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VLinK E901 2.4G WiFi 6 plus BLE 5.1 IOT Module Instructions

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VLinK E901 2.4G WiFi 6 plus BLE 5.1 IOT Module

INSTRUCTION MANUAL

E901 2.4G WiFi 6 +BLE 5.1
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Product Specification
802.11b/g/n/ax 1T1R WiFi +BLE Module
(ECR6600-TS2L)
Version Ver1.0

History

Document Release	Date	Modification	Initials	Approved
Version V1.0	2022/02/25			

E901 2.4G WiFi 6+BLE 5.1 Module

1 .Summarize

The E901WiFi 6 +BLES.1 IOT module uses ESWIN&IECR6600, a single-band 2.4GHz Combo (802.llax +BLES.1) chip line. It uses WiFi/BLE coexistence architecture, which can meet the re□irements of low latency, long distance and low power application scenarios at the same time, and pro@le big data transmission sercvice.

The ECR6600 uses built-in PM Us compatible with DC-DC/LDO modes, high-performance PA, and high-gain LNA and digital filters to improve power conversion efficiency, realize dynamic power output, and protect the device against interference in complex environments

The ECR6600 adopts lxl radio architecture, uses OFDMA technology to support multi-user access, optimizes data stream transmission based on lxl space, and the transmission rate can be increased by 25%.

On the safe side, the ECR6600 uses the WPA3 security mechanism to provide two-way authentication protection for smart home and mobile payment portals. In addition, the E901 has a simple design with a 24x16mm universal IOT module size that meets FCC/CE/SRRC certification requirements.

Advantage

Wi-Fi 6 co-exists with BLE 5.1 architecture

- Wi-Fi 6 Single band 2.4GHz SoC line,
- The driver supports RTOS and Linux, loaded with a Fully Host and Fully MAC respectively.
- Provides BLE 5.1-based Wi-Fi P2P networks with transmission bandwidth up to 40MHz and supports long protection intervals0
- Improve PA efficiency through digital predistortion technology; Low vector error (EVM}, high signal modulation

quality0

Graphical development interface

- Provide graphical user development interface, effectively save development time and cost;
- Peripheral streamlining reduces design costs

Telnet deag

Supports remote Telnet debugging, saving debugging time and cost and releasing the serial port

Authentication

- Complies with FCC/CE/SRRC certification

Up

- Multiple users access AP at the same time to perfectly solve the delay problem
- Dynamic bandwidth adjustment, which uses bandwidth rationally and efficiently performs long-distance transmission, improves home device deployment, and prolongs the distance by four times
- The TWT technology significantly reduces power consumption and prolongs battery life by seven times Long protection intervals can effectively reduce the multipath effect migrates data and moves the CSMA detection threshold
- BLE Rapid network distribution

Apply

- Based on Wi-Fi 6 and BLE 5.1 technologies, the E901 can be used in IoT and big data transmission scenarios:
- electrical, lighting, door locks
- wearable devices
- POS
- Appliances/Home Entertainment /Wi-Fi toys

2. EC R6600 Blocking Diagram
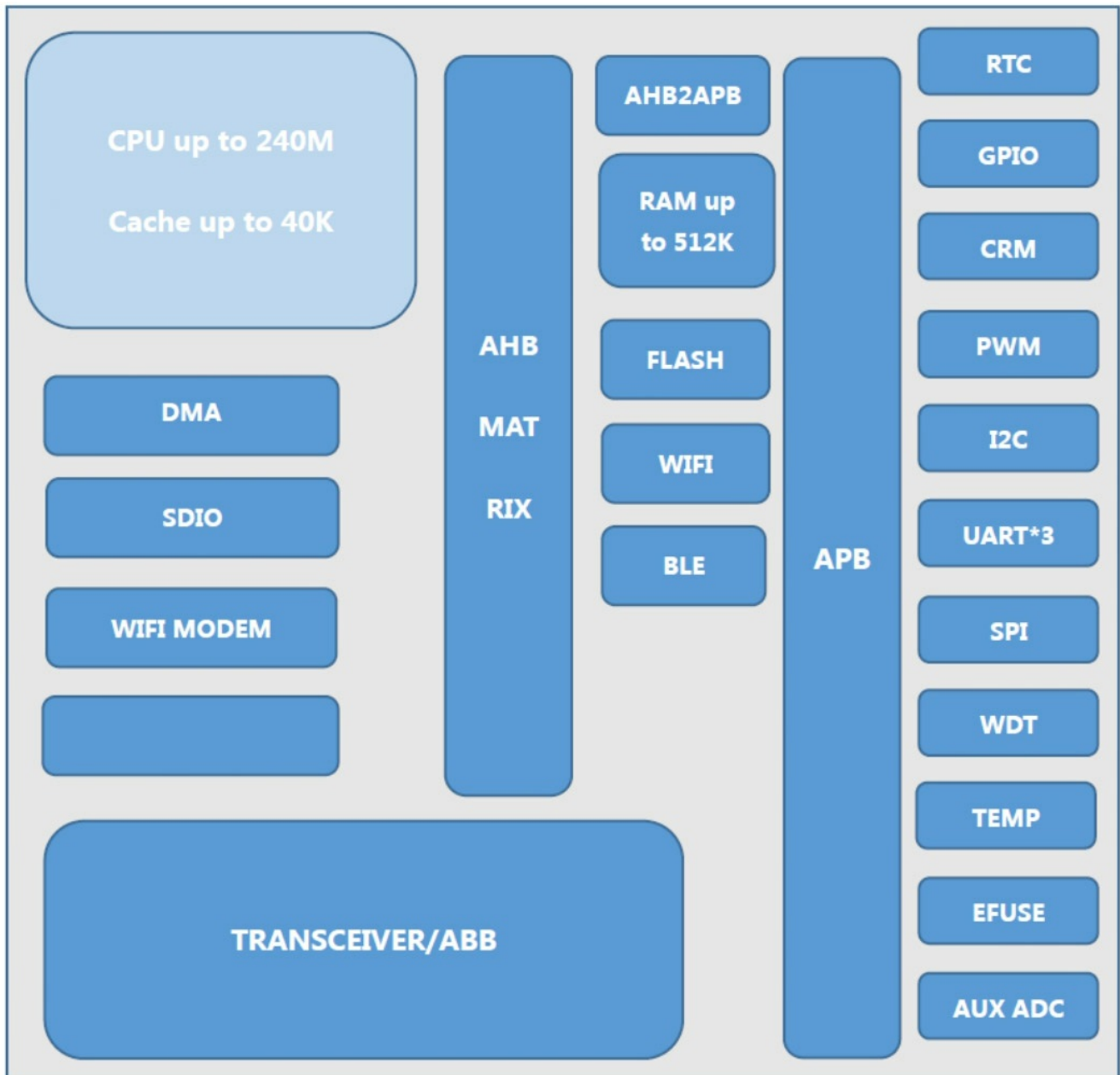
3. Main feature

Wi-Fi

- 2.4G IEEE 802.11 b/g/n/ax AHB2APB RAM up to 512K FLASH
- Greenfield mode, Mixed Modef□Legacy mode• SoftAP, STA, Wi-Fi Direct (P2P)
- RXSTBC
- PA, LNA, TRX Switch
- OFDMA, DCM
- All GI, TWT
- Dynamic bandwidth management

BLE

- BLE 5.1
- iShare PA&LNA with Wi- Fi • GAP
- AFH
- Support connection parameter update
- Power control

Secure

- AES128/ ECC /HASH /TRNG
- WEP, WPA/WPA2 /WPA3 personal
- WPS

MCU

- The core frequency to 240MHz, support floating-point operations, with I cache and D cache Peripheral
- UART0/1 /2
- SPI0/1 (80MHZ@max)
- IR T/R
- I2S
- 12(
- PWM x6
- ADC x4
- SDIO2.0(S0MHZ@max)

Internal memory

- i?t.@?fB] (RAM)
- t???fB] (ROM)
- SIP Flash
- External PSRAM
- External FLASH
- 1 Kbit eFuse

Other information

• Power supply voltage input range : 3.0V ~ 3.6V, Typical value3.3Vo
• Operating temperature : -40°C ~ + 105°C

4.Module size (Units: mm)

16.00mm

0.80mm

8.50mm

6.25mm

24.00mm

24.00mm

16.50mm

1.10mm

2.00mm

1.50mm

1.60mm

2.00mm

2.00mm

3.00mm

3.00mm

注：不带屏蔽罩模块整体高度大约 1.8mm 左右

RESET# 1

22 GPIO6/DBG_TX0/32K_OUT

GPIO20/ADC2/PWM3 2

21 GPIO5/DBG_RX0/32K_IN

GPIO23/PWM1 3

20 GPIO14/ADC0/PWM4/BM0

GPIO13/TX2/I2C_SCL 4

19 GPIO15/ADC1/PWM5/BM1

GPIO25/PWM3/I2C_SDA 5

18 GPIO0/TX2/PWM0

GPIO24/PWM2 6

17 GPIO17/RX2/PWM5

GPIO22/TX0/PWM0 7

16 GPIO4/PWM4

3V3 8

15 GND

GPIO16/PWM2 9

GPIO21/RX0/I2C_SDA 10

GND 11

GPIO2/TX1/PWM2/I2C_SCL 12

GPIO1/RX1/PWM1 13

GPIO3/PWM3/I2C_SDA 14

5. Module pin definition

Pin	Function	Type	Voltage	Description
1	Reset#	IANA	3.3V	RC NC
2	GPIO20/ADC2/PWM3	I/O	3.3V	GPIO
3	GPIO23/PWM1	I/O	3.3V	GPIO
4	GPIO13/TX2/I2C_SCL	I/O	3.3V	GPIO
5	GPIO25/PWM3/I2C_SDA	I/O	3.3V	GPIO
6	GPIO24/PWM2	I/O	3.3V	GPIO
7	GPIO22/TX0/PWM0	I/O	3.3V	GPIO
8	3.3V	IPMU	3.3V	3.3V
9	GPIO16/PWM2	I/O	3.3V	GPIO
10	GPIO21/RX0/I2C_SDA	I/O	3.3V	GPIO
11	GND	GND	GND	GND
12	GPIO2/TX1/PWM2/I2C_SCL/SPI_MOSI	I/O	3.3V	GPIO
13	GPIO1/RX1/PWM1/SPI_CS0	I/O	3.3V	GPIO
14	GPIO3/PWM3/I2C_SDA/SPI_MISO	I/O	3.3V	GPIO
15	GND	GND	GND	GND
16	GPIO4/PWM4/SPI_CS1	I/O	3.3V	GPIO
17	GPIO17/RX2/PWM5	I/O	3.3V	GPIO
18	GPIO0/TX2/PWM0/SPI_CLK	I/O	3.3V	GPIO
19	GPIO15/ADC1/PWM5/BM1	I/O	3.3V	GPIO
20	GPIO14/ADC0/PWM4/BM0	I/O	3.3V	GPIO
21	GPIO5/DBG_RX0/32K_IN	I/O	3.3V	GPIO/
22	GPIO6/DBG_TX0/32K_OUT	I/O	3.3V	GPIO/

6. Order Information

Module	Part number	Description
E901	E901_NI_NS	E901 IOT
E901	E901_WI_NS	E901 IOT
E901	E901_NI_WS	E901 IOT
E901	E901_WI_WS	E901 IOT

7. Specifications

7.1 Recommended Operating Conditions

Parameter	Min	Typ	Max	Unit
Operation Voltage	3.0	3.3	3.6	V
Operation Temperature	-40		105	°C

7.2 Current consumption

Table 4.2 Current consumption performance specification

WiFi TX	11b, CCK,1Mbps	20dBm	353	mA
	11b, CCK,11Mbps	20dBm	345	mA
	11g, OFDM, 6Mbps	19dBm	265	mA
	11g, OFDM, 54Mbps	17dBm	215	mA
	11n,HT20, MCS0	19dBm	256	mA
	11n,HT20, MCS7	16dBm	216	mA
	11ax,HT20, MCS7	19dBm	260	mA
	11ax,HT20, MCS7	16dBm	215	mA
	11n,HT40, MCS0	18dBm	240	mA
	11n,HT40, MCS7	15dBm	198	mA
	–	0dBm	42.4	mA
WiFi RX	–	–	44.8	mA

BT TX	BLE,1M, Power_Level = 3	12dBm	98	mA
	BLE,2M, Power_Level = 3	12dBm	75	mA
	–	0dBm	42.4	mA
BT RX	–	–	42.7	mA

7.3 WiFi WLAN Receiver Characteristic

Table 4.3 WLAN receiver performance specification

Parameters	Test Item		CH1	CH7	CH13	Unit
Receive Sensitivity	11b, CCK,1M , <-76dBm@8%PER		-94	-94	-94	dBm
	11b, CCK,11M ,<-76dBm@8%PER		-86	-86	-86	dBm
	11g, OFDM,6M , <-82dBm@10%PER		-90	-90	-89	dBm
	11g, OFDM,54M , <-65dBm@10%PER		-74	-74	-73	dBm
	11n, HT20 MCS0, <-82dBm@10%PER		-90	-90	-89	dBm
	11n, HT20 MCS7, <-64dBm@10%PER		-71	-71	-70	dBm
	11ax, HT20 MCS0, <-82dBm@10%PER		-90	-90	-89	dBm
	11ax, HT20 MCS7, <-64dBm@10%PER		-71	-71	-70	dBm
	Test Item		CH3	CH7	CH11	Unit
	11n, HT40 MCS0,<-79dBm@10%PER		-87	-87	-86	dBm
	11n, HT40 MCS7,<-61dBm@10%PER		-68	-68	-67	dBm

7.4 WiF WLAN Transmitter Characteristics

Table 4.4 WLAN transmitter performance specification

Parameter	Test Item	Typical Value	CH1	CH7	CH13	Unit
Output Power	11b, CCK,1Mbps	20±1dBm,EVM<-20dB	20.32	20.38	20.32	dBm
	11b,1CCK,1Mbps	20±1dBm, EVM<-20dB	20.28	20.38	20.33	dBm
	11g ,OFDM, 6Mbps	19±1dBm,EVM<-18dB	19.06	19.06	19.08	dBm
	11g ,OFDM, 54Mbps	17±1dBm,EVM<-27dB	17.22	17.37	17.37	dBm
	11n, HT20 MCS0	19±1dBm,EVM<-18dB	18.56	18.55	18.53	dBm
	11n, HT20 MCS7	16±1dBm,EVM<-27dB	16.25	16.21	16.21	dBm
	11ax ,HT20 MSC0	19±1dBm,EVM<-25dB	18.74	18.77	18.82	dBm
	11ax ,HT20 MSC7	16±1dBm,EVM<-30dB	16.14	16.10	16.11	dBm
	Test Item	Typical Value	CH3	CH7	CH11	Unit
	11n, HT40 MCS0	17±1dB,EVM<-25dB	17.13	17.10	17.19	dBm
	11n, HT40 MCS7	15±1dB,EVM<-29dB	14.64	14.69	14.87	dBm

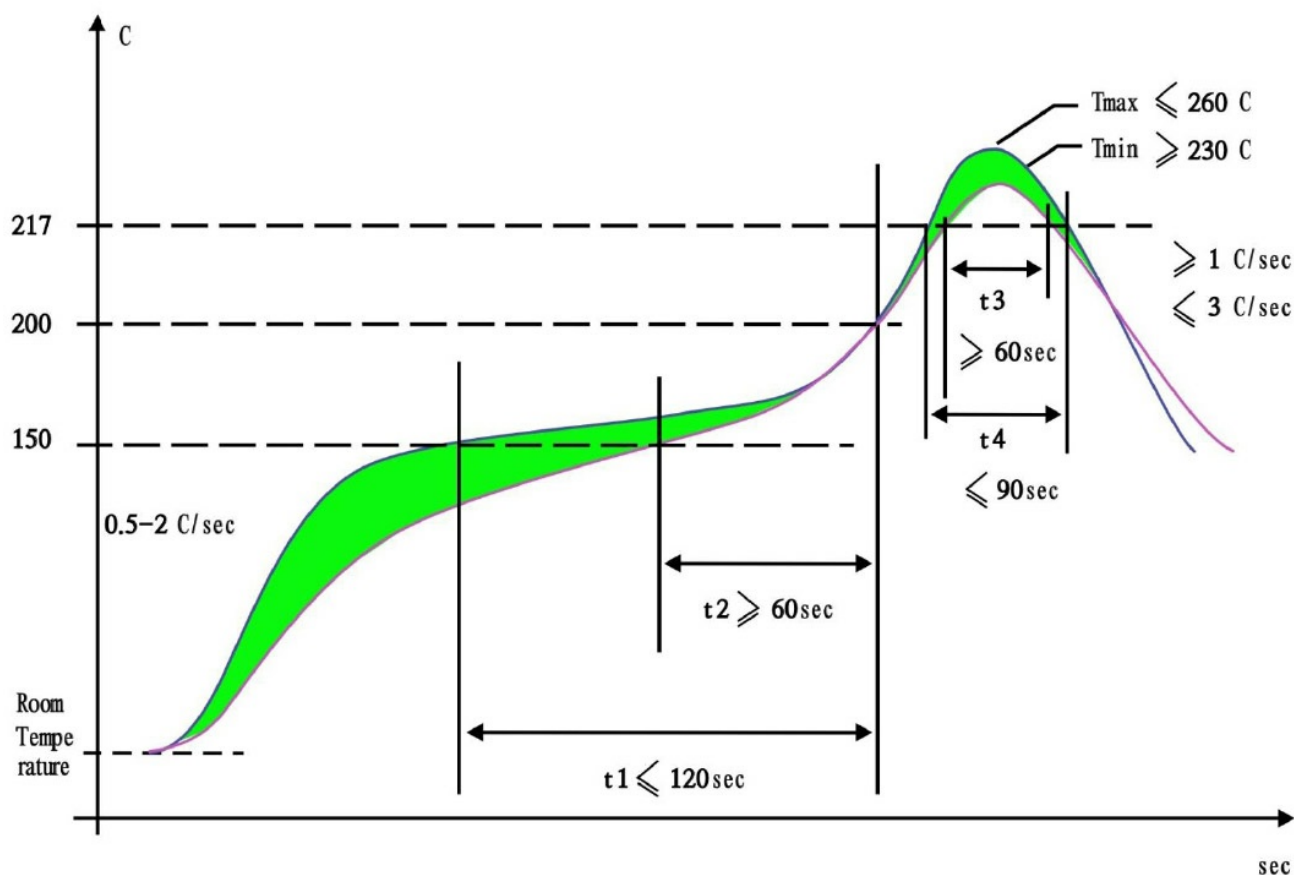## 7.6 BLE BLE TX Performance

Table 4.6 BLE transmitter performance specification

Parameter	Test Item	Typical Value	Channel(dBm)			Unit
			CH0	CH19	CH39	
Output power	1Mbps	10±1	9.86	10.01	9.93	dBm
	2Mbps	10±1	9.98	10.13	10.06	dBm

8. Lead-free reflow welding process parameter requirements

Lead-free reflow welding process curve is shown in the figure below.

Lead-free reflow welding process parameters are shown in the following table.

region	time	Heating rate	Peak temperature	Cooling rate
40 150℃	60 150s	≤2.0℃/s	–	–
150 200℃	60 120s	1.0℃/s	–	–
217℃	60 90s	–	230-260℃	–
Tmax 180℃	–	–	–	1.0℃/s≤Slope≤4.0℃/s

INSTRUCTION

- Preheating zone: The temperature is from 40 ° C to 150 ° C, the temperature rise rate is controlled at about 2 °

C /s, and the temperature zone time is 60 ~ 150s.

- Average temperature zone: the temperature is 150℃ ~ 200℃, steadily and slowly rising, the temperature rise rate is less than 1℃/s, and the time in the region is controlled at 60 ~ 120s (Note: the region must be slowly heated, otherwise it is easy to lead to bad welding).
- Reflux zone: temperature from 217℃ ~ Tmax ~ 217℃, the whole interval time is controlled at 60 ~ 90s. Cooling zone: The temperature is from Tmax to 180℃, and the maximum temperature drop rate can not exceed 4℃/s.
- The temperature from room temperature 25℃ to 250℃ should not exceed 6 minutes.
- The reflow curve is recommended only. The client needs to adjust it according to the actual production situation.
- The target reflux time is 60 to 90s. For some boards with large heat capacity that cannot meet the time requirements, the reflux time can be set relax to 120s.

Package body temperature standard refer to IPC/JEDEC J-STD-020D standard, package body temperature measurement method refer to JEP 140 standard. IPC/JEDEC J-STD-020D standard, enclosed body temperature measurement method in accordance with the JEP 140 standard requirements:

The temperature resistance standards of lead-free device packages in IPC/JEDEC 20D are shown in the following table.

Table IPC/JEDEC020D temperature tolerance standards for lead-free device packages

Package Thickness	Volume mm3 350	Volume mm3 350~2000	Volume mm3 2000
1.6mm	260℃	260℃	260℃
1.6mm 2.5mm	260℃	250℃	245℃
2.5mm	250℃	245℃	245℃

The device welding ends (welding balls, pins) and external heat sinks are not included in the volume calculation. Reflow welding process curve measurement wed method:

JEP140 recommendation: For devices with small thickness, the thermocouple is directly attached to the surface of the device when measuring the temperature of the package, and for devices with large thickness, the thermocouple is drilled into the surface of the device for measurement. Due to the requirements of quantifying the thickness of the device, it is recommended to use all the holes in the surface of the package buried in the thermocouple type (especially thin devices, except drilling is not possible).

FCC Statement

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.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursua nt

to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful inte rference in a residential installation. This equipment generates uses and can radiate radio frequency energy a nd, if not installed and used in accordance with the instructions, may cause harmful interference to radio com munications. 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 turn ing 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 important announcement

Important Note:

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 and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. Country Code selection feature to be disabled for products marketed to the US/ Canada.
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 users, and
2. The transmitter module may not be co-located with any other transmitter or antenna,
3. For all products market in US, OEM has to limit the operation channels in CHl to CHll for 2.4G band by supplied firmware programming tool. OEM shall not supply any tool or info to the end-user regarding to Regulatory Domain change. (if modular only test Channel 1-11)

As long as the three conditions above are met, further transmitter testing 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.

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.

End Product Labeling

The final end product must be labeled in a visible area with the following"
Contains FCC ID: 2AXX8-E901-NI-WS"

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 end user manual shall include all required regulatory information/warning as show in this manual.

Integration instructions for host product manufacturers according to KDB 996369 D03
OEM Manual v01 r01

2.2 List of applicable FCC rules

CFR 47 FCC PART 15 SUBPART C has been investigated. It is applicable to the modular transmitter

2.3 Specific operational use conditions

This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmrtting condrtion or different operational conditions for a stand-alone modular transmrtter in a hos? host manufacturer have to consult wrth module manufacturer for the installation method in end system.

2.4 Limited module proc edures

Not applicable

2.5 Trac e antenna designs

Not applicable

2.6 RF exposure consi derations

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

2.7 Antennas

This radio transmitter FCC ID:2AXX8-E901-NI-WS has been approved by Federal Communications Commission to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are stricUy prohibrted for use wrth this device.

Antenna No.	Model No. of a ntenna:	Type of antenna:	Gain of the antenna (Max.) Antenna 1	Frequency range :
Bluetooth	/	PCB Antenna	-0.58	2402-2480MHz
2.4G Wi-Fi	/	PCB Antenna	-0.58	2412-2462MHz

2.8 Label and compliance information
The final end product must be labeled in a visible area wrth the following" Contains FCC ID:2AXX8-E901-NI-WS".

2 .9 Information on test modes and additional testing requirements

Host manufacturer is strongly recommended to confirm compliance wrth FCC requirements for the transmrtter when the module is installed in the host.

2.10 Additional testing, Part 15 Subpart B disclaimer
Host manufacturer is responsible for compliance of the host system with module installed with all other applicable requirements for the system such as Part 15 B.

2.11 Note EMI Considerations

Host manufacture is recommended to use 004 Module Integration Guide recommending as "best practice" RF design engineering testing and evaluation in case non-linear interactions generate additional non-compliant limits due to module placement to host components or properties.

2.12 How to make changes

This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult wrth module manufacturer for the installation method in end system. According to the KOB 996369 002 Q&A Q12, that a host manufacture only needs to do an evaluation (i.e, no C2PC required when no emission exceeds the limit of any individual device (including unintentional radiators) as a composrte The host manufacturer must fix any failure.

Specifications

- Product Name: E901 2.4G WiFi 6+BLE 5.1 Module
- Model: ECR6600-TS2L
- Wireless Standards: 802.11b/g/n/ax 1T1R WiFi + BLE
- Frequency: 2.4GHz
- Document Release Version: V1.0
- Date: 2022/02/25

Product Usage Instructions

1. Overview

The E901 WiFi 6 + BLE 5.1 IOT module utilizes ESWIN's ECR6600 chip line, providing a combination of 2.4GHz WiFi and BLE technology for low latency, long-distance, and low power applications.

2. Main Features

- Wi-Fi: Supports IEEE 802.11b/g/n/ax standards with various modes and features like AP, STA, Wi-Fi Direct, and more.
- BLE: Features BLE 5.1 technology with power control, encryption options, and iShare PA&LNA with Wi-Fi GAP.
- MCU: Includes UART, SPI, I2C, PWM, ADC, and other interfaces for connectivity.

3. Module Size

Size: 1.8mm

Frequently Asked Questions (FAQ)

Q: What certifications does the E901 module comply with?

A: The E901 module complies with FCC/CE/SRRC certifications for regulatory compliance.

Q: What is the power supply voltage range for the module?

A: The module operates within a voltage range of 3.0V to 3.6V, with a typical operating voltage of 3.3V.

Documents / Resources

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E901 2.4G WiFi 6+BLE 5.1 Module   VLinK

E901 2.4G WiFi 6 +BLE 5.1
IOT Module

Product Specification
802.11b/g/n/ax 1T1R WiFi +BLE Module

(ECR6600-TS2L)

Version Ver1.0
History

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[VLinK E901 2.4G WiFi 6 plus BLE 5.1 IOT Module](#) [pdf] Instructions
E901-NI-WS, 2AXX8-E901-NI-WS, 2AXX8E901NIWS, E901 2.4G WiFi 6 plus BLE 5.1 IOT Module, E901, E901 IOT Module, 2.4G WiFi 6 plus BLE 5.1 IOT Module, 2.4G WiFi 6 plus Module, BLE 5.1 IOT Module, IOT Module, IOT, Module

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References

- **[User Manual](#)**