

RF EXPOSURE EVALUATION REPORT

FCC ID : U8G-P1835
Equipment : PEPWAVE / peplink Wireless Product
Brand Name : PEPWAVE / peplink
Model Name : UBR Go
UBR Rugged
UBR Go LTEA
UBR Rugged LTEA
UBR-GO-LTEA-R-T-PRM
UBR-GO-LTEA-US-T-PRM
UBR-RUG-LTEA-US-T-PRM
UBR-RUG-LTEA-R-T-PRM
Pepwave UBR Go LTEA
Pepwave UBR Rugged LTEA
MAX Transit
MAX Transit LTEA
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 1.1307

We, SPORTON INTERNATIONAL INC has been evaluated this product in accordance with 47 CFR Part 1.1307 and it complies with applicable limit.

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC evaluation.

The results in this 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



SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan



Table of Contents

1. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)	4
2. MAXIMUM RF AVERAGE OUTPUT POWER AMONG PRODUCTION UNITS	6
3. RF EXPOSURE LIMIT INTRODUCTION	7
4. RADIO FREQUENCY RADIATION EXPOSURE EVALUATION	8
4.1. Standalone Power Density Calculation	8
4.2. Collocated Power Density Calculation.....	9



History of this test report

[illegible]

**1. Description of Equipment Under Test (EUT)**

Product Feature & Specification	
FCC ID	U8G-P1835
EUT Type	PEPWAVE / peplink Wireless Product
Brand Name	PEPWAVE / peplink
Model Name	UBR Go UBR Rugged UBR Go LTEA UBR Rugged LTEA UBR-GO-LTEA-R-T-PRM UBR-GO-LTEA-US-T-PRM UBR-RUG-LTEA-US-T-PRM UBR-RUG-LTEA-R-T-PRM Pepwave UBR Go LTEA Pepwave UBR Rugged LTEA MAX Transit MAX Transit LTEA
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2400 MHz ~ 2483.5 MHz WLAN 5.2GHz Band: 5150 MHz ~ 5250 MHz WLAN 5.3GHz Band: 5250 MHz ~ 5350 MHz WLAN 5.5GHz Band: 5470 MHz ~ 5725 MHz WLAN 5.8GHz Band: 5725 MHz ~ 5850 MHz
Mode	WLAN: 802.11a/b/g/n/ac HT20/HT40/VHT20/VHT40/VHT80
EUT Stage	Identical Prototype

WWAN Module 1	
EUT Type	Radio Module
Brand Name	Sierra
Model Name	EM7411
Wireless Technology and Frequency Range	WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 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: 788 MHz ~ 798 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 42: 3400 MHz ~ 3600 MHz LTE Band 43: 3600 MHz ~ 3800 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz
Mode	HSDPA HSUPA DC-HSDPA HSPA+ (16QAM uplink) LTE: QPSK, 16QAM, 64QAM



WWAN Module 2	
EUT Type	Radio Module
Brand Name	Sierra
Model Name	EM7511
Wireless Technology and Frequency Range	WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 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: 788 MHz ~ 798 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 30: 2305 MHz ~ 2315 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 66: 1710 MHz ~ 1780 MHz
Mode	RMC 12.2Kbps HSDPA HSUPA LTE: QPSK, 16QAM

Reviewed by: Jason Wang

Report Producer: Paula Chen

2. Maximum RF average output power among production units

<EM7411>

Mode		Maximum Average power(dBm)
WCDMA	Band II	24.0
	Band IV	24.0
	Band V	24.3
LTE	Band 2	24.0
	Band 4	24.0
	Band 5	24.3
	Band 7	23.8
	Band 12	24.0
	Band 13	24.0
	Band 14	24.0
	Band 25	24.0
	Band 26	24.0
	Band 41	23.8
	Band 42	23.8
	Band 43	23.8
	Band 48	23.8
	Band 66	24.0
	Band 71	24.0

<EM7511>

Mode		Maximum Average power(dBm)
WCDMA	Band II	24.0
	Band IV	24.0
	Band V	24.0
LTE	Band 2	24.0
	Band 4	24.0
	Band 5	24.0
	Band 7	23.8
	Band 12	24.0
	Band 13	24.0
	Band 14	24.0
	Band 26	24.0
	Band 30	23.0
	Band 41	23.8
	Band 66	24.0

<WLAN>

Mode	Maximum Average Power (dBm)	
2.4GHz WLAN	802.11b	8.31
	802.11g	12.66
	802.11n-HT20	11.71
	802.11n-HT40	7.96
5GHz WLAN	802.11a	15.06
	802.11n-HT20	14.36
	802.11n-HT40	18.37
	802.11n-VHT20	14.41
	802.11n-VHT40	18.41
	802.11n-VHT80	14.37



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

<EM7411>

Band	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	6.00	24.00	30.0	1.00	1000.00	0.199	1.000	0.199
WCDMA Band 4	6.00	24.00	30.0	1.00	1000.00	0.199	1.000	0.199
WCDMA Band 5	6.00	24.30	30.3	1.07	1071.52	0.213	0.536	0.398
LTE Band 2	6.00	24.00	30.0	1.00	1000.00	0.199	1.000	0.199
LTE Band 4	6.00	24.00	30.0	1.00	1000.00	0.199	1.000	0.199
LTE Band 5	6.00	24.30	30.3	1.07	1071.52	0.213	0.549	0.388
LTE Band 7	9.00	23.80	32.8	1.91	1905.46	0.379	1.000	0.379
LTE Band 12	6.00	24.00	30.0	1.00	1000.00	0.199	0.466	0.427
LTE Band 13	6.00	24.00	30.0	1.00	1000.00	0.199	0.518	0.384
LTE Band 14	6.00	24.00	30.0	1.00	1000.00	0.199	0.525	0.379
LTE Band 25	6.00	24.00	30.0	1.00	1000.00	0.199	1.000	0.199
LTE Band 26	6.00	24.00	30.0	1.00	1000.00	0.199	0.543	0.367
LTE Band 41	9.00	23.80	32.8	1.91	1905.46	0.379	1.000	0.379
LTE Band 42	9.00	23.80	32.8	1.91	1905.46	0.379	1.000	0.379
LTE Band 43	9.00	23.80	32.8	1.91	1905.46	0.379	1.000	0.379
LTE Band 48	9.00	23.80	32.8	1.91	1905.46	0.379	1.000	0.379
LTE Band 66	6.00	24.00	30.0	1.00	1000.00	0.199	1.000	0.199
LTE Band 71	6.00	24.00	30.0	1.00	1000.00	0.199	0.442	0.450

<EM7511>

Band	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	6.00	24.00	30.0	1.00	1000.00	0.199	1.000	0.199
WCDMA Band 4	6.00	24.00	30.0	1.00	1000.00	0.199	1.000	0.199
WCDMA Band 5	6.00	24.00	30.0	1.00	1000.00	0.199	0.536	0.371
LTE Band 2	6.00	24.00	30.0	1.00	1000.00	0.199	1.000	0.199
LTE Band 4	6.00	24.00	30.0	1.00	1000.00	0.199	1.000	0.199
LTE Band 5	6.00	24.00	30.0	1.00	1000.00	0.199	0.549	0.362
LTE Band 7	9.00	23.80	32.8	1.91	1905.46	0.379	1.000	0.379
LTE Band 12	6.00	24.00	30.0	1.00	1000.00	0.199	0.466	0.427
LTE Band 13	6.00	24.00	30.0	1.00	1000.00	0.199	0.518	0.384
LTE Band 14	6.00	24.00	30.0	1.00	1000.00	0.199	0.525	0.379
LTE Band 26	6.00	24.00	30.0	1.00	1000.00	0.199	0.543	0.367
LTE Band 30	1.00	23.00	24.0	0.25	251.19	0.050	1.000	0.050
LTE Band 41	9.00	23.80	32.8	1.91	1905.46	0.379	1.000	0.379
LTE Band 66	6.00	24.00	30.0	1.00	1000.00	0.199	1.000	0.199

<WLAN>

Band	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
WLAN2.4GHz Band	2.44	12.66	15.1	0.03	32.36	0.006	1.000	0.006
WLAN5GHz Band	4.73	18.41	23.1	0.21	206.06	0.041	1.000	0.041

**4.2. Collocated Power Density Calculation****EM7411 + WLAN**

WWAN Power Density / Limit	WLAN Power Density / Limit	Σ (Power Density / Limit) of WWAN+WLAN
0.450	0.041	0.491

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 all 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.

EM7511 + WLAN

WWAN Power Density / Limit	WLAN Power Density / Limit	Σ (Power Density / Limit) of WWAN+WLAN
0.427	0.041	0.468

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 all 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 §1.1307, the RF exposure analysis concludes that the RF Exposure is FCC compliant.