



# High Precision CCD Spectroradiometer & Integrating Sphere Test System LPCE-2(LMS-9000)

## Brochure

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**Leader in Lighting & Electrical Test Instruments**

Rev. 9/1/2025



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**Note: 1. If test the single LED or LED Chip, please option the Blue items; If test luminaries' several point temperature, please option the Orange item.**  
**2. Already include the upgradeable & free software which can run in Win7, 8, 10 and 11 (USB driver was register by Microsoft, it can install directly).**

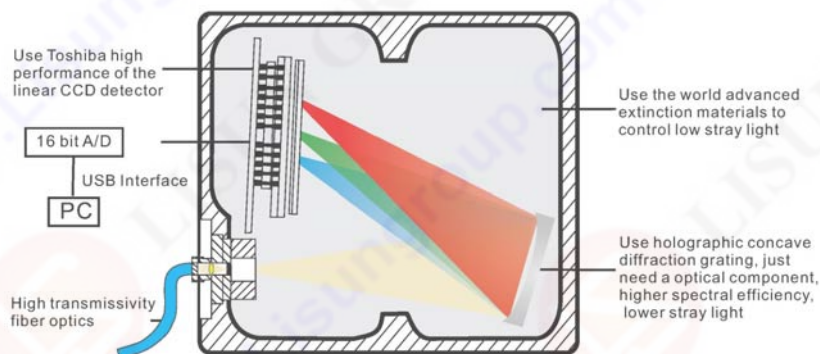
## 1、 High Precision CCD Spectroradiometer

LMS-9000C is adopting the world advanced Holographic grating with flat-field correction, precision optical system and the electronic shutter control technology. The test speed can be in milliseconds and the test accuracy is in the laboratory level. It has the lowest value of stray light. LMS-9000C has high repeatability and stability testing. It is fully meet CIE127-1997, IES LM-79-19 and IES LM-80.



### Specifications:

- Spectral Wavelength Accuracy:  $\pm 0.3\text{nm}$
- Wavelength Reproducibility:  $\pm 0.1\text{nm}$
- Accuracy of Chromaticity Coordinate ( $\Delta x, \Delta y$ ):  $\pm 0.002$  (Standard A Lamp)
- Correlated Color Temperature CCT:  $1500\text{K} \sim 100,000\text{K}$ , CCT Accuracy:  $\pm 0.3\%$
- Color Rendering Index Range:  $0 \sim 100.0$ , Accuracy:  $\pm (0.3\% \text{rd} \pm 0.3)$
- Photometric linear:  $\pm 0.3\%$ ; Time of integration:  $0.1\text{ms} - 20\text{s}$
- Stray light:  $< 0.015\%$  (600nm) and  $< 0.03\%$  (435nm)
- It can measure the temperature inside and outside of integrating sphere
- Flux testing method: spectrum, photometric and spectrum with photometric revision



LMS-9000C used the Band pass-filter Wheel Correcting Technique, Spectrometer & Broadband-radiometer & photometer Combined Technique, and modified NIST stray light correction technology, the LMS-9000C Spectroradiometer can realize ultra low stray light and super photometry linearity in overall dynamic range.

LISUN Model	LMS-9000C	LMS-9000CUV-VIS	LMS-9000CVIS-NIR
Wavelength	350-800nm	200-800nm	350-1050nm

P.S. If the UV Accuracy Test, please go here learn more: [LPCE-2\(LMS-9000CUV\)](#)

## 2、 Optical Fiber



The optical fiber is used to connect the integrating sphere with spectroradiometer.

LISUN Model	CFO-1.5M	CFS-1.5M
Products Name	1.5m Optical Fiber	1.5m Silica Optical Fiber
Work in Wavelength	350-1050nm	200-1050nm

P.S. The 2m or 3m length optical fiber can be design according to customers' request.

## 3、 Digital CC and CV DC Power Supply

The DC Series Power Supplies are with high stability and high accuracy. The voltage and current can be adjustable and simple operation. They are suitable to supply DC Power for the standard lamps.



### Specifications:

- Accuracy of Voltage and Current:  $\pm(0.02 \text{ Reading} + 0.01\% \text{ Range} + 1 \text{ Digit})$
- Stability of Output Voltage/Current:  $\pm 0.01\% \text{ Reading}/3\text{min}$
- Digital control for Constant Current output or Constant Voltage output
- Communicate with PC via software, the Voltage & Current set by the software and Power Output can be remote controlled.

Model	DC3005	DC3010	DC6005	DC6010	DC12005
U Range	0.0005-30.000V	0.0005-30.000V	0.0005-60.000V	0.0005-60.000V	0.0001-120.00V
I Range	0.0005-5.0000A	0.0005-10.000A	0.0005-5.0000A	0.0005-10.000A	0.0005-5.0000A

## 4、 Digital Power Meter



LISUN Model	Measure	Remark
LS2012	U(AC&DC), I(AC&DC), P(AC&DC), Power Factor PF(AC)	Digital Tube display
LS2050B	U(AC&DC), I(AC&DC), P(AC&DC), Power Factor PF(AC), Displacement Factor DF(AC) and Total 0-50 Harmonic in IEC/CSA	Test Accuracy is Class 0.5 with LCD touch screen display, it has special Software can be run in Win7, Win8 or Win10
LS2050C	U(AC&DC), I(AC&DC), P(AC&DC), Power Factor PF(AC), Displacement Factor DF(AC) and Total 0-50 Harmonic in IEC/CSA	Test Accuracy is Class 0.2 with LCD touch screen display, it has special Software can be run in Win7, Win8 or Win10

P.S. The LS2050C is fully meet LM-79-19 requirements and the frequency Range: 0.5Hz-100kHz

## 5、 AC Power Source



- AC-DC-AC frequency conversion technology, Controlled & tested by 16 bits MCU
- Protection for over hot, thundering voltage and current
- Total voltage distortion:  $\leq 0.6\%$ ; Voltage stability:  $\leq 0.1\%/30\text{min}$
- Load adjust rate:  $\leq 0.1\%$ ; Frequency stability:  $\leq 0.05\%/30\text{min}$
- Output voltage range: AC 0.0~300.0V, Output Frequency Range: 45~70Hz, 100Hz, 200Hz and 400Hz
- Input Power: 220V and 50/60Hz

- Communicate with PC via software, the Voltage & Current set by the software and Power Output can be remote controlled.

P.S. LSP-500VARC and LSP-1KVARC are the update version with big LCD screen.

LISUN Model	Output Power	Specification
LSP-500VARC (with Trigger Function)	500VA	0~150V is 4.2A and 150~300V is 2.1A
LSP-500VARC-Pst (IEC-Pst AC Source Generator)		
LSP-1KVARC (with Trigger Function)	1KVA	0~150V is 8.4A and 150~300V is 4.2A
LSP-1KVARC-Pst (IEC-Pst AC Source Generator)		

The LSP-500VARC-Pst and LSP-1KVARC-Pst are according to IEC TR 61547-1:2020 IEC61000-3-3, IEC 61000-4-15 and IEEE 1453 Pst programmable function as below:

**Table 1 – Voltage fluctuations – Test specification of voltage fluctuations applied at input AC mains 120/230 V and 50/60 Hz**

Rectangular amplitude modulations with duty cycle of 50 % <sup>a c d f</sup>					
Voltage changes per minute cpm	Modulation frequency $f_m$ Hz	Relative voltage fluctuation $d = \Delta U/U$ %			
		120 V 50 Hz	120 V 60 Hz	230 V 50 Hz	230 V 60 Hz
39	0,325 0	1,045	1,040	0,894	0,895
110	0,916 7	0,844	0,844	0,722	0,723
1 056	8,8	0,353 b	0,353 b	0,275 b	0,275 b
1 620	13,5	0,545	0,548	0,407	0,409
4 000	33 1/3 <sup>e</sup>	3,426	Test not required	2,343	Test not required
4 800	40,0 <sup>e</sup>	Test not required	4,837	Test not required	3,263

<sup>a</sup> See Table 5 of IEC 61000-4-15:2010 and Table D1 of IEC 61000-3-3:2013.

<sup>b</sup> See Tables 2a and 2b of IEC 61000-4-15:2010 for  $P_{inst} = 1$ ; the values of  $d = 0,252$  % and  $d = 0,196$  % are increased to respectively 0,353 % and 0,275 % to give  $P_{st}^{LM}(I) = 1$ .

<sup>c</sup> The duration of the voltage fluctuation and recording of the illuminance is recommended to be a minimum of 180 s (60 s for the transient response of the flickermeter's filters and 120 s for the duration of the statistical evaluation of the flicker level in block d, see A.2.5). First of all, the transient response of the light flickermeter's filters should be considered, which is dominated by the illuminance adapter (block a, see A.2.2). The time constant of this filter is set at 10 s, reaching the 90 % of the value corresponding to the steady state response at approximately 50 s. In addition, the evaluation period should contain an integer number of voltage fluctuation periods. For the set of test modulation frequencies given in this table, the minimum duration to achieve an integer number of voltage fluctuation periods in all the test cases is 120 s.

<sup>d</sup> Recommended absolute tolerance for the duty cycle is  $\pm 2$  pp, for the modulation frequency the recommended tolerance is  $\pm 1$  % and for the relative voltage fluctuation the recommended tolerance is  $\pm 5$  %.

<sup>e</sup> The 33 1/3 Hz and 40 Hz modulation frequencies should be synchronous with the supply frequency of respectively 50 Hz and 60 Hz with a fixed phase angle as defined by Equation (1).

<sup>f</sup> The light flicker specifications in this document are expanded such that it is aligned with the voltage flicker specifications given in IEC 61000-4-15, which is limited to 120 V and 230 V, 50 Hz and 60 Hz. No voltage fluctuation tests are available yet for 100 V, 200 V and 277 V. However, in practice the test specifications given in this table for 120 V and 230 V can be applied for 100 V and 200/277 V respectively for indicative purposes.

LSP-500VARC-Pst or LSP-1KVARC-Pst can work with LISUN LSRF-3 to do Flicker dynamic Pst LM(I) test in IEC TR 61547-1:2020

## 6、 New Design Integrating Sphere

Due to the LED luminaires such as LED street luminaires developed, to do 4π geometry testing, it is hard to be hold in the traditional integrating sphere design. To solve this problem, LISUN design a new kind of sphere.



### A Molding Integrating Sphere VS the traditional Integrating Sphere

LISUN new Integrating sphere has the following advantages:

- The hold base can bear max 20kg, it can test all kinds of luminaires and light source such as E27/E40, all tubes such as T5/T8/T12 and all kinds of luminaires
- The hold base can be installed in the ceiling or down, height can be adjustable
- The test hold base has four power cables connect to the outside Power Supply and max is 5KW
- Build-in Cross laser system which help to install the standard lamp and testing lamp in the centre of the integrating sphere



### Build-in Cross Laser System

#### Specification:

- Diameter: 0.3m, 0.5m, 1.0m, 1.5m, 1.75m, 2.0m, 2.5m and 3.0m
- The painting of integrating spheres is according to CIE Pub.No.84(1989)
- BaSO<sub>4</sub> coating:  $\rho(\lambda) \geq 0.96(450\text{nm} \sim 800\text{nm})$  and  $\rho(\lambda) \geq 0.92(380\text{nm} \sim 450\text{nm})$
- Fine diffuse reflection: Reflectance  $\rho \approx 0.8$  and accuracy of  $\rho(\lambda) < 1.5\%$

**Order Number:**

<b>Sphere Diameter</b>	1.0m	1.5m	1.75m	2m
<b>LISUN Model</b>	IS-1.0MA	IS-1.5MA	IS-1.75MA	IS-2.0MA
<b>Cycle side opening</b>	IS-1.0MA33C	IS-1.5MA55C	IS-1.75MA66C	IS-2.0MA77C

**Remark:**

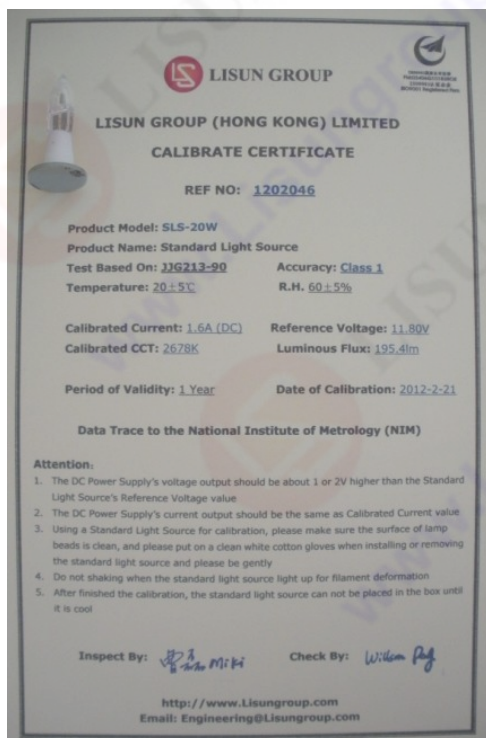
The code 55C in IS-1.5MA55C means the side opening is diameter=50cm cycle size

## 7、 Auxiliary Lamp

Due to the luminaires material has self-absorption, the test flux will be a bit difference than the original flux when test the luminaires in the integrating sphere and LISUN 350-1050nm Spectroradiometer Test System, according to CIE request, it is necessary use an Auxiliary lamp to do flux self-absorption revise.

<b>Integrating Sphere Size</b>	<b>Auxiliary Lamp (350-1050nm)</b>
1m/1.5m/1.75m	RLS-50W
2m/2.5m/3m	RLS-100W

## 8、 Standard Light Source



The **Standard Light Source** is used to calibrate LISUN LPCE-2 Scientific Grade Spectroradiometer Integrating Sphere System or LPCE-3 CCD Spectroradiometer Integrating Sphere Compact System. The Standard Light Source Calibrate Certificate can be traced to NIM and NIST. The different size of Integrating Sphere should choose the right power of standard lamp source.

<b>Integrating Sphere Size</b>	<b>Standard Light Source (350-800nm)</b>	<b>Standard Light Source (350-1050nm)</b>
0.3m/0.5m	SLS-10W	SLS-10WIR
1m/1.5m/1.75m	SLS-50W	SLS-50WIR
2m/2.5m/3m	SLS-100W	SLS-100WIR

## 9、 Multi-function LED Clamps Set

The whole sets includes three good thermal conductivity clamps and an extended converter : for through hole LED, for COB LED for multi-functions SMD LED, they can work with 0.3m or 0.5m integrating sphere



## 10、 19Inch Cabinet

Combine all of the test instruments in a 19 inch standard Cabinet, makes the whole systems looks nice and is simple to use



## 11、 Multiplex Temperature Tester

TMP-8 Temperature range:  $-40\sim 300^{\circ}\text{C}$  and testing accuracy: Class 0.5. There are 8pcs K type thermocouple Sensors to measure the luminaries several points temperature while testing in the integrating sphere system. The max 8 channels temperature results will be display in the Lightsource Test Report (See the next page test report of "TMP Temperature Data").

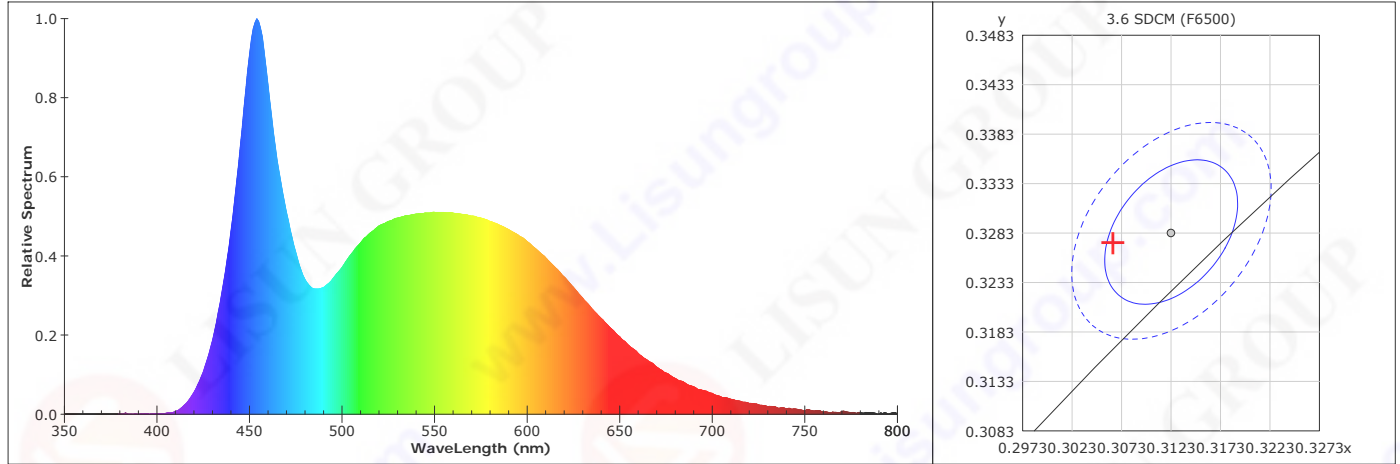
**The next pages are LPCE-2 (LMS-9000) Test Report.**

### Lightsource Test Report

**Report No:** 1737

**Test Time:** 2025-08-28 17:58:34

**Category:** LED  
**Spec:** 9W  
**Manufacturer:** PHILIPS

**Type:** Bulb  
**Number:** 1737  
**Submitter:** Jacky

**CIE Colorimetric Parameters**

CIE(x,y): 0.3064,0.3273      CIE(u,v): 0.1941,0.3110      CIE(u',v'): 0.1941,0.4665  
 CCT: 6872 K (Duv=0.005555 )      Dominant Wavelength: 488.8 nm      Color Purity: 0.095  
 Peak Wavelength: 454.1 nm      Half Width: 29.5 nm      Color Ratio: R:0.130, G:0.807, B:0.063

Color Render Index: Ra:84.0 , avgR(1~14):76.9 , avgR(1~15):76.9

R1: 82	R2: 90	R3: 93	R4: 81	R5: 82	R6: 84	R7: 89	R8: 70
R9: 9	R10: 74	R11: 80	R12: 60	R13: 84	R14: 97	R15: 77	

Color Quality Scale: Qa:82.2 , Qf:82.5 , Qp:81.6 , Qg:90.3 ,

Q1: 83	Q2: 98	Q3: 81	Q4: 74	Q5: 78	Q6: 80	Q7: 85	Q8: 90
Q9: 97	Q10: 89	Q11: 85	Q12: 84	Q13: 83	Q14: 72	Q15: 77	

TM-30: Rf:83 , Rg:93

TLCI-2012: 75

Gamut Area Index (GAI): GAI\_EES:87.7 , GAI\_BB\_8:88.5 , GAI\_BB\_15:93.6

**Photometric Parameters**

Luminous Flux: 838.34 lm      Radiant Power: 2.750 W      Efficacy: 98.63 lm/W  
 Energy Efficiency Class:F (EU 2019/2015 η<sub>TM</sub>):98.63lm/W      S/P: 2.345  
 M/P Ratio (WELL): 1.037      K<sub>mel,v</sub>: 1.245 mW/lm      γ<sub>mel,v</sub>(D65): 0.939  
 Melanopic Flux (Φ<sub>mel</sub>): 1044.13 mW

 Pupil Flux: 1629.90 Plm (K<sub>p</sub>=1.944)

Pupil Lumens per Watt: 191.75 Plm/W

Circopic Flux: 4066.02 lm

 Mesopic Flux (CIE R.): 1177.43 lm (L<sub>p</sub>=0.100)

 Mesopic Flux (USP): 1410.12 lm (L<sub>p</sub>=0.100)

 Mesopic Flux (MOVE): 1234.38 lm (L<sub>p</sub>=0.100)

**Blue Light Characteristics**

Φ<sub>blue</sub>: 0.965 W      Φ<sub>nblue</sub>: 0.418 W      Φ<sub>w</sub>: 2.749 W      Φ<sub>v</sub>: 838.342 lm  
 R<sub>blueV</sub>: 1151.404 uW/lm      R<sub>blue</sub>: 35.115 %      R<sub>nblue</sub>: 43.277 %  
 BR<sub>v</sub>: 8.45E-04      Low Blue Light Level: 3      BR: 0.720      Blue Light Radiation Level: 1  
 Φ<sub>B@400~500nm</sub>: 0.708 W      Φ<sub>B@380~500nm</sub>: 0.708 W      Φ<sub>b@380~500nm</sub>: 0.984 W

**Electric Parameters**

Voltage: 219.800 V      Current: 0.0760 A      Power: 8.500 W  
 Power Factor: 0.5060      Frequency: 49.96 Hz

 Geometry: 4n, m  
 Warmup Time: 24 Minutes  
 Spectroradiometer: LMS-9000C

 Self-absorption Factor: 1.000  
 Integration Time: 178 ms  
 Digital Power Meter: LS2008R/LS2012-NEW

 Photometric Method: sphere-photometer (spec\_rev)  
 Peak of Signal: 46038  
 Power Source: LSP Series

 Test Lab: LISUN GROUP  
 Operator: Jacky

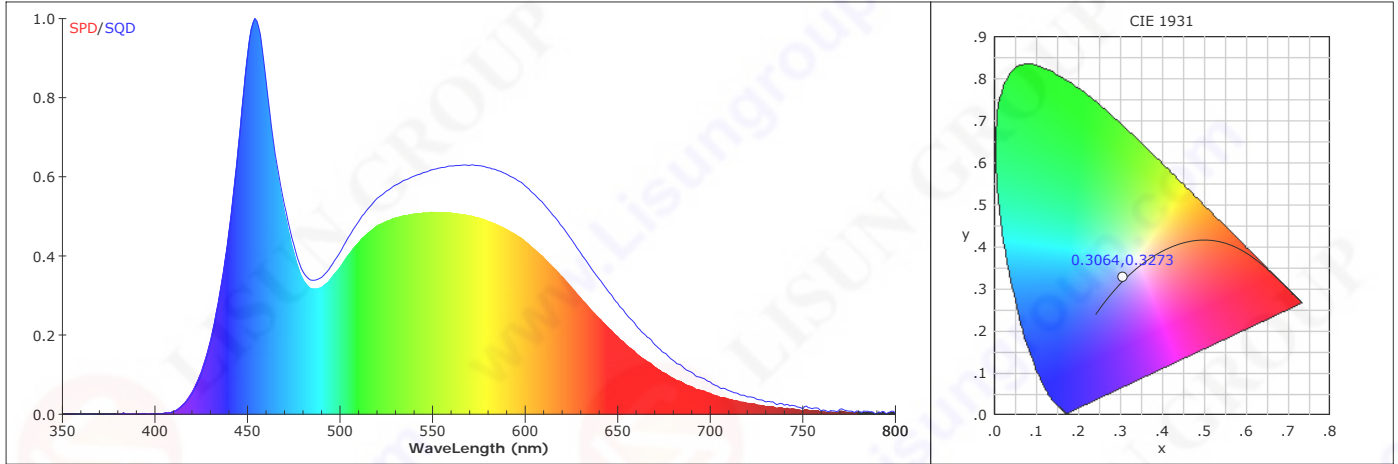
 Testing Environment: Ts:27°C, Ta:25°C,65%  
 Approver:

### Plant Growth Lamp Test Report

**Report No:** 1737

**Test Time:** 2025-08-28 17:58:34

**Category:** LED  
**Spec:** 9W  
**Manufacturer:** PHILIPS

**Type:** Bulb  
**Number:** 1737  
**Submitter:** Jacky

**CIE Colorimetric Parameters**

CIE(x,y): 0.3064,0.3273      CIE(u,v): 0.1941,0.3110      CIE(u',v'): 0.1941,0.4665  
 CCT: 6872 K (Duv=0.005555)      Dominant Wavelength: 488.8 nm      Color Purity: 0.095  
 Peak Wavelength: 454.1 nm      Half Width: 29.5 nm      Color Ratio: R:0.130, G:0.807, B:0.063

Color Render Index: Ra:84.0 , avgR(1~14):76.9 , avgR(1~15):76.9

R1: 82	R2: 90	R3: 93	R4: 81	R5: 82	R6: 84	R7: 89	R8: 70
R9: 9	R10: 74	R11: 80	R12: 60	R13: 84	R14: 97	R15: 77	

**Photometric Parameters**

Luminous Flux: 838.34 lm	Efficacy: 98.63 lm/W
Radiant Power: 2.750 W	Radiant Efficiency ( $\eta$ ): 0.324
Photosynthetic Photon Flux ( $\Phi_p$ ): 12.132 $\mu\text{mol/s}$	Photosynthetic Photon Efficacy ( $K_p$ ): 1.427 $\mu\text{mol/J}$
Photosynthetic Radiant Flux ( $\Phi_e$ ): 2.711 W	Photosynthetic Radiant Efficiency ( $\eta_e$ ): 0.319
Photon Flux (400~500nm): 3.678 $\mu\text{mol/s}$	Photon Flux (500~600nm): 5.552 $\mu\text{mol/s}$
Photon Flux (600~700nm): 2.902 $\mu\text{mol/s}$	Photon Flux (PFFr 700~800nm): 0.239 $\mu\text{mol/s}$
Photon Flux (PFuv 280~400nm): 0.002 $\mu\text{mol/s}$	Photon Flux (PF_PBAR): 12.373 $\mu\text{mol/s}$
Radiant Flux (400~500nm): 0.956 W	Radiant Flux (500~600nm): 1.207 W
Radiant Flux (600~700nm): 0.548 W	Radiant Flux (700~800nm): 0.039 W
Radiant Flux (280~400nm): 0.000 W	R/B: 0.6    R/FR: 13.9
YPF (320~780nm): 10.256 $\mu\text{mol/s}$	YPF (400~500nm): 2.663 $\mu\text{mol/s}$
YPF (500~600nm): 4.783 $\mu\text{mol/s}$	YPF (600~700nm): 2.759 $\mu\text{mol/s}$
YPF (700~780nm): 0.051 $\mu\text{mol/s}$	YPF (320~400nm): 0.001 $\mu\text{mol/s}$
Radiant Flux (Chl-A): 0.179 W	Radiant Flux (Chl-B): 0.506 W

**Electric Parameters**

Voltage: 219.800 V      Current: 0.0760 A      Power: 8.500 W  
 Power Factor: 0.5060      Frequency: 49.96 Hz

 Geometry: 4n, m  
 Warmup Time: 24 Minutes  
 Spectroradiometer: LMS-9000C

 Self-absorption Factor: 1.000  
 Integration Time: 178 ms  
 Digital Power Meter: LS2008R/LS2012-NEW

 Photometric Method: sphere-photometer (spec\_rev)  
 Peak of Signal: 46038  
 Power Source: LSP Series

 Test Lab: LISUN GROUP  
 Operator: Jacky

 Testing Environment: Ts:27°C, Ta:25°C,65%  
 Approver:

**ANSI/IES TM-30-24 Color Rendition Report**

Report No: 1737

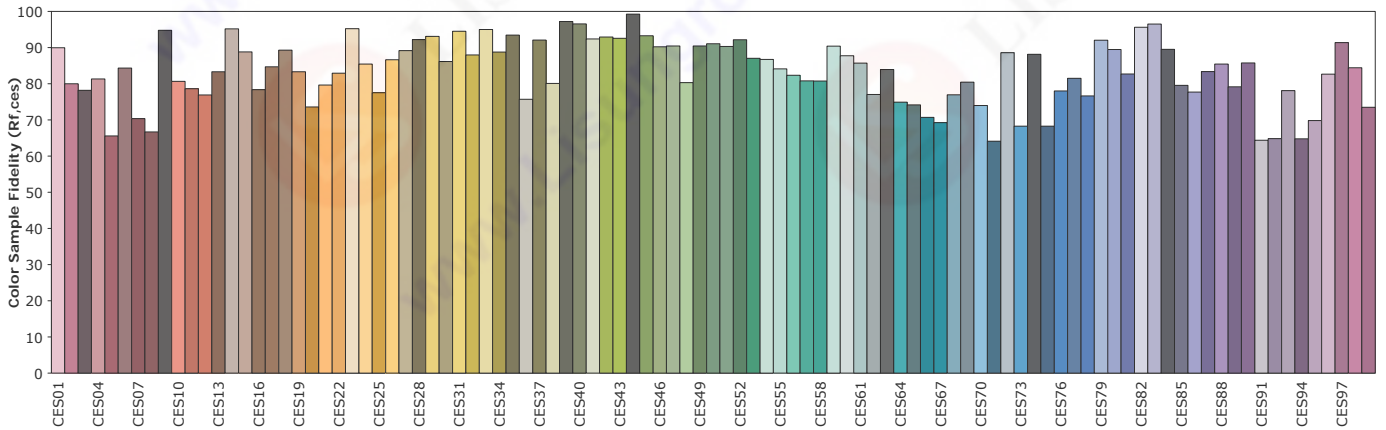
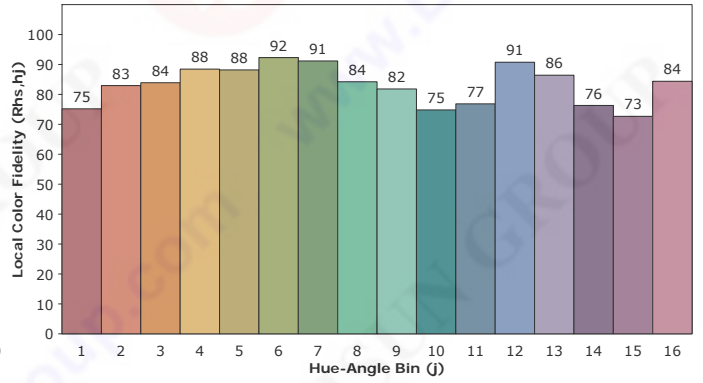
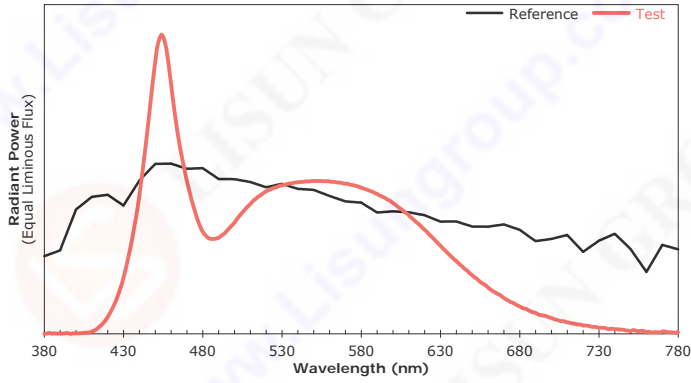
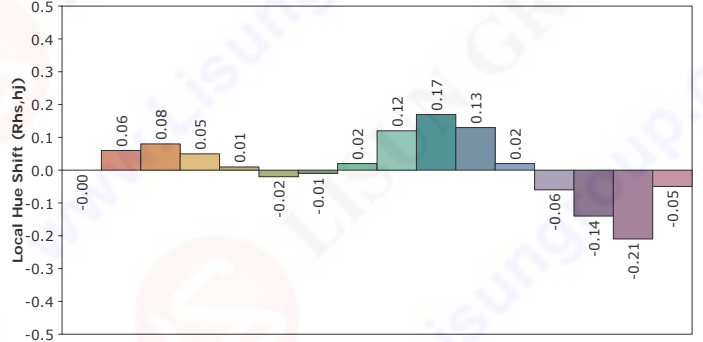
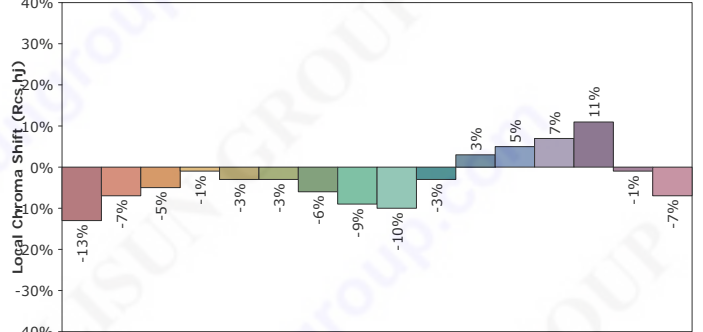
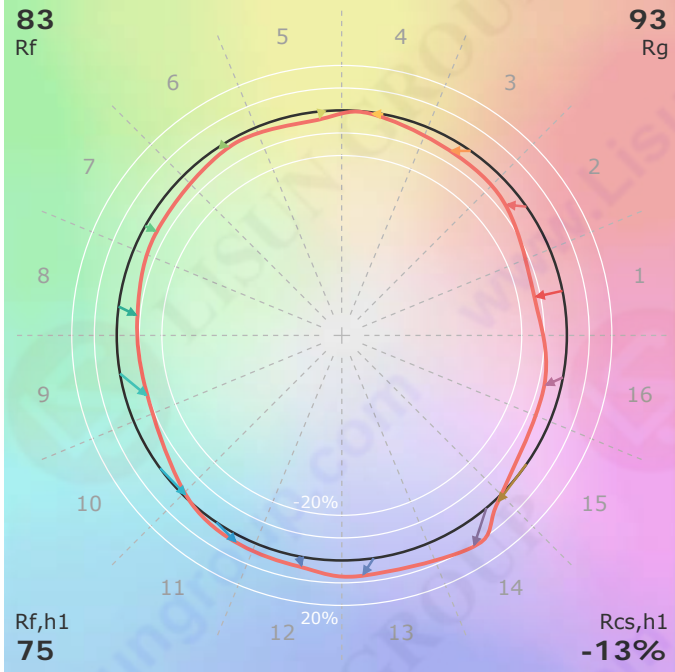
Test Time: 2025-08-28 17:58:34

Category: LED  
 Spec: 9W  
 Manufacturer: PHILIPS

Type: Bulb  
 Number: 1737  
 Submitter: Jacky

CCT: 6872 K  
 Duv: 0.005555

**P- V- F-**



This report was generated according ANSI/IES TM-30-24.

Test Lab: LISUN GROUP  
 Operator: Jacky

Testing Environment: Ts:27°C, Ta:25°C,65%  
 Approver:

### Warmup Curve

**Report No:** 1737

**Test Time:** 2025-08-28 17:58:34

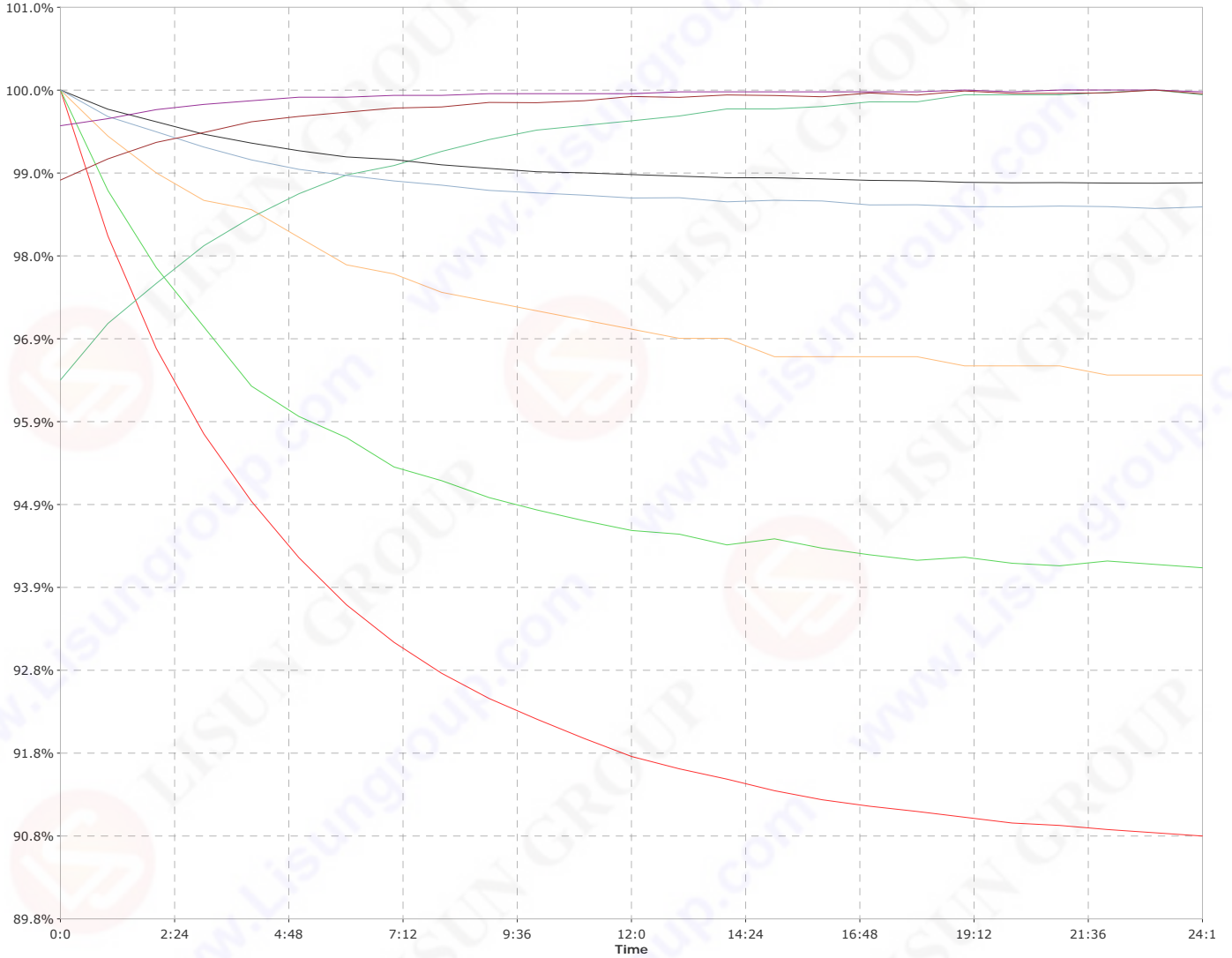
**Category:** LED

**Type:** Bulb

**Spec:** 9W

**Number:** 1737

**Manufacturer:** PHILIPS

**Submitter:** Jacky


Stable time: 24:1

Uptime: 0:0

Parameters	Maximum	Minimum	Change
Luminous Flux ,lm	923.36	838.34	85.02
Power ,W	8.810	8.500	0.310
Efficacy ,lm/W	104.81	98.63	6.18
CCT ,K	6872	6626	246
CIE x	0.3100	0.3064	0.0036
CIE y	0.3321	0.3273	0.0049
Peak Wavelength ,nm	454.1	452.1	2.0
Ra	84.0	83.1	0.9

**Spectral Power Distribution Data**
**Report No:** 1737

**Test Time:** 2025-08-28 17:58:34

Category: LED

Type: Bulb

Spec: 9W

Number: 1737

Manufacturer: PHILIPS

Submitter: Jacky

WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
350	0.0000	0.00000E+00	397	0.0000	0.00000E+00	444	0.6292	1.58315E+01
351	0.0000	0.00000E+00	398	0.0011	2.84116E-02	445	0.6752	1.69887E+01
352	0.0000	0.00000E+00	399	0.0016	4.00754E-02	446	0.7226	1.81814E+01
353	0.0000	0.00000E+00	400	0.0013	3.28783E-02	447	0.7723	1.94320E+01
354	0.0000	0.00000E+00	401	0.0013	3.30983E-02	448	0.8211	2.06587E+01
355	0.0000	0.00000E+00	402	0.0015	3.81063E-02	449	0.8674	2.18234E+01
356	0.0000	0.00000E+00	403	0.0018	4.55197E-02	450	0.9090	2.28702E+01
357	0.0000	0.00000E+00	404	0.0020	4.97965E-02	451	0.9486	2.38671E+01
358	0.0000	0.00000E+00	405	0.0029	7.34207E-02	452	0.9743	2.45127E+01
359	0.0000	0.00000E+00	406	0.0037	9.28661E-02	453	0.9905	2.49199E+01
360	0.0000	0.00000E+00	407	0.0033	8.30958E-02	454	1.0000	2.51601E+01
361	0.0000	0.00000E+00	408	0.0042	1.06438E-01	455	0.9927	2.49758E+01
362	0.0000	0.00000E+00	409	0.0053	1.34124E-01	456	0.9763	2.45627E+01
363	0.0000	0.00000E+00	410	0.0075	1.88045E-01	457	0.9532	2.39825E+01
364	0.0000	0.00000E+00	411	0.0093	2.33602E-01	458	0.9164	2.30574E+01
365	0.0000	0.00000E+00	412	0.0116	2.92907E-01	459	0.8755	2.20281E+01
366	0.0000	0.00000E+00	413	0.0154	3.88342E-01	460	0.8331	2.09607E+01
367	0.0000	0.00000E+00	414	0.0197	4.95536E-01	461	0.7926	1.99425E+01
368	0.0000	0.00000E+00	415	0.0242	6.08840E-01	462	0.7516	1.89107E+01
369	0.0000	0.00000E+00	416	0.0284	7.14714E-01	463	0.7121	1.79161E+01
370	0.0000	0.00000E+00	417	0.0343	8.63171E-01	464	0.6758	1.70038E+01
371	0.0000	0.00000E+00	418	0.0410	1.03208E+00	465	0.6423	1.61608E+01
372	0.0000	0.00000E+00	419	0.0481	1.21025E+00	466	0.6133	1.54313E+01
373	0.0000	0.00000E+00	420	0.0558	1.40370E+00	467	0.5857	1.47369E+01
374	0.0000	0.00000E+00	421	0.0647	1.62684E+00	468	0.5596	1.40787E+01
375	0.0000	0.00000E+00	422	0.0743	1.86846E+00	469	0.5340	1.34354E+01
376	0.0000	0.00000E+00	423	0.0842	2.11952E+00	470	0.5111	1.28597E+01
377	0.0000	0.00000E+00	424	0.0952	2.39554E+00	471	0.4902	1.23340E+01
378	0.0000	0.00000E+00	425	0.1070	2.69154E+00	472	0.4678	1.17696E+01
379	0.0000	0.00000E+00	426	0.1211	3.04766E+00	473	0.4470	1.12473E+01
380	0.0000	0.00000E+00	427	0.1362	3.42698E+00	474	0.4278	1.07644E+01
381	0.0002	6.06266E-03	428	0.1518	3.81955E+00	475	0.4103	1.03227E+01
382	0.0006	1.53416E-02	429	0.1689	4.24853E+00	476	0.3925	9.87490E+00
383	0.0037	9.28732E-02	430	0.1869	4.70265E+00	477	0.3762	9.46574E+00
384	0.0015	3.86327E-02	431	0.2071	5.21104E+00	478	0.3628	9.12908E+00
385	0.0004	1.09317E-02	432	0.2294	5.77205E+00	479	0.3505	8.81792E+00
386	0.0011	2.82497E-02	433	0.2541	6.39236E+00	480	0.3407	8.57101E+00
387	0.0005	1.36206E-02	434	0.2785	7.00808E+00	481	0.3334	8.38935E+00
388	0.0000	9.53466E-04	435	0.3047	7.66535E+00	482	0.3275	8.23976E+00
389	0.0008	2.09631E-02	436	0.3330	8.37753E+00	483	0.3223	8.11000E+00
390	0.0007	1.84971E-02	437	0.3628	9.12895E+00	484	0.3187	8.01840E+00
391	0.0001	1.40175E-03	438	0.3933	9.89618E+00	485	0.3170	7.97677E+00
392	0.0009	2.21548E-02	439	0.4261	1.07204E+01	486	0.3167	7.96710E+00
393	0.0013	3.22332E-02	440	0.4626	1.16385E+01	487	0.3167	7.96717E+00
394	0.0023	5.83200E-02	441	0.5001	1.25825E+01	488	0.3174	7.98538E+00
395	0.0021	5.16383E-02	442	0.5411	1.36143E+01	489	0.3190	8.02497E+00
396	0.0002	5.95376E-03	443	0.5855	1.47301E+01	490	0.3207	8.06876E+00

 Test Lab: LISUN GROUP  
 Operator: Jacky

 Testing Environment: Ts:27°C, Ta:25°C,65%  
 Approver:

### Spectral Power Distribution Data

**Report No:** 1737

**Test Time:** 2025-08-28 17:58:34

Category: LED

Type: Bulb

Spec: 9W

Number: 1737

Manufacturer: PHILIPS

Submitter: Jacky

WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
491	0.3242	8.15580E+00	538	0.5048	1.27012E+01	585	0.4783	1.20352E+01
492	0.3284	8.26194E+00	539	0.5055	1.27185E+01	586	0.4764	1.19875E+01
493	0.3317	8.34513E+00	540	0.5062	1.27352E+01	587	0.4744	1.19356E+01
494	0.3365	8.46651E+00	541	0.5068	1.27517E+01	588	0.4717	1.18685E+01
495	0.3425	8.61705E+00	542	0.5073	1.27644E+01	589	0.4694	1.18107E+01
496	0.3484	8.76622E+00	543	0.5073	1.27626E+01	590	0.4670	1.17507E+01
497	0.3546	8.92166E+00	544	0.5079	1.27777E+01	591	0.4641	1.16762E+01
498	0.3599	9.05636E+00	545	0.5091	1.28094E+01	592	0.4612	1.16033E+01
499	0.3656	9.19789E+00	546	0.5087	1.27998E+01	593	0.4590	1.15474E+01
500	0.3714	9.34334E+00	547	0.5088	1.28012E+01	594	0.4566	1.14879E+01
501	0.3783	9.51906E+00	548	0.5097	1.28233E+01	595	0.4535	1.14108E+01
502	0.3858	9.70733E+00	549	0.5106	1.28480E+01	596	0.4502	1.13269E+01
503	0.3925	9.87496E+00	550	0.5105	1.28454E+01	597	0.4475	1.12589E+01
504	0.3991	1.00407E+01	551	0.5105	1.28444E+01	598	0.4450	1.11974E+01
505	0.4053	1.01966E+01	552	0.5103	1.28383E+01	599	0.4412	1.11000E+01
506	0.4111	1.03435E+01	553	0.5105	1.28444E+01	600	0.4368	1.09895E+01
507	0.4176	1.05061E+01	554	0.5103	1.28392E+01	601	0.4333	1.09017E+01
508	0.4232	1.06465E+01	555	0.5104	1.28409E+01	602	0.4296	1.08082E+01
509	0.4280	1.07683E+01	556	0.5097	1.28234E+01	603	0.4246	1.06835E+01
510	0.4335	1.09059E+01	557	0.5092	1.28119E+01	604	0.4208	1.05873E+01
511	0.4391	1.10482E+01	558	0.5097	1.28235E+01	605	0.4173	1.05005E+01
512	0.4451	1.11977E+01	559	0.5097	1.28245E+01	606	0.4129	1.03874E+01
513	0.4485	1.12844E+01	560	0.5089	1.28033E+01	607	0.4084	1.02749E+01
514	0.4531	1.14003E+01	561	0.5078	1.27772E+01	608	0.4043	1.01734E+01
515	0.4578	1.15192E+01	562	0.5076	1.27721E+01	609	0.4009	1.00855E+01
516	0.4611	1.16025E+01	563	0.5071	1.27576E+01	610	0.3961	9.96702E+00
517	0.4648	1.16935E+01	564	0.5061	1.27330E+01	611	0.3909	9.83386E+00
518	0.4688	1.17938E+01	565	0.5056	1.27210E+01	612	0.3863	9.71945E+00
519	0.4728	1.18953E+01	566	0.5050	1.27061E+01	613	0.3814	9.59715E+00
520	0.4762	1.19806E+01	567	0.5047	1.26992E+01	614	0.3764	9.47022E+00
521	0.4786	1.20417E+01	568	0.5035	1.26691E+01	615	0.3718	9.35380E+00
522	0.4809	1.20991E+01	569	0.5020	1.26294E+01	616	0.3674	9.24363E+00
523	0.4824	1.21369E+01	570	0.5011	1.26088E+01	617	0.3629	9.13160E+00
524	0.4851	1.22049E+01	571	0.5012	1.26100E+01	618	0.3577	8.99904E+00
525	0.4878	1.22732E+01	572	0.5004	1.25895E+01	619	0.3517	8.84891E+00
526	0.4890	1.23032E+01	573	0.4983	1.25365E+01	620	0.3473	8.73828E+00
527	0.4905	1.23409E+01	574	0.4972	1.25104E+01	621	0.3429	8.62807E+00
528	0.4932	1.24079E+01	575	0.4963	1.24864E+01	622	0.3372	8.48385E+00
529	0.4952	1.24600E+01	576	0.4949	1.24507E+01	623	0.3315	8.34085E+00
530	0.4962	1.24855E+01	577	0.4935	1.24156E+01	624	0.3263	8.20868E+00
531	0.4973	1.25125E+01	578	0.4920	1.23798E+01	625	0.3212	8.08062E+00
532	0.4984	1.25395E+01	579	0.4897	1.23202E+01	626	0.3159	7.94710E+00
533	0.4998	1.25751E+01	580	0.4878	1.22723E+01	627	0.3101	7.80222E+00
534	0.5015	1.26173E+01	581	0.4865	1.22408E+01	628	0.3044	7.65968E+00
535	0.5025	1.26442E+01	582	0.4841	1.21788E+01	629	0.2991	7.52602E+00
536	0.5026	1.26450E+01	583	0.4826	1.21432E+01	630	0.2938	7.39214E+00
537	0.5034	1.26648E+01	584	0.4809	1.20995E+01	631	0.2879	7.24303E+00

 Test Lab: LISUN GROUP  
 Operator: Jacky

 Testing Environment: Ts:27°C, Ta:25°C,65%  
 Approver:

### Spectral Power Distribution Data

**Report No:** 1737

**Test Time:** 2025-08-28 17:58:34

Category: LED

Type: Bulb

Spec: 9W

Number: 1737

Manufacturer: PHILIPS

Submitter: Jacky

WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
632	0.2832	7.12532E+00	679	0.0933	2.34674E+00	726	0.0230	5.79755E-01
633	0.2785	7.00584E+00	680	0.0910	2.28894E+00	727	0.0230	5.77653E-01
634	0.2727	6.86025E+00	681	0.0884	2.22473E+00	728	0.0226	5.69295E-01
635	0.2674	6.72685E+00	682	0.0849	2.13721E+00	729	0.0211	5.31016E-01
636	0.2619	6.58929E+00	683	0.0843	2.12025E+00	730	0.0196	4.93172E-01
637	0.2572	6.47038E+00	684	0.0830	2.08795E+00	731	0.0203	5.11064E-01
638	0.2521	6.34163E+00	685	0.0802	2.01661E+00	732	0.0199	5.01773E-01
639	0.2469	6.21308E+00	686	0.0770	1.93627E+00	733	0.0194	4.88865E-01
640	0.2427	6.10532E+00	687	0.0742	1.86685E+00	734	0.0193	4.85892E-01
641	0.2383	5.99588E+00	688	0.0727	1.82972E+00	735	0.0169	4.24762E-01
642	0.2330	5.86153E+00	689	0.0712	1.79221E+00	736	0.0152	3.81687E-01
643	0.2280	5.73757E+00	690	0.0699	1.75867E+00	737	0.0162	4.08223E-01
644	0.2235	5.62411E+00	691	0.0673	1.69244E+00	738	0.0169	4.26095E-01
645	0.2182	5.48939E+00	692	0.0638	1.60482E+00	739	0.0162	4.06962E-01
646	0.2142	5.38885E+00	693	0.0621	1.56269E+00	740	0.0141	3.55800E-01
647	0.2103	5.29047E+00	694	0.0617	1.55142E+00	741	0.0153	3.84450E-01
648	0.2040	5.13307E+00	695	0.0607	1.52642E+00	742	0.0151	3.79400E-01
649	0.1997	5.02409E+00	696	0.0594	1.49551E+00	743	0.0129	3.25481E-01
650	0.1962	4.93724E+00	697	0.0583	1.46747E+00	744	0.0141	3.53937E-01
651	0.1906	4.79520E+00	698	0.0556	1.40006E+00	745	0.0134	3.36508E-01
652	0.1868	4.70091E+00	699	0.0540	1.35887E+00	746	0.0128	3.22761E-01
653	0.1835	4.61716E+00	700	0.0530	1.33365E+00	747	0.0111	2.78906E-01
654	0.1783	4.48488E+00	701	0.0499	1.25560E+00	748	0.0109	2.75157E-01
655	0.1737	4.37123E+00	702	0.0485	1.22040E+00	749	0.0100	2.52290E-01
656	0.1698	4.27218E+00	703	0.0470	1.18237E+00	750	0.0085	2.12864E-01
657	0.1664	4.18631E+00	704	0.0460	1.15633E+00	751	0.0117	2.95478E-01
658	0.1633	4.10847E+00	705	0.0435	1.09451E+00	752	0.0125	3.13899E-01
659	0.1596	4.01440E+00	706	0.0417	1.04951E+00	753	0.0102	2.55600E-01
660	0.1543	3.88185E+00	707	0.0424	1.06562E+00	754	0.0097	2.43750E-01
661	0.1499	3.77172E+00	708	0.0416	1.04729E+00	755	0.0084	2.12397E-01
662	0.1467	3.69074E+00	709	0.0398	1.00083E+00	756	0.0096	2.41306E-01
663	0.1426	3.58773E+00	710	0.0384	9.66594E-01	757	0.0097	2.43121E-01
664	0.1397	3.51376E+00	711	0.0373	9.38438E-01	758	0.0096	2.42118E-01
665	0.1368	3.44234E+00	712	0.0361	9.07126E-01	759	0.0073	1.83499E-01
666	0.1329	3.34396E+00	713	0.0346	8.71063E-01	760	0.0049	1.22377E-01
667	0.1311	3.29785E+00	714	0.0342	8.61353E-01	761	0.0066	1.64853E-01
668	0.1283	3.22745E+00	715	0.0333	8.39014E-01	762	0.0059	1.49298E-01
669	0.1231	3.09632E+00	716	0.0313	7.86773E-01	763	0.0048	1.20003E-01
670	0.1195	3.00585E+00	717	0.0305	7.67448E-01	764	0.0037	9.33183E-02
671	0.1164	2.92804E+00	718	0.0306	7.69982E-01	765	0.0057	1.43636E-01
672	0.1133	2.84965E+00	719	0.0296	7.43708E-01	766	0.0052	1.30076E-01
673	0.1105	2.78079E+00	720	0.0276	6.94775E-01	767	0.0051	1.27979E-01
674	0.1067	2.68577E+00	721	0.0278	6.98639E-01	768	0.0041	1.03060E-01
675	0.1045	2.62984E+00	722	0.0275	6.91587E-01	769	0.0047	1.19252E-01
676	0.1030	2.59116E+00	723	0.0267	6.71523E-01	770	0.0075	1.88376E-01
677	0.0993	2.49904E+00	724	0.0260	6.54481E-01	771	0.0082	2.06093E-01
678	0.0960	2.41607E+00	725	0.0239	6.00713E-01	772	0.0069	1.72682E-01

 Test Lab: LISUN GROUP  
 Operator: Jacky

 Testing Environment: Ts:27°C, Ta:25°C,65%  
 Approver:

**Spectral Power Distribution Data****Report No:** 1737**Test Time:** 2025-08-28 17:58:34

Category: LED

Type: Bulb

Spec: 9W

Number: 1737

Manufacturer: PHILIPS

Submitter: Jacky

WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
773	0.0058	1.46236E-01	783	0.0049	1.22892E-01	793	0.0043	1.08554E-01
774	0.0051	1.27462E-01	784	0.0043	1.07857E-01	794	0.0036	9.13089E-02
775	0.0047	1.18522E-01	785	0.0046	1.15921E-01	795	0.0005	1.33080E-02
776	0.0049	1.23997E-01	786	0.0037	9.33121E-02	796	0.0023	5.81926E-02
777	0.0038	9.52424E-02	787	0.0038	9.61288E-02	797	0.0033	8.40533E-02
778	0.0027	6.86423E-02	788	0.0031	7.80432E-02	798	0.0046	1.14537E-01
779	0.0049	1.23708E-01	789	0.0009	2.16145E-02	799	0.0042	1.05921E-01
780	0.0044	1.11596E-01	790	0.0007	1.74217E-02	800	0.0014	3.40333E-02
781	0.0036	9.03394E-02	791	0.0037	9.20022E-02			
782	0.0029	7.37964E-02	792	0.0024	6.01603E-02			