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1. General Description

YGC-C302 is a wireless module based on WiFi BLE single chip SoC which can satisfy the low power consumption and the high performance IOT application development. The module core processor BL602 integrates 2.4 G Wi-Fi (802.11b/g/n) and BLE 5.0 baseband and MAC design. The on-chip processor uses RISC-V 32-bit with floating point. With high-speed processing memory system (see the L1C chapter for details), to achieve high-quality computing efficiency. External to the processor is a multilayer 32-bit AHB architecture with low power consumption, low latency, and high flexibility. The memory section contains high-speed tightly coupled memory as well as cache and system shared memory. Off-chip memory supports Flash expansion.

YGC-C302 have a wealth of peripherals, such as PWM、I2C、UART、IR remote、ADC、DAC、PIR、SPI、SDIO and GPIO.

2. Features

- 16.0±0.3mm (W)×24±0.3mm (L)×3.0±0.3mm (H)
- Working voltage: 3.3±0.3V
- Working temperature: -30°C to 105°C
- ARM cortex-m4 processing core, 100MHz main frequency
- Built-in board-mounted antenna, antenna gain 2dBi
- 2MB Flash
- UART download
- 50 MHz clock frequency SDIO
- 5 channel PWM signal generation supported
- WIFI
 - Compliance with b/g/n 1x1 802.11 standards
 - Channel 1-13@2.4 GHz
 - WPA/WPA2 security model supported
 - STA/Soft AP work model supported
 - Output power up to 15 dBm in 802.11 b mode ,54 dBm,HT20MCS7 output power 14 dBm 13
- BLE:
 - Bluetooth 5.0 supported
 - Maximum output power 0 dBm~15 dBm, typical 6 dBm
 - Maximum sensitivity -92 dBm
- Application area
 - Smart Buildings
 - Smart Home / Home Appliances / Smart Socket / Smart Lamp
 - PWM 1/2/3/4/5 dimming bulb
 - PWM 1/2/3/4/5 trimming bulb
 - PWM 1/2/3/4/5 dimming ceiling
 - Industrial wireless control
 - Babies/network monitoring
 - Smart bus

Block diagram of main core as shown in Figure 1

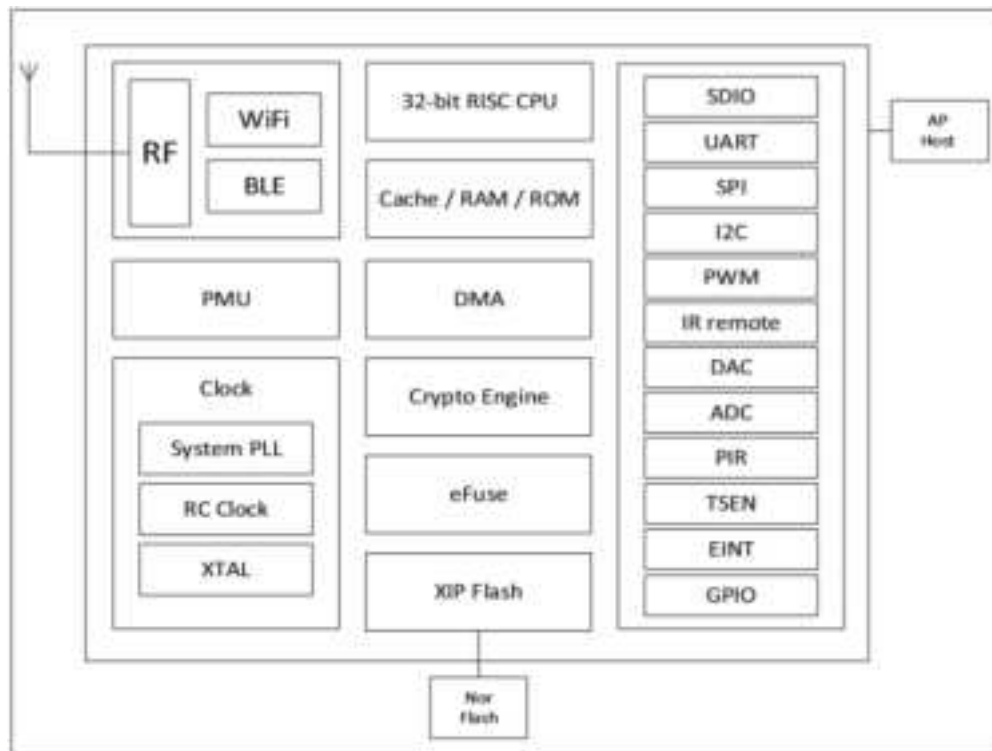


Figure 1

3. Electrical Parameters

3.1 Absolute electrical parameters

Parameter	Description	Minimum	Maximum	Unit
Ts	Storage temperature	-45	135	°C
VCC	supply voltage	3.0	3.6	V
ESD_HBM	Electrostatic release voltage (human model)		2000	V
ESD_MM	Electrostatic release voltage (Machine Model)		200	V

3.2 Normal working conditions

Parameter	Description	Min	Typical	Max	Unit
Ta	Working temperature	-30		105	°C
VCC	Supply voltage	3.0	3.3	3.6	V
VIL	IO low level input	-0.3		VCC*0.25	V
VIH	IO high level input	VCC*0.75		VCC	V
VOL	IO low level output			VCC*0.1	V
VOH	IO high level Output	VCC-0.3		VCC	V
Ima	IO input/output drive capability		12		mA

3.3 Power consumption during continuous transmission and reception

Working condition	Mode	Rate	Transmission power/receive	Representative value	Peak value	Unit
transmit	11b	11Mbps	15dBm	300	350	mA
transmit	11g	54Mbps	14dBm	270	350	mA
transmit	11n	MCS7	13dBm	265	350	mA
receive	11b	11Mbps	Continuous reception	99		mA
receive	11g	54Mbps	Continuous reception	99		mA
receive	11n	MCS7	Continuous reception	99		mA

4. RF Parameters

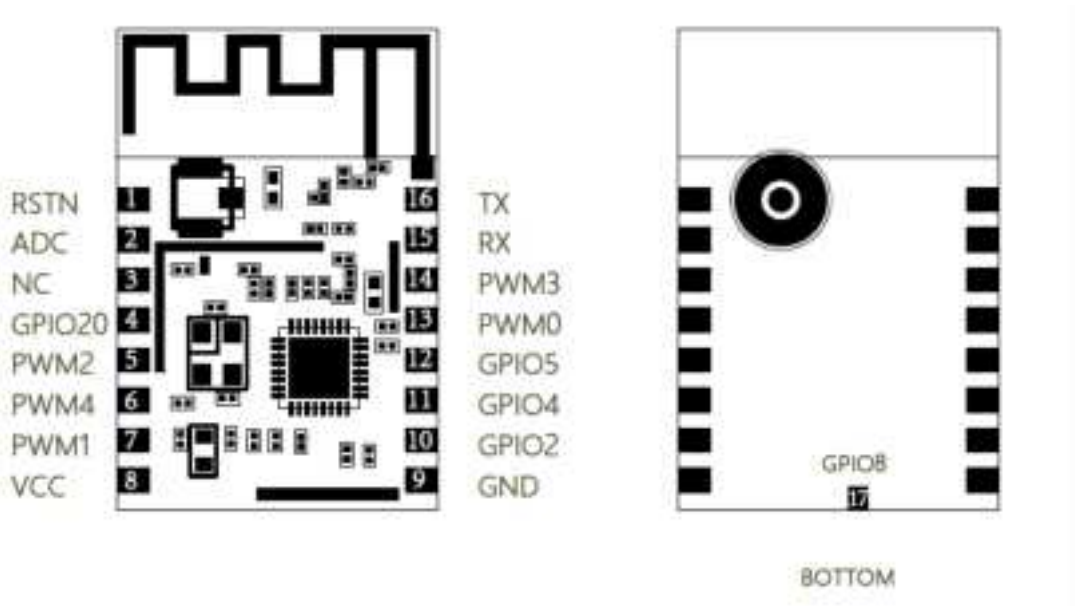
4.1 WIFI

Working frequency	2.400 ~ 2.4835GHz
Channel	WiFi: USA/Canada: channel 1~11 Europe/China/Australia: channel 1~13 Japan: channel 1~14
Rate of data signalling	WiFi: 802.11b: 11,5.5,2,1 Mbps 802.11g: 54,48,36,24,18,12,9,6 Mbps 802.11n: HT20 MCS0~7;
Average output power	WiFi: 802.11b 11Mbps: 15±2dBm 802.11g 54Mbps: 14±2dBm 802.11n MCS7: 13±2dBm
EVM	802.11b EVM≤35% 802.11g EVM≤-25dB 802.11n EVM≤-28dB
RX sensitivity	WiFi: 802.11b@8% PER 1Mbps -98dBm 11Mbps -91dBm 802.11g@10% PER 6Mbps -93dBm 54Mbps -77dBm 802.11n_HT20@10% PER MCS 0 -93dBm MCS 7 -73dBm

4.2 BLE

Working frequency	2.402 ~ 2.480GHz
Transmitting power	Maximum output power 0 dBm~15 dBm, typical 6 dBm
RX sensitivity	-92dBm

5. Pin Definition



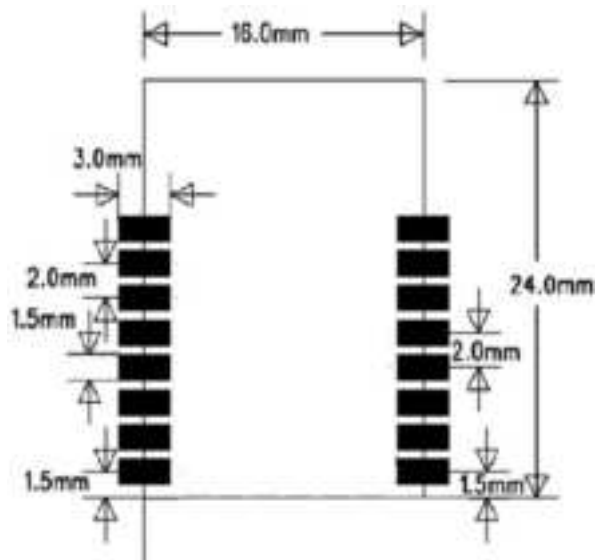
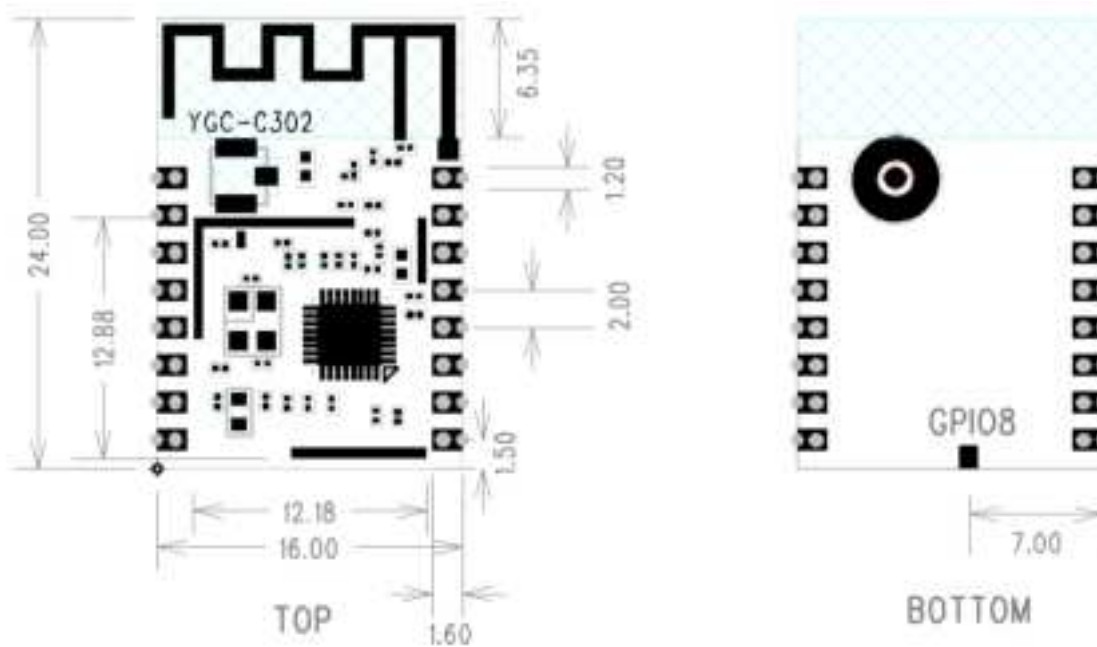
Pin	Definition	Signal Type	Description
1	RSTN	I/PU	Low effective hardware reset input pin, internal reset circuit, external no need to add pull resistance, corresponding to IC CHIP_EN
2	ADC	I/O	SPI, I2C, UART, PWM, AUXADC, GPIO, corresponding to IC GPIO_11
3	NC	/	/
4	GPIO20	I/O	SFLASH, SPI, I2C, UART, PWM, GPIO, corresponding to IC GPIO_20
5	PWM2	I/O	SPI, I2C, UART, PWM, AUXADC, GPIO, corresponding to IC GPIO_12
6	PWM4	I/O	SPI, I2C, UART, PWM, AUXADC, GPIO, corresponding to IC GPIO_14
7	PWM1	I/O	SDIO, SFLASH, SPI, I2C, UART, PWM, GPIO, corresponding to IC GPIO_1
8	VCC	Power	External supply 3.3V
9	GND	Power	GND
10	GPIO2	I/O	SDIO, SFLASH, SPI, I2C, UART, PWM, GPIO, corresponding to IC GPIO_2
11	GPIO4	I/O	SDIO, SPI, I2C, UART, PWM, GPIO, corresponding to IC GPIO_4
12	GPIO5	I/O	SDIO, SPI, I2C, UART, PWM, GPIO, corresponding to IC GPIO_5
13	PWM0	I/O	SDIO, SFLASH, SPI, I2C, UART, PWM, GPIO, corresponding to IC GPIO_0
14	PWM3	I/O	SDIO, SPI, I2C, UART, PWM, GPIO, corresponding to IC GPIO_3
15	RX	I	SPI, I2C, UART, PWM, AUXADC, GPIO, corresponding to IC GPIO_7
16	TX	O/PU	SPI, I2C, UART, PWM, GPIO, corresponding to IC GPIO_16
17	GPIO8	I/O	Start selection, default drop-down level, keep suspended, do not recommend user use. Corresponding to IC GPIO_8 Drop: Start the program from Flash Pull high: Start the program from the serial port

<illustration>: I — input; O — output; PU — internal weak resistance pull up ; PD — Internal Weak Resistance Drop-down; P — power

6. Size Package

The module has 17 pins on both sides of the module, the pin spacing is 2.0 ± 0.1 mm.

Size dimension: 16.0 ± 0.3 mm (W) $\times 24.0 \pm 0.3$ mm (L) $\times 3.0 \pm 0.3$ mm (H)。

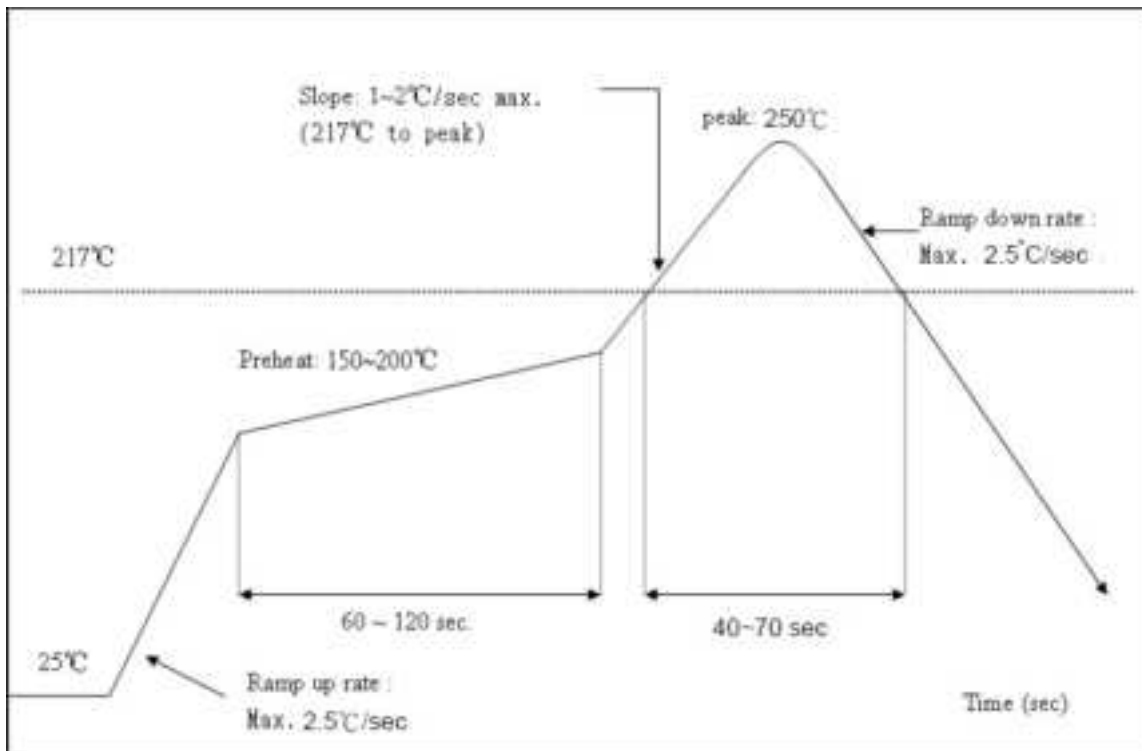


PCB Recommended packages

7. Recommended Reflow Profile

7.1 Recommended furnace temperature curve.

Referred to IPC/JEDEC standar. Peak Temperature:<250°C.Number of Times: ≤2 times



7.2 Storage conditions of factory modules

- A. moisture-proof bags must be stored in an environment with temperature <30°C and humidity <85%RH.
- B. The shelf life of dry packed products should be 6 months from the date of sealing.

Notes:

- A. in the whole process of production, all station operators must wear electrostatic rings.
- B. Strictly prevent the module from being contaminated with water or dirt during operation.

8. FCC Statement

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.

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.

The minimum separation generally be used is at least 20 cm.

modular Transmitter Assembled Products

The DUT are produced with a standard PVC enclosure that does not affect wireless transmission and reception characteristics.



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.

Explanation: this module meets all the requirements of FCC part 15 -247

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 EUT uses an unchangeable PCB antenna with a maximum gain of 2dbi. There is no restriction on the installation method.

2.4 Limited module procedures

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

A limited module 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 limited module 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: not applicable

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.

Explanation: not applicable. this module without trance antenna designs,use fixed-length PCB antenna

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: This module complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This module is designed to comply with the FCC statement, fcc id is:2AYYQ-YGC-C302

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 “omnidirectional 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: This module use PCB antenna. Antenna Gain:2dBi

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: On the metal shielding shell, there is space for printing basic information such as the name and model of the product, and the id :2AYYQ-YGC-C302 is included.

2.9 Information on test modes and additional testing requirements

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: Data transfer module demo board can control the EUT work in RF test mode at specified test channel.

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 do not require an evaluation by FCC part15 subpart B. The host should be evaluated by the FCC subpart B.