



PHOTOMETRIC TESTING & EVALUATION TO IES LM-79-08

Sample Tested
LED-PAR30S-75-1WD-IF

Prepared for:

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Program Description

Photometric and electrical testing of an “LED-PAR30S-75-1WD-IF” replacement lamp to IES LM-79-08.

Executive Summary

Sample Tested = **LED-PAR30S-75-1WD-IF**

Luminous Efficacy* (Lumens/Watt)	Luminous Flux* (Lumens)	Input Power* (Watts)	Power Factor*
54.04	759.2	14.05	0.925

CCT (K)*	CRI*	Stabilization Time (Light & Power)
2953.3	82.4	43 minutes

* The above results are recorded / derived from measurements made using an Integrating Sphere



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Sample

The following sample was submitted for evaluation:

LEDnovation, Inc. - **LED-PAR30S-75-1WD-IF**



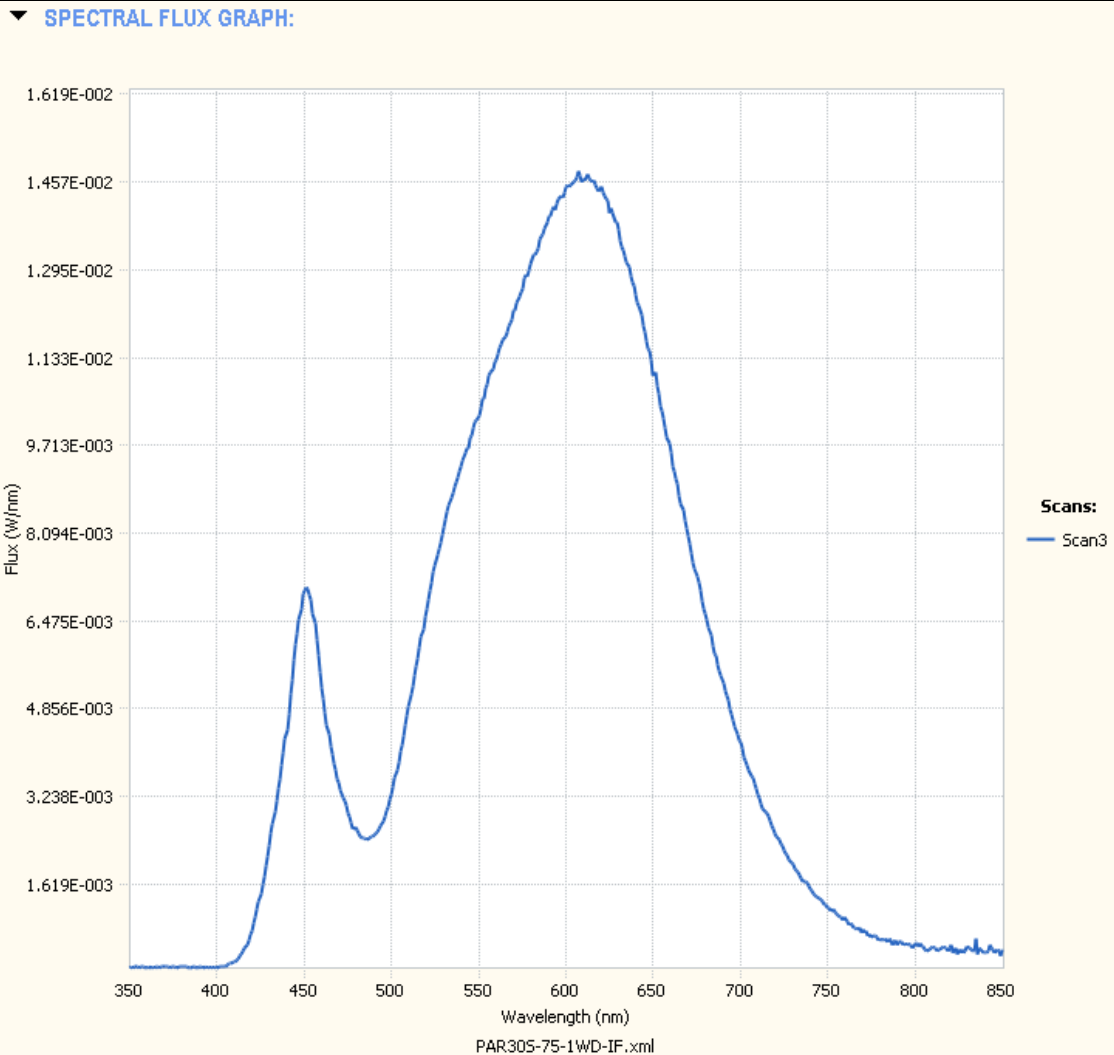
LED-PAR30S-75-1WD-IF

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Test Results –		
The following results were measured after stabilization of the sample in the Integrating Sphere (unless otherwise stated). Stability is reached when the variation of 3 readings of light output and electrical power, taken 15 minutes apart, is less than 0.50% (in accordance with IES LM-79-08).		
Key Photometric Results	Sample Reference	
	LED-PAR30S-75-1WD-IF	
	Integrating Sphere	Goniophotometer
Luminous Efficacy (Lumens/Watt)	54.04	51.95
Total Luminous Flux (Lumens)	759.2	732.5
Total Radiant Flux (Watts)	2.53	
Correlated Color Temperature (CCT)	2953.3	
Color Rendering Index (CRI)	82.4	
Chromaticity (Chroma x / Chroma y)	0.4390 / 0.4027	
Chromaticity (Chroma u / Chroma v)	0.2525 / 0.3474	
Chromaticity (Chroma u' / Chroma v')	0.2525 / 0.5211	
D _{uv} Value	-0.00085	
Stabilization Time (Light and Power)	Approx. 43 minutes	
Total Run Time – Integrating Sphere	49 minutes	
Total Run Time – Goniophotometer	97 minutes	
Spacing Criteria	0.56 (0° – 180°) / 0.54 (90° – 270°)	
Electrical Input Results:	Sample Reference	
	LED-PAR30S-75-1WD-IF	
	Integrating Sphere	Goniophotometer
Input Power (Watts)	14.05	14.10
Input Voltage (Volts AC)	120.0	120.0
Input Current (Amps)	0.126	0.132
Input Frequency (Hertz)	60.0	60.0
Power Factor	0.925	0.893
Additional Information	Sample Reference	
	LED-PAR30S-75-1WD-IF	
Ambient Temperature	25.6°C	
Integrating Sphere Detector	CDS 600 Spectroradiometer	
Absorption Correction used?	Yes	

Spectral Flux

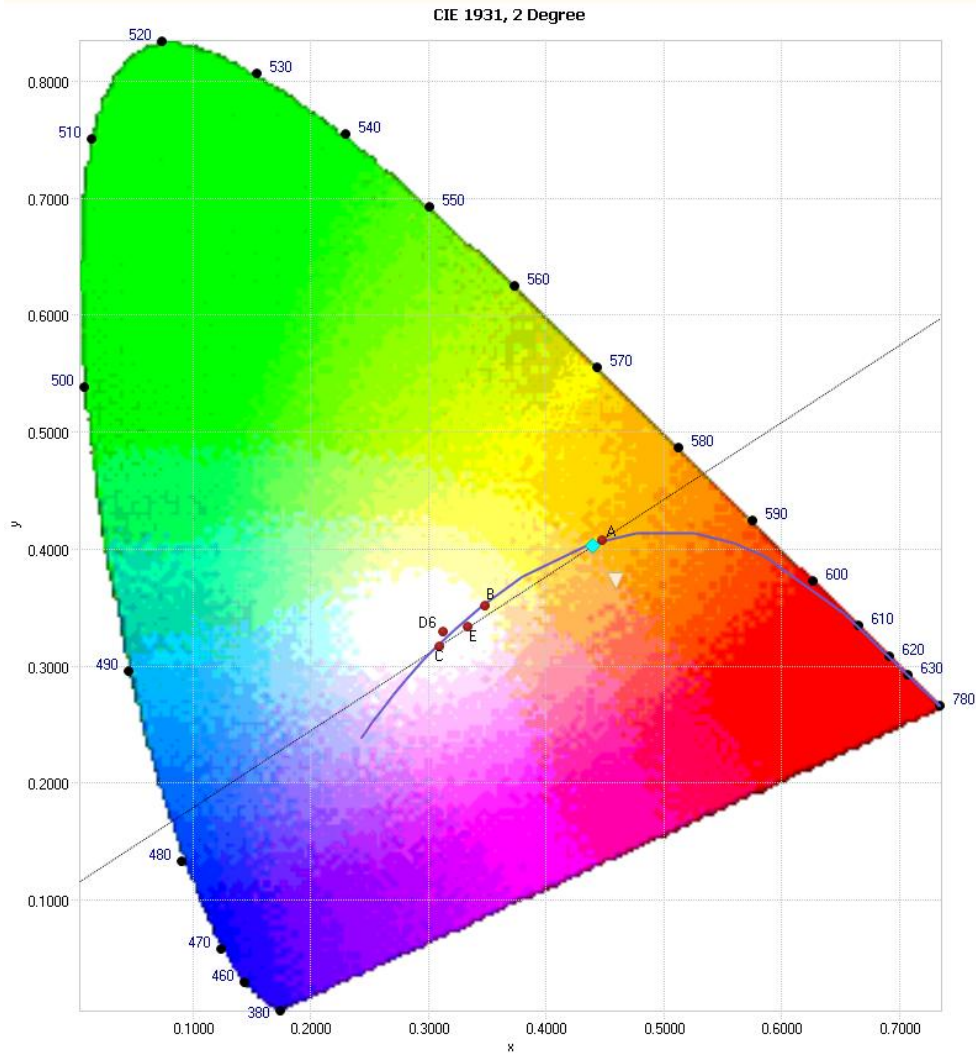
The following graph shows the spectral response curve of the radiant flux for the sample:



Spectral response of the Radiant Flux
(350nm to 850nm – calibrated range of the Spectroradiometer).

Chromaticity Diagram

The following image shows the chromaticity diagram for the sample:



Tristimulus values (from page 5):
x / y = 0.4390 / 0.4027

The locations on the diagram of the tristimulus coordinates are indicated by the blue diamond.

Test Results – Flux Distribution – Zonal Lumen Summary

The following table depicts the zonal lumen distribution for the sample:

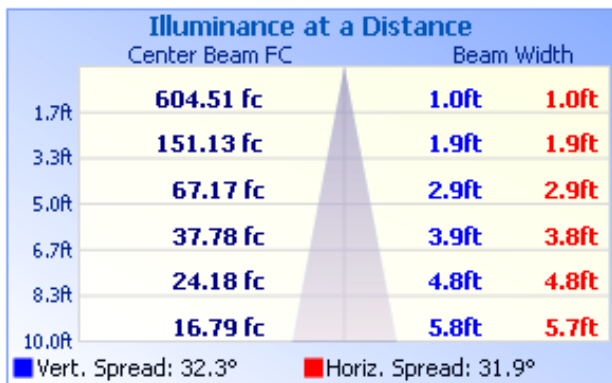
Zone	Lumens	% Total
0 - 10	140.4	19.2%
10 - 20	250.6	34.2%
20 - 30	163.1	22.3%
30 - 40	77.4	10.6%
40 - 50	39.6	5.4%
50 - 60	25.8	3.5%
60 - 70	20.0	2.7%
70 - 80	12.0	1.6%
80 - 90	3.6	0.5%
Total	732.5 Lumens	100%

Zonal Lumen Summary

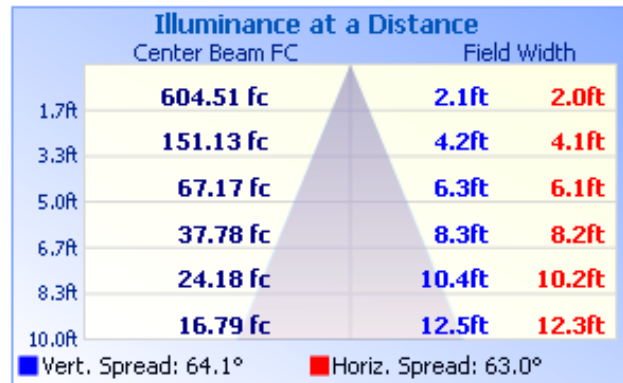
Zone	Lumens	% Lamp / Luminaire
0 - 60	696.9	95.1%
60 - 90	35.7	4.9%
0 - 90	732.5	100%
90 - 180	0.0	0.0%
0 - 180	732.5	100%

Test Results – Illuminance Plots

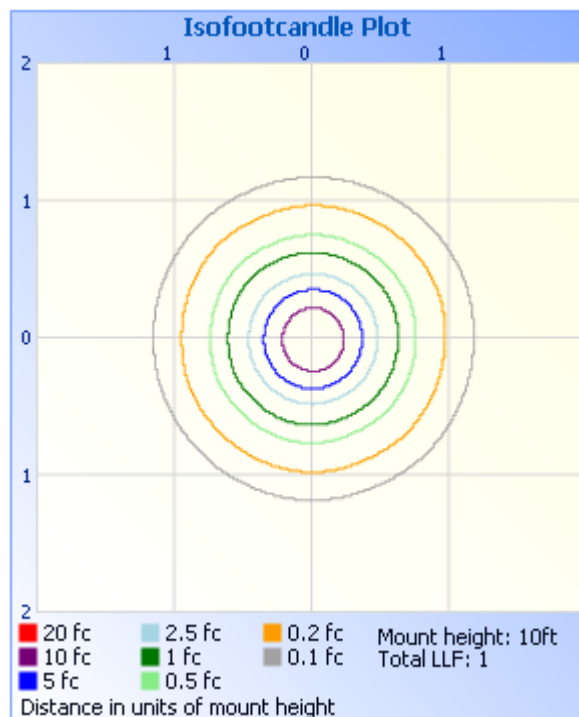
The following images depict the illuminance characteristics of the luminaire.



Beam Angle



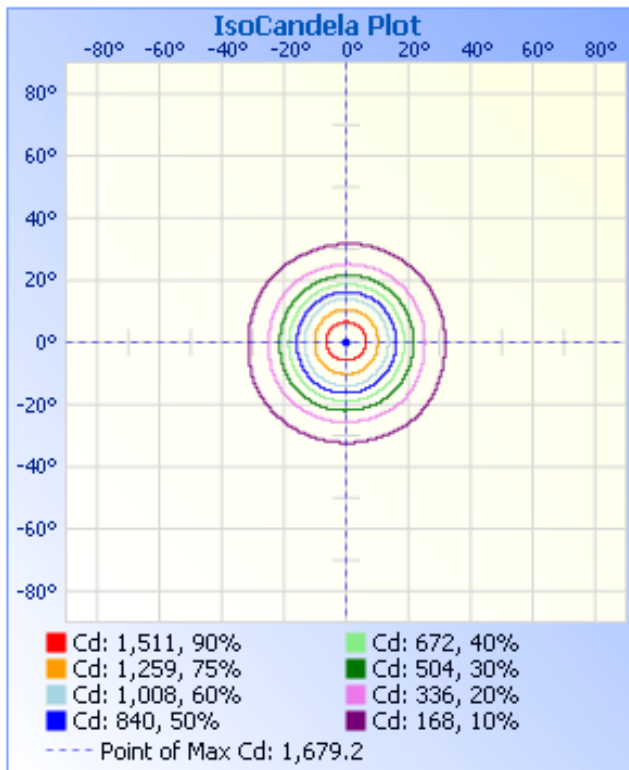
Field Angle



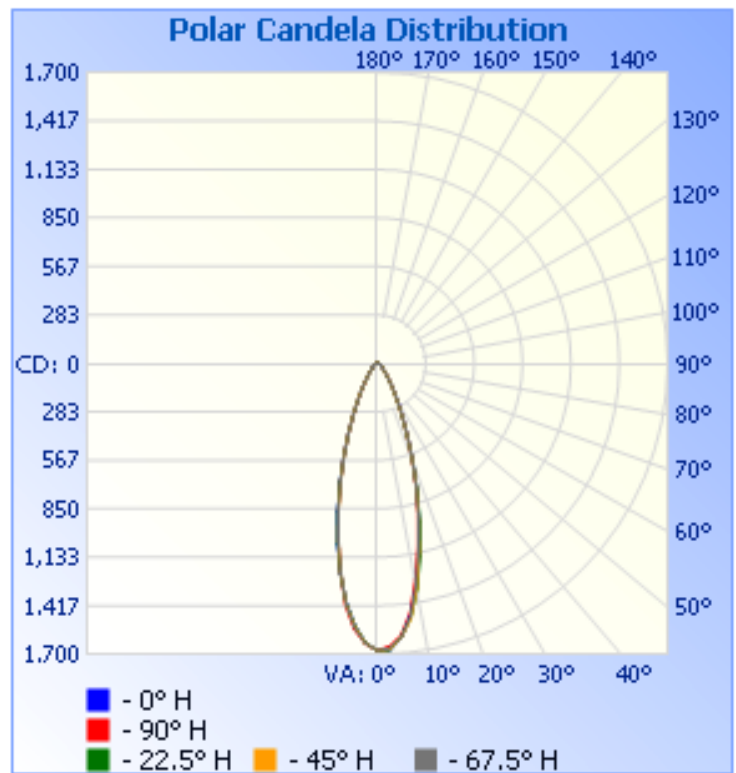
Illuminance Plot (Footcandles)

Test Results – Candela Plots

The following images depict the luminous intensity distribution characteristics of the luminaire.



Isocandela Plot



Polar Candela Distribution

Test Results – Candela Tabulation

The following table provides the tabulated Candela measurements:

	0.0	22.5	45.0	67.5	90.0	112.5	135.0	157.5	180.0	202.5	225.0	247.5	270.0	292.5	315.0	337.5	360.0
0.0	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679
2.5	1677	1676	1672	1665	1654	1645	1640	1634	1632	1633	1636	1638	1640	1650	1662	1670	1674
5.0	1608	1604	1608	1608	1594	1578	1560	1540	1536	1536	1541	1550	1559	1574	1589	1599	1605
7.5	1486	1496	1503	1490	1470	1456	1436	1416	1406	1410	1413	1416	1426	1448	1464	1473	1484
10.0	1322	1339	1334	1304	1285	1282	1282	1260	1246	1249	1240	1236	1246	1276	1303	1314	1319
12.5	1136	1152	1132	1110	1098	1096	1107	1096	1081	1076	1062	1055	1059	1082	1115	1129	1130
15.0	944	957	937	927	921	918	922	915	899	896	879	878	885	901	929	946	942
17.5	763	768	757	755	750	749	751	744	729	725	715	712	720	732	752	767	761
20.0	601	599	597	596	591	598	595	593	576	576	571	564	572	578	592	608	600
22.5	467	457	461	458	454	466	464	464	452	445	449	437	439	447	454	469	466
25.0	357	345	352	350	345	354	355	353	344	338	345	335	333	340	343	357	357
27.5	273	261	267	264	260	270	269	265	263	258	265	256	252	259	260	271	273
30.0	209	198	202	201	197	205	204	204	203	195	206	195	191	196	196	206	209
32.5	160	151	155	153	154	161	156	156	158	154	157	152	147	152	150	157	160
35.0	124	116	120	118	117	123	119	119	121	116	122	116	113	117	116	121	124
37.5	97	91	95	92	92	97	94	93	95	91	96	91	89	92	91	94	97
40.0	77	73	76	74	74	78	75	75	76	73	76	73	71	74	73	75	77
42.5	63	59	61	60	60	63	61	61	62	59	61	59	58	60	59	61	63
45.0	52	49	51	50	50	52	51	50	51	49	50	49	47	49	48	50	51
47.5	43	41	42	42	42	43	43	42	42	41	42	41	40	40	40	41	43
50.0	36	35	36	36	36	37	37	36	36	35	36	35	34	34	35	35	36
52.5	31	31	32	31	32	32	32	32	31	31	31	30	30	30	30	31	31
55.0	28	28	28	28	29	29	29	29	28	28	28	27	27	27	27	28	28
57.5	26	26	26	27	27	27	27	27	26	26	26	26	26	25	25	26	26
60.0	24	24	25	25	25	25	25	25	24	24	24	24	24	23	24	24	24
62.5	23	23	23	23	23	23	23	23	22	22	22	22	22	21	22	22	23
65.0	21	21	21	21	21	21	21	21	20	20	20	20	20	20	20	20	21
67.5	18	19	19	18	19	19	19	19	18	18	18	17	18	17	18	18	18
70.0	16	16	16	16	16	16	17	16	16	16	16	15	15	15	15	16	16
72.5	14	14	14	14	14	14	14	14	13	13	13	13	13	13	13	14	14
75.0	12	11	12	11	12	12	12	12	11	11	11	11	11	11	11	11	12
77.5	10	9	9	9	9	10	10	10	9	9	9	9	9	9	9	9	10
80.0	8	7	7	7	7	8	8	8	7	7	7	7	7	7	7	7	8
82.5	5	5	5	5	5	6	6	6	5	5	5	5	5	5	5	5	5
85.0	3	2	3	3	3	4	4	4	3	3	3	3	3	3	2	3	3
87.5	1	1	1	1	1	2	2	2	1	2	1	1	1	1	1	1	1
90.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Photometric Testing Information

The sample was evaluated for photometric and electrical characteristics using an integrating sphere and a goniophotometer, each located in purpose-built, temperature and humidity-controlled, draft free environments.

The integrating sphere is a 65-inch diameter sphere manufactured by Labsphere (Model# LMS650) which exhibits a “ 4π geometry” configuration according to IES LM-79-08 and is applicable for all types of LED products (directional and non-directional light projections). Its spectroradiometer is an array-type detector manufactured and calibrated by Labsphere (Model# CDS600).

The integrating sphere uses self-absorption correction to eliminate errors due to mismatches between the standard reference lamp and the test samples being measured. The auxiliary lamp used to perform this task is a halogen type lamp powered by a calibrated *Lamp Power Supply* manufactured and calibrated by Labsphere (model LPS 200). Ambient temperature (for photometric analysis) is measured using a “J-Type” thermocouple located inside the integrating sphere at the same height as the sample under test and not more than 1 meter in horizontal distance away from the sample. The thermocouple is located behind the baffle of the photo detector in order to eliminate any direct optical radiation from the sample under test.

Luminaire Stabilization.

The sample was placed inside the integrating sphere and powered by a regulated and conditioned 120.0 Volt, alternating current supply. The correlated color temperature, color rendering index, chromaticity coordinates and electrical power measurements contained in this report are the numeric **averages** of the three readings upon which stabilization is verified. The stabilization times shown on the results pages of this report denote the time of the 1st measurement (of the 3 consecutive readings) since this is the minimum time that the sample is assumed to have taken to reach stabilization.

The integrating sphere is calibrated using a quartzline halogen lamp with the following specifications:

Manufacturer: Sylvania

Model# 75Q/CL-28V

Voltage = 28.0 Volt

Wattage = 75.0 Watts

Calibration Current = 2.679 Amperes

Luminous Flux = 1538.8 Lumens

Calibration Date = 8-18-2005 (calibrated by Labsphere – NIST traceable).

Continued.....

Photometric Testing Information (continued)

The goniophotometer is calibrated using a frosted tungsten filament FDS/DZE lamp with the following specifications:

Manufacturer: General Electric
 Part Number: CSB-110
 Bulb Number: 108-A
 Voltage: 24.0 Volts
 Wattage: 150.0 Watts
 Calibration Current: 4.799 Amperes
 Luminous Intensity: 150.3 Candelas
 Calibration Date: 4-14-2009 (NIST traceable)

A *Power Analyzer* was used to measure all electrical characteristics of the sample.

Equipment List:

Description	Manufacturer and Model Number	OnSpeX Instrument Reference Number	Calibration Due Date
Integrating Sphere 65"	Labsphere LMS650	IS100	N/A
Spectroradiometer	Labsphere CDS600	CDS600	5-20-2011
Auxiliary Lamp PSU	Labsphere LPS200	LPS200	2-16-2011
Power Analyzer	Voltech PM1000+	PA110	4-27-2011
Power Analyzer	Yokogawa WT210	PA107	3-23-2011
Regulated Power Supply	California Instruments 1001P	AC100	N/A
Regulated Power Supply	Chroma Instruments 61602	AC300	N/A
Thermometer (Thermocouple)	Fluke 52	TH100	8-04-2011

All equipment is calibrated by TMI (Technical Maintenance, Inc.) ISO / IEC 17025-2005 Accredited (Cert. 1378.01) except: Labsphere CDS600 and Labsphere LPS200 which is calibrated by Labsphere, USA.