

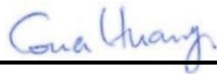
# RF EXPOSURE EVALUATION REPORT

**FCC ID** : 2AG7G-C1A  
**Equipment** : Plume PowerPod  
**Brand Name** : Plume Design Inc  
**Model Name** : C1A  
**Applicant** : Plume Design Inc  
290 S California Ave, Suite 200, Palo Alto,  
CA 94306, USA  
**Manufacturer** : Plume Design Inc  
290 S California Ave, Suite 200, Palo Alto,  
CA 94306, USA  
**Standard** : 47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC has been evaluated in accordance with 47 CFR Part 2.1091 for the device and pass the limit.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The results in this variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.



Approved by: Cona Huang / Deputy Manager

**SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory**  
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### History of this test report

Report No.	Version	Description	Issued Date
FA912813A	Rev. 01	Initial issue of report	Apr. 23, 2019



**1. Description of Equipment Under Test (EUT)**

Product Feature & Specification	
EUT Type	Plume PowerPod
Brand Name	Plume Design Inc
Model Name	C1A
FCC ID	2AG7G-C1A
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 Bluetooth: 2402 MHz ~ 2480 MHz
Mode	802.11a/b/g/n/ac HT20/HT40/VHT20/VHT40/VHT80 Bluetooth LE
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.

**< Antenna Gain for Non-Beamforming Mode >**

Peak antenna gain(dBi)										
Bluetooth LE	2.4GHz WLAN			5GHz WLAN						
Ant 2	SISO Mode Ant 1	SISO Mode Ant 2	MIMO Mode Ant 1+2	SISO Mode Ant 1	MIMO Mode Ant 2	SISO Mode Ant 3	MIMO Mode Ant 4	MIMO Mode Ant 1+2	MIMO Mode Ant 1+2+3	MIMO Mode Ant 1+2+3+4
0.4	1.8	0.4	1	3.6	4.4	3.1	3.8	1.1	2.7	2

**< Antenna Gain for Beamforming Mode >**

Peak antenna gain(dBi)			
2.4GHz WLAN	5GHz WLAN		
MIMO Mode Ant 1+2	MIMO Mode Ant 1+2	MIMO Mode Ant 1+2+3	MIMO Mode Ant 1+2+3+4
0.12	0.29	0.82	1.18

**Reviewed by: Jason Wang**

**Report Producer: Wan Liu**



**2. Maximum RF average output power among production units**

**<Non-Beamforming Mode>**

Maximum Average Power (dBm)						
Bluetooth LE	2.4GHz WLAN		5GHz WLAN			
Ant 2	SISO Mode Ant 1	MIMO Mode Ant 1+2	SISO Mode Ant 1	MIMO Mode Ant 1+2	MIMO Mode Ant 1+2+3	MIMO Mode Ant 1+2+3+4
-2	22.5	25.5	22.5	26	27.5	28.5

**<Beamforming Mode>**

Maximum Average Power (dBm)			
2.4GHz WLAN	5GHz WLAN		
MIMO Mode Ant 1+2	MIMO Mode Ant 1+2	MIMO Mode Ant 1+2+3	MIMO Mode Ant 1+2+3+4
25	26.5	28	26.5



### 3. 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 <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	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

## **4. Radio Frequency Radiation Exposure Evaluation**

### **4.1. Standalone Power Density Calculation**

#### **<Non-Beamforming Mode>**

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Power Density / Limit
Bluetooth LE	2402.0	0.40	-2.00	-1.600	0.001	0.692	0.000	1.000	0.000138
2.4GHz WLAN SISO Mode ANT1	2412.0	1.80	22.50	24.300	0.269	269.153	0.054	1.000	0.053574
2.4GHz WLAN MIMO Mode ANT1+2	2412.0	1.00	25.50	26.500	0.447	446.684	0.089	1.000	0.088910
5GHz WLAN SISO Mode ANT1	5180.0	3.60	22.50	26.100	0.407	407.380	0.081	1.000	0.081087
5GHz WLAN MIMO Mode ANT1+2	5180.0	1.10	26.00	27.100	0.513	512.861	0.102	1.000	0.102082
5GHz WLAN MIMO Mode ANT1+2+3	5180.0	2.70	27.50	30.200	1.047	1047.129	0.208	1.000	0.208425
5GHz WLAN MIMO Mode ANT1+2+3+4	5180.0	2.00	28.50	30.500	1.122	1122.018	0.223	1.000	0.223332

#### **Note:**

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

#### **<Beamforming Mode>**

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Power Density / Limit
2.4GHz WLAN MIMO Mode ANT1+2	2412.0	0.12	25.00	25.120	0.325	325.087	0.065	1.000	0.064707
5GHz WLAN MIMO Mode ANT1+2	5180.0	0.29	26.50	26.790	0.478	477.529	0.095	1.000	0.095050
5GHz WLAN MIMO Mode ANT1+2+3	5180.0	0.82	28.00	28.820	0.762	762.079	0.152	1.000	0.151688
5GHz WLAN MIMO Mode ANT1+2+3+4	5180.0	1.18	26.50	27.680	0.586	586.138	0.117	1.000	0.116668

#### **Note:**

- In the above table have assessed WLAN2.4GHz and WLAN 5GHz by referring to their maximum power.

### **4.2. Collocated Power Density Calculation**

Maximum Bluetooth Power Density / Limit	Maximum 2.4GHz WLAN Power Density / Limit	Maximum 5GHz WLAN Power Density / Limit	$\Sigma$ (Power Density / Limit) of WLAN+Bluetooth
0.000138	0.088910	0.223332	0.312380

#### **Note:**

- $\Sigma$  (Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for all radio transmitter.
- Considering all antenna collocation of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of all collocated transmitters is compliant.

## **Conclusion:**

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