



Report No.: GZE160820-N

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-7324-35-A

Representative (Tested) Model: LED-7324-35-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-7324-35-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	3500K	
LED Manufacturer	Samsung Electronics LED Business	
LED Model	SPMWHT327F*****	
Sample Number	GZE160820-N1(3500K)	
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-7324-35-A		

**Electrical Measurement :**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160820-N1	120.0	60	0.0614	6.65	0.9025	17.94

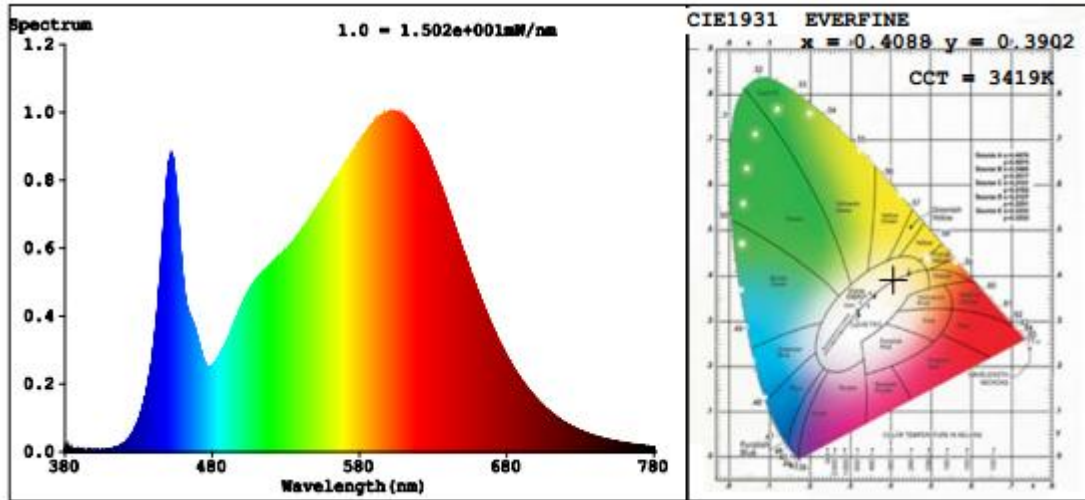
**Chromaticity Measurement - Sphere-Spectroradiometer Method :**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	84	R9	19
Frequency (Hz)	60	R2	92	R10	82
CCT (K)	3419	R3	97	R11	83
Duv	-0.0010	R4	83	R12	70
Chromaticity (x, y)	x=0.4088 y=0.3902	R5	84	R13	86
Chromaticity (u', v')	u'=0.2382 v'=0.5116	R6	89	R14	99
Color Rendering Index (CRI)	85.1	R7	86	R15	78
R9	19	R8	66	--	--

**Photometric Measurement – Goniophotometer Method :**

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	841.88
Luminous Efficacy (lm/W)	126.60
Beam Angle (°)	109.1
Center Beam Candle Power (cd)	278

**Spectral Power Distribution & Chromaticity Diagram**

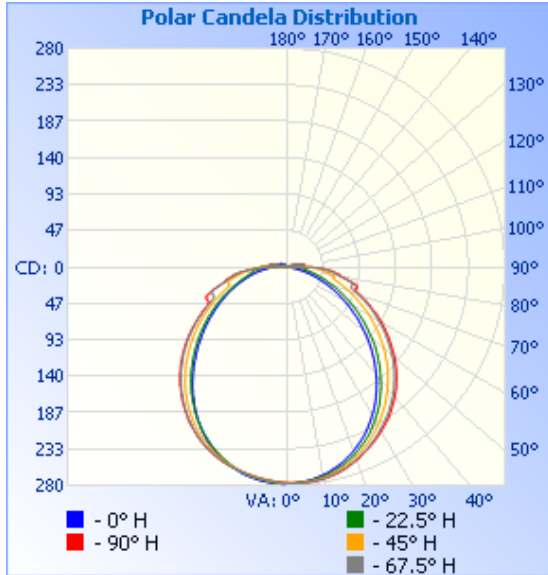


**Zonal Lumen Tabulation**

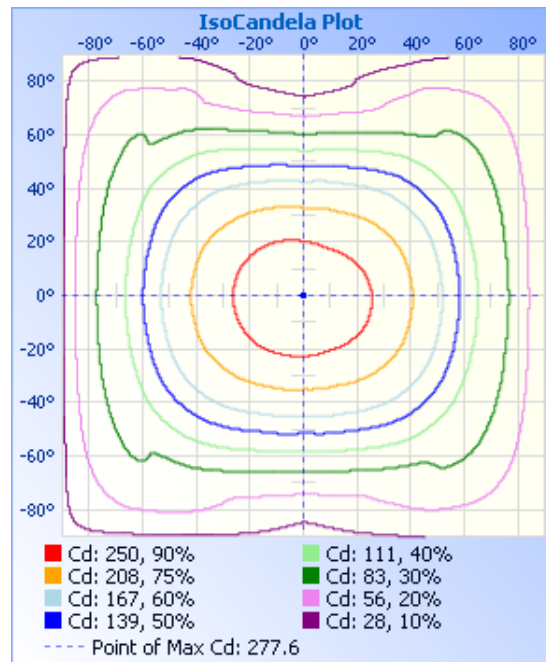
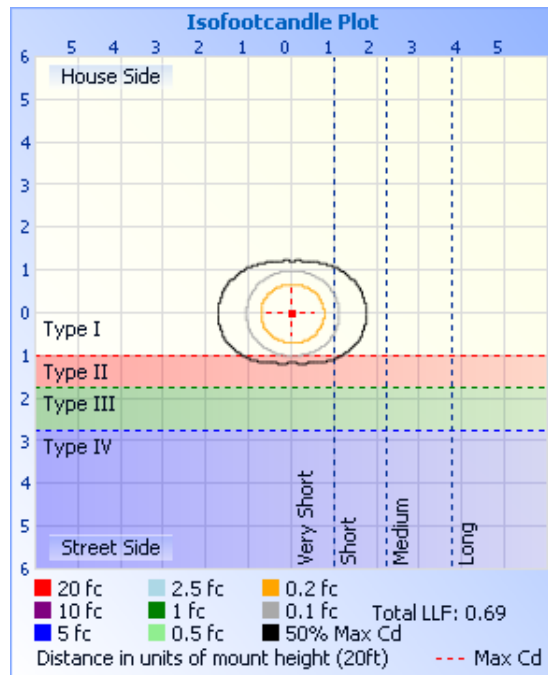
Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	214.5	25.5%
0-40	350.1	41.6%
0-60	612.7	72.8%
60-90	212.4	25.2%
70-100	123.1	14.6%
90-120	14.7	1.7%
0-90	825.1	98%
90-180	16.8	2%
0-180	841.9	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	26.2	3.1%	90-100	7.6	0.9%
10-20	75.0	8.9%	100-110	5.8	0.7%
20-30	113.3	13.5%	110-120	1.3	0.2%
30-40	135.6	16.1%	120-130	0.7	0.1%
40-50	138.8	16.5%	130-140	0.4	0%
50-60	123.8	14.7%	140-150	0.5	0.1%
60-70	96.9	11.5%	150-160	0.4	0%
70-80	71.8	8.5%	160-170	0.2	0%
80-90	43.7	5.2%	170-180	0.0	0%

**Photometric Data**



Distance (ft)	Center Beam fc	Beam Width
17.0ft	0.96 fc	40.2 ft
34.0ft	0.24 fc	80.5 ft
51.0ft	0.11 fc	120.7 ft
68.0ft	0.06 fc	161.0 ft
85.0ft	0.04 fc	201.2 ft
102.0ft	0.03 fc	241.5 ft



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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	278	277	277	277	277	276	275	276	278	277	277	277	277	276	275	276	278
1	277	277	277	277	277	276	276	276	278	277	277	277	276	275	275	275	277
2	277	277	277	277	277	276	276	276	278	277	276	276	276	275	275	275	277
3	277	277	277	277	277	276	276	276	277	277	276	276	275	274	274	274	277
4	276	277	277	277	277	276	276	276	277	276	275	275	275	274	273	274	276
5	276	276	277	277	277	276	276	275	277	276	275	275	274	273	273	273	276
6	275	276	276	277	277	276	276	275	276	275	274	274	273	272	272	272	275
7	274	275	276	277	277	276	275	275	276	274	273	273	273	271	271	271	274
8	273	274	275	276	277	276	275	274	275	273	273	272	272	270	270	271	273
9	272	273	275	276	276	275	274	273	274	272	272	271	271	270	269	269	272
10	271	272	274	275	276	275	274	273	273	271	271	271	270	269	268	268	271
11	269	271	273	275	275	274	273	272	272	270	270	270	269	268	267	267	269
12	268	270	272	274	274	273	272	270	270	269	269	269	268	267	265	265	268
13	266	269	271	273	273	272	271	269	269	268	267	268	268	266	264	264	266
14	264	267	270	272	272	271	270	268	267	266	266	267	267	265	262	262	264
15	262	265	268	270	271	270	269	266	266	264	265	266	265	263	261	260	262
16	261	264	267	269	270	268	267	265	264	262	263	264	265	262	259	258	261
17	258	262	265	268	268	267	266	263	262	260	262	263	263	261	258	256	258
18	256	260	263	266	267	265	264	261	260	259	260	262	262	260	256	254	256
19	254	258	262	264	265	263	262	259	258	256	259	261	261	258	254	252	254
20	251	255	260	262	263	262	260	257	256	254	257	260	260	257	252	249	251
21	248	253	257	260	262	260	259	255	253	252	255	258	258	255	250	247	248
22	245	251	255	259	259	258	256	253	251	249	253	256	256	253	248	245	245
23	243	248	253	257	257	256	254	250	248	247	251	254	254	251	247	242	243
24	240	246	250	255	255	254	252	248	245	244	249	252	252	250	244	240	240
25	237	242	248	252	254	252	249	245	243	241	247	250	251	247	242	237	237
26	234	240	245	250	252	250	247	242	240	239	245	248	248	245	240	234	234
27	230	237	242	248	250	248	244	239	236	236	242	246	246	243	237	231	230
28	227	233	240	246	247	245	241	236	233	233	239	244	244	241	235	228	227

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29	224	230	237	243	245	243	239	232	229	229	237	241	241	238	232	225	224
30	220	227	234	240	243	241	236	229	226	227	234	239	239	236	229	221	220
31	216	223	231	238	240	238	234	226	223	223	231	236	236	233	226	218	216
32	212	220	228	236	238	236	230	223	218	220	228	233	234	230	224	215	212
33	209	216	225	233	236	234	227	219	215	216	225	230	231	228	220	211	209
34	205	213	222	230	234	231	223	216	211	212	222	227	228	225	217	208	205
35	200	209	219	228	231	228	221	212	206	209	218	225	226	222	214	204	200
36	197	205	216	225	228	225	217	207	203	205	215	221	222	219	211	200	197
37	192	200	212	222	225	222	214	203	199	202	212	218	220	215	208	197	192
38	188	197	208	219	222	219	211	200	195	198	208	215	216	213	204	193	188
39	183	193	206	216	219	216	207	196	191	193	205	212	213	209	200	189	183
40	179	188	202	212	216	213	203	192	186	190	201	209	210	206	197	185	179
41	175	184	199	210	213	210	200	188	182	186	198	205	206	203	193	180	175
42	170	180	195	206	210	207	196	183	178	182	194	201	203	199	189	177	170
43	166	176	191	202	206	203	193	179	174	178	189	198	199	196	186	172	166
44	161	171	187	199	203	200	189	175	169	173	186	194	195	192	182	167	161
45	155	166	183	195	200	196	185	170	164	170	182	191	192	189	178	164	155
46	151	162	179	192	196	192	181	166	161	165	178	187	188	185	174	159	151
47	146	157	176	188	193	189	177	162	156	161	174	183	185	180	170	155	146
48	142	153	171	185	189	185	174	158	152	157	170	179	181	177	166	150	142
49	137	149	168	181	184	181	169	154	148	152	166	175	177	173	162	145	137
50	132	144	163	177	181	177	165	149	143	149	162	172	173	169	158	142	132
51	127	139	160	173	177	173	161	145	139	144	158	167	168	165	154	137	127
52	122	134	155	169	172	169	157	141	135	140	153	163	165	161	149	133	122
53	117	130	151	165	169	165	153	137	131	136	149	159	160	157	145	128	117
54	113	125	147	161	165	160	149	133	126	131	145	154	156	153	141	123	113
55	108	121	142	157	161	157	144	128	122	128	141	151	152	148	137	119	108
56	103	116	138	153	157	152	141	125	118	123	137	146	147	144	133	114	103
57	99	111	134	149	152	149	136	120	114	120	133	141	143	140	128	110	99
58	94	107	130	145	149	144	133	117	110	115	128	138	139	136	124	105	94
59	90	102	126	141	144	140	128	113	106	111	125	133	134	131	120	101	90

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60	85	98	121	136	140	136	125	108	102	108	120	129	130	126	116	97	85
61	80	94	118	132	136	131	120	105	99	103	116	124	125	123	112	92	80
62	77	90	113	128	132	128	116	101	95	99	112	120	121	118	107	89	77
63	72	85	109	124	127	123	112	97	91	96	108	116	117	114	104	84	72
64	68	81	105	120	123	120	108	93	88	92	105	111	112	110	99	80	68
65	64	77	101	115	119	115	105	89	84	89	100	107	110	105	96	76	64
66	60	73	98	112	114	111	100	86	81	85	96	104	109	102	91	72	60
67	56	69	93	107	110	107	96	82	77	81	93	101	109	99	87	69	56
68	52	65	89	104	106	103	93	80	73	78	89	100	110	98	84	65	52
69	48	62	86	99	101	99	89	76	71	75	86	100	110	98	80	61	48
70	44	58	82	95	98	95	86	73	67	72	82	101	108	99	76	58	44
71	41	54	79	92	94	92	82	70	64	68	79	101	105	100	74	54	41
72	37	51	75	88	93	88	80	66	61	65	77	100	100	98	73	51	37
73	33	48	72	87	94	86	76	64	58	63	76	97	96	96	73	48	33
74	30	45	69	87	95	87	73	61	55	59	77	92	91	91	75	44	30
75	27	42	65	88	94	88	70	58	52	57	78	87	87	85	74	42	27
76	24	39	63	88	90	88	67	55	49	54	77	83	82	81	72	39	24
77	20	36	61	84	86	85	65	53	46	52	75	78	80	77	69	36	20
78	18	33	62	80	81	82	67	50	43	50	70	76	79	75	65	33	18
79	14	31	62	75	77	77	68	48	41	47	67	74	75	74	61	31	14
80	11	29	61	71	72	72	68	46	38	45	63	70	71	69	57	30	11
81	9	27	56	66	69	68	64	43	36	44	59	66	69	66	57	31	9
82	6	24	52	65	69	66	61	41	33	44	58	66	65	63	54	31	6
83	5	24	49	63	64	65	57	40	30	43	55	63	60	60	51	28	5
84	3	23	49	58	60	60	54	40	28	40	53	57	54	54	48	25	3
85	1	21	46	56	59	57	52	39	26	38	49	51	50	49	42	23	1
86	1	19	42	52	53	55	48	36	24	35	44	47	45	45	38	20	1
87	0	16	39	47	48	48	45	34	22	32	41	42	40	40	34	18	0
88	0	14	35	42	43	44	40	31	20	30	37	38	36	36	30	15	0
89	0	12	31	37	38	36	35	25	18	26	34	35	33	33	27	13	0
90	0	9	25	25	21	16	17	17	12	20	28	31	31	30	24	11	0

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

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122	0	0	0	0	0	0	0	1	8	1	0	0	0	0	0	0
123	0	0	0	0	0	0	0	0	8	1	0	0	0	0	0	0
124	0	0	0	0	0	0	0	1	8	1	0	0	0	0	0	0
125	0	0	0	0	0	0	0	0	8	1	0	0	0	0	0	0
126	0	0	0	0	0	0	0	0	8	1	0	0	0	0	0	0
127	0	0	0	0	0	0	0	0	7	0	1	0	0	0	0	0
128	0	0	0	0	0	0	0	0	7	0	1	0	0	0	0	0
129	0	0	0	0	0	0	0	0	4	0	1	0	0	0	0	0
130	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
131	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
132	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
133	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0
134	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0
135	0	0	0	0	0	0	0	2	1	2	0	0	0	0	0	0
136	0	0	0	0	0	0	0	2	1	2	0	0	0	0	0	0
137	0	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0
138	0	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0
139	0	0	0	0	0	0	0	3	1	3	0	0	0	0	0	0
140	0	0	0	0	0	0	0	3	1	3	0	0	0	0	0	0
141	0	0	0	0	0	0	0	3	1	3	1	0	0	0	0	0
142	0	0	0	0	0	0	0	3	1	3	0	0	0	0	0	0
143	0	0	0	0	0	0	0	3	1	3	0	0	0	0	0	0
144	0	0	0	0	0	0	0	3	1	3	1	0	0	0	0	0
145	0	0	0	0	0	0	1	3	1	3	1	0	0	0	0	0
146	0	0	0	0	0	0	1	3	1	3	1	0	0	0	0	0
147	0	0	0	0	0	0	1	3	1	3	1	0	0	0	0	0
148	0	0	0	0	0	0	1	3	1	3	1	0	0	0	0	0
149	0	0	0	0	0	0	1	3	1	3	1	0	0	0	0	0
150	0	0	0	0	0	0	1	3	1	3	1	0	0	0	0	0
151	0	0	0	0	0	0	1	3	1	3	1	0	0	0	0	0
152	0	0	0	0	0	0	1	3	1	3	1	0	0	0	0	0

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153	0	0	0	0	0	0	1	3	1	3	1	0	0	0	0	0	0
154	0	0	0	0	0	0	1	3	1	3	1	1	0	0	0	0	0
155	0	0	0	0	0	0	1	3	1	3	1	0	0	0	0	0	0
156	0	0	0	0	0	0	1	2	1	3	1	1	0	0	0	0	0
157	0	0	0	0	0	0	1	2	1	3	1	1	0	0	0	0	0
158	0	0	0	0	0	0	1	2	1	2	1	1	0	0	0	0	0
159	0	0	0	0	0	0	1	2	1	2	1	1	0	0	0	0	0
160	0	0	0	0	0	1	1	2	1	2	1	1	0	0	0	0	0
161	0	0	0	0	0	1	1	2	1	2	1	1	0	0	0	0	0
162	0	0	0	0	0	0	1	2	1	2	1	1	0	0	0	0	0
163	0	0	0	0	0	1	1	2	1	2	1	1	0	0	0	0	0
164	0	0	0	0	0	1	1	2	1	1	1	1	0	0	0	0	0
165	0	0	0	0	0	0	1	2	1	1	1	1	0	0	0	0	0
166	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0
167	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0
168	0	0	0	0	0	0	1	1	0	1	1	1	0	0	0	0	0
169	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0
170	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0
171	0	0	0	0	0	1	1	1	1	0	1	0	0	0	0	0	0
172	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0
173	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
174	0	0	0	0	0	0	1	1	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 \*\*\*\*\***

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