



欧智通科技

Fn-Link
6110R-IF

WiFi Single-band 1X1 11n

Product Specification

Revision History

Version	Date	Modifications	Draft	Approved
1.0	2016-12-26	Initial release	Colin Ming	WILLIAM TAN
1.1	2017-01-17	Add reference design	Colin Ming	WILLIAM TAN
1.2	2017-02-15	Modified module height	Colin Ming	WILLIAM TAN
1.3	2017-04-05	Modified operating temperature	Colin Ming	WILLIAM TAN

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1. Introduction

6110R-IF is a highly integrated module with low power 802.11n Wireless LAN(WLAN) network controller. It combines an ARM-CM3 MCU, WLAN MAC, a 1T1R capable WLAN baseband, and RF function. It also provides a bunch of configurable GPIO which are configured as digital peripherals for different applications and control usage.

6110R-IF integrates internal memories for complete WIFI protocol functions.

6110R-IF integrates 1MB ROM to provide high access speed, low leakage memory. The ROM memory clock speed is up to 166MHz. The ROM lib provides the following functions:

- Boot Code and MCU initialization.
- Default UART driver.
- Non-flash booting functions and drivers.
- Peripheral libs.
- Security functions libs.

2. Features

General

- 22.6mm*13.0mm*2.1mm
- CMOS MAC, Baseband PHY, and RF in the module for 802.11b/g/n compatible WLAN
- Complete 802.11n solution for 2.4G band
- 150Mbps receive PHY rate and 150Mbps transmit PHY rate using 40MHz bandwidth

Standards Supported

- 802.11b/g/n compatible WLAN
- 802.11e QoS Enhancement(WMM)
- 802.11i(WPA,WP2). Open, shared key, and pair-wise key authentication services
- WiFi Direct support
- Light Weight TCP/IP protocol

WLAN PHY Features

- 802.11n OFDM
- One Transmit and one Receive path(1T1R)
- 20MHz and 40MHz bandwidth transmission
- Short Guard Interval(400ns)
- Maximum data rate 54Mbps in 802.11g and 150Mbps in 802.11n

Host Interface

- 2 high speed UART
- 1 I2C
- GPIO

The general block diagram for the module is shown in Figure 1

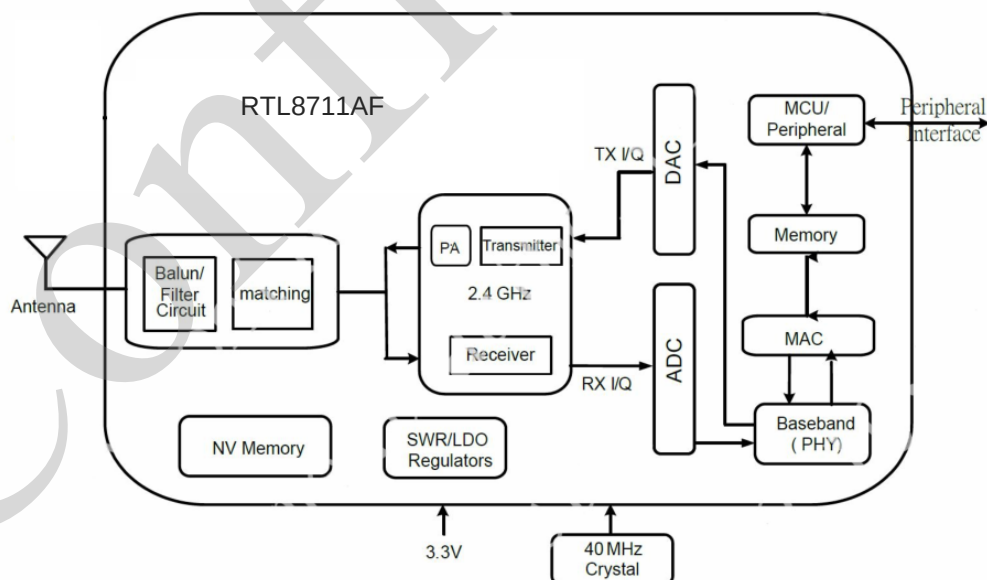


Figure 1

3. General specification

3.1 General Information

Model Name	6110R-IF
Main Chipset	Realtek RTL8710AF/ RTL8711AF
Host Interface	UART,GPIO,SDIO(8711AF)
Wifi Standards	802.11b/g/n
Other RF Standards	N/A
Dimension	L22.5mm*W13.0mm*H2.1mm

3.2 Operating Conditions

Operating Voltage	3.3±10% Vdc
Operating Temperature	-20°C to +85°C
Storage Temperature	-40°C to +80°C

4. WIFI RF Specification

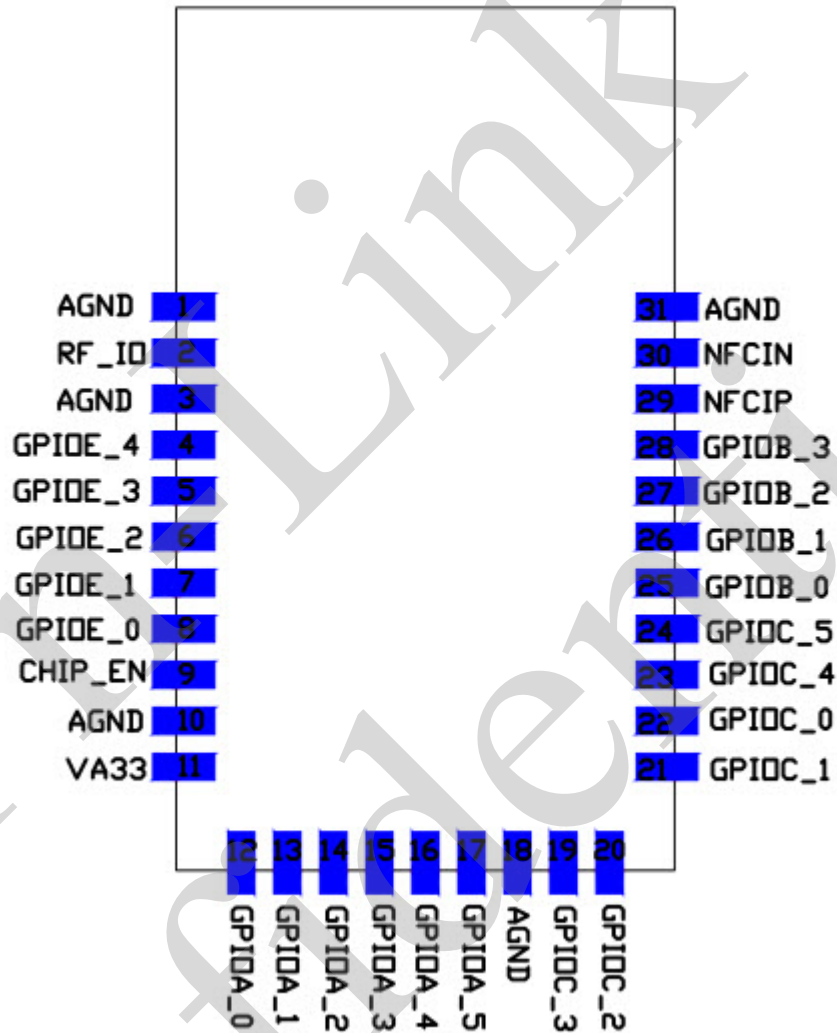
4.1 2.4GHz RF Specification

Operating Frequency	2.400~2.4835GHz
Channels	WiFi: USA/Canada: channel 1~11; Europe/China/Australia: channel 1~13; Japan: channel 1~14
Modulation	WiFi: 802.11b(DSSS): CCK(11, 5.5Mbps), DQPSK(2Mbps), DBPSK(1Mbps); 802.11g(OFDM): BPSK(9,6Mbps), QPSK(18,12Mbps), 16QAM(36,24Mbps), 64QAM(54,48Mbps); 802.11n(OFDM): BPSK, QPSK, 16QAM, 64QAM(150Mbps)
PHY Data rates	WiFi: 802.11b: 11,5.5,2,1 Mbps 802.11g: 54,48,36,24,18,12,9,6 Mbps 802.11n: up to 150Mbps
Output Power	WiFi: 802.11b $\leq 16.5\text{dBm}$ 802.11g $\leq 14.5\text{dBm}$ 802.11n $\leq 13.5\text{dBm}$
EVM	802.11b EVM $\leq 35\%$ 802.11g EVM $\leq -25\text{dB}$ 802.11n EVM $\leq -28\text{dB}$
Sensitivity	WiFi: 802.11b@8% PER 1Mbps -88dBm 2Mbps -87dBm 5.5Mbps -85dBm 11Mbps -82dBm 802.11g@10% PER 6Mbps -86dBm 9Mbps -85dBm 12Mbps -84dBm 18Mbps -82dBm 24Mbps -80dBm 36Mbps -77dBm 48Mbps -73dBm 54Mbps -71dBm 802.11n_HT20@10% PER MCS 0 -83dBm MCS 1 -82dBm MCS 2 -80dBm

	MCS 3 -78dBm MCS 4 -75dBm MCS 5 -71dBm MCS 6 -69dBm MCS 7 -67dBm
Network Architecture	WiFi: Ad-hoc mode (Peer-to-Peer) Infrastructure mode WiFi Direct
Security	802.11i(WPA,WP2). Open, shared key, and pair-wise key authentication services
Antenna	Integral Antenna (PCBA)

5. Pin Assignments

5.1 Pin outline



5.2 Pin Definition

Pin#	Name	Description
1	AGND	Ground connections
2	RF_IO	WLAN RF Signal
3	AGND	Ground connections
4	GPIOE_4	GPIO Pin. The MUX Function can be referred to Pin Function Table
5	GPIOE_3	GPIO Pin. The MUX Function can be referred to Pin Function Table
6	GPIOE_2	GPIO Pin. The MUX Function can be referred to Pin Function Table
7	GPIOE_1	GPIO Pin. The MUX Function can be referred to Pin Function Table
8	GPIOE_0	GPIO Pin. The MUX Function can be referred to Pin Function Table
9	CHIP_EN	Enable chip. 1: Enable Chip,0: Shut Down Chip.
10	AGND	Ground connections
11	VA33	3.3V Input
12	GPIOA_0	GPIO Pin. The MUX Function can be referred to Pin Function Table
13	GPIOA_1	GPIO Pin. The MUX Function can be referred to Pin Function Table
14	GPIOA_2	GPIO Pin. The MUX Function can be referred to Pin Function Table
15	GPIOA_3	GPIO Pin. The MUX Function can be referred to Pin Function Table
16	GPIOA_4	GPIO Pin. The MUX Function can be referred to Pin Function Table
17	GPIOA_5	GPIO Pin. The MUX Function can be referred to Pin Function Table
18	AGND	Ground connections
19	GPIOC_3	GPIO Pin. The MUX Function can be referred to Pin Function Table
20	GPIOC_2	GPIO Pin. The MUX Function can be referred to Pin Function Table
21	GPIOC_1	GPIO Pin. The MUX Function can be referred to Pin Function Table
22	GPIOC_0	GPIO Pin. The MUX Function can be referred to Pin Function Table
23	GPIOC_4	GPIO Pin. The MUX Function can be referred to Pin Function Table
24	GPIOC_5	GPIO Pin. The MUX Function can be referred to Pin Function Table

25	GPIOB_0	GPIO Pin. UART1_OUT(multiplexing)
26	GPIOB_1	GPIO Pin. UART1_IN(multiplexing)
27	GPIOB_2	GPIO Pin. The MUX Function can be referred to Pin Function Table
28	GPIOB_3	GPIO Pin. The MUX Function can be referred to Pin Function Table
29	IP	Input Differential Signal
30	IN	Input Differential Signal
31	AGND	Ground connections

5.2.1 Pin Function Group Table

(For 8710)

PIN name	JTAG	UART Group	I2C Group	SPI Group	WL_LED	WKDT	GPIO INT	Default State	SCHMT
GPIOA_0		UART2_IN					GPIO_INT	PH	0
GPIOA_4		UART2_OUT						PH	
GPIOA_5						D_SBY0		PH	
GPIOB_0		UART_LOG_OUT						HI	
GPIOB_1		UART_LOG_IN			WL_LED0	D_SLPO		PH	
GPIOB_2			I2C3_SCL					HI	0
GPIOB_3			I2C3_SDA				GPIO_INT	PH	
GPIOC_0		UART0_IN		SPI0_CS0				HI	
GPIOC_1		UART0_CTS		SPI0_CLK			GPIO_INT	HI	0
GPIOC_2		UART0_RTS		SPI0_MOSI				HI	
GPIOC_3		UART0_OUT		SPI0_MISO			GPIO_INT	HI	0
GPIOC_4				SPI0_CS1			GPIO_INT	HI	
GPIOE_0	JTAG_TRST							PH	0
GPIOE_1	JTAG_TDI							PH	0
GPIOE_2	JTAG_TDO							PH	0
GPIOE_3	JTAG_TMS							PH	0
GPIOE_4	JTAG_CLK							PH	0

Note1: PH = Pull-High, HI = High-impedance

Note2: Others' pull control can be done by register setting.

(For 8711)

PIN name	JTAG	SDIO	UART Group	I2C Group	SPI Group	I2S Group	PCM Group	WL_LED	PWM	ETE	WKDT	GPIO INT	Default State	SCHMT
GPIOA_0		SD_D2	UART2_IN		SPI1_MISO							GPIO_INT	PH	0
GPIOA_1		SD_D3	UART2_CTS		SPI1_MOSI							GPIO_INT	HI	
GPIOA_2		SD_CMD	UART2_RTS		SPI1_CLK								PH	0
GPIOA_3		SD_CLK											PH	0
GPIOA_4		SD_D0	UART2_OUT		SPI1_CS								PH	
GPIOA_5		SD_D1									D_SBY0		PH	
GPIOB_0			UART_LOG_OUT							ETE0			HI	
GPIOB_1			UART_LOG_IN					WL_LED0		ETE1	D_SLP0		PH	
GPIOB_2				I2C3_SCL						ETE2			HI	0
GPIOB_3				I2C3_SDA						ETE3		GPIO_INT	PH	
GPIOC_0			UART0_IN		SPI0_CS0	I2S1_WS	PCM1_SYNC		PWM0	ETE0			HI	
GPIOC_1			UART0_CTS		SPI0_CLK	I2S1_CLK	PCM1_CLK		PWM1	ETE1		GPIO_INT	HI	0
GPIOC_2			UART0_RTS		SPI0_MOSI	I2S1_SD_TX	PCM1_OUT		PWM2	ETE2			HI	
GPIOC_3			UART0_OUT		SPI0_MISO	I2S1_MCK	PCM1_IN		PWM3	ETE3		GPIO_INT	HI	0
GPIOC_4				I2C1_SDA	SPI0_CS1	I2S1_SD_RX						GPIO_INT	HI	
GPIOC_5				I2C1_SCL	SPI0_CS2							GPIO_INT	HI	0
GPIOE_0	JTAG_TRST		UART0_OUT	I2C2_SCL	SPI0_CS0		PCM0_SYNC		PWM0				PH	0
GPIOE_1	JTAG_TDI		UART0_RTS	I2C2_SDA	SPI0_CLK		PCM0_CLK		PWM1			GPIO_INT	PH	0
GPIOE_2	JTAG_TDO		UART0_CTS	I2C3_SCL	SPI0_MOSI		PCM0_OUT		PWM2			GPIO_INT	PH	0
GPIOE_3	JTAG_TMS		UART0_IN	I2C3_SDA	SPI0_MISO		PCM0_IN		PWM3		D_SBY3	GPIO_INT	PH	0
GPIOE_4	JTAG_CLK				SPI0_CS1								PH	0
GPIOF_5													HI	

Note1: PH = Pull-High, HI = High-impedance

Note2: GPIOA_1 needs external circuit to do the pull high control; Others' pull control can be done by register setting(including GPIOA_1's PD).

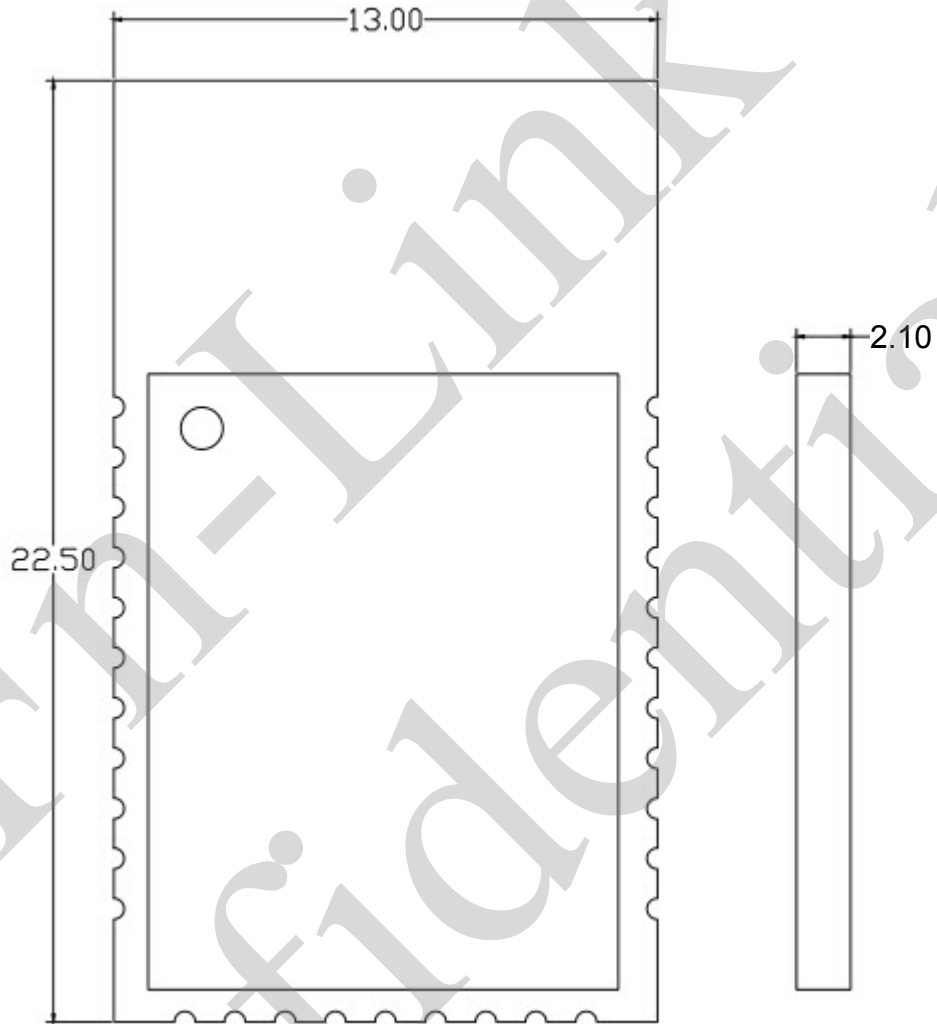
6. Ordering Information

Part No.	Description
FG6110RRF0-00	SOC model RTL8710AF.
FG6110RRF1-00	SOC model RTL8711AF

7. Dimensions

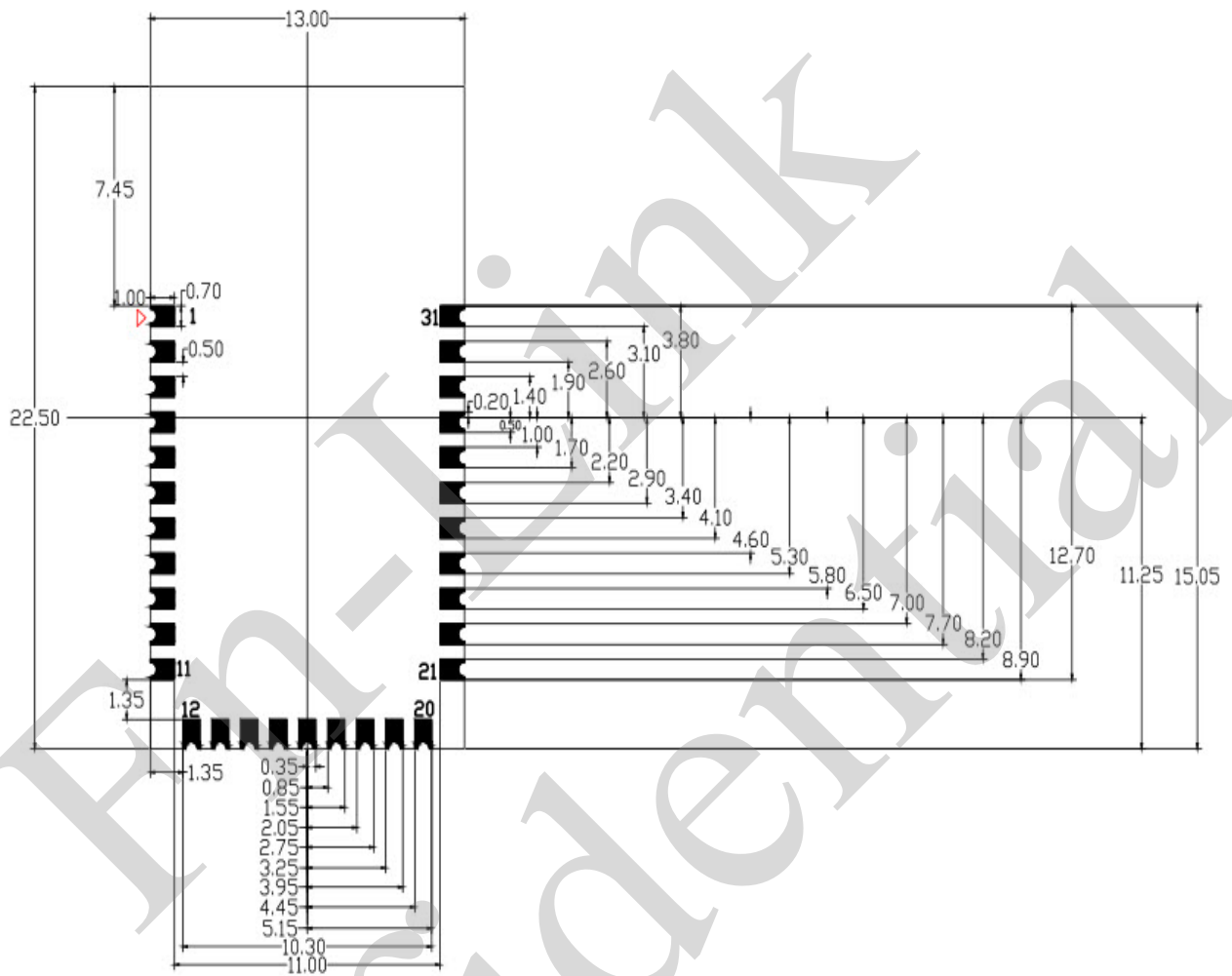
7.1 Physical Outline

(unit: mm)



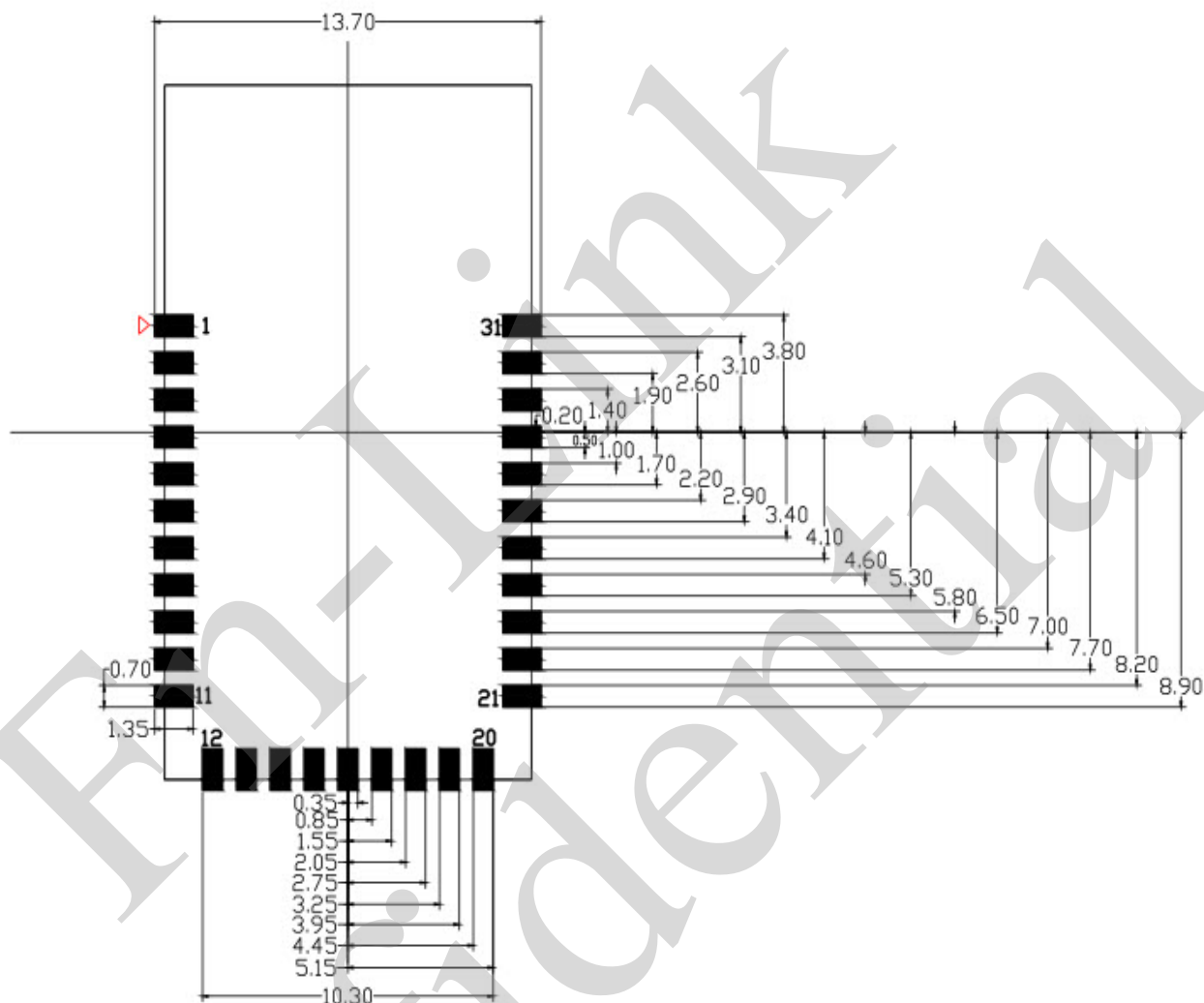
7.2 Physical Dimensions

(unit: mm)

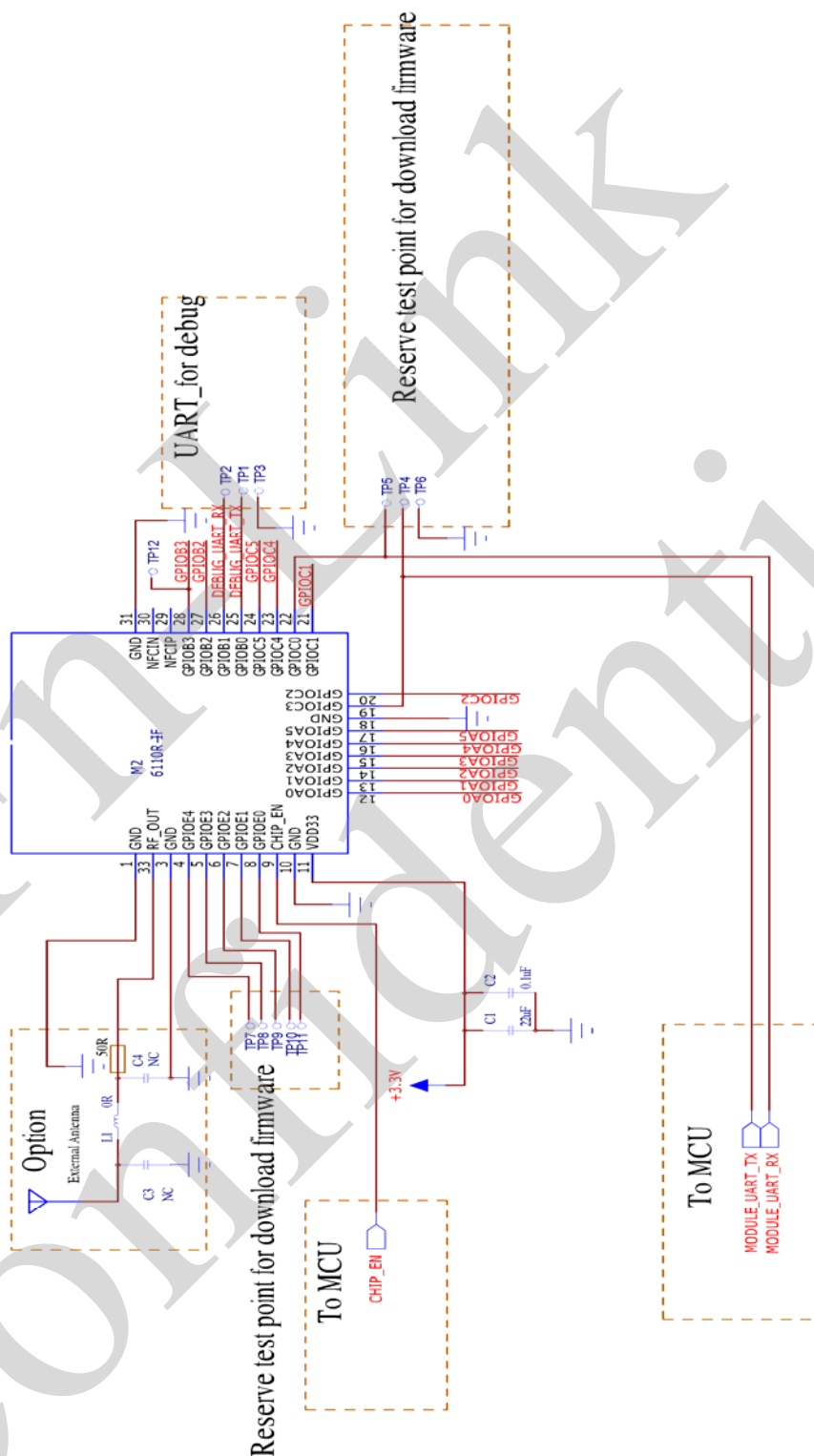


7.3 Layout Recommendation

(unit: mm)



8. Reference Design



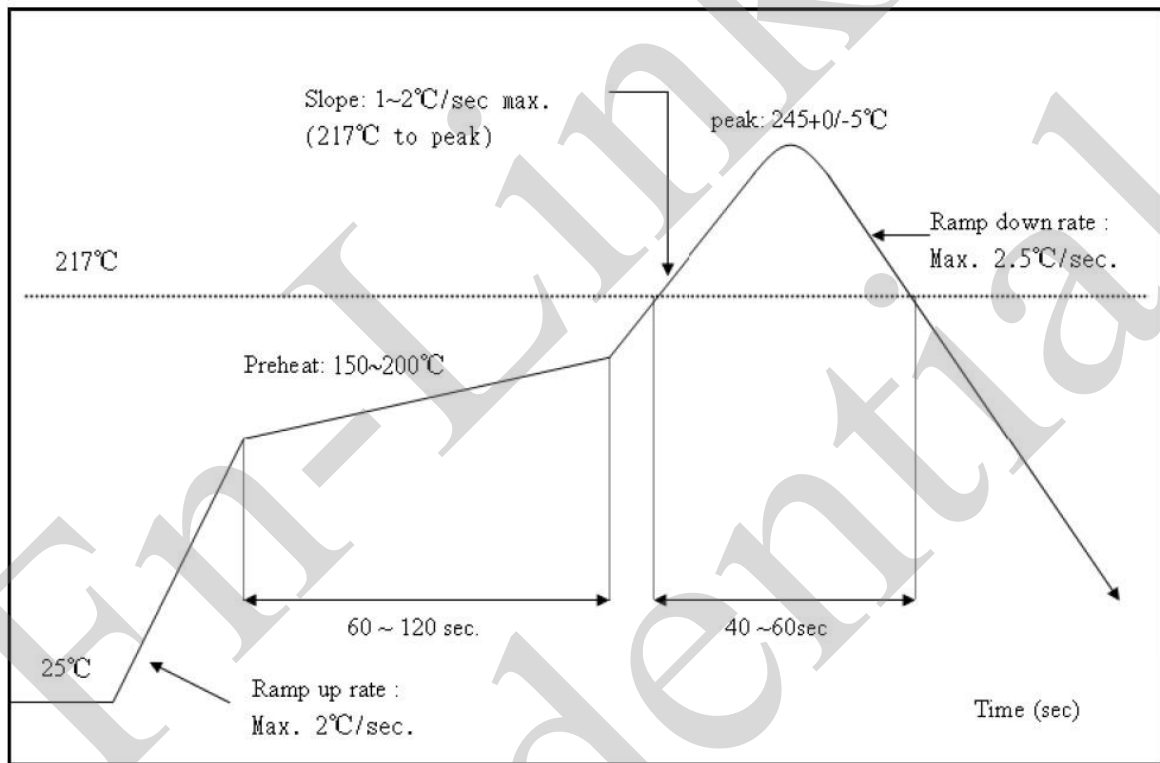
9. Environmental Requirements

9.1 Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <250°C

Number of Times : ≤2 times



9.2 Patch WIFI modules installed before the notice:

WIFI module installed note:

1. Please press 1 : 1 and then expand outward proportion to 0.7 mm, 0.12 mm thickness When open a stencil
2. Take and use the WIFI module, please insure the electrostatic protective measures.
3. Reflow soldering temperature should be according to the customer the main size of the products, such as the temperature set at 250 + 5 °C for the MID motherboard.

About the module packaging, storage and use of matters needing attention are as follows:

1. The module of the reel and storage life of vacuum packing: 1). Shelf life: 8 months, storage environment conditions: temperature in: < 40 °C, relative humidity: < 90% r.h.
2. The module vacuum packing once opened, time limit of the assembly:
Card: 1) check the humidity display value should be less than 30% (in blue), such as: 30% ~ 40% (pink), or greater than 40% (red) the module have been moisture absorption.
2.) factory environmental temperature humidity control: $\leq 30\text{ }^{\circ}\text{C}$, $\leq 60\%$ r.h..
- 3). Once opened, the workshop the preservation of life for 168 hours.
3. Once opened, such as when not used up within 168 hours:
 - 1). The module must be again to remove the module moisture absorption.
 - 2). The baking temperature: 125 °C, 8 hours.
 - 3.) After baking, put the right amount of desiccant to seal packages.

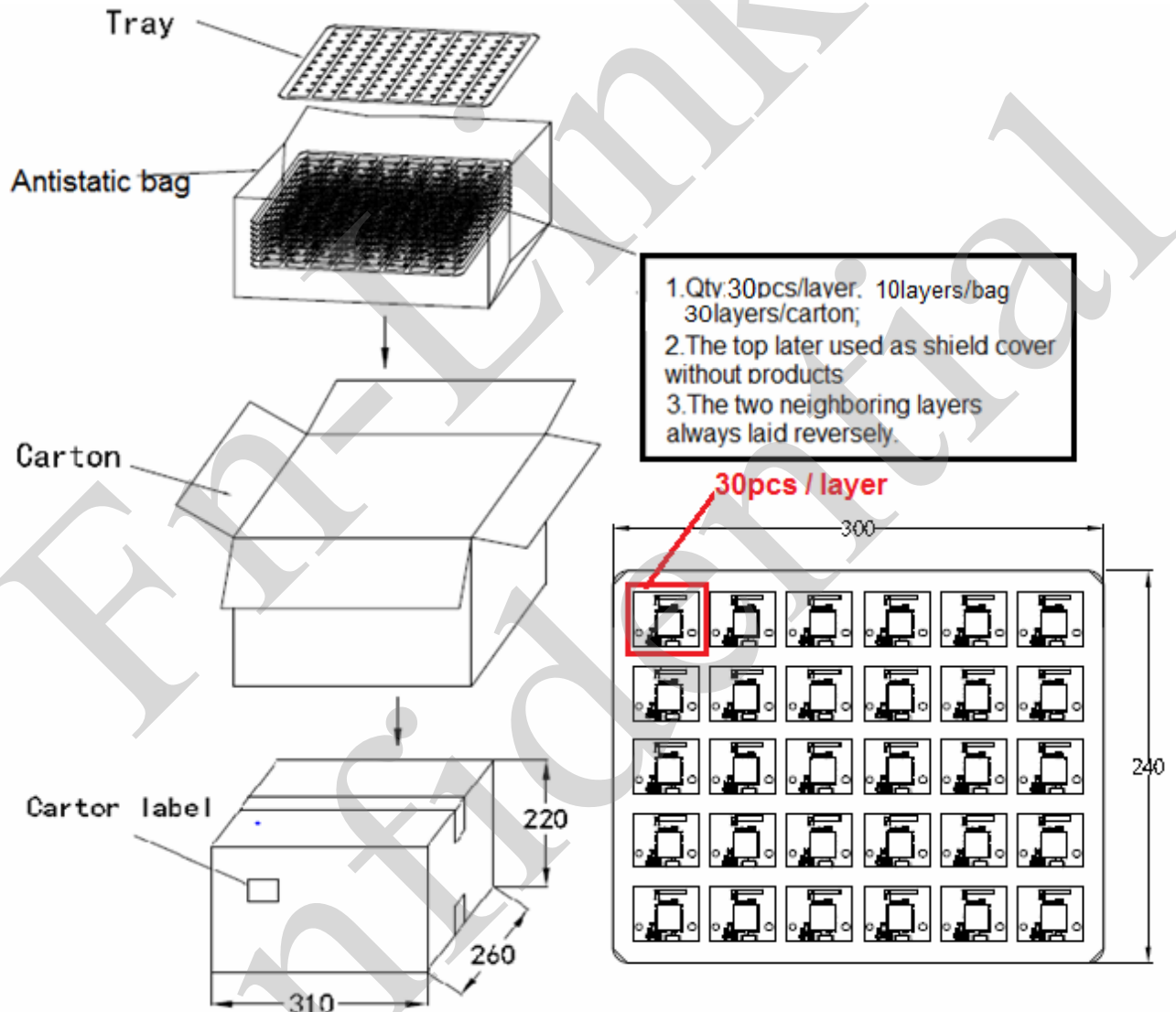
10. Package Information

Layer size: L300.0*W240.0 mm

Layer material: PVC

Carton size: L310.0*W260.0*H220.0 mm

Carton material: A=A



WARNING:

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

NOTE: 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 or more 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.

WARNING: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

LABEL OF THE END PRODUCT:

The final end product must be labelled in a visible area with the following "Contains TX FCC ID: 2AATL-6110R-IF". If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users manual: 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.

RF Exposure

This device has been evaluated and shown compliant with the FCC RF Exposure limits under fixed exposure conditions (antennas are greater than 20cm from a person's body) when installed in certain specific OEM configurations.

IMPORTANT NOTE:

Integration is typically strictly restricted to Grantee himself or dedicated OEM integrators under control of the Grantee. The module will be responsible to satisfy SAR/RF Exposure requirements, when the module integrated into any (portable, mobile, fixed) host device. This module is intended for OEM integrator only and the OEM integrators and instructed to ensure that the end user has no manual instructions to remove or install the device. The OEM integrator is still responsible for the FCC compliance requirement of the end product, which integrates this module.

EU Regulatory Conformance

Hereby, we (FN-Link Technology Limited) declared that this device is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.