

MPE Report

Applicant : Plume Design, Inc.
Product Name : SuperPod Aon
Trade Name : Plume Design, Inc.
Model Number : G2A
Applicable Standard : 47 CFR § 2.1091
Received Date : Nov. 23, 2022
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Issued by

Approved By : _____

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Taiwan Accreditation Foundation accreditation number: 1330

Note:

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3. The relevant information is provided by customers in this test report. According to the correctness, appropriateness or completeness of the information provided by the customer, if there is any doubt or error in the information which affects the validity of the test results, the laboratory does not take the responsibility.

Revision History

Rev.	Issued Date	Revisions	Revised By
00	Apr. 21, 2023	Initial Issue	Abby Hsu

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1. General Information

1.1 Reference Applicable Standard

Standard	Description	Version
IEEE C95.1	American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 300 KHz to 100 GHz, New York.	1992
47 CFR § 2.1091	Radiofrequency radiation exposure evaluation: mobile devices.	-
47 CFR § 1.1310	Radiofrequency radiation exposure limits.	-
KDB 447498 D04	RF exposure procedures and equipment authorization policies for mobile and portable devices	v01

1.2 Testing Location

Site Name: Site Name: Eurofins E&E Wireless Taiwan Co., Ltd.

Site Address: No. 140-1, Changan Street, Bade District, Taoyuan City 334025, Taiwan (R.O.C.)

Site Address: No. 2, Wuquan 5th Rd. Wugu Dist., New Taipei City, Taiwan (R.O.C.)

2. Description of Equipment under Test (EUT)

Applicant	Plume Design, Inc. 325 Lytton Ave., Palo Alto, CA 94301			
Product Name	SuperPod Aon			
Trade Name	Plume Design, Inc.			
Model Number	G2A			
FCC ID	2AG7G-G2A			
Transmitter	Modulation	Frequency Range (MHz)	Number of Channels	
WLAN 2.4G	IEEE 802.11b IEEE 802.11g IEEE 802.11n 20 MHz (64QAM) IEEE 802.11n 20 MHz (256QAM) IEEE 802.11ax 20 MHz	2412 - 2462	11	
	IEEE 802.11n 40 MHz (64QAM) IEEE 802.11n 40 MHz (256QAM) IEEE 802.11ax 40 MHz	2422 - 2452	9	
(WLAN 5G)	IEEE 802.11a IEEE 802.11n 5 GHz 20 MHz / IEEE 802.11ac 20 MHz / IEEE 802.11ax 20 MHz	U-NII Band I	5180 – 5240	4
		U-NII Band II-A	5260 – 5320	4
		U-NII Band II-C	5500 – 5720	12
		U-NII Band III	5745 – 5825	5
	IEEE 802.11n 5 GHz 40 MHz / IEEE 802.11ac 40 MHz / IEEE 802.11ax 40 MHz /	U-NII Band I	5190 – 5230	2
		U-NII Band II-A	5270 – 5310	2
		U-NII Band II-C	5510 – 5710	6
		U-NII Band III	5755 – 5795	2
	IEEE 802.11ac 80 MHz / IEEE 802.11ax 80 MHz /	U-NII Band I	5210	1
		U-NII Band II-A	5290	1
		U-NII Band II-C	5530 – 5690	3
		U-NII Band III	5775	1
	IEEE 802.11ac 160 MHz / IEEE 802.11ax 160 MHz /	U-NII Band I & II-A	5250	1
		U-NII Band II-C	5570	1
	Bluetooth	Low Energy	2402 - 2480	40
	SRD	Matter 2.4G	2405 – 2480	16
Use Distance	25cm			

Note:

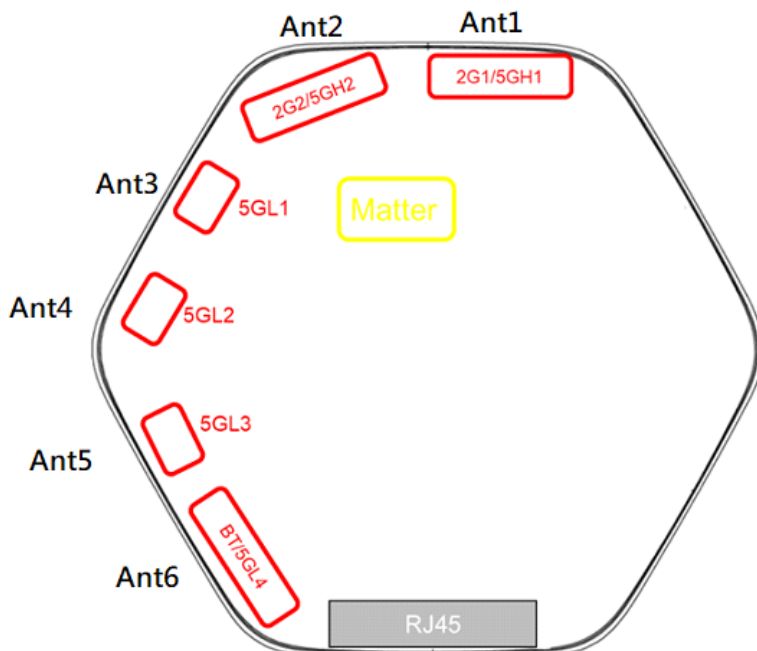
The above information of DUT was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

2.1 Antenna System Description

Ant.	Ant. Type	Gain (dBi)					
		2.4GHz	5GHz				6GHz
			Band I	Band II-A	Band II-C	Band III	
1	IFA Antenna	3.50	---	---	5.90	5.90	---
2	IFA Antenna	2.70	---	---	3.80	3.70	---
3	IFA Antenna	---	4.00	3.30	---	---	---
4	IFA Antenna	---	2.50	2.40	---	---	---
5	IFA Antenna	---	3.80	3.80	---	---	---
6	IFA Antenna	---	3.00	2.40	---	---	---

Specification		Ant. 1	Ant. 2	Ant. 3	Ant. 4	Ant. 5	Ant. 6	Remark
2.4G	IEEE 802.11 b/g/n/ac/ax	V						1X1
	IEEE 802.11 b/g/n/ac/ax	V	V					2x2
5G	IEEE 802.11 a/n/ac/ax	V						1x1
	IEEE 802.11 a/n/ac/ax	V	V					2x2
	IEEE 802.11 a/n/ac/ax			V				1x1
	IEEE 802.11 a/n/ac/ax			V	V	V	V	4x4

Note 1: The above information is provided by customers.



3. RF Exposure Limit

For devices that operate at larger distances from persons, where there are minimal RF coupling interactions between a device and the user or nearby persons, RF exposure compliance using maximum permissible exposure (MPE) limits is applied. The limits for MPE is listed as below:

Limits for General Population / Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
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 / 1,500	30
1,500-100,000	-	-	1.0	30
Limits for Occupational / Controlled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1,842 / f	4.89 / f	(900 / f ²)*	6
30-300	61.4	0.163	1.0	6
300-1,500	-	-	F / 300	6
1,500-100,000	-	-	5	6

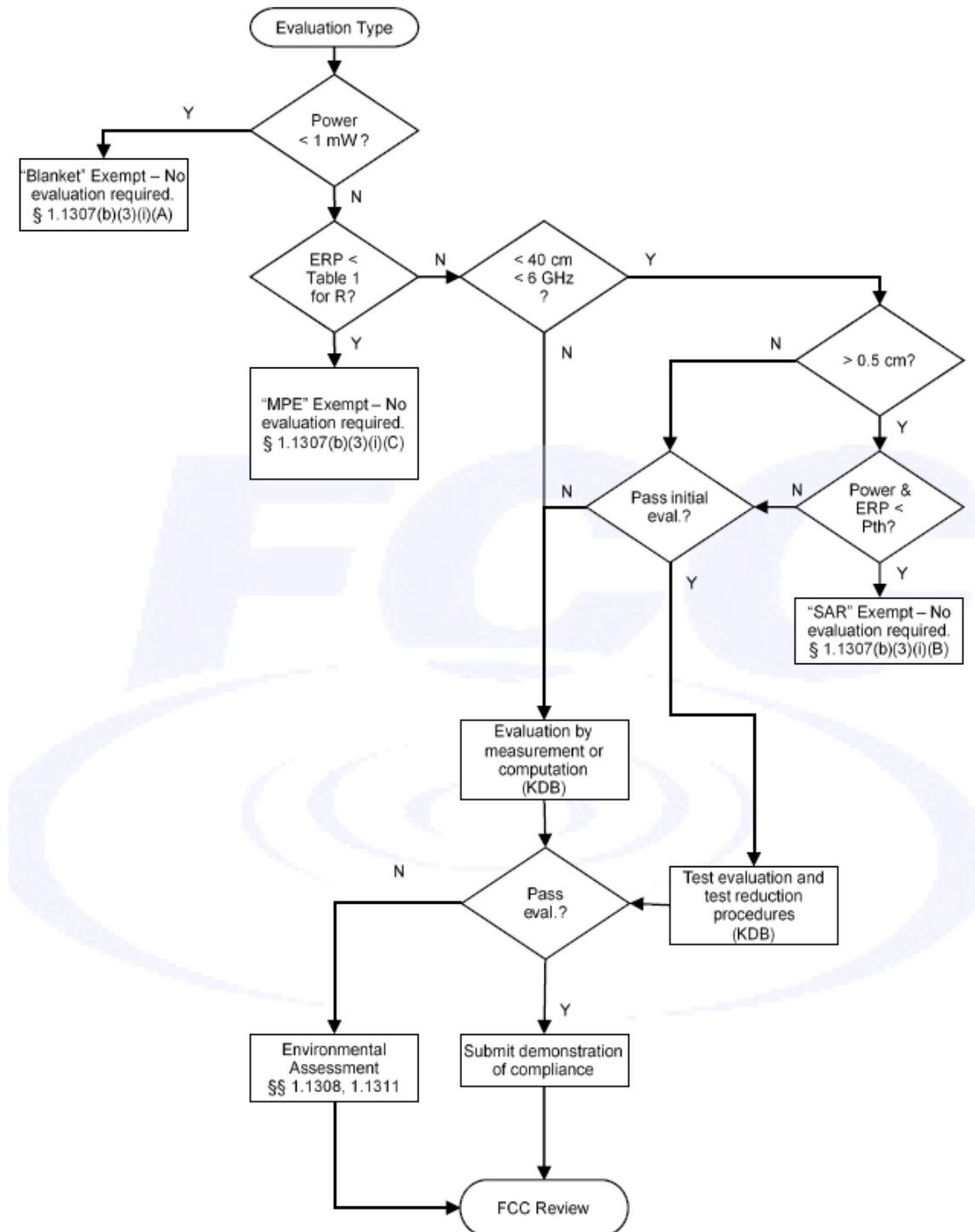
f = frequency in MHz. * = Plane-wave equivalent power density.

4. RF Exposure Assessment

4.1 Exemption Evaluation

Exemption evaluation was performed according to the appendix A and B in KDB447498 D04.

The General Sequence for Determination of Procedure demonstrated in Figure A.1 of KDB447498 D04 was applied.



4.2 Human Exposure Assessment

Due to the design and installation of this product, it is not possible to conduct SAR evaluation. This is because client either manufactures or supplies the antenna(s) that will be used in the installation of this product. Therefore, this product will be evaluated as a mobile device per 47 CFR § 1.1310 titled “Radiofrequency radiation exposure limits”, generally referred to as MPE limits.

In 47 CFR § 2.1091, paragraph (b) defines a mobile device as “a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 cm is normally maintained between the transmitter’s radiating structure(s) and the body of the user or nearby persons.”

Exposure evaluation

$$S_{eip} = \frac{EIRP}{4\pi d^2} = \frac{PG}{4\pi d^2} (W / m^2)$$

Where

S: is the input power (W);

G: is the antenna gain;

d : is the distance between antennas and evaluation point (m).

5. Maximum Conducted Power

Transmitter	Frequency (MHz)	Maximum Total Conducted Power (dBm)	TX Status
WLAN 2.4 GHz	2412 - 2462	28.51	MIMO 2x2
WLAN 5.2 GHz	5150 - 5250	27.97	MIMO 4x4
WLAN 5.3 GHz	5250 - 5350	21.74	MIMO 4x4
WLAN 5.6 GHz	5470 - 5725	21.06	MIMO 2x2
WLAN 5.8 GHz	5725 - 5850	25.44	MIMO 2x2
Bluetooth LE	2402 - 2480	18.61	SISO
Matter	2405 - 2480	18.56	SISO

6. Result

Exemption evaluation

Band	Frequency (MHz)	Tune-up Power (dBm)	ANT Gain (dBi)	ERP (mW)	<§1.1307(b)(3)(i)(C)> Exemption Threshold ERP (W)	<§1.1307(b)(3)(i)(C)> Exemption considerations
WLAN 2.4 GHz	2412 - 2462	28.51	5.61	1573.983	1.200	Not Qualified
WLAN 5.2 GHz	5150 - 5250	27.97	7.24	2023.019	1.200	Not Qualified
WLAN 5.3 GHz	5250 - 5350	21.74	8.09	586.138	1.200	Qualified
WLAN 5.6 GHz	5470 - 5725	21.06	8.88	601.174	1.200	Qualified
WLAN 5.8 GHz	5725 - 5850	25.44	8.90	1655.770	1.200	Not Qualified
Bluetooth LE	2402 - 2480	18.61	2.40	79.913	1.200	Qualified
Matter	2405 - 2480	18.56	2.62	79.983	1.200	Qualified

MPE evaluation

Band	Frequency (MHz)	Tune-up Power (dBm) [P]	ANT Gain (dBi)	Power with Duty cycle (mW) [P]x[G]	Power Density (mW/cm ²) [S]	Standalone Limit (mW/cm ²)
WLAN 2.4 GHz	2412 - 2462	28.51	5.61	2582.86	0.33	1.00
WLAN 5.2 GHz	5150 - 5250	27.97	7.24	3321.05	0.42	1.00
WLAN 5.8 GHz	5725 - 5850	25.44	8.90	2715.57	0.35	1.00

Note:

1. Mobile or fixed location transmitters, minimum separation distance is 0.25 m, even if calculations indicate MPE distance is less.
2. The Numeric Gain calculated by $10^{(\text{ant. Gain(dBi)} / 10)}$.
3. Max total conducted power were performed for MPE of any configurations.
4. MPE results are evaluated by lowest data rate for WLAN.
5. MPE calculation for WLAN is based on MIMO Beamforming mode

Simultaneous Transmitting :

WLAN 2.4G + WLAN 5G + Bluetooth LE + Matter

Total Exposure Ratio = 0.88

7. Conclusion

The result shows that this device is compliance with the exposure limits in 47 CFR §1.1310.

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