RF Exposure Report

Report No.: MFBBUI-WTW-P21040655

FCC ID: TX2-RTL8852BE

Test Model: RTL8852BE

Received Date: 2021/4/21

Test Date: 2021/12/1 ~ 2022/4/18

Issued Date: 2022/8/15

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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Release Control Record

Issue No.	Description	Date Issued
MFBBUI-WTW-P21040655	Original release.	2022/8/15

1   Certificate of Conformity

Product: 11ax RTL8852BE Combo module

Brand: REALTEK

Test Model: RTL8852BE

Sample Status: Engineering sample

Applicant: Realtek Semiconductor Corp.

Test Date: 2021/12/1 ~ 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 : ___Vivian Huang___ , **Date:** ___2022/8/15___
Vivian Huang / Specialist
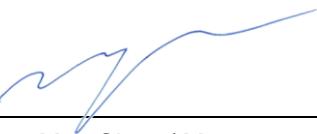
Approved by : _____ , **Date:** ___2022/8/15___
May Chen / Manager

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/cm^2

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:
1. From the above transmission chains, the worse case was found in transmission on Chain 0 for 1TX mode. Therefore only the test data of the mode was recorded in this report.
2. The Bluetooth technology will fix transmission on Chain 1.

*The above Antenna information is declared by manufacturer and for more detailed features description,
  please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

2.5 Calculation Result of Maximum Conducted Power

All data (except WLAN U-NII-4) was copied from the original test report (Report No.: SABBUI-WTW-P21040655E).

Mode A (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
WLAN 5GHz (U-NII-4)	5845~5885	120.664	5	20	0.07591	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
WLAN 5GHz (U-NII-4)	5845~5885	120.664	8.01	20	0.15181	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 + 10log(2) = 6.51 dBi
3. 5GHz: The directional gain = 5 dBi + 10log(2) = 8.01 dBi

Mode B (For 1TX)

Operation Mode	Evaluation Frequency (MHz)	Max. Average Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm²)	Limit (mW/cm²)	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
WLAN 5GHz (U-NII-4)	5845~5885	138.995	5	20	0.08744	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 + ……etc. < 1

CPD = Calculation power density

LPD = Limit of power density

CDD Mode

WLAN 5GHz + Bluetooth = 0.21248 / 1 + 0.00749 / 1 = 0.21997

Beamforming Mode

WLAN 5GHz + 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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