



RF Exposure Evaluation Report

Application No.: SZEM1812000268AT
Applicant: Furrion Ltd.
Address of Applicant: Unit 503c & 505-508, Level 5, Core D, Cyberport 3, 100 Cyberport Road, Hong Kong.
Manufacturer: Furrion Ltd.
Address of Manufacturer: Unit 503c & 505-508, Level 5, Core D, Cyberport 3, 100 Cyberport Road, Hong Kong.
Equipment Under Test (EUT):
Product Name: Wi-Fi Router
Model No.: FAN17A82, FAN17B8A ♣
♣ Please refer to section 4.1 of this report which indicates which model was actually tested and which were electrically identical.
Trade Mark: Furrion
FCC ID: 2ABH3-FAN17A
Standards: 47 CFR Part 1.1307 (2016)
47 CFR Part 1.1310 (2016)
Date of Receipt: 2018-12-10
Date of Test: 2018-12-13 to 2018-12-17
Date of Issue: 2018-12-20

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

Keny Xu

Keny Xu
EMC Laboratory Manager





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

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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2018-12-20		Original

Authorized for issue by:			
			
		<hr/> Powell Bao /Project Engineer	
			
		<hr/> Eric Fu /Reviewer	





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4 General Information

4.1 General Description of EUT

Module1	MT7603E
Power supply:	DC 12V from a Car battery
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:	Module 1: Integral Antenna
Antenna Gain:	2dBi The two antennas cannot simultaneous transmission

Module2	MT7603E
Power supply:	DC 12V from a Car battery
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:	Module 2: External Antenna
Antenna Gain:	2dBi The two antennas cannot simultaneous transmission





Declaration of EUT Family Grouping:

Model No.: FAN17A82, FAN17B8A

Only the model FAN17B8A was tested, since the electrical circuit design, layout, components used, internal wiring and functions were identical for the above models, with only difference as below:

Model	Description
FAN17A82	Wi-Fi Booster Unit
FAN17B8A	Wi-Fi Booster Unit, with ceiling mount bracket



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.

• 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.



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: $Pd = (Pout \cdot G) / (4 \cdot \pi \cdot R^2)$

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

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.



4.1.3 EUT RF Exposure Evaluation

Module 1

Ant 1: 2dBi, Ant 2: 2dBi

The two antennas cannot simultaneous transmission

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.585 in linear scale.

The max tune-up tolerance power Into Antenna & RF Exposure Evaluation Distance:

Channel	Antenna	Frequency (MHz)	Max tune-up tolerance power (dBm)	Max tune-up Tolerance power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
Low	2	2412MHz	17.02	50.35	0.0159	1.0	PASS

Note: Refer to report No. SZEM181200026802 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.

Module 2:

Ant 1: 2dBi, Ant 2: 2dBi

The two antennas cannot simultaneous transmission

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.585 in linear scale.

The max tune-up tolerance power Into Antenna & RF Exposure Evaluation Distance:

Channel	Antenna	Frequency (MHz)	Max tune-up tolerance power (dBm)	Max tune-up Tolerance power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
High	1	2462MHz	16.6	45.71	0.0144	1.0	PASS

Note: Refer to report No. SZEM181200026802 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.

exposure conditions for simultaneous transmission operations

The EUT has two WiFi module can simultaneous transmission at the same time.

The simultaneous transmission result between of module1 and module2:

The SAR Exclusion Threshold Level:

(CPD = Calculation power density, LPD = Limit of power density)

$$= (0.0159/1) + (0.0144/1) = 0.0303 < 1$$

the Max. sum of the MPE ratios is 0.0303<1. So, Simultaneous transmission SAR test is not required.

- End of the Report -

