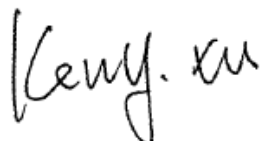


RF Exposure Evaluation Report

Application No.: SZEM1909018098CR
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.
Product Name: LTE WiFi Router-Unlocked
Model No.: FAN17B8F, FAN17B87 ♣
 ♣ Please refer to section 4.1 of this report which indicates which model was actually tested and which were electrically identical.
Trade Mark: FURRIION
FCC ID: 2ABH3-FAN17B
 47 CFR Part 1.1307
Standards: 47 CFR Part 1.1310
 47 CFR Part 2.1091
Date of Receipt: 2019-09-02
Date of Test: 2019-09-05 to 2019-09-28
Date of Issue: 2019-10-08

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



Keny Xu
 EMC Laboratory Manager



2 Version

<i>Revision Record</i>				
<i>Version</i>	<i>Chapter</i>	<i>Date</i>	<i>Modifier</i>	<i>Remark</i>
01		2019-10-08		Original

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



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4 General Information

4.1 General Description of EUT

Power supply:	DC 12V			
Internal source:	More than 108MHz			
For 2.4G WiFi(MT7603):				
Type of Modulation:	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) 802.11n (HT20/HT40): OFDM (64QAM, 16QAM, QPSK, BPSK)			
Operating Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz 802.11n(HT40): 2422MHz to 2452MHz			
Channel Number:	802.11b/g/n(HT20): 11 Channels 802.11n(HT40): 7 Channels			
Channels Step:	Channels with 5MHz step			
Sample Type:	Fixed production			
Antenna Type:	Integral			
Antenna Gain:	Antenna1/Antenna2:2dBi The two antennas can simultaneous transmission.			
For 2.4G WiFi(RTL8192ee):				
Type of Modulation:	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) 802.11n (HT20/HT40): OFDM (64QAM, 16QAM, QPSK, BPSK)			
Operating Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz 802.11n(HT40): 2422MHz to 2452MHz			
Channel Number:	802.11b/g/11n(HT20): 11 Channels 802.11n(HT40): 7 Channels			
Channels Step:	Channels with 5MHz step			
Sample Type:	Fixed production			
Antenna Type:	External			
Antenna Gain:	Antenna3/Antenna4:4dBi The two antennas can simultaneous transmission.			
For 5G WiFi(MT7612E):				
Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels
	UNII Band I	802.11a/n(HT20)/ac(HT20)	5180-5240	4
		802.11n(HT40)/ac(HT40)	5190-5230	2
		802.11ac(HT80)	5210	1
	UNII Band III	802.11a/n(HT20)/ac(HT20)	5745-5825	5
		802.11n(HT40)/ac(HT40)	5755-5795	2



	802.11ac(HT80)	5775	1
Modulation Type:	802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK) 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)		
Sample Type:	Fixed production		
Antenna Type:	Integral		
Antenna Gain:	Antenna5/Antenna6:2dBi The two antennas can simultaneous transmission		
For WCDMA/LTE module*:			
Operation Frequency Band:	WCDMA Band II,IV,V; LTE FDD Band 2,4,5,12,13,14,66,71		
Modulation Type:	WCDMA: QPSK LTE: QPSK, 16QAM		
HSDPA UE Category:	24		
HSUPA UE Category:	6		
LTE Category:	4		
Antenna Type:	External		
Antenna Ports:	Tx & Rx Port	1	
	Rx-only Port	1	
Antenna Gain:	Antenna3:4dBi		

*: The WCDMA/LTE single module approval by TCB(FCC ID:XMR201808EC25AF).





Declaration of EUT Family Grouping:

Model No.: FAN17B8F, FAN17B87

Only the model FAN17B8F 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
FAN17B8F	Internet Access Point, LTE and Wi-Fi Router SIM Swappable with ceiling mount bracket
FAN17B87	Internet Access Point, LTE and Wi-Fi Router SIM Swappable without ceiling mount bracket

Internet Access Point, LTE Wi-Fi Router-Unlocked (FAN17B87)	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.



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Shenzhen Branch EMC Laboratory

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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

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

For Uncontrolled Environment, the MPE limit of 300MHz to 1500MHz is f/1500 mW/cm², the MPE limit of 1500MHz to 100000MHz is 1.0 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.



5.1.3 EUT RF Exposure Evaluation

1) Test Results

Note: The 2.4G WiFi(RTL8192ee) and WCDMA/LTE module cannot synchronous transmission at the same time.

The 2.4G WiFi(MT7603), 5G WiFi(MT7612E) and WCDMA/LTE module can synchronous transmission at the same time.

For 2.4G WiFi(MT7603 module):

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

Antenna	Max Antenna Gain (dBi)	Max Antenna Gain (Numeric)	Max tune-up tolerance power (dBm)	Max tune-up Tolerance power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	MPE Ratios	Result
Ant1+2	2	1.58	20.11	102.57	0.0323	1	0.0323	PASS

Note: Refer to report No. SZEM190901809802 or 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(RTL8192ee module):

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

Antenna	Max Antenna Gain (dBi)	Max Antenna Gain (Numeric)	Max tune-up tolerance power (dBm)	Max tune-up Tolerance power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	MPE Ratios	Result
Ant3+4	4	1.58	17.79	60.12	0.0300	1	0.0300	PASS

Note: Refer to report No. SZEM190901809803 or 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:

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

Antenna	Max Antenna Gain (dBi)	Max Antenna Gain (Numeric)	Max tune-up tolerance power (dBm)	Max tune-up Tolerance power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	MPE Ratios	Result
Ant5+6	2	1.58	15.51	35.56	0.0112	1	0.0112	PASS

Note: Refer to report No. SZEM190901809804 or 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 WCDMA Band V/ LTE Band 5(824MHz-849MHz):

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

Antenna	Max Antenna Gain (dBi)	Max Antenna Gain (Numeric)	Max tune-up tolerance power (dBm)	Max tune-up Tolerance power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	MPE Ratios	Result
Ant3	4	2.51	25	316.23	0.1580	0.5498	0.2874	PASS

Note: Refer to report No. R1806A0301-R1V1 or 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 WCDMA Band II/ LTE Band 2(1850MHz-1910MHz):

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

Antenna	Max Antenna Gain (dBi)	Max Antenna Gain (Numeric)	Max tune-up tolerance power (dBm)	Max tune-up Tolerance power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	MPE Ratios	Result
Ant3	4	2.51	25	316.23	0.1580	1	0.1580	PASS

Note: Refer to report No. R1806A0301-R2V1 or 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 WCDMA Band IV, LTE Band 4(1710MHz-1755MHz) / LTE Band 66(1710MHz-1780MHz):

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

Antenna	Max Antenna Gain (dBi)	Max Antenna Gain (Numeric)	Max tune-up tolerance power (dBm)	Max tune-up Tolerance power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	MPE Ratios	Result
Ant3	4	2.51	25	316.23	0.1580	1	0.1580	PASS

Note: Refer to report No. R1806A0301-R3V1 or 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 LTE Band 12(699MHz-716MHz), LTE Band 13(777MHz-787MHz), LTE Band 71(663MHz-698MHz):

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

Antenna	Max Antenna Gain (dBi)	Max Antenna Gain (Numeric)	Max tune-up tolerance power (dBm)	Max tune-up Tolerance power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	MPE Ratios	Result
Ant3	4	2.51	25	316.23	0.1580	0.4437	0.3562	PASS

Note: Refer to report No. R1806A0301-R3V1 or 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 LTE Band 14(788MHz-798MHz):

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

Antenna	Max Antenna Gain (dBi)	Max Antenna Gain (Numeric)	Max tune-up tolerance power (dBm)	Max tune-up Tolerance power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	MPE Ratios	Result
Ant3	4	2.51	25	316.23	0.1580	0.5270	0.2999	PASS

Note: Refer to report No. R1806A0301-R4V1 or 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(MT7603), 5G WiFi and WCDMA/LTE:

The SAR Exclusion Threshold Level:

=CPD1 / LPD1 + CPD2 / LPD2 + CPD3 / LPD3

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

= (0.0323/1) +(0.0112/1) +(0.1580/0.4437)= 0.3997 < 1

Since the SAR Exclusion Threshold Level is well below the SAR low threshold level, so the EUT is considered to comply with SAR requirement without testing.

End of Report

