

ATP9101 Handheld Miniature FieldSpec User Manual



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1 Summary

ATP9101 handheld miniature fieldspec is the latest product of Optosky ,with a wavelength range of 400-950 nm, which can be used for various environmental uses such as online testing.

ATP9101 spectrometer measures the spectrum with a fast, accurate, nondestructive, and contact-free method, and it is a true handheld miniature field spectrometer. It is with built-in battery, easy to carry, easily connected to a mobile phone or computer, minimizing time to collect data in the field, and making the best quality of the measured spectrum. ATP9101 is flexible and durable ,achieving laboratory-grade results in remote sensing and analytical applications, whether in different orientation measurements and in different environments.

2 Technical Indicators and Characteristics of Instruments

| order number | article |
|--------------|--|
| 1 | Handheld Miniature Fieldspec Host; Detector: wire array CMOS sensor; CCD: 512 pixels; Spectral range: 400-950 nm; Spectral resolution: <4nm@811nm; Length accuracy: ± 0.5 nm; Wavelength repetition: ± 0.3 nm @ ± 10 °C temperature change; SNR noise ratio:> 300:1; Spectral sampling interval: 0.98 nm; External size: 8040175mm; Weight: 0.5Kg; Temperature / humidity range: -10°C~45°C (working status), 20°C~65°C (storage status); <90%RH; Battery life:> 6h Waterproof: IP65 |
| 2 | Standard probe The standard probe for the field series spectrometer is equipped with an SMA interface and the M120.5 threaded holes to connect the optical fiber respectively. Characteristic: Small and light |

| | |
|--|--|
| | <p>Built-in bluetooth, can be used to be connected with the phone</p> <p>Built-in laser indicator to indicate the direction of probe</p> <p>Replaceable field of view lens, standard 25° , optional Angle: 1° / 8° / 15° , other accessories can be customized</p> |
|--|--|

3 Instrument Introduction



Figure 3.1 Instrument Side View

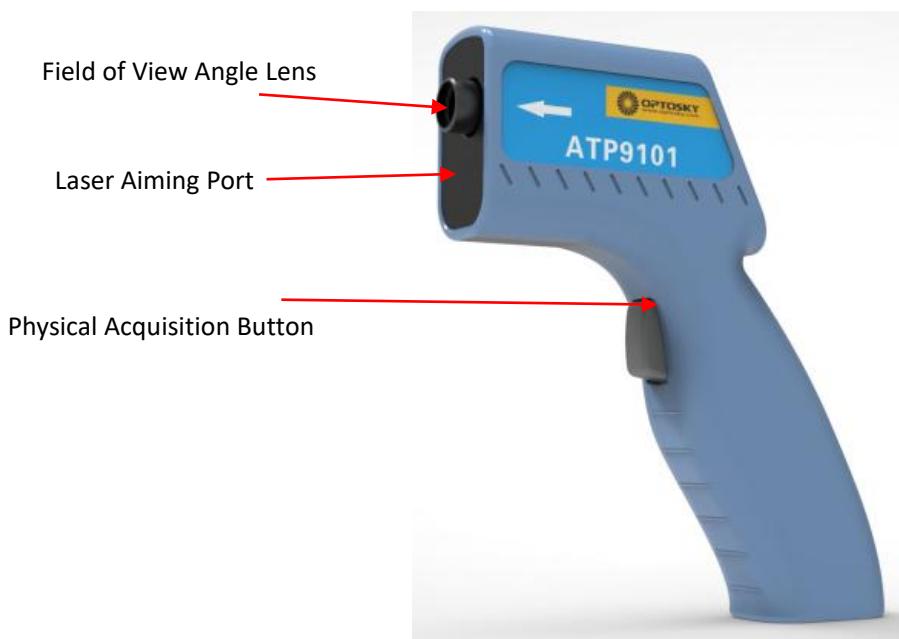


Figure 3.2 Instrument Elevation Drawing



Figure 3.3 Schematic diagram at the bottom of the instrument

3.1 Source

Push the power to on button, the blue tooth indicator is on and flashing, and the instrument is on. This device is with built-in large capacity lithium battery and can be charged using an adapter.

* Note: Charge the battery and only using certified adapters or connectors. Using an unsuitable battery, adapter, or connector may cause harm to the body or instrument.

3.2 Aiming Button

Before acquisition, press the aiming button and align the scanning position by laser.

* Note: When the laser is lit up, do not point the probe tube against the human eye or skin.

3.3 Physical Acquisition Button

Users can collect spectral data through the physical acquisition button, and take one acquisition action every pressing the physical acquisition button.

3.4 Power Interface

The power interface is located at the bottom of the instrument, type-c interface, connected to the corresponding adapter for charging.

3.5 Field of View Angle Lens

Users can select lenses with different fields of view angles according to the field range requirements.

3.6 Pilot lamp

[Power supply indicator light]: When the power supply is sufficient, the power supply indicator light is low; when the power supply indicator light is low, the power supply indicator light is flashing, and the power supply indicator light is always on when the charging is complete.

[Bluetooth indicator light]: When Bluetooth is not connected, Bluetooth indicator blue light flashes; when Bluetooth connection, Bluetooth indicator blue light always shines.

4 Instrument Operation Instructions

4.1 Startup & Shutdown

Turn on: dial the switch to ON, and the blue tooth indicator switches from constant on to flashing after the device initialization.

Shutdown: dial the switch to OFF when all indicator lights of the device go off.

4.2 Main Interface

Open the installed ATP9101 software after startup. The main interface of the software is shown in Figure 4.2.1

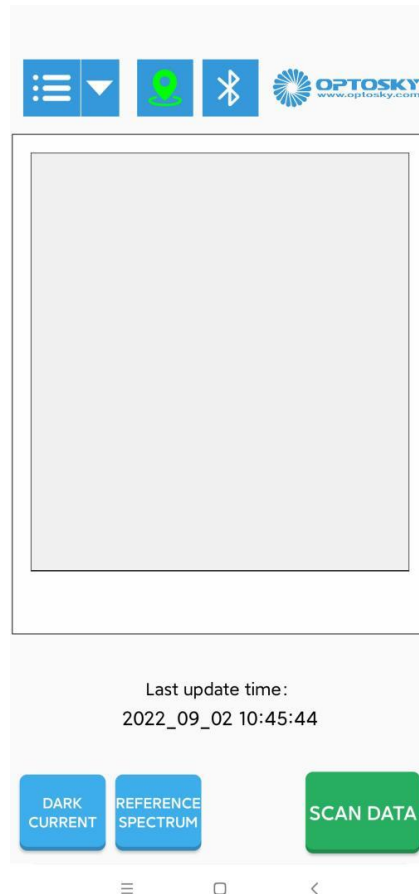


Figure 4.2.1 Main Interface

[Menu]: Click the menu icon in the upper left corner respectively, with four options: parameter setting, history, system information, and system shutdown.

[Test Category]: Click on the "▼" icon in the upper left corner for three categories: absorbance, reflectivity, and spectral intensity.

[Positioning]: Click the positioning icon to open or close the positioning service of the ATP9101 software.

[Bluetooth]: Click the Bluetooth icon to make the Bluetooth connection between the mobile phone and the ATP9101 device.

[System Information]: including product name, product model, software version, company information, etc.

[Dark Current]: Collect the dark current, and click to enter the dark current collection interface.

[Reference Spectra]: Collect the reference spectra. Click to enter the Acquisition Reference Spectrum interface.

[Collect Data]: Collect spectral data. Click to enter the acquisition spectral data interface.

4.3 Positioning and Bluetooth

[Location]: Click the location icon, and open the "Access My Location Information" location service. When not open, the positioning icon is white; when open, the positioning icon is green, and the ATP9101 collection must be previously turned on for the positioning service.

[Bluetooth]: Click the Bluetooth icon and select the ATP9101 device as Bluetooth for connection, as shown in Figure 4.3.1. The ATP9101 acquisition requires a prior Bluetooth connection to the ATP9101 device. (Bluetooth indicator is blue when not connected, Bluetooth indicator is blue when connected, and Bluetooth cannot be connected in charging status)

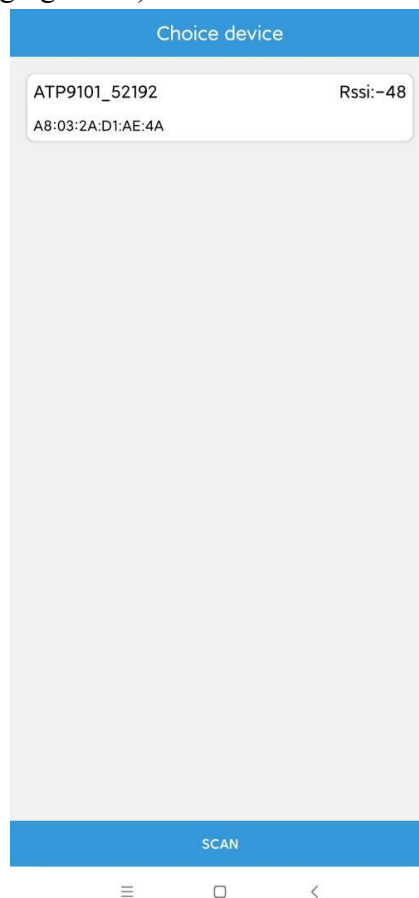


Figure 4.3.1 Bluetooth Connection

4.4 Set Up

The setting includes instrument parameters (integration time, filtering times) and test item selection (absorbance, reflectance, and spectral intensity), as shown in Figure 4.4.1 and Figure 4.4.2, respectively.

4.4.1 Instrument Parameter

[Integral Time]: The integration time of spectral acquisition can be set by itself. The integration time is the cumulative time of the signal, depending on the acquisition conditions.

[Filter Times]: Can change the filter times by yourself. Filtering will reduce the noise to some extent, depending on the acquisition conditions.

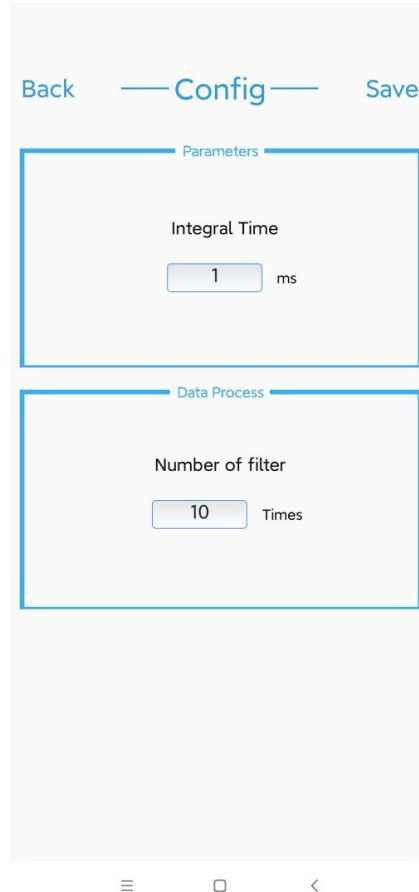


Figure 4.4.1 Settings- -Parameter Settings

4.4.2 Test Item Selection

[Absorbance]: Select the absorbance in the test item to measure the absorbance.

[Reflectivity]: Select the reflectivity in the test item to measure the reflectivity.

[Spectral intensity]: Select the spectral intensity in the test project, and the spectral intensity can be measured.

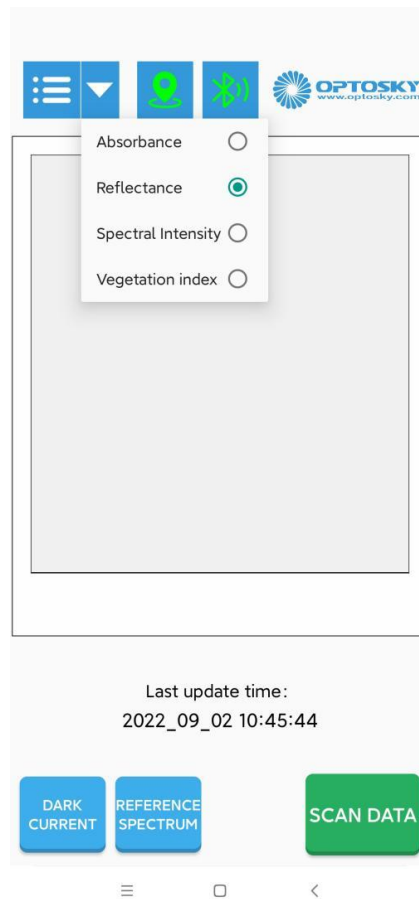


Figure 4.4.2 Settings-Test Item Selection

4.5 Collect Data

4.5.1 Acquisition of Spectrum Intensity

Click [▼], and the test category selects "Spectral Strength", as shown in Figure 4.5.1.1. Set the integration time and filtering times in [Settings], click [Save], the system prompts "click OK to save the parameters", as shown in Figure 4.5.1.2, and click [OK] to save the parameters.

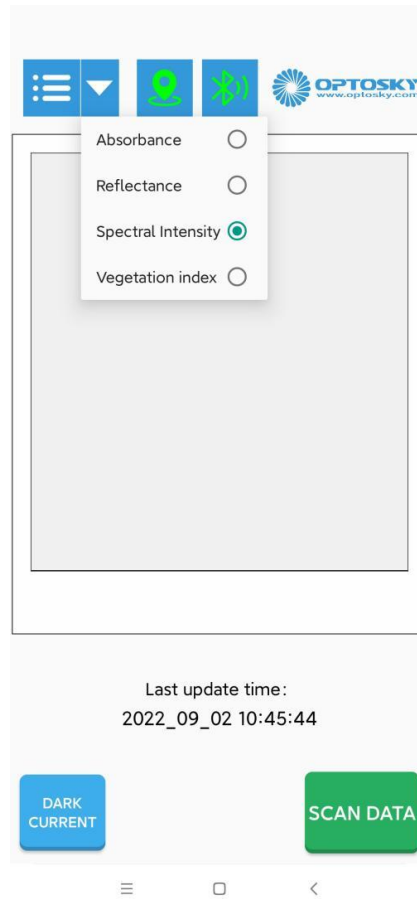


Figure 4.5.1.1 Select Test Category-Spectral Strength



Figure 4.5.1.2 Set up and save the parameters

Cover the lens, click [**dark current**], the system prompt information is shown in Figure 4.5.1.3, click [**OK**] to collect the dark current, the dark current collection is completed (the dark current collection will be saved to the instrument, if the user does not collect the dark current again, the dark current will be adopted for the last time by default), as shown in Figure 4.54..1.

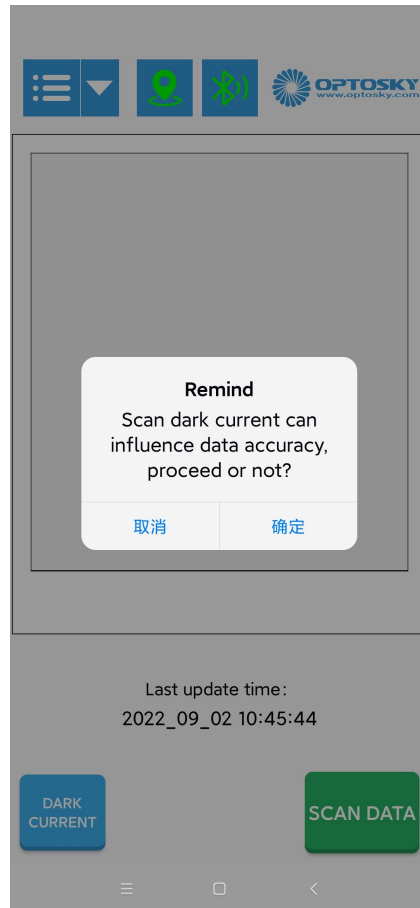


Figure 4.5.1.3 Collect dark current prompt

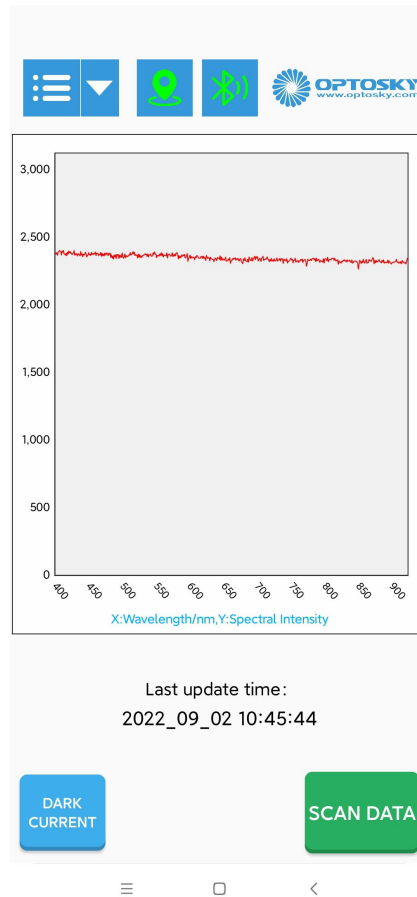


Figure 4.5.1.4 Completion of dark current acquisition

Click **[for data acquisition]** or press the entity acquisition button, the system to conduct a new spectral acquisition, and press the entity acquisition button again to conduct a new spectral acquisition. Click **[Save data]**, as shown in Figure 4.5.1.5, enter the file name and click **[OK]** to save the current data, and click **[Cancel]** to cancel saving it.



Figure 4.5.1.5 Completion of data acquisition
The saved data can be viewed in the history, as shown in Figure 4.5.1.6.

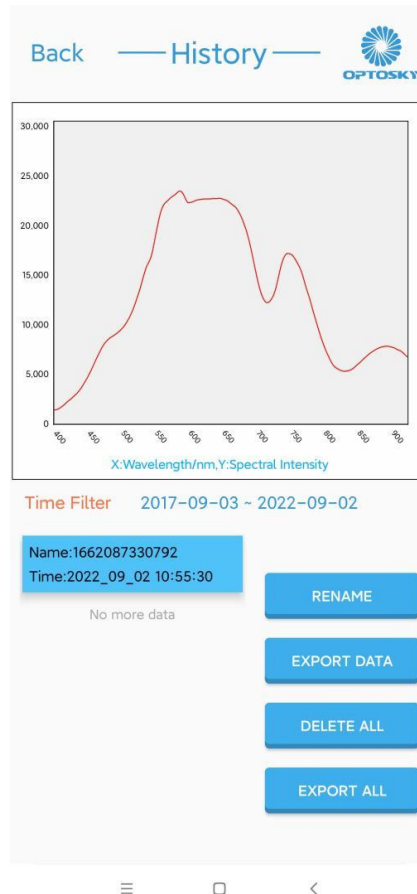


Figure 4.5.1.6 Historical Records

4.5.2 Acquisition of Reflectivity Rate

Click on [▼], and the test category selects "reflectivity", as shown in Figure 4.5.2.1. Set the integration time and filtering times in [Settings], click [Save], and the system prompts "click to determine the save parameters", as shown in Figure 4.5.2.2.

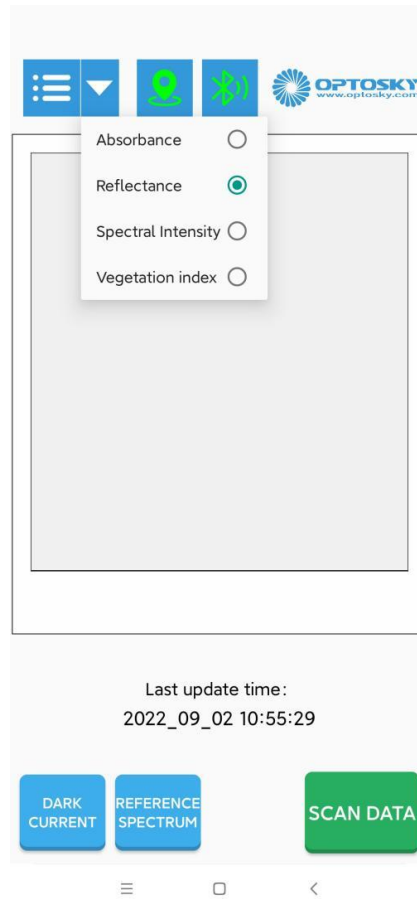


Figure 4.5.2.1 Select Test Category-Reflectivity



Figure 4.5.2.2 Set up and save the parameters

Cover the lens, click [**dark current**], the system prompt information is shown in Figure 4.5.2.3, click [**OK**] to collect the dark current, the dark current collection is completed (the dark current collection will be saved to the instrument, if the user does not collect the dark current again, the last dark current by default), Figure 4.5.2.4

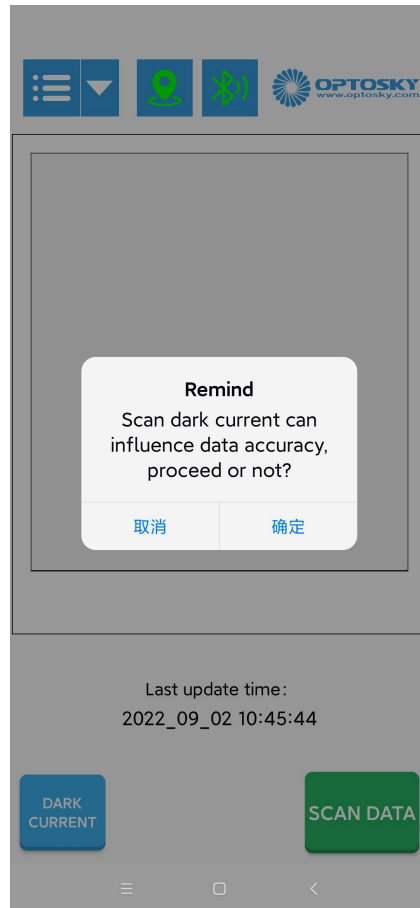


Figure 4.5.2.3 Collect dark current prompt

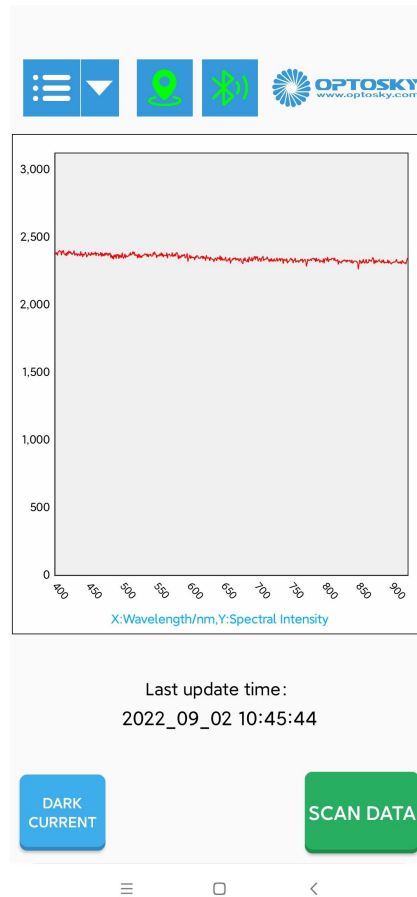


Figure 4.5.2.4 Completion of dark current acquisition

Click **[Reference Spectra]**, the system prompt information is shown in Figure 4.5.2.5, click **[OK]** to complete the reference spectra collection (the reference spectra will be saved to the instrument until the next reference spectra are collected again. Users are recommended to collect the reference spectra again when the light intensity changes or the environment changes to ensure the accuracy of the test results).

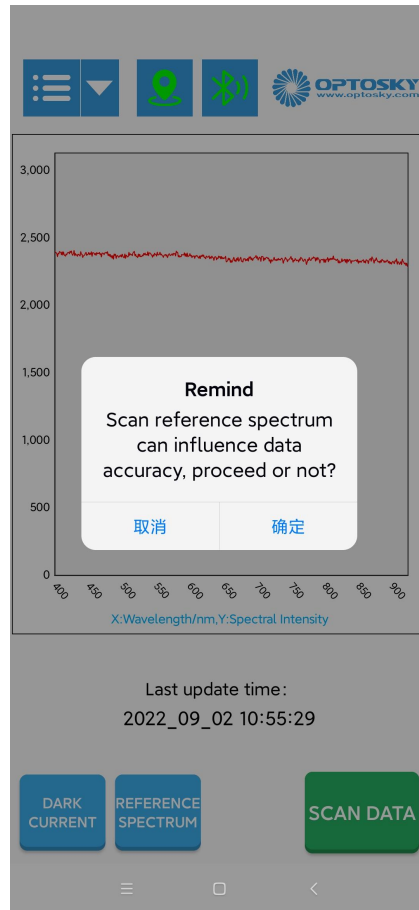


Figure 4.5.2.5, Collecting the reference spectral tips

Click [**Data acquisition**] or press the entity acquisition button, the system for a data acquisition, and press the entity acquisition button again for another spectral acquisition. Click [**Save data**], as shown in Figure 4.5.2.6, enter the file name and click [**OK**] to save the current piece of data, and click [**Cancel**] to cancel saving it.

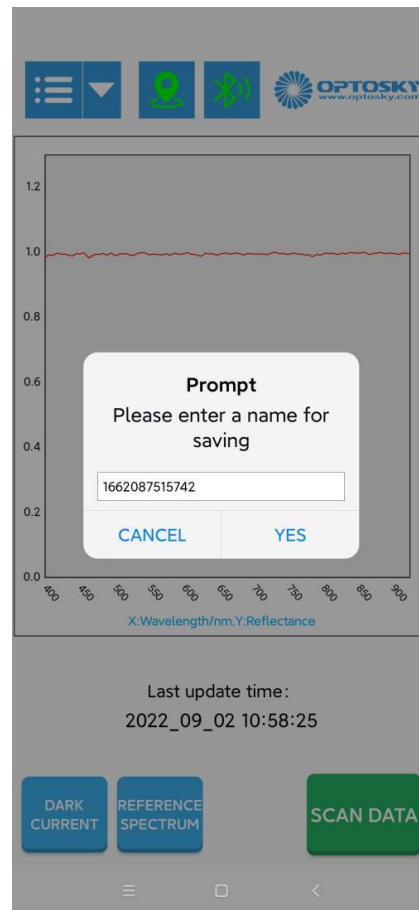


Figure 4.5.2.6 Completion of data acquisition

The saved data can be viewed in the history record, as shown in Figure 4.5.2.7

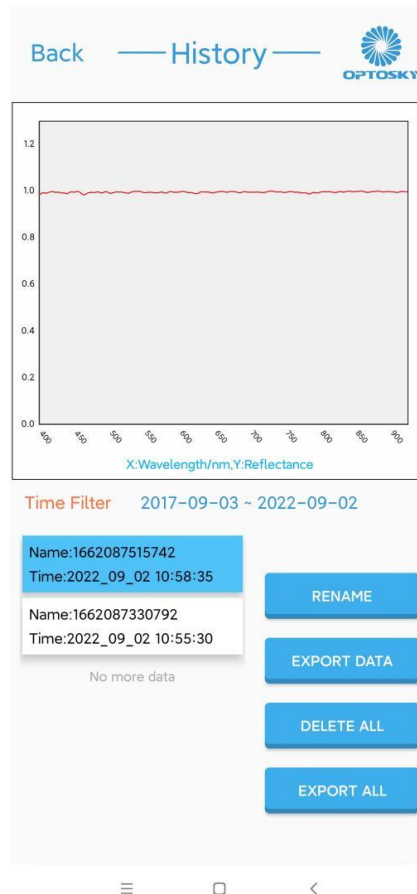


Figure 4.5.2.7 Historical Records

* Suggestion: When collecting the reflectance, it is recommended to adjust the integration time to the integration time with the spectral intensity above 20,000.

4.5.3 Acquisition of Absorbance

Click [▼] to select "absorbance", as shown in Figure 4.5.3.1. Set the integration time and filtering times in [Settings], click [Save], and the system prompts "click to determine the save parameters", as shown in Figure 4.5.3.2.

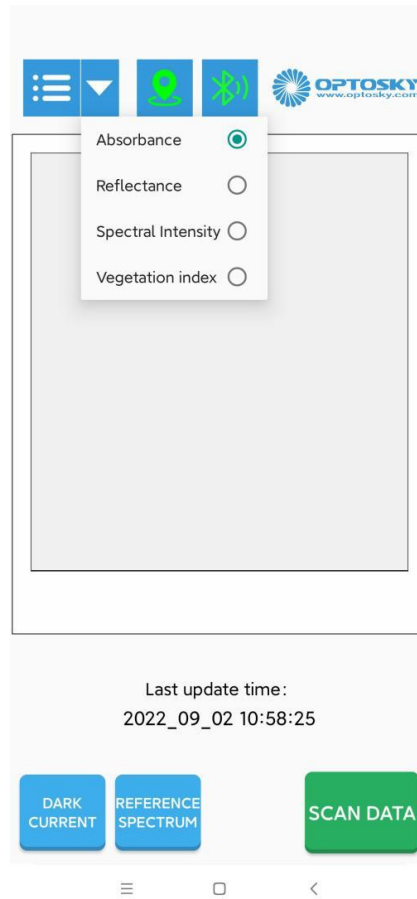


Figure 4.5.3.1 Select Test Category-Absorbance



Figure 4.5.3.2 Set up and save the parameters

Cover the lens, click [**dark current**], the system prompt information is shown in Figure 4.5.3.3, click [**OK**] to collect dark current, dark current collection is completed (dark current collection will be saved to the instrument, if the user does not collect dark current again, the last dark current by default), Figure 4.5.3.4

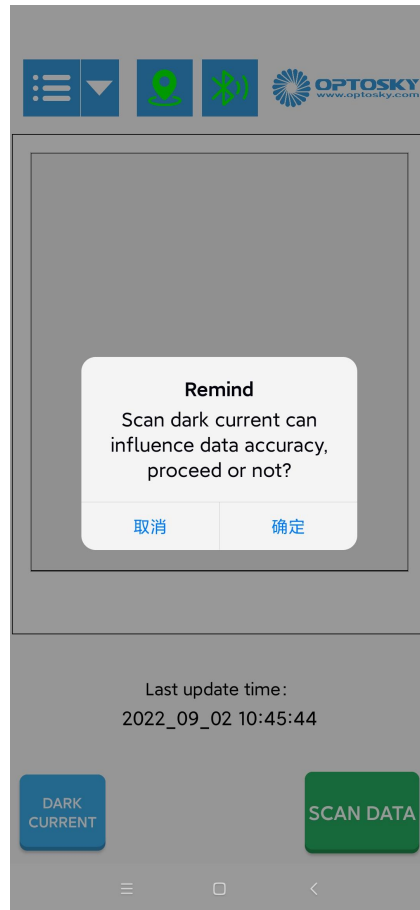


Figure 4.5.3.3 Collect dark current prompt

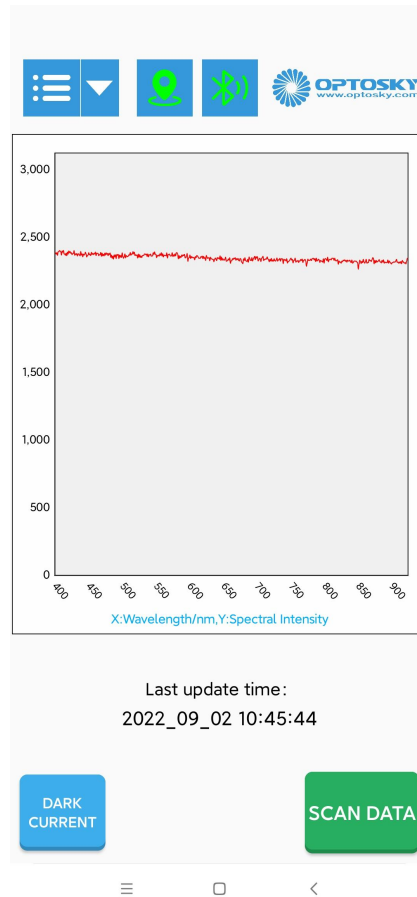


Figure 4.5.3.4 Completion of dark current acquisition

Click [**Reference Spectrum**], and the system prompt information is shown in Figure 4.5.3.5, and click [**OK**] to collect the reference spectrum.(The reference spectra will be stored in the instrument until the next time the reference spectra are recollected. It is recommended that the reference spectra be recollected when the light intensity changes or the environment changes to ensure the accuracy of the test results).

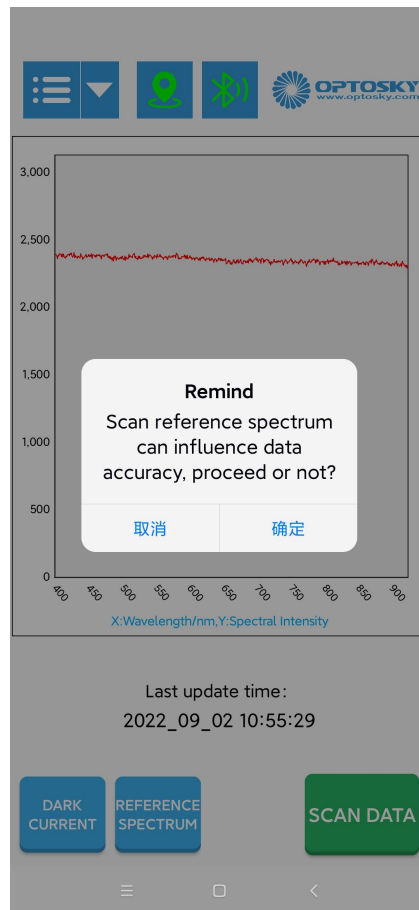


Figure 4.5.3.5

Click **[for data acquisition]** or press the entity acquisition button, the system for a data acquisition, and press the entity acquisition button again for another spectral acquisition. Click **[Save data]**, as shown in Figure 4.5.3.6, enter the file name and click **[OK]** to save the current data, and click **[Cancel]** to cancel saving it.

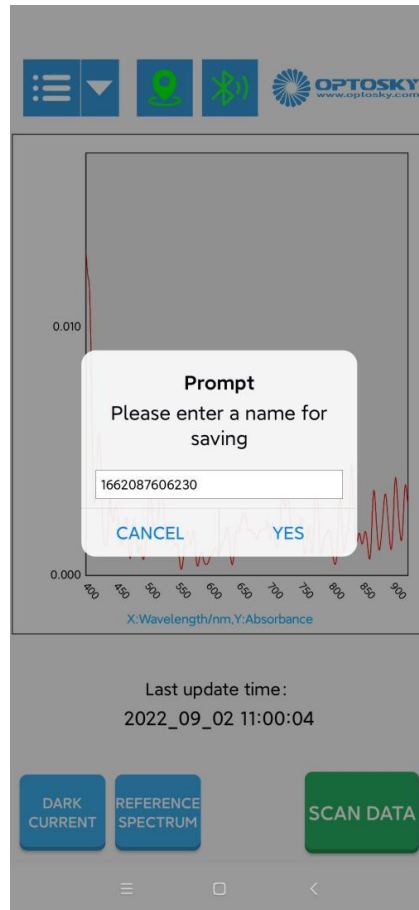


Figure 4.5.3.6 Completion of data acquisition

The saved data can be viewed in the history record, as shown in Figure 4.5.3.7.

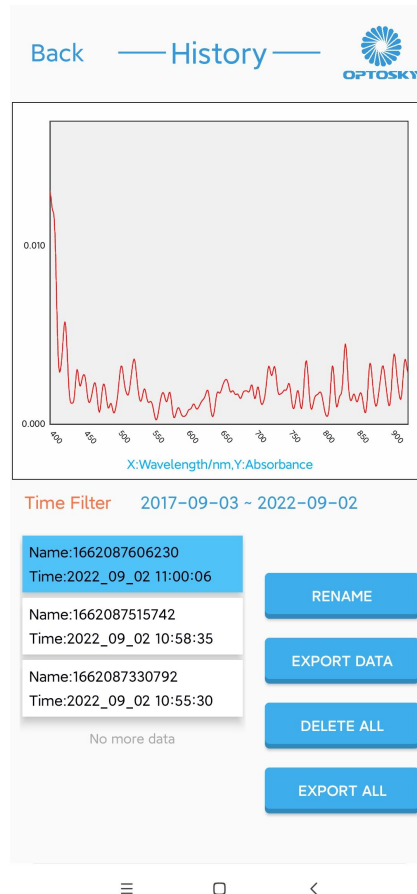


Figure 4.5.3.7 Historical Records

4.6 History Record

4.6.1 Search History Record

Click **[History Record]** to enter the history record interface, as shown in Figure 4.6.1.1. After entering the history interface, you can filter the required history records through time, as shown in Figure 4.6.1.2. Two fingers can zoom in / out of the spectrograph, scaled as shown in Figure 4.6.1.3.

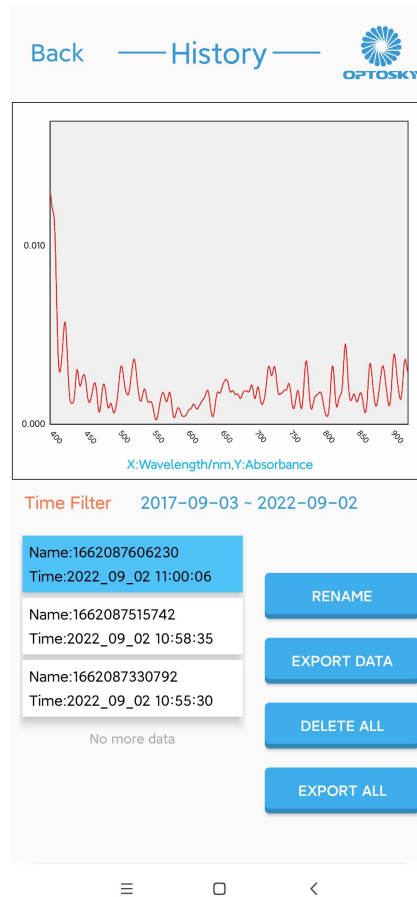


Figure 4.6.1.1 Historical Records

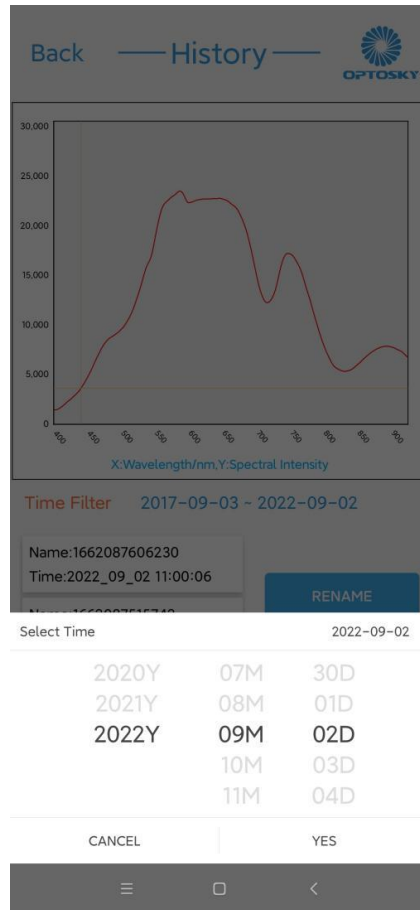


Figure 4.6.1.2 Selection Time

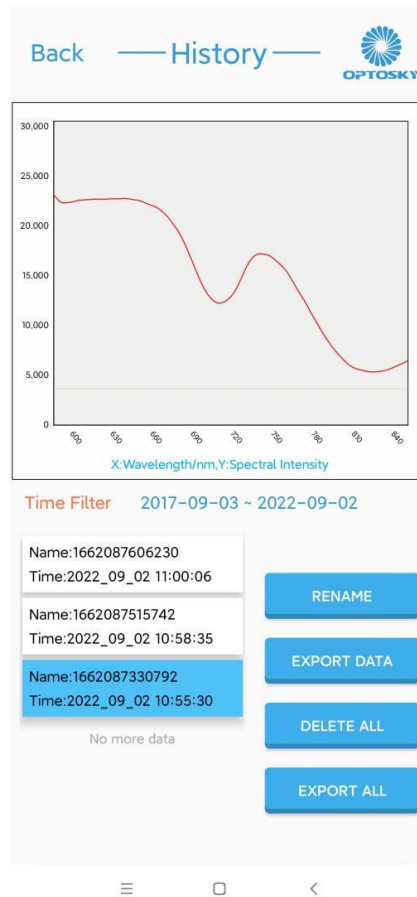


Figure 4.6.1.3 Figure magnification

4.6.2 Rename History Record

Enter the history record interface, click the required data, click **[Rename]**, the system popup the save file name dialog box, as shown in Figure 4.6.2.1, enter the file name and click **[OK]** to save successfully.

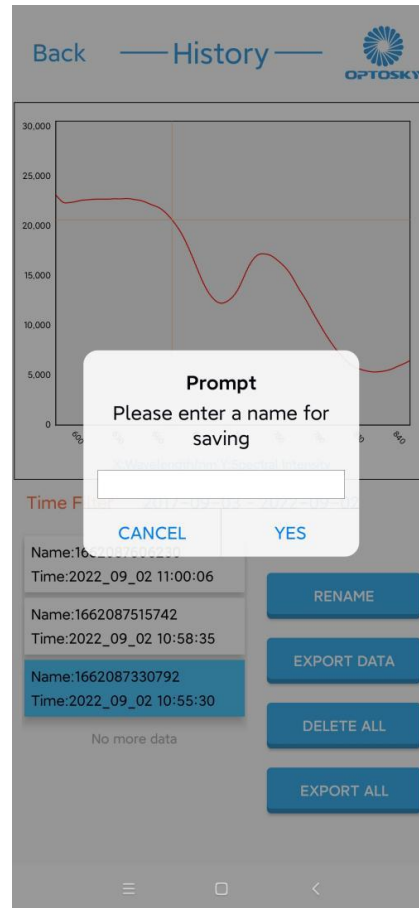


Figure 4.6.2.1, Save the File Name dialog box

4.6.3 Export Data

Export a single piece of data: first click the data to be exported, click **[Export data]**, the system prompts "whether to export this data", as shown in Figure 4.6.3.1, click **[OK]** to export.

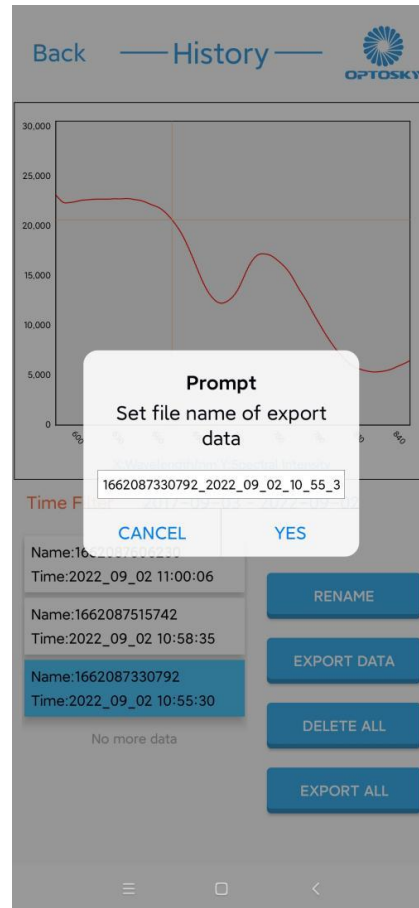


Figure 4.6.3.1 Export data prompt box

The exported data is stored in the folder of \ ATP9101 \ txt, as shown in Figure 4.6.3.2. The saved data is in TXT format, and users can transfer the data files between the mobile phone and the computer through the mobile phone data cable.



Figure 4.6.3.2 Export the data-saved folder

Export all the data: click **[Export all the data]**, the system prompts "whether to export all the historical data", click **[OK]** to export all the data, as shown in Figure 4.6.3.3, the exported data exists in the mobile phone storage \ ATP9100 \ txt folder.

* Tip: Transmission of data files also supports other forms of wireless transmission.

4.6.4 Delete Data

Delete a single data: enter the history record interface, long press the data to be deleted, the system prompts "Click OK to delete this record", as shown in Figure 4.6.4.1, click **[OK]** to delete.

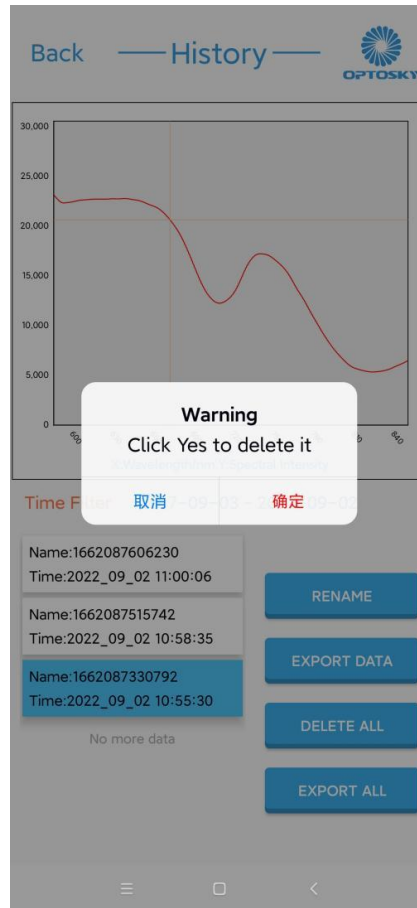


Figure 4.6.4.1, remove a single data prompt

Delete all data: enter the history interface, click **[Delete all data]**, and the system prompts "whether to delete all data". In Figure 4.6.4.2, click **[OK]** to delete all data.

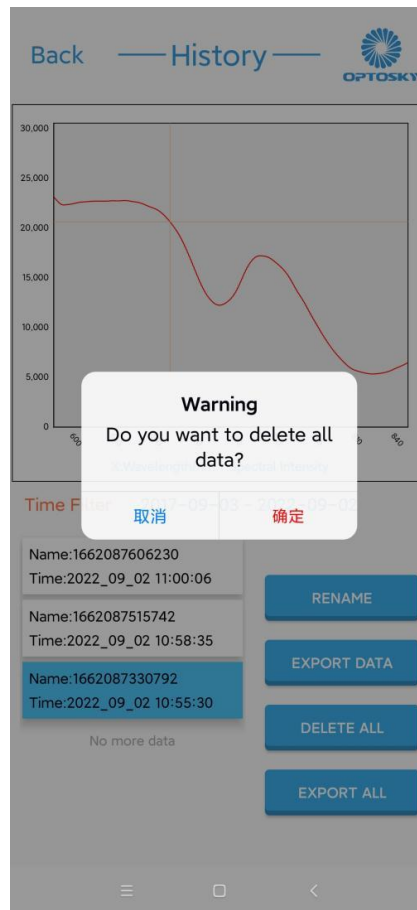
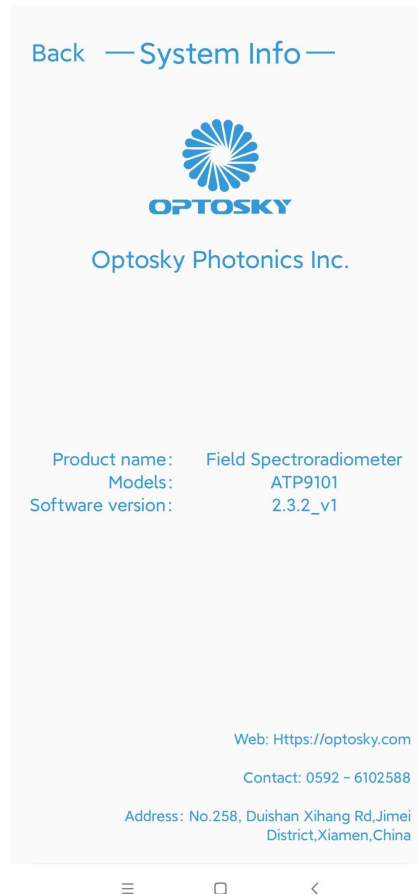


Figure 4.6.4.2, delete all the data prompts

5 System Information

Click the "System Information" in the menu to see the system information, including the product name, product model, software version, company information, etc., as shown in Figure 5.1



5.1 System Information

6 Notes for Instrument Use

In the process of use, you should pay attention to the following points, which can extend the service life of the instrument.

Temperature / humidity range of the ① instrument: $-10^{\circ}\text{C}\sim 45^{\circ}\text{C}$ (operating status), $20^{\circ}\text{C}\sim 65^{\circ}\text{C}$ (storage status); $<90\%\text{RH}$. Should avoid the use of instruments in the case of drastic temperature changes, so as not to avoid the internal frost, electrical components short circuit and damage to the instrument;

② During transportation, try to avoid violent vibration to avoid loosening of internal screws

Damage of the computer hard disk;

When the ④ instrument is not used for a long time, it should be charged once every other month or so to prevent the damage of the instrument battery.

⑤ When the power indicator light flashes, please charge it in time to avoid causing damage to the battery.

⑥ Do not remove the host by itself. If the instrument fails, please contact the manufacturer as soon as possible.

⑦ in the use of the instrument process, should try to avoid contact with hard objects, so as not to cause the instrument shell spray layer off and affect the

appearance of the instrument.

7 Attachment

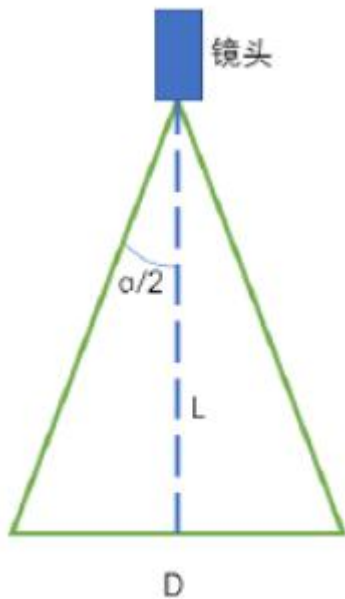
Standard accessories include: 5v adapter, Type-C cable, cosine orthotics, 25° V lens, 10cm whiteboard, other accessories can be customized.

Comparison table of visual field angle and test distance and test area:

A. Refer to the whiteboard test distance limit table

| | 1° | 3° | 5° | 8° | 10° | 25° |
|----------------------|--------|-------|-------|-------|-------|------|
| A 10cm white board | 570cm | 190cm | 110cm | 70cm | 55cm | 20cm |
| A 25x25cm whiteboard | 1425cm | 475cm | 275cm | 175cm | 137cm | 50cm |
| 5x5inch ash board | 720cm | 240cm | 140cm | 90cm | 65cm | 25cm |

B. Schematic diagram of calculation



lens angle: α
 measuring distance: L
 Test Area Diameter:
 D
 Test area area: S
 $D = 2 * L * \tan(\alpha/2)$
 $S = \pi * (D/2)^2$
 $= \pi * (L * \tan(\alpha/2))^2$