

## RF Exposure Report

**Report No.:** SA160923E02E

**FCC ID:** U8G-P1811ACPRO

**Test Model:** Balance 30 Pro

**Series Model:** Peplink Balance 30 Pro, BPL-031-LTEA-W-T, Pismo 811AC, B30 Pro

**Received Date:** Mar. 20, 2019

**Test Date:** Apr. 24 to 27, 2019

**Issued Date:** May 21, 2019

**Applicant:** PISMO LABS TECHNOLOGY LIMITED

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**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
Hsin Chu Laboratory

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Taiwan R.O.C.

**Test Location:** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,  
Taiwan R.O.C.

**FCC Registration /  
Designation Number:** 723255 / TW2022

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### Release Control Record

Issue No.	Description	Date Issued
SA160923E02E	Original release.	May 21, 2019

## 1 Certificate of Conformity

**Product:** PEPWAVE / peplink Wireless Product

**Brand:** PEPWAVE / peplink

**Test Model:** Balance 30 Pro

**Series Model:** Peplink Balance 30 Pro, BPL-031-LTEA-W-T, Pismo 811AC, B30 Pro

**Sample Status:** PROTOTYPE

**Applicant:** PISMO LABS TECHNOLOGY LIMITED

**Test Date:** Apr. 24 to 27, 2019

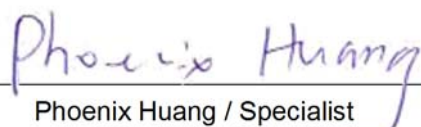
**Standards:** FCC Part 2 (Section 2.1091)

KDB 447498 D01 General RF Exposure Guidance v06

IEEE C95.1-1992

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

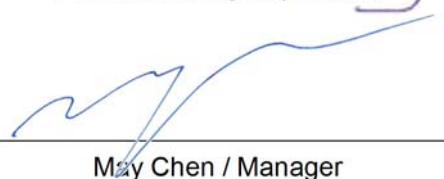
**Prepared by :**

  
Phoenix Huang / Specialist

**Date:**

May 21, 2019

**Approved by :**

  
May Chen / Manager

**Date:**

May 21, 2019

## 2 RF Exposure

### 2.1 Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Average Time (minutes)
Limits For General Population / Uncontrolled Exposure				
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f <sup>2</sup> )*	30
30-300	27.5	0.073	0.2	30
300-1500	...	...	f/1500	30
1500-100,000	...	...	1.0	30

f = Frequency in MHz ; \*Plane-wave equivalent power density

### 2.2 MPE Calculation Formula

$$Pd = (P_{out} \cdot G) / (4 \cdot \pi \cdot r^2)$$

where

Pd = power density in mW/cm<sup>2</sup>

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

### 2.3 Classification

The antenna of this product, under normal use condition, is at least 49 cm away from the body of the user. So, this device is classified as **Mobile Device**.

## 2.4 Antenna Gain

For WLAN						
Antenna No.	Brand	Model	Antenna Net Gain (dBi)	Frequency Range (MHz)	Antenna Type	Connector Type
2.4GHz	Master Wave Technology Co., Ltd	98614PRSX000	2.44	2400 ~ 2500	Dipole	R-SMA
5GHz			4.10	5150 ~ 5350	Dipole	R-SMA
			4.73	5725 ~ 5850		
For WWAN(LTE)						
Brand	Model	Antenna Net Gain(dBi)	Frequency Range (MHz)	Antenna Type	Connector Type	
Master Wave Technology Co., Ltd	98642ZSAX001	2.5	1920~1980	Dipole	SMA	
		1.82	880~915			
		1.48	1710~1785			
		3.42	2500~2570			
		2	832~862			
		3.52	2570~2620			
		3.02	2300~2400			
		2.39	1850~1910			
		1.69	699~716			
		2.12	777~787			
		2.39	1850~1915			
		3.52	2496~2690			

## 2.5 Calculation Result

Operation Mode	Evaluation Frequency (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
WLAN 2.4GHz	2437	997.839	5.45	49	0.11600	1
WLAN 5GHz (U-NII-1)	5230	511.334	7.11	49	0.08712	1
WLAN 5GHz (U-NII-3)	5795	410.933	7.74	49	0.08094	1

Note:

- 2.4GHz: The directional gain = 2.44dBi + 10log(2) = 5.45dBi.
- 5GHz (U-NII-1): The directional gain = 4.1dBi + 10log(2) = 7.11dBi.
- 5GHz (U-NII-3): The directional gain = 4.73dBi + 10log(2) = 7.74dBi.

### WWAN (LTE Band 12) <WWAN (LTE) Worst Case> (FCC ID: N7NMC7455)

Frequency Band (MHz)	Evaluation Frequency (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
698-716	699.7	251	1.69	49	0.01228	0.4665

Note: Limit of Power Density = F/1500

### WWAN (2G) <USB cellular device Worst Case>

Frequency Band (MHz)	Evaluation Frequency (MHz)	Max. EIRP (mW)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
824-849	824.2	11480	49	0.38049	0.5495

Note:

- This product can operate with plug-in USB cellular device which has maximum of 7W(ERP) output power. ERP is then converted to EIRP as follows:  
Formula:  $EIRP(W) = 1.64 \times ERP(W)$   
 $EIRP = 1.64 \times 7 W = 11.48 W = 11480mW$
- Limit of Power Density = F/1500

### Conclusion:

The formula of calculated the MPE is:

$$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$$

CPD = Calculation power density

LPD = Limit of power density

$$WLAN\ 2.4GHz + WLAN\ 5GHz + WWAN\ (LTE) + WWAN\ (2G) = 0.11600 / 1 + 0.08712 / 1 + 0.01228 / 0.4665 + 0.38049 / 0.5495 = 0.92187$$

Therefore the maximum calculations of above situations are less than the “1” limit.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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## Appendix

MPE Evaluation for MC7455 Radio Module (FCC ID: N7NMC7455)

Mode	Equipment Category	Transmitter Range (MHz)		Maximum Output Power		Antenna Gain (dBi)	Power Density (mW/cm <sup>2</sup> )		Ratio
		Start	Stop	(dBm)	(W)		Vaule	Limit	
WCDMA	Band 2	1850	1910	24	0.25	2.39	0.01437	1	0.01437
	Band 4	1710	1755	24	0.25	1.48	0.01165	1	0.01165
	Band 5	824	849	24	0.25	2	0.01313	0.5493*	0.02390
LTE	Band 2	1850	1910	24	0.25	2.39	0.01437	1	0.01437
	Band 4	1710	1755	24	0.25	1.48	0.01165	1	0.01165
	Band 5	824	849	24	0.25	2	0.01313	0.5493*	0.02390
	Band 7	2500	2570	23	0.2	3.42	0.01457	1	0.01457
	Band 12	699	716	24	0.251	1.69	0.01228	0.4665*	0.02633
	Band 13	777	787	24	0.25	2.12	0.01350	0.5180*	0.02606
	Band 25	1850	1915	24	0.25	2.39	0.01437	1	0.01437
	Band 26	814	849	24	0.25	2	0.01313	0.5426*	0.02420
	Band 30	2305	2315	23	0.2	3.02	0.01329	1	0.01329
	Band 41	2496	2690	23	0.2	3.52	0.01491	1	0.01491

Note: \*Limit of Power Density = F/1500