Product Specification

IEEE 802.11b/g/n 1T1R WiFi Module

Project Name	WIFI Module
Model NO	F89FTSM13

Approved:: SYMEN SONG	Check: Jim HU	Prepared: SJ LI

CONTENTS

0. Revision History

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

1. Introduction

1.1 Overview

F89FTSM13 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 MIMO (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
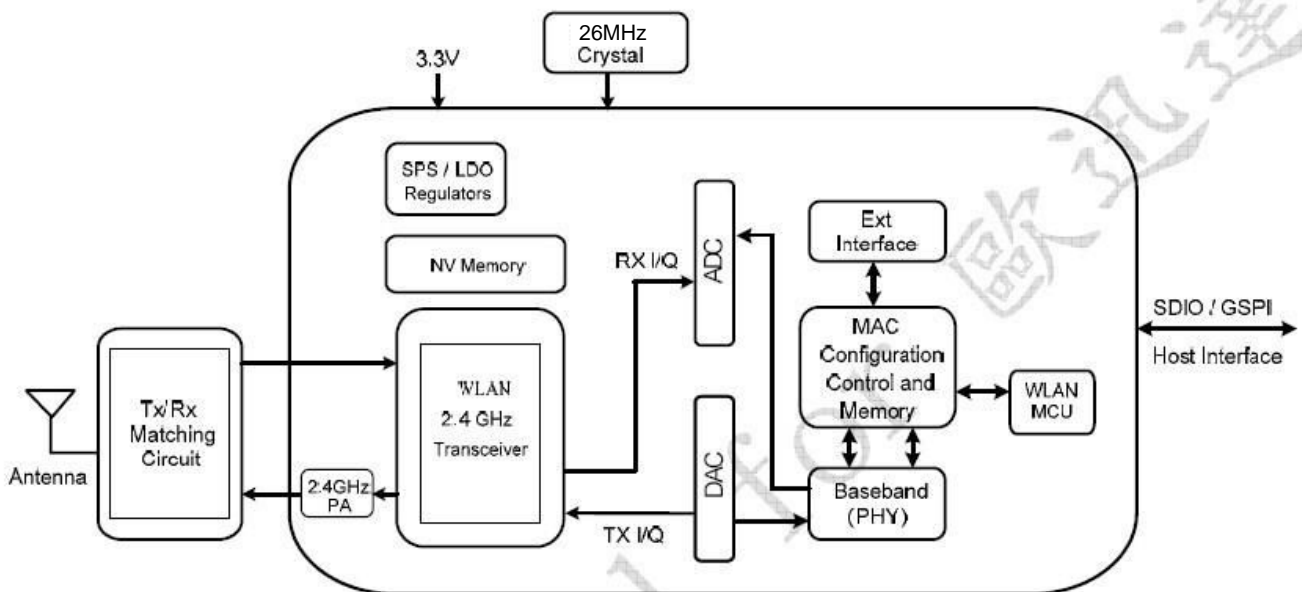
1.2 Product Features

- 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

Main Chipset	RTL8189FTV
Operating Frequency	2.400～2.4835GHz

Standards	**WiFi:**
	    IEEE 802.11b,
	    IEEE 802.11g,
	    IEEE 802.11n,

Modulation	**WiFi:**
	    802.11b: CCK(11, 5.5Mbps), QPSK(2Mbps), BPSK(1Mbps),
	    802.11 g/n: OFDM

PHY Data rates	**WiFi:**
	    802.11b: 11,5.5,2,1 Mbps
	    802.11g: 54,48,36,24,18,12,9,6 Mbps
	    802.11n: up to 150Mbps

Transmit Output Power	**WiFi:**
	
	    802.11b <16dBm
	
	    802.11g <14dBm
	
	    802.11n <13dBm

Receiver Sensitivity	802.11b@11Mbps -82±1dBm
	802.11g@54Mbps -71±1dBm
	802.11n
	        -67±1dBm (MCS 7_HT20)
	        -64±1dBm (MCS 7_HT40)

Operating Channel	**WiFi 2.4GHz:** 11: (Ch. 1-11) – United States
Media Access Control	**WiFi:** CSMA/CA with ACK
Antenna	Integral (1dBi Max)

Network Architecture	**WiFi:** Ad-hoc mode (Peer-to-Peer)
	        Infrastructure mode
	        Software AP
	        WiFi Direct

Security	**WiFi:** WPA, WPA-PSK, WPA2, WPA2-PSK, WEP 64bit & 128bit,
OS Supported	Android /Linux
Host Interface	**WiFi:** SDIO/GPIO
Operating Voltage	3.3Vdc ±10% I/O supply voltage
Dimension	Typical L12.0*W12. 0*H1.6mm

2.2 Power Consumption

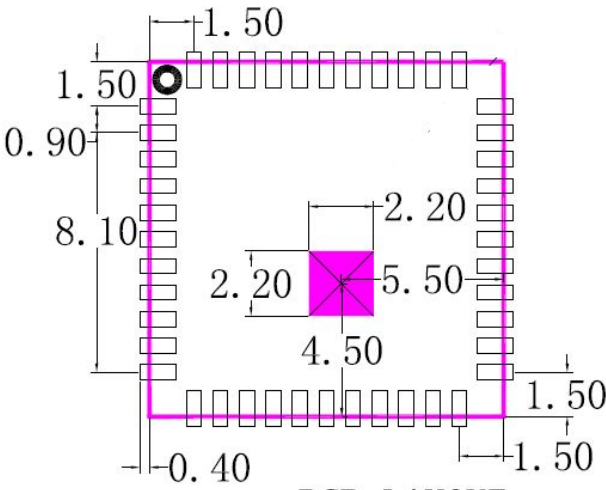| Mode	Status	Power(mA)	Note
OS Windows XP	Link	130	
	RX	130	20M
	TX	190	20M(MCS7)
		175	40M(MCS7)

3. Mechanical Specification
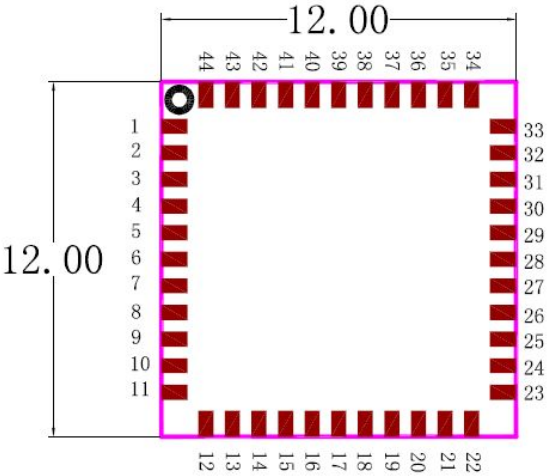
3.1 Outline Drawing

3.2 PCB LAYOUT (Unit: ±0.15mm)
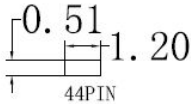
3.3 PIN Assignment
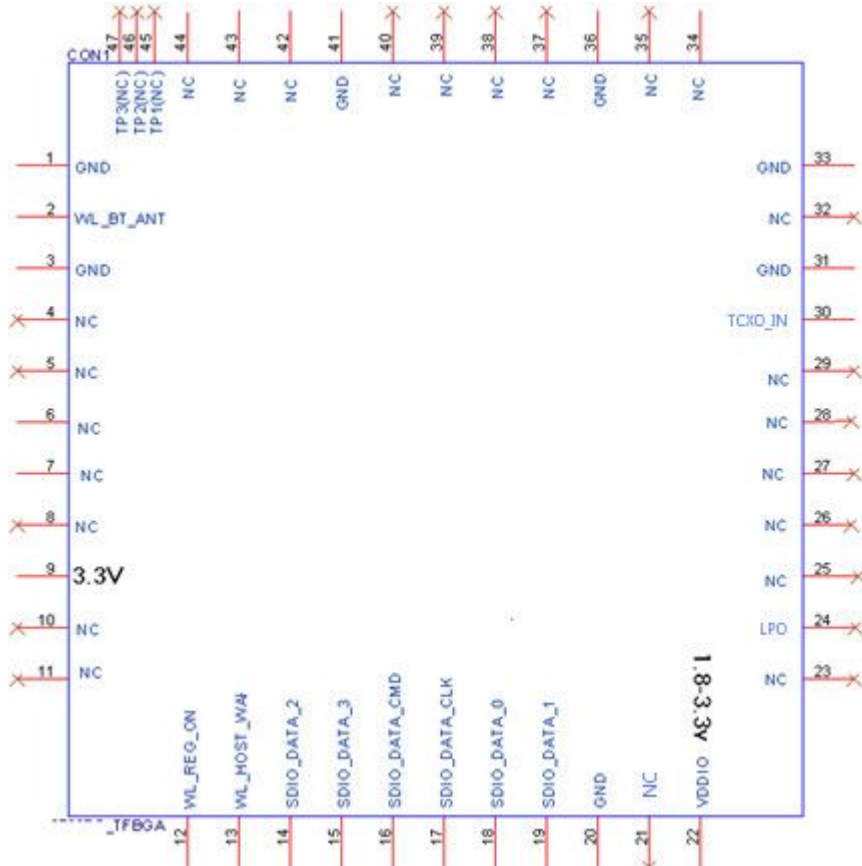
Pin #	Name	Description
1	GND	GND
2	RF	RF OUTPUT
3	GND	GND
4~8	NC	NC
9	VBAT	3.3V Optional
10	NC	NC
11	NC	NC
12	WL_REG_ON	WL_REG_ON
13	WL_HOST_WAKE	WAKE UP
14	SDIO_DATA_2	SDIO_D2
15	SDIO_DATA_3	SDIO_D3
16	SDIO_DATA_CMD	SDIO_CMD
17	SDIO_DATA_CLK	SDIO_CLK
18	SDIO_DATA_D0	SDIO_D0
19	SDIO_DATA_D1	SDIO_D1
20	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
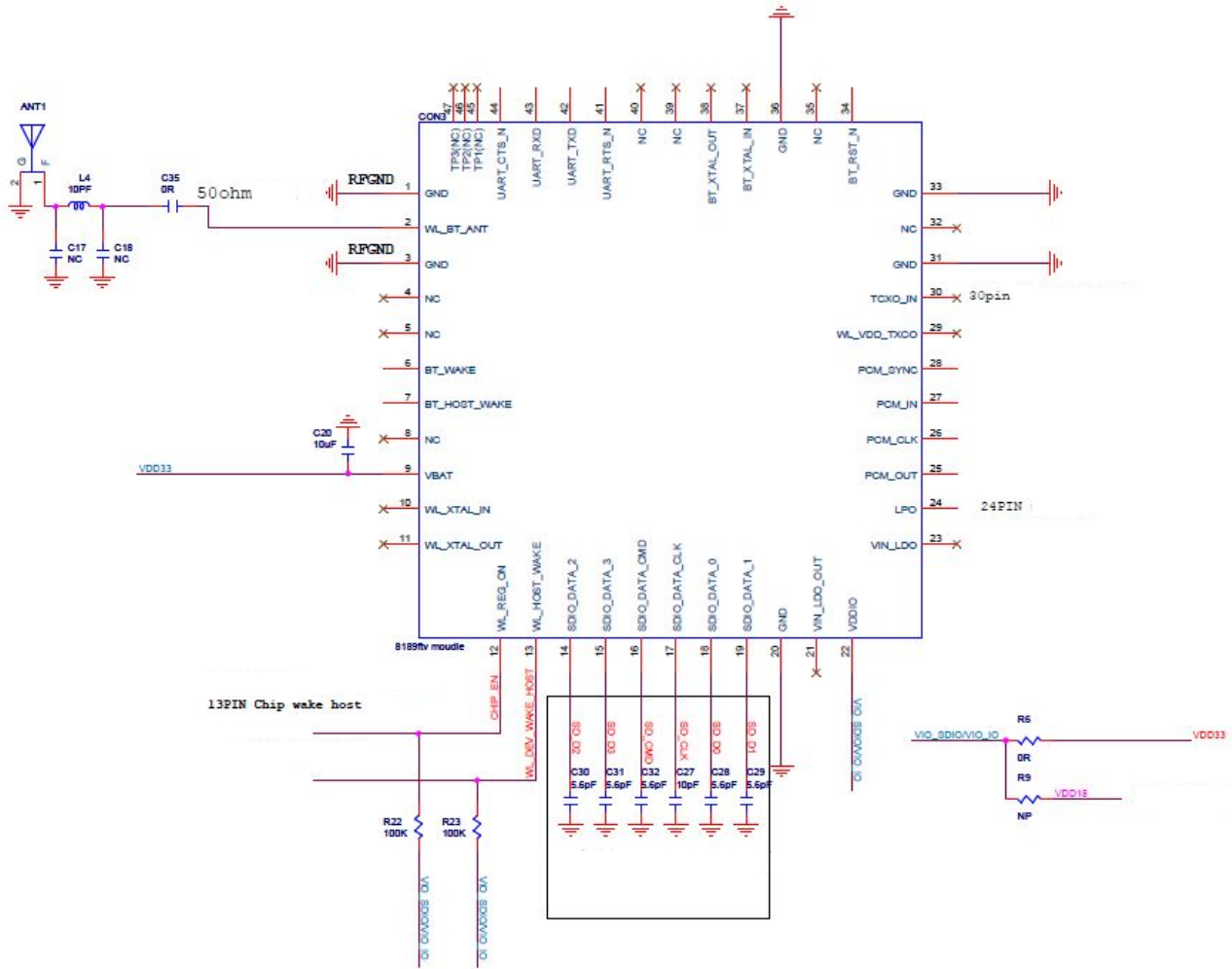
4. Environmental Requirements

4.1 Operating & storage tempreture

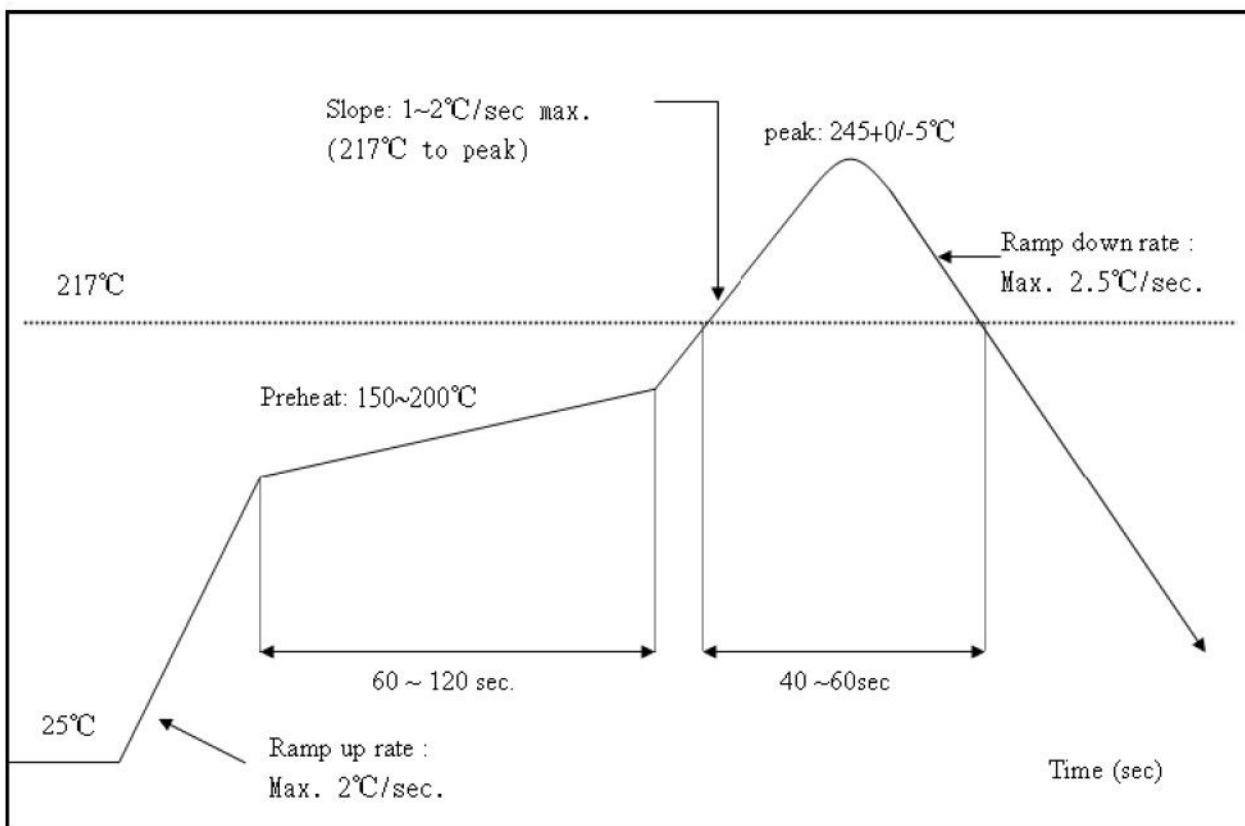| Operating	Temperature: -5°C to +55°C
	Relative Humidity: 10-90% (non-condensing)
Storage	Temperature: -40°C to +80°C (non-operating)
	Relative Humidity: 5-90% (non-condensing)
MTBF (Mean Time Between Failures)	Over 150,000hours

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 ℃ 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 ℃, 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℃, ≦ 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 ℃, 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

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.

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

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.

IMPORTANT NOTE:
This device is intended only for OEM integrators under the following conditions:
(1) According to FCC Part 15 Subpart C Section 15.212, the radio elements of the modular transmitter must have their own shielding. However, due to there is no shielding for this WIFI Module, this module is granted as a Limited Modular Approval.
(2) This module has been designed to operate with a Integral antenna having a maximum gain of 1dBi. Only this type of antenna may be used.
(3) Integration is typically strictly restricted to Grantee himself or dedicated OEM integrators under control of the Grantee.

IMPORTANT NOTE:
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 integrated into any (portable, mobile, fixed) host device.

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.

LABEL OF THE END PRODUCT:
The final end product must be labeled in a visible area with the following "Contains TX FCC ID: 2AATL-F89FTSM13". 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.

We hereby requests for part 15 unlicensed limited modular transmitter approval of our device, described as follows:

This devic 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.

FCC Radiation Exposure Statement:
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.
Due to missing shielding the module is strictly limited to integration by the Grantee himself or his dedicated OEM integrator under control of the Grantee.However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

Note 1: The wifi module has no shielding and tested stand alone.
This module is tested and approved as Limited modular approval with stand alone configuration, any OEM incorporated this radio module into any system are require additional testing and evaluation.

Note 2: The module is only certified with the installed antenna. Any change of the antenna will void the certification. The host device including this RF module need to undergo separate cetification.

Attention: Limited Modular Approval - this RF Module may not be sold to the generic public
and requires professional installation.
Due to the fact that this RF Module is not equipped with an own shielding, the end-product
incl. this RF Module has to show compliance to the FCC rules (15C / radiated emissions).

(OEM) Integrator has to assure compliance of the entire end-product
incl. the integrated RF Module. Additional measurements (15C) and/or equipment authorizations
(e.g either a complete new certification or a Class II Permissive Change.)
may need to be addressed depending on co-location or simultaenous
transmission issues if applicable.

Integrator is reminded to assure that these installation instructions
will not be made available to the end-user of the final host device.

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

The final host device, into which this RF Module is integrated" has to be labelled
with an auxilliary lable stating the FCC ID of the RF Module, such as
"Contains FCC ID: 2AATL-F89FTSM13

Depending on the size of the final end-product, the §15.19 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, and
(2) this device must accept any interference received, including
 interference that may cause undesired operation."
should be placed also on the device or alternatively within a prominent location of the users
manual

The §15.21 "Changes or modifications to this unit not expressly
approved by the party responsible for compliance could
void the user's authority to operate the equipment." statement has to be included in a prominent
location of the users manual