RF EXPOSURE EVALUATION REPORT

FCC ID	:	U8G-P1941
Equipment	:	PEPWAVE / peplink Wireless Product
Brand Name	:	PEPWAVE / peplink
Model Name	:	UBR LTE MAX UBR LTE MAX UBR MAX UBR LTEA UBR MAX BR2 Pro BR2 Pro MAX BR2 Pro LTE MAX BR2 Pro LTEA MAX-CX2-Mini MAX CX2 Mini CX2 Mini MAX-BR2-PRO-LTEA-W-T MAX-BR2-PRO-LTE-US-T Pismo941 UBR-LTE UBR-LTE-US-T UBR-LTE-US-T-PRM UBR-LTEA-W-T UBR-LTEA-W-T-PRM MAX BR1 Pro MAX BR1 Pro LTE MAX BR1 Pro LTEA MAX-BR1-PRO-LTEA-W-T MAX-BR1-PRO-LTE-US-T
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 this product in accordance with 47 CFR Part 2.1091 and it complies with applicable 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 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.

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.

Cona Huang

Approved by: Cona Huang / Deputy Manager

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
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History of this test report

Report No.	Version	Description	Issued Date
FA9N0104	Rev. 01	Initial issue of report	Mar. 25, 2020

1. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	PEPWAVE / peplink Wireless Product
Brand Name	PEPWAVE / peplink
Model Name	UBR LTE MAX UBR LTE MAX UBR MAX UBR LTEA UBR MAX BR2 Pro BR2 Pro MAX BR2 Pro LTE MAX BR2 Pro LTEA MAX-CX2-Mini MAX CX2 Mini CX2 Mini MAX-BR2-PRO-LTEA-W-T MAX-BR2-PRO-LTE-US-T Pismo941 UBR-LTE UBR-LTE-US-T UBR-LTE-US-T-PRM UBR-LTEA-W-T UBR-LTEA-W-T-PRM MAX BR1 Pro MAX BR1 Pro LTE MAX BR1 Pro LTEA MAX-BR1-PRO-LTEA-W-T MAX-BR1-PRO-LTE-US-T
FCC ID	U8G-P1941
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	WLAN: 802.11a/b/g/n HT20 / HT40
EUT Stage	Identical Prototype

Remark:
1. Model list Refer to “PISMO_FCC_model_confirmation_to_Sporton_UBR LTE
2. Below either one WWAN module will be possible integrated into this host, therefore, the transmit simultaneous with WWAN operation is necessary, and WWAN maximum powers are showing on section 2 according to module report.
3. This device supports 2 WWAN slots, either LE910C4-NF or MC7455 can be integrated into this host with two pieces, these two WWAN slots can transmit simultaneously as well.

WWAN Module Information	
Integrated Module 1	Brand Name: Telit Model Name: LE910C4-NF FCC ID: RI7LE910CXNF
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: 1850.7 MHz ~ 1909.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 12: 699.7 MHz ~ 715.3 MHz LTE Band 13: 779.5 MHz ~ 784.5 MHz LTE Band 14: 790.5 MHz ~ 795.5 MHz LTE Band 66: 1710.7 MHz ~ 1779.3 MHz LTE Band 71: 665.5 MHz ~ 695.5 MHz
Mode	RMC 12.2Kbps HSDPA HSUPA LTE: QPSK, 16QAM
Integrated Module 2	Brand Name: Sierra Model Name: MC7455 FCC ID: N7NMC7455
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: 1850.7 MHz ~ 1909.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 7: 2502.5 MHz ~ 2567.5 MHz LTE Band 12: 699.7 MHz ~ 715.3 MHz LTE Band 13: 779.5 MHz ~ 784.5 MHz LTE Band 25: 1850.7 MHz ~ 1914.3 MHz LTE Band 26: 814.7 MHz ~ 848.3 MHz LTE Band 30: 2307.5 MHz ~ 2312.5 MHz LTE Band 41: 2498.5 MHz ~ 2687.5 MHz
Mode	RMC 12.2Kbps HSDPA HSUPA LTE: QPSK, 16QAM

Antenna Gain for LE910C4-NF	
Antenna Gain(dBi)	WCDMA Band II: 2.14 WCDMA Band IV: 2.56 WCDMA Band V: 1.8 LTE Band 2: 2.14 LTE Band 4: 2.56 LTE Band 5: 1.8 LTE Band 12: 1.5 LTE Band 13: 1.87 LTE Band 14: 1.66 LTE Band 66: 2.56 LTE Band 71: 1.5

Antenna Gain for MC7455	
Antenna Gain(dBi)	WCDMA Band II: 3.77 WCDMA Band IV: 3.74 WCDMA Band V: 1.69 LTE Band 2: 3.77 LTE Band 4: 3.74 LTE Band 5: 1.69 LTE Band 7: 2.77 LTE Band 12: 1.93 LTE Band 13: 1.93 LTE Band 25: 3.77 LTE Band 26: 1.99 LTE Band 30: 2.64 LTE Band 41: 2.8

Reviewed by: Jason Wang

Report Producer: Daisy Peng

2. Maximum RF average output power among production units

<WLAN>

	Mode	Channel	Frequency (MHz)	Ant 1 Tune-up Limit	Ant 2 Tune-up Limit	Ant 1+2 Tune-up Limit
2.4GHz WLAN	802.11b 1Mbps	1	2412	20.00	19.50	23.50
		6	2437	25.50	25.00	27.00
		11	2462	20.50	20.00	23.50
	802.11g 6Mbps	1	2412	14.50	14.50	15.50
		6	2437	23.50	23.00	26.50
		11	2462	14.50	14.50	15.50
	802.11n-HT20 MCS0	1	2412	14.50	13.50	16.00
		6	2437	23.50	23.50	16.00
		11	2462	14.50	14.00	15.50
	802.11n-HT40 MCS0	3	2422	11.50	11.00	11.00
		6	2437	14.00	13.50	15.00
		9	2452	11.00	10.50	10.50

	Mode	Channel	Frequency (MHz)	Ant 1 Tune-up Limit	Ant 2 Tune-up Limit	Ant 1+2 Tune-up Limit
5.2GHz WLAN	802.11a 6Mbps	36	5180	19.00	19.00	24.00
		44	5220	24.00	23.50	24.00
		48	5240	21.50	21.50	24.00
	802.11n-HT20 MCS0	36	5180	18.50	18.50	24.00
		44	5220	24.00	23.50	24.00
		48	5240	21.00	21.00	24.00
	802.11n-HT40 MCS0	38	5190	11.00	11.00	16.00
		46	5230	21.00	21.00	23.50

	Mode	Channel	Frequency (MHz)	Ant 1 Tune-up Limit	Ant 2 Tune-up Limit	Ant 1+2 Tune-up Limit
5.8GHz WLAN	802.11a 6Mbps	149	5745	20.50	20.00	22.50
		157	5785	20.00	20.00	22.00
		165	5825	19.50	19.50	21.50
	802.11n-HT20 MCS0	149	5745	20.50	20.00	22.50
		157	5785	20.50	20.00	22.00
		165	5825	20.00	19.50	21.50
	802.11n-HT40 MCS0	151	5755	20.00	20.00	22.50
		159	5795	19.50	19.50	22.00

<LE910C4-NF>

Mode		Average Power (dBm)
WCDMA	Band II	25
	Band IV	25
	Band V	25
LTE	Band 2	25
	Band 4	25
	Band 5	25
	Band 12	25
	Band 13	25
	Band 14	25
	Band 66	25
	Band 71	25

<MC7455>

Mode		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
	Band 12	24
	Band 13	24
	Band 25	24
	Band 26	24
	Band 30	23
	Band 41	23

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/f2)	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/f2)	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 23 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

<LE910C4-NF>

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 23cm (mW/cm^2)	Limit (mW/cm^2)	Power Density / Limit
WCDMA Band 2	1852.4	2.14	25	27.140	0.518	517.607	0.078	1.000	0.078
WCDMA Band 4	1712.4	2.56	25	27.560	0.570	570.164	0.086	1.000	0.086
WCDMA Band 5	826.4	1.80	25	26.800	0.479	478.630	0.072	0.551	0.131
LTE Band 2	1850.7	2.14	25	27.140	0.518	517.607	0.078	1.000	0.078
LTE Band 4	1710.7	2.56	25	27.560	0.570	570.164	0.086	1.000	0.086
LTE Band 5	824.7	1.80	25	26.800	0.479	478.630	0.072	0.550	0.131
LTE Band 12	699.7	1.50	25	26.500	0.447	446.684	0.067	0.466	0.144
LTE Band 13	779.5	1.87	25	26.870	0.486	486.407	0.073	0.520	0.141
LTE Band 14	790.5	1.66	25	26.660	0.463	463.447	0.070	0.527	0.132
LTE Band 66	1710.7	2.56	25	27.560	0.570	570.164	0.086	1.000	0.086
LTE Band 71	665.5	1.50	25	26.500	0.447	446.684	0.067	0.444	0.152

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

<MC7455>

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 23cm (mW/cm^2)	Limit (mW/cm^2)	Power Density / Limit
WCDMA Band 2	1852.4	3.77	24	27.770	0.598	598.412	0.090	1.000	0.090
WCDMA Band 4	1712.4	3.61	24	27.610	0.577	576.766	0.087	1.000	0.087
WCDMA Band 5	826.4	1.69	24	25.690	0.371	370.681	0.056	0.551	0.101
LTE Band 2	1850.7	3.77	24	27.770	0.598	598.412	0.090	1.000	0.090
LTE Band 4	1710.7	3.61	24	27.610	0.577	576.766	0.087	1.000	0.087
LTE Band 5	824.7	1.69	24	25.690	0.371	370.681	0.056	0.550	0.101
LTE Band 7	2502.5	2.77	23	25.770	0.378	377.572	0.057	1.000	0.057
LTE Band 12	699.7	1.93	24	25.930	0.392	391.742	0.059	0.466	0.126
LTE Band 13	779.5	1.93	24	25.930	0.392	391.742	0.059	0.520	0.113
LTE Band 25	1850.7	3.77	24	27.770	0.598	598.412	0.090	1.000	0.090
LTE Band 26	814.7	1.69	24	25.690	0.371	370.681	0.056	0.543	0.103
LTE Band 30	2307.5	2.64	23	25.640	0.366	366.438	0.055	1.000	0.055
LTE Band 41	2498.5	2.80	23	25.800	0.380	380.189	0.057	1.000	0.057

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

<WLAN>

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 23cm (mW/cm^2)	Limit (mW/cm^2)	Power Density / Limit
2.4GHz WLAN	2412.0	2.44	27.00	29.440	0.879	879.023	0.132	1.000	0.132
5GHz WLAN	5180.0	4.73	24.00	28.730	0.746	746.449	0.112	1.000	0.112

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

<LE910C4-NF>

WWAN Tx 1 Power Density / Limit	WWAN Tx 2 Power Density / Limit	2.4GHz WLAN Power Density / Limit	5GHz WLAN Power Density / Limit	∑(Power Density / Limit) of WWAN+WLAN
0.152	0.152	0.132	0.112	0.548

Note:

1. ∑(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 4 collocated transmitters is compliant

<MC7455>

WWAN Tx 1 Power Density / Limit	WWAN Tx 2 Power Density / Limit	2.4GHz WLAN Power Density / Limit	5GHz WLAN Power Density / Limit	∑(Power Density / Limit) of WWAN+WLAN
0.126	0.126	0.132	0.112	0.496

Note:

1. ∑(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.
3. 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 4 collocated transmitters is compliant

Conclusion:

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