User's Manual v1.0.0.0

F741-SD

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1. Introduction

This user's manual guide is providing instruction for installing and operating the **F741-SD** RFID reader.

This document is designed for use by RFID system integrators and software developer who develops relatively program and extended systems that take full advantage of the RFID Reader's capabilities.

1.1 Overview

F741-SD, one of FAVITE RFID reader family, is an Intel ATOM CPU based smart reader. The **F741-SD** is embedded with Impinj R2000 chip and following EPC Class1 Gen2 Dense Reader mode (DRM) / ISO 18000-6C. The **F741-SD** is equipped with 4 TNC RF antenna ports which could support 4 mono-static antennas that could support to the richest enterprise applications. With the powerful combination of TI ARM9 and 1GB memory, the **F741-SD** is the smartest RFID reader available and capable of running complex RFID applications.

The RFID Reader is delivered with the following components and accessories:

- One (1) RFID Reader.
- One (1) power supply and cord.
- Operation system:
  A. Linux embedded operation system with SCO server.

1.2 Requirement

The list following is the requirements of environment of the **F741-SD**:

- Standard DC 19V +/ - 0.5V
- 2.6A Power supply
- Favite demo software/ the software developed based on Favite Software Development Kit

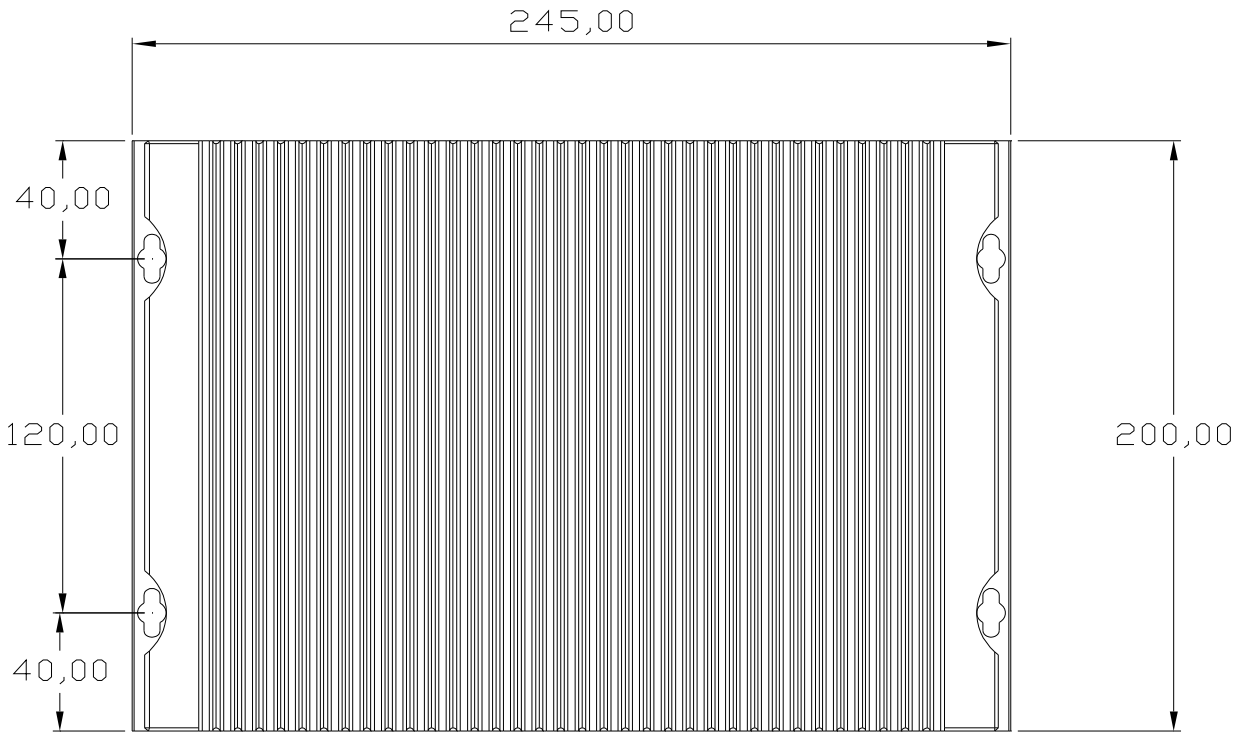
1.3 Reference Documents

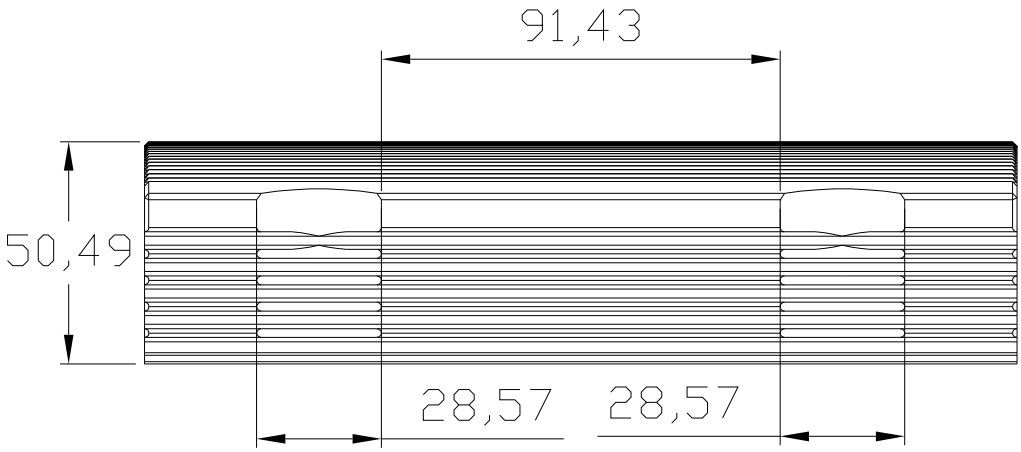
Table 1: Specification of the F741-SD System		
Chipset	PHY: Impinj R2000 MAC: ATMEL AT91SAM7S-256	
Protocol		
RFID Protocol Support	EPC Gen 2 , ISO 18000-6C	
Support EPC DRM	Yes (with DRM Filter) Switchable	
RF		
Frequency	US: 902 ~ 928MHz（FHSS） EU: 865 ~ 868MHz	SRRC: 920~925MHz JP:952~954MHz NCC: 922-928MHz
Demodulation	ASK	
Modulation Depth	90% nominal	
Data Encoding	FM0 or Miller code	
Bit Rate	Supports uplink data rates of up to 640 Kbps (DRM)	
TX Output power	5 ~ 32dBm in 0.1dB step	
Antenna Type	4Port Mono-static	
Antenna connector	4 Reverse Polarity TNC connectors	
Regulatory and Environmental Compliance		
EMC certification	FCC 47 CFG Ch.1 Part 15 (US) ETSI EN 302 208-1 (V1.1.1) (EU) NCC CAAI10LP0970(TW) SRRC SRTC2010-A070-0016 (China) DSP RJ9905 10C02 (JP)	
Safety Certification	CE/FCC Class A, UL, CCC	
Environment		
Temperature Range	Operating: 0 ~ 55 degree C @ 80%RH Storage: -20 ~ 85 degree C @ 90%RH	
Humidity	10% ~ 85% Non-condensing	
System Architecture		
Processor	TI ARM9	
System Memory	1GB DDR2 SDRAM	
Internal Storage	1GB Flash	

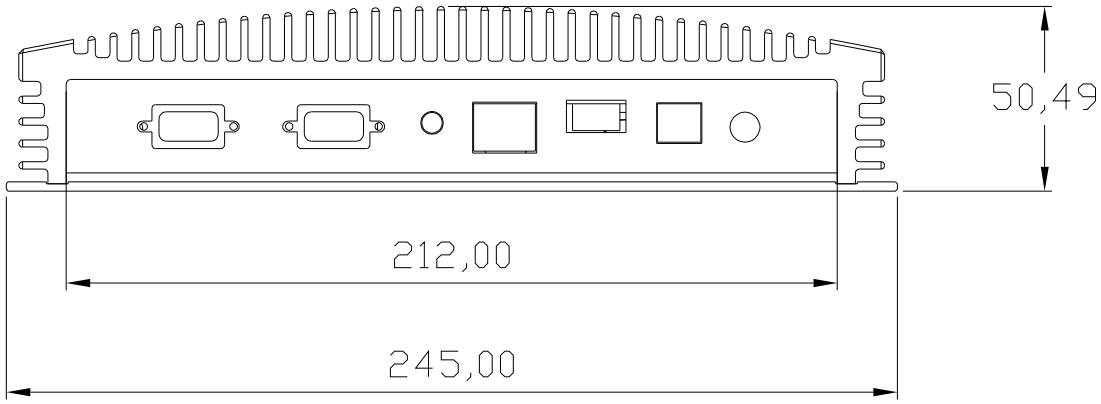
Software	
Operation System	Linux with SCO server
General Characteristics	
Dimension	500mm x 245 mm x 50.49mm
Weight	2.5 Kg
Base Material	Die-cast aluminum
Mounting	Wall mounting, vertical placement
Power Input	DC 19V +- 0.5V / 1.5A @ 33dBm
Power Consumption	28.5 W (Typical)
Communication	
USB	USB2.0
Ethernet	10/100 Base-T (RJ-45)
GPIO	4 digital input, 4 digital output

Mechanical: Reader Physical Size

Figure 1: **F741-SD** Reader Physical Size







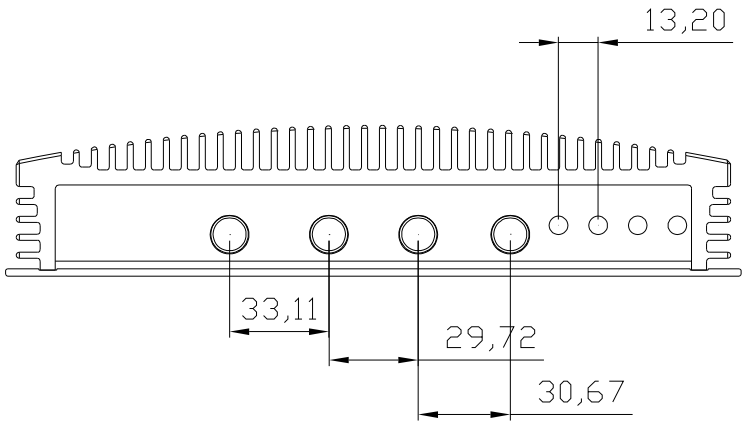


Figure 2: **F741-SD** Reader I/O Terminal

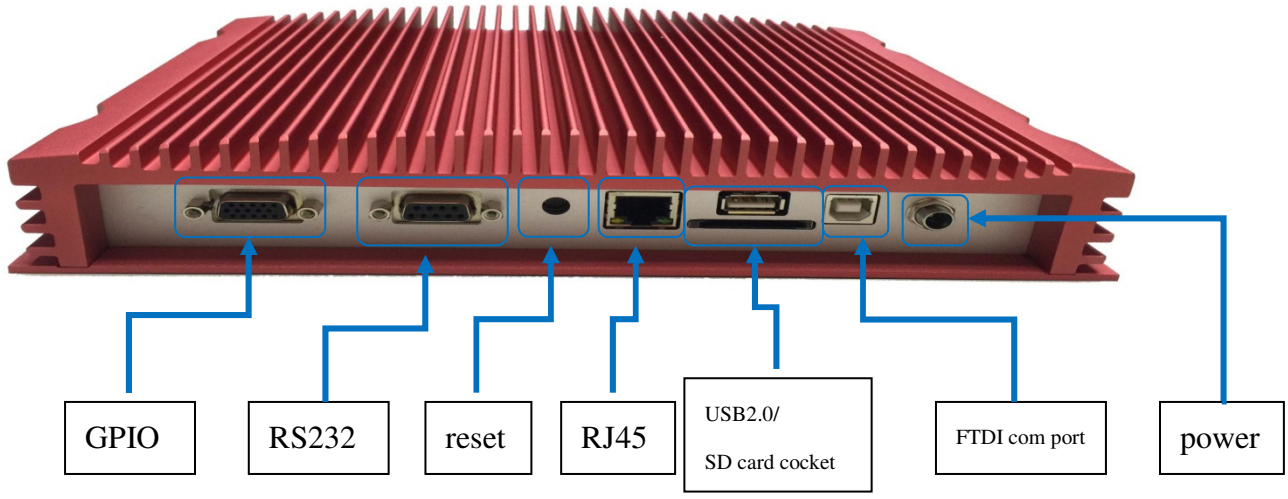


Figure 3: Antenna Port Terminal Interface

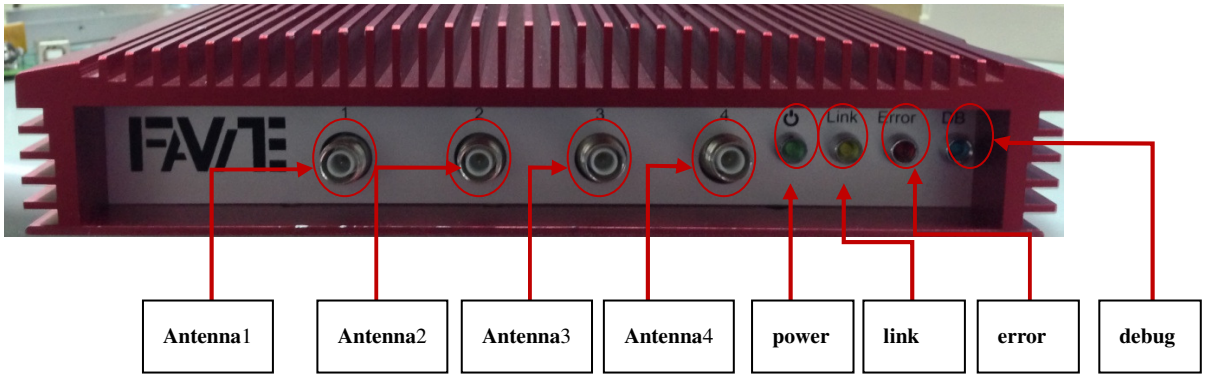
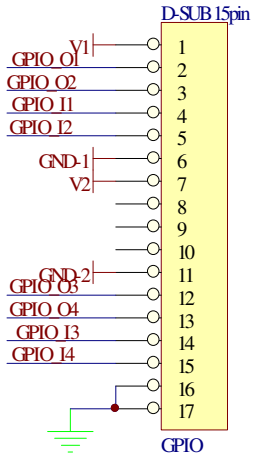
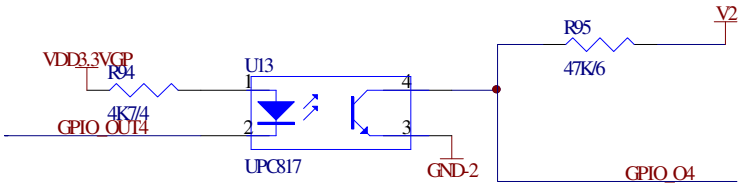


Figure 4: F741-SD GPIO Pin definition and I/O description.

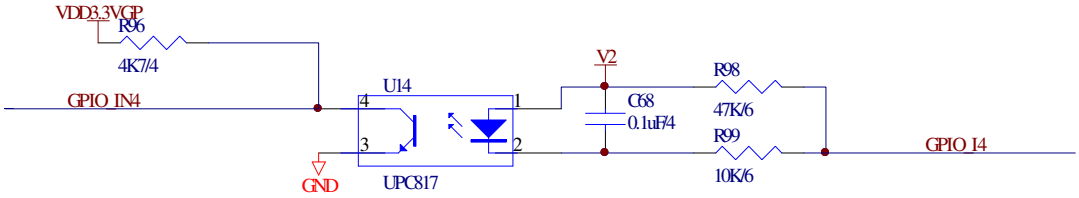
Pin definition



GPIO-OUT Circuit diagram (add figure#)



GPIO-IN Circuit diagram(add figure#)



Note:

Please add the 4k7 electric resistances. The limitation of voltage is from 12V to 24V.

If F741-SD is going to transmit signal to other device, please connect to the device which is below 48V and 10mA.

If user wants **F741-SD** to receive data from other device through GPIO, please connect 24V power source to PIN19 or PIN20 and connect the device output line to Pin 1~ Pin8.

The development of programming of receiving data from GPIO could reference the document "FAVITE **F741-SD** GPIO Programming Guide_DotNet CSharp" for read data from GPIO with application method.

If user wants **F741-SD** to transmit data to other device though GPIO, please connect to Pin 9~ Pin 16.

The programming of transmitting data to other device (like light stack) could reference the document "FAVITE **F741-SD** GPIO Programming Guide_DotNet CSharp" for write data from GPIO with application method. The device should connect to independent power source.

2. Reader Hardware Installation and Operation

2.1 Receiving the RFID Reader

Your RFID Reader Kit is shipped with the items listed below. Please verify the contents of your received shipment before assembling.

- RFID reader.
- Power supply and cables (two sections: one attached, one detached).
- CD-ROM containing demonstration software, user guides and documentation.

Figure 5: **F741-SD** (1)

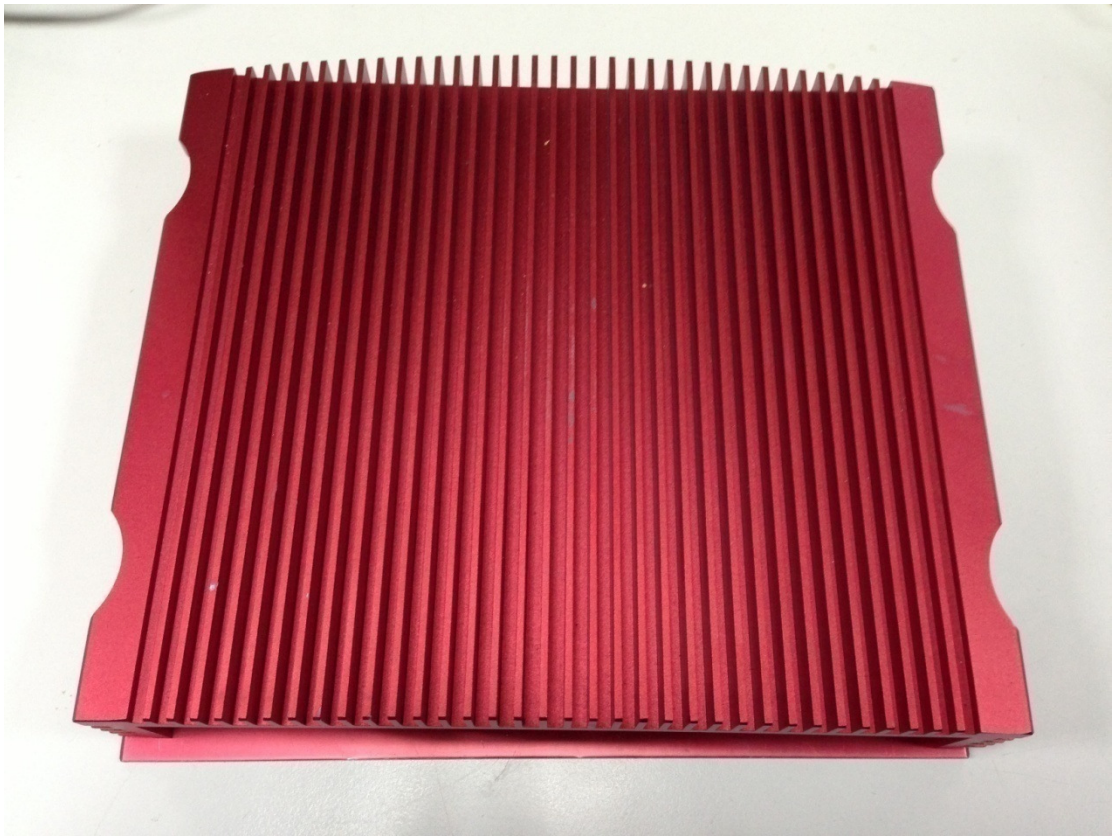


Figure 6: **F741-SD** (2)

Figure 7: **F741-SD** Power Supply and Adapter cable

2.2 Diagnostic LEDs

The **F741-SD** is including diagnostic LEDs on the face of the reader to provide easy and convenient external indication for various operating conditions:

- POWER (green) – indicates that power is applied to the reader.
- Read (yellow) – indicates that the reader is receiving data from a tag.
- Fault (red) – indicates that a fault condition like CRC check error.
- debug (blue) – indicates that the **F741-SD** is into debug mode

Figure 8: **F741-SD** Reader Diagnostic LEDs

Antenna Panel

The antenna panel is containing four coax antenna connector ports, which is TNC connector, as shown below. These are TNC connectors.

2.3 Installation & Demonstration Software Guide

Installation ：

First , please let F740 connect with the power cable and RJ45 network cable, then the debug and power two LEDs of front side will be blink . Until power LED still bright and debug LED slake , it can execute the tool as picture.

Demonstration Software：

Please refer to the document “FAVITE API Programming Guide_DotNet CSharp”, “FAVITE SDK Getting Started Guide CSharp”, “FAVITE Saturn Demo API User Guide” and “F740 GPIO Programming Guide_DotNet CSharp”.Please refer to the document “FAVITE API Programming Guide_DotNet CSharp”, “FAVITE SDK Getting Started Guide CSharp”, “FAVITE Saturn Demo API User Guide” and “**F741-SD** GPIO Programming Guide_DotNet CSharp”.

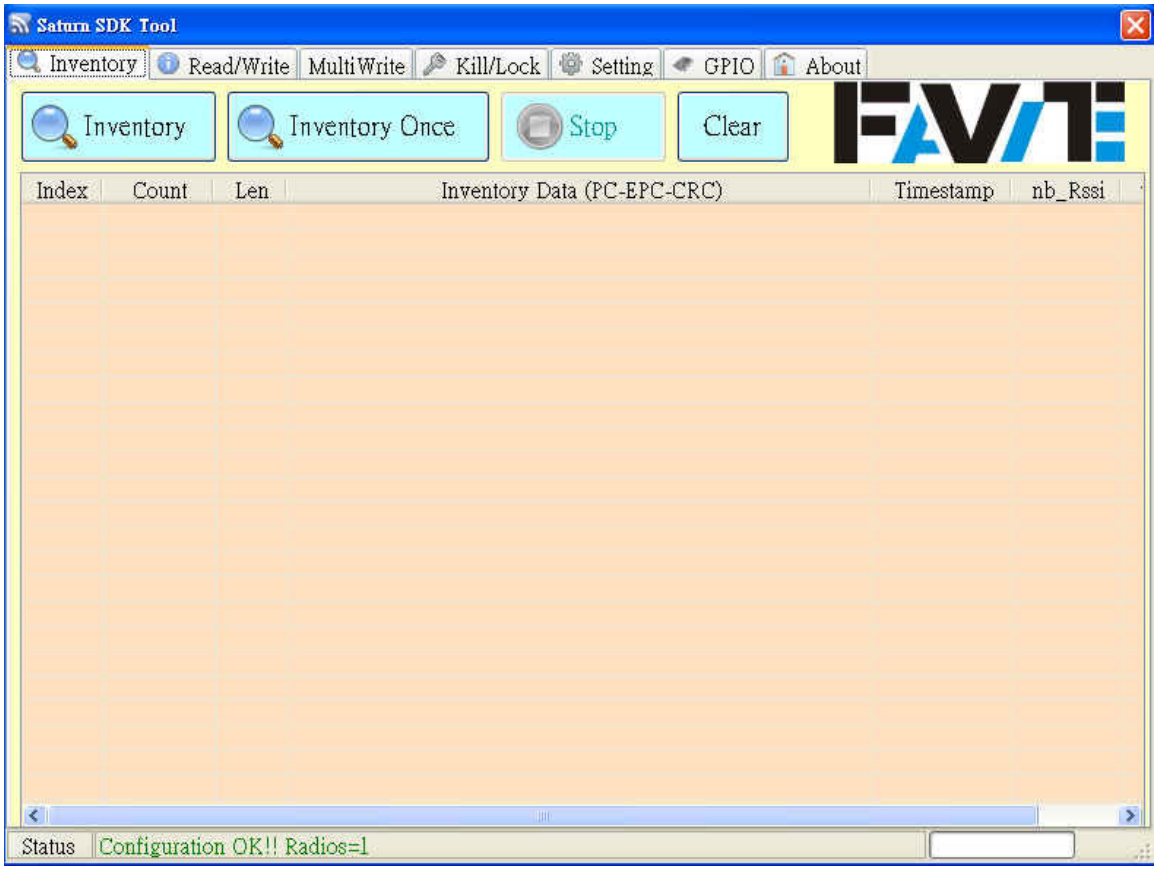


Figure 9: Demo Program

- **NCC Declaration:**

Article 12—Without permission granted by the NCC, any company, enterprise, or user is not allowed to change frequency, enhance transmitting power or alter original characteristics as well as performance of an approved low power radio-frequency device.

第十二條 經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

Article 14—The low power radio-frequency device shall not influence aircraft security and interfere legal communication; if such influence or interference is found, the user shall cease operating immediately until no interference is achieved. The said legal communications means radio communications are operated in compliance with the Telecommunications Act. The low power radio-frequency devices must be susceptible with the interference from legal communications or ISM radio wave radiated devices.

第十四條 低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應改善至無干擾時方得繼續使用。前項合法通信，指依電信法規定作業之無線電通信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

- **FCC Declaration:**

FCC statement in User's Manual (for class B)

"Federal Communications Commission(FCC) 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 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:

1. The 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.

2. This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

3. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user authority to operate the equipment.

FCC Radiation Exposure Statement:

1. This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.
2. This equipment should be installed and operated with minimum distance 23cm between the radiator and your body.

Professional Use:

FCC NOTICE: To comply with FCC part 15 rules, the system must be professionally installed to ensure compliance with the Part 15 certification. It is the responsibility of the operator and professional installer to ensure that only certified systems are deployed in the United States.