

SPECIFICATIONS

Product

Specification

model: TL7100C

specification: URAT Interface

version: V1.0

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Approve:

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Version and modified content

version	Release date	Modify content	Modifier	Remarks
V1.0	2020/12/08	Initial Release		

一. Overview:

TG7100C is a smart new generation of highly integrated Wi-Fi and BLE combo chip. The wireless subsystem includes 2.4G radio frequency, Wi-Fi 802.11b/g/n and BLE baseband/MAC design. The microcontroller subsystem contains a low-power 32-bit RISC CPU, cache and memory. The power management unit provides flexible settings to achieve low power consumption mode and supports a variety of safety functions. This Demo board is based on the TG7100C design and can be debugged with JTAG. It provides rich hardware interfaces including UART, PWM, ADC, DAC, I2C, SPI, GPIO, SDIO and so on.

二. Product Features:

802.11b/g/n, Wi-Fi+BLE5.0 Combo, support STA, Soft AP and Sniffer mode

Adopting open source and self-controllable RISC-V CPU, adjustable from 1 to 160MHz, 276KB SRAM

Ultra-low power consumption: sleep power consumption is only 0.5uA, network standby power consumption is only 40uA (DTIM10)

Ultra-fast connection: cold start fast connection only 70ms

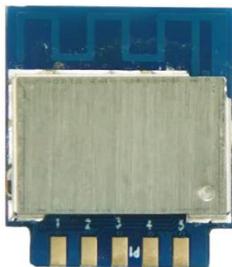
Ultra-long distance: The maximum transmit power is 21dBm, the sensitivity is -98dBm, and it can penetrate a wall more.

High security: support secure boot, secure debugging, AES 128/192/256 encryption engine, WPA3, MD5, SHA-1/224/256, PKA (RSA/ECC) encryption engine

Support Wi-Fi and BLE coexistence

三. Product Image

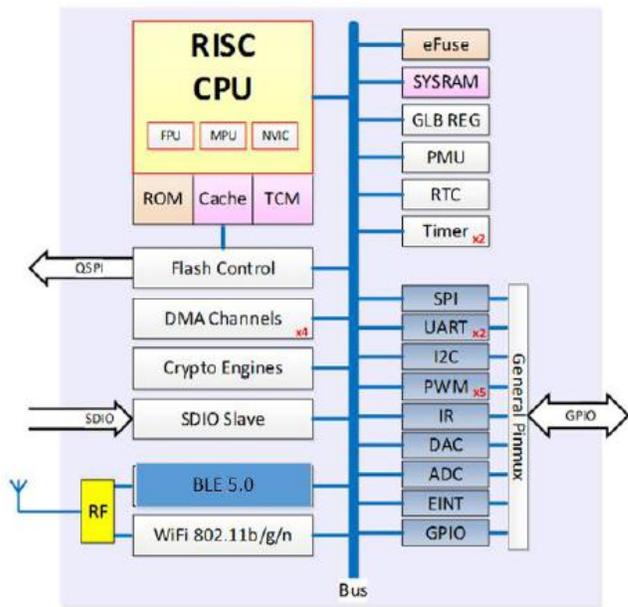
positive



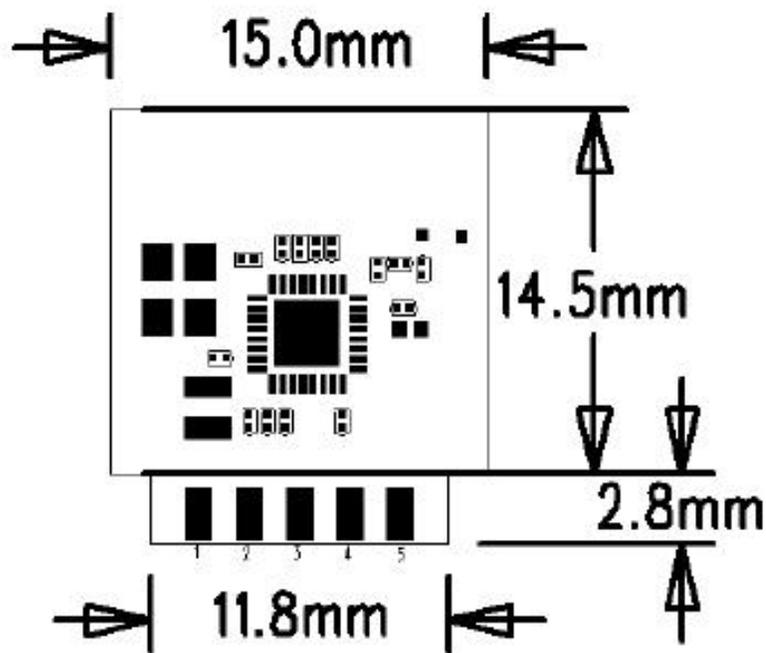
Negative



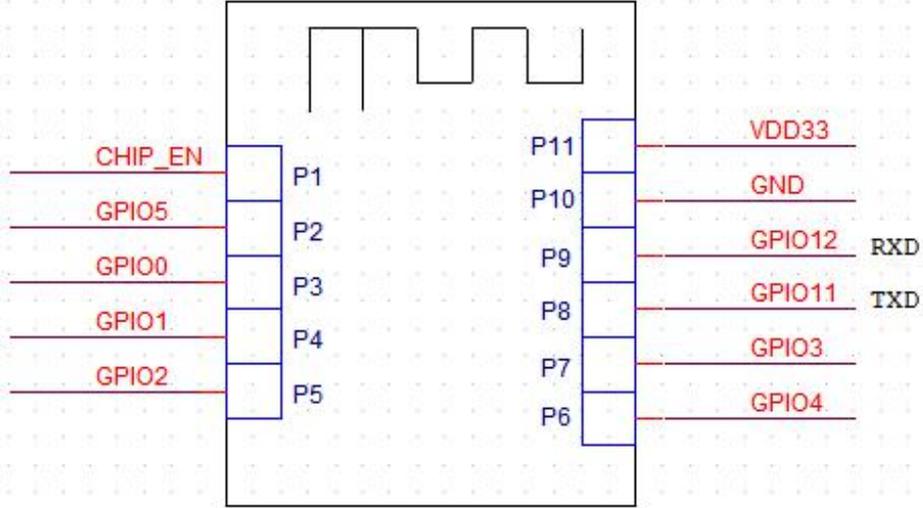
四. Chip block diagram:



五. Module size chart



六. Pin definition



NO	Name	Description
1	CHIP_EN	Chip enable pin (active high)
2	GPIO5	ADC
3	GPIO0	PWM
4	GPIO1	PWM
5	GPIO2	PWM
6	GPIO4	PWM
7	GPIO3	PWM
8	GPIO11	UART0_TXD
9	GPIO12	UART0_RXD
10	GND	Ground connections
11	VCC	Power supply. 3.3V is required

七. Product technical specifications

Index item	description
product name	TL7100C
main chip	TG7100C
Interface method	URAT
Working frequency	2.4~2.4835GHz
Wireless standard	IEEE 802.11b/g/n BLE
Modulation	802.11b: CCK, DQPSK, DBPSK 802.11g: 64-QAM, 16-QAM, QPSK, BPSK 802.11n: 64-QAM, 16-QAM, QPSK, BPSK BLE: GFSK
Wireless transmission rate	1, 2, 5.5, 6, 11, 12, 18, 22, 24, 30, 36, 48, 54, 65, 72.2Mbps
Standard sizes	24.0*16.0*2.8mm (L*W*H)
Operating Voltage	DC 3.3V
Encryption	AES 128/192/256 、WPA3 、MD5 、SHA-1/224/256 、PKA (RSA/ECC)
Operating temperature	-45° C to +85° C
Storage temperature	-55° C to +85° C
Antenna type and gain	PCB Antenna and 2.36db

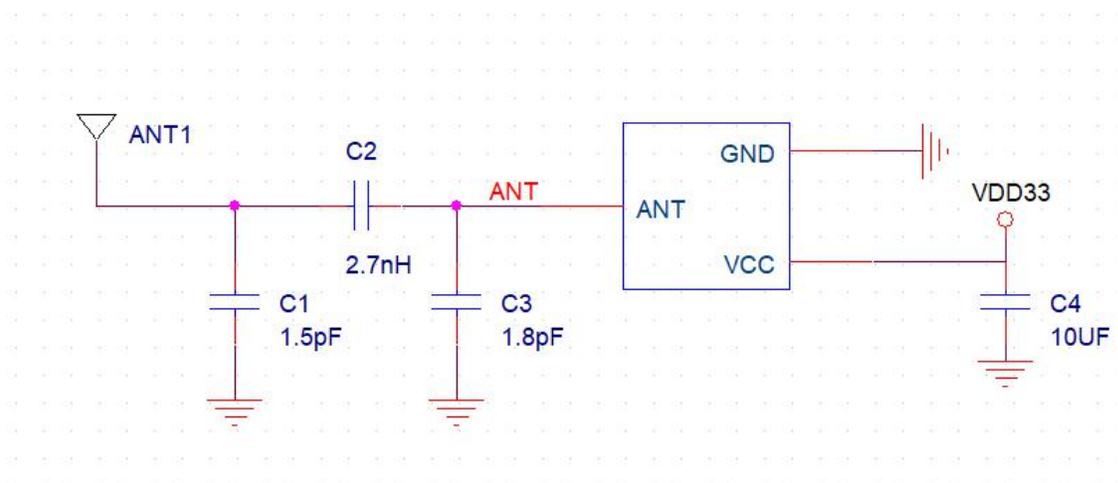
八. RF technical parameters

Transmit power	802.11b: 17 ± 1.5 dBm
	802.11g: 15 ± 1.5 dBm
	802.11n HT20: 13 ± 1.5 dBm
Vector error (EVM)	802.11b: < -20 dB@11Mbps
	802.11g: < -27 dB@54Mbps
	802.11nHT20: < -28 dB@65Mbps
Receiving sensitivity	11b-1Mbps: -98dBm
	11b-11Mbps: -91dBm
	11g-54Mbps: -77dBm
	11n HT20-MCS0: -92dBm
	11n HT20-MCS7: -73dBm
BLE TX	1Mbps: 9dBm
BLE RX	1Mbps: -97dBm

九. DC power consumption

VCC3.3V , TA=25°C, unit:mA		
Mode	TX/RX	Current Max
802.11b (11Mbps)	TX	140
	RX	35
802.11g (54Mbps)	TX	121
	RX	37
802.11n (MCS7)	TX	109
	RX	37
BLE 1Mbps	TX	65
	RX	22

十. Peripheral reference circuit



十一. PCB design requirements

The RF output pins are impedance matched inside the chip. It is recommended to reserve a matching network during circuit design, which is mainly used for antenna impedance matching. It is recommended to use the π -type (CLC) matching network structure for the configuration and spurious harmonic suppression. The specific network component parameters need to be based on the actual antenna design and PCB. The impedance characteristic is debugged.

The RF trace requires 50Ω single-ended impedance control, and both sides and the lower layer of the trace must ensure a complete reference ground plane. The width of RF traces should be consistent,

The length of the trace should be as short as possible, try to use 135° angle trace or arc trace, and there should be relatively dense grounding hole shielding around it. On the RF trace

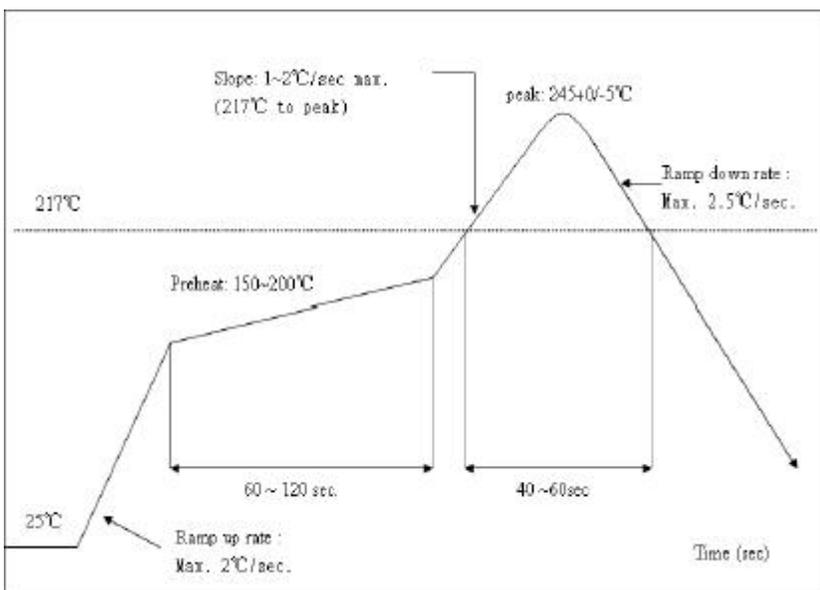
Reserve a π -type matching circuit and place it close to the chip end.

RF wiring accessories try to avoid high-speed signal lines to prevent crosstalk.

十二. Nvironmental requirements

Operating temperature	Temperature: -45°C to +85°C
	Relative Humidity: 10-90% (non-condensing)
storage temperature	Temperature: -55°C to +85°C (non-condensing)
	Relative Humidity: 10-90% (non-condensing)

Standard temperature of reflow soldering



十三. Packaging Information

Tray color: blue, size: 42cm*34cm*35cm (carton packaging) 1 box of tape packaging 3000PCS;
 Vacuum packaging contains 2 bags of 2g desiccant and a 6-color humidity card;
 Other unfinished matters shall be packaged according to customer requirements.



Use vacuum reel packaging;

Reel color: blue, size: 33.7cm*33.7cm*9.5cm (carton packaging) 1 carton packaging 3 reels 1 box
 reel packaging 2000PCS;

Vacuum packaging contains 2 bags of 2g desiccant and a 6-color humidity card;
 Other unfinished matters shall be packaged according to customer requirements.



Remarks: Customers can choose the packaging method according to their needs.

This module is non-restrictive

List of applicable FCC rules: FCC Part 15 Subpart C, Section 15.247

Information on test modes and additional testing requirements

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

RADIATED EMISSION TEST (BELOW 1GHz):

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports (if EUT with antenna diversity architecture).

For the test results, only the worst case was shown in test report.

RADIATED EMISSION TEST (ABOVE 1GHz):

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports (if EUT with antenna diversity architecture).

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.

Federal Communication Commission Statement (FCC, U.S.)

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 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.

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.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

FCC INFORMATION (additional)

OEM INTEGRATION INSTRUCTIONS:

This device is intended only for OEM integrators under the following conditions: The module must be installed in the host equipment such that 20 cm is maintained between the antenna and users, and the transmitter module may not be co-located with any other transmitter or antenna. The module shall be only used with the internal antenna(s) that has been originally tested and certified with this module. As long as 3 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 (for example, digital device emissions, PC peripheral requirements, etc.).

Validity of using the module certification:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization for this module in combination with the host equipment is no longer considered valid and the FCC ID of the module cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

Module label:

FCC ID: 2AYHW-TL7100C

The final end product must be labeled in a visible area with the following: "Contains FCC ID:2AYHW-TL7100C". Information that must be placed in the end user manual:

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

The module not applicable Limited module procedures. The module is a Single module and complies with the requirement of FCC Part15.247

The module has its own antenna , and doesn't need a host's printed board microstriptrace antenna etc, Not applicable Trace antenna designs