	463	466
80	476	473	478	484	476	482	475	466	456	460	464	473	476	465	465	469	476
81	485	483	488	491	485	492	482	474	463	470	473	480	487	474	473	477	485
82	496	490	496	502	493	500	491	482	472	477	482	491	495	481	479	484	496
83	503	497	504	509	502	507	501	489	478	487	490	500	506	489	490	494	503
84	510	505	512	517	512	516	510	497	486	498	503	506	519	496	499	502	510
85	519	514	523	522	519	526	518	505	498	505	513	515	527	505	511	515	519
86	531	522	531	534	527	537	529	516	510	513	522	526	541	514	520	525	531
87	540	534	539	544	536	546	538	527	518	522	529	534	555	522	530	532	540
88	548	545	546	554	550	557	545	537	524	529	537	544	565	532	538	543	548
89	558	555	555	561	560	565	553	547	536	537	546	554	569	541	549	550	558
90	566	563	566	572	569	572	564	558	543	548	555	565	575	551	557	558	566
91	570	572	573	580	577	583	570	567	551	557	566	573	582	560	564	565	570
92	577	578	581	588	586	592	579	576	560	567	575	583	588	570	573	572	577

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93	585	583	587	595	591	596	588	585	570	576	581	592	595	576	578	578	585
94	592	589	591	600	594	602	593	593	576	585	591	597	600	583	583	583	592
95	596	594	596	607	601	605	595	598	584	591	597	604	603	589	590	589	596
96	600	600	602	612	607	608	603	604	593	594	603	610	610	594	597	597	600
97	608	606	606	617	612	611	606	609	599	599	608	616	617	601	598	603	608
98	610	609	608	622	617	620	611	612	605	603	611	626	620	604	603	609	610
99	612	611	612	626	625	622	614	621	607	609	615	632	624	604	608	613	612
100	617	615	614	627	632	629	617	627	609	613	622	633	629	607	612	613	617
101	622	618	617	628	638	637	622	630	614	617	629	634	633	612	614	613	622
102	627	620	620	630	646	642	628	628	618	620	632	634	636	617	620	615	627
103	631	624	626	636	651	646	634	629	622	626	636	636	637	621	625	619	631
104	634	629	633	644	658	650	640	632	628	630	639	640	641	628	629	624	634
105	635	637	641	652	659	653	641	635	633	638	642	645	650	630	635	627	635
106	638	642	646	653	664	660	642	635	635	643	646	648	659	634	640	632	638
107	644	648	648	654	673	665	644	635	642	641	652	651	661	637	642	633	644
108	648	656	657	656	683	666	662	637	652	644	657	654	662	641	651	636	648
109	652	658	670	662	686	668	681	653	657	647	658	658	664	647	660	639	652
110	653	661	684	666	682	681	688	656	654	652	659	666	670	651	663	645	653
111	659	663	682	666	676	688	683	652	655	656	662	672	672	653	659	649	659
112	664	667	678	667	684	677	683	655	662	654	670	680	674	656	662	652	664
113	670	667	676	662	679	666	685	665	677	656	681	679	677	662	669	657	670
114	675	661	675	654	675	648	677	671	681	659	693	680	683	663	675	660	675
115	674	651	672	647	667	648	663	670	669	672	692	678	681	662	669	659	674
116	661	648	662	645	651	651	656	664	656	682	680	671	672	660	662	654	661
117	652	652	651	641	651	658	650	658	644	679	670	658	664	668	660	650	652
118	645	658	646	639	656	663	645	663	638	667	669	651	658	682	661	638	645
119	645	662	650	645	660	657	648	664	633	666	672	652	662	689	658	629	645
120	645	665	656	647	662	651	658	651	634	668	671	653	666	683	656	623	645
121	652	657	664	642	666	650	666	642	639	666	668	654	668	671	650	622	652
122	653	648	675	647	663	651	667	639	635	658	671	650	676	662	647	620	653
123	648	644	683	652	656	655	670	640	629	652	673	643	680	659	649	617	648
124	648	649	686	654	653	660	673	640	626	650	663	643	678	664	651	617	648

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125	645	655	690	657	662	670	675	637	634	648	660	651	675	668	651	620	645
126	642	655	696	662	672	682	673	630	646	640	655	660	662	662	652	623	642
127	643	652	691	658	673	673	661	628	663	635	652	662	656	664	654	632	643
128	643	646	675	653	672	655	644	635	668	626	646	660	651	665	658	635	643
129	637	639	667	646	671	636	631	633	664	626	644	661	643	669	655	635	637
130	633	625	661	636	675	624	620	617	654	629	649	660	633	667	652	628	633
131	628	619	650	620	674	598	616	593	644	629	644	655	619	666	650	630	628
132	620	614	634	603	667	574	603	583	647	622	634	647	615	661	649	632	620
133	616	610	622	595	654	566	596	582	651	612	626	633	614	654	648	621	616
134	619	611	615	589	642	574	599	581	647	606	628	627	607	647	639	609	619
135	620	608	610	589	636	574	602	588	627	608	630	630	605	642	631	600	620
136	612	610	606	591	627	576	594	588	605	615	627	625	593	623	623	599	612
137	603	611	602	595	618	576	580	568	598	599	608	617	593	610	628	600	603
138	601	596	596	598	610	570	557	561	594	574	604	606	597	605	633	598	601
139	594	586	590	585	608	573	543	567	590	564	593	598	600	597	631	596	594
140	586	577	572	575	602	583	555	566	577	558	583	596	595	588	624	589	586
141	574	583	555	574	588	572	566	556	569	560	568	594	583	583	614	584	574
142	572	592	557	585	576	535	561	543	557	564	546	588	566	575	599	577	572
143	566	597	553	575	566	505	539	526	547	568	549	579	549	569	589	573	566
144	553	585	537	550	553	491	521	510	542	553	553	564	543	574	584	574	553
145	545	545	518	545	545	473	508	498	525	517	539	549	533	577	584	572	545
146	527	510	498	544	531	457	497	502	497	495	519	536	524	573	587	563	527
147	499	491	493	536	523	450	489	516	495	475	519	552	507	563	582	548	499
148	498	493	507	524	523	443	473	530	497	461	522	556	488	547	560	540	498
149	501	497	513	502	516	434	455	531	488	456	519	540	467	530	525	532	501
150	487	477	502	490	504	429	449	507	467	459	502	519	467	516	514	520	487
151	466	458	480	475	498	429	442	476	445	451	482	503	483	505	521	497	466
152	448	445	466	468	505	417	456	455	438	444	476	490	466	500	524	482	448
153	445	435	447	482	495	391	469	455	441	422	465	477	439	485	506	466	445
154	434	421	457	482	468	354	447	439	422	419	439	459	434	474	472	471	434
155	420	402	465	470	452	345	418	409	416	394	418	443	393	467	469	484	420
156	409	383	417	451	453	331	380	395	399	363	394	417	366	453	476	462	409

Laboratory: Standard-Tech Co., Ltd Testing Center

NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

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157	405	368	399	428	430	305	385	377	377	347	386	404	352	437	445	440	405
158	400	353	406	411	399	295	369	358	336	341	382	382	363	426	420	395	400
159	372	331	404	405	389	296	341	355	321	319	364	351	360	406	401	367	372
160	344	320	375	390	387	298	322	371	330	303	347	347	331	392	382	370	344
161	336	312	331	373	353	296	297	344	327	298	344	347	310	376	353	367	336
162	332	316	327	348	336	280	276	326	314	289	321	321	303	346	331	357	332
163	319	297	321	333	321	248	269	283	286	274	296	293	284	321	347	350	319
164	291	278	297	319	303	216	254	245	254	248	250	245	272	321	321	330	291
165	281	243	277	307	297	219	242	221	242	228	245	238	251	306	291	292	281
166	260	226	253	276	270	219	234	221	239	234	235	233	224	276	279	246	260
167	249	226	238	232	254	197	229	213	215	222	229	211	198	264	247	240	249
168	241	219	222	220	228	184	186	193	192	217	216	182	178	233	232	236	241
169	205	214	203	216	220	176	166	169	171	202	183	159	158	218	228	225	205
170	171	201	189	195	208	162	160	143	164	184	163	162	144	232	212	195	171
171	150	175	169	175	209	130	131	122	139	172	145	151	131	222	188	168	150
172	137	155	152	173	200	90	93	96	134	139	125	124	115	205	162	154	137
173	133	137	133	144	180	76	75	77	122	100	99	92	86	180	160	144	133
174	116	112	115	125	162	57	54	61	78	80	86	85	76	176	150	133	116
175	91	93	91	111	145	35	26	44	65	48	61	64	57	161	133	110	91
176	72	66	75	99	118	16	14	23	35	31	35	34	22	129	101	90	72
177	63	60	68	88	89	7	7	11	14	15	19	12	9	106	78	64	63
178	35	35	49	69	74	9	6	6	5	5	6	6	8	87	66	49	35
179	20	25	30	53	61	22	18	12	5	5	9	16	18	66	57	29	20
180	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27

3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-331	2 meter Integrating Sphere	2017-07-01	2018-06-30
ST-R-327	Spectral analysis system HAAS-2000	2017-07-01	2018-06-30
D204	Standard Lamp	2017-07-12	2018-07-11
PF2010	Power Meter for Integrating Sphere	2017-07-01	2018-06-30
GO-R5000	Goniophotometer system	2017-07-01	2018-06-30
D908S	Standard Lamp	2017-07-12	2018-07-11
PF210	Power Meter for Goniophotometer	2017-07-07	2018-07-06
Expand Uncertainty: Photometric Measurement (Sphere):2.04%, k=2 Chromaticity Measurement(Sphere):28.8K, k=2 Photometric Measurement(Goniophotometer):2.36%, k=2			

******* END OF REPORT *******