WIFI Module
IEEE 802.11 b/g/n 2T/2R
Model Number: WP2XM2100

Product Description

The WP2XM2100 is a 2.4GHz WIFI module. The WLAN operation supports 20MHz,40MHz channels for data rates up to 300Mbps. It fully complies with IEEE 802.11 b/g/n feature rich wireless connectivity at high standards, delivers reliable,cost-effective, throughput from an extended distance.

Product Features

- ◆ Complies with IEEE 802.11b/g/n for 2.4GHz Wireless LAN.
- ◆ Two transmit and Two receive path(2T2R)
- ◆ Works with all existing network nfrastructure.
- ◆ Capable of up to 128-Bit WEP Encryption.
- ◆ Freedom to roam while staying connected.
- ◆ Operating Systems：Linux,Windows
- ◆ Low power consumption.
- ◆ Easy to install and configure.
- ◆ High speed USB 2.0 interface
- ◆ ROHS compliant

Product Specification

Model	WIFI Module
Product Name	WP2XM2100
Standard	802.11 b/g/n
Interface	USB
Data Transfer Rate	Max 300Mbps
Modulation Method	DQPSK,DBPSK,CCK(802.11b) QPSK,BPSK,16QAM,64QAM with OFDM (802.11g) QPSK,BPSK,16QAM,64QAM with OFDM (802.11n)
Frequency Band	2412~2462 MHz
Operation Mode	Infrastructure
Security	WEP, TKIP, AES, WPA, WPA2
Operating Voltage	3.3V±10%
Current Consumption	＜750mA
Antenna Type	FPC
Operating Temperature	-10 ~ 70°C ambient temperature
Storage Temperature	-40 ~ 70°C ambient temperature
Humidity	5 to 95 % maximum (non-condensing)

NOTICE:

◆please keep this product and accessories attached to the places which children can't touch;
◆do not splash water or other liquid onto this product, otherwise it may cause damage;
◆do not put this product near the heat source or direct sunlight, otherwise it may cause deformation or malfunction;
◆please keep this product away from flammable or naked flame;
◆please do not repair this product by yourself. Only qualified personnel can be repaired.

FCC Statement

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.

This equipment 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.

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

2.2

This module has been assessed against the following FCC rule parts: CFR 47 FCC Part 15 C. It is applicable to the modular transmitter.

2.3

This radio transmitter FCC ID: 2AC23-WP2X has been assessed to rules of the 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. The concrete contents to check are the following three points.

1) Must use an antenna such as FPC antenna with a gain not exceeding -0.27 dBi(ANT0) & 0.39dBi (ANT1)for 2.4G WIFI;

2) Should be installed so that the end user cannot modify the antenna;

3) Feed line should be designed in 50ohm

Fine-tuning of return loss etc. can be performed using a matching network.

The antenna shall not be accessible for modification or change by the end user

2.4

The module complies with FCC Part 15.247 apply for Limited module approval.

2.5

Any deviation(s) from the defined parameters of the antenna trace, as described by the instructions, require that the host product manufacturer must notify the module grantee that they wish to change the antenna trace design. In this case, a Class II permissive change application is required to be filed by the grantee, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

The device must be professionally installed.

The intended use is generally not for the general public.

It is generally for industry/commercial use.

The connector is within the transmitter enclosure and can only be accessed by disassembly of the transmitter that is not normally required.

The user has no access to the connector.

Installation must be controlled.

Installation requires special training.

2.6
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator & your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

2.7
Antenna type and antenna gain:

Antenna	Frequency (MHz)	Antenna Type	MAX Antenna Gain (dBi)
0	2412-2462	FPC Antenna	-0.27
1	2412-2462	FPC Antenna	0.39

2.8
Please notice that if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: “Contains FCC ID: 2AC23-WP2X” Any similar wording that expresses the same meaning may be used.

2.9
Testing of the host product with all the transmitters installed – referred to as the composite investigation test- is recommended, to verify that the host product meets all the applicable FCC rules. The radio spectrum is to be investigated with all the transmitters in the final host product functioning to determine that no emissions exceed the highest limit permitted for any one individual transmitter as required by Section 2.947(f). The host manufacturer is responsible to ensure that when their product operates as intended it does not have any emissions present that are out of compliance that were not present when the transmitters were tested individually.
If the modular transmitter has been fully tested by the module grantee on the required number of channels, modulation types, and modes, it should not be necessary for the host installer to re-test all the available transmitter modes or settings. It is recommended that the host product manufacturer, installing the modular transmitter, perform some investigative measurements to confirm that the resulting composite system does not exceed the spurious emissions limits or band edge limits (e.g., where a different antenna may be causing additional emissions).

The testing should check for emissions that may occur due to the intermixing of emissions with the other transmitters, digital circuitry, or due to physical properties of the host product (enclosure). This investigation is especially important when integrating multiple modular transmitters where the certification is based on testing each of them in a stand-alone configuration.

2.10
Any company of the host device which install this modular should perform the test of radiated & condicted emission and spurious emission etc. according to FCC Part 15C: 15.247, 15.209, & 15.207, 15B class B requirement, only if the test result complies with FCC part 15C: 15.247, 15.209, & 15.207, 15B class B requirement. Then the host can be sold legally.
The host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuity), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

2.11
The host manufacture is recommended to use 996369 D04 Module Integration Guide v02 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

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.

No shield test according to KDB996369 D01
This module does not contain a shielding and therefore is limited, requiring the original grantee to file a Class II permissive change for each host specific installation.
Original Grantee contact information: guanh@gaosd.cn/+86-0752-2096698

When considering the module is installed in a host:
1. The transmitter's power is measured as conducted, and if the C2PC investigation indicates that the module's power has increased from the original filing test report, the host integrator must investigate to determine if the initial module tested in a standalone module was improperly granted. The module may require a new FCC ID. An inquiry can be submitted to review a specific case, but the C2PC can only be given once the issue is resolved.

2. An increase in measured field strength over the module's tested field strength is the result of host installation, such as signal reflections, and this increased field strength value remains compliant with the rules. In that case, a statement is required in the end product test report indicating that "an increase in field strength.

3. Any radiated emission that does not comply with regulations must be corrected, and the C2PC can only be granted once the issue is resolved.

The following testing should be performed to demonstrate continued compliance:
1. Confirm and document the continued compliance for the fundamentals for each band under each specific rule part granted for the module.
2. The test shall demonstrate each band's worst-case modulation mode(s).
3. Test Band edge compliance for the widest and narrowest bandwidths per modulation type.
4. Include radiated spurious emissions with the antenna connected. Testing shall be performed for each supported modulation teasing 15.31(m). In all cases, a test of each modulation is required for channels over the frequency range defined in 15.33(a) for unlicensed transmitters and 2.1057(a) for licensed transmitters.
5. Confirm and demonstrate with the radiated test that no additional parasitic, non-compliant emissions exist due to ingress (parasitic oscillations, radiation of stray signals within a host, etc.) are present.
6. These tests can be based on C63.10 and C63.26 as guidance.

1. The Module is Wi-Fi device that support 802.11b/g/n (Wi-Fi 5 modes) all support a plethora of modulations (DSSS, OFDM), bandwidths, and data rates. Testing may be documented for a limited selection of WIFI 2.4G 802.11b 1Mbps (BW 20MHz), WIFI 2.4G 802.11n HT40 MCS0 (BW 40MHz) modes as worst-case.

Test items are as follows for reference:

Test items	Worst case mode and standards
	WIFI 2.4G (802.11b mode 1Mbps, 802.11n HT40 mode MCS0)
Conduced output power	☒15.247(b)
Power Spectral Density	☒15.247(e)
Radiated Band edge and Spurious Emission	☒15.247 (d) 15.205 15.209
AC Power Line Conducted Emissions Voltage	☒15.207(a)
Antenna Requirement	☒15.203 15.247 (c)

2. The worst cases mode are as follows for reference:

Technology	Maximum conducted output power	Maximum power spectral density	Worst case mode	Test channel	Remark
WIFI 2.4G	11B: 19.89dBm	11B: -10.12 dBm/3kHz	WIFI 2.4G (802.11b mode 1Mbps)	LCH, MCH, HCH	With highest power and highest power spectral density
			WIFI 2.4G (802.11n HT40 mode MCS0)	LCH, MCH, HCH	With widest bandwidth

According to KDB 996369 D01:
The widest bandwidth, highest aggregate power, and highest power spectral density should be tested.

According to KDB 178919 D01:
Conducted power of host should be equal to or less than the maximum power of Module's.
An increase in maximum output power requires a new grant of certification (FCC ID) per § 2.1043. This includes an increase in conducted output power and/or radiated power listed on the grant.

3. For Antenna Requirement, the modular transmitter must comply with the antenna and transmission system requirements of §§ 15.203.
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

4. The modular transmitter has its own power supply regulation.
Testing is performed to show that the system has stability over voltage and temperature variation. Please refer to the test result of 15.407 Frequency stability.

5. The host supplies regulated power to the module.
Minimum Operating Voltage: 2.93 VDC
Maximum Operating Voltage: 3.63 VDC