RF Exposure Report

Report No.:	SA200114E03
FCC ID:	TX2-RTL8822C
Test Model:	RTL8822C
Received Date:	Jan. 14, 2020
Test Date:	Mar. 13 to 25, 2020
Issued Date:	Apr. 14, 2020
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
SA200114E03	Original release.	Apr. 14, 2020

1 Certificate of Conformity

Product:	11a/b/g/n/ac RTL8822C Combo module
Brand:	Realtek
Test Model:	RTL8822C
Sample Status:	ENGINEERING SAMPLE
Applicant:	Realtek Semiconductor Corp.
Test Date:	Mar. 13 to 25, 2020
Standards:	FCC Part 2 (Section 2.1091) IEEE C95.3 -2002
References Test Guidance:	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:** Apr. 14, 2020

Phoenix Huang / Specialist

Approved by : , **Date:** Apr. 14, 2020

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

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

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

Antenna Set	Chain No.	Brand	Model	Antenna Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type
1	Chain 0	LYNwave	ALA110-222050-300011	3.5	2.4~2.5	PIFA	i-pex(MHF)
				5	5.15~5.85		
	Chain 1	LYNwave	ALA110-222050-300011	3.5	2.4~2.5	PIFA	i-pex(MHF)
				5	5.15~5.85		
2	Chain 0	PSA	RFDPA171320EMLB301	3.14	2.4~2.5	Dipole	i-pex(MHF)
				5	5.15~5.85		
	Chain 1	PSA	RFDPA171320EMLB301	3.14	2.4~2.5	Dipole	i-pex(MHF)
				5	5.15~5.85		
3	-	REALTEK	RTK-ANT-0006	3.5	2.4~2.4835	PIFA	i-pex(MHF)
	-	REALTEK	RTK-ANT-0006	5	5.15~5.85	PIFA	i-pex(MHF)

Note:
1. The Bluetooth technology will fix transmission on Chain 1.
2. From the above antennas, antenna set 1 and 2 was selected as representative antenna for the test.

2.5 Calculation Result of Maximum Conducted Power

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	240.455	6.51	20	0.21417	1
WLAN (U-NII-1)	5180~5240	197.256	8.01	20	0.24818	1
WLAN (U-NII-2A)	5260~5320	163.745	8.01	20	0.20601	1
WLAN (U-NII-2C)	5500~5720	208.905	8.01	20	0.26283	1
WLAN (U-NII-3)	5745~5825	254.707	8.01	20	0.32046	1
BT-EDR	2402~2480	4.634	3.5	20	0.00206	1
BT-LE	2402~2480	4.487	3.5	20	0.002	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

Conclusion:

The formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1

CPD = Calculation power density

LPD = Limit of power density

WLAN 2.4GHz + Bluetooth = 0.21417 / 1 + 0.00206 / 1 = 0.21623

WLAN 5GHz + Bluetooth = 0.32046 / 1 + 0.00206 / 1 = 0.32252

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

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