

RF Exposure Report

Report No.: SA170513E01

FCC ID: R68XPICO200

Test Model: xPico 250, xPico 240

Received Date: May 13, 2017

Test Date: Sep. 09 to 11, 2017

Issued Date: Oct. 02, 2017

Applicant: Lantronix, Inc.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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Release Control Record

Issue No.	Description	Date Issued
SA170513E01	Original release.	Oct. 02, 2017

1 Certificate of Conformity

Product: xPico® 200 Series Wi-Fi® IoT Gateway module

Brand: Lantronix

Test Model: xPico 250, xPico 240

Sample Status: ENGINEERING SAMPLE

Applicant: Lantronix, Inc.

Test Date: Sep. 09 to 11, 2017

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 :



Date:

Oct. 02, 2017

Wendy Wu / Specialist

Approved by :



Date:

Oct. 02, 2017

May Chen / Manager

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 ²)	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 ²)*	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

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

where

Pd = power density in mW/cm²

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 20cm away from the body of the user.

So, this device is classified as **Mobile Device**.

2.4 Antenna Gain

Ant Set.	Brand	Model	Antenna Gain (dBi)	Frequency rang (GHz)	Antenna type	Connector type	*Cable Length	*Cable Loss(dB)	excluding cable loss Antenna Gain(dBi)
1	Taoglas	GW.71.5153	2.8	2.4~2.4835	Dipole	R-SMA	45mm	1	3.8
			3.8	5.15~5.85				1.7	5.5
	Taoglas	GW.71.5153	2.8	2.4~2.4835			45mm	1	3.8
			3.8	5.15~5.85				1.7	5.5
2	NA	WSS002	1	2.4~2.4835	Dipole	R-SMA	45mm	1	2
			0.3	5.15~5.85				1.7	2
	NA	WSS002	1	2.4~2.5			45mm	1	2
			0.3	5.15~5.25				1.7	2
3	ethertronics	1000668	2.5	2.4~2.4835	PCB	i-pex(MHF)	50mm	NA	NA
			5	5.15~5.85					
	ethertronics	1000668	2.5	2.4~2.4835					
			5	5.15~5.85					
4	ProAnt	PRO-OB-536	0.02	2.4~2.4835	Metal	NA	NA	NA	NA
			3.31	5.15~5.85					

Note: From the above antennas, Ant Set 1, 3, 4 were selected as representative antenna for the test.

2.5 Calculation Result of Maximum Conducted Power

For WLAN:

Frequency Band (MHz)	Max. Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
2412-2462	296.483	2.8	20	0.11239	1
5180-5240	69.343	5.0	20	0.04362	1
5260-5320	69.343	5.0	20	0.04362	1
5500-5700	64.121	5.0	20	0.04034	1
5745-5825	66.988	5.0	20	0.04214	1

For Bluetooth:

BT-EDR

Frequency Band (MHz)	Max. Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
2402-2480	1.585	2.8	20	0.00032	1

BT-LE

Frequency Band (MHz)	Max. Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
2402-2480	3.981	2.8	20	0.00151	1

NOTE: 1. For Bluetooth, the power includes tune-up tolerance range that specified in xPico 250, xPico 240 Tune-Up power table.

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

Simultaneously transmission condition:

Condition	Technology	
1	WLAN (2.4GHz)	Bluetooth
2	WLAN (5GHz)	Bluetooth

Condition 1: WLAN 2.4GHz + Bluetooth = $0.11239 / 1 + 0.00151 / 1 = 0.1139$

Condition 2: WLAN 5GHz + Bluetooth = $0.04362 / 1 + 0.00151 / 1 = 0.04513$

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

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