



VISIBLE SPECTROPHOTOMETER

USER MANUAL



Spectral range
400-720 nm



Connectivity
Bluetooth / USB



Absorbance and
transmittance



Software for
Windows / Android

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1. Introduction

Thank you for purchasing the GIGAIE/VISS visible spectrophotometer.

The GIGAIE/VISS is a portable visible spectrophotometer designed to measure absorbance and transmittance over a spectral range of **400 to 720 nm**. Its compact design, ease of use, and Bluetooth and USB connectivity make it ideal for laboratories, universities, research, and quality control.

The instrument includes Windows software and an Android application for viewing spectra, saving results, and exporting data.

Read this manual carefully before using the instrument to obtain the best performance.

Key features

- Spectral range: 400-720 nm
- Spectral resolution: 0.5 nm
- Wavelength accuracy: ± 2 nm
- Absorbance and transmittance measurements
- Compatible with standard 10 mm optical cuvettes
- Compatible with microscope slides
- Bluetooth and USB connectivity
- Windows software
- Android application
- CSV and image export

2. Safety information

Read the following instructions before using the GIGAIE/VISS spectrophotometer:

- Place the instrument on a stable, clean, dry surface.
- Keep it away from liquids, moisture, dust, extreme temperatures, and direct sunlight.
- Do not use the instrument if its cable, connectors, or housing are damaged.
- Disconnect the instrument before cleaning. Do not disassemble it or attempt repairs.
- Wear gloves, safety glasses, and a laboratory coat when required for the samples being handled.
- Do not insert cuvettes that are wet, damaged, or have liquid on their outer surfaces.
- Handle cuvettes and microscope slides carefully. Avoid touching their optical surfaces.
- If a spill occurs, disconnect the instrument immediately.

The GIGAIE/VISS is not intended for medical diagnosis or safety-critical applications.

3. Package contents

When opening the package, check that the following items are included:

- 1 GIGAIE/VISS visible spectrophotometer with integrated USB cable
- 3 optical cuvettes with a 10 mm optical path length
- 3 Pasteur pipettes

Online user manual

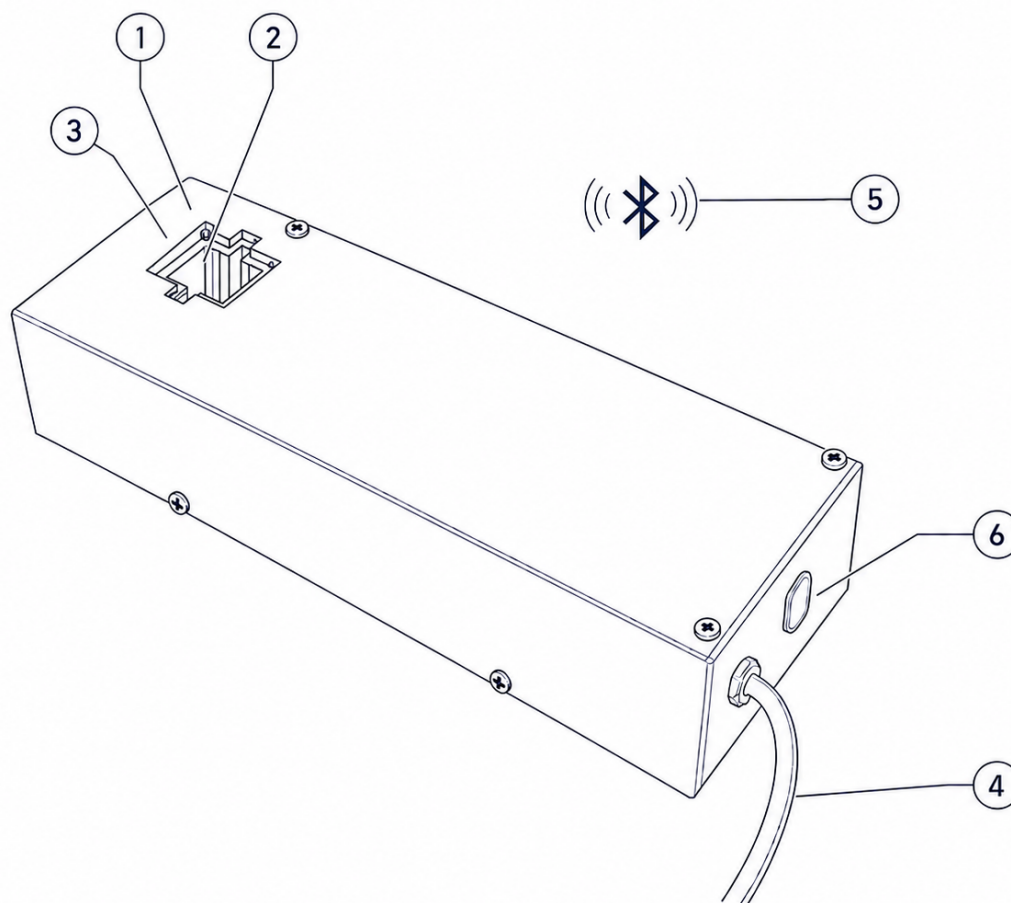
The user manual is available at:

<https://www.gigaie.com/viss>

Keep the original packaging for safe storage and transport.

4. Instrument overview

The GIGAIE/VISS integrates the optical system, light source, and electronic components required for absorbance and transmittance measurements.



Main components

1. Measurement compartment
2. Cuvette holder
3. Microscope slide holder
4. Integrated USB cable
5. Bluetooth connectivity
6. Status indicator

5. Technical specifications

Feature	Specification
Spectral range	400 to 720 nm
Spectral resolution	0.5 nm
Wavelength accuracy	±2 nm
Points per measurement	640
Measurement modes	Absorbance and transmittance
Sample container	Standard 10 mm optical cuvette
Solid samples	Microscope slides for thin-film measurements
Computer connection	USB
Wireless connection	Bluetooth
Compatible software	Windows and Android
Result export	CSV file and image
Dimensions	21 × 6.3 × 4.4 cm (length × width × height)
Weight	210 g
Power supply	5 VDC via USB
Current consumption	100 mA

6. Windows PC installation and operation

6.1 Installation

1. Connect the instrument to a USB port on a Windows computer.
2. Download the installation archive from:
https://downloads.gigaie.com/downloads/PC_Install_ext.rar
3. Extract the downloaded archive.
4. Install the USB driver by running CH341SER.EXE.
5. Open the PC_UserInterface folder and run setup.exe to install the user interface.

After installation, the software is ready to connect to the spectrophotometer.

6. Windows PC installation and operation

6.2 Using the Windows PC interface

1. Open the GIGAIE_VISS program.
2. Press CONNECT and wait until CONNECTED is displayed.
3. Insert the reference blank, for example a cuvette containing deionized water or a clean microscope slide.
4. Press SCAN.
5. Wait for the reference spectrum measurement to finish.
6. Press STORE BASELINE to save the reference data.
7. Remove the blank and insert the sample to be measured.
8. Press SCAN and wait for the measurement to finish.

Once the scan is complete, the results appear in the interface graph.

6.2 Using the Windows PC interface

Additional functions

- The PC version can display up to seven measurements on one graph.
- Use the selection controls to switch between absorbance and transmittance.
- The graph includes a zoom function.
- SAVE PLOT IMAGE saves an image of the displayed graphs.
- SAVE DATA saves the selected data (Baseline, Raw Values, Absorbance, or Transmittance) in CSV format.
- Press CLEAN to clear the current measurements and start a new series.
- To acquire a new reference measurement, press CONNECT again and repeat steps 3 through 6.

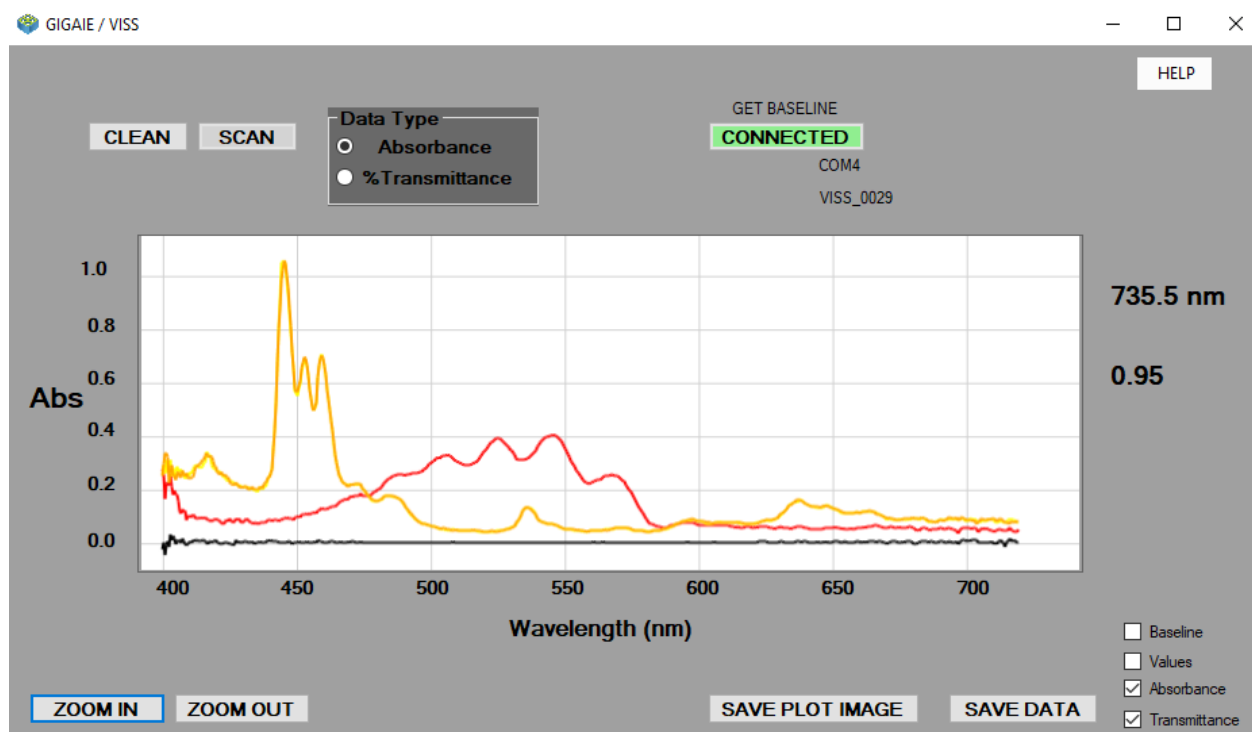


Figure 6.1. GIGAIE/VISS user interface for Windows PC.

7. Android installation and operation

7.1 Installing the Android application

1. Download the GIGAIE/VISS application from Google Play:

https://play.google.com/store/apps/details?id=appinventor.ai_alexjgimenez.gigaievissBLEXTV1&hl=es_419

2. Open the GIGAIE/VISS application on the Android device.

3. Enter the instrument serial number in the SN field. The serial number is printed on the rear label. Enter only the four numeric characters, for example: 0029.

This is only required during first use. The serial number is saved for subsequent connections.

4. During the first connection, grant Bluetooth and Location permissions when requested by the device.

5. Wait until the button turns green and displays CONNECTED.

The instrument is now connected and ready to use.



Figure 7.1. QR code for downloading GIGAIE/VISS from Google Play.

7. Android installation and operation

7.2 Using the Android application

1. Open the GIGAIE_VISS application on the Android device.
2. Press CONNECT and wait until the button turns green and displays CONNECTED.
3. Insert the reference blank, for example a cuvette containing deionized water or a clean microscope slide.
4. Press GET BASELINE and wait for the reference spectrum to appear.
5. Remove the reference blank and insert the sample.
6. Press CAPTURE and wait for the sample spectrum to appear.

Additional functions

- The Android version can display up to four measurements on one graph.
- Use the checkboxes to display absorbance or transmittance.
- Pinch gestures allow you to zoom in or out on the graph.
- SHARE PLOT generates a PNG image of the graph for sharing.
- SHARE DATA generates a CSV file of the measurement data for sharing.
- Depending on the device settings and installed applications, files can be shared by email, WhatsApp, or other available options.
- CLEAR deletes the current measurements and starts a new series.

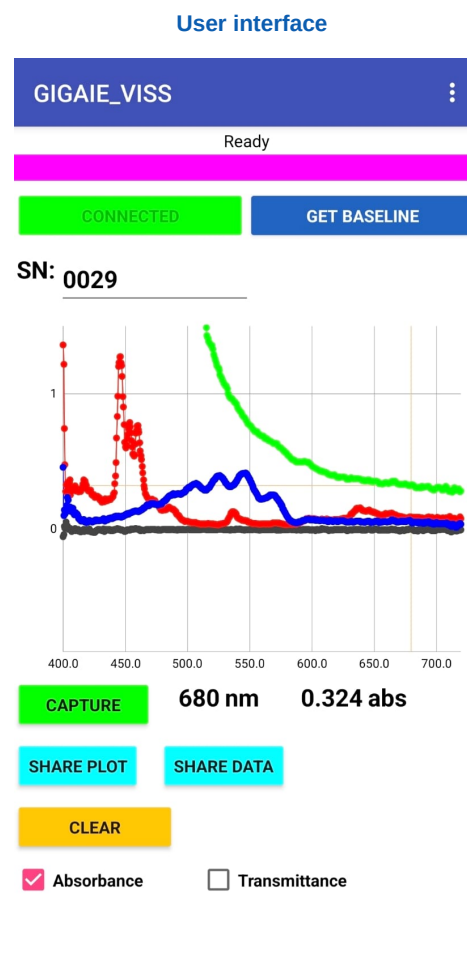


Figure 7.2. GIGAIE/VISS
Android user interface.

8. Preparing for measurements

8.1 Liquid samples

1. Select a clean, undamaged 10 mm optical cuvette.
2. Prepare a reference blank using the same solvent as the sample. Deionized water can be used for aqueous solutions.
3. Fill the cuvette sufficiently to cover the entire region traversed by the light beam.
4. Check for bubbles, suspended particles, and residue on the optical surfaces.
5. Clean the outside of the cuvette with optical tissue or a soft, lint-free cloth.
6. Insert the cuvette in the measurement compartment with its transparent faces aligned with the light beam.
7. Measure the reference blank first, then measure the sample.
8. Maintain the same cuvette orientation for every measurement.

Important: Do not insert a wet or overfilled cuvette, or one with liquid on its outer surface.

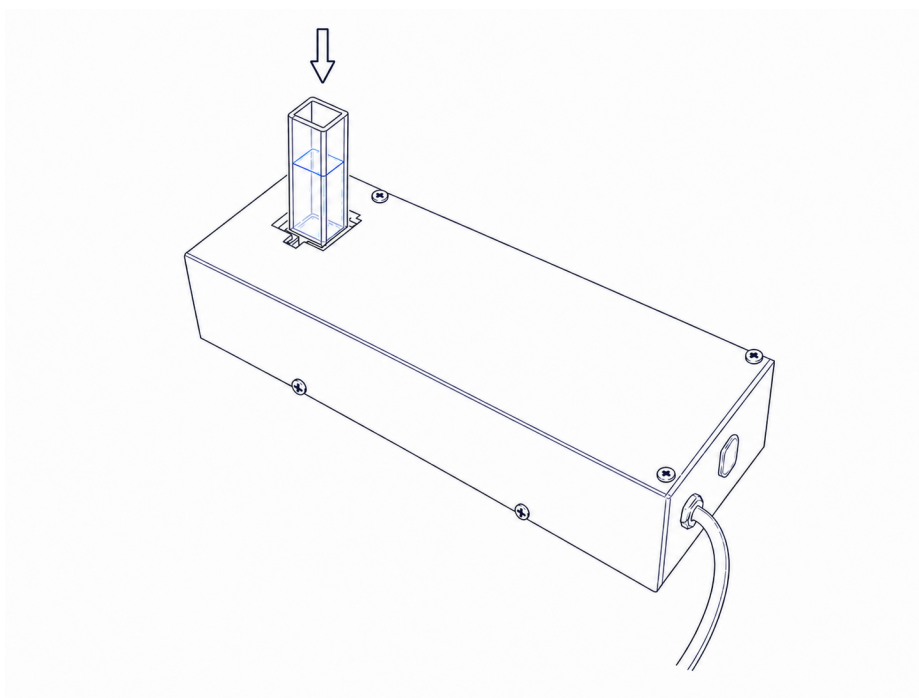


Figure 8.1. Inserting an optical cuvette containing a liquid sample.

8. Preparing for measurements

8.2 Thin-film samples

1. Use a clean, uncoated microscope slide as the reference blank.
 2. The reference slide must have the same material and thickness as the thin-film substrate.
 3. Clean the slide with a soft, lint-free cloth and check for dust, fingerprints, and residue.
 4. Insert the reference slide into the slot and acquire the baseline spectrum.
 5. Remove the reference slide and insert the slide carrying the thin film.
 6. Position the coated region so that it fully covers the area traversed by the light beam.
 7. Maintain the the same slide orientation and position for all measurements.
 8. Acquire the measurement and select transmittance to view the results.
- Important:** Handle slides by their edges. Avoid touching, scratching, or contaminating the film surface.

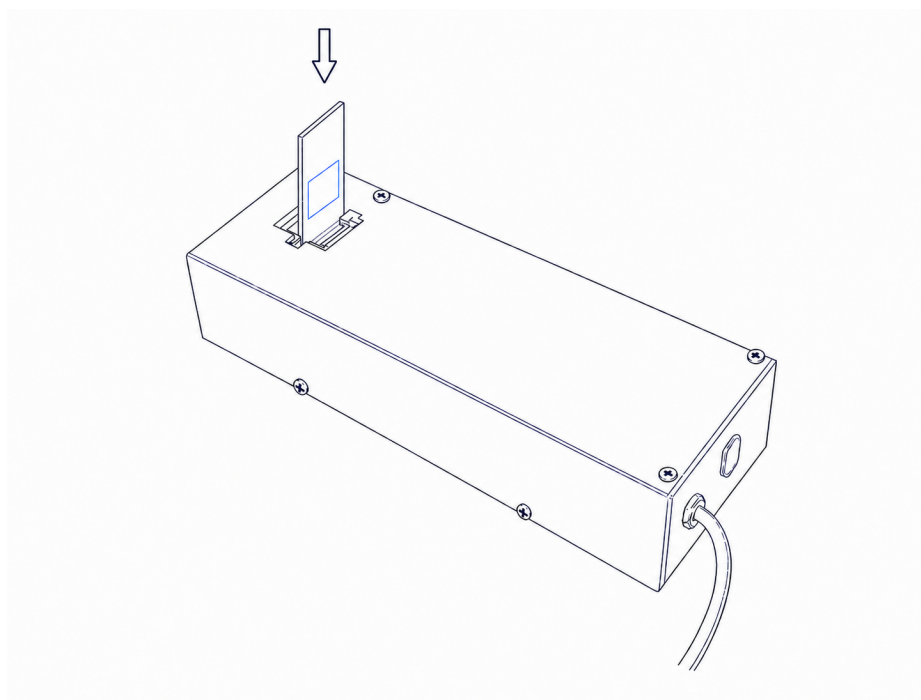


Figure 8.2. Inserting a microscope slide carrying a thin-film sample.

9. Measuring absorbance

Absorbance describes how much light a sample absorbs at each wavelength. It is calculated by comparing the intensity transmitted through the sample with the intensity measured using the reference blank.

$$A(\lambda) = -\log_{10}\left(\frac{I(\lambda)}{I_0(\lambda)}\right)$$

It can also be expressed as:

$$A(\lambda) = \log_{10}\left(\frac{I_0(\lambda)}{I(\lambda)}\right)$$

Where:

- $A(\lambda)$: absorbance at wavelength λ .
- $I_0(\lambda)$: intensity measured using the reference blank.
- $I(\lambda)$: intensity transmitted through the sample.

Absorbance is dimensionless. The GIGAIE/VISS software calculates it automatically using the stored reference spectrum.

10. Measuring transmittance

Transmittance is the fraction of light that passes through a sample at each wavelength. It is calculated by comparing the intensity transmitted through the sample with the intensity measured using the reference blank.

$$T(\lambda) = \frac{I(\lambda)}{I_0(\lambda)}$$

To express it as a percentage:

$$\%T(\lambda) = 100\left(\frac{I(\lambda)}{I_0(\lambda)}\right)$$

Where:

- $T(\lambda)$: transmittance at wavelength λ .
- $\%T(\lambda)$: percentage transmittance.
- $I_0(\lambda)$: intensity measured using the reference blank.
- $I(\lambda)$: intensity transmitted through the sample.
- The PC interface displays percentage transmittance (%T), generally between 0 and 100%.
- The Android application displays transmittance as a decimal fraction (T), generally between 0 and 1.

$$\%T = 100T$$

For example, $T = 0.75$ in Android is equivalent to 75% in the PC interface.

11. Saving and exporting data

Results can be exported in CSV format. This format organizes data in columns and can be opened, analyzed, and plotted using various programs.

Compatible programs

- Microsoft Excel
- Google Sheets
- LibreOffice Calc
- Origin
- MATLAB
- Python (Pandas and Matplotlib)
- R and RStudio

On a Windows PC

1. Select the data to export: Baseline, Raw Values, Absorbance, or Transmittance.
2. Press SAVE DATA.
3. Choose the CSV file name and location.
4. To save the graph as an image, press SAVE PLOT IMAGE.

On Android

1. Press SHARE DATA to generate and share a CSV file.
2. Choose an available application, such as email, WhatsApp, or file storage.
3. To generate a PNG image of the graph, press SHARE PLOT.

Sharing options depend on the applications installed and configured on the Android device.

12. Maintenance and cleaning

The GIGAIE/VISS spectrophotometer requires little maintenance. To keep it in good condition:

- Disconnect the instrument from the USB port before cleaning.
- Clean the housing with a soft cloth that is dry or slightly damp.
- Do not use solvents or abrasive products, and do not apply liquids directly to the instrument.
- Keep the sample opening free of dust, residue, and liquids.
- Do not insert objects or cleaning materials into the optical system.
- Clean cuvettes and slides after use, and store them protected from dust.
- Do not disassemble the instrument. Internal repairs and adjustments must be performed by authorized personnel.
- When not in use, store the instrument in a clean, dry place, preferably in its original packaging.

13. Troubleshooting

Most operating problems are related to communication between the instrument and the connected device.

Connection indicator

Flashing indicator: The instrument is powered on and waiting for a connection.

Steady indicator: The connection has been established.

13.1 Troubleshooting the PC connection

- After connecting the instrument to a USB port, open Windows Device Manager and check for a new port under Ports (COM & LPT).
- The port may be identified as a USB Serial CH340/CH341 device and assigned a number, for example COM4.
- If the COM port does not appear, disconnect the instrument, reinstall the driver by running CH341SER.EXE, and reconnect the instrument.
- Close any other program that may be using the COM port, such as a serial monitor or other communication software.
- Try another USB port and avoid USB hubs or extension cables.
- If the indicator continues flashing after you press CONNECT, the connection has not been established. When connected, the indicator remains steadily lit.

13. Troubleshooting

13.2 Troubleshooting the Bluetooth connection

- Check that the number entered in the SN field matches the rear label on the instrument. Enter only the four numeric characters.
- Check that Bluetooth is enabled and that the application has Bluetooth and Location permissions.
- Keep the Android device close to the spectrophotometer while connecting.
- Check that the instrument is not connected to another phone or tablet via Bluetooth.
- If the application cannot find the instrument, close the application completely, disconnect the instrument from USB power, and wait 30 seconds. Reconnect the instrument, reopen the application, and try connecting again.
- If the connection is interrupted during a measurement, reconnect and acquire a new reference spectrum before measuring again.

When the Bluetooth connection is established, the status indicator stops flashing and remains steadily lit.

14. Technical recommendations

- To improve measurement linearity, dilute samples when necessary to obtain absorbance values below 1. Record the dilution factor so it can be included in the analysis.
- For colorimetry and analysis using the Beer-Lambert law, avoid wavelengths near the ends of the spectral range. The recommended working interval is 430 to 630 nm.
- Use the same solvent and the same type of cuvette or substrate for the reference blank and the samples.
- Acquire a new reference spectrum whenever the solvent, cuvette, microscope slide, or measurement conditions change.
- Maintain the same cuvette or slide orientation and position to reduce variation between measurements.
- Make sure liquid samples are homogeneous and free of bubbles, precipitates, or large particles, which can scatter light and affect the results.
- When greater precision is required, measure each sample at least three times and use the average.

15. Warranty

The GIGAIE/VISS spectrophotometer includes a one-year warranty against manufacturing defects.

The warranty is void if the warranty seal has been altered, removed, or damaged. Do not open or disassemble the instrument.

Opening the instrument may alter the alignment of its optical components and cause permanent miscalibration, affecting measurement accuracy.

Repairs and internal adjustments must be performed exclusively by authorized personnel.

16. Contact information

For technical support, warranty information, or assistance with the GIGAIE/VISS spectrophotometer, contact:

GIGA IE

Email:

info@gigaie.com

Website:

<https://www.gigaie.com>

Product and manual:

<https://www.gigaie.com/viss>

Information to include in a support request

- Instrument serial number.
- Warranty label number.
- Detailed description of the problem.
- Photos or screenshots, when possible.
- Proof and date of purchase for warranty requests.