

TP300 Bluetooth Module Specification Document

CDI-WC46600A-01

IOT WiFi6+BLE5.0 Module Spec

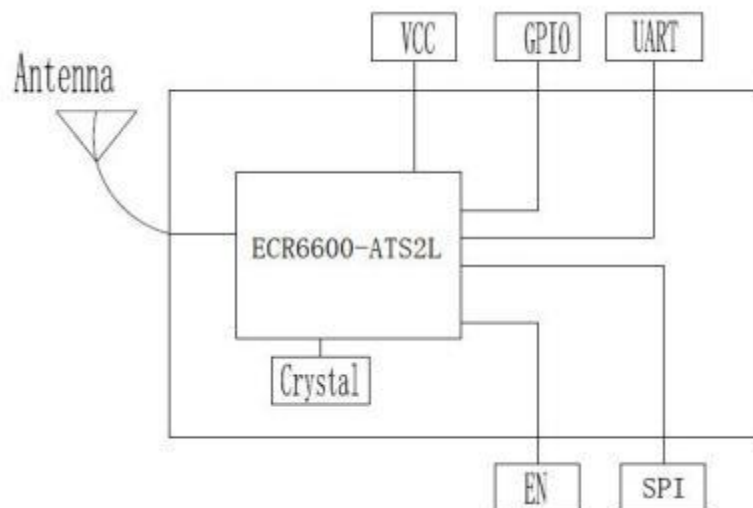
(UART, 1 antenna type, with shielding)

1. Overview

CDI-WC46600A-01 is a Wi-Fi + BLE module independently developed by Cdtech based on the ECR6600-ATS2L chip.

ECR6600-ATS2L is a SoC chip designed for smart home IoT terminal devices, supporting Wi-Fi 802.11b/g/n/ax and BLE 5.1 protocols. It includes a power management module, power amplifier, low-noise amplifier, and transceiver switch.

ECR6600-ATS2L adopts a RISC processor architecture, has ample storage space, rich peripheral interfaces, a more secure encryption mechanism, an on-chip FullMAC architecture, and a wider operating temperature range.



2. Characteristics

Wi-Fi Features

- Supports IEEE 802.11 b/g/n/ax
- Supports Full MAC, including LMAC and UMAC
- Supports SoftAP, STA, and Wi-Fi direct connection mode
- Supports WMM QoS
- Supports 0.8/1.6/3.2 us security protection intervals
- Supports 802.11 ax MCS0 - MCS7
- The maximum bit rate reaches 150 Mbps
- Both uplink and downlink support MU-OFDMA (STA is supported)
- STA supports beamforming (STA acts as the Beamformer)
- Supports Mid-amble
- Supports 20 M and 40 M bandwidth. 802.11ax only supports 20 M bandwidth.
- Supports dual carrier modulation (Dual Carrier Modulation, DCM)

BLE Feature

- Supports BLE 5.1 protocol (does not support AOA/AOD)
- Supports single-device BLE connection
- Supports synchronous broadcasting and scanning
- Supports enhanced power control
- Output power up to +8 dBm
- Supports adaptive frequency hopping (AFH)
- Supports asynchronous data sending and receiving
- Supports connection parameter update
- Supports extensible data packet length
- Supports link layer encryption
- Supports LE ping

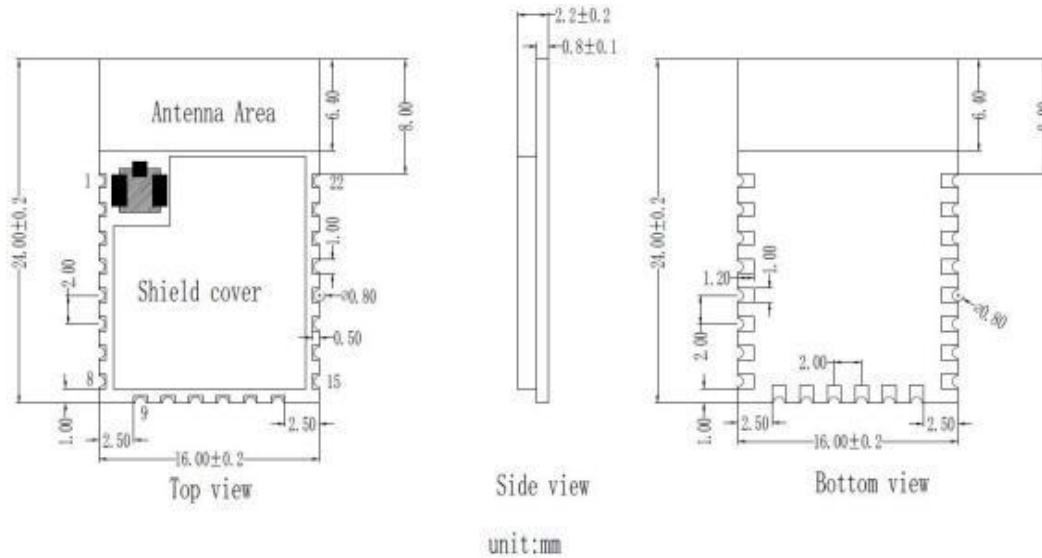
The Wi-Fi subsystem and BLE subsystem share the radio part, including ADC/DAC/PLL. Wi-Fi and BLE can only have one working at a time.

3. General Specification

Module model	CDI-WC46600A-01
WLAN standard	IEEE 802.11b/g/n/ax Wi-Fi6 and BLE 5.1
Main chip model	ECR6600-ATS2L
Modulation system	802.11b(DSSS):CCK(11,5.5Mbps),DQPSK(2Mbps),DBPSK(1Mbps) 802.11g(OFDM):BPSK(9,6Mbps),QPSK(18,12Mbps), 16QAM(36,24Mbps),64QAM(54,48Mbps) 802.11n(OFDM):BPSK,QPSK,16QAM,64QAM(65Mbps) 802.11ax(OFDMA)/64-QAM BLE(GFSK/4-DQPSK 8-DPSK)
Channel bandwidth	WIFI:20MHz/40MHz BLE:2MHz
The basic transmission rate	WIFI 802.11b:11,5.5,2,1 Mbps WIFI 802.11g:54,48,36,24,18,12,9,6 Mbps WIFI 802.11n:up to 72Mbps(20MHZ);up to 150Mbps(40MHZ) WIFI 802.11ax:up to 150Mbps(20MHZ) BLE:1Mbps
Frequency range	WiFi:2400~2483.5MHZ BT: 2402~2480MHZ
Output power	11b_11M:17±2dBm 11g_54M:15±2dBm 11n(20M)_MCS7:14±2dBm 11n(40M)_MCS7:13±2dBm 11ax(20M):14±2dBm BLE(1M):8±2dBm
Receive sensitivity	11b CCK11(PER<8%)< -76dBm 11g OFDM54(PER<10%) < -65dBm 11n HT20 MCS7(PER<10%) < -64dBm 11n HT40 MCS7(PER<10%) < -61dBm 11ax HT20 MCS7(PER<10%) < -52dBm BLE Receiving Sensitivity@ 1Mbit/s < -87dBm
Wi-Fi interface	UART
Encryption protocol	WEP/WPA-PSK/WPA2-PSK
Supply current	Min: 500 mA
Operating Ambient temperature	-40~ +85°C ambient temperature

Storage Environment temperature	-40 ~ +125°C ambient temperature
Work environment humidity	5 to 90 % maximum (non-condensing)
PCBA size	24 x 16 x 2.2mm (LxWxH) ±0.2mm

4. Pin description and PCBA size

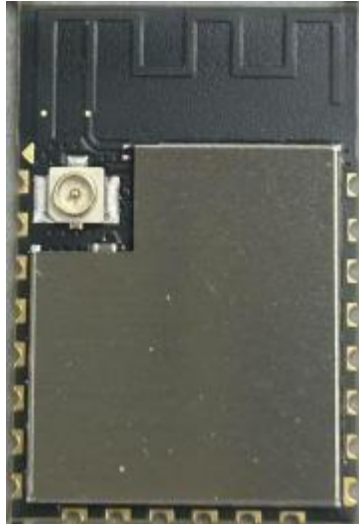


NO	NAME	DESCRIPTION
1	RESET_B	EST MODE
2	GPIO23	General-purpose GPIO
3	EN	Module Enable Pin (Requires Pull-Up)
4	GPIO22	General-purpose GPIO
5	GPIO13	General-purpose GPIO, UART2_TX (application port)
6	GPIO21	General-purpose GPIO
7	GPIO25	General-purpose GPIO
8	VCC	Module power supply (+3.3V)
9	GPIO24	General-purpose GPIO
10	GPIO17	General-purpose GPIO, UART2_RX (application port)
11	GPIO16	General-purpose GPIO
12	GPIO4	General-purpose GPIO
13	GPIO3	SPI_MISO; General-purpose GPIO
14	GPIO2	SPI_MISO; General-purpose GPIO
15	GND	GND
16	GPIO1	SPI_CS; General-purpose GPIO
17	GPIO0	SPI_CLK; General-purpose GPIO
18	GPIO20	General-purpose GPIO

19	GPIO15	General-purpose GPIO
20	GPIO14	General-purpose GPIO
21	GPIO5	General-purpose GPIO, UART0_RX (debugging port)
22	GPIO6	General-purpose GPIO, UART0_TX (debugging port)

Note: Method for downloading the module: VCC, GND, EN (pull-up), UART0_TX, UART0_RX, RESET_B (connected to the RTS of the serial port)

5. Module physical picture



6. Bill of materials

Secondary supplier list	
Material name	Supplier brand
WiFi IC	ESWIN
Crystal	FK,TKD,JWT,KYX
PCBA	A, T, P, N
Power inductance	Sunlord, CHILISIN, INPAQ,DDY
Capacitance	SAMSUNG /EYANG
Resistance	UniOhm /YAGEO/Walsin

7. electrical characteristics

7.1. Direct-current characteristic

Arguments		Minimum value	Standard values	Maximum value	Units	
C _{IN}	Pin capacitance		2		pf	
V _{IH}	High-level input voltage	0.7vdd		vdd	V	
V _{IL}	Low-level input voltage	0		0.3vdd		
I _{IH}	High-level input current	-10		10	uA	
I _{IL}	Low-level input current	-10		10	uA	
V _{OH}	High-level output voltage	0.9vdd			V	
V _{OL}	Low-level output voltage			0.1vdd	V	
I _{OH}	High-level source current	4 mA	2	3.2	5	mA
I _{OL}	Low-level sink current	4 mA	4	5.2	7	mA
R _{PU}	Pull-up resistor	66K	81.1k	110k		Ω
R _{PD}	Pull-down resistor	55k	62.7k	82.5k		Ω

7.2. Suggested working conditions

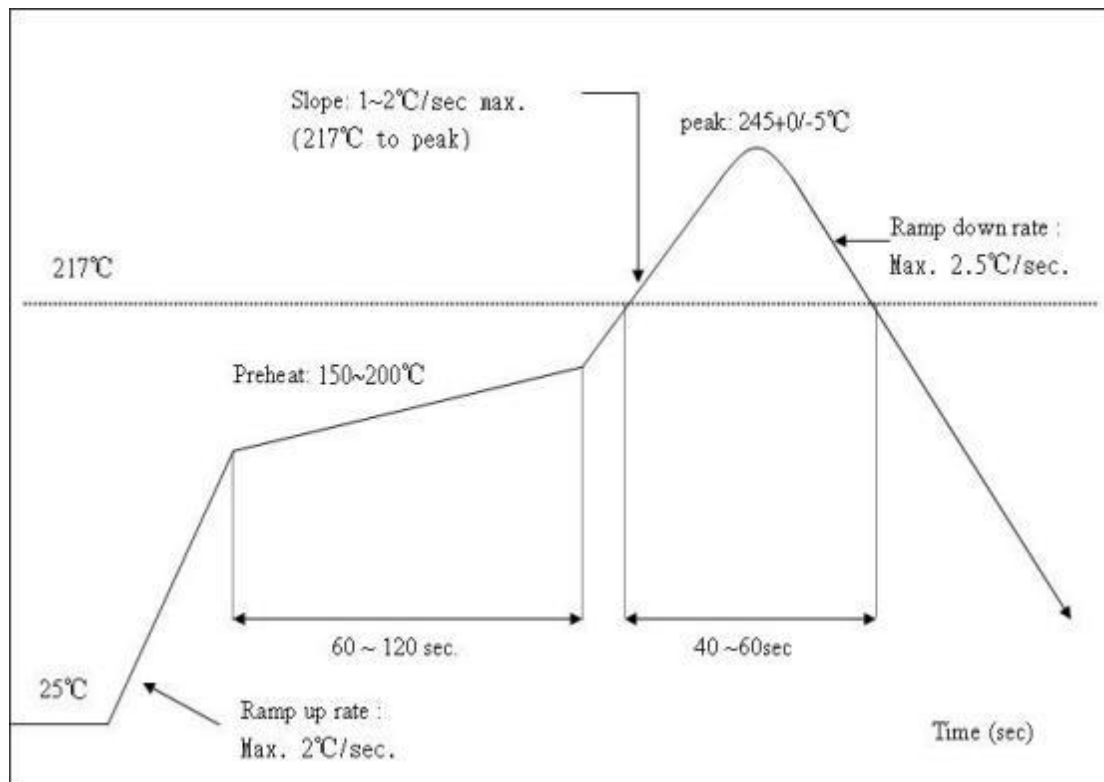
Arguments	Pin name	Minimum value	Typical value	Maximum value	Units
Operating voltage	vcc-pin	3	3.3	3.6	V
Operating temperature		-40		85	°C

8. Reflow soldering curve graph

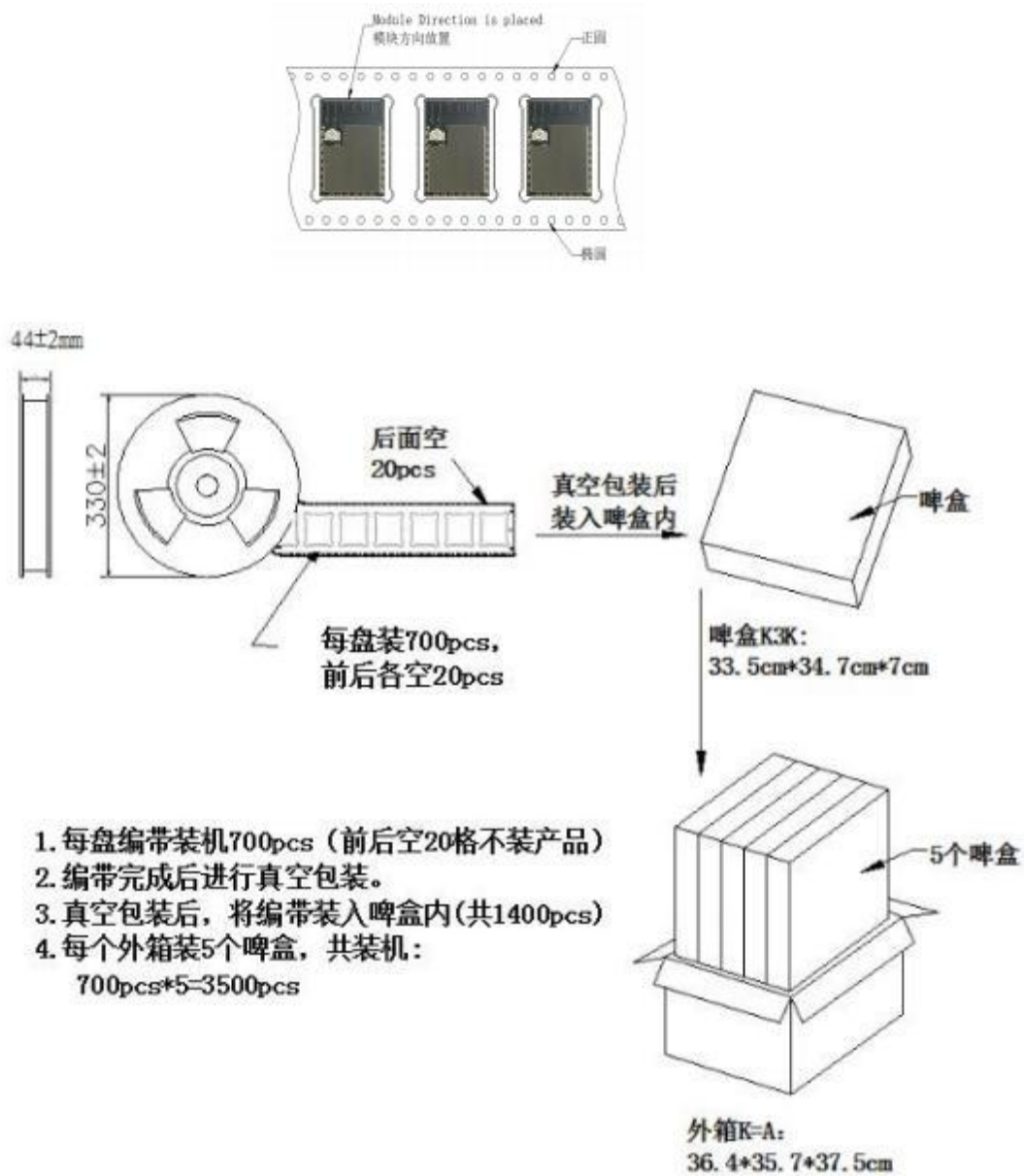
Referred IPC/JEDEC standard.

Peak Temperature : $<250^{\circ}\text{C}$

Number of Times : ≤ 2 times



9. package figure



WC46600A-01 is an ESD (Electrostatic Discharge) sensitive component. ESD or peak voltage may cause damage to the device. Although the WC46600A-01 has an internal ESD protection circuit, please handle it with care to avoid causing permanent damage or performance degradation.

10. Certification

Integration instructions for host product manufacturers according to KDB 996369 D03 OEM Manual v01r01

10.1. List of applicable FCC rules

CFR 47 FCC Part 15 Subpart C and Subpart C has been investigated. It is applicable to the modular transmitter

10.2. Specific Operational Use Conditions

Antenna Placement Within the Host Platform The module is tested for mobile RF exposure use condition..

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

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID 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.

10.3. Limited Module Procedures

Not applicable

10.4. Trace Antenna Designs

Not applicable

10.5. RF Exposure Considerations

This device complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This equipment should be mobile RF exposure use condition.

10.6. Antenna Type and Gain

The following antennas have been certified for use with this module.

Only antennas of the same type with equal or lower gain may also be used with this module.

Other types of antennas and/or higher gain antennas may require the additional authorization for operation.

10.7. End Product Labelling Compliance Information

When the module is installed in the host device, the FCC ID label must be visible through a window on the final device or it must be visible when an access panel, door or cover is easily removed. If not, a second label must be placed on the outside of the final device that contains the following text: "Contains FCC ID:2AATP-TP300".

The FCC ID can be used only when all FCC compliance requirements are met.

10.8. Information on Test Modes and Additional Testing Requirements

This transmitter is tested in mobile RF exposure condition and any co-located or simultaneous transmission with other transmitter(s) class II permissive change re-evaluation or new FCC authorization.

Host manufacturer installed this modular with single modular approval should perform the test of radiated emission and spurious emission according to FCC part 15C, 15.209, 15.207 requirement, only if the test result comply with FCC part 15C, 15.209, 15.207 requirement, then the host can be sold legally.

10.9. Additional testing, Part 15 Subpart B Disclaimer

This transmitter modular is tested as a subsystem and its certification does not cover the FCC Part 15 Subpart B rules requirement applicable to the final host. The final host will still need to be reassessed for compliance to this portion of rules requirements if applicable.

As long as all 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 modular installed.

10.10. Manual Information to The End User

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 host integrator must follow the integration instructions provided in this document and ensure that the composite system end product complies with the requirements by a technical assessment or evaluation to the rules and to KDB Publication 996369.

The host integrator installing this module into their product must ensure that the final composite product complies with the requirements by a technical assessment or evaluation to the rules, including the transmitter operation and should refer to guidance in KDB Publication 996369.

OEM/Host Manufacturer Responsibilities

OEM/Host manufacturers are ultimately responsible for the compliance of the Host and Module.

The final product must be reassessed against all the essential requirements of the FCC rule such as FCC Part 15 Subpart B before it can be placed on the US market. This includes reassessing the transmitter module for compliance with the Radio and RF Exposure essential requirements of the FCC rules.

10.11. How to Make Changes - Important Note

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID 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.

FCC Statement

This device is intended only for OEM integrators under the following conditions: 1) The antenna must be installed such that 20 cm is maintained between the antenna and user. 2) The transmitter module may not be co-located with any other transmitter or antenna.

Module Antenna Type: 2.4GHz onboard FPC Antenna, 2.68 dBi peak gain.

15.19

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. (2) This device must accept any interference received, including interference that may cause undesired operation.

15.21

Note: The grantee is not responsible for any changes or modifications not expressly approved by the party responsible for compliance. Such modifications could void the user's authority to operate the equipment.

15.105(b)

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.

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.

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The host integrator installing this module into their product must ensure that the final composite product complies with the requirements by a technical assessment or evaluation to the rules, including the transmitter operation and should refer to guidance in KDB Publication 996369.

OEM/Host manufacturers are ultimately responsible for the compliance of the Host and Module.

The final product must be reassessed against all the essential requirements of the FCC rule such as FCC Part 15 Subpart B before it can be placed on the US market. This includes reassessing the transmitter module for compliance with the Radio and RF Exposure essential requirements of the FCC rules.

RF 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 of 20 cm between the radiator and your body