Model WCATA011

Wi-Fi/Bluetooth Combo Module

Datasheet

IEEE 802.11 1x1 WiFi 4 Wireless LAN

and

Bluetooth 4.2

SMD Uart Combo Module

[SoC RTL8720CM]

for 802.11b/g/n + Bluetooth 4.2

Version： 1.0

For Private Preview

<Specification may be changed without prior notice>

Haier US Appliances Solutions, Inc.

Appliance Park, AP5-2N-65, Louisville, KY

40225, United States

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Company: Haier US Appliances Solutions, Inc.

Module Name	WCATA011		
	Designed by	Reviewed by	Approved by
Signature	TANG, Wei	HUANG, Wei	FAN, Xijun
Date	2024/11/20	2024/11/20	2024/11/20

K Confidential

Model WCATA011

- **Compatible WLAN Standards**

  IEEE Std. 802.11 b/g/n
  Bluetooth 4.2

- **SoC**

  RTL8720CM

- **Product Size**

  67.82mmx21.77mmx11.9mm

- **Product Weight**

  17.8 g

	Haier US Appliances Solutions, Inc.
	Appliance Park, AP5-2N-65, Louisville, KY 40225, United States

RoHS

Features

WLAN

- CMOS MAC, Baseband PHY, and RF in a single chip for 802.11b/g/n compatible WLAN
- Complete 802.11n solution for 2.4GHz band
- 65Mbps receive PHY rate and 65Mbps transmit PHY rate using 20MHz bandwidth
- Backward compatible with 802.11b/g devices while operating in 802.11n mode
- One Transmit and one Receive path (1T1R)
- 20MHz bandwidth transmission
- DSSS with DBPSK and DQPSK, CCK modulation with long and sh

Bluetooth

- The RTL8720CM highly integrated Bluetooth Low Energy controller with a UART interface. It combines a BLE Protocol (PHY, LL, L2CAP, SM, ATT, GAP, GATT), BLE Baseband, Modem, and BLE RF in chip, also supports BLE user GATT-based profile application.
- Bluetooth 4.2 Low Energy (F/W supported)

Revision Record

Revision	Date	Description	Edited by
V0.1	2024/09/03	Premier Release	TANG, Wei
V1.0	2024/11/20	Update FCC/IC authentication information	TANG, Wei
** Private Preview Only*			

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1 General Description

1.1 System Overview

WCATA011 SoC module designed base on RTL8720CM chip solution. RTL8720CM are highly integrated single-chip low power 802.11n Wireless LAN (WLAN) network controllers. It combines a KM4 MCU, WLAN MAC, a 1T1R capable WLAN baseband, RF, and Bluetooth in a single chip. It also provides a bunch of configurable GPIOs which are configured as digital peripherals for different applications and control usage.

1.2 System Properties

Dimension	Typically, 67.82mmx21.77mmx11.9mm
Chipset	RTL8720CM
Operating Frequency	2.4GHz: 2400-2483.5MHz
Antenna	Ceramic antenna
Operating Voltage	5.0V±10%
PCB Information	4-layers design (1.65mm)
Peripheral Interface	WIFI@UART BT@ UART
Rate	11b: 1, 2, 5.5 and 11Mbps 11g: 6, 9, 12, 18, 24, 36, 48 and 54 Mbps 11n: MCS0~7, up to 65Mbps
Operating Temperature	-20℃ to +85℃
Storage Temperature	-40℃ to +125℃

1.3 Diagram

The general HW architecture for the module is shown in Figure-1, The WCATA011 module is a chipset solution, system-on-chip-module, 1x1 802.11 b/g/n device optimized for low-power embedded applications with single-stream capability for both transmit and receive, and Bluetooth in a single chip. It has an integrated network processor with a large set of TCP/IP with IPv4/IPv6 based services.

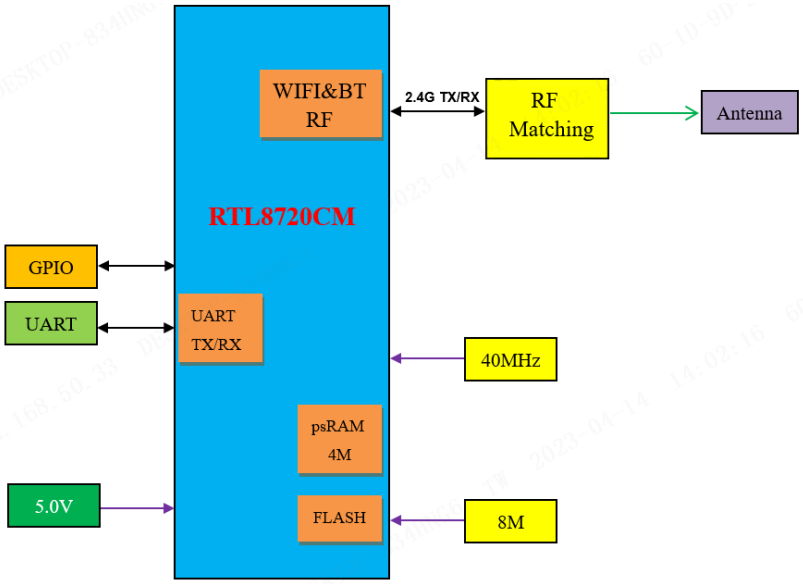
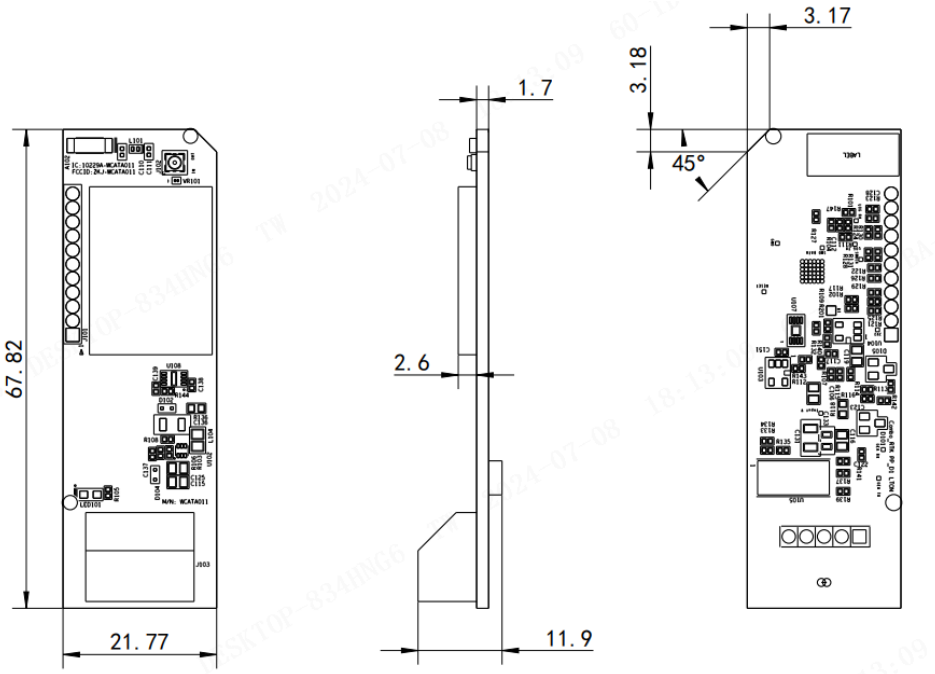


Figure 1: Block Diagram

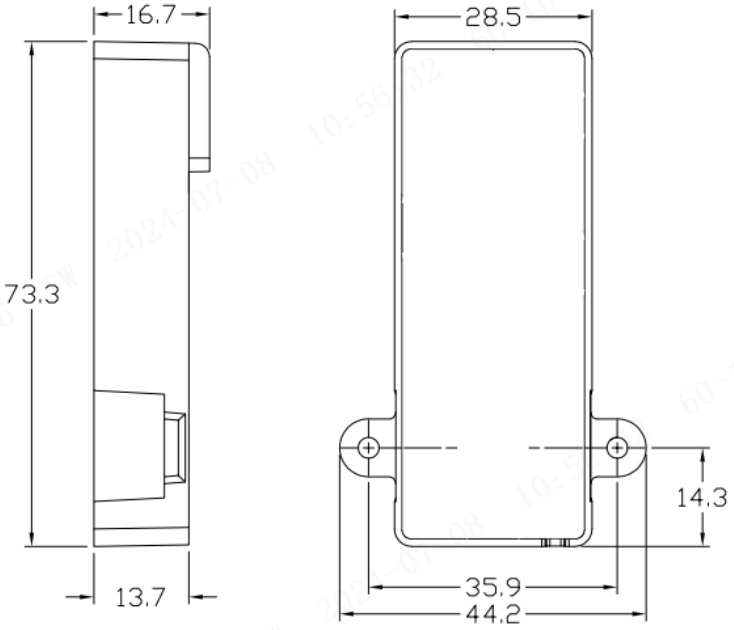
2 Mechanical Dimensions

2.1 Mechanical Outline Drawing

- Typical Dimension (W x L x T): 67.82mmx21.77mmx11.9mm
- General tolerance: ±0.127 mm
- Direction tolerance: ±0.5°

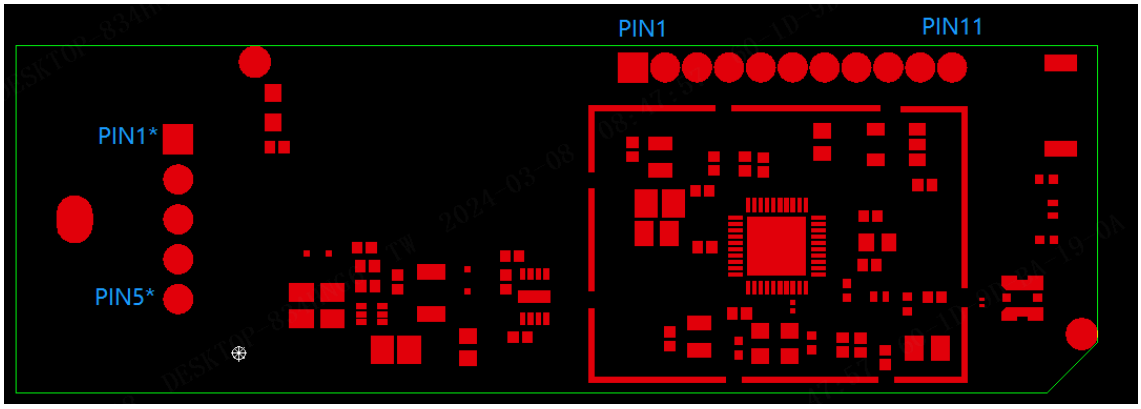


Top View *Bottom View*



2.3 Pin definitions

CONNECTOR					SWD & UART										
1	2	3	4	5	1	2	3	4	5	6	7	8	9	10	11
5v0	MCU_TX &GPIO_14	MCU_RX &GPIO_13	Baud Select	GND	3.3V	SWD Data &GPIO_1				SWD CLK &GPIO_0	LOG_TXD &GPIO_16	LOG_RXD &GPIO_15	MCU Reset	3.3V Input	GND



2.4 Product Photos

Top View

Bottom View

Top View

Bottom View

3 RF Characteristics

3.1 Wi-Fi Subsystem

Items	Contents	
WLAN Standard	IEEE 802.11b/g/n	
Frequency Range	2400-2483.5 GHz (2.4 GHz)	
Channels	CH1 to CH13 @ 2.4G	
Modulation Mode	802.11b: DBPSK, DQPSK ,CCK	
	802.11g/n: BPSK, QPSK, 16QAM, 64QAM	
Output Power & EVM	Power Value	EVM
	802.11b /11Mbps: 16dBm ± 2dBm	≤ -10dB
	802.11g /54Mbps: 14dBm ± 2dBm	≤ -25dB
	802.11n HT20 /MCS7: @2.4G 14 dBm ± 2dBm	≤ -28dB
Receiver Sensitivity @2.4G PER≤ 10%	Rate Type	Max
	802.11b /11Mbps @2.4G PER≤8%	-76dBm
	802.11g /54Mbps @2.4G	-65dBm
	802.11n HT20 /MCS7 @2.4G	-64dBm

** Note: [1] Typical RF Output Power are tested at room temp.25℃*

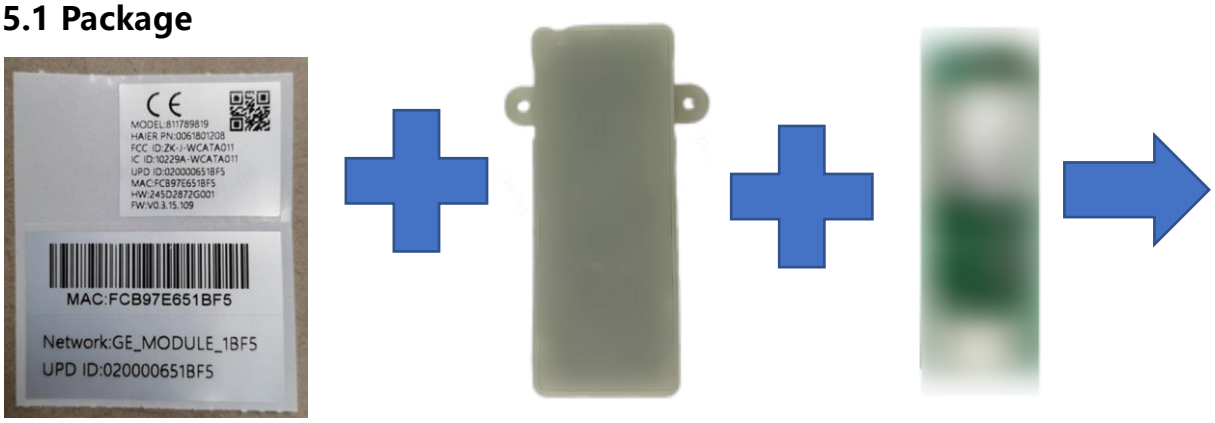
4 Software Information

AmebaZII_PGTool_v1.2.34

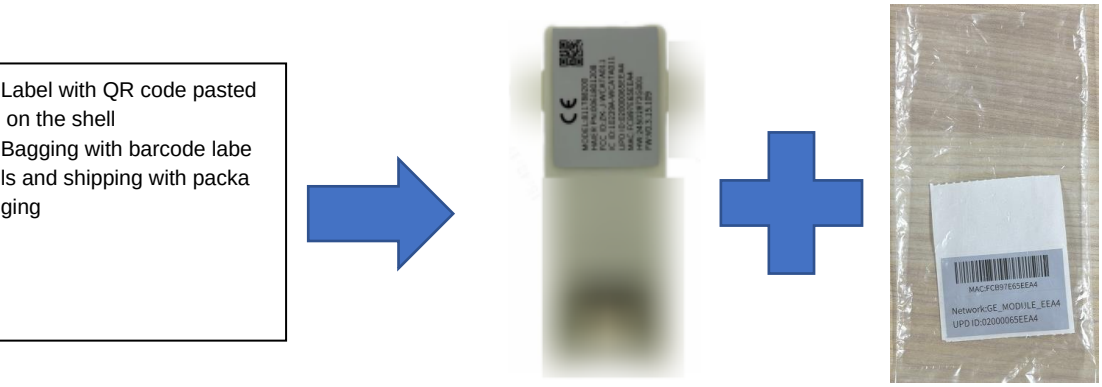
**Note: The software (driver) package version is subject to change without notice because it may encounter several updates. It is advised to consult with AI-Link for the best right driver package.*

5 Package, Storage & Disposal

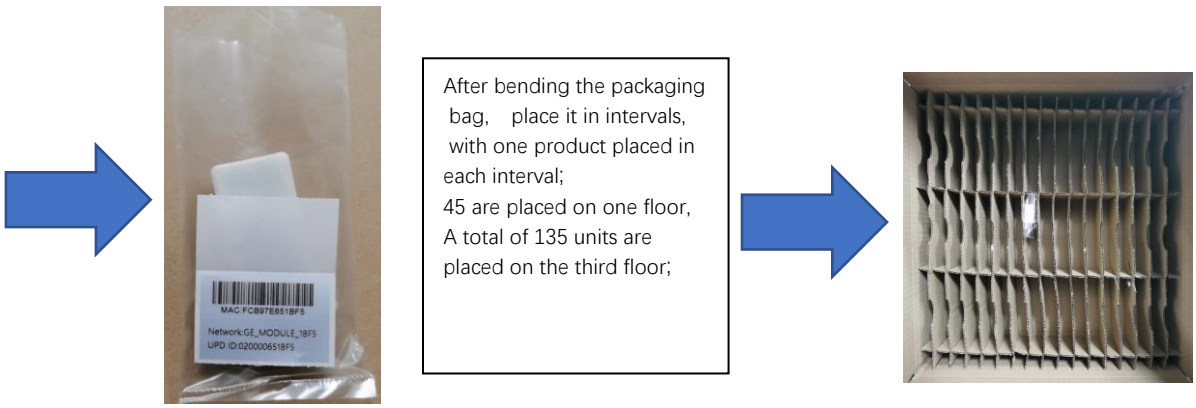
5.1 Package

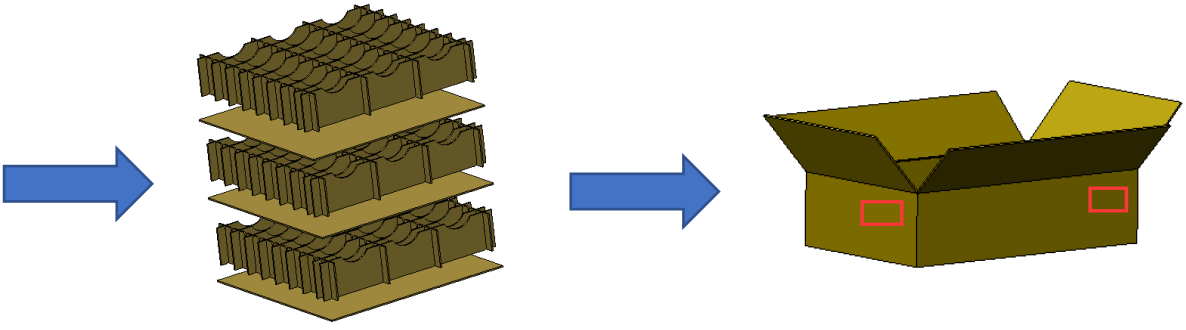


Label with QR code pasted on the shell
Bagging with barcode labels and shipping with packaging



After bending the packaging bag, place it in intervals, with one product placed in each interval;
45 are placed on one floor,
A total of 135 units are placed on the third floor;





5.2 Storage

All electronic components must be stored in a clean, well-ventilated place free of corrosive gas. Unless otherwise specified, the temperature and humidity of the storage place must meet below requirements:

- Temperature：-40~125℃;
- Humidity：20%~75%;
- Humidity sensitivity grade： MSL 3
- Container Requirement: products shall be placed in a container well-functioning as an electrostatic shielding.

5.3 Authentication information

IC:10229A-WCATA011

IC Radiation Exposure Statement

This device complies wth Industry Canadas cenoe-eemt Rsss Operation is subject to the followng two conditions:

1、This device may not cause interference and

2、 This device must accept any interference,including interference that may cause undesired operation of the device.

The term "IC:" before the certification/regeistration number oniy signifies that the industry Canada technical specifications were met.This product meets the applicabe industry Canada technical specifications.

Le present appareil est conforme aux CNR d' lndustrie Canada applicable auxappareils radio exempts de licence.

L' exploitation est autorisee aux deux conditions suivantes:(1)l' appareil ne doit pas produire de brouillage,et

(2)l' utilisateur de l' appareil doit accepter tout brouillage radioelectrique subi,meme si le brouillage est susceptible d' en compromettre le fonctionnemem.

FCC ID:ZKJ-WCATA011

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

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

5.4 Disposal

The waste disposal of this product and the package should comply with the applicable local/regional /state/ international regulations.

- Below Space Intentionally Left Blank –

RF Exposure
This equipment complies with FCC/IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
Cet équipement est conforme aux limites d'exposition aux rayonnements de la IC établies pour unenvironnement non contrôé. Cet équipement doit être installé et fonctionner à au moins 20cm de distance d'un radiateur ou de votre corps.

The module is limited to installation in mobile or fixed applications. Separate approval is required for all other operating configurations, including portable configuration with respect to Part 2.1093 and different antenna configurations.

IC labeling requirement for the final end product:

The final end product must be labeled in a visible area with the following
"Contains IC: 10229A-WCATA011"
The Host Marketing Name (HMN) must be indicated at any location on the exterior of the host product or product packaging or product literature, which shall be available with the host product or online.

Unauthorized modifications could void the user's authority to operate the equipment.

This radio transmitter [IC: 10229A-WCATA011] has been approved by Innovation, Science and Economic Development Canada 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.

Frequency range	Manufacturer	Peak gain	Impedance	Antenna type
2400-2483.5MHz	Walsin Technology Corporation	2.66dBi	50Ω	Ceramic Antenna

ORIGINAL EQUIPMENT MANUFACTURER (OEM) NOTES

OEM must certify the final end product to comply with unintentional radiators (FCC Sections 07 and 15.109) before declaring compliance of the final product to Part 15 of the FCC rules and regulations. Integration into devices that are directly or indirectly connected to AC lines must add with Class II Permissive Change.

The OEM must comply with the FCC labeling requirements. If the module's label is not visible when installed, then an additional permanent label must be applied on the outside of the finished product which states: "Contains transmitter module FCC ID: ZKJ-WCATA011". Additionally, the following statement should be included on the label and in the final product's user manual: "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 interferences, and

(2) this device must accept any interference received, including interference that may cause undesired operation."

The module is limited to installation in mobile or fixed applications. Separate approval is required for all other operating configurations, including portable configuration with respect to Part 2.1093 and different antenna configurations. A module or modules can only be used without additional authorizations if they have been tested and granted under the same intended end-use operational conditions, including simultaneous transmission operations. When they have not been tested and granted in this manner, additional testing and/or FCC application filing may be required. The most straightforward approach to address additional testing conditions is to have the grantee responsible for the certification of at least one of the modules submit a permissive change application. When having a module grantee file a permissive change is not practical or feasible, the following guidance provides some additional options for host manufacturers. Integrations using modules where additional testing and/or FCC application filing(s) may be required are:

(A) a module used in devices requiring additional RF exposure compliance information (e.g., MPE evaluation or SAR testing); (B) limited and/or split modules not meeting all of the module requirements; and (C) simultaneous transmissions for independent collocated transmitters not previously granted together.

This Module is full modular approval, it is limited to OEM installation ONLY. Integration into devices that are directly or indirectly connected to AC lines must add with Class II Permissive Change. (OEM) Integrator has to assure compliance of the entire end product include the integrated Module. Additional measurements (15B) and/or equipment authorizations (e.g. Verification) may need to be addressed depending on co-location or simultaneous transmission issues if applicable. (OEM) Integrator is reminded to assure that these installation instructions will not be made available to the end user.

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).

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 module has the trace antenna designs, and the antenna use a permanently attached antenna which is unique, The designed antenna meets the hardware module's requirements, The antenna is fixed on the module PCB board.

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: The module is not a limited 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.
Explanation: Yes, The module with trace antenna designs, and this manual has been shown the layout of trace design, antenna, connectors, and isolation requirements.

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 equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body." This module is designed to comply with the FCC statement, FCC ID is: ZKJ-WCATA011.

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 module has the trace antenna designs, and the antenna use a permanently attached antenna which is unique, The designed antenna meets the hardware module's requirements, The antenna is fixed on the module PCB board.

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: ZKJ-WCATA011”

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