

Shenzhen Uascent Technology Co., Ltd

Universal Ascent Holdings Limited

UAM053 Matter Module

Wi-Fi Single-band 1T1R 802.11b/g/n

Module Datasheet

Office: Zhongxing Hotel (Qianhai HOP
International), No. 19, Xinghua 1st Road
(Extension), Haiwang Community, Xin'an
Street, Bao'an District, Shenzhen, 2101, CHINA

TEL: +86-0755-82571152

E-MAIL: marketing@uascent-iot.com

Website: www.uascent-iot.com

Customer Approval : _____ Company

_____ Title

_____ Signature

_____ Date

_____ Uascent

Revision History.

Version	Date	Revision Content	Draft	Approved
1.0	2024/11/06	New version	Bella	

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1 Overview.

1.1 Introduction.

UAM053 is a cost-effective WIFI+BLE module developed by Uascent Technology, supporting IEEE 802.11 b/g/n protocol standards, lightweight TCP/IP protocol stack, STA, AP, and Direct modes, and Matter protocol. Users can use this module to add networking functions to existing devices or build independent network controllers.

1.2 Features.

- Operate at ISM frequency bands (2.4GHz).
- Standard IEEE 802.11b/g/n
- Support Wi-Fi and BLE coexist.
- Support BLE assists in fast Wi-Fi connection.
- Built-in single core RISC-V MCU with a main frequency of up to 320MHz, can be used as an application processor.
- Built-in 64KB ROM, 512KB SRAM, 4Mbit Flash, 32byte eFuse.
- Built-in TR switch, BALUN, LNA, PA, and PCB onboard antenna.
- Support remote firmware OTA upgrade.
- Support STA, AP, STA+AP and Direct working modes.
- Support WPA/WPA2/WPA3 security protocol.

1.3 Recommended Operating Rating.

Description		Min	Typ	Max	Unit
Ambient Temperature (TA)		-30	25	85	deg.C
Vcc		3.0	3.3	3.6	V
(VOL)	Output low voltage	VSS	/	VSS+0.3	V
(VOH)	Output high voltage	VCC-0.3	/	VCC	V

1.4 Reference power consumption for conventional continuous operation.

Parameter	Condition / Notes	Typ.	Unit
TX model			
I _{RF}	11b 11M	280	mA
I _{RF}	11g 54M	250	mA
I _{RF}	11n HT20 MCS7	250	mA
I _{RF}	11n HT40 MCS7	250	mA
RX model			
I _{RF}	11b 11M	80	mA

I_{RF}	11g 54M	80	mA
I_{RF}	11n HT20 MCS7	80	mA
I_{RF}	11n HT40 MCS7	80	mA

1.5 ESD Specifications

Item	Description	Value	Unit
Human Body Mode (HBM)	Electrostatic Discharge Tolerance under Human Body Model	± 4	KV
CDM	Electrostatic Discharge Tolerance under Charged Device Model	± 0.2	KV

2 Module usage precautions.

When using the WIFI module of Uascent Technology, a certain tolerance should be reserved for the output current of the power supply. It is recommended that the output current of the power supply be $\geq 500\text{mA}$, and a suitable power supply IC packaging should be selected. When supplying LDO power, attention should be paid to the issue of heating, and when supplying DC-DC power, attention should be paid to the issue of overshoot at the moment of power on.

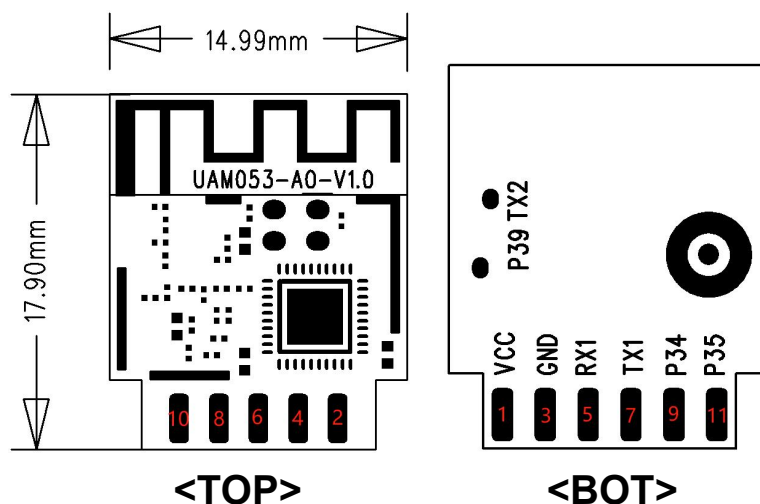
3 WiFi Specification.

Features	Descriptions
Main Chipset	BEKEN : BK7235
Operating Frequency	2.412~2.484GHz
Operating Voltage	3.0~3.6V
WIFI Standard	IEE 802.11b/g/n
PHY Data rates	Wi-Fi: 802.11b: 11, 5.5, 2, 1 Mbps 802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps HT20 MCS0-MCS7 HT40 MCS0-MCS7 HE20 MCS0-MCS7 HE40 MCS0-MCS7
Transmit Output Power	Wi-Fi: 802.11b@11Mbps $16\pm 2\text{dBm}$ 802.11g@54Mbps $15\pm 2\text{dBm}$ 802.11n@HT20 MCS7 $14\pm 2\text{dBm}$ 802.11n@HT40 MCS7 $14\pm 2\text{dBm}$
EVM	802.11b /11Mbps: $\text{EVM} \leq -10\text{dB}$ 802.11g /54Mbps: $\text{EVM} \leq -25\text{dB}$ 802.11n /HT20 MCS7: $\text{EVM} \leq -27\text{dB}$ 802.11n /HT40 MCS7: $\text{EVM} \leq -27\text{dB}$
Receiver Sensitivity	802.11b@8% PER11Mbps $\leq -88\text{dBm}$

(HT20)	802.11g@10% PER 54Mbps $\leq$ -74dBm
	802.11n@10% PER MCS 7 $\leq$ -70dBm
Operating Channel	Wi-Fi 2.4GHz: 11: (Ch. 1-11) – United States(North America) 13: (Ch. 1-13) – Europe 14: (Ch. 1-14) – Japan
Antenna	PCB onboard antenna

4 Pin Descriptions.

4.1 Pin Outline.



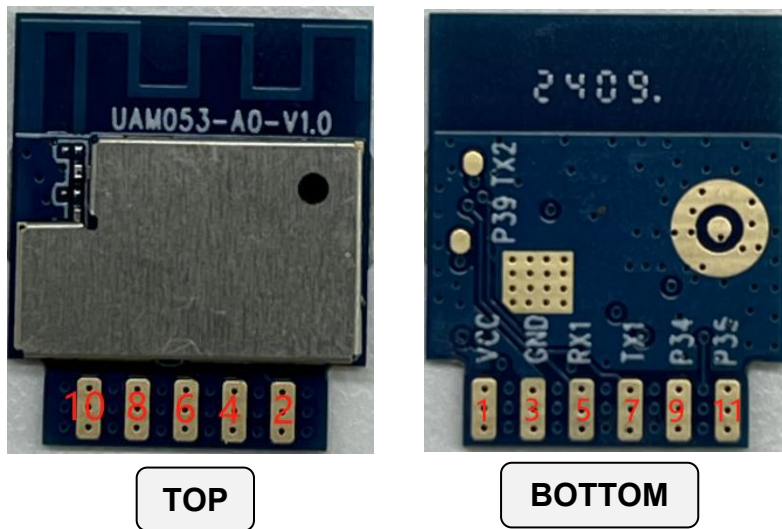
4.2 Pin Definition.

Pin No.	Name	Type	Description	Voltage
1	3V3	P	Supply 3.3V	
2	P32	I/O	GPIO32/CIS_PXD0/PWM6/Touch sensor 6	
3	GND	P	Ground	
4	P33	I/O	GPIO33/CIS_PXD1/PWM7/Touch sensor 7	
5	RX1	I/O	UART_RX1/GPIO10	
6	P25	I/O	P25/IRDA/PWM5/ADC1	
7	TX1	I/O	UART_TX1/GPIO11	
8	ADC4	I/O	ADC4/GPIO28/I2S_MCLK/Touch sensor 2	
9	P34	I/O	GPIO34/CIS_PXD2/PWM8/Touch sensor 8	
10	CEN	I/O	Chip enable, active high	
11	P35	I/O	P35/PXD3/PWM9/Touch sensor 9	

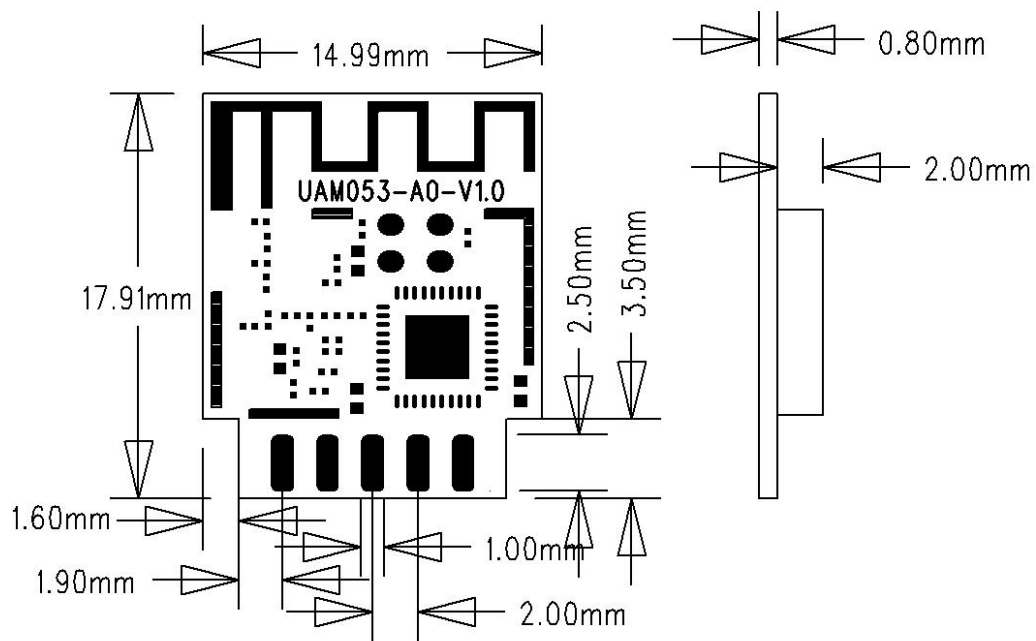
※ P:POWER I:INPUT O:OUTPUT

5 Dimensions.

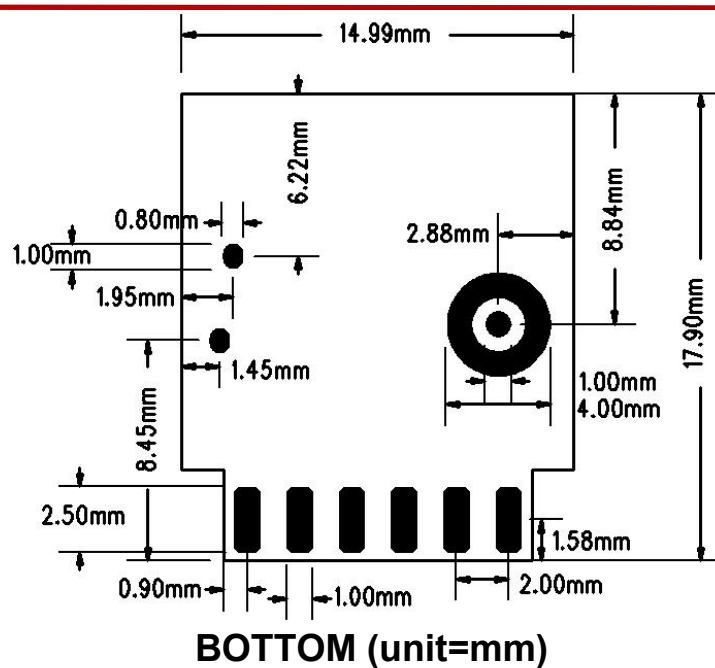
5.1 Module Picture.



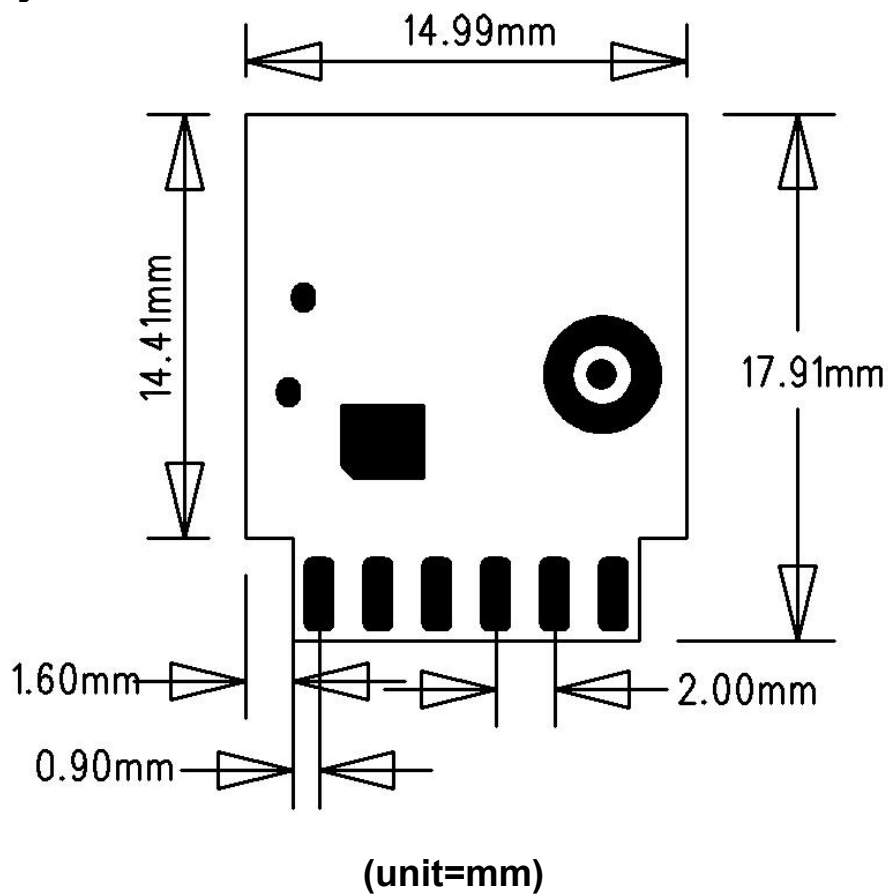
L:17.91 x W:14.99 x H:2.8 (±0.2) unit=mm



5.2 Module Mechanical Dimensions.



5.3 PCB Layout Reference.



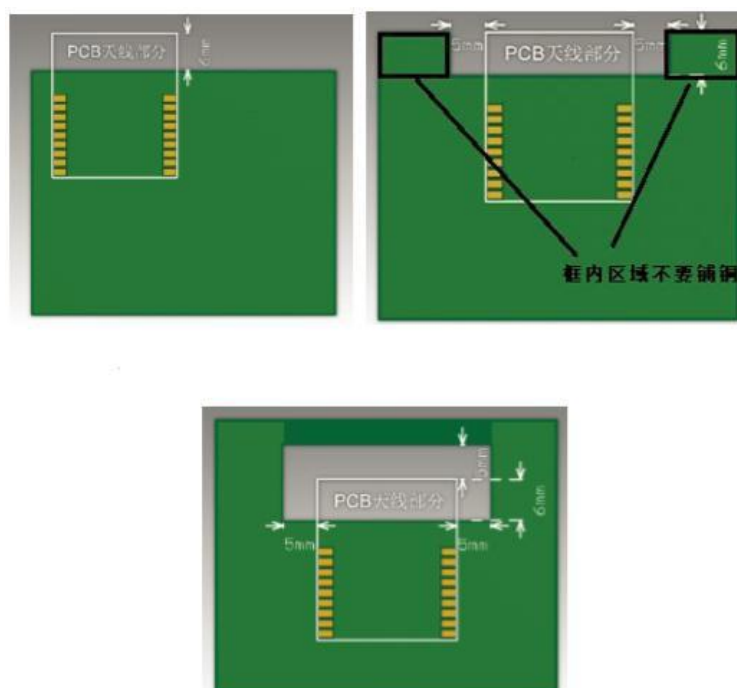
6 Antenna Information.

6.1 Antenna type.

This module antenna type is PCB on-board antenna with antenna gain of -1.3dBi (MAX)

6.2 Module layout considerations.

The UAM053-A0 module shall be welded to the PCB board. In order to obtain the best RF performance. Under the PCB on-board antenna, there should be no copper laying, device and wiring. During PCB design, the corresponding area should be cleared. As shown in the following figure.



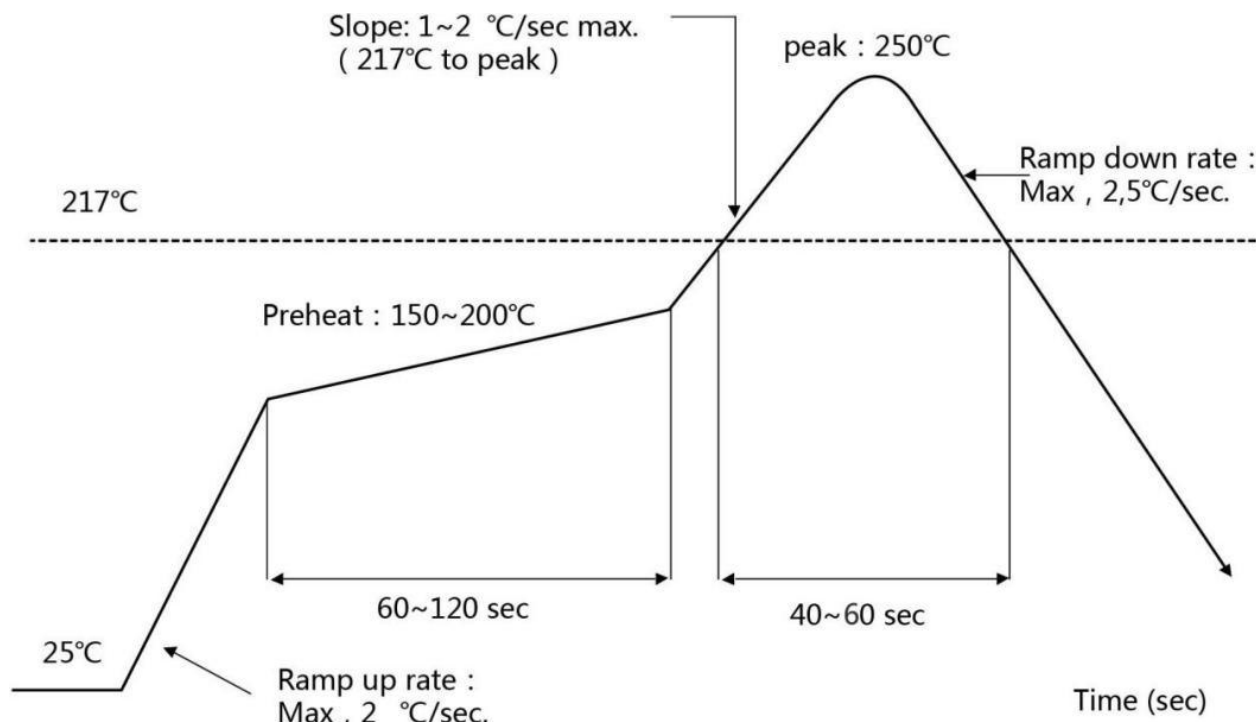
7 Environmental Requirements.

7.1 Recommended Reflow Profile.

Referred to IPC/JEDEC standard.

Peak Temperature : <245°C

Number of Times : ≤2 times



7.2 Note.

Note: Take and use the module, please insure the electrostatic protective measures.

1. Reflow soldering temperature should be according to the customer the main size of the products, such as the temperature set at $250 + 5$ °C for the MID motherboard.

About the module packaging, storage and use of matters needing attention are as follows:

2. The module of the reel and storage life of vacuum packing: 1). Shelf life: 8 months, storage environment conditions: temperature in: < 40 °C, relative humidity: $< 90\%$ r.h.

3. The module vacuum packing once opened, time limit of the assembly:

Card: 1) check the humidity display value should be less than 30% (in blue), such as: 30% ~ 40% (pink), or greater than 40% (red) the module have been moisture absorption.

2.) factory environmental temperature humidity control: ≤ -30 °C, $\leq 60\%$ r.h..

3). Once opened, the workshop the preservation of life for 168 hours.

4. Once opened, such as when not used up within 168 hours:

1). The module must be again to remove the module moisture absorption.

2). The baking temperature: 125 °C, 8 hours.

3). After baking, put the right amount of desiccant to seal packages.

7.3 Humidity sensitive control.

	CAUTION This bag contains MOISTUR-SENSITIVE DEICES	LEVEL 3 If blank, see adjacent bar code label
1. Calculatied shelf life an sealed bag: 12 months at < 40℃ and <90% relative humidity(RH) 2. Peak package body temperature : _____ 260 _____℃ 3. After bag is opened ,devices that will be subjected to reflow solder of other high temperature process must a) Mounted within: _____ 168 _____ hrs. of factory confitions ≤30℃/60%RH, OR b) Stored at<10% RH 4. Devices require bake,before mounting, if: a) Humidity Indicator Care is > 10% when read at 23 ± 5℃ b) 3a or 3b not met. 5. If baking is required , devices may be baked for 48 hrs. at 125 ± 5℃ Note : If device containers cannot be subjected to high temperature of shorted bake times are desired, reference IPC/JDEC J-STD-033 for bake procedure bag Seal Date : _____ Note : level and body temperature defined by IPC/JEDEC J-STD-020		

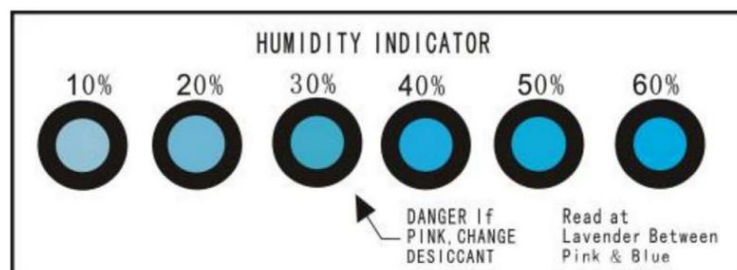
8 Package style.

8.1 Packaging Detail.

The module and the humidity indicator card are placed together in vacuum anti-static packaging, separated by a certain amount of paper, and neatly placed in the packaging box. The packaging must have reliable moisture-proof and anti-collision measures.

Note1:

There is a "triangular arrow" on the humidity indicator card indicating at 30%RH (as shown in the picture below). If the chemical changes to pink in the circle it points to, the element is damp and needs baking.



Note2:

Please confirm the packaging style with our sales staff before purchasing this product. If no packing style is specified before purchase, we will ship the goods by our own choice of packing method.

9 Transport regulations.

In the process of logistics or express transportation, attention should be paid to handling with care to avoid direct rain and snow.

10 Disclaimer and copyright notice.

All information in this document is provided according to the product status quo and subject to change without notice.

The contents of this document disclaim any warranties, including any warranties of fitness for sale, fitness for a particular purpose or non-infringement, and any warranties mentioned elsewhere in any proposal, specification or sample.

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11 Attention.

Due to product version upgrade or other reasons, the content of this manual may be changed. Shenzhen Uascent Technology Co., Ltd. reserves the right to modify the content of this manual without any notice or prompt. If users need to obtain the latest product information, please apply for the final document with our company. This manual is only used as a guide. Shenzhen Uascent Technology Co., Ltd. tries its best to provide the latest information in this manual, but does not guarantee that the content of the manual is completely accurate.

None of the statements, information and recommendations contained in this manual constitute any warranty, express or implied.

FCC Warning Statement

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.

RF Exposure Statement

To maintain compliance with FCC's RF Exposure guidelines, This equipment should be installed and operated with minimum distance of 20cm the radiator your body. This device and its antenna(s) must not be co-located or operation in conjunction with any other antenna or transmitter.

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 Title 47 Part 15 Section 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 PCB Antenna, antenna gain: -1.2dBi. 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: 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.4a) 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: No. The module without trace antenna designs

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. The device is mobile, and the use distance is 20 cm. This module is designed to comply with the FCC statement, FCC ID is: 2A4G9-UAM053

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 EUT uses PCB Antenna, antenna gain: -1.2dBi.

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: The host system using this module, should have label in a visible area indicated the following texts: "Contains FCC ID: 2A4G9-UAM053

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 standalone 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 does not require an evaluation by FCC Part 15 Subpart B. The host should be evaluated by the FCC Subpart B