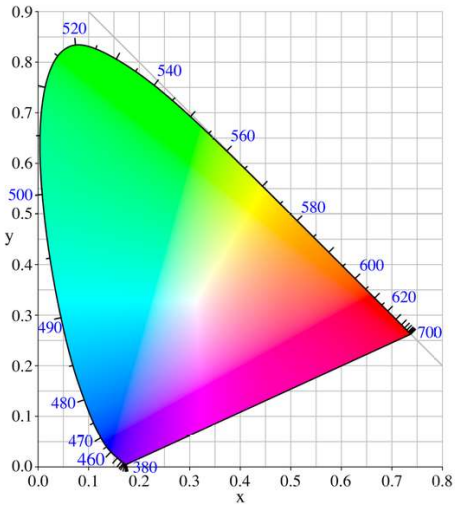
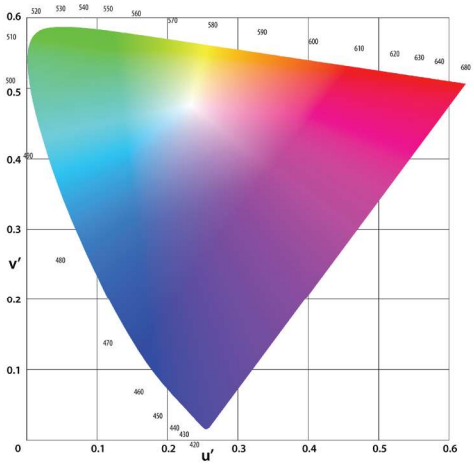
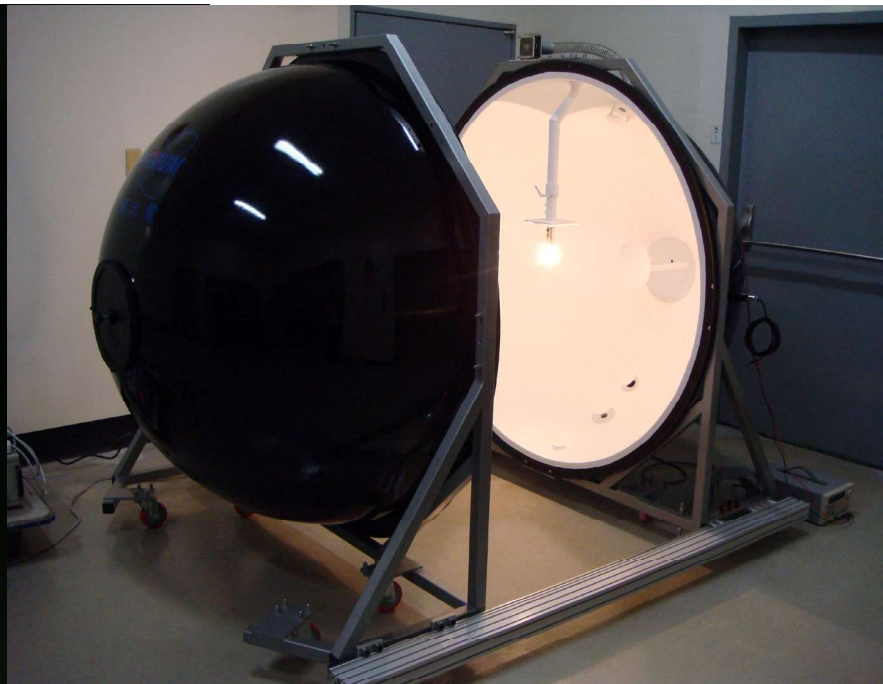
OPTIMUM OPTOELECTRONICS CORP.



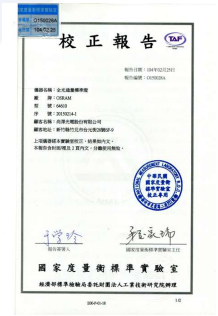


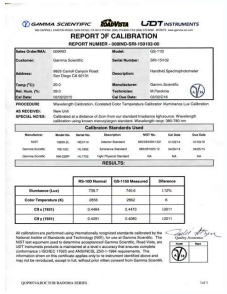


Taiwan Optimum Optoelectrics Co., Ltd. is Taiwan's the first of photometric and colorimetric measurement equipments and professional supplier of calibration services in Taiwan.
In particular, the overall strength of the leading manufacturers in the field of other lighting testing equipment and light and color measurement test equipment. In Taiwan we are the only professional self-developed and produced by measuring equipments manufacture.

Since Optimum established in 1996, was the founder Michael Chang, uphold national standards laboratory(ITRI, NMLT) in charge of measuring spirit, while performing on Optimum. Implement measurement and calibration standards to maintain quality, Optimum has become Taiwan's LED manufacturing enterprises leading provider of integrated solutions.

As light and color measurement technology leader in testing equipment field, Optimum owned technology research (R & D) team, focusing on independent and innovation to development new testing equipments. Optimum Optoelectronics based on "doing a soul product" concept and practice excellent quality testing equipment are consistent goal. And look forward to contribute to Taiwan's optoelectronics industry measurement equipments.





Total Luminous Flux Measurement System LM-ISP-xxxx
The Easiest Way to Achieve Accurate LED Measurements
The Spectral Sphere Systems from Optimum make it simple for you instantly capture accurate LED measurements.

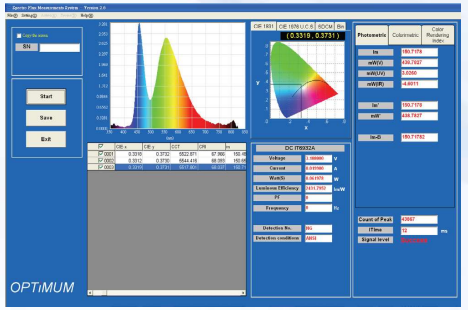
Combining SM-2000 spectroradiometers and Optimum integrating sphere, Spectral Sphere Systems produce highly repeatable and precise measurements of total luminous flux and total spectral flux.

The main measurement function

Colorimetric parameters
chromaticity coordinates (x, y), (u ', v')/ Dominant wavelength (λd)/Ppeak wavelength (λp)/FWHM (Δλd)/
Color Rendering Index (R1-R15)/Color purity/ Correlated color temperature (TC)
Photometric parameters: radiant flux (mW), lumens (lm)
Electrical parameters: optical efficiency (PF), luminous efficacy (W /lm)

Hardware Configuration

1. Spectrophotometer (SM2000)
2. Depending on the size of the analyze with a suitable integrating sphere size
3. DC Power Supply
4. AC power supply
5. Computer and Microsoft Windows operating measurement software
6. Standard lamp (correction system) can be traced back to national standards laboratory (NMLT)
7. Assist Lamp
8. Instrument cabinet



Lumen measurement system accuracy and specifications table (below are all measured LED lighting specifications)

Item	Range	Accuracy
Peak Wavelength(λp)	380-780nm	±0.5nm
Dominate Wavelength(λd)	380-780nm	±0.5nm
Luminous Flux (lm)	1lm-250,000lm	±4%
	repeatability	±0.2%
Color Temperature	1000K to 10,000K	Follow (x,y)
Chromaticity Coordinates	CIE 1931 (x,y)	±0.003
	repeatability	±0.2%
Correlated Color Temperature	CCT, 1,000 -100,000K	Follow (x,y)
FWHM	0-200nm	±0.5nm
Purity	100%	±5%
CRI(R1-R15)	0-100%	±3%
L-I-V test		
Long Term Test		
Binning function		

LED Rotating Luminaire Goinophotometer

Accurate and Repeatable Spatial LED Measurements

Optimum Goinophotometers are designed to analyze angle dependent spatial radiation properties of LED luminaires, lamps and modules.

With an angular resolution of 0.01˚ the goinophotometers capture highly accurate and repeatable LED measurements. This goinophotometers are in conformity with CIE, DIN and IES standards.

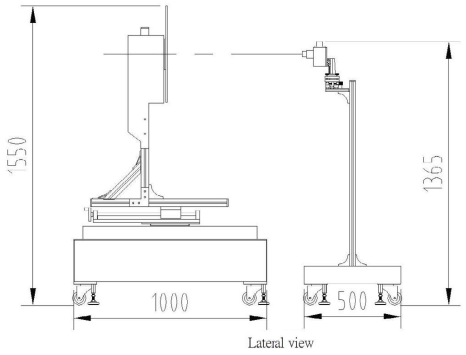
The basic measurement functions

Spatial intensity distribution, intensity distribution curve on each section(represent by right-angled coordinated or polar coordinates), iso-illuminance distribution curve on the plane, luminance limitation curve, zonal flux, effective luminous flux, utilization factor and electric parameters(voltage, current, wattage, power factor) and so on.

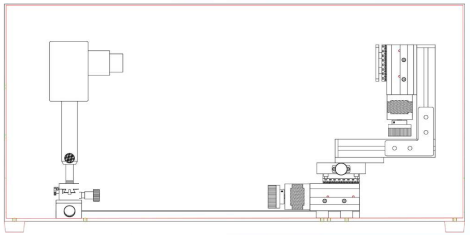
Return Colorimetric parameters: chromaticity coordinates (x, y), (u ', v')/ Dominant wavelength (λd)/ Ppeak wavelength (λp)/FWHM (Δλd)/Color Rendering Index (R1-R15)/Color purity/ Correlated color temperature (TC).

Features

- According to CIE Type C-γ measurement methods with horizontal optical axis
- Measures samples up to 1200mm in diameter and 25kg in weight
- Angular analysis of spectral and colorimetric quantities
- Measures luminous intensity distribution and luminous flux
- Exceptional accuracy via high-resolution bandwidth coverage
- Precision horizontal and vertical cross laser alignment to align the center of the lamp

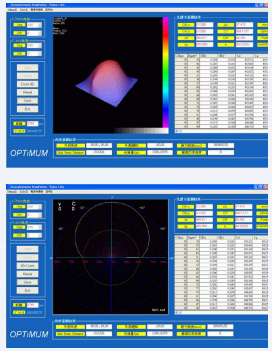


Lateral view



Mirror Pursuit Goniophotometer

Product Code: MLID-3000
This Goniophotomer designed to compliant with LM-79 measurement specifications. Rotating mirror mode, synchronous rotation detector module system, measuring spatial intensity distribution, achieve TYPE A-α, B-β, C-γ measured way.
Suitable for large lamps



Horizontal Distribution Goniophotometer

Product Code: LID-120
Compliance with CIE TYPE C-γ measurement methods
X-axis, Y-axis rotation measurement mode ,
Scalability 120CM Lamp And large lamps.

Product Code: LID-120S
LID-120s is a smaller version of the LID-120, applicable LED light panels, LED light, small lamps.

Light intensity measurement series - black-box type of light intensity measurement system

Product Code: LID-060
Small light intensity distribution analyzer, photometric testing on a black box is completed, the test distance up to 100cm.

Product Code: LI-100
Single angle of the light intensity measuring device
Compliance with CIE 127 condition B, 100mm distance measurement, can measure single LED, a single angle of the light intensity

Integrating sphere ISP-XXXX

Custom Configurations for Accurate LED Testing

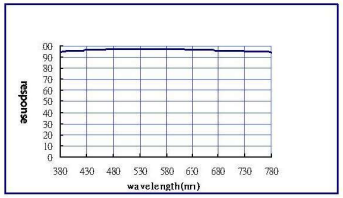
With closed 20 years of experience in designing integrating spheres. Optimum has the expertise to build custom spheres and sphere systems to meet your testing requirements.

To measurement the power radiate flux the common applications is using integrating sphere. Integrating sphere is hollow sphere, the inner wall of the integrating sphere coated could be using barium-sulfate ($BaSO_4$), Teflon, or Gold. The light can be diffused reflectance thousand times inside the sphere, and output the uniform light in the ports.

Multi-Purpose Integrating Spheres from Optimum have been designed to provide maximum flexibility for a wide range of testing applications. With multi-purpose integrating spheres we can quickly build a custom sphere to meet your exact test requirements.

¤ integrating sphere size:
35mm, 50mm, 100mm, 150mm, 200mm, 250mm, 300mm, 500mm, 1000mm, 1500mm, 2000mm, 3000mm

Barium sulfate material reflectance spectrum inside the sphere



The material $BaSO_4$ specification	
Reflectance From 380nm to 1100nm	96% ± 2 %
$BaSO_4$ Purified	≧ 99 %
CCT changed after go through sphere	≦ 0.5 %
Uniform (from port center to edge)	≧ 99 %

Miniature spectrometer SM-1000

Product Code: SM-1000

This miniature spectrometer, using CMOS sensors as detector, combined with smart software and the longbench optical designed, can reach 3nm pixels resolution and 8nm half-wavelength(FMWH) width resolution.

Colorimeters SRI-1000

Compact and Accurate Handheld Measurements

SRI-1000 handheld spectrophotometer is a stand-alone instrument designed and sample operation for lighting installers, designers and engineers who require accurate, low cost and compact spectral measurements.
Based on a compact design spectrophotometer with a CMOS sensor, could measure lux, CT, and CRI in SRI-1000.

SPECIFICATION		
Detector Type	CMOS Sensor	
Receiving Area	10 ± 0.1 mm	
Measurement Range	50 lx ~ 10,000 lx	
Wavelenght Range	380 ~ 780 nm	
Exposure time	Auto	
Integrating Mode	Auto	
FWHM	8nm	
Wavelength Resolution	2-3nm	
Measuring Capabilites	1. Illuminance / Lux 2. Correlated Color Temperature; CCT (in Kelvins) 3. Color Rendering Index; Ra (Rendering Average)	
Digital Resolution	16 bits	
Dark Calibration	Auto	
Illuminance Accuracy	Source A / other light source (Illuminance at 200 lx and higher) in CIE 1931	±2% /± 4%
CCT Accuracy		±1% / ± 2%
CRI Accuracy @ Ra		±1% / ± 2%
Max. files storage	10,000 Files	
Battery Operation Time	≧ 3 Hour	
Battery	4 AAA battery x4, OR USB cable	
Data Output Interface	mini-USB 2.0	
Data Format	igital readout	
Size (mm)	200×92×30 (L×W×H)	
Operating Temperature Range	0 ~ 50 ℃	

Your solution for Faster, More Accurate Measurements

As the inventors of the high-performance, computer-controlled spectroradiometers for LED testing, Optimum has continued to set the standard in spectroradiometer accuracy and reliability. Optimum spectroradiometers is ideally suited for the testing LED color and luminance, flat panel displays, reflectance, and transmittance measurements.

SM-2000 Spectroradiometers is designed to measure the light, colorimetric parameters, and spectrum instruments. SM-2000 owned a 2048 element linear CCD array, and longbench optical designed. It is millisecond speed and superior blue light region sensitivity and highly accurate measurement of wavelength, color and power.

Specification and application

- High-resolution 0.5nm per pixel
- Multiple models covering UV, Visible and Near-IR wavelength ranges
- Near real-time(millisecond) measurement speed
- High-repeatability(stability), CIE(x,y) ±0.0003
- High-accuracy , CIE(x,y) ±0.003
- Low-noise (50/64000), high linearity(99.99%)
- Full luminosity hardware accessories (integrating sphere, light tubes, lenses) to achieve all photometric parameters measurements.
- Photometric specifications compliance with international standards
- Optimum can issued a formal verification report, traceable to the Taiwan National Standards Laboratory (also TAF) standard.

	SM-25850	SM-2000	SM-UV-2000	SM-IR-2000
Detector	SONY CCD Linear Array Number of Pixles:2048 Sensing Pixel Size:14μmx 200μ Sensitivity:1800V/(lxs)@660nm	SONY CCD Linear Arry Number of Pixles:2048 Sensing Pixel Size:14μmx 200μ Sensitivity: 1800V/(lxs)@660nm	SONY CCD Linear Arry Number of Pixles:2048 Sensing Pixel Size:14μmx 200μ Sensitivity: 1800V/(lxs)@660nm	InGaAs linear image sensor Number of Pixels:512 Sensing Pixel Size:25μmx 500μ
Dimensions (mm)	98(L)x65(W)x36(H)	98(L)x65(W)x36(H)	98(L)x65(W)x36(H)	98(L)x65(W)x36(H)
Weight	263g	263g	263g	263g
Spectral Range	From 250nm to 850nm	From 380nm to 780nm	From 200nm to 500nm	From 800nm to 1300nm
Spectral Resolution	0.25-0.35nm dependent on spectral rage, slit width, and fiber diameter	0.25-0.35nm dependent on spectral rage, slit width, and fiber diameter	0.25-0.35nm dependent on spectral rage, slit width, and fiber diameter	0.25-0.35nm dependent on spectral rage, slit width, and fiber diameter
Gratings	1200G/mm, 600G/mm	1200G/mm, 600G/mm	1800G/mm	1200G/mm, 600G/mm
Entrance	Fiber: SMA905 Slit: 25, 50, 100, or 150μm	Fiber: SMA905 Slit: 25, 50, 100, or 150μm	Fiber: SMA905 Slit: 25, 50, 100, or 150μm	Fiber: SMA905 Slit: 25, 50, 100, or 150μm
Dynamic Range	16 bits or 65536:1	16 bits or 65536:1	16 bits or 65536:1	16 bits or 65536:1
Computer Interface	USB 2.0, 16 bits, 500KHz	USB 2.0, 16 bits, 500KHz	USB 2.0, 16 bits, 500KHz	USB 2.0, 16 bits, 500KHz
Power	5V DC<1A	5V DC<1A	5V DC<1A	5V DC<1A
Input	Power Consumption Rate:1W	Power Consumption Rate:1W	Power Consumption Rate:1W	Power Consumption Rate:1W
Temperature Range	15°C to 40°C	15°C to 40°C	15°C to 40°C	15°C to 40°C
Software	SKD	SKD	SKD	SKD

Luminance measurement, SM-NE-2900

Could measure light source and objects surface reflectivity, one degree and two degrees angle to be selected.

Phosphors Spectrofluorimetric measurement

To determine the fluorescence spectrum and chromaticity of LED phosphors excited at the spectral line from 350nm to 800nm, and implement the best matching in luminous efficacy and chromaticity between LED chips and phosphor, using the blue light source.

Light radiation power measurement , SM-MD-5200

Especially suitable for Medical LED lamp measurements, the parameters in the measurement software in line with medical lamps specification requirement. Could measure colorimeteric parameters, and radiation factor like (mW), (mW/m^2/lx), (mW/m^2 or mW/cm^2)

Spectro-radiometers SM-25850

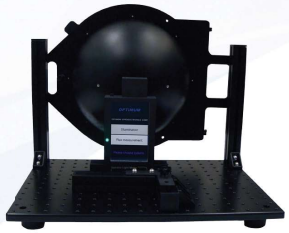
SM-25850 spectral irradiance measurement instrument used to measure and photograph the spectrum of high quality and the absolute value of the score is calculated according to measure optical radiation measurement.

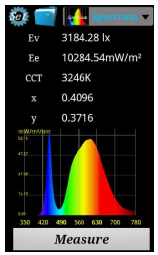
Reflectance/Transmittance measurement , SM-GA-2800

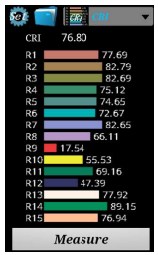
Using high-precision spectrometer and steady light source, go through integrating sphere interface, could measure light transmittance. Also using converting 8-degree angle into the optical port can measure the reflectance. This system could measure transmittance and reflectance dual function, and whiteboard, blackboard correction, produce the spectra and wavelength data.

Seven Advantages :

- Using integrating sphere as light entrance port, consist perfect cosine effect at different angel.
- Unique long focal length, high precision spectrometer for measurement.
- Fast Booting level, can perform instant measurement, no unnecessary action, measurement result is real time display.
- Huge storage capacity, can connect to PC to export the data, transfer and remote operation control.
- Simple operation with accurate measurement, R1-R15 measurement are clearly shown.
- Spectral wavelength resolution 0.5nm, half-wavelength width resolution 1.0nm.
- The only instruments measure Irradiance / Radiant in the world.







SPECIFICATION		
Detector Type	CCD Sony linear array Sensor,2048 pixels Spectrometer 29mm integrating sphere as light entrance port	
Measurement Range	10 lx ~ 50000 lx or 50 lx ~ 250000 lx	
Wavelenght Range	350 ~ 780 nm	
Capture Mode	Single/Continuous	
Measuring Capabilites	1. Illuminance / Lux 2. Spectral Irradiance 3. C.I.E Chromaticity Coordinates (C.I.E 1931 , C.I.E 1976 , SDCM) 4. Peak Wavelength 5. Dominant Wavelength 6. Correlated Color Temperature; CCT (in Kelvins) 7. Color Rendering Index; Ra (Rendering Average) 8. mW/m^2	
Digital Resolution	16 bits	
Dark Calibration	Auto	
Stray Light	0.001%	
Wavelenght Data Increment	0.5 nm	
Wavelength Accuracy	± 0.3 nm	
FWHM	1nm	
Illuminance Accuracy	Source A / other light source	±2% / ±4%
Color Accuracy		±0.001 / ±0.003
Color Repeatability	(Illuminance at 200 lx and higher)	±0.0003 / ±0.0005
CCT Accuracy	in CIE 1931	±1% / ±2%
CRI Accuracy @ Ra		±0.8% / ±1.5%
Display	5" LCD 480X800 Touch Panel	
Max. files storage	Up to 500000 Files	
Battery Operation Time	Up to 5 hours continuous use	
Battery	3000 mAh / Rechargeable lithium ion battery	
Data Output Interface	mini-USB 2.0	
Data Format	Microsoft Excel compatible	
Weight (with Battery)	660 g ± 20 g	
Size(mm)	200(L)×92(W)×30(H)	
Operating Temperature Range	0 ~ 50° C	

1*

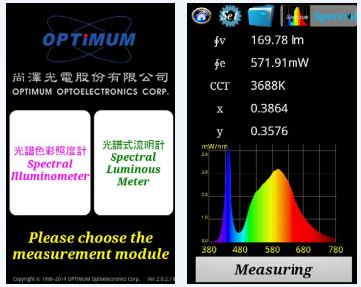
2*

3*

4*

5*

SRI-2000-UV



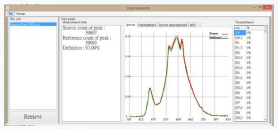
1. Single unit could be Spectral Lux Meter(same with SRI-2000)
2. The unit connect with integrating sphere, then you could measure Lumen(lm).
This machine builds in two functions on one unit.

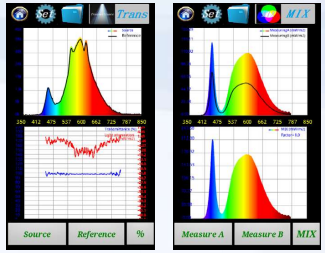
Luminance Intensity(mcd)

Luminous Flux(lm)

LED GROW(PLANTS) LIGHT SPECTROMETER SRI-PL-6000+

- could measure the coverings transmittance(%) , before(source) and after(reference) in your plant factory.
- could measure the light source imposed from the original light source



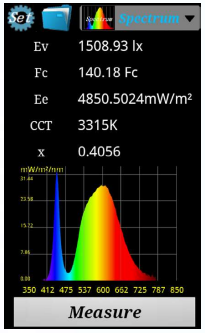


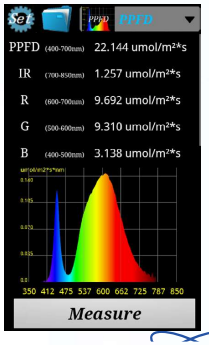
LED GROW(PLANTS) LIGHT SPECTROMETER SRI-PL-6000

Six Advantages :

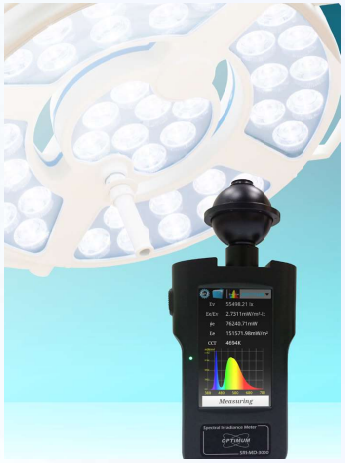
- Using integrating sphere as light entrance port, consist perfect cosine effect at different angel.
- Unique long focal length, high precision spectrometer for measurement.
- Fast Booting level, can perform instant measurement, no unnecessary action, measurement result is real time display.
- Huge storage capacity, can connect to PC to export the data, transfer and remote operation control.
- Simple operation with accurate measurement, R1-R15 measurement are clearly shown.
- Spectral wavelength resolution 0.5nm, half-wavelength width resolution 1.0nm.
- The only instruments measure Irradiance / Radiant in the world.

PRODUCT SPECIFICATION		
Detector Type	CCD Sony linear array Sensor,2048 pixels Spectrometer 29mm integrating sphere as light entrance port	
Cosine Receptor Diameter	6.6 ± 0.1 mm (0.260 ± 0.004 inch)	
Measurement Range	10 lx ~ 50000 lx or 50 lx ~ 250000 lx	
Wavelenght Range	350 ~ 850 nm	
Exposure Time Range	1 ~ 4000 ms	
Capture Mode	Single/Continuous	
Integrating Mode	Auto	
Measuring Capabilites	1. Illuminance / Lux 2. Spectral Irradiance 3. C.I.E Chromaticity Coordinates (1)C.I.E 1931 (x,y) Coordinates (2)C.I.E 1976 U.C.S (u',v') Coordinates 4. Peak Wavelength 5. Dominant Wavelength 6. Correlated Color Temperature; CCT (in Kelvins) 7. Color Rendering Index; Ra (Rendering Average) 8. SDCM for ANSI standard	9. mW/m² 10. PPFD
Digital Resolution	16 bits	
Dark Calibration	Auto	
Stray Light	0.001%	
Wavelenght Data Increment	0.5 nm	
Wavelength Accuracy	± 0.3 nm	
FWHM	1nm	
Illuminance Accuracy	Source A / other light source	±2% / ±4%
Color Accuracy		±0.001 / ±0.003
Color Repeatability	(Illuminance at 200 lx and higher)	±0.0003 / ±0.0005
CCT Accuracy	in CIE 1931	±1% / ±2%
CRI Accuracy @ Ra		±0.8% / ±1.5%
Display	5" LCD 480X800 Touch Panel	
Max. files storage	Up to 500000 Files	
Battery Operation Time	Up to 5 hours continuous use	
Battery	3000 mAh / Rechargeable lithium ion battery	
Date Output Interface	mini-USB 2.0	
Data Format	Microsoft Excel compatible	
Weight (with Battery)	660 g ± 20 g	
Size(mm)	200(L)×92(W)×30(H)	
Operating Temperature Range	0 ~ 50° C	





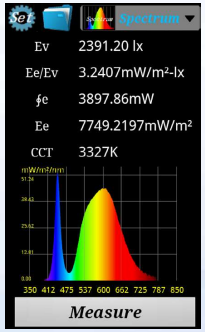
Spectral Irradiance Meter SRI-MD-3000



SPECIFICATION		
Detector Type	CCD Sony linear array Sensor,2048 pixels Spectrometer 50mm integrating sphere as light entrance port	
Measurement Range	150 lx ~ 600000 lx 500 mW/m² ~ 2100000 mW/m²	
Wavelenght Range	350 ~ 850 nm	
Capture Mode	Single/Continuous	
Measuring Capabilites	1. Illuminance / Lux 2. Spectral Irradiance 3. C.I.E Chromaticity Coordinates (C.I.E 1931 , C.I.E 1976 , SDCM) 4. Peak Wavelength 5. Dominant Wavelength 6. Correlated Color Temperature; CCT (in Kelvins) 7. Color Rendering Index; Ra (Rendering Average) 8. mW/m², mW , mW/m²-lx	
Digital Resolution	16 bits	
Dark Calibration	Auto	
Stray Light	0.001%	
Wavelenght Data Increment	0.5 nm	
Wavelength Accuracy	± 0.3 nm	
FWHM	1nm	
Illuminance Accuracy	Source A / other light source	±2% / ±4%
Color Accuracy		±0.001 / ±0.003
Color Repeatability	(Illuminance at 200 lx and higher)	±0.0003 / ±0.0005
CCT Accuracy	in CIE 1931	±1% / ±2%
CRI Accuracy @ Ra		±0.8% / ±1.5%
Display	5" LCD 480X800 Touch Panel	
Max. files storage	Up to 500000 Files	
Battery Operation Time	Up to 5 hours continuous use	
Battery	3000 mAh / Rechargeable lithium ion battery	
Data Output Interface	mini-USB 2.0	
Data Format	Microsoft Excel compatible	
Weight (with Battery)	660 g ± 20 g	
Size(mm)	200(L)×92(W)×30(H)	
Operating Temperature Range	0 ~ 50° C	

Six Advantages :

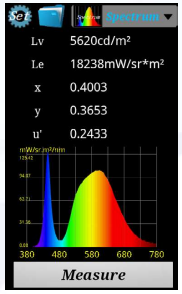
- Meet Medical lamp specification.
- Unique long focal length, high precision spectrometer for measurement.
- Fast Booting level, can perform instant measurement, no unnecessary action, measurement result is real time display.
- Can be sub-band measurements to calculate the light irradiance.
- Simple operation with accurate measurement, R1-R15 measurement are clearly shown.
- Spectral resolution 0.5nm, FWHM resolution 1.0nm

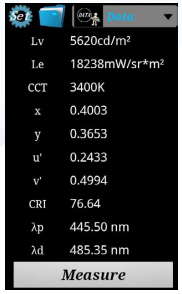


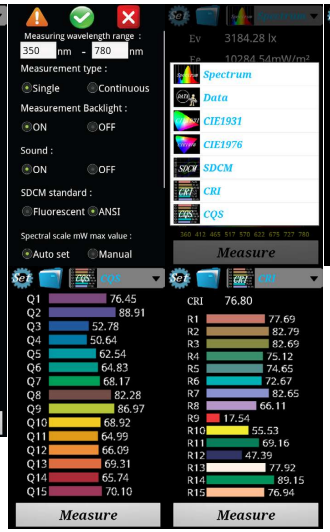
Spectral Luminance Meter SRI-RL-5000

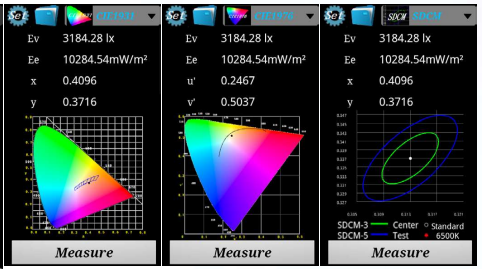
This instrument could measure surface brightness in LCD panel, display, and LED, in unit of cd/m^2 (or nits.).

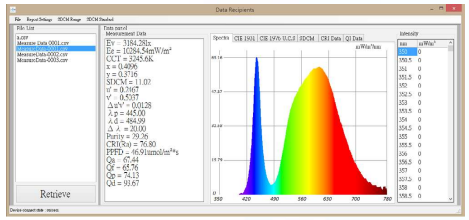
PRODUCT SPECIFICATION		
Detector Type	CCD Sony linear array Sensor,2048 pixels Spectrometer Fiber, Luminance light entrance port	
Cosine Receptor Diameter	5mm ± 0.2mm / 10mm ± 0.2mm	
Measurement Range	0.5 -1000 nits or 5 -10000 nits (under Source A)	
Wavelenght Range	380 ~ 780 nm	
Exposure Time Range	1 ~ 4000 ms	
Capture Mode	Single/Continuous	
Integrating Mode	Auto	
Measuring Capabilites	1. Luminance(nit) 2. Spectral Irradiance 3. C.I.E Chromaticity Coordinates (1)C.I.E 1931 (x,y) Coordinates (2)C.I.E 1976 U.C.S (u',v') Coordinates 4. Correlated Color Temperature; CCT (in Kelvins) 5. Color Rendering Index; Ra (Rendering Average) 6. SDCM for ANSI standard	
Digital Resolution	16 bits	
Dark Calibration	Auto	
Stray Light	0.001%	
Wavelenght Data Increment	0.5 nm	
Wavelength Accuracy	± 0.3 nm	
FWHM	1nm	
Luminance Accuracy	Source A / other light source (luminance at 5 nits and higher) in CIE 1931	±2% / ±4%
Color Accuracy		±2% / ±4%
Color Repeatability		±0.0002 / ±0.0005
Display	5" LCD 480X800 Touch Panel	
Max. files storage	Up to 500000 Files	
Battery Operation Time	Up to 5 hours continuous use	
Battery	3000 mAh / Rechargeable lithium ion battery	
Date Output Interface	mini-USB 2.0	
Data Format	Microsoft Excel compatible	
Weight (with Battery)	660 g ± 20 g	
Size(mm)	200(L)×92(W)×30(H)	
Operating Temperature Range	0 ~ 50° C	





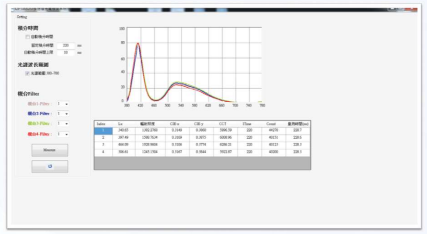




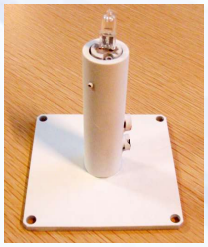


Phosphors sheet measurement SM-XY-8800

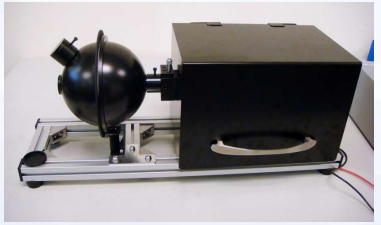
Using blue uniform light source as platform to inspire the phosphors to produce the white light. This system could measure the photometric and colorimetric parameters. Suitable for phosphors supplier and users.



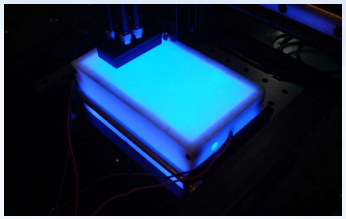
Light Source



Standard lamp (correction system) can be traced back to national standards laboratory (NMLT)



Uniform Luminance Light Source Generator (150mm Integrating sphere)



TAIWAN

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