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Report No.: SZEM180500359603

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RF Exposure Evaluation Report

Application No.: SZEM1805003596CR

Applicant: Hub6 Inc.

Address of Applicant: 11 Gwendolen Cres, North York, Canada, M2N2L9

Manufacturer: Hub6 Inc.

Address of Manufacturer: 11 Gwendolen Cres, North York, Canada, M2N2L9

Equipment Under Test (EUT):

EUT Name: SAFE BY HUB6

Model No.: H1

FCC ID: 2APTZSAFEHUB6A

Standard(s) : 47 CFR Part 1.1307

47 CFR Part 1.1310

Date of Receipt: 2018-05-03

Date of Test: 2018-05-12 to 2018-05-28

Date of Issue: 2018-06-15

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.



Keny Xu

EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2018-06-15		Original

Authorized for issue by:			
		 _____ Harry Wu /Project Engineer	
		 _____ Eric Fu /Reviewer	

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4 General Information

4.1 General Description of EUT

Power supply:	Input: DC 12V
Cable:	Power Cable: 100cm, Unshielded; Network Cable: 100cm, Unshielded
WiFi	
Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz IEEE 802.11n(HT40): 2422MHz to 2452MHz
Modulation Type:	IEEE for 802.11b: DSSS(CCK, DQPSK, DBPSK) IEEE for 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n(HT20 and HT40): OFDM (BPSK, QPSK, 16QAM, 64QAM)
Channel Spacing	5MHz
Channel Numbers:	IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels IEEE 802.11n HT40: 7 Channels
Antenna Type:	Dedicated Antenna
Antenna Gain:	2dBi
UMTS-FDD	
Operation Frequency:	UMTS-FDD Band V: TX: 826.4-846.6MHz, RX: 871.4-891.6MHz UMTS-FDD Band II: TX: 1852.4-1907.6MHz, RX: 1932.4-1987.6MHz
Modulation Type:	QPSK, 16QAM
Channel Numbers:	UMTS-FDD Band V: 102 UMTS-FDD Band II: 277
Antenna Type:	Dedicated Antenna
Antenna Gain:	Antenna 1: 1dBi, Antenna 2: 1dBi Two antennas can not synchronous transmission.

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:

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **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.

- **Industry Canada (IC)**

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

4.4 Deviation from Standards

None.

4.5 Abnormalities from Standard Conditions

None.

4.6 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: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$

Where

P_d = power density in mW/cm²

P_{out} = 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

P_d is 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.

4.1.3 EUT RF Exposure Evaluation

2.4GHz Wifi

Antenna Gain: 2dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.58 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (including Tune-up tolerance) (dBm)	E.I.R.P (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
Highest	2462	18.07	101.62	0.020	1.0	PASS

Note: Refer to report No. SZEM180500359602 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.

UMTS-FDD Band V

Antenna Gain: 1dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.259 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (including Tune-up tolerance) (dBm)	E.I.R.P (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
4233	846.6	24.0	316.23	0.063	0.56	PASS

Note: Refer to report No. 15050045-FCC-H 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.

UMTS-FDD Band II

Antenna Gain: 1dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.259 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (including Tune-up tolerance) (dBm)	E.I.R.P (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
9400	1880	23.5	281.84	0.056	1.0	PASS

Note: Refer to report No. 15050045-FCC-H 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.

Simultaneous transmission:(Worst Case)

	Wifi Antenna	WCDMA Antenna	Sum	Limit	Result
MPE Ratio	0.020	0.1125	0.1325	1	PASS

According to 447498 D01, Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneously transmitting antennas incorporated in a host device is ≤ 1.0 .

- End of the Report -