



RF EXPOSURE EVALUATION REPORT

FCC ID : 2AG7G-F1A
Equipment : Plume Adaptive WiFi
Brand Name : Plume Design Inc
Model Name : F1A
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 this product in accordance with 47 CFR Part 2.1091 and it complies with applicable limit.

The results in this 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.

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC evaluation.

Approved by: Cona Huang / Deputy Manager

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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History of this test report

Report No.	Version	Description	Issued Date
FA031701	Rev. 01	Initial issue of report	Sep. 22, 2020
FA031701	Rev. 02	Added UWB Information in Section 1	Sep. 25, 2020
FA031701	Rev. 03	Update Equipment Name	Nov. 04, 2020



1. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	Plume Adaptive WiFi
Brand Name	Plume Design Inc
Model Name	F1A
FCC ID	2AG7G-F1A
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2400 MHz ~ 2483.5 MHz WLAN 5.2GHz Band: 5150 MHz ~ 5250 MHz WLAN 5.3GHz Band: 5250 MHz ~ 5350 MHz WLAN 5.6GHz Band: 5470 MHz ~ 5725 MHz WLAN 5.8GHz Band: 5725 MHz ~ 5825 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz UWB(Ch5): 6489.6MHz UWB(Ch9): 7987.2MHz
Mode	WLAN: 802.11a/b/g/n/ac/ax HT20/HT40/VHT20/VHT40/VHT80/VHT160/HE20/HE40/HE80/HE160 Bluetooth LE UWB: 850Kbps, 6.8Mbps, 27Mbps
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.

<BF Gain>

Model Name	Antenna Gain (dBi)	
	2.4G	5G
F1A	0.67 dBi	1.4 dBi

<Non-BF Gain>

	Antenna Gain (dBi)					
	Ant1	Ant2	Ant3	Ant4	Ant H1	Ant H2
BT			0.1			
2.4G					2.5	3.1
5G B1	3.3	2.5	3	4.2		
5G B2	2.7	2	3	3.4		
5G B3					4.1	2.2
5G B4					2.8	2.4

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 3	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
-0.5	26	28.5	27	30	25	26

<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
30	28.5	24	25.5



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 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 22 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	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 22cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
Bluetooth LE	0.10	-0.50	-0.400	0.001	0.912	0.0002	1.000	0.0002
2.4GHz WLAN SISO Mode ANT1	2.50	26.00	28.500	0.708	707.946	0.1165	1.000	0.1165
2.4GHz WLAN MIMO Mode ANT1+2	3.10	28.50	31.600	1.445	1445.440	0.2378	1.000	0.2378
5GHz WLAN SISO Mode ANT1	4.10	27.00	31.100	1.288	1288.250	0.2119	1.000	0.2119
5GHz WLAN MIMO Mode ANT1+2	4.10	30.00	34.100	2.570	2570.396	0.4228	1.000	0.4228
5GHz WLAN MIMO Mode ANT1+2+3	4.10	25.00	29.100	0.813	812.831	0.1337	1.000	0.1337
5GHz WLAN MIMO Mode ANT1+2+3+4	4.20	26.00	30.200	1.047	1047.129	0.1723	1.000	0.1723

<Beamforming Mode>

Band	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 22cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
2.4GHz WLAN MIMO Mode ANT1+2	0.67	30.00	30.670	1.167	1166.810	0.1919	1.000	0.1919
5GHz WLAN MIMO Mode ANT1+2	1.40	28.50	29.900	0.977	977.237	0.1608	1.000	0.1608
5GHz WLAN MIMO Mode ANT1+2+3	1.40	24.00	25.400	0.347	346.737	0.0570	1.000	0.0570
5GHz WLAN MIMO Mode ANT1+2+3+4	1.40	25.50	26.900	0.490	489.779	0.0806	1.000	0.0806

4.2. Collocated Power Density Calculation

Bluetooth Power Density / Limit	2.4GHz WLAN Power Density / Limit	5GHz WLAN Power Density / Limit	Σ (Power Density / Limit) of WLAN+Bluetooth
0.0002	0.2378	0.4228	0.6608

Note:

1. Σ (Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for WLAN + Bluetooth.
2. Considering the all 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.