BL-M8852BP4

802.11ax 1200Mbps WLAN + BT v5.2

M.2 2230 Key A+E Card Specification

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(Top View)

(Bottom View)

Card Name: BL-M8852BP4	
Card Type: 802.11a/b/g/n/ac/ax 1200Mbps WLAN + Bluetooth v5.2 Combo M.2 Card	
Revision: V1.0	
Customer Approval:	
Company:	
Title:	
Signature:	Date:
Approval:	
Title:	
Signature:	Date:

Revision History

Revision	Summary	Release Date	Revised By
1.0	Official release	2023-02-20	
1.0	Content optimization	2023-3-21	Qx

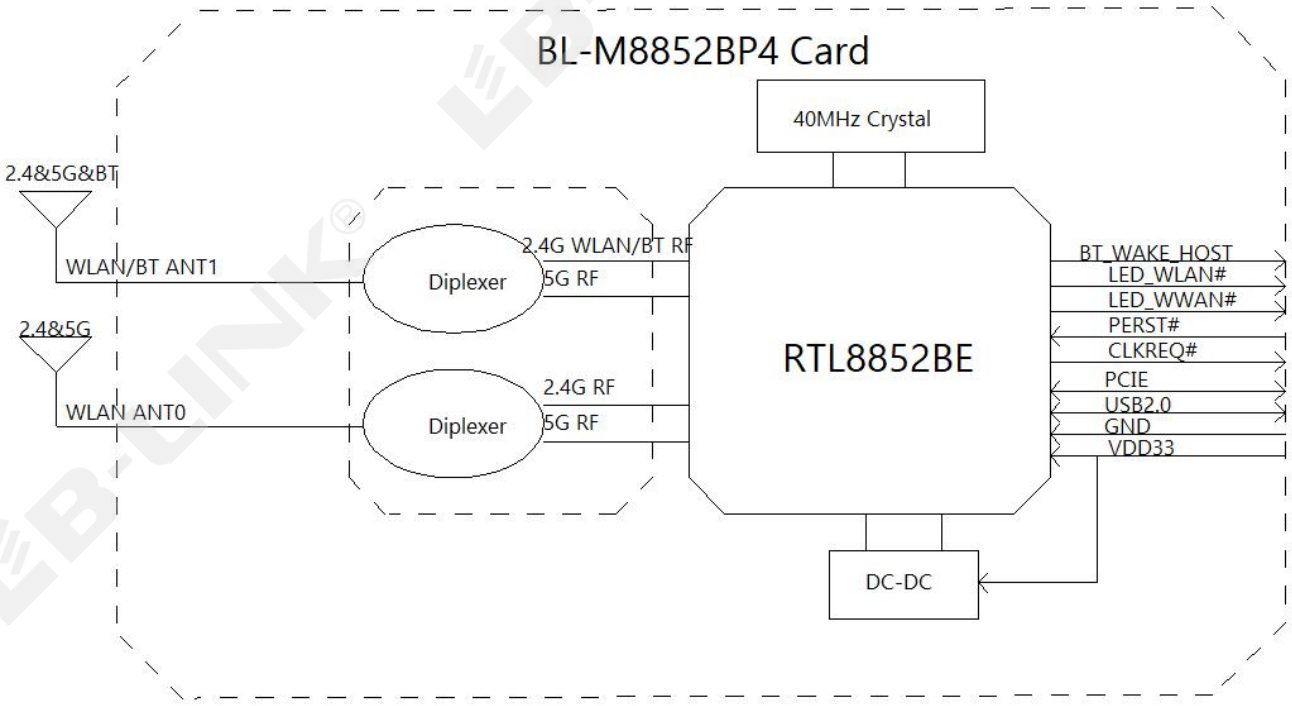
1.Introduction

BL-M8852BP4 is a highly integrated Dual-band WLAN+Bluetooth Combo M.2 Card. It combines a 2T2R Dual-band WLAN subsystem with PCI Express interface controllers and a Bluetooth v5.2 subsystem with USB interface controller. This card compatible IEEE 802.11 a/b/g/n/ac/ax standard and provides the maximum PHY rate up to 1201Mbps, it supports Bluetooth dual mode with v5.2/v4.2/v2.1 compliant. The card provides a complete solution for high-performance integrated wireless and Bluetooth devices such as laptops, set-top boxes, smart TVs, etc.

1.1 Features

- M.2 Type 2230 S2 Key A+E Card
- Operating Frequencies: 2.4~2.4835GHz or 5.15~5.85GHz
- Support Dual-band 2T2R mode with 20/40/80Mhz bandwidth
- Support 802.11ax with OFDMA and MU-MIMO
- Dual Mode Bluetooth support : Simultaneous LE and BR / EDR
- Connect to external antenna through MHF4/IPEX4 connectors

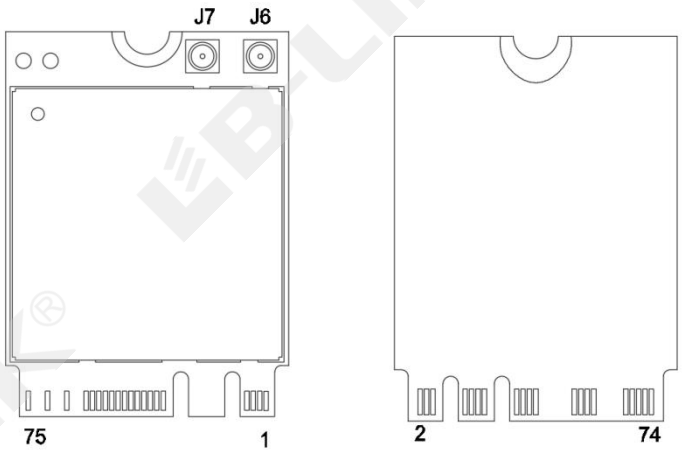
1.2 Block Diagram



1.3 General Specifications

Card Name	BL-M8852BP4
Chipset	RTL8852BE-CG
WLAN Standards	IEEE802.11a/b/g/n/ac/ax
BT Specification	Bluetooth Core Specification v5.2/4.2/2.1
Host Interface	PCI Express 1.1 for WLAN & USB2.0 FS for Bluetooth
Antenna	Connect to the external antenna through MHF4/IPEX4 connectors(Two antennas)
Dimension	M.2 Type 2230 Pluggable Card: 30*22*2.15mm (L*W*H)
Power Supply	DC 3.3V±0.2V@ 1.5A (Max)
Operation Temperature	-20℃ to +70℃
Operation Humidity	10% to 95% RH (Non-Condensing)

2. Pin Assignment



(Top View) (Bottom View)

2.1 Pin Definition

No	Pin Name	Type	I/O Level	Card Pin Description
1	GND	P		Ground connections
2	VDD33	P		DC 3.3V power supply
3	USB_D+	A I/O		USB 2.0 Device Full Speed Interface differential pair for BT
4	VDD33	P		DC 3.3V power supply
5	USB_D-	A I/O		USB 2.0 Device Full Speed Interface differential pair for BT

6	LED_WLAN#	O	3.3V	WLAN LED Active Low output, shared with GPIO8
7	GND	P		Ground connections
8	Connector Key	--		Connector Key
9	Connector Key	--		Connector Key
10	Connector Key	--		Connector Key
11	Connector Key	--		Connector Key
12	Connector Key	--		Connector Key
13	Connector Key	--		Connector Key
14	Connector Key	--		Connector Key
15	Connector Key	--		Connector Key
16	LED_WWAN#	O	3.3V	BT LED Active Low output
17	NC	--		No connection(floating)
18	GND	P		Ground connections
19	NC	--		No connection(floating)
20	BT_WAKE_HOST	O	3.3V	Bluetooth device to wake up HOST Shared with GPIO14.internal pull high by 100K resistor.
21	NC	--		No connection(floating)
22	NC	--		No connection(floating)
23	NC	--		No connection(floating)
24	Connector Key	--		Connector Key
25	Connector Key	--		Connector Key
26	Connector Key	--		Connector Key
27	Connector Key	--		Connector Key
28	Connector Key	--		Connector Key
29	Connector Key	--		Connector Key
30	Connector Key	--		Connector Key
31	Connector Key	--		Connector Key
32	NC	--		No connection(floating)
33	GND	P		Ground connections
34	NC	--		No connection(floating)
35	PERp0	AI		PCI Express device receive differential pair for WLAN
36	NC	--		No connection(floating)
37	PERn0	AI		PCI Express device receive differential pair for WLAN
38	HOST_WAKE_BT	I	3.3V	HOST to wake up BT input, shared with GPIO8
39	GND	P		Ground connections
40	NC	--		No connection(floating)
41	PETp0	AO		PCI Express device transmit differential pair for WLAN (AC coupling capacitors are integrated on Card)
42	NC	--		No connection(floating)

43	PETn0	AO		PCI Express device transmit differential pair for WLAN (AC coupling capacitors are integrated on Card)
44	NC	--		No connection(floating)
45	GND	P		Ground connections
46	NC	--		No connection(floating)
47	REFCLKp0	AI		PCI Express 100MHz differential reference clock input
48	NC	--		No connection(floating)
49	REFCLKn0	AI		PCI Express 100MHz differential reference clock input
50	SUSCLK	I		Boot from flash select for power on trap and external 32K clock input
51	GND	P		Ground connections
52	PERST#	I	3.3V	PCI Express Reset active low input. When the PERST0# is asserted at power-on state, the card returns to a pre-defined reset state and is ready for initialization and configuration after the de-assertion of the PERST0#
53	CLKREQ#	O/D	3.3V	Reference Clock Request open drain output, it used to request for the the reference clock.
54	W_DIS2#	I	3.3V	W_DIS2# can externally shut down the card BT function when its pulled Low, and USB interface will be also disabled. Shared with GPIO11
55	PEWAKE0#	O/D	3.3V	Power Management Event active low open drain output. Used to reactivate the PCI Express bus main power rails and reference clock. This PEWAKE0# can be shared with BT wake up host function via sideband signals
56	W_DIS1#	I	3.3V	W_DIS1# can be defined as the WLAN Radio-of function with host interface remaining connected. When this pin is pulled low, WLAN function will be Radio-off. Shared with GPI09
57	GND	P		Ground connections
58	NC	--		No connection(floating)
59	NC	--		No connection(floating)
60	NC	--		No connection(floating)
61	NC	--		No connection(floating)
62	NC	--		No connection(floating)
63	GND	P		Ground connections
64	NC	--		No connection(floating)
65	NC	--		No connection(floating)
66	NC	--		No connection(floating)
67	NC	--		No connection(floating)
68	NC	--		No connection(floating)
69	GND	P		Ground connections

70	NC	--		No connection(floating)
71	NC	--		No connection(floating)
72	3.3Vaux	P		Auxiliary DC3.3V power supply (“3.3Vaux” and “VDD33” are connected together in the card, customers must evaluate whether this affects their application platform!)
73	NC	--		No connection(floating)
74	3.3Vaux	P		Auxiliary DC3.3V power supply (“3.3Vaux” and “VDD33” are connected together in the card, customers must evaluate whether this affects their application platform!)
75	GND	P		Ground connections
J6	ANT1 RF			IPEX connector for 2.4G/5G WLAN/2.4G BT RF to ANT1
J7	ANT0 RF			IPEX connector for 2.4G/5G WLAN RF to ANT0

P: Power or Ground; I/O: digital In/Output; O/D:Open Drain digital Output;

A I/O: Analog In/Output; RF: Analog RF Port or RF Ground;

3. Electrical and Thermal Specifications

3.1 Recommended Operating Conditions

Parameters		Min	Typ	Max	Units
Ambient Operating Temperature		-20	25	70	℃
* limited Ambient Operating temperature		-40	25	85	℃
External Antenna VSWR			1.7	2	/
Supply Voltage	VDD33	3.1	3.3	3.5	V

Note: * The card has passed the WLAN communication test in this temperature range, but the RF specifications and WLAN throughput performance cannot be guaranteed.

3.2Current Consumption

Conditions : VDD33=3.3V ; Ta:25℃			
Use Case	VDD33 Current		
	Typ (I_{RMS})	Max (I_{Peak})	Units
2.4G WLAN TCP throughput TX 360Mbps (Linux Drive, BT disable)	540	870	mA
2.4G WLAN TCP throughput RX 340Mbps (Linux Drive, BT disable)	340	850	mA

5G WLAN TCP throughput TX 800Mbps (Linux Drive, BT disable)	560	950	mA
5G WLAN TCP throughput RX 700Mbps (Linux Drive, BT disable)	350	940	mA
2.4G 11b@1Mbps TX@ 18dBm (1TX RF-Test)	460	510	mA
2.4G 11g@6Mbps TX @18dBm(1TX RF-Test)	485	640	mA
2.4G 11n@HT20_MCS15 TX @17dBm(2TX RF-Test)	350	820	mA
2.4G 11n@HT20_MCS15 RX (2RX RF-Test)	198	260	mA
2.4G 11ax@HE_SU 40M_MCS11 TX @15dBm(2TX RF-Test)	348	880	mA
2.4G 11ax@HE_SU 40M_MCS11 RX (2RX RF-Test)	200	260	mA
5G 11g@6Mbps TX@19dBm (1TX RF-Test)	512	680	mA
5G 11n@HT20_MCS8 TX @18dBm(2TX RF-Test)	704	1020	mA
5G 11n@HT40_MCS7 TX @16dBm(1TX RF-Test)	272	620	mA
5G 11n@HT40_MCS15 TX@16dBm (2TX RF-Test)	710	980	mA
5G 11n@HT40_MCS15 RX (2RX RF-Test)	175	240	mA
5G 11ac@VHT20_MCS0 TX @18dBm(2TX RF-Test)	689	980	mA
5G 11ac@VHT20_MCS8 TX @16dBm(2TX RF-Test)	363	980	mA
5G 11ax@HE_SU 80M_MCS11 TX @15dBm(2TX RF-Test)	360	940	mA
5G 11ax@HE_SU 80M_MCS11 RX (2RX RF-Test)	192	280	mA
BT			
BR_DH1 TX @5dBm(RF-Test)	270	320	mA
BR_DH1 RX(RF-Test)	215	260	mA
LE 1M TX@5dBm(RF-Test)	260	320	mA
LE 2M RX (RF-Test)	209	260	mA

4. WLAN & Bluetooth RF Specifications

4.1 2.4G WLAN RF Specification

Conditions : VDD33=3.3V ; Ta:25℃	
Features	**Description**
WLAN Standard	IEEE 802.11b/g/n/ax
Frequency Range	2.4~2.4835GHz (2.4GHz ISM Band)

Channels	Ch1~Ch13 (For 20MHz Channels)
Modulation	802.11b (DSSS): CCK, DQPSK, DBPSK; 802.11g (OFDM): BPSK, QPSK, QAM16, QAM64; 802.11n (OFDM): BPSK, QPSK, QAM16, QAM64; 802.11ax (OFDMA): BPSK, BPSK_DCM, QPSK, QPSK_DCM, QAM16, QAM16_DCM, QAM64, QAM256, QAM1024;
Date Rate	802.11b: 1, 2, 5.5, 11Mbps; 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps; 802.11n (HT20): MCS0~MCS7(1T1R_SISO) 6.5~72.2Mbps; 802.11n (HT20): MCS8~MCS15(2T2R_MIMO) 13~144.4Mbps; 802.11n (HT40): MCS0~MCS7(1T1R) 13.5~150Mbps; 802.11n (HT40): MCS8~MCS15(2T2R) 27~300Mbps; 802.11ax (HE_MU,26~242RU): MCS0~MCS11(1T1R) 0.4~143.4Mbps; 802.11ax (HE_MU,26~242RU): MCS0~MCS11(2T2R) 0.8~286.8Mbps; 802.11ax (HE_SU, non-OFDMA 20MHz): MCS0~MCS11(1T1R) 3.6~143.4Mbps; 802.11ax (HE_SU, non-OFDMA 20MHz): MCS0~MCS11(2T2R) 7.3~286.8Mbps; 802.11ax (HE_SU, non-OFDMA 40MHz): MCS0~MCS11(1T1R) 7.3~286.8Mbps; 802.11ax (HE_SU,non-OFDMA 40MHz): MCS0~MCS11(2T2R) 14.6~573.5Mbps;
Frequency Tolerance	≦±20ppm

2.4G Transmitter Specifications (TX power tolerance calibrated, customers can define the target TX power within recommended range by modifying configuration file of the driver software WLAN_ANT0&WLAN_ANT1)

TX Rate	Recommended Target TX Power (dBm)	TX Power Tolerance (dBm)	EVM (dB)
802.11b@1~11Mbps	18	±2	≦-15
802.11g@6Mbps	18	±2	≦-15
802.11g@54Mbps	17	±2	≦-25
802.11n@HT20_MCS0	18	±2	≦-16
802.11n@HT20_MCS7	17	±2	≦-28
802.11n@HT40_MCS0	18	±2	≦-10
802.11n@HT40_MCS7	16	±2	≦-28
802.11ax@HE_SU 20M_MCS0	17	±2	≦-15
802.11ax@HE_SU 20M_MCS11	15	±2	≦-35
802.11ax@HE_SU 40M_MCS0	17	±2	≦-15
802.11ax@HE_SU 40M_MCS11	15	±2	≦-35

2.4G Receiver Specifications (WLAN_ANT0&WLAN_ANT1)

RX Rate	Min Input Level (Typ)	Max Input Level (Typ)	PER
802.11b@1Mbps	-94dBm	-5dBm	< 8%

802.11b@11Mbps	-87dBm	-5dBm	< 8%
802.11g@6Mbps	-93dBm	-5dBm	< 10%
802.11g@54Mbps	-74dBm	-5dBm	< 10%
802.11n@HT20_MCS0	-92dBm	-5dBm	< 10%
802.11n@HT20_MCS7	-72dBm	-5dBm	< 10%
802.11n@HT40_MCS0	-89dBm	-5dBm	< 10%
802.11n@HT40_MCS7	-69dBm	-5dBm	< 10%
802.11ax@HE_SU 20M_MCS0	-90dBm	-5dBm	< 10%
802.11ax@HE_SU 20M_MCS11	-61dBm	-5dBm	< 10%
802.11ax@HE_SU 40M_MCS0	-88dBm	-5dBm	< 10%
802.11ax@HE_SU 40M_MCS11	-58dBm	-5dBm	< 10%

4.2 5G WLAN RF Specification

Conditions: VDD33=3.3V; Ta:25℃	
Features	**Description**
WLAN Standard	IEEE 802.11a/n/ac/ax
Frequency Range	5.15~5.25GHz; 5.25~5.35GHz; 5.47~5.73GHz; 5.735~5.835GHz (5GHz ISM Band)
Channels	Ch36, Ch40, Ch44, Ch48; Ch52~Ch64; Ch100~Ch140; Ch149~Ch165 (For 20MHz Channels)
Modulation	802.11a (OFDM): BPSK, QPSK, QAM16, QAM64; 802.11n (OFDM): BPSK, QPSK, QAM16, QAM64; 802.11ac (OFDM): BPSK, QPSK, QAM16, QAM64, QAM256; 802.11ax (OFDMA): BPSK, BPSK_DCM, QPSK, QPSK_DCM, QAM16, QAM16_DCM, QAM64, QAM256, QAM1024;
Date Rate	802.11a: 6, 9, 12, 18, 24, 36, 48, 54Mbps; 802.11n (HT20): MCS0~MCS7(1T1R_SISO) 6.5~72.2Mbps; 802.11n (HT20): MCS8~MCS15(2T2R_MIMO) 13~144.4Mbps; 802.11n (HT40): MCS0~MCS7(1T1R) 13.5~150Mbps; 802.11n (HT40): MCS8~MCS15(2T2R) 27~300Mbps; 802.11ac (VHT20): MCS0~MCS8(1T1R) 6.5~86.7Mbps; 802.11ac (VHT20): MCS0~MCS8(2T2R) 13~173.3Mbps;

	802.11ac (VHT40): MCS0~MCS9(1T1R)13.5~200Mbps; 802.11ac (VHT40): MCS0~MCS9(2T2R)27~400Mbps; 802.11ac (VHT80): MCS0~MCS9(1T1R)29.3~433.3Mbps; 802.11ac (VHT80): MCS0~MCS9(2T2R)58.5~866.7Mbps; 802.11ax (HE_MU,26~484RU): MCS0~MCS11(1T1R) 0.4~286.8Mbps; 802.11ax (HE_MU,26~484RU): MCS0~MCS11(2T2R) 0.8~573.5Mbps; 802.11ax (HE_SU, non-OFDMA 20MHz): MCS0~MCS11(1T1R) 3.6~143.4Mbps; 802.11ax (HE_SU, non-OFDMA 20MHz): MCS0~MCS11(2T2R) 7.3~286.8Mbps; 802.11ax (HE_SU, non-OFDMA 40MHz): MCS0~MCS11(1T1R) 7.3~286.8Mbps; 802.11ax (HE_SU,non-OFDMA 40MHz): MCS0~MCS11(2T2R) 14.6~573.5Mbps; 802.11ax (HE_SU,non-OFDMA 80MHz): MCS0~MCS11(1T1R) 15.3~600.4Mbps; 802.11ax (HE_SU, non-OFDMA 80MHz): MCS0~MCS11(2T2R) 30.6~1201Mbps;
Frequency Tolerance	≦ ±20ppm

5G Transmitter Specifications (TX power tolerance calibrated, customers can define the target TX power within recommended range by modifying configuration file of the driver software WLAN_ANT0&WLAN_ANT1)			
TX Rate	**Recommended Target TX Power（dBm）**	**TX Power Tolerance（dBm）**	**EVM（dB）**
802.11a@6Mbps	19	±2	≦-10
802.11a@54Mbps	17	±2	≦-25
802.11n@HT20_MCS0	18	±2	≦-13
802.11n@HT20_MCS7	16	±2	≦-28
802.11n@HT40_MCS0	18	±2	≦-13
802.11n@HT40_MCS7	16	±2	≦-28
802.11ac@VHT20_MCS0	18	±2	≦-13
802.11ac@VHT20_MCS8	16	±2	≦-30
802.11ac@VHT80_MCS0	18	±2	≦-13
802.11ac@VHT80_MCS9	16	±2	≦-32
802.11ax@HE_SU 20M_MCS0	17	±2	≦-13
802.11ax@HE_SU 20M_MCS11	15	±2	≦-35
802.11ax@HE_SU 80M_MCS0	17	±2	≦-13
802.11ax@HE_SU 80M_MCS11	15	±2	≦-35
5G Receiver Specifications（WLAN_ANT0&WLAN_ANT1）			
RX Rate	**Min Input Level（Typ）**	**Max Input Level（Typ）**	**PER**

802.11a@6Mbps	-93dBm	-5dBm	< 10%
802.11a@54Mbps	-74dBm	-5dBm	< 10%
802.11n@HT20_MCS0	-92dBm	-5dBm	< 10%
802.11n@HT20_MCS7	-72dBm	-5dBm	< 10%
802.11n@HT40_MCS0	-89dBm	-5dBm	< 10%
802.11n@HT40_MCS7	-69dBm	-5dBm	< 10%
802.11ac@VHT80_MCS0	-85dBm	-5dBm	< 10%
802.11ac@VHT80_MCS9	-59dBm	-5dBm	< 10%
802.11ax@HE_SU 80M_MCS0	-86dBm	-5dBm	< 10%
802.11ax@HE_SU 80M_MCS11	-56dBm	-5dBm	< 10%

4.3 Bluetooth RF Specification

Conditions: VDD33=3.3V; Ta:25℃			
Features	**Description**		
Bluetooth Specification	Bluetooth Core Specification v5.2/4.2/2.1		
Frequency Range	2.4~2.4835GHz (2.4GHz ISM Band)		
Channels	Bluetooth Classic: Ch0~Ch78 (For 1MHz Channels); Bluetooth Low Energy: Ch0~Ch39 (For 2MHz Channels);		
Power Classes	Bluetooth Classic: Class1; Bluetooth Low Energy: Class1.5;		
Date Rate & Modulation	BR_1Mbps: GFSK; EDR_2Mbps: π/4-DQPSK; EDR_3Mbps: 8DPSK; LE_125Kbps: GFSK (Coded_S=8); LE_500Kbps: GFSK (Coded_S=2); LE_1Mbps: GFSK (Uncoded); LE_2Mbps: GFSK (Uncoded);		
Bluetooth Transmitter Specifications (BT_ANT)			
Items	**Min (dBm)**	**Typ (dBm)**	**Max (dBm)**
TX Power			
BR_1M	2	5	8
EDR_2/3M	2	5	8

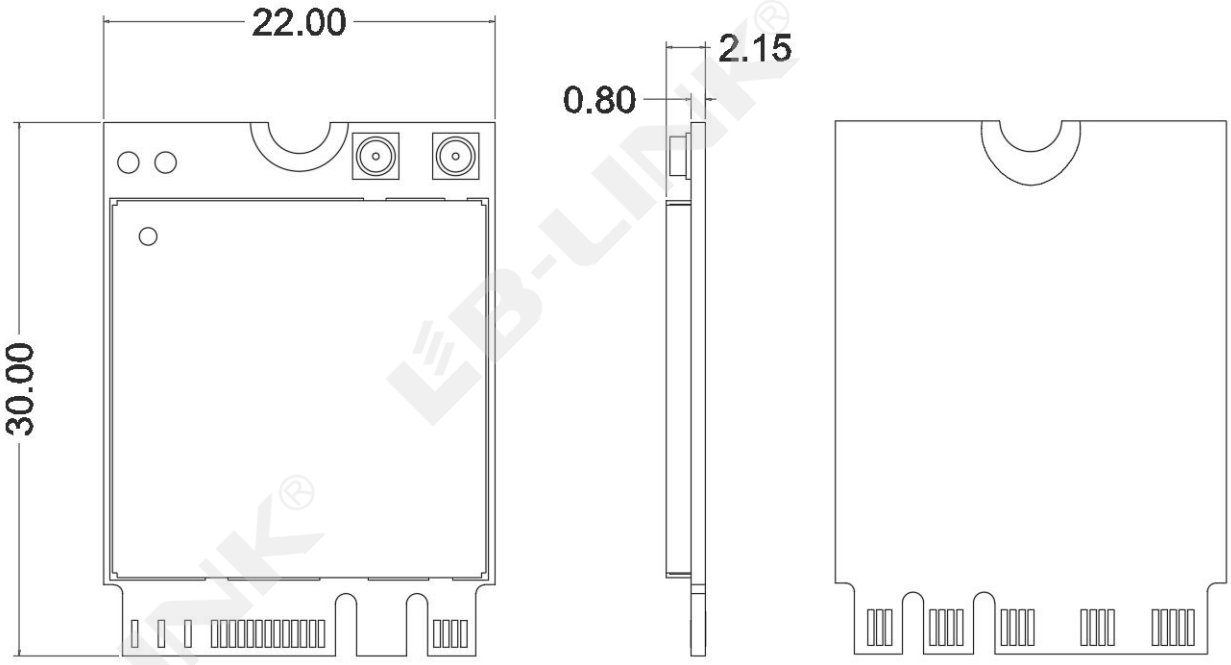
LE_125K/500K/1M/2M	2	5	8
Items	**Min**	**Typ**	**Max**
BR_1M (DH1) Modulation Characteristics			
Δf1avg	140KHz	165.2KHz	175KHz
Δf2avg	140KHz	153KHz	175KHz
Δf2max	115KHz	161.3KHz	/
Δf2avg/Δf1avg	0.8	0.926	/
Items	**Min**	**Typ**	**Max**
EDR_3M(3DH5) EDR Carrier Frequency Stability and Modulation Accuracy			
ωi	-75KHz	16.6KHz	+75KHz
ωi+ωo	-75KHz	16.51KHz	+75KHz
ωo	-10KHz	0.34KHz	+10KHz
8DPSK RMS DEVM	/	0.037	0.13
8DPSK DEVM	/	0.082	0.25
Items	**Min**	**Typ**	**Max**
LE_1M Modulation Characteristics			
Δf1avg	225KHz	252.28KHz	275KHz
Δf2avg	225KHz	231.54KHz	275KHz
Δf2max	185KHz	224.60KHz	/
Δf2avg/Δf1avg	0.8	0.918	/
Items	**Min**	**Typ**	**Max**
LE_2M Modulation Characteristics			
Δf1avg	450KHz	499.73KHz	550KHz
Δf2avg	450KHz	495.79KHz	550KHz
Δf2max	370KHz	477.9KHz	/
Δf2avg/Δf1avg	0.8	0.992	/

Bluetooth Receiver Specifications (BT_ANT)				
Items	**Sensitivity**		**Maximum Input Level**	
	Input Level (Typ)	**BER**	**Input Level (Typ)**	**BER**

BR_1M (DH1)	-90 dBm	≦ 0.1%	-5 dBm	≦ 0.1%
EDR_2M(DH1)	-90 dBm	≦ 0.01%	-5 dBm	≦ 0.1%
EDR_3M (3DH5)	-80 dBm	≦ 0.01%	-5 dBm	≦ 0.1%
	Input Level (Typ)	PER	Input Level (Typ)	PER
LE_125/500K	-92 dBm	≦ 5%	-5 dBm	≦ 5%
LE_1M	-88 dBm	≦ 5%	-5 dBm	≦ 5%
LE_2M	-84 dBm	≦ 5%	-5 dBm	≦ 5%

5. Mechanical Specifications

5.1 Card Outline Drawing

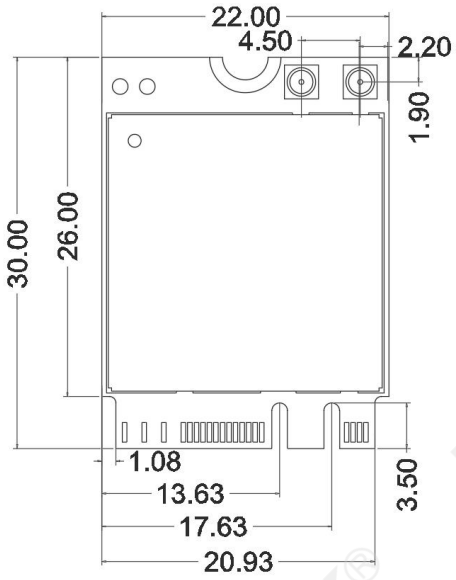


(Top View) (Side View) (Bottom View)

Card dimension: 30.0*22.0*2.15mm(L*W*H; Tolerance: ±0.15mm)

IPEX / MHF-4 connector dimension: 2.0*2.0*0.6mm (L*W*H, Ø1.5mm)

5.2 Mechanical Dimensions



(Top View)

6. Application Information

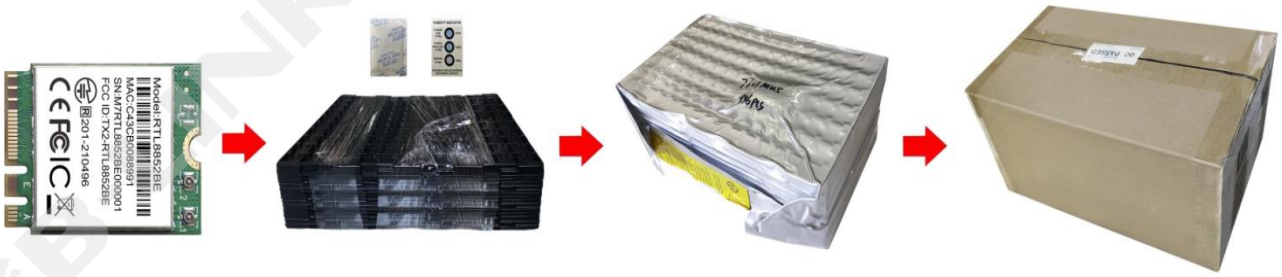
6.1 Typical Application Circuit

7. Key Components Of card

No.	Parts	Specification	Manufacturer	Note
1	Chipset	RTL8852BE-CG	Realtek Semiconductor Corp.	
2	PCB	BL-M8852BP4	SHEN ZHEN QILI ELECTRON CO.,LTD	
			MILLION SOURCE PRINTED CIRCUIT BOARD CO.,LTD	
			ShenZhen Tie Fa Technology Limited	
			Jiangsu Lantek Electronics Tech Co.,LTD	
3	Crystal	40MHz-2016	HOSONIC ELECTRONIC CO.,LTD	
			Chengde oscillator Electronic Technology CO.,LTD	
			JinHua East Crystal Electronic CO.,LTD	
			LUCKI CM ELECTRONICS CO.,LTD	
4	Diplexer	DIP1608	Walsin Technology Corporation	
			Dongguan Hekang Electronics Co.,LTD	
			Advanced Ceramic X Corp.	

8. Package and Storage Information

8.1 Package Dimensions



Package specification:

1. 35 cards per blister plate and 700 cards per box.
2. The blister is bound with wire membrane and put into anti-static vacuum bag.
3. Put 1 bag of dry beads (20g) in each anti-static vacuum bag. 1 pcs 3 point humidity card.
4. The outer box size is 35.2*21.5*15.5cm.

8.2 Storage Conditions

Absolute Maximum Ratings:

Storage temperature: -40℃ to +85℃,

Storage humidity: 10% to 95 （Non-Condensing）

Recommended Storage Conditions:

Storage temperature: 5℃ to +40℃,

Storage humidity: 20% to 90% RH

Please use this card within 12month after vacuum-packaged.

The card shall be stored without opening the packing.

After the packing opened, the card shall be used within 72hours.

When the color of the humidity indicator in the packing changed,

The card shall be baked before use.

Baking condition: 60℃, 24hours, 1time.

ESD Sensitivity：

ESD Protection: 2KV (HBM, Maximum rating)

The card is a static-sensitive electronic device.

Do not operate or store near strong electrostatic fields.

Take proper ESD precautions!

ESD CAUTION