

RF EXPOSURE EVALUATION REPORT

FCC ID : U8G-P1MBX
Equipment : PEPWAVE / peplink Wireless Product
Brand Name : PEPWAVE / peplink
Model Name : 1. MAX-HD4-MBX-LTEA-R-T
2. MAX HD4 MBX
3. HD4 MBX
4. MBX
5. MAX HD4 MBX LTEA
6. EXM-T4-LTEA-R
7. Peplink Balance 310X
8. Balance 310X
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
Standard : 47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC has been evaluated in accordance with 47 CFR Part 2.1091 for the device and pass the limit.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The results in this variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.



Approved by: Cona Huang / Deputy Manager

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History of this test report

Report No.	Version	Description	Issued Date
FA8D0607	Rev. 01	Initial issue of report	Jul. 25, 2019

1. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	PEPWAVE / peplink Wireless Product
Brand Name	PEPWAVE / peplink
Model Name	1. MAX-HD4-MBX-LTEA-R-T 2. MAX HD4 MBX 3. HD4 MBX 4. MBX 5. MAX HD4 MBX LTEA 6. EXM-T4-LTEA-R 7. Peplink Balance 310X 8. Balance 310X
FCC ID	U8G-P1MBX
EUT Stage	Identical Prototype
Integrated WWAN Module	
EUT Type	Radio Moudle
Brand Name	Sierra
Model Name	EM7511
FCC ID	N7NEM75S
Wireless Technology and Frequency Range	WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WCDMA Band IV: 1712.4 MHz ~ 1752.6 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 14: 790.5 MHz ~ 795.5 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 30: 2305 MHz ~ 2315 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 MHz
Mode	RMC 12.2Kbps HSDPA HSUPA LTE: QPSK, 16QAM, 64QAM
Integrated WLAN Module	
Brand Name	COMPEX
Model Name	WLE600VX
FCC ID	TK4WLE600VX
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz
Mode	802.11a/b/g/n/ac HT20/HT40/VHT20/VHT40/VHT80

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

Reviewed by: Jason Wang

Report Producer: Wan Liu

2. Maximum RF average output power among production units

<EM7511>

Mode		Maximum Average power(dBm)
WCDMA	Band II	24
	Band IV	24
	Band V	24
LTE	Band 2	24
	Band 4	24
	Band 5	24
	Band 7	23.8
	Band 12	24
	Band 13	24
	Band 14	24
	Band 26	24
	Band 30	23
	Band 41	23.8
	Band 48	23
	Band 66	24

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Mode		Maximum Average power(dBm)
2.4GHz WLAN	802.11b	21.71
	802.11g	21.63
	802.11n HT20	23.86
	802.11n HT40	18.10
5GHz WLAN	802.11a	20.33
	802.11n HT20	22.80
	802.11n HT40	22.77
	802.11ac VHT20	21.82
	802.11ac VHT40	22.16
	802.11ac VHT80	19.04



3. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f ²)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) 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 ²)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

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

Where:

S = Power Density

P = Output Power at Antenna Terminals

G = Gain of Transmit Antenna (linear gain)

R = Distance from Transmitting Antenna

4. Radio Frequency Radiation Exposure Evaluation

4.1. Standalone Power Density Calculation

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Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
WCDMA Band 2	1852.4	2.14	24	26.140	0.411	411.150	0.082	1.000	0.082
WCDMA Band 4	1712.4	2.56	24	26.560	0.453	452.898	0.090	1.000	0.090
WCDMA Band 5	826.4	2.34	24	26.340	0.431	430.527	0.086	0.551	0.156
LTE Band 2	1850.7	2.14	24	26.140	0.411	411.150	0.082	1.000	0.082
LTE Band 4	1710.7	2.56	24	26.560	0.453	452.898	0.090	1.000	0.090
LTE Band 5	824.7	2.34	24	26.340	0.431	430.527	0.086	0.550	0.156
LTE Band 7	2502.5	4.38	23.8	28.180	0.658	657.658	0.131	1.000	0.131
LTE Band 12	699.7	1.50	24	25.500	0.355	354.813	0.071	0.466	0.151
LTE Band 13	779.5	2.34	24	26.340	0.431	430.527	0.086	0.520	0.165
LTE Band 14	790.5	2.34	24	26.340	0.431	430.527	0.086	0.527	0.163
LTE Band 26	814.7	2.34	24	26.340	0.431	430.527	0.086	0.543	0.158
LTE Band 30	2307.5	4.38	23	27.380	0.547	547.016	0.109	1.000	0.109
LTE Band 41	2498.5	4.38	23.8	28.180	0.658	657.658	0.131	1.000	0.131
LTE Band 48	3547.5	1.65	23	24.650	0.292	291.743	0.058	1.000	0.058
LTE Band 66	1710.7	2.56	24	26.560	0.453	452.898	0.090	1.000	0.090

Note: For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band

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Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
2.4GHz WLAN	2412.0	2.44	23.86	26.300	0.427	426.580	0.085	1.000	0.085
5GHz WLAN	5180.0	4.73	22.80	27.530	0.566	566.239	0.113	1.000	0.113

Note: For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band

4.2. Collocated Power Density Calculation

WWAN Power Density / Limit	WLAN Power Density / Limit	Σ (Power Density / Limit) of WWAN+WLAN
0.165	0.113	0.278

Note:

1. Σ (Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for WWAN + WLAN.
2. Considering the WWAN module collocation with the WLAN transmitter of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of 2 collocated transmitters is compliant

Conclusion:

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.