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# 承 认 书

Customer name: \_\_\_\_\_

Model: RTL-00-V1.0

B&T P/N: \_\_\_\_\_

Spec.: SINGLE-CHIP 802.11b/g/n 1T1R WLAN SoC Module

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# SPECIFICATION

## SINGLE-CHIP 802.11b/g/n 1T1R WLAN SoC Module

RTL-00-V1.0

Version: V1.1



# 1. Overview

The RTL-00-V1.0 is a highly integrated Wi-Fi SOC module, Main chip is RTL8710AF is a highly integrated single-chip low power 802.11n Wireless LAN (WLAN) network controller. It combines an ARM-CM3 MCU, WLAN MAC, a 1T1R capable WLAN baseband, and RF in a single chip. It also provides a bunch of configurable GPIOs which are configured as digital peripherals for different applications and control usage.

RTL-00-V1.0 integrates internal memories for complete WIFI protocol functions. The embedded memory configuration also provides simple application developments.

## 2. Features

### General

- Package SMT22 (24x16mm)
- CMOS MAC, Baseband PHY, and RF in a single chip for 802.11b/g/n compatible WLAN
- Complete 802.11n solution for 2.4GHz band

### Standards Supported

- 802.11b/g/n compatible WLAN
- 802.11e QoS Enhancement (WMM)
- 802.11i (WPA, WPA2). Open, shared key, and pair-wise key authentication

services

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- WIFI Direct support
- Light Weight TCP/IP protocol

## WLAN PHY Features

- 802.11n OFDM
- One Transmit and one Receive path (1T1R)
- 20MHz & 40MHz bandwidth transmission
- Short Guard Interval (400ns)
- DSSS with DBPSK and DQPSK, CCK modulation with long and short preamble
- OFDM with BPSK, QPSK, 16QAM, and 64QAM modulation. Convolutional Coding Rate: 1/2, 2/3, 3/4, and 5/6
- Maximum data rate 54Mbps in 802.11g and 150Mbps in 802.11n

## Peripheral Interfaces

- 1 high speed UART interface with baud rate up to 4MHz
- 1 low speed UART interface
- 1 log UART with standard baud rate support
- 1 I2C interface
- 1 SPI supported with baud rate up to 10.4MHz (master).
- Maximum 16 GPIO pins

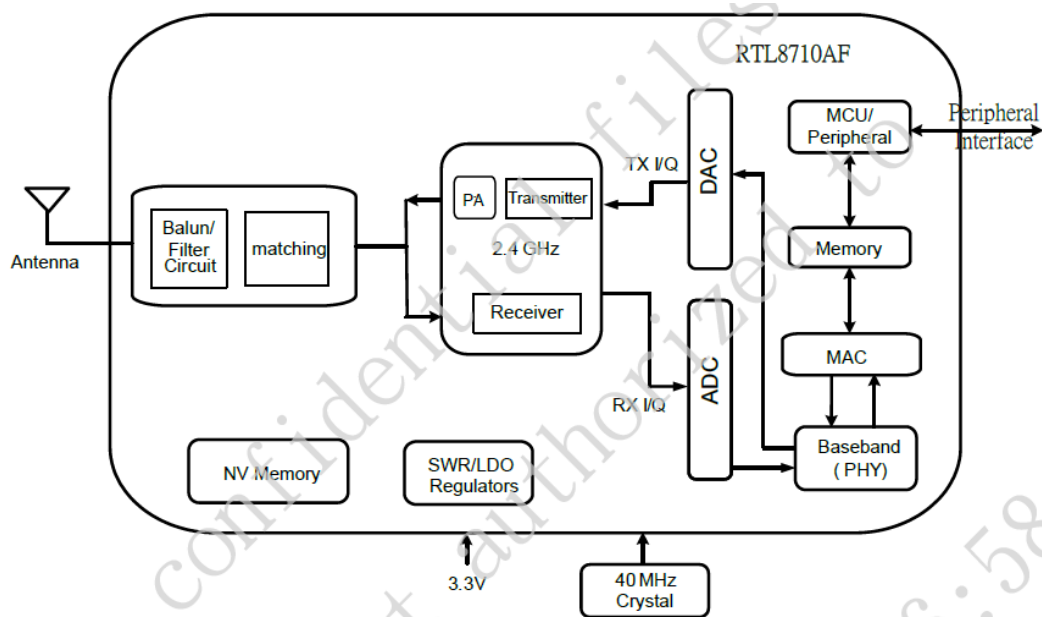
# 3. Applications

- M2M
- Smart LED
- Remote sensing

# 4. General Specification

Model	RTL-00-V1.0
Product Name	SoC WiFi module
Major Chipset	RTL8710AF
Standard	802.11 a/b/g/n
Interface	UART,I2C,SPI,GPIO
Power Supply	3.3±10%Vdc
Operating Temperature	-20 ~ +85° C ambient temperature
Storage Temperature	-40 ~ 125°C ambient temperature
Humidity	5 to 90 % maximum (non-condensing)
Dimension	24.0 x16.0x 2.5mm (LxWxH) ±0.2mm

# 5. Block Diagram



## 6. Electrical Specifications

### 1) Power Consumption

Power Consumption	Min.	Typ.	Max.	Unit
Normal	-	30	300	mA
Modem-Sleep <sup>①</sup>		15		mA
Light-Sleep <sup>②</sup>		0.9		mA
Deep-Sleep <sup>③</sup>		10		uA

Note 1: Modem-Sleep is used to require the CPU to be active at all times, such as PWM or I2S applications. When there is no data transmission, if there is no data transmission, the WiFi Modem circuit can be turned off according to the 802.11 standard (such as U-APSD) to save power. For example, in DTIM3, every sleep 300ms, wake up 3ms to receive the AP's Beacon package, etc., the overall average current is 15mA.

Note 2: Light-Sleep is used for CPU-suspended applications such as WiFi switches. When there is no data transmission, if there is no data transmission, the WiFi Modem circuit can be turned off according to the 802.11 standard (such as U-APSD) and the CPU can be suspended to save power. For example, in DTIM3, each sleep 300 ms, wake up 3ms to receive the AP's Beacon package, etc., the overall average current is about 0.9mA.

Note 3: Deep-Sleep does not need to maintain a WiFi connection all the time, and it only takes a long time to send a packet application, such as a sensor that measures temperature every 100 seconds. For example, after waking up every 300 s, it takes 0.3s - 1s to connect to the AP to send data, the overall average current can be much less than 1 mA. (Default FW not support Deep-Sleep)

### 2) RF Characteristics for IEEE802.11b

Items	Contents			
Specification	IEEE802.11b			
Mode	CCK 11 Mbps			
Channel frequency	2412 ~ 2484 MHz			
Freq.Error(±15ppm)	±15 ppm			
RX (PER≤-76dBm@8%)	-82 dBm			
TX Characteristics	Min.	Typ.	Max.	Unit
Power Level (15±2 dBm)		15		dBm
EVM (≤-18)		-22		dB

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### 3) RF Characteristics for IEEE802.11g

Items	Contents			
Specification	IEEE802.11g			
Mode	OFDM 54Mbps			
Channel frequency	2412 ~ 2484 MHz			
Freq.Error( $\pm 15$ ppm)	$\pm 15$ ppm			
RX (PER $\leq$ -65dBm@10%)	-67 dBm			
TX Characteristics	Min.	Typ.	Max.	Unit
Power Level (13 $\pm$ 2 dBm)		13		dBm
EVM ( $\leq$ -25)		-32		dB

### 4) RF Characteristics for IEEE802.11n (BW20\_MCS7)

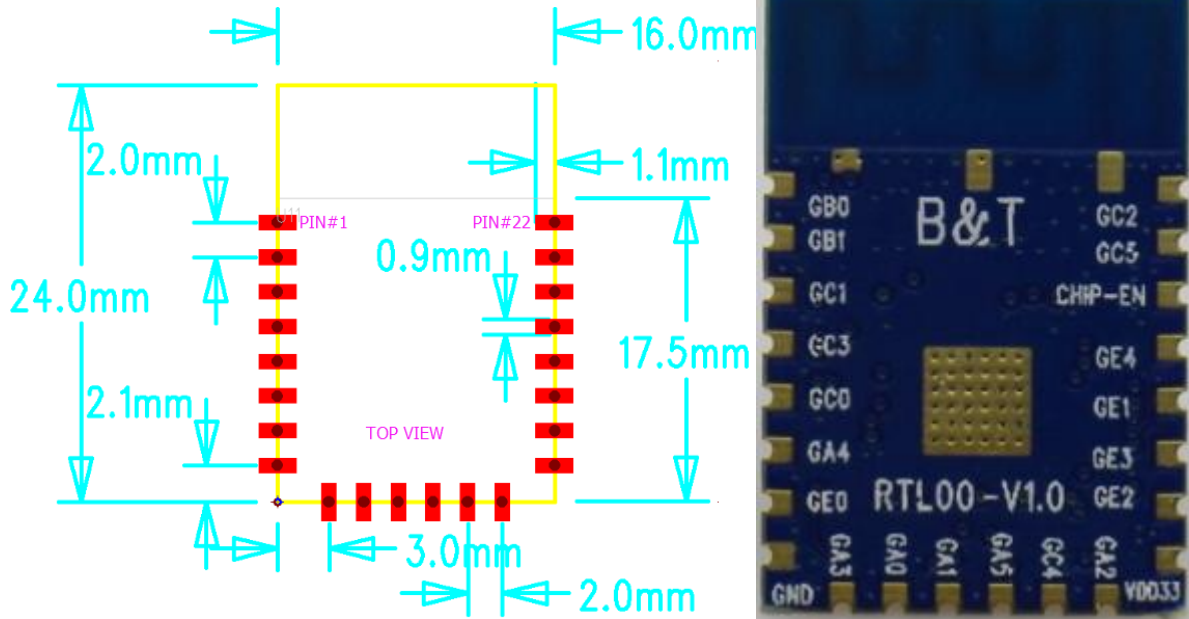
Items	Contents			
Specification	IEEE802.11n BW20_MCS7			
Mode	BW20_MCS7 65 Mbps			
Channel frequency	2412 ~ 2484 MHz			
Freq.Error( $\pm 15$ ppm)	$\pm 15$ ppm			
RX (PER $\leq$ -64dBm@10%)	-65 dBm			
TX Characteristics	Min.	Typ.	Max.	Unit
Power Level (12 $\pm$ 2 dBm)		12		dBm
EVM ( $\leq$ -28)		-32		dB

### 5) RF Characteristics for IEEE802.11n (BW40\_MCS7)

Items	Contents			
Specification	IEEE802.11n BW40_MCS7			
Mode	BW40_MCS7 135 Mbps			
Channel frequency	2412 ~ 2484 MHz			
Freq.Error( $\pm 15$ ppm)	$\pm 15$ ppm			
RX (PER $\leq$ -61dBm@10%)	-63 dBm			
TX Characteristics	Min.	Typ.	Max.	Unit
Power Level (12 $\pm$ 2 dBm)		12		dBm
EVM ( $\leq$ -28)		-32		dB



# 7. Package Dimensions & Pin Definition



Pin No.	Definition	I/O	Description
1	GPIOC_2	IO	UART0_RTS,SPI0_MOSI
2	GPIOC_5	IO	I2C1_SCL, SPI0_CS2
3	CHIP_EN	I	Enable chip. 1: enable chip; 0: shutdown chip
4	GPIOE_4	IO	JTAG_CLK
5	GPIOE_1	IO	JTAG_TDI
6	GPIOE_3	IO	JTAG_TMS
7	GPIOE_2	IO	JTAG_TDO
8	VDD33	Power	3.3V INPUT
9	GPIOA_2	NA	Only for RTL8711AF
10	GPIOC_4	IO	I2C1_SDA, SPI0_CS1
11	GPIOA_5	IO	WKDT:D_SBY0
12	GPIOA_1	NA	Only for RTL8711AF
13	GPIOA_0	IO	UART2_IN
14	GPIOA_3	NA	Only for RTL8711AF
15	GND	Power	Ground
16	GPIOE_0	IO	JTAG_TRST
17	GPIOA_4	IO	UART2_OUT
18	GPIOC_0	IO	UART0_IN, SPI0_CS0
19	GPIOC_3	IO	UART0_OUT, SPI0_MISO
20	GPIOC_1	IO	UART0_CTS, SPI0_CLK
21	GPIOB_1	IO	UART_LOG_IN
22	GPIOB_0	IO	UART-LOG_OUT

# 8. Application circuit reference

