RF EXPOSURE EVALUATION REPORT

FCC ID	:	2AG7G-G1A
Equipment	:	Plume Adaptive WiFi with LTE
Brand Name	:	Plume Design Inc
Model Name	:	G1A with LTE
Applicant	:	Plume Design Inc 325 Lytton Ave., Palo Alto, CA 94301
Manufacturer	:	Plume Design Inc 325 Lytton Ave., Palo Alto, CA 94301
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.

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.

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

Approved by: Cona Huang / Deputy Manager

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History of this test report

Report No.	Version	Description	Issued Date
FA111911-05	Rev. 01	Initial issue of report	Jul. 21, 2021

1. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	Plume Adaptive WiFi with LTE
Brand Name	Plume Design Inc
Model Name	G1A with LTE
FCC ID	2AG7G-G1A
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2400 MHz ~ 2483.5 MHz WLAN U-NII 1: 5150 MHz ~ 5250 MHz WLAN U-NII 2-A: 5250 MHz ~ 5350 MHz WLAN U-NII 2-C: 5470 MHz ~ 5725 MHz WLAN U-NII 3: 5725 MHz ~ 5825 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz
Mode	WLAN: 802.11a/b/g/n/ac/ax HT20/HT40/VHT20/VHT40/VHT80/VHT160/HE20/HE40/HE80/HE160 Bluetooth BR/EDR/LE
EUT Stage	Production Unit
Remark: 1. The below WWAN operation also into this host, additional WWAN power density calculation just assessment Sim-Tx anslysis to meet requirement.	

WWAN Module Information	
Brand Name	Quectel
Model Name	EM06-A
Wireless Technology and Frequency Range	WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 30: 2305 MHz ~ 2315 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 66: 1710 MHz ~ 1780 MHz
Mode	RMC 12.2Kbps HSDPA HSUPA DC-HSDPA LTE: QPSK, 16QAM, 64QAM

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

Reviewed by: Jason Wang

Report Producer: Carlie Tsai

<WWAN Antenna Gain>

Band	Gain (dBi)
3G B2 / LTE B2	2.6
3G B4 / LTE B4	2.3
3G B5 / LTE B5	-0.5
LTE B7	2.4
LTE B12	-0.5
LTE B13	-0.5
LTE B25	2.6
LTE B26	-0.5
LTE B30	-0.1
LTE B41	2.4
LTE B66	2.3

<WLAN Non-Beamforming Gain>

Antenna type	Ant L0	Ant L1	Ant L2	Ant L3	Ant H0	Ant H1
BLE (IFA Antenna)				2.4		
2.4G (IFA Antenna)					3.5	2.7
5G B1 (IFA Antenna)	4	2.5	3.8	3		
5G B2 (IFA Antenna)	3.3	2.4	3.8	2.3		
5G B3 (IFA Antenna)					5.9	3.8
5G B4 (IFA Antenna)					5.9	3.7

<WLAN Beamforming Gain>

Bands	BF Gain (dBi)
2.4G 2Tx	6.12
5G LB(B1) 2Tx	6.29
5G LB(B1) 3Tx	8.23
5G LB(B1) 4Tx	9.37
5G LB(B2) 2Tx	5.87
5G LB(B2) 3Tx	7.96
5G LB(B2) 4Tx	8.99
5G HB(B3) 2Tx	7.92
5G HB(B4) 2Tx	7.88

2. Maximum RF average output power among production units

<WWAN>

Radio Tech	Band Number	Maximum Transmit Power Level (dBm)
		Default
WCDMA	B2	24.00
	B4	24.00
	B5	24.00
LTE	B2	24.00
	B4	24.00
	B5	24.00
	B7	24.00
	B12	24.00
	B13	24.00
	B25	24.00
	B26	24.00
	B30	24.00
	B41	24.00
	B66	24.00

<WLAN>

	tune up (non TXBF)	tune up (TXBF)
BLE	19.50	-
WLAN 2.4G	26.00	26.00
WLAN 5G B1	27.00	24.50
WLAN 5G B2	18.00	19.00
WLAN 5G B3	24.00	17.50
WLAN 5G B4	27.50	25.00

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/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

4. Radio Frequency Radiation Exposure Evaluation

4.1. Standalone Power Density Calculation

<WWAN>

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
WCDMA Band 2	2.60	24.00	26.60	0.46	457.09	0.091	1.000	0.091
WCDMA Band 4	2.30	24.00	26.30	0.43	426.58	0.085	1.000	0.085
WCDMA Band 5	-0.50	24.00	23.50	0.22	223.87	0.045	0.536	0.083
LTE Band 2	2.60	24.00	26.60	0.46	457.09	0.091	1.000	0.091
LTE Band 4	2.30	24.00	26.30	0.43	426.58	0.085	1.000	0.085
LTE Band 5	-0.50	24.00	23.50	0.22	223.87	0.045	0.549	0.081
LTE Band 7	2.40	24.00	26.40	0.44	436.52	0.087	1.000	0.087
LTE Band 12	-0.50	24.00	23.50	0.22	223.87	0.045	0.466	0.096
LTE Band 13	-0.50	24.00	23.50	0.22	223.87	0.045	0.518	0.086
LTE Band 25	2.60	24.00	26.60	0.46	457.09	0.091	1.000	0.091
LTE Band 26	-0.50	24.00	23.50	0.22	223.87	0.045	0.543	0.082
LTE Band 30	-0.10	24.00	23.90	0.25	245.47	0.049	1.000	0.049
LTE Band 41	2.40	24.00	26.40	0.44	436.52	0.087	1.000	0.087
LTE Band 66	2.30	24.00	26.30	0.43	426.58	0.085	1.000	0.085

<Non-Beamforming Mode>

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
WLAN2.4GHz Band	3.50	26.00	29.50	0.89	891.25	0.177	1.000	0.177
WLAN5GHz Band 1	4.00	27.00	31.00	1.26	1258.93	0.251	1.000	0.251
WLAN5GHz Band 2	3.80	18.00	21.80	0.15	151.36	0.030	1.000	0.030
WLAN5GHz Band 3	5.90	24.00	29.90	0.98	977.24	0.195	1.000	0.195
WLAN5GHz Band 4	5.90	27.50	33.40	2.19	2187.76	0.435	1.000	0.435
Bluetooth	2.40	19.50	21.90	0.15	154.88	0.031	1.000	0.031

<Beamforming Mode>

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
WLAN2.4GHz Band	6.12	26.00	32.12	1.63	1629.30	0.324	1.000	0.324
WLAN5GHz Band 1	9.37	24.50	33.87	2.44	2437.81	0.485	1.000	0.485
WLAN5GHz Band 2	8.99	19.00	27.99	0.63	629.51	0.125	1.000	0.125
WLAN5GHz Band 3	7.92	17.50	25.42	0.35	348.34	0.069	1.000	0.069
WLAN5GHz Band 4	7.88	25.00	32.88	1.94	1940.89	0.386	1.000	0.386

4.2. Collocated Power Density Calculation

WWAN Power Density / Limit	2.4GHz WLAN Power Density / Limit	5GHz WLAN Power Density / Limit	Bluetooth Power Density / Limit	Σ(Power Density / Limit) of WWAN+WLAN+Bluetooth
0.096	0.324	0.485	0.031	0.936

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 WWAN + 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.