

Report No.: SZEM201101161306

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RF Exposure Evaluation Report

Application No.: SZEM2011011613CR

Applicant: UBTECH ROBOTICS CORP LTD

Address of Applicant: 16th and 22nd Floor, Block C1, Nanshan I Park, No.1001 Xueyuan Road,

Nanshan District, Shenzhen City, China

Manufacturer: UBTECH ROBOTICS CORP LTD

Address of Manufacturer: 16th and 22ND Floor, block C1 Nanshan I Park, NO.1001 Xueyuan Road,

Nanshan District, Shenzhen City, 518055, P.R.CHINA

Factory: UBTECH (KUNMING) CO., LTD

Address of Factory: Room No.2, Block 2, Shilin Street, Chenggong District, Kunming City, Yunnan

Province, P.R.CHINA

Equipment Under Test (EUT):

Product Name: ADIBOT
Model No.: ADAS101
Trade mark: UBTECH

 FCC ID:
 2AHJX-ADAS101

 Standards:
 47 CFR Part 1.1307

 47 CFR Part 1.1310

47 CFR Part 2.1091

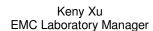
KDB447498D01 General RF Exposure Guidance v06

Date of Receipt: 2020-11-17

Date of Test: 2020-11-27 to 2020-12-13

Date of Issue: 2020-12-13

Test Result : PASS*





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



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2 Version

Revision Record								
Version	Chapter	Date	Modifier	Remark				
01		2020-12-13		Original				

Authorized for issue by:		
	Co.Ci	
	Leo Li/Project Engineer	-
	EvicFu	
	Eric Fu/Reviewer	-



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4 General Information

4.1 General Description of EUT

Rated voltage:	AC 120V/60Hz
For BT:	
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V5.0 Dual mode
Spectrum Spread Technology:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, pi/4DQPSK, 8DPSK
Number of Channels:	79
Channel Spacing:	1MHz
Antenna Type:	FPC Antenna
Antenna Gain:	2.74dBi
For BLE:	
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V5.0 Dual mode
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Data Rate:	1Mb/s & 2Mb/s
Antenna Type:	FPC Antenna
Antenna Gain:	2.74dBi

For Wi-Fi 2.4G:	
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz
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;802.11n(HT40):7
Channel Spacing:	5MHz
Antenna Type:	ANT 1: FPC Antenna; ANT 2: FPC Antenna
Antenna Gain:	ANT 1:2.74dBi; ANT 2:2.74dBi



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For Wi-Fi 5G:	
Operation Frequency (80MHz):	U-NII-1: 5210MHz; U-NII-3: 5775MHz
Operation Frequency (40MHz):	U-NII-1: 5190-5230MHz; U-NII-3: 5755-5795MHz
Operation Frequency (20MHz):	U-NII-1: 5180-5240MHz; U-NII-3: 5745-5825MHz
Moudulation Type:	802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK); 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM); 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
Channel Spacing:	802.11a/n(HT20)/ac(HT20): 20MHz; 802.11n(HT40)/ac(HT40): 40MHz; 802.11ac(HT80): 80MHz
Antenna Type:	ANT 1: FPC Antenna; ANT 2: FPC Antenna
Antenna Gain:	U-NII-1 band: ANT 1:1.28dBi; ANT 2:1.28dBi;
Antenna Gam.	U-NII-3 band: ANT 1:1.32dBi; ANT 2:1.32dBi
Remark:	Two antennas can simultaneous transmission



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4.2 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

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

4.3 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.

· VCC

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.

4.4 Deviation from Standards

None.

4.5 Abnormalities from Standard Conditions

None.

4.6 Other Information Requested by the Customer

None.



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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/cm²)	Averaging time (minutes)	
(A) Lim	its for Occupational	/Controlled Exposu	res		
0.3–3.0	614 1842/f 61.4	1.63 4.89/f 0.163	*(100) *(900/f²) 1.0 f/300 5	6 6 6 6	
(B) Limits	for General Populati	on/Uncontrolled Exp	oosure		
0.3–1.34	614 824/f 27.5	1.63 2.19/f 0.073	*(100) *(180/f²) 0.2 f/1500 1.0	30 30 30 30 30	

F= Frequency in MHz

Friis Formula

Friis transmission formula: Pd = (Pout*G)/(4*Pi*R2)

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

Pd id the limit of MPE, 1 mW/cm2. 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.



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5.1.3 EUT RF Exposure Evaluation

For BT:

Antenna Gain: 2.74dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.88 in linear scale.

Frequency	Antenna	Max Conducted	Output Power	Power Density	Limit	Result
(MHz)		Peak Output	to Antenna	at R = 20 cm		
		Power (dBm)	(mW)	(mW/cm ²)		
2480	1	10.41	10.99	0.0041	1.0	PASS

Note: Refer to report No. SZEM201101161302 for EUT test Max Conducted Peak Output Power value. The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

For BLE:

Antenna Gain: 2.74dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.88 in linear scale.

Frequency	Antenna	Max Conducted	Output Power	Power Density	Limit	Result
(MHz)		Peak Output	to Antenna	at R = 20 cm		
		Power (dBm)	(mW)	(mW/cm ²)		
2480	1	6.27	4.24	0.0010	1.0	PASS

Note: Refer to report No. SZEM201101161303 for EUT test Max Conducted Peak Output Power value. The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.



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For 2.4G:

Antenna Gain: 2.74dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.88 in linear scale.

The state of the s						
Frequency	Antenna	Max Conducted	Output Power	Power Density	Limit	Result
(MHz)		Peak Output	to Antenna	at R = 20 cm		
		Power (dBm)	(mW)	(mW/cm ²)		
2422	1+2	19.30	85.11	0.0318	1.0	PASS

Note: Refer to report No. SZEM201101161304 for EUT test Max Conducted Peak Output Power value. The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

For 5G:

Antenna Gain: 1.32dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.36 in linear scale.

Frequency	Antenna	Max Conducted	Output Power	Power Density	Limit	Result
(MHz)		Peak Output	to Antenna	at R = 20 cm		
		Power (dBm)	(mW)	(mW/cm ²)		
5745	1+2	20.08	101.86	0.0276	1.0	PASS

Note: Refer to report No. SZEM201101161305 for EUT test Max Conducted Peak Output Power value. The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

- End of the Report -



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