

Product Specification

IEEE 802.11b/g/n 1T1R SDIO WiFi Module

WIFI MODULE

ZAPO

S1

Shenzhen ZAPO Technology Co., LTD.

CONTENT

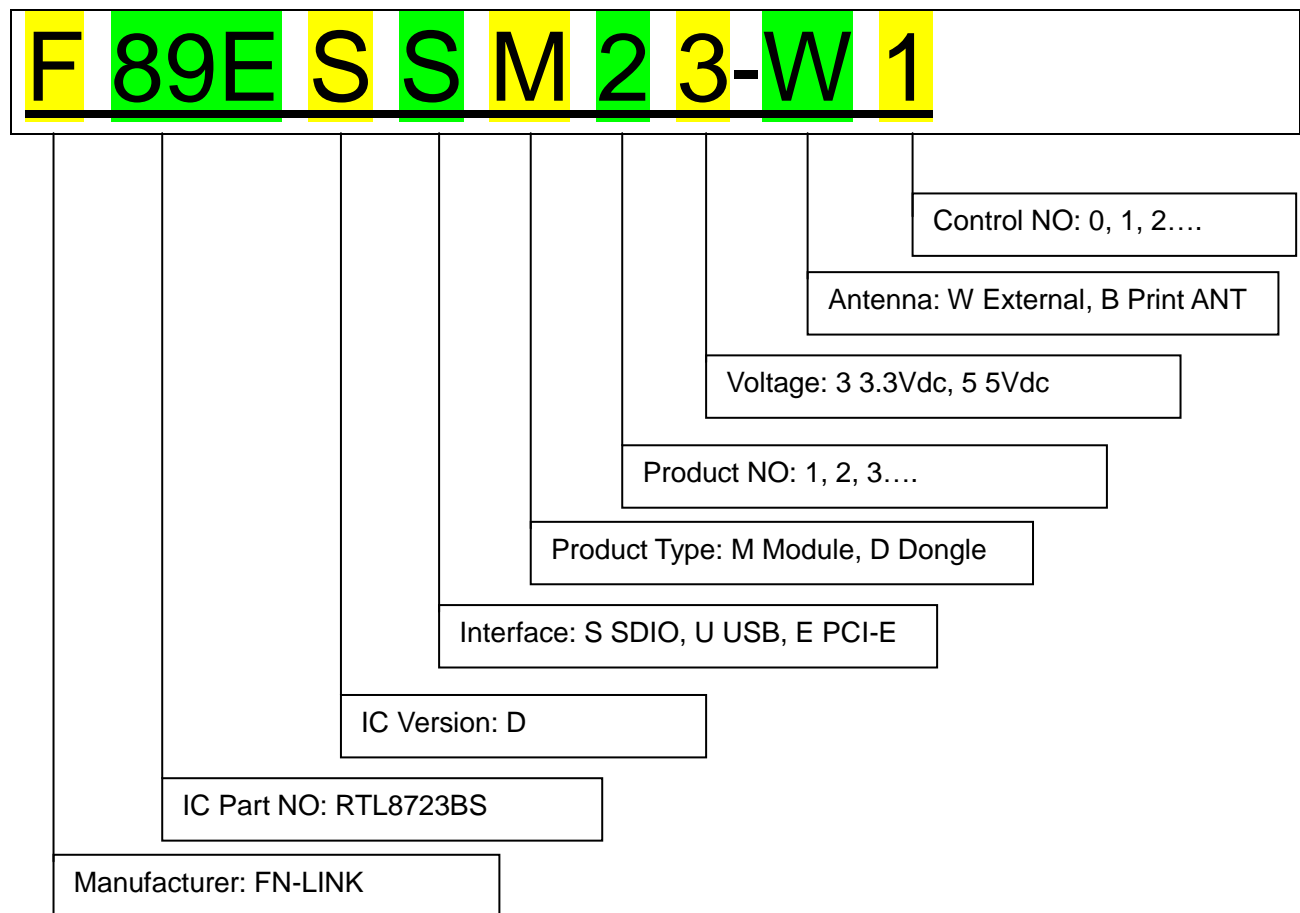
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0. Revision History

REV NO	Date	Modifications	Approved	Drafted
Rev1.0	May 11,2012			XJ Hu
Rev1.1	Dec 30,2013			SJ LI
Rev1.2	Jul.30,2014	Add KCC mark, and shielding case	SYMEN	SJ LI

0.1. Model No Definition

Example: F89ESSM23-W1



1. Introduction

S1 is a highly integrated and excellent performance Wireless LAN (WLAN) SDIO network interface device. High-speed wireless connection up to 150 Mbps .

1.1 Overview

The general hardware for the module is shown in Figure 1. This WLAN Module design is based on Realtek RTL8189ES. 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.

1.2 Specification Reference

This specification is based on additional references listed as below.

IEEE 802.11b

IEEE 802.11g

IEEE 802.11n

Statement

Shenzhen ZAPO Technology Co., LTD.

FCC ID: 2AFA8-S1

This equipment has the capable of operating the FCC band(2412~2462MHz),

2. GENERAL SPECIFICATION

2.1 WiFi RF Specifications

Features	Descriptions
Main Chipset	Realtek RTL8189ES
Operating Frequency	2.400~2.4835GHz
Operating Voltage	3.3Vdc $\pm 10\%$ I/O supply voltage
Host Interface	SDIO/GSPI
WIFI Standard	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
EVM	802.11b /11Mbps : EVM ≤ -9 dB 802.11g /54Mbps : EVM ≤ -25 dB 802.11n /65Mbps : EVM ≤ -28 dB
Receiver Sensitivity (HT 20)	802.11b@8% PER 1Mbps -88 ± 1 dBm 2Mbps -87 ± 1 dBm 5.5Mbps -85 ± 1 dBm 11Mbps -82 ± 1 dBm 802.11g@10% PER 6Mbps -86 ± 1 dBm 9Mbps -85 ± 1 dBm 12Mbps -84 ± 1 dBm 18Mbps -82 ± 1 dBm 24Mbps -80 ± 1 dBm 36Mbps -77 ± 1 dBm 48Mbps -73 ± 1 dBm 54Mbps -71 ± 1 dBm 802.11n@10% PER MCS 0 -83 ± 1 dBm MCS 1 -82 ± 1 dBm MCS 2 -80 ± 1 dBm MCS 3 -78 ± 1 dBm MCS 4 -75 ± 1 dBm MCS 5 -71 ± 1 dBm MCS 6 -69 ± 1 dBm MCS 7 -67 ± 1 dBm
Operating Channel	WiFi 2.4GHz: 11: (Ch. 1-11) – United States(North America) 13: (Ch. 1-13) – Europe 14: (Ch. 1-14) – Japan
Media Access Control	WiFi: CSMA/CA with ACK
Network Architecture	WiFi: Ad-hoc mode (Peer-to-Peer)

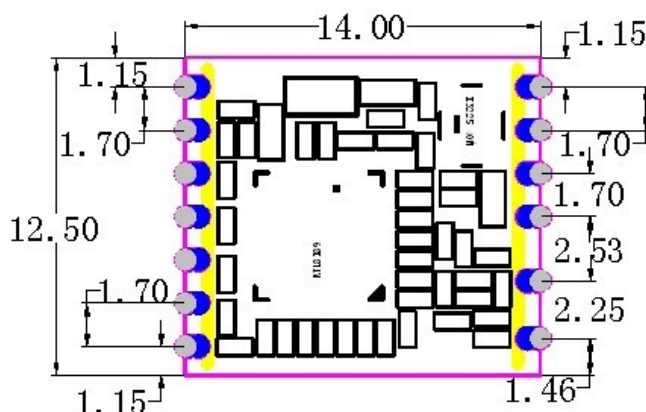
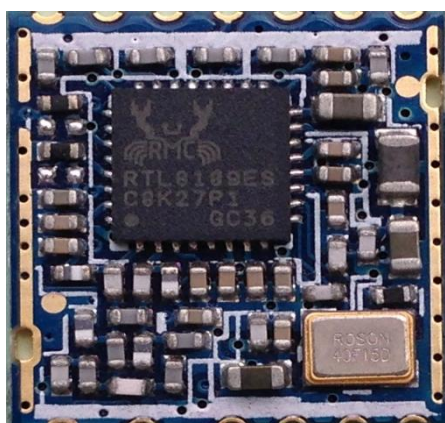
	Infrastructure mode Software AP WiFi Direct
Security	WiFi: WPA, WPA-PSK, WPA2, WPA2-PSK, WEP 64bit & 128bit,
Antenna	External
OS Supported	Android /Linux/ Win CE /iOS /XP/WIN7
Dimension	Typical L14.00*W12.50*T2.00mm

2.2 Power Consumption

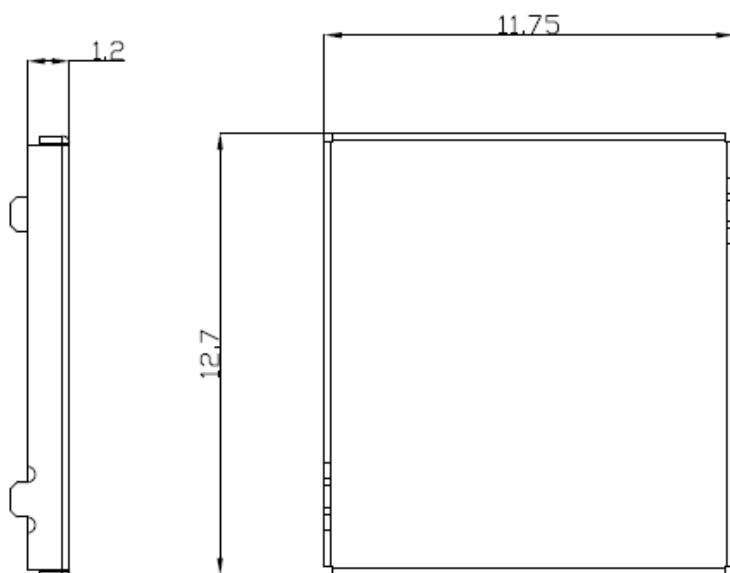
Mode	Status	Power(mW)	Note
OS Windows XP	Link	3.3Vx70mA =231	20M
		3.3Vx75 mA =248	40M
	RX	3.3Vx75mA =248	20M
		3.3Vx75 mA =248	40M
	TX	3.3Vx100 mA =330	20M
		3.3Vx110 mA=363	40M
	Power save mode	3.3Vx20 mA =66	DTIM=100ms
	Device Disable	3.3Vx25 mA =82.5	
	Radio Off	3.3Vx0 mA =0	

3. Mechanical Specification

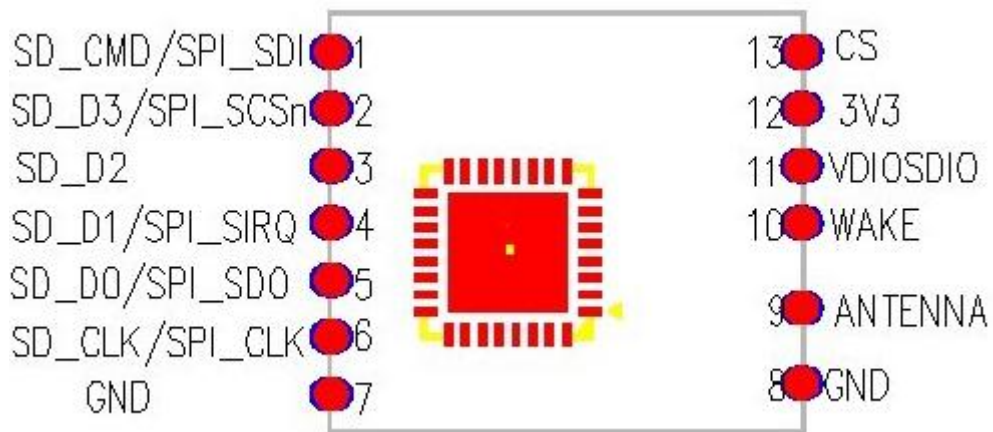
3.1 Outline Drawing



3.2 Specification of shielding case (unit: mm)

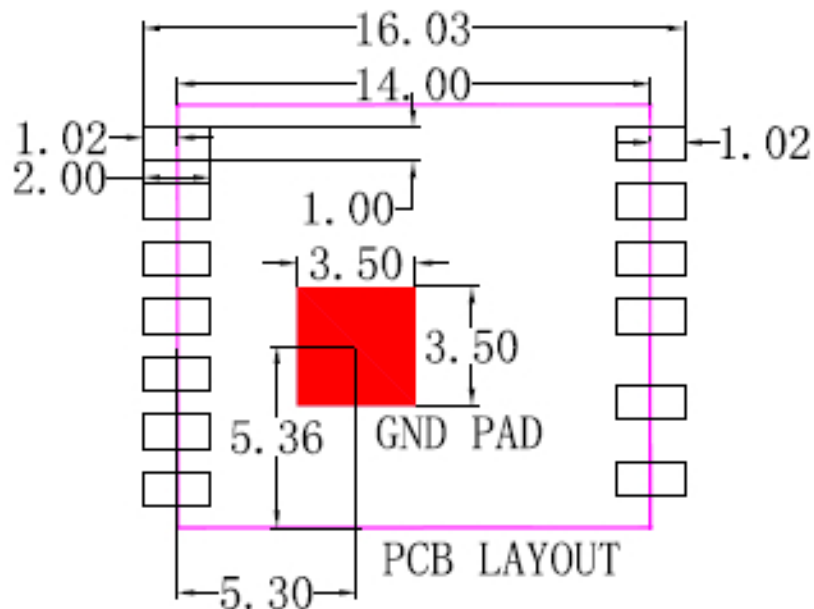


3.3 Connector Pin Definition



Pin #	Name	Description
1	SD_CMD	SDIO Command Input
2	SD_D3	SDIO Data Line 3
3	SD_D2	SDIO Data Line 2
4	SD_D1	SDIO Data Line 1
5	SD_D0	SDIO Data Line 0
6	SD_CLK	SDIO Clock Input
7	GND	POWER GND
8	GND	POWER GND
9	ANTENNA	RF OUT
10	WAKE	Wake Function
11	VDIOSDIO	SDIO Voltage 1.8V-3.3V
12	3.3	Power Supply
13	CS	PDn

3.4 Layout reference



4. Environmental Requirements

4.1 Operating& Storage Conditions

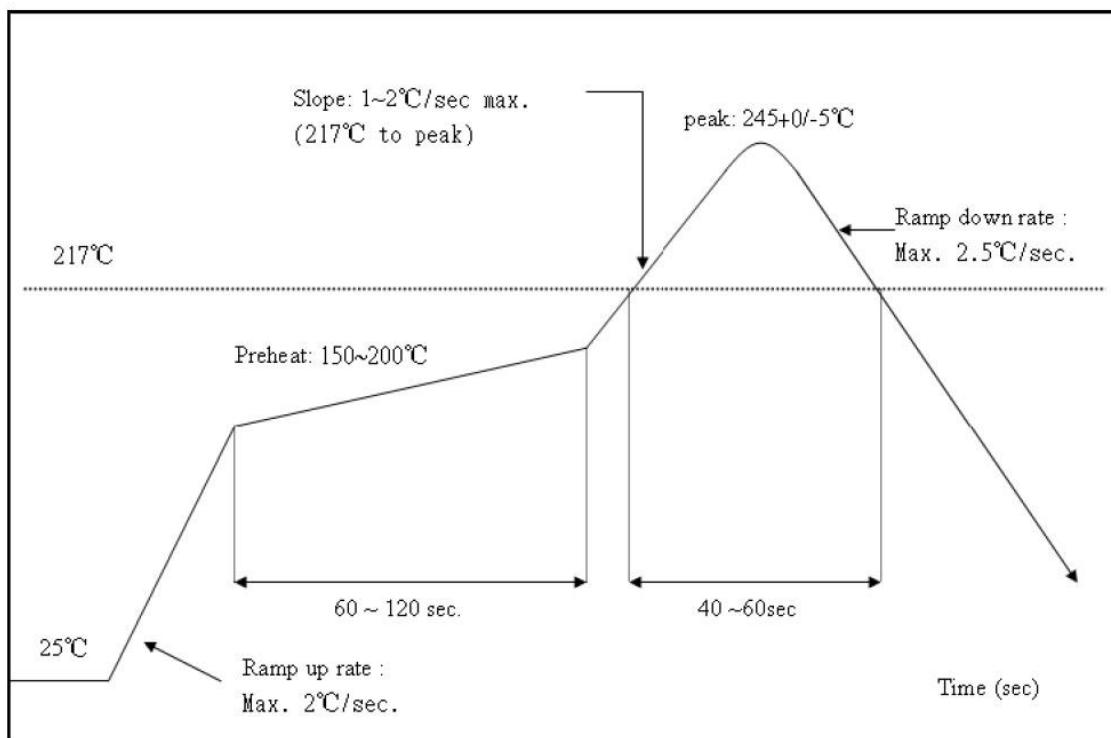
Operating	Temperature: 0°C to +50°C
	Relative Humidity: 10-90% (non-condensing)
Storage	Temperature: -40°C to +80°C (non-operating)
	Relative Humidity: 5-90% (non-condensing)
MTBF (Mean Time Between Failures)	Over 150,000hours

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:

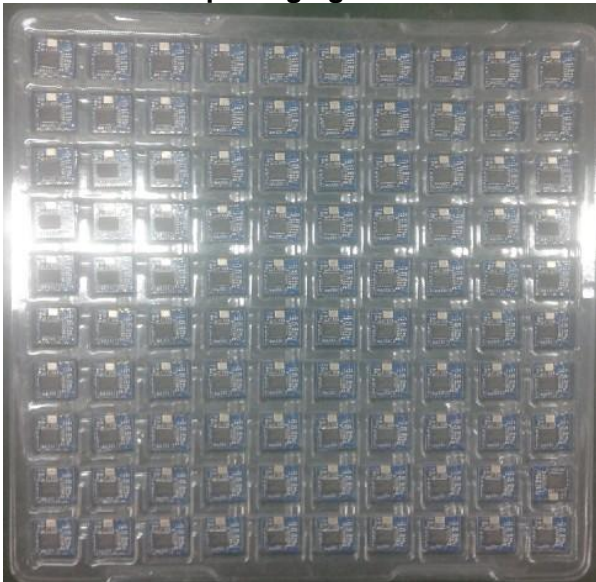
1. Please press 1 : 1 and then expand outward proportion to 0.7 mm, 0.12 mm thickness When open a stencil
2. Take and use the WIFI module, please insure the electrostatic protective measures.
3. Reflow soldering temperature should be according to the customer the main size of the products, such as the temperature set at $250 \pm 5^{\circ}\text{C}$ 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: $< 40^{\circ}\text{C}$, 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: $\leq -30^{\circ}\text{C}$, $\leq 60\%$ 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 Information and Copyright

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.

15.19 Labelling requirements.

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.

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

FCC RF warning statement: the device has been evaluated to meet general RF exposure requirement , The device can be used in portable exposure condition without restriction.

using of non-approval antenna with this radio module may subject to additional testing and FCC certification.

The labeling instruction for final product using this radio module, it contains FCC ID : 2AFA8-S1.

The final OEM that the final product manual should have RF Exposure warning statement to User.