



**MPE Report** 

Applicant : PISMO LABS TECHNOLOGY LIMITED Product Type : PEPWAVE / peplink Wireless Product

Trade Name : PEPWAVE, peplink

Model Number : AP One AC Mini, PismoAC0P, AC0P, APO-AC-MINI, AP One series,

AC0E, PismoAC0E

Test Specification : ANSI / IEEE Std.C95.1-1992 / IEEE Std. 1528-2013

47 CFR § 2.1091

47 CFR § 1.1310

Received Date : Jun. 13, 2019 Test Period : Jun. 24, 2019 Issue Date : Jul. 31, 2019

Issue by

Approved By : Tested By : Kris Pan (Kris Pan)

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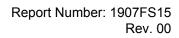
Taiwan Accreditation Foundation accreditation number: 1330

Test Firm MRA designation number: TW0010

### Note:

- 1. The test results are valid only for samples provided by customers and under the test conditions described in this report.
- 2. This report shall not be reproduced except in full, without the written approval of A Test Lab Technology Corporation.
- 3. The relevant information is provided by customers in this test report. According to the correctness, appropriateness

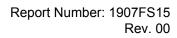






## **Revision History**

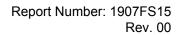
Rev.	Issue Date	Revisions	Revised By
00	Jul. 31, 2019	Initial Issue	Shelly Chen





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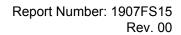
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1. Reference Testing Standards

Standard	Description	Version
ANSI/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.	2005





# 2. Description of Equipment under Test (EUT)

	DIOMOLA	DO TEOURIO CON	LIMITED				
Applicant	PISMO LABS TECHNOLOGY LIMITED  A8, 5/F, HK Spinners Industrial Building, Phase 6, 481 Castle Peak Road, Cheung Sha Wan, Hong Kong						
Manufacturer	PISMO LABS TECHNOLOGY LIMITED  A8, 5/F, HK Spinners Industrial Building, Phase 6, 481 Castle Peak Road, Cheung Sha Wan, Hong Kong						
Product Type		/ peplink Wireless					
Trade Name	PEPWAVE	, peplink					
Model Number	AP One AC Mini, PismoAC0P, AC0P, APO-AC-MINI, AP One series, AC0E, PismoAC0E						
Product Type /Trade Name / Model Number Different Description	Those product Type & trade names & model numbers differ from each other selling region.					ch other in	
FCC ID	U8G-P1AC	0P					
		Operate	Band	Frequency Range (MHz)			
		1b / 802.11g 1n 2.4 GHz 20 MH:	z (256QAM)	2412 - 2462		12 - 2462	
	IEEE 802.1	1n 2.4 GHz 40 MH:	z (256QAM)	242		22 - 2452	
	IEEE 802.1	1a U-NII Band I		518		80 - 5240	
Frequency Range	IEEE 802.1	1a U-NII Band III	574		45 - 5825		
. requeries realings	IEEE 802.1	1n 5 GHz / 802.11a	and I 518		80 - 5240		
	IEEE 802.1	1n 5 GHz / 802.11a			45 - 5825		
	IEEE 802.1	1n 5 GHz / 802.11a			90 - 5230		
	IEEE 802.1	1n 5 GHz / 802.11a	Band III 575		55 - 5795		
	IEEE 802.1	1ac 80 MHz U-NII I			5210		
	IEEE 802.1	1ac 80 MHz U-NII I			5775		
	ANT	Model	Туре		uency IHz)	Max. Gain (dBi)	
		SSP-16713		2412 - 2462		2.13	
	ANT-0		PIFA Antenna	5150 - 5250		2.62	
				5745 - 5825		2.39	
		SSP-16713	PIFA Antenna	2412 - 2462		1.99	
Antonno Information	ANT-1			5150 - 5250		2.71	
Antenna Information		5745 - 5825		2.92			
		$G_{ANT}$	2412 - 2462		2.06		
		5150 - 5250		2.67			
		5745 - 5825		2.66			
					- 2462	5.07	
	Directional Gain			5150 - 5250		5.68	
				5745 - 5825		5.67	

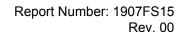


Report Number: 1907FS15

Rev. 00

Antenna Delivery	IEEE 802.11b / IEEE 802.11g: 2TX (CDD) IEEE 802.11n 2.4GHz 20 MHz / 40 MHz: 2TX (MIMO) IEEE 802.11a: 2TX (CDD) IEEE 802.11ac 20 MHz / 40 MHz / 80 MHz: 2TX (MIMO)
RF Evaluation	0.310 mW/cm <sup>2</sup>
Temperature Range	-5 ~ +45°C

The above equipment was tested by A Test Lab Techno Corp. For compliance with the requirements set forth in 47 CFR  $\S$  2.1091 / 47 CFR  $\S$  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





### 3. 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

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

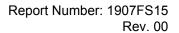
Where

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.



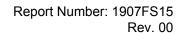


## 4. RF Output Power

The conducted power turn-up tolerance reference manufacturer specification.

Band	Date Rate	Frequency	Average Conducted power (dBm)			
	(Mbps)	(MHz)	ANT-0	ANT-1	ANT-0+1	
		2412.0	15.47	14.90	18.20	
IEEE 802.11b	1	2437.0	16.33	14.91	18.69	
		2462.0	11.55	11.02	14.30	
		2412.0	15.94	14.82	18.43	
IEEE 802.11g	6	2437.0	19.63	18.79	22.24	
		2462.0	14.10	13.15	16.66	
		2412.0	15.07	13.87	17.52	
IEEE 802.11n 2.4 GHz 20 MHz (256QAM)	13	2437.0	19.70	18.86	22.31	
(230QAWI)		2462.0	14.89	14.15	17.55	
		2422.0	13.11	12.04	15.62	
IEEE 802.11n 2.4 GHz 40 MHz (256QAM)	27	2437.0	16.03	15.14	18.62	
(230QAW)		2452.0	12.28	11.41	14.88	
		5180.0	16.86	16.41	19.65	
		5200.0	20.45	20.12	23.30	
		5220.0	20.62	20.31	23.48	
		5240.0	20.73	20.41	23.58	
IEEE 802.11a	6	5745.0	20.03	20.20	23.13	
		5765.0	20.13	20.25	23.20	
		5785.0	20.02	19.98	23.01	
		5805.0	20.05	19.92	23.00	
		5825.0	20.21	20.07	23.15	
		5180.0	16.79	16.41	19.61	
		5200.0	20.51	20.09	23.32	
		5220.0	20.59	20.21	23.41	
		5240.0	20.72	20.33	23.54	
IEEE 802.11ac 20 MHz	13	5745.0	19.94	19.93	22.95	
		5765.0	20.07	19.91	23.00	
		5785.0	20.02	19.95	23.00	
		5805.0	20.01	20.05	23.04	
		5825.0	20.15	20.13	23.15	
		5190.0	12.18	11.33	14.79	
IEEE 000 44 oo 40 MH.	07	5230.0	20.67	20.11	23.41	
IEEE 802.11ac 40 MHz	27	5755.0	20.62	20.06	23.36	
		5795.0	20.92	20.09	23.54	
IFFF 902 4400 90 MU-	E0.0	5210.0	10.21	9.55	12.90	
IEEE 802.11ac 80 MHz	58.6	5775.0	18.43	18.15	21.30	

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





5. Test Results

Antenna	Band	Frequency (MHz)	Limit (mw)	Distance [R] (cm)	Tune-up Power (dBm) [P]	ANT Gain (dBi)	Numeric Gain [G]	Duty Cycle	Power with Duty cycle [TP] (mW)	Power Density [S] (mw/cm²)
	2.4 GHz	2412-2462	1	20	22.81	5.07	3.21	1	613.14	0.122
Wi-Fi Antenna		5180-5240	1	20	24.08	5.68	3.70	1	947.38	0.188
	5 GHz	5745-5825	1	20	24.04	5.67	3.69	1	934.41	0.186

### Note:

- 1. Mobile or fixed location transmitters, minimum separation distance is 20 cm, even if calculations indicate MPE distance is less.
- 2. We used the maximum power and gain to provide MPE results.
- 3. The Numeric Gain calculated by 10<sup>(ant. Gain(dBi)/10)</sup>.
- 4. The MPE results are evaluated by lowest data rate for WLAN.
- 5. The device operating IEEE 802.11 a/b/g mode is 2TX CDD.
- 6. The device operating IEEE 802.11 ac/n mode is 2TX MIMO.

### Simultaneous Transmitting:

Total MPE =  $2.4 \text{ GHz MPE} + 5 \text{ GHz MPE} = 0.122 + 0.188 = 0.310 \text{ mw/cm}^2 < 1 \text{ mw/cm}^2$ 

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