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Board Specification
Model: HZ-GJ33UV1.0

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Catalogue (目录)

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1. General Specifications

- HZ-GJ33UV1.0 is a high performance intergrated wireless and Bluetooth module with USB 2.0 interface.It is based on Realtek RTL8733BU-CG,It supports IEE802.11 a/b/g/n and BT5.2.
- HZ-GJ33UV1.0 是一款带有USB 2.0接口，集成了高性能无线网络和蓝牙功能模块。它基于Realtek RTL8733BU-CG，支持IEEE802.11 a/b/g/n和 BT5.2。
- The module supports 2.4GHz and 5GHz dual band.
- 该模块支持2.4GHz和5GHz双频。
- The module provides 72.2Mbps receive PHY rate and 72.2Mbps transmit PHY rate using 20MHz bandwidth.
- 该模块使用20MHz带宽提供72.2Mbps的接收速率和72.2Mbps的发送速率。
- The module provides 150Mbps receive PHY rate and 150Mbps transmit PHY rate using 40MHz bandwidth.
- 该模块使用40MHz带宽提供150Mbps的接收速率和150Mbps的发送速率。
- The module Compatible with Bluetooth v2.1+EDR and v5.2 Systems.
- 兼容蓝牙v2.1+EDR和v5.2系统。
- The module Supports Bluetooth 4.0 Low Energy(BLE).
- 本模块支持蓝牙4.0低功耗（BLE）。

2. WIFI Specifications

IEEE 802.11 a/b/g/n

Protocol	IEEE 802.11 a
Transmit Power	Typical RF Output Power at each RF chain 15±2dBm at 54Mbps
Receive Sensitivity	Typical Sensitivity at each RF chain -71dBm for 54Mbps
Protocol	IEEE 802.11 b
Transmit Power	Typical RF Output Power at each RF chain 17±2dBm at 11Mbps
Receive Sensitivity	Typical Sensitivity at each RF chain. -83dBm for 11Mbps
Protocol	IEEE 802.11 g
Transmit Power	Typical RF Output Power at each RF chain 15±2dBm at 54Mbps
Receive Sensitivity	Typical Sensitivity at each RF chain -71dBm for 54Mbps
Protocol	IEEE 802.11 n
Transmit Power	2.4GHz Band/HT20 14±2dBm at MCS7 2.4GHz Band/HT40 14±2dBm at MCS7 5GHz Band/HT20 14±2dBm at MCS7 5GHz Band/HT40 14±2dBm at MCS7
Receive Sensitivity	Typical Sensitivity at each RF chain. 2.4GHz Band/HT20 -68dBm at MCS7 2.4GHz Band/HT40 -66dBm at MCS7 5GHz Band/HT20 -68dBm at MCS7 5GHz Band/HT40 -66dBm at MCS7
Max output power	2.4G WIFI: 16.17~21.68 (dBm)
	5.2G WIFI: 8.71~12.15(dBm)
	5.3G WIFI: 6.06~12.09(dBm)
	5.6G WIFI: 7.49~11.69(dBm)
	5.8G WIFI: 8.85~11.83(dBm)

3. BT Specifications

Protocol	BT V2.1+EDR, 4.2 and 5.2
Interface	USB2.0
Frequency	2402 MHz ~ 2480 MHz (79 channels)
Modulation	GFSK, π / 4-DQPSK, 8-DPSK
PHY Rate	1Mbps for Basic Rate; 2、3 Mbps for Enhance Data Rate; 1、2 Mbps for BLE
PHY Rate Transmit Power	6dBm, typical
Receive Sensitivity	<-86dBm @ BER=0.1% for GFSK (1Mbps); <-86dBm @ BER=0.01% for π / 4-DQPSK (2Mbps); <-80dBm @ BER=0.01% for 8-DPSK (3Mbps);
Maximum Input level	GFSK(1Mbps):-20dBm; π / 4-DQPSK(2Mbps): -20dBm; 8-DPSK(3Mbps):-20dBm.
Max output power	BLE: 2.28~4.02 (dBm)
	EDR: 2.44~6.48(dBm)

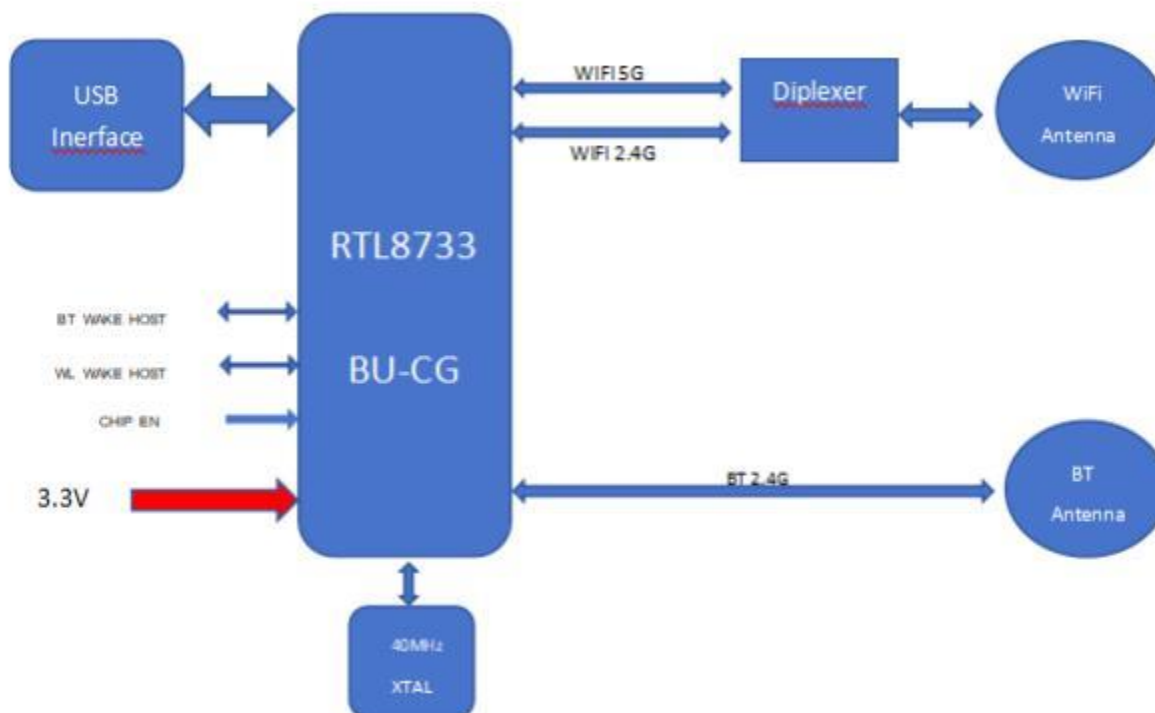
4. Temperature limit ratings

Parameter	Minimum	Maximum	Units
Storage temperature	-20	+70	C
Ambient operating temperature	0	+70	C

5. General section

Feature	Detailed description
Antenna type	PAD (WF0/WF1/BT)
Operating Voltage	3.3V $\pm$ 10%
Current consumption	<600mA@RX <1000mA@TX
Form Factor and interface	High Speed USB2.0 interface

6. System Block Diagram



7. Module configurations

All of pictures below are only for reference. Please take the actual objects as a standard.

(以下图片仅供参考,请以实物为准)



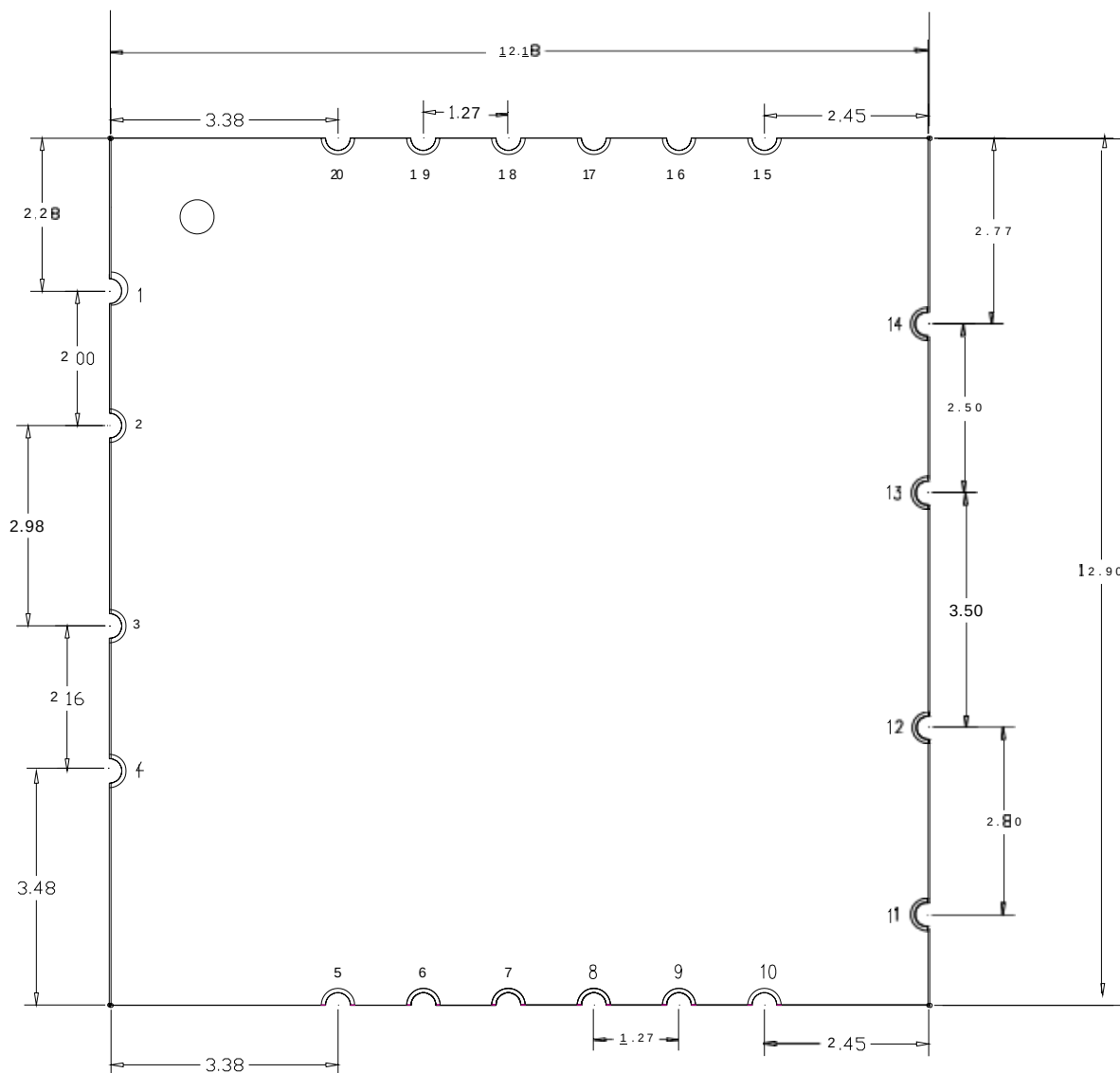
*The silk-screen at the bottom of the module is produced and controlled by the PCB supplier, and the silk-screen may vary among different board factories.

(*模块底部丝印为PCB供应商生产管控丝印, 不同板厂丝印会有所不同。)

CAD DIMENSIONS (CAD 尺寸)

PCB thickness: 0.6mm

Module overall thickness: 1.6mm

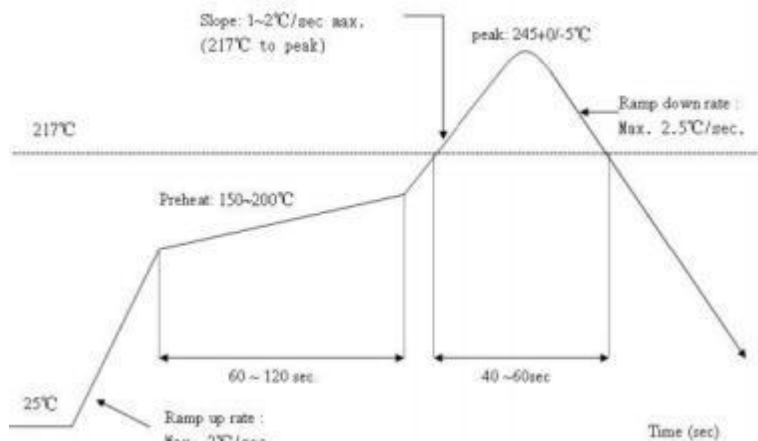


8. Pin definition

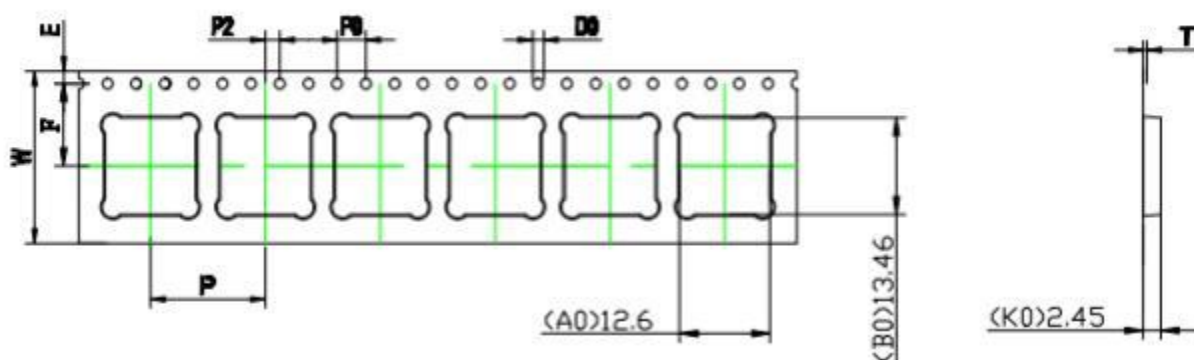
Pin	Definition	Description
1	GND	Ground
2	RF_S0	RF for BT
3	RF_S1	RF for WIFI
4	GND	Ground
5	BT_PCM_IN	GPIO 0
6	BT_PCM_OUT	GPIO 1
7	BT_PCM_SYNC	GPIO 2
8	BT_PCM_CLK	GPIO 3
9	BT_HOST_WAKE	BT Wake up Host (pull up 100K ohm to 3.3V inside the module, low active)
10	HOST_WAKE_BT	Host wake up BT device
11	3.3V	3.3V Source
12	D-	USB Communication signal USB-DM
13	D+	USB Communication signal USB-DP
14	GND	Ground
15	NC	Not Connected
16	NC	Not Connected
17	NC	Not Connected
18	CHIP_EN	CHIP_EN
19	HOST_WAKE_WL	Host wake up WIFI device
20	WL_HOST_WAKE	WIFI device Wake Host (pull up 100k ohm to 3.3V inside the module ,low active)

9. Recommend reflow profile

Referred to IPC/JEDEC standard. Peak Temperature : $245 \pm 5^{\circ}\text{C}$ Times : $\leq 2\text{ s}$



10. Packing



symbol	AO	BO	KO	PO	P	P2	长度/13"盘
Spec	12.6 ± 0.10	13.46 ± 0.10	2.45 ± 0.10	4.00 ± 0.10	16.0 ± 0.10	2.00 ± 0.10	27.8M
symbol	W	T	E	F	DO		元件/13"盘
Spec	24.0 ± 0.30	0.30 ± 0.05	1.75 ± 0.10	11.5 ± 0.10	1.50 ± 0.10		1740PCS

11. Matters Need Attention, LMA Test Plan and Integration Instructions and Host Product Requirements

Environmental Requirement（环境要求）：

- ◆ Do not pressed and distorted.（禁止挤压和弯曲）
- ◆ Keep away from static and water.（远离静电和水）
- ◆ Relative humidity : 10% ~ 90%.（相对湿度：10% ~ 90%）
- ◆ Storage humidity : 5% ~ 95%.（储存湿度：5% ~ 95%）
- ◆ Storage temperature: -10~ +60℃.（储存温度：-20~ +70℃）
- ◆ Operation temperature: 0~ +40℃.（操作温度：0~ +70℃）
- ◆ Cooling Method: Ventilation cooling.（冷却方式：通风）
- ◆ The production shall not be exposed to dripping or splashing and that no objects filled with liquids, such as vases, shall be placed on it.（该产品不能遭到水滴或水溅，而且设备上不能放置诸如花瓶一类装满液体的物品）
- ◆ Please use it under the condition of good aeration.（该产品使用时需有良好通风）
- ◆ 5000 meters above sea level.（海拔5000米以下）

LMA Test Plan: This module does not contain a shield and therefore is limited. The grantee will be required to file a Class II Permissive Change for each host specific installation. The following testing should be performed to demonstrate continued compliance.

- **§15.205: Restricted Bands of Operation.** Ensuring emissions fall outside restricted bands.
- **§15.209: Radiated Emission Limits; General Requirements.** Specifies general radiated emission limits for unintentional radiators.
- **§15.247: Operation within the bands 2400-2483.5 MHz**

EDR	Test Item	Section in CFR 47
	Radiated Emission	15.205/15.209
	Band Edge	15.247(d)
	RF Exposure evaluation	1.1307(b)
BLE	Band Edge	15.247(d)
	Spurious Emission	15.205/15.209
	RF Exposure evaluation	1.1307(b)
WIFI 2.4G	Band Edge	FCC part 15.247(d)
	Spurious Emission	FCC part 15.205/15.209
	RF Exposure evaluation	1.1307(b)

- **§15.407: General technical requirements.** Defines specific limits for the 5725-5850 MHz operation.

	Test Item	Section in CFR 47
5G: UNII Band I, band II-2A, band II-2C	Radiated Emission	FCC part 15.205/15.209
	Band Edge	FCC part 15.407(b)(1)
	RF Exposure evaluation	1.1307(b)
5G: UNII Band III	Band Edge	FCC part 15.407(b)(4)
	Spurious Emission	FCC part 15.205/15.209/15.407(b)(4)
	RF Exposure evaluation	1.1307(b)

- **§2.1091 and §2.1093: RF Exposure (MPE/SAR).** A Maximum Permissible Exposure (MPE) evaluation was performed, establishing a minimum separation distance of **20 cm** between the radiator and the human body. This distance must be maintained in the final product installation.

WIFI+BT Module - Integration with Host Device

This document details the Limited Modular Approval (LMA) test plan for the WIFI+BT Module, specifically for its integration into the host device. This plan ensures ongoing compliance with FCC regulations, building upon the module's preapproved status.

1. Module Identification

- **Module Name:** WIFI+BTC Module
-
- **Module Model Number:** HZ-GJ33UV1.0
-

Antenna Dimensions: Φ4.4mm x 410mm (BT) , Φ5.2mm x 486mm (Wifi) .

- **WIFI+BT Module Dimensions (includes Antenna):**12.1mm x 12.9mm x 1.6mm

- **FCC ID:** 2BGY7-HZ03
- **Operating Voltage:** 3.3V DC
- **Operating Frequency:** BT:2402~2480MHz
WIFI2.4G:2412~2462MHz

WIFI 5G: 5180~5240MHz @U-NII Band I, 5260~5320MHz @U-NII Band II-2A, 5500~5700MHz @U-NII Band II-2C, 5745~5825MHz @U-NII Band III

- **Module Components:** The module consists of the Reader PCBA, Antenna PCBA, Motor Mount Plate, and RFID CAP, which is part of the overall casing.

- **2. Applicable FCC Rules for Limited Modular Approval (LMA)**

The WIFI+BT Module (Model: HZ-GJ33UV1.0) has been granted Limited Modular Approval (LMA) under FCC Part 15.247, FCC Part 15.407. The Instrument Actuator (host device) has been specifically tested and approved for use with this module. The WIFI+BT Module (Model:

HZ-GJ33UV1.0) is exclusively designed and supplied for integration into the and will not be sold or distributed to any other third-party vendors.

Any integration into host devices other than the Instrument Actuator will necessitate a new FCC certification for the entire host product. Integrators must strictly adhere to the following FCC regulations:

Integration Instructions and Host Product Requirements (Instrument Actuator)

Strict adherence to these instructions is critical to maintain the LMA validity when integrating the WIFI+BT Module into the Instrument Actuator (host device). These guidelines are derived from internal documentation.

- **Antenna System:** The module is certified exclusively with its integral, non-detachable PCB Loop antenna (refer to User Manual Installation Instructions). Any attempt to replace or modify this antenna will void the module's approval and necessitate a new FCC certification of the host product.
- **Power Supply:** The WIFI+BT Module operates at 3.3V DC. The Instrument Actuator, which operates at 24V DC, provides the module with the necessary 3.3V DC. The host device must incorporate robust and well-regulated power conversion circuitry to ensure a stable 3.3V DC supply to the module. Voltage ripple and noise must be minimized to ensure stable WIFI+BT performance and compliance.
- **Mechanical Integration:** Refer to the MPI WIFI+BT Module and Housing Assembly Instructions and MPI Carriage Integration for precise mechanical mounting, cabling, and shielding guidelines. Proper grounding and isolation are essential to prevent EMI. The WIFI+BT Module, including the Motor Mount Plate and WIFI+BT CAP, must be fully enclosed within the Instrument Actuator casing (P/N 10600-00-M-063).
- **Software/Firmware Control:** The Instrument Actuator (host device's) software and firmware must not provide any user-accessible controls or mechanisms that could alter the WIFI+BT module's fundamental operating parameters (e.g., frequency, power output, modulation characteristics). All regulatory-critical parameters are internally managed by the module's firmware.

12. FCC Modular Usage Statement

The requirement for KDB 996369 D03:

2.2 List of applicable FCC rules

FCC CFR Title 47 Part 15 Subpart 15.247 and 47 Part 15.407

2.3 Summarize the specific operational use conditions

The module has been certified for Fix applications. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

2.4 Limited module procedures

The module has not its own RF shielding, which belong to Limited module.

2.5 Trace antenna designs

Not applicable

2.6 RF exposure considerations

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. This modular must be installed and operated with a minimum distance of 20 cm between the radiator and user body.

2.7 Antennas

The antenna is permanently attached,

BT
Antenna Type: Integral Antenna
Antenna gain: 1.95dBi
WIFI
Antenna Type: Integral Antenna
Antenna gain: WIFI 2.4G ANT: 2.47dBi WIFI 5G ANT: 2.52dBi @Band I, 3.51dBi @Band II-2A, 5.57dBi @Band II-2C 5.57dBi@Band III

2.8 Label and compliance information

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.

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.

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 Transmitter Module FCC ID: 2BGY7-HZ01 Or Contains FCC ID: 2BGY7-HZ01"

2.9 Information on test modes and additional testing requirements

The modular transmitter is only FCC authorized for the specific rule parts (FCC Part 15.247) list on the grant, and that 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. The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed when contains digital circuitry.

2.10 Additional testing, Part 15 Subpart B disclaimer

When testing host product, the host manufacture should follow FCC KDB Publication 996369 D04 Module Integration Guide for testing the host products. The host manufacturer may operate their product during the measurements.

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, the grantee have to consult with module manufacturer for the installation method in end system. According to the KDB 996369 D02 Q&A Q12, that the grantee only needs to do an evaluation (i.e., no C2PC required when no emission exceeds the limit of any individual device (including unintentional radiators) as a composite. The grantee must fix any failure.

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 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.

The distance between user and device should be no less than 20cm.