

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-8145M40C-A

Representative (Tested) Model: LED-8145M40C-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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<http://www.standard-tech.com>

1.1 Product Information:

Organization Name	LIGHT EFFICIENT DESIGN, LLC		
Brand Name	N/A		
Model Number	LED-8145M40C-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	4000K		
LED Manufacturer	SAMSUNG ELECTRONICS CO., LTD		
LED Model	SPMWH1228FD5WAT0SE		
Sample Number	GZE1801030-H-AA1		
Luminaire Aperture (for downlights)	--	in. mm mm s	
Luminaire Length	--		
Luminaires Width	--		
Number of Units (modular products)	N/A		
Photo			
			

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-8145M40C-A		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE180103	277.0	60	0.1680	44.53	0.9569	12.46
0-H-AA1	347.0	60	0.1405	44.41	0.9108	16.08

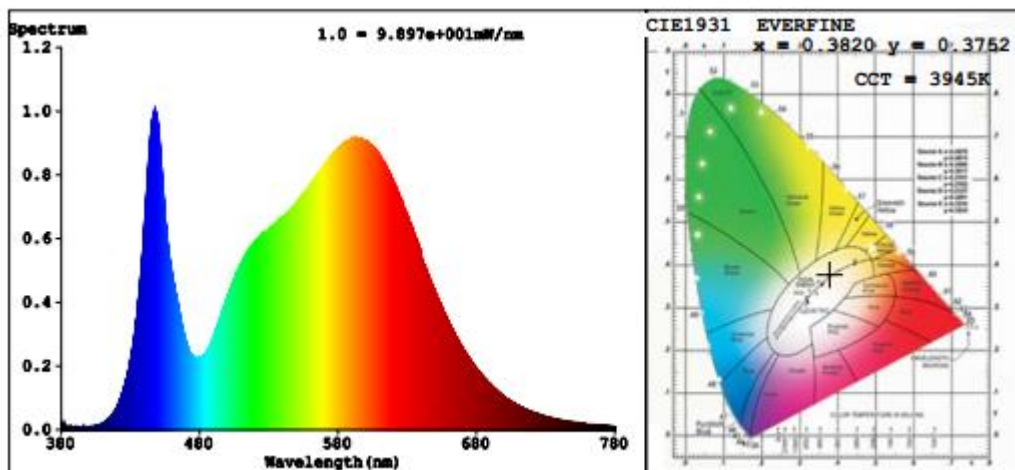
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	277.0	R1	80	R9	1
Frequency (Hz)	60	R2	87	R10	70
CCT (K)	3945	R3	93	R11	80
Duv	-0.0012	R4	81	R12	64
Chromaticity (x, y)	x=0.3820 y=0.3752	R5	80	R13	81
Chromaticity (u', v')	u'=0.2268 v'=0.5011	R6	83	R14	96
Color Rendering Index (CRI)	81.4	R7	85	R15	73
R9	1	R8	62	--	--

Photometric Measurement – Goniophotometer Method:

Parameter	Result	
Test Voltage (V)	277.0	347.0
Frequency (Hz)	60	60
Total Luminous (lm)	5488.7	5456.6
Luminous Efficacy (lm/W)	123.26	122.87
Most worst Luminous/Highest Watts	122.54	
Beam Angle (°)	324.1	--
Center Beam Candle Power (cd)	3	--

Spectral Power Distribution & Chromaticity Diagram

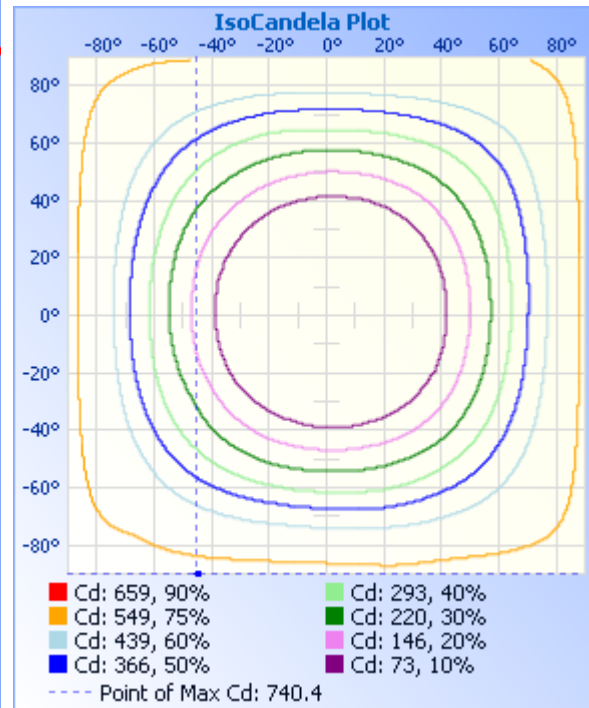
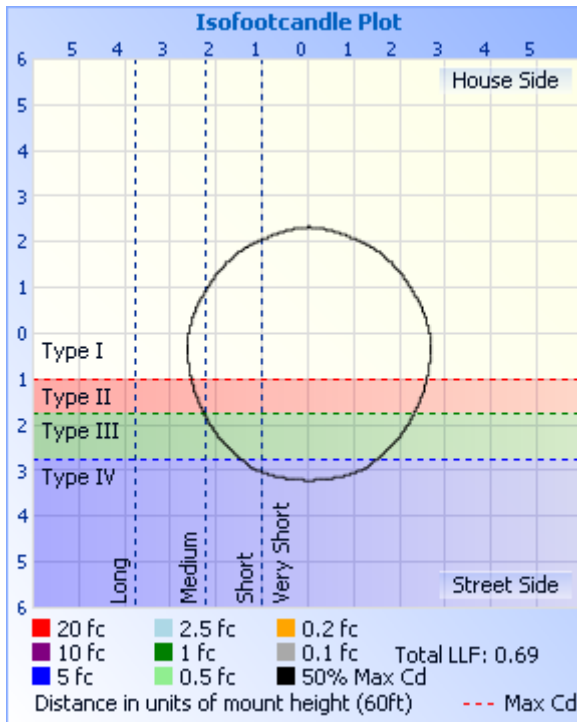
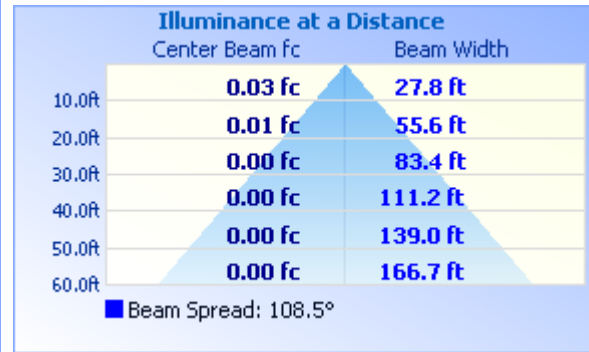
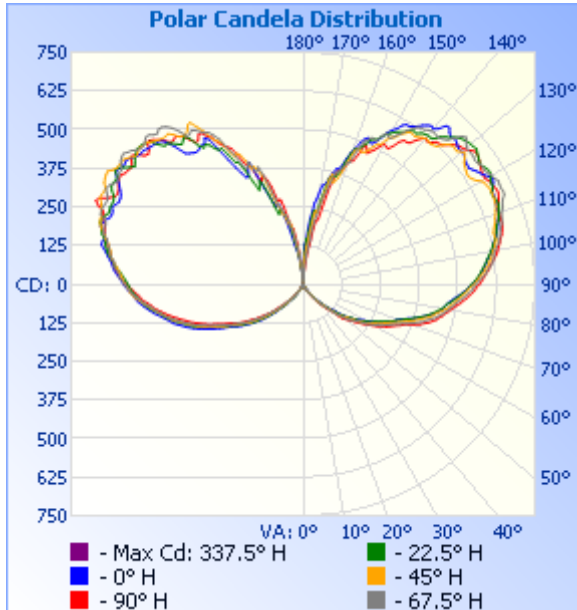


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	7.4	0.1%
0-40	35.2	0.6%
0-60	314.0	5.7%
60-90	1,335.3	24.3%
70-100	1,680.4	30.6%
90-120	2,036.8	37.1%
0-90	1,649.3	30%
90-180	3,839.6	70%
0-180	5,488.9	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	0.3	0.0%	90-100	657.1	12%
10-20	1.5	0.0%	100-110	697.4	12.7%
20-30	5.7	0.1%	110-120	682.2	12.4%
30-40	27.8	0.5%	120-130	615.8	11.2%
40-50	89.1	1.6%	130-140	510.1	9.3%
50-60	189.8	3.5%	140-150	369.5	6.7%
60-70	312.0	5.7%	150-160	213.9	3.9%
70-80	452.4	8.2%	160-170	82.0	1.5%
80-90	570.9	10.4%	170-180	11.5	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	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	2	3	3	3	3
4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
5	2	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	2
6	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	3
7	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3
8	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
9	3	3	3	3	3	3	4	4	4	4	3	3	3	3	3	3	3
10	3	3	3	3	3	4	4	4	4	4	4	3	3	3	3	3	3
11	3	3	3	4	4	4	4	4	4	4	4	3	3	3	3	3	3
12	3	3	3	4	4	4	4	5	4	4	4	4	3	3	3	3	3
13	3	4	4	4	4	5	5	5	5	5	4	4	4	3	3	3	3
14	4	4	4	5	5	5	5	5	5	5	5	4	4	4	3	3	4
15	4	4	5	5	5	6	6	6	6	5	5	5	4	4	4	4	4
16	4	5	5	5	6	6	6	6	6	6	6	5	5	4	4	4	4
17	5	5	5	6	6	7	7	7	7	7	6	6	5	4	4	4	5
18	5	5	6	7	7	7	7	8	7	7	7	6	5	5	5	5	5
19	6	6	7	7	8	8	8	8	8	8	7	7	6	6	5	6	6
20	6	7	7	8	8	9	9	9	9	9	8	7	7	6	6	6	6
21	7	7	8	9	9	10	10	10	10	9	9	8	7	7	7	7	7
22	8	8	8	9	10	10	11	11	11	10	9	8	8	8	7	7	8
23	8	9	9	10	11	11	12	11	11	11	10	9	8	8	8	8	8
24	9	10	10	11	12	12	13	12	12	12	11	10	9	9	9	9	9
25	10	10	11	12	13	14	13	14	13	13	12	11	10	10	9	9	10
26	11	11	12	13	14	15	15	15	14	13	12	12	11	11	10	10	11
27	12	12	13	14	15	16	16	16	16	15	14	13	12	11	11	11	12
28	12	13	14	15	16	17	18	18	18	16	15	14	13	12	12	12	12

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29	14	14	14	17	17	19	23	22	20	18	16	15	14	13	13	13	14
30	15	16	16	18	20	26	26	27	24	22	18	16	15	14	14	14	15
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35	31	37	42	43	48	54	56	54	53	49	44	42	37	30	29	27	31
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38	49	53	59	57	67	68	71	71	68	63	58	56	52	46	46	49	49
39	53	60	66	64	73	74	80	80	80	70	65	62	60	54	54	53	53
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41	70	72	77	84	86	91	94	96	93	88	80	71	71	66	65	64	70
42	73	79	86	86	94	99	104	104	100	96	88	78	75	72	72	70	73
43	80	88	95	96	100	107	116	113	109	105	97	87	84	78	75	79	80
44	88	95	97	104	110	118	126	124	122	113	106	98	92	84	84	85	88
45	96	101	105	113	116	133	137	135	130	124	117	107	101	95	96	92	96
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47	114	117	124	134	136	154	154	156	149	147	135	125	120	111	111	108	114
48	122	128	137	144	153	162	165	167	162	156	145	135	133	119	118	117	122
49	127	138	153	153	169	169	175	176	175	167	156	144	144	130	125	126	127
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53	175	175	181	193	198	217	215	211	212	206	197	188	181	171	169	171	175
54	183	186	192	199	208	226	222	221	219	216	209	197	192	181	183	185	183
55	194	191	203	207	217	233	234	232	230	224	217	209	200	192	192	193	194
56	204	204	215	216	227	241	244	245	241	232	225	219	211	203	200	201	204
57	212	215	224	229	237	250	255	256	250	242	235	229	221	209	209	209	212
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59	227	233	245	252	259	270	273	275	267	260	255	248	244	233	226	227	227
60	238	241	251	265	270	279	283	284	278	267	264	258	251	240	235	236	238

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61	247	253	261	274	282	288	293	295	292	279	277	271	261	246	244	248	247
62	261	259	269	284	291	298	303	308	306	291	290	283	269	253	255	258	261
63	272	267	279	292	304	309	317	321	318	304	303	293	283	263	264	269	272
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65	293	287	298	311	320	332	346	348	345	328	326	318	306	283	283	288	293
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76	415	415	428	444	452	461	464	465	461	453	449	448	435	408	412	417	415
77	430	426	436	453	461	471	471	477	470	463	457	460	447	422	423	428	430
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82	470	469	484	492	500	520	516	519	520	512	507	505	497	469	472	478	470
83	476	480	492	498	512	534	525	528	529	520	518	516	507	477	480	484	476
84	486	490	499	509	520	545	534	536	538	528	529	525	519	487	490	490	486
85	496	501	509	518	530	552	546	545	545	535	542	535	526	502	495	498	496
86	508	509	518	528	539	559	555	555	550	542	551	546	534	512	507	507	508
87	517	521	526	537	548	567	567	564	558	550	559	555	543	524	516	517	517
88	529	530	533	547	556	572	578	573	566	557	564	562	552	532	526	523	529
89	537	538	542	552	561	582	588	578	575	563	570	571	562	541	536	534	537
90	548	545	554	560	571	590	595	586	581	567	578	577	573	547	541	542	548
91	556	555	562	569	577	602	603	595	588	573	582	585	581	556	552	550	556
92	567	563	569	579	584	607	613	606	596	580	586	596	593	563	560	560	567

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93	573	571	578	590	590	613	620	606	603	588	591	597	600	570	567	568	573
94	580	578	587	596	598	618	625	608	611	595	597	604	606	578	573	577	580
95	586	583	593	604	605	620	630	617	618	606	604	614	613	586	580	586	586
96	592	590	603	613	611	622	635	628	621	615	611	614	619	594	588	595	592
97	598	597	608	619	619	630	645	634	628	621	620	617	623	598	594	602	598
98	604	603	615	623	627	639	640	641	638	631	628	628	627	606	604	609	604
99	614	610	619	624	635	646	642	654	645	640	631	633	632	614	612	619	614
100	619	618	623	631	639	654	647	660	654	645	633	636	637	621	620	624	619
101	625	624	632	638	645	659	645	665	665	651	640	641	642	627	624	627	625
102	630	629	635	648	650	666	648	672	664	654	646	648	648	630	625	631	630
103	635	637	640	652	655	671	661	680	659	660	657	651	656	634	629	635	635
104	643	641	639	656	662	673	670	688	661	671	661	665	662	636	634	640	643
105	648	647	638	660	666	679	671	693	671	676	672	668	666	641	637	645	648
106	653	650	642	665	670	687	663	693	682	680	682	669	667	650	643	651	653
107	658	656	647	672	674	688	666	694	679	688	687	667	671	655	645	655	658
108	662	664	654	676	673	686	673	699	672	686	689	674	678	663	648	659	662
109	668	670	657	679	675	690	679	702	661	679	690	694	682	667	652	665	668
110	672	674	663	684	675	694	671	707	658	670	695	695	688	669	660	671	672
111	671	679	667	692	677	697	665	704	660	670	699	695	710	672	667	679	671
112	674	683	673	695	682	693	654	708	668	672	704	692	723	677	679	684	674
113	677	683	675	701	688	687	651	720	659	670	714	689	715	688	682	692	677
114	680	680	676	712	692	686	644	720	653	671	714	692	687	691	683	693	680
115	680	676	679	714	697	687	644	717	653	676	710	702	672	693	691	695	680
116	682	678	679	711	698	680	645	709	656	689	711	709	668	697	702	693	682
117	688	688	679	712	693	679	642	712	664	696	722	704	670	698	708	694	688
118	697	691	676	715	693	681	635	714	673	697	726	694	676	694	707	697	697
119	703	693	673	707	688	684	629	709	684	694	730	685	684	690	708	705	703
120	695	699	667	705	682	682	631	704	697	694	731	690	687	679	712	717	695
121	685	705	652	698	681	683	637	709	707	710	718	696	687	672	718	723	685
122	677	703	644	693	681	682	643	712	704	710	710	694	679	663	714	730	677
123	671	697	638	694	686	679	648	710	696	695	709	701	676	657	713	726	671
124	662	691	639	693	691	672	656	695	696	677	707	712	673	661	713	724	662

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125	655	695	643	687	696	664	655	689	699	665	705	717	676	667	714	725	658
126	656	700	647	685	701	665	654	680	693	673	696	719	688	673	705	733	656
127	658	705	652	689	704	655	646	674	683	681	685	710	692	675	702	736	658
128	663	712	663	689	700	647	647	671	677	686	680	703	682	679	707	740	663
129	669	708	674	688	689	644	648	671	674	692	687	690	661	684	715	737	669
130	669	706	668	690	681	644	636	666	674	692	689	685	654	678	715	734	669
131	668	703	657	698	677	655	626	659	668	689	685	684	661	678	714	720	668
132	671	699	659	710	671	652	616	656	664	683	686	689	676	680	710	721	671
133	678	693	658	702	663	646	611	646	662	676	674	697	682	686	706	719	678
134	678	684	652	680	649	634	606	639	657	651	668	695	673	696	704	713	678
135	675	671	637	660	637	622	613	633	656	633	661	683	660	703	706	712	675
136	682	662	620	653	633	618	616	629	641	633	655	678	644	691	705	712	682
137	694	652	616	647	630	633	605	621	609	623	653	686	628	677	701	710	694
138	690	634	613	646	616	632	587	608	570	610	655	684	626	665	690	699	690
139	667	628	616	648	612	609	570	587	561	598	643	675	632	669	672	688	667
140	656	628	616	647	617	587	545	577	554	605	623	660	625	675	674	674	656
141	659	626	611	642	605	573	524	575	549	613	619	636	613	659	682	672	659
142	653	620	604	635	591	558	513	587	551	600	616	608	593	647	672	680	653
143	644	610	600	633	572	547	511	596	554	561	623	609	575	647	657	686	644
144	633	612	602	628	569	542	503	571	556	546	636	616	578	643	649	686	633
145	623	607	601	613	568	548	496	535	555	552	638	607	590	633	646	691	623
146	615	595	590	600	555	557	496	524	571	543	612	595	591	627	640	688	615
147	616	587	578	581	532	542	497	525	558	523	589	583	571	614	627	674	616
148	606	581	561	568	517	525	491	526	510	512	554	580	560	603	630	650	606
149	586	574	555	551	521	524	490	499	469	514	540	562	533	587	642	629	586
150	576	563	539	551	524	503	481	476	436	484	529	541	519	576	631	611	576
151	560	554	516	559	508	465	446	451	411	450	491	501	507	583	601	605	560
152	536	542	515	544	492	423	416	418	392	448	466	475	498	584	582	589	536
153	518	525	499	522	482	407	399	394	390	415	475	434	472	578	570	563	518
154	506	522	482	522	471	384	386	391	404	369	464	415	440	564	579	562	506
155	509	514	472	523	487	388	383	402	424	336	440	423	421	552	570	572	509
156	519	495	468	510	495	394	382	379	432	345	407	433	415	535	536	564	519

Laboratory: Standard-Tech Co., Ltd Testing Center

NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

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157	509	481	468	500	455	364	376	357	382	365	415	395	380	507	521	544	509
158	493	473	476	469	429	302	309	314	333	351	403	395	357	494	510	528	493
159	471	469	461	423	429	280	294	274	305	311	382	406	373	484	503	520	471
160	453	450	420	417	416	266	287	263	279	265	356	374	373	445	498	501	453
161	429	416	385	400	390	258	266	248	265	239	308	331	356	412	458	481	429
162	400	381	359	387	386	244	247	230	272	247	269	290	331	407	429	465	400
163	389	366	347	381	387	234	213	200	267	255	262	261	284	395	420	417	389
164	387	361	343	372	351	181	178	185	243	246	233	254	279	367	406	389	387
165	374	361	370	344	316	134	156	172	215	230	232	237	283	347	375	391	374
166	359	355	351	311	259	120	124	155	187	220	205	229	257	346	374	392	359
167	338	321	297	291	217	112	101	131	158	204	197	211	218	350	362	376	338
168	329	284	259	258	209	75	77	107	127	172	203	184	200	310	329	338	329
169	325	249	233	228	207	66	68	97	120	139	186	183	188	279	314	307	325
170	304	234	243	205	168	46	59	91	108	122	140	151	181	269	275	270	304
171	278	243	234	179	130	40	39	75	93	100	121	126	152	274	271	271	278
172	266	237	189	140	114	26	30	44	69	92	102	104	130	266	278	268	266
173	233	210	166	105	91	18	25	30	53	60	68	90	89	254	252	250	233
174	211	170	134	96	73	11	21	27	34	45	51	71	69	229	225	193	211
175	177	141	122	65	53	7	12	14	16	29	38	51	36	211	178	173	177
176	144	147	104	34	34	5	6	7	8	12	14	26	19	190	161	162	144
177	134	125	87	32	46	6	6	6	6	6	6	10	8	172	158	149	134
178	128	78	64	25	18	22	24	23	22	19	8	5	5	136	122	108	128
179	101	67	55	15	10	40	61	47	37	38	18	11	5	91	91	76	101
180	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51

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 *******