

保密等级：机密

## SPECIFICATION

### 产品规格书

## SKI.WB821CU.2

**IEEE 802.11a/b/g/n/ac 1T1R USB Wi-Fi Module**

**Integrated Bluetooth 2.1+BR/EDR/4.2**

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

# REVISION HISTORY

| VERSION | DATE       | BOARD ID                | PAGE | DESCRIPTION   | AUTHOR |
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# Content

|                                                                 |    |
|-----------------------------------------------------------------|----|
| 1. Introduction（简介） .....                                       | 1  |
| 2. FEATURES（特性） .....                                           | 1  |
| 3. Block Diagram（结构框图） .....                                    | 2  |
| 4. Package Outline and Mounting（外形及安装尺寸） .....                  | 2  |
| 5. Pin Definition（引脚定义） .....                                   | 3  |
| 6. Product Pictures（实物图片） .....                                 | 4  |
| 7. Key Materials（关键物料） .....                                    | 4  |
| 8. General Requirements（一般要求） .....                             | 5  |
| 9. Electrical Characteristics（电气特性） .....                       | 5  |
| 9.1 IEEE 802.11b Section.....                                   | 5  |
| 9.2 IEEE 802.11g Section.....                                   | 6  |
| 9.3 IEEE 802.11n HT20 Section(2.4GHz).....                      | 7  |
| 9.4 IEEE 802.11n HT40 Section(2.4GHz).....                      | 8  |
| 9.5 IEEE 802.11a Section.....                                   | 9  |
| 9.6 IEEE 802.11n HT20 Section(5GHz).....                        | 10 |
| 9.7 IEEE 802.11n HT40 Section(5GHz).....                        | 11 |
| 9.8 IEEE 802.11ac Section.....                                  | 12 |
| 9.9 Bluetooth Section.....                                      | 13 |
| 10. Mechanical,Environmental and Reliability Tests（机械、环境和可靠性测试） | 14 |
| 11. Package（包装） .....                                           | 16 |
| 12. Software Requirements（软件要求） .....                           | 16 |

## 1. Introduction（简介）

SKI.WB821CU.2 module is based on Realtek RTL8821CU-CG solution.

RTL8821CU-CG is a highly integrated single chip which features a low power 1x1 11a/b/g/n/ac dual-band Wi-Fi subsystem and a Bluetooth subsystem. The Wi-Fi subsystem contains the 802.11a/b/g/n/ac radio, baseband, and MAC that are designed to meet both the low power and high throughput application. The Bluetooth subsystem contains the Bluetooth radio which complies with Bluetooth v2.1+BR/EDR and v4.2, baseband, link controller. This documentation describes the engineering requirements specification.

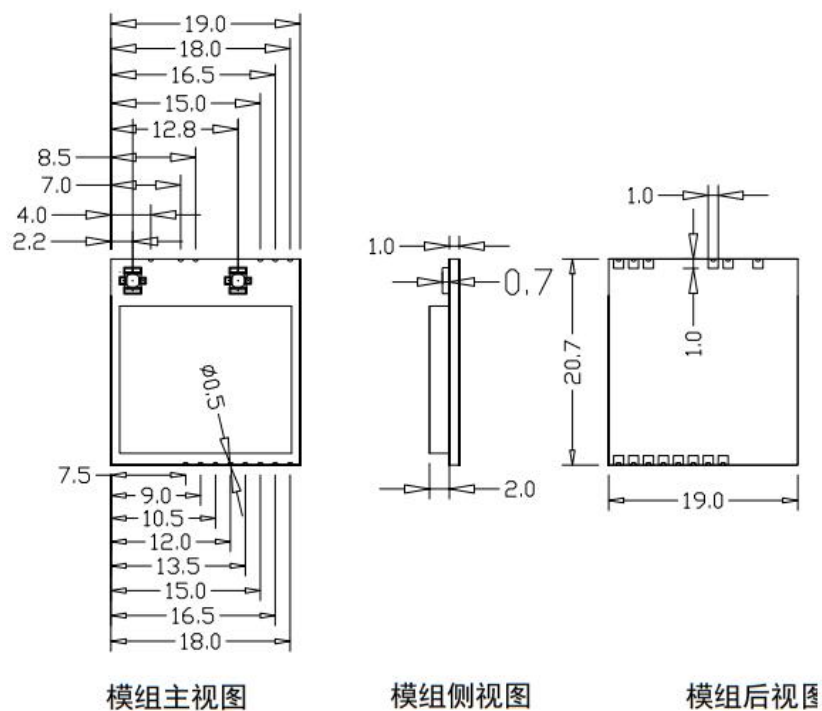
SKI.WB821CU.2 模组是基于 Realtek 的 RTL8821CU-CG 方案开发，RTL8821CU-CG 是一款高集成单芯片和低功耗的单发单收的双频 WIFI 芯片，支持 802.11a/b/g/n/ac，同时此 IC 支持蓝牙 v2.1+BR/EDR 和 v4.2，主要用于 TV 驱动领域。本文档描述了产品的设计要求规范。

## 2. FEATURES（特性）

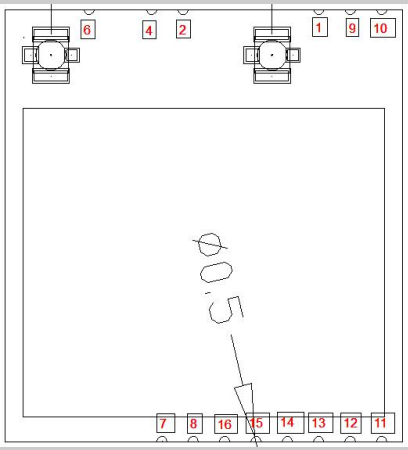
|                                 |                          |
|---------------------------------|--------------------------|
| <b>Reserving System</b><br>接收制式 | IEEE Std. 802.11a        |
|                                 | IEEE Std. 802.11b        |
|                                 | IEEE Std. 802.11g        |
|                                 | IEEE Std. 802.11n        |
|                                 | IEEE Std. 802.11ac       |
|                                 | Bluetooth 2.1+BR/EDR/4.2 |
| <b>Chip Solution</b><br>芯片方案    | RTL8821CU-CG             |
| <b>Band</b><br>波段               | 2.4/5GHz                 |
| <b>Dimensions</b><br>尺寸         | 19mm×20.7mm×3.0mm        |

| 型号            | 安装方式 | 支持标准                                               | 频段       | 天线接口    | 备注                    |
|---------------|------|----------------------------------------------------|----------|---------|-----------------------|
| SKI.WB821CU.2 | SMD  | IEEE 802.11a/b/g/n/ac+<br>Bluetooth 2.1+BR/EDR/4.2 | 2.4/5GHz | 三代 IPEX | 19mm×20.7mm<br>×3.0mm |

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

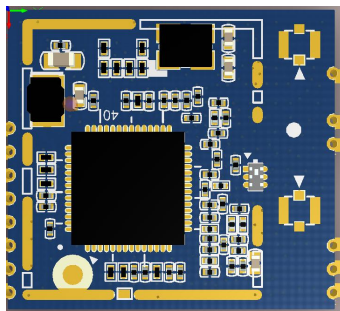


## 5. Pin Definition (引脚定义)

|  |           |                                                     |
|------------------------------------------------------------------------------------|-----------|-----------------------------------------------------|
| PIN                                                                                | SYMBOL    | DESCRIPTION                                         |
| 1                                                                                  | LED       | LED0\ LED 灯控制                                       |
| 2                                                                                  | AGND      | Ground\ 接地                                          |
| 4                                                                                  | AGND      | Ground\接地                                           |
| 6                                                                                  | AGND      | Ground\接地                                           |
| 7                                                                                  | BT_DIS    | BT Disable, L Active\ 蓝牙使能控制, 高电平使能, 默认高电平          |
| 8                                                                                  | WL_DIS    | WIFI Disable, L Active\ WIFI 使能控制, 高电平使能, 默认高电平     |
| 9                                                                                  | VDD33     | 3.3V input\ 3.3V 供电输入                               |
| 10                                                                                 | AGND      | Ground\接地                                           |
| 11                                                                                 | WL_USB_DM | WLAN USB2.0 DM Signal\ USB 差分负电压信号                  |
| 12                                                                                 | WL_USB_DP | WLAN USB2.0 DP Signal\ USB 差分正电压信号                  |
| 13                                                                                 | AGND      | Ground\接地                                           |
| 14                                                                                 | PDN       | Power Down, L Active\ 供电使能, 高电平有效, 默认高电平            |
| 15                                                                                 | D_WAKE_H  | WIFI Device Wake Host, L Active\ WIFI 从机唤醒主机, 低电平有效 |
| 16                                                                                 | H_WAKE_D  | Host Wake WIFI DeviceL, Active\ 主机唤醒 WIFI 从机, 低电平有效 |

注：此模块没有 PIN3、PIN5

## 6. Product Pictures（实物图片）



正视图（top view）



背视图（bottom view）

产品铭牌内容如下（高温贴纸）：



## 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  | RTL8821CU-CG         | QFN56     |    |
| 2  | PCB   | SKI.WB821CU.2        | FR-4,4LAY |    |
| 3  | 晶体振荡器 | PF4040M00012T2115138 | 40MHz     |    |
| 4  | 双工器   | SLFD18-2R450G-06T    |           |    |

## 8. General Requirements (一般要求)

| No. | Feature                       | Description                                |
|-----|-------------------------------|--------------------------------------------|
| 8-1 | Operation Voltage\ 工作电压范围     | 3.3V+/-0.3                                 |
| 8-2 | Current Consumption\ 最大电流     | 300mA                                      |
| 8-3 | Ripple\ 波纹                    | ≤70mV                                      |
| 8-4 | Operation Temperature\ 工作温度范围 | 0°C to +40°C                               |
| 8-5 | Antenna Type\ 天线类型            | External antenna\ 外置天线                     |
| 8-6 | USB                           | High Speed USB 2.0 Interface\ 高速 USB2.0 接口 |
| 8-7 | Storage Temperature\ 存储温度     | -20°C to +85°C                             |

## 9. Electrical Characteristics (电气特性)

The Test for electrical specification was performed under the following condition unless otherwise specified. Ambient condition Temperature :25°C ± 5°C ;Power supply voltages: 3.3V (±10%) input power at the Module.

除非另有说明，电气规范试验是在下列条件下进行的。环境条件温度：25°C±5°C；电源电压：模块输入电压 3.3V（±10%）。

### 9.1 IEEE 802.11b Section

| 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 Each antenna port                       | 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                             | -25               | -    | 25   | ppm  |        |
| RX Characteristics                             | Min.              | Typ. | Max. | Unit |        |
| 5 Minimum Input Level Sensitivity (each chain) |                   |      |      |      |        |
| 1) 1Mbps (FER ≤8%)                             | -                 | -    | -83  | dBm  |        |

|                                         |     |   |     |     |  |
|-----------------------------------------|-----|---|-----|-----|--|
| 2) 2Mbps (FER $\leq 8\%$ )              | -   | - | -80 | dBm |  |
| 3) 5.5Mbps (FER $\leq 8\%$ )            | -   | - | -79 | dBm |  |
| 4) 11Mbps (FER $\leq 8\%$ )             | -   | - | -76 | dBm |  |
| 6 Maximum Input Level (FER $\leq 8\%$ ) | -10 | - | -   | dBm |  |

## 9.2 IEEE 802.11g Section

| 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 Each antenna port                       | 12                               | 14   | 16   | dBm  |        |
| 2. Spectrum Mask @ target power                |                                  |      |      |      |        |
| 1) at fc +/-11MHz                              | -                                | -    | -20  | dBr  |        |
| 2) at fc +/-20MHz                              | -                                | -    | -28  | dBr  |        |
| 3) at fc > +/-30MHz                            | -                                | -    | -40  | dBr  |        |
| 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                              | -25                              | -    | 25   | ppm  |        |
| RX Characteristics                             | Min.                             | Typ. | Max. | Unit |        |
| 5 Minimum Input Level Sensitivity (each chain) |                                  |      |      |      |        |
| 1) 6Mbps (PER $\leq 10\%$ )                    | -                                | -    | -85  | dBm  |        |
| 2) 9Mbps (PER $\leq 10\%$ )                    | -                                | -    | -84  | dBm  |        |
| 3) 12Mbps (PER $\leq 10\%$ )                   | -                                | -    | -82  | dBm  |        |
| 4) 18Mbps (PER $\leq 10\%$ )                   | -                                | -    | -80  | dBm  |        |
| 5) 24Mbps (PER $\leq 10\%$ )                   | -                                | -    | -77  | dBm  |        |
| 6) 36Mbps (PER $\leq 10\%$ )                   | -                                | -    | -73  | dBm  |        |
| 7) 48Mbps (PER $\leq 10\%$ )                   | -                                | -    | -69  | dBm  |        |
| 8) 54Mbps (PER $\leq 10\%$ )                   | -                                | -    | -65  | dBm  |        |
| 6 Maximum Input Level (PER $\leq 10\%$ )       | -20                              | -    | -    | dBm  |        |

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

| Items                                              | Contents                 |      |      |      |  |
|----------------------------------------------------|--------------------------|------|------|------|--|
| Specification                                      | EEE802.11n HT20 @ 2.4GHz |      |      |      |  |
| Mode                                               | OFDM                     |      |      |      |  |
| Channel                                            | CH1 to CH13              |      |      |      |  |
| Data rate (MCS index)                              | MCS0/1/2/3/4/5/6/7       |      |      |      |  |
| TX Characteristics                                 | Min.                     | Typ. | Max. | Unit |  |
| 2. Power Levels                                    |                          |      |      |      |  |
| 1) For Each antenna port                           | 11                       | 13   | 15   | dBm  |  |
| 3. Spectrum Mask @ target power                    |                          |      |      |      |  |
| 1) at fc +/-11MHz                                  | -                        | -    | -20  | dBr  |  |
| 2) at fc +/-20MHz                                  | -                        | -    | -28  | dBr  |  |
| 3) at fc > +/-30MHz                                | -                        | -    | -45  | dBr  |  |
| 4. 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   |  |
| 5. Frequency Error                                 | -25                      | -    | 25   | ppm  |  |
| RX Characteristics                                 | Min.                     | Typ. | Max. | Unit |  |
| 6. Minimum Input Level Sensitivity<br>(each chain) |                          |      |      |      |  |
| 1) MCS0 (PER ≤10%)                                 | -                        | -    | -82  | dBm  |  |
| 2) MCS1 (PER ≤10%)                                 | -                        | -    | -79  | dBm  |  |
| 3) MCS2 (PER ≤10%)                                 | -                        | -    | -77  | dBm  |  |
| 4) MCS3 (PER ≤10%)                                 | -                        | -    | -74  | dBm  |  |
| 5) MCS4 (PER ≤10%)                                 | -                        | -    | -70  | dBm  |  |
| 6) MCS5 (PER ≤10%)                                 | -                        | -    | -66  | dBm  |  |
| 7) MCS6 (PER ≤10%)                                 | -                        | -    | -65  | dBm  |  |
| 8) MCS7 (PER ≤10%)                                 | -                        | -    | -64  | dBm  |  |
| 7. Maximum Input Level (PER ≤10%)                  | -20                      | -    | -    | dBm  |  |

## 9.4 IEEE 802.11n HT40 Section(2.4GHz)

| Items                                           | Contents                  |      |      |      |        |
|-------------------------------------------------|---------------------------|------|------|------|--------|
| Specification                                   | IEEE802.11n HT40 @ 2.4GHz |      |      |      |        |
| Mode                                            | OFDM                      |      |      |      |        |
| Channel                                         | CH3 to CH11               |      |      |      |        |
| Data rate (MCS index)                           | MCS0/1/2/3/4/5/6/7        |      |      |      |        |
|                                                 | Min.                      | Typ. | Max. | Unit | Remark |
| TX Characteristics                              | Min.                      | Typ. | Max. | Unit |        |
| 1. Power Levels (Calibrated)                    |                           |      |      |      |        |
| 1) For Each antenna port                        | 11                        | 13   | 15   | dBm  |        |
| 2. Spectrum Mask @target power                  |                           |      |      |      |        |
| 1) at fc +/-22MHz                               | -                         | -    | -20  | dBr  |        |
| 2) at fc +/-40MHz                               | -                         | -    | -28  | dBr  |        |
| 3) at fc > +/-60MHz                             | -                         | -    | -45  | dBr  |        |
| 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                              | -25                       | -    | 25   | ppm  |        |
| RX Characteristics                              | Min.                      | Typ. | Max. | Unit |        |
| 5. Minimum Input Level Sensitivity (each chain) |                           |      |      |      |        |
| 1) MCS0 (PER ≤10%)                              | -                         | -    | -79  | dBm  |        |
| 2) MCS1 (PER ≤10%)                              | -                         | -    | -76  | dBm  |        |
| 3) MCS2 (PER ≤10%)                              | -                         | -    | -74  | dBm  |        |
| 4) MCS3 (PER ≤10%)                              | -                         | -    | -71  | dBm  |        |
| 5) MCS4 (PER ≤10%)                              | -                         | -    | -67  | dBm  |        |
| 6) MCS5 (PER ≤10%)                              | -                         | -    | -63  | dBm  |        |
| 7) MCS6 (PER ≤10%)                              | -                         | -    | -62  | dBm  |        |
| 8) MCS7 (PER ≤10%)                              | -                         | -    | -61  | dBm  |        |
| 6. Maximum Input Level (PER ≤10%)               | -20                       | -    | -    | dBm  |        |

## 9.5 IEEE 802.11a Section

| Items                                             | Contents                         |      |      |      |        |
|---------------------------------------------------|----------------------------------|------|------|------|--------|
| Specification                                     | IEEE802.11a                      |      |      |      |        |
| Mode                                              | OFDM                             |      |      |      |        |
| Channel                                           | CH36 to CH165                    |      |      |      |        |
| Data rate                                         | 6, 9, 12, 18, 24, 36, 48, 54Mbps |      |      |      |        |
| TX Characteristics                                | Min.                             | Typ. | Max. | Unit | Remark |
| 1. Power Levels                                   |                                  |      |      |      |        |
| 1) For Each antenna port                          | 9                                | 11   | 13   | dBm  |        |
| 2. Spectrum Mask @ target power                   |                                  |      |      |      |        |
| 1) at fc +/-11MHz                                 | -                                | -    | -20  | dBr  |        |
| 2) at fc +/-20MHz                                 | -                                | -    | -28  | dBr  |        |
| 3) at fc > +/-30MHz                               | -                                | -    | -40  | dBr  |        |
| 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<br>(each chain) |                                  |      |      |      |        |
| 1) 6Mbps (PER ≤10%)                               | -                                | -    | -82  | dBm  |        |
| 2) 9Mbps (PER ≤10%)                               | -                                | -    | -81  | dBm  |        |
| 3) 12Mbps (PER ≤10%)                              | -                                | -    | -79  | dBm  |        |
| 4) 18Mbps (PER ≤10%)                              | -                                | -    | -77  | dBm  |        |
| 5) 24Mbps (PER ≤10%)                              | -                                | -    | -74  | dBm  |        |
| 6) 36Mbps (PER ≤10%)                              | -                                | -    | -70  | dBm  |        |
| 7) 48Mbps (PER ≤10%)                              | -                                | -    | -66  | dBm  |        |
| 8) 54Mbps (PER ≤10%)                              | -                                | -    | -65  | dBm  |        |
| 6 Maximum Input Level (PER ≤10%)                  | -30                              | -    | -    | dBm  |        |

## 9.6 IEEE 802.11n HT20 Section(5GHz)

| Items                                           | Contents                          |      |      |      |  |
|-------------------------------------------------|-----------------------------------|------|------|------|--|
| Specification                                   | EEE802.11n HT20 @ 5GHz            |      |      |      |  |
| Mode                                            | BPSK, QPSK, 16QAM, 64QAM and OFDM |      |      |      |  |
| Channel                                         | CH36 to CH165                     |      |      |      |  |
| Data rate (MCS index)                           | MCS0/1/2/3/4/5/6/7                |      |      |      |  |
| TX Characteristics                              | Min.                              | Typ. | Max. | Unit |  |
| 2. Power Levels                                 |                                   |      |      |      |  |
| 1) For Each antenna port                        | 8                                 | 10   | 12   | dBm  |  |
| 3. Spectrum Mask @ target power                 |                                   |      |      |      |  |
| 1) at fc +/-11MHz                               | -                                 | -    | -20  | dBr  |  |
| 2) at fc +/-20MHz                               | -                                 | -    | -28  | dBr  |  |
| 3) at fc > +/-30MHz                             | -                                 | -    | -45  | dBr  |  |
| 4. 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   |  |
| 5. Frequency Error                              | -20                               | -    | 20   | ppm  |  |
| RX Characteristics                              | Min.                              | Typ. | Max. | Unit |  |
| 7. Minimum Input Level Sensitivity (each chain) |                                   |      |      |      |  |
| 1) MCS0 (PER $\leq 10\%$ )                      | -                                 | -    | -82  | dBm  |  |
| 2) MCS1 (PER $\leq 10\%$ )                      | -                                 | -    | -79  | dBm  |  |
| 3) MCS2 (PER $\leq 10\%$ )                      | -                                 | -    | -77  | dBm  |  |
| 4) MCS3 (PER $\leq 10\%$ )                      | -                                 | -    | -74  | dBm  |  |
| 5) MCS4 (PER $\leq 10\%$ )                      | -                                 | -    | -70  | dBm  |  |
| 6) MCS5 (PER $\leq 10\%$ )                      | -                                 | -    | -66  | dBm  |  |
| 7) MCS6 (PER $\leq 10\%$ )                      | -                                 | -    | -65  | dBm  |  |
| 8) MCS7 (PER $\leq 10\%$ )                      | -                                 | -    | -64  | dBm  |  |
| 7. Maximum Input Level (PER $\leq 10\%$ )       | -30                               | -    | -    | dBm  |  |

## 9.7 IEEE 802.11n HT40 Section(5GHz)

| Items                                           | Contents                          |      |      |      |        |
|-------------------------------------------------|-----------------------------------|------|------|------|--------|
| Specification                                   | IEEE802.11n HT40 @ 5GHz           |      |      |      |        |
| Mode                                            | BPSK, QPSK, 16QAM, 64QAM and OFDM |      |      |      |        |
| Channel                                         | CH38 to CH163                     |      |      |      |        |
| Data rate (MCS index)                           | MCS0/1/2/3/4/5/6/7                |      |      |      |        |
|                                                 | Min.                              | Typ. | Max. | Unit | Remark |
| TX Characteristics                              | Min.                              | Typ. | Max. | Unit |        |
| 1. Power Levels (Calibrated)                    |                                   |      |      |      |        |
| 1) For Each antenna port                        | 8                                 | 10   | 12   | dBm  |        |
| 2. Spectrum Mask @target power                  |                                   |      |      |      |        |
| 1) at fc +/-21MHz                               | -                                 | -    | -20  | dBr  |        |
| 2) at fc +/-40MHz                               | -                                 | -    | -28  | dBr  |        |
| 3) at fc > +/-60MHz                             | -                                 | -    | -45  | dBr  |        |
| 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 |        |
| 6. Minimum Input Level Sensitivity (each chain) |                                   |      |      |      |        |
| 1) MCS0 (PER ≤10%)                              | -                                 | -    | -79  | dBm  |        |
| 2) MCS1 (PER ≤10%)                              | -                                 | -    | -76  | dBm  |        |
| 3) MCS2 (PER ≤10%)                              | -                                 | -    | -74  | dBm  |        |
| 4) MCS3 (PER ≤10%)                              | -                                 | -    | -71  | dBm  |        |
| 5) MCS4 (PER ≤10%)                              | -                                 | -    | -67  | dBm  |        |
| 6) MCS5 (PER ≤10%)                              | -                                 | -    | -63  | dBm  |        |
| 7) MCS6 (PER ≤10%)                              | -                                 | -    | -62  | dBm  |        |
| 8) MCS7 (PER ≤10%)                              | -                                 | -    | -61  | dBm  |        |
| 6. Maximum Input Level (PER ≤10%)               | -30                               | -    | -    | dBm  |        |

## 9.8 IEEE 802.11ac Section

| Items                                               | Contents                                                          |      |           |           |           |     |
|-----------------------------------------------------|-------------------------------------------------------------------|------|-----------|-----------|-----------|-----|
| Specification                                       | IEEE802.11ac                                                      |      |           |           |           |     |
| Mode                                                | BPSK, QPSK, 16QAM, 64QAM, 256QAM and OFDM                         |      |           |           |           |     |
| Channel                                             | CH36 to CH165 VHT20<br>CH38 to CH163 VHT40<br>CH42 to CH157 VHT80 |      |           |           |           |     |
| Data rate (MCS index)                               | MCS0/1/2/3/4/5/6/7/8/9                                            |      |           |           |           |     |
|                                                     | Min.                                                              | Typ. | Max.      | Unit      | Remark    |     |
| TX Characteristics                                  | Min.                                                              | Typ. | Max.      | Unit      |           |     |
| 1. Power Levels (Calibrated)                        |                                                                   |      |           |           |           |     |
| 1) For Each antenna port                            | 8                                                                 | 10   | 12        | dBm       |           |     |
| 2. Spectrum Mask<br>@VHT20/VHT40/VHT80 target power |                                                                   |      |           |           |           |     |
| 1) at fc +/-11MHz/21MHz/41MHz                       | -                                                                 | -    | -20       | dBr       |           |     |
| 2) at fc +/-20MHz/40MHz/80MHz                       | -                                                                 | -    | -28       | dBr       |           |     |
| 3) at fc +/-30MHz/60MHz/120MHz                      | -                                                                 | -    | -40       | dBr       |           |     |
| 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                                             | -                                                                 | -    | -27       | dB        |           |     |
| 9) MCS8                                             |                                                                   |      | -30       | dB        |           |     |
| 10) MCS9                                            |                                                                   |      | -32       | dB        |           |     |
| 4. Frequency Error                                  | -20                                                               | -    | 20        | ppm       |           |     |
| RX Characteristics                                  | Min.                                                              | Typ. | Max.      | Unit      |           |     |
| 7. Minimum Input Level Sensitivity<br>(each chain)  |                                                                   |      | VHT<br>20 | VHT<br>40 | VHT<br>80 |     |
| 1) MCS0 (PER ≤10%)                                  | -                                                                 | -    | -82       | -79       | -76       | dBm |
| 2) MCS1 (PER ≤10%)                                  | -                                                                 | -    | -79       | -76       | -73       | dBm |
| 3) MCS2 (PER ≤10%)                                  | -                                                                 | -    | -77       | -74       | -71       | dBm |
| 4) MCS3 (PER ≤10%)                                  | -                                                                 | -    | -74       | -71       | -68       | dBm |
| 5) MCS4 (PER ≤10%)                                  | -                                                                 | -    | -70       | -67       | -64       | dBm |
| 6) MCS5 (PER ≤10%)                                  | -                                                                 | -    | -66       | -63       | -60       | dBm |
| 7) MCS6 (PER ≤10%)                                  | -                                                                 | -    | -65       | -62       | -59       | dBm |
| 8) MCS7 (PER ≤10%)                                  | -                                                                 | -    | -64       | -61       | -58       | dBm |
| 9) MCS8 (PER ≤10%)                                  |                                                                   |      | -59       | -56       | -53       | dBm |

|                                           |     |   |     |     |     |     |  |
|-------------------------------------------|-----|---|-----|-----|-----|-----|--|
| 10) MCS9 (PER $\leq 10\%$ )               |     |   | -57 | -54 | -51 | dBm |  |
| 6. Maximum Input Level (PER $\leq 10\%$ ) | -30 | - | -   |     |     | dBm |  |

## 9.9 Bluetooth Section

| Items                                                                | Contents             |          |      |          |        |  |
|----------------------------------------------------------------------|----------------------|----------|------|----------|--------|--|
| Specification                                                        | BT2.1+BR/EDR/4.2     |          |      |          |        |  |
| Mode                                                                 | FHSS,GFSK,DPSK,DQPSK |          |      |          |        |  |
| Number of Channel                                                    | 79 Channels          |          |      |          |        |  |
| Frequency Band                                                       | 2.402 GHz ~2.480GHz  |          |      |          |        |  |
|                                                                      | Min.                 | Typ.     | Max. | Unit     | Remark |  |
| 1. Output Power                                                      |                      | 4        | -    | dBm      |        |  |
| 2. Gain step                                                         | 2                    | 4        | 8    | dB       |        |  |
| 3. Receiver sensitivity (BER $\leq 0.1\%$ )                          | -                    | -93.5    | -80  | dBm      |        |  |
| 4. Maximum usable signal (BER $\leq 0.1\%$ )                         | -                    | -5       | -    |          |        |  |
| 5. C/I co-channel (BER $<0.1\%$ )                                    | -                    | 4        | 11   | dB       |        |  |
| 6. C/I 1MHz (BER $<0.1\%$ )                                          | -                    | -14      | 0    | dB       |        |  |
| 7. C/I 2MHz (BER $<0.1\%$ )                                          | -                    | -42      | -30  | dB       |        |  |
| 8. C/I $\geq 3$ MHz (BER $<0.1\%$ )                                  | -                    | -49      | -40  | dB       |        |  |
| 9. C/I Image channel (BER $<0.1\%$ )                                 | -                    | -25      | -9   | dB       |        |  |
| 10. C/I Image 1MHz (BER $<0.1\%$ )                                   | -                    | -50      | -20  | dB       |        |  |
| 11. Inter-modulation                                                 | -                    | -13      | -    | dB       |        |  |
| 12. Out-of-band blocking                                             |                      |          |      |          |        |  |
| 1). 30MHz to 2000MHz                                                 | -10                  | -        | -    | dBm      |        |  |
| 2). 2000MHz to 2399MHz                                               | -27                  | -        | -    | dBm      |        |  |
| 3). 2498MHz to 3000MHz                                               | -27                  | -        | -    | dBm      |        |  |
| 4). 3000MHz to 12.75GHz                                              | -10                  | -        | -    | dBm      |        |  |
| 13. Modulation characteristics                                       |                      |          |      |          |        |  |
| 1). $\Delta f_{1avg}$                                                | 140                  | 157      | 175  | KHz      |        |  |
| 2). $\Delta f_{2max}$ (For at least 99.9% of all $\Delta f_{2max}$ ) | 115                  | 140      | -    | KHz      |        |  |
| 3). $\Delta f_{1avg} / \Delta f_{2avg}$                              | 0.8                  | 0.98     | -    | KHz      |        |  |
| 14. ICFT                                                             | -75                  | $\pm 20$ | +75  | KHz      |        |  |
| 15. Carrier frequency drift                                          |                      |          |      |          |        |  |
| 1). One slot packet (DH1)                                            | -25                  | $\pm 15$ | +25  | KHz      |        |  |
| 2). Two slot packet (DH3)                                            | -40                  | $\pm 15$ | +40  | KHz      |        |  |
| 3). Five slot packet (DH5)                                           | -40                  | $\pm 15$ | +40  | KHz      |        |  |
| 4). Max drift rate                                                   | -                    | 6        | 20   | KHz/50us |        |  |
| 16. TX output spectrum(20dB bandwidth)                               | -                    | 922      | 1000 | KHz      |        |  |
| 17. In-Band spurious emission                                        |                      |          |      |          |        |  |
| 1). $\pm 2$ MHz offset                                               | -                    | -45      | -20  | dBm      |        |  |
| 2). $\pm 3$ MHz offset                                               | -                    | -48      | -40  | dBm      |        |  |
| 3). $> \pm 3$ MHz offset                                             | -                    | -48      | -40  | 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 be 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 55 Hz to 30 Hz, 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.                                                                                                                                    |

|              |                                        |                                                                                                                                                                     |    |                                                                                                                                                                                        |
|--------------|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>10-6</b>  | <b>High temperature load life test</b> | Thermostat cabinet temperature:<br>55±5℃<br><br>Applied voltage:<br>110% rated voltage Working duration: 200 hour (Supply Voltage Cycle 23h power on, 1h power off) | 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.                                    |
| <b>10-7</b>  | <b>High temperature load test</b>      | Temperature: 55±5℃<br>Samples work for 16 hours                                                                                                                     | 3  | After test, the Appearance, Power, EVM and Frequency error shall be Satisfied with the test specification.                                                                             |
| <b>10-8</b>  | <b>Low temperature storage test</b>    | Leave the samples in -25±3℃@24 hours                                                                                                                                | 3  | Leave samples in standard test condition for 2 hours then test, the Appearance, Power, EVM and Frequency error shall be satisfied with the test specification.                         |
| <b>10-9</b>  | <b>Low temperature load test</b>       | Leave samples in -15±3℃@ 2 hours, samples' function shall be normal, the let samples work for 1 hour                                                                | 3  | After test, leave the samples in standard condition and tested the Appearance, Power, EVM and Frequency error shall be satisfied with the test specification.                          |
| <b>10-10</b> | <b>Temperature 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 condition and tested Power EVM and Frequency error shall be qualified and all the characters shall be satisfied with the test specification. |
| <b>10-11</b> | <b>Continuous 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 signal disconnection or interruption 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 after ESD test.                                                                                                                                  |

## 11. Package（包装）

（1）编带尺寸：

暂无

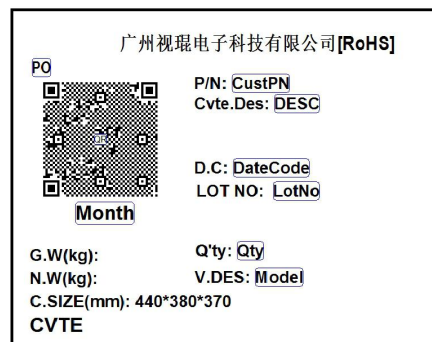
（2）编带方向：（箭头代表编带走向）

暂无

（3）包装示意图：

暂无

（4）标签样式：



内盒标签示例【具体内容根据系统打印为准】

## 12. Software Requirements（软件要求）

The driver supports the following operating systems: Microsoft Windows XP, Vista and Win7.

驱动程序支持以下操作系统：微软 Windows XP, Vista 和 win7。