

IESNA LM-79: 2008

Measurement and Test Report

for

Green Creative Ltd.

Room 1206-7, New Victory House, 93-103 Wing Lok Street, Central, HONG KONG

Nov 20, 2013

Product Name:	LED BR40
Model No:	10BR40G3DIM/824
Test Engineer:	David Zhang 
Report No.:	BTR66.181.13.1493.32
Sample Received Date:	Nov 18, 2013
Test Performed Date:	Nov 18, 2013 to Nov 20, 2013
Reviewed By:	Steven Hsu 
Prepared By:	BEST Test Service Shenzhen Co., Ltd. 1st Floor, 1st Building, Weitai Industrial Park, Yingrenshi, Shiyan, Baoan, Shenzhen, China TEL: +86-755-28236006 FAX: +86-755-23467087-811 Email: certification@bestcert.cn



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1 - GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

Applicant	:	Green Creative Ltd.
Product Name	:	LED BR40
Model No	:	10BR40G3DIM/824
Brand	:	GREEN CREATIVE
SKU	:	T.B.D
12 NC Code	:	T.B.D
Nominal Operation Voltage	:	AC 120V/60Hz
Nominal Power	:	10W
Nominal CCT	:	2400K
Nominal CRI	:	83
Nominal Lumen Output	:	640Lumens
Nominal Life Time	:	40000Hours
Number of hours operated prior to measurement for new sample	:	0 Hours
Stabilization Time	:	1.5 hours
Total operating time for measurement include stabilization time	:	3.5 hours
		<input checked="" type="checkbox"/> Standard <input type="checkbox"/> Non Standard
Nominal Shape of Bulb(Designation)	:	<input type="checkbox"/> Omnidirectional A, BT, P, PS, S, T <input type="checkbox"/> Decorative B, BA, C, CA, DC, F, G <input checked="" type="checkbox"/> Directional R, BR, ER, PAR, MR, K
Date of Receiving Sample	:	Nov 18, 2013
Measurement quantities measured	:	1 pcs
Orientation During Testing	:	Base up
Test Requested	:	Electrical and Photometric Test Luminous Intensity Distribution Test

1.2 Objective

The following test report is prepared on behalf of Green Creative Ltd. in accordance with IESNA LM-79-08, used the following American National Standards or illumination Engineering Society of North America test guides:

ANSI C78.377-2008: Specifications for the Chromaticity of Solid State Lighting Products;

ANSI C79.1– 2002: American National Standard for Electric Lamps – Nomenclature for Glass Bulbs Intended for Use with Electric Lamps;

ANSI C78.20 – 2003: American National Standard for Electric Lamps – A, G, PS, and Similar Shapes with E26 Medium Screw Bases;

ANSI C78.21 – 2011: American National Standard for Electric Lamps – PAR and R Shapes;

ANSI C78.24 – 2001: American National Standard for Electric Lamps – Two-inch (51 mm);

Integral-reflector Lamps with Front Covers and GU5.3 or GX 5.3 Bases;

ANSI/IEC C81.61-2003: American National Standard for Electric Lamp Bases;

ANSI/IEEE C62.41 – 1991 (01-May-1991): Surge Voltages in Low-Voltage AC Power Circuits, Recommended Practice for;

CIE Publication No. 13.3 – 1995: Method of Measuring and Specifying Color Rendering of Light Sources;

CIE Publication No. 18.2 – 1983: The Basis of Physical Photometry;

IESNA LM-16-1993: Practical Guide to Colorimetry of Light Sources;

IESNA LM-28-89 – 1989: Guide for the Selection, Care, and Use of Electrical Instruments in the Photometric Laboratory;

IESNA LM-79-08 Electrical and Photometric Measurement of Solid State Lighting Products

UL 1993 – 1999: Standard for Self-Ballasted Lamps and Lamp Adapters;

UL 8750 – 2009: Light Emitting Diode (LED) Equipment for Use in Lighting Products.

1.3 Test Facility Description

The Energy Efficiency Lab used by BEST to collect energy efficiency measurement data is located in 1st Floor, 1st Building, Weitai Industrial Park, Yingrenshi, Shiyao, Baoan, Shenzhen, China. BEST Test Service Shenzhen Co., Ltd is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200770-0). BEST Test Service Shenzhen Co., Ltd is also an ELI accredited lab for lighting products (ELI Certificate No. ELI-L04-2010) and UL accredited lab for lighting products

1.4 Test Equipment List

Apparatus List	Device	Cal. Date	Cal Due Date
1	Integral Sphere+ Spectrophotometer System	Mar 10, 2013	Mar 09, 2014
2	Digital Power Meter	Oct 18, 2013	Oct 17, 2014
3	Goniophotometer+ Spectrophotometer System	Nov 20, 2013	Nov 19, 2014
4	Standard Light Source	Sep 17, 2013	Sep 16, 2014
5	Standard Light Source	Sep 17, 2013	Sep 16, 2014
6	Digital Storage Oscilloscope	Oct 18, 2013	Oct 17, 2014
7	Ultra Compact Simulator	Oct 20, 2013	Oct 20, 2014
8	Temperature Chamber	Oct 20, 2013	Oct 20, 2014
9	Digital Caliper	Nov 20, 2013	Nov 19, 2014
10	Digital CC&CV DC Power Supply(30V 5A)	N/A	N/A
11	5 1/2 Digital Multimeter	Oct 18, 2013	Oct 17, 2014
12	Digital CC&CV DC Power Supply(120V 10A)	N/A	N/A
13	6 1/2 Digital Multimeter	Oct 18, 2013	Oct 17, 2014
14	Digital Multimeter	Oct 18, 2013	Oct 17, 2014
15	Temperature Recorder+Thermocouple	Nov 20, 2013	Nov 19, 2014
16	Timer Controller	Nov 20, 2013	Nov 19, 2014

Statement of Traceability: BEST Test Service Shenzhen Co., Ltd. certifies that all calibration has been performed using suitable standards traceable to the NIM China.

2 - Test Method

2.1 Photometric and Electrical Measurement (Integrated Sphere Method)

Total light output (luminous flux) for the $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ ambient temperature conditions is measured using a 1.6m 4Π geometry integrating sphere. Temperature is measured at a position inside the sphere. Spectral radiant flux measurements are made using Lab sphere to the detector port of the integrating sphere. Each lamp is operated at rated voltage in its designated orientation. Each lamp should be stable before measurements are made. The determining method of stable is as follows:

Step 1 Take 3 measurements of the lamp light output at 15 minute interval (total time=30mintues.)This time period is in addition to the recommended pre-burning time.

Step 2 Calculate the percent difference between the maximum measured value and the minimum measured value for the three consecutive measurements.

Step 3 if the value calculated in Step 2 does not exceed 0.5 percent, the lamp is considered stable. Luminous flux, chromaticity coordinates, correlated color temperature and color rendering index for each lamp are calculated from the spectral radiant flux measurements taken at 2 nm intervals over the range 350 to 1050 nm. The calibration of the sphere photometer-spectrometer system is traceable to the NIST USA. Lamp efficacy (lumens per watts) for each lamp model is computed based on the revised luminous flux result. Electrical measurements including voltage, current, power and power factor are measured using the digital power Meter.

The total uncertainty of the light output measurements is estimated, at the 95% confidence level, not to exceed $\pm 1.12\%$ over the wavelength range 350-1050 nm.

2.2 Photometric and Electrical Measurement (GonioPhotometer Method)

A Goniometer was used to measure the intensity (candelas) at each angle of distribution for each sample; the photometric distance is 24m. Ambient temperature was measured equal to the height of the sample mounted on the Goniometer equipment. Each sample was operated at input rated voltage in its designated orientation. Each sample was allowed to be stable before measurement was made. Electrical measurements including voltage, current, power and power factor were measured using the Power Analyzer

Before each measurement, the method below should be used to determine the lamp is stable or not.

Step 1 Take 3 measurements of the lamp intensity at 15 minute interval (total time=30mintues.)This time period is in addition to the recommended pre-burning time.

Step 2 Calculate the percent difference between the maximum measured value and the minimum measured value for the three consecutive measurements.

Step 3 if the value calculated in Step 2 does not exceed 0.5 percent, the lamp is considered stable.

Some graphics were created with Photometric Plus software.

2.3 Deviation from standard operating procedure

None.

3 – Summary of Test Result

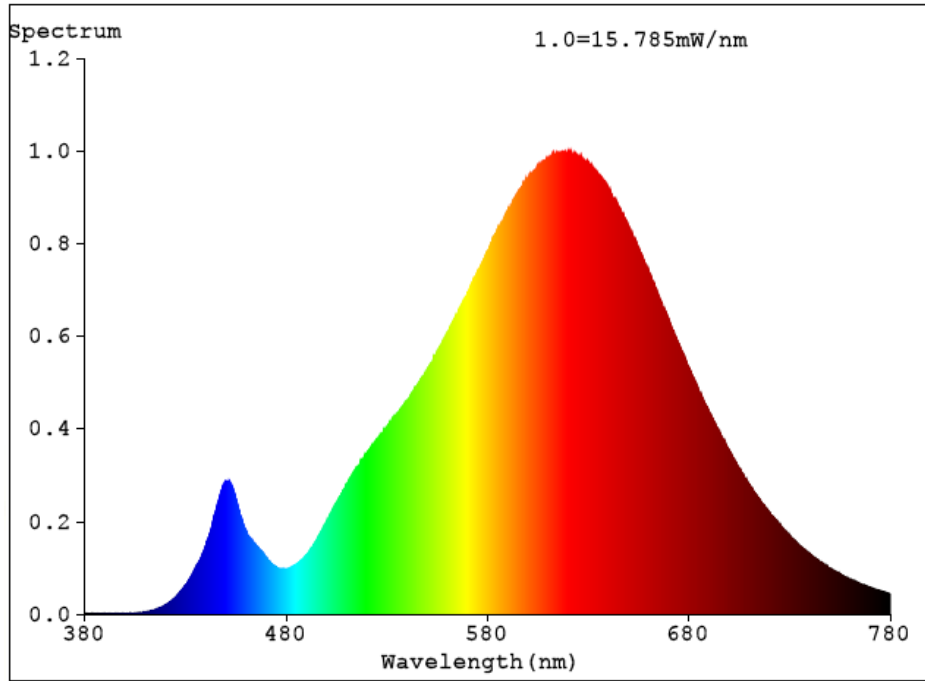
	Item	Test Result		Accreditation
Required Fields	Lumen Output (Lumens)	701.73		NVLAP/EPA
	Luminous Efficacy (lm/w)	70.33		NVLAP/EPA
	Correlated Color Temperature (CCT)	2458		NVLAP/EPA
	Color Rendering Index– CRI	84.8		NVLAP/EPA
	Input Power (W)	9.98		NVLAP/EPA
Optional Fields	Power Type	<input checked="" type="checkbox"/> AC	<input type="checkbox"/> DC	/
	Input Voltage (V)	120.0		NVLAP/EPA
	Input Current (A)	0.0940		NVLAP/EPA
	Power Factor	0.8839		NVLAP/EPA
	x(CIE 1931)	0.4814		NVLAP/EPA
	y(CIE 1931)	0.4151		NVLAP/EPA
	u' (CIE 1976)	0.2744		NVLAP/EPA
	v' (CIE 1976)	0.5323		NVLAP/EPA
	Duv(CIE 1976)	0.0003		NVLAP/EPA
	Beam Angle: (Degree)	110.7		NVLAP/EPA
	Center beam candlepower: (cd)	224		NVLAP/EPA
	Zonal lumen density (0-60°):	71.1%		NVLAP/EPA
	Zonal lumen density (60-90°):	24.1%		NVLAP/EPA
	Zonal lumen density (90-120°):	4.4%		NVLAP/EPA
Zonal lumen density (120-180°):	0.4%		NVLAP/EPA	

	CRI (R1)	83	NVLAP/EPA
	CRI (R2)	91	NVLAP/EPA
	CRI (R3)	97	NVLAP/EPA
	CRI (R4)	83	NVLAP/EPA
	CRI (R5)	82	NVLAP/EPA
	CRI (R6)	88	NVLAP/EPA
	CRI (R7)	87	NVLAP/EPA
	CRI (R8)	68	NVLAP/EPA
	CRI (R9)	31	NVLAP/EPA
	CRI (R10)	79	NVLAP/EPA
	CRI (R11)	81	NVLAP/EPA
	CRI (R12)	73	NVLAP/EPA
	CRI (R13)	85	NVLAP/EPA
	CRI (R14)	98	NVLAP/EPA

Lumen summary:

[OTHER]	Gamma(deg)	Fz(lm)	Ft(lm)	%Lum	%Lamp
[OTHER]	0- 10	21.20	21.20	3.02	3.02
[OTHER]	10- 20	60.82	82.02	11.69	11.69
[OTHER]	20- 30	92.09	174.10	24.81	24.81
[OTHER]	30- 40	110.27	284.37	40.52	40.52
[OTHER]	40- 50	112.97	397.34	56.62	56.62
[OTHER]	50- 60	101.32	498.66	71.06	71.06
[OTHER]	60- 70	80.02	578.67	82.46	82.46
[OTHER]	70- 80	55.70	634.37	90.40	90.40
[OTHER]	80- 90	33.82	668.19	95.22	95.22
[OTHER]	90-100	17.79	685.98	97.76	97.76
[OTHER]	100-110	8.45	694.43	98.96	98.96
[OTHER]	110-120	4.17	698.60	99.55	99.55
[OTHER]	120-130	2.04	700.64	99.84	99.84
[OTHER]	130-140	0.82	701.46	99.96	99.96
[OTHER]	140-150	0.23	701.69	99.99	99.99
[OTHER]	150-160	0.03	701.73	100.00	100.00
[OTHER]	160-170	0.01	701.73	100.00	100.00
[OTHER]	170-180	0.00	701.73	100.00	100.00

4 – Spectral Flux Plots



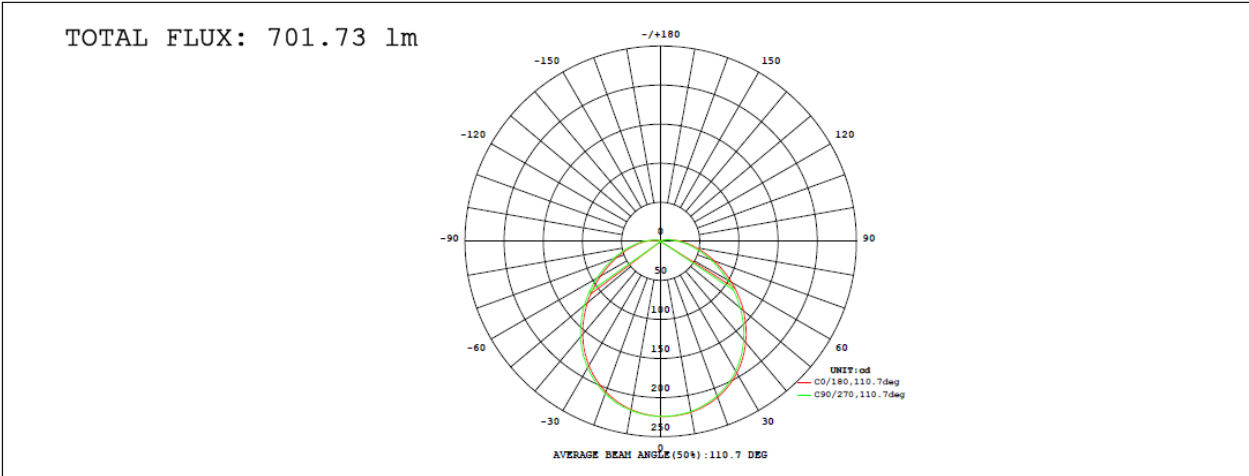
5 – EUT Photos



6 – Luminous Intensity Distribution Test Plots (CIE Chromaticity)

LAMP PHOTOMETRIC REPORT

Electrical: Voltage:120.0V Current:0.0940A Power:9.977W Factor:0.8839		
MODEL: 10BR40G3DIM/824		
POWER: 10W	VOLTAGE: 120.0V	WORKING VOLTAGE: 120.0V
MANUFACTURER: Green Creative		Eff.: 70.33 lm/W



γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%
10	218.4	218.4	219.5	220.9	222.0	222.0	220.9	219.5	0- 10	21.20	21.20	3.02
20	205.2	205.2	207.3	210.1	212.3	212.4	210.3	207.4	10- 20	60.82	82.02	11.7
30	183.6	183.9	186.9	190.8	194.5	194.6	191.6	187.2	20- 30	92.09	174.1	24.8
40	154.9	155.1	159.2	164.4	169.0	168.8	164.9	159.5	30- 40	110.3	284.4	40.5
50	122.2	122.6	127.3	133.1	137.9	137.3	132.8	127.0	40- 50	113.0	397.3	56.6
60	89.12	89.81	94.50	100.0	104.3	103.5	98.77	93.17	50- 60	101.3	498.7	71.1
70	59.18	59.94	64.04	68.81	72.56	71.76	67.52	62.70	60- 70	80.02	578.7	82.5
80	35.70	36.34	39.30	43.00	46.02	45.29	42.04	38.32	70- 80	55.70	634.4	90.4
90	19.11	19.48	21.48	24.01	26.03	25.47	23.36	20.87	80- 90	33.82	668.2	95.2
100	9.376	9.596	10.69	12.03	13.10	12.88	11.53	10.20	90-100	17.79	686.0	97.8
110	4.787	4.917	5.357	5.897	6.337	6.210	5.683	5.134	100-110	8.447	694.4	99
120	2.674	2.774	3.018	3.292	3.477	3.395	3.118	2.841	110-120	4.168	698.6	99.6
130	1.324	1.405	1.560	1.720	1.802	1.727	1.535	1.386	120-130	2.042	700.6	99.8
140	0.5206	0.5813	0.6708	0.7482	0.7547	0.6842	0.5646	0.5073	130-140	0.8240	701.5	100
150	0.1338	0.1731	0.2077	0.2238	0.1893	0.1355	0.0747	0.0684	140-150	0.2293	701.7	100
160	0.0401	0.0665	0.0688	0.0494	0.0047	0	0	0	150-160	0.0336	701.7	100
170	0.0097	0.0258	0.0260	0.0102	0	0	0	0	160-170	0.0051	701.7	100
180	0	0	0	0	0	0	0	0	170-180	0.0005	701.7	100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:25.3DEG
 Operators:David

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.287
 Humidity:65.0%
 Test Distance:2.463m [K=1.0000]

LUMINOUS DISTRIBUTION INTENSITY DATA

Electrical: Voltage:120.0V Current:0.0940A Power:9.977W Factor:0.8839		
MODEL: 10BR40G3DIM/824		
POWER: 10W	VOLTAGE: 120.0V	WORKING VOLTAGE: 120.0V
MANUFACTURER: Green Creative		Eff.: 70.33 lm/W

Table--1

UNIT: cd

C (DEG) \ γ (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338			
0	224	224	224	224	224	224	224	224	224	224	224	224	224	224	224	224			
5	222	222	222	222	223	223	223	224	224	224	224	224	223	223	223	222			
10	218	218	218	219	219	220	221	221	222	222	222	222	221	220	220	219			
15	213	213	213	214	214	216	217	217	218	218	218	217	216	215	214				
20	205	205	205	206	207	209	210	211	212	213	212	212	210	209	207	206			
25	195	195	196	197	198	200	202	203	204	205	205	204	202	200	198	197			
30	184	183	184	185	187	189	191	193	195	195	195	193	192	189	187	185			
35	170	170	170	172	174	176	178	180	183	183	183	181	179	177	174	172			
40	155	154	155	157	159	162	164	166	169	169	169	167	165	162	159	157			
45	139	138	139	141	144	146	149	151	154	154	153	152	149	146	144	142			
50	122	122	123	124	127	130	133	135	138	138	137	135	133	130	127	125			
55	105	105	106	108	111	114	117	119	121	121	120	118	116	113	110	108			
60	89.1	88.9	89.8	91.7	94.5	97.3	100	102	104	104	103	101	98.8	95.9	93.2	91.0			
65	73.6	73.6	74.5	76.3	78.8	81.3	83.9	86.0	87.9	88.1	87.1	85.1	82.5	79.8	77.3	75.3			
70	59.2	59.5	59.9	62.0	64.0	66.5	68.8	70.7	72.6	72.7	71.8	69.9	67.5	65.0	62.7	60.9			
75	46.7	46.7	47.5	49.0	51.0	53.1	55.1	56.8	58.5	58.7	57.8	56.2	54.0	51.7	49.7	48.1			
80	35.7	35.7	36.3	37.6	39.3	41.2	43.0	44.4	46.0	46.1	45.3	43.9	42.0	40.1	38.3	37.0			
85	26.4	26.4	26.9	28.0	29.4	31.1	32.6	33.8	35.1	35.2	34.5	33.3	31.8	30.2	28.7	27.6			
90	19.1	19.0	19.5	20.3	21.5	22.8	24.0	25.0	26.0	26.0	25.5	24.6	23.4	22.0	20.9	20.0			
95	13.5	13.4	13.7	14.4	15.3	16.3	17.2	17.9	18.7	18.7	18.3	17.5	16.6	15.6	14.8	14.1			
100	9.38	9.36	9.60	10.1	10.7	11.4	12.0	12.6	13.1	13.1	12.9	12.2	11.5	10.8	10.2	9.72			
105	6.56	6.56	6.76	7.08	7.49	7.94	8.37	8.73	9.02	9.02	8.82	8.46	8.00	7.54	7.12	6.81			
110	4.79	4.81	4.92	5.11	5.36	5.63	5.90	6.11	6.34	6.34	6.21	5.98	5.68	5.40	5.13	4.94			
115	3.61	3.63	3.72	3.85	4.02	4.21	4.38	4.50	4.64	4.64	4.55	4.39	4.20	4.01	3.84	3.72			
120	2.67	2.70	2.77	2.88	3.02	3.17	3.29	3.38	3.48	3.47	3.40	3.27	3.12	2.97	2.84	2.75			
125	1.92	1.95	2.01	2.10	2.21	2.32	2.42	2.48	2.55	2.54	2.47	2.37	2.24	2.13	2.03	1.97			
130	1.32	1.35	1.41	1.48	1.56	1.65	1.72	1.76	1.80	1.78	1.73	1.64	1.54	1.45	1.39	1.35			
135	0.86	0.89	0.94	0.99	1.06	1.12	1.17	1.19	1.21	1.19	1.13	1.06	0.98	0.92	0.88	0.87			
140	0.52	0.55	0.58	0.62	0.67	0.72	0.75	0.75	0.75	0.73	0.68	0.62	0.56	0.53	0.51	0.51			
145	0.28	0.31	0.33	0.36	0.39	0.42	0.44	0.43	0.42	0.39	0.36	0.31	0.26	0.24	0.24	0.26			
150	0.13	0.16	0.17	0.19	0.21	0.22	0.22	0.21	0.19	0.17	0.14	0.10	0.07	0.06	0.07	0.10			
155	0.07	0.09	0.10	0.11	0.11	0.11	0.10	0.08	0.06	0.05	0.02	0.00	0.00	0.00	0.00	0.03			
160	0.04	0.06	0.07	0.07	0.07	0.06	0.05	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
165	0.02	0.04	0.04	0.05	0.04	0.04	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
170	0.01	0.02	0.03	0.03	0.03	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
175	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			

C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:25.3DEG
 Operators:David

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.287
 Humidity:65.0%
 Test Distance:2.463m [K=1.0000]