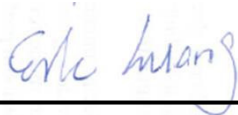


RF Exposure Evaluation Report

APPLICANT : Plume Design Inc
EQUIPMENT : Plume Pod
BRAND NAME : Plume Design Inc
MODEL NAME : A1A
MARKETING NAME : Plume Adaptive WiFi
FCC ID : 2AG7G-A1A
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 District, Taoyuan City, Taiwan (R.O.C.)



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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA6O0801-01	Rev. 01	Initial issue of report	Nov. 04, 2016
FA6O0801-01	Rev. 02	Re-evaluated the collocated power density cacluation in section 5.2	Nov. 11, 2016
FA6O0801-01	Rev. 03	Added 5.3GHz / 5.5GHz WLAN.	Nov. 30, 2016



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 District, Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978

Applicant	
Company Name	Plume Design Inc
Address	200 California Ave, STE200, Palo Alto, CA 94306, USA

Manufacturer	
Company Name	Plume Design Inc
Address	200 California Ave, STE200, Palo Alto, CA 94306, USA

2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Name	Plume Pod
EUT Type	Adaptive Wifi System Device
Brand Name	Plume Design Inc
Model Name	A1A
Marketing Name	Plume Adaptive WiFi
FCC ID	2AG7G-A1A
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5720 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Mode	· 802.11a/b/g/n/ac HT20/HT40/VHT80 · Bluetooth BR/EDR/LE
HW Version	DVT
EUT Stage	Production Unit

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

Mode / Band	Average Power (dBm)			
	BR / EDR			LE
	1Mbps	2Mbps	3Mbps	
2.4 GHz Bluetooth	1	1	1	4

2.4GHz WLAN ANT 1+2	Mode	Channel	Frequency (MHz)	Data Rate	Tune-Up Limit
	802.11b	CH 1	2412	1Mbps	22.5
		CH 6	2437		23.0
		CH 11	2462		24.5
	802.11g	CH 1	2412	6Mbps	17.5
		CH 6	2437		24.0
		CH 11	2462		20.5
	802.11n-HT20	CH 1	2412	MCS8	17.0
		CH 6	2437		24.0
		CH 11	2462		21.0
	802.11n-HT40	CH 3	2422	MCS8	14.5
		CH 6	2437		19.0
		CH 9	2452		18.0



	Mode	Channel	Frequency (MHz)	Data Rate	Tune-Up Limit
5.2GHz WLAN ANT 1+2	802.11a	CH 36	5180	6Mbps	21.0
		CH 44	5220		22.0
		CH 48	5240		22.5
	802.11n-HT20	CH 36	5180	MCS0	21.0
		CH 44	5220		22.0
		CH 48	5240		23.0
	802.11n-HT40	CH 38	5190	MCS0	17.5
		CH 46	5230		23.0
	802.11ac-VHT80	CH 42	5210	MCS0	15.0

	Mode	Channel	Frequency (MHz)	Data Rate	Tune-Up Limit
5.3GHz WLAN ANT 1+2	802.11a	CH 52	5260	6Mbps	21.0
		CH 60	5300		20.5
		CH 64	5320		20.0
	802.11n-HT20	CH 52	5260	MCS0	21.5
		CH 60	5300		22.0
		CH 64	5320		20.5
	802.11n-HT40	CH 54	5270	MCS0	22.5
		CH 62	5310		16.0
	802.11ac-VHT80	CH 58	5290	MCS0	13.5



	Mode	Channel	Frequency (MHz)	Data Rate	Tune-Up Limit
5.5GHz WLAN ANT 1+2	802.11a	CH 100	5500	6Mbps	20.5
		CH 116	5580		21.0
		CH 140	5700		19.0
		CH 144	5720		22.5
	802.11n-HT20	CH 100	5500	MCS0	21.0
		CH 116	5580		21.5
		CH 140	5700		18.5
		CH 144	5720		22.5
	802.11n-HT40	CH 102	5510	MCS0	17.5
		CH 110	5550		22.5
		CH 134	5670		20.0
		CH 142	5710		23.5
	802.11ac-VHT80	CH 106	5530	MCS0	15.0
		CH 122	5610		20.0
		CH 138	5690		23.5

	Mode	Channel	Frequency (MHz)	Data Rate	Tune-Up Limit
5.8GHz WLAN ANT 1+2	802.11a	CH 149	5745	MCS0	22.5
		CH 157	5785		22.0
		CH 165	5825		22.0
	802.11n-HT20	CH 149	5745	MCS0	22.5
		CH 157	5785		22.0
		CH 165	5825		21.5
	802.11n-HT40	CH 151	5755	MCS0	22.0
		CH 159	5795		22.5
	802.11ac-VHT80	CH 155	5775	MCS0	21.5

Note: MIMO Ant. 1+2 average power is a combined result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.



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/f ²)	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/f ²)	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. Standalone Power Density Calculation

Band	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
Bluetooth	2.90	4.00	6.900	0.005	4.898	0.001	1.000	0.001
2.4GHz WLAN	2.90	24.50	27.400	0.550	549.541	0.109	1.000	0.109
5GHz WLAN	4.10	23.50	27.600	0.575	575.440	0.115	1.000	0.115

Note : In the above table have assessed Bluetooth, WLAN2.4GHz and WLAN 5GHz by referring to their maximum antenna gain and maximum power.

5.2. Collocated Power Density Calculation

< Bluetooth transmit simultaneously with 5GHz WLAN >

Bluetooth Power Density / Limit	5GHz WLAN Power Density / Limit	Σ(Power Density / Limit) of WLAN+Bluetooth
0.001	0.115	0.116

< 2.4GHz WLAN transmit simultaneously with 5GHz WLAN >

2.4GHz WLAN Power Density / Limit	5GHz WLAN Power Density / Limit	Σ(Power Density / Limit) of WLAN+Bluetooth
0.109	0.115	0.224

Note:

- For this device, Bluetooth can transmit simultaneously with 5GHz WLAN, and 2.4GHz WLAN can transmit simultaneously with 5GHz WLAN ,however Bluetooth cannot transmit simultaneously with 2.4GHz WLAN.
- Σ(Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for Bluetooth + 5GHz WLAN and 2.4GHz WLAN + 5GHz WLAN.
- Considering the WLAN module collocation with the Bluetooth 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.