CDW-G47638U-02

DATASHEET

Software：

Customer	Approve	Date

Design	Check	Approve	Version	Date
Joan liu	Tan Chunming	Li wei	**V1.0**	**2019.06.26**

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Reversion History：

Version	Date	Modification
1.0	2019.06.26	1.0

1. Overview

The CDW- G47638U-02 is a highly integrated single chip Module which has built in a 2x2 dual-band wireless LAN radio and a Bluetooth subsystem.It supports IEEE 802.11b/g/n standard and provides the highest PHY rate up to 300Mbps,offering feature-rich wireless connectivity and reliable throughput from an extended distance.It includes Bluetooth EDR and LE radio which complies with Bluetooth v2.1+EDR,v4.2,Low Energy, and v5.0.

The CDW-G47638U-02 integrates PA/LNA such that the number of the external components is reduced to minimum.Intelligent MAC design deploys a high efficient DMA engine and hardware data processing accelerators which offloads the host processor.

The CDW-G47638U-02 supports the 802.11i security standard and implements hardware acceleration for TKIP,CCMP and WAPI. The device also supports 802.11e Qos for video,voice,and multimedia applications.

The CDW-G47638U-02 can provide a comcurrent operation of Wi-Fi and Bluetooth over USB interace. An intelligent Wi-Fi/Bluetooth coexistence algorithm is implemented to reach the best Wi-Fi and Bluetooth radio performance.

2. Features

2.1 Platform

- Embedded high-performance 32-bit RISC microprocessor
- Highly integrated RF with 55nm CMOS technology
- Integrate high efficiency switching regulator
- 40MHz crystal clock support with low power operation in sleep mode
- Best-in-class active and idle power consumption performance
- Fully Compliance with USB v2.0 specification
- Iternal thermal sensor for temperature compensation and thermal protection.
- Self calibration.
- Advanced FDD/TDD mode Wi-Fi/Bluetooth coexistence scheme.
- Wi-Fi and Bluetooth over USB.

2.2 WLAN

- IEEE 802.11b/g/n compliant
- Support 20MHz,40MHz bandwidth in 2.4GHz band.
- Embedded high-performance 32-bit RISC microprocessor
- Dual-band 2T2R mode with data rate up to 300Mbps
- Support STBC,LDPC,MRC,and transmit Beamforming
- Greenfield,mixed mode,legacy modes support
- Frame aggregation
- Integrated LNA,PA,and T/R switch
- Optional external LNA and PA support.
- IEEE 802.11d/e/h/i/k/r/w support
- Security support for WGA WPA/WPA2 personal,WPS2.0,WAPI
- Supports 802.11w proteced managed frames
- QoS support of WFA WMM,WMM PS
- Supports Wi-Fi Direct
- Fully compliance with USB v2.0
- Wake on WLAN

2.3 Bluetooth

- Bluetooth specification v2.1+EDR
- Bluetooth v4.2 Low Energy(LE)
- Standard HCI interface over USB super-speed,high-speed and full-speed mode
- Integrated BALUN and PA
- Best-in-class BT/Wi-Fi coexistence performance
- Scatternet support:Up to 7 piconets simultaneously with background inquiry/page scan
- Up to 3 simulaneous active ACL links
- Support SCO and SCO link with re-transmission
- Support wide-band speech and hardware accelerated SBC codec for A2DP streaming
- Packet loss concealment
- Channel assessment and WB RSSI for AFH

3. General Specification

Model	CDW-G47638U-02
Product Name	WI-Fi 11 b/g/n 2T2R +BT5.0 Module
Major Chipset	MT7638GU
Standard	802.11 b/g/n, 802.3, 802.3u
Data Transfer Rate	1,2,5.5,6,11,12,18,22,24,30,36,48,54,60, 90,120 and maximum of 300Mbps
Modulation Method	BPSK/ QPSK/ 16-QAM/ 64-QAM
Frequency Band	2.4~2.4835 GHz ISM Band
Spread Spectrum	IEEE 802.11b: DSSS (Direct Sequence Spread Spectrum)IEEE802.11g/n:OFDM(OrthogonalFrequency Division Multiplexing)
RF Output Power	11n ≥ 12dBm，11g ≥ 13dBm，11b ≥ 15dBm，
BT RF Output Power	0< BT RF ≤ 15 dBm
Operation Mode	Ad hoc, Infrastructure
WLAN Receiver Sensitivity	11b CCK11(PER<8%) < -85dBm , 11g OFDM54(PER<10%) < -73dBm , 11n HT20 MCS7(PER<10%) < -69dBm , 11n HT40 MCS7(PER<10%) < -66dBm
BT Receiver Sensitivity	86 @ BER=0.1% for GFSK (1Mbps) 86 @ BER=0.01% for π/4-DQPSK (2Mbps) 80 BER=0.01% for 8DPSK (3Mbps)
Operation Range	Up to 180 meters in open space
OS Support	Win7 32/64,Win8 32/64,Android
Security	WEP, TKIP, AES, WPA, WPA2
Interface	USB 2.0
Power Consumption	DC3.3V Max 882mA
Operating Temperature	-20~ +60° C ambient temperature
Storage Temperature	-40 ~ 85°C ambient temperature
Humidity	5 to 90 % maximum (non-condensing)
Dimension	46.5x40.0x5.8mm (LxWxH)

4. DC Characteristics

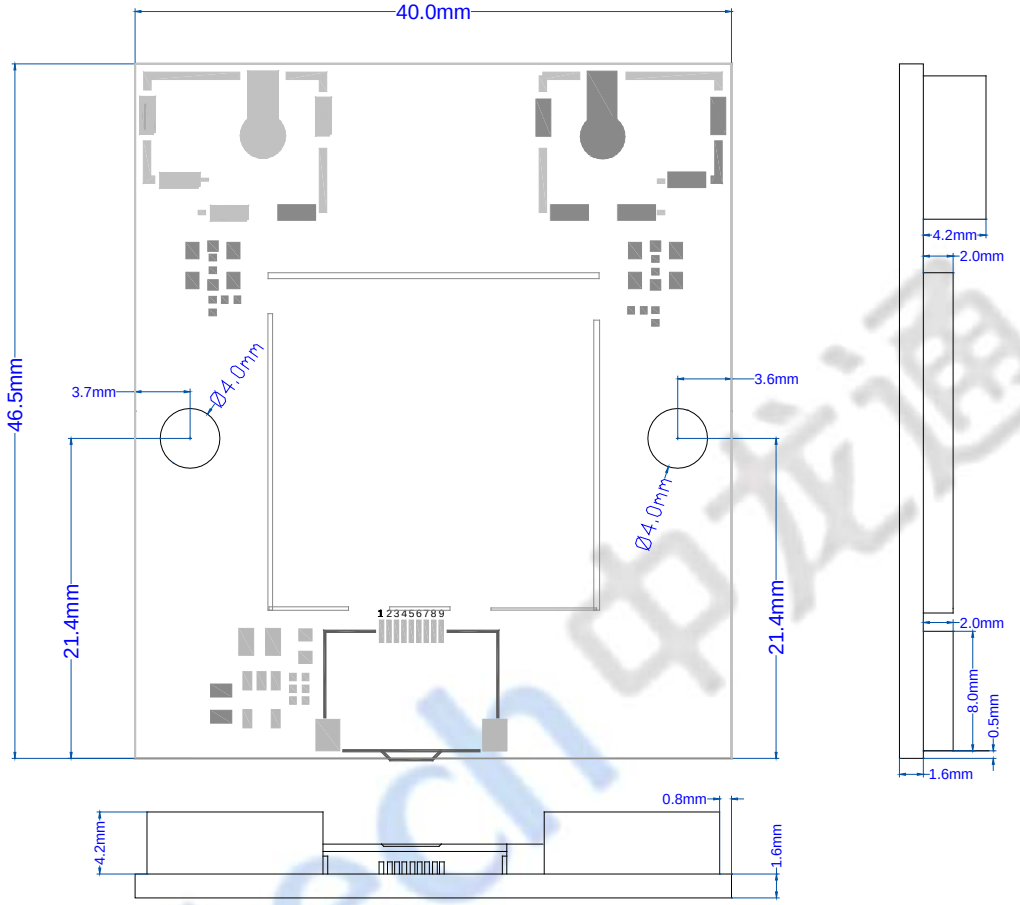
4.1 WLAN current consumption

Description	TYP	Unit
Sleep mode	1.5	mA
2GHz RX Active,HT20,MCS15	144	mA
RX Power saving,DTIM=1	3.3	mA
2GHz TX HT20,mcs15 @17.5dBm	496	mA
2GHz TX HT20,mcs0 @18dBm	520	mA
2GHz TX CCK,11Mbps @21dBm	403	mA

4.2 Bluetooth current consumption

Description	TYP	Unit
Sleep mode	1.5	mA
Bluetooth continuous transmit(TX output power:9dBm)	69	mA
Bluetooth continuous receive	44	mA
Bluetooth SCO connection, HV3 packets+sniff mode+scan (Page scan internal=1.28sec,inquiry scan interval=2.56s,sniff interval=500ms)	32	mA
Bluetooth page scan+inquiry scan (Page scan interval=1.28s,inquiry scan interval=2.56s)	2	mA
Bluetooth page scan (Page scan interval=1.28s)	2	mA

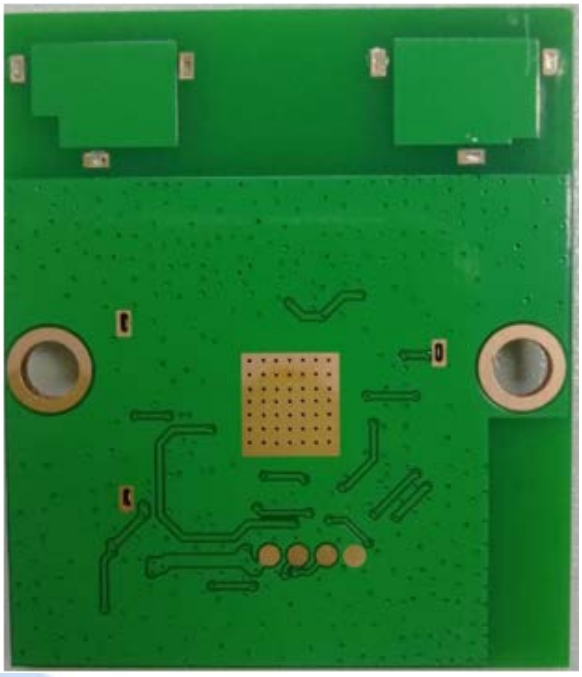
5. Pin Description and PCB size



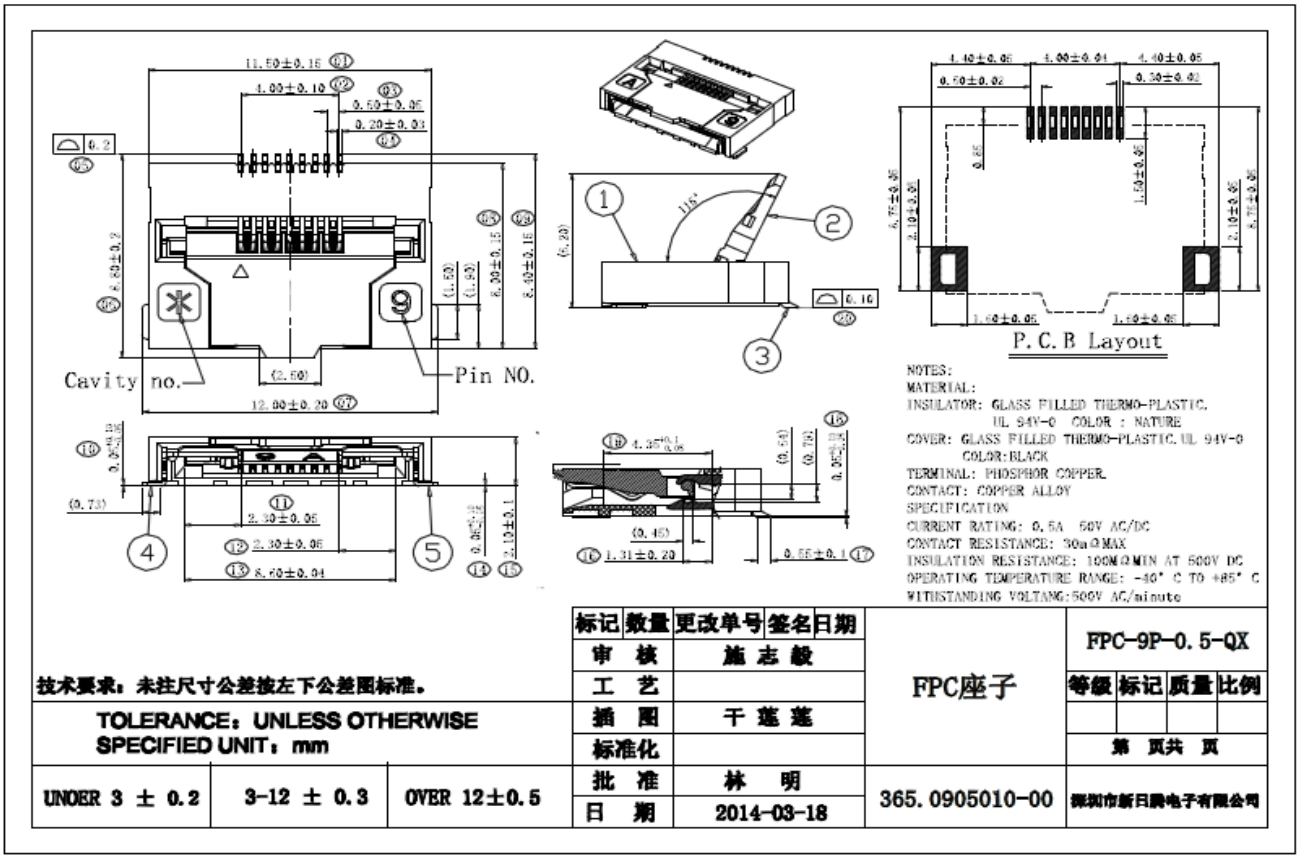
NO.	Symbol	Description
1	RST	Reset
2	WIFI_INT	WIFI Wake up
3	GND	Ground connections
4	DP	USB positive differential data lines
5	DM	USB negative differential data lines
6	GND	Ground connections
7	BT_INT	BT Wake up
8	UV+	Power supply 5.0V is required
9	UV+	Power supply 5.0V is required

(Top view)

6. Physical map



7. FPC Connector spec

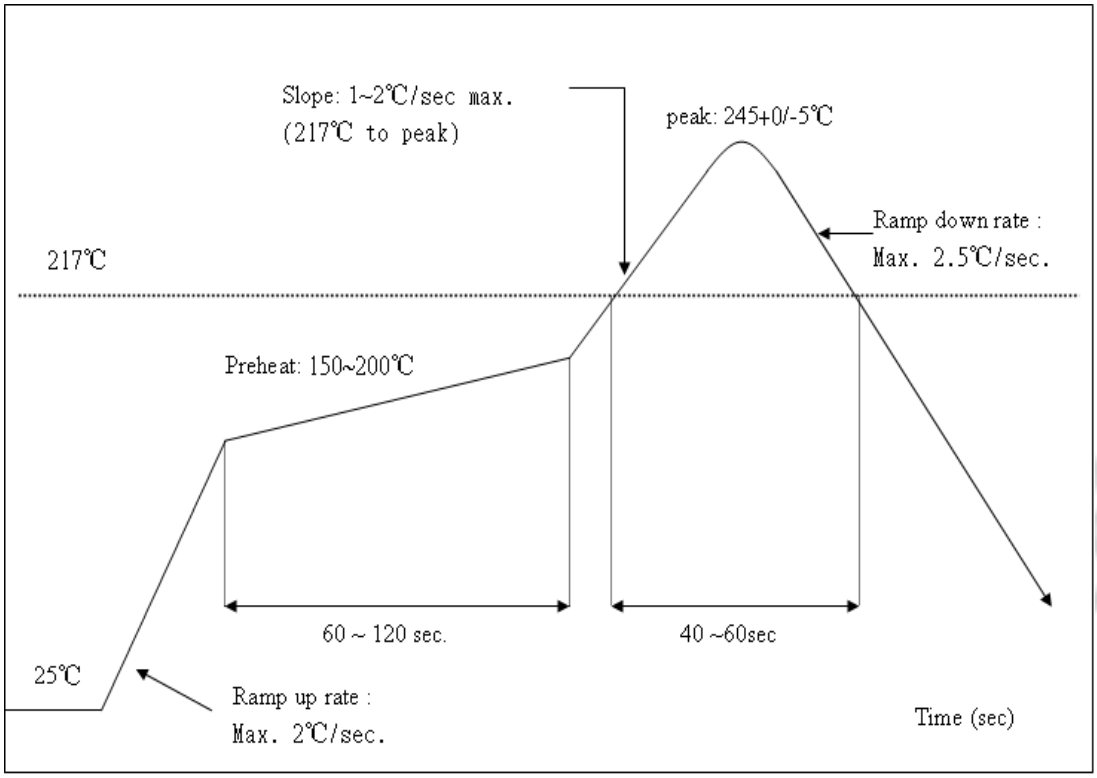


8. Recommended Reflow Profile

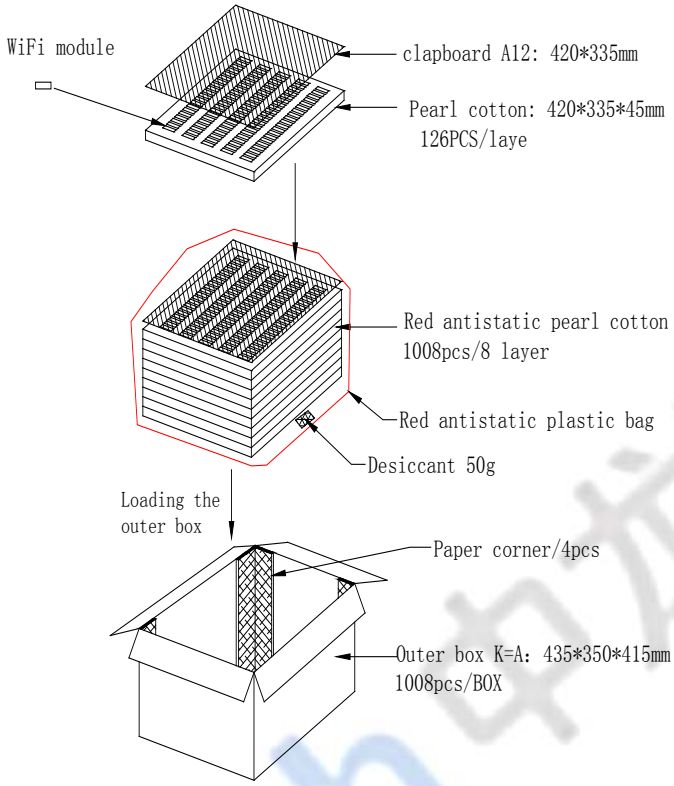
Referred IPC/JEDEC standard.

Peak Temperature : <250°C

Number of Times : ☐2 times

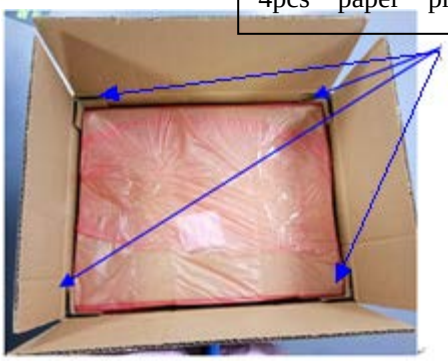

Slope: 1~2℃/sec max.
(217℃ to peak)
peak: 245+0/-5℃
Ramp down rate :
Max. 2.5℃/sec.
217℃
Preheat: 150~200℃
60 ~ 120 sec.
40 ~60sec
25℃
Ramp up rate :
Max. 2℃/sec.
Time (sec)

9. Package



Pearl cotton
Antistatic test

4pcs paper protector



ESD CAUTION

The CDW-G47638U-02 is ESD (electrostatic discharge) sensitive device and may be damaged with ESD or spike voltage. Although CDW-G47638U-01 is with built-in ESD protection circuitry, please handle with care to avoid the permanent malfunction or the performance degradation.

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 ROW-CDWG47638U02”

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 establish the 6dB Bandwidth, Peak Output Power, Radiated Spurious Emission, Power Spectral Density, Restricted Band of Operation and Band Edge (Out of Band Emissions)

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 external antenna, BLE/BT has one ANT, WIFI has two ANT,The antenna cannot be removed, Unconventional interface

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.

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: ROW-CDWG47638U02.

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 has one PCB Antenna, The antenna cannot be removed, Unconventional interface

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: ROW-CDWG47638U02

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: WiFi Module 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 shoule be evaluated by the FCC Subpart B.