



NVLAP LAB CODE 500080-0

Ref. No.: LCP15100119

Version: 1.0

Date of issue: Nov. 6, 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-8035E57, LED-8035E57C

Test Date: Oct. 30, 2015 to Nov. 4, 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-8035E57 and LED-8035E57C are the same except for model number.*

Complied by:

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Nov. 6, 2015

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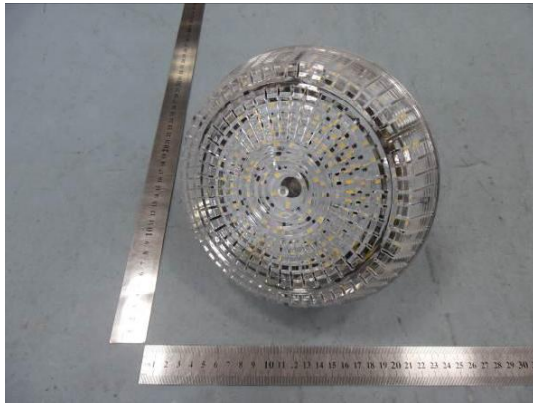
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1. General

1.1 Product Information

Brand Name	Light Efficient Design
Trade Mark	-
Luminaire Type	LED Lamps
Model Number	LED-8035E57,LED-8035E57C
Rated Inputs	120-277VAC 50-60Hz
Rated Power	60 W
Rated Light output	7000 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. 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 ± 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	277.02V~60Hz
Input Current(A)	0.243	0.245
Total Power(W)	64.79	65.33
Power Factor	0.965	0.961
I-THD	7.71%	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	7062.30	7080.40
Luminaire Efficacy(lm/W)	109.00	108.38
Correlated Color Temperature (CCT)(K)	5460	-
Color Rendering Index (CRI)	85.7	-
R9	27	-
Chromaticity Coordinate (x,y)	x = 0.3333 y = 0.3405	-
Chromaticity Coordinate (u,v)	u = 0.2077 v = 0.2983	-
Chromaticity Coordinate (u',v')	u' = 0.2077 v' = 0.4774	-
Duv	-0.000709	-
Beam Angle	-	C0 plan: 93.71°
Filed Angle	-	C0 plan: 308.0°

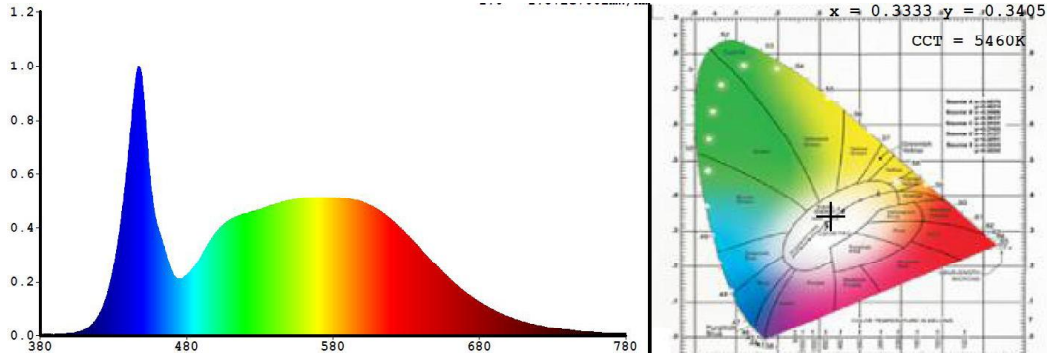
3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
86	88	90	87	87	85	88	75
R9	R10	R11	R12	R13	R14	R15	-
27	72	88	71	86	94	82	-

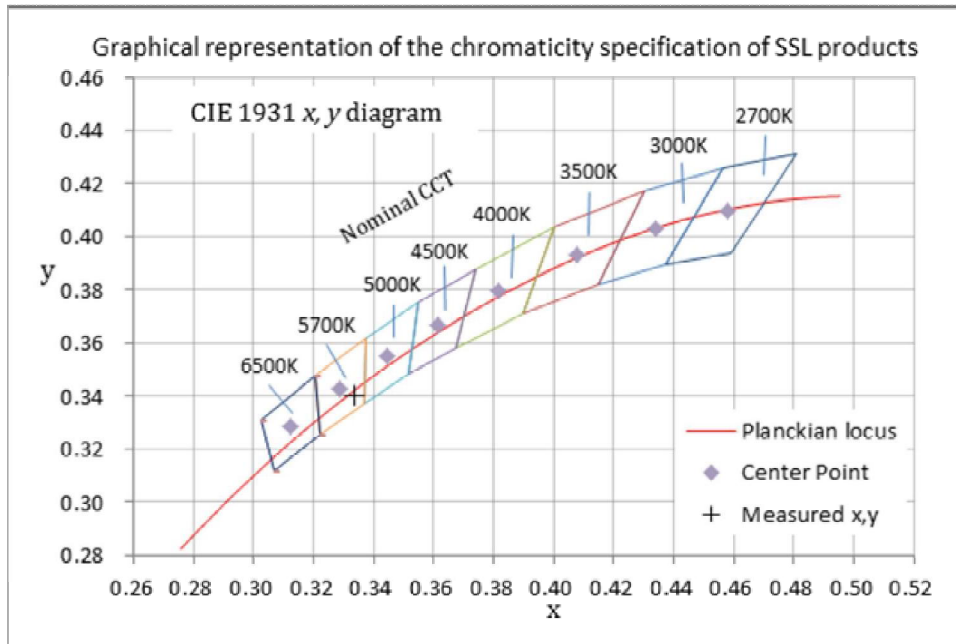
Note: N.A.

4. Test Data

4.1 Spectral Distribution



4.2 ANSI Chromaticity Quadrangles Diagram





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4.3 Goniometry Test Data

CIE Type	Semi-Direct	Basic Luminous Shape	Circular w/Sides
Spacing Criteria (0-180)	1.10	Luminous Length	0.20(Diameter)
Spacing Criteria (90-270)	1.12	Luminous Width	0.20(Diameter)
Spacing Criteria (Diagonal)	1.26	Luminous Height	0.04m
Test Distance	30.04 m		

4.4 Zonal Lumen Summary

Zone	Lumens	%Lamp	%Fixt
0-20	712.78	10.10	10.10
0-30	1483.08	20.90	20.90
0-40	2396.29	33.80	33.80
0-60	4023.72	56.80	56.80
0-80	5179.12	73.10	73.10
0-90	5550.74	78.40	78.40
10-90	5360.92	75.70	75.70
20-40	1683.52	23.80	23.80
20-50	2571.52	36.30	36.30
40-70	2278.84	32.20	32.20
60-80	1155.4	16.30	16.30
70-80	503.99	7.10	7.10
80-90	371.62	5.20	5.20
90-110	612.31	8.60	8.60
90-120	855.00	12.10	12.10
90-130	1051.9	14.90	14.90
90-150	1368.46	19.30	19.30
90-180	1529.64	21.60	21.60
110-180	917.33	13.00	13.00
0-180	7080.38	100.00	100.00

Total Luminaire Efficiency = 100.00%

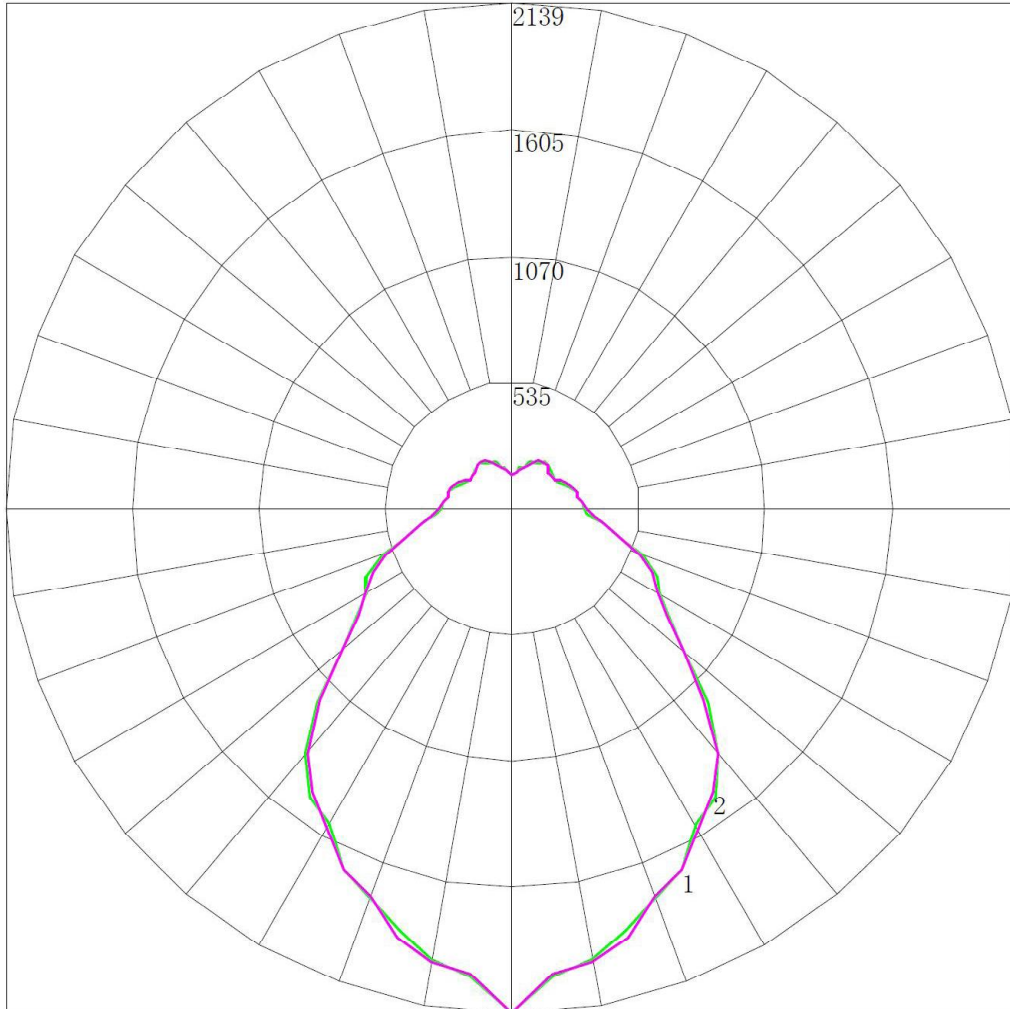
ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	189.82
10-20	522.96
20-30	770.30
30-40	913.22
40-50	888.00
50-60	739.42
60-70	651.42
70-80	503.99
80-90	371.62
90-100	323.32
100-110	288.99
110-120	242.70
120-130	196.89
130-140	170.89
140-150	145.67
150-160	95.29
160-170	51.20
170-180	14.69



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4.5 Polar Curves

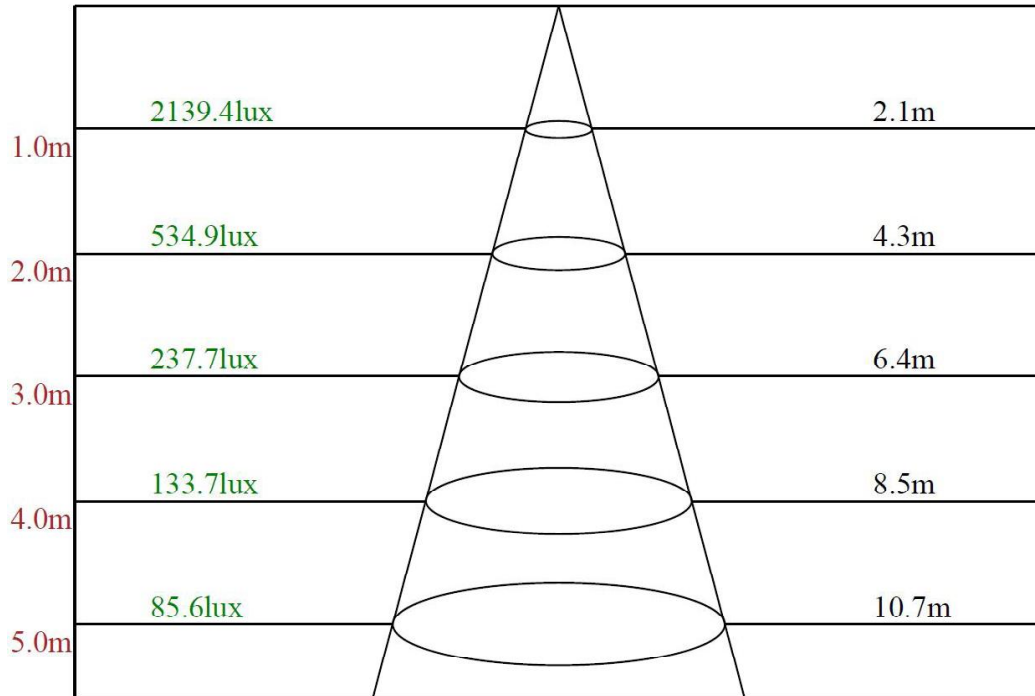


Maximum Candela = 2139.444 Located At Horizontal Angle = 0, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)



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4.6 Lux Distance curve



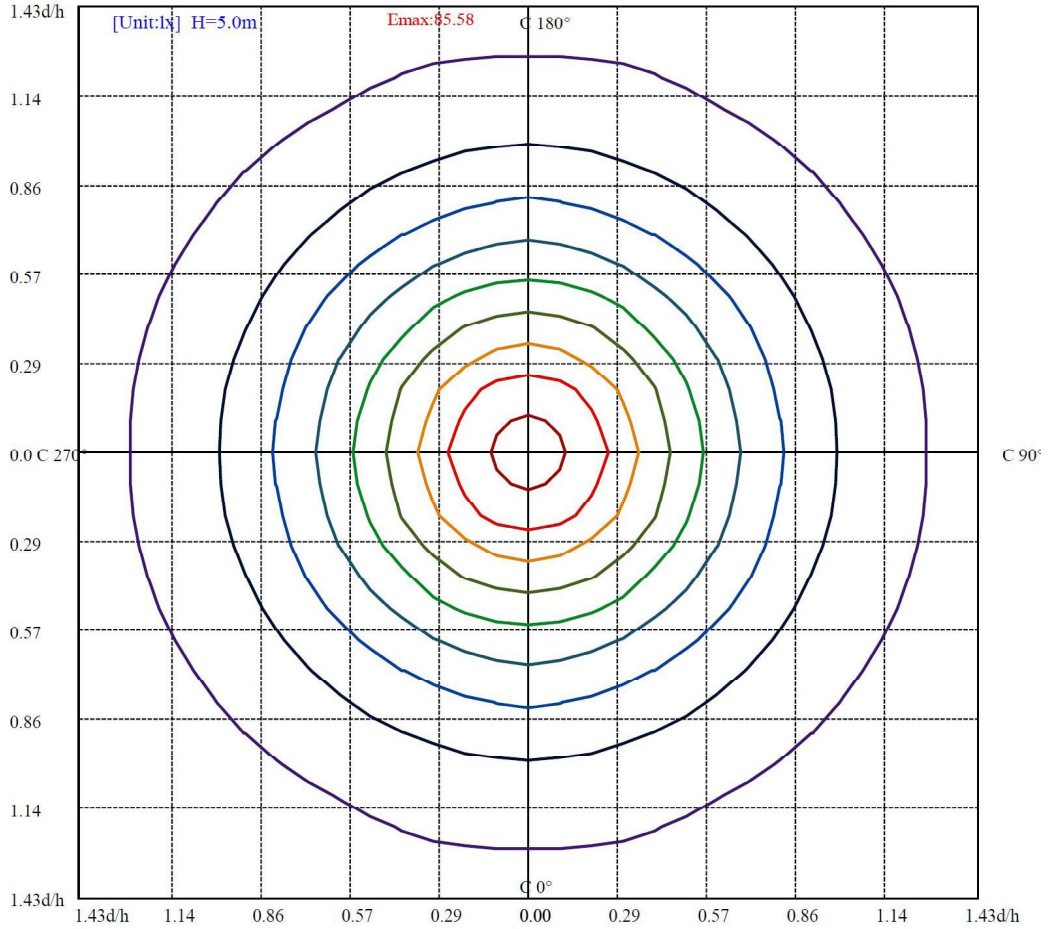
Beam angle of C0plane93.71



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4.7 ISO illuminance diagram



(10%Emax) 8.55776	—
(20%Emax) 17.11552	—
(30%Emax) 25.67328	—
(40%Emax) 34.23104	—
(50%Emax) 42.7888	—
(60%Emax) 51.3464	—
(70%Emax) 59.9044	—
(80%Emax) 68.46201	—
(90%Emax) 77.02	—



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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	2139.444	2139.444	2139.444	2139.444	2139.444	2139.444	2139.444
5	1989.174	1984.854	1981.802	1980.810	1985.403	1975.297	1985.458
10	1944.127	1950.096	1960.580	1949.669	1931.047	1937.447	1950.937
15	1855.975	1872.794	1874.278	1865.646	1842.230	1839.488	1889.615
20	1765.118	1744.931	1733.663	1741.104	1763.045	1721.184	1754.253
25	1692.747	1679.189	1695.545	1683.423	1699.096	1682.398	1687.662
30	1543.939	1556.623	1575.601	1532.428	1556.447	1546.390	1569.425
35	1499.079	1474.377	1450.018	1457.910	1488.949	1470.413	1475.535
40	1357.474	1309.442	1321.518	1331.915	1354.081	1318.162	1352.256
45	1168.230	1158.652	1152.334	1165.177	1152.230	1165.503	1145.034
50	941.940	968.487	941.496	960.723	958.354	955.895	941.900
55	808.738	832.090	786.022	823.088	811.107	822.726	795.228
60	720.294	731.838	709.304	732.109	720.742	732.276	710.831
65	680.097	663.209	653.884	668.706	683.574	668.252	651.463
70	582.071	566.433	567.401	564.900	576.333	568.805	570.973
75	474.700	476.704	470.812	472.804	468.483	475.534	473.585
80	391.166	400.132	391.375	389.527	383.675	392.045	392.777
85	321.278	328.906	344.173	328.244	321.069	330.594	346.399
90	299.525	310.986	305.793	308.504	306.130	314.815	315.965
95	293.882	303.177	295.147	301.455	295.827	301.324	294.616
100	275.220	284.740	276.789	283.638	273.316	279.533	278.764
105	278.228	279.437	279.111	270.885	267.244	271.353	278.582
110	262.358	260.276	272.696	261.007	261.328	263.869	273.449
115	240.252	243.823	247.292	239.431	239.671	239.825	247.421
120	225.139	227.981	232.923	226.215	226.724	226.909	230.933
125	216.829	218.570	216.574	218.977	217.828	218.149	215.807
130	217.145	215.592	210.201	213.778	214.567	213.731	212.809
135	221.663	220.444	216.094	218.235	219.111	217.543	218.169
140	231.314	234.504	233.601	233.200	231.741	230.716	231.750
145	237.265	237.820	236.483	235.017	236.970	237.654	234.067
150	217.186	223.176	225.450	219.387	215.810	220.085	227.844
155	209.349	208.326	200.404	200.139	201.052	206.748	210.447
160	201.761	188.962	188.709	185.913	191.781	190.653	194.776
165	181.236	184.403	176.845	175.804	181.704	181.091	179.604
170	170.413	164.250	164.767	169.709	169.064	171.920	165.886
175	148.110	146.625	143.205	146.049	149.250	150.239	147.490
180	138.602	138.602	138.602	138.602	138.602	138.602	138.602

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