



NVLAP LAB CODE 500080-0

Ref. No.: LCP15100151

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-8029E30, LED-8029E30C

**Test Date:** Oct. 30, 2015 to Nov. 3, 2015

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

2/F., Technology and Enterprise Development Center, Guangyuan Road, Xiaolan,  
Zhongshan, Guangdong, China

**Test Note:** *Model LED-8029E30 and LED-8029E30C are the same except for model number.*

---

**Complied by:**

Thomas Liu

Project Engineer

Nov. 9, 2015

**Reviewed by:**

Richard Li

Technical Manager

Nov. 9, 2015

---

The duplication of this report or parts of it and its use for advertising purposes is only allowed with permission of the testing laboratory. This report contains the result of the examination of the product sample submitted by the applicant. A general statement concerning the quality of the products from the series manufacture cannot be derived therefore. This report must not be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the Federal Government.

## Table of Contents

<b>1. General</b> .....	3
1.1 Product Information .....	3
1.2 Standards or methods.....	4
1.3 Equipment list.....	4
<b>2. Test conducted and method</b> .....	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
<b>3. Test Result Summary</b> .....	6
3.1 Electrical data.....	6
3.2 Photometric data.....	6
3.3 Color Rendering Details.....	6
<b>4. Test Data</b> .....	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



LCTECH



# 1. General

## 1.1 Product Information

Brand Name	Light Efficient Design
Trade Mark	-
Luminaire Type	LED Lamps
Model Number	LED-8029E30,LED-8029E30C
Rated Inputs	120-277VAC 50-60Hz
Rated Power	24 W
Rated Light output	2300 lm
Declared CCT	3000 K
Power Supply	Integral LED driver
LED Package, Array or Module	Not provided
Receipt Samples	1 unit
Date of Receipt Samples	Oct. 29, 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  $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ ; 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  $\pm 0.2$  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	277.00V~60Hz	277.10V~60Hz
Input Current(A)	0.092	0.093
Total Power(W)	24.27	24.36
Power Factor	0.954	0.948
I-THD	15.29%	-

#### 3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	2369.90	2388.96
Luminaire Efficacy(lm/W)	97.65	98.07
Correlated Color Temperature (CCT)(K)	3023	-
Color Rendering Index (CRI)	82.3	-
R9	8	-
Chromaticity Coordinate (x,y)	x = 0.4338 y = 0.4003	-
Chromaticity Coordinate (u,v)	u = 0.2502 v = 0.3463	-
Chromaticity Coordinate (u',v')	u' = 0.2502 v' = 0.5194	-
Duv	-0.00108	-
Beam Angle	-	C0 plan: 294.60°
Filed Angle	-	C0 plan: N/A°

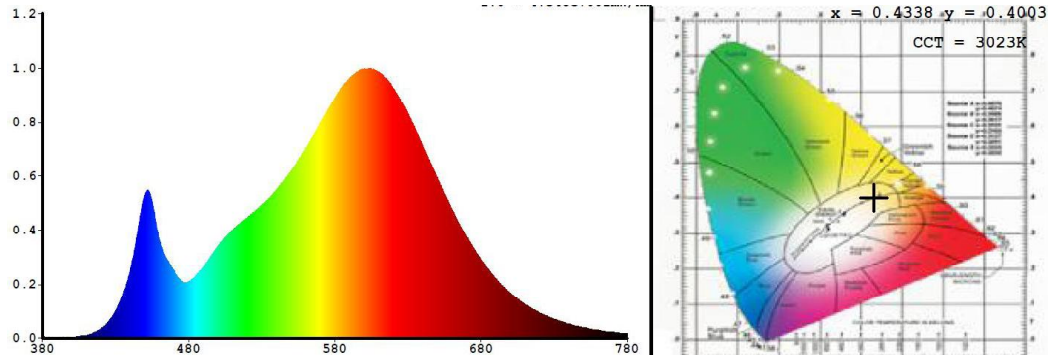
#### 3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
81	91	96	80	81	89	82	59
R9	R10	R11	R12	R13	R14	R15	-
8	80	78	73	83	98	74	-

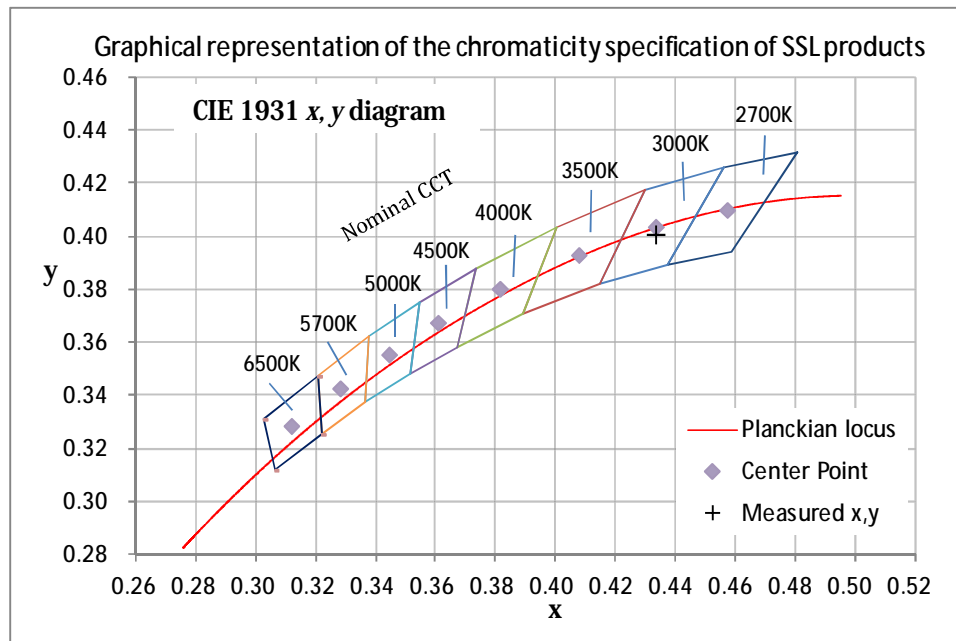
Note: N.A.

## 4. Test Data

### 4.1 Spectral Distribution



### 4.2 ANSI Chromaticity Quadrangles Diagram





LCTECH



**4.3 Goniometry Test Data**

CIE Type	General Diffuse	Basic Luminous Shape	Circular w/Sides
Spacing Criteria (0-180)	N/A	Luminous Length	0.06(Diameter)
Spacing Criteria (90-270)	N/A	Luminous Width	0.06(Diameter)
Spacing Criteria (Diagonal)	N/A	Luminous Height	0.08m
Test Distance	30.04 m		

**4.4 Zonal Lumen Summary**

Zone	Lumens	%Lamp	%Fixt
0-20	65.39	2.70	2.70
0-30	158.46	6.60	6.60
0-40	294.78	12.30	12.30
0-60	685.23	28.70	28.70
0-80	1185.75	49.60	49.60
0-90	1433.63	60.00	60.00
10-90	1418.8	59.40	59.40
20-40	229.39	9.60	9.60
20-50	405.91	17.00	17.00
40-70	637.95	26.70	26.70
60-80	500.53	21.00	21.00
70-80	253.03	10.60	10.60
80-90	247.87	10.40	10.40
90-110	462.31	19.40	19.40
90-120	651.47	27.30	27.30
90-130	787.71	33.00	33.00
90-150	929.52	38.90	38.90
90-180	955.33	40.00	40.00
110-180	493.01	20.60	20.60
0-180	2388.96	100.00	100.00

Total Luminaire Efficiency = 100.00%

**ZONAL LUMEN SUMMARY**

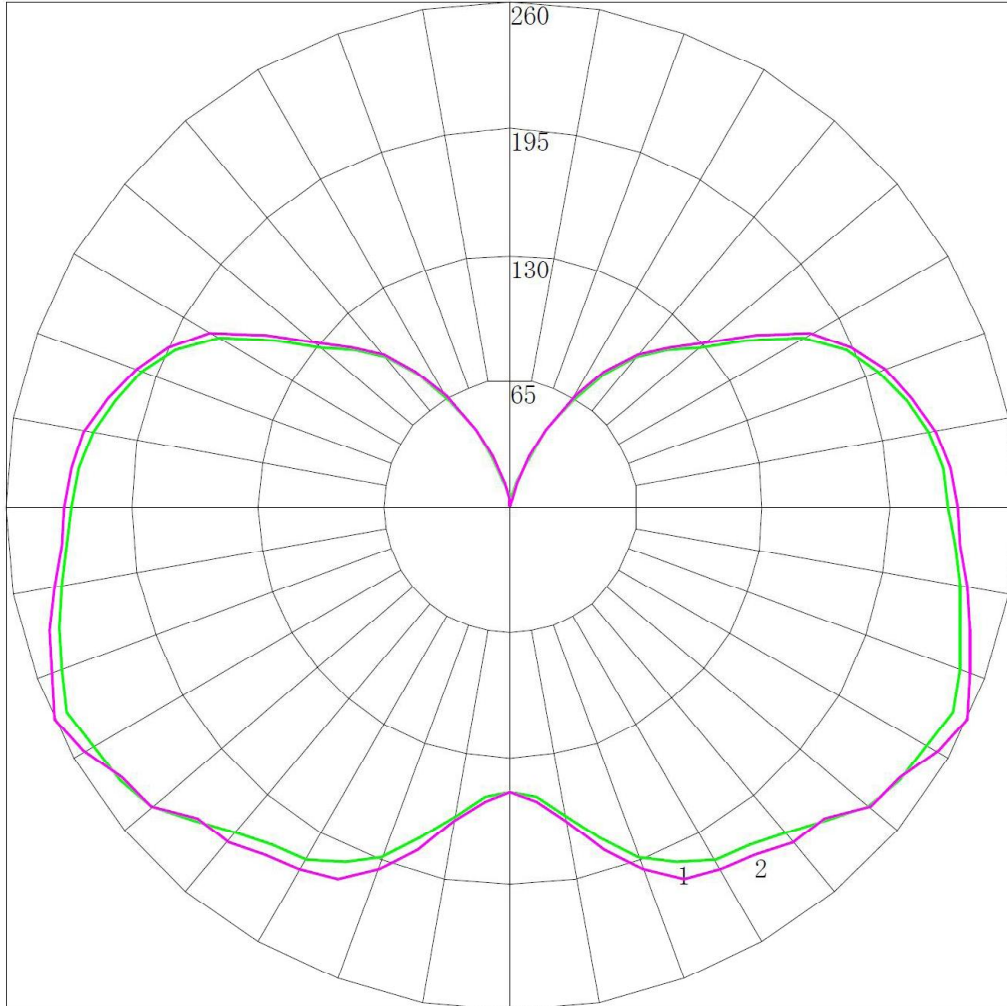
Zone	Lumens
0-10	14.83
10-20	50.57
20-30	93.07
30-40	136.32
40-50	176.52
50-60	213.93
60-70	247.50
70-80	253.03
80-90	247.87
90-100	240.18
100-110	222.13
110-120	189.15
120-130	136.25
130-140	89.15
140-150	52.65
150-160	21.23
160-170	4.32
170-180	0.26





LCTECH

4.5 Polar Curves

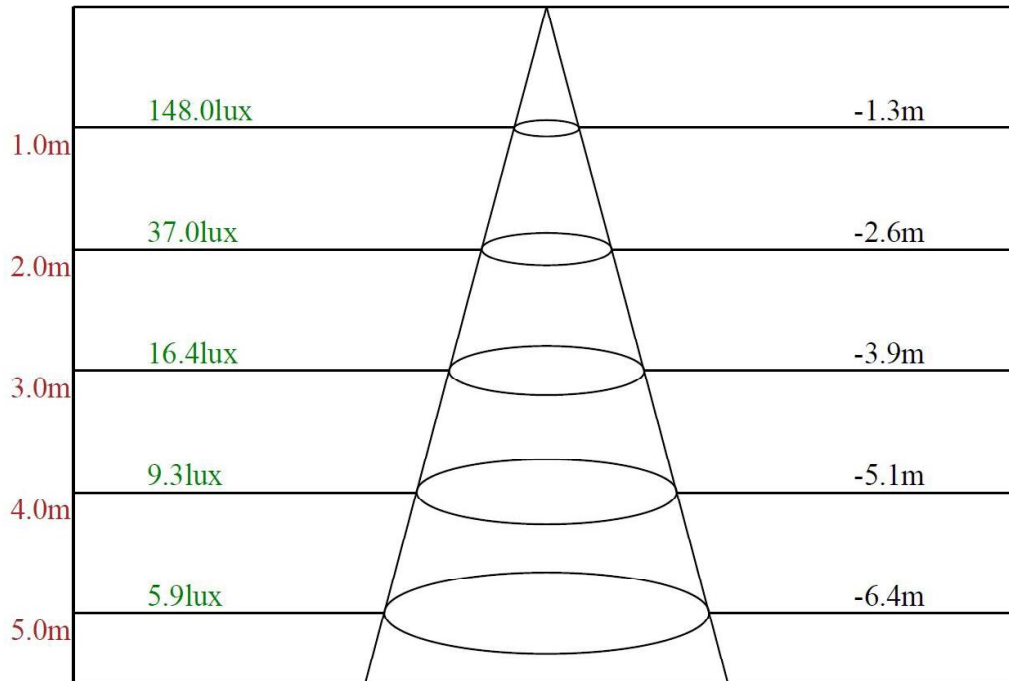


Maximum Candela = 260.158 Located At Horizontal Angle = 90, Vertical Angle = 65  
# 1 - Vertical Plane Through Horizontal Angles (0 - 180)  
# 2 - Vertical Plane Through Horizontal Angles (90 - 270)



LCTECH

4.6 Lux Distance curve



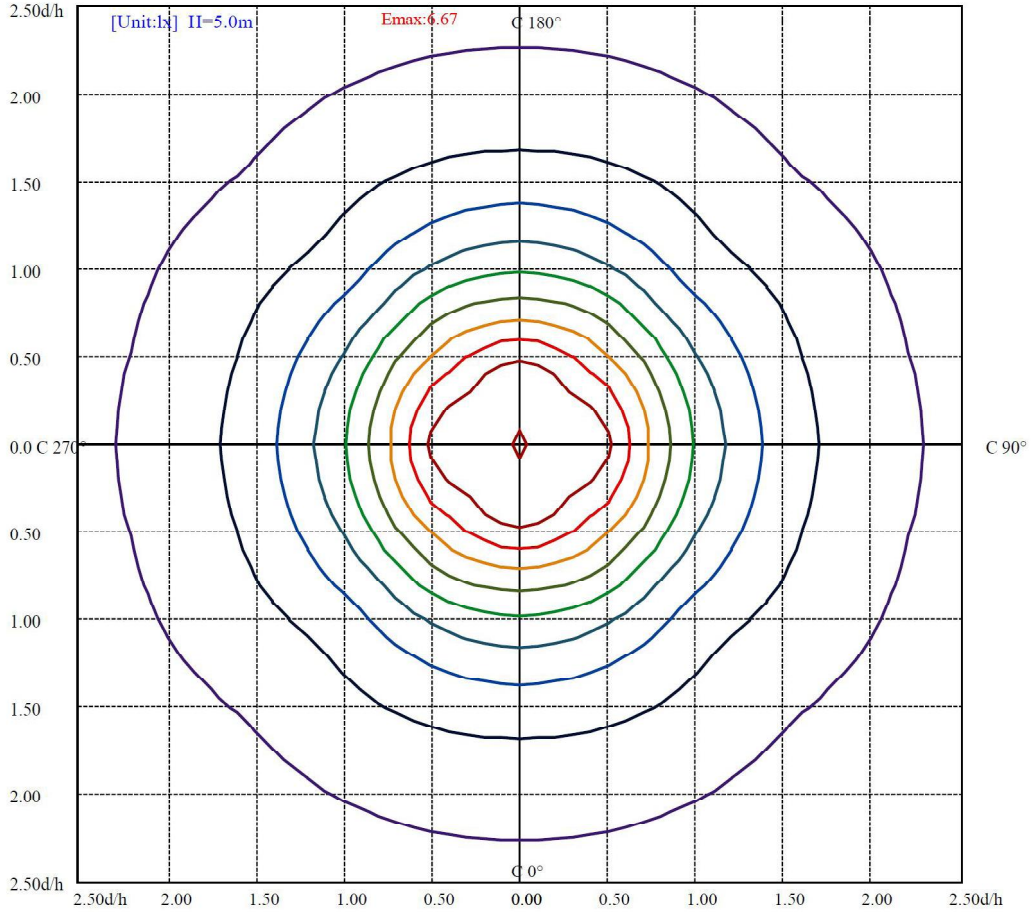
Beam angle of C0plane294.60



LCTECH



4.7 ISO illuminance diagram



(10%Emax) 0.666816	—
(20%Emax) 1.333636	—
(30%Emax) 2.000452	—
(40%Emax) 2.667272	—
(50%Emax) 3.334088	—
(60%Emax) 4.00092	—
(70%Emax) 4.66772	—
(80%Emax) 5.33456	—
(90%Emax) 6.00136	—



LCTECH

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>
<b>0</b>	148.009	148.009	148.009	148.009	148.009	148.009	148.009
<b>5</b>	151.100	151.613	150.931	151.621	151.812	152.240	153.171
<b>10</b>	162.254	162.396	161.579	161.561	162.749	163.160	165.642
<b>15</b>	178.068	177.097	175.755	174.684	177.671	180.662	184.554
<b>20</b>	193.388	191.167	187.816	184.932	188.755	194.760	199.721
<b>25</b>	203.154	201.814	197.454	194.101	199.735	205.926	212.237
<b>30</b>	210.456	207.976	205.987	204.902	210.721	214.417	217.125
<b>35</b>	213.726	213.716	215.042	214.242	219.493	220.452	219.775
<b>40</b>	220.938	222.412	226.709	222.584	224.870	224.690	226.947
<b>45</b>	229.360	228.291	230.933	225.650	226.339	226.324	228.546
<b>50</b>	241.500	237.679	231.061	219.471	224.450	235.750	242.250
<b>55</b>	245.666	243.331	237.073	221.372	235.772	240.646	245.174
<b>60</b>	247.951	252.366	250.602	231.465	248.706	248.272	254.082
<b>65</b>	252.072	254.775	252.967	238.217	257.379	254.209	260.158
<b>70</b>	246.607	248.243	248.470	232.389	252.991	242.990	252.255
<b>75</b>	240.604	237.732	242.274	229.830	247.419	234.936	245.494
<b>80</b>	235.184	229.761	235.870	225.960	240.432	227.195	238.733
<b>85</b>	229.853	223.910	229.132	220.393	233.721	220.483	232.886
<b>90</b>	226.090	219.971	225.740	217.105	229.877	217.333	230.784
<b>95</b>	223.760	218.372	223.067	214.020	227.237	214.655	227.541
<b>100</b>	219.012	214.296	219.292	209.871	222.972	211.105	223.201
<b>105</b>	211.800	208.982	213.608	203.625	217.397	205.784	214.704
<b>110</b>	201.900	201.733	205.722	195.534	209.230	198.451	205.568
<b>115</b>	191.014	192.163	194.939	185.570	198.056	188.383	194.330
<b>120</b>	173.454	175.074	178.427	169.435	179.513	173.676	178.616
<b>125</b>	148.457	150.801	153.149	145.735	153.951	148.350	153.034
<b>130</b>	128.478	129.977	132.368	126.087	133.198	127.199	131.426
<b>135</b>	113.695	115.005	116.890	111.646	116.767	112.107	116.214
<b>140</b>	99.718	100.391	101.817	98.442	101.813	98.319	102.007
<b>145</b>	83.233	83.798	86.360	82.620	83.989	83.030	85.151
<b>150</b>	63.298	65.292	64.726	64.386	66.745	62.612	66.513
<b>155</b>	43.767	45.345	47.312	43.559	42.739	43.708	43.078
<b>160</b>	26.206	27.355	27.634	24.761	25.511	26.015	27.637
<b>165</b>	13.797	14.094	14.062	12.547	12.368	12.375	12.288
<b>170</b>	5.331	5.673	5.436	5.044	4.738	4.521	3.929
<b>175</b>	1.747	1.688	1.617	1.509	1.511	1.175	0.685
<b>180</b>	0.664	0.664	0.664	0.664	0.664	0.664	0.664

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