RF Exposure Report

Report No.:	SA180206E03B
FCC ID:	S9GM510
Test Model:	M510
Received Date:	Feb. 09, 2018
Test Date:	Feb. 28 to Mar. 12, 2018
Issued Date:	May 17, 2018
Applicant:	Ruckus Wireless, Inc.
Address:	350 West Java Drive, Sunnyvale, CA 94089
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 R.O.C.
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
FCC Registration / Designation Number:	723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
SA180206E03B	Original release.	May 17, 2018

1 Certificate of Conformity

Product:	M510 Access Point
Brand:	Ruckus Wireless
Test Model:	M510
Sample Status:	ENGINEERING SAMPLE
Applicant:	Ruckus Wireless, Inc.
Test Date:	Feb. 28 to Mar. 12, 2018
Standards:	FCC Part 2 (Section 2.1091) KDB 447498 D01 General RF Exposure Guidance v06 IEEE C95.1-1992

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:** May 17, 2018

Phoenix Huang / Specialist

Approved by : , **Date:** May 17, 2018

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 20cm away from the body of the user. So, this device is classified as **Mobile Device**.

2.4 Antenna Gain

WLAN								
Antenna NO.	Transmitter Circuit	Antenna Net Gain(dBi)	Frequency range (GHz)	Antenna Type	Connecter Type	Cable Length (mm)	Cable Loss (dB)	Excluding cable loss Antenna Gain(dBi)
1	5GHz_chain_0 2.4GHz_chain_1	1	2.4~2.4835	PIFA	i-pex (MHF)	120	0	1
		3	5.15~5.85				0	3
2	5GHz_chain_1 2.4GHz_chain_0	1.2	2.4~2.4835	PIFA	i-pex (MHF)	70	0	1.2
		3	5.15~5.85				0	3

GPS						
Antenna Net Gain(dBi)	Frequency range (MHz)	Antenna Type	Connecter Type	Cable Length (mm)	Cable Loss (dB)	Excluding cable loss Antenna Gain(dBi)
1.66	1575.42	Dipole	i-pex (MHF)	80	0.34	2

WWAN						
Antenna NO.	Antenna Type	Brand	Model	Band	Freq. Range	Gain (dBi)
1 (Main)	Dipole	Aristotle	RFA-LTE-C55-B70-C255	WCDMA II (B2)	1850~1910	1.66
				WCDMA IV (B4)	1710~1755	1.66
				WCDMA V (B5)	824~849	1.66
				LTE Band (2)	1850~1910	1.66
				LTE Band (4)	1710~1755	1.66
				LTE Band (12)	698~716	1.53
2 (Aux)	Dipole	Aristotle	RFA-LTE-C55-B70-C255	WCDMA II (B2)	1850~1910	1.5
				WCDMA IV (B4)	1710~1755	1.5
				WCDMA V (B5)	824~849	1.5
				LTE Band (2)	1850~1910	1.5
				LTE Band (4)	1710~1755	1.5
				LTE Band (12)	698~716	1.37

Note: There are two WLAN antennas will transmit simultaneously (one is Horizontal and the other one is Vertical-- MIMO system with two outputs driving a cross-polarized pair of linearly polarized antennas). As the antenna combination must be supplied with one H

2.5 Calculation Result of Maximum Conducted Power

For 2.4GHz, 5GHz (U-NII-1 & UNII-3 band) and WWAN (LTE Band 12) data was copied from the original test report (Report No.: SA180206E03)

WLAN:

Frequency Band (MHz)	Max Conducted Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2412-2462	702.651	1.2	20	0.18428	1
5180-5240	652.747	3	20	0.25910	1
5260-5320	239.163	3	20	0.09493	1
5500-5700	249.53	3	20	0.09905	1
5745-5825	830.988	3	20	0.32986	1

Note: 1. There are two WLAN antennas will transmit simultaneously (one is Horizontal and the other one is Vertical -- MIMO system with two outputs driving a cross-polarized pair of linearly polarized antennas). As the antenna combination must be supplied with one Horizontal and one Vertical antenna.

2. 2.4GHz: The max gain is 1.2dBi;

3. 5GHz: The max gain is 3dBi.

WWAN

Operation Mode	Frequency Band (MHz)	Max Conducted Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
WCDMA Band 2	1852.4 ~1907.6	208.449	1.66	20	0.06078	1
WCDMA Band 4	1712.4 ~ 1752.6	178.238	1.66	20	0.05197	1
WCDMA Band 5	826.4 ~ 846.6	194.536	1.66	20	0.05672	0.5576
LTE Band 2	1850.7 ~ 1909.3	165.959	1.66	20	0.04839	1
LTE Band 4	1710.7 ~ 1754.3	150.314	1.66	20	0.04383	1
LTE Band 12	699.7 ~ 715.3	206.538	1.53	20	0.05844	0.4665

Note: *Limit of Power Density = F/1500

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 + WLAN 5GHz (U-NII-3) + WWAN (LTE Band 12) = 0.18428 / 1 + 0.32986 / 1 + 0.05844 / 0.4665 = 0.63942

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

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