

# Go Direct™ SpectroVis® Plus Spectrophotometer

(Order Code GDX-SVISPL)



The Go Direct SpectroVis Plus is a portable, visible to near-IR spectrophotometer and fluorometer. This spectrophotometer can be used in a wide range of introductory spectroscopy experiments for chemistry, biology, and physics. Such experiments include: determining the peak wavelength to collect data on solution concentration for Beer's law studies, collecting a full wavelength spectrum to measure absorbance, percent transmittance, fluorescence, or emissions, and monitoring rates of reaction.

**Note:** Vernier products are designed for educational use. Our products are not designed nor are they recommended for any industrial, medical, or commercial process such as life support, patient diagnosis, control of a manufacturing process, or industrial testing of any kind.

## What's Included

- Go Direct SpectroVis Plus Spectrophotometer
- 15 plastic cuvettes and lids
- Rechargeable battery (included inside unit)
- Mini USB cable
- Power supply (for battery recharge only)

## Compatible Software

See [www.vernier.com/manuals/gdx-svispl](http://www.vernier.com/manuals/gdx-svispl) for a list of software compatible with the Go Direct SpectroVis Plus Spectrophotometer.

## Getting Started

### USB Connection

1. Connect the spectrophotometer directly to the USB port of the computer or LabQuest. You do not need to have the AC power connected or the battery charged. **Note:** The first time you connect a Spectrophotometer to a computer, your computer may ask you a few questions. **Do not go online for device drivers.** The device drivers were installed when you installed *Logger Pro*.
2. Start the appropriate data-collection software (*Logger Pro*, *LabQuest App*) if not already running, and choose New from File menu.

The software will identify the sensor and load a default data-collection setup. You are now ready to continue your experiment.

### Bluetooth® Wireless Connection

If you are collecting data using a Chromebook™ or mobile device such as iPad® or Android™ tablet, see the following link for up-to-date connection information:

[www.vernier.com/start/gdx-svispl](http://www.vernier.com/start/gdx-svispl)

**Note:** Bluetooth wireless compatibility requires Spectral Analysis app, which will be available for most devices in spring 2017. To receive notification when Spectral Analysis is available, sign up at [www.vernier.com/x596](http://www.vernier.com/x596)

## LED Behavior

### ⏻ Power LED

State	Meaning
Off	Unit is off
Green	Unit is on

### 🔌 Charging LED

State	Meaning
Off	Sufficient battery charge for normal use or unit is not charging
Orange	Unit is charging
Green	Charging is complete; battery is fully charged
Red (Flashing)	Battery level is low
Red (Solid)	Charging circuit timeout (~10 hr), battery fault, or no battery found

### 📶 Bluetooth LED

State	Meaning
Off	Bluetooth connection not available
Blue (Flashing)	Available for Bluetooth connection
Blue (Solid)	Connected to host via Bluetooth; ready for data collection
Red	Bluetooth system failed

### 🔌 USB LED

State	Meaning
Off	Not connected to USB host or no power from USB host
Orange	USB connected; not communicating with software
Green	Connected to host via USB; ready for data collection
Red	USB host failed to enumerate or USB port underpowered

## Using the Product with *Logger Pro*

Connect the sensor following the steps in the Getting Started section of this user manual.

### Select the Type of Data (or Units) You Want to Measure

The default data type is absorbance. If you want to measure the absorbance of a solution, proceed directly to the Calibrate section below.

If you want to measure %T, fluorescence (excited at 405 nm or 500 nm), or intensity, do the following:

1. Choose Change Units ► Spectrophotometer from the Experiment menu.
2. Select the unit or data type you wish to measure.

### Calibrate (Not Required if Measuring Intensity or Fluorescence)

1. To calibrate the SpectroVis Plus, choose Calibrate ► Spectrophotometer from the Experiment menu. **Note:** For best results, allow the Spectrophotometer to warm up for a minimum of five minutes.
2. Fill a cuvette about 3/4 full with distilled water (or the solvent being used in the experiment) to serve as the blank. After the Spectrophotometer has warmed up, place the blank cuvette in the Spectrophotometer. Align the cuvette so the clear side of the cuvette is facing the light source.
3. Follow the instructions in the dialog box to complete the calibration, and then click .

### Collect Data with Logger Pro

There are three general types of data collection that measure absorbance or transmittance—absorbance (or %T) vs. wavelength, which produces a spectrum, absorbance (or %T) vs. concentration for Beer's law experiments, and absorbance (or %T) vs. time for kinetics experiments.

### Measurement vs. Wavelength (Generate a Spectrum)

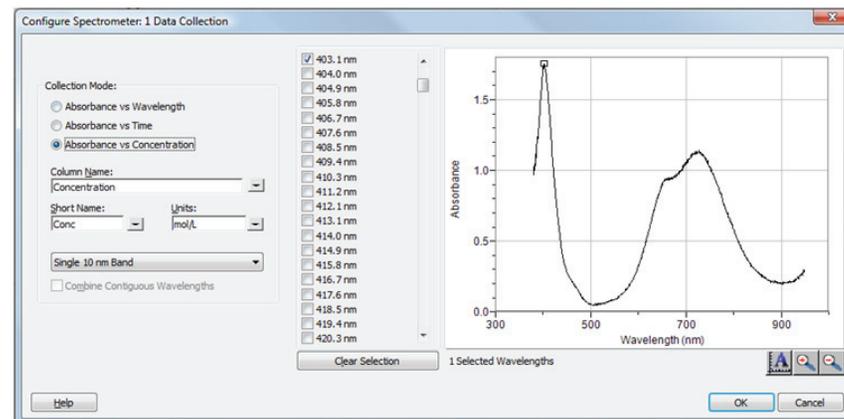
1. Fill a cuvette about 3/4 full of a sample of the solution to be tested. Place the sample in the Spectrophotometer and click . Click  to end data collection.
2. To store the spectrum data, choose Store Latest Run from the Experiment menu.

### Measurement vs. Concentration (Beer's Law Studies)

1. Generate a spectrum as described above.
2. Click the Configure Spectrophotometer Data Collection button, .

There are three regions in this box:

- **Collection Mode** The three options for data collection are offered. If the measurement (Absorbance in this example) vs. Time or vs. Concentration is selected, a wavelength or wavelengths will need to be chosen.
- **Graph** The graph displays a full-spectrum analysis of the sample in the cuvette holder. By default, the wavelength with the maximum measured value will be selected. You may wish to select a different wavelength. See Step 3 for details.
- **List of wavelength options** This column lists all the available wavelengths. It becomes active when either the Concentration or Time mode is selected.



Configure Spectrometer data-collection dialog box

3. Select Absorbance (or %T) vs. Concentration as the data-collection mode. The wavelength with the maximum value from the spectrum ( $\lambda$  max) will be automatically selected. There are three options when choosing a wavelength (or wavelengths) for subsequent measurements.
  - **Option 1** The default option is to use a single 10 nm band. This measures the average absorbance from ~5 nm on either side of the chosen wavelength. You can change the center wavelength value by clicking on the graph or by choosing a wavelength from the list.
  - **Option 2** If you wish to use the  $\lambda$  max chosen by Logger Pro, but you want the absorbance to be measured only at that one wavelength, change Single 10 nm Band to Individual Wavelengths. You may then select up to ten wavelengths to measure at the same time.
  - **Option 3** If you wish to measure an average over a range of contiguous wavelengths of your choice, change Single 10 nm Band to Individual Wavelengths. Click . Select boxes in the list or drag your cursor on the graph to select up to ten contiguous wavelengths. Check Combine Contiguous Wavelengths.
4. Click  to continue.
5. Click . Place your first sample in the cuvette slot of the Spectrophotometer. After the readings stabilize, click . Enter the concentration of the sample and click .
6. Place your second sample in the cuvette slot. After the readings stabilize, click . Enter the concentration of the second sample and click .
7. Repeat Step 6 for the remaining samples. When finished, click  to end data collection.
8. Click Linear Fit, , to see the best fit line equation for the standard solutions.
9. If doing Beer's law to determine the concentration of an unknown, place the unknown sample in the cuvette holder. Choose Interpolation Calculator from

the Analyze menu. A helper box will appear, displaying the absorbance and concentration of the unknown. Click .

#### Measurement vs. Time (Kinetics)

1. Generate a spectrum as described above.
2. Click the Configure Spectrophotometer Data Collection button, .
3. Select Absorbance vs. Time as the data-collection mode. The wavelength of maximum absorbance will be selected. Click  to continue or click  and select a wavelength on the graph or in the list of wavelengths. See the previous section for more details.
4. The default settings are 1 sample per second for 200 seconds. To change the data-collection parameters for your experiment, choose Data Collection from the Experiment menu and make the necessary changes. Click .
5. Mix the reactants. Transfer ~2 mL of the reaction mixture to a cuvette and place the cuvette in the Spectrophotometer. Click . Click  if you wish to end data collection early.
6. Click Curve Fit, , to calculate a function for your data.

#### Measure Emission Spectra with a Computer

You may use your Spectrophotometer to measure the emission spectrum of a light source such as an LED or a gas discharge tube. To do so, you will need to purchase the Vernier Optical Cable (order code: VSP-FIBER). **Note:** For best results observing emission spectra, consider the Vernier Emission Spectrometer (order code: VSP-EM).

#### Measure Intensity of Light Emissions

1. Insert the Vernier Optical Fiber into the SpectroVis Plus, lining up the white triangles.
2. Choose Change Units ► Spectrophotometer ► Intensity from the Experiment menu. Intensity is a relative measure with a range of 0–1. **Note:** The Spectrophotometer is not calibrated for measuring intensity.
3. Aim the tip of the optical fiber cable at a light source. Click . Click  to end data collection.

If the spectrum maxes out (flat and wide peaks at a value of 1), increase the distance between the light source and the tip of the optical fiber cable or reduce the sample time (see Change the Settings in *Logger Pro*).

To increase the sample time, or if data collection is unusually slow, choose Set Up Sensors ► Spectrophotometer: 1 from the Experiment menu. Set the Sample Time (begin with 75 ms, with subsequent reductions by 20 ms) to a suitable value and decrease the Samples to Average to 1.

#### Use the Stored Emissions Files in *Logger Pro*

*Logger Pro* contains a folder of emissions graphs from selected discharge tubes, including: argon, helium, hydrogen, mercury, oxygen, sodium, and xenon. You can display and analyze these graphs without a spectrometer connected to your computer. Follow these steps to view one of these graphs.

1. Choose Open from the File menu.
2. Open the Sample Data folder.

3. Inside the Sample Data folder, open the Physics folder.
4. Inside the Physics folder, open the Gas Discharge Spectra. Open the desired file.

You can use the mercury emissions graph to test fluorescent lighting for the presence of mercury.

#### Measure Fluorescence with *Logger Pro*

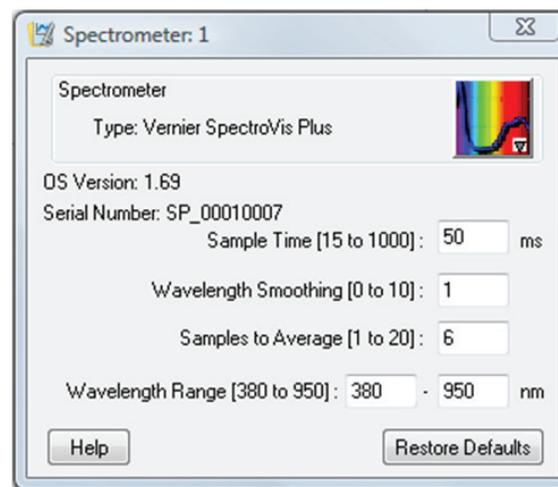
You may use your Spectrophotometer to measure the fluorescence spectrum of an aqueous sample, such as chlorophyll, riboflavin, and fluorescein. Fluorescence is the emission of light by a compound after it has absorbed a particular wavelength of light. Under most circumstances, the emission of light will occur at a longer wavelength than the light used to excite it. The SpectroVis Plus has two excitation wavelengths, one at 405 nm and one at 500 nm.

There are three general types of data collection that measure fluorescence—fluorescence vs. wavelength, which produces a spectrum, fluorescence vs. concentration, and fluorescence vs. time for kinetics experiments. Once the units have been changed to Fluorescence from the Experiment menu, follow the instructions in the Collect Data with *Logger Pro* section of this user manual to collect these types of data.

#### Change the Settings in *Logger Pro*

##### Spectrophotometer Dialog Box

The Spectrophotometer dialog box lists all the settings for the device. To display this box, choose Set Up Sensors ► Spectrophotometer from the Experiment menu.



*Spectrometer dialog box*

For most experiments, the default settings work well.

There are four parameters listed in the dialog box.

- Sample Time: This is similar to the shutter speed of a camera. *Logger Pro* automatically selects the proper sample time during calibration. **Note:** For

emission studies, you may need to change the sample time manually.

- **Wavelength Smoothing:** This is the number of adjacent readings on either side of a given value that is used to calculate an average value. **Note:** Be careful adjusting this parameter as it may shift your wavelength values slightly.
- **Samples to Average:** This is the number of readings taken at a given wavelength to calculate an average reading.
- **Wavelength Range:** The range is determined by the type of Spectrophotometer in use.

By clicking on the picture of the Spectrophotometer in this dialog box, you will gain access to four options: calibrate, configure data collection, go to the support website, and units of measure. Click on an item to select it.

## Using the Product with LabQuest App

### Select the Type of Data (or Units) You Want to Measure

The default data type is absorbance. If you want to measure the absorbance of a solution, proceed directly to the Calibrate section.

If you want to measure %T, fluorescence (excited at 405 nm or 500 nm), or intensity, do the following:

1. From the Sensors menu, choose Change Units ► USB: Spectrophotometer.
2. Select the unit or data type you wish to measure.

### Calibrate the Spectrophotometer (Not Required if Measuring Intensity or Fluorescence)

1. Choose Calibrate ► USB: Spectrophotometer from the Sensors menu. **Note:** For best results, allow the Spectrophotometer to warm up for a minimum of five minutes.
2. Fill a cuvette about 3/4 full with distilled water (or the solvent being used in the experiment) to serve as the blank. After the Spectrophotometer has warmed up, place the blank cuvette in the Spectrophotometer. Align the cuvette so a clear side of the cuvette is facing the light source.
3. Follow the instructions in the dialog box to complete the calibration, and then tap OK.

### Collect Data with LabQuest

Measurement vs. Wavelength (Generate a Spectrum)

1. Fill a cuvette about 3/4 full of the solution to be tested and place it in the Spectrophotometer.
2. Start data collection by tapping on the Start button in the lower left corner of the screen. Tap the Stop button to end data collection.
3. Select wavelength. **Note:** The wavelength of maximum absorbance ( $\lambda$  max) is automatically selected. This  $\lambda$  max will be used for any subsequent data collection, such as a Beer's law experiment (abs vs. conc.) or a kinetics experiment (abs vs. time). If you wish to choose another wavelength, you can tap on the graph to select a new wavelength. Another way to change the wavelength is to navigate to the Meter screen, tap on the meter, and select Change Wavelength. Enter the wavelength of your choice and select OK. If

the wavelength you type in is not measured by the unit, LabQuest will automatically choose the wavelength closest to your choice.

4. To store the spectrum data, tap on the file cabinet icon in the upper right of your screen.

### Measurement vs. Concentration (Beer's Law Studies)

1. Generate a spectrum as described above. On the Meter screen, tap Mode. Change the mode to Events with Entry.
2. Enter the Name (e.g., Concentration) and Units (e.g., mol/L). Select OK.
3. A message will appear warning you to either save or discard the full spectrum run. Make your choice and proceed with data collection.
4. Place your first Beer's law standard solution in the Spectrophotometer. Start data collection. After the absorbance reading stabilizes, tap Keep. Enter the concentration of the solution and select OK.
5. Place your second standard sample in the Spectrophotometer. After the absorbance readings stabilize, tap Keep. Enter the concentration of the second sample and select OK.
6. Repeat Step 5 for the remaining standard samples. After you have tested the final standard, tap the Stop button to end data collection.
7. To calculate a best fit line equation for your standards, choose Curve Fit from the Analyze menu. Select Linear for the Fit Equation, and then select OK. The graph screen will appear again with the linear regression equation displayed.
8. Place a cuvette containing an unknown sample of solution in the Spectrophotometer. Tap the Meter tab and write down the displayed absorbance value. Tap the Graph tab and choose Interpolate from the Analyze menu. Trace the linear regression equation to determine the concentration of the unknown.

### Measurement vs. Time (Kinetics)

1. Generate a spectrum as described above. On the Meter screen, tap Mode. Change the data-collection mode to Time Based.
2. You can change the rate, interval, and/or duration of time of data collection, if desired. Select OK when you are ready to proceed.
3. A message will appear warning you to either save or discard the full spectrum run. Make your choice and proceed with data collection.
4. Mix the reactants, transfer ~2 mL of the reaction mixture to a cuvette, and place the cuvette in the Spectrophotometer. Start data collection. You may tap the Stop button to end data collection early.
5. To calculate a function for your data, choose Curve Fit from the Analyze menu. Select the Fit Equation, and then select OK. The graph screen will appear again.

### Measure an Emission Spectrum with LabQuest

You may use your Spectrophotometer to measure the emission spectrum of a light source such as an LED or a gas discharge tube. To do so, you will need to purchase the Vernier Optical Fiber (order code: VSP-FIBER). **Note:** For best results observing emission spectra, consider the Vernier Emission Spectrometer (order code: VSP-EM).

## Measure Intensity of Light Emissions

1. Insert the Vernier Optical Fiber into the SpectroVis Plus, lining up the white triangles.
2. Use a USB cable to connect the Spectrophotometer to your LabQuest.
3. Choose New from the File menu.
4. On the Meter screen, tap Change Units ► USB: Spectrophotometer ► Intensity from the Sensors menu. Intensity is a relative measure with a range of 0–1. **Note:** The Spectrophotometer is not calibrated for measuring intensity.
5. Aim the tip of the optical fiber at a light source. Start data collection. Tap the Stop button to end data collection.

If the spectrum maxes out (flat and wide peaks at a value of 1), increase the distance between the light source and the tip of the optical fiber cable or reduce the sample time (see Change the Settings in LabQuest below).

To increase the sample time, or if data collection is unusually slow, choose Set Up Sensors ► Spectrophotometer: 1 from the Experiment menu. Set the Sample Time (begin with 75 ms, with subsequent reductions by 20 ms) to a suitable value and decrease the Samples to Average to 1.

## Measure Fluorescence with LabQuest

You may use your Spectrophotometer to measure the fluorescence spectrum of an aqueous sample, such as chlorophyll, riboflavin, and fluorescein. Fluorescence is the emission of light by a compound after it has absorbed a particular wavelength of light. Under most circumstances, the emission of light will occur at a longer wavelength than the light used to excite it. The SpectroVis Plus has two excitation wavelengths: one at 405 nm and one at 500 nm.

There are three general types of data collection that measure fluorescence—fluorescence vs. wavelength, which produces a spectrum, fluorescence vs. concentration, and fluorescence vs. time for kinetics experiments. Once the units have been changed to Fluorescence from the Sensors menu, follow the instructions in the Collect Data with LabQuest section of this user manual to collect these types of data.

## Change the Settings in LabQuest

### Data Collection Screen

The Data Collection Screen in LabQuest lists all the settings for the device. To display this box, choose Sensors ► Data Collection from the Meter screen.

For most experiments, the default settings work well.

There are four parameters listed in the dialog box.

- **Sample Time:** This is similar to the shutter speed of a camera. LabQuest automatically selects the proper sample time during calibration. **Note:** For emission studies, you may need to change the sample time manually.
- **Wavelength Smoothing:** This is the number of adjacent readings on either side of a given value that is used to calculate an average value. **Note:** Be careful adjusting this parameter as it may shift your wavelength values slightly.
- **Samples to Average:** This is the number of readings taken at a given wavelength to calculate an average reading.

- **Wavelength Range:** The range is determined by the type of Spectrophotometer in use.

## Videos

View videos related to this product at [www.vernier.com/gdx-svispl](http://www.vernier.com/gdx-svispl)

## Specifications

Resolution	12 bit
Battery	High-capacity, lithium-ion rechargeable battery
Battery life (single full charge)	~24 hours (varies depending on sensors used)
Battery life (long term)	~500 full charge cycles (several years depending on usage)
USB specification	2.0 full speed
Wireless specification	Bluetooth® v4.2
Maximum wireless range	30 m (unobstructed)
Dimensions	15 cm × 9 cm × 4 cm
Support for fluorescence	Excitation centered at 405 and 500 nm
Light source	Incandescent with LED support
Detector	Linear CCD
Wavelength range	380 nm–950 nm
Wavelength reporting interval	~1 nm
Optical resolution (FWHM)	5.0 nm
Wavelength accuracy	± 4.0 nm
Photometric accuracy	±0.10 A.U.
Typical scan time	~2 s
Operating temperature	15–35°C

## Safety

- When this instrument is in data-collection mode labeled Intensity, the light source will be blocked or turned off. Continue to use proper safety precautions.
- Do not remove or modify any of the installed safety components of this device. Doing so will create an unsafe operating condition and will void the product warranty.
- No user-serviceable parts are in this device. Do not attempt to open or modify this device. Contact Vernier for all repairs and service including lamp replacement.
- Handle the device with care. This instrument can be damaged if it is dropped.

- Do not use this instrument if it is damaged in any way. Contact Vernier Technical Support for troubleshooting and technical assistance.
- Do not use this instrument for clinical or diagnostic procedures.

## Troubleshooting

For troubleshooting tips, see [www.vernier.com/til/3847](http://www.vernier.com/til/3847)

## Repair Information

- The light source in the Go Direct SpectroVis Plus is an incandescent lamp. The lifetime of this source is rated at approximately 8,000 hours.
- The lamp is covered by a three-year warranty.
- Contact Vernier for all repairs and service including lamp replacement.
- No user-serviceable parts are in this device. Do not attempt to open the case of the device. Do not attempt to change or repair the lamp. Doing so will create an unsafe operating condition and will void the product warranty.

If you have watched the related product video(s), followed the troubleshooting steps, and are still having trouble with your Go Direct SpectroVis Plus, contact Vernier Technical Support at [support@vernier.com](mailto:support@vernier.com) or call 888-837-6437. Support specialists will work with you to determine if the unit needs to be sent in for repair. At that time, a Return Merchandise Authorization (RMA) number will be issued and instructions will be communicated on how to return the unit for repair.

## Accessories/Replacements

Item	Order Code
Cuvette Rack	CUV-RACK
Plastic Cuvettes (Visible Range)	CUV
Vernier Spectrophotometer Optical Fiber	VSP-FIBER
Replacement Battery for LabQuest® 2 and LabQuest Stream®	LQ2-BAT
LabQuest Power Supply	LQ-PS
Vernier Mini USB Cable	CB-USB-MINI

## Warranty

Vernier warrants this product to be free from defects in materials and workmanship for a period of five years from the date of shipment to the customer. This warranty does not cover damage to the product caused by abuse or improper use. This warranty covers educational institutions only. The light source is covered for three years.

## Disposal

When disposing of this electronic product, do not treat it as household waste. Its disposal is subject to regulations that vary by country and region. This item should be given to an applicable collection point for the recycling of electrical and electronic equipment. By ensuring that this product is disposed of correctly, you help prevent potential negative consequences on human health or on the environment. The recycling of materials will help to conserve natural resources. For more detailed information about recycling this product, contact your local city office or your disposal service.

Battery recycling information is available at [www.call2recycle.org](http://www.call2recycle.org)

Do not puncture or expose the battery to excessive heat or flame.



The symbol, shown here, indicates that this product must not be disposed of in a standard waste container.

## Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

### FCC Caution

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference and
- (2) this device must accept any interference received, including interference that may cause undesired operation

### RF Exposure Warning

The equipment complies with RF exposure limits set forth for an uncontrolled environment. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

## IC Statement

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:

- (1) this device may not cause interference, and
- (2) this device must accept any interference, including interference that may cause undesired operation of the device.

**Industry Canada - Class B** This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled "Digital Apparatus," ICES-003 of Industry Canada. Operation is subject to the following two conditions: (1) this device may not cause interference, and

- (2) this device must accept any interference, including interference that may cause undesired operation of the device.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

**RF exposure warning:** The equipment complies with RF exposure limits set forth for an uncontrolled environment. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

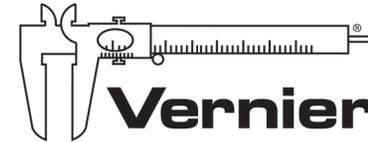
- (1) l'appareil ne doit pas produire de brouillage, et
- (2) l'appareil doit accepter tout interférence radioélectrique, même si cela résulte à un brouillage susceptible d'en compromettre le fonctionnement.

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe B prescrites dans la norme sur le matériel interférant-brouilleur: "Appareils Numériques," NMB-003 édictée par Industrie Canada. L'utilisation est soumise aux deux conditions suivantes:

- (1) cet appareil ne peut causer d'interférences, et
- (2) cet appareil doit accepter toutes interférences, y comprises celles susceptibles de provoquer un dysfonctionnement du dispositif.

Afin de réduire les interférences radio potentielles pour les autres utilisateurs, le type d'antenne et son gain doivent être choisis de telle façon que l'équivalent de puissance isotrope émise (e.i.r.p.) n'est pas plus grand que celui permis pour une communication établie.

**Avertissement d'exposition RF:** L'équipement est conforme aux limites d'exposition aux RF établies pour un environnement non supervisé. L'antenne (s) utilisée pour ce transmetteur ne doit pas être jumelée ou fonctionner en conjonction avec toute autre antenne ou transmetteur.



MEASURE. ANALYZE. LEARN.™

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