Bluetooth Module Datasheet

Model No.型号:TBM-A2823

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版本变更说明 Document Revision History

Revision 版本	Date 日期	Author 作者	Description 描述
V1.0	2017-02-08	Tommy.li	First release.
V1.1	2017-07-17	Tommy.li	Operating temperature modify
V1.2	2017-09-20	Tommy.li	BT version modify

目录 Table of Contents

1. 系统概览 System overview

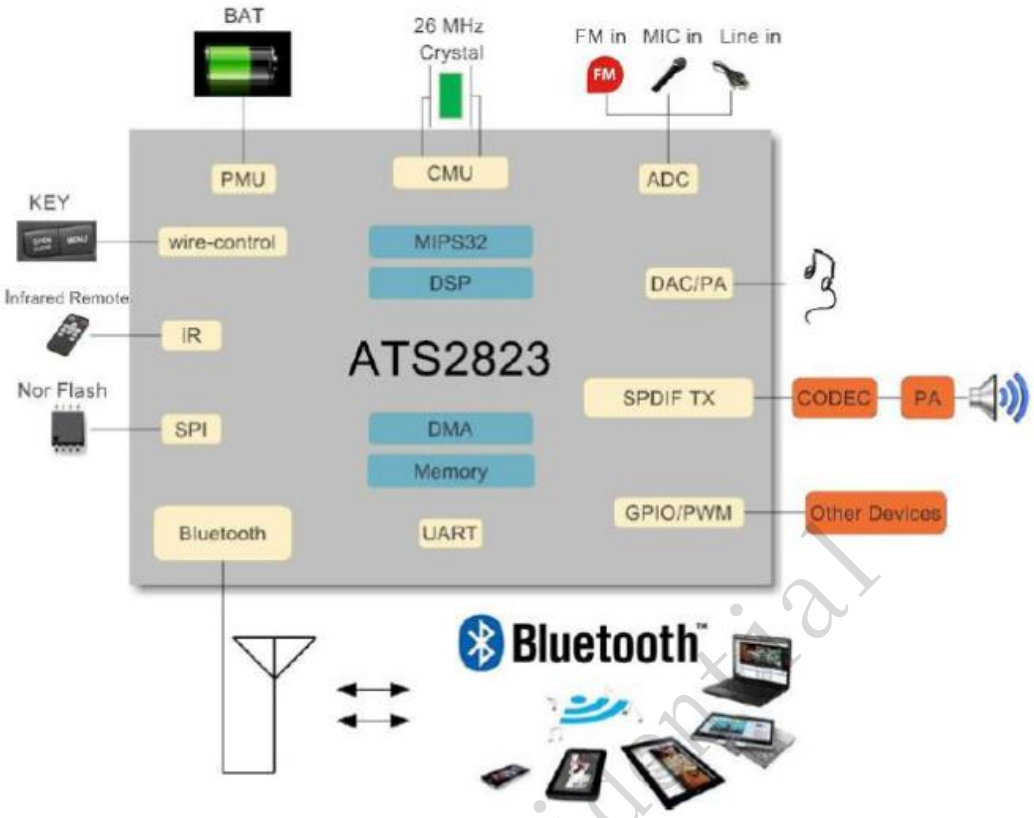
1.1 通用说明 General Descriptions

TBM-A2823 is a Bluetooth sub-system using ATS2823 chipset from 'Actions' . The ATS2823 consumer audio platform for wired and wireless applications integrates an ultra low power DSP and application processor , a high-performance stereo codec, a power management subsystem, LED drivers , Usb flash Disk and MMC in a SoC IC.

1.2 性能特点 Features

- 104 MHz MIPS32 Processor and 180 MHz DSP
- Internal ROM and serial flash memory
- interface supporting randomizer
- Internal RAM for data and program
- Built-in high performance stereo 24 bit DAC& ADC
- Supports Digital microphones, single-ended
- Analog microphones and full difference microphone
- Built-in stereo PA for headphone and differential audio output for speaker PA
- Bluetooth V4.2 compatible with Bluetooth V4.1, V3.0, V2.1 systems
- Bluetooth fast AGC control to improve receiving dynamic range
- Supports AFH to dynamically detect channel quality to improve Bluetooth transmission quality.
- Support SD/MMC/eMMC card interface and
- SPI Nor Flash interface
- Audio Interfaces: I2S, SPDIF TX
- Serial Interfaces: UART, SPI
- Infrared Remote controller supported
- Integrated PMU supports multiple low energy States
- Integrated Linear battery charger up to 600mA charging current
- PCB Dimension: 16.9mm (L) ×13.7mm (W) ×0.8mm (H)

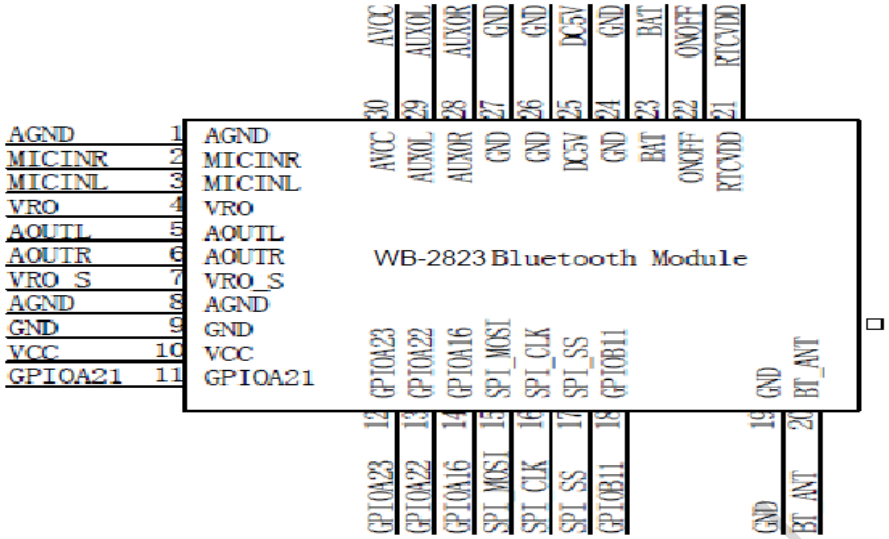
1.3 系统方框图Block Diagram



2.产品描述 Production Description

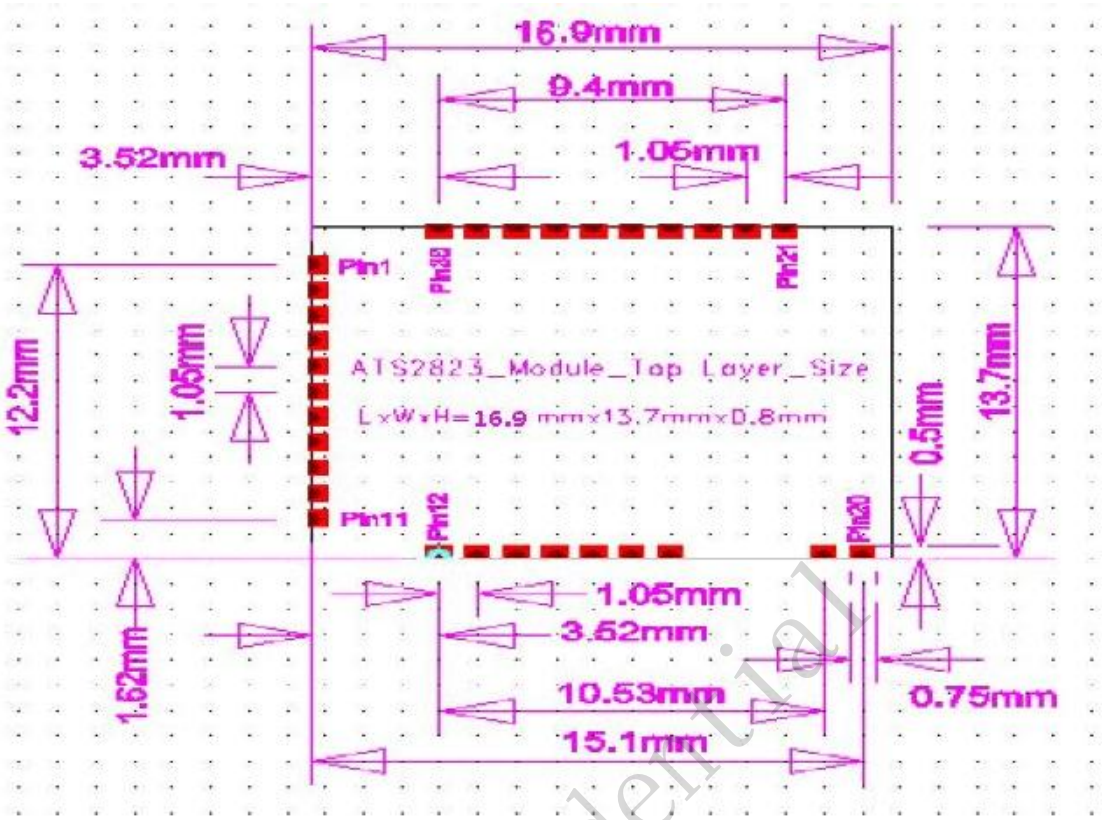
引脚与功能说明 Apperance & Pin Description& Physical Dimensions

- Description & Apperance:

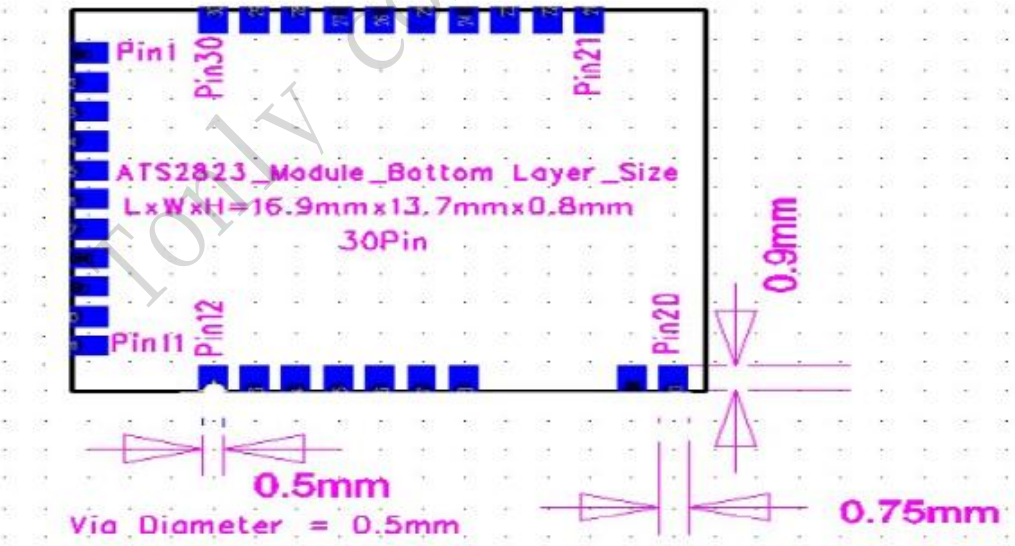


- **Physical Dimensions**

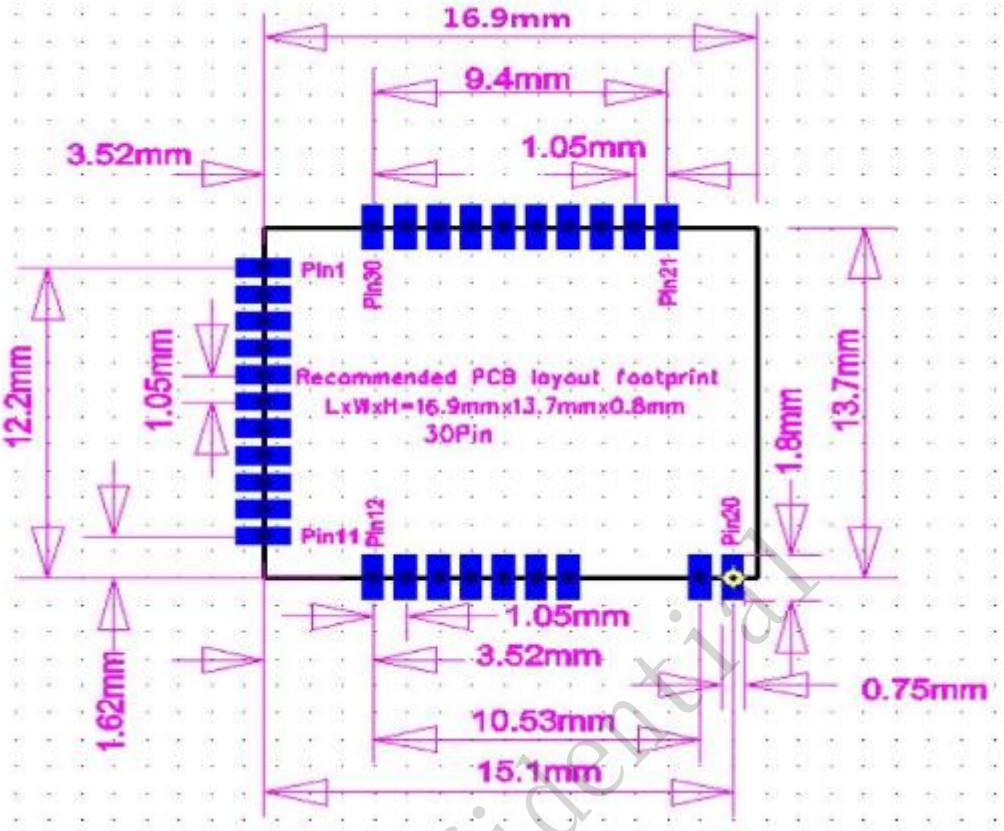
  Top VIEW



Bottom VIEW



PCB Layerout recommend



Pin descriptions

PIN NO.	Symbol	Description	Function
1	AGND	Ground	Analog ground
2	MICINR	Analog input	MIC right channel input
3	MICINL	Analog input	MIC left channel input
4	VRO	Analog output	Virtual Ground for PA
5	AOUTL	Analog output	Left channel of PA
6	AOUTR	Analog output	Right channel of PA
7	VRO_S	Analog input	VRO Sense for PA
8	AGND	ground	Analog ground
9	GND	Power ground	Ground
10	VCC	Power output	3.3V power supply
11	GPIOA21	Bi-directional	General Purpose Input Output: A21/Uart_RX
12	GPIOA23	Bi-directional	General Purpose Input Output: A23/SPDIF_TX,Uart_TX1
13	GPIOA22	Bi-directional	General Purpose Input Output: A22/IR_RX

14	GPIOA16	Bi-directional	Bi-directional General Purpose Input Output: A16
15	SPI_MOSI	Bi-directional	General Purpose Input Output: A31/SPI_MOSI
16	SPI_CLK	Bi-directional	General Purpose Input Output: A29/ SPI_CLK
17	SPI_SS	Bi-directional	General Purpose Input Output: A28 SPI_SS
18	GPIOB11	Bidirectional with weak pull-down	Programmable I/O line 11./SPI_BTIO2
19	GND	Power ground	Ground
20	BT_ANT	This pin can be used when not using a chip antenna or connector of the module.	Bluetooth 50Ω transmitter output /receiver inpu
21	RTCVDD	Power output	Power for RTC Module, typical voltage:1.2V
22	ON/OFF	Input	Power on/off
23	BAT	Power input	Battery input, typical voltage range :3.4V ~ 4.2V
24	GND	Power ground	Ground
25	DC5V	Power input	USB power input, typical voltage range :4.5V ~ 7.0V
26	GND	Power ground	Ground
27	GND	Power ground	Ground
28	AUX0R	Analog input	AUX0 right channel input
29	AUX0L	Analog input	AUX0 left channel input
30	AVCC	Power output	Power for Analog module, typical voltage:2.95V

3.应用说明 Application Explanations

- Stereo headsets and headphones
- Portable stereo speakers and speakerphones
- Bluetooth car audio unit
- Bluetooth sound bar

4. 电气特性 Electrical Characteristics

Base Characteristics

ELECTRICAL CHARACTERISTICS	
Supply Voltage	>= 3.6V DC

	(Absolute Maximum Ratings 4.2V)
Working current	Depends on profiles, Max 24mA (A2DP)
Standby current(disconnected)	0mA~5mA
WEIGHT AND DIMENSIONS	(unit : mm)
Size (L x W x H)	24.9*14*1.5 mm
Weight	~1.0g

Recommended operating conditions

	Min	Max	Unit
Operating temperature	-10	70	°C
VDD_BAT	2.8	4.2	V
VDD_CHG	0	7	V
Terminal voltages	0	VDD	V

Regulator Maximum output current

Block Name	Output Voltage	Load Capacity
VCC	2.7~3.4V	300 mA
VDD	0.8~1.5V	100 mA
VD15	1.0~1.7V	170 mA
BTVCC	2.8~3.5V	100 mA
AVCC	VCC-0.15V	50 mA@98%

电池充电 Battery charger

Item	Min	Type	Max	Unit
Input Voltage	4.5	5	7	V
Charge Current(CC mode)	~	500	600	mA
Trickle Charge Current		10		mA
Trickle Charge Threshold Voltage		3		V
Regulated Output(Float)Voltage		4.2		V

Audio feature

Test Condition: Power BAT=3.8V, Analog audio output AOUTL/R, Load = 10K ohm, BW=20Hz ~ 20 KHz, A-Weight. Test equipment: AP2700.

Audio Codec (1KHz,A weight)	DAC/ADC Sampling rate	Max : 48K Typical : 44.1K Min : 8K
	DAC SNR	Max : 102dB Typical : 99dB
	ADC SNR	Max : 90 dB Typical : 87 dB
	DAC THD+N	Min: -87dB Typical : -85 dB
	ADC THD+N	Min : -82dB Typical : -80 dB
Audio performance DAC (0Hz/1KHz,A weight)	Output Level	Max : 960mVrms Typical : 940 mVrms
	Ground Noise	Max : 10 uV Typical : 7 uV
	Dynamic Range	Max : 102 dB Typical : 99dB
	Crosstalk	Min : -100 dB Typical : -96dB
	Frequency Response	20Hz ~20KHz
Audio performance ADC (0Hz/1KHz,A weight)	Input Level THD+N <1%	Max : 980mVrms Min : --
	Ground Noise	Max : 40 uVrms Typical : 30 uVrms
	Dynamic Range	Max : 85 dB Typical : 82dB
	Crosstalk	Min : -85 dB Typical : -82dB
	Frequency Response	20Hz ~20KHz

5.射频性能 RF Performance

Specification	Description
RF performance	
Standard	Bluetooth 4.2
Frequency Band	2.402~ 2.48GHz
Modulation Method	GFSK；4/ПDQPSK;8DQPSK
Maximum Data Rate	1 Mbps/2 Mbps/3 Mbps
Antenna	External antenna
Interface	UART, PIO, AIO, SPI,PCM,SPI
Operation Range	>=30 meters(Free Space)
Sensitivity	-90dBm at 0.1% BER
RF TX Power	<+10dBm

6.认证与法规信息 Certification& Regulation

The BQB Certification：

Bluetooth® product listing

The Bluetooth SIG Hereby Recognizes

TCL Technoly Electronics (Huizhou) Co., Ltd.
Member Company

D035706
Declaration ID

Referenced Qualified Design ID(s): 97384, 74532
Listing Date: 07 June 2017
Product Listing: TBM-A2823C, TBM-A2825C

This certificate acknowledges the products declared by the member were listed in accordance with the *Bluetooth*® Qualification Process

Bluetooth®

7.包装与订货说明 Package & Ordering Information

Assembly Information

- 60Pcs per every Blister tray
- 600Pcs per every Vacuum packing

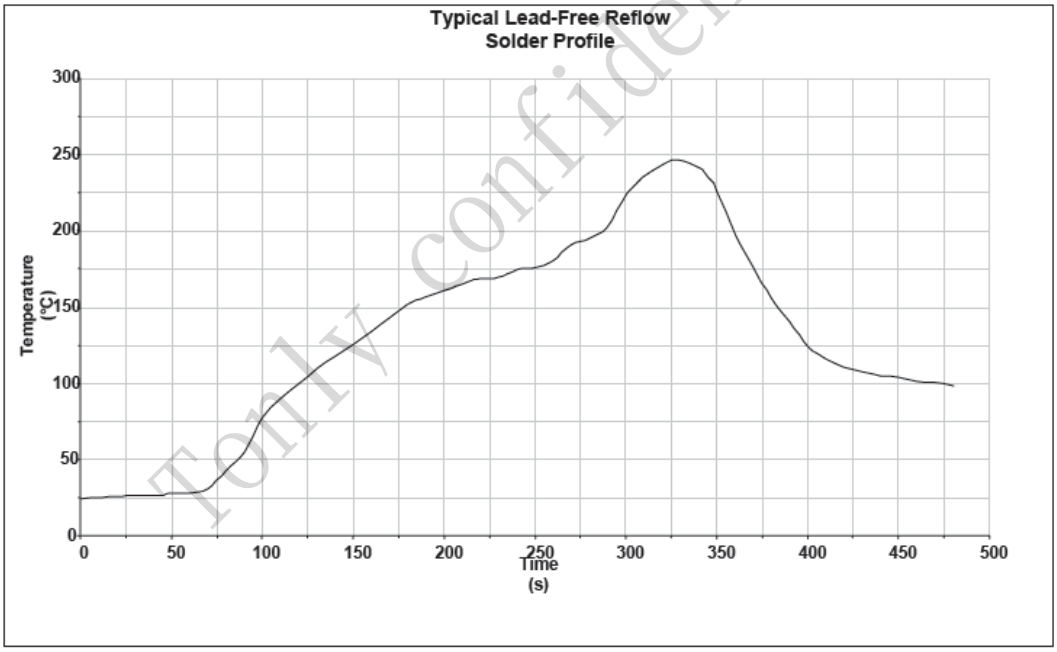
8.环保声明 Green Policy

This module can meet ROHS&REACH compliance.

9.推荐过炉温度 RECOMMENDED TEMPERATURE REFLOW PROFILE

The soldering profile depends on various parameters necessitating a set up for each application. The data here is given only for guidance on solder re-flow. There are four zones:

1. Preheat Zone - This zone raises the temperature at a controlled rate, typically 1-2.5°C/s.
2. Equilibrium Zone - This zone brings the board to a uniform temperature and also activates the flux. The duration in this zone (typically 2-3 minutes) will need to be adjusted to optimize the out gassing of the flux.
3. Reflow Zone - The peak temperature should be high enough to achieve good wetting but not so high as to cause component discoloration or damage. Excessive soldering time can lead to inter metallic growth which can result in a brittle joint.
4. Cooling Zone - The cooling rate should be fast, to keep the solder grains small which will give a longer lasting joint. Typical rates will be 2-5°C/s.



Key features of the profile:

- Initial ramp = 1-2.5°C/sec to 175°C ±25°C equilibrium
- Equilibrium time = 60 to 180 seconds
- Ramp to maximum temperature (245°C) = 3°C/sec max.
- Time above liquidus temperature (217°C): 45-90 seconds
- Device absolute maximum reflow temperature: 260°C

10.抗静电保护 ESD Protection

Condition	Class	Max Rating
Human Body Model Contact Discharge per ANSI/ESDA/JEDEC JS-001	2	2 kV (all pins except CHG_EXT. CHG_EXT is rated at 1 kV)
Charged Device Model Contact Discharge per JEDEC/EIA JESD22-C101	III	500 V (all pins)

----------END----------

For IC:

This device complies with RSS247 of Industry Canada. Cet appareil se conforme à RSS247 de Canada d'Industrie. This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device. appareils radio exempts de licence. Son fonctionnement est sujet aux deux conditions suivantes: (1) le dispositif ne doit pas produire de brouillage prejudiciable, et (2) ce dispositif doit accepter tout brouillage recu, y compris un brouillage susceptible de provoquer un fonctionnement indesirable.

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme a la norme NMB-003 du Canada.

The device should be installed and operated with a minimum distance of 20cm between the radiator and your body.

L'appareil doit être installé et utilisé avec une distance minimale de 20 cm entre le radiateu et votre corps.

For FCC:

Warning: 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.

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.**
-

"The device must not be co-located or operating in conjunction with any other antenna or transmitter."

FCC RF Radiation Exposure Statement Caution: To maintain compliance with the FCC's RF exposure guidelines, place the product at least 20cm from nearby persons.

FCC Conditions

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.

This device is intended only for OEM integrators under the following conditions:

1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
2) The transmitter module may not be co-located with any other transmitter or antenna.
3) For all products market in United States, OEM has to limit the operation channels in CH1 to CH11 for 2.4G band by supplied firmware programming tool. And OEM shall not supply any tool or info to the end-user regarding to change the domain selection.
As long as 3 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

IMPORTANT NOTE: In the event that these conditions cannot 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 cannot 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.

End Product Labeling
This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users (for example: Access point, Wireless Router, Notebook, etc.). The final end product must be labeled in a visible area with the following: “Contains FCC ID: ZVA12”.

Antenna Type: PCB Antenna
Antenna Gain : 2dBi