RF EXPOSURE REPORT

Report No.: 15020044-FCC-H1
Supersede Report No.: N/A

Applicant	Shanghai MXCHIP Information Technology Co., Ltd
Product Name	Embedded WiFi module
Main Model No.	EMW3165
Test Standard	FCC 2.1091
Test Date	January 26 to February 27, 2015
Issue Date	February 28, 2015
Test Result	☑ Pass ☐ Fail
Equipment complied with the specification	☑
Equipment did not comply with the specification	☐

Herith Shi	Alex Liu	
Herith Shi Test Engineer	**Alex Liu** Checked By	

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Test result presented in this test report is applicable to the tested sample only

Laboratories Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.

In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

Accreditations for Conformity Assessment

Country/Region	Scope
USA	EMC, RF/Wireless, SAR, Telecom
Canada	EMC, RF/Wireless, SAR, Telecom
Taiwan	EMC, RF, Telecom, SAR, Safety
Hong Kong	RF/Wireless, SAR, Telecom
Australia	EMC, RF, Telecom, SAR, Safety
Korea	EMI, EMS, RF, SAR, Telecom, Safety
Japan	EMI, RF/Wireless, SAR, Telecom
Singapore	EMC, RF, SAR, Telecom
Europe	EMC, RF, SAR, Telecom, Safety

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1   Report Revision History

Report No.	Report Version	Description	Issue Date
15020044-FCC-H1	NONE	Original	February 28, 2015

2   Customer information

Applicant Name	Shanghai MXCHIP Information Technology Co., Ltd
Applicant Add	Room 811, Tongpu Building, No.1220, Tongpu Road, Shanghai, China
Manufacturer	Shanghai MXCHIP Information Technology Co., Ltd
Manufacturer Add	Room 811, Tongpu Building, No.1220, Tongpu Road, Shanghai, China

3   Test site information

Lab performing tests	SIEMIC (Nanjing-China) Laboratories
Lab Address	2-1 Longcang Avenue Yuhua Economic and Technology Development Park, Nanjing, China
FCC Test Site No.	986914
IC Test Site No.	4842B-1
Test Software	Labview of SIEMIC version 1.0

4 Equipment under Test (EUT) Information

Description of EUT: Embedded WiFi module

Main Model: EMW3165

Serial Model: EMW3165-P, EMW3165-E

Date EUT received: January 19, 2015

Test Date(s):   January 26 to February 27, 2015

Output power   802.11b:14.30dBm
                                      802.11g:13.50 dBm
                                      802.11n20M:13.56 dBm

Antenna Gain: PCB Antenna EMW3165-P: 2 dBi
                                      External Antenna EMW3165-E: 2 dBi

Type of Modulation: 802.11b/g/n20M: DSSS/OFDM

RF Operating Frequency (ies):   802.11b/g/n(20M): 2412-2462 MHz(TX/RX)

Number of Channels: 802.11b/g/n(20M): 11CH

Port: N/A

Input Power: 3.0V~3.6V

Trade Name :   MXCHIP

FCC ID: P53-EMW3165

Note: The EMW3165 Serial included two Models（EMW3165-E and EMW3165-P）.
All models have the same constructions, circuit diagram and PCB layout.
EMW3165-E used external antenna, EMW3165-P used PCB antenna.

5 FCC §2.1091 - MaximuM Permissible exposure (MPE)

Applicable Standard

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to §1.1310 and §2.1091 RF exposure is calculated.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm²)	Averaging Time (minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f²)	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
* = Plane-wave equivalent power density

Test Data

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

Where: S = power density (in appropriate units, e.g. mW/cm2)
      P = power input to the antenna (in appropriate units, e.g., mW).
      G = power gain of the antenna in the direction of interest relative to an isotropic radiator,
         the power gain factor, is normally numeric gain.
      R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

Type	Test mode	CH	Freq (MHz)	Conducted Power (dBm)	Tune Up Power (dBm)
Output power	802.11b	Low	2412	14.30	14.0±1
		Mid	2437	13.99	
		High	2462	13.76	
	802.11g	Low	2412	13.50	14.0±1
		Mid	2437	13.02	
		High	2462	14.53	
	802.11n(20M)	Low	2412	13.56	13.0±1
		Mid	2437	13.16	
		High	2462	13.21	

For the antenna manufacturer provide only used limited to ERP/EIRP or radiated spurious emission test. The MPE evaluation as below:

802.11b Mode:
The maximum peak output power (turn-up power) in low channel of WIFI is 15 dBm
Maximum peak output power (turn-up power) at antenna input terminal: 31.62 (mW)

Prediction distance: >20 (cm)
Predication frequency: 2412(MHz) lowest frequency
Antenna Gain (typical): 2 (dBi)

Antenna Gain (typical): 1.585(numeric)
The worst case is power density at predication frequency at 20 cm: 0.0100(mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0.0100 (mW/cm^2) < 1(mW/cm^2)

The maximum peak output power (turn-up power) in Middle channel of WIFI is 15 dBm
Maximum peak output power (turn-up power) at antenna input terminal: 31.62 (mW)

Prediction distance: >20 (cm)
Predication frequency: 2437(MHz) lowest frequency
Antenna Gain (typical): 2 (dBi)

Antenna Gain (typical): 1.585(numeric)
The worst case is power density at predication frequency at 20 cm: 0.0100 (mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0.0100 (mW/cm^2) < 1(mW/cm^2)

The maximum peak output power (turn-up power) in High channel of WIFI is 15dBm
Maximum peak output power (turn-up power) at antenna input terminal: 31.62 (mW)

Prediction distance: >20 (cm)
Predication frequency: 2462(MHz) lowest frequency
Antenna Gain (typical): 2 (dBi)

Antenna Gain (typical): 1.585(numeric)
The worst case is power density at predication frequency at 20 cm: 0.0100(mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0.0100 (mW/cm^2) < 1(mW/cm^2)

802.11g Mode:

The maximum peak output power (turn-up power) in low channel of WIFI is 15 dBm
Maximum peak output power (turn-up power) at antenna input terminal: 31.62 (mW)

Prediction distance: >20 (cm)
Predication frequency: 2412(MHz) lowest frequency
Antenna Gain (typical): 2 (dBi)

Antenna Gain (typical): 1.585(numeric)
The worst case is power density at predication frequency at 20 cm: 0.0100(mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0.0100 (mW/cm^2) < 1(mW/cm^2)

The maximum peak output power (turn-up power) in Middle channel of WIFI is 15 dBm
Maximum peak output power (turn-up power) at antenna input terminal: 31.62(mW)

Prediction distance: >20 (cm)
Predication frequency: 2437(MHz) lowest frequency
Antenna Gain (typical): 2 (dBi)

Antenna Gain (typical): 1.585(numeric)
The worst case is power density at predication frequency at 20 cm: 0.0100 (mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0.0100 (mW/cm^2) < 1(mW/cm^2)

The maximum peak output power (turn-up power) in High channel of WIFI is 15 dBm
Maximum peak output power (turn-up power) at antenna input terminal: 31.62 (mW)

Prediction distance: >20 (cm)
Predication frequency: 2462(MHz) lowest frequency
Antenna Gain (typical): 2 (dBi)

Antenna Gain (typical): 1.585(numeric)
The worst case is power density at predication frequency at 20 cm: 0.0100(mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0.0100 (mW/cm^2) < 1(mW/cm^2)

802.11 n(20M) Mode:

The maximum peak output power (turn-up power) in low channel of WIFI is 14.0dBm

Maximum peak output power (turn-up power) at antenna input terminal: 25.12 (mW)

Prediction distance: >20 (cm)
Predication frequency: 2412(MHz) lowest frequency
Antenna Gain (typical): 2 (dBi)

Antenna Gain (typical): 1.585(numeric)

The worst case is power density at predication frequency at 20 cm: 0.0079 (mW/cm^2)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0.0079 (mW/cm^2) < 1(mW/cm^2)

The maximum peak output power (turn-up power) in Middle channel of WIFI is 14.0 dBm

Maximum peak output power (turn-up power) at antenna input terminal: 25.12 (mW)

Prediction distance: >20 (cm)
Predication frequency: 2437(MHz) lowest frequency
Antenna Gain (typical): 2 (dBi)

Antenna Gain (typical): 1.585(numeric)

The worst case is power density at predication frequency at 20 cm: 0.0079 (mW/cm^2)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0.0079 (mW/cm^2) < 1(mW/cm^2)

The maximum peak output power (turn-up power) in High channel of WIFI is 14.0dBm

Maximum peak output power (turn-up power) at antenna input terminal: 35.48 (mW)

Prediction distance: >20 (cm)
Predication frequency: 2462(MHz) lowest frequency
Antenna Gain (typical): 2 (dBi)

Antenna Gain (typical): 1.585(numeric)

The worst case is power density at predication frequency at 20 cm: 0.0079 (mW/cm^2)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0.0079 (mW/cm^2) < 1(mW/cm^2)

Result: Pass

MXCHIP

Statement

We

MXCHIP

Of

Room 811,Tongpu Building, No.1220 Tongpu Road,Shanghai,200333

hereby state that
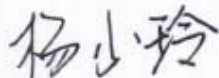
Product : WiFi module

Model Number : EMW3165

The EMW3165 Serial included two Models（EMW3165-E and EMW3165-P）.

All models have the same constructions, circuit diagram and PCB layout.

EMW3165-E used external antenna, EMW3165-P used PCB antenna.

Sincerely,

Signature:

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