LM-79-08 Test Report

For

LIGHT EFFICIENT DESIGN

(Brand Name:N/A)

188 S. Northwest HighwayCary, IL60013

LED Luminaires

Model name(s): LED-8024M40-A
LED-8024-CW-E40-A

Remark: The two models are the same product with two model names

Representative (Tested) Model: LED-8024M40-A

Model Different: N/A

Test & Report By:

Garman Mo

Engineer: Garman Mo

Date: Mar.22,2017

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.

1.1 Product Information:

Organization Name	LIGHT EFFICIENT DESIGN	
Brand Name	N/A	
Model Number	LED-8024M40-A, LED-8024-CW-E40-A	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	LED Luminaires	
Rated Voltage / Frequency	120-277Vac, 50/60 Hz	
Nominal Power	45W	
Rated Initial Lamp Lumen	--	
Declared CCT	4000K	
LED Manufacturer	Samsung	
LED Model	LM561B	
Sample Number	GZE161214-F1	
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	Jan 16,2017
Date of Test	Jan 17,2017
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° C ± 1° 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 25º C ± 1º 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 25º C ± 1º 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	2017-01-17	Test Ambient:	25.2 º C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	LED-8024M40-A		

Electrical Measurement :

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
GZE161214-	120.0	60	0.4094	47.57	0.9684
F1	277.0	60	0.1786	46.23	0.9344

Chromaticity Measurement - Sphere-Spectroradiometer Method :

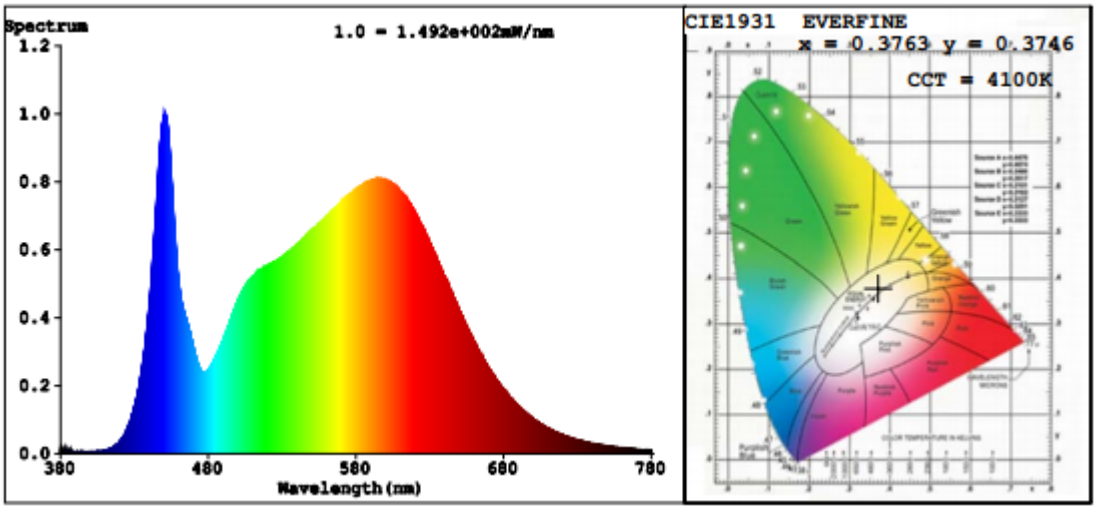
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	4100
Duv	0.0002
Chromaticity (x, y)	x=0.3763 y=0.3746
Chromaticity (u', v')	u'=0.2232 v'=0.5000
Color Rendering Index (CRI)	84.7
R9	14

Special Color Rendering Indices			
R1	83	R9	14
R2	90	R10	77
R3	96	R11	84
R4	84	R12	66
R5	84	R13	85
R6	87	R14	98
R7	87	R15	77
R8	67	--	--

Photometric Measurement – Goniophotometer Method :

Parameter	Result	
Test Voltage (V)	120.0	277.0
Frequency (Hz)	60	60
Total Luminous (lm)	6923.9	6842.0
Luminous Efficacy (lm/W)	145.55	148.00
Beam Angle (°)	278.0	--
Center Beam Candle Power (cd)	308	--

Spectral Power Distribution & Chromaticity Diagram

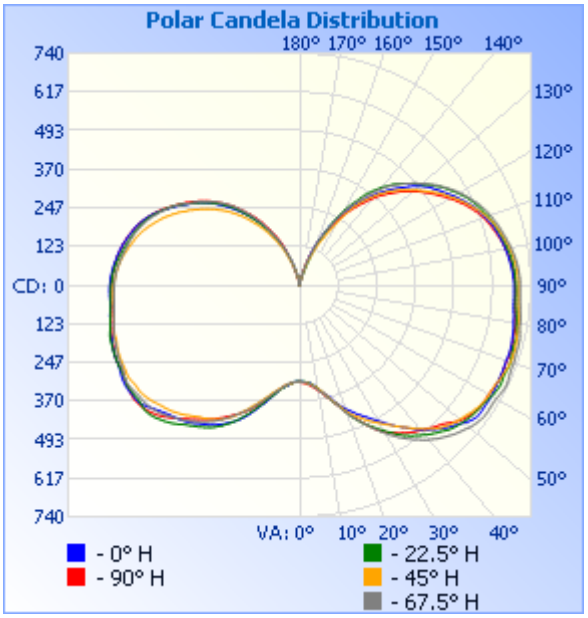


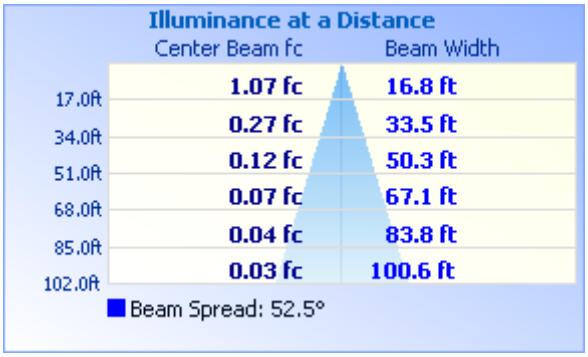
Zonal Lumen Tabulation

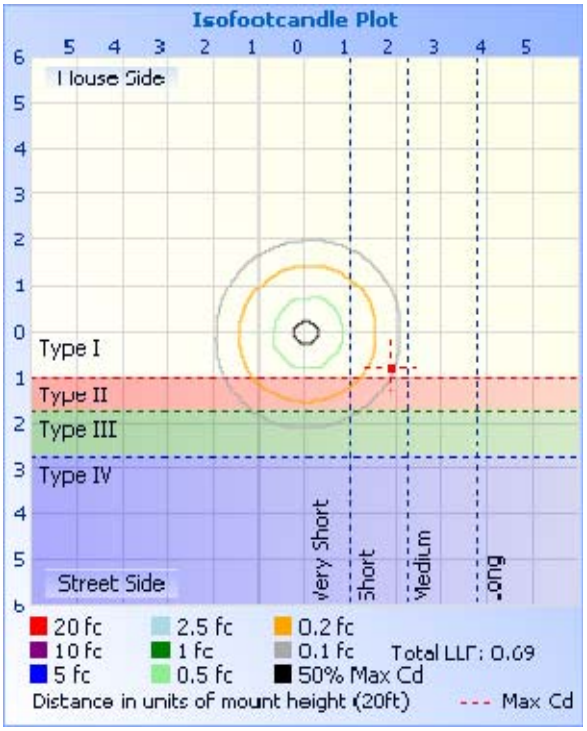
Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	360.1	5.2%
0-40	714.1	10.3%
0-60	1,807.7	26.1%
60-90	2,122.0	30.6%
70-100	2,156.4	31.1%
90-120	1,945.1	28.1%
0-90	3,929.8	56.8%
90-180	2,994.6	43.2%
0-180	6,924.4	100%

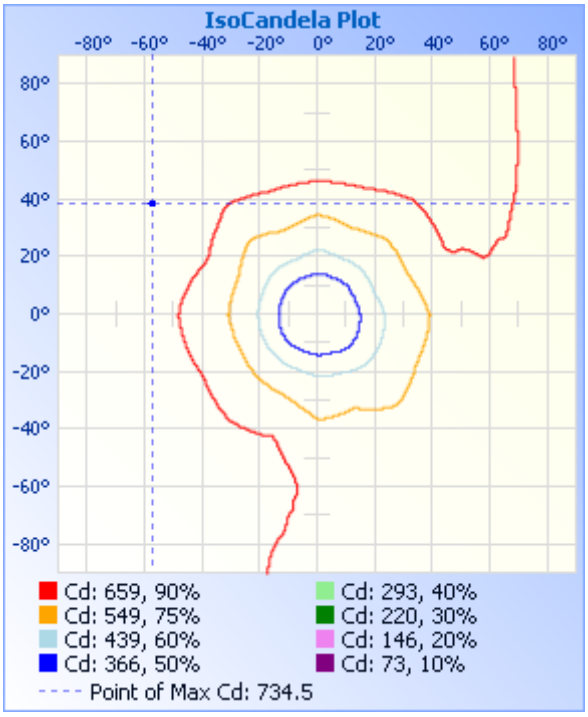
Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	30.7	0.4%	90-100	713.0	10.3%
10-20	108.0	1.6%	100-110	660.9	9.5%
20-30	221.4	3.2%	110-120	571.2	8.2%
30-40	354.0	5.1%	120-130	448.7	6.5%
40-50	489.2	7.1%	130-140	317.9	4.6%
50-60	604.4	8.7%	140-150	187.7	2.7%
60-70	678.6	9.8%	150-160	79.2	1.1%
70-80	718.0	10.4%	160-170	15.6	0.2%
80-90	725.4	10.5%	170-180	0.6	0%

Photometric Data









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	308	308	308	308	308	308	308	308	308	308	308	308
1	308	308	310	309	311	307	307	309	307	307	310	309	310	309	307	309	308
2	309	309	310	310	311	307	308	309	308	308	309	309	310	309	309	310	309
3	310	309	311	311	313	308	309	311	309	309	310	310	310	309	310	312	310
4	311	310	313	312	315	309	312	314	313	313	312	312	312	310	312	313	311
5	312	313	315	314	318	313	317	317	316	315	315	313	314	314	314	313	312
6	315	316	317	317	321	317	321	321	320	319	317	316	317	317	317	316	315
7	319	319	321	323	326	322	324	325	322	321	320	320	320	321	321	319	319
8	323	324	326	327	330	326	327	328	327	326	323	324	323	324	324	323	323
9	330	329	329	333	335	330	332	333	330	331	326	327	328	329	329	329	330
10	335	336	335	339	342	337	337	339	334	336	332	334	333	337	334	334	335
11	342	342	341	345	346	342	343	344	342	342	338	340	339	343	339	341	342
12	349	349	348	352	353	347	349	353	351	351	342	345	347	351	348	350	349
13	355	358	357	360	361	357	357	362	358	359	349	351	353	358	356	358	355
14	363	367	365	368	369	365	367	371	367	365	354	359	362	367	363	367	363
15	370	377	374	376	378	376	377	380	376	373	362	366	369	378	373	374	370
16	381	386	384	386	387	386	389	389	387	382	371	374	379	388	381	384	381
17	391	394	394	397	397	396	401	402	397	393	378	382	388	399	392	392	391
18	399	405	404	407	407	408	410	415	406	403	386	391	395	408	400	404	399
19	410	416	414	421	417	419	423	426	417	412	394	400	404	421	412	416	410
20	418	429	426	432	430	432	433	440	427	424	404	408	412	430	423	426	418
21	426	444	435	445	439	443	447	451	438	433	412	419	422	442	432	438	426
22	433	455	446	455	452	457	459	464	450	445	422	427	429	451	444	448	433
23	441	467	453	466	463	470	472	475	459	455	432	436	437	462	452	459	441
24	451	477	461	475	476	481	486	487	469	466	441	443	444	472	463	469	451
25	457	488	468	488	487	495	497	500	477	477	452	452	452	480	472	478	457
26	466	497	477	499	499	506	510	509	486	485	462	460	460	489	482	487	466
27	473	508	485	512	509	520	520	520	492	496	472	469	466	497	490	498	473
28	482	516	493	522	522	532	532	528	500	503	479	478	473	506	499	506	482

29	491	527	500	535	531	545	542	539	507	513	487	486	480	512	506	517	491
30	501	536	509	545	541	558	553	547	513	521	494	495	488	520	514	527	501
31	509	547	516	557	548	568	564	557	520	529	500	503	495	527	521	538	509
32	521	556	525	567	556	579	572	565	525	536	506	511	503	536	530	547	521
33	530	567	533	579	562	587	581	574	531	541	511	518	511	543	537	557	530
34	542	576	542	588	570	596	588	583	536	547	516	526	517	552	544	566	542
35	550	586	551	599	576	603	597	589	542	552	520	532	524	559	549	575	550
36	561	594	561	607	583	611	604	598	546	558	524	539	530	569	556	582	561
37	570	602	569	618	588	616	611	605	552	563	528	546	537	577	561	590	570
38	581	608	579	626	595	623	617	614	558	569	533	552	543	587	568	597	581
39	593	617	590	635	599	628	622	621	563	574	539	559	551	595	573	605	593
40	602	623	599	644	605	634	628	629	568	581	544	564	558	606	580	612	602
41	612	632	609	651	610	641	632	637	572	589	550	570	566	615	586	621	612
42	620	637	618	660	615	646	636	645	576	595	556	575	573	624	595	628	620
43	631	644	628	665	622	652	640	652	579	602	562	581	582	631	604	635	631
44	638	649	635	673	627	657	645	657	583	607	566	585	590	638	613	643	638
45	647	657	642	679	632	663	651	662	586	613	571	591	596	644	623	649	647
46	654	664	648	686	638	670	657	665	590	618	576	597	604	649	631	657	654
47	662	669	654	691	646	677	663	670	596	624	579	601	611	654	640	664	662
48	669	674	658	696	654	682	670	674	601	628	583	607	618	658	646	673	669
49	677	677	664	701	664	688	678	676	607	632	586	611	622	662	653	679	677
50	683	681	667	708	671	694	683	677	612	634	591	615	628	665	659	683	683
51	693	684	671	713	677	698	688	678	619	636	595	618	632	665	667	685	693
52	699	687	675	716	682	704	693	678	625	635	600	619	635	664	673	687	699
53	704	690	680	720	687	707	698	679	632	634	603	621	638	664	680	690	704
54	706	693	685	722	690	709	702	679	636	633	607	622	640	664	684	694	706
55	708	695	688	724	693	709	706	680	637	632	610	623	642	664	690	698	708
56	707	697	693	725	695	710	709	683	639	634	612	625	642	666	693	701	707
57	707	699	695	725	697	713	710	684	640	635	614	627	641	669	694	704	707
58	708	702	697	724	698	715	712	684	641	635	614	629	640	671	693	708	708
59	708	705	698	724	698	718	713	685	642	637	615	632	639	674	692	712	708
60	707	709	699	726	698	721	713	687	642	638	617	634	639	678	692	715	707

61	707	712	700	728	699	725	711	690	642	635	620	634	637	681	691	717	707
62	707	714	701	731	701	729	708	692	641	633	622	633	635	681	692	719	707
63	706	716	702	733	703	730	706	692	639	633	621	631	632	681	692	722	706
64	705	717	705	**735**	706	732	706	692	637	633	620	627	631	681	691	724	705
65	705	716	707	734	707	732	706	692	635	633	619	625	631	680	692	724	705
66	705	714	710	732	707	732	707	694	633	633	620	624	631	680	693	722	705
67	705	715	712	730	707	733	708	695	633	633	620	624	633	682	695	720	705
68	704	716	715	728	705	733	708	695	634	632	619	624	633	682	696	719	704
69	704	718	717	728	705	732	707	693	633	632	619	623	633	681	699	717	704
70	703	718	718	729	706	731	706	690	632	632	618	621	631	679	701	716	703
71	704	716	719	728	706	731	706	689	630	631	617	619	629	679	702	715	704
72	705	714	718	727	707	731	707	688	629	630	615	617	627	678	702	715	705
73	704	712	718	726	707	730	707	689	628	630	613	617	626	678	700	715	704
74	704	711	718	726	706	730	706	692	626	629	611	617	624	678	699	714	704
75	703	712	716	726	705	729	705	691	625	628	613	616	622	678	697	714	703
76	701	713	715	725	704	728	704	689	624	625	611	612	621	677	696	714	701
77	700	712	714	723	703	723	702	687	621	622	610	609	619	673	695	712	700
78	699	708	714	720	703	720	701	684	618	619	606	607	617	673	694	709	699
79	698	706	712	717	702	719	698	683	617	617	604	605	614	673	692	707	698
80	695	704	711	716	701	716	696	681	615	615	602	603	613	671	691	706	695
81	693	703	709	716	699	715	696	680	614	613	601	601	610	669	688	705	693
82	692	700	707	714	697	714	695	679	611	611	599	599	609	667	687	702	692
83	689	698	706	711	695	713	693	678	610	609	598	597	607	667	686	699	689
84	688	696	703	710	694	712	693	677	609	607	598	597	606	666	685	697	688
85	687	694	702	708	692	712	693	676	609	606	598	596	605	664	684	696	687
86	687	693	701	707	691	712	692	675	608	606	597	595	605	663	684	695	687
87	687	693	701	706	690	710	691	675	608	605	597	594	605	662	683	694	687
88	686	693	700	706	690	710	691	674	608	605	597	594	604	661	683	693	686
89	686	692	700	705	690	708	690	673	608	604	596	594	604	661	683	692	686
90	686	692	700	705	689	707	689	673	607	603	595	593	603	660	682	692	686
91	686	691	699	705	688	706	688	671	606	602	594	592	603	659	681	691	686
92	684	690	699	704	687	705	687	670	605	601	591	591	602	658	680	690	684

93	683	689	698	703	686	703	685	668	604	600	589	590	601	657	679	690	683
94	681	688	697	702	684	701	683	665	602	597	587	588	599	655	678	689	681
95	679	686	695	700	683	700	681	663	600	596	585	587	597	655	676	687	679
96	678	684	693	698	680	697	680	661	598	593	583	584	595	653	674	685	678
97	675	683	691	695	677	695	677	659	595	590	580	581	594	650	672	684	675
98	674	681	688	693	675	693	675	656	593	587	577	579	592	647	670	681	674
99	671	679	685	690	672	690	672	654	591	584	574	575	590	644	667	678	671
100	669	676	682	687	669	687	669	650	588	580	569	573	588	642	664	675	669
101	666	673	679	683	666	684	665	648	586	577	565	570	585	639	661	672	666
102	663	669	674	680	663	681	662	644	583	574	562	568	582	636	659	669	663
103	660	667	671	676	659	677	658	640	580	570	557	565	580	633	655	666	660
104	657	663	666	672	654	674	654	637	576	567	554	563	577	630	651	663	657
105	654	660	663	669	650	670	651	633	573	564	549	560	574	627	648	659	654
106	650	657	659	665	645	666	646	629	569	561	545	557	570	623	644	656	650
107	647	653	655	662	641	662	642	625	565	557	540	554	567	621	640	653	647
108	642	650	649	658	637	659	636	621	562	554	536	550	562	616	635	650	642
109	637	646	643	654	632	654	632	616	558	550	531	547	559	612	631	644	637
110	633	642	638	650	627	650	625	612	554	546	525	542	554	606	626	639	633
111	628	637	631	646	621	645	619	608	549	543	520	538	550	601	620	636	628
112	623	632	625	641	616	640	612	602	545	538	512	533	544	596	616	631	623
113	617	628	617	635	609	636	603	596	538	534	507	529	538	591	609	626	617
114	612	623	609	630	602	630	597	591	533	528	500	524	533	586	604	621	612
115	605	619	603	624	594	624	588	583	526	523	494	519	526	579	596	615	605
116	597	613	594	616	588	617	582	577	520	516	487	512	521	574	589	610	597
117	591	607	587	611	579	610	573	569	511	510	481	507	513	567	582	603	591
118	583	601	578	603	571	602	567	562	504	503	472	501	507	559	574	597	583
119	577	593	570	598	563	596	557	554	496	497	466	494	500	552	564	589	577
120	569	587	561	590	554	587	550	546	487	489	458	489	493	544	557	580	569
121	561	579	552	583	546	580	541	538	480	483	451	482	484	537	548	573	561
122	555	571	546	575	537	571	533	530	472	475	442	476	478	527	540	563	555
123	546	564	536	567	527	562	524	521	465	469	434	468	470	519	531	557	546
124	540	556	528	559	520	554	516	513	456	459	427	460	463	511	522	548	540

125	532	548	518	550	510	544	507	502	448	451	418	451	455	501	514	539	532
126	526	538	508	543	503	536	498	493	440	442	411	444	449	492	505	528	526
127	520	530	500	534	493	526	490	485	434	434	402	435	441	482	498	517	520
128	511	521	490	523	485	518	480	475	425	426	395	428	434	475	489	509	511
129	503	510	482	515	475	509	471	467	418	418	386	420	425	467	480	500	503
130	492	503	473	505	465	502	461	458	409	411	379	412	418	458	472	492	492
131	483	494	463	497	457	491	452	450	402	402	369	405	409	451	462	481	483
132	471	486	455	487	446	483	441	441	392	394	362	397	402	441	454	471	471
133	458	476	445	476	438	471	432	433	384	385	352	390	393	433	444	463	458
134	448	466	437	467	426	462	421	422	374	377	345	382	383	424	433	453	448
135	436	459	426	456	415	450	411	413	363	367	335	375	375	414	424	446	436
136	426	449	417	447	406	440	399	401	354	360	327	366	365	406	412	435	426
137	414	440	406	435	394	427	389	391	343	349	316	357	357	395	402	427	414
138	401	428	394	425	385	416	377	378	334	340	308	347	346	386	391	416	401
139	391	417	385	412	373	402	367	368	324	329	297	338	338	374	381	405	391
140	378	407	372	398	360	391	354	355	312	320	288	327	327	362	368	395	378
141	367	394	361	387	349	376	344	344	303	306	277	318	318	351	355	382	367
142	354	382	348	371	335	363	331	330	292	296	268	305	306	338	345	371	354
143	341	368	337	359	324	348	320	319	283	283	257	295	297	328	332	359	341
144	330	357	323	344	310	336	307	305	271	273	245	283	285	314	321	345	330
145	316	340	309	328	299	320	296	294	262	260	237	273	275	303	308	334	316
146	305	323	293	316	286	308	282	280	250	250	225	261	264	290	294	319	305
147	292	309	272	301	276	292	271	269	241	238	217	251	255	275	282	308	292
148	281	295	254	288	263	281	258	256	229	228	205	238	243	264	268	293	281
149	267	280	233	270	249	265	247	246	219	216	196	227	233	249	257	282	267
150	253	261	213	256	237	253	233	233	207	206	183	213	221	238	243	267	253
151	240	243	201	240	223	238	221	221	194	194	173	202	208	224	232	251	240
152	223	227	185	220	212	227	207	207	183	184	162	190	198	210	217	239	223
153	210	208	172	206	199	212	195	194	172	172	154	177	185	199	204	223	210
154	194	190	161	192	185	201	180	179	162	161	143	166	175	186	194	212	194
155	179	174	150	177	174	186	170	167	148	147	133	153	163	174	181	198	179
156	167	158	139	165	161	173	156	152	138	134	125	141	154	159	168	183	167

157	153	143	123	149	147	157	144	142	126	124	113	126	141	143	158	171	153
158	142	127	109	136	135	146	131	129	118	112	103	116	127	131	144	154	142
159	127	106	98	118	120	130	119	120	105	102	91	103	110	118	133	138	127
160	110	90	89	103	109	116	109	108	95	92	82	94	94	105	118	124	110
161	94	70	83	93	97	107	96	95	85	83	73	83	80	94	105	108	94
162	76	54	71	83	87	96	86	84	75	71	66	71	64	79	95	95	76
163	62	46	61	75	78	87	76	71	66	61	57	59	50	69	84	79	62
164	52	39	52	60	64	74	66	63	55	54	51	48	34	58	73	63	52
165	38	31	38	44	48	64	54	52	48	44	42	40	21	47	62	52	38
166	29	28	25	32	40	50	44	45	40	37	33	29	14	41	53	41	29
167	21	22	17	22	31	35	37	36	34	31	27	21	10	32	45	33	21
168	18	19	10	14	23	28	27	27	27	26	21	14	10	23	36	23	18
169	17	16	6	14	16	20	22	23	21	18	18	10	8	18	26	18	17
170	13	14	7	10	11	17	16	17	16	14	13	8	6	13	21	15	13
171	9	11	6	8	9	16	13	12	12	10	9	6	4	9	15	12	9
172	6	7	6	6	9	12	10	8	8	7	7	5	3	7	10	9	6
173	3	3	5	4	7	8	8	5	5	5	4	3	3	4	7	5	3
174	2	2	3	3	5	5	6	4	4	3	3	2	2	2	4	4	2
175	2	2	3	2	3	4	3	3	3	2	2	2	2	2	3	2	2
176	2	2	2	2	2	3	2	2	2	2	2	2	1	2	2	1	2
177	1	1	2	2	1	2	2	1	1	1	1	2	1	1	1	1	1
178	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
179	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1
180	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

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 ********