



## FX86 CWDM Quad Laser Source

Please direct all questions to your local VeEX Sales Office, Representative, or Distributor. Or, contact VeEX technical support at [www.veexinc.com](http://www.veexinc.com).

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## 1.0 About This User Manual

This user manual is suitable for novice, intermediate, and experienced users and is intended to help you successfully use the features and capabilities of the FX86 CWDM Quad Laser Source. It is assumed that the user has basic computer experience and skills, and is familiar with optical fiber, telecommunication concepts, terminology, and safety.

Every effort was made to ensure that the information contained in this user manual is accurate. Information is subject to change without notice and we accept no responsibility for any errors or omissions. In case of discrepancy, the web version takes precedence over any printed literature. The content in this manual may vary from the software version installed in the unit.

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For more technical resources, visit the VeEX, Inc. web site at [www.veexinc.com](http://www.veexinc.com).

If you need assistance or have questions related to the use of this product, call or e-mail our customer care department for customer support. Before contacting our customer care department, you must have your product serial number and software version ready. Please provide this number when contacting VeEX customer service.

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## 2.0 Safety Information



Safety precautions should be observed during all phases of operation of this instrument. The instrument has been designed to ensure safe operation however please observe all safety markings and instructions. Do not operate the instrument in the presence of flammable gases or fumes or any other combustible environment. VeEX Inc. assumes no liability for the customer's failure to comply with safety precautions and requirements.



### Optical Connectors

The test platform displays a laser warning icon when the laser source is active to alert the user about a potentially dangerous situation. Make sure that optical sources are inactive before connecting fiber to the test set to avoid skin or eye damage, or damage to the unit. It is recommended to:

- Deactivate the laser before connecting or disconnecting optical cables or patchcords.
- Never look directly into an optical patchcord or an optical interface (e.g. CFP, CFP2, CFP4, QSFP+, SFP+, SFP, OTDR, LS, VFL) while the laser is enabled. Even though optical transceivers are typically fitted with Class 1 lasers, which are considered eye safe, optical radiation for an extended period can cause irreparable damage to the eyes.
- Never use a fiber microscope to check the optical connectors when the laser source is active.

### Electrical Connectors

Telephone lines may carry dangerous voltages. Always connect the electrical test ports to known test interfaces which carry low level signals.

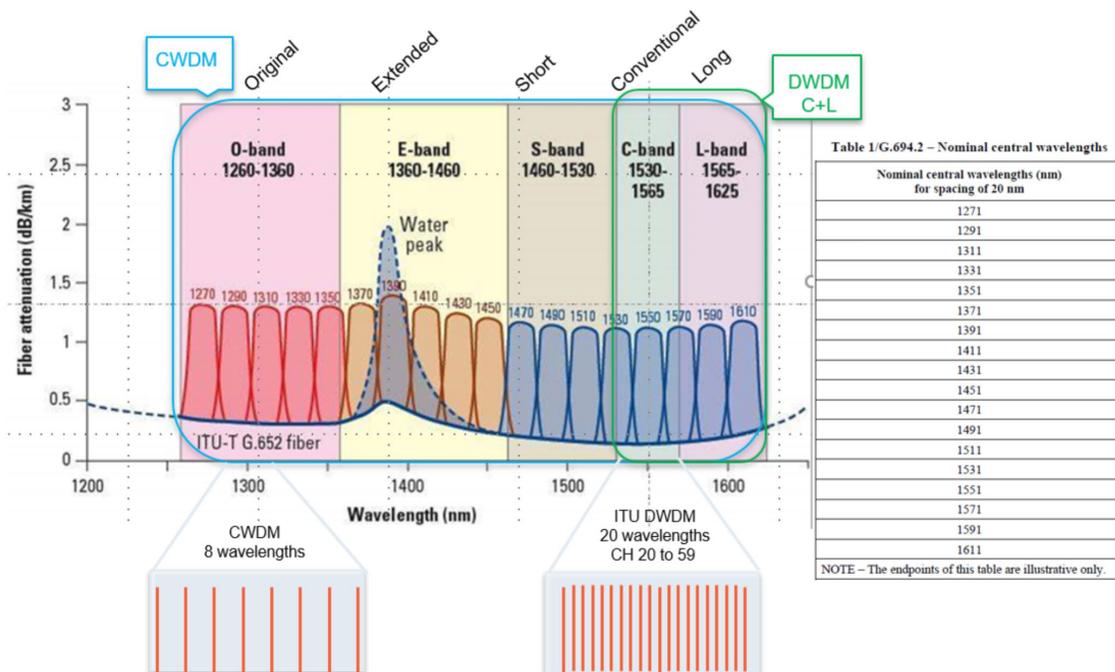
### 3.0 Product Introduction

The FX86 CWDM Quad Laser Source is a handheld optical testing device for providing calibrated laser radiation, to be used together with an optical power meter. The accompanying power meter must be calibrated to one of the FX86 laser wavelengths. For the power meter operations, please see its manual.

#### 3.1 FX86 Overview

CWDM – Course Wavelength Division Multiplexing is a WDM technology characterized by wide, 20 nm channel spacing and grid wavelengths with 1271 nm to 1611 (16 active channels) and is typically used for shorter distances as found in city and access networks.

*CWDM Spectrum Graph*



The FX86 CWDM Quad Laser Source is specially engineered to test CWDM systems. A single device can support up to 4 fixed wavelengths for OLS fiber optic network testing and measurement, defined by the customer upon ordering. The wavelengths can be any 4 values in the 1270 – 1610 nm range incremented by 20 nm, in any combination.

To make the fiber identification in a rack more convenient, the laser signal from FX86 with a calibrated wavelength (see the CDWM set of calibrated wavelengths above) is also modulated with the following frequencies:

- CW (Continuous Wave)
- 270 Hz
- 330 Hz
- 1000 Hz
- 2000 Hz

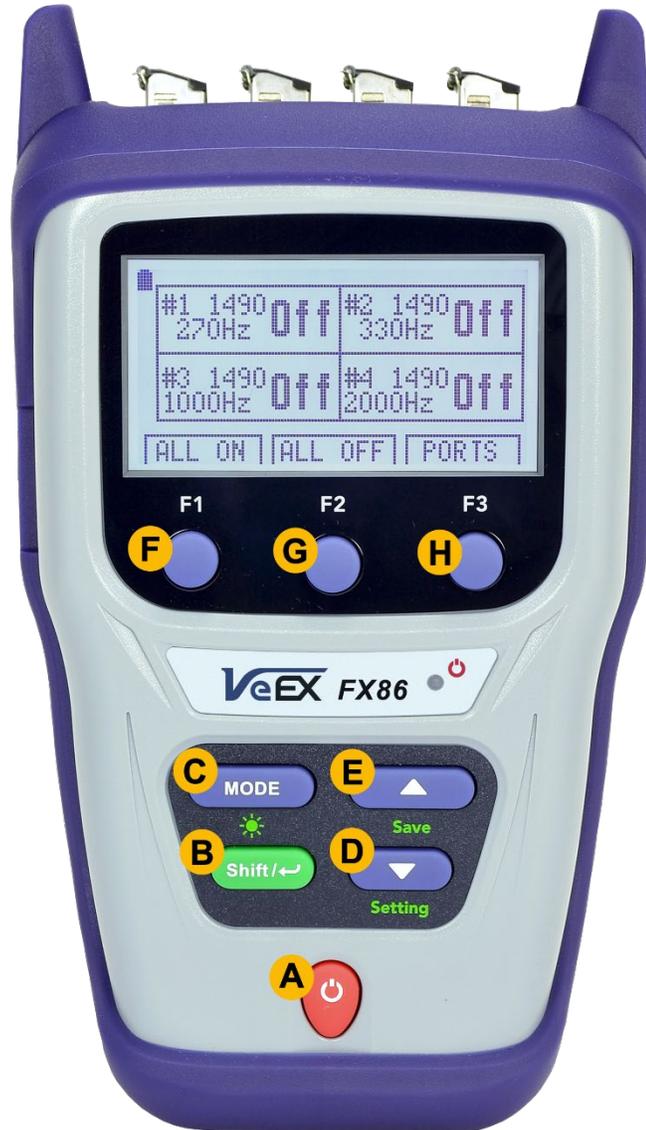
## 3.2 Definitions

<b>Optical Interface:</b>	<p>PC, UPC, APC (designates the connector end face polish type):</p> <ul style="list-style-type: none"> <li>• PC (regular Physical Contact): better than -45 dB return loss</li> <li>• UPC (Ultra Physical Contact): better than -55 dB return loss</li> <li>• APC (Angled Physical Contact): better than -65 dB return loss</li> </ul>
<b>Optical Patchcord:</b>	<p>A fiber (typically tight-buffered) terminated with an Optical Connector on each end (see below). Patchcords can be configured in simplex, duplex, or ribbon cable configuration. Patchcords can be made with singlemode or multimode fiber.</p>
<b>Optical Connector:</b>	<p>A patchcord is terminated with a MALE type connector. There are a wide variety of optical connectors, such as FC, SC, LC, MU, etc. For singlemode fiber, the end face can have either 'flat' or 'angled' Optical Polish (for example, FC/UPC or FC/APC). Multimode fiber end face is always flat.</p>
<b>Fixed Optical Adapter: (mid-coupler or bulkhead)</b>	<p>The adapter is used to connect two male Optical Connectors together (Example: FC-FC, FC-SC, FC-LC).</p> <p>On a test set with universal interface option, one side of the coupler may be changed by user using universal/variable adapters (see Variable Optical Adapter). However, the connectors have to be of the same Optical Polish (for example FC/UPC or FC/APC). Optical Adapters are located on instrument test ports (OTDR, Power Meter, Light Source, OSA, etc.), network equipment front panels or patch panels</p>
<b>Variable Optical Adapter:</b>	<p>Unlike with the Fixed Optical Adapter, one or both end female connectors of a Variable Optical Adapter can be changed to accommodate different male Optical Connectors.</p>

## 4.0 Basic Operation

### 4.1 FX86 Front Panel Layout

*FX86/87 Front View*



#### 4.1.1 LED Indicators

**Power LED:** A single LED indicates the power state of the unit.

- The LED is off when the unit is powered off.
- The LED is green when the unit is powered on.
- The LED is orange when the unit is connected to the AC power port and powered off (charging).

## 4.1.2 Rubber Keypad

See the details below for information on the keypad functions, as labelled on the image above.

- **A: Power** - Press for 3 seconds to turn the test set ON or OFF (prevents accidental ON/OFF). Initially, the display will show the current date, time, and mode of operation.
- **B: SHIFT/Enter** – Confirms choice when editing a parameter or starts selected action. Depends on active application.
- **D/E: Up/Down** - Used to change the selected parameter. Depends on active application and unit configuration.
- **F/G/H:** Soft-key functions, which vary depending upon operating mode. Function menu options appear at the bottom of the screen.

**SHIFT + MODE:** Switches the backlight mode: OFF, Low-level, Mid-level, Bright-level.

**SHIFT + DOWN:** Instrument Settings mode

## 4.2 Test Ports

### 4.2.1 Optical Ports

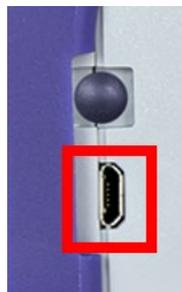
*FX86 OLS Optical Ports*



**OLS ports:** Used to provide 4 independent, continuous light sources at the specified wavelengths. Pairing the OLS with an OPM allows you to test for loss or end-to-end continuity on a CWDM network.

### 4.2.2 Service Port

*FX86 Service Port*



The service port (micro-USB) located on the left side of the device is used to charge the unit.

## 5.0 Getting Started

Please note that FX86 works with a power meter calibrated to one of the FX86 laser wavelengths. For the power meter operations, see its manual.

Before using the FX86 CWDM quad laser source for the first time, fully charge the battery and set the local date and time.

### 5.1 Battery

The unit is equipped with a built-in, rechargeable Li-Polymer 3A, smart charge battery and it is partially charged upon delivery. However, VeEX recommends charging the battery to full capacity before using the test unit for the first time.



*The device is powered from the built-in Li-Polymer battery and can be operated with the AC/ DC adaptor plugged in.*

When the test unit is plugged into AC/DC power, the Plugged icon (  ) appears on the top left corner of the display. When the unit is operating on the internal battery, the Battery icon (  ) appears.



*It is recommended to charge the battery at room temperature to preserve its life and to obtain maximum charge.*

To charge the test unit, connect the AC/DC adaptor supplied with the unit to the micro-USB service port located on the left side of the device. The battery charging time depends on the battery condition and ambient temperature. Only use the cables provided with the device to charge the battery.



**Important:** *The Li-Polymer battery is designed for maximum safety. However, the battery may explode, leak or catch fire when:*

- *It is exposed to high temperatures or fire.*
- *It is opened or dismantled.*

The test unit provides up to 35 hours of battery time when operating in Broadband OPM mode and up to 25 hours when operating in FTTx PON mode. An auto-off feature, configured in the Settings mode, powers down the unit when a low battery condition is reached.

#### 5.1.1 Battery Replacement

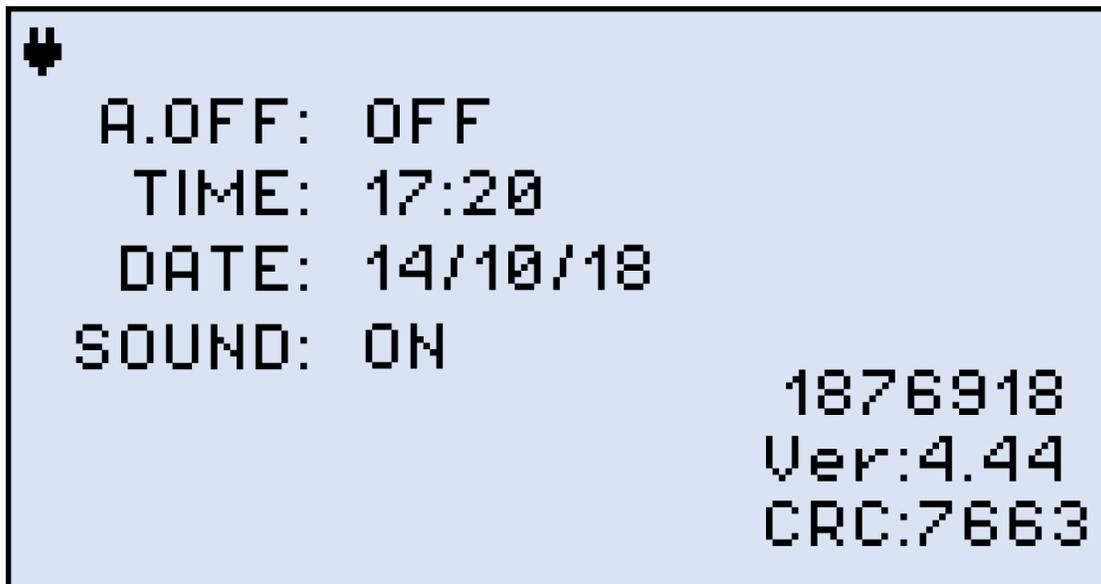
Battery replacement in the field is not authorized or permitted. The unit must be returned to an authorized VeEX service center or partner for repair.

## 5.2 Instrument Settings

To properly save the date/time with your measurement results, you must set the device date and time to your local date/time. To set the date and time:

1. Power ON the test unit by pressing and holding the **Power** button for 3 seconds. The green LED light turns on to indicate the unit is on.
2. Press **Shift/Enter + Down** to enter the Settings mode. The following parameters can be set: Auto Shutdown mode, Time and Date. The current selected test parameter available to edit will be flashing.
3. Press **Up** and **Down** to change the parameter.
4. Press **MODE** to select the next field to edit, then change the value if necessary by pressing Up and Down.
5. Press **Shift/Enter** to save the date and time settings.

*FX86 Instrument Setting screen*



## 5.3 Resetting your FX86

To reset your device:

1. Disconnect external power supply from the device;
2. With the device OFF, press the red **Power** button and hold it for at least 15 seconds. The FX86 will reboot, but you will need to reset the date and time (see above).

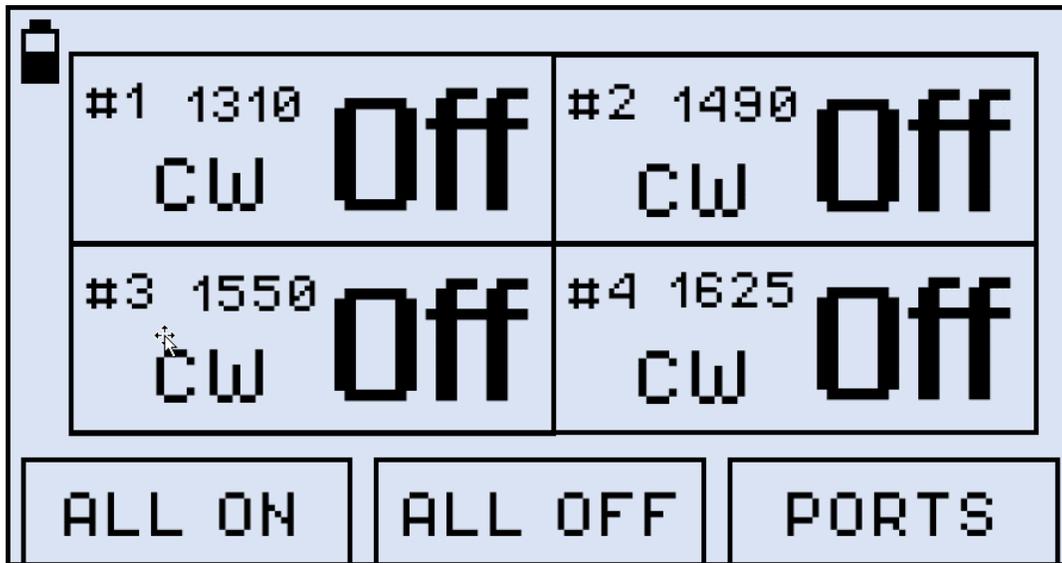
## 6.0 Fiber Measurements

### 6.1 Optical Light Source

To use your device as a stable light source:

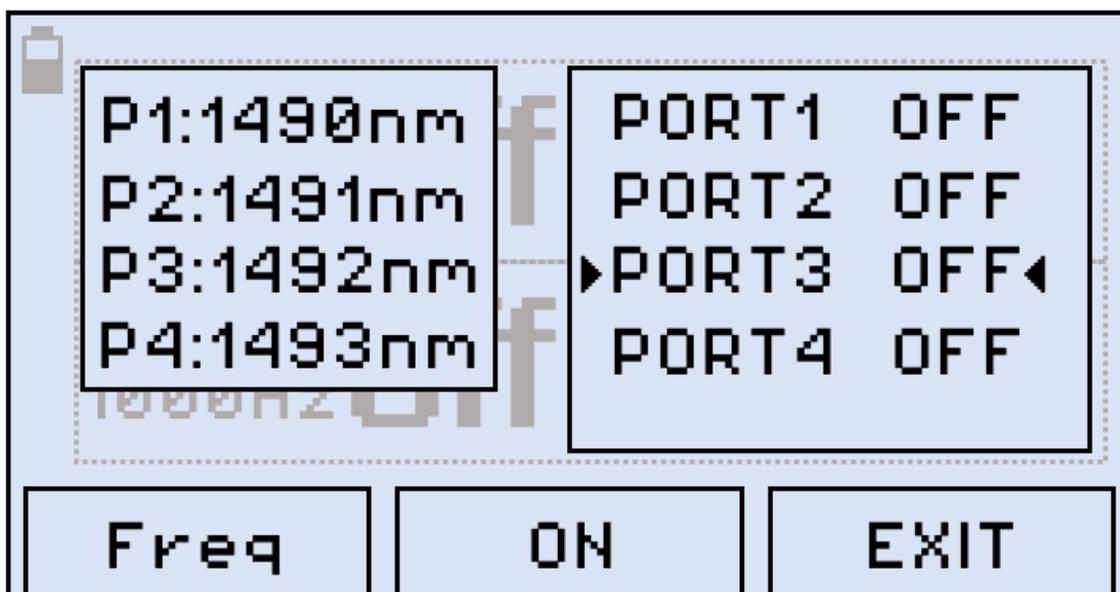
1. Press the red **POWER** button to turn the test unit on.

*FX86 Main Menu Screen*



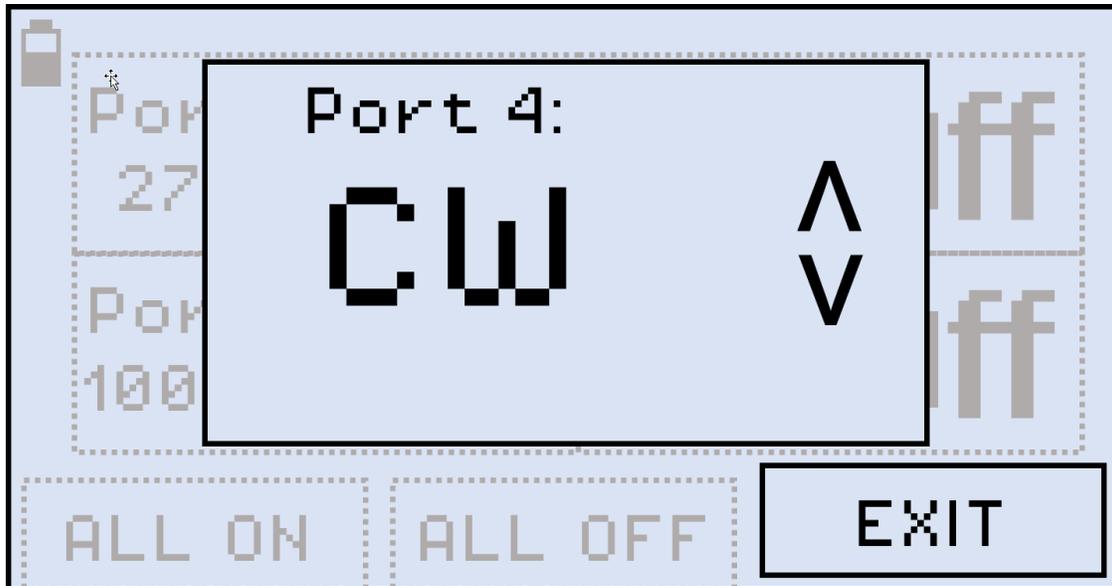
2. To turn all ports on with the indicated frequencies, press **F1** (ALL ON). To turn all ports off, press **F2** (ALL OFF).
3. To set a certain frequency to a specified port, press **F3** (PORTS).

*FX86 Port Settings Screen*



4. Press **Up** and **Down** to select a port. Then press **F2** (ON) to turn it on with the frequency previously specified.
5. To change the port frequency, press **F1** (Freq).

*FX86 Individual Port Frequency Screen*



6. Press **Up** and **Down** to select the port frequency (Continuous Wave, 270 Hz, 330 Hz, 1000 Hz, 2000 Hz). The port frequency is then saved to the device. Note that setting the port frequency when the port is off DOES NOT turn the port on, you must do it separately.

## 7.0 Warranty and Software

**Warranty Period:** The warranty period for hardware, software and firmware is one (1) year from the date of shipment to the customer. The warranty period for battery pack, LCD, LCD touch panel, LCD protective cover, and accessories (including, but not limited to patch cords, AC adaptor, SFP, USB adaptors, carrying case, carrying pouch) is limited to one (1) year.

**Hardware Coverage:** VeEX Inc. warrants hardware products against defects in materials and workmanship. During the warranty period, VeEX Inc. will, at its sole discretion, either

- Repair the products
- Replace hardware which prove to be defective

provided that the products that the customer elects to replace are returned to VeEX Inc. by the customer, along with Proof of Purchase, within thirty (30) days of the request by the customer, freight prepaid.

**Software Coverage:** VeEX Inc. warrants software and firmware materials against defects in materials and workmanship. During the warranty period, VeEX Inc. will, at its sole discretion, either

- Repair the products
- Replace software and/or firmware which prove to be defective

provided that the products that the customer elects to replace are returned to VeEX Inc. by the customer, along with proof of purchase, within thirty (30) days of the request by the customer, freight prepaid.

Additionally, during the warranty period, VeEX Inc. will provide, without charge to the customer, all fixes, patches and enhancements to the purchased software, firmware and software options. VeEX Inc. does not warrant that all software or firmware defects will be corrected. New enhancements attached to a software option require the option to be purchased (at the time of order or the time of upgrade) in order to benefit from such enhancements.

**Limitations:** The warranty is only for the benefit of the customer and not for the benefit of any subsequent purchaser or licensee of any merchandise (hardware, software, firmware and/or accessories).

**Revoking the warranty:** VeEX Inc. does not guarantee or warrant that the operation of the hardware, software or firmware will be uninterrupted or error-free. The warranty will not apply in any of the following cases:

- Improper or inadequate maintenance by the customer
- Damage due to software installed by the customer on the unit without prior authorization (written) from VeEX Inc.

- Unauthorized alteration or misuse
- Damage occurred from operating the unit outside of the environmental specifications for the product
- Improper installation by the customer

## 8.0 Product Specifications



The most recent product specifications can be found on the VeEX web site at [www.veexinc.com](http://www.veexinc.com).

## 9.0 Certifications and Declarations



Declaration of Conformity

### What is CE?

The CE marking is a mandatory European marking for certain product groups to indicate conformity with the essential health and safety requirements set out in European Directives. To permit the use of a CE mark on a product, proof that the item meets the relevant requirements must be documented.

Use of this logo implies that the unit conforms to requirements of European Union and European Free Trade Association (EFTA). EN61010-1

For a copy of the CE Declaration of Conformity relating to VeEX products, please contact VeEX customer service.



ROHS Statement

### What is RoHS?

RoHS is the acronym for Restriction of Hazardous Substances. Also known as Directive 2002/95/EC, it originated in the European Union and restricts the use of specific hazardous materials found in electrical and electronic products. All applicable products imported into the EU market after July 1, 2006 must pass RoHS compliance.

Click [here](#) for more information about RoHS compliance as it relates to VeEX products or go to [www.veexinc.com](http://www.veexinc.com).

## 10.0 About VeEX

VeEX Inc., an innovative, customer-focused communications test and measurement company, develops next-generation test and monitoring solutions for telecommunication networks and services. With a blend of advanced technologies and vast technical expertise, VeEX has developed products that diligently address all stages of network deployment, maintenance, and field service turn-up and integrate service verification features across DSL, fiber optics, CATV/DOCSIS, mobile backhaul and fronthaul (CPRI/OBSAI), next-generation transport network, fiber channel, carrier and metro Ethernet technologies, WLAN, and synchronization.

Visit us online at [www.veexinc.com](http://www.veexinc.com) for the latest updates and additional documentation.

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