



**UPRtek**



The Magician of Spectrometer

**HANDHELD**  
SPECTROMETER  
BROCHURE



**UPRtek**  
PREMIUM

English

**UPRtek**

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## Brand Story

### UPRtek Optics' professional pioneer

UPRtek, formerly known as the OEM (Original Equipment Manufacturer) from the domestic technology industry, was devoted in manufacturing memory cards for brand factory. In 2012, the current CEO, Mr. Tu Ming Da took over the professional management and relied on his wise vision and market sensitivity. He led the UPRtek from OEM to professional OEM of LED. Formally, he started the blueprint of handheld spectrometer internationally in the same year.

UPRtek has the most advanced optical, mechanical, electrical, and soft integration capabilities. We fully control the core technology of LED optics, understand the measurement needs of various markets and integrate professional production lines with R&D closely. Whole products of

UPRtek are designed and produced in Taiwan and are embedded with the best application system integration for measuring instruments and quality technology. In the future, UPRtek will continue to advance our innovative R&D capabilities and enhance our own knowledges to help our customers create maximum value continuously.

**UPRtek**



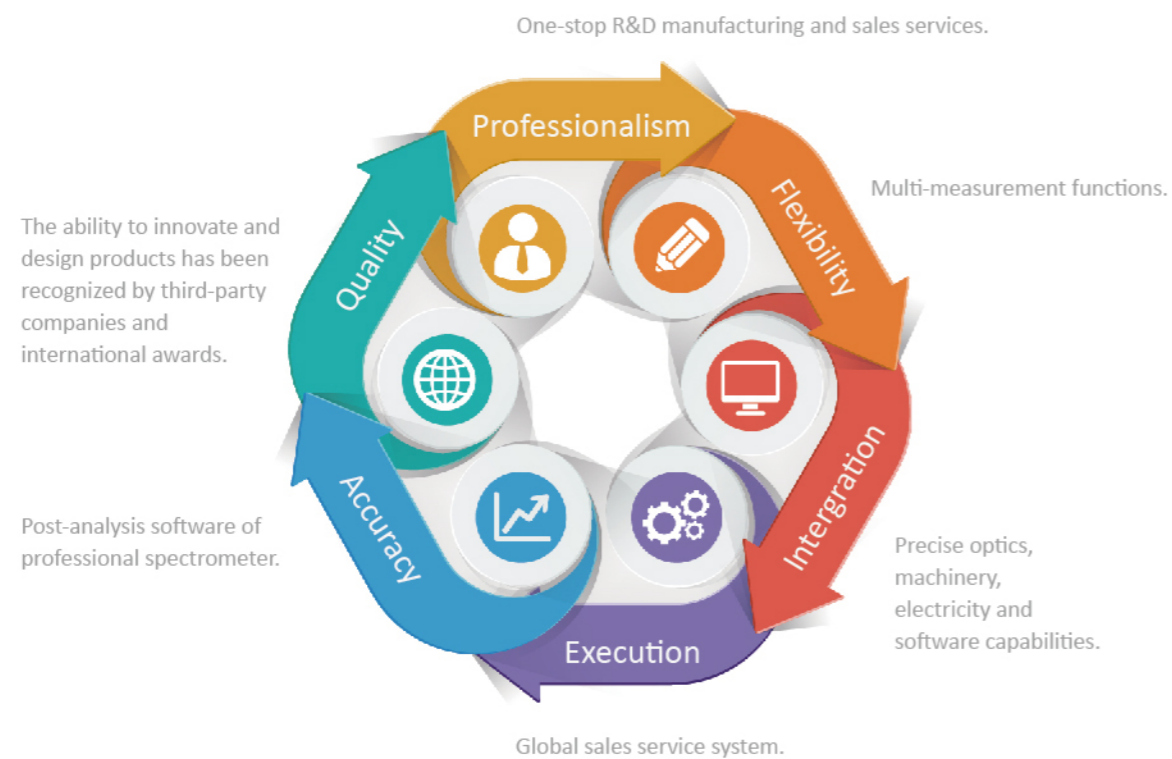
Chairman

**PHISON**  
Phison Electronics Corp.

Affiliated with NAND Flash control chip world leader - PHISON subsidiary.

PHISON's income in 2016 was 43.78 billion and became the second largest flash memory chip manufacturer in the world.

### UPRtek Product competitive advantages





## Applied Field

### Source

Different kinds of artificial lighting, such as Business/House Lighting with LED, Agricultural LED, Stage Lighting Adjustment, Indoor & Outdoor Landscape Lighting Management and others.

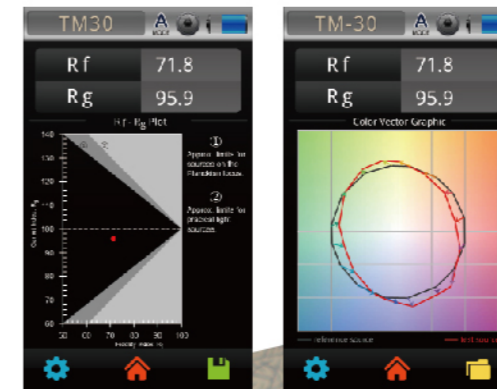
### Industry



### Measuring Parameters




**Basic metrics** Spectral Power Distribution (Spectrum), Illuminance (LUX)/Foot-Candle (fc), Color Rendering Index- CRI (Ra), Correlated Color Temperature (CCT), Domain Wavelength ( $\lambda$ d), CIE 1931/1976 Chromaticity Diagram.

**Special metrics** IES TM30-15 Color Evaluation, Stroboscopic Effect Visibility Measure (SVM), Blue Light Hazard Efficacy of Luminous Radiation (KB,V), Blue Light Hazard Risk Group (RG), Photosynthetic Photon Flux Density (PPFD/PPFD).





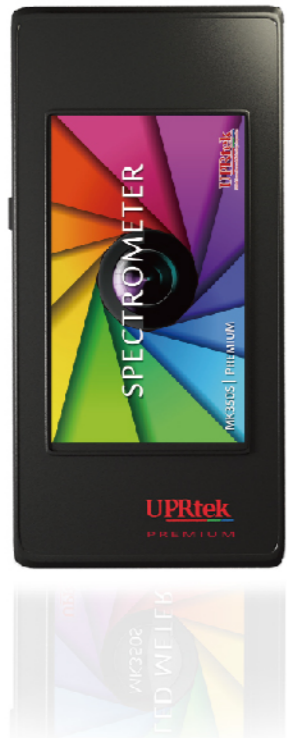
## Light Measurement Solution

Application	Key Parameters	MK Series Spectrometers			MF250N Flicker Meter	CV600 Spectral Color Meter	PG100N Spectral PAR Meter
		MK350S Premium	MK350N Premium	MK350D			
Commercial Lighting	<ul style="list-style-type: none"> <li>▪ Lux, CIE Chromaticity Diagram</li> <li>▪ CRI</li> <li>▪ Spectrum</li> <li>▪ Flicker Measurement</li> </ul>	✓	✓	✓	✓		
LED Fixture/ Display Equipment production Quality Management	<ul style="list-style-type: none"> <li>▪ Lux, CIE Chromaticity Diagram</li> <li>▪ CRI</li> <li>▪ Spectrum</li> <li>▪ Compare Mode</li> <li>▪ LED BIN Rating Mode</li> <li>▪ Logging Mode</li> <li>▪ Checker Mode</li> </ul>	✓					
Spatial Lighting Design	<ul style="list-style-type: none"> <li>▪ Lux, CIE Chromaticity Diagram</li> <li>▪ CRI</li> <li>▪ TM30-15</li> <li>▪ Spectrum</li> <li>▪ LUX.G Image Distribution</li> </ul>	✓					
Museum Lighting	<ul style="list-style-type: none"> <li>▪ Lux, CIE Chromaticity Diagram</li> <li>▪ CRI</li> <li>▪ TM30-15</li> <li>▪ Spectrum</li> <li>▪ LUX.G Image Distribution</li> <li>▪ Transmit Mode</li> <li>▪ Blue Light Hazard Risk Mode</li> </ul>	✓					
Plant Factory	<ul style="list-style-type: none"> <li>▪ LUX.G Image Distribution</li> <li>▪ Spectrum</li> <li>▪ PPF/PFD</li> <li>▪ Logging Mode</li> </ul>	✓		ODM/ OEM			✓
Broadcast Lighting	<ul style="list-style-type: none"> <li>▪ Spectrum</li> <li>▪ TM30-15</li> <li>▪ Flicker Measurement</li> <li>▪ Filter Measurement</li> <li>▪ Exposure Mode</li> </ul>					✓	
Health Lighting	<ul style="list-style-type: none"> <li>▪ Transmit Mode</li> <li>▪ Blue Light Hazard Risk Mode</li> <li>▪ Spectrum</li> <li>▪ Flicker Measurement</li> </ul>	✓	---				





## Light Measurement Solution



### MK350S Premium

Spatial Lighting Research · Handheld Spectrometer

#### Features

- ✿ The only handheld spectrometer with LUX Image Distribution function globally.
- ✿ The only one with IEEE PAR 1789-2015 Flicker Risk Point Analysis Figure.
- ✿ Blue Light Hazard (BLH) Judgment- Easier prevention of BLH from happening.
- ✿ Using LED BIN Rating Application & SDCM (Standard Deviation Color Matching) to check LED quality in real time.
- ✿ Logging Mode- Real time monitor of light color changes and adjustment.
- ✿ Quality Checker Mode- Improvement of the inspection efficiency of the buyer's and seller's fixtures.
- ✿ Compare Mode- Presents the data/figure intuitively and helps users to complete the differences of spectrum and other parameters.
- ✿ PPF/PPFD Plant Growth Secret- Understand the lighting requirements of plant growth and adjust it simultaneously to achieve an intelligent cultivation environment.

#### Measuring Parameters

- ✿ Wavelength Range: 380 to 780 nm
- ✿ Measuring Range: 1 to 150,000 lx
- ✿ Integration Time Range: 60 us to 5,000 ms
- ✿ Illuminance Accuracy:  $\pm 2.5\%$
- ✿ Sampling Rate: 100k sample/sec
- ✿ Flicker Frequency Range: 5 to 50k Hz
- ✿ Flicker Accuracy:  $\pm 5\%$  (5 to 30k Hz)



#### Overview

##### Flicker Measuring Mode

Quantify and be aware of LED flicker problems efficiently.



##### TM-30-15 Mode

Obviously tell you how the change for fidelity and saturation.



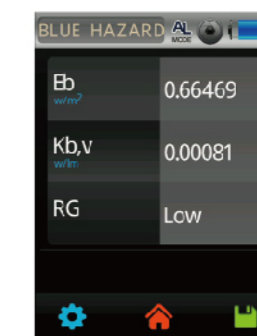
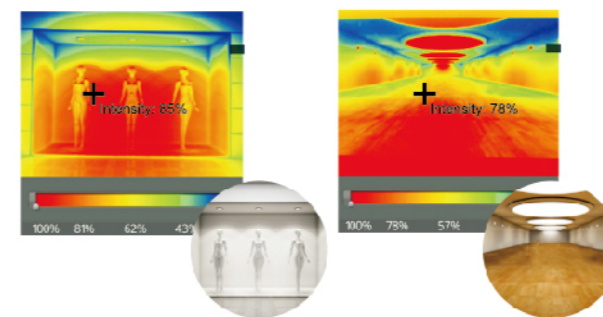
##### Blue Light Hazard Mode

Comply with the IEC 62778 Blue Light Hazard measuring requirement and assess the risk level for light source to human eye.

Risk Group(RG)	Risk Level	Maximum exposure time (s)
RG0	Exempt	>10000 sec
RG1	Low Risk	>100~10000 sec
RG2	Moderate Risk	0.25~100 sec
RG3	High Risk	<0.25 sec

##### LUX Image Distribution Mode

See what's bright and what's not.





## Light Measurement Solution



NIST

### MK350N Premium

Industrial LED Measurement Research • Handheld Spectrometer

#### Features

- ☀ The only handheld spectrometer with IEEE PAR 1789-2015 Flicker Risk Point analysis figure.
- ☀ It has both Spectrum Analysis and Flicker Measurement functions.
- ☀ 3.5" Color touch screen- What you see is what you get!
- ☀ Compare Mode- Presents the data/figure intuitively and helps users to complete the differences of spectrum and other parameters.
- ☀ IES TM30-15 Color Evaluation Mode- Users can judge the lighting color quality of Rf (Color Fidelity), Rg (Color Saturation) and Color Vector Graphic objectively.

#### Measuring Parameters

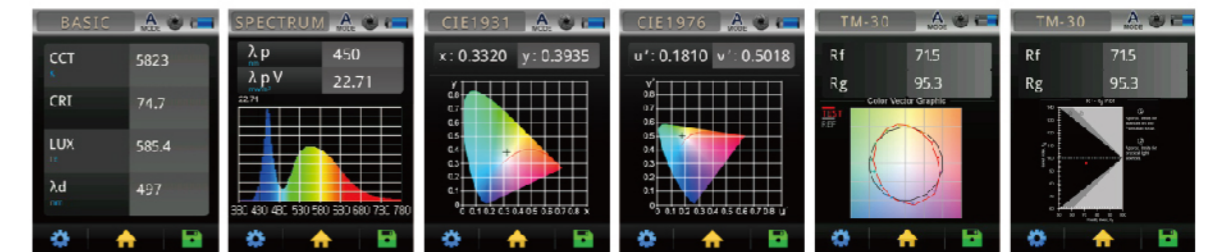
- ☀ Wavelength Range: 380 to 780 nm
- ☀ Measuring Range: 5 to 100,000 lx
- ☀ Integration Time Range: 100 us to 1,000 ms
- ☀ Illuminance Accuracy:  $\pm 2.5\%$
- ☀ Sampling Rate: 100k sample/sec
- ☀ Flicker Frequency Range: 5 to 50k Hz
- ☀ Flicker Accuracy:  $\pm 5\%$  (5 to 30k Hz)

#### Overview

Adopting advanced CMOS high-speed spectral technology, capture data within 3 seconds  
High speed, stability, accuracy

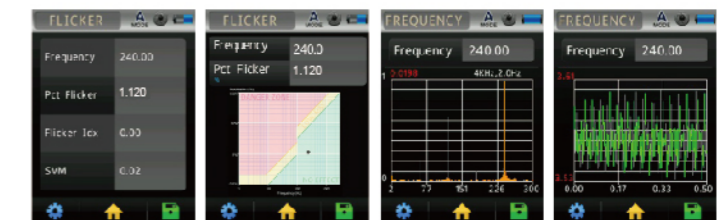


#### Measuring Modes



#### Embedded with high speed Flicker sensor

Using flicker indicators, Time-domain and Frequency-domain modes to examine the light problems simultaneously for maintaining strict quality control of lighting.





## Light Measurement Solution



### MK350D

Compact • Handheld Spectrometer

#### Features

- ☀ The tiniest pocket size spectrometer in the world.
- ☀ Standalone and smartphone or pc connection not needed.
- ☀ Customized plant factory light measurement module.
- ☀ It is only 70g which is portable and easy to carry.
- ☀ Built-in Bluetooth that can be controlled by smart devices.

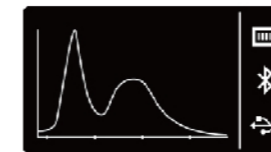
NIST

#### Measuring Parameters

- ☀ Wavelength Range: 380 to 780 nm
- ☀ Measuring Range: 70 to 70,000 lx
- ☀ Integration Time Range: 6 ms to 1,000 ms
- ☀ Illuminance Accuracy:  $\pm 5\%$
- ☀ Flicker Frequency Range: 10 to 165k Hz

#### Overview

#### Quick snapshot and basic measurement information



CIE1931  $x=0.4620$   
 $y=0.4157$   
 CIE1976  $u=0.2616$   
 $v=0.5296$

CCT = 2761  
 CRI = 80.5  
 LUX = 145.1  
 LambdaP = 612nm

R9 = 76.3  
 LUX = 145.1  
 FC = 8.0  
 Flicker = 16.0%

CCT  
 CRI  
 LUX  
 x, y  
 u'/v'

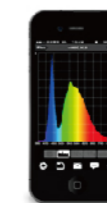
**FLICKER  
 R9**

and more! ...

Supports Micro SD card unlimited data storage for measurement. Stand-alone operation, the interface is easy to use. Lightweight and easy to carry, ready to detect that is known.



Compatible with smart devices, Wireless control by Bluetooth.





## Light Measurement Solution



### MF250N

Handheld LED Flicker Meter

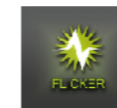
#### Features

- ☀ The first flicker meter with spectrum function.
- ☀ Detachable optical sensor provides multi-measurements for users.
- ☀ The first handheld spectrometer is embedded with Fast Fourier Transform (FFT) & Light wave functions which monitor light quality in real time.
- ☀ Stand-alone and can be used anywhere.
- ☀ It is also the the first device with Percent Flicker(%), Flicker Index and Stroboscopic Effect Visibility (SVM) measuring functions.

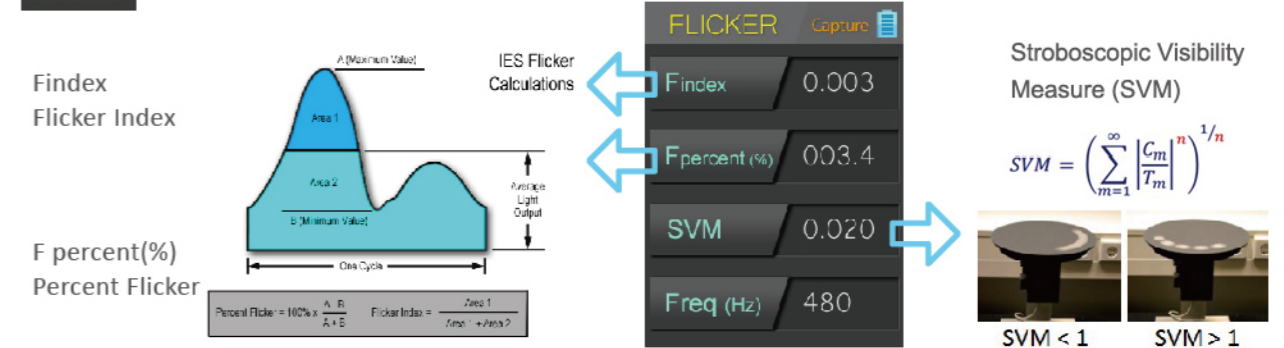
#### Measuring Parameters

- ☀ Wavelength Range: 380 to 780 nm
- ☀ Measuring Range: 30 to 60,000 lx
- ☀ Integration Time Range: 6 ms to 1,200 ms
- ☀ Illuminance Accuracy: ± 5%
- ☀ Sampling Rate: 5k sample/sec
- ☀ Flicker Frequency Range: 5 to 2k Hz
- ☀ Flicker Accuracy: ± 5%

#### Overview

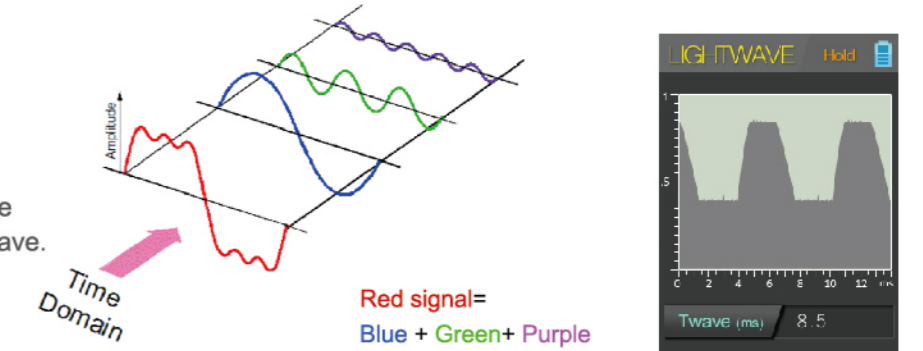


### Percent Flicker vs. Flicker Index vs. SVM



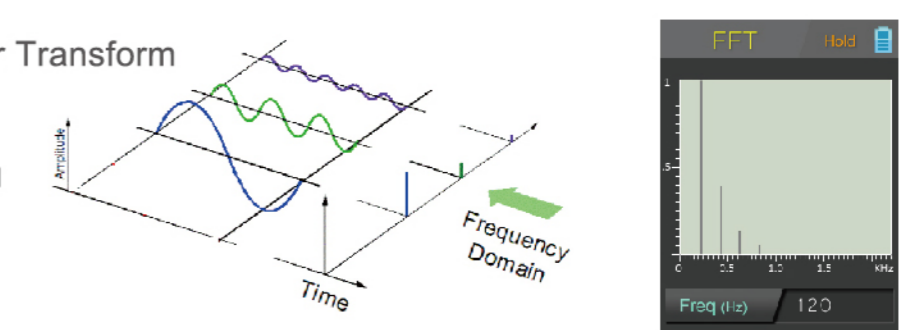
### Light Wave

Using spectral spectrometer technology, help you measure the cycle time of main light wave.



### Fast Fourier Transform

FFT mode is a computational tool that transfers the signal from time domain to frequency domain.





## Light Measurement Solution



### CV600

Specialized in broadcast Lighting · Handheld Spectrometer

#### Features

- Light source measuring parameters are more than 30 units, users can customize the measuring list depending on their needs.
- Embedded with “White Balance mode” to assist users to choose the suitable filter type. It is easy to control the light quality and save post-production cost.
- Exposure Mode- Suggests the best setting for “Shutter Speed, Aperture and ISO.
- Flicker Free Mode- Supervises the changes of light source and camera frequency (FPS) on-site. Provides a Flicker Free shooting environment.
- Specializes in color rendering data for TV & Cinema-TLCI (Television Lighting Consistency Index).

#### Measuring Parameters

- Wavelength Range: 380 to 780 nm
- Measuring Range: 5 to 100,000 lx
- Integration Time Range: 100 us to 1,000 ms
- Illuminance Accuracy:  $\pm 5\%$
- Sampling Rate: 100k sample/sec
- Flicker Frequency Range: 5 to 50k Hz
- Flicker Accuracy:  $\pm 5\%$  (5 to 30k Hz)

NIST

#### Overview

### Light Palette

CC/LB Filter library.

**Present CCT value**  
Measure by CV600.

**Choose**  
the filter brand.

**1 Target** the amount of CCT

**2** **3** **4**

**Filter brand**

ROSCO	LEE
FUJIFILM	KODAK

Yes No

**Filter**

CCT: 4479K Target: 4000K

CCF: CC075M, 249 LBF: 223, 1/8

A-B: 16.7A

G-M: 6G

**Filter recommends**  
Make preset CCT value close to Target CCT value.

### Exposure Value Compensating

Make sure every shoot are always correctly exposed.

Aperture

ISO

Shutter Speed

EXPOSURE

Shutter 30 s

ISO 4

F-number F11 +0.8

LUX 482.73B

EV -----

EV -2 EV -1 EV 0 EV +1 EV +2

### Perfect Shoot

Catch the frequency of light is the key to create a flicker free shoot!

**Flicker Free**

FLICKER

Camera 30 FPS

Frequency 210.00 Hz

Pct Flicker 104 %

Shutter speed Use Any

PASS

**Flicker** **VS.** **Flicker-free**



## Light Measurement Solution



### PG100N

Handheld Spectral PAR Meter

#### Features

- ☀ Photosynthetic Photon Flux Density (PPFD/PFD)- Assists users to adjust RGB formula of Agriculture LED and accelerate crop growth.
- ☀ Customized light sources are more than 40 units.
- ☀ Embedded with Logging Mode-Users can set-up the I-Time (Integration Time)/ Interval/Counts to monitor and adjust lighting changes in real time.
- ☀ Detachable optical sensor provides multi-measurements for users with wide space and distance coverage.

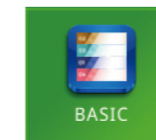
#### Measuring Parameters

- ☀ Wavelength Range: 380 to 780 nm
- ☀ Measuring Range: 70 to 150,000 lx/  
0.5 to 1,000 W/m<sup>2</sup>(Irradiance)/  
1 to 3,000 μmol/(m<sup>2</sup>\*s) (PPFD)
- ☀ Integration Time Range: 2 ms to 2,000 ms
- ☀ Illuminance Accuracy: ± 5%

#### Overview

### Basic Mode

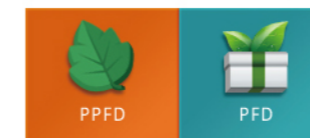
Up to 40 lighting measurement parameters  
Customized Top 4 list per your own preference.



BASIC		LUX			fc			CCT			R5			R4			R3		
CCT	8188 K	Duv	λpV	x	y	u'	v'	Δx	Δy	Δu'	Δv'	λp	λpV	R5	R4	R3	R6	R7	R2
PPFD	58.7	Δx	Δy	Δu'	Δv'	λp	λpV	λd	Purity	IRR	CRJ	R1	R2	R12	R13	R14	R9	R10	R11
LUX	1320	λd	Purity	IRR	CRJ	R1	R2	R15	PPFD	PFD	PFD-UV	PFD-B	PFD-G	PFD-R	PFD-FR				
λp	503 nm																		

### PPFD & PFD

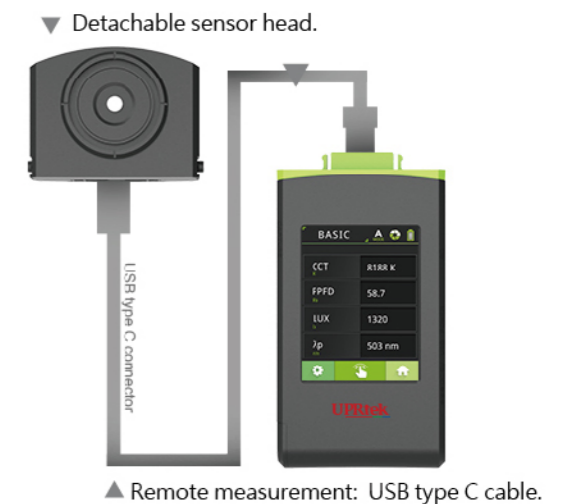
Adjust the light quality timely which increases the plant growth through the technical parameters.



PPFD		PFD	
PPFD	11.59	PFD	11.59
PFD - R	3.03	PFD - UV	3.03
PFD - G	5.68	PFD - FR	5.68
PFD - B	2.87		

### Measurement Function

Awareness of the light source is possible despite distance and space which significantly improves measuring efficiency and flexibility.





## Spectrum Application Software



### uSpectrum

PC Software

Powerful analytic function, customized operation list and intuitive UI insist on strict optical technology control.

#### Suggested Models

- ✿ MK350S Premium Spatial Lighting Research · Handheld Spectrometer
- ✿ MK350N Premium Industrial LED Measurement Research · Handheld Spectrometer
- ✿ MK350D Compact · Handheld Spectrometer
- ✿ CV600 Specialized in broadcast Lighting Handheld Spectrometer (Only Read)
- ✿ PG100N Handheld Spectral PAR Meter



### uFlicker

PC Software

#### Suggested Models

- ✿ MK350S Premium Spatial Lighting Research · Handheld Spectrometer
- ✿ MK350N Premium Industrial LED Measurement Research · Handheld Spectrometer



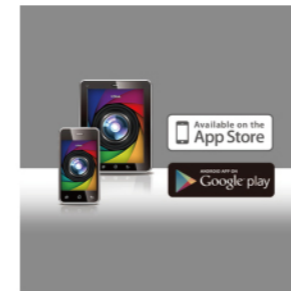
### WING Wi-Fi

Wireless Control Card

Using WING Wi-Fi Wireless Control Card with different spectrometer allows wireless measurement of the light. Whether it is a mobile phone or a tablet mobile device, Wing card on hand enables you to share your data unlimitedly.

#### Suggested Models

- ✿ MK350S Premium Spatial Lighting Research · Handheld Spectrometer
- ✿ MK350N Premium Industrial LED Measurement Research · Handheld Spectrometer
- ✿ CV600 Specialized in broadcast Lighting Handheld Spectrometer
- ✿ PG100N Handheld Spectral PAR Meter



### Mobile Spectrum App


It is based on various devices to create its own Mobile APP. It can be measured by stand-alone or it can depend on current environment to choose the remote wireless measurement.



#### Suggested Models

- ✿ MK350S Premium Spatial Lighting Research · Handheld Spectrometer
- ✿ MK350N Premium Industrial LED Measurement Research · Handheld Spectrometer
- ✿ MK350D Compact · Handheld Spectrometer
- ✿ CV600 Specialized in broadcast Lighting Handheld Spectrometer
- ✿ PG100N Handheld Spectral PAR Meter



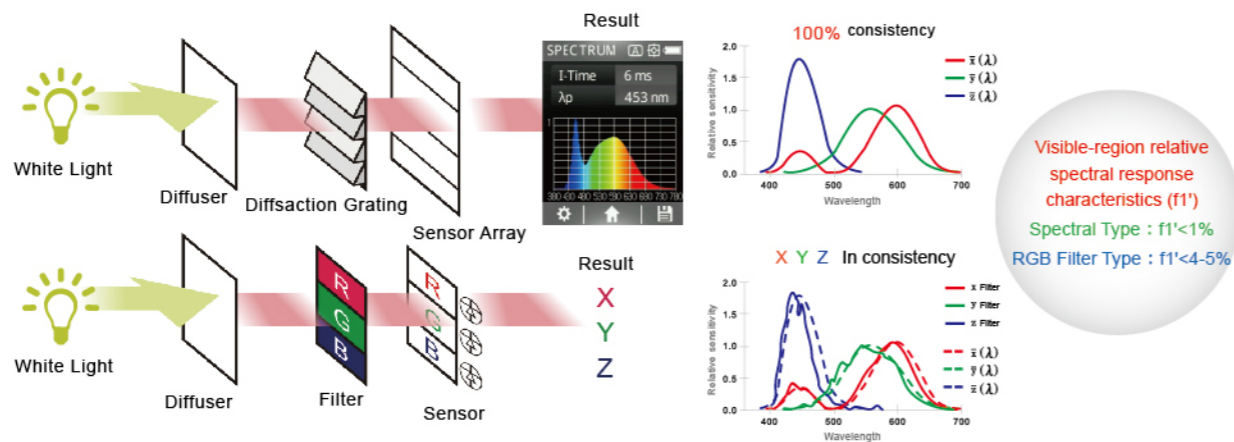
## Differences Between Spectral and RGB Filter Types

Type	Technique	Component	Theory	Result
Spectrometer 	Spectral Type	Diffuser	Light source goes through the "Diffraction Grating and Sensor Array" to collect the spectrum and dispers the light for analysis.	Obtain spectral energy and come out the CIE XYZ.
		Diffraction Grating		
		Sensor Array		
Color Analyzer, RGB Filter Type	Diffuser	Filter	Light source goes through the "Filter and Sensor" and execute light analysis.	Sensor provides the CIE XYZ directly.

 Spectrum information: Spectrometer (✓); Color Analyzer (✗).  
 CIE XYZ accuracy: Spectrometer > Color Analyzer.

### High accurate measurement performance

Make sure that the spectral sensitivities of  $x(\lambda) / y(\lambda) / z(\lambda)$  are comparable to the CIE1931 color matching function. Easily enhance the chroma accuracy and provide measurements result which closer to the human visual function.



## Awards

2018	RedDot Award Winner Industrial Design (EU)		PG100N Handheld Spectral PAR Meter
	LEDs Magazine Sapphire Awards Finalist (US)		
2017	IES Progress Report (US)		PG100N Handheld Spectral PAR Meter
	China Good Design (CN)		
	RedDot Award Winner Industrial Design (EU)		MK350N Plus Handheld Spectrometer
	LEDs Magazine Sapphire Awards Finalist (US)		
	Lighting Award (CN)		MF250N Handheld LED Flicker Meter
2016	IES Progress Report (US)		MK350N Handheld Spectrometer
2015	Taiwan Excellence Award (TW)		MK350S \ MK350D Handheld Spectrometer
2014	ICT Month Innovation Elite (TW)		MK350S \ MK350D
	Taiwan Excellence Award (TW)		MK350N
	The National Brand Yushan Award (TW)		MK350S Handheld Spectrometer
	OPTO of Outstanding Photonics Product Award (TW)		
2013	IES Progress Report (US)		MK350N Handheld Spectrometer
	LEDinside Aurora Award (US)		
2012	Honor Award of Golden Torch Award Selection (TW)		MK350N Handheld Spectrometer

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### International Certifications



ISO14001 environmental management system

Certification Institution: AFNOR ASIA



ISO9001 quality management system

Certification Institution: AFNOR ASIA



IECQ QC080000 HSPM hazardous materials process management system

Certification Institution: AFNOR ASIA



CE Certification



FCC Certification



UPRtek