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MPE Report

Applicant	: Plasma Cloud Limited
Product Type	: WiFi Access Point
Trade Name	: Plasma Cloud
Model Number	: PA300, PA300-E
Received Date	: Apr. 12, 2019
Test Period	: May 07, 2019
Issue Date	: Jun. 11, 2019
Test Specification	: ANSI / IEEE Std.C95.1-1992 / IEEE Std. 1528-2013 47 CFR § 2.1091 47 CFR § 1.1310
Test Firm MRA designation number	: TW0010

1. The test operations have to be performed with cautious behavior, the test results are as attached.
2. The test results are under chamber environment of A Test Lab Techno Corp. A Test Lab Techno Corp. does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples.
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Approved By : Edison Hu
(Edison Hu)

Tested By : Kris Pan
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Revision History

Rev.	Issue Date	Revisions	Revised By
00	Jun. 11, 2019	Initial Issue	Serene Yang



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1. Description of Equipment under Test (EUT)

Applicant	Plasma Cloud Limited 5/F, Yat Chau Building 262 Des Voeux Road Central Hong Kong			
Manufacturer	Emplus Technologies, Inc. Bldg. B, 10F., No.209, Sec. 1, Nangang Rd., Nangang Dist., Taipei City 11568, Taiwan			
Product Type	WiFi Access Point			
Trade Name	Plasma Cloud			
Model Number	PA300, PA300-E			
Models Different Description	PA300: built-in Antenna PA300-E: External Antenna			
FCC ID	2ASXXPA300			
Frequency Range	Operate Band			
	IEEE 802.11b / 802.11g / 802.11n 2.4 GHz 20 MHz			
	IEEE 802.11n 2.4 GHz 40 MHz			
Antenna information	Model: PA300: built-in antenna			
	ANT	Manufacturer	Model Number	Type
	ANT-0	SENAO	5718A0436300	PIFA Antenna
	ANT-1	SENAO	5718A0437300	PIFA Antenna
	Directional= G _{ANT}			
	Model: PA300-E: External antenna			
	ANT	Manufacturer	Model Number	Type
	ANT-0	Master Wave	98143MRSX000	Dipole Antenna (Reverse SMA)
	ANT-1	Master Wave	98143MRSX000	Dipole Antenna (Reverse SMA)
	Directional= G _{ANT}			
Antenna Delivery	2TX (CDD)			
RF Evaluation	0.169 mW/cm ² (for PA300) 0.292 mW/cm ² (for PA300-E)			
Temperature Range	0 ~ +40°C			

The above equipment was tested by A Test Lab Techno Corp. For compliance with the requirements set forth in 47 CFR § 2.1091 / 47 CFR § 1.1310. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties



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." This product is intended to be installed into a vehicle such that the unit is physically secured at one location. In the installation guide supplied with the product,

Client has made the following statement: "IMPORTANT: To meet the FCC's RF Exposure Guidelines, the antenna should be installed so there is at least 20 cm of separation between the body of the user and nearby persons and the antenna". Based on the installation of the transceiver and the antenna, the transmitters radiating structure is more than 20 cm from the user. Thus, this product is a "mobile device" as defined in section § 2.1091 paragraph (b).

Exposure evaluation

$$S = \frac{PG}{4\pi R^2}$$

Where

S: power density

P: power input to the antenna

G: power gain of the antenna in the direction of interest relative to an isotropic radiator.

R: distance to the center of radiation of the antenna.



3. RF Output Power

The conducted power turn-up tolerance reference manufacturer specification.

Model: PA300: built-in antenna					
Band	Date Rate (Mbps)	Frequency (MHz)	Average Conducted power (dBm)		
			ANT-0	ANT-1	ANT-0+1
IEEE 802.11b	1	2412.0	22.55	21.87	25.23
		2437.0	21.23	21.31	24.28
		2462.0	22.69	22.50	25.61
IEEE 802.11g	6	2412.0	22.23	22.10	25.18
		2437.0	22.42	21.82	25.14
		2462.0	22.90	22.63	25.78
IEEE 802.11n 2.4 GHz 20 MHz	13	2412.0	22.59	22.12	25.37
		2437.0	22.46	22.06	25.27
		2462.0	22.52	22.71	25.63
IEEE 802.11n 2.4 GHz 40 MHz	27	2422.0	20.82	20.40	23.63
		2437.0	22.54	22.20	25.38
		2452.0	20.60	20.46	23.54

Model: PA300-E: External antenna					
Band	Date Rate (Mbps)	Frequency (MHz)	Average Conducted power (dBm)		
			ANT-0	ANT-1	ANT-0+1
IEEE 802.11b	1	2412.0	23.15	22.54	25.87
		2437.0	16.67	16.47	19.58
		2462.0	23.28	22.68	26.00
IEEE 802.11g	6	2412.0	14.48	14.25	17.38
		2437.0	11.22	11.17	14.21
		2462.0	11.61	11.40	14.52
IEEE 802.11n 2.4 GHz 20 MHz	13	2412.0	13.86	13.56	16.72
		2437.0	10.84	10.58	13.72
		2462.0	14.65	14.20	17.44
IEEE 802.11n 2.4 GHz 40 MHz	27	2422.0	21.32	20.51	23.94
		2437.0	23.19	22.79	26.00
		2452.0	22.35	21.97	25.17

Note: The relevant measured result has the offset with cable loss already.

4. Test Results

Model: PA300: built-in antenna										
Band	Data Rate (Mbps)	Frequency (MHz)	Limit (mw)	Distance [R] (cm)	Max tune-up Power (upper limit) [P] (dBm)	ANT Gain (dBi)	Numeric Gain [G]	Duty Cycle	Power with Duty cycle [TP] (mW)	Power Density [S] (mw/cm ²)
IEEE 802.11b	1	2412.0	1	20	26.00	3.30	2.14	1	851.95	0.169
		2437.0	1	20	26.00	3.30	2.14	1	851.95	0.169
		2462.0	1	20	26.00	3.30	2.14	1	851.95	0.169
IEEE 802.11g	6	2412.0	1	20	26.00	3.30	2.14	1	851.95	0.169
		2437.0	1	20	26.00	3.30	2.14	1	851.95	0.169
		2462.0	1	20	26.00	3.30	2.14	1	851.95	0.169
IEEE 802.11n 2.4 GHz 20 MHz	13	2412.0	1	20	26.00	3.30	2.14	1	851.95	0.169
		2437.0	1	20	26.00	3.30	2.14	1	851.95	0.169
		2462.0	1	20	26.00	3.30	2.14	1	851.95	0.169
IEEE 802.11n 2.4 GHz 40 MHz	27	2422.0	1	20	25.50	3.30	2.14	1	759.3	0.151
		2437.0	1	20	25.50	3.30	2.14	1	759.3	0.151
		2452.0	1	20	25.50	3.30	2.14	1	759.3	0.151

Model: PA300-E: External antenna										
Band	Data Rate (Mbps)	Frequency (MHz)	Limit (mw)	Distance [R] (cm)	Max tune-up Power (upper limit) [P] (dBm)	ANT Gain (dBi)	Numeric Gain [G]	Duty Cycle	Power with Duty cycle [TP] (mW)	Power Density [S] (mw/cm ²)
IEEE 802.11b	1	2412.0	1	20	26.00	5.17	3.29	1	1309.77	0.261
		2437.0	1	20	20.00	5.17	3.29	1	329	0.065
		2462.0	1	20	26.50	5.17	3.29	1	1469.59	0.292
IEEE 802.11g	6	2412.0	1	20	18.00	5.17	3.29	1	207.58	0.041
		2437.0	1	20	15.00	5.17	3.29	1	104.04	0.021
		2462.0	1	20	15.00	5.17	3.29	1	104.04	0.021
IEEE 802.11n 2.4 GHz 20 MHz	13	2412.0	1	20	17.00	5.17	3.29	1	164.89	0.033
		2437.0	1	20	14.00	5.17	3.29	1	82.64	0.016
		2462.0	1	20	18.00	5.17	3.29	1	207.58	0.041
IEEE 802.11n 2.4 GHz 40 MHz	27	2422.0	1	20	24.00	5.17	3.29	1	826.41	0.164
		2437.0	1	20	26.50	5.17	3.29	1	1469.59	0.292
		2452.0	1	20	25.50	5.17	3.29	1	1167.34	0.232

Note:

1. Mobile or fixed location transmitters, minimum separation distance is 20 cm, even if calculations indicate MPE distance is less.
2. The Numeric Gain calculated by $10^{(ant. Gain(dBi) / 10)}$.
3. Each band max power which perform MPE of any configurations.
4. The MPE results are evaluated by lowest data rate for WLAN.
5. The device operating IEEE 802.11 b/g/n mode is 2TX CDD.