

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 Test Engineer	Alex Liu Checked By	
This test report may be reproduced in full only Test result presented in this test report is applicable to the tested sample only		

Issued by:

SIEMIC (Nanjing-China) Laboratories

2-1 Longcang Avenue Yuhua Economic and
Technology Development Park, Nanjing, China

Tel: +86(25)86730128/86730129 Fax: +86(25)86730127 Email: China@siemic.com.cn

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

Test Report No.	15020044-FCC-H1
Page	3 of 11

This page has been left blank intentionally.

CONTENTS

1	REPORT REVISION HISTORY.....	5
2	CUSTOMER INFORMATION	5
3	TEST SITE INFORMATION.....	5
4	EQUIPMENT UNDER TEST (EUT) INFORMATION	6
5	FCC §2.1091 - MAXIMUM PERMISSIBLE EXPOSURE (MPE).....	7

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/cm ²)	Averaging Time (minutes)
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

* = 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/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm²)

0.0100 (mW/cm²) < 1(mW/cm²)

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/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm²)

0.0100 (mW/cm²) < 1(mW/cm²)

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/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm²)

0.0100 (mW/cm²) < 1(mW/cm²)

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/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm²)

0.0100 (mW/cm²) < 1(mW/cm²)

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/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm²)

0.0100 (mW/cm²) < 1(mW/cm²)

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/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm²)

0.0100 (mW/cm²) < 1(mW/cm²)

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/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm²)

0.0079 (mW/cm²) < 1(mW/cm²)

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/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm²)

0.0079 (mW/cm²) < 1(mW/cm²)

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/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm²)

0.0079 (mW/cm²) < 1(mW/cm²)

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

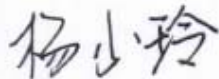
The EMW3165 Serial included two Models (EMW3165-E and EMW3165-P) .

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

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

Sincerely,

Signature:



E-mail: yangxl@mxchip.com

Phone: +86 15026681781

Fax: +86 21 52655025-880

Address: Room 811, Tongpu Building, No.1220 Tongpu Road, Shanghai, China, 200333