



GlobalTop Technology Inc.

Ivy-1

Wi-Fi Standalone Module

Data Sheet

Part Number: Wrm-u2535

Revision: V01



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1. Functional Description

1.1 Overview

Ivy-1 is a small-size 25 x 35 x 4.8mm, IEEE 802.11n access point board that achieves a data rate up to 150Mbps. It is 3 times faster than the legacy 11g model making it more cost-effective for Wi-Fi connection. The high speed microprocessor contains a power conservation mechanism maintaining the chip surface temperature to around or below 60°C.

This product supports AP/Client modes. It is ideal for multi-purpose installation to share wireless connection.

By supporting 64/128-bits WEP, TKIP, WPA, WPA2, AES and WPS, your data can be protected during air transmission.

This module could be mounted on system board like IPTV, STB, Media Player, Femto, XDSL, Cable Modem, Industrial PC, Ethernet Switch, Printer Server, Connected TV, Smart Phone and Portable CPE for WiMAX/LTE

Application

- Wi-Fi IP camera (optional)
- Wi-Fi storage
- Internet-of-Things
- General Wi-Fi Router

1.2 Features

- ◆ Ralink RT5350 chipset with slow speed I/O : GPIO, SPI, I2C, I2S, PCM, UART, and JTAG
- ◆ Support boot from Flash
- ◆ Data Rate up to 150Mbps
- ◆ Security: 64/128-bits WEP, TKIP, WPA, WPA2, AES, WPS
- ◆ Multi-modes: AP/Client
- ◆ Runs at full speed and maintains 60°C chip surface temperature
- ◆ Embedded PA/LNA
- ◆ Embedded 1T1R 2.4G CMOS RF
- ◆ USB 2.0 HOST/Device dual mode x1
- ◆ IPV4, IPV6

➤ **Network Characteristics**

- ◆ Video, Storage (optional, upon request)
- ◆ DHCP Client/Relay/Server
- ◆ Dynamic DNS
- ◆ NTP Client
- ◆ DNS Cache/Proxy
- ◆ Firewall
- ◆ MAC/IP/Port Filter
- ◆ Virtual Server
- ◆ DMZ
- ◆ Content Filter

➤ **RF Characteristics**

- ◆ One Transmit and One Receive paths (1T1R)
- ◆ 20MHZ/40MHZ bandwidth.
- ◆ Support Multiple SSID
- ◆ Clock rate up to 400MHz Legacy and High Throughput Modes.
- ◆ Support WPS
- ◆ High security with build-in: WEP 64/128, TKIP, WPA, WPA2 mixed, 802.1x and 802.11i
- ◆ 802.1X Authentication with RADIUS Client
- ◆ QoS-WMM.WMM-PS

1.3 System Block Diagram

Wi-Fi module Wrm-u2535 Block Diagram

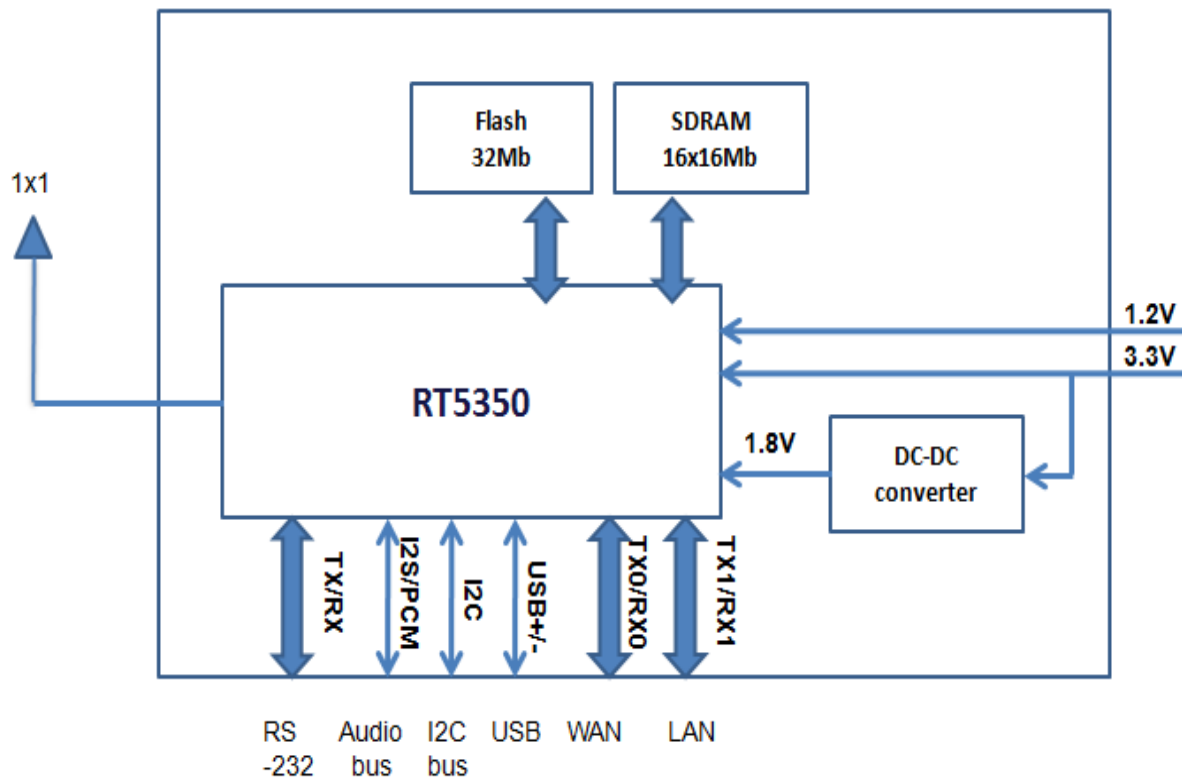
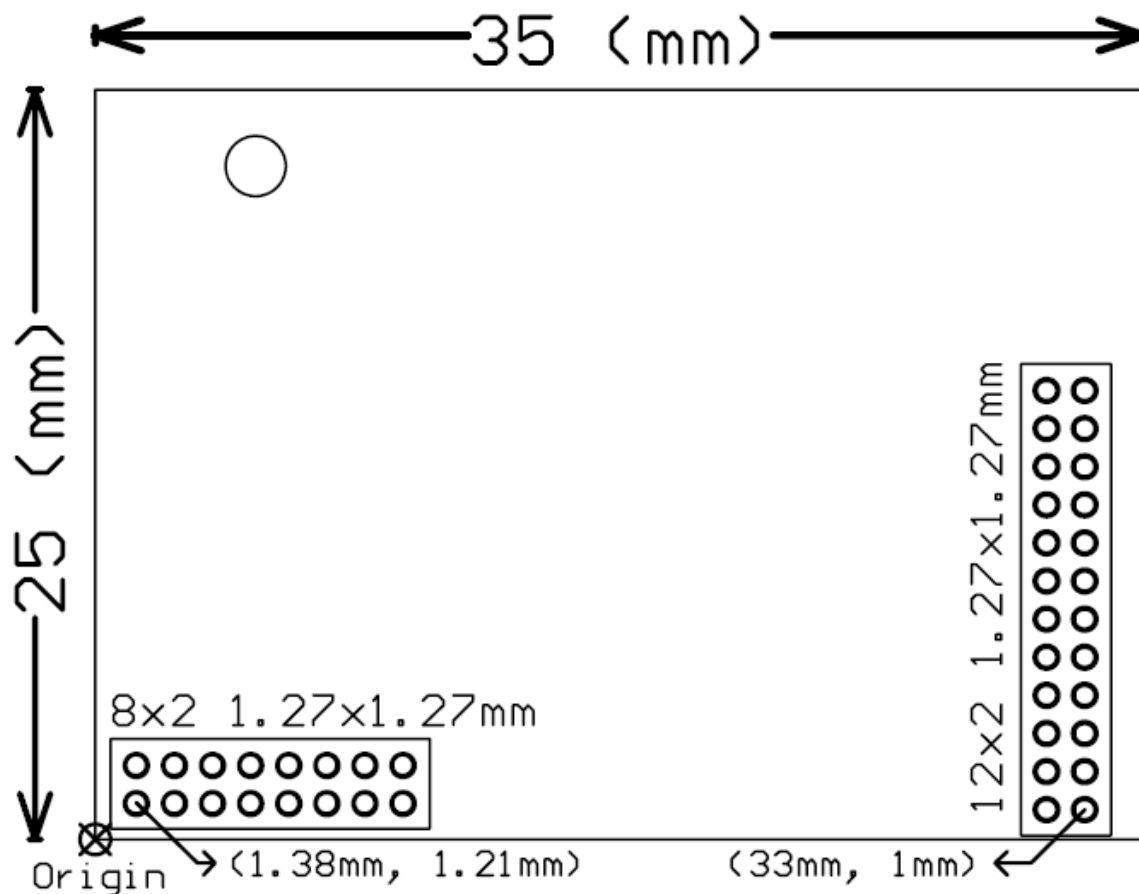


Fig- System block diagram

2. Specifications

2.1 Mechanical Dimension

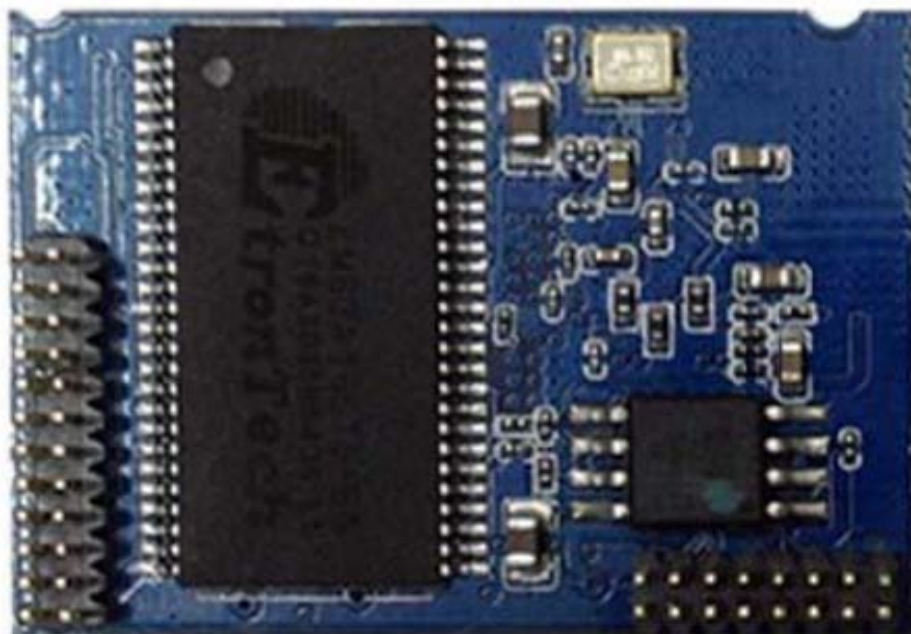
Dimension: (Unit: mm, Tolerance: +/- 0.2mm)



2.2 Pin Configuration



(Top view)



(Bottom view)

2.3 Pin Assignment

Connector J1

Pin	Name	I/O	Description & Note
1	I ² SCLK	I/O	I2S clock
2	PCMFS	I/O	SYNC signal of PCM. In our design, the direction of this signal is independent in the direction of PCMCLK. It's direction and mode is
3	I ² SWS	I/O	Channel Selection
4	PCMCLK	I/O	PCM clock out/in
5	I ² SSDO	O	Data output
6	PCMDRX	I	DATA signal from external codec to PCM's host.
7	I ² SSDI	I	Data input
8	PCMDTX	O	DATA signal from PCM's host to external codec
9	I ² C_SCLK	I/O	I2C Clock
10	I ² C_SD	O	I2C Data
11	RX1+	I	10/100 PHY Port #1 RXP
12	TX1+	O	10/100 PHY Port #1 TXP
13	RX1-	I	10/100 PHY Port #1 RXN
14	TX1-	O	10/100 PHY Port #1 TXN
15	GND	G	Ground
16	GND	G	Ground

Connector J3

Pin	Name	I/O	Description & Note
1	+3.3V	PI	Main DC power input
2	+3.3V	PI	Main DC power input
3	UART_Rx	I/O	Serial Data input (TTL)
4	GND	G	Ground
5	UART_Tx	I/O	Serial Data Output (TTL)
6	Reserved	I/O	Reserved pin
7	GND	G	Ground
8	WPS/Reset	I	WPS/Reset to default
9	LED_WLAN#	O	WLAN Activity LED
10	GND	G	Ground
11	LED_WPS#	O	LED for WPS indicator
12	USB_D+	I/O	USB data pin Data+
13	AP/Client selection	O	Mode selection (AP mode /Client mode)
14	USB_D-	I/O	USB data pin Data-
15	1.2V	PI	Main DC power input
16	1.2V	PI	Main DC power input
17	GPIO#19	I/O	General-Purpose Input / Output
18	TX0+	O	10/100 PHY Port #0 TXP
19	GPIO#18	I/O	General-Purpose Input / Output
20	TX0-	O	10/100 PHY Port #0 TXN
21	GPIO#17	I/O	General-Purpose Input / Output
22	RX0+	I	10/100 PHY Port #0 RXP
23	Link0_LED	O	LED for Link indicator
24	RX0-	I	10/100 PHY Port #0 RXN

2.4 Description of I/O Pin Connector J1

I²SCLK (Pin1)

Digital audio format _I²S Clock

PCMFS (Pin2)

Audio raw data _ Independent in the direction of PCMCLK. It's direction and mode is configurable.

I²SWS (Pin3)

Digital audio format _I²S Channel Selection

PCMCLK (Pin4)

Audio raw data_ PCM clock out

I²SSDO (Pin 5)

Digital audio format _Data output

PCMDRX (Pin6)

Audio raw data_ DATA signal from external codec to PCM's host.

I²SSDI (Pin7)

Digital audio format _Data input

PCMDTX (Pin8)

Audio raw data_ DATA signal from PCM's host to external codec

I²C_SCK (Pin9)

I2C bus_ Clock

I²C_SD (Pin10)

I2C bus_ Data

RX1+/- (Pin11,13)

10/100 PHY Port #1 RXP/RXN signal

TX1+/- (Pin12,14)

10/100 PHY Port #1 TXP/TXN signal

GND (Pin15,16)

Ground

Connector J3

+3.3V (Pin1, 2)

The main DC power supply of the module, the voltage should be kept between from 3.6V to 3.15V (Typical: 3.3V). **The Vcc ripple must be controlled under 50mV_{pp}**

UART_Rx (Pin3)

This is the UART receiver of the module

UART_Tx (Pin5)

This is the UART transmitter of the module

GND (Pin4, Pin7, Pin10)

Ground

Reserved (Pin 6)

Reserved pin

WPS/Reset (Pin8)

WPS function and Reset to default value.

LED_WLAN# (Pin9)

Indicator for Wireless activity status

LED_WPS# (Pin11)

Indicator for WPS link status.

USB_D+ (Pin12)

USB data pin Data+

AP/Client selection (Pin13)

Can select AP mode or Client mode by(H/L)

USB_D-(Pin14)

USB data pin Data-

1.2V (Pin15, 16)

The main DC power supply of the module, the voltage should be kept between from 1.14V to 1.26V (Typical: 1.2V). **The Vcc ripple must be controlled under 50mV_{pp}**



GPIO#17, 18, 19 (Pin21, 19, 17)

General purpose I/O

TX0+ (Pin18)

10/100 PHY Port #0 TXP

TX0-(Pin20)

10/100 PHY Port #0 TXN

RX0+ (Pin22)

10/100 PHY Port #0 RXP

LINK0_LED (Pin23)

Indicator for WAN port activity status

RX0- (Pin24)

10/100 PHY Port #0 RXN

2.5 Specification

	Description
Wi-Fi Solution	RT5350
Standard	IEEE 802.11 b/g/n standards compliant
Wireless LAN	1T1R Mode
Antenna	iPex Connector *1 (PIFA optional)
Frequency Range	2.400 to 2.4835GHz (subject to local regulations)
Number of Selectable Channels	IEEE802.11n 20MHz/40MHz ; IEEE 802.11b/g USA, Canada (FCC):11 channels (2.412GHz~2.462GHz) Europe (CE): 13 channels (2.412GHz~2.472GHz) Japan (TELEC): 14 channels (2.412GHz~2.4835GHz)
Data Rate	IEEE 802.11n: up to 150Mbps IEEE 802.11b: 1, 2, 5.5, 11Mbps IEEE 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps
Transmit Power(EIRP)	IEEE 802.11n HT40 MCS7 : +13 dBm IEEE 802.11b CCK: +18 dBm IEEE 802.11g OFDM: +15 dBm
Receiver Sensitivity	66dBm at HT40 MCS7 -73dBm at 54Mbps -86dBm at 11Mbps
Dimension	25 x 35 x 4.8 mm
Certifications	FCC/CE by request
Power consumption	Pin input: 3.3V 500mA, 1.2V 600mA(LDO) Total: 5V 550mA Above are the peak, average is like 5V 300mA, depend on the system design.

2.6 Absolute Maximum Ratings

The voltage applied for VCC should not exceed 4.3VDC.

	Symbol	Min.	Typ.	Max.	Unit
Power Supply Voltage	VCC	3.15	3.3	3.6	V
Power Supply Voltage	VCC	1.14	1.2	1.26	V

2.7 Operating Conditions

	Condition	Min.	Typ.	Max.	Unit
Operation supply Ripple Voltage	—	—	—	50	mVpp
RX0 TTL H Level	VCC=3.0~4.3V	2.0	—	VCC	V
RX0 TTL L Level	VCC=3.0~4.3V	0	—	0.8	V
TX0 TTL H Level	VCC=3.0~4.3V	2.4	—	2.8	V
TX0 TTL L Level	VCC=3.0~4.3V	0	—	0.4	V

3. Packing and Handling

Wi-Fi modules, like any other SMD devices, are sensitive to moisture, electrostatic discharge, and temperature. By following the standards outlined in this document for GlobalTop module storage and handling, the chances of them being damaged during production set-up can be reduced. This section will walk you through the basics on how GlobalTop packages its modules to ensure they arrive at their destination without any damages and deterioration to performance quality. It includes cautionary notes for prior to the surface mount process.



Please read the sections II to V carefully to avoid damages permanent damages due to moisture intake



Wi-Fi modules contain highly sensitive electronic circuits and are electronic sensitive devices and improper handling without ESD protections may lead to permanent damages to the modules. Please read section VI for more details.

3.1 Moisture Sensitivity

GlobalTop Wi-Fi modules are moisture sensitive, and must be pre-baked before going through the solder reflow process. It is important to know that:

GlobalTop Wi-Fi modules must complete solder reflow process in 72 hours after pre-baking.

This maximum time is otherwise known as “Floor Life”

If the waiting time has exceeded 72 hours, it is possible for the module to suffer damages during the solder reflow process such as cracks and delamination of the SMD pads due to excess moisture pressure.

3.2 Packing

GlobalTop Wi-Fi modules are packed in such a way to ensure the product arrives to SMD factory floor without any damages.

Wi-Fi modules are placed individually on to the packaging tray. The trays will then be stacked and packaged together.

Included are:

1. Two packs of desiccant for moisture absorption
2. One moisture level color coded card for relative humidity percentage.

Each package is then placed inside an antistatic bag (or PE bag) that prevents the modules from being damaged by electrostatic discharge.



Figure 1: One pack of Wi-Fi modules

Each bag is then carefully placed inside two levels of cardboard carton boxes for maximum protection.



Figure 2: Box protection

The moisture color coded card provides an insight to the relative humidity (RH). When the WI-FI modules are taken out, it should be around or lower than 30% RH level.

Outside each electrostatic bag is a caution label for moisture sensitive device.

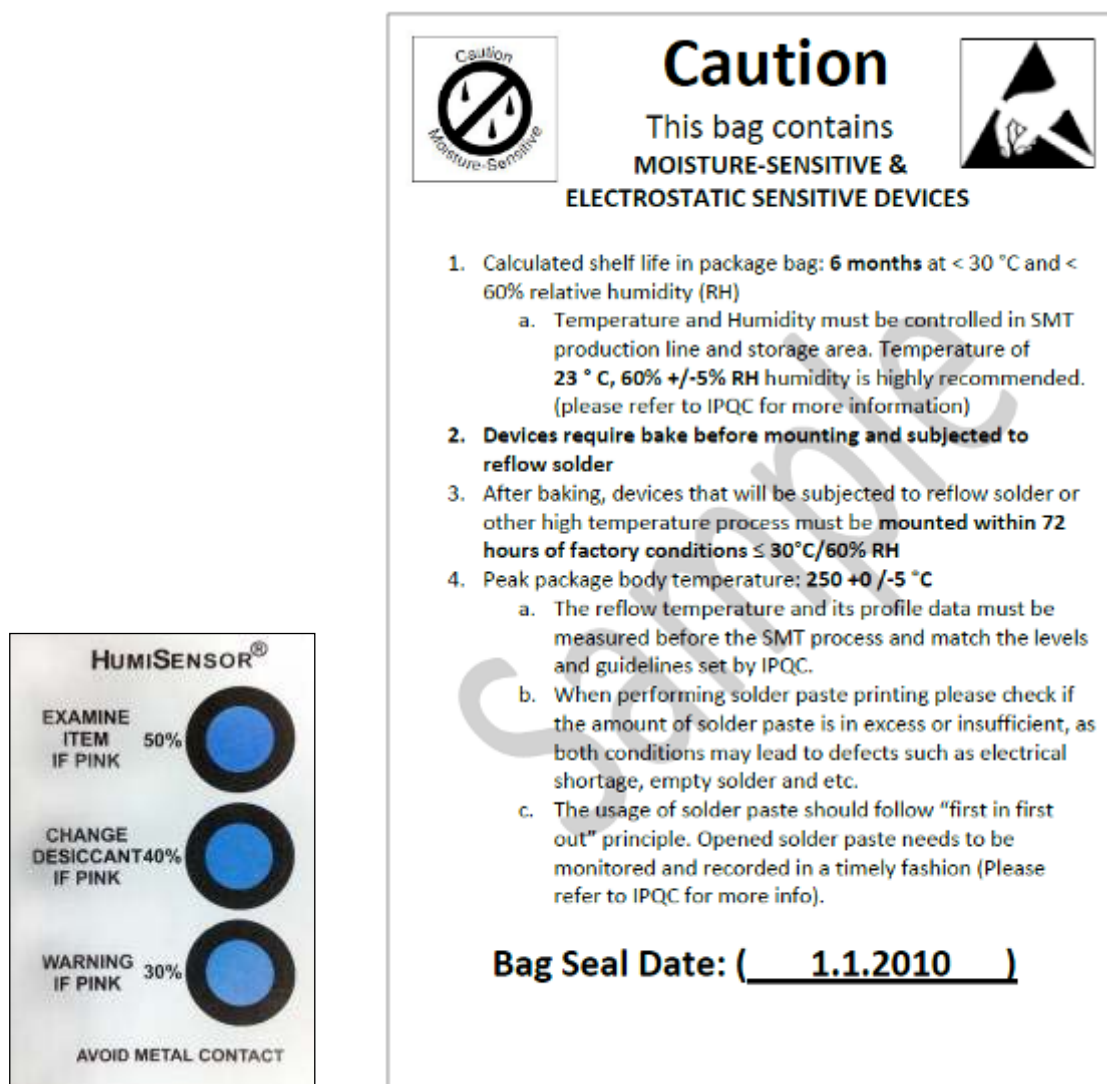


Figure 3: Example of moisture color coded card and caution label

3.3 Storage and Floor Life Guideline

Since GlobalTop modules must undergo solder-reflow process in 72 hours after it has gone through pre-baking procedure, therefore if it is not used by then, it is recommended to store the WI-FI modules in dry places such as dry cabinet.

The approximate shelf life for GlobalTop WI-FI modules packages is 6 months from the bag seal date, when store in a non-condensing storage environment (<30°C/60% RH)



It is important to note that it is a required process for GlobalTop Wi-Fi modules to undergo pre-baking procedures, regardless of the storage condition.

3.4 Drying

When WI-FI modules exposed to high temperature of solder reflow, the moisture vapor pressure inside the WI-FI modules increase greatly. In order to prevent internal delaminating, cracking of the device or the “popcorn” phenomenon, it is **necessary** to undergo pre-baking procedure prior to any high temperature or solder reflow process.

The recommended baking time for GlobalTop WI-FI module is as follows:

- ✓ **60°C for 8 to 12 hours**

Once baked, the module’s floor life will be “reset”, and has additional 72 hours in normal factory condition to undergo solder reflow process.



Please limit the number of times the Wi-Fi modules undergoes baking processes as repeated baking process has an effect of reducing the wetting effectiveness of the SMD pad contacts. This applies to all SMT devices.



Oxidation Risk: Baking SMD packages may cause oxidation and/or intermetallic growth of the terminations, which if excessive can result in solderability problems during board assembly. The temperature and time for baking SMD packages are therefore limited by solderability considerations. The cumulative bake time at a temperature greater than 90°C and up to 125°C shall not exceed 96 hours. Bake temperatures higher than 125°C are now allowed.

3.5 ESD Handling



Please carefully follow the following precautions to prevent severe damage to Wi-Fi modules.

GlobalTop Wi-Fi modules are sensitive to electrostatic discharges, and thus are Electrostatic Sensitive Devices (ESD). Careful handling of the Wi-Fi modules and in particular to its patch antenna (if included) and RF_IN pin, must follow the standard ESD safety practices:

- ✓ Unless there is a galvanic coupling between the local GND and the PCB GND, then the first point of contact when handling the PCB shall always be between the local GND and PCB GND.
- ✓ Before working with RF_IN pin, please make sure the GND is connected
- ✓ When working with RF_IN pin, do not contact any charges capacitors or materials that can easily develop or store charges such as patch antenna, coax cable, soldering iron.
- ✓ Please do not touch the mounted patch antenna to prevent electrostatic discharge from the RF input
- ✓ When soldering RF_IN pin, please make sure to use an ESD safe soldering iron (tip).



4. Contact Information

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