



Report No.: GZE160820-D

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-7312-27-A

Representative (Tested) Model: LED-7312-27-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

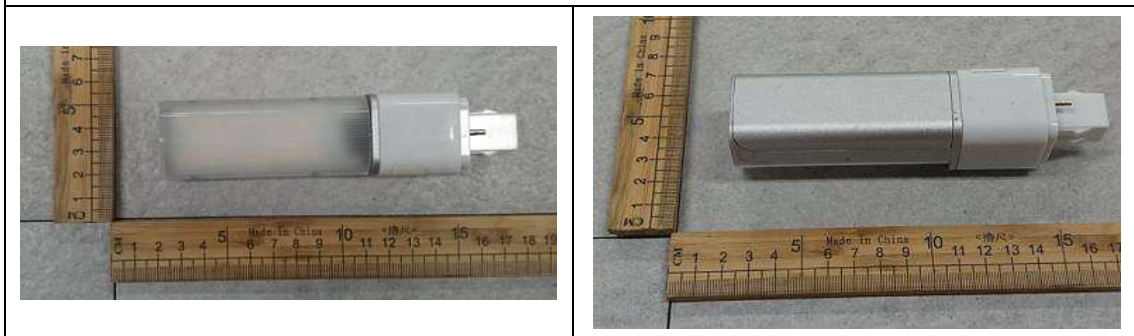
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**1.1 Product Information:**

Organization Name	LIGHT EFFICIENT DESIGN	
Brand Name	N/A	
Model Number	LED-7312-27-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-D1(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-7312-27-A		

**Electrical Measurement :**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160820-D1	120.0	60	0.0623	6.75	0.9024	18.59

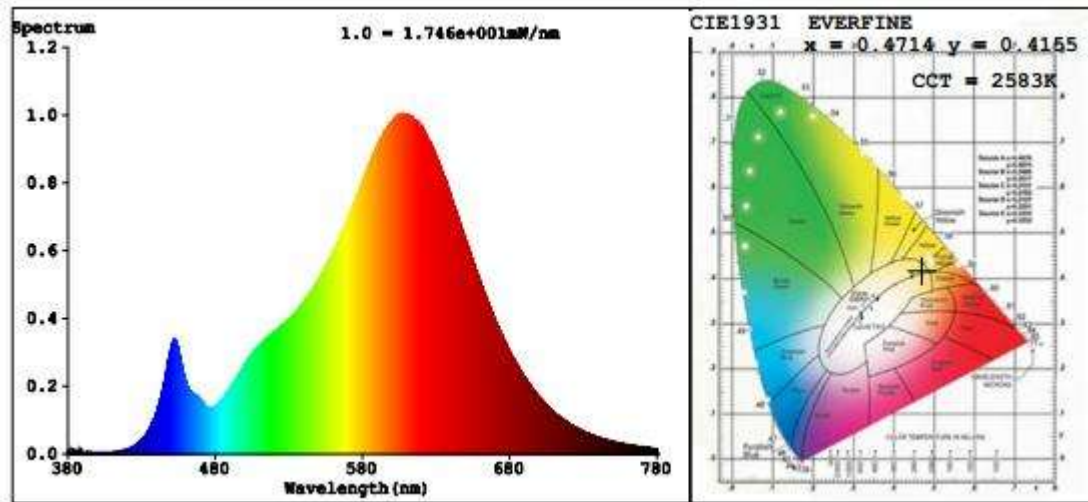
**Chromaticity Measurement - Sphere-Spectroradiometer Method :**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	6
Frequency (Hz)	60	R2	92	R10	82
CCT (K)	2583	R3	95	R11	79
Duv	0.0009	R4	79	R12	76
Chromaticity (x, y)	x=0.4714 y=0.4155	R5	81	R13	83
Chromaticity (u', v')	u'=0.2677 v'=0.5309	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)	801.51
Luminous Efficacy (lm/W)	118.74
Beam Angle (°)	108.5
Center Beam Candle Power (cd)	269

**Spectral Power Distribution & Chromaticity Diagram**



**Zonal Lumen Tabulation**

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	205.9	25.7%
0-40	335.8	41.9%
0-60	587.4	73.3%
60-90	193.4	24.1%
70-100	109.3	13.6%
90-120	19.5	2.4%
0-90	780.8	97.4%
90-180	20.7	2.6%
0-180	801.5	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	25.2	3.1%	90-100	8.5	1.1%
10-20	72.0	9.0%	100-110	8.1	1%
20-30	108.7	13.6%	110-120	2.9	0.4%
30-40	129.9	16.2%	120-130	0.5	0.1%
40-50	132.9	16.6%	130-140	0.2	0%
50-60	118.7	14.8%	140-150	0.2	0%
60-70	92.6	11.6%	150-160	0.2	0%
70-80	63.0	7.9%	160-170	0.1	0%
80-90	37.7	4.7%	170-180	0.0	0%

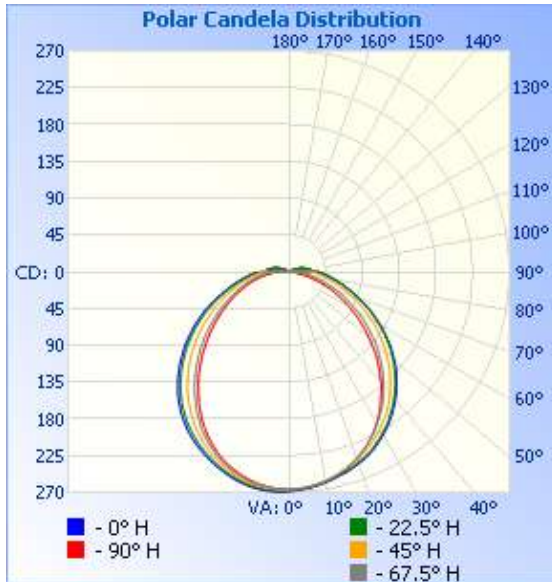
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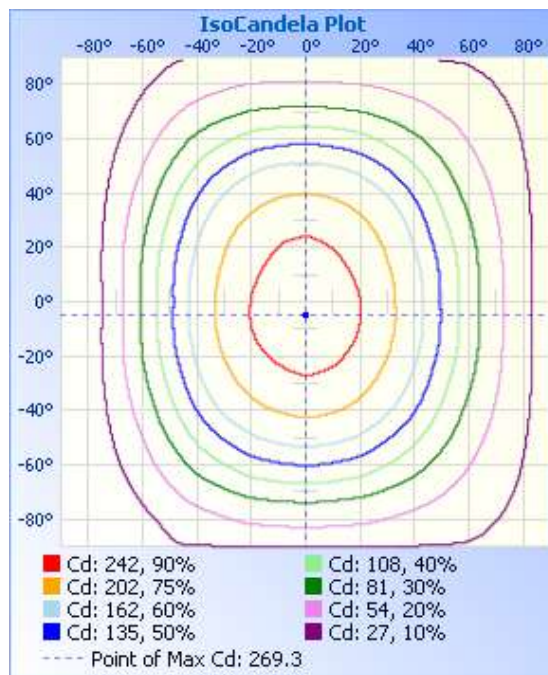
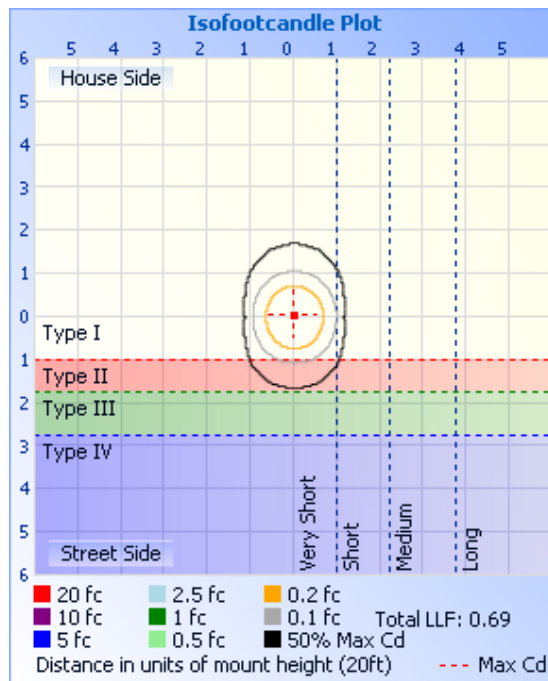
**Photometric Data**



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
17.0ft	0.93 fc	57.1 ft	39.4 ft
34.0ft	0.23 fc	114.2 ft	78.9 ft
51.0ft	0.10 fc	171.3 ft	118.3 ft
68.0ft	0.06 fc	228.4 ft	157.8 ft
85.0ft	0.04 fc	285.5 ft	197.2 ft
102.0ft	0.03 fc	342.5 ft	236.6 ft

■ Vert. Spread: 118.4°  
■ Horiz. Spread: 98.5°



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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	269	268	266	266	266	266	266	266	269	268	266	266	266	266	266	266	269
1	268	267	266	266	266	266	266	266	269	268	266	266	266	266	265	266	268
2	268	267	266	265	266	266	266	266	269	268	267	266	266	265	265	265	268
3	267	266	265	265	266	266	266	267	269	268	266	266	265	265	264	264	267
4	267	266	264	265	266	266	266	267	269	268	266	265	265	264	264	264	267
5	266	265	264	264	265	266	266	267	269	268	266	265	265	263	263	263	266
6	265	264	263	264	265	265	266	267	269	268	266	264	264	263	262	262	265
7	264	263	262	263	264	265	265	266	269	267	265	264	263	262	261	262	264
8	263	262	262	262	263	264	265	266	268	267	265	263	262	261	260	261	263
9	262	261	260	261	262	263	264	265	268	266	264	262	261	260	259	260	262
10	261	261	259	260	261	263	264	264	267	265	263	261	260	258	258	259	261
11	260	259	258	259	260	261	263	264	266	265	262	260	259	257	257	257	260
12	259	258	257	257	259	260	262	263	265	264	261	259	257	256	256	256	259
13	258	257	256	256	257	259	261	262	264	263	260	257	256	254	254	255	258
14	257	256	254	254	256	258	259	261	263	261	258	256	254	253	252	254	257
15	256	255	252	252	254	256	258	259	262	260	257	254	252	251	251	253	256
16	255	254	251	251	252	255	257	258	261	259	255	253	250	249	249	252	255
17	254	252	249	249	250	253	255	256	259	257	254	251	248	247	247	250	254
18	252	251	248	247	248	251	253	255	258	256	252	249	246	245	246	249	252
19	251	250	246	245	246	249	252	253	256	254	250	247	244	243	244	248	251
20	250	248	244	243	244	247	250	252	255	252	248	245	242	240	242	246	250
21	248	247	242	240	242	245	248	250	253	250	246	242	239	238	241	244	248
22	247	245	241	238	238	243	246	249	251	249	244	239	237	235	238	243	247
23	245	243	238	235	236	240	243	246	249	247	242	237	234	232	237	241	245
24	243	242	236	233	233	237	242	244	247	245	240	234	231	230	234	240	243
25	242	240	235	230	230	235	239	243	246	243	237	232	228	227	232	238	242
26	240	238	232	227	228	232	236	241	244	241	235	229	225	224	230	236	240
27	237	235	230	225	224	229	234	238	242	239	232	226	221	221	227	234	237
28	235	234	228	222	222	226	232	236	240	237	229	223	218	218	225	232	235

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29	233	231	225	219	218	223	229	234	238	235	227	220	215	215	222	229	233
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33	223	221	215	205	204	210	217	224	229	225	215	206	200	201	211	219	223
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35	218	215	209	199	196	202	211	219	224	219	209	198	192	194	205	213	218
36	215	213	206	196	191	199	209	216	221	216	206	194	188	190	202	211	215
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38	209	207	199	189	183	191	202	210	215	211	199	187	180	183	195	205	209
39	206	204	196	184	180	187	199	208	212	208	196	183	176	179	192	202	206
40	203	200	192	180	175	183	195	204	209	204	193	179	172	175	188	198	203
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42	196	194	185	172	167	175	188	198	203	198	186	171	164	167	181	192	196
43	193	191	182	168	162	171	185	194	199	194	182	167	159	164	178	189	193
44	190	188	179	164	158	167	181	191	195	191	178	164	156	160	174	185	190
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46	183	181	171	156	149	158	174	185	188	183	170	155	148	152	167	178	183
47	179	177	167	152	144	154	170	181	185	180	167	151	143	148	163	175	179
48	176	173	163	148	139	150	166	177	181	176	163	147	139	143	159	171	176
49	172	171	160	144	134	146	162	173	177	173	159	144	135	140	155	167	172
50	168	167	155	139	130	141	158	169	174	169	155	139	131	136	151	163	168
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52	161	159	148	131	121	132	150	162	165	161	147	131	123	128	143	156	161
53	157	155	144	126	116	128	146	157	162	157	143	127	119	124	140	152	157
54	153	151	140	122	111	123	142	154	158	153	140	123	115	120	136	149	153
55	149	147	136	118	107	119	138	150	154	149	135	119	111	116	131	144	149
56	145	143	132	113	102	114	133	146	150	145	131	115	108	113	128	141	145
57	141	140	128	109	98	109	129	142	146	141	127	111	104	109	124	137	141
58	137	135	124	105	93	106	125	138	142	137	123	107	100	105	120	132	137
59	133	132	120	101	89	101	121	134	138	134	120	103	97	101	116	129	133

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60	129	127	116	96	85	97	117	130	134	129	116	100	93	98	112	124	129
61	125	123	112	93	80	92	114	127	130	125	111	96	89	94	109	121	125
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73	79	77	68	48	34	47	69	81	83	79	70	58	52	57	67	76	79
74	75	75	65	45	31	45	66	77	79	76	67	55	50	54	65	73	75
75	72	71	62	42	27	41	62	73	76	73	64	53	47	51	62	70	72
76	69	68	59	39	25	38	60	71	73	69	61	50	44	49	59	66	69
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78	64	63	53	34	18	33	54	65	67	64	56	46	39	44	54	61	64
79	61	60	50	32	16	31	51	62	64	61	53	43	37	43	52	59	61
80	58	57	48	29	13	28	48	58	61	58	51	41	34	40	49	56	58
81	56	55	46	27	11	25	46	56	58	56	48	39	31	38	47	54	56
82	53	52	43	25	8	22	43	53	55	54	47	37	29	36	45	51	53
83	51	50	41	23	6	19	41	51	53	51	44	35	27	34	42	49	51
84	48	48	39	21	4	16	39	49	51	49	42	33	25	33	41	47	48
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86	44	43	35	18	2	12	35	44	46	44	38	29	20	28	37	43	44
87	42	41	33	16	1	12	32	42	44	42	36	27	18	27	35	41	42
88	40	40	31	15	1	12	31	40	42	40	34	26	16	25	33	39	40
89	38	38	29	14	0	12	28	37	40	38	32	23	15	23	32	37	38
90	35	33	26	12	0	9	17	24	25	23	19	16	10	16	25	33	35

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

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

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