



NVLAP LAB CODE 500080-0

Ref. No.: LCP45100135

Version: 1.0

Date of issue: Nov. 9, 2015

Total pages: 12



Test report of
IES LM-79-08

**Approved Method: Electrical and Photometric Measurements of
Solid-State Lighting Products**

Rendered to:

LIGHT EFFICIENT DESIGN, DIV OF TADD LLC
188 S. Northwest Highway Cary, IL 60013.

For products:

LED Lamp

Models No.:

LED-8033E57, LED-8033E57C

Test Date: Oct. 30, 2015 to Nov. 2, 2015

Test Lab.: LCTECH (Zhongshan) Testing Service Co., Ltd

2/F., Technology and Enterprise Development Center, Guangyuan Road, Xiaolan,
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Test Note: *Model LED-8033E57 and LED-8033E57C are the same except for model number.*

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Nov. 9, 2015

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Table of Contents

1. General	3
1.1 Product Information	3
1.2 Standards or methods	4
1.3 Equipment list	4
2. Test conducted and method	5
2.1 Ambient Condition	5
2.2 Power Supply Characteristics	5
2.3 Seasoning and Stabilization	5
2.4 Electrical Instrumentation	5
2.5 Color Measurement Method	5
2.6 Total Luminous Flux Measurement Method	5
2.7 Luminous Intensity Distribution Measurement Method	5
2.8 Spatial Non-uniformity of Chromaticity	5
3. Test Result Summary	6
3.1 Electrical data	6
3.2 Photometric data	6
3.3 Color Rendering Details	6
4. Test Data	7
4.1 Spectral Distribution	7
4.2 ANSI Chromaticity Quadrangles Diagram	7
4.3 Goniometry Test Data	8
4.4 Zonal Lumen Summary	8
4.5 Polar Curves	9
4.6 Lux Distance curve	10
4.7 ISO illuminance diagram	11
4.8 Candela Tabulation	12

1. General

1.1 Product Information

Brand Name	Light Efficient Design
Trade Mark	-
Luminaire Type	LED Lamps
Model Number	LED-8033E57,LED-8033E57C
Rated Inputs	120-277VAC 50-60Hz
Rated Power	38 W
Rated Light output	4800 lm
Declared CCT	5700 K
Power Supply	Integral LED driver
LED Package, Array or Module	Not provided
Receipt Samples	1 unit
Date of Receipt Samples	Oct. 13, 2015

Photo



Picture 1



Picture 2

1.2 Standards or methods

The following standards are partly or totally used or referenced for test:

No.	Name
ANSI/NEMA/ ANSLG C78.377-2011	Specifications for the Chromaticity of Solid State Lighting Products
ANSI C82.77-2002	Harmonic Emission Limits—Related Power Quality Requirements for Lighting Equipment
CIE Pub. No. 13.3-1995	Method of Measuring and Specifying Color Rendering of Light Sources
CIE Pub. No. 15:2004	Colorimetry
IES LM-79-08	Electrical and Photometric Measurements of Solid-State Lighting Products

1.3 Equipment list

Instrument	ID	Model name	Cal. date	Next cal. Date
AC Power supply	LC-I-923	CHP-500	2015-02-05	2016-02-04
AC Power supply	LC-I-987	APW-110N	2015-02-05	2016-02-04
Power analyzer	LC-I-928	WT210	2015-02-09	2016-02-08
Power analyzer	LC-I-954	WT210	2015-03-04	2016-03-03
Multimeter	LC-I-972	Fluke 17B	2015-08-17	2016-08-16
Photometric colorimetric electric system (2 meter sphere)	LC-I-900	SPR3000	Before use	Before use
Standard lamp	LC-I-917	24V100W	2015-10-09	2016-10-08
Luminous Flux Standard Lamp	LC-I-946	110V/200W	2015-10-09	2016-10-08
Goniophotometer(with mirror)	LC-I-902	GMS2000	2012-05-10	2016-05-09
Wireless temperature transmitter	LC-I-978	DWRF-B	2015-02-11	2016-02-10
Wireless temperature transmitter	LC-I-979	DWRF-B	2015-02-11	2016-02-10

2. Test conducted and method

2.1 Ambient Condition

The ambient temperature in which measurements are being taken was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$; the air flow around the sample(s) being tested did not affect the performance.

2.2 Power Supply Characteristics

The AC power supply had a sinusoidal voltage wave shape at the prescribed frequency (60 Hz) such that the RMS summation of the harmonic components does not exceed 3 percent of the fundamental during operation of the test item.

The voltage of AC power supply (RMS voltage) applied to the device under test was regulated to within ± 0.2 percent under load.

2.3 Seasoning and Stabilization

No seasoning was performed in accordance with IESNA LM-79-08. And before the measurement, the sample was stabilized until the light output and power variations were less than 0.5% in 30 minutes intervals (3 readings, 15 minutes apart).

2.4 Electrical Instrumentation

The calibration uncertainties of the instruments for AC voltage and current were less than 0.2 percent, and the calibration uncertainty of the AC power meter was less than 0.5 percent (95 % confidence interval, $k=2$).

2.5 Color Measurement Method

Spectral radiant flux was measured by a sphere (2 meter)-spectroradiometer system, and the color characteristics (Color rendering index, correlated color temperature, chromaticity coordinate) were calculated from these by software automatically.

2.6 Total Luminous Flux Measurement Method

Total luminous flux was measured by sphere-spectroradiometer system and type C goniophotometer system.

Light intensity distribution was measured by a type C goniophotometer (with mirror) which can keep the sample in burn position when the tests conduct, and the total luminous flux was calculated from the intensity data by software automatically.

Spectral radiant flux was measured by a sphere (2 meter)-spectroradiometer system, and the total luminous flux was calculated from these by software automatically.

2.7 Luminous Intensity Distribution Measurement Method

Luminous intensity distribution was measured by a mirror-type goniophotometer (Type C) which can keep the sample in burn position when the tests conduct, and the kinds of graph were generated by software automatically.

2.8 Spatial Non-uniformity of Chromaticity

The customer did not require this measurement.

3. Test Result Summary

3.1 Electrical data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Input Voltage & Frequency	276.90V~60Hz	276.98V~60Hz
Input Current(A)	0.149	0.150
Total Power(W)	38.03	38.15
Power Factor	0.924	0.918
I-THD	9.54%	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	4781.90	4791.81
Luminaire Efficacy(lm/W)	125.74	125.60
Correlated Color Temperature (CCT)(K)	5514	-
Color Rendering Index (CRI)	86.0	-
R9	27	-
Chromaticity Coordinate (x,y)	x = 0.3321 y = 0.3378	-
Chromaticity Coordinate (u,v)	u = 0.2079 v = 0.3172	-
Chromaticity Coordinate (u',v')	u' = 0.2079 v' = 0.4758	-
Duv	-0.00151	-
Beam Angle	-	C90 plan: 326.09°
Filed Angle	-	C0 plan: N/A°

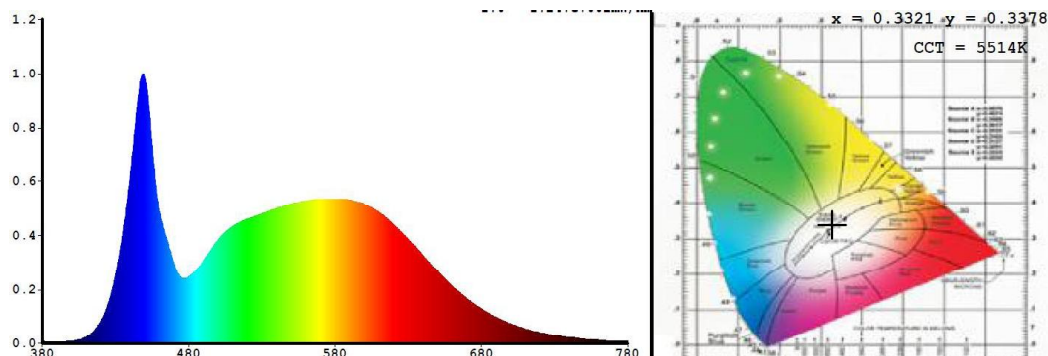
3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
86	89	91	87	87	85	88	75
R9	R10	R11	R12	R13	R14	R15	-
27	74	88	70	86	95	82	-

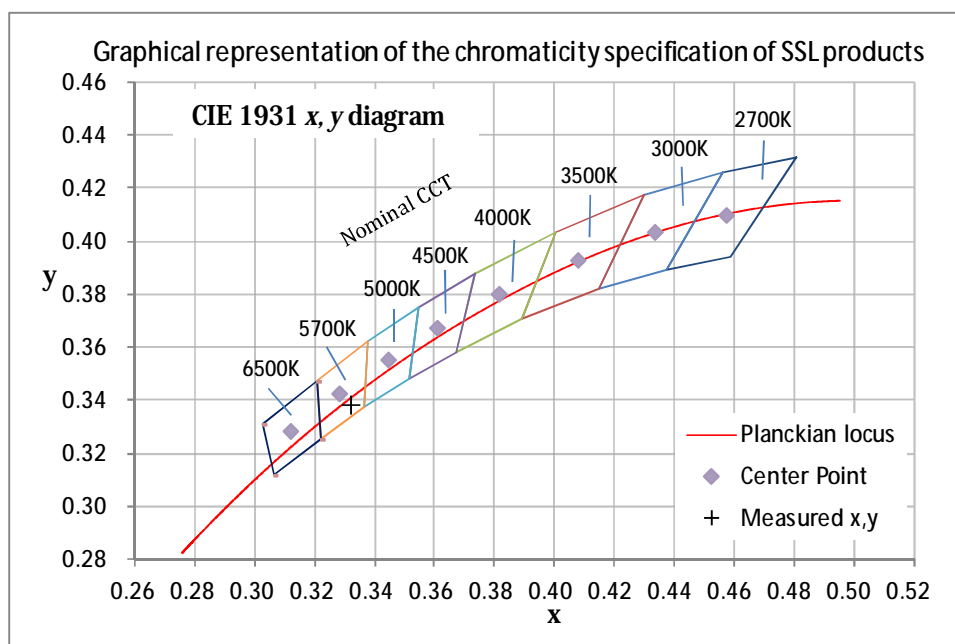
Note: N.A.

4. Test Data

4.1 Spectral Distribution



4.2 ANSI Chromaticity Quadrangles Diagram



4.3 Goniometry Test Data

CIE Type	General	Basic Luminous Shape	Circular w/Sides
	Diffuse		
Spacing Criteria (0-180)	N/A	Luminous Length	0.07(Diameter)
Spacing Criteria (90-270)	N/A	Luminous Width	0.07(Diameter)
Spacing Criteria (Diagonal)	N/A	Luminous Height	0.15m
Test Distance	30.04 m		

4.4 Zonal Lumen Summary

Zone	Lumens	%Lamp	%Fixt
0-20	71.36	1.50	1.50
0-30	206.55	4.30	4.30
0-40	436.43	9.10	9.10
0-60	1164.91	24.30	24.30
0-80	2130.93	44.50	44.50
0-90	2655.01	55.40	55.40
10-90	2642.19	55.10	55.10
20-40	365.07	7.60	7.60
20-50	690.15	14.40	14.40
40-70	1190.74	24.80	24.80
60-80	966.02	20.20	20.20
70-80	503.76	10.50	10.50
80-90	524.08	10.90	10.90
90-110	992.47	20.70	20.70
90-120	1391.72	29.00	29.00
90-130	1707.85	35.60	35.60
90-150	2064.08	43.10	43.10
90-180	2136.8	44.60	44.60
110-180	1144.33	23.90	23.90
0-180	4791.8	100.00	100.00

Total Luminaire Efficiency = 100.00%

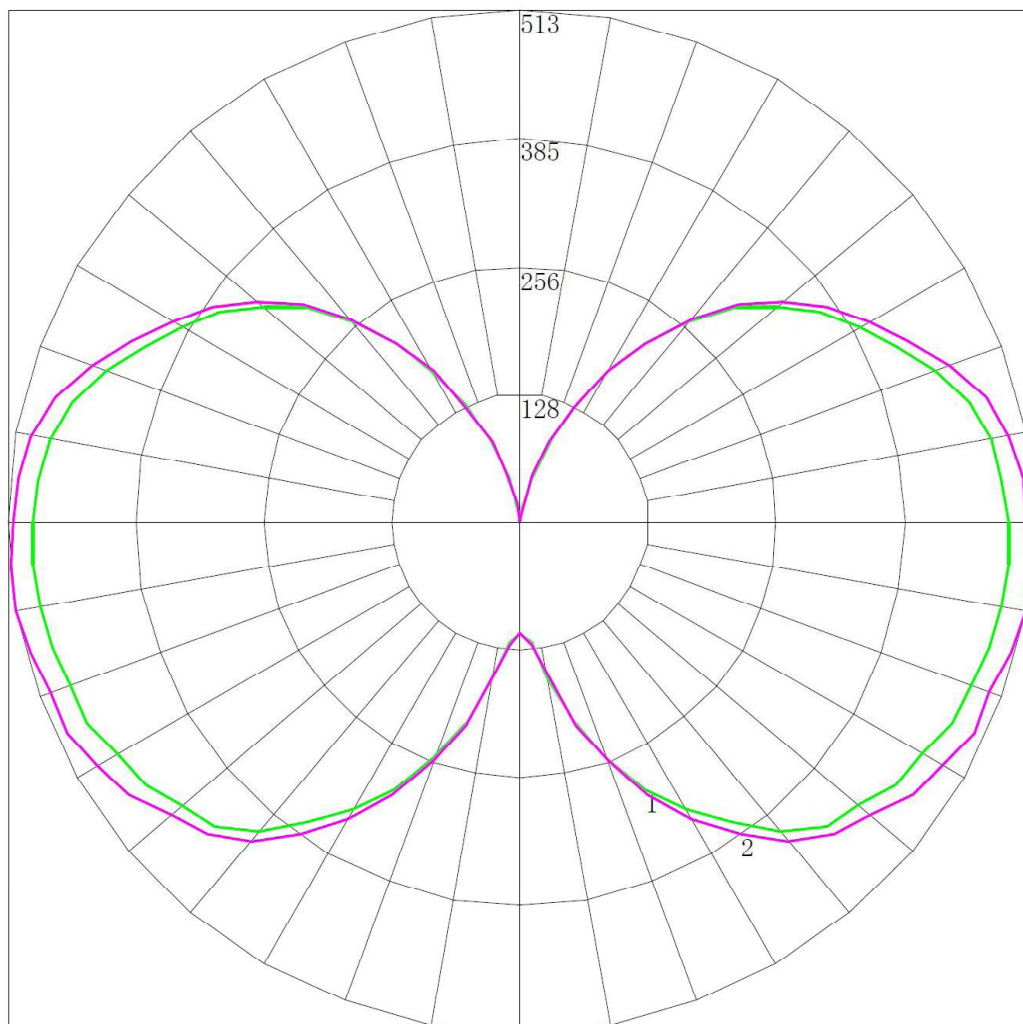
ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	12.82
10-20	58.54
20-30	135.19
30-40	229.88
40-50	325.07
50-60	403.40
60-70	462.27
70-80	503.76
80-90	524.08
90-100	516.13
100-110	476.34
110-120	399.25
120-130	316.13
130-140	224.65
140-150	131.57
150-160	58.02
160-170	14.02
170-180	0.68



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4.5 Polar Curves

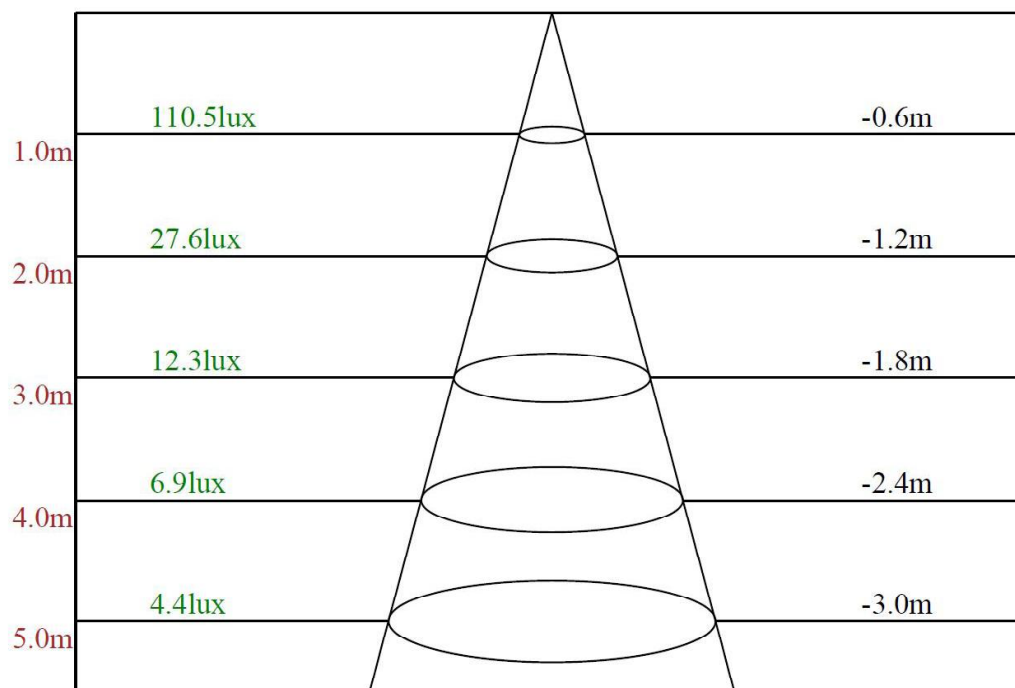


Maximum Candela = 512.697 Located At Horizontal Angle = 90, Vertical Angle = 80

1 - Vertical Plane Through Horizontal Angles (0 - 180)

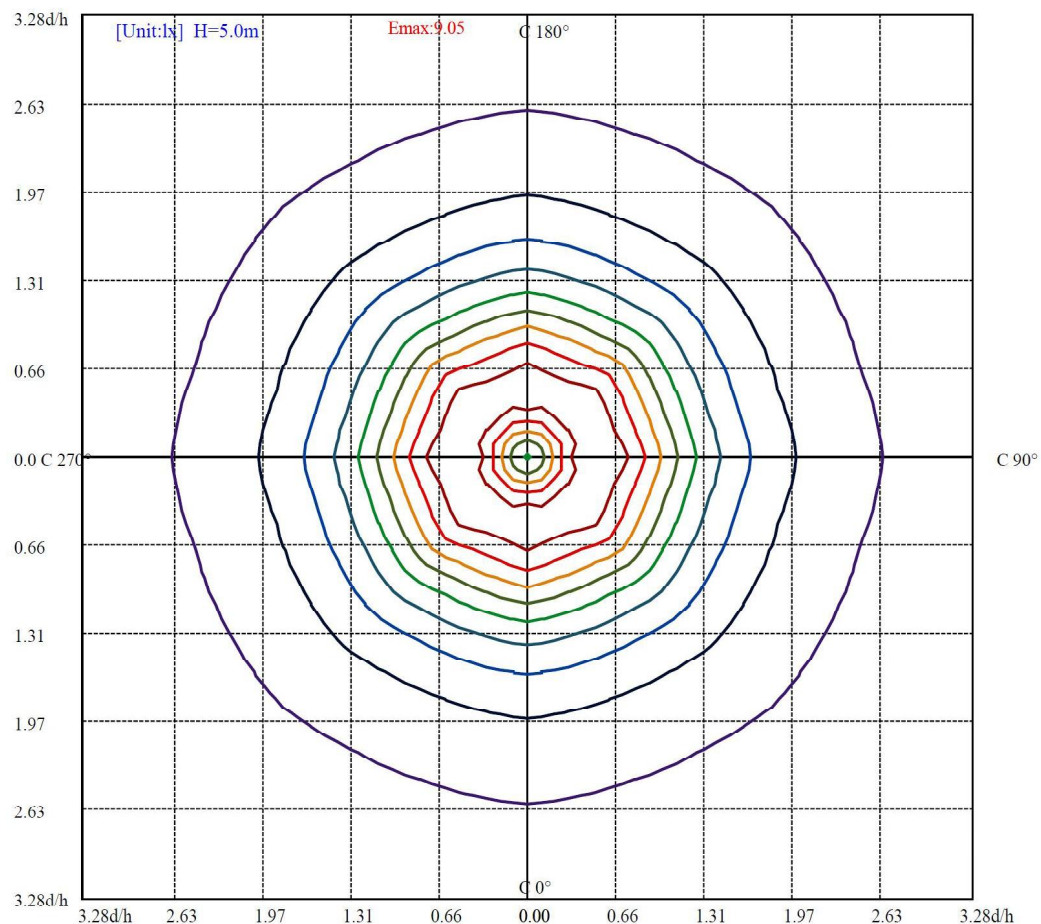
2 - Vertical Plane Through Horizontal Angles (90 - 270)

4.6 Lux Distance curve



Beam angle of C0plane326.09

4.7 ISO illuminance diagram



(10%Emax) 0.905484	—
(20%Emax) 1.810964	—
(30%Emax) 2.716444	—
(40%Emax) 3.621928	—
(50%Emax) 4.5274	—
(60%Emax) 5.43288	—
(70%Emax) 6.33836	—
(80%Emax) 7.24384	—
(90%Emax) 8.14932	—

4.8 Candela Tabulation

	<u>0</u>	<u>15</u>	<u>30</u>	<u>45</u>	<u>60</u>	<u>75</u>	<u>90</u>
0	110.507	110.507	110.507	110.507	110.507	110.507	110.507
5	122.949	122.990	123.029	123.479	123.593	123.106	124.124
10	157.287	155.223	156.244	157.383	157.576	156.189	159.482
15	206.654	201.388	202.119	205.470	201.490	202.229	211.089
20	252.141	243.795	245.073	251.581	245.050	244.391	255.679
25	296.647	283.570	286.572	297.701	289.708	289.123	303.547
30	334.062	322.210	324.749	338.954	331.272	329.077	344.491
35	368.980	354.491	356.689	375.554	366.292	363.176	383.680
40	406.127	385.676	387.051	411.719	397.134	393.221	417.839
45	432.617	409.597	409.539	437.939	421.190	417.334	443.088
50	443.052	423.774	421.626	451.563	433.731	429.695	457.305
55	458.482	441.418	439.108	467.694	449.174	445.010	478.677
60	465.573	446.104	443.755	474.969	459.004	453.354	489.109
65	478.193	451.483	453.858	480.529	466.308	458.938	500.188
70	480.155	456.152	456.260	485.535	467.561	464.623	500.419
75	485.417	463.887	461.850	492.994	472.310	471.780	507.758
80	488.718	468.829	466.475	497.161	477.771	477.366	512.697
85	490.100	466.654	466.947	497.202	478.436	475.872	512.466
90	488.316	464.261	463.829	493.868	474.828	472.495	507.250
95	483.990	460.080	460.238	489.633	470.216	467.840	505.035
100	478.282	452.858	452.605	483.034	462.662	461.951	497.372
105	464.413	439.322	438.734	469.673	448.083	447.830	482.786
110	440.956	414.342	414.472	444.130	423.340	422.601	457.490
115	414.734	388.130	387.676	418.068	395.850	395.873	428.871
120	390.653	364.554	364.717	393.762	372.365	372.191	402.606
125	366.259	341.870	340.904	368.785	348.203	347.307	375.926
130	336.024	314.492	313.795	337.228	321.950	319.476	343.429
135	304.272	281.047	280.962	303.307	288.251	285.539	308.025
140	263.066	242.116	241.196	263.594	247.656	246.187	266.573
145	216.866	201.025	200.707	216.203	206.692	204.176	217.044
150	176.463	160.018	160.245	175.048	164.606	162.340	174.669
155	130.396	118.369	117.941	128.915	122.285	119.521	128.047
160	87.674	78.282	78.172	86.950	81.200	79.385	85.073
165	44.461	42.563	42.084	48.543	45.313	43.966	47.268
170	13.512	13.474	14.122	17.708	17.540	16.826	18.418
175	2.274	2.439	2.245	2.232	1.767	2.181	2.354
180	0.716	0.716	0.716	0.716	0.716	0.716	0.716

****End of test report****