



Report No.: GZE160820-J

NVLAP LAB CODE 201011-0

## LM-79-08 Test Report

For

# LIGHT EFFICIENT DESIGN

(Brand Name:N/A)

188 S. Northwest Highway Cary, IL60013

## LED Lamp

Model name(s): LED-7322-27-A

Representative (Tested) Model: LED-7322-27-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

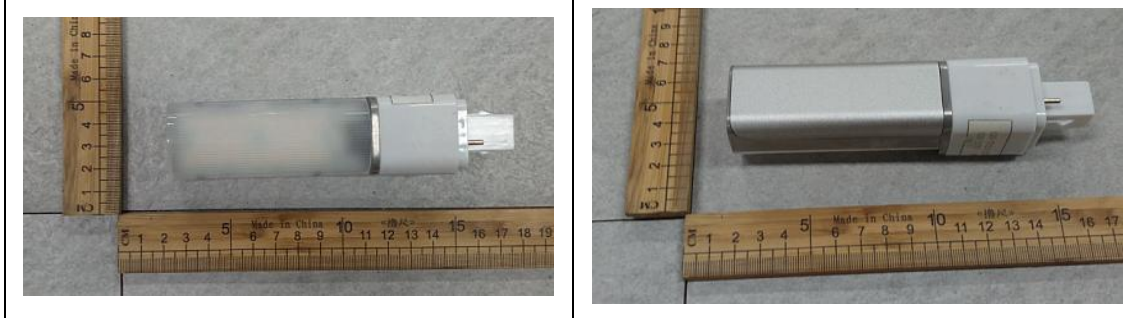
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**1.1 Product Information:**

Organization Name	LIGHT EFFICIENT DESIGN	
Brand Name	N/A	
Model Number	LED-7322-27-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	2700K	
LED Manufacturer	Samsung Electronics LED Business	
LED Model	SPMWHT327F*****	
Sample Number	GZE160820-J1(2700K)	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

**Photo**



### 1.2 Test Specifications:

Date of Receipt	Aug 13,2016
Date of Test	Aug.14,2016
Test item	<ol style="list-style-type: none"> <li>1. Total Luminous Flux</li> <li>2. Luminous Distribution Intensity</li> <li>3. Luminous Efficacy</li> <li>4. Correlated Color Temperature</li> <li>5. Color Rendering Index</li> <li>6. Chromaticity Coordinate</li> <li>7. Electrical Parameters</li> </ol>
Reference Standard	<ol style="list-style-type: none"> <li>1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products</li> <li>2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products</li> <li>3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources</li> <li>4. CIE 15-2004 Technical Report Colorimetry</li> <li>5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source</li> <li>6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems</li> </ol>
Reference Work Instruction	QD25

### 1.3 Test Methods

<p><b>1) Photometric and Light Distribution Measurement – Goniophotometer Method:</b></p> <p>Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at <math>25^{\circ}\text{C} \pm 1^{\circ}\text{C}</math>, 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 <math>1^{\circ}</math> vertical intervals and <math>22.5^{\circ}</math> horizontal intervals.</p>
<p><b>2) Chromaticity Measurement – Sphere-Spectroradiometer Method:</b></p> <p>Chromaticity parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at <math>25^{\circ}\text{C} \pm 1^{\circ}\text{C}</math>. 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.</p>
<p><b>3) Electrical Measurements:</b></p> <p>Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at <math>25^{\circ}\text{C} \pm 1^{\circ}\text{C}</math>. 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.</p>

**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-7322-27-A		

**Electrical Measurement :**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160820-J1	120.0	60	0.0644	6.97	0.9025	18.47

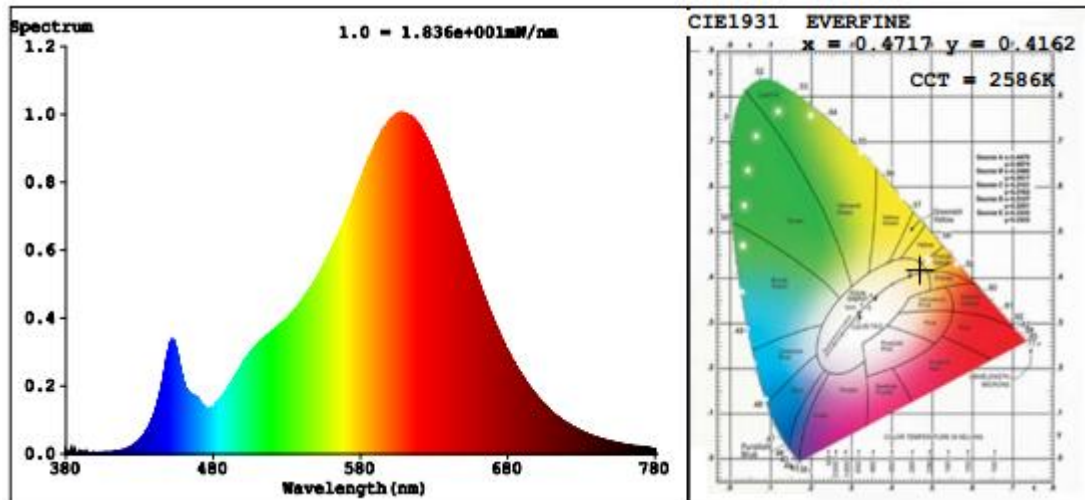
**Chromaticity Measurement - Sphere-Spectroradiometer Method :**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	6
Frequency (Hz)	60	R2	91	R10	82
CCT (K)	2586	R3	95	R11	79
Duv	0.0012	R4	79	R12	76
Chromaticity (x, y)	x=0.4717 y=0.4162	R5	81	R13	83
Chromaticity (u', v')	u'=0.2676 v'=0.5313	R6	91	R14	98
Color Rendering Index (CRI)	81.9	R7	81	R15	72
R9	6	R8	56	--	--

**Photometric Measurement – Goniophotometer Method :**

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	849.58
Luminous Efficacy (lm/W)	121.89
Beam Angle (°)	109.7
Center Beam Candle Power (cd)	281

**Spectral Power Distribution & Chromaticity Diagram**

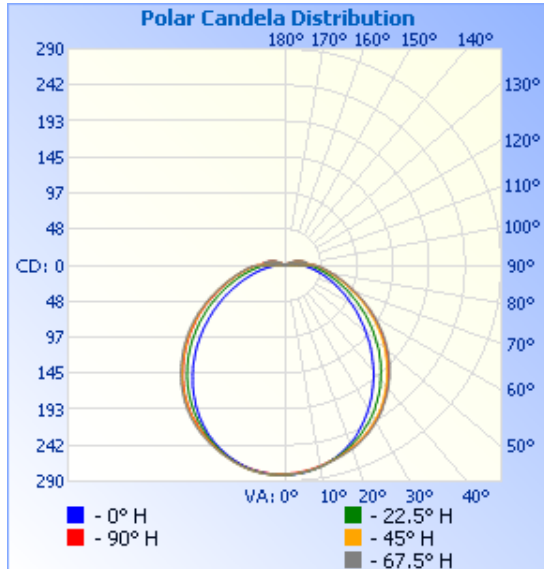


**Zonal Lumen Tabulation**

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	216.0	25.4%
0-40	352.3	41.5%
0-60	616.6	72.6%
60-90	206.6	24.3%
70-100	119.2	14%
90-120	24.7	2.9%
0-90	823.2	96.9%
90-180	26.4	3.1%
0-180	849.6	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	26.5	3.1%	90-100	10.4	1.2%
10-20	75.5	8.9%	100-110	10.2	1.2%
20-30	114.0	13.4%	110-120	4.1	0.5%
30-40	136.3	16.0%	120-130	0.7	0.1%
40-50	139.5	16.4%	130-140	0.3	0%
50-60	124.8	14.7%	140-150	0.3	0%
60-70	97.8	11.5%	150-160	0.2	0%
70-80	67.3	7.9%	160-170	0.1	0%
80-90	41.4	4.9%	170-180	0.0	0%

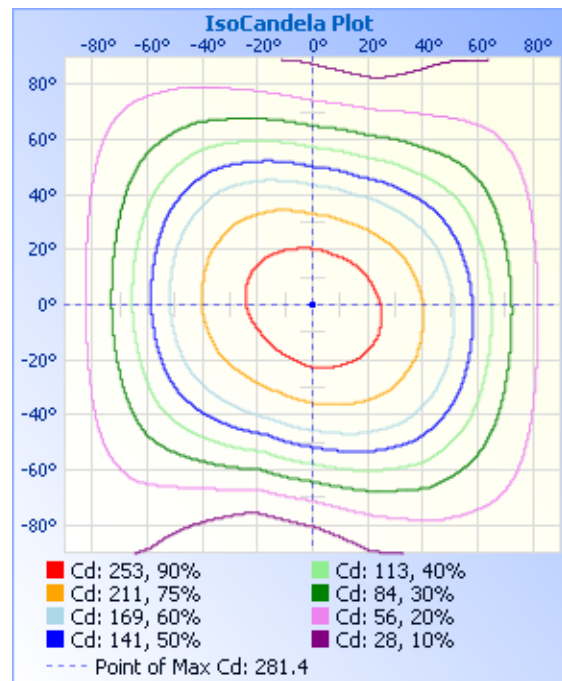
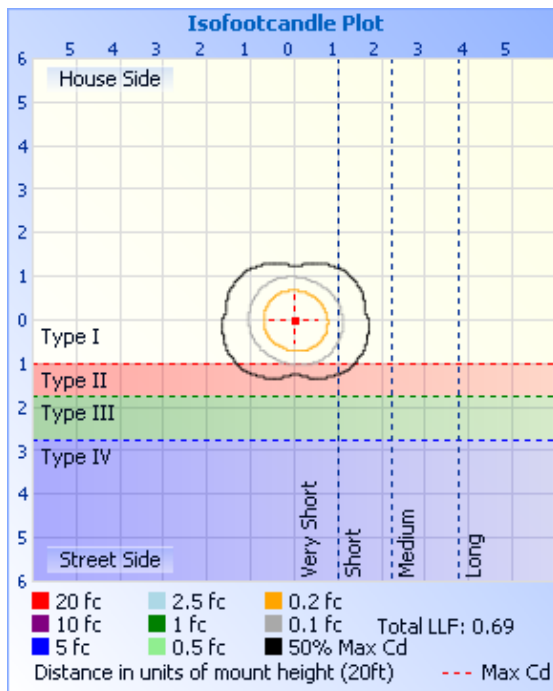
**Photometric Data**



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
17.0ft	0.97 fc	41.9 ft	55.6 ft
34.0ft	0.24 fc	83.9 ft	111.1 ft
51.0ft	0.11 fc	125.8 ft	166.7 ft
68.0ft	0.06 fc	167.7 ft	222.2 ft
85.0ft	0.04 fc	209.7 ft	277.8 ft
102.0ft	0.03 fc	251.6 ft	333.3 ft

■ Vert. Spread: 101.9°  
■ Horiz. Spread: 117.1°



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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	281	281	281	281	280	279	278	279	281	281	281	281	280	279	278	279	281
1	281	281	281	281	280	278	278	279	281	281	281	281	280	279	279	279	281
2	281	281	280	280	279	278	278	279	281	281	281	281	280	279	278	279	281
3	280	280	280	280	279	278	278	278	281	281	281	281	280	279	278	278	280
4	280	280	279	279	278	277	277	278	281	281	281	281	280	279	278	278	280
5	279	279	279	279	278	277	277	278	280	281	281	281	280	278	277	277	279
6	279	278	278	278	277	276	276	277	280	280	281	281	279	278	277	277	279
7	278	278	277	277	276	275	276	276	279	280	280	280	279	277	276	276	278
8	277	277	276	276	275	274	274	275	278	279	279	279	278	276	275	275	277
9	276	276	275	275	274	273	274	274	278	278	279	279	277	275	274	274	276
10	274	274	274	274	273	272	272	273	276	277	278	278	276	275	273	273	274
11	273	273	273	273	272	271	271	272	275	276	277	277	276	273	272	271	273
12	272	272	272	272	271	269	270	270	274	275	276	275	274	272	271	270	272
13	270	270	271	271	270	268	268	269	272	274	274	274	273	271	269	268	270
14	268	269	269	270	269	267	267	267	271	273	273	273	272	269	268	266	268
15	266	267	268	269	267	265	265	265	269	271	272	272	270	268	266	264	266
16	264	265	267	268	266	264	263	263	268	269	270	270	269	266	264	262	264
17	262	264	265	267	265	262	261	261	265	267	268	268	267	264	262	260	262
18	260	261	264	265	264	260	259	259	263	265	267	267	266	262	260	258	260
19	257	260	262	264	262	258	257	257	261	263	265	266	264	260	258	256	257
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21	252	255	259	261	259	255	252	252	257	259	261	262	260	256	253	250	252
22	250	253	257	260	258	253	250	249	255	257	259	260	258	254	250	247	250
23	247	251	256	258	256	251	247	246	252	254	257	259	256	252	247	245	247
24	244	249	254	256	254	249	244	244	249	252	255	257	254	249	245	241	244
25	240	246	252	254	253	247	242	241	246	249	253	255	252	247	242	239	240
26	237	244	250	253	251	244	239	237	243	247	251	253	250	245	239	235	237
27	234	241	248	250	249	242	237	235	240	244	249	251	248	242	235	232	234
28	230	239	246	248	247	240	233	231	237	241	247	249	246	239	233	228	230

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29	227	236	244	246	244	238	230	227	234	239	244	246	243	236	229	224	227
30	223	234	241	244	242	235	227	224	230	236	242	243	240	233	225	221	223
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35	204	217	227	230	229	220	210	204	212	220	228	230	227	218	207	201	204
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39	189	203	215	219	217	208	195	189	196	207	216	218	214	204	191	184	189
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41	181	196	208	212	210	201	187	179	187	199	208	211	207	197	183	176	181
42	176	193	205	209	207	197	182	174	184	195	205	207	204	193	179	171	176
43	172	188	201	206	203	194	179	170	179	191	201	203	200	189	175	167	172
44	168	185	198	202	200	190	174	165	174	188	198	200	196	185	171	163	168
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47	156	173	186	192	189	178	161	151	161	176	187	189	185	173	158	149	156
48	152	170	182	188	185	175	158	146	156	171	182	185	181	169	154	146	152
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52	135	152	167	172	170	158	140	127	138	155	167	169	165	153	137	129	135
53	130	149	164	169	166	155	136	122	133	150	163	165	161	148	133	125	130
54	126	144	159	164	162	150	131	118	128	146	158	161	157	145	129	121	126
55	123	140	155	161	158	146	127	113	124	141	154	157	153	140	124	117	123
56	118	136	151	156	155	142	122	109	119	138	150	153	149	137	121	113	118
57	115	132	147	151	150	138	118	104	115	133	146	149	144	132	117	109	115
58	111	128	143	148	145	134	114	100	110	128	142	144	141	128	113	105	111
59	107	124	139	143	142	130	110	95	105	125	137	141	136	124	109	101	107

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60	103	120	135	139	137	125	105	90	101	120	134	136	132	120	105	98	103
61	99	116	130	135	133	121	100	86	96	116	129	132	128	116	101	94	99
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70	69	83	95	98	96	86	65	49	60	81	93	94	92	83	70	64	69
71	67	80	91	94	93	82	62	45	56	77	89	90	88	80	67	61	67
72	63	76	88	91	89	78	58	41	52	74	86	87	84	76	64	58	63
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74	58	70	80	84	82	72	52	34	46	67	78	80	77	70	59	52	58
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89	25	35	43	44	43	34	17	1	11	30	39	41	40	36	27	18	25
90	18	30	38	39	39	30	15	0	10	24	33	31	33	26	20	14	18

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91	7	9	17	22	19	8	8	0	5	5	11	13	11	8	9	7	7
92	1	1	2	4	2	1	1	0	1	1	1	1	1	1	1	1	1
93	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1
94	1	2	1	1	1	5	0	0	1	1	1	1	1	3	1	1	1
95	2	9	7	3	4	12	2	0	1	4	7	2	3	14	4	1	2
96	5	17	26	16	22	12	6	0	3	6	21	12	19	16	10	1	5
97	9	17	30	29	30	11	8	0	5	5	27	26	28	15	15	5	9
98	8	16	28	29	28	11	8	0	4	5	26	27	27	14	14	7	8
99	6	12	27	28	27	10	7	0	3	4	24	26	26	13	13	6	6
100	4	6	26	27	26	10	5	0	3	1	23	25	25	12	10	5	4
101	2	5	25	25	25	9	3	0	1	2	22	24	24	12	7	4	2
102	1	9	24	24	23	9	1	0	1	3	21	23	23	11	5	3	1
103	0	11	22	23	22	9	2	0	1	3	20	22	22	10	3	2	0
104	1	9	21	22	21	8	2	0	0	3	19	21	21	10	3	1	1
105	0	9	20	21	20	7	1	0	1	2	18	20	20	9	3	1	0
106	1	8	19	20	19	7	1	0	0	2	17	19	19	8	2	1	1
107	1	6	18	19	18	6	0	0	0	2	16	18	18	8	1	1	1
108	1	6	16	18	17	6	0	0	0	2	15	17	17	7	1	1	1
109	1	5	15	17	16	5	0	0	0	2	14	16	16	7	1	2	1
110	1	4	14	16	14	5	0	0	0	2	14	15	15	6	1	2	1
111	1	3	13	15	13	4	0	0	0	1	12	15	14	6	1	2	1
112	1	2	11	14	12	3	0	0	0	1	12	14	13	5	1	2	1
113	1	1	10	12	11	2	0	0	0	1	11	13	12	4	1	2	1
114	1	1	9	11	10	2	0	0	0	1	10	12	11	3	1	2	1
115	1	0	8	10	8	1	0	0	0	0	9	11	10	2	1	3	1
116	1	0	6	9	7	1	0	0	0	0	7	10	9	2	1	3	1
117	1	0	5	7	6	0	0	0	0	0	6	9	8	1	1	3	1
118	1	0	4	6	5	0	0	0	0	0	5	8	7	1	1	3	1
119	0	0	3	5	4	0	0	0	0	0	4	7	6	1	1	3	0
120	0	0	2	4	3	0	0	0	0	0	3	6	4	0	1	3	0
121	0	0	1	3	1	0	0	0	0	0	2	5	4	0	1	3	0

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122	0	0	0	2	1	0	0	0	0	0	2	4	3	1	1	3	0
123	0	0	0	1	0	0	0	0	0	0	1	3	2	1	0	3	0
124	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	3	0
125	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	3	0
126	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	3	0
127	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0
128	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0
129	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
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	1	0	0	0
132	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
133	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
134	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
135	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
136	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
137	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
138	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
139	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
140	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
141	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
142	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
143	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
144	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
145	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
146	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
147	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
148	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
149	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
150	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
151	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
152	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1

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153	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
154	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
155	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
156	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
157	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
158	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1
159	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1
160	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1
161	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1
162	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1
163	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1
164	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1
165	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0
166	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
167	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0
168	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0
169	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0
170	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
171	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
173	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
174	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
176	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
178	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
180	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 \*\*\*\*\***

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