

保密等级：机密

SPECIFICATION  
产品规格书

EL.RTL8192FC-CWFT  
IEEE 802.11b/g/n 2T2R USB Wi-Fi Module

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|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
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|  |  |  |

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| Comments 确认意见        | Approved by 批准签字 | Company's seal 盖章 |
|                      |                  |                   |
| Customer's Name:     |                  |                   |

# REVISION HISTORY

| VERSION | DATE      | BOARD ID          | PAGE | DESCRIPTION | AUTHOR |
|---------|-----------|-------------------|------|-------------|--------|
| V1.0    | 2025.3.22 | EL.RTL8192FC-CWFT | All  | 初版          | 牙举辉    |
|         |           |                   |      |             |        |
|         |           |                   |      |             |        |
|         |           |                   |      |             |        |
|         |           |                   |      |             |        |

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## 1. Introduction（简介）

EL.RTL8192FC-CWFT module is based on RTL8192FC-CG. The Realtek RTL8192FC-CG is a highly integrated single-chip MIMO (Multiple In, Multiple Out) Wireless LAN (WLAN) USB network interface controller complying with the wireless very high throughput IEEE 802.11n and high throughput 802.11n specification. The RTL8192FC provides a complete solution for a high-performance wireless client and also supports Wi-Fi Direct feature that can easily build a Wi-Fi P2P PAN network. This documentation describes the engineering requirements specification.

EL.RTL8192FC-CWFT 模块基于 RTL8192FC-CG 方案。Realtek RTL8192FC-CG 是一个高度集成的单芯片 MIMO（多入多出）无线局域网（WLAN）USB 网络接口控制器，符合无线超高吞吐量的 IEEE 802.11n 和高吞吐量的 802.11n 规范。RTL8192FC 为客户端提供了一个完整的高性能无线解决方案，同时还支持 Wi-Fi Direct 功能，可以轻松构建 Wi-Fi P2P 网络。本文档描述了工程需求规范。

## 2. Features（特性）

|                                  |                   |
|----------------------------------|-------------------|
| <b>Reserving System</b><br>接收制式  | IEEE Std. 802.11b |
|                                  | IEEE Std. 802.11g |
|                                  | IEEE Std. 802.11n |
| <b>Chip Solution</b><br>芯片方案     | RTL8192FC         |
| <b>Band</b><br>波段                | 2.4GHz            |
| <b>Bandwidth</b><br>带宽           | 20M/40M           |
| <b>Dimensions</b><br>尺寸          | 21mm*15mm*2.8mm   |
| <b>Antenna</b><br>天线             | Internal antenna  |
| <b>Installation Mode</b><br>安装方式 | SMD               |
| <b>Remark</b><br>备注              | 2T2R WiFi Module  |

### 3. Block Diagram (结构框图)

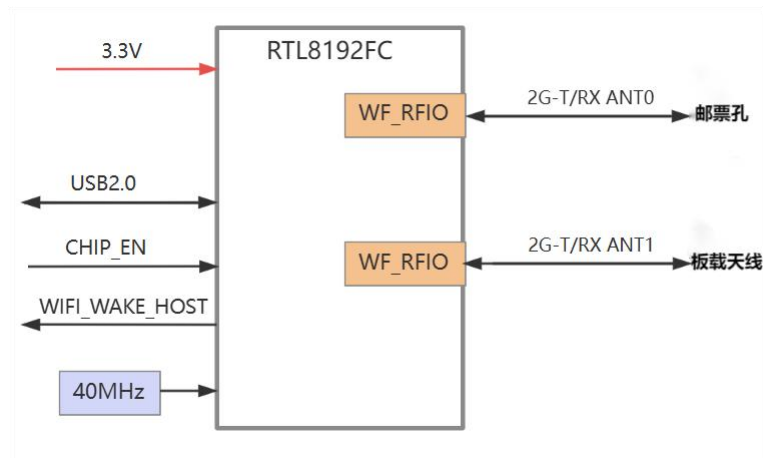
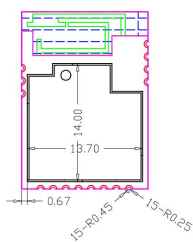
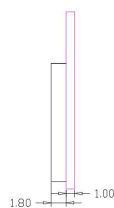


Figure 1 Block Diagram

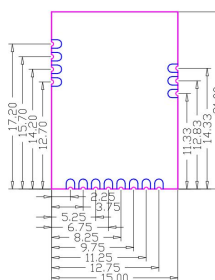
### 4. Package Outline and Mounting (外形及安装尺寸)



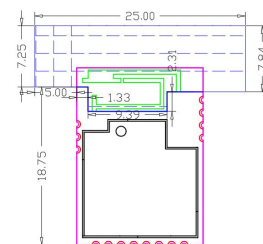
模组俯视图



模组侧视图



模组底视图

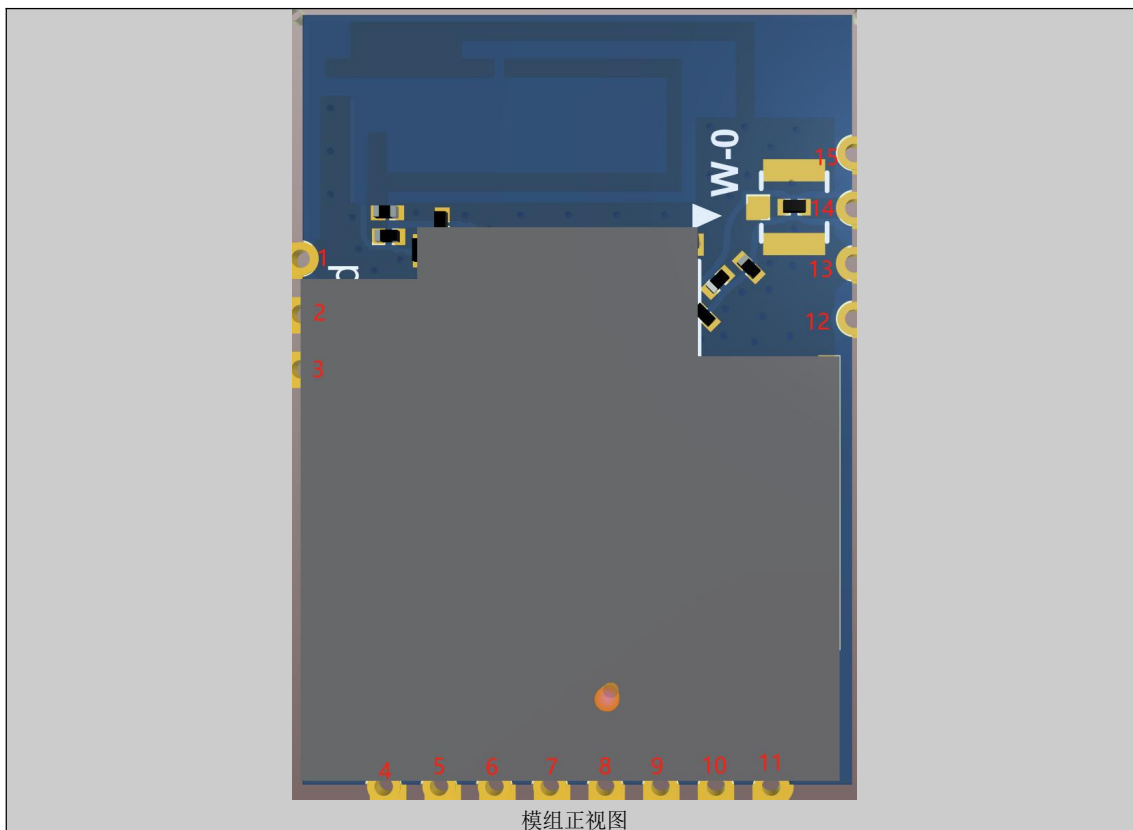


主板封装建议净空区尺寸

**NOTE:**

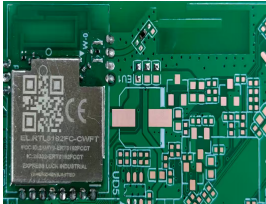
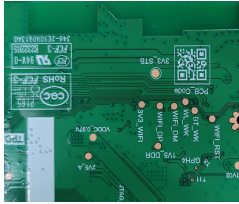
1. 板内顶层器件最高1.8mm, 底层无器件;
2. 模组外形尺寸公差为 $\pm 0.15\text{mm}$ , 板厚以及未标注公差为 $\pm 0.1\text{mm}$ ;
3. 条纹区为的天线净空区

## 5. Pin Definition (引脚定义)



| PIN | SYMBOL  | DESCRIPTION                  |
|-----|---------|------------------------------|
| 1   | GND     | Connected to Ground \ 接地     |
| 2   | NC      | NC                           |
| 3   | GND     | Connected to Ground \ 接地     |
| 4   | CHIP_EN | 使能信号, 模组内有 10K 上拉到 3.3V      |
| 5   | WAKE    | DEV_WAKE_HOST, 低电平有效, 默认为高电平 |
| 6   | NC      | NC                           |
| 7   | GND     | Connected to Ground \ 接地     |
| 8   | USB-DM  | USB-DM                       |
| 9   | USB-DP  | USB-DP                       |
| 10  | GND     | Connected to Ground \ 接地     |
| 11  | VCC     | +3.3V DC Power supply input  |
| 12  | NC      | NC                           |
| 13  | GND     | Connected to Ground \ 接地     |
| 14  | WIFI0   | WIFI0 Antenna Port           |
| 15  | GND     | Connected to Ground \ 接地     |

## 6. Product Pictures（参考图片）

| 模组料号            | 正视图                                                                               | 背视图                                                                                | 备注 |
|-----------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|----|
| 002.029.0001542 |  |  |    |

丝印说明：

- （1）红色方框内的字符为产品 PCB 型号；
- （2）黄色方框内的字符为产品周期号；
- （3）其他为非关键字符，无须管控。

## 7. Key Materials (关键物料)

| 序号 | 关键件名称 | 型号              | 规格/材料     | 备注      |
|----|-------|-----------------|-----------|---------|
| 1  | 集成电路  | RTL8192FC       | 32-QFN    |         |
| 2  | PCB   | SKI.W192FC.5    | FR-4,2LAY |         |
| 3  | 晶体振荡器 | 2.3.3.400001208 | 40MHz     | MDH/JWT |

## 8. General Requirements (一般要求)

| No. | Feature                      | Description      |
|-----|------------------------------|------------------|
| 1   | Operation Voltage 工作电压范围     | 3.3V+/-0.3       |
| 2   | Current Consumption 最大电流     | 600mA            |
| 3   | Ripple 纹波*                   | ≤165mV           |
| 4   | Operation Temperature 工作温度范围 | -10°C to +70°C   |
| 5   | Antenna Type 天线类型            | Internal antenna |
| 6   | Interface                    | USB2.0           |
| 7   | Storage Temperature 存储温度     | -40°C to +85°C   |

\*纹波：定义是主板给模组供电处的纹波要求

\*RF Power Configuration Requirements (射频功率配置需求)

```
##### Features #####  
CONFIG_AP_MODE = y  
CONFIG_P2P = y  
CONFIG_MP_INCLUDED = y  
CONFIG_POWER_SAVING = y  
CONFIG_IPS_MODE = 0  
CONFIG_LPS_MODE = 0  
CONFIG_USB_AUTOSUSPEND = n  
CONFIG_HW_PWRP_DETECTION = n  
CONFIG_BT_COEXIST = y  
CONFIG_WAPI_SUPPORT = n  
CONFIG_EFUSE_CONFIG_FILE = y  
CONFIG_EXT_CLK = n  
CONFIG_TRAFFIC_PROTECT = n  
CONFIG_LOAD_PHY_PARAMS_FROM_FILE = y  
CONFIG_TXPWR_BY_RATE = y  
CONFIG_TXPWR_BY_RATE_EN = y  
CONFIG_TXPWR_LIMIT = y  
CONFIG_TXPWR_LIMIT_EN = n  
CONFIG_RTW_REGDB = rtk
```

上板后功率受驱动的 TXPWR\_BY\_RATE 和 TXPWR\_LIMIT 文件控制，规格书展示为单模组时调试指标。  
可根据上板测试性能要求，对驱动文件进行相应调控。

## 9. Electrical Characteristics (电气特性)

除非另有说明，电气规范试验都在下列条件下进行：

环境条件温度：25℃±5℃；

电源电压：模块输入电压 3.3V（±5%）；

The Test for electrical specification was performed under the following condition unless otherwise specified:

Ambient condition Temperature :25℃ ± 5℃;

Power supply voltages: 3.3V+/-0.3 input power at the Module;

### 9.1 IEEE 802.11b Section(2.4GHz)

| Items                                             | Contents          |      |      |      |        |
|---------------------------------------------------|-------------------|------|------|------|--------|
| Specification                                     | IEEE802.11b       |      |      |      |        |
| Mode                                              | CCK               |      |      |      |        |
| Channel                                           | CH1 to CH13       |      |      |      |        |
| Data rate                                         | 1, 2, 5.5, 11Mbps |      |      |      |        |
| TX Characteristics                                | Min.              | Typ. | Max. | Unit | Remark |
| 1. Power Levels(Calibrated)                       |                   |      |      |      |        |
| 1) For antenna port (CCK 11Mbps)                  | 14                | 16   | 18   | dBm  |        |
| 2. Spectrum Mask @ target power                   |                   |      |      |      |        |
| 1) fc +/-11MHz to +/-22MHz                        | -                 | -    | -30  | dBr  |        |
| 2) fc > +/-22MHz                                  | -                 | -    | -50  | dBr  |        |
| 3 Constellation Error(EVM)@ target power          |                   |      |      |      |        |
| 1) 1Mbps                                          | -                 | -    | -10  | dB   |        |
| 2) 2Mbps                                          | -                 | -    | -10  | dB   |        |
| 3) 5.5Mbps                                        | -                 | -    | -10  | dB   |        |
| 4) 11Mbps                                         | -                 | -    | -10  | dB   |        |
| 4. Frequency Error                                | -20               | -    | 20   | ppm  |        |
| RX Characteristics                                | Min.              | Typ. | Max. | Unit |        |
| 5 Minimum Input Level Sensitivity<br>(each chain) |                   |      |      |      |        |
| 1) 1Mbps (FER ≤8%)                                | -                 | -    | -83  | dBm  |        |
| 2) 2Mbps (FER ≤8%)                                | -                 | -    | -80  | dBm  |        |
| 3) 5.5Mbps (FER ≤8%)                              | -                 | -    | -79  | dBm  |        |
| 4) 11Mbps (FER ≤8%)                               | -                 | -    | -76  | dBm  |        |
| 6 Maximum Input Level (FER ≤8%)                   | -10               | -    | -    | dBm  |        |

## 9.2 IEEE 802.11g Section(2.4GHz)

| Items                                          | Contents                         |      |      |      |        |
|------------------------------------------------|----------------------------------|------|------|------|--------|
| Specification                                  | IEEE802.11g                      |      |      |      |        |
| Mode                                           | OFDM                             |      |      |      |        |
| Channel                                        | CH1 to CH13                      |      |      |      |        |
| Data rate                                      | 6, 9, 12, 18, 24, 36, 48, 54Mbps |      |      |      |        |
| TX Characteristics                             | Min.                             | Typ. | Max. | Unit | Remark |
| 1. Power Levels                                |                                  |      |      |      |        |
| 1) For antenna port (54Mbps)                   | 13                               | 15   | 17   | dBm  |        |
| 2. Spectrum Mask @ target power                |                                  |      |      |      |        |
| 1) at fc +/-11MHz                              | -                                | -    | -20  | dBm  |        |
| 2) at fc +/-20MHz                              | -                                | -    | -28  | dBm  |        |
| 3) at fc > +/-30MHz                            | -                                | -    | -40  | dBm  |        |
| 3 Constellation Error(EVM)@ target power       |                                  |      |      |      |        |
| 1) 6Mbps                                       | -                                | -    | -5   | dB   |        |
| 2) 9Mbps                                       | -                                | -    | -8   | dB   |        |
| 3) 12Mbps                                      | -                                | -    | -10  | dB   |        |
| 4) 18Mbps                                      | -                                | -    | -13  | dB   |        |
| 5) 24Mbps                                      | -                                | -    | -16  | dB   |        |
| 6) 36Mbps                                      | -                                | -    | -19  | dB   |        |
| 7) 48Mbps                                      | -                                | -    | -22  | dB   |        |
| 8) 54Mbps                                      | -                                | -    | -25  | dB   |        |
| 4 Frequency Error                              | -20                              | -    | 20   | ppm  |        |
| RX Characteristics                             | Min.                             | Typ. | Max. | Unit |        |
| 5 Minimum Input Level Sensitivity (each chain) |                                  |      |      |      |        |
| 1) 6Mbps (PER ≤ 10%)                           | -                                | -    | -85  | dBm  |        |
| 2) 9Mbps (PER ≤ 10%)                           | -                                | -    | -84  | dBm  |        |
| 3) 12Mbps (PER ≤ 10%)                          | -                                | -    | -82  | dBm  |        |
| 4) 18Mbps (PER ≤ 10%)                          | -                                | -    | -80  | dBm  |        |
| 5) 24Mbps (PER ≤ 10%)                          | -                                | -    | -77  | dBm  |        |
| 6) 36Mbps (PER ≤ 10%)                          | -                                | -    | -73  | dBm  |        |
| 7) 48Mbps (PER ≤ 10%)                          | -                                | -    | -69  | dBm  |        |
| 8) 54Mbps (PER ≤ 10%)                          | -                                | -    | -65  | dBm  |        |
| 6 Maximum Input Level (PER ≤ 10%)              | -20                              | -    | -    | dBm  |        |

## 9.3 IEEE 802.11n HT20/40 Section(2.4GHz)

| Items                                              | Contents                               |      |          |          |        |  |
|----------------------------------------------------|----------------------------------------|------|----------|----------|--------|--|
| Specification                                      | IEEE802.11n HT20/40 @ 2.4GHz           |      |          |          |        |  |
| Mode                                               | OFDM                                   |      |          |          |        |  |
| Channel                                            | HT20: CH1 to CH13<br>HT40: CH3 to CH11 |      |          |          |        |  |
| Data rate (MCS index)                              | MCS0/1/2/3/4/5/6/7                     |      |          |          |        |  |
| TX Characteristics                                 | Min.                                   | Typ. | Max.     | Unit     | Remark |  |
| 1. Power Levels                                    |                                        |      |          |          |        |  |
| 1) For antenna port (MCS7)                         | 12                                     | 14   | 16       | dBm      |        |  |
| 2. Spectrum Mask @ target power                    |                                        |      |          |          |        |  |
| 1) at fc +/-11MHz                                  | -                                      | -    | -20      | dBm      |        |  |
| 2) at fc +/-20MHz                                  | -                                      | -    | -28      | dBm      |        |  |
| 3) at fc > +/-30MHz                                | -                                      | -    | -45      | dBm      |        |  |
| 3. Constellation Error(EVM)@ target power          |                                        |      |          |          |        |  |
| 1) MCS0                                            | -                                      | -    | -5       | dB       |        |  |
| 2) MCS1                                            | -                                      | -    | -10      | dB       |        |  |
| 3) MCS2                                            | -                                      | -    | -13      | dB       |        |  |
| 4) MCS3                                            | -                                      | -    | -16      | dB       |        |  |
| 5) MCS4                                            | -                                      | -    | -19      | dB       |        |  |
| 6) MCS5                                            | -                                      | -    | -22      | dB       |        |  |
| 7) MCS6                                            | -                                      | -    | -25      | dB       |        |  |
| 8) MCS7                                            | -                                      | -    | -28      | dB       |        |  |
| 4. Frequency Error                                 | -20                                    | -    | 20       | ppm      |        |  |
| RX Characteristics                                 | Min.                                   | Typ. | Max.     | Unit     |        |  |
| 5. Minimum Input Level Sensitivity<br>(each chain) |                                        |      | HT<br>20 | HT<br>40 |        |  |
| 1) MCS0 (PER ≤10%)                                 | -                                      | -    | -82      | -79      | dBm    |  |
| 2) MCS1 (PER ≤10%)                                 | -                                      | -    | -79      | -76      | dBm    |  |
| 3) MCS2 (PER ≤10%)                                 | -                                      | -    | -77      | -74      | dBm    |  |
| 4) MCS3 (PER ≤10%)                                 | -                                      | -    | -74      | -71      | dBm    |  |
| 5) MCS4 (PER ≤10%)                                 | -                                      | -    | -70      | -67      | dBm    |  |
| 6) MCS5 (PER ≤10%)                                 | -                                      | -    | -66      | -63      | dBm    |  |
| 7) MCS6 (PER ≤10%)                                 | -                                      | -    | -65      | -62      | dBm    |  |
| 8) MCS7 (PER ≤10%)                                 | -                                      | -    | -64      | -61      | dBm    |  |
| 7. Maximum Input Level (PER ≤10%)                  | -20                                    | -    | -        |          | dBm    |  |

## 10.Mechanical,Environmental and Reliability Tests (机械、环境和可靠性测试)

| Test Items |                                 | Test Conditions                                                                                                                                                                                   | Qty   | Criteria Condition                                                                                                                                                                                                                                                                                                      |
|------------|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10-1       | Drop test                       | The packed samples within 100Kg can be tested<br>Drop height:<br>Face Side: 800/600/450mm<br>Edge line: 600/450/350mm<br>Drop time: 1 each Face and edge.                                         | 1xBox | After drop test, the outer box and inner box will not been broken by appearance visual inspection.                                                                                                                                                                                                                      |
| 10-2       | Vibration test                  | X-Y-Z direction, first frequency changing from 10Hz to 30Hz to 10Hz, amplitude 0.75mm, 5 times vibrations, then frequency changing from 30Hz to 55Hz to 30Hz, amplitude 0.15mm, 5 time vibration. | 3     | After test, the Appearance, Power EVM and Frequency error shall be satisfied with the specification.                                                                                                                                                                                                                    |
| 10-3       | Impact test                     | Impact acceleration:<br>50m/sec <sup>2</sup> ;<br>Impact duration: 16ms;<br>Impact times: 1000.                                                                                                   | 3     | After test, the Appearance, Power EVM and Frequency error shall be satisfied with the specification.                                                                                                                                                                                                                    |
| 10-4       | Soldering ability test          | Soldering temperature:<br>235±5℃<br>Soldering duration:<br>2±0.5S                                                                                                                                 | 3     | 1.After soldering, the soldered area must be covered by a smooth bright solder layer, some deficiencies such as a small amount of the pinhole, not wetting are allowed, but the deficiencies can not be in the same place;<br>2. At least 90% of soldered area shall be covered continuously by the soldering material. |
| 10-5       | Humidity test                   | Leave samples in 40±3℃, 93% RH @ 96 hours                                                                                                                                                         | 3     | Leave samples in standard test condition for 2 hours then test, the Appearance, Power, EVM and Frequency error functional parameter shall be satisfied with the test specification.                                                                                                                                     |
| 10-6       | High temperature load life test | Thermostat cabinet temperature:<br>55±5℃                                                                                                                                                          | 60    | After test, leave samples in standard condition for 1 hour and test, Power, EVM and Frequency error shall be satisfied with the test specification.                                                                                                                                                                     |

|              |                                             |                                                                                                                              |   |                                                                                                                                                                                                    |
|--------------|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|              |                                             | Applied voltage:<br>110% rated voltage Working<br>duration: 200 hour (Supply<br>Voltage Cycle 23h power on,<br>1h power off) |   |                                                                                                                                                                                                    |
| <b>10-7</b>  | <b>High<br/>temperature<br/>load test</b>   | Temperature: 55±5℃<br>Samples work for 16 hours                                                                              | 3 | After test, the Appearance, Power, EVM<br>and Frequency error shall be satisfied<br>with the test specification.                                                                                   |
| <b>10-8</b>  | <b>Low<br/>temperature<br/>storage test</b> | Leave the samples in<br>-25±3℃@24 hours                                                                                      | 3 | Leave samples in standard test condition<br>for 2 hours then test, the Appearance,<br>Power, EVM and Frequency error shall be<br>satisfied with the test specification.                            |
| <b>10-9</b>  | <b>Low<br/>temperature<br/>load test</b>    | Leave samples in<br>-15±3℃@ 2 hours,<br>samples' function shall be<br>normal, the let samples<br>work for 1 hour             | 3 | After test, leave the samples in standard<br>condition and tested the Appearance,<br>Power, EVM and Frequency error shall be<br>satisfied with the test specification.                             |
| <b>10-10</b> | <b>Temperature<br/>circle test</b>          | One cycle duration<br>-10±3℃@3H<br>40±3℃ @3H<br>Total cycle: 10x                                                             | 3 | After test, leave the samples in standard<br>condition and tested Power EVM and<br>Frequency error shall be qualified and all<br>the characters shall be satisfied with the<br>test specification. |
| <b>10-11</b> | <b>Continuous<br/>TP test</b>               | Twice cycle duration<br>-10±3℃@4H<br>+60±3℃@4H,<br>+25@2H@2H                                                                 | 3 | During test, there will not been appeared<br>signal disconnection or interruption<br>between DUT and AP.                                                                                           |
| <b>10-12</b> | <b>ESD</b>                                  | Discharge voltage: 1kV<br>C: 150pF<br>Discharge resistance: 330Ω<br>Positive 10 times<br>1 time for each second              | 3 | The products can recoverable smoothly<br>after ESD test.                                                                                                                                           |

## **11.Package**（包装待更新）

- （1）编带尺寸：
- （2）编带方向：（箭头代表编带走向）
- （3）外箱示意图：
- （4）标签样式：

## 12.Reflow Standard Condition（回流焊条件）

炉温最高不能超过 250℃，推荐是 240℃。

推荐 SMT 焊炉温曲线如下图所示。

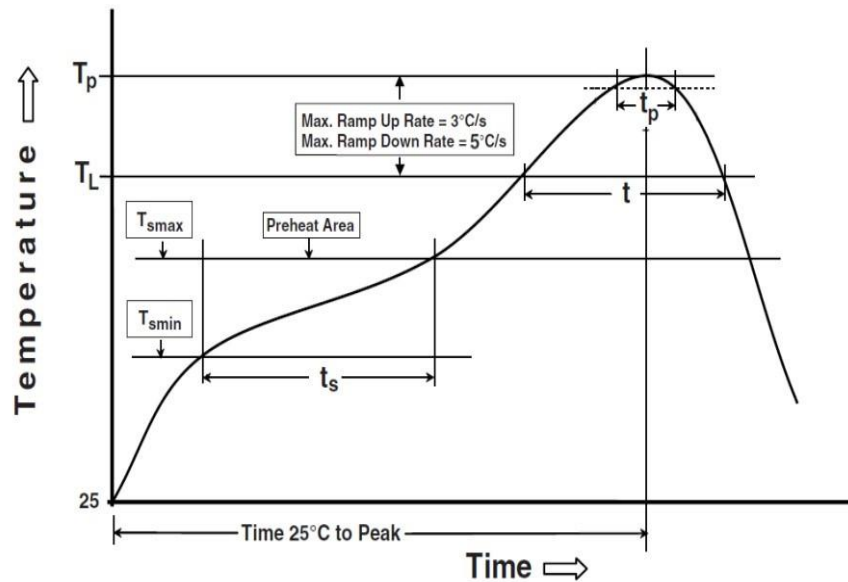


图 6-1 炉温曲线推荐图

表 16-2 炉温曲线参数

| 炉温参数                              | 最小值 | 典型值 | 最大值 | 单位  |
|-----------------------------------|-----|-----|-----|-----|
| 预热区最低温度 $T_{smin}$                | 150 |     |     | ℃   |
| 预热区最高温度 $T_{smax}$                |     |     | 200 | ℃   |
| 预热上升时间 $t_s$                      | 80  |     | 120 | s   |
| 回流焊区升温速率(TL 到 $T_p$ )             |     |     | 3   | ℃/s |
| 回流焊区低温 $T_L$                      |     | 220 |     | ℃   |
| 回流焊区峰值温度 $T_p$                    | 235 | 240 | 250 | ℃   |
| 回流焊峰值温度时间 $t_p$ ( $T_p$ 波动 5℃ 范围) |     |     | 30  | s   |
| 回流焊区冷却降温速率 ( $T_p$ 到 $T_L$ )      | -5  | -3  | -1  | ℃/s |
| 回流时间 $t$                          | 40  |     | 60  | s   |

**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.

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.

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 transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

**List of applicable FCC rules**

This module has been tested and found to comply with [part 15, part 2, FCC part 15.247](#) requirements for Modular Approval.

**Antenna Placement Within the Host Platform**

The module is tested for standalone mobile RF exposure use condition.

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

(2) 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.

**The module complies with FCC Part 15.247 and apply for Single module approval.**

**Trace antenna designs: Not applicable.**

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.

**RF exposure considerations**

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.

**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.

Antenna Specification list below:

| Antenna Type        | Frequency Bands | Max. Antenna Gain (dBi) | Impedance( $\Omega$ ) |
|---------------------|-----------------|-------------------------|-----------------------|
| PCB Antenna (WiFi0) | 2.4GHz          | 3.22                    | $50 \pm 10\%$         |
| PCB Antenna (WiFi1) | 2.4GHz          | 0.23                    | $50 \pm 10\%$         |

**End Product Labeling**

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 re-moved. If not, a second label must be placed on the outside of the final device that contains the following text: “Contains FCC ID: 2AWY6-ERT8192FCCT”. The FCC ID can be used only when all FCC compliance requirements are met.

The end product shall bear the following 15.19 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.

**Information on test modes and additional testing requirements**

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

**Part 15 Subpart B disclaimer**

This transmitter module is tested as a subsystem and its certification does not cover the FCC

Part 15 Subpart B rule requirement applicable to the final host. The final host will still need to be reassessed for compliance to this portion of rule 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 module installed.

#### **Note EMI Considerations**

Note that a host manufacture is recommended to use D04 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

For standalone mode, reference the guidance in D04 Module Integration Guide and for simultaneous mode; see D02 Module Q&A Question 12, which permits the host manufacturer to confirm compliance.

#### **How to make changes**

Since . only Grantees are permitted to make permissive changes, it is recommended that module manufactures provide contact information and some guidance to host providers in the integration instructions if they expect their module will be used differently than granted.

#### **Important Note**

In the event that these conditions can not 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 can not be used on the final product. In these circumstances, the OEM integrator will be responsible for reevaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

#### **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 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 EMF essential requirements of the FCC rules. This module must not be incorporated into any other device or system without retesting for compliance as multi-radio and combined equipment

According to country code, channel 12 and 13 would be disabled in North America.

**ISED Statement:**

This Class B digital apparatus complies with Canadian ICES-003.

*Cet appareil numérique de classe B est conforme à la norme canadienne ICES-003.*

**This device complies with Innovation, Science and Economic Development Canada's licence-exempt RSS standard(s).**

Operation is subject to the following two conditions:

- 1) This device may not cause interference, and
- 2) This device must accept any interference, including interference that may cause undesired operation of the device.

***Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.***

*L'exploitation est autorisée aux deux conditions suivantes:*

- 1) *l'appareil ne doit pas produire de brouillage, et*
- 2) *l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.*

**RF Radiation Exposure Statement**

This equipment complies with ISED 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.

***Déclaration d'exposition aux radiations***

*Cet appareil est conforme aux limites d'exposition aux rayonnements définies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé à une distance minimale de 20 centimètres entre le radiateur et votre corps.*

**IMPORTANT NOTE**

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

***NOTE IMPORTANTE***

*Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du Canada n'est plus considérée comme valide et IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit*

*final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.*

#### **Required end product labeling**

This transmitter module is authorized only for use in device where the antenna may be installed and operated with greater than 20cm between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains IC: [26332-ERT8192FCCT](#)".

#### **Plaque signalétique du produit final**

*Ce module émetteur est autorisé uniquement pour une utilisation dans un appareil où l'antenne peut être installée et utilisée à plus de 20 cm entre l'antenne et les utilisateurs. Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: "[Contient des IC: 26332-ERT8192FCCT](#)".*

#### **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.

The following text, or an equivalent notice, that shall be displayed in a conspicuous location, either in the user manual or on the device, or both:

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- 1) This device may not cause interference.
- 2) This device must accept any interference, including interference that may cause undesired operation of the device.

#### **Manuel d'information à l'utilisateur final**

*L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final quant à la façon d'installer ou de supprimer ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module.*

*Le manuel de l'utilisateur final doit inclure toutes les informations réglementaires requises et avertissements comme indiqué dans ce manuel.*

*l'énoncé qui suit, ou l'équivalent, à un endroit bien en vue dans le manuel d'utilisation ou sur l'appareil, ou encore aux deux endroits :*

*L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :*

1. *L'appareil ne doit pas produire de brouillage;*
2. *L'appareil doit accepter toute interférence, y compris toute interférence pouvant*

*entraîner un fonctionnement indésirable du dispositif.*

### **Antennas**

The following antennas have been certified for use with this module; antennas of the same type with equal or lower gain may also be used with this module. The antenna must be installed such that 20 cm can be maintained between the antenna and users.

This radio transmitter [ [26332-ERT8192FCCT](#) ] has been approved by Innovation, Science and Economic Development Canada 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 strictly prohibited for use with this device.

Antenna Specification list below:

| Antenna Type                        | Frequency Bands        | Max. Antenna Gain (dBi) | Impedance( $\Omega$ ) |
|-------------------------------------|------------------------|-------------------------|-----------------------|
| <a href="#">PCB Antenna (WiFi0)</a> | <a href="#">2.4GHz</a> | <a href="#">3.22</a>    |                       |
| <a href="#">PCB Antenna (WiFi1)</a> | <a href="#">2.4GHz</a> | <a href="#">0.23</a>    |                       |

### **ANTENNE**

*Les antennes suivantes ont été certifiées pour une utilisation avec ce module; des antennes du même type à gain égal ou inférieur peuvent également être utilisées avec ce module. L'antenne doit être installée de telle sorte que 20 cm puissent être maintenus entre l'antenne et les utilisateurs.*

*Cet émetteur radio a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antenne énumérés ci-dessous, avec le gain maximal autorisé indiqué. Les types d'antenne non inclus dans cette liste qui ont un gain supérieur au gain maximum indiqué pour tout type répertorié sont strictement interdits pour l'utilisation avec cet appareil.*