Test Report No:
22A0297R-RFUSV17S-A

RF EXPOSURE EVALUATION DECLARATION

Product Name	Peplink Pepwave Wireless Product
Brand Name	peplink PEPWAVE
Model No.	MAX HD1, MAX HD2, MAX-HD1-5GH-T, MAX-HD1-5GH-T-PRM, MAX-HD2-5GH-T, MAX-HD2-5GH-T-PRM
FCC ID	U8G-P1AX17
Applicant´s Name / Address	PISMO LABS TECHNOLOGY LIMITED A8, 5/F, HK Spinners Industrial Building, Phase 6, 481 Castle Peak Road, Cheung Sha Wan, Hong Kong
Manufacturer's Name / Address	PISMO LABS TECHNOLOGY LIMITED A8, 5/F, HK Spinners Industrial Building, Phase 6, 481 Castle Peak Road, Cheung Sha Wan, Hong Kong
Test Method Requested, Standard	FCC CFR Title 47 Part 2.1091 Radiofrequency radiation exposure evaluation: mobile devices.
Verdict Summary	IN COMPLIANCE
Documented By	Amelia Wu Amelia Wu / Project Specialist
Approved By	Rueyyan Lin Rueyyan Lin / Supervisor
Date of Receipt	Oct. 13, 2022
Date of Issue	Mar 22, 2024
Report Version	V2.0

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Competences and Guarantees

DEKRA is a testing laboratory competent to carry out the tests described in this report.
In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

General Conditions

1. The test results relate only to the samples tested.
2. The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.
3. This report must not be used to claim product endorsement by TAF or any agency of the government.
4. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.
5. Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Revision History

Version	Description	Issued Date
V1.0	Initial issue of report	May 03, 2023
V2.0	Adding the value of maximum antenna gain and conducted output power at section 1.1.	Mar 22, 2024

1. General Information

1.1. EUT Description

RF General Information			
Evaluation Mode	Frequency Range (MHz)	Operating Frequency (MHz)	Modulation Type
WiFi 2.4 GHz	2400 ~ 2483.5	2412 ~ 2462	802.11b: DSSS 802.11g/n/ac: OFDM 802.11ax: OFDMA
WiFi 5 GHz	5150 ~ 5250 5725 ~ 5850	5180 ~ 5240 5745 ~ 5825	802.11a/n/ac: OFDM 802.11ax: OFDMA

The EUT contains two of the same WWAN module and the detail as below.

Brand Name	Model	FCC ID	Bands	Operating Frequency Range (MHz)	Function
AirPrime	EM9191	N7NEM91	WCDMA Band 2	TX: 1852.4 ~ 1907.6 RX: 1932.4 ~ 1987.6	WCDMA / HSDPA / DC-HSDPA / HSUPA / HSPA+
			WCDMA Band 4	TX: 1712.4 ~ 1752.6 RX: 2112.4 ~ 2152.6	
			WCDMA Band 5	TX: 826.4 ~ 846.6 RX: 871.4 ~ 891.6	
			Bands	Operating Frequency Range (MHz)	Modulation Type
			LTE Band 2	Uplink: 1850 ~ 1910 Downlink: 1930 ~ 1990	QPSK / 16QAM / 64QAM
			LTE Band 4	Uplink: 1710 ~ 1755 Downlink: 2110 ~ 2115	
			LTE Band 5	Uplink: 824 ~ 849 Downlink: 869 ~ 894	
			LTE Band 7	Uplink: 2500 ~ 2570 Downlink: 2620 ~ 2690	
			LTE Band 12	Uplink: 699 ~ 716 Downlink: 729 ~ 746	
			LTE Band 13	Uplink: 777 ~ 787 Downlink: 746 ~ 756	
			LTE Band 14	Uplink: 788 ~ 798 Downlink: 758 ~ 768	
			LTE Band 17	Uplink: 704 ~ 716 Downlink: 734 ~ 746	
			LTE Band 25	Uplink: 1850 ~ 1915 Downlink: 1930 ~ 1995	
			LTE Band 26	Uplink: 824 ~ 849 Downlink: 859 ~ 894	
			LTE Band 30	Uplink: 2305 ~ 2315 Downlink: 2350 ~ 2360	
			LTE Band 41	Uplink: 2496 ~ 2690 Downlink: 2496 ~ 2690	
			LTE Band 41 (HPUE)	Uplink: 2496 ~ 2690 Downlink: 2496 ~ 2690	
			LTE Band 42	Uplink: 3450 ~ 3550 Downlink: 3450 ~ 3550	
			LTE Band 48	Uplink: 3550 ~ 3700 Downlink: 3550 ~ 3700	
			LTE Band 66	Uplink: 1710 ~ 1780 Downlink: 2110 ~ 2200	
			LTE Band 71	Uplink: 663 ~ 698 Downlink: 617 ~ 652	
			5G NR n2	Uplink: 1850~1910 Downlink: 1930~1990	
			5G NR n5	Uplink: 824~849 Downlink: 869~894	pi/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM
			5G NR n7	Uplink: 2500 ~ 2570 Downlink: 2620 ~ 2690	
			5G NR n12	Uplink: 699~716 Downlink: 729~746	
			5G NR n25	Uplink: 1850 ~ 1915 Downlink: 1930 ~ 1995	
			5G NR n41	Uplink: 2496 ~ 2690 Downlink: 2496 ~ 2690	
			5G NR n66	Uplink: 1710~1780 Downlink: 2110~2200	
			5G NR n71	Uplink: 663 ~ 698 Downlink: 617 ~ 652	
			5G NR n77	Uplink: 3300 ~ 4200 Downlink: 3300 ~ 4200	
			5G NR n78	Uplink: 3300 ~ 3800 Downlink: 3300 ~ 3800	
The ENDC mode combination could be referred to the product spec.					

The brand name/model number in the following table are all refer to the identical product.

Brand Name		Model No.	Cellular Module
peplink	PEPWAVE	MAX HD1	With a cellular module
		MAX HD2	With two cellular modules
		MAX-HD1-5GH-T	With a cellular module
		MAX-HD2-5GH-T	With two cellular modules
		MAX-HD1-5GH-T-PRM	With a cellular module
		MAX-HD2-5GH-T-PRM	With two cellular modules

From the above models, model: MAX HD2 was selected as representative model for the test and its data was recorded in this report.

For WiFi 2.4 GHz:

Antenna Information				
Ant.	Brand Name	Model No.	Type	Antenna Gain (dBi)
0	Master Wave	98614PRSX000	Omni-directional	2.44
1	Master Wave	98614PRSX000	Omni-directional	2.44

For WiFi 5 GHz:

Antenna Information							
Ant.	Brand Name	Model No.	Type	Antenna Gain (dBi)		Directional Gain (dBi)	
				5GHz Band 1	5GHz Band 4	5GHz Band 1	5GHz Band 4
0	Master Wave	98614PRSX000	Omni-directional	4.10	4.73	7.11	7.74
1	Master Wave	98614PRSX000	Omni-directional	4.10	4.73		

Note: The above EUT information is declared by the manufacturer.

1.2. Test Facility

Laboratory Information

USA	**:**	**FCC Registration Number: TW3024**
Canada		**CAB identifier : TW3024**

The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our Web site: http://www.dekra.com.tw

If you have any comments, please don't hesitate to contact us. Our test sites as below:

Test Laboratory	DEKRA Testing and Certification Co., Ltd.
Address	1. No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C. 2. No.372, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C.
Phone number	1. +886-3-582-8001 2. +886-3-582-8001
Fax number	1. +886-3-582-8958 2. +886-3-582-8958
E mail address	info.tw@dekra.com
Website	http://www.dekra.com.tw
Note: Test site number for address 1 includes HC-SR02. Test site number for address 2 includes HC-CB02, HC-CB03, HC-CB04, HC-SR10 and HC-SR12.	

2. RF Exposure Evaluation

2.1. Test Limit

(A) Test Limit for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm²)	Averaging Time |E|²,|H|² or S (minutes)
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) Test Limit for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm²)	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/f²)	<30
30-300	27.5	0.073	0.2	<30
300-1500	-	-	f/1500	<30
1500-100,000	-	-	1.0	<30

Note: f = frequency in MHz; *Plane-wave equivalent power density

Power Density (S) is calculated by the following formula:

$$S=(P*G)/4\pi R^2$$

where:

S = power density (in appropriate units, e.g. mW/ cm^2)

P = power input to the antenna (in appropriate units, e.g., mW)

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

π = 3.1416

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

2.2. Test Result of RF Exposure Evaluation

Exposure Environment: General Population / Uncontrolled Exposure

Evaluation Mode	E.I.R.P (dBm)	E.I.R.P (mW)	Power Density (mW/cm^2)	Limit (mW/cm^2)	Test Result (PASS/FAIL)
WiFi 2.4 GHz	25.400	346.737	0.069	1.000	PASS
WiFi 5 GHz Band 1	22.460	176.198	0.035	1.000	PASS
WiFi 5 GHz Band 4	27.450	555.904	0.111	1.000	PASS
WCDMA Band 2	26.620	459.198	0.091	1.000	PASS
WCDMA Band 4	26.340	430.527	0.086	1.000	PASS
WCDMA Band 5	22.800	190.546	0.038	0.549	PASS
LTE Band 2	26.120	409.261	0.081	1.000	PASS
LTE Band 4	25.840	383.707	0.076	1.000	PASS
LTE Band 5	22.300	169.824	0.034	0.549	PASS
LTE Band 7	22.290	169.434	0.034	1.000	PASS
LTE Band 12	22.090	161.808	0.032	0.466	PASS
LTE Band 13	22.300	169.824	0.034	0.518	PASS
LTE Band 14	22.300	169.824	0.034	0.525	PASS
LTE Band 17	22.300	169.824	0.034	0.469	PASS
LTE Band 25	26.120	409.261	0.081	1.000	PASS
LTE Band 26	22.300	169.824	0.034	0.543	PASS
LTE Band 30	20.980	125.314	0.025	1.000	PASS
LTE Band 41	22.290	169.434	0.034	1.000	PASS
LTE Band 41 (HPUE)	23.490	223.357	0.044	1.000	PASS
LTE Band 42	19.890	97.499	0.019	1.000	PASS
LTE Band 48	19.780	95.060	0.019	1.000	PASS
LTE Band 66	25.840	383.707	0.076	1.000	PASS
LTE Band 71	22.470	176.604	0.035	0.442	PASS
5G NR n2	26.620	459.198	0.091	1.000	PASS
5G NR n5	22.800	190.546	0.038	0.549	PASS
5G NR n7	21.990	158.125	0.031	1.000	PASS
5G NR n12	22.590	181.552	0.036	0.466	PASS
5G NR n25	26.620	459.198	0.091	1.000	PASS
5G NR n41	21.990	158.125	0.031	1.000	PASS
5G NR n66	26.340	430.527	0.086	1.000	PASS
5G NR n71	22.970	198.153	0.039	0.442	PASS
5G NR n77	25.990	397.192	0.079	1.000	PASS
5G NR n78	22.040	159.956	0.032	1.000	PASS

Distance (cm): 20 for Maximum Permissible Exposure.

Co-location
Conclusion: The formula of calculated the MPE is: **CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1** **CPD = Calculation power density** **LPD = Limit of power density** 1. WiFi 2.4 GHz + WiFi 5 GHz + WWAN module 1: WCDMA + WWAN module 2: WCDMA function = 0.069 + 0.111 + 0.091 + 0.091 = 0.362, therefore the maximum calculations of above situations are less than the “1” limit. 2. WiFi 2.4 GHz + WiFi 5 GHz + WWAN module 1: LTE + WWAN module 2: LTE function = 0.069 + 0.111 + 0.081 + 0.081 = 0.342, therefore the maximum calculations of above situations are less than the “1” limit. 3. WiFi 2.4 GHz + WiFi 5 GHz + WWAN module 1: 5G NR + WWAN module 2: 5G NR function = 0.069 + 0.111 + 0.091 + 0.091 = 0.362, therefore the maximum calculations of above situations are less than the “1” limit. 4. WiFi 2.4 GHz + WiFi 5 GHz + WWAN module 1: LTE + WWAN module 2: 5G NR function= 0.069 + 0.111 + 0.081 + 0.091 = 0.352, therefore the maximum calculations of above situations are less than the “1” limit.

Note:

1. The above EUT information is declared by the manufacturer.
2. The results are evaluated using the maximum power.