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Shenzhen Branch**

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Report No.: SZEM180400347805
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RF Exposure Evaluation Report

Application No.: SZEM1804003478CR
Applicant / Manufacturer Furrion Ltd.
Address of Applicant / Manufacturer Units 503c & 505-508, Level 5, Core D, Cyberport 3, 100 Cyberport Road, Hong Kong
Factory: Furrion Ltd.
Address of Factory: Units 503c & 505-508, Level 5, Core D, Cyberport 3, 100 Cyberport Road, Hong Kong
EUT Name: LTE WiFi Router
Model No.: FAN17B8B, FAN17B83 ♣
♣ Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Trade mark: FURRIION
FCC ID: 2ABH3-FAN17
Standards: 47 CFR Part 1.1307
47 CFR Part 1.1310
Date of Receipt: 2018-05-22
Date of Test: 2018-05-24 to 2018-06-15
Date of Issue: 2018-06-20

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		2018-06-20		Original

Authorized for issue by:				
				
		Edison Li /Project Engineer		
				
		Eric Fu /Reviewer		



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4 General Description of EUT

Power supply:	DC 12V			
Internal source:	More than 108MHz			
Sample Type:	Fixed production			
For 2.4G wifi:				
Type of Modulation:	IEEE for 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE for 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n (HT20/HT40): OFDM (64QAM, 16QAM, QPSK, BPSK)			
Operating Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz IEEE 802.11n(HT40): 2422MHz to 2452MHz			
Channel Number:	IEEE 802.11b/g, IEEE 802.11n(HT20): 11 Channels IEEE 802.11n(HT40): 7 Channels			
Channels Step:	Channels with 5MHz step			
Antenna Type:	Integral			
Antenna Gain:	Antenna1/Antenna2:2dBi			
	The two antennas cannot simultaneous transmission			
For 5G wifi:				
Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels
	UNII Band I	IEEE 802.11a/n(HT20)/ac(HT20)	5180-5240	4
		IEEE 802.11n(HT40)/ac(HT40)	5190-5230	2
		IEEE 802.11ac(HT80)	5210	1
	UNII Band III	IEEE 802.11a/n(HT20)/ac(HT20)	5745-5825	5
		IEEE 802.11n(HT40)/ac(HT40)	5755-5795	2
		IEEE 802.11ac(HT80)	5775	1
Modulation Type:	IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM) IEEE 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)			
Antenna Type:	Integral			
Antenna Gain:	Antenna1/Antenna2:2dBi			
	The two antennas cannot simultaneous transmission			
For 4G LTE:				
LTE Operation Frequency Band:	LTE FDD Band 2, 4, 13			
Modulation Type:	QPSK, 16QAM			
LTE Release Version:	R9			



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LTE Power Class:	Level 3	
Antenna Type:	External	
Antenna Ports:	Tx & Rx Port	1
	Tx-only Port	0
	Rx-only Port	1
Antenna Gain:	6dBi	

Declaration of EUT Family Grouping:

Model No.: FAN17B8B, FAN17B83

Only the model FAN17B8B was tested, since the electrical circuit design, layout, components used, internal wiring and functions were identical for all the above models, only the difference as below:

Model	Description
FAN17B8B	Internet Access Point, LTE and Wi-Fi Booster, with ceiling mount bracket
FAN17B83	Internet Access Point, LTE and Wi-Fi Booster, without ceiling mount bracket



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:

• 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.

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

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 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.



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4.1.3 EUT RF Exposure Evaluation

Remark: The UNII Band I and UNII Band III, LTE Band 2/4 and LTE Band 13 can't synchronous transmission at the same time.

For 2.4G WiFi

Ant 1: 2dBi, Ant 2: 2dBi

The two antennas cannot simultaneous transmission

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.58 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
Middle	2	2437MHz	18.00	63.10	0.0199	1.0	PASS

Note: Refer to report No. SZEM180400347802 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 5G WiFi

Ant 1: 2dBi, Ant 2: 2dBi

The two antennas cannot simultaneous transmission

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

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

Test mode	Frequency (MHz)	Antenna	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
11AC80	5775 MHz	2	14.00	25.12	0.0079	1.0	PASS

Note: Refer to report No. SZEM180400347803 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 4G LTE(Band 2/4)

Ant.: 6dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.98 in linear scale.

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

Test mode	Frequency (MHz)	Antenna	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
Band4 15MHz	1747.5	/	23.50	223.87	0.1773	1.0	PASS

Note: Refer to report No. SZEM180400347804 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 4G LTE(Band 13)

Ant.: 6dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.98 in linear scale.

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

Test mode	Frequency (MHz)	Antenna	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
Band13 5MHz	784.5	/	22.5	177.83	0.1408	0.523	PASS

Note: Refer to report No. SZEM180400347804 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.

The simultaneous transmission result between of 2.4G WiFi, 5G WiFi and 4G LTE:

The SAR Exclusion Threshold Level:

$$= \text{CPD1} / \text{LPD1} + \text{CPD2} / \text{LPD2} + \text{CPD3} / \text{LPD3}$$

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

$$= (0.0199/1) + (0.0079/1) + (0.1408/0.523) = 0.2970 < 1$$

Since the source-based time-averaging conducted output power is well below the SAR low threshold level, so the EUT is considered to comply with SAR requirement without testing.

- End of the Report -