

FT1852BEV1 Module Datasheet

FTY 飞腾云



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Customer Approval

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Date _____

FTY _____

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1 Overview

1.1 Introduction

The FT1852BEV1 is a highly integrated single-chip that support 2-stream 802.11ax solutions with Multi-user MIMO (Multiple-Input, Multiple-Output) with Wireless LAN (WLAN) PCI Express network interface controller with integrated Bluetooth 5 USB interface controller. It combines a WLAN MAC, a 2T2R capable WLAN base band, and RF in a single chip. The RTL8852BE provides a complete solution for a high-performance integrated wireless and Bluetooth device.

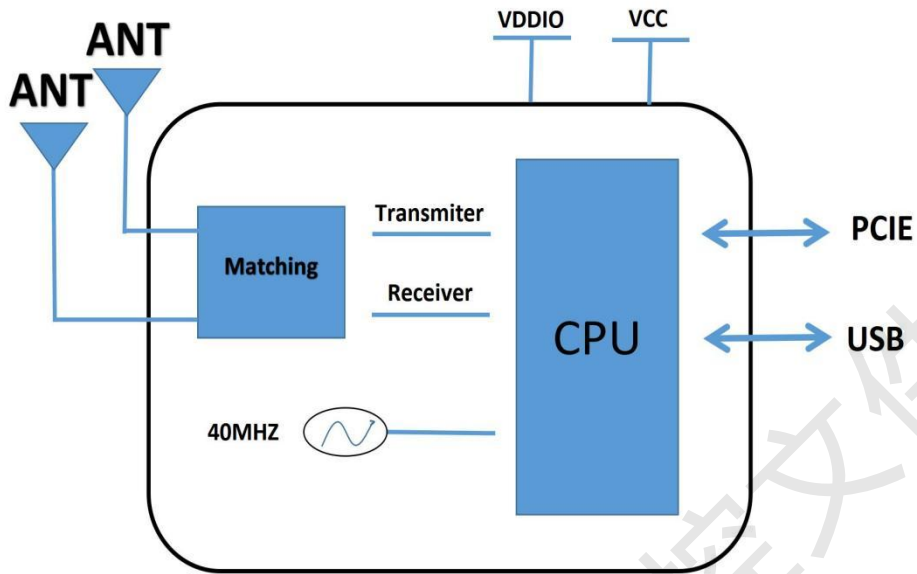
The FT1852BEV1 baseband implements Multi-user Multiple Input, Multiple Output (MU-MIMO) Orthogonal Frequency Division Multiplexing (OFDM) with two transmit and two receive paths (2T2R). Features include two spatial stream transmissions, short Guard Interval (GI), spatial spreading, and support for variant channel bandwidth. Moreover, FT1852BEV1 provides one spatial stream space-time block code (STBC), Transmit Beamforming (TxBF) and Low Density Parity Check (LDPC) to extend the range of transmission. At the receiver, extended range and good minimum sensitivity is achieved by having receiver diversity up to 2 antennas. As the recipient, the FT1852BEV1 also supports explicit sounding packet feedback that helps senders with beamforming capability.

1.2 Features

- Supports WLAN-Bluetooth coexistence
- CMOS MAC, Baseband PHY and RF in a single chip for IEEE 802.11a/b/g/n/ac/ax compatible WLAN
- Complete 802.11n MIMO solution for 2.4GHz and 5Ghz band
- Maximum PHY data rate up to 286.8 Mbps using 20MHz bandwidth, 573.5Mbps using 40MHz bandwidth, and 1201Mbps using 80MHz bandwidth
- Backward compatible with 802.11a/b/g devices while operating at 802.11n data rates
- Backward compatible with 802.11a/n/ac devices while operating at 802.11ax data rates
- Supports low power Bluetooth
- Support Bluetooth 5 system (BT 5.2 Logo Compliant)
- Compatible with Bluetooth v2.1+EDR

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1.3 Block Diagram



1.4 General Specification

Model Name	FT1852BEV1
Product Description	WIFI6 and Bluetooth M.2 Module
Dimension	L x W x H: 22x30x2.3(±0.3) mm
Wi-Fi Interface	Support M.2
BT Interface	Support M.2
Operating Temperature	-0° C to 70° C
Storage Temperature	-55° C to 125° C

1.5 DC Characteristics

Power Supply Characteristics

Symbol	Min.	Typ.	Max.	Unit
VCC33	3.15	3.3	3.45	V
VDDIO	1.7	1.8 or 3.3	3.45	V
Power Consumption	VCC33=3.3V(Unit:mA)			
	Wi-Fi on Mode	170		
	TX (2.4G HT20)	520		
	RX (2.4G HT20)	300		
	TX (5G HT40)	550		
	RX (5G HT40)	360		

2 RF Specifications

2.1 2.4GHz RF Specification

Features	Description		
WLAN Standard	IEEE802.11b/g/n		
Frequency Range	2.4~2.4835GHz (2.4GHz ISM Band)		
Number of Channel	WiFi 2.4GHz: 11: (Ch. 1-11) – United States; 13: (Ch. 1-13) –Europe; 14: (Ch. 1-14) – Japan		
2.4G Transmitter Specifications			
TX Rate	TX Power	TX Power Tolerance	EVM
802.11b@11Mbps	17dBm	±2dBm	≤-13dB
802.11g@54Mbps	14dBm	±2dBm	≤-25dB
802.11n@BW20_MCS7	13dBm	±2dBm	≤-28dB
802.11n@BW40_MCS7	13dBm	±2dBm	≤-28dB
802.11ax@HE20_HE11	10dBm	±2dBm	≤-36dB
802.11ax@HE40_HE11	10dBm	±2dBm	≤-36dB
Frequency Error:±12PPM			
2.4G Receiver Specifications			
RX Rate	Standard Value		PER
802.11b@11Mbps	≤-85dBm		8%
802.11g@54Mbps	≤-68dBm		10%
802.11n@BW20_MCS7	≤-66dBm		10%
802.11n@BW40_MCS7	≤-65dBm		10%
802.11ax@HE20_HE11	≤ -55dBm		10%
802.11ax@HE40_HE11	≤ -53dBm		10%

2.2 5GHz RF Specification

Features	Description		
WLAN Standard	IEEE802.11a/n/ac/ax		
Frequency Range	5.15GHz ~ 5.85GHz (5GHz ISM Band)		
5G Transmitter Specifications			
TX Rate	TX Power	TX Power Tolerance	EVM
802.11a@54 Mbps	13dBm	±2dBm	≤-25dB
802.11n@HT40_MCS7	12dBm	±2dBm	≤-28dB
802.11ac@VHT80_MCS9	10dBm	±2dBm	≤-32dB
802.11ax@HE80_HE11	10dBm	±2dBm	≤-36dB
802.11ax@HE160_HE11	10dBm	±2dBm	≤-36dB
5G Receiver Specifications			
RX Rate	Standard Value		PER
802.11a@54Mbps	≤-70dBm		<10%
802.11n@HT40_MCS7	≤-65dBm		< 10%
802.11ac@VHT80_MCS9	≤-56dBm		< 10%
802.11ax@HE80_HE11	≤ -51dBm		< 10%
802.11ax@HE160_HE11	≤ -50dBm		< 10%

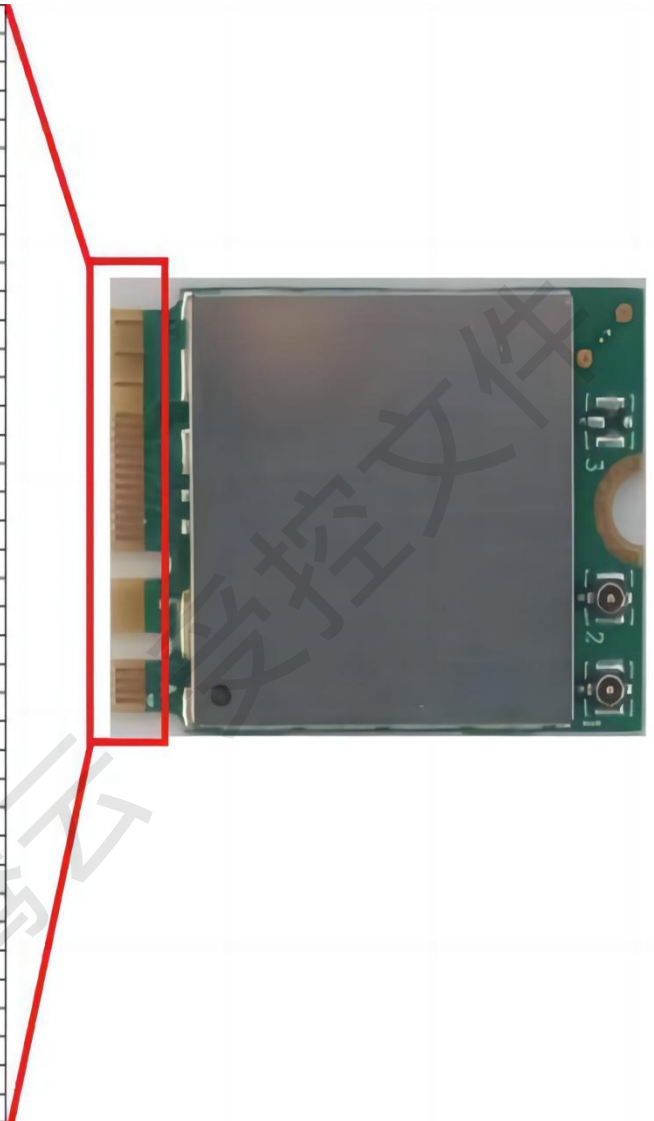
2.3 Bluetooth Section:

Feature	Description
General Specification	
Bluetooth Standard	Bluetooth 5.2
Host Interface	USB
Frequency Band	2400~2483.5MHz
Number of Channels	79 channels
Modulation	GFSK, DPSK, DQPSK
RF Specification	
Power (BDR:GFSK/1Mbps)	0dBm~10dBm
Power(EDR:π /4-DQPSK/2Mbps)	0dBm~10dBm
Power(EDR:DPSK/3Mbps)	0dBm~10dBm
Power (LE:GFSK/ 1Mbps)	0dBm~10dBm
Power (LE:GFSK/ 2Mbps)	0dBm~10dBm
Sensitivity@BER=0.1%for(BDR:GFSK/1Mbps)	-91 dBm
Sensitivity@BER=0.1%for(EDR:π/4-DQPSK/2Mbps)	-88 dBm
Sensitivity@BER=0.1%for(EDR:DPSK/3Mbps)	-85 dBm
Sensitivity@BER=30.8%for(BLE:GFSK/ 1Mbps)	-91 dBm
Sensitivity@BER=30.8%for(BLE:GFSK/ 2Mbps)	-90 dBm
Carrier frequency drift	BDR:GFSK/1Mbps:±75KHZ
	EDF:π /4-DQPSK/2Mbps:±75KHZ
	EDR:DPSK/3Mbps:±75KHZ
	BLE:GFSK/ 1Mbps:±75KHZ
	BLE:GFSK/ 2Mbps:±75KHZ

3 Pin Assignments

3.1 Pin Outline

PIN	Signal	Signal	PIN
74	NC	GND10	75
72	NC	NC	73
70	NC	NC	71
68	NC	GND9	69
66	NC	NC	67
64	NC	NC	65
62	NC	GND	63
60	NC	NC	61
58	NC	NC	59
56	WL_DIS_N	GND	57
54	BT_DIS_N	PEWAKE0	55
52	PERST0	CLKREQ0	53
50	SUSCLK	GND	51
48	COEX_RXD	REFCLKN0	49
46	COEX_TXD	REFCLKP0	47
44	COEX3	GND	45
42	NC	PETN0	43
40	NC	PETP0	41
38	VENDOR DEFINED	GND	39
36	NC	PERN0	37
34	NC	PERP0	35
32	NC	GND	33
30	NC	NC	31
28	NC	NC	29
26	NC	NC	27
24	NC	NC	25
22	NC	NC	23
20	NC	NC	21
18	GND	NC	19
16	LED_2#	NC	17
14	NC	NC	15
12	NC	NC	13
10	NC	NC	11
8	NC	NC	9
6	LED_1#	GND	7
4	3_3V	USB_D-	6
2	3_3V	USB_D+	3
		GND	1



3.2 Pin Definition

NO	Name	Type	Description	Voltage
1	GND	-	Ground connections	
3	USB_D+	I/O	USB differential line for BT	
5	USB_D-	I/O		
7	GND	-	Ground connections	
9	NC	-	Floating (NC)	
11	NC		Floating (NC)	
13	NC		Floating (NC)	
15	NC		Floating (NC)	
17	NC	-	Floating (NC)	
19	NC	-	Floating (NC)	
21	NC	-	Floating (NC)	
23	NC	-	Floating (NC)	
25	NC		Floating (NC)	
27	NC		Floating (NC)	
29	NC		Floating (NC)	
31	NC		Floating (NC)	
33	GND	-	Ground connections	
35	PERP0	I	PCIe RX differential signals	
37	PERN0	I		
39	GND	-	Ground connections	
41	PETP0	O	PCIe TX differential signals	
43	PETN0	O		
45	GND	-	Ground connections	
47	REFCLKP0	I	PCIe clock differential input signal	
49	REFCLKN0	I		
51	GND		Ground connections	
53	CLKREQ0	O	PCIe reference clock request signal, open drain, active low	3.3V
55	PEWAKE0	O	PCIe wake up host, open drain, active low	3.3V
57	GND	-	Ground connections	
59	NC	-	Floating (NC)	
61	NC	-	Floating (NC)	
63	GND	-	Ground connections	

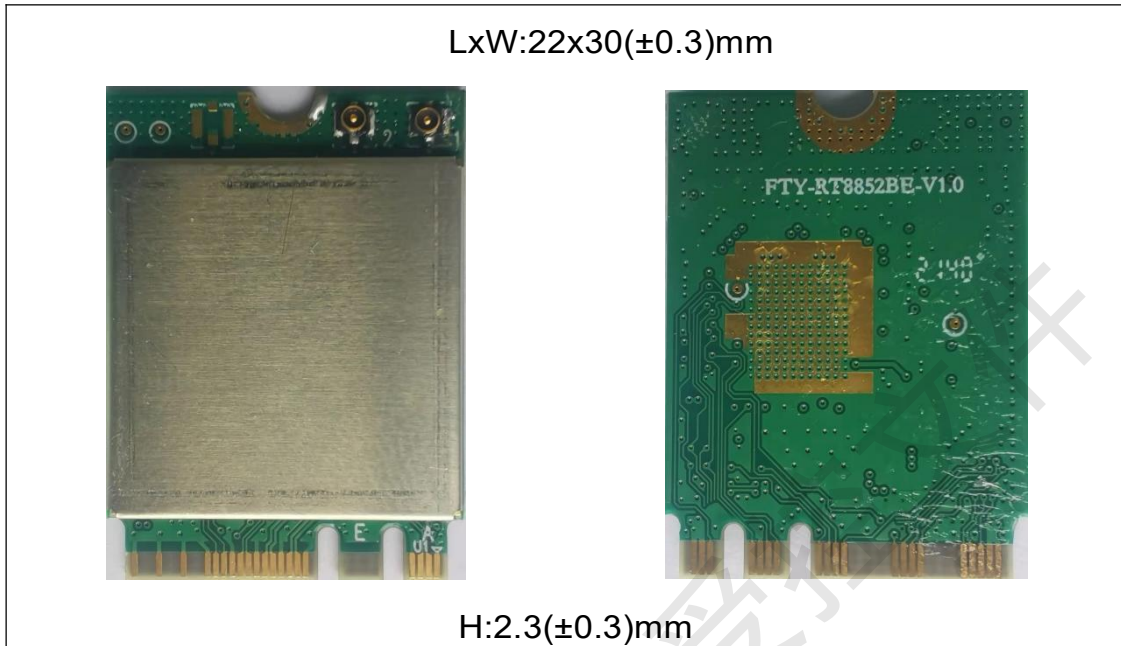
65	NC	-	Floating (NC)	
67	NC	-	Floating (NC)	
69	GND9	-	Ground connections	
71	NC	-	Floating (NC)	
73	NC	-	Floating (NC)	
75	GND10	-	Ground connections	
Bottom side				
2	3_3V	P	Power supply	3.3V
4	3_3V	P	Power supply	3.3V
6	LED_1#	O	WLAN LED signal	3.3V
8	PCM_CLK	I/O	general perpose input	
10	PCM_SYNC	I/O	general perpose input	
12	PCM_OUT	I/O	general perpose input	
14	PCM_IN	I/O	general perpose input	
16	LED_2#	O	BT LED signal	3.3V
18	GND	-	Ground connections	
20	BT_WAKE_HOST_Ant	O	Bluetooth device to wake-up HOST	3.3V
22	NC	-	Floating (NC)	
24	NC	-	Floating (NC)	
26	NC	-	Floating (NC)	
28	NC	-	Floating (NC)	
30	NC	-	Floating (NC)	
32	NC	-	Floating (NC)	
34	NC	-	Floating (NC)	
36	NC	-	Floating (NC)	
38	VENDOR DEFINED	-	Host wake BT. No function, please don't connect to this pin.	
40	NC	-	Floating (NC)	
42	NC	-	Floating (NC)	
44	COEX3	I/O	LTE coexistence signal	3.3V
46	COEX_TXD	O	LTE coexistence signal	3.3V
48	COEX_RXD	I	LTE coexistence signal	3.3V
50	SUSCLK	I	Sleep clock input	3.3V
52	PERST0	I	PCIe reset signal, active low	3.3V
54	BT_DIS_N	I	Bluetooth enable signal, pull low to disable BT function, default high.	3.3V

56	WL_DIS_N	I	WLAN enable signal, pull low to disable BT function, default high.	3.3V
58	NC	-	Floating (NC)	
60	NC	-	Floating (NC)	
62	NC	-	Floating (NC)	
64	NC	-	Floating (NC)	
66	NC	-	Floating (NC)	
68	NC	-	Floating (NC)	
70	NC	-	Floating (NC)	
72	NC	-	Floating (NC)	
74	NC	-	Floating (NC)	

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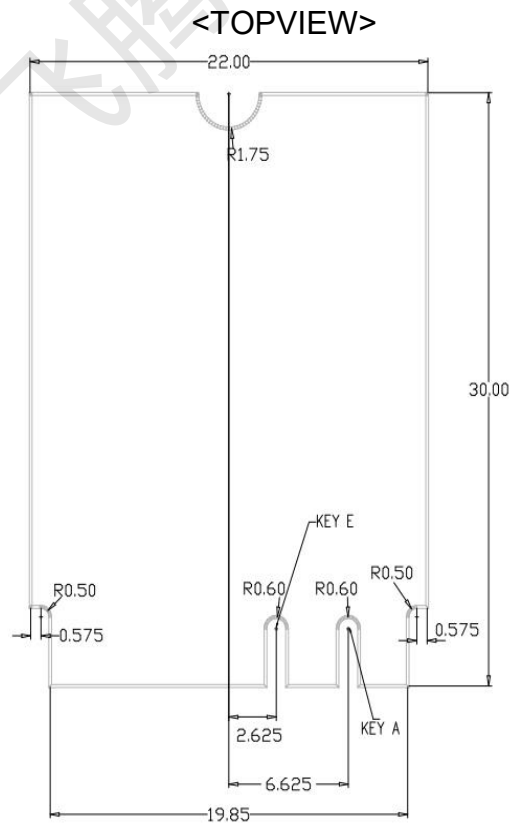
4 Dimensions

4.1 Module Picture

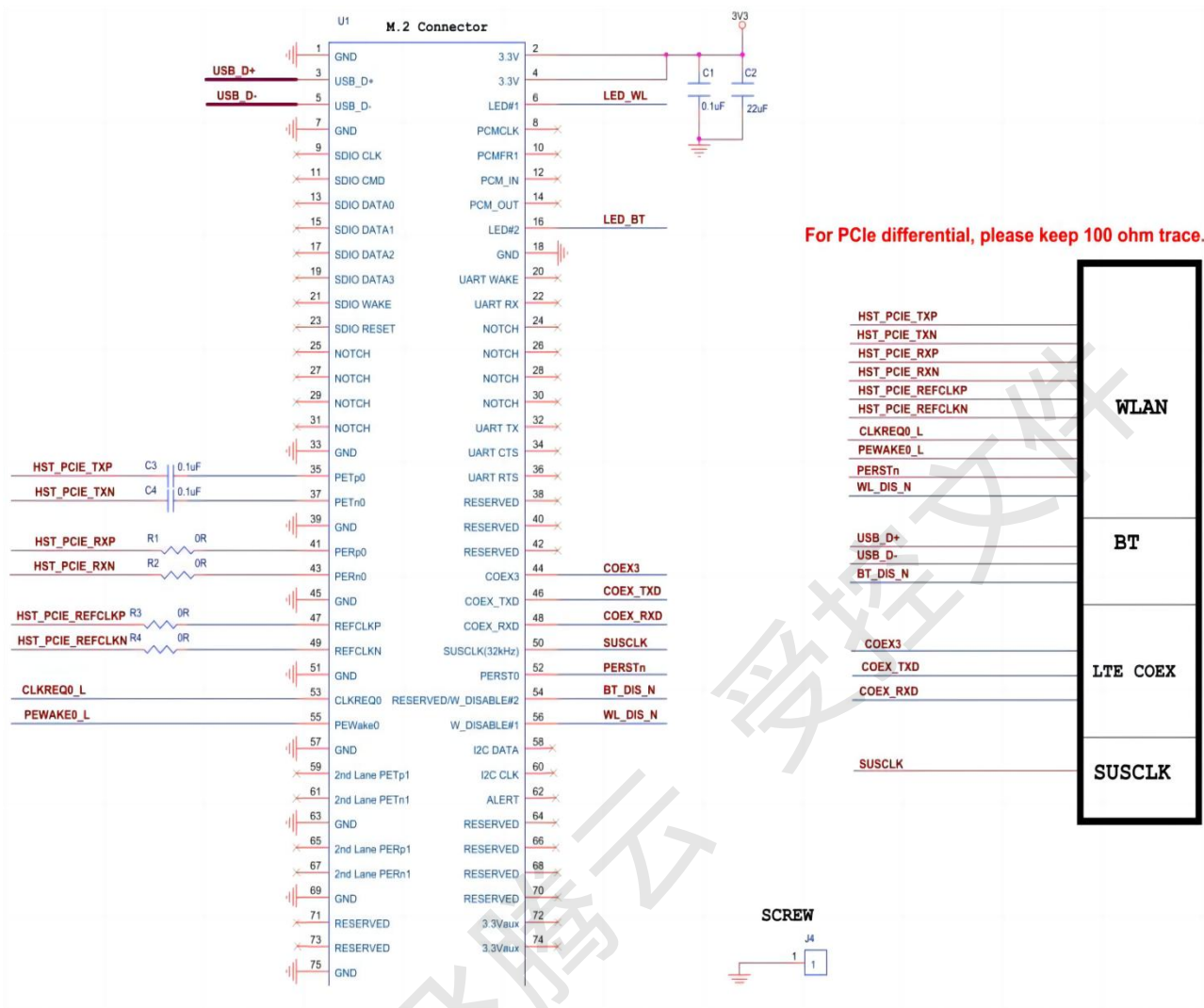


4.2 Module Physical Dimensions

(Unit: mm)



5 Reference Design



6 The Key Material List

No.	Parts	Specification	Manufacturer	Note
1	Chipset	RTL8852BE-CG	Realtek Semiconductor Corp	
2	PCB	FTY-RT8852BE-V1.0	Xinfeng Fuchangfa Electronics Co., Ltd	
3	PCB	FTY-RT8852BE-V1.0	Shenzhen Kexiang Precision Circuit Technology Co., Ltd	
4	Crystal oscillator	2016 40MHz \pm 8ppm 12pF (-30~85° C)	Hefei Jing Wei Te Electronics Co. Ltd	
5	Crystal oscillator	2016 40MHz \pm 8ppm 12pF (-30~85° C)	Zhejiang Lanjing Micro electronics Co., Ltd	
6	duplexer	双工器 1.6×0.8mm 6P 2.4G-5.95G -40_+85° 麦捷 MDPX18M2455P69-D06	Shenzhen Microgate Technology Co., Ltd	
7	duplexer	双工器 1.6×0.8mm 6P 2.4G-5.95G -40_+85° 飞特尔 FLT18D24254959D-3268B	Shenzhen Feiteer Technology Co., Ltd	

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7 Package Information

7.1 Pallet Packaging

7.2 Moisture sensitivity

The Modules is a Moisture Sensitive Device level 3, in according with standard IPC/JEDEC J-STD-020B, take care all the relatives requirements for using this kind of components.

Moreover, the customer has to take care of the following conditions:

a) Calculated shelf life in sealed bag: 12 months at $<40^{\circ}\text{C}$ and $<90\%$ relative humidity (RH).

b) Environmental condition during the production: 30°C / 60% RH according to IPC/JEDEC J-STD-033A paragraph 5.

c) The maximum time between the opening of the sealed bag and the reflow process must be 168 hours if condition

d) "IPC/JEDEC J-STD-033A paragraph 5.2" is respected

e) Baking is required if conditions b) or c) are not respected

f) Baking is required if the humidity indicator inside the bag indicates 10% RH or more