



## PRODUCT SPECIFICATION

<b>MODEL</b>	<b>PE-IOT-11AF</b>
<b>PRODUCT DESCRIPTION</b>	<b>802.11 b/g/n 2.4GHz 1T1R WLAN SoC Module</b>
<b>TYPE</b>	<b>LGA Module 53-PIN</b>
<b>DIMENSION</b>	<b>22.25mm*19mm*2.25mm</b>
<b>MAIN CHIPSET</b>	<b>Realtek RTL8711AF</b>

**Revision: V1.0**

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**REVISION HISTORY**

<b>Revision</b>	<b>Issue Date</b>	<b>Change Note</b>
1.0	Mar.20, 2016	First Released

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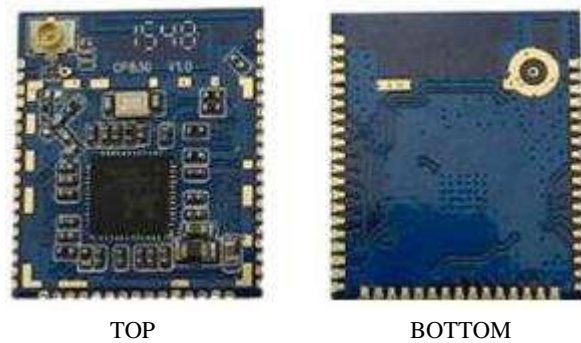
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## 1. INTRODUCTION

**PE-IOT-11AF** is a WLAN 11n module , It combines 802.11 1T1R b/g/n that achieves a data rate up to 150Mbps, it's short guard interval ( 400ns ). WLAN MAC supports 802.11e for multimedia applications, 802.11i for security. Power saving Mechanisms such as legacy power Save, and U-APSD, reduce the power wasted during idle item, and compensates for the extra power required to transmit OFDM.

This module supports WiFi Station/Soft AP /con-current mode. It is ideal for multi-purpose installation for Machine to Machine ( M2M )device. It runs FreeRTOS for Cortex M3 MCU insides. By supporting encryption 64/128-bits WEP/TKIP and authenaticon, 802,11i ( WPA, WPA2, Open ), helps to protect your data and privacy during transmission. This module could be smaller, thinner, less weight

### Appearance



## 2. FEATURES

Realtek RTL8711AF single chip with I2C/I2S/SPI/SDIO/UART/PWM/JTAG/GPIOs interface.

ROM/RAM inside ( 1MB/2M+512kB ).

IEEE802.11 b/g/n 1T1R ARM Cortex M3 166MHz.

Internal 1MB Flash.

IAR/DAP development tool

FreeRTOS & Lightweight TCP/IP ( lwIP )

I2S with 8/16/32/48/44.1KHz sample rate

Max 2 I2Cs interface

SPI supported, one supports buad rate up to 41.5MHz, the other one supports buad rate up to 15MHz

PCM with 8/16KHz sample rate

Support 3 PWMs with configurable duration and duty cycle from 0~100%

Max 2 high speed UARTs with buad rate up to 4MHz

1 log/debug UART with standard buad rate

15 GPIOs

### 2.1 Standards Supported

Operates in 2.4 GHz frequency bands

1x1 MIMO technology improves effective throughput and range over existing 802.11 b/g products

Data rates: up to 150Mbps

802.11e-compatible bursting and I standards

BPSK, QPSK, 16 QAM, 64 QAM modulation schemes

WEP, TKIP, and AES, WPA, WPA2 hardware encryption schemes

Power saving mechanism

WIFI WPS support

WIFI Direct support

Fully-featured software utility for easy configuration and management

ROHS compliance

Low Halogen compliance

### 3. SPECIFICATIONS

#### 3.1 GENERAL SPECIFICATIONS

<b>Model Name</b>	<b>PE-IOT-11AF</b>
<b>Main Chipset</b>	<b>Realtek RTL8711AF</b>
<b>Interface</b>	JTAG,SDIO,UART,I2C,SPI,I2S,,PCM,PWM,ETE,GPIO
<b>Dimensions</b>	L*W*H = 22.5mm*19mm*2mm
<b>Operating voltage</b>	+3.3 V

#### 3.2 ELECTRICAL CHARACTERISTICS

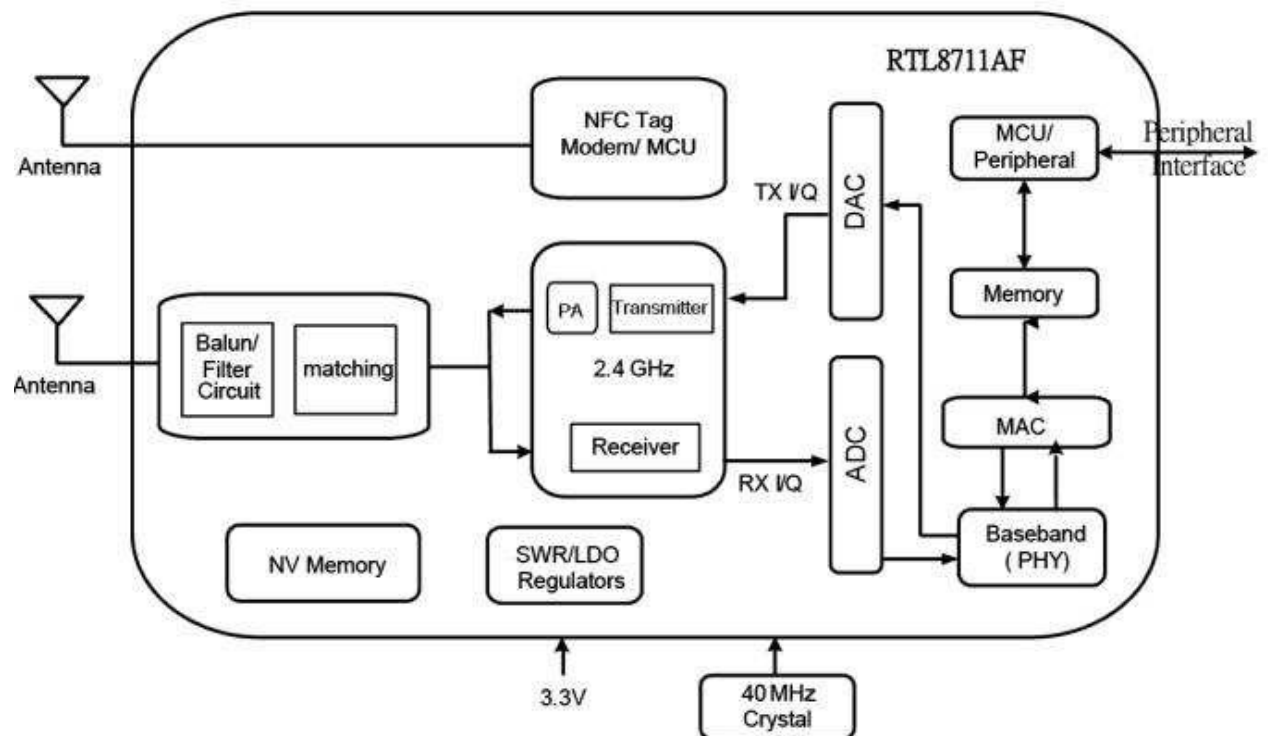
<b>Data Transfer Rate</b>	<b>802.11b</b>	11, 5.5, 2, 1 Mbps
	<b>802.11g</b>	54, 48, 36, 24, 18, 12, 9, 6 Mbps
	<b>802.11n</b>	MCS 0 to 7 for HT20MHz MCS 0 to 7 for HT40MHz
<b>Modulation</b>	<b>802.11b</b>	CCK, DQPSK, DBPSK
	<b>802.11g</b>	64 QAM, 16 QAM, QPSK, BPSK
	<b>802.11n</b>	64 QAM, 16 QAM, QPSK, BPSK
<b>Operation Mode</b>	Ad hoc mode (Peer-to-Peer) Infrastructure mode	

<b>Operating Channel</b>	11: (Ch. 1-11) – United State 13: (Ch. 1-13) – Europe 14: (Ch. 1-14) – Japan
<b>Security</b>	WEP, TKIP, AES, WPA, WPA2

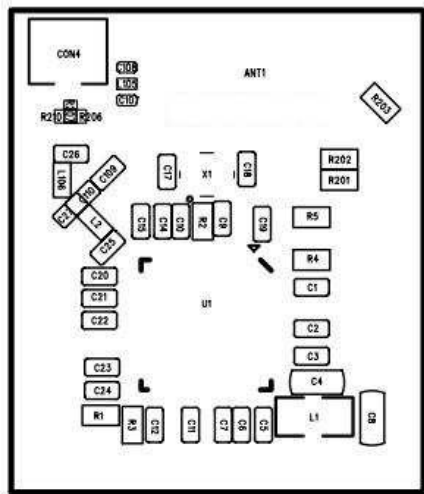
### 3.3 RF PERFORMANCE

<b>Transmit Output Power 1x1 (Tolerance: ±2dBm)</b>	<b>802.11b@11Mbps</b> 16dBm	<b>802.11g@54Mbps</b> 15dBm	<b>802.11n</b> 13dBm (MCS 0_HT20) 13dBm (MCS 7_HT20) 12dBm (MCS 0_HT40) 12dBm (MCS 7_HT40)
<b>Receiver Sensitivity</b>	<b>802.11b@11Mbps</b> -82dBm	<b>802.11g@54Mbps</b> -71dBm	<b>802.11n</b> -67dBm (MCS 7_HT20) -64dBm (MCS 7_HT40)

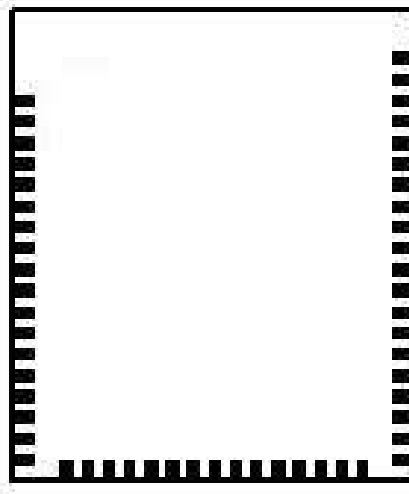
### 3.4 BLOCK DIAGRAM



### 3.5MODULE PIN ASSIGNMENT



**Top layer (Top View)**



**Bottom Layer (Top View)**

Fig.3.5\_1

Pin	Signal	I/O	Description
1	GND	I	Ground
2	CHIP_EN	I	Ground
3	GPIOD_4	I/O	NC
4	GPIOD_5	I/O	NC
5	GPIOD_6	I/O	NC
6	GPIOD_7	I/O	NC
7	VDDIO_E	P	GPIOE and GPIOC group IO power
8	GPIOE_5	I/O	NC
9	GPIOE_4	I/O	JTAG CLK
10	GPIOE_3	I/O	JTAG TMS
11	GPIOE_2	I/O	JTAG TDO
12	GPIOE_1	I/O	JTAG TDI
13	GPIOE_0	I/O	JTAG TRST
14	ADC_CH1	I	NC
15	ADC_CH2	I	NC
16	DAC_CH0	I	NC
17	GND	I	Ground
18	CHIP_ENAB	I	1: enable chip 0: disable chip in shutdown mode

19	GPIOA_0	I/O	SDIO bus SD_D2
20	GPIOA_1	I/O	SDIO bus SD_D3
21	GPIOA_2	I/O	SDIO bus SD_CMD
22	GPIOA_3	I/O	SDIO bus SD_CLK
23	GPIOA_4	I/O	SDIO bus SD_D0
24	GPIOA_5	IO	SDIO bus SD_D1
25	GPIOA_7	I/O	NC
26	GPIOA_6	I/O	NC
27	GND_USB	I	Ground
28	HSDM	I/O	NC
29	HSDP	I/O	NC
30	GND	I	Ground
31	VDDIO2	P	SDIO bus IO power
32	N/A		NC
33	GND	I	Ground
34	VD33	P	DC 3.3V power supply
35	GND	I	Ground
36	GPIOC_3	I/O	GPIO pin
37	GPIOC_2	I/O	GPIO pin
38	GPIOC_1	I/O	GPIO pin
39	GPIOC_0	I/O	GPIO pin
40	GPIOC_4	I/O	GPIO pin
41	GPIOC_5	I/O	GPIO pin
42	GPIOB_3	I/O	GPIO pin
43	GPIOB_2	I/O	GPIO pin
44	GPIOB_1	I/O	GPIO pin
45	GPIOB_0	I/O	GPIO pin
46	GPIOB_4	I/O	NC
47	GPIOB_5	I/O	NC
48	GND	I	Ground
49	NFCIP	I	NFC input differential signal
50	NFCIN	I	NFC input differential signal



51	GND	I	Ground
52	GND	I	Ground
53	RF_OUT	I/O	WL RF signal

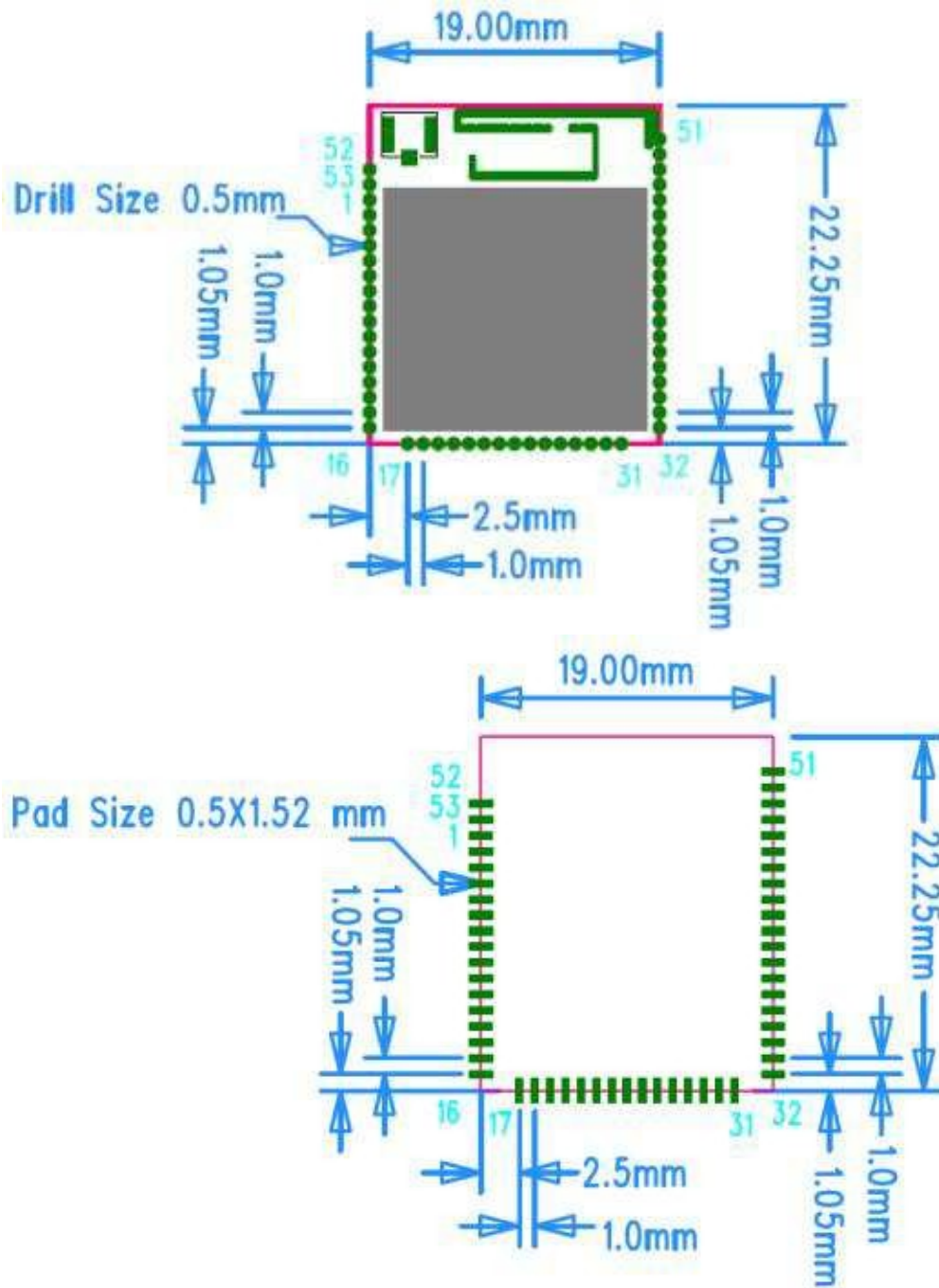
(NC) means NC in actual circuit design. To avoid confusing, those pins are unused although the pin function is shown in the following diagram.

PIN name	JTAG	UART Functon	I2C Group	SPI Group	I2S GROUP	PCM Group	WL_LED0	PWM	WKDT	GPIO_INT
GPIOA_0		UART2_IN		SPI1_MISO						GPIO_INT
GPIOA_1		UART2_CTS		SPI1_MOSI						GPIO_INT
GPIOA_2		UART2_RTS		SPI1_CLK						
GPIOA_3		UART0_RTS								
GPIOA_4		UART2_OUT		SPI1_CS						
GPIOA_5		UART0_CTS							WKDT0	
GPIOA_6		UART0_IN								
GPIOA_7		UART0_OUT								
GPIOB_0		UART_LOG_OUT								
GPIOB_1		UART LOG IN					WL_LED0			
GPIOB_2			I2C3_SCL							
GPIOB_3			I2C3_SDA							GPIO_INT
GPIOB_4							WL_LED0	PWM0		GPIO_INT
GPIOB_5							WL_LED0	PWM1		
GPIOC_0		UART0_IN		SPIO_CS0	I2S1_WS	PCM1_SYNC		PWM0		
GPIOC_1		UART0_CTS		SPIO_CLK	I2S1_CLK	PCM1_CLK		PWM1		GPIO_INT
GPIOC_2		UART0_RTS		SPIO_MOSI	I2S1_SD_TX	PCM1_OUT		PWM2		
GPIOC_3		UART0_OUT		SPIO_MISO	I2S1_MCK	PCM1_IN		PWM3		GPIO_INT
GPIOC_4			I2C1_SDA	SPIO_CS1	I2S1_SD_RX					GPIO_INT
GPIOC_5			I2C1_SCL	SPIO_CS2						GPIO_INT
GPIOD_4		UART2_IN	I2C0_SDA	SPI1_CS		PCM1_SYNC		PWM0		GPIO_INT
GPIOD_5		UART2_CTS	I2C0_SCL	SPI1_CLK		PCM1_CLK		PWM1	WKDT2	GPIO_INT
GPIOD_6	JTAG	UART2_RTS	I2C1_SCL	SPI1_MOSI	I2S0_SD_RX	PCM1_OUT		PWM2		GPIO_INT
GPIOD_7		UART2_OUT	I2C1_SDA	SPIO_MISO		PCM1_IN		PWM3		GPIO_INT
GPIOE_0	TAG_TRST	UART0_OUT	I2C2_SCL	SPIO_CS0	I2S0_WS	PCM0_SYNC		PWM0		
GPIOE_1	TAG_TDI	UART0_RTS	I2C2_SDA	SPIO_CLK	I2S0_CLK	PCM0_CLK		PWM1		GPIO_INT
GPIOE_2	TAG_TDO	UART0_CTS	I2C3_SCL	SPIO_MOSI	I2S0_SD_TX	PCM0_OUT		PWM2		GPIO_INT
GPIOE_3	TAG_TMS	UART0_IN	I2C3_SDA	SPIO_MISO	I2S0_MCK	PCM0_IN		PWM3	WKDT3	GPIO_INT
GPIOE_4	TAG_CLK		I2C3_SCL	SPIO_CS1						
GPIOE_5			I2C3_SDA	SPIO_CS2						GPIO_INT

### 3.6 MECHANICAL

#### 3.6.1 Module Dimension

	Length	Width	Height		
<b>PCB Dimension</b>	22.25mm (±0.1)	19mm (±0.1)	0.6mm(±0.1)		
<b>Module Dimension</b>	22.25mm (±0.1)	19mm(±0.1)	<b>Component Height</b>	<b>Top</b>	Max. 1.0mm
				<b>Bottom</b>	0mm
Total height = 2.0mm (Max.= 2.2mm)					



### 3.7 ENVIRONMENTAL

Operating	Operating Temperature: 0°C to +60°C Relative Humidity: 0-90% (non-condensing)
Storage	Temperature: -20°C to +70°C (non-operating) Relative Humidity: 0-95% (non-condensing)

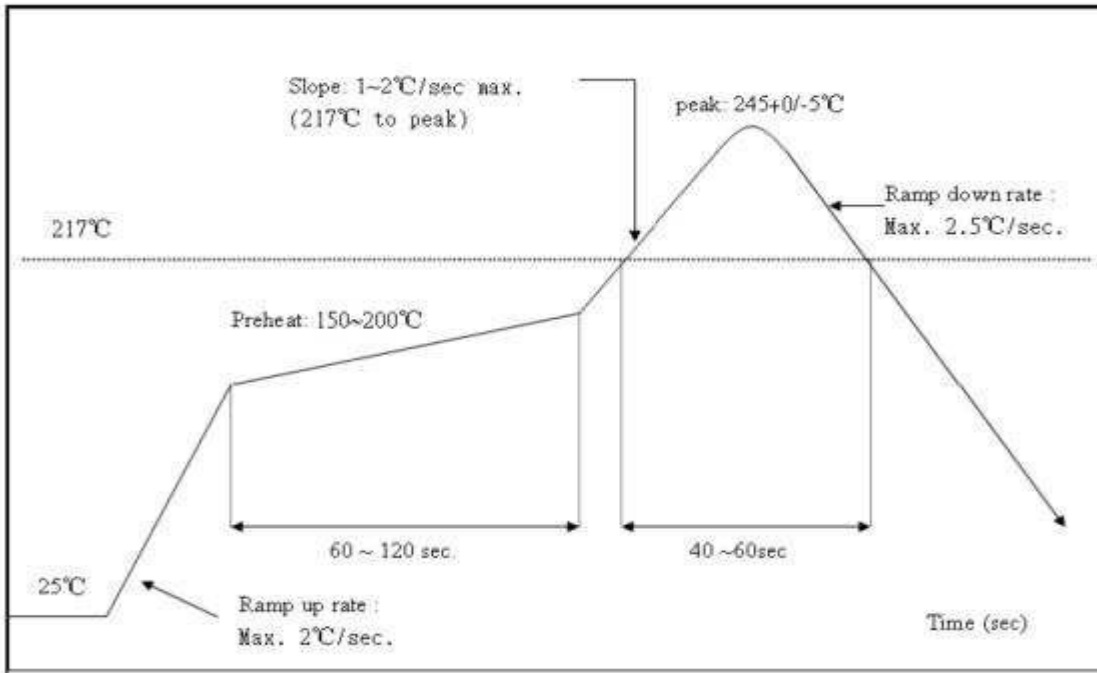
### 3.8 SOFTWARE

OS supported: Windows 8, 7, XP /Mac /Linux

## 4. Temperature

### 4.1 Reference Temperature Reflow Chart

Referred to IPC/JEDEC standard.  
 Peak Temperature : <math> < 250^{\circ}\text{C}</math>  
 Number of Times :  $\leq 2$  times



Note:

1. If the system PCBA is double side design please reflow the side without this module first.
2. Don't let the solder machine temperature over 250°C or follow solder paste vender's recommended temperature.
3. The Ramp-up temperature speed is 1~4 °C per second, the Ramp-down temperature speed is 1~4 °C per second.
4. This temperature reflow chart is for reference only, it depends on the manufacturing machine's characters requirement.

This module is surface mount device; please refer below conditions for drying before solder reflow processes.

Bake @ 125 oC		Bake @ 90 oC		Bake @ 40 oC	
Exceeding floor Life By > 72h	Exceeding floor Life By ≤ 72h	Exceeding floor Life By > 72h	Exceeding floor Life By ≤ 72h	Exceeding floor Life By > 72h	Exceeding floor Life By ≤ 72h
9 hours	7 hours	33 hours	23 hours	13 days	9 days