

RF Exposure Report

Report No.: SABBUI-WTW-P21040655

FCC ID: TX2-RTL8852BE

Test Model: RTL8852BE

Received Date: Apr. 21, 2021

Test Date: July 12, 2021

Issued Date: Aug. 02, 2021

Applicant: Realtek Semiconductor Corp.

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

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Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
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**FCC Registration /
Designation Number:** 723255 / TW2022



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Release Control Record

Issue No.	Description	Date Issued
SABBUI-WTW-P21040655	Original release.	Aug. 02, 2021

1 Certificate of Conformity

Product: 11ax RTL8852BE Combo module

Brand: REALTEK

Test Model: RTL8852BE

Sample Status: Engineering sample

Applicant: Realtek Semiconductor Corp.

Test Date: July 13, 2021

Standards: FCC Part 2 (Section 2.1091)

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:** Aug. 02, 2021
Vivian Huang / Specialist

Approved by : Clark Lin , **Date:** Aug. 02, 2021
Clark Lin / Technical 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

$$P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot r^2)$$

where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 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			

Note:

1. From the above transmission chains, the transmission on **Chain 0** for 1TX mode was selected as representative model for the test. Therefore only the test data of the mode was recorded in this report.
2. The Bluetooth technology will fix transmission on Chain 1.
3. Max. gain was selected for the final test, except for the radiated emissions test.

* 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

Mode 1 (For 2TX)

Operation Mode	Evaluation Frequency (MHz)	Max. Average Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
WLAN (2.4GHz)	2412-2472	307.683	6.51	20	0.27405	1
WLAN (U-NII-1)	5180-5240	247.192	8.01	20	0.311	1
WLAN (U-NII-2A)	5260-5320	248.568	8.01	20	0.31273	1
WLAN (U-NII-2C)	5500-5720	244.863	8.01	20	0.30807	1
WLAN (U-NII-3)	5745-5825	348	8.01	20	0.43783	1
BT-EDR	2402-2480	8.995	3.50	20	0.00401	1
BT-LE	2402-2480	17.298	3.50	20	0.00770	1

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 irectional gain = 5 dBi + 10log(2) = 8.01 dBi

Mode 2 (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)
WLAN (2.4GHz)	2412-2472	171.396	3.50	20	0.07634	1
WLAN (U-NII-1)	5180-5240	172.187	5.00	20	0.10833	1
WLAN (U-NII-2A)	5260-5320	173.38	5.00	20	0.10908	1
WLAN (U-NII-2C)	5500-5720	171.791	5.00	20	0.10808	1
WLAN (U-NII-3)	5745-5825	176.604	5.00	20	0.1111	1
BT-EDR	2402-2480	8.995	3.50	20	0.00401	1
BT-LE	2402-2480	17.298	3.50	20	0.00770	1

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 irectional 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

WLAN 5GHz + Bluetooth = $0.43783 / 1 + 0.00770 / 1 = 0.44553$

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

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