



欧智通科技

*Fn-Link*

**F89FTSM13-W3**

WiFi Single-band 1X1 802.11 b/g/n

User's Manual

## CONTENTS

|     |                                      |    |
|-----|--------------------------------------|----|
| 0   | REVISION HISTORY.....                | 3  |
| 1.1 | MODEL NO DEFINITION.....             | 3  |
| 1   | INTRODUCTIONS.....                   | 4  |
| 1.1 | OVERVIEW.....                        | 4  |
| 1.2 | PRODUCT FEATURES.....                | 4  |
| 2   | GENERAL SPECIFICATION.....           | 5  |
| 2.1 | WIFI RF SPECIFICATION.....           | 5  |
| 2.2 | POWER CONSUMPTION.....               | 5  |
| 3   | MECHANICAL SPECIFICATION.....        | 6  |
| 3.1 | OUTLINE DRAWING.....                 | 6  |
| 3.2 | PCB LAYOUT.....                      | 6  |
| 3.3 | PIN DEFINITION.....                  | 7  |
| 3.4 | APPLICATION CIRCUIT.....             | 8  |
| 4   | ENVIRONMENTAL REQUIREMENTS.....      | 9  |
| 4.1 | OPERATING & STORAGE TEMPERATURE..... | 9  |
| 4.2 | RECOMMENDED REFLOW PROFILE.....      | 9  |
| 4.3 | NOTICE.....                          | 9  |
| 5   | PACKING INFORMATION.....             | 10 |

**0. Revision History**

| REV NO  | Date     | Modifications  | Draft    |
|---------|----------|----------------|----------|
| Rev.1.0 | 2015-7-9 | First Released | Allen Hu |
|         |          |                |          |
|         |          |                |          |

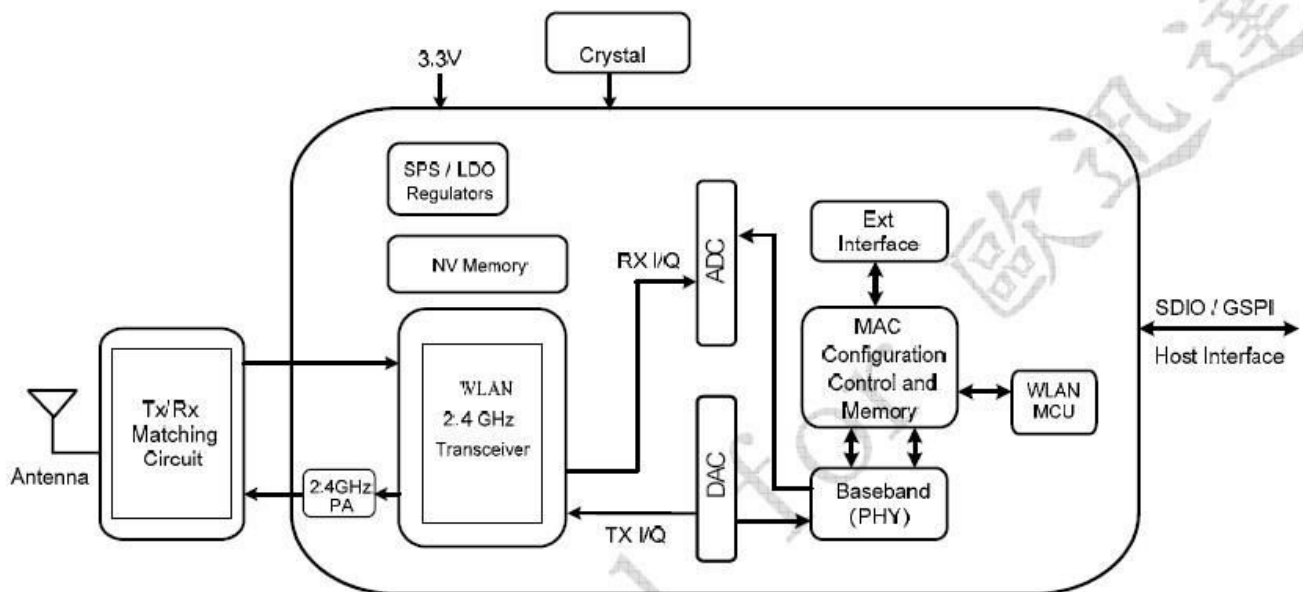
## 1. Introduction

### 1.1 Overview

F89FTSM13-W3 is a highly integrated and excellent performance Wireless LAN (WLAN) SDIO network interface device. High-speed wireless connection up to 150 Mbps.

The general hardware for the module is shown in Figure 1. This WLAN Module design is based on Realtek RTL8189FTV. It is a highly integrated single-chip 1\*1 SISO (Multiple In Multiple Out) Wireless LAN (WLAN) SDIO network interface controller complying with the 802.11n specification. It combines a MAC, a 1T1R capable baseband, and RF in a single chip. It is designed to provide excellent performance with low power Consumption and enhance the advantages of robust system and cost-effective.

### *Single-Band 11n (1x1) Solution*



### 1.2 Product Features

- Operate at ISM frequency bands (2.4GHz)
- SDIO Interface for WiFi
- IEEE standards support: IEEE 802.11b, IEEE 802.11g, IEEE 802.11n,
- Enterprise level security which can apply WPA/WPA2 certification for WiFi.
- WiFi 1 transmitter and 1 receiver allow data rates supporting up to 150 Mbps downstream and 150 Mbps upstream PHY rates

**2. GENERAL SPECIFICATION****2.1 WiFi RF Specifications**

|                             |                                                                                                                                 |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <b>Main Chipset</b>         | RTL8189FTV                                                                                                                      |
| <b>Operating Frequency</b>  | 2.400~2.4835GHz                                                                                                                 |
| <b>Standards</b>            | <b>WiFi:</b><br>IEEE 802.11b,<br>IEEE 802.11g,<br>IEEE 802.11n,                                                                 |
| <b>Modulation</b>           | <b>WiFi:</b><br>802.11b: CCK(11, 5.5Mbps), QPSK(2Mbps), BPSK(1Mbps),<br>802.11 g/n: OFDM                                        |
| <b>PHY Data rates</b>       | <b>WiFi:</b><br>802.11b: 11,5.5,2,1 Mbps<br>802.11g: 54,48,36,24,18,12,9,6 Mbps<br>802.11n: up to 150Mbps                       |
| <b>Receiver Sensitivity</b> | 802.11b@11Mbps -82±1dBm<br><br>802.11g@54Mbps -71±1dBm<br><br>802.11n<br><br>-67±1dBm (MCS 7_HT20)<br><br>-64±1dBm (MCS 7_HT40) |
| <b>Operating Channel</b>    | <b>WiFi 2.4GHz:</b><br>11: (Ch. 1-11) – United States                                                                           |
| <b>Media Access Control</b> | <b>WiFi:</b> CSMA/CA with ACK                                                                                                   |
| <b>Antenna</b>              | External Antenna (PIFA)                                                                                                         |
| <b>Network Architecture</b> | <b>WiFi:</b> Ad-hoc mode (Peer-to-Peer )<br>Infrastructure mode<br>Software AP<br>WiFi Direct                                   |
| <b>Security</b>             | <b>WiFi:</b> WPA, WPA-PSK, WPA2, WPA2-PSK, WEP 64bit & 128bit,                                                                  |
| <b>OS Supported</b>         | Android /Linux                                                                                                                  |
| <b>Host Interface</b>       | <b>WiFi:</b> SDIO/GPIO                                                                                                          |
| <b>Operating Voltage</b>    | 3.3Vdc ±10% I/O supply voltage                                                                                                  |
| <b>Dimension</b>            | Typical L12.0*W12.0*H1.6mm                                                                                                      |

**2.2 Power Consumption**

| Mode             | Status | Power(mA) | Note      |
|------------------|--------|-----------|-----------|
| OS<br>Windows XP | Link   | 130       |           |
|                  | RX     | 130       | 20M       |
|                  | TX     | 190       | 20M(MCS7) |
|                  |        | 175       | 40M(MCS7) |

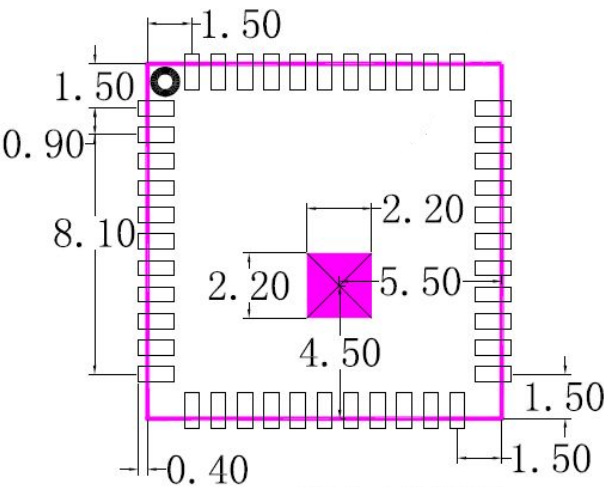
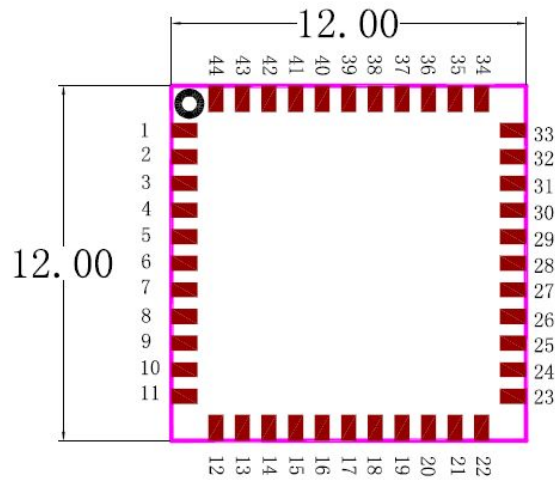
3. Mechanical Specification

3.1 Outline Drawing



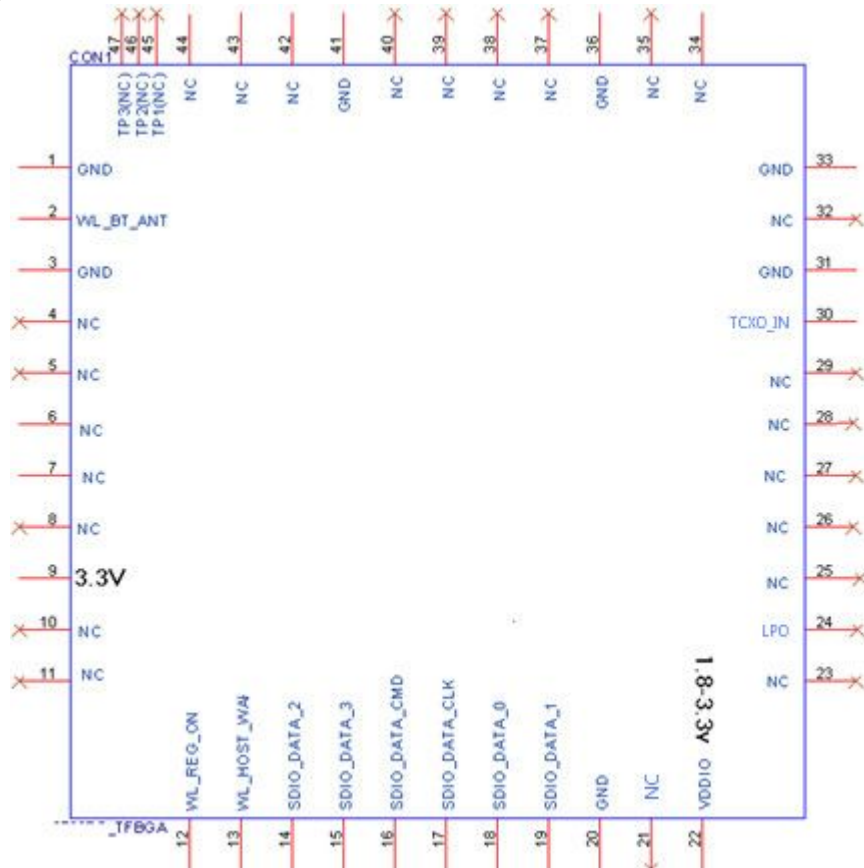
3.2 PCB LAYOUT (Unit:  $\pm 0.15\text{mm}$ )

Unit: mm      er:  $\pm 0.1$



PCB LAYOUT

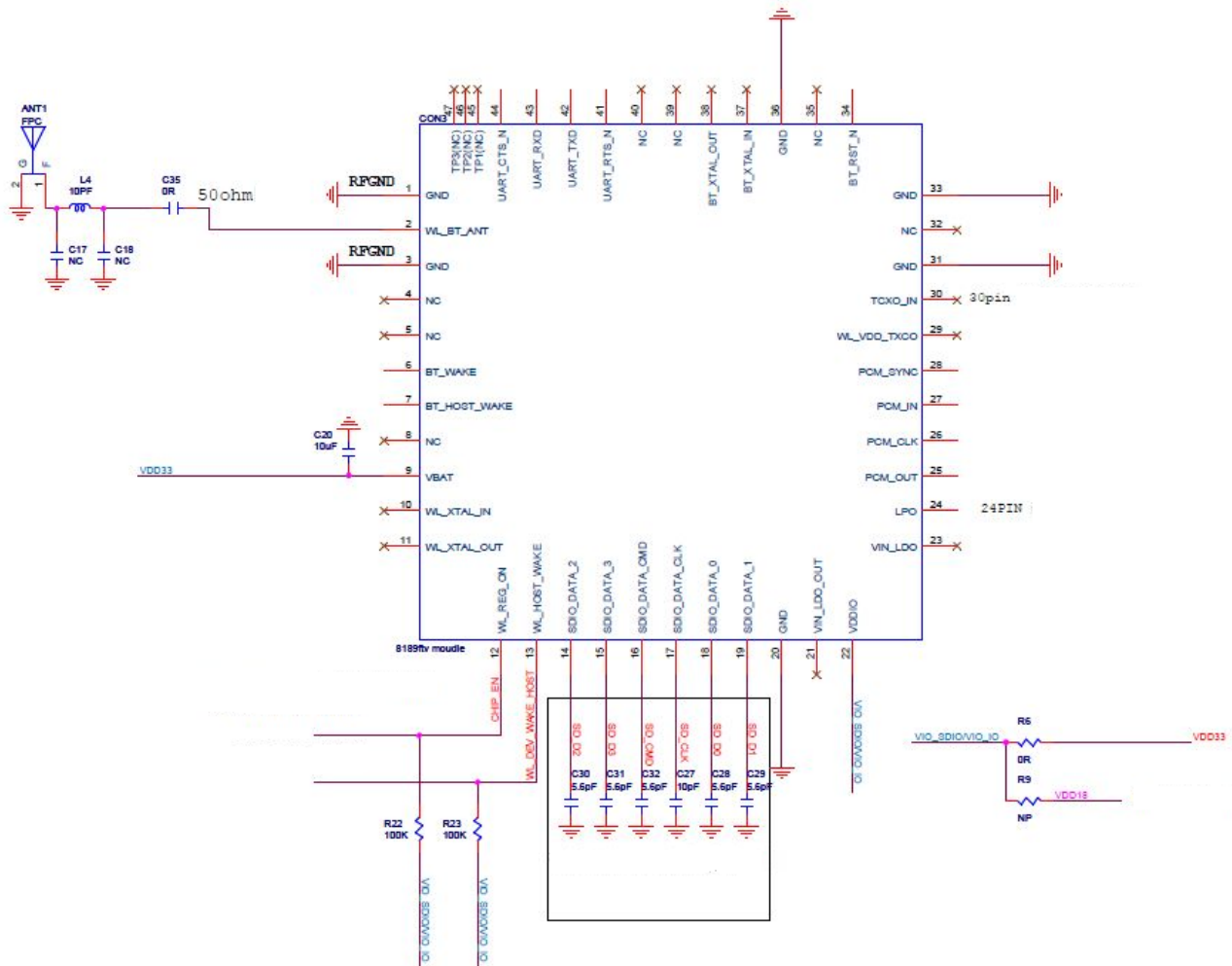
## 3.3 PIN Assignment



| Pin # | Name          | Description   |
|-------|---------------|---------------|
| 1     | GND           | GND           |
| 2     | RF            | RF OUTPUT     |
| 3     | GND           | GND           |
| 4~8   | NC            | NC            |
| 9     | VBAT          | 3.3V Optional |
| 10    | NC            | NC            |
| 11    | NC            | NC            |
| 12    | WL_REG_ON     | WL_REG_ON     |
| 13    | WL_HOST_WAKE  | WAKE UP       |
| 14    | SDIO_DATA_2   | SDIO_D2       |
| 15    | SDIO_DATA_3   | SDIO_D3       |
| 16    | SDIO_DATA_CMD | SDIO_CMD      |
| 17    | SDIO_DATA_CLK | SDIO_CLK      |
| 18    | SDIO_DATA_D0  | SDIO_D0       |
| 19    | SDIO_DATA_D1  | SDIO_D1       |
| 20    | GND           | GND           |
| 21    | NC            | NC            |
| 22    | VDIO          | 1.8~3.3V      |
| 23    | NC            | NC            |
| 24    | LPO           | CLK_REQ       |
| 25~29 | NC            | NC            |
| 30    | TCXO_IN       | 26MHz_IN      |
| 31    | GND           | GND           |

|       |     |     |
|-------|-----|-----|
| 32    | NC  | NC  |
| 33    | GND | GND |
| 34~35 | NC  | NC  |
| 36    | GND | GND |
| 37~40 | NC  | NC  |
| 41    | GND | GND |
| 42~44 | NC  | NC  |

### 3.4 Application Circuit



## 4. Environmental Requirements

### 4.1 Operating & storage temperature

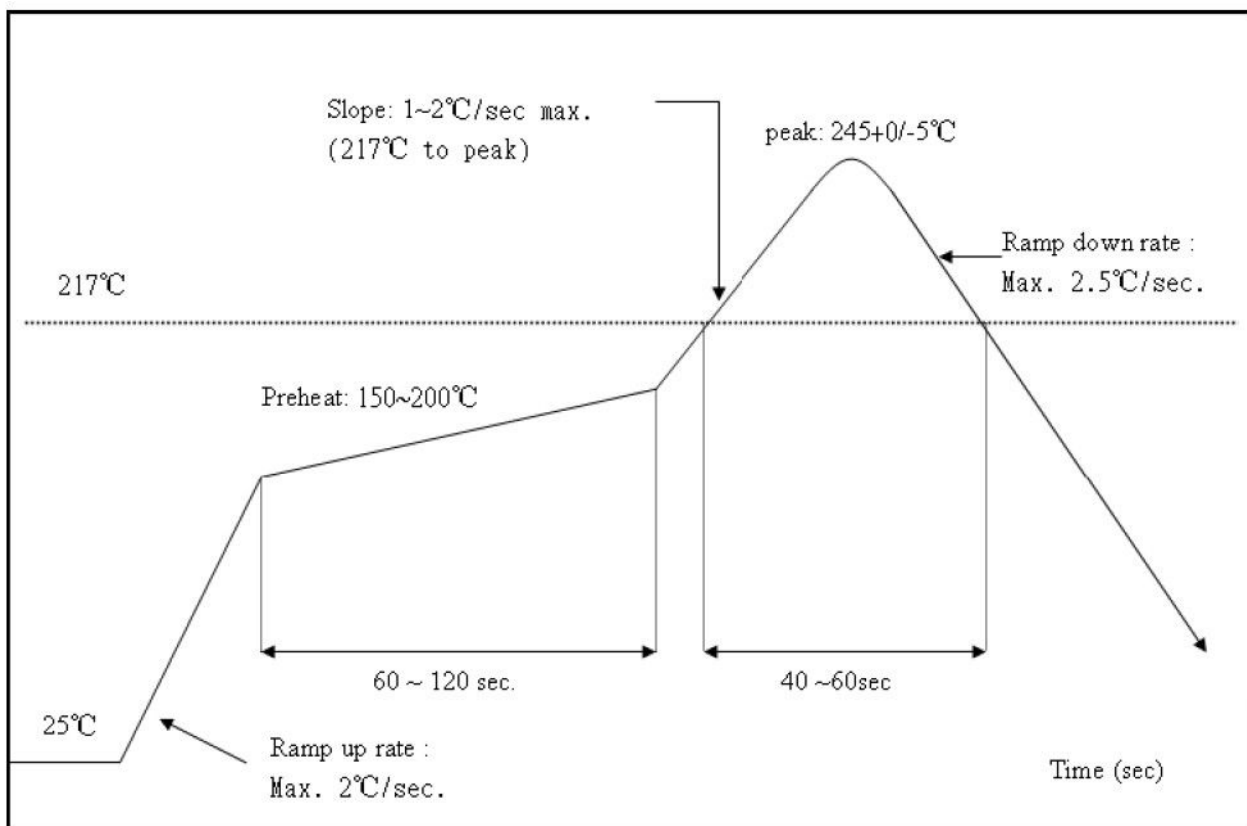
|                                   |                                             |
|-----------------------------------|---------------------------------------------|
| Operating                         | Temperature: -20°C to +70°C                 |
|                                   | Relative Humidity: 10-90% (non-condensing)  |
| Storage                           | Temperature: -40°C to +80°C (non-operating) |
|                                   | Relative Humidity: 5-90% (non-condensing)   |
| MTBF (Mean Time Between Failures) | Over 150,000hours                           |

### 4.2 Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <250°C

Number of Times : ≤2 times



### 4.3 Patch WIFI modules installed before the notice:

WIFI module installed note:

1. Please press 1 : 1 and then expand outward proportion to 0.7 mm, 0.12 mm thickness When open a stencil
2. Take and use the WIFI module, please insure the electrostatic protective measures.
3. Reflow soldering temperature should be according to the customer the main size of the products, such as the temperature set at 250 + 5 °C for the MID motherboard.

About the module packaging, storage and use of matters needing attention are as follows:

1. The module of the reel and storage life of vacuum packing: 1). Shelf life: 8 months, storage environment conditions: temperature in: < 40 °C, relative humidity: < 90% r.h.
2. The module vacuum packing once opened, time limit of the assembly:  
Card: 1) check the humidity display value should be less than 30% (in blue), such as: 30% ~ 40% (pink), or greater than 40% (red) the module have been moisture absorption.  
2.) factory environmental temperature humidity control: ≤ -30°C, ≤ 60% r.h..  
3). Once opened, the workshop the preservation of life for 168 hours.

3. Once opened, such as when not used up within 168 hours:
  - 1). The module must be again to remove the module moisture absorption.
  - 2). The baking temperature: 125 °C, 8 hours.
  - 3.) After baking, put the right amount of desiccant to seal packages.

## **5. PACKING INFORMATION**

### **5.1 Blister packaging**



**A piece of 100 PCS**

### **5.2 Coiling Packaging**



**A roll of 2000pcs**

**FCC Statement:**

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. (2) This device must accept any interference received, including interference that may cause undesired operation.

NOTE: 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.

**WARNING:** Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**LABEL OF THE END PRODUCT:**

The final end product must be labelled in a visible area with the following "Contains TX FCC ID: 2AATL-F89FTSM13-W3". If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users manual: 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**

This device has been evaluated and shown compliant with the FCC RF Exposure limits under fixed exposure conditions (antennas are greater than 20cm from a person's body) when installed in certain specific OEM configurations.

This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

**IMPORTANT NOTE:**

This module is intended for OEM integrator only and the OEM integrators are instructed to ensure that the end user has no manual instructions to remove or install the device. The OEM integrator is still responsible for the FCC compliance requirement of the end product, which integrates this module.

Integration is typically strictly restricted to Grantee himself or dedicated OEM integrators under control of the Grantee.

In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter, then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

The module will be responsible to satisfy SAR/RF Exposure requirements, when the module is integrated into any (portable, mobile, fixed) host device.

This module has been designed to operate with a PIFA antenna having a maximum gain of 2.99dBi. Only this type of antenna may be used, the manufacturer recommended antenna as below:

| No. | Brand         | Model name        | Antenna Type | Connector | Gain (dBi) |
|-----|---------------|-------------------|--------------|-----------|------------|
| 1   | ZHONGTIAN XUN | 2.00001213        | PIFA         | I-PEX     | 2.99       |
| 2   | XK            | XKFPC-2D4-5D8-150 | PIFA         | I-PEX     | 0.0        |
| 3   | XK            | XK-QX2400-PCB-140 | PIFA         | I-PEX     | 2.0        |
| 4   | ZHONGTIAN XUN | 2.00001050        | PIFA         | I-PEX     | 0.38       |

The module must in the end-product be installed in such manner that the authorized antennas can be used, any change of the antenna will void the certification.

**EU Regulatory Conformance**

Hereby, we(FN-LINK TECHNOLOGY LIMITED) declared that this device is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU