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**Metrologic Instruments, Inc.
SP5500 Optimus S Series
Users's Guide**

Copyright

Table of Contents

Introduction

Product Overview

The **SP5500** Optimus *S* Portable Data Terminals are robust and versatile data terminals designed to provide exceptional performance, while enduring the demands of everyday use. The lithium-ion rechargeable battery provides the Optimus with more than 100 hours of operation. It is supported by a resourceful set of development tools. That includes a Windows-based application generator, "C" compiler, and "Basic" compiler. The Optimus S has a fully integrated laser for scanning all barcode symbologies, completely enclosed by the protective ergonomic housing. That built-in functionality of the Optimus makes it an excellent choice for numerous applications. However, when combined with the optional Bluetooth module it is the ideal solution for real time applications such as inventory control, shop floor management, warehousing operations, and distribution operations.

Key Product Features

- 2 Mb RAM capable of storing over 100,000 records
- Easy to use Application Generator and download software
- Auto-backlit LCD display
- Audible and visual indications
- Built-in laser bar code scan engine capable of scanning all 1D barcode symbologies.
- Powered by rechargeable Lithium-ion battery
- Upload/download data via RS232 interfaces
- Programmable Charging and Communication cradle
- Integrated laser scanner
- Decodes all 1D barcode symbologies

Scanner and Accessories

METROLOGIC PART NUMBERS.	PART DESCRIPTION
SP5501-6	Optimus*S* laser batch unit with 1MB RAM
SP5502-6	Optimus*S* laser batch unit with 2MB RAM
SP5535-6	Optimus*S* laser Bluetooth unit
MI5500-614	Optimus*S* Charging/Communication cradle

General Features and Characteristics
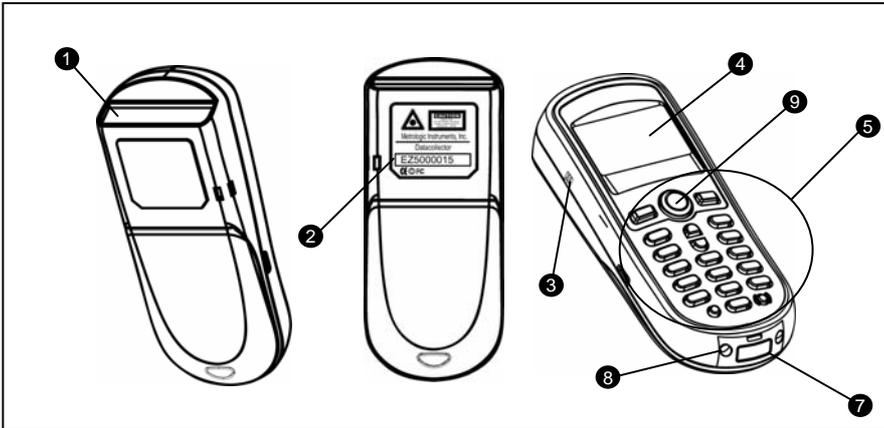
Figure 1. Scanner Features

Figure 3 Product Label

ITEM NO.	DESCRIPTION
1	Red Output Window (Laser Aperture)
2	Safety and Product label (Figure 3)
3	Speaker for audible indicators
4	LCD display
5	Multi-functional Keypad
6	Charging and communication contacts
7	IrDA Communication port
8	Battery Compartment release
9	Scan Button
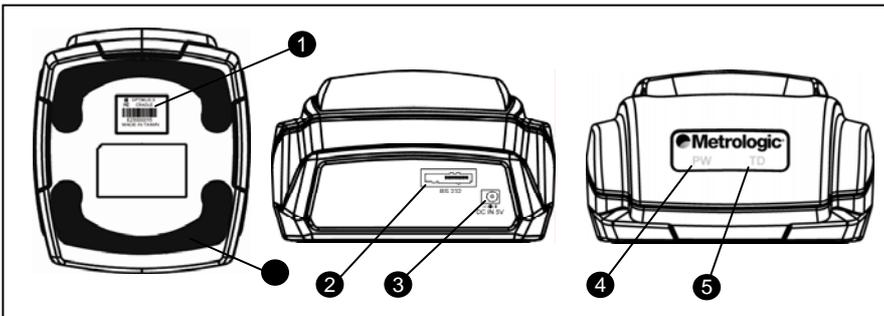
Figure .2.Cradle Features

Figure 4 Optimus and Cradle

ITEM NO.	DESCRIPTION
1	Safety and Product label
2	RS232 communication port
3	Power Adapter port
4	LED power indicator
5	LED Transmission indicator
6	Rubber footpads

Multifunctional Keypad
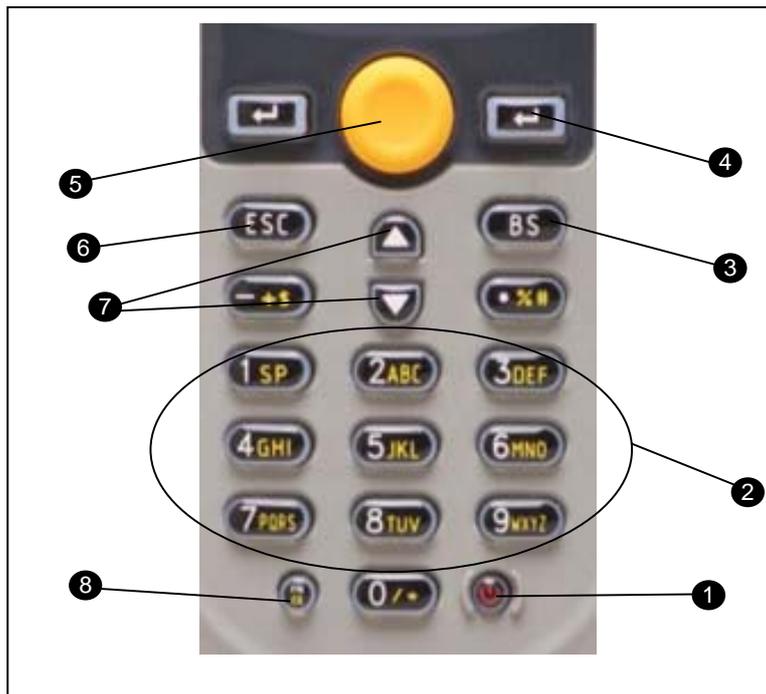
Figure 5.Cradle Features

ITEM NO.	KEY NAME	DESCRIPTION
1	**POWER**	*Power On/Off.* To prevent a faulty push, it needs about 1.5 sec of continuous pressing to turn On/Off the power.
2	**ALPHANUMERIC**	*Alphanumeric* These 10 keys can be used for either alpha characters or numerical input. (See Item 8 for further description of key operation)
3	**ENTER**	*Enter.* There are two enter keys on the side of the scan key. Normally the enter keys are used for command execution or input confirmation.
4	**SCAN**	*Scan a barcode.* Pressing this button will trigger the scanner to read a barcode.
5	**ESC**	*Escape.* This key is used to stop and exit current operation.
6	**BS**	*Back Space.* This key can be used to toggle back one space or if pressed down longer than one second, a ***clear*** code will be sent.
7	**ARROW**	*Arrow.* The two arrow keys located below the *Scan* key are used to toggle up and down between menu selections.

Item No.	Key Name	Description
8	ALPHA(α)	*The toggle key for Alphabet / Numeral input.* When the system is in alpha-mode, a small icon will be shown in the lower right corner of the display. For the 24-key keyboard, each numeric key can be used to generate one of the three capital letters located on that number key. For example, numeral **2** can be used to produce **A**, **B**, or **C**. Pressing the same key twice within one second, will produce the letter **B**. Pressing the same key without halting longer than one second, will allow the user to toggle through the three letters. When the key has been depressed for longer than one second or another key has been pressed, the unit will send the real key code to the application program.
	FUNCTION(FN)	*The function key.* This key cannot be activated alone, it must be pressed with one of the numeric keys at the same time. For example, *FN + 1* generates function **#1**, *FN + 2* generates function **#2**, etc (up to 9 functions). Also, this key can be combined with the *UP/DOWN* arrow keys to adjust the contrast of the LCD. And when this key is combined with the *ENTER* key, it will turn ON/OFF the backlight.

The LCD Screen

The LCD screen of the Optimus S Portable Data Terminal displays program settings, operational parameters, data collected, and much more. The display is a graphical LCD with the following characteristics:

- Display area of 64 pixels x 100 pixels
- Resolution:
  - Maximum of 8 lines x 20 characters
  - Minimum of 4 lines x 15 characters
- Displays alpha-characters, numbers, and symbols
- Automated back light

The Lithium-Ion Battery

The Optimus S Portable Data Terminal includes a lithium-ion rechargeable battery pack. The battery is inserted (*See Getting Started* for battery installation) into the battery compartment of the Optimus and recharges with Optimus in the cradle and in charging mode.
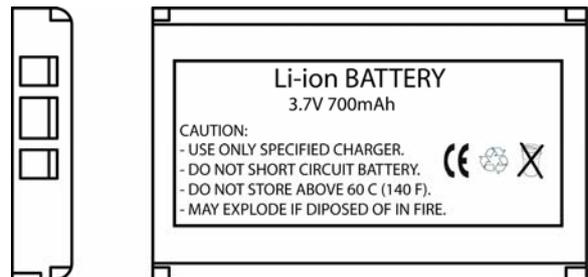
Figure 6 Lithium-Ion Battery

Installation

Getting Started

The Optimus *S* Portable Data Terminal (*PDT*) requires minimal effort to begin functional operation for data collection in any application. In order to get started the unit must have a fresh battery inserted into the battery compartment.

1. Access the battery compartment by removing the battery cover (See Figure 7). To remove the cover, press the cover release down and slide the cover away form the unit.
2. Insert the Li-ion battery into the battery compartment, battery information side up and battery contacts to the bottom, at an angle with the battery contacts inserted first.
3. Push the Li-ion battery the remainder of the way in to the compartment. The battery will fit snuggly into place.
4. Close the battery compartment by sliding the battery cover toward the scan head until the cover locks into place.

Item No.	Description
1	Li-ion battery
2	Battery cover
3	Battery contacts
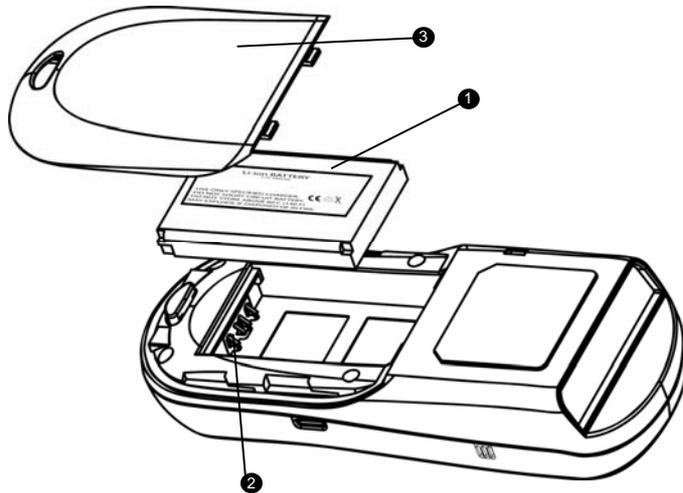
Figure 7 Battery Compartment Features

5. Turn the unit over, so that keypad is visible and hold down the power button ⏻.
6. The LCD graphical display will display a menu and an audible indicator will sound to signify that the Optimus has been powered up properly.
7. Using the arrow keys select the *Run Program* option.
8. Scan a barcode.

Basic Operation

In order for the Optimus to operate properly, an application program must be loaded onto the *PDT*. If upon power up the Optimus has no application program loaded, then the following Application Manger menu options will appear on the display:

MENU OPTIONS.	DESCRIPTION
Download	This option allows the user to download application programs (*.SHX), BASIC run-time (bas.ops.shx), BASIC programs (*.SYN) or font files to the terminal. There are 6 resident locations and one Active Memory. A maximum of 7 programs can be downloaded to the terminal. The application program downloaded to the Active Memory will be the only activate program running. In order to activate one of the other programs, immediately after downloading, input a name for the program desired or just press the enter key to keep its current name if one is applicable. This will enable the user to download the program. The application program's type, name, and size will be shown on the list of programs when entering the Download or Activate menu of the Application Manager. The file type is a small letter that follows the program number (01~06), it can be either 'b', 'c' or 'f' which represents BASIC program, C program or font file respectively. The program name is up to 12 characters and the program size is in units of K bytes.
Activate	This option will enable the use to activate one of the residential programs. In order to accomplish this, the use must copy one of the 6 resident programs to the Active Memory. Upon activation of the new program the original program in the Active Memory will be replaced. *Note:* A font file cannot be activated, and a BASIC program cannot be activated either if the BASIC run-time does not exist.
Upload	The *Upload* option gives the user additional method for retrieving an application program. It allows a user to transmit the application programs to a host PC or another terminal. This function also allows a terminal to be cloned without going through a PC.

Selecting and successfully completed one of these three menu options will enable the Optimus *S* to begin functional operation.

Communication and Data collection setup

The Optimus *S* Series has various ways of communicating with a host device. Depending on the model of Optimus, it can communicate via RS232, USB, or via a wireless Bluetooth connection. The two model s available are the, Optimus *S* Batch and Optimus *S* Bluetooth. These two models have various ways of data collection as well. Depending on the model it may store the data on the terminal itself or transmit live data back to a host device.

The Optimus *S* Batch model has the ability to utilize a RS232 or USB connection to communicate to a host device for both application program downloads and data collection. The Optimus *S* Batch model includes either a USB or RS232 cable. In order to begin an application download or data transfer the following steps would need to be followed.

1. Remove the Optimus cradle and either the USB or RS232 cable from the box
2. For the RS232 cable plug the 9 pin serial connector into a serial port on the host device. Plug the opposite end into the communication port of the cradle.

3. For the USB cable plug the USB end of the cable into an appropriate communication port on the host device and the opposite end of the cable into the communication port of the cradle.
4. Power up the Optimus and select the *Utlities* option.
5. This will open additional menu options. Select the *Transfer File*s option.
6. Select *Get Program* on the next menu. The unit is now ready to download an application program.
7. Place unit in cradle and download the appropriate application program.
8. Once the Optimus has received the application program the unit is ready for scanning and collecting data.

Data Collection

1. To transfer the data collected select the *Utilities* option.
2. Select the *Transfer Files* option on the next menu. And then the *Send Files* option.
3. Re-insert the Optimus unit into the cradle and upload the data to the host device.

The Optimus *S* Bluetooth model is similarly connected to the host device and programmed however, there are some key differences in the data collection process. The Optimus *S* Bluetooth supports transmission of data wirelessly and as such has the capability of communicating that data in two distinctive methods. The first of those methods is Network Emulation. The second of is Serial Emulation.

Network Emulation: Because of the wireless capability of the Optimus Bluetooth it has the capability to transmit data wirelessly to a Bluetooth equipped access point. An access point that exists and is connected to a Local Area Network (LAN) allows users to collect and transmit data in real time, minimizing time lost to transfer data to a host device.

Serial Emulation: Serial Emulation is another manner in which the wireless capable Optimus Bluetooth can transmit data and upload an application program. With Serial Emulation the Optimus Bluetooth can transmit wirelessly to any Bluetooth device that supports Serial Port Profile (SPP). The SPP supported device also allows users to download an application program to the Optimus *S* Bluetooth wirelessly.

System Settings and Operation Tests

Depending on the application program that is active on the Optimus, there are number of settings and options that may be selected for both setup and testing. The table shows a number of those settings and their descriptions.

SETTING	DESCRIPTION	DEFAULT
Clock	Set date and time for the system.	N/A
Backlight ON Period	Set the duration for the keyboard/LCD backlight	*the light goes off after 20 seconds*
CPU Speed	Set CPU running speed. There are five speeds available: Full speed, half speed, quarter speed, eighth speed and sixteenth speed.	*Full speed*
Powering Off the Terminal	Set time threshold for automatically power off when no operation is taking place during that specified period. If this value is set to zero, this function will be disabled.	*10 minutes*
Power On Options	There are two possible selections: **Program Resume**, which starts from the program being used during the last session before the last power-off; and **Program Restart**, which starts with a new program.	*Program Resume*
Key Click	Select a tone for the beeper or disable the beeper when the user presses a key button.	*Enable*
System Password	Set a password to protect the user from entering the system menu.	*no password is set*

The Optimus S has numerous tests available to the user for both operation and diagnostics. Depending on the application program that is in the active memory will determine which tests can be performed and are available to the user. The following table provides a description of the available tests.

SETTING	DESCRIPTION	DEFAULTS
Reader	To test the reading performance of the scanner. The following symbologies are enabled for the Reader test. All other symbologies will need to be enabled via programming. *Default Barcodes: Code 39, Industrial 25, Interleave 25,Codabar, Code 93, Code 128, UPCE UPCE with ADDON 2, UPCE with ADDON 5, EAN8, EAN8 with ADDON 2 EAN8 with ADDON 5, EAN13, EAN13 with ADDON 2, EAN13 with ADDON 5*	
Buzzer	To test the buzzer with different Frequency/Duration. Press **ENTER** key to start and then press any key to stop the test.	
LCD & LED	To test LCD display and LED indicator. Press **ENTER** key to start and then press any key to stop the test.	
Keyboard	To test the rubber keys. Press a key and the result will be shown on the LCD display. Note that the **FN** key should be used in conjunction with numeral keys.	
Memory	To test the data memory (SRAM). Note after the test, the contents of the memory space will be wiped out. ⚠ Warning: This test erases any data stored in the terminal.	

Application

The Application module runs on top of the System module. The Optimus *S* Series Portable Data Terminals are preloaded with the Application Generator's run-time program and the following menu will be shown upon powering the unit up:

Batch model (SP5501, SP5502):

1. **Run Program**
2. **Utilities**

Bluetooth models (SP5535)

1. **Take data**
2. **Utilities**

Utilizing the arrow keys select the menu option and execute it by pressing the ENTER key. For certain models of the Optimus *S* Series the Data Optimizer program may need to be used in order to handle the in-coming and out-going data to and from a host device. For detailed information, please refer to "Optimizer User's Guide" and "Data Optimizer User's Guide".

Note: If the Application Generator is used to create the application program, it will be necessary to download it to the terminal.

Programming the terminal

There are three software tools available for developing application programs for the terminal.

- The Optimizer
- The "BASIC" Compiler
- The "C" Compiler

For detailed information, please contact Metrologic Instruments, Inc..

Programming the communication cradle

The communication cradle of the Optimus *S* Portable Data Terminal supports serial IR interface only. If a customized PC application has been developed for communication with the terminal via the cradle, it will be necessary to first configure the cradle through programming. There is a DLL available for this purpose.

For more information, please contact Metrologic Instruments, Inc..

Troubleshooting

Symptom	Description
Does not power up after pressing POWER key.	Make sure the battery is loaded.
	Charge the battery and check the charging status. If no charging information shown on the display, reload the battery and check if the battery is properly installed then try again.
	Call for service if problem persists.
Cannot transmit data or programs via the terminal's communication port.	Check if the cable is plugged tightly
	Check if host communication parameters (COM port, baud rate, data bits, parity, and stop bit) match with the Terminal's.
Keypad does not work properly	Turn off the power then enter the system menu. From the system menu, select the *Test* and then its sub-item *KBD.* Perform the key-in test.
	Call for service if problem persists.
Scanner does not scan	Check if the barcodes used are enabled
	Check if battery-low indicator is shown on the LCD display. If yes, charge the battery
	Call for service if problem persists.
Abnormal responses	Open the battery cap and re-load the battery.
	Enter system menu. Check if the terminal can have a correct response by performing tests.
	Call for service if problem persists.

Specification

	OPTIMUS S SERIES	
OPERATIONAL		
Light Source:	**V**isible **L**aser **D**iode (VLD) @ 650 nm	
Normal Depth of Field:	20 mm - 202 mm (.75"- 8.75")	0.33 mm (13 mil) bar code
Width of Scan Field:	290mm (11.4") @ 222 mm (8.75")	
Single-Line		
Scan Speed:	100 scan lines per second	
No. of Scan Lines:	1	
Min Bar Width:	0.127 mm (5.0 mil)	
Decode Capability:	All standard 1-D bar codes including RSS-14, RSS-Expanded, and RSS-14 Limited	
System Interfaces:	RS232, USB, and Bluetooth	
Print Contrast:	35% minimum reflectance difference	
No. Characters Read:	Up to 80 data characters Maximum number will vary based on symbology and density.	
Beeper Operation:	7 tones or no beep	
CPU:	16-bit CMOS, low power consumption	
Program Memory:	1 MB Flash ROM	
Data Memory:	1 MB SRAM (Bluetooth)	
	2 MB SRAM (Batch)	
Display:	LCD 100 x 64 pixels, back-lit	
Display Resolution:	8 lines x 20 Characters (max), 4 Lines x 15 characters (min)	
Bluetooth Versions:	1.1	
Bluetooth Profiles:	Bluetooth Network Encapsulation Profile(BNEP), Serial Port Profile (SPP)	
Communication (Unit):	IrDA, CradleIR or Bluetooth	
Communication (Cradle):	RS232 or USB	
Application Development:	Windows-based Optmizer; optional C & BASIC compilers	

	OPTIMUS S SERIES
MECHANICAL	
Width (Unit):	55 mm (2.2")
Depth (Unit):	28 mm (1.1")
Height (Unit):	137 mm (5.4")
Weight (Unit):	4.9 oz (140 g) – including battery
Width (Cradle):	92 mm (3.6")
Depth (Cradle):	110 mm (4.3")
Height (Cradle):	58 mm (2.3")
ELECTRICAL	
Battery Operation:	Li-ion
Battery Backup:	3.7V, 700mA hours, rechargeable lithium battery
Operation:	Over 36 hours
Laser Class 1:	IEC 60825-1:1993+A1:1997+A2:2001 EN 60825-1:1994+A11:1996+A2:2001
EMC:	FCC, Class B
ENVIRONMENTAL	
Operating Temperature:	0°C to 55°C (32°F to 131°F)
Storage Temperature:	-70°C to 60°C (-4°F to 140°F)
Humidity:	5% to 95% relative humidity, non-condensing
Contaminants:	Sealed to resist airborne particulate contaminants
Shock Resistance:	1.2 m (4') drop onto concrete
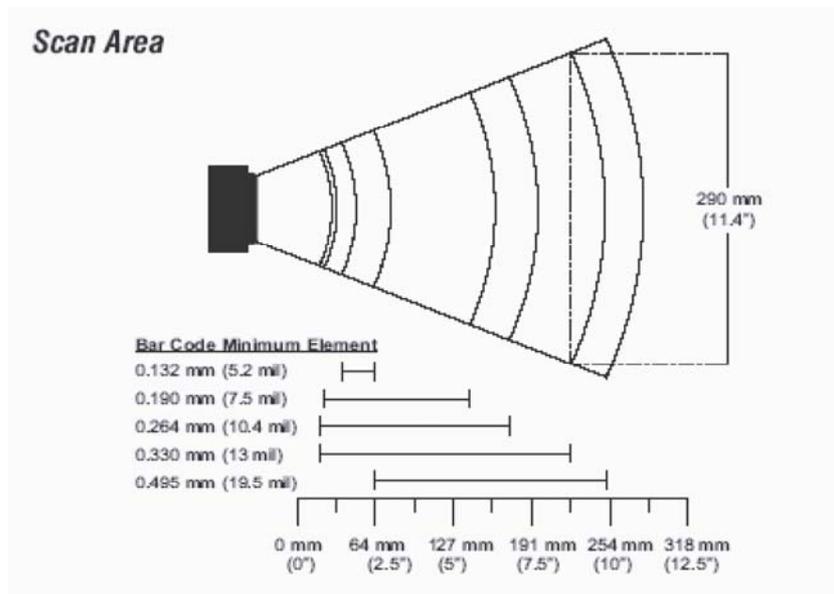
Figure 8 Scan Areas

Contact Information and Office Locations

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Safety Notices

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 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.

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.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

The equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. The internal / external antennas used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter within the host device.

Canada (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."