tuya | Global Intelligent Platform

Product Manual

Tuya TCLWRQS1 Wi-Fi Module

Version: 2.0.0 **Date: 2020-2-26** **No:**

1. Product Overview

TCLWRQS1 is a Wi-Fi module developed by Hangzhou Tuya Inc ,which takes the communication with 5V TTL signal . It consists of a highly integrated RF chip (RTL8710BN)、external Flash IC and DC-DC components, It embedded with Wi-Fi network protocol stack and robust library functions，Besides it also contains with a low-power ARM-CM4 MCU, 2 MB flash memory, 256KB SRAM, WLAN MAC，1T1R WLAN and rich peripheral resources.

1.1 Features

✧ Embedded with32 bit CPU, which can be used as an application processor

- Dominant frequency: up to 125 MHz

✧Working voltage: 5 V

✧Peripherals: 1*UART (5V TTL)

✧Wi-Fi connectivity

- 802.11b/g/n/HT20/HT40
- Channels 1 to 14 at 2.4 GHz(Ch1-11 for US/CA,Ch1-13 for EU/CN)
- WPA, WPA2, WEP, and TKIP security modes
- Up to +17 dBm Avg output power in 802.11b mode
- STA, AP, and STA+AP working modes
- Smart and AP network configuration modes (for Android and iOS devices)
- PCB On board antenna
- Working temperature: –20°C to 85°C

1.2 Applications

✧Intelligent building

✧Smart household and home appliances

✧Industrial wireless control

✧Handheld device

Change History

No.	Date	Change Description	Version After Change
1	2020-2-25	First release.	2.0.0

Contents

Figures & Tables

2 Module Interfaces

2.1 Dimensions and Footprint

TCLWRQS1 dimensions: 49.3mm±0.35mm(L)×30.8±0.35mm(W) ×7.8±0.15mm (H).

Note :(H) is the total height of Bottom surface components and Top surface components of the transfer plate

Figure 1, Figure 2 shows the TCLWRQS1 dimensions.

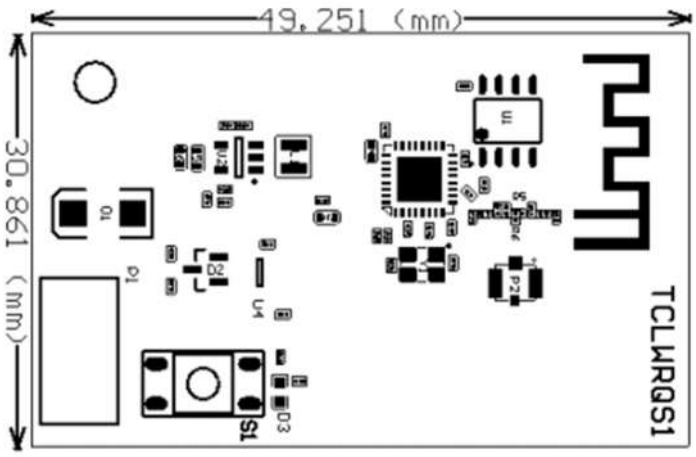


Figure 1 TCLWRQS1 front views

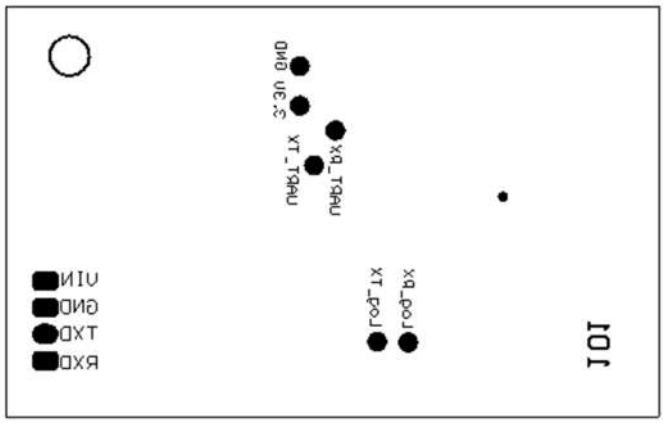


Figure 2 TCLWRQS1 back views

2.2 Pin Definition

Table 1 describes the interface pins.

Table 1 TCLWRQS1 interface pins

No.	Symbol	I/O Type	Function
1	Vin	P	Power supply pin 5v input
2	GND	P	Power supply reference ground pin
3	TXD	I/O	TX port, output 5V TTL
4	RXD	I/O	RX port, input 5V TTL

Note: P indicates power-supply pins, I/O indicates input and output pins.

2.3 Test Pin Definition

Table 2 describes the test pins.

Table 2 TCLWRQS1 test pins

No.	Symbol	I/O Type	Function
1	3.3V	P	Internal 3.3V Power pin for downloading and authorizing
2	GND	P	Internal GND pin
3	UART_Rx	I/O	Used for authorization
4	UART_Tx	I/O	Used for authorization
5	Log_Tx	I/O	Log Tx，Used for debugging to print the log information
6	Log_Rx	I/O	Log Rx，Used for debugging to print the log information
7		-	Used for RF test

Note: Test pins cannot be used.

3 Electrical Parameters

3.1 Absolute Electrical Parameters

Table 3 Absolute electrical parameters

Parameter	Description	Minimum Value	Maximum Value	Unit
Ts	Storage temperature	–20	85	°C
VBAT	Power supply voltage	-	5.5	V
Static electricity voltage (human body model)	Tamb = 25°C	N/A	2	kV
Static electricity voltage (machine model)	Tamb = 25°C	N/A	0.5	kV

3.2 Electrical Conditions

Table 4 Normal electrical conditions

Parameter	Description	Minimum Value	Typical Value	Maximum Value	Unit
Ta	Working temperature	–20	N/A	85	°C
VBAT	Power supply voltage	4.5	5	5.5	V
VIL	IO negative level input	-0.3	-	VCC*0.25	V
VIH	IO positive level input	VCC*0.75	-	VCC	V
VOL	IO negative level output	-	-	VCC*0.1	V
VoH	IO positive level output	VCC*0.8	-	VCC	V
Imax	IO drive current	-	-	12	mA

3.3 RF Current

Table 5 Current during constant transmission and transmitting

Working Status	Parameter			Typical Value	Unit
	Mode	Rate	TX Power		
TX	802.11b	11 Mbit/s	18.76 dBm	270	mA
	802.11g	54Mbit/s	17.48 dBm	255	mA
	11n BW20/BW40	Mcs7	16.56dBm	235	mA

3.4 Wi-Fi RX Power Consumption

Table 6 RX power consumption during constant receiving

Symbol	Mode	Rate	Typical Value	Unit
I_{RF}	CPU Sleep	11 Mbit/s	90	mA
I_{RF}	CPU Active	54 Mbit/s	120	mA

3.5 Working Mode Current Consumptions

Table 7. Working current consumption

Mode	AT TA=25℃	Typical	Max*	Unit
EZ Mode	Module is under EZ paring mode, wifi indicator light flashes quickly	95	245	mA
AP Mode	Module is under AP paring mode, wifi indicator light flashes slowly	88	150	mA
Operation Mode	Module is connected, wifi indicator light is on	45	220	mA

Note：the above parameters are different according to the firmware functions.

4 RF Features

4.1 Basic RF Features

Table 8 Basic RF features

Parameter	Description
Frequency band	2400 GHz to 2483.5 MHz
Wi-Fi standard	IEEE 802.11b/g/n20 /n40(channels FCC:1-11 CE:1-13)
Data transmission rate	802.11b: 1, 2, 5.5, or 11 (Mbit/s) 802.11g: 6, 9, 12, 18, 24, 36, 48, or 54 (Mbit/s) 802.11n: HT20 MCS0 to MCS7 802.11n: HT40 MCS0 to MCS7
Antenna type	Onboard PCB antenna

4.2 Wi-Fi Output Power

Table 9 TX power during constant emission

Parameter		Minimum Value	Typical Value	Maximum Value	Unit
Average RF output power, 802.11b CCK mode	1 Mbit/s	N/A	18.76	N/A	dBm
Average RF output power, 802.11g OFDM mode	54 Mbit/s	N/A	17.48	N/A	dBm
Average RF output power, 802.11n OFDM mode	MCS7	N/A	16.65	N/A	dBm
Frequency error		–20	N/A	20	ppm

4.3 Wi-Fi RX Sensitivity

Table 10 RX sensitivity

Parameter		Minimum Value	Typical Value	Maximum Value	Unit
PER < 8%, 802.11b CCK mode	1 Mbit/s	N/A	–90	N/A	dBm
PER < 10%, 802.11g OFDM mode	54 Mbit/s	N/A	–73	N/A	dBm
PER < 10%, 802.11n OFDM mode	MCS7	N/A	–70	N/A	dBm

5 Antenna Information

5.1 Antenna Type

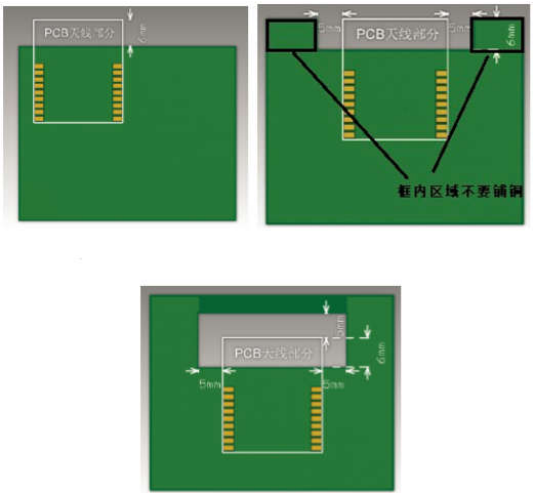
TCLWRQS1 uses the onboard PCB antenna.

5.2 Antenna Interference Reduction

To ensure optimal Wi-Fi performance when the Wi-Fi module uses an onboard PCB antenna, it is recommended that the antenna be at least 15 mm away from other metal parts.

To prevent adverse impact on the antenna performance, do not use copper or route cables along the antenna area on the PCB.

For details about the onboard PCB antenna area on a module, see Figure 3.



5.3 Antenna Connector Specifications

There is no antenna connector for this module

6. Packaging Information and Production Instructions

6.1 Mechanical Dimensions

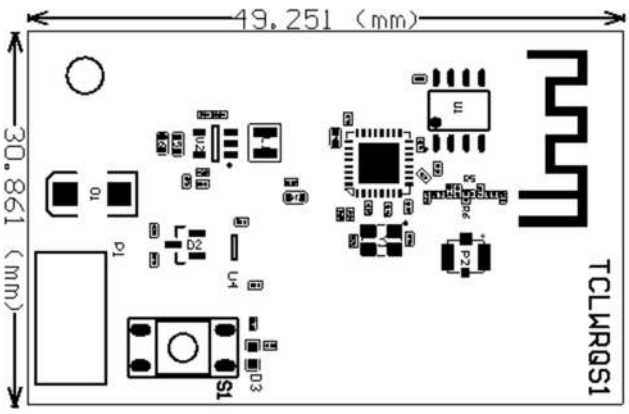


Figure 3 TCLWRQS1 mechanical dimension

6.2 Production Instructions

1. Storage conditions for a delivered module are as follows:

   (1) The moisture-proof bag is placed in an environment where the temperature is below 30°C and the relative humidity is lower than 70%.

   (2) The shelf life of a dry-packaged product is six months from the date when the product is packaged and sealed.

   Attention:

   (1) In the whole process of production, operators at all stations must wear electrostatic rings.If the 30% circle is pink, bake the module for 4 consecutive hours.

   (2) During operation, strictly prevent water or dirt from touching the module

7 MDQ and Packing Information

MOQ and packing information				
Product Model	**MOQ**	**Packing Method**	**Number of Modules in Each Reel Pack**	**Number of Reel Packs in Each Box**
TCLWRQS1		Tray		

8 Appendix: Statement

Federal Communications Commission (FCC) Declaration of Conformity

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.

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.

Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled rolled

environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

Important Note

This radio module must not installed to co-locate and operating simultaneously with other radios in host system except in accordance with FCC multi-transmitter product procedures. Additional testing and equipment authorization may be required to operating simultaneously with other radio.

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 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. The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

The end user manual shall include all required regulatory information/warning as shown in this manual, including: This product must be installed and operated with a minimum distance of 20 cm between the radiator and user body.

This device have got a FCC ID：2ANDL-TCLWRQS1.The final end product must be labeled in a visible area with the following: “Contains Transmitter Module FCC ID:2ANDL-TCLWRQS1”

This device is intended only for OEM integrators under the following conditions:

1)The antenna must be installed such that 20cm is maintained between the antenna and users, and

2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

Declaration of Conformity European notice

Hereby, Hangzhou Tuya Information Technology Co., Ltd declares that this module product is in compliance with essential requirements and other relevant provisions of Directive 2014/53/EU,2011/65/EU.A copy of the Declaration of conformity can be found at https://www.tuya.com

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This product must not be disposed of as normal household waste, in accordance with EU directive for waste electrical and electronic equipment (WEEE- 2012/19/EU). Instead，it should be disposed of by returning it to the point of sale, or to a municipal recycling collection point.