



深圳市鼎科实业有限公司

Shenzhen TOP-TECH Industrial CO., LTD

Board Specification

Model: HZ-LY22UV1.0

Prepared by (编制)	Checked by (审核)	Rechecked by (复核)	Approved by (批准)
李彩艳	王经伟	2024.04.03 16:44:45 +08'00'	吴延滨

地址: 深圳市南山区中山园路 1001 号 TCL 国际 E 城 E1 栋 4 楼
ADDRESS: 4F E1 Building, TCL international E City, No.1001 Zhongshanyuan
Road, Nanshan District, Shenzhen, P.R.China 518055;
电话/TELEPHONE: 0755-26742425, 26740460
传真/FAX: 0755-26740494
网址/WEB:www.top-tech.com.cn

Catalogue (目录)

目录

Board Specification	1
Model: HZ-LY22UV1.0	1
1. General Specifications	3
2. WIFI Specifications	4
3. BT Specifications	5
4. Power specifications	5
6. Module configurations	6
7. Pin definition	8
8. Packing	9
9. Matters Need Attention	9

Amendment record (修改记录)

1. General Specifications

- HZ-LY22UV1.0 is a high performance integrated wireless and Bluetooth module with USB 2.0 interface. It is based on Realtek RTL8822CU-CG. It supports IEEE802.11 a/b/g/n/ac and BT5.0. It also supports 2T2R MIMO.
- HZ-LY22UV1.0 is a high performance integrated wireless and Bluetooth module with USB 2.0 interface. It is based on Realtek RTL8822CU-CG. It supports IEEE802.11 a/b/g/n/ac and BT5.0. It also supports 2T2R MIMO.
- The module MAC supports 802.11e for multimedia applications, 802.11i and WAPI for security, and 802.11n/802.11ac for enhanced MAC protocol efficiency.
- 该模块MAC支持802.11e(多媒体应用), 支持802.11i和WAPI(加密), 支持802.11n/802.11e(提高MAC协议效率)。

2. WIFI Specifications

Protocol	IEEE 802.11 a/b/g/n/ac	
Interface	USB 2.0	
Bandwidth	20/40/80 MHz	
2.4G	802.11b(2.4G 11M): 17±2dBm @ EVM<-20dB; 802.11g(2.4G 54M): 15±2dBm @ EVM<-28dB; 802.11n (2.4G HT20 MCS7): 14±2dBm @ EVM<-28dB;	
Transmit Power	802.11a(5G 54M): 15±2dBm @ EVM<-28dB; 802.11n (5G HT20 MCS7): 14±2dBm @ EVM<-28dB; 802.11n (5G HT40 MCS7): 14±2dBm @ EVM<-28dB; 802.11ac (5G VHT20 MCS8): 13±2dBm @ EVM<-30dB; 802.11ac (5G VHT40 MCS9): 12±2dBm @ EVM<-32dB; 802.11ac (5G VHT80 MCS9): 12±2dBm @ EVM<-32dB.	
Frequency Error	<±20ppm/802.11 a/b/g/n/ac	
2.4G Receive Sensitivity @ PER<10%	802.11b(2.4G 1M): -95dBm,typical; 802.11b(2.4G 11M): -85dBm,typical; 802.11g(2.4G 6M): -92dBm,typical; 802.11g(2.4G 54M): -75dBm,typical; 802.11n (2.4G HT20 MCS0): -90dBm,typical; 802.11n (2.4G HT20 MCS7): -72dBm,typical; 802.11n (2.4G HT40 MCS0): -88dBm,typical; 802.11n (2.4G HT40 MCS7): -69dBm,typical.	
5G Receive Sensitivity @ PER<10%	802.11g (5G 6M): -92dBm, typical; 802.11g (5G 54M): -74dBm, typical; 802.11n (5G HT20 MCS0): -90dBm, typical; 802.11n (5G HT20 MCS7): -72dBm, typical; 802.11n (5G HT40 MCS0): -88dBm, typical; 802.11n (5G HT40 MCS7): -69dBm, typical; 802.11ac (5G VHT20 MCS0): -89dBm, typical; 802.11ac (5G VHT20 MCS8): -67dBm, typical; 802.11ac (5G VHT40 MCS0): -87dBm, typical; 802.11ac (5G VHT40 MCS9): -64dBm, typical; 802.11ac (5G VHT80 MCS0): -85dBm, typical; 802.11ac (5G VHT80 MCS9): -60dBm, typical.	

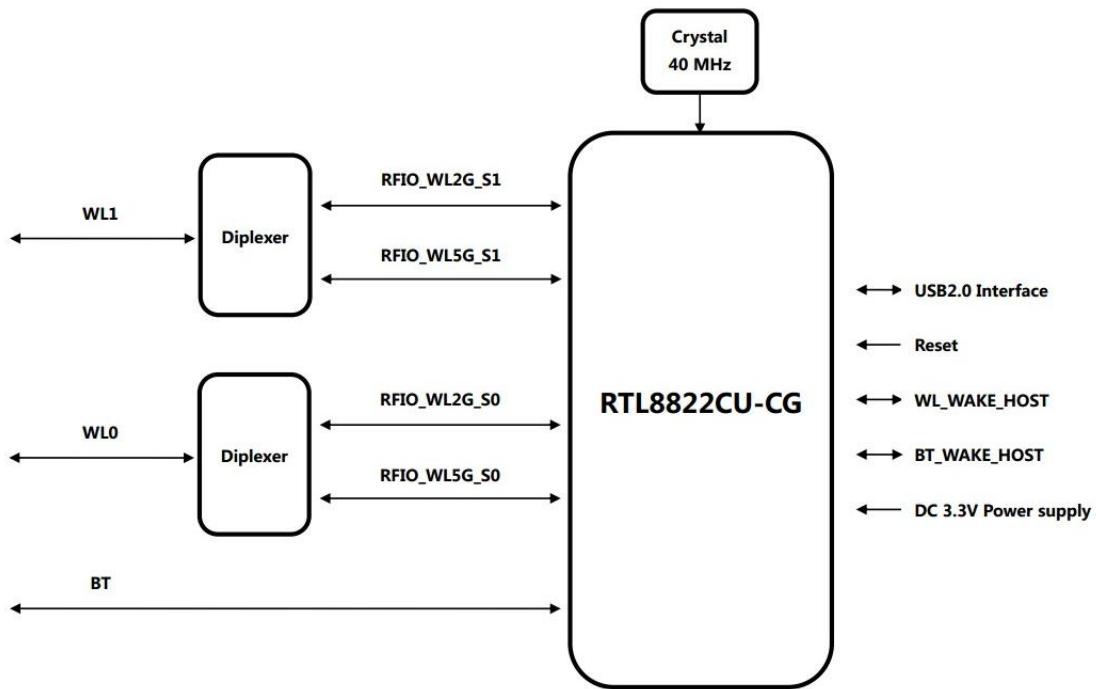
3. BT Specifications

Protocol	BTv2.1+EDR/BTv3.0/BTv3.0+HS/BT v5.0
Interface	USB2.0
Frequency	2400 MHz ~ 2483.5 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	<-89dBm @ BER=0.1% for GFSK (1Mbps); <-86dBm @ BER=0.01% for π/4-DQPSK (2Mbps); <-83dBm @ BER=0.01% for 8-DPSK (3Mbps); <-90dBm @ PER=30.8% for BLE
Maximum Input level	GFSK(1Mbps):-20dBm; π/4-DQPSK(2Mbps): -20dBm; 8-DPSK(3Mbps):-20dBm.

4. Power specifications

Symbol	Parameter	Min.	Typical	Max.	Unit
VDD_3.3V	3.3V Supply Voltage	3.0	3.3	3.6	V
VDD_3.3V	3.3V Rating Current	1	-		A

5. System Block Diagram



6. 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)

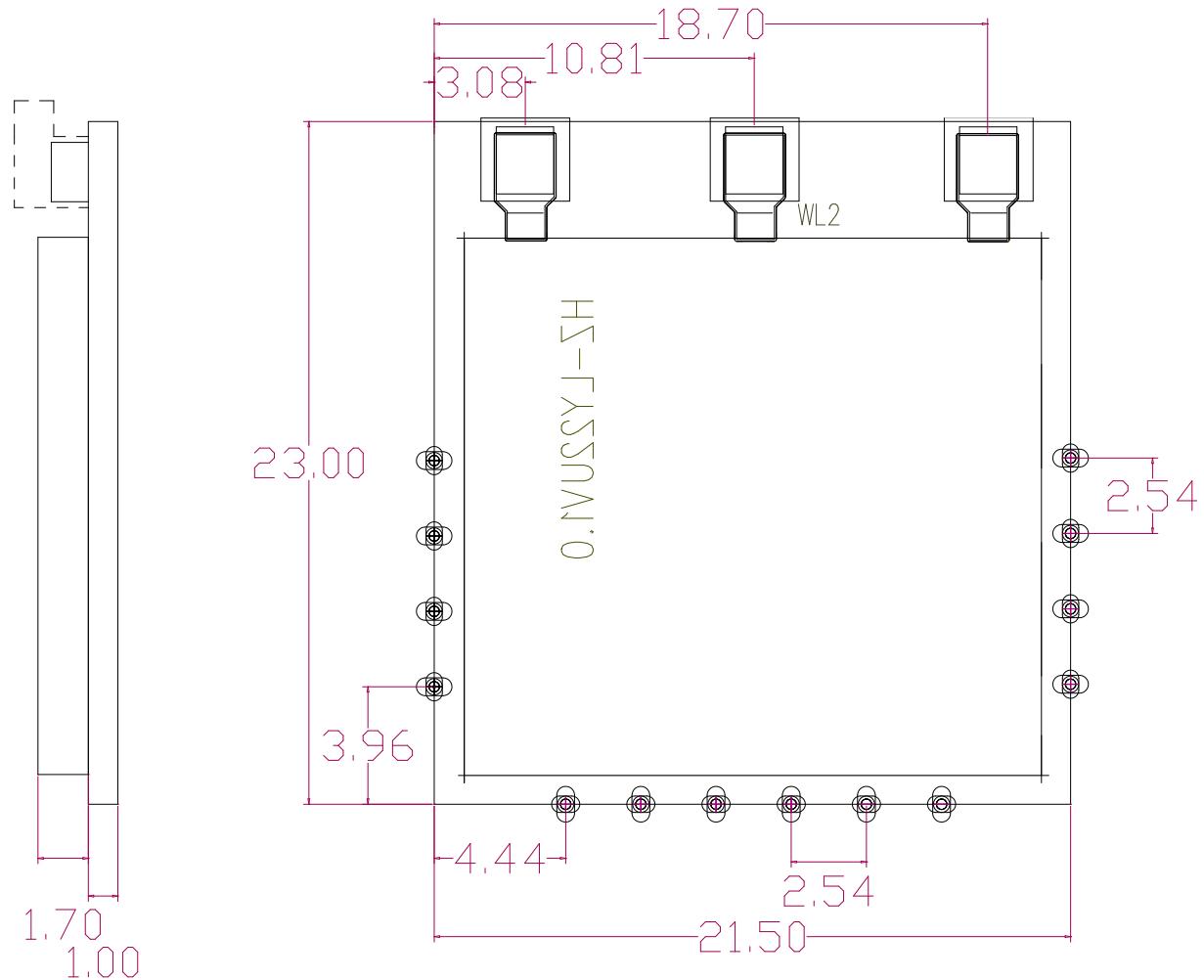


*The silk-screen at the bottom of the module is produced and controlled by the PCB supplier, and the silk-screen may vary among different board factories.

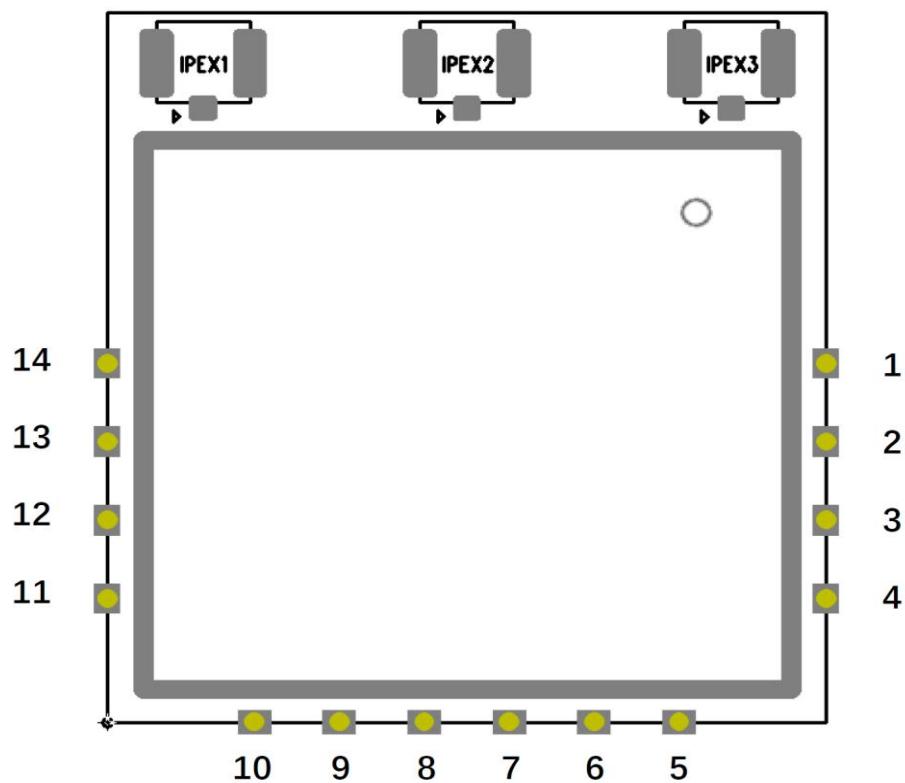
(*模块底部丝印为PCB供应商生产管控丝印, 不同板厂丝印会有所不同。)

CAD DIMENSIONS (CAD 尺寸)

PCB thickness: 1.0mm
Module overall thickness: 2.7mm
With buckle thickness: 3.5mm

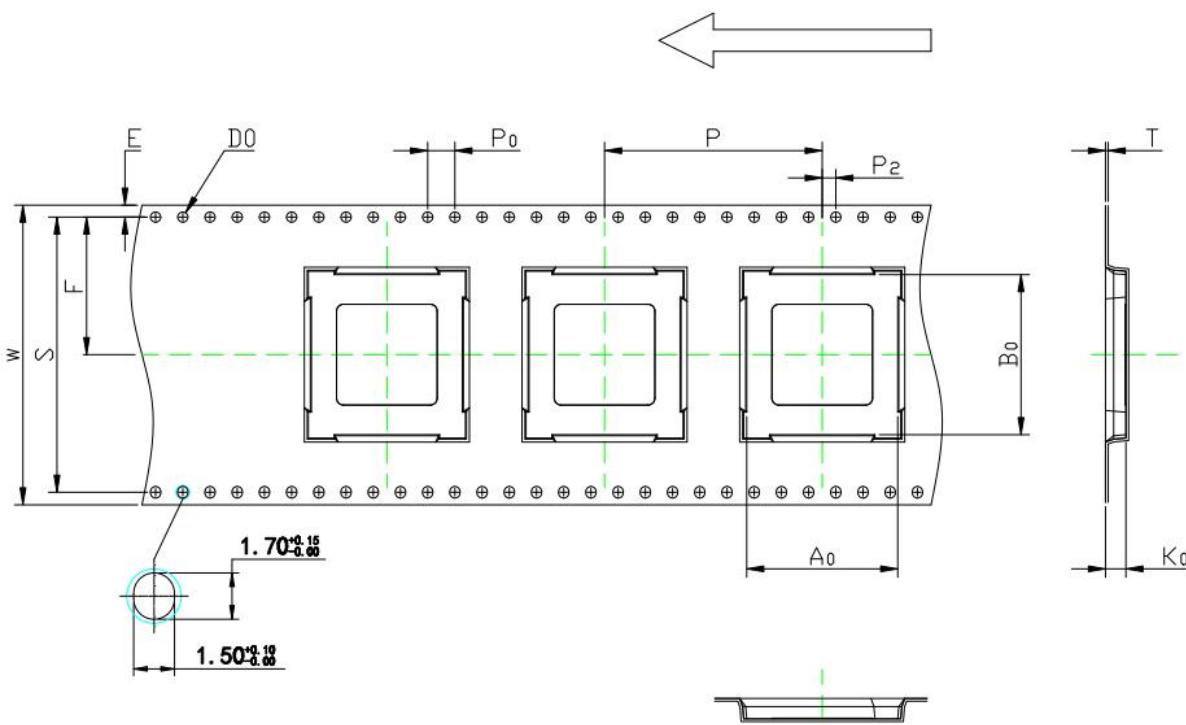


7. Pin definition



Pin	Definition	Description	Power Supply	Power level
IPEX1	WL0	Wi-Fi Path 0 ANT Port	-	-
IPEX2	WL1	Wi-Fi Path 1 ANT Port	-	-
IPEX3	BT	Bluetooth ANT port	-	-
1	GND	Ground	-	-
2	GND	Ground	-	-
3	VDD33	Main power voltage source input (DC 3.3V±0.3V)	Main Power	3.3V
4				
5	USB_D-	USB 2.0 Transceiver pair	-	-
6	USB_D+	USB 2.0 Transceiver pair	-	-
7	GND	Ground	-	-
8	RESET	Pull Low to Reset , Active Low	Main Power	3.3V
9	WL_WAKE_HOST	WLAN to wake-up the host	Main Power	3.3V
10	GND	Ground	-	-
11	BT_WAKE_HOST	Bluetooth to wake-up the host	Main Power	3.3V
12	GND	Ground	-	-
13	GND	Ground	-	-
14	GND	Ground	-	-

8. Packing



W	44.00 ^{+0.30} _{-0.30}	P	32.00 ^{+0.10} _{-0.10}	A ₀	22.20 ^{+0.15} _{-0.15}	B ₀	23.50 ^{+0.15} _{-0.15}
S	40.40 ^{+0.10} _{-0.10}	P ₀	4.00 ^{+0.10} _{-0.10}	A ₁		B ₁	^{+0.10} _{-0.10}
E	1.75 ^{+0.10} _{-0.10}	P ₂	2.00 ^{+0.15} _{-0.15}	A ₂		B ₂	^{+0.10} _{-0.10}
F	20.20 ^{+0.15} _{-0.15}	D ₀	01.50 ^{+0.10} _{-0.00}	K ₀	3.00 ^{+0.10} _{-0.10}		
T	0.40 ^{+0.05} _{-0.05}	D ₁		K ₁			

9. Matters Need Attention

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°C. (储存温度: -10~ +60°C)
- ◆ Operation temperature: 0~ +40°C. (操作温度: 0~ +40°C)
- ◆ 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)

FCC WARNING

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

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.

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

15.105 Information to the user.

(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

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.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20

cm between the radiator and your body.

Radiation Exposure Statement:

This equipment complies with FCC 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.

The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination.

The firmware setting is not accessible by the end user.

The final end product must be labelled in a visible area with the following:

“Contains Transmitter Module “**FCC ID:2BGY7-HZ**”

Requirement per KDB996369 D03

2.2 List of applicable FCC rules

List the FCC rules that are applicable to the modular transmitter. These are the rules that specifically establish the bands of operation, the power, spurious emissions, and operating fundamental frequencies. DO NOT list compliance to unintentional-radiator rules (Part 15 Subpart B) since that is not a condition of a module grant that is extended to a host manufacturer. See also Section 2.10 below concerning the need to notify host manufacturers that further testing is required.³

Explanation: This module meets the requirements of FCC part 15C (15.247). It Specifically identified AC Power Line Conducted Emission, Radiated Spurious emissions, Band edge and RF Conducted Spurious Emissions, Conducted Peak Output Power, Bandwidth, Power Spectral Density, Antenna Requirement.

2.3 Summarize the specific operational use conditions

Describe use conditions that are applicable to the modular transmitter, including for example any limits on antennas, etc. For example, if point-to-point antennas are used that require reduction in power or compensation for cable loss, then this information must be in the instructions. If the use condition limitations extend to professional users, then instructions must state that this information also extends to the host manufacturer's instruction manual. In addition, certain information may also be needed, such as peak gain per frequency band and minimum gain, specifically for master devices in 5 GHz DFS bands.

Explanation: The product antenna uses an irreplaceable antenna with a gain of
BT: 1.86dBi , WiFi (2.4G): 2.31dBi, WiFi (5.2G): 1.62dBi, WiFi (5.3G): 3.51dBi
WiFi (5.6G): 5.57dBi, WiFi (5.8G): 3.58dBi

2.4 Single Modular

If a modular transmitter is approved as a "Single Modular," then the module manufacturer is responsible for approving the host environment that the Single Modular is used with. The manufacturer of a Single Modular must describe, both in the filing and in the installation instructions, the alternative means that the Single Modular manufacturer uses to verify that the host meets the necessary requirements to satisfy the module limiting conditions.

A Single Modular manufacturer has the flexibility to define its alternative method to address the conditions that limit the initial approval, such as: shielding, minimum signaling amplitude, buffered modulation/data inputs, or power supply regulation. The alternative method could include that the limited

module manufacturer reviews detailed test data or host designs prior to giving the host manufacturer approval.

This Single Modular procedure is also applicable for RF exposure evaluation when it is necessary to demonstrate compliance in a specific host. The module manufacturer must state how control of the product into which the modular transmitter will be installed will be maintained such that full compliance of the product is always ensured. For additional hosts other than the specific host originally granted with a limited

module, a Class II permissive change is required on the module grant to register the additional host as a specific host also approved with the module.

Explanation: The module is a single module.

2.5 Trace antenna designs

For a modular transmitter with trace antenna designs, see the guidance in Question 11 of KDB Publication 996369 D02 FAQ – Modules for Micro-Strip Antennas and traces. The integration information shall include for the TCB review the integration instructions for the following aspects: layout of trace design, parts list (BOM), antenna, connectors, and isolation requirements.

a) Information that includes permitted variances (e.g., trace boundary limits, thickness, length, width, shape(s), dielectric constant, and impedance as applicable for each type of antenna); b) Each design shall be considered a different type (e.g., antenna length in multiple(s) of frequency, the wavelength, and antenna shape (traces in phase) can affect antenna gain and must be considered); c) The parameters shall be provided in a manner permitting host manufacturers to design the printed circuit (PC) board layout; d) Appropriate parts by manufacturer and specifications; e) Test procedures for design verification; and f) Production test procedures for ensuring compliance

The module grantee shall provide a notice that 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

2.6 RF exposure considerations

It is essential for module grantees to clearly and explicitly state the RF exposure conditions that permit a host product manufacturer to use the module. Two types of instructions are required for RF exposure information: (1) to the host product manufacturer, to define the application conditions (mobile, portable – xx cm from a person's body); and (2) additional text needed for the host product manufacturer to provide to end users in their end-product manuals. If RF exposure statements and use conditions are not provided, then the host product manufacturer is required to take responsibility of the module through a change in FCC ID (new application).

Explanation: The module complies with FCC radiofrequency radiation exposure limits for uncontrolled environments. The device is installed and operated with a distance of more than 20 cm between the radiator and your body." This module follows FCC statement design, FCC ID: **2BGY7-HZ**

2.7 Antennas

A list of antennas included in the application for certification must be provided in the instructions. For modular transmitters approved as limited modules, all applicable professional installer instructions must be included as part of the information to the host product manufacturer. The antenna list shall also identify the antenna types (monopole, PIFA, dipole, etc. (note that for example an "omni-directional antenna" is not considered to be a specific "antenna type").

For situations where the host product manufacturer is responsible for an external connector, for example with an RF pin and antenna trace design, the integration instructions shall inform the installer that unique antenna connector must be used on the Part 15 authorized transmitters used in the host product.

The module manufacturers shall provide a list of acceptable unique connectors.

Explanation: The product antenna uses an irreplaceable antenna with a gain of BT:1.86dBi , WiFi (2.4G): 2.31dBi, WiFi (5.2G): 1.62dBi, WiFi (5.3G): 3.51dBi WiFi (5.6G): 5.57dBi, WiFi (5.8G): 3.58dBi

2.8 Label and compliance information

Grantees are responsible for the continued compliance of their modules to the FCC rules. This

includes advising host product manufacturers that they need to provide a physical or e-label stating "Contains FCC ID" with their finished product. See Guidelines for Labeling and User Information for RF Devices – KDB Publication 784748.

Explanation: The host system using this module, should have label in a visible area indicated the following texts: "Contains FCC ID: **2BGY7-HZ**

2.9 Information on test modes and additional testing requirements⁵

Additional guidance for testing host products is given in KDB Publication 996369 D04 Module Integration Guide. Test modes should take into consideration different operational conditions for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product.

The grantee should provide information on how to configure test modes for host product evaluation for different operational conditions for a stand-alone modular transmitter in a host, versus with multiple, simultaneously transmitting modules or other transmitters in a host.

Grantees can increase the utility of their modular transmitters by providing special means, modes, or instructions that simulates or characterizes a connection by enabling a transmitter. This can greatly simplify a host manufacturer's determination that a module as installed in a host complies with FCC requirements.

Explanation: Huizhou Huizhi Technology Co., Ltd can increase the utility of our modular transmitters by providing instructions that simulates or characterizes a connection by enabling a transmitter.

2.10 Additional testing, Part 15 Subpart B disclaimer

The grantee should include a statement that the modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed 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. If the grantee markets their product

as being Part 15

Subpart B compliant (when it also contains unintentional-radiator digital circuitry), 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.

Explanation: The module without unintentional-radiator digital circuitry, so the module does not require an evaluation by FCC Part 15 Subpart B. The host should be evaluated by the FCC Subpart B.