

**CDW-N37603U-03****DATASHEET****Software:**

Customer	Approve	Date

Design	Check	Approve	Version	Date
			V1.2	2021.06.01

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## 1. Overview

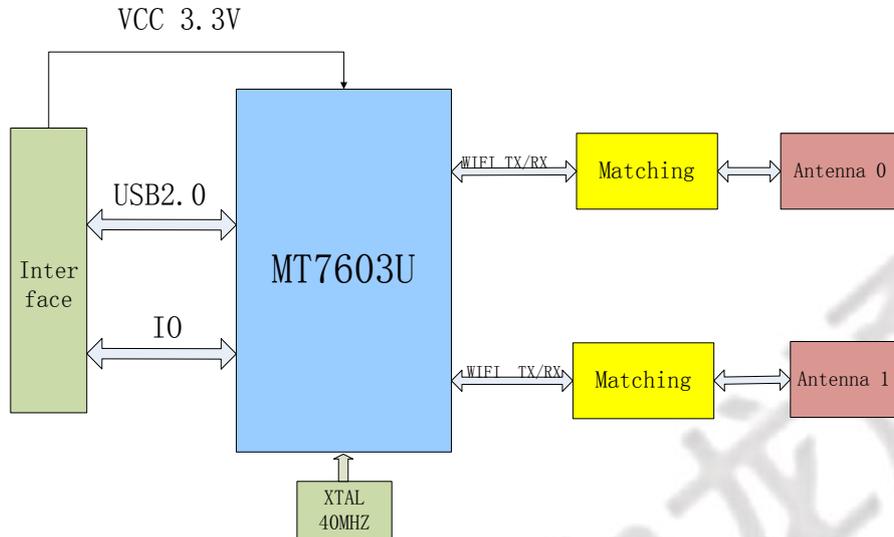
The CDW-N37603U-03 is a highly integrated Wi-Fi single chip which supports 300 Mbps PHY rate. It fully complies with IEEE 802.11n and IEEE 802.11 b/g standards, offering feature-rich wireless connectivity at high standards, and delivering reliable, cost-effective throughput from an extended distance. Optimized RF architecture and baseband algorithms provide superb performance and low power consumption. Intelligent MAC design deploys a high efficient DMA engine and hardware dataprocessing accelerators which offloads the host processor.

The CDW-N37603U-03 is designed to support standard based features in the areas of security, quality of service and international regulations, giving end users the greatest performance any time and in any circumstance.

## 2. Features

- IEEE 802.11 b/g/n compliant
- 2T2R mode with support of 300Mbps PHY rate
- Greenfield, mixed mode, legacy modes support
- Support MCC(multi channel concurrent)
- Frame aggregation
- WiFi Positioning(802.11v/ TOD)
- BW5/10 narrow band(Rx +2.5dBm), extending coverage
- WoWLAN via GPIO(client mode), Support Host Sleep(AP mode)
- Airtime Fairness(QoS)
- Meet ETSI EN 300 328 V1.8.1 test plan(mandatory for EU in 2014/E)
- Integrated LNA, PA, and T/R switch
- IEEE 802.11 d/h/k support
- Security support for WFA WPA/WPA2 personal, WPS2.0, WAPI
- Supports 802.11w protected management frames
- QoS support of WFA WMM, WMM PS
- Supports Wi-Fi Direct
- Per packet transmit power control
- Wake on WLAN

### 3. Block Diagram



### 4. DC Characteristics

symbol	Parameter	Minimum	Typical	Maximum	Units
V33USB	3.3Vsupply voltage	3.0	3.3	3.6	V
VD12DE	1.2Vsupply voltage	1.10	1.2	1.32	V
VD16DE	1.6Vsupply voltage	1.50	1.6	1.66	V
IDD5.0	5.0V rating TX current	--	--	330	mA
IDD5.0	5.0V rating RX current	--	--	200	mA
IDD33	3.3V rating current	--	--	600	mA

## 5. General Specification

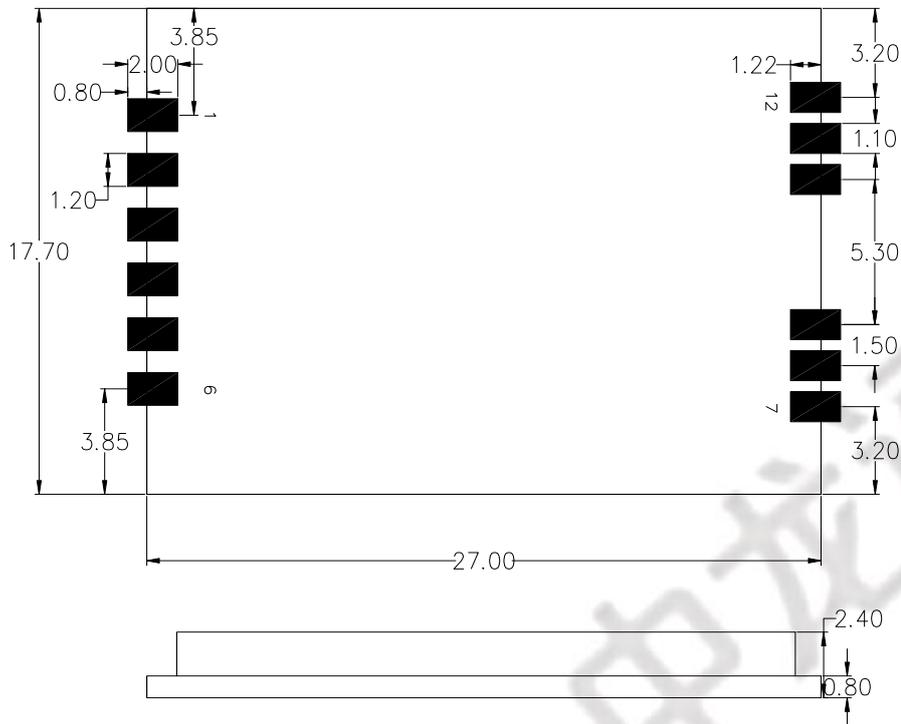
Model	CDW-N37603U-03
Product Name	WLAN 11n USB 2T2R module
Major Chipset	MT7603UN
Antenna	IFA antenna*2
Antenna Gain	2.3dBi
Modulation Method	802.11b:CCK,DQPSK,DBPSK 802.11g:64QAM,16QAM,QPSK,BPSK 802.11n:BPSK,QPSK,16QAM,64QAM
Frequency Band	2412-2462MHz for 802.11b/g/n20BW 2422-2452 MHz for 802.11n-40BW
Channels	802.11b/g/n-20MHz:11, n-40MHz:7
Max. Frequency Deviation	802.11b:11/5.5/2/1 Mbps 802.11g:54/48/36/24/18/12/9/6Mbps 802.11n Up to 150Mbps
Test Tone deviation	+/-75kHz
Interface	USB 2.0
Operating Temperature	-20~+70 °C
Storage Temperature	-40 ~+ 85 °C
Humidity	5 to 90 % maximum (non-condensing)

## 6. Electrical Characteristics

Feature	Description
WLAN Standard	IEEE 802.11b/g/n WiFi compliant
Frequency Range	2412~2462 MHz
Number of Channels	2.4GHz: Ch1 ~ Ch11
Modulation	802.11b : DQPSK, DBPSK, CCK 802.11 g/n : OFDM /64-QAM,16-QAM, QPSK, BPSK
Output Power	802.11b /11Mbps : 17dBm ±2 dB @ EVM ≤ -15dB
	802.11g /54Mbps : 15 dBm ±2 dB @ EVM ≤ -25dB
	802.11n /MCS7 HT20 : 14 dBm ±2 dB @ EVM ≤ -28dB
	02.11n /MCS7 HT40 : 13 dBm ±2 dB @ EVM ≤ -28dB

Receive Sensitivity (11b,20MHz) @8% PER	- 1Mbps	PER @ -93 dBm, typical
	- 2Mbps	PER @ -91 dBm, typical
	- 5.5Mbps	PER @ -87 dBm, typical
	- 11Mbps	PER @ -85 dBm, typical
Receive Sensitivity (11g,20MHz) @10% PER	- 6Mbps	PER @ -90 dBm, typical
	- 9Mbps	PER @ -89 dBm, typical
	- 12Mbps	PER @ -88 dBm, typical
	- 18Mbps	PER @ -85 dBm, typical
	- 24Mbps	PER @ -82 dBm, typical
	- 36Mbps	PER @ -79 dBm, typical
	- 48Mbps	PER @ -74 dBm, typical
Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0	PER @ -90 dBm, typical
	- MCS=1	PER @ -87 dBm, typical
	- MCS=2	PER @ -85 dBm, typical
	- MCS=3	PER @ -81 dBm, typical
	- MCS=4	PER @ -78 dBm, typical
	- MCS=5	PER @ -73 dBm, typical
	- MCS=6	PER @ -72 dBm, typical
	- MCS=7	PER @ -70 dBm, typical
Receive Sensitivity (11n,40MHz) @10% PER	- MCS=0	PER @ -87 dBm, typical
	- MCS=1	PER @ -84 dBm, typical
	- MCS=2	PER @ -82 dBm, typical
	- MCS=3	PER @ -79 dBm, typical
	- MCS=4	PER @ -75 dBm, typical
	- MCS=5	PER @ -71 dBm, typical
	- MCS=6	PER @ -69 dBm, typical
	- MCS=7	PER @ -68 dBm, typical
Maximum Input Level	802.11b : -10 dBm	
	802.11g/n : -20 dBm	
Antenna Reference		

## 7. Pin Description and PCB size

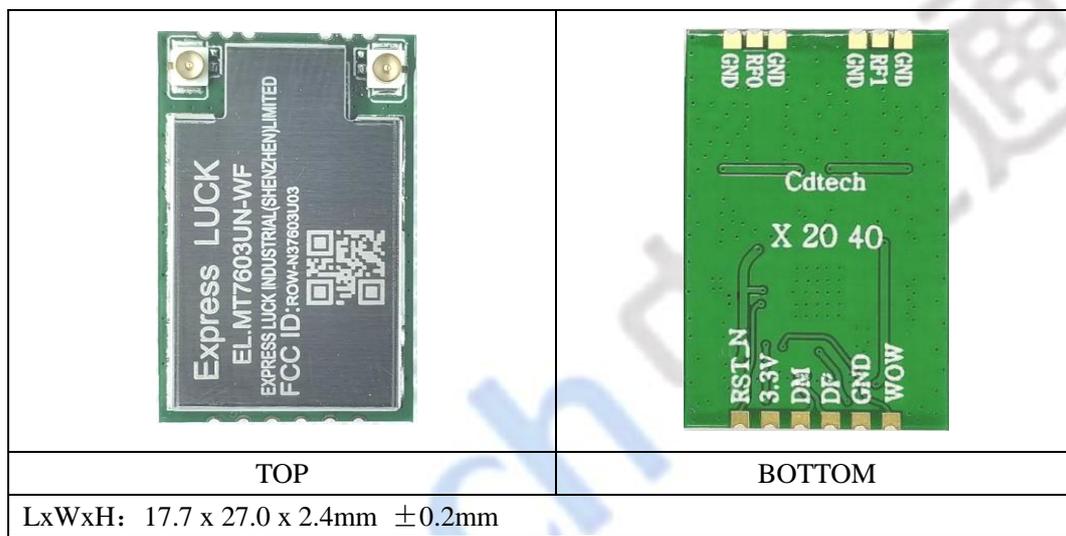


NO.	Symbol	Description
1	WOW	Wake up
2	GND	Ground connected
3	UDP	USB positive differential data lines
4	UDM	USB negative differential data lines
5	3.3V	Power supply 3.3V is required
6	RST_N	Reset
7	GND	Ground connected
8	RF0	NC
9	GND	Ground connected
10	GND	Ground connected
11	RF1	NC
12	GND	Ground connected

### 8. Modular photo

Corresponding to the material	specifications	suppliers
Crystal	40Mhz	JWT, FK, TXC
IC	MT7603U	MTK
PCBA VER	N37603U-03	A, 0

#### PCBA physical photo

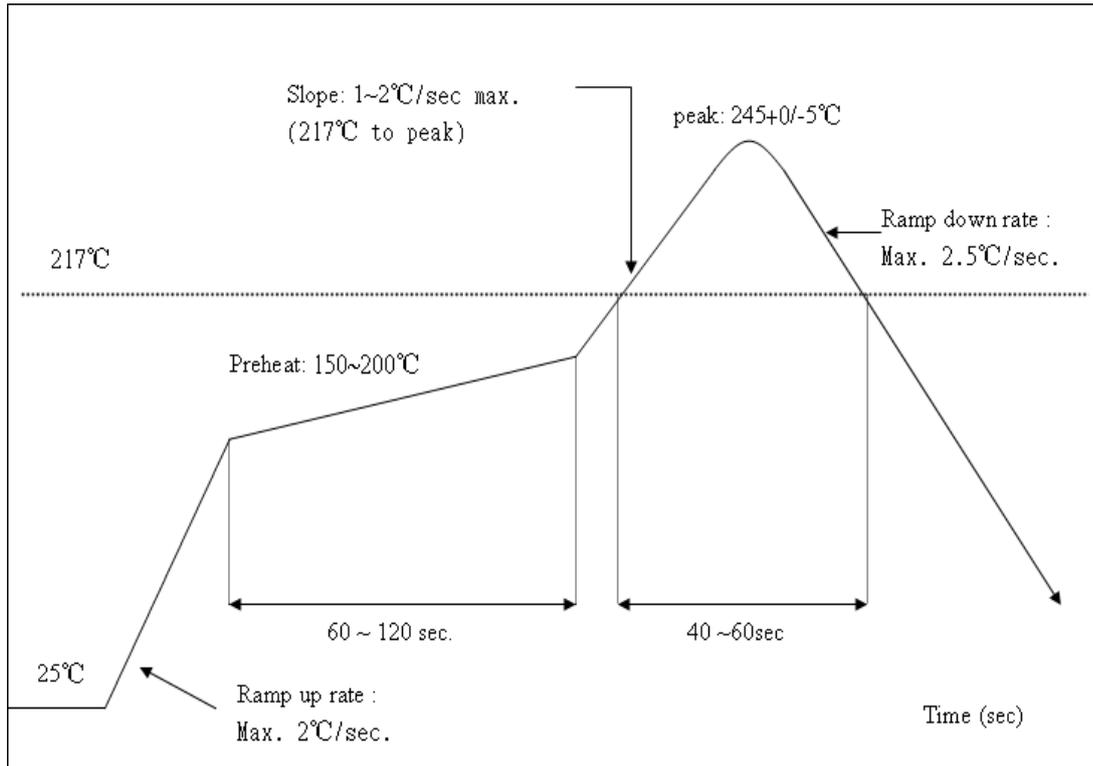


### 9. Recommended Reflow Profile

Referred PC/JEDEC standard.

Peak Temperature : <math> < 250^{\circ}\text{C}</math>

Number of Times : 2 times



**ESD CAUTION**

The CDW-N37603U-03 is ESD (electrostatic discharge) sensitive device and may be damaged with ESD or spike voltage. Although CDW-N37603U-03 is with built-in ESD protection circuitry, please handle with care to avoid the permanent malfunction or the performance degradation.

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## 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-N37603U03”

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## 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.<sup>3</sup>

**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) Measurement

### 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 has two IFA antenna, Yes, the module contains a permanently attached antenna, The antenna gain is 2.3dBi.

### 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

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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.

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## 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-N37603U03.

## 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 two IFA antenna, Yes, the module contains a permanently attached antenna, The antenna gain is 2.3dBi.

## 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-N37603U03

## 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.

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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:** WiFiRanger, A LinOra Company 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.