UV Quartz Transmittance Measurement System SAD-8600

Optimum Optoelectronics Corp.

Transmittance Measurement

What is Transmittance Measurement?

Transmittance measurement refers to the quantitative determination of how much light or electromagnetic radiation passes through a specific medium or material. Expressed as a ratio or percentage, transmittance represents the fraction of incident light that successfully traverses a sample without being absorbed, reflected, or scattered. This optical property evaluation provides critical information about a material's transparency, optical density, and composition.

When expressed as a percentage, this value ranges from 0% (complete opacity where no light passes through) to 100% (perfect transparency where all light passes through).

The basic operating principle includes:

1. A light source generates radiation at specific wavelengths
2. The light passes through the DUT
3. A detector captures and analyses the transmitted light
4. Software calculates the transmittance ratio and displays results
5. XY position table playform - these versatile devices are designed to move objects in two perpendicular directions, allowing for the precise positioning for the measurement.

System Configurations

This system complies with standard measurement specifications ASTM D1003/ISO 13468.

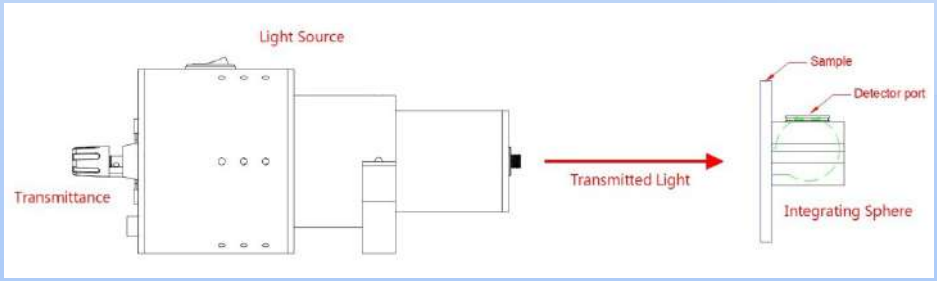
1. Hardware Configuration

- **XY position table platform**
  X-Y tables, also known as cross working tables or coordinate tables, help provide horizontal motion along X and Y axis. Go with two-axis system, optical quality measurement system.
  Travel range: X axis:400 mm, repeatability: ± 0.1 mm, Y axis: 400 mm, repeatability: ± 0.1 mm
- **High precision Spectrometer**
  The most common technique for optical analysis involves spectrophotometers – precision instruments that evaluate how materials interact with light across various wavelengths. Spectrophotometers can operate across ultraviolet, visible, and infrared regions of the electromagnetic spectrum.
- **LED light source module**
  LED 275 nm as light source combines with integrating sphere and collect light lens as the light source module
  Integrating sphere - For materials with significant light scattering properties, integrating spheres provide enhanced accuracy. These hollow spherical chambers have interior surfaces coated with highly reflective materials that collect scattered light, ensuring more comprehensive detection and analysis.
- **Two-layer structure mechanical dark box**
  Top layer – for XY table and source light module
  Lower layer – for servo motor controller, power supply, PC and electronics socket
- **DUT holder fixtures**

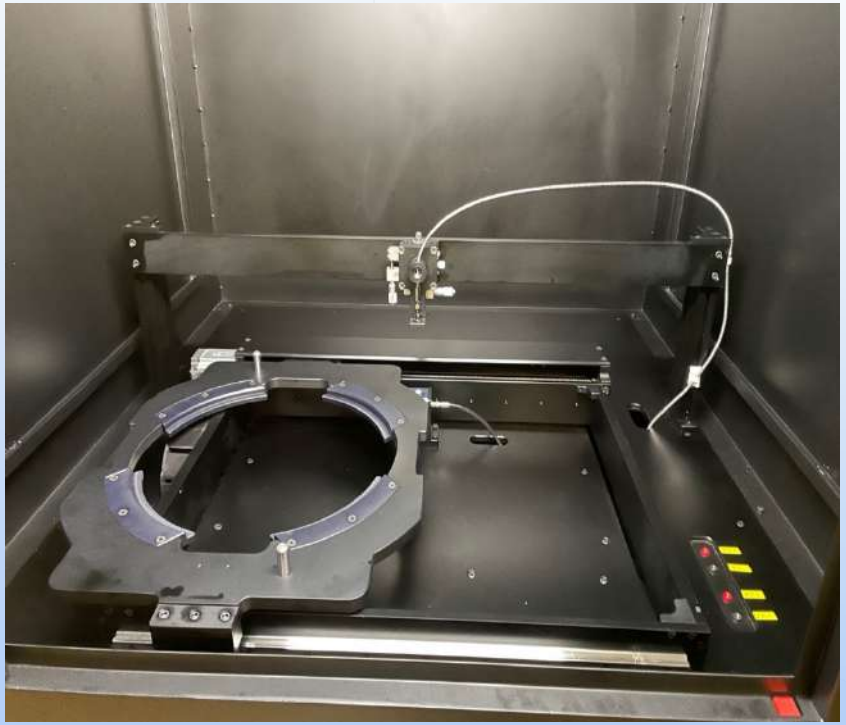
System Configurations

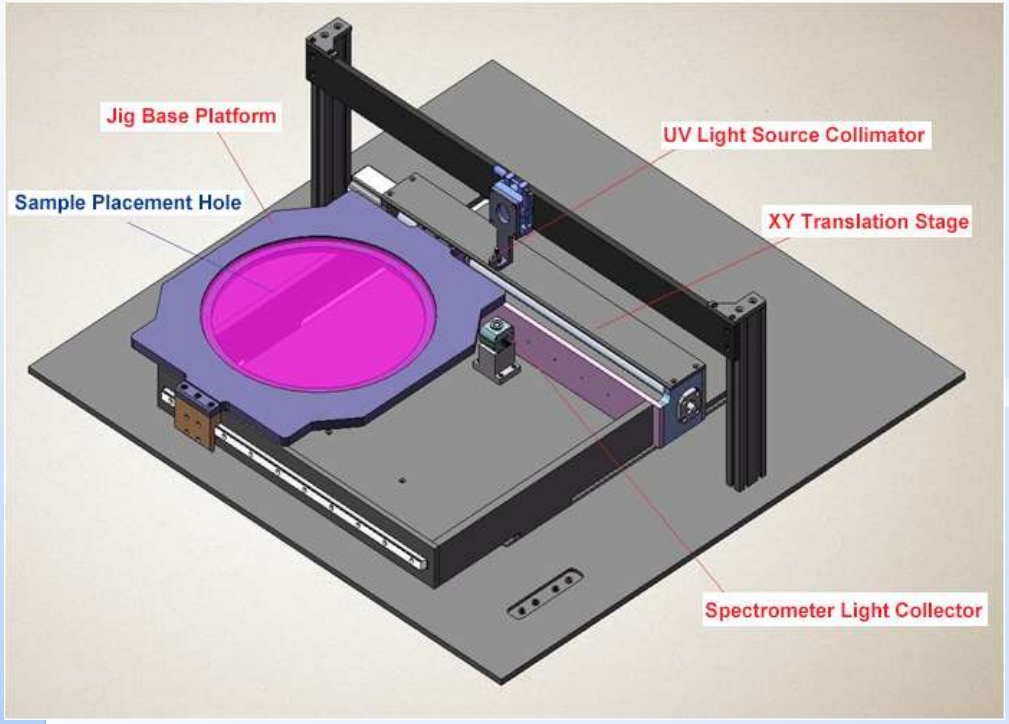
2. Software Configurations

- Equip with 10% transmittance standards on proper instrument calibration, to ensure the reliable results
- Two types of setting the measurement points, area settings and manual set the points
- Set up the wavelength range
- Perform spectral response curves (reference spectrum and sample response spectrum curves)
- Perform Total transmittance (%)
- Perform Average transmittance (%)
- Measurement data can be exported as a color mapping diagram
- Ta pass thresholds check



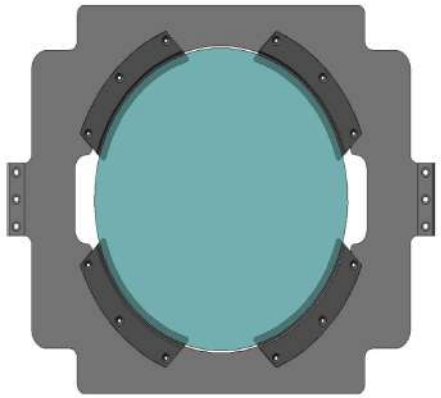
XY position table platform

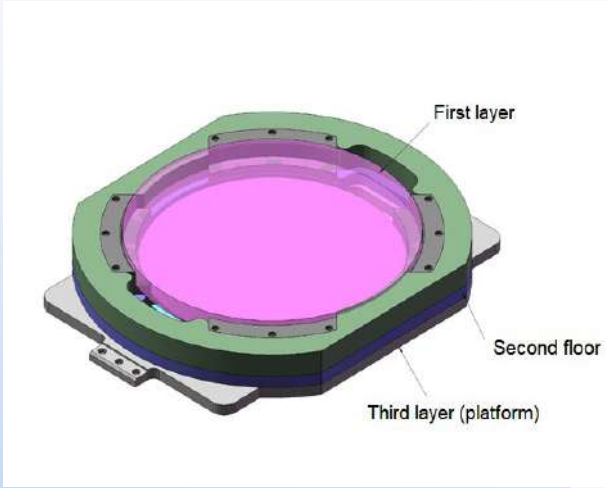


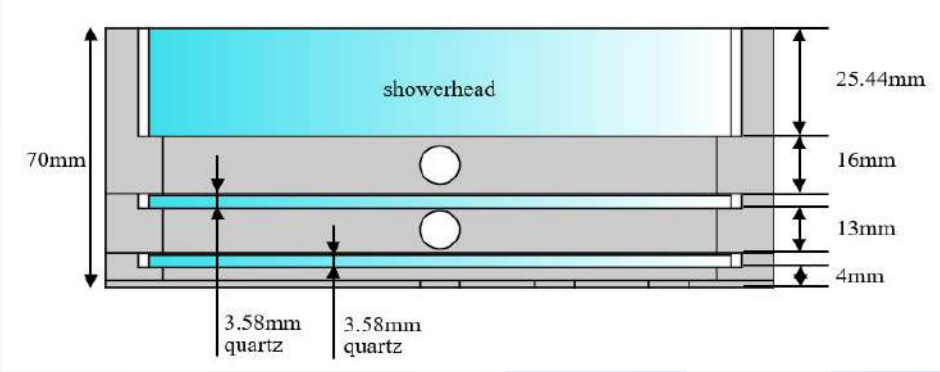


DUT Holder Fixture

Single-layer fixture

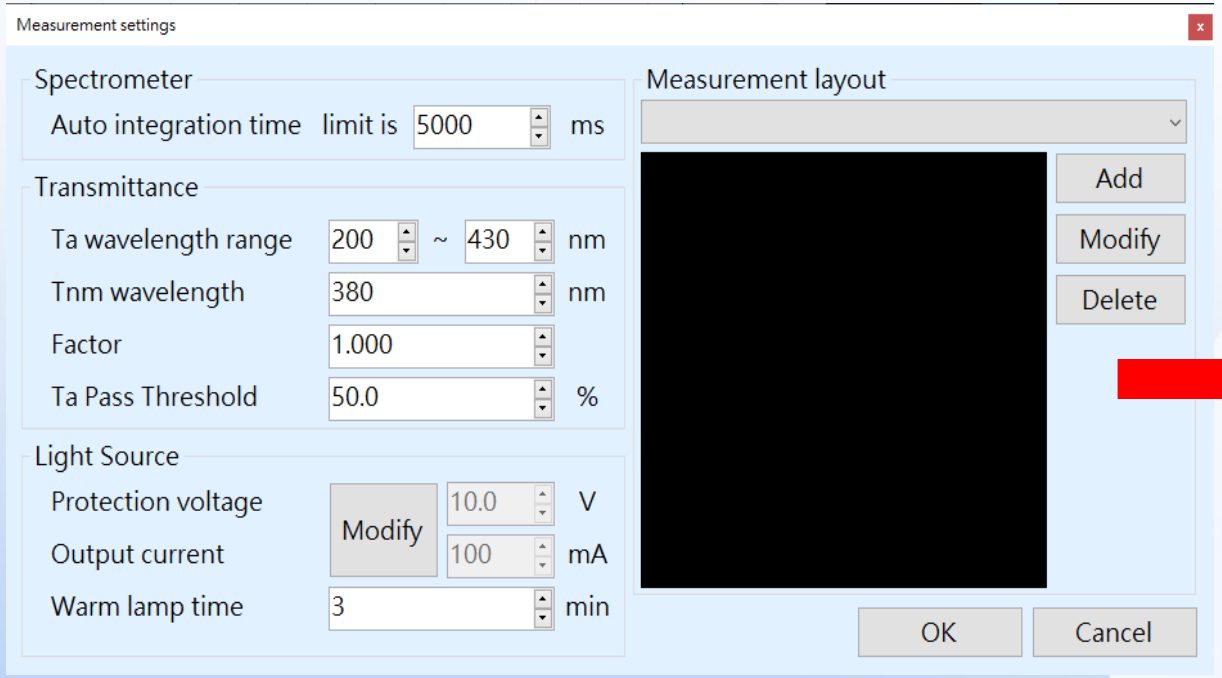




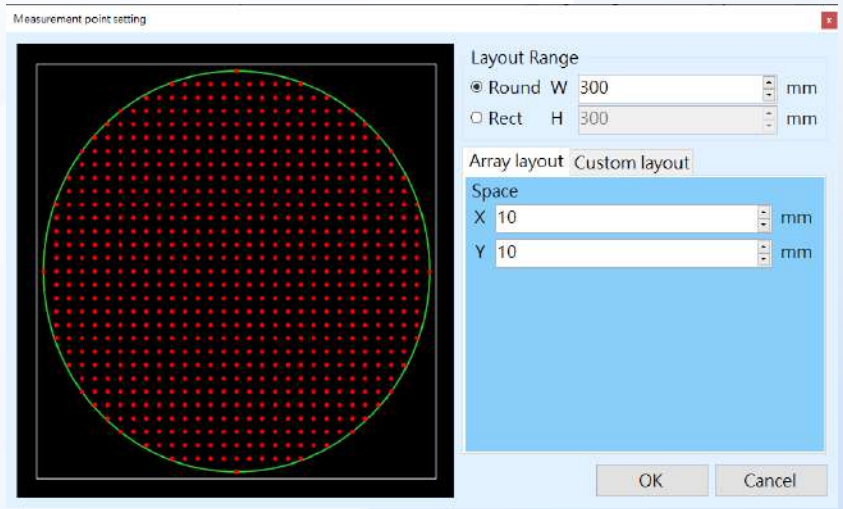


The test sample consists of three layers of quartz glass.
Thick Layer (First Layer): Thickness 25.44 mm / Diameter 375 mm
Thin Layers (Second and Third Layers): Thickness 3.58 mm / Diameter 335 mm

Step 1 Initial Setup Interface



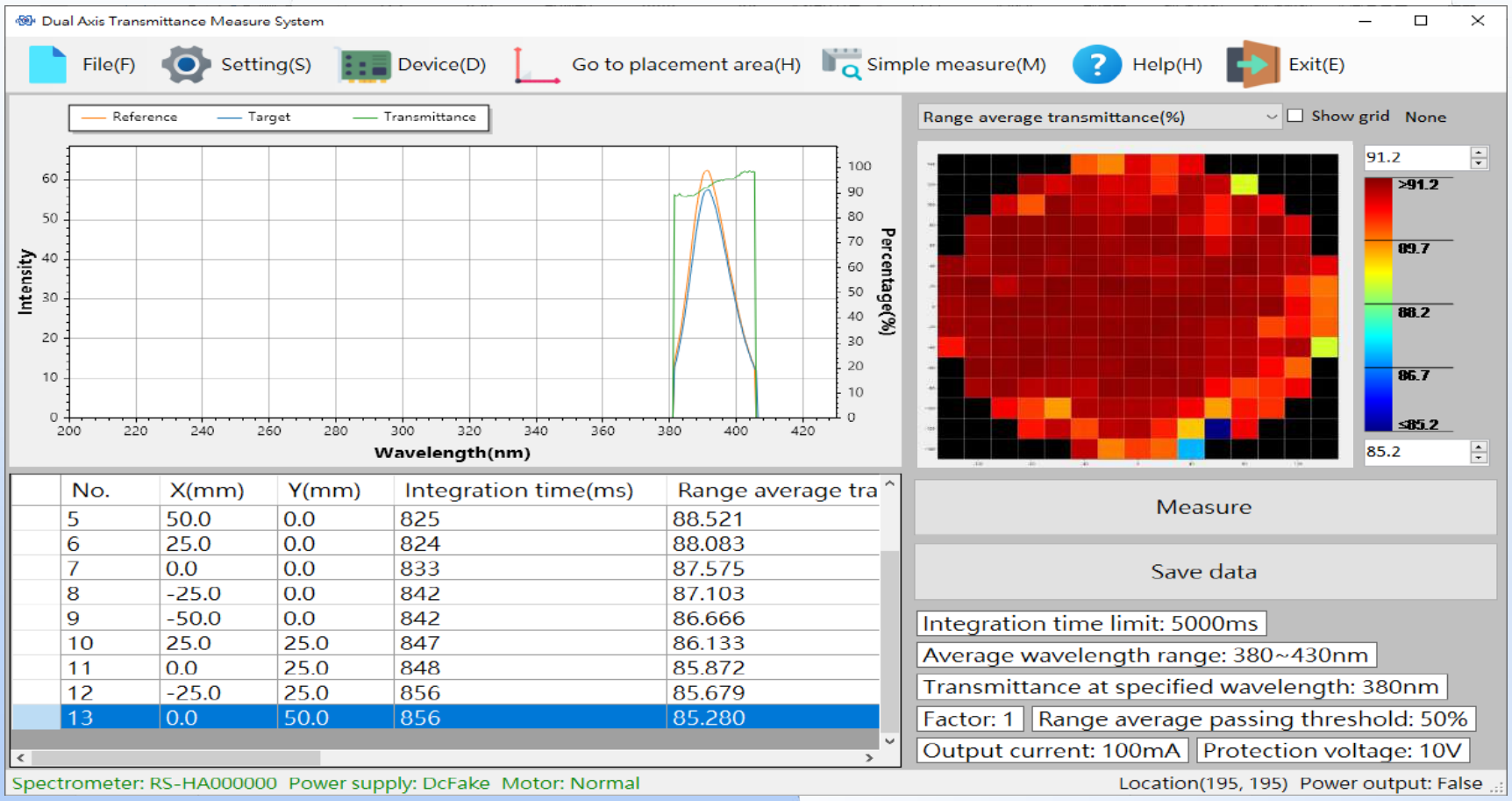
Initial page



After setup

★**Input the measurement size and interval, and the system will quickly simulate the measurement points.**

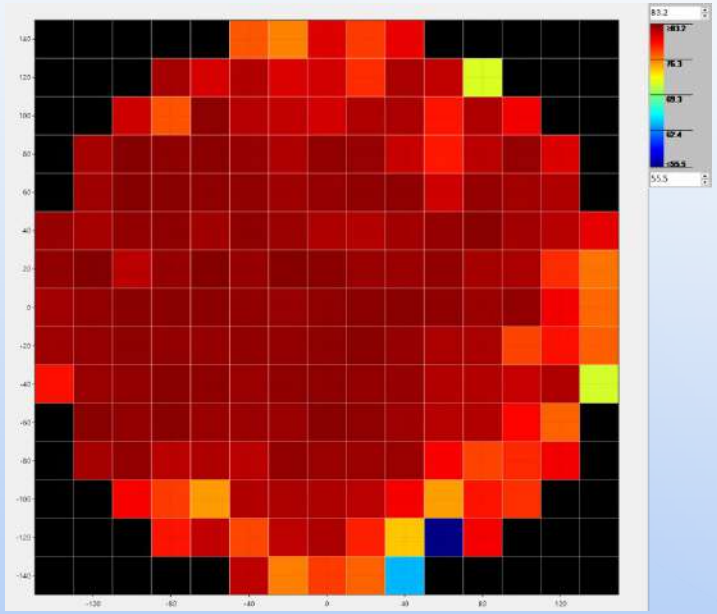
Measurement Software Interface



No.	X(mm)	Y(mm)	Integration time(ms)	Range average tra
5	50.0	0.0	825	88.521
6	25.0	0.0	824	88.083
7	0.0	0.0	833	87.575
8	-25.0	0.0	842	87.103
9	-50.0	0.0	842	86.666
10	25.0	25.0	847	86.133
11	0.0	25.0	848	85.872
12	-25.0	25.0	856	85.679
13	0.0	50.0	856	85.280

Transmittance Mapping Diagram

Using X and Y axis coordinates along with transmittance values at each point to generate a color mapping diagram.



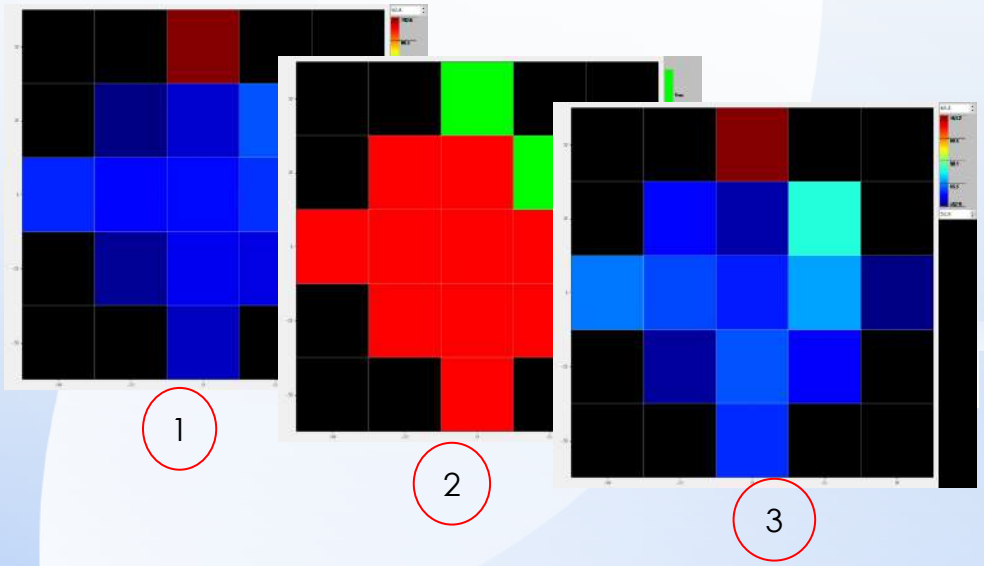
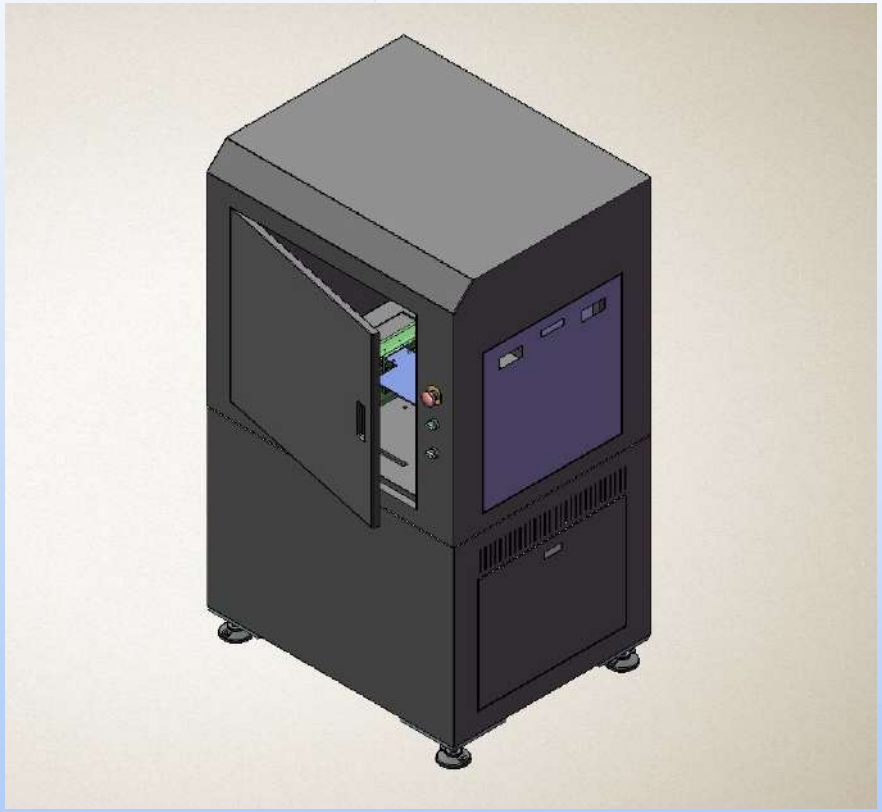


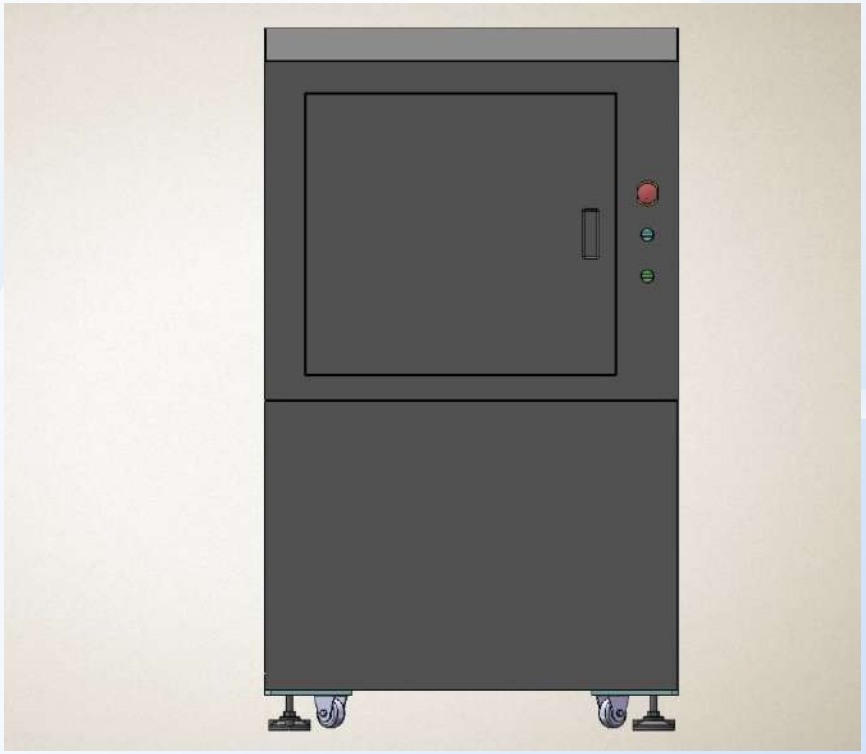
Figure 1: Tnm (ex. 280 nm)
Figure 2: Ta pass (check)
Figure 3: Ta

Specification

Measurement Area	350mm*350mm
XY Travel Range	X: 400mm, Repeatability: ±0.1mm, Automatic Y: 400mm, Repeatability: ±0.1mm, Automatic
Detector	SM-HA-4000, Hamamatsu CCD Array Spectrometer
Spectral Wavelength Range	200-430 nm
Spectral Resolution	0.5nm
Photometric Accuracy	±1%
Photometric Repeatability	±1%
Excitation Light Source	UVLED 275 nm ± 2nm, light Spot size Ø5–Ø7mm, LED life time 5000 hours, LED liability within 1 hour ± 1%, within 2 hrs ± 1.5%
Detector	SM-HA-4000, Hamamatsu CCD Array Spectrometer
light source module	2.5 cm Integrating Sphere, Ø10 mm Light Collection Port
Measurement Time	2–10 sec (per point)
Sample Measurement Platform	Testing Platform, Automatic XY Table
Software	Displays Spectral Response Graphs (Reference and Sample Spectra) Fluorescence Intensity, Average Transmittance, Transmittance Mapping Graph Displays Full-Spectrum Point Data, Automatic Calculation/Data Storage
Electronics power	110 V
System Requirements	Window 8，10，11
Machine Dimensions	120×120×200 cm Floor Type, Including Enclosure
Machine Weight	250 Kg

Measurement Architecture and Appearance





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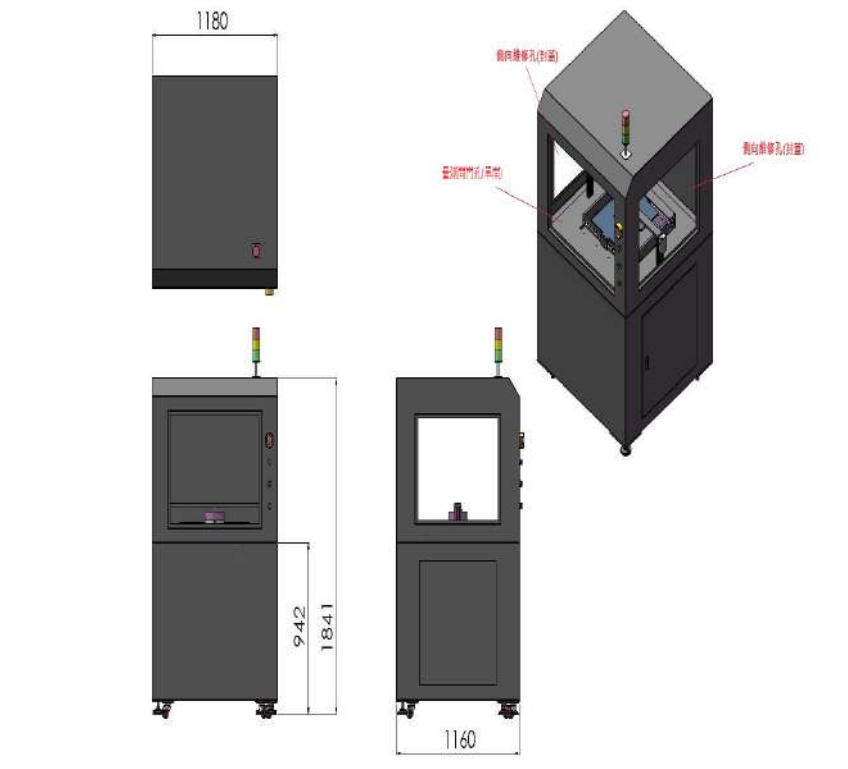

Unit: mm

Thank you

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