

W0802P Module Datasheet

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1 Overview

W0802P is an IoT wireless module integrating Wi-Fi, designed around the embedded Wi-Fi SoC W800.

The module supports 2.4G IEEE 802.11 b/g/n Wi-Fi with a built-in full TCP/IP protocol stack.

W0802P is widely used in smart home appliances, smart home, wireless audio/video, smart toys, medical monitoring, industrial control, and other IoT fields, providing an ideal solution for IoT applications.

W0802P uses an SMD package with stamp-hole interconnection and onboard PCB antenna. It supports high-speed production using standard SMT equipment and offers highly reliable connections, especially suitable for automated, large-scale, low-cost modern manufacturing.

1.1 Features

Basic Features

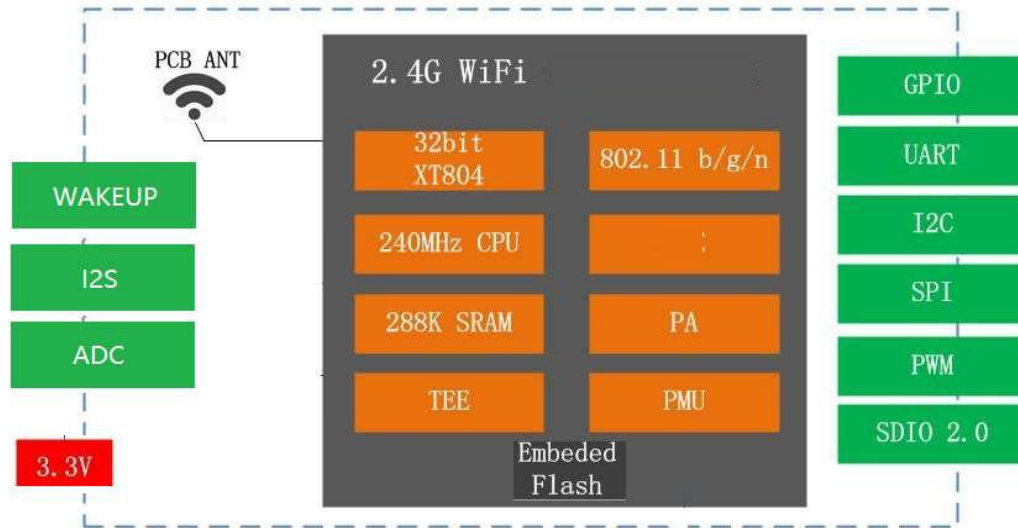
- Module dimensions: 16 mm × 24 mm × 3 mm; pin pitch: 2 mm
- Integrated 32-bit XT804 processor, operating frequency up to 240 MHz
- Built-in DSP, floating-point unit, and security engine
- Built-in 2 MB Flash, 288 KB RAM
- Integrated PSRAM interface supporting up to 64 MB external PSRAM
- Supports SDIO 2.0, SDHC, MMC4.2
- MCU with TEE security engine; supports secure/non-secure world separation
- Asymmetric key distribution for firmware encryption keys
- Hardware security: RC4-256, AES128, DES/3DES, SHA1/MD5, CRC32, 2048-bit RSA, true random number generator

Wi-Fi Features

- Supports 802.11b/g/n; compliant with GB15629.11-2006

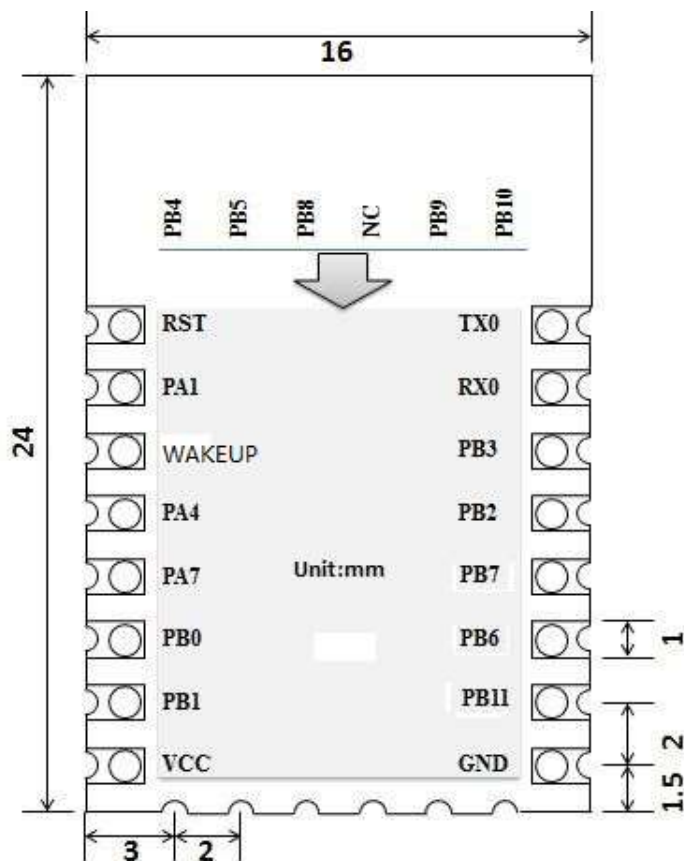
- Frequency range: 2.4 GHz – 2.4835 GHz
- Supports WMM/WMM-PS/WPA/WPA2/WPS
- Supports EDCA channel access
- Supports STBC, GreenField, Short GI, and reverse transmission
- Supports AMPDU, AMSDU
- Supports 20/40 MHz bandwidth modes
- Supports IEEE 802.11n MCS0–7, MCS32; PHY rate up to 150 Mbps
- Supports Short Preamble at 2/5.5/11 Mbps
- Supports HT-immediate Compressed Block Ack, Normal Ack, No Ack
- Supports Station, Soft-AP, Soft-AP/Station concurrent modes
- Supports CTS-to-self
- Supports up to 32 multicast groups/associated STAs in BSS
- 12 × GPIO
- 3 × UART (baud rate: 1200 bps – 2 Mbps)
- 1 × I2S
- 1 × I2C
- 1 × SPI
- WAKEUP interface
- RESET interface
- 5 × PWM (up to 20 MHz)
- 2 × 12-bit ADC
- 2 × 12-bit SDADC (max sampling rate: 1 KHz)
- Others
 - User-programmable GPIO control
 - ASCII-based AT command set via UART
 - Supports TCP/UDP/ICMP/DHCP/DNS/HTTP
 - Supports DHCP Server, DNS Server
 - Extensible web server
 - Supports OTA firmware upgrade
- Temperature
 - Operating temperature: –40 °C to +85 °C
 - Storage temperature: –45 °C to +105 °C

1.2 Block Diagram

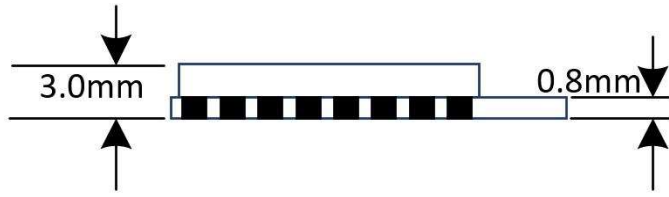


2 Mechanical Specifications

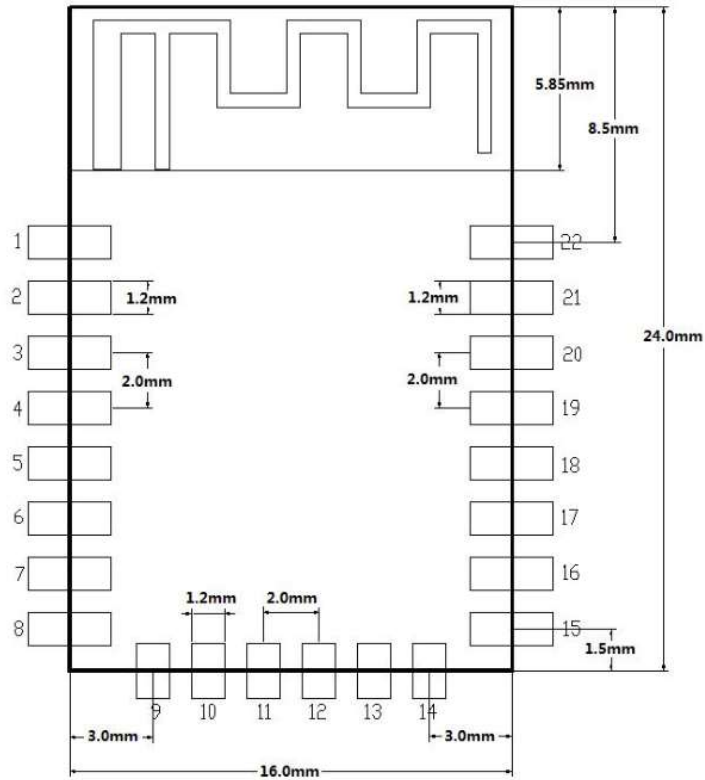
2.1 PCB Dimensions



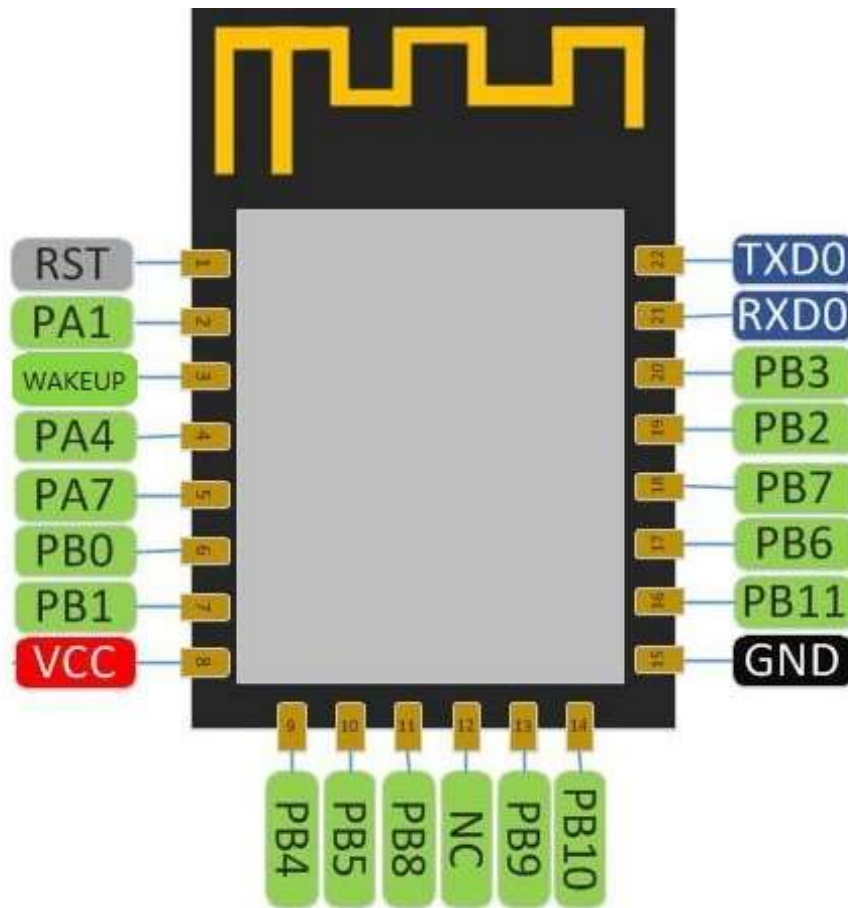
- Front view, side view, and dimension drawing provided (unit: mm)



- Thickness: 0.8 mm
- Overall height: 3.0 mm



2.2 Pin Definition



Pin definitions and functions are listed below.

Table 2-1 Pin Description

No.	Pin names	type	Function
1	RST	reset	Built-in pull-up, high-level enabling module, and low-level disabling module
2	PA1	I/O	JTAG_CK, IIC_SCL, PWM3, IIS_LRCK, ADC0
3	WAKEUP	I	WAKEUP
4	PA4	I/O	JTAG_SWO, IIC_SDA, PWM4, IIS_BCK, ADC1
5	PA7	I/O	PWM4, LSPI_MOSI, IIS_MCK, IIS_DI
6	PB0	I/O	PWM0, LSPI_MISO, UART3_TX, PSRAM_CK
7	PB1	I/O	PWM1, LSPI_CK, UART3_RX, PSRAM_CS
8	VCC	P	3.3V/500mA
9	PB4	I/O	LSPI_CS, UART2_RTS, UART4_TX, PSRAM_D2

10	PB5	I/O	LSPI_MOSI, UART2_CTS, UART4_RX, PSARM_D3
11	PB8	I/O	IIS_BCK, MMC_D0, PWM_BREAK, SDIO_D0
12	NC	-	NOT CONNECT
13	PB9	I/O	S_LRCK, MMC_D1, HSPI_CS, SDIO_D1
14	PB10	I/O	IIS_DI, MMC_D2, HSPI_DI, SDIO_D2
15	GND	P	GND
16	PB11	I/O	IIS_DO, MMC_D3, HSPI_DO, SDIO_D3
17	PB6	I/O	UART1_TX, MMC_CLK, HSPI_CK, SDIO_CK
18	PB7	I/O	UART1_RX, MMC_CMD, HSPI_INT, SDIO_CMD
19	PB2	I/O	PWM2, LSPI_CK, UART2_TX, PSRAM_D0
20	PB3	I/O	PWM3/LSPI_MISO/UART2_RX/PSRAM_D1
21	PB20	I/O	UART0_RX/PWM1/UART1_CTS/I ² C_SCL
22	PB19	I/O	UART0_TX/PWM0/UART1_RTS/I ² C_SDA

3 Electrical Characteristics

3.1 Electrical Parameters

Parameter		Test Conditions	Mix	Type	Max	Unit
Storage Temperature		-	-45	Normal	105	°C
Welding temperature		IPC/JEDEC J-STD-020	-	-	260	°C
Operating Voltage		-	3.0	3.3	3.6	V
I/O	V _{IL} /V _{IH}	-	-/2.0	-	0.8/-	V
	V _{OL} /V _{OH}	-	-/2.4	-	0.4/-	
Electrostatic Parameters (Human Body Model)		TAMB=25°C	-	-	2	KV

Electrostatic Discharge (Human Body Model)	TAMB=25°C	-	-	0.5	KV
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3.2 Power Consumption

Parameter	Mix	Type	Max	Unit
TX @11b,1Mbps,16dBm		240		mA
TX @11b,11Mbps,15dBm		240		mA
TX @11g,54Mbps,15dBm		180		mA
RX @11b/g/n		95		mA

3.3 Wi-Fi RF Parameters

Transmit Power				
11b, 11Mbps	-	16	-	dBm
11g, 54Mbps	-	15	-	dBm
11n MCS0 HT20	-	15	-	dBm
11n MCS7 HT40	-	15	-	dBm
Receiver Sensitivity				
11b, 11Mbps	-	-96	-	dBm
11g, 54Mbps	-	-72	-	dBm
11n MCS0 HT20	-	-70	-	dBm
Adjacent Channel Suppression				
11b, 6Mbps	-	32	-	dB
11g, 54Mbps	-	16	-	dB
11n, HT20, MCS0	-	31	-	dB
11n, HT40, MCS7	-	12	-	dB

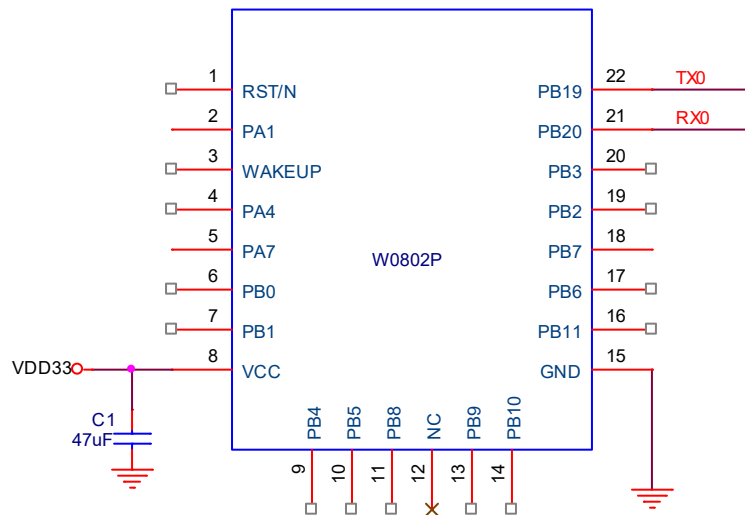
3.4 BT Parameters

Parameter	Mix	Type	Max	Unit
Sensitivity@0.1% BER	-	-91	-	dBm
MaximumReceived Signal @0.1% BER	-	0	-	dBm
Co-channel Rejection Ratio	-	9	-	dB
Out-of-bandBlocking @30MHz~2000MHz	-	-10	-	dBm
Out-of-bandBlocking @2000MHz~3000MHz	-	-27	-	dBm
Out-of-bandBlocking @3000MHz~12.5GHz	-	-10	-	dBm
Intermodulation	-	-39	-	dB
Transmit Power	-	6	-	dBm
Gain Control Step Size	-	3	-	dB
Δf_{1avg}	-	159.8	-	-
Δf_{2max}	-	142.8	-	-
Drift rate	-2.25	-2.08	2.23	KHz
Offset DH1	-4	-	-1	KHz

4 Hardware Reference Design

4.1 Schematic (Minimum System)

The module operates from 3.3 V.

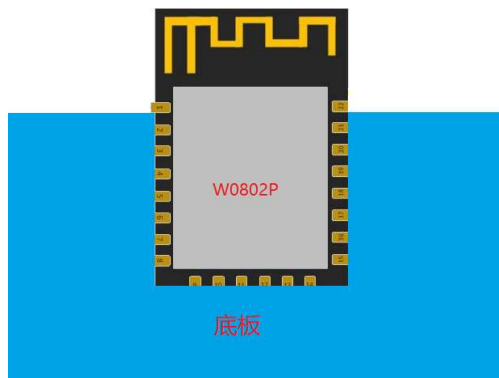


- Place a **47 μ F capacitor** close to VCC.
- I/O maximum output current: **12 mA**.
- RESET is **active low**.
- UART cross connection: module TX $\rightarrow$ host RX; module RX $\rightarrow$ host TX.
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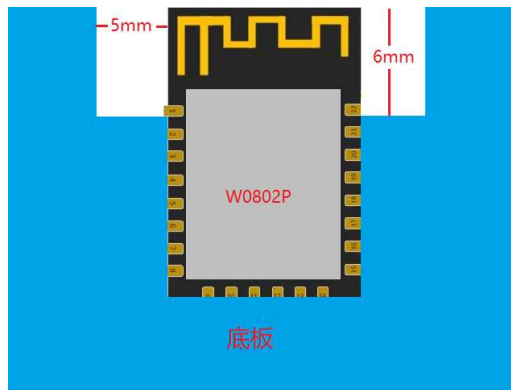
4.2 Module Placement

The module has an onboard antenna. For optimal RF performance:

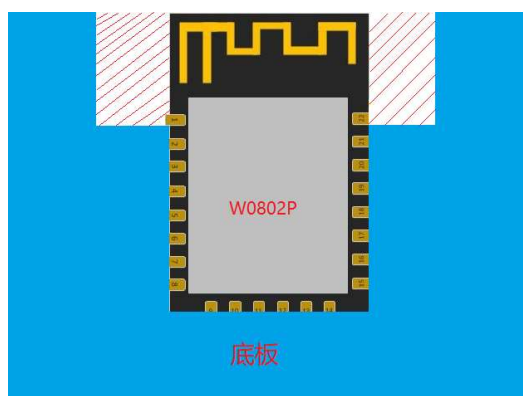
- **Option 1 (Best):** Place the module at the board edge with the antenna fully extended outside the main PCB, no metal nearby.



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- **Option 2 (Good):** Place at board edge; keep ≥ 5 mm clearance around the antenna; hollow out PCB under the antenna.



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- **Option 3 (Fair):** Place at board edge; keep the antenna area **clear of copper** for 5 mm around and below.

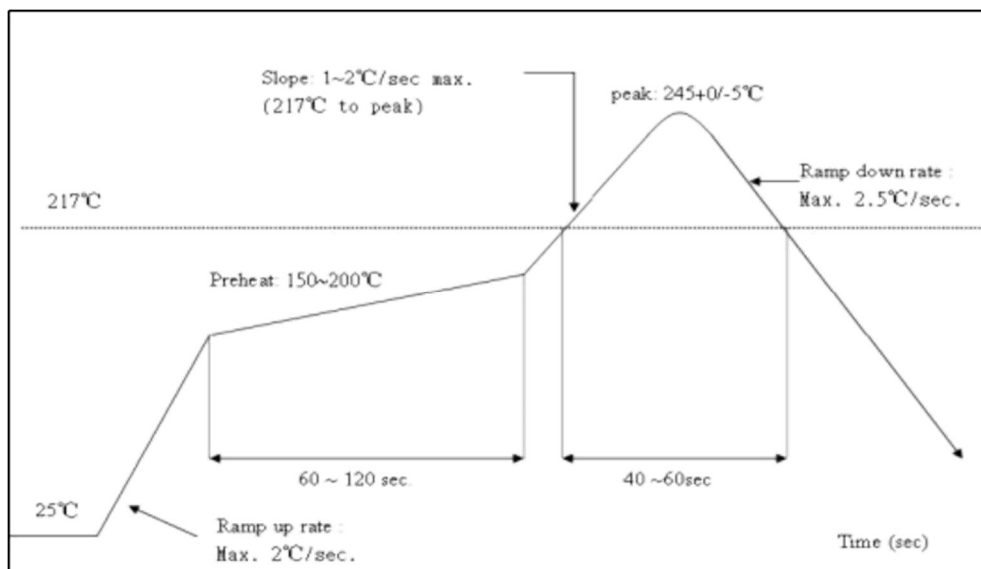


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4.3 Peripheral Circuit Recommendations

For low EMI and low power, add a **10–100 Ω series resistor** on high-speed I/O lines to improve signal stability and ESD robustness.

5 Reflow Soldering Profile



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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.

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 announcement

Important Note:

Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

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

Country Code selection feature to be disabled for products marketed to the US/Canada.

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 US, OEM has to limit the operation channels in CH1 to CH11 for 2.4G band by supplied firmware programming tool. OEM shall not supply any tool or info to the end-user regarding to Regulatory Domain change. (if modular only test Channel 1-11)

As long as the three conditions above are met, further transmitter testing 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.

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

The final end product must be labeled in a visible area with the following"

Contains FCC ID: **2AGQ7W0802P** "

Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

Integration instructions for host product manufacturers according to KDB 996369 D03 OEM Manual v01r01

2.2 List of applicable FCC rules

CFR 47 FCC PART 15.247, 15.207 and 15.209 has been investigated. It is applicable to the modular transmitter

2.3 Specific operational use conditions

This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system.

2.4 Limited module procedures

Not applicable

2.5 Trace antenna designs

Not applicable

2.6 RF exposure considerations

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

2.7 Antennas

This radio transmitter **FCC ID:2AGQ7W0802P** has been approved by Federal Communications Commission to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Antenna No.	Model No. of antenna:	Type of antenna:	Gain of the antenna (Max.)	Frequency range:
2.4G Wi-Fi	/	PCB Antenna	1.63dBi	2412-2462MHz

2.8 Label and compliance information

The final end product must be labeled in a visible area with the following" Contains **FCC ID:2AGQ7W0802P**".

2.9 Information on test modes and additional testing requirements

Operation Frequency: 2412-2462MHz

Number of Channel: 11

Modulation: DSSS/OFDM

Host manufacturer is strongly recommended to confirm compliance with FCC requirements for the transmitter when the module is installed in the host.

2.10 Additional testing, Part 15 Subpart B disclaimer

Host manufacturer is responsible for compliance of the host system with module installed with all other applicable requirements for the system such as Part 15 B.

2.11 Note EMI Considerations

Host manufacture is recommended to use D04 Module Integration Guide recommending as "best practice" RF design engineering testing and evaluation in case non-linear interactions generate additional non-compliant limits due to module placement to host components or properties.

2.12 How to make changes

This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system. According to the KDB 996369 D02 Q&A Q12, For EMC/radio-parameter compliance purposes, when an evaluation is done by the grantee or host provider and there are no additional emissions generated due to simultaneous-transmission operations compared to single transmitter operations testing (i.e., not transmitting simultaneously), it is not necessary to file the additional simultaneous transmission test data. The host manufacturer is responsible for ensuring compliance with the applicable FCC rules for the transmitters operating individually and simultaneously. This includes compliance for the summation of all emissions from all outputs occupying the same or overlapping frequency ranges, as defined by the applicable rules.