广东美的制冷设备有限公司

GD Midea Air-Conditioning Equipment Co., Ltd.

模组规格书

Module specification

制造商名称：广东美的制冷设备有限公司

Manufacturer: GD Midea Air-Conditioning Equipment Co., Ltd.

模组名称： **WIFI 模块组件**

Module Name: Smart Kit

型号规格： **EU-SK110, US-SK110**

Type No.: EU-SK110, US-SK110

物料编码： **17310900004281**

Item Code: 17310900004281

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会签 Sign：

审核 Audit：

文档版本记录

Document revision history

版本（Revision）	日期（Date）	编辑（Approved by）	描述（Remarks）
Version 1.0	2023.7.5		Draft

1. 概述

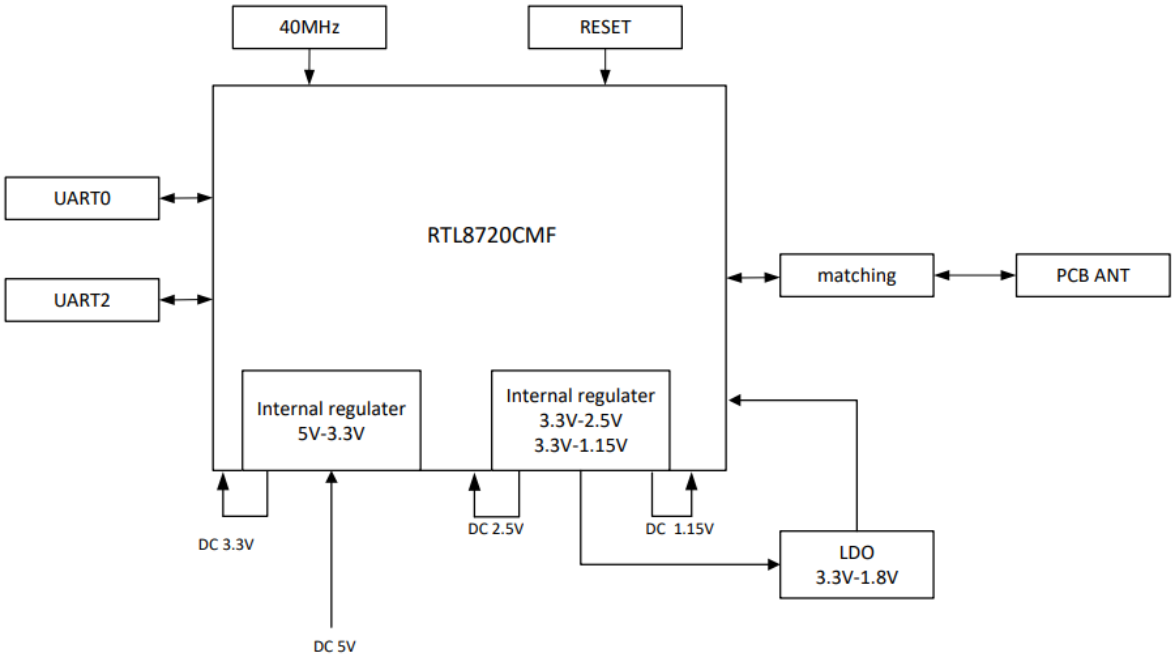
overview

EU-SK110/US-SK110是一款低成本低功耗的UART转串口的通用Wi-Fi+BLE模块，可以将UART数据介入互联网。该模块支持IEEE 802.11 b/g/n协议。该模块基于REALTEK RTL8720芯片设计，RTL8720是一种高度集成的单芯片，它具有应用处理器、低功耗Wi-Fi子系统、蓝牙子系统和电源管理单元。应用处理器子系统包括ARMv8-M、MCU、WLAN MAC。它还包括许多外围设备，包括UART、I2C、GPIO。它还包括嵌入式SRAM/ROM。

EU-SK107 is a low-cost and low-power UART to serial universal Wi Fi+BLE module that can connect UART data to the internet. This module supports the IEEE 802.11 b/g/n protocol. This module is designed based on the REALTEK RTL8720 chip, which is a highly integrated single chip with application processors, low-power Wi Fi subsystems, Bluetooth subsystems, and power management units. The application processor subsystem includes ARMv8-M, MCU, and WLAN MAC. It also includes many peripheral devices, including UART, I2C, and GPIO. It also includes embedded SRAM/ROM.

2. 原理框图

Block diagram



3. 基本功能

The basic function

1) 支持IEEE 802.11b/g/n协议

   Supports IEEE 802.11b/g/n protocol

2) 在2.4GHz频段内支持20MHz带宽

   Supports 20MHz bandwidth in the 2.4GHz band

3) 支持加密协议：WEP, WPA, WPA2，WPA3，TKIP

   Support encryption protocols: WEP, WPA, WPA2, WPA3, TKIP

4) 支持IPV4, TCP, UDP, DNS, HTTP等网络协议

   Support IPv4, TCP, UDP, DNS, HTTP and other network protocols

4. 模块参数

Module parameters

芯片 Chip	RTL8720
工作频率 Operating frequency	2.40~2.4835GHz
标准 Standard	802.11b/g/n(1*1)、Bluetooth 4.2 Low Energy
调制方式 Modulation system	11b: DBPSK, DQPSK and CCK and DSSS 11g: BPSK, QPSK, 16QAM, 64QAM and OFDM 11n: MCS0~7 OFDM BLE 4.2: GFSK
数据传输速率 Data transfer rates	11b: 1Mbps,2Mbps,5.5Mbps,11Mbps 11g: 6Mbps,9Mbps,12Mbps,18Mbps,24Mbps,36Mbps,48Mbps,54Mbps 11n: MCS0,MCS1,MCS2,MCS3,MCS4,MCS5,MCS5,MCS6,MCS7 BLE 4.2: 1Mbps
主接口 Main interface	Uart interface
模组与电控通讯波特率范围（输入/输出）bit/s	9600,14400,19200,38400,57600,115200 Uart RX/TX max tolerance ±2%

Module and electronic control board communication baud rate range （Input/Output）bit/s	
PCB 规格 PCB specification	2-layers design
PCB 尺寸 PCB size	18mm(W)*35.2mm(L)*1.0mm(T)
天线 Antenna	PCB Antenna
工作温度 Operating temperature	-20~85℃
工作电压 Operating voltage	4.5~5.5V

5. 射频特性

Radio frequency characteristics

5.1 IEEE802.11b

	参数	说明
1	标准 Standard	IEEE 802.11b
2	无线调制模式Wireless modulation mode	DQPSK , DBPSK and CCK with DSSS
3	工作频率 Operating frequency	2400~2483.5MHz ISM频道（ ISM band）
4	频道数 Channel Number	全球通用13个频道（13 channels）
5	速率 rate	最高11Mbps （at most 11Mbps）
6	媒体访问协议 Media Access Protocol	CSMA/CA with ACK
7	典型输出功率 Typical output power	17±2 dBm at 11Mbps @ 25℃
8	典型接收灵敏度 Typical reception sensitivity	-83 dBm for 11Mbps@ 25℃&丢包率小于8% (Packet loss rate less than 8%)

5.2 IEEE802.11g 部分

	参数	说明
1	标准 Standard	IEEE 802.11g
2	无线调制模式Wireless modulation mode	QPSK , BPSK , 16QAM ,64QAM with OFDM

3	工作频率 Operating frequency	2400~2483.5MHz ISM频道（ ISM band）
4	频道数 Channel Number	全球通用13个频道（13 channels）
5	速率 rate	最高54Mbps（at most 54Mbps）
6	媒体访问协议 Media Access Protocol	CSMA/CA with ACK
7	典型输出功率 Typical output power	15±2 dBm at 54Mbps @ 25℃
8	典型接收灵敏度 Typical reception sensitivity	-71 dBm for 54Mbps @ 25℃&丢包率小于10% (Packet loss rate less than 10%)

5.3 IEEE 802.11n 部分

	参数	说明
1	标准 Standard	IEEE 802.11n
2	无线调制模式Wireless modulation mode	BPSK , QPSK , 16QAM ,64QAM with OFDM
3	工作频率 Operating frequency	2.4GHz :2400 ~ 2483.5MHz
4	速率 rate	最高65Mbps（at most 65Mbps）
5	媒体访问协议 Media Access Protocol	CSMA/CA with ACK
6	典型输出功率 Typical output power	2.4GHz Band/HT20 14±2dBm at MCS7 @ 25℃
7	典型接收灵敏度 Typical reception sensitivity	2.4GHz Band/HT20 -68dBm at MCS7 @ 25℃&丢包率小于10% (Packet loss rate less than 10%)

5.4 蓝牙部分

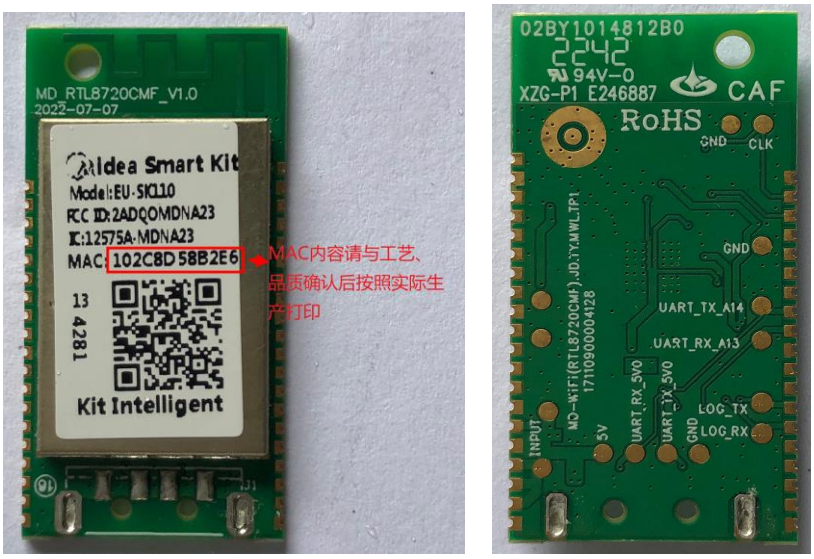
	参数	说明
1	标准 Standard	4.2
2	无线调制模式Wireless modulation mode	GFSK
3	工作频率 Operating frequency	2.4GHz :2400 ~ 2483.5MHz
4	速率 rate	最高1Mbps（at most 1Mbps）
5	媒体访问协议 Media Access Protocol	L2CAP and LL.
6	天线输出功率 Antenna Output Power	4.5dBm（不含天线输出功率）(excluding antenna output power)
7	天线接收灵敏度 Antenna reception sensitivity	-100dB（扣除spur channel，不含天线接收灵敏度） (Excluding Spur channel, excluding antenna reception sensitivity)

6. 外观尺寸图（单位：mm）

Appearance dimensions（Unit：mm）

6.1 实物图

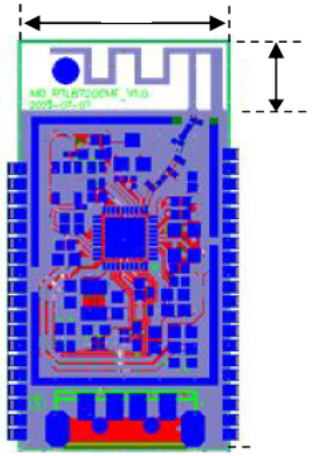
Real figure



7. 天线信息 Antenna Information

7.1 Antenna Type

PCB onboard antenna:17.5mm*3.8mm



7.2 Antenna Interference Reduction

To ensure optimal RF performance, it is recommended that the antenna be at least 15 mm away from other metal parts. If metal materials are wrapped around the antenna, the wireless signals will be reduced greatly, deteriorating the RF performance. Because the antenna is inserted to the PCB, sufficient space needs to be reserved for the antenna. It is better there is no shielding cover and other similar equipment outside the antenna, no interference source of the same frequency band, and close to the wireless router to ensure good signal, and it is best to have no conflict between WiFi and the channel.

8. 器件使用注意事项

Precautions for device use

8.1 检测/使用时，轻拿轻放，避免碰撞、摔落，不可叠放、竖放，以防损坏。

When testing/using, handle with care, avoid collision, avoid fall. Do not stack, do not stand upright, to prevent damage

8.2 工作电压范围： 5V +/-5%。

Working voltage range: 5V +/-5%.

8.3 工作温度范围：-25 度~85 度，工作湿度：相对湿度小于 90%，如果超过可能会引起 WIFI 掉线等情况，但不会损坏。

Working temperature range: -25 degrees ~85 degrees, working humidity: relative humidity is less than 90%, if more than it may cause WIFI drop, but will not damage.

8.4 存储环境：防尘、防潮、防静电，温度：贮存温度：-40℃to +125℃； 湿度：5%-95%RH。

Storage environment: dustproof, moisture-proof, anti-static, temperature: storage temperature: -40℃ to +125℃; Humidity: 5% - 95% RH.

8.5 CAUTIONS

To satisfy FCC exterior labeling requirements, the following test must be placed on the exterior of the end product"Contains Transmitter module FCC ID: 2ADQOMDNA23"

To satisfy ISED exterior labeling requirements, the following text must be placed on the exterior of the end product "Contains Transmitter module IC: 12575A-MDNA23"

This product complies with Part 15.212 and 15.247 of the FCC rules.

This device complies with Part 15 of the FCC Rules and it 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 harmful interference, and

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

Only operate the device in accordance with the instructions supplied.

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

In Canada:

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 tout brouillage radioélectrique subi, même si le brouillage est susceptible d’ en compromettre le fonctionnement.

Cet ééquipement est conforme aux limites d exposition aux rayonnements de la IC éétablies pour un environnement non contrôéé. Cet ééquipement doit êêtre installé et fonctionner à au moins 20 cm de distance d un radiateur ou de votre corps.

Pour satisfaire alSED extérieur étiauetaae.le texte suivant doit être placéa’ extérieur du produit fina “Containsémetteur moduleIC:12575A-MDNA23”.

This radio module must not be installed to co-locate and operate simultaneously with other radios in the host system except by following FCC multi-transmitter product procedures. Additional testing and device authorization may be required to operate simultaneously with other radios.
The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination. The firmware setting is not accessible to the end-user.

The host product manufacturer is responsible for compliance with any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed. The separate approval is required for all other operating configurations including portable configurations with respect to Part 2.1093 and different antenna configuration.

The end-user manual shall include all required regulatory information/warnings as shown in this manual, including “This product must be installed and operated with a minimum distance of 20 cm between the radiator and user body”. The OEM integrator is responsible for ensuring that the end-user has no manual instructions to remove or install module.

This device is intended only for OEM integrators under the following conditions:

The antenna must be installed such that 20cm is maintained between the antenna and users, and the transmitter module may not be co-located with any other transmitter or antenna.

As long as the 2 conditions above are met, further transmitter tests 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.