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Project No: CB10509165

Maximum Permissible Exposure Report

Applicant's company	Habilisnet Technology Co., LTD
Applicant Address	6F, No.6, Sec. 4, Xinyi Rd., Da'an Dist., Taipei City 10683, Taiwan R.O.C.
FCC ID	2AJUCE101VWT
Manufacturer's company	Abocom Systems, Inc
Manufacturer Address	No.77, Yu-Yih Rd., Chu-Nan, Miao-Lih County 35059, Taiwan R.O.C.

Product Name	MiniVPN Box
Brand Name	ZEBRA Hotspot
Model Name	WE101VWT , BE101VWT
Ref. Standard(s)	47 CFR FCC Part 2 Subpart J, section 2.1091
Received Date	Aug. 17, 2016
Final Test Date	Sep. 22, 2016
Submission Type	Original Equipment

Testing Laboratory
1190

Sam Chen
SPORTON INTERNATIONAL INC.

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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA681709	Rev. 01	Initial issue of report	Dec. 08, 2016

1. GENERAL DESCRIPTION

1.1. EUT General Information

RF General Information			
Evaluation Mode	Frequency Range (MHz)	Operating Frequency (MHz)	Modulation Type
2.4GHz WLAN	2400-2483.5	2412-2462	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)

1.2. Table for Multiple List

The model numbers in the following table are all refer to the identical product.

Model No.	Color of Housing	Description
WE101VWT	White	All models are identical except for the color of housing.
BE101VWT	Black	

From the above models, Model No.: BE101VWT was selected as representative model for the test and its data was recorded in this report.

1.3. Testing Location

Testing Location			
☐	HWA YA	ADD :	No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
		TEL :	886-3-327-3456 FAX : 886-3-327-0973
☒	JHUBEI	ADD :	No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.
		TEL :	886-3-656-9065 FAX : 886-3-656-9085

2. MAXIMUM PERMISSIBLE EXPOSURE

2.1. Limit of Maximum Permissible Exposure

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm²)	Averaging Time |E|², |H|² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	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

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm²)	Averaging Time |E|², |H|² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ; *Plane-wave equivalent power density

2.2. MPE Calculation Method

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:

E (V/m) = $\frac{\sqrt{30 \times P \times G}}{d}$ Power Density: *Pd* (W/m²) = $\frac{E^2}{377}$

E = Electric field (V/m)

P = Peak RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

Pd = $\frac{30 \times P \times G}{377 \times d^2}$

2.3. Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

For 2.4GHz WLAN:

Antenna Type : PIFA Antenna

Conducted Power for IEEE 802.11n MCS0 (HT20): 23.65 dBm

Distance (cm)	Test Freq. (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	The maximum combined Average Output Power		Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
				(dBm)	(mW)			
20	2437	2.39	1.7338	23.65	231.7395	0.0799	1	Complies

For 4G WWAN:

4G dongle (FCC ID: QISE3372H-510)

EIRP Power for GSM 1900: 32.50 dBm

Distance (cm)	Test Freq. (MHz)	ERP Output Power (dBm)	EIRP Output Power		Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
			(dBm)	(mW)			
20	1850.2	30.3600	32.50	1778.2794	0.3539	1	Complies

Conclusion:

Both of the 2.4GHz WLAN and 4G WWAN can transmit simultaneously after the EUT connect the external 4G dongle, the formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 + ...etc. < 1

CPD = Calculation power density

LPD = Limit of power density

Therefore, the worst-case situation is 0.0799 / 1 + 0.3539 / 1 = 0.4338, which is less than "1". This confirmed that the device complies.