RF Exposure Evaluation Report

APPLICANT	:	Redpine Signals Inc.
EQUIPMENT	:	802.11 abgn MODULE
BRAND NAME	:	Redpine Signals
MODEL NAME	:	RS9110-N-11-03
FCC ID	:	XF6-RS9110N1103
STANDARD	:	47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC., would like to declare that the device has been evaluated in accordance with 47 CFR Part 2.1091, and pass the limit. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Eric Huang / Deputy Manager

Approved by: Jones Tsai / Manager

SPORTON INTERNATIONAL INC.
No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

Table of Contents

Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA472246	Rev. 01	Initial issue of report	Sep. 18, 2014

1. Administration Data

1.1. Testing Laboratory

Testing Laboratory	
Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978

Applicant	
Company Name	Redpine Signals Inc.
Address	2107 N.First Street Suite 680 San Jose, CA 95131-2019 U.S.A

Manufacturer	
Company Name	Redpine Signals Inc.
Address	2107 N.First Street Suite 680 San Jose, CA 95131-2019 U.S.A

2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	802.11 abgn MODULE
Brand Name	Redpine Signals
Model Name	RS9110-N-11-03
FCC ID	XF6-RS9110N1103
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz
Mode	・802.11a/b/g/n HT20
Antenna Type	Dipole Antenna

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

3. Maximum RF average output power among production units

Band / Frequency (MHz)		IEEE 802.11 Average Power (dBm)		
		11b	11g	HT20
2.4GHz Band	2412	16	14	12
	2437	16	14	15
	2462	16	14	12

Band / Frequency (MHz)		IEEE 802.11 Average Power (dBm)	
		11a	HT20
5.2GHz Band	5180	13	13.5
	5190		
	5200		
	5210		
	5220		
	5230		
	5240		
5.8GHz Band	5745	6	6
	5765	3	3
	5785	6	6
	5805	3	3
	5825	6	6

4. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f2)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f2)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:
S = Power Density
P = Output Power at Antenna Terminals
G = Gain of Transmit Antenna (linear gain)
R = Distance from Transmitting Antenna

5. Radio Frequency Radiation Exposure Evaluation

5.1. Power Density Calculation

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm^2)	Limit (mW/cm^2)	Power Density / Limit
2.4GHz WLAN	2412.0	3.0	16.0	19.000	0.079	79.433	0.016	1.000	0.016
5GHz WLAN	5180.0	3.0	13.5	16.500	0.045	44.668	0.009	1.000	0.009

Note: For conservativeness, the lowest uplink frequency of each band is used to determine the MPE limit of that band.

5.2. Collocated Power Density Calculations

WLAN Power Density / Limit	WWAN Power Density / Limit	∑(Power Density / Limit) of WWAN+WLAN
0.016	0.362	0.378

Note:

1. WWAN module CloudGate LTE WW is also integrated into this device, Brand Name: Option, Model Name CG0114, FCC ID: RI7LN930, Report No: FA450221.
2. The WWAN maximum power density is 0.199 mW/cm^2, and the calculation Power Density / Limit is 0.362 was used performed simultaneous transmission analysis.
3. For colocation analysis, 2.4GHz WLAN is chosen for summation due to the highest (power density/limit) among all WLAN modes.
4. ∑(Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for WWAN + WLAN
5. Considering the WWAN module collocation with the WLAN transmitter of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of 2 collocated transmitters is compliant.

Conclusion:

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.