



Report No.: GZE160820-O

NVLAP LAB CODE 201011-0

LM-79-08 Test Report

For

LIGHT EFFICIENT DESIGN

(Brand Name:N/A)

188 S. Northwest HighwayCary, IL60013

LED Lamp

Model name(s): LED-7324-40-A

Representative (Tested) Model: LED-7324-40-A

Model Different: N/A

Test & Report By:

Garman Mo

Engineer: Garman Mo

Date: Aug 19,2016

Review By:

Tommy Liang

Manager: Tommy Liang

Note: 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

Tel: 8620-3229 0320 Fax: 8620-32290422 <http://www.standard-tech.com>

1.1 Product Information:

Organization Name	LIGHT EFFICIENT DESIGN		
Brand Name	N/A		
Model Number	LED-7324-40-A		
SKU (if available)	N/A		
Type of Luminaire (for integral lamps, list base type and lamp type)	LED Lamp		
Rated Voltage / Frequency	120-277Vac, 50/60 Hz		
Nominal Power	7W		
Rated Initial Lamp Lumen	--		
Declared CCT	4000K		
LED Manufacturer	Samsung Electronics LED Business		
LED Model	SPMWHT327F*****		
Sample Number	GZE160820-O1(4000K)		
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	Aug 13,2016
Date of Test	Aug.14,2016
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. Electrical Parameters
Reference Standard	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 120 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 120 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 120 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	2016-08-14	Test Ambient:	25.2 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	LED-7324-40-A		

Electrical Measurement :

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160820-O1	120.0	60	0.0638	6.90	0.9018	18.48

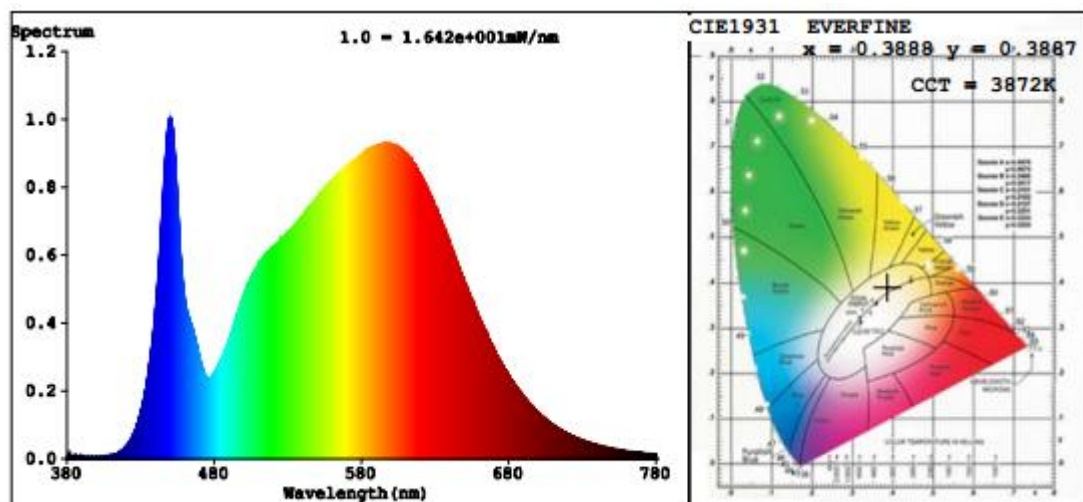
Chromaticity Measurement - Sphere-Spectroradiometer Method :

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	13
Frequency (Hz)	60	R2	89	R10	73
CCT (K)	3872	R3	95	R11	82
Duv	0.0032	R4	83	R12	63
Chromaticity (x, y)	x=0.3888 y=0.3887	R5	81	R13	83
Chromaticity (u', v')	u'=0.2258 v'=0.5080	R6	85	R14	97
Color Rendering Index (CRI)	83.5	R7	88	R15	75
R9	13	R8	67	--	--

Photometric Measurement – Goniophotometer Method :

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	944.54
Luminous Efficacy (lm/W)	136.89
Beam Angle (°)	109.6
Center Beam Candle Power (cd)	308

Spectral Power Distribution & Chromaticity Diagram



Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	237.7	25.2%
0-40	388.2	41.1%
0-60	682.2	72.2%
60-90	242.6	25.7%
70-100	142.4	15.1%
90-120	17.6	1.9%
0-90	924.7	97.9%
90-180	19.8	2.1%
0-180	944.5	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	29.0	3.1%	90-100	9.0	1%
10-20	83.1	8.8%	100-110	7.1	0.8%
20-30	125.5	13.3%	110-120	1.6	0.2%
30-40	150.5	15.9%	120-130	0.7	0.1%
40-50	154.9	16.4%	130-140	0.4	0%
50-60	139.1	14.7%	140-150	0.5	0.1%
60-70	109.2	11.6%	150-160	0.4	0%
70-80	82.4	8.7%	160-170	0.2	0%
80-90	51.0	5.4%	170-180	0.0	0%

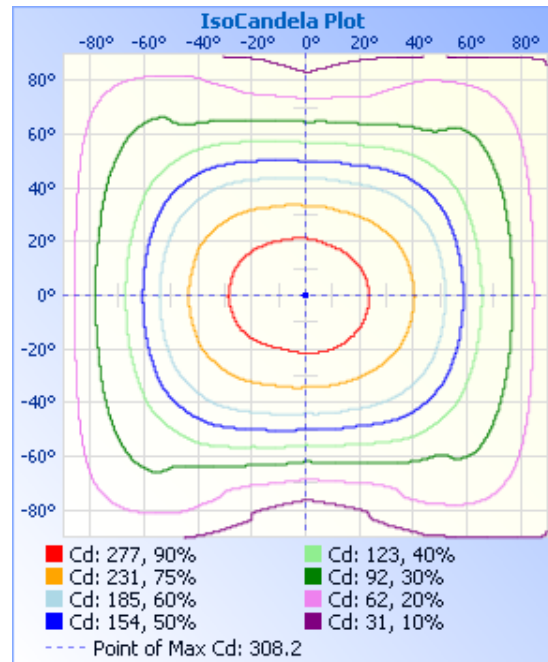
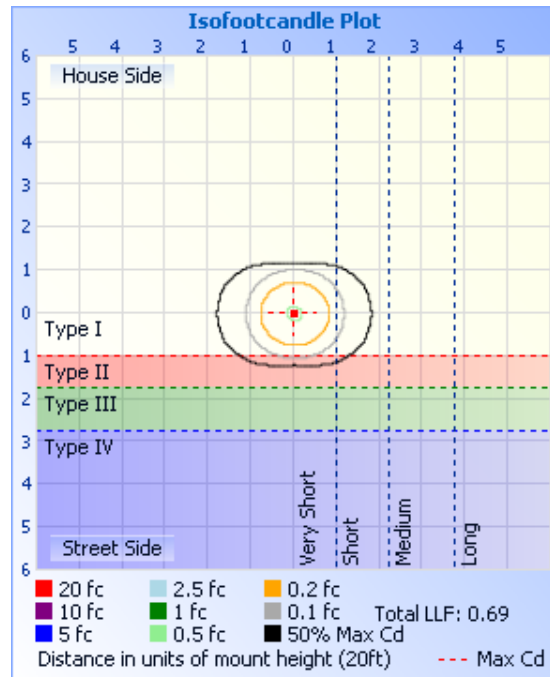
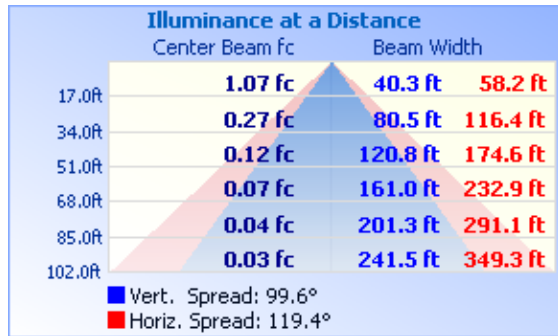
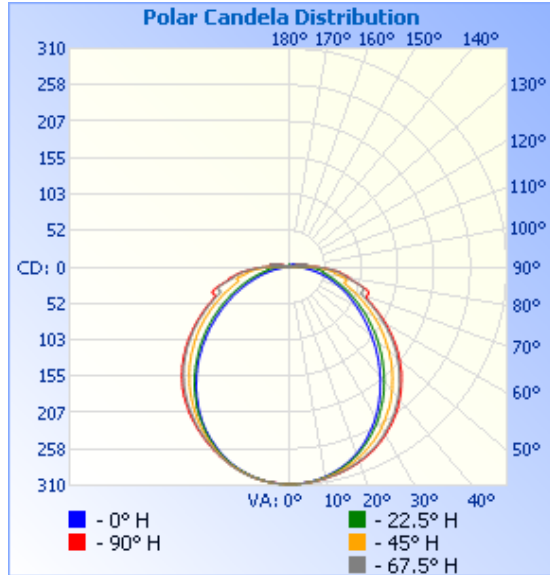
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Photometric Data



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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	308	308	308	308	308	306	305	304	308	308	308	308	308	306	305	304	308
1	308	308	308	308	308	306	305	304	308	308	308	308	308	306	305	304	308
2	308	308	308	308	308	306	305	304	308	308	308	308	307	306	305	304	308
3	308	308	308	308	308	306	305	304	307	307	308	307	307	306	305	303	308
4	307	308	308	308	307	306	304	303	307	307	307	307	307	305	304	303	307
5	307	307	307	307	307	306	304	303	306	306	306	306	306	305	304	303	307
6	306	307	307	307	307	305	304	302	305	306	306	306	306	304	303	302	306
7	305	306	306	307	306	305	303	302	304	305	305	305	305	303	302	301	305
8	304	305	305	306	306	304	302	301	303	303	304	304	304	303	301	300	304
9	303	304	304	305	305	304	301	300	302	303	303	303	303	302	300	299	303
10	302	303	303	304	304	303	300	298	301	301	302	302	302	301	299	298	302
11	301	302	303	304	304	302	299	297	299	300	300	301	300	299	298	297	301
12	299	300	301	303	303	301	298	296	298	298	299	300	299	298	297	296	299
13	298	299	300	302	302	301	297	294	296	297	297	298	298	297	295	294	298
14	296	297	299	301	301	299	295	292	294	295	296	296	296	295	294	292	296
15	294	295	297	300	300	298	294	291	292	293	294	295	294	293	292	290	294
16	292	293	296	299	299	297	293	289	290	291	292	293	293	291	290	289	292
17	290	291	294	297	298	296	291	287	288	289	290	291	291	290	288	286	290
18	287	289	293	296	297	295	289	284	285	286	288	289	289	287	286	284	287
19	284	286	291	295	296	293	288	282	283	284	286	287	287	286	283	282	284
20	282	284	288	293	294	292	286	280	280	281	283	285	285	283	281	279	282
21	279	282	287	292	293	290	284	277	278	279	281	282	283	281	279	277	279
22	276	279	285	290	292	289	281	275	275	276	278	280	281	279	277	273	276
23	273	276	282	288	290	287	279	272	271	273	275	277	278	277	274	270	273
24	270	273	280	286	288	285	277	269	268	270	272	275	276	274	271	268	270
25	266	269	277	284	286	283	275	266	265	267	270	272	274	272	268	264	266
26	262	267	275	282	284	281	272	263	262	264	267	270	271	270	265	261	262
27	259	263	272	280	282	279	270	260	259	260	263	267	269	267	263	258	259
28	255	259	270	278	280	276	267	257	255	256	261	264	266	264	259	254	255

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29	251	256	267	276	277	274	265	253	251	253	257	262	264	262	256	251	251
30	247	252	264	273	275	271	262	250	247	249	254	259	261	259	253	246	247
31	243	249	260	270	273	269	259	246	243	246	251	257	258	256	250	243	243
32	239	244	258	267	270	266	255	243	239	241	247	253	256	253	246	239	239
33	234	241	254	264	267	263	253	239	235	238	244	250	253	250	243	235	234
34	230	236	250	262	264	261	249	235	230	233	240	248	250	247	240	231	230
35	226	233	247	259	261	258	246	231	226	229	236	244	247	244	236	226	226
36	222	228	244	256	259	255	243	228	221	225	233	242	244	241	232	222	222
37	217	225	240	252	255	252	239	223	217	220	229	238	241	238	228	218	217
38	212	220	236	249	253	248	235	219	212	216	226	235	238	235	224	214	212
39	208	216	232	245	248	244	231	214	207	211	222	232	235	231	221	209	208
40	203	212	229	242	246	241	228	210	203	206	218	228	232	228	217	205	203
41	198	207	225	238	242	238	224	205	197	202	214	225	229	224	213	201	198
42	194	203	220	234	239	234	220	201	193	197	210	221	225	220	209	196	194
43	188	198	217	231	235	230	216	196	187	193	206	217	221	217	205	192	188
44	184	193	212	227	230	226	212	192	183	188	202	214	218	213	201	187	184
45	179	189	208	223	227	223	208	187	177	182	198	210	213	210	197	183	179
46	174	185	204	219	223	219	204	182	172	178	193	206	209	206	193	178	174
47	170	180	200	215	219	215	199	178	167	173	189	202	206	201	189	173	170
48	165	175	195	211	215	211	195	173	162	168	185	197	201	198	184	169	165
49	160	171	190	206	210	206	190	168	156	163	180	194	197	193	180	164	160
50	155	167	187	202	206	202	186	163	151	158	176	189	193	188	176	159	155
51	151	162	182	198	202	198	182	158	146	153	172	185	188	185	172	155	151
52	146	158	177	194	198	193	177	154	141	148	167	181	184	180	167	150	146
53	142	153	173	189	193	189	173	148	135	143	163	176	179	176	163	147	142
54	137	148	168	184	189	184	168	143	130	138	158	172	175	171	159	142	137
55	133	144	164	180	183	180	163	138	125	133	154	167	170	167	154	137	133
56	128	139	159	175	178	175	159	133	119	128	149	163	165	162	150	133	128
57	124	135	155	169	174	170	154	129	115	123	144	158	161	157	145	128	124
58	120	130	150	165	169	165	150	123	109	118	140	153	156	153	141	125	120
59	115	126	145	160	164	160	144	119	104	114	135	149	152	148	137	120	115

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60	112	122	141	156	159	156	140	114	100	108	130	144	147	143	132	115	112
61	107	117	136	150	155	151	135	109	94	104	126	139	142	139	127	112	107
62	104	113	132	146	149	146	130	104	90	99	121	135	138	134	124	107	104
63	100	109	127	141	144	141	126	99	85	94	118	130	133	131	119	104	100
64	96	105	122	135	139	136	121	95	80	90	113	126	129	126	115	100	96
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66	88	97	113	126	130	126	112	86	71	82	104	117	119	117	107	92	88
67	85	94	109	122	124	122	108	82	66	77	100	113	115	113	103	88	85
68	81	90	105	117	120	117	103	77	62	73	96	108	112	109	99	84	81
69	77	86	101	113	119	113	99	74	57	69	92	105	111	105	96	82	77
70	74	83	97	110	119	110	95	69	54	65	88	103	112	104	92	78	74
71	70	79	93	110	119	110	91	65	49	61	84	103	113	105	88	75	70
72	67	76	89	111	120	110	87	61	45	57	80	104	113	107	85	72	67
73	64	72	85	112	118	111	83	57	41	54	77	104	110	107	81	68	64
74	61	70	83	111	115	110	80	54	37	50	74	103	106	105	79	66	61
75	57	66	83	108	109	108	80	50	34	47	73	98	100	100	79	63	57
76	53	64	84	103	104	102	81	48	30	44	74	93	95	96	81	60	53
77	50	60	85	98	98	98	82	44	26	41	75	88	90	90	81	57	50
78	47	57	84	92	94	92	80	41	23	38	73	83	86	86	80	54	47
79	44	55	81	88	89	88	77	38	19	35	69	79	86	82	76	52	44
80	41	52	76	83	87	82	72	35	17	32	64	79	82	81	72	49	41
81	37	50	71	82	86	81	67	33	13	30	60	74	76	77	67	48	37
82	35	50	67	80	80	79	63	32	10	29	59	70	73	72	66	47	35
83	32	49	66	74	76	73	62	34	8	30	57	68	70	71	63	47	32
84	29	47	63	72	75	70	59	32	5	28	52	64	65	66	59	44	29
85	27	44	59	70	70	67	55	29	3	24	50	58	58	60	56	41	27
86	24	41	57	63	63	61	52	26	2	22	45	52	52	55	51	39	24
87	23	38	51	58	57	56	47	23	1	19	40	48	48	49	47	36	23
88	20	35	46	51	52	50	42	20	1	17	36	43	43	45	42	32	20
89	19	31	42	47	46	46	37	17	1	15	32	39	40	40	39	29	19
90	12	22	30	39	41	39	31	14	0	12	27	31	31	26	24	18	12

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91	3	10	10	18	26	25	11	8	0	6	6	8	9	7	2	6	3
92	0	1	1	2	5	4	1	1	0	1	1	1	1	1	1	1	0
93	0	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	0
94	0	1	1	1	1	1	2	0	0	0	2	1	1	1	2	1	0
95	0	1	9	4	1	3	8	1	0	1	4	4	1	7	7	2	0
96	3	4	15	23	9	19	8	4	0	4	4	23	14	22	7	6	3
97	7	6	14	27	25	27	8	5	0	5	4	26	26	27	6	8	7
98	10	6	12	26	26	25	7	3	0	3	4	25	25	25	6	5	10
99	10	3	11	25	25	24	7	2	0	2	3	23	24	24	5	3	10
100	9	1	5	23	24	22	6	1	0	1	3	22	23	22	4	1	9
101	9	1	2	21	22	21	6	0	0	0	3	20	21	21	3	1	9
102	8	1	5	20	21	19	5	0	0	0	3	19	20	19	3	1	8
103	6	1	6	18	19	17	4	0	0	0	2	17	19	17	3	1	6
104	3	1	5	16	18	16	3	0	0	0	2	15	17	16	2	1	3
105	4	1	3	14	16	14	3	0	0	0	1	14	16	14	2	1	4
106	7	1	2	12	15	12	2	0	0	0	1	12	14	12	1	1	7
107	9	1	2	11	13	11	1	0	0	0	1	10	12	10	1	1	9
108	9	1	1	9	11	9	1	0	0	0	1	8	11	9	1	1	9
109	9	1	0	7	10	7	0	0	0	0	0	7	9	7	1	1	9
110	9	1	0	6	8	6	0	0	0	0	0	6	8	6	1	1	9
111	10	1	0	4	7	4	0	0	0	0	0	5	7	5	1	1	10
112	10	1	0	3	5	3	0	0	0	0	0	3	5	3	1	1	10
113	10	1	0	2	4	2	0	0	0	0	0	2	4	2	1	1	10
114	9	1	0	1	3	1	0	0	0	0	0	1	3	1	1	1	9
115	9	1	0	0	2	0	0	0	0	0	0	0	2	0	0	1	9
116	9	1	1	0	1	0	0	0	0	0	0	0	1	0	1	1	9
117	9	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	9
118	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	9
119	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	9
120	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	9
121	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	9

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122	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	8
123	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	8
124	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	8
125	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	8
126	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	8
127	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
128	7	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	7
129	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
130	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
131	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
132	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
133	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
134	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
135	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1
136	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
137	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
138	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2
139	2	3	0	0	0	0	0	0	0	0	0	0	0	0	1	3	2
140	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2
141	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2
142	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2
143	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2
144	1	3	1	0	0	0	0	0	0	0	0	0	0	0	1	3	1
145	1	3	1	0	0	0	0	0	0	0	0	0	0	0	1	3	1
146	1	3	1	0	0	0	0	0	0	0	0	0	0	0	1	3	1
147	1	3	1	0	0	0	0	0	0	0	0	0	0	0	1	3	1
148	1	3	1	0	0	0	0	0	0	0	0	0	0	0	1	3	1
149	1	3	1	0	0	0	0	0	0	0	0	0	0	0	1	3	1
150	1	3	1	0	0	0	0	0	0	0	0	0	0	0	1	3	1
151	1	3	1	0	0	0	0	0	0	0	0	0	0	0	1	3	1
152	1	3	1	0	0	0	0	0	0	0	0	0	0	0	1	3	1

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NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

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153	1	3	1	0	0	0	0	0	0	0	0	0	0	0	1	3	1
154	1	3	1	0	0	0	0	0	0	0	0	0	0	0	1	3	1
155	1	3	1	0	0	0	0	0	0	0	0	0	0	0	1	3	1
156	1	3	1	0	0	0	0	0	0	0	0	0	0	1	1	3	1
157	1	2	1	0	0	0	0	0	0	0	0	0	0	1	1	3	1
158	1	2	1	0	0	0	0	0	0	0	0	0	0	1	1	2	1
159	1	2	1	1	0	0	0	0	0	0	0	0	0	1	1	2	1
160	1	2	1	1	0	0	0	0	0	0	0	0	0	1	1	2	1
161	1	2	1	0	0	0	0	0	0	0	0	0	0	1	1	2	1
162	1	2	1	0	0	0	0	0	0	0	0	0	0	1	1	2	1
163	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	2	1
164	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	2	1
165	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1
166	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1
167	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0
168	0	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	0
169	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0
170	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0
171	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0
172	0	0	1	1	0	0	0	0	0	0	0	0	0	1	1	1	0
173	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0
174	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
175	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
176	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
177	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
178	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
179	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-336	2 meter Integrating Sphere	2016-07-01	2017-06-30
ST-R-331	Spectral analysis system HAAS-2000	2016-07-01	2017-06-30
D204	Standard Lamp	2016-07-01	2017-06-30
PF2010	Power Meter for Integrating Sphere	2016-07-01	2017-06-30
EE-09	Goniophotometer system	2016-07-01	2017-06-30
D908S	Standard Lamp	2016-07-01	2017-06-30
PF210	Power Meter for Goniophotometer	2016-07-01	2017-06-30
ST-R-181A	Temperature Tester	2016-07-01	2017-06-30
Uncertainty: Photometric Measurement (Sphere):1.74% Chromaticity Measurement(Sphere):14.3K Photometric Measurement(Goniophotometer):1.62%			

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