Report No.: SZEM190201119605
Page: 1 of 8

RF Exposure Evaluation Report

Application No.:	SZEM1902011196CR
Applicant:	D-BOX Technologies Inc.
Address of Applicant:	2172 Rue de la Province, Longueuil, J4G 1R7 Canada
Manufacturer:	D-BOX Technologies Inc.
Address of Manufacturer:	2172 Rue de la Province, Longueuil, J4G 1R7 Canada
Factory:	D-BOX Technologies Inc.
Address of Factory:	2172 Rue de la Province, Longueuil, J4G 1R7 Canada
EUT Name:	Haptic Processor
Model No.:	HP-R300
FCC ID:	2AS2X800N035
Standards:	47 CFR Part 1.1307 47 CFR Part 1.1310 47 CFR Part 2.1091
Date of Receipt:	2019-02-27
Date of Test:	2019-03-13 to 2019-03-25
Date of Issue:	2019-03-27
Test Result :	**PASS***

* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu
EMC Laboratory Manager

2 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2019-03-27		Original

Authorized for issue by:				
				
		Leo Lai /Project Engineer		
				
		Eric Fu /Reviewer		

3 Contents

Page

1 COVER PAGE 1

2 VERSION 2

3 CONTENTS 3

4 GENERAL DESCRIPTION OF EUT 4

4.1 TEST LOCATION 5
4.2 TEST FACILITY 5
4.3 DEVIATION FROM STANDARDS 5
4.4 ABNORMALITIES FROM STANDARD CONDITIONS 5
4.5 OTHER INFORMATION REQUESTED BY THE CUSTOMER 5

5 RF EXPOSURE EVALUATION 6

5.1 RF EXPOSURE COMPLIANCE REQUIREMENT 6
5.1.1 Limits 6
5.1.2 Test Procedure 6
4.1.3 EUT RF EXPOSURE EVALUATION 7

4 General Description of EUT

Power supply:	DC 5V from AC/DC adapter Model: A122-050200UD Input: 100-240V~50/60Hz 0.4A Output: DC 5V 2A
Cable:	DC cable: 1.5m
For BT:	
Operation Frequency:	2402MHz to 2480MHz
Spectrum Spread Technology:	Frequency Hopping Spread Spectrum(FHSS)
Bluetooth Version:	V4.1
Modulation Type:	GFSK, π/4DQPSK, 8DPSK
Number of Channels:	79
Channel Spacing:	1MHz
Antenna Type:	Chip Antenna
Antenna Gain:	1.5dBi
For BLE:	
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V4.1
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Antenna Type:	Chip Antenna
Antenna Gain:	1.5dBi
For 2.4G wifi:	
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels:	802.11b/g/n(HT20):11
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz
Channel Spacing:	5MHz
Antenna Type:	Chip Antenna
Antenna Gain:	1.5dBi

No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn
中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

4.1 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• VCCI

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• FCC –Designation Number: CN1178

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.
IC#: 4620C.

4.3 Deviation from Standards

None.

4.4 Abnormalities from Standard Conditions

None.

4.5 Other Information Requested by the Customer

None.

5 RF Exposure Evaluation

5.1 RF Exposure Compliance Requirement

5.1.1 Limits

According to FCC Part1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in part1.1307(b)

TABLE 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)	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

F= Frequency in MHz

Friis Formula

Friis transmission formula: Pd = (Pout*G)/(4* Pi * R^2)

Where

Pd = power density in mW/cm^2

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

Pd id the limit of MPE, 1 mW/cm^2 . If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

5.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

4.1.3 EUT RF Exposure Evaluation

Remark: The Bluetooth and Wifi function can't synchronous transmission at the same time.

For BT

Antenna Gain: 1.5dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.41 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Antenna	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)	Result
Middle	1	2441MHz	6.73	4.71	0.001	1.0	PASS

Note: Refer to report No. SZEM190201119602 for EUT test Max Conducted Peak Output Power value.
The distancer (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

For BLE

Antenna Gain: 1.5dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.41 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Antenna	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)	Limit (mW/cm^2)	Result
Hightest	1	2480MHz	7.36	5.45	0.002	1.0	PASS

Note: Refer to report No. SZEM190201119603 for EUT test Max Conducted Peak Output Power value.

The distancer (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

For 2.4G WIFI

Antenna Gain: 1.5dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.41 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Antenna	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)	Limit (mW/cm^2)	Result
Hightest	1	2462MHz	21.17	133.97	0.038	1.0	PASS

Note: Refer to report No. SZEM190201119604 for EUT test Max Conducted Peak Output Power value.

The distancer (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

∑ rations of simultaneous transmitting= BT + BLE + WiFi property:

Ratio of Power Density for BT at R = 20 cm	Ratio of Power Density for BLE at R = 20 cm	Ratio of Power Density for WiFi at R = 20 cm	Total ratios of simultaneous transmitting at R =20cm	Limit (mW/cm^2)	Result
0.001	0.002	0.038	0.041	1.0	PASS

- End of the Report -