SPIC-300
SPECTRAL IRRADIANCE COLORIMETER
USER'S MANUAL

V 2.01

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Foreword

Thank you for purchasing the EVERFINE SPIC-300 Spectral Irradiance Colorimeter.This user's Manual contains useful information involving the instrument's functions and operating procedures as well as precautions that should be noticed during operation. In order to use the instrument correctly, please read the manual carefully first, then put it in a right place for quick references.

Notes:

- EVERFINE pursues a continuing improvement of the performance and functions of its products, therefore, the contents of this manual may be changed without prior notice.
- Great effort has been made in preparation of this manual to ensure the accuracy of its contents. If you have any questions or find any errors, please contact your dealer or EVERFINE sales office.
- If you have different understanding to this manual, please refer to the Technical Service Department of EVERFINE.

Checking package contents

Please check the instrument carefully when you unpack the box for the first time. If the instrument and related accessories are missing or appear abnormal, please contact the dealer immediately.

Warm notice to valued customers of EVERFINE

"Ensure the quality, insist on continuous improvement and make every customer more satisfied" is the quality policy of EVERFINE. Therefore, the quality of products and services provided by EVERFINE should be better than those have been promised. If you have further suggestions or advices on our products and services, please provide your feedback to our quality supervision department.

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Your supervision is the motivation for us to move forward!

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If EVERFINE has signed a written agreement with user and the contents in the agreement are in conflict with above terms, the contents in the written agreement have preferential force effect.

Safety Precautions

Precautions:

- Do not place anything on top of the instrument, especially objects containing iron filings, water and oil etc. Otherwise, it may results in severe consequences.
- Do not bend the USB cable.
- To avoid high internal temperature, do not block the vent holes in the instrument case.
- Do not open the case of the instrument to ensure the safety of user and instrument When the instrument needs internal inspection or adjustment, please contact your dealer or EVERFINE representative.
- If you notice smoke or unusual odors coming from the instrument, immediately turn OFF the power and remove the battery. Please contact your dealer or the EVERFINE representative.
- If the battery power is low, please charge it by the original charger. If battery is always in the over discharge condition, it will reduce the lifetime. If the instrument will be unused for a long period, keep the battery power within 40%-80%, then remove it from the instrument and store in a dry environment at room temperature.

Storage environment:

Please do not store the instrument in places where it may be exposed to any of the following conditions.

- Relative humidity:>65％RH; temperature:>45℃
- Excessive vibration
- Splashes of water, oil or chemicals heat sources
- Direct sunlight
- Excessive amount of dust, dirt, salt or iron filings

Using Operation environment:

- Relative humidity:65% RH ± 20% RH； Temperature:（0～35）℃
- Avoid mechanical vibration
- Keep away from water, oil or chemicals heat sources, salt or iron filings field and electric field.
- Avoid excessive amount of dust, dirt, corrosive or flammable gases
- Avoid Direct sunlight

Quantity calibration:

- To ensure high measurement accuracy, it is recommended that the instrument should be calibrated in EVERFINE Test and Calibration Center or other laboratory which owns the calibration accreditation for spectrum and photometric parameters.
- Recommend Calibration period: Once a year.

To ensure high measurement accuracy, the instrument is recommended to operate on the following conditions: Temperature of 15 ℃ ~25℃; Humidity: 50%RH~75%RH

Contents

Chapter 1 Overviews

SPIC-300 Spectral Irradiance Colorimeter can realize the measurement of the spectrum, illuminance, colorimetric and photometric quantities etc. With a series of international patented technologies, the instrument realizes excellent linearity in the measurement of wide dynamic range

The detector can be separated from the main unit of SPIC-300, realizing super measurement flexibility. The equiped 5" touch screen, large storage space and the android operating system etc..makes the measurement more intelligent. All the quantities could be measured and displayed by one touch, which suits best for the on-site measurements of road, indoor, commercial, office and plant growing lighting etc., as well as the research and development field of lighting products, production line controlling, etc..

Main Characteristics of SPIC-300：

1） The Spectrometer & Broadband-radiometer/photometer Combined Technique (SBCT) and stray light correction patented technologies make SPIC-300 realizing high measurement accuracy and excellent linearity;

2） The measurement speed is finished in several milliseconds, during which all the spectral radiometric, photometric, colorimetric quantities can be obtained;

3） The detector and the main unit can be integrated in whole, or separated and the communication between the detector and the main unit is realizes by a USB or WIFI , which is suitable for the remote measurement.

4） The software can be customized for extended functions in compliance with the latest standards or the requirements of customer, such as the IES equivalent illuminance and phytometric measurements;

5） The 5" color capacitive touch screen wided the vision and simplfied the operation with fingertip;

6） The data can be exported as “Excel” and “JPG” etc. formats, and it is convenient for view and edit;

7） The large storage space can be used for storing the history data and the on-line test data, which is convenient for on-site analysis and comparisons as well as data transmission.

8） The compact design makes it handheld and portable;

9） Equipped with a high capacity and rechargeable lithium ion battery (3300mAh), it can be continuously operated for field measurement.

10） Powerful software function, it can automatically finish the quality verification automatically according to test results

11） The software owns functions like sending e-mail, updating on-line

Chapter 2 Specifications

2.1 Measurable items:

1) Relative Spectral Power Distribution P(λ)
2) Spectral Irradiance E(λ)
3) Chromaticity Coordinates:（x，y）、（u，v）、（u'，v'）
4) Correlated Color Temperature:Tc
5) Color Rendering Index: Ra, Ri（i=1～15）
6) Standard Deviation of Color Matching (SDCM)
7) Peak wavelength, Full width at half maximum (FWHM)
8) Spectral Purity, Dominate Wavelength
9) Red ratio
10) Illuminance E、Irradiance E_e
11) Available to customized more measurement functions.

2.2 Technical specifications

Model*[1]	AW Model	BW Model
Wavelength	380nm～760nm	380nm～780nm
Wavelength accuracy	± 0.5nm	± 0.5nm
Measurement accuracy	±(4% reading+1 digit）	±（3% reading+1 digit）
Receptor window	Φ8 mm	（Φ8mm+Φ3.5mm）
SBCT	——	Yes
Accuracy of chromaticity coordinates	±0.003（Relative to the standard light source whose stability is better than ±0.0001 and NIM traceable calibrated value）	
CCT	1,000K～100,000K	1,000K～100,000K
Stray light	≤0.3%	≤0.3%
Photometry linearity	——	±0.3%
Illuminance range	1lx～100klx	0.01lx～100klx
Integration time range	5ms～60000ms	5ms～60000ms
Communication interface	USB Type-C	
Operation conditions	Temp. 5～30℃， Relative humidity <80% RH（No condensing）	
Storage conditions	Temp. 0～35℃， Relative humidity<80% RH（No condensing）	
Screen	5.0" LCD touch screen	

Communication	Main unit-detector: RS232&Bluetooth Main unit-computer: USB/WIFI
Data Storing	6G
Power supply	Rechargeable Lithium battery/adapter
Standard accessories	A adapter, a USB cable and a data cable
Size	192mm（L）× 76mm（W）× 30mm（H）
Weight	320g（with battery）

*1. Models containing subunit "W", have equipped with BLUETOOTH and WIFI function.

Chapter 3 Instrument Introduction

3.1 Instrument Configuration

The SPIC-300 Spectral Irradiance Colorimeter includes the main unit (the detector included), adapter, USB communication line, and USB connection line, etc.

SPIC-300 includes two types: AW and BW. The appearance of SPIC-300 model BW spectral irradiance colorimeter is shown in Fig. 3.1, the main difference between AW and BW is light-receiving surface .

Fig 3.1 Integrated structure

Fig 3.2 The separate structure

Fig 3.3 Bluetooth connection structure

① Main unit

② Home key of main unit (for switch and wake operation of instrument)

③ Director power swift

④ Detector part

⑤ USB communication and charge Port (Type-C interface available for connection to PC)

⑥ LCD Screen

⑦ Detector cover

⑧ Sling hole of director

⑨ Director power light

⑩ Threaded hole （to install the tripod）

⑪ Spectral channel (light-receiving surface is diffuse transmittance material)

⑫ Photometric channel (light-receiving surface is diffuse transmittance material)

⑬ USB connection line（extension line of detector）

Model AW does not have the light-receiving interface ⑪ ,the position ⑫ is photometric channel.

3.2 Installation and dismounting of detector

The detector can be separated from the main unit, as shown in Fig. 3.4, the detector can be separated from the main unit along the direction of the blue arrow. Then the main unit and the detector can be communicated by the USB connection line, as shown in Fig. 3.2, or directly connected via Bluetooth, shown in Figure 3.3, meanwhile the power switch must be turned on. The detector also can be reinstall to the main unit as shown in Fig. 3.5.

Fig 3.4 Dismounting of detector

Fig 3.5 Installation of detector

3.3 Detector indicator

Yellow light on the detector ⑨ flashing indicates that the detector power is low. Charge the detector by main unit. The yellow indicator will lights on when in the state of charging. The yellow light is off when the detector is fully charged.

When the detector is turned on, the blue light is on, which is a indicator of being working condition; when the detector is during measurement process, the blue light flashes.

Chapter 4 Operation Guide

The main unit is based on android operation system and the interface is friendly and clear, user can finish the parameters setting, zero calibration and measurements etc. step by step according to the following prompts.

4.1 Start the instrument

Hold the button on the left of screen for a time, start the instrument and enter the main interface, as shown in Fig. 4.1. The status bar on the top of the screen shows the model, system time, detector connection sign, battery level, etc. The menu bar is on the bottom of screen which includes 6 function modules of Common measure, Continue measure, Compare measure, File management, Setting, Knowledge.

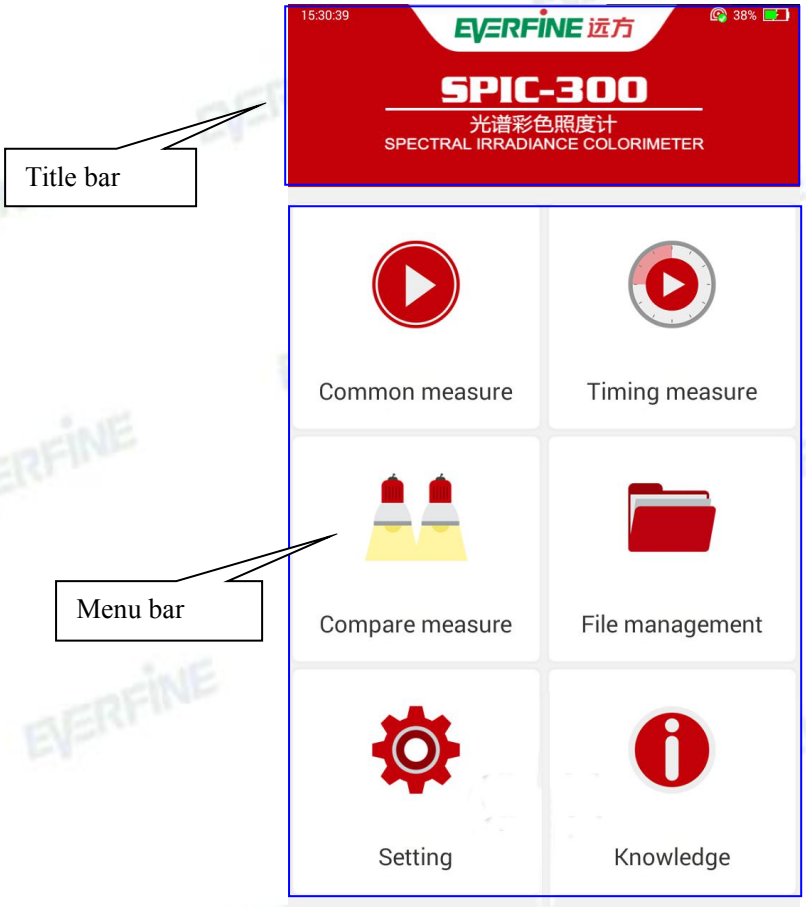


Fig 4.1 Main interface of the main unit

4.2 Common measure

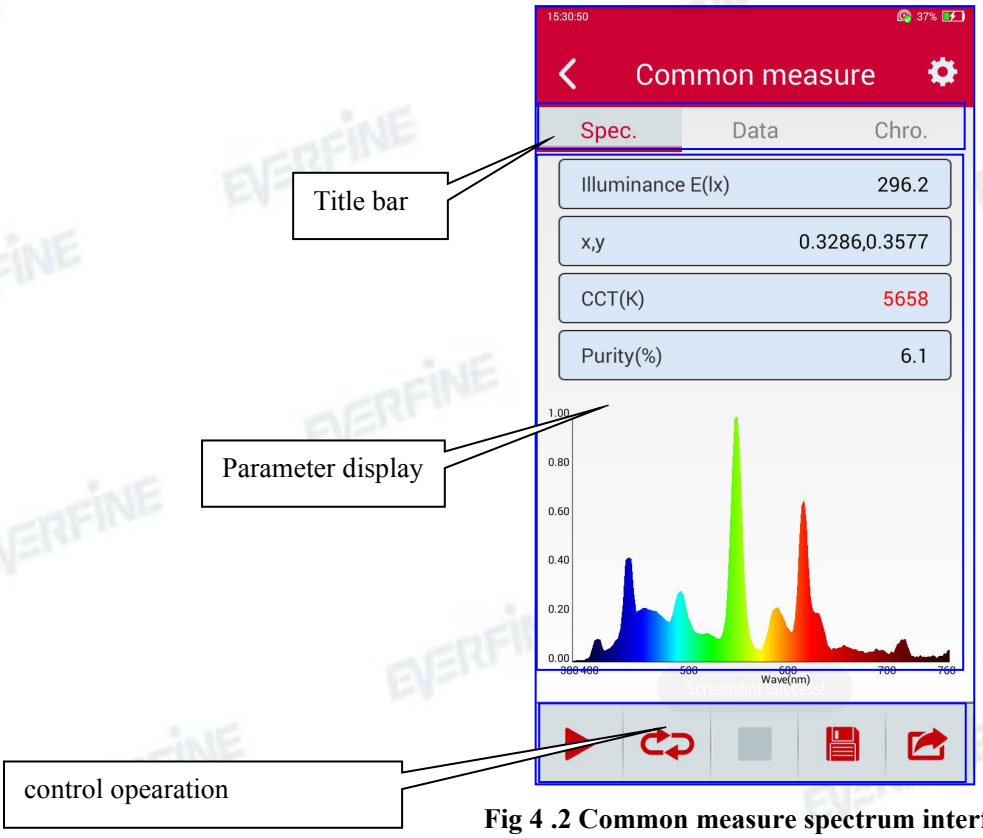


Fig 4 .2 Common measure spectrum interface

The title bar consists of Spec.、Data and Chro., click to switch the test results, the parameter display area displays different parameter view.

- Spec. : Displays the spectrum and the corresponding spectral parameters under the current test . There are 4 parameters display bars. Click on each parameter display bar to select the parameter to be displayed on the interface. By moving the cursor in the spectrum display area, the wavelength and the corresponding spectrum on the cursor position will be displayed.
- Data : Displays all parameter (as is shown in Figure 4.3), which can be viewed through a slide screen and the measured values are marked in red as they exceed the set criteria.
- Chro. : Under this view, three CIE chromaticity diagrams can be displayed (CIE1931, CIE1960 and CIE1976 chromaticity diagram) (as is shown in Figure 4.4), as well as white class (as is shown in Figure 4.5), color index radar graph (as is shown in Figure 4.6), color index histogram (as is shown in Figure 4.7). The position of the measured color coordinates will be shown on the chromaticity diagram. The user can slide a finger on the screen to see the three CIE color

coordinates under thespecific chromaticity diagram; white light binning built-in couple of group data, user need toedit their own choice; CRI classify into the radar and histograms.; TM30 and the parameters related to the TLCI are shown in Figure 4.8 and 4.9.

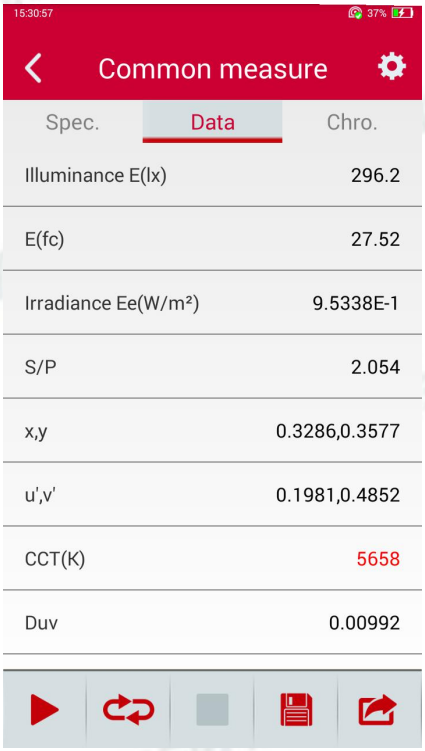


Fig 4.3 Data display interface

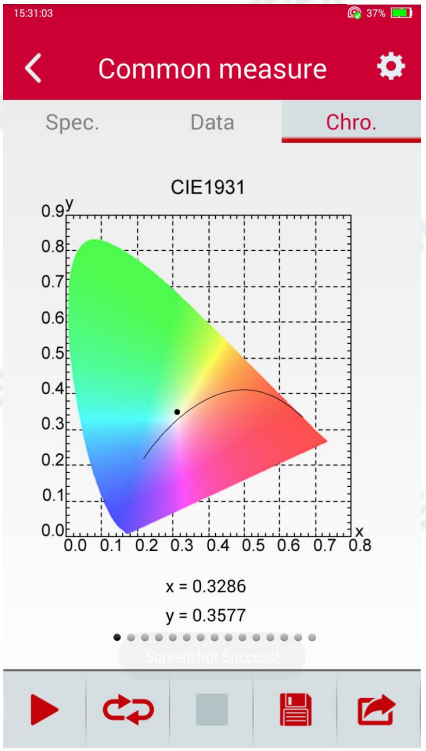


Fig 4.4 Chromaticity diagram interface

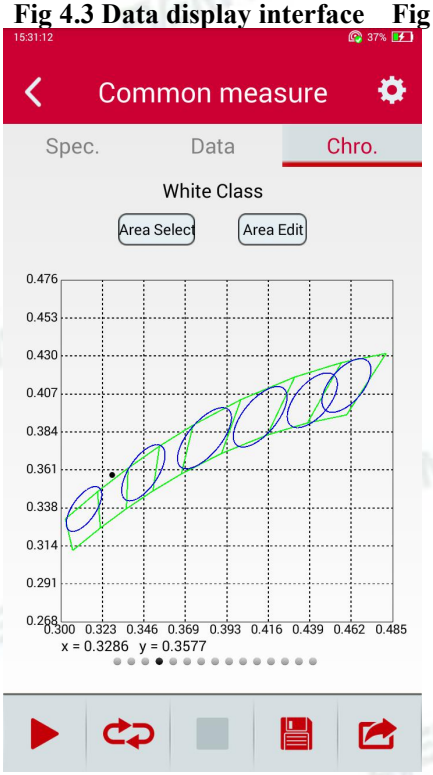


Fig 4.5 White class

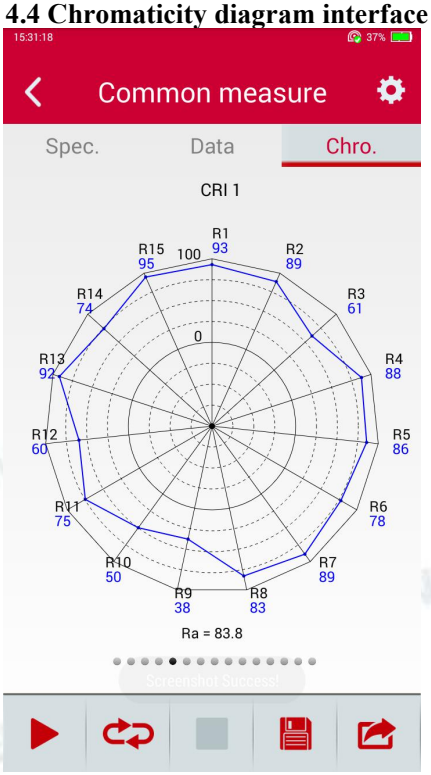


Fig 4.6 CRI1

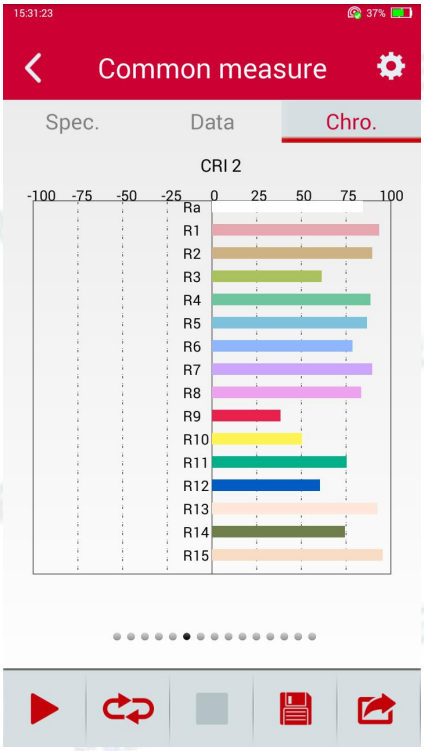


Fig 4.7 CRI2

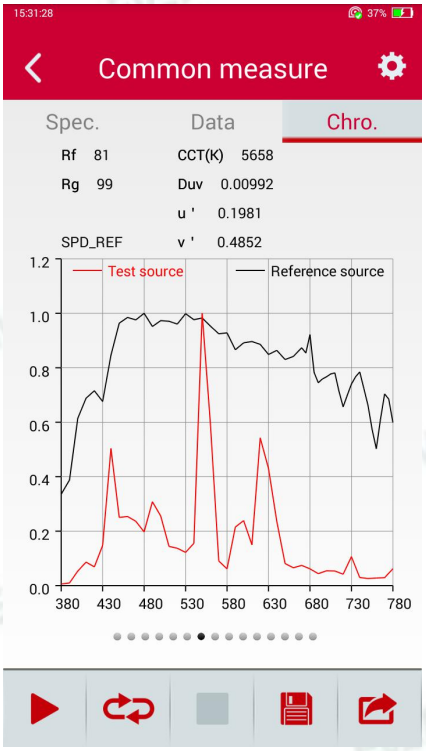


Fig 4.8 TM30 related parameters

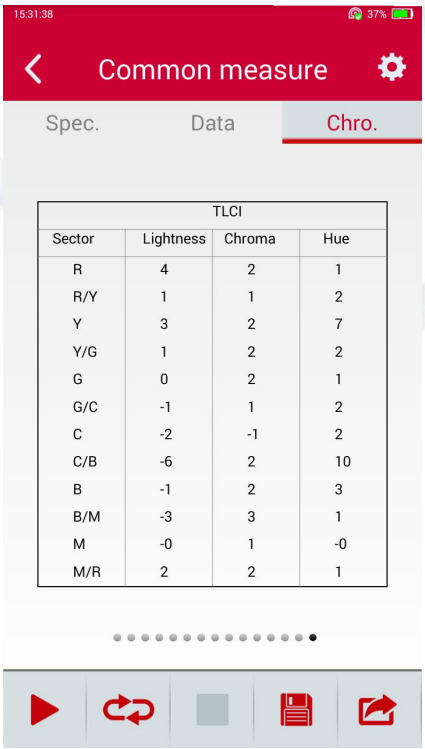


Fig 4.9 TLCI related parameters

The control operation column consists of five parts: single test, cycle test, stop test, save and share.

- Single test button: click to start a single test.
- Cycle test button: click to start cycle test.

➢ Stop button: click to terminate the test.

➢ Save button: click to save the test data.

➢ Share button: click to send test data to the designated mailbox, as shown in Figure 4.10.

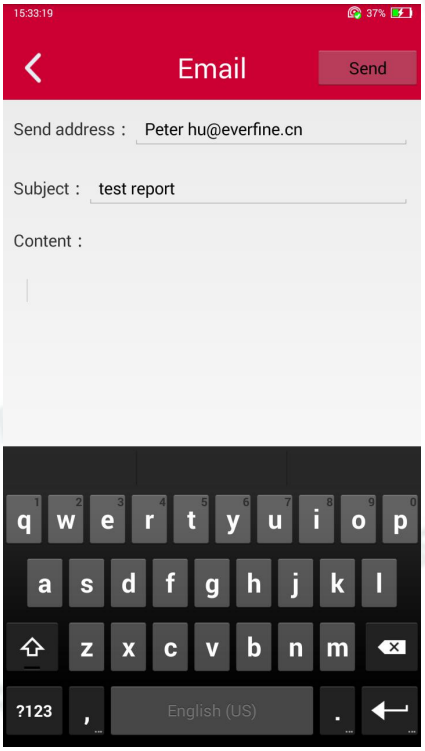


Fig 4.10 Send test data by mail

➢ : Test settings button: set the measurement mode, save mode, integrating time and so on.

➢ Area Select：In the interface of Fig 4.5, click "Area Select" to enter inteference in Fig 4.11, user can tick before the name of the designated area.

➢ Area Edit： User can delete or add areas (shown in Fig 4.12) in the Area Edit interface. Click "Add" to enter the Area Select interface (shown in Fig 4.13), there are two types of areas: Polygon and ellipse areas. Polygon area is composed of multiple vertexes, which can be edited by enter each vertex x, y coordinates in turn, and then save (shown in Fig 4.14) in edit mode; ellipse is determined by ellipse parameters (a11, a12, a22), the center coordinates (x0, y0) and the SDCM value, and the edited parameters can be saved(shown in Fig 4.15). Press "Count" to set the grids for X and Y axes, generally, set 8 for X axis and 9 for Y axis(shown in Fig 4.16).

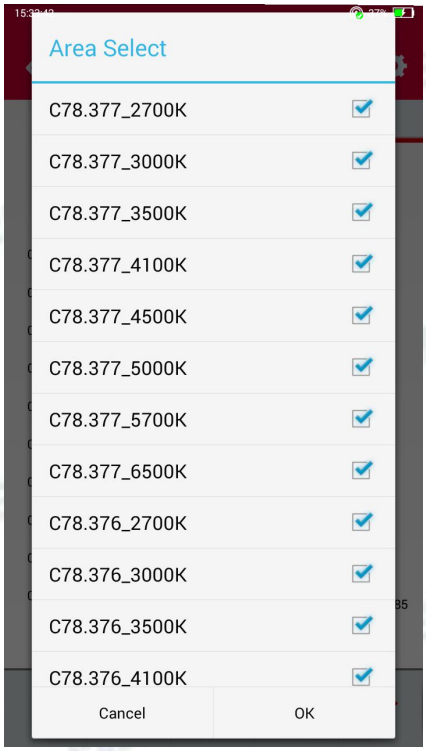


Fig 4.11 Area select interface

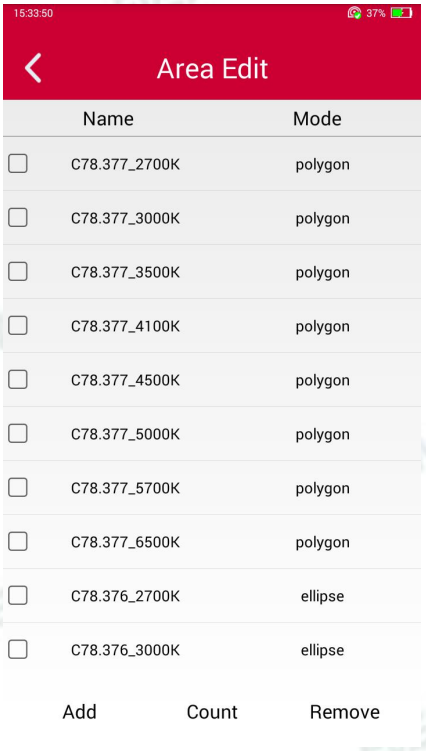


Fig 4.12 Area edit button

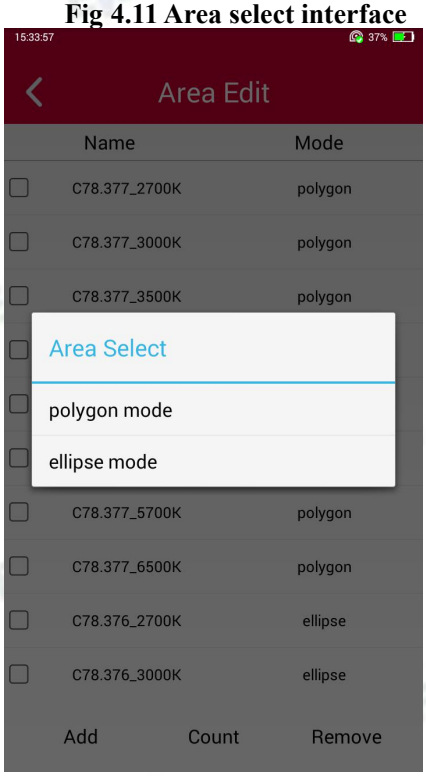


Fig 4.13 Area type select interface

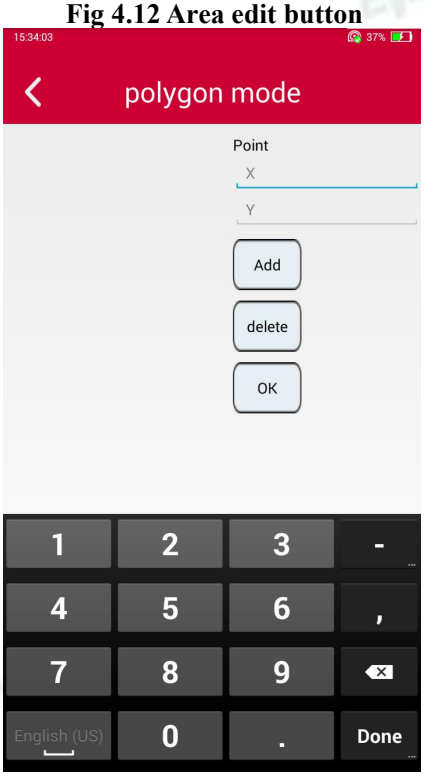


Fig 4.14 Polygon mode area edit

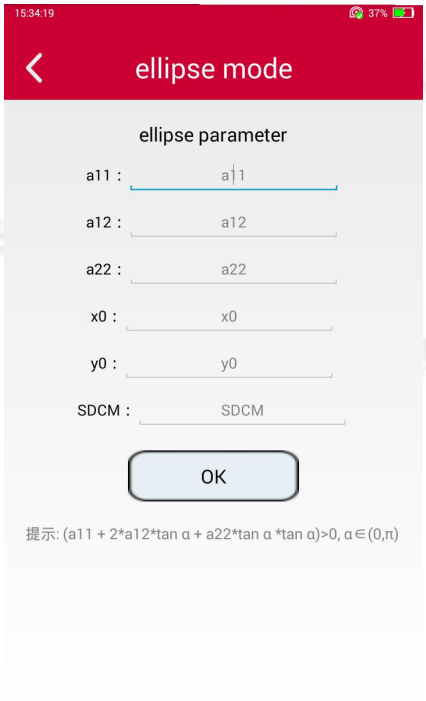


Fig 4.15 Ellipse model area edit

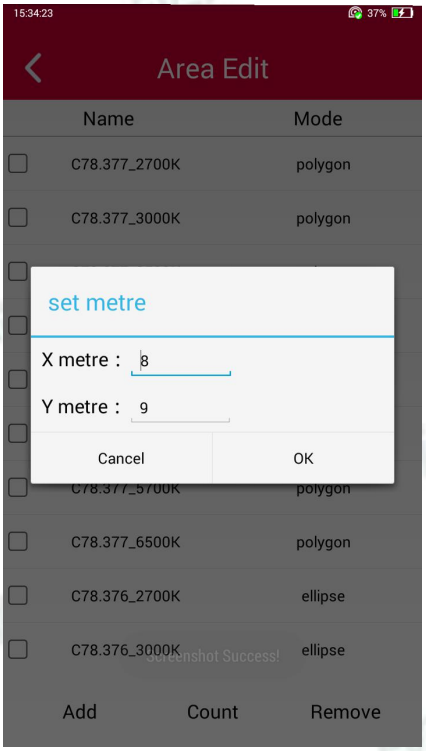


Fig 4.16 Grids Setting

4.3 Continous measurement

Test the change of parameters in a period, the test result is as shown in Fig 4.17, click the drop-down list of the observation parameter to select the parameters concerned and the maximum value, the minimum value, the average and test time will be displayed. Check the parameter value at the designed time by moving the cursor.

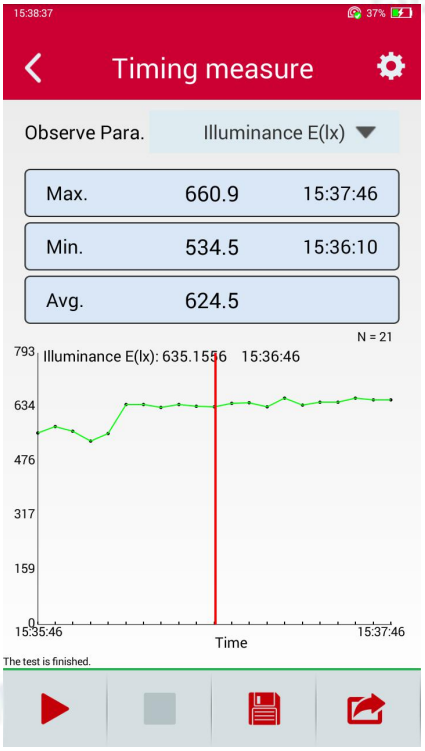


Fig 4.17 Continue measure interface

4.4 Comparing measurement

In the comparing measurement mode, the difference between the tested sample and the standard sample will be tested. The data of the standard sample data source can be directly selected from the saved comparing measurement files, or it can be obtained through direct measurement. Select the standard sample as shown in Fig 4.18, select the standard sample file and click OK. Click the test button in the control operation column to start the test of the tested sample. The upper part of the data bar is the standard sample data, and the lower part is the test sample data. Move the cursor to check the absolute spectral data of samples (standard samples and tested samples).

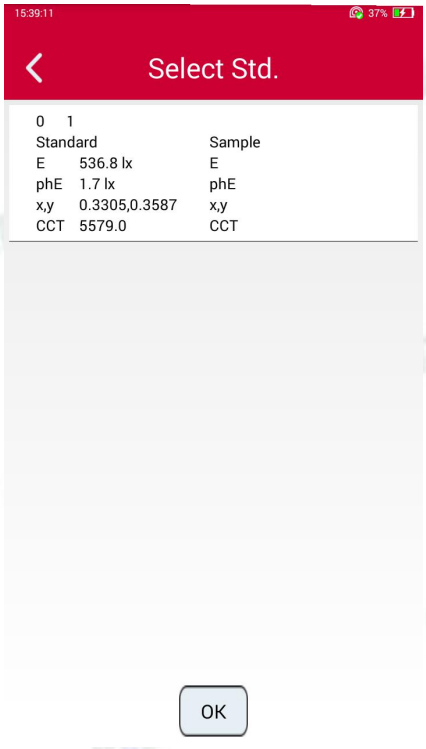


Fig 4.18 Select standard samples interface

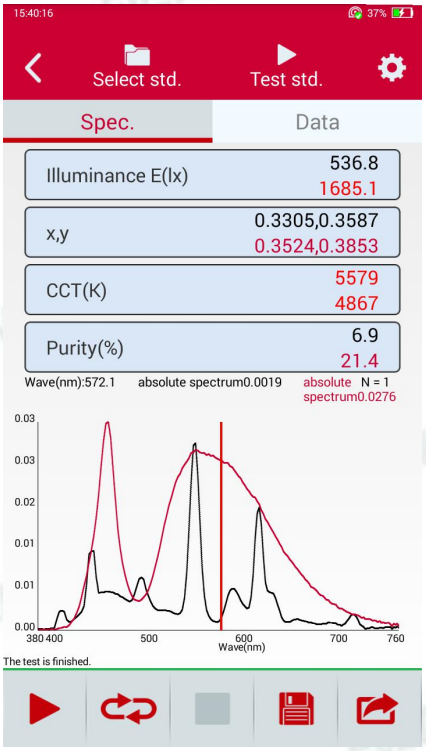


Fig 4.19 Compare measure interface

4.5 Setting

Setting menu functions include test setting, system setting, zero setting and about. The calibration functions of spectrum and illumination calibration are only available in the advanced mode, by entering the password in system setting,.

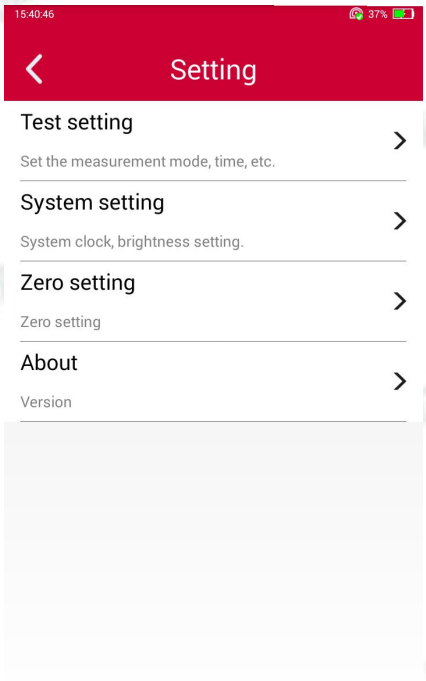


Fig 4.20 Setting interface

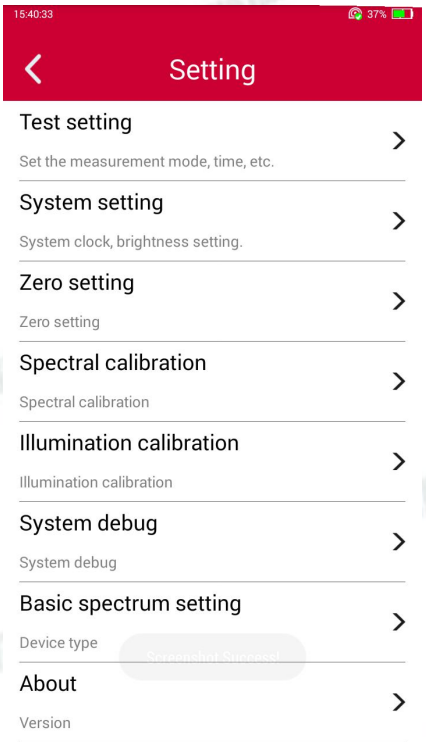


Fig 4.21 Advanced mode setting interface

4.5.1 Test setting

Click "Test setting" to enter test setting interface (as is shown in Fig 4.22).

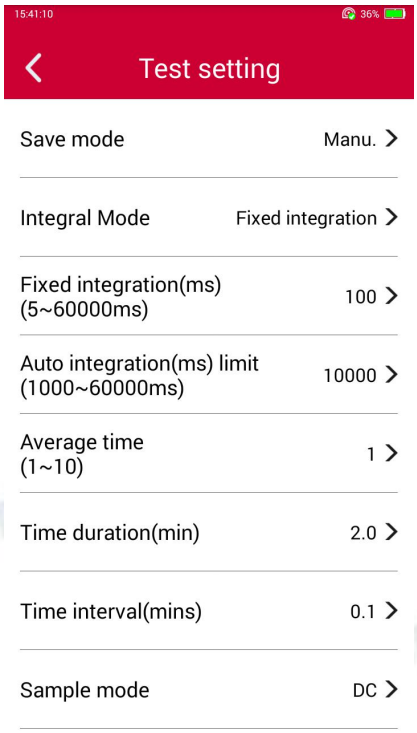


Fig4.22 Test setting interface

a. Save mode：Manual save and auto save。

Manual save：Users need to click "  " to save the test results.

Auto save：After the test is completed, the data will be automatically saved.

Note: Long time use of auto save mode will make SD memory card data overflow and can not be saved. Please use it prudently.

b. Integration mode：Auto integration and fixed integration

Auto integration： When testing, the instrument automatically selects the appropriate integral time according to the intensity of the light signal.

Fixed integration：User sets the integral time according to the intensity of the measured light signal.

c. Integral time： The setting is valid when the fixed integral is selected. It is suggested that users set the integral time according to the intensity of the measured light signal.

Note: When selecting the integral time, on one hand, the signal should be ensured not overflow, on the other hand, the signal can not be too

small, otherwise the accuracy of the test will be affected. The basis for judging whether the time of integration is appropriate is that the Ip value on the data display interface is more than 50% namely more than 30000 on the data display interface. When the Ip value is small, increase the integral time and when Ip value is too large, reduce the integral time.

d. Automatic integral upper limit: When selecting automatic integration, the upper limit of integral time can be set to 1000~60000ms.

e. Average times: Set the average times of tests, the software will automatically calculate the average as the current measurement result .

f. Timing measurement time: Set the total test time under the timing measurement function.

g. Timing interval: Set the time interval between the two measurements under the timing measurement function.

h. Qualification: User define the file including the upper and lower limits of parameters , and when the test is completed, the qualification will be judged according to the file selected by the user. The parameter falling outside the limit range is marked in red. As Fig 4.23 and Fig 4.24 shows is the editor interface and and the "file select" interface.

Fig 4.23 Editor

Fig 4.24 File select

4.5.2 System setting

Click "System Setting" to enter the system setting interface (as is shown in Fig 4.25), user can set the language, advanced mode, date, time, black light and other operations.

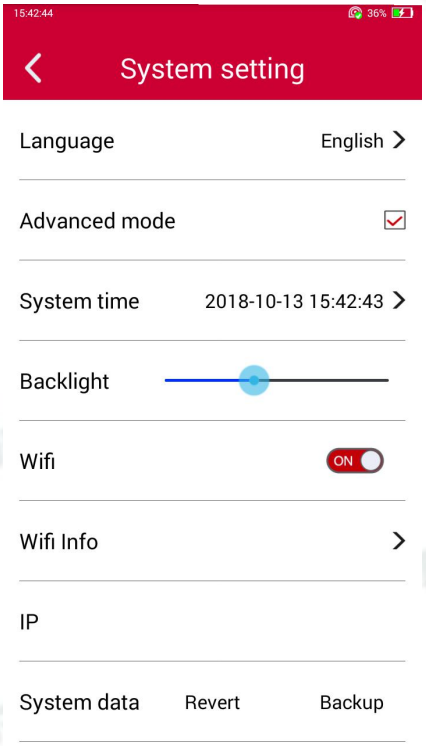


Fig 4.25 System setting

12) Language: Chinese and English are included.
13) Advanced mode: there are common mode and advanced mode. The default setting is common mode. The advanced mode need to be selected in Fig. 4.25. when selecting the advanced mode, user need to type the password of "1234" correctly and "spectral calibration" and "illumination calibration" will be added in the setting menu. The advanced mode is mainly used for spectral calibration and illumination calibration and the related information is shown in Chapter 4.8 and Chapter 4.9.
14) System time: Click to modify the current date and time of the instrument.
15) Backlight: Slide the cursor to adjust the brightness of the instrument screen.
16) Wifi: Wifi switch, turn off WIFI without using wireless network, which can increase standby time.
17) Wifi Info: Wireless network information, current router account and

password connected to instrument, and automatically assigned IP addresses are displayed after the connection, as shown in Fig 4.26.

18) System data: SD card built in the instrument saves dedicated calibration data files. The content in file will be modified in the operation of spectral calibration, zero correction. The system data has one key backup and one key restore function, and has backup data before leaving the factory (the name is Factory data). Users can back up the system data files on their own one button: click "backup", enter the name and confirm, then the backup data files will be saved in the SD card. In the advanced mode, the "restore" button will appear on the right side of the Backup button (as shown in Fig 4.25), and click the backup file name to complete the restore operation (as shown in Fig 4.27). The backup data or the backup data generated by the user can be selected when the Backup button is restored.

Note: it is necessary to restart the instrument after reduction.

19) Bluetooth: a bluetooth communication mode (in the advanced mode) is also provided when the detector is dismounted from the main unit, as shown in Fig 4.28. When the Bluetooth of the detector is searched, the pair can be completed by clicking the connection.Usually, the detector and the main unit are paired when they are out of the factory.
20) Dormancy time: Set the automatic dormancy time of the instrument.
21) Detector power: Displays the percentage of the detector power. Generally, the detector needs to be charged when the power is less than 20%. The dector is charged by the main unit when it is connected to the main unit. the main host is used to charge the probe, while the main unit needs to be charged through the equipped charger.
22) Server configuration: The information required for the first authentication of the instrument and the update of the software version, as shown in Fig 4.29.
23) Sample information: The added test information when saved test file generates the PDF file, as shown in Fig 4.30.

Note: Insufficient dector power will result in communication failure or data abnormity. The detector power can be viewed in the system setting.

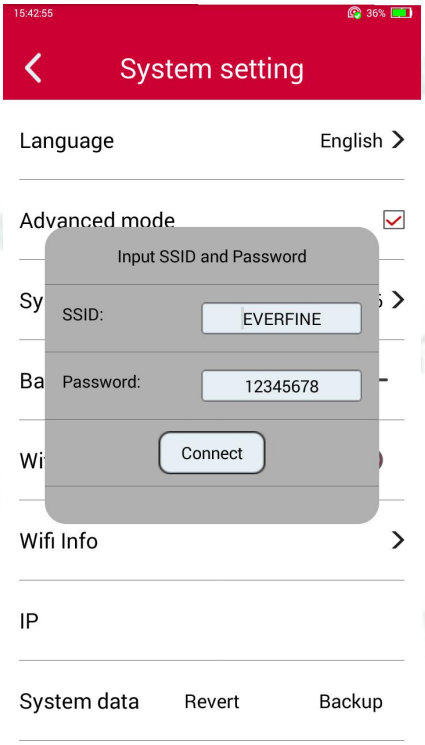


Fig 4.26 WIFI connection

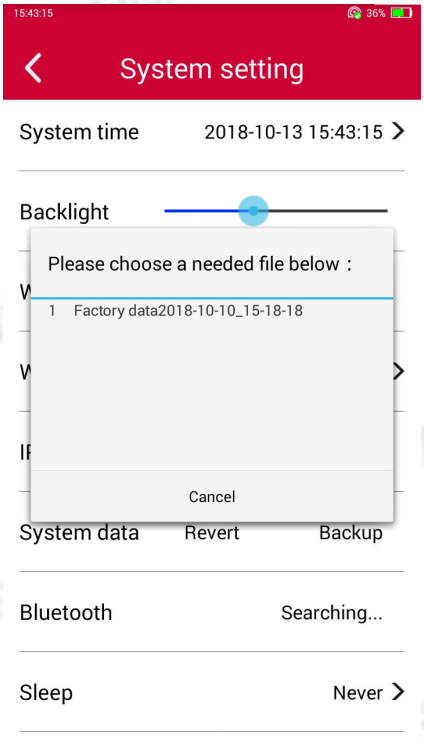


Fig 4.27 Reduction of factory calibration data

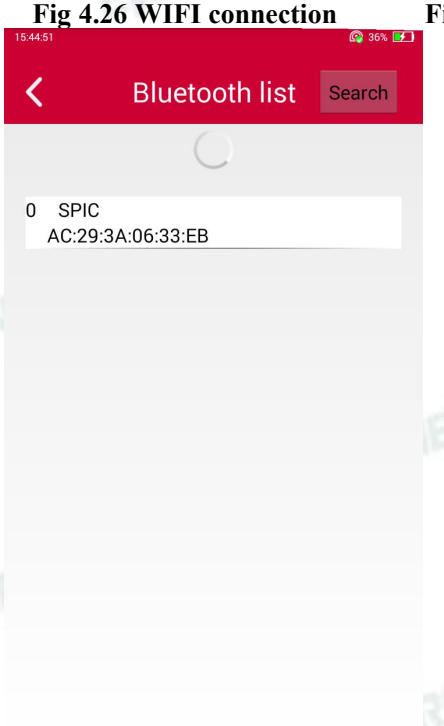


Fig 4.28 Bluetooth search

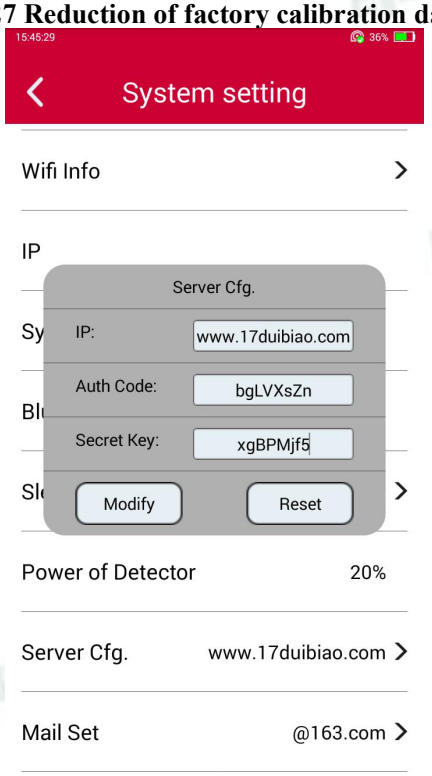


Fig 4.29 Server configuration

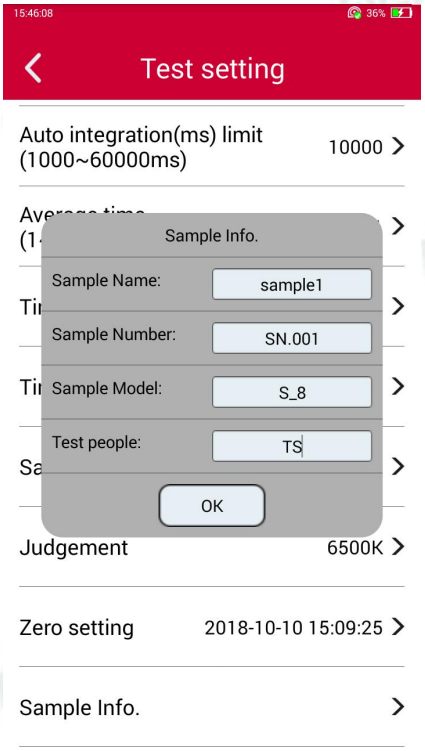


Fig 4.30 Sample information

4.5.3 Zero setting

Click "Zero setting" into the zero setting interface (as shown in Fig 4.31). Before zero calibration, cover the probe and click the "start". The progress bar in the interface shows the progress of zero calibration. If there is a mistake in the zero process, there will be corresponding prompt information. If you want to stop the current zeros, click the stop button.

Special Description: in order to get higher precision, it is suggested that the user should do the instrument zero setting before the formal measurement or calibration. Before the zero, the equipment should be preheated for no less than 5 minutes after being opened or wake-up.

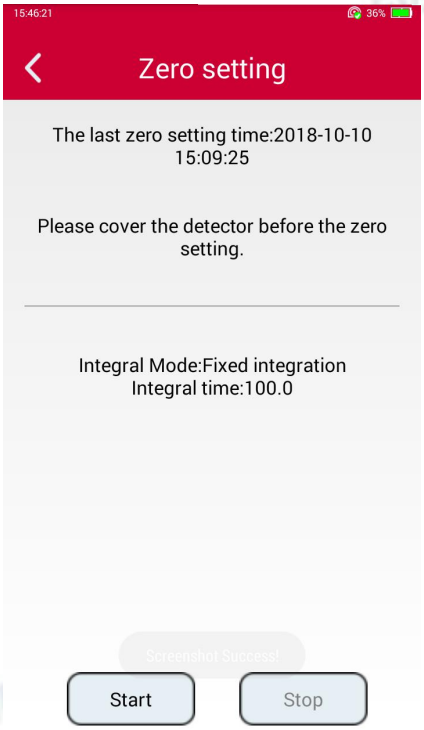


Fig 4.31 Zero setting interface

4.5.4 About

Enter the version information interface to view the company information, the instrument number (that is, the host number), the detector number, the instrument application version, the detector software version, the Android platform version, the kernel version (as shown in Fig 4.33). When the instrument connects to the network, click to upgrade the software, check the latest version software and carry out the online upgrading function.

Fig 4.32 About interface

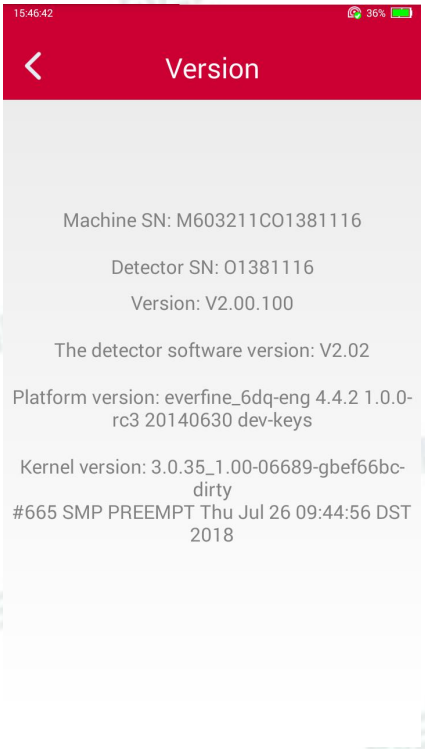


Fig 4.33 Version information

4.6 File management

Click "File management" into the file management interface. The file management interface is composed of three parts: file title, file information and operation key, as shown in Fig 4.34. File saving is divided into three file modules, common measurement, continuous measurement and comparing measurement, and click the title bar to switch the list of files saved.

File Titles: The saved documents of common measurement, continue measurement and comparing measurement are stored separately and displayed separately.

File information bar: Displays the description information and main parameters of the file.

The key on the bottom of the file management interface is to open the saved file. At this time, the file list is a single selection. The user can select a file and click the "open" button. The software will return to the main interface and display the data saved by the selected file; the key on the bottom of the file management interface is to delete file, select a file and click to delete. Long press a file, enter file delete multiple selection mode, as shown in Fig 4.35, after selecting a number of files, click "delete" button, the software will delete the selected file, the deleted file can not

be restored, please operate prudently. Press the button , file generates PDF report, click sharing function button to send PDF file.

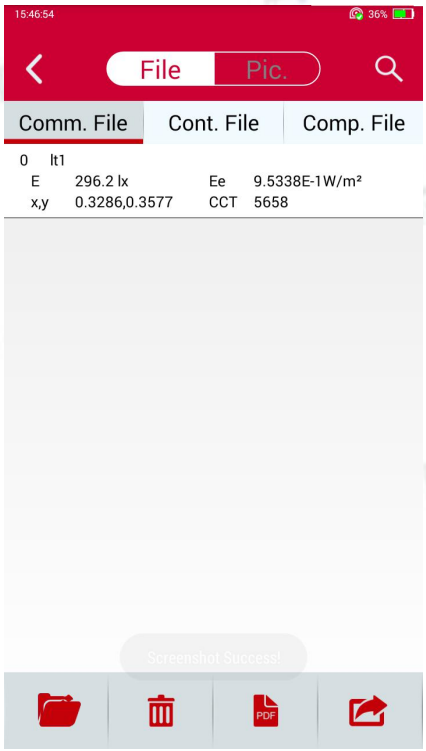


Fig 4.34 File management interface(a)

Fig 4.35 File management interface(b)

4.7 Knowledge

The knowledge module introduces the definition of optical parameters, application scenarios, the parameter can be viewed by sliding up and down on the interface, as shown in Fig 4.36.

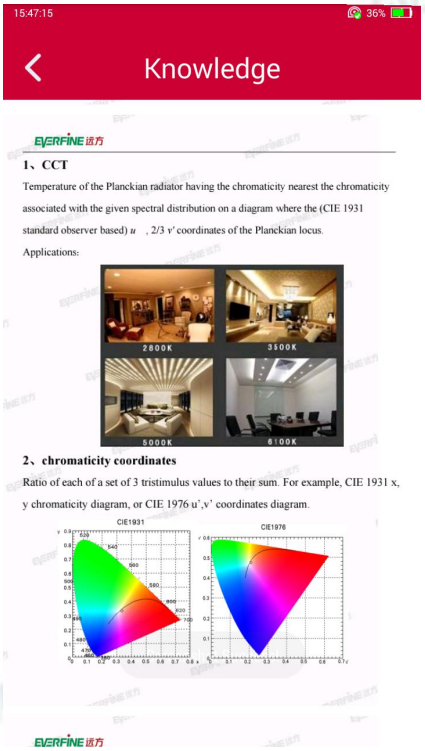


Fig 4.36 Knowledge interface

4.8 Spectral calibration

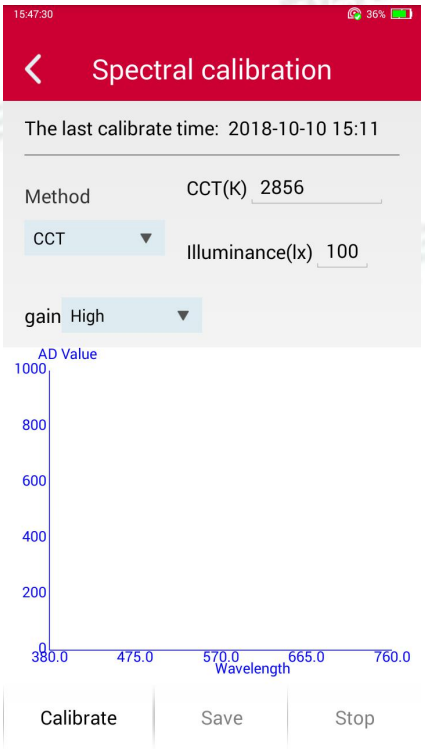


Fig 4.37 Spectral calibration interface

Referring to the 4.5.2 section, click the spectral calibration menu, then enter into the calibration interface, as shown in Fig 4.37, input the correlated color temperature and the illuminance value which is required by calibration condition, and then click the

calibration. Click "Save" to complete the spectral calibration.

Note: Before spectral calibration of the instrument, do zero setting after warming up. Spectral calibration will directly affect the measurement accuracy, only professionals can operate this function.

4.9 Illumination calibration

Refer to the 4.5.2 section, enter the advanced mode, select the illumination calibration function as shown in Fig 4.38. Input the standard illumination of the standard light, and then click " calibration" to complete the illumination calibration. After the calibration is completed, the value of the illuminance test value can be checked by clicking the "inspection" button.

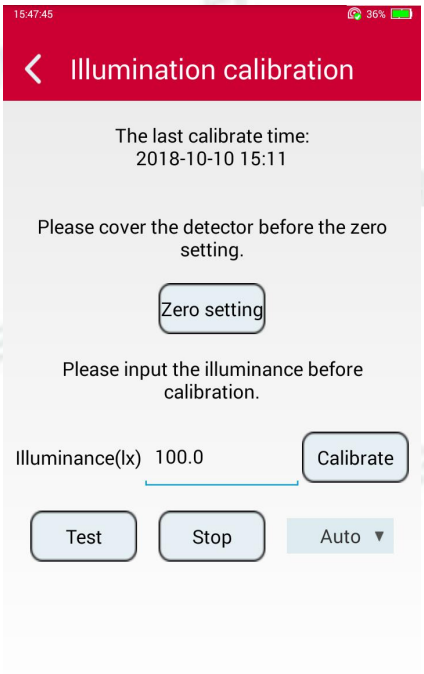


Fig 4.38 Illumination calibration interface

Note: Before illumiance calibration of the instrument, do zero setting after warming up.illumiance calibration will directly affect the measurement accuracy, only professionals can operate this function.

4.10 communication with PC

The instrument can be communicated with PC by USB and WIFI.

USB communication mode: connect the USB interface to the computer, and connect the TPC interface to the instrument.

WIIF communication mode, the instrument end and the PC connect to the same router, then the communication is aveilable, the login instrument interface is shown in Fig 4.39.

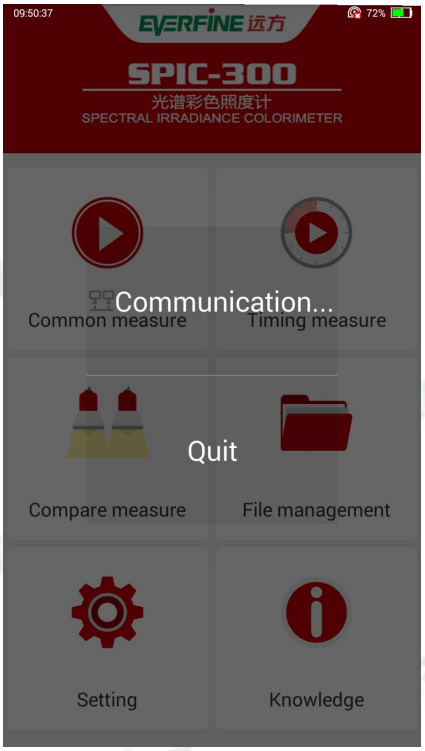


Fig 4.39 Login interface

Chapter 5 PC Software Instruction

SPICSuite is equipped with PC software. User can download data from the software by USB or WIFI connection and a number of instruments can be set up for network communication and measurement.

The USB cable should be correctly connected or wireless router should be set if user needs remote control of SPIC-300 by PC.

5.1 PC software installation

Remote control soft is equipped with the device.

Note: please check the serial number consistency between the software and the device before installation. If it is not, please contact EVERFINE immediately, otherwise the accuracy will not be guaranteed.

5.1.1 Operating system demands

① Windows XP or updated versions;

② 200 MB or more free space;

③ A CD-ROM driver (only needed for the installation);

④ One USB 2.0 connection port;

⑤ Display resolution: 1280×1024 or more; 1280×1024 recommended.

5.1.2 Software installation

① Please find the naming rules for this software in the file "ReadMe";

② Open SPICSuite installation folder;

③ Under the naming rules, click the corresponding catalog of SPICSuite_V2.00.XXX (XXX is version number)

④ Double-click Setup.exe 

,finish the installation following the procedures.

5.2 Software Overview

5.2.1 Software start

Click "Start Menu", and then find "EVERFINE" in "Programs". Click the icon "SPICSuite_ V2.00.XXX" to start the software.

5.2.2 Main interface introduction

The main interface of SPICSuite software is shown in Fig 5.1.1.

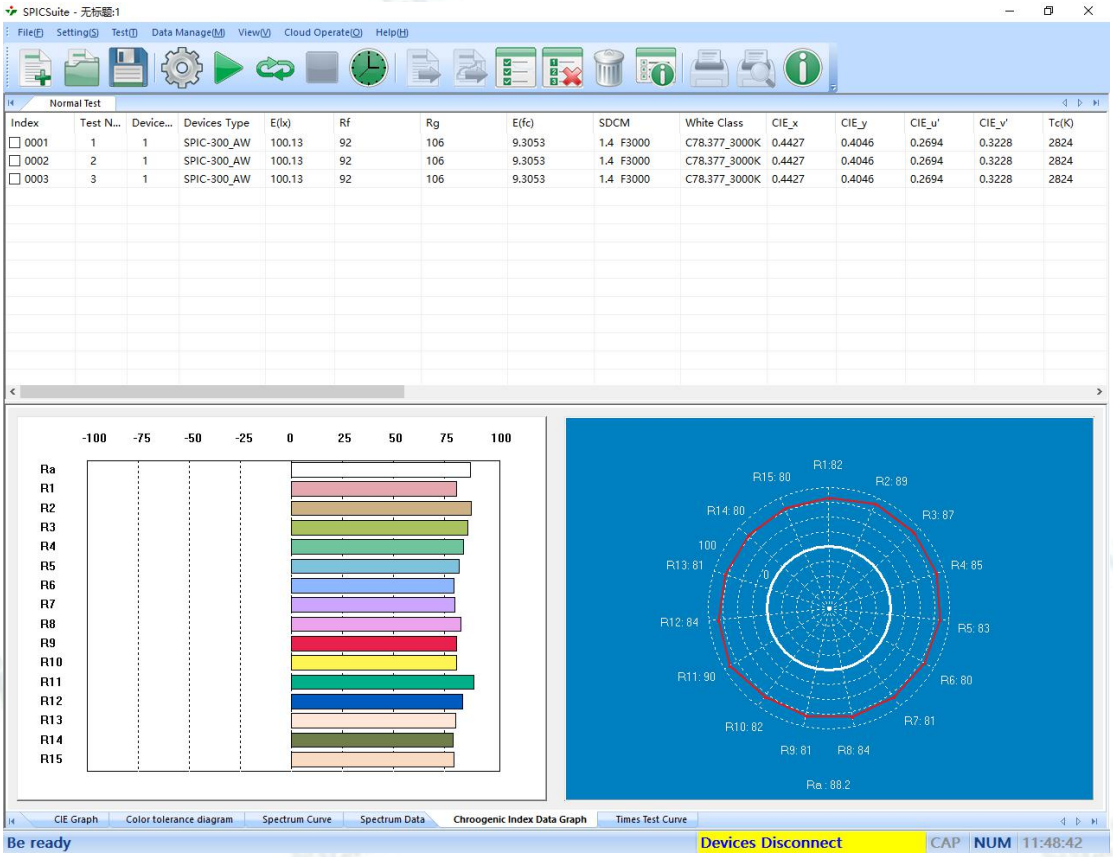


Fig 5.1.1 Main operation interface

Main Menu and **Toolbar**: For the function selection and parameters setting, as shown in Table 5.1.

Table 5.1 Main icons and their functions

Icon	Function	Shortcut
	New files	Ctrl + N （n）
	Open files	Ctrl + O （o）
	Save files	
	Single test	F3

	Continuous test	F4
	Stop test	F5
	Timing test	F6
	System setting	F1
	Delete data	Alt+D
	Export data	F7
	Print	Alt+P
	Print preview	Alt+Y
	Sample information	Alt+S

5.3 Test

5.3.1 System setting

Click "system setting" under "setting", and then the dialog box comes up, as shown in Fig 5.2.

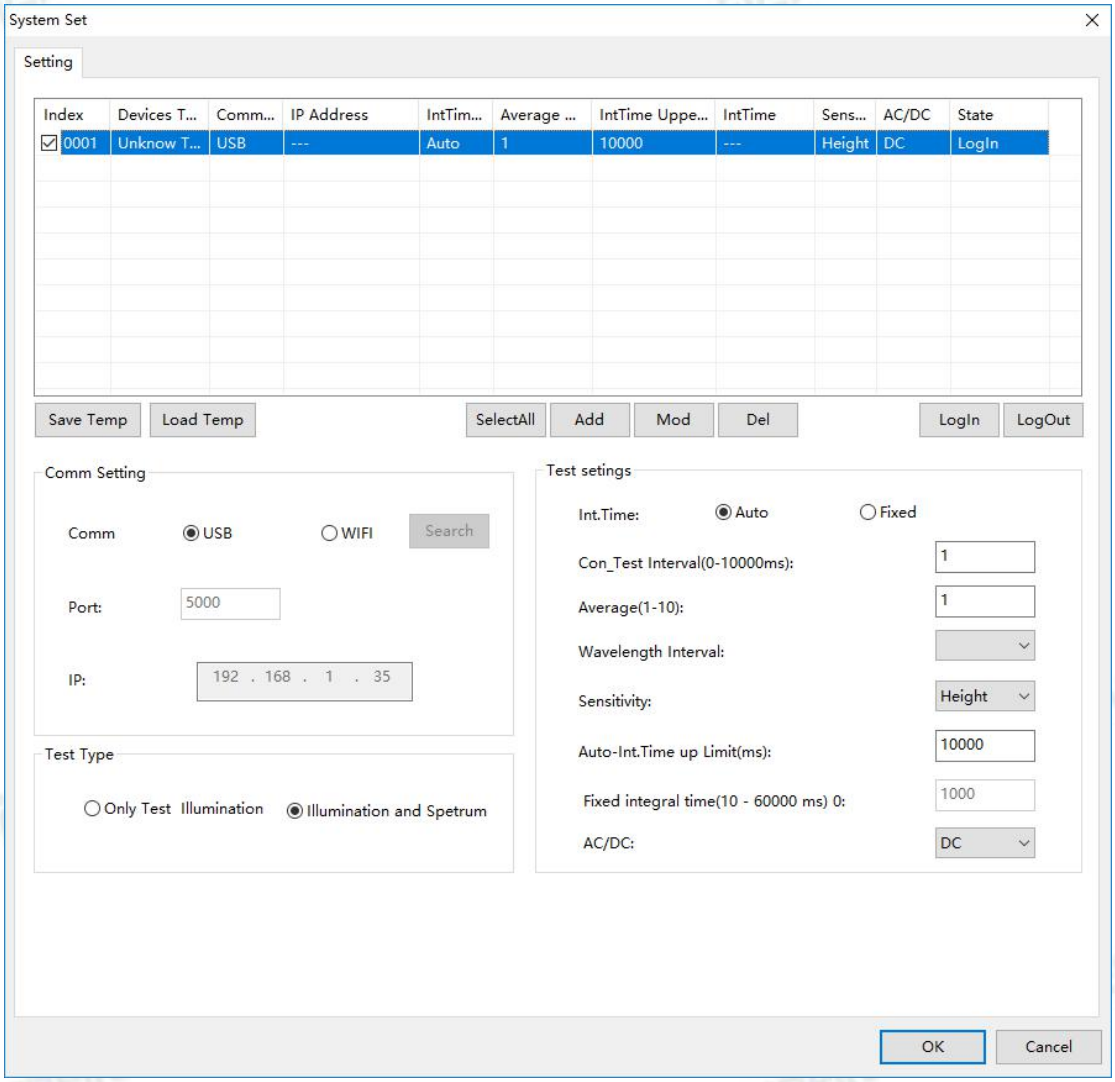


Fig 5.2 Interface of system settings

- Communication mode: Select USB communication or WIFI communication（the equipment need to support WIFI function）;

  USB communication：Click "Add" button first, then click "Login" to connect to the instrument;

  WIFI communication：Click "Search" button first, then click "Login" to connect to the instrument.

  When the state displays "Login", it can start testing.

- Port : if WIFI communication is selected, please set up network port number, whose default is 5000;
- IP: if WIFI communication is selected, please directly click the search function to identify all the instruments connected to the PC terminal and display them in the list.;

- Integration mode：Automatic integration and fixed integration；

  Automatic integration: when testing, the instrument automatically selects the appropriate integration time according to the intensity of the light signal.

  Fixed integration: the user sets the integration time according to the intensity of the measured light signal.

- Time interval for the continuous test: the time interval between every two single tests in the continuous mode;
- Average times: set the average number of tests, the software will automatically calculate the average after many tests as the current measurement results.
- Sensitivity: set the sensitivity gear used in the test.
- AC/DC mode: DC/AC:50Hz , AC:60Hz.

5.3.2 Test

User can start the test accordingly as long as the corresponding setting is completed.

Click "single test" under "test" or "  " or press shortcut F3, and then the device starts single test.

Click "continuous test" under "test" or "  "or press shortcut F4, and then the device starts continuous test. Click "  " or press shortcut F5, and then the device stops continuous test. (Attention: under continuous test, click "Cancel" can also stop the test).

The dialog box of test information will come up automatically after each single test. User can easily edit the information. If user need to modify the information after continuous test, please double click the current test data and the system will pop up the dialog box.

5.3.3 Type diagram

Type diagram includes: chromaticity diagram, SDCM and white light binning, spectrum, color rendering index , respectively as shown in Fig 5.3, 5.4, 5.5, 5.6.

CIE1931, CIE1960, CIE1976 chromaticity diagram are available by the drop-down menu;

SDCM can be automatically judged and calculated the results according to the color coordinates. Right-click the to edit SDCM data; white light binning is based on

the color coordinates to judge the region , then to achieve classification. User can edit in the white binning menu;

Choose absolute or relative spectral spectrum as appropriate;

CRI diagrams are divided into histogram and radar, which reflect the CRI more directly.

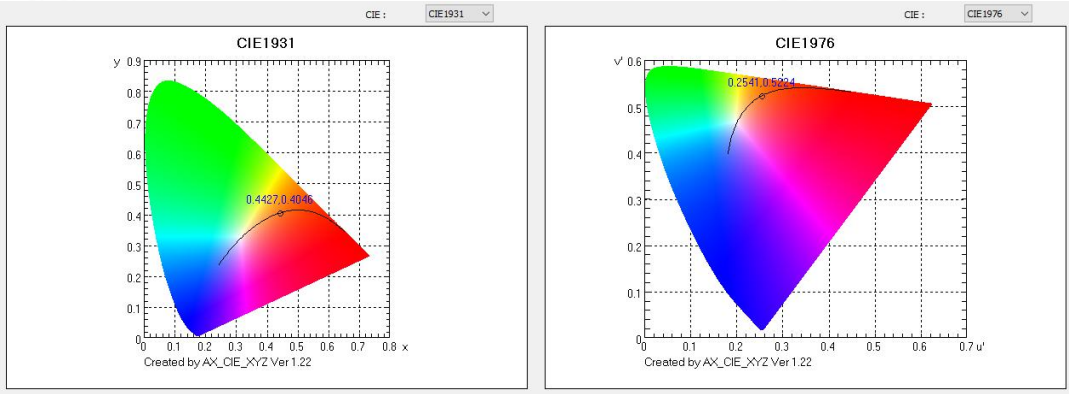


Fig 5.3 Chromaticity diagram1931（left）Chromaticity diagram1976（right）

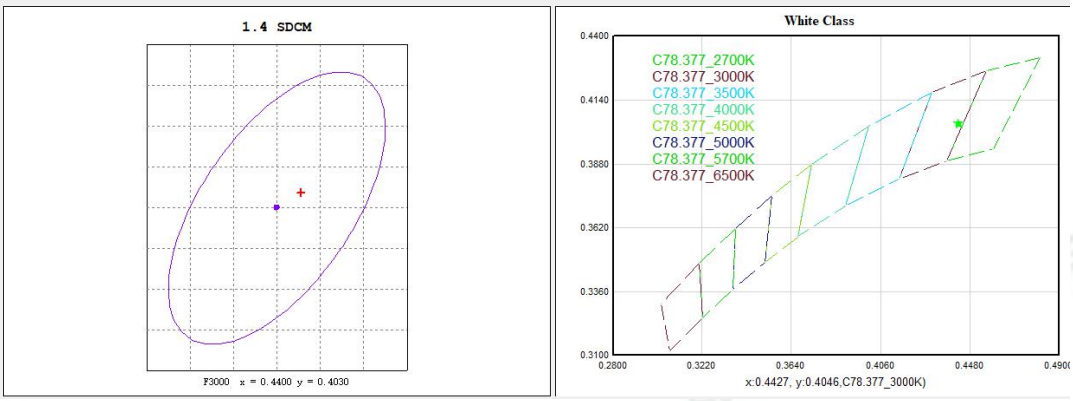


Fig 5.4 SDCM（left）white light binning（right）

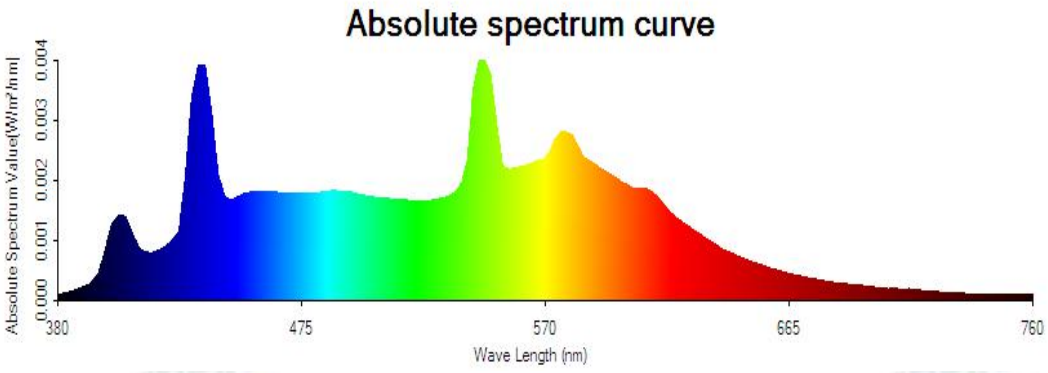


Fig 5.5 Spectrum diagram

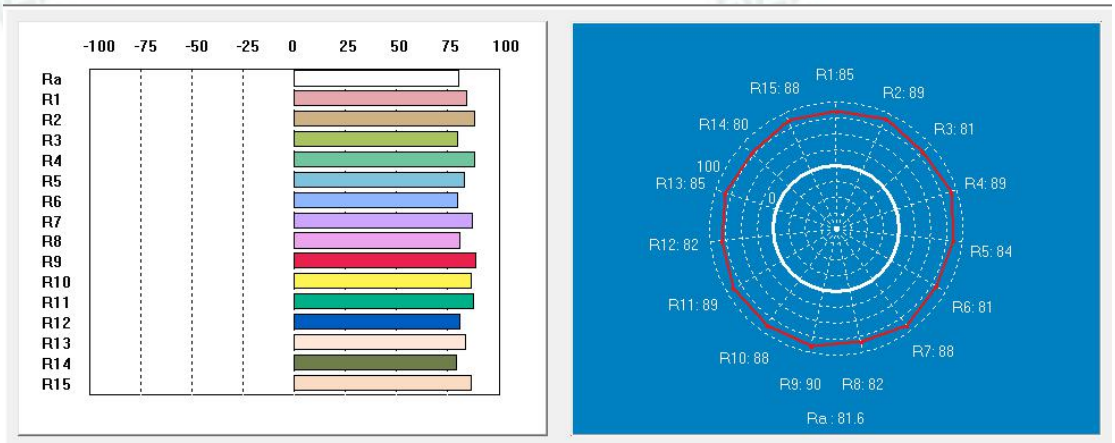


Fig 5.6 CRI histogram（left）radar diagram（right）

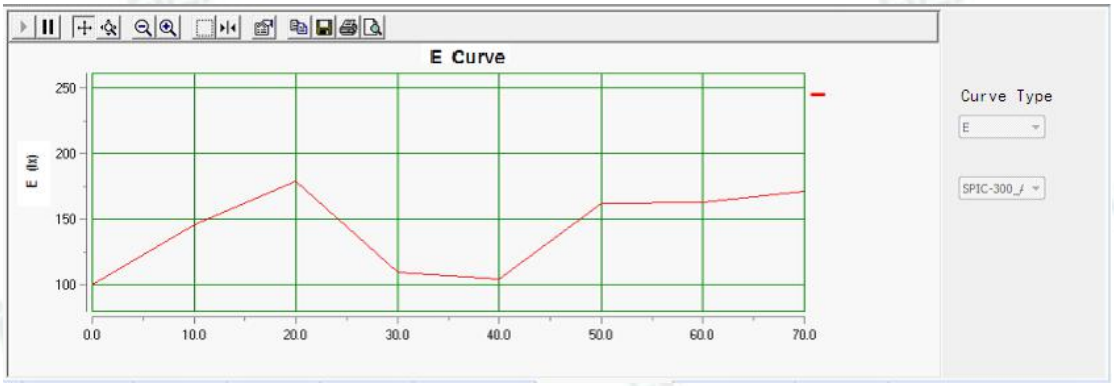


Fig 5.7 Time test curve

5.3.4Test information Modification

User can modify the test information after one single test or when all tests are finished.

Click "sample information" under "data management" or double click the specific data on the data list, and then the dialog box "sample information" comes up, as shown in Fig 5.8. User can modify the relevant information such as "product model", "product number" and so on. The system can enter 20 characters by default. If you need to increase the number of input characters, you can select a "new version" in "Settings", "print options", "report version", and the number of characters you can input is increased to 50.

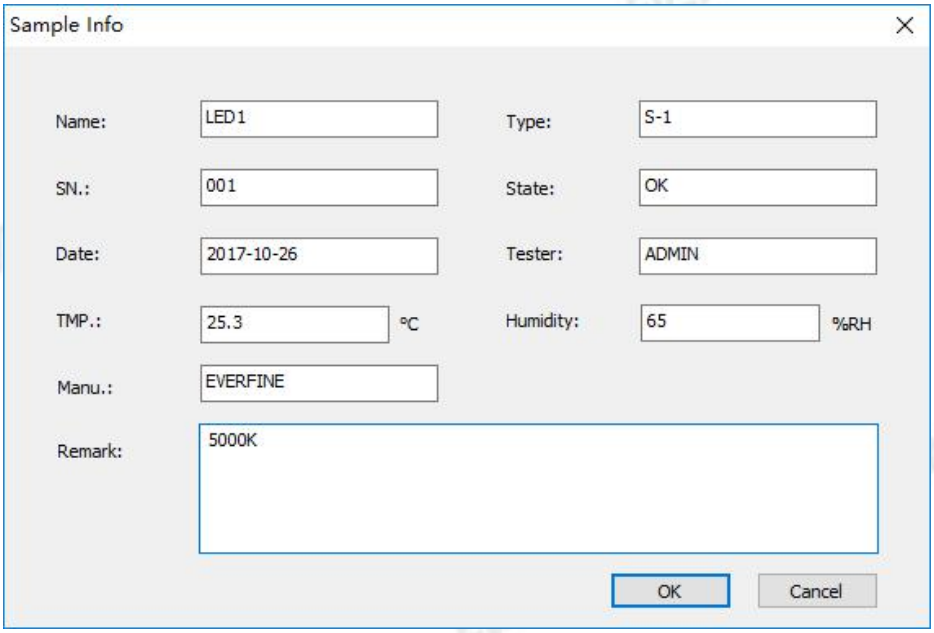


Fig 5.8 Test information

5.3.5 Test result output and print

Click "export data" under "data management" or "  ", then the test results is exported. All the data is saved in corresponding Excel file.

Right click on the CIE chromaticity diagram interface, and then the edit dialog box comes up. Click "Copy to Clipboard" and then click "  " on the spectrogram interface, the chromaticity diagram is copied. Meanwhile chromaticity diagram CIE 1931, CIE1976, SDCM diagram, white light binning diagram can be printed shown in printed reports, as shown in Fig 5.9.

User can print the test results as needed. Please see more detailed information about printing in Chapter 8.

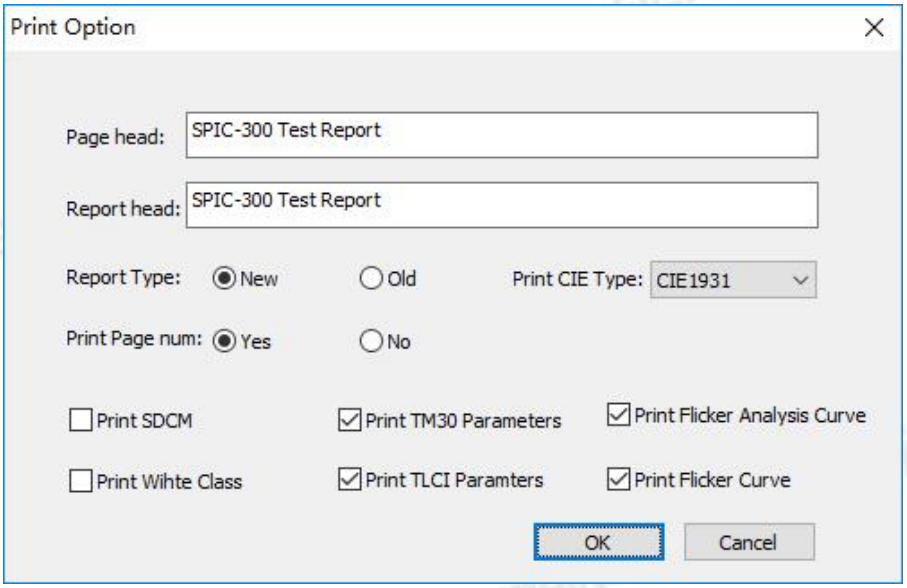


Fig 5.9 Print option

Chapter 6 Instrument Verification

This method is applicable to the verification of the specifications of SPIC-300 spectral irradiance colorimeter.

Besides specification, the instrument do zero setting after turned on or in standby wake no less than five minutes to warm up, than test after the calibration .

6.1 Verification conditions

6.1.1 Working conditions

(1) Ambient temperature: 23°C±1°C；

(2) Relative room humidity:55%RH ± 5%RH；

(3) Indoors without corrosive atmosphere and ensure electromagnetic environment does not interfere with the test results.

6.1.2 Apparatus

Mercury lamp, Thermostatic blue LED lamp, Standard illuminant A, Standard power supply, Optical rail

6.2 Items and methods

6.2.1 Verification of wavelength accuracy

Choose a mercury lamp or laser as the light source, test three times at the spectra line 404.66nm, 435.88nm, 546.07nm and 632.80nm, then figure out each peak wavelength λ_i. Then calculate according to formula 6.1, the deviation should meet the technical specifications of wavelength accuracy shown in Chapter 2.

$$\Delta\lambda = \left|\overline{\lambda_i} - \lambda_0\right| \qquad (6.1)$$

Where $\Delta\lambda$ is the wavelength accuracy, nm;

$\overline{\lambda_i}$ is the wavelength average value of three tests;

λ_0 is characteristic wavelength corresponding to the peak value of the mercury lamp.

Fig 6.1 Wavelength accuracy verification

6.2.2 Verification of chromaticity coordinates accuracy

Preheat SPIC-300 and standard illuminant A for 30 minutes first. Then calibrate SPIC-300 with the standard illuminant A to get the standard spectrum. Maintain the working conditions for standard A, then measure the chromaticity every 2 minutes. After 3 runs, calculate the accuracy according to (6.2). The result should be consistent with the specifications in Chapter 2 under standard illuminant A.

$$\Delta u = \left| \overline{u_i} - u_0 \right| \qquad (6.2)$$

Where Δu is the chromaticity coordinate accuracy under standard illuminant A;

$\overline{u_i}$ is the average value of chromaticity coordinate for 3 tests;

u_0 is the standard value of chromaticity coordinate of standard illuminant A.

6.2.3 Verification of photometric channel linearity

The illuminance value is measured on the optical rail. By moving SPIC-300 to different distances (e.g. 1m-6m), the illuminance value Xi can be measured at each distance. The standard illuminance value Bi at different distances is calculated by the photometric distance law referring to the standard illuminance value B0 at 1m. Then calculate the photometric channel linearity according to (6.3). The result should be consistent with the standards in Chapter 2.

$$r = \frac{1}{n}\sum_{i=1}^{n}\left|\frac{X_i - B_i}{B_i}\right| \times 100\%, \quad B_i \neq B_0 \qquad (6.3)$$

Where r is the photometric channel linearity error; Xi is the measured value; Bi is the standard value; n is the measurement times.

6.2.4 Verification of stray light

With the standard illuminant A as the light source, set up the sensitivity to "low" and choose 450nm as the working wavelength. After zero calibration, take down the peak value AD0（AD0>55000）and calculate the average value after 10 runs. Put an optical filter whose cutoff wavelength at 510nm on the incident light path, and take down the average value AD' around 450±5nm. Then calculate the percentage of stray light according to (6.4).

$$SL=AD'/AD_0\times100\% \qquad (6.4)$$

Where SL is the percentage of stray light; AD0 is the peak value of spectrum; AD' is the value at chosen wavelength (around the range of cutoff wavelengths).

Chapter 7 Common Faults

Common Faults

1. It prompt that the USB device can not be recognized, when the SPIC300 connects with computer by USB .

Solutions:

a. Check whether the USB port of the computer is OK. User can check it by USB device. If it also can not be recognized, please change a USB port of the computer.

b. Check the USB communication cable, and make sure the USB communication cable is well. Change a USB cable or wire other USB device with this cable.

2. The spectrum signal is weak or it can not be test.

Solutions:

a. Check whether it is in a right way when testing the dark current. And please do zero calibration again, refering to the section 4.2.3.

3. Communication failed.

Solutions:

check if the power switch on the side of the detector is off, press it to switch on.

4. Measurement failed through the blue tooth

Solutions:

a. Remove the obstacle between the main unit and the cell phone, or shorten the distance of them to ensure the blue tooth signal unimpeded

b. Click the "Bluetooth ini" under the menu "System Setting", rematch the main unit and the detector, refer to section 4.2.4 for details.

c. The power of the detector is low(the indicator is off or the orange light is flashed), and please connect it with the main unit and charge it with the power.

5. Measurement failed through theWIFI communication.

Solutions:

a. Exit the remote mode, and reconnect the WIFI.

b. Reconnect the WIFI after the test is finished on the main interface.

Chapter 8 Typical test report

SPIC-300 Test Report 1/5

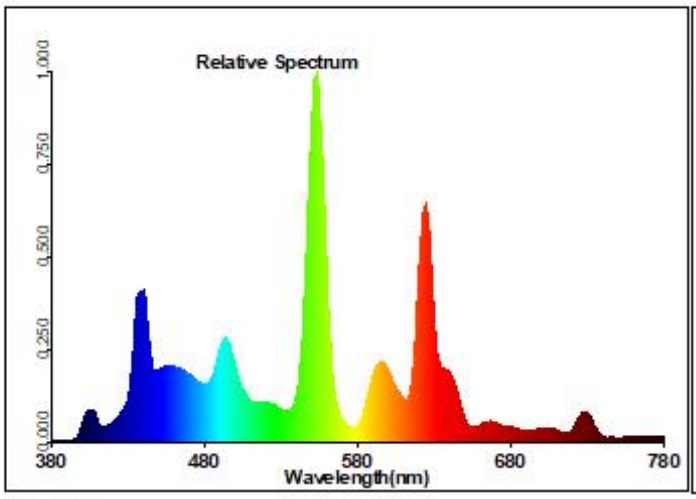
SPIC-300 Test Report

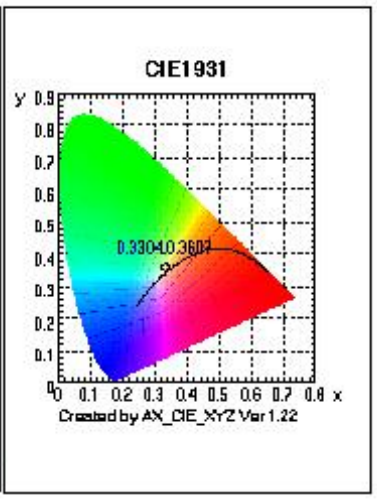
Sample Info:

Name:sample1 Model:S-1
SN:001 ManuFactrory:EVERFINE
Date:2018-10-15 09:55 Tester:ADMIN
Temperature:25.3 Deg Humidity:65 %RH
Remark:------

Meter State:

Test Meter: SPIC_A
IntegralT: 233.117 ms PeakAD Ip: 43584.7 Average times: 1





Test Params:

E= 476.4 lx	E(fc)=44.2748 fc	E_e=1.500e+000 W/m2	
CIE-x= 0.3304	CIE-y= 0.3607	CIE-u'=0.1982	CIE-v'=0.4869
CCT=5585 K	Lp=545.0 nm	HW=12.8 nm	Ld=396.9 nm
Pur=7.5 %	RedRatio(%)=18.5	GreenRatio(%)=75.7	BlueRatio(%)=5.7
DUV=0.0106	S/P=2.03		
Ra=83.3	R1=93	R2=89	R3=61
R4=88	R5=86	R6=78	R7=90
R8=83	R9=35	R10=49	R11=75
R12=59	R13=92	R14=75	R15=95

SDCM=12.2(F5000)

White Class:OUT

