

RF Exposure Report

Report No.: MFBBUI-WTW-P21040655Z

FCC ID: TX2-RTL8852BE

Test Model: RTL8852BE

Received Date: 2022/3/10

Test Date: 2022/4/18

Issued Date: 2024/5/9

Applicant: Realtek Semiconductor Corp.

Address: No. 2, Innovation Road II, Hsinchu Science Park, Hsinchu 300, Taiwan

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Hsin Chu Laboratory

Lab Address: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
Taiwan

Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
Taiwan

**FCC Registration /
Designation Number:** 723255 / TW2022



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Table of Contents

Release Control Record	3
1 Certificate of Conformity	4
2 RF Exposure	5
2.1 Limits for Maximum Permissible Exposure (MPE).....	5
2.2 MPE Calculation Formula	5
2.3 Classification	5
2.4 Antenna Gain	6
2.5 Calculation Result of Maximum Conducted Power.....	7

Release Control Record

Issue No.	Description	Date Issued
MFBBUI-WTW-P21040655Z	Original release.	2024/5/9

1 Certificate of Conformity

Product: 11ax RTL8852BE Combo module
Brand: REALTEK
Test Model: RTL8852BE
Sample Status: Engineering sample
Applicant: Realtek Semiconductor Corp.
Test Date: 2022/4/18
FCC Rule Part: FCC Part 2 (Section 2.1091)
Standards: KDB 447498 D01 General RF Exposure Guidance v06

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : Phoenix Huang , **Date:** 2024/5/9
Phoenix Huang / Specialist

Approved by : May Chen , **Date:** 2024/5/9
May Chen / Manager

2 RF Exposure

2.1 Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (minutes)
Limits For General Population / Uncontrolled Exposure				
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	f/1500	30
1500-100,000	1.0	30

f = Frequency in MHz ; *Plane-wave equivalent power density

2.2 MPE Calculation Formula

$$Pd = (Pout * G) / (4 * \pi * r^2)$$

where

Pd = power density in mW/cm²

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

2.3 Classification

The antenna of this product, under normal use condition, is at least 20 cm away from the body of the user. So, this device is classified as **Mobile Device**.

2.4 Antenna Gain

Ant. Set	RF Chain No.	Brand	Model	Ant. Net Gain (dBi)	Frequency Range (GHz)	Ant. Type	Connector Type	Cable Length (mm)
1	Chain 0	ARISTOTLE	RFA-27-JP326-MHF4300	3.5	2.4~2.4835	PIFA	i-pex(MHF)	300
				5	5.15~5.85			
				5	5.875~7.125			
	Chain 1	ARISTOTLE	RFA-27-JP326-MHF4300	3.5	2.4~2.4835	PIFA	i-pex(MHF)	300
				5	5.15~5.85			
				5	5.875~7.125			
2	Chain 0	ARISTOTLE	RFA-27-C38H1-MHF4300	3	2.4~2.4835	Dipole	i-pex(MHF)	300
				5	5.15~5.85			
				5	5.875~7.125			
	Chain 1	ARISTOTLE	RFA-27-C38H1-MHF4300	3	2.4~2.4835	Dipole	i-pex(MHF)	300
				5	5.15~5.85			
				5	5.875~7.125			
3	Chain 0	ARISTOTLE	RFA-27-JP378-4B-200	3.38	2.4~2.4835	Monopole	i-pex(MHF)	200
				4.81	5.15~5.85			
				4.86	5.875~7.125			
	Chain 1	ARISTOTLE	RFA-27-JP378-4B-200	3.38	2.4~2.4835	Monopole	i-pex(MHF)	200
				4.81	5.15~5.85			
				4.86	5.875~7.125			

Note: The Bluetooth technology will fix transmission on Chain 1.

* Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

2.5 Calculation Result of Maximum Conducted Power

Note: This report is issued as a duplication report to BV CPS report no.: MFBBUI-WTW-P21040655E. The differences compared with original report are add PCIe+USB E-Key for dual antenna SKU, add component (R4) for identified voltage in the new interface and change software. There is no addition human exposure has to be evaluated, all test data were copied from the original test report (Report No.: MFBBUI-WTW-P21040655E).

For 2Tx

CDD Mode

Operation Mode	Evaluation Frequency (MHz)	Max. Average Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Pass/ Fail
WLAN 2.4GHz	2412-2472	298.974	3.5	20	0.13316	1	Pass
WLAN 5GHz (U-NII-1)	5180-5240	238.524	5	20	0.15006	1	Pass
WLAN 5GHz (U-NII-2A)	5260-5320	240.084	5	20	0.15104	1	Pass
WLAN 5GHz (U-NII-2C)	5500-5720	235.984	5	20	0.14846	1	Pass
WLAN 5GHz (U-NII-3)	5745-5825	337.75	5	20	0.21248	1	Pass
BT-EDR	2402-2480	16.52	3.5	20	0.00736	1	Pass
BT-LE	2402-2480	16.827	3.5	20	0.00749	1	Pass

Beamforming Mode

Operation Mode	Evaluation Frequency (MHz)	Max. Average Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Pass/ Fail
WLAN 2.4GHz	2412-2472	294.715	6.51	20	0.2625	1	Pass
WLAN 5GHz (U-NII-1)	5180-5240	150.929	8.01	20	0.18989	1	Pass
WLAN 5GHz (U-NII-2A)	5250-5320	150.907	8.01	20	0.18986	1	Pass
WLAN 5GHz (U-NII-2C)	5500-5720	151.898	8.01	20	0.19111	1	Pass
WLAN 5GHz (U-NII-3)	5745-5825	310.952	8.01	20	0.39122	1	Pass
BT-EDR	2402-2480	16.52	3.5	20	0.00736	1	Pass
BT-LE	2402-2480	16.827	3.5	20	0.00749	1	Pass

Note:

- Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
- 2.4GHz: The directional gain = 3.5 dBi + 10log(2) = 6.51 dBi
- 5GHz: The directional gain = 5 dBi + 10log(2) = 8.01 dBi

For 1Tx

Operation Mode	Evaluation Frequency (MHz)	Max. Average Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Pass/ Fail
WLAN 2.4GHz	2412-2472	171.396	3.5	20	0.07634	1	Pass
WLAN 5GHz (U-NII-1)	5180-5240	167.88	5	20	0.10562	1	Pass
WLAN 5GHz (U-NII-2A)	5260-5320	168.267	5	20	0.10586	1	Pass
WLAN 5GHz (U-NII-2C)	5500-5720	167.88	5	20	0.10562	1	Pass
WLAN 5GHz (U-NII-3)	5745-5825	172.584	5	20	0.10858	1	Pass
BT-EDR	2402-2480	16.52	3.5	20	0.00736	1	Pass
BT-LE	2402-2480	16.827	3.5	20	0.00749	1	Pass

Note:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. 2.4GHz: The directional gain = 3.5 dBi
3. 5GHz: The directional gain = 5 dBi

Conclusion:

The formula of calculated the MPE is:

$$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$$

CPD = Calculation power density

LPD = Limit of power density

CDD Mode

$$\text{WLAN 5GHz} + \text{Bluetooth} = 0.21248 / 1 + 0.00749 / 1 = 0.21997$$

Beamforming Mode

$$\text{WLAN 5GHz} + \text{Bluetooth} = 0.39122 / 1 + 0.00749 / 1 = 0.39871$$

Therefore the maximum calculations of above situations are less than the "1" limit.

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