

# Shanghai MXCHIP Information Technology Co.,Ltd

## Embedded WiFi module

**Main Model: EMW3162**

**Serial Model: EMW3162-E,EMW3162-P**

**November 28, 2013**

**Report No.: 13020741-FCC-H1-V1**

**(This report supersedes NONE)**



**Modifications made to the product : None**

**This Test Report is Issued Under the Authority of:**

		
William Long Compliance Engineer	Alex Liu Technical Manager	

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Test result presented in this test report is applicable to the representative sample only.**

**RF Exposure Evaluation Report**

**SIEMIC, Inc.**  
Accessing global markets

To: FCC 2.1091: 2013

## Laboratory 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 through out 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	Accreditation Body	Scope
USA	FCC, A2LA	EMC , RF/Wireless , Telecom
Canada	IC, A2LA, NIST	EMC, RF/Wireless , Telecom
Taiwan	BSMI , NCC , NIST	EMC, RF, Telecom , Safety
Hong Kong	OFTA , NIST	RF/Wireless , Telecom
Australia	NATA, NIST	EMC, RF, Telecom , Safety
Korea	KCC/RRA, NIST	EMI, EMS, RF , Telecom, Safety
Japan	VCCI, JATE, TELEC, RFT	EMI, RF/Wireless, Telecom
Mexico	NOM, COFETEL, Caniety	Safety, EMC , RF/Wireless, Telecom
Europe	A2LA, NIST	EMC, RF, Telecom , Safety

### Accreditations for Product Certifications

Country/Region	Accreditation Body	Scope
USA	FCC TCB, NIST	EMC , RF , Telecom
Canada	IC FCB , NIST	EMC , RF , Telecom
Singapore	iDA, NIST	EMC , RF , Telecom
EU	NB	EMC & R&TTE Directive
Japan	MIC, (RCB 208)	RF , Telecom
Hong Kong	OFTA (US002)	RF , Telecom



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**Serial Model:** See P5  
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## **1. EXECUTIVE SUMMARY & EUT INFORMATION**

**The purpose of this test programme was to demonstrate compliance of the Shanghai MXCHIP Information Technology Co.,Ltd, Embedded WiFi module and model: EMW3162 against the current Stipulated Standards. The Embedded WiFi module has demonstrated compliance with the FCC 2.1091: 2013.**

### **EUT Information**

**EUT** : Embedded WiFi module  
**Description** :  
**Main Model** : EMW3162  
**Serial Model** : EMW3162-E,EMW3162-P  
**Antenna Gain** : PCB Antenna: 2dBi  
: IPEX antenna: 2dBi  
**Input Power** : Voltage Range: 3.0 ~ 3.6V DC  
  
**Maximum** : 802.11b:15.35dBm  
**Conducted** : 802.11g:12.37dBm  
**Peak Power to** : 802.11n:11.52 dBm  
**Antenna**  
  
**Classification** :  
**Per Stipulated** : FCC 2.1091: 2013  
**Test Standard**

Note: the EMW3162 Serial included two Models (EMW3162-E and EMW3162-P. All models have the same constructions, circuit diagram and PCB layout. EMW3162-E used external antenna, EMW3162-P used PCB antenna, like all the other.

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## 2. TECHNICAL DETAILS

<b>Purpose</b>	Compliance testing of Embedded WiFi module with stipulated standard
<b>Applicant / Client</b>	Shanghai MXCHIP Information Technology Co.,Ltd Room811,Tongpu Building,No.1220,Tongpu Road,Shanghai,China
<b>Manufacturer</b>	Shanghai MXCHIP Information Technology Co.,Ltd Room811,Tongpu Building,No.1220,Tongpu Road,Shanghai,China
<b>Laboratory performing the tests</b>	SIEMIC (Nanjing-China) Laboratories NO.2-1,Longcang Dadao, Yuhua Economic Development Zone, Nanjing, China Tel: +86(25)86730128/86730129 Fax: +86(25)86730127 Email: China@siemic.com.cn
<b>Test report reference number</b>	13020741-FCC-H1-V1
<b>Date EUT received</b>	September 11, 2013
<b>Standard applied</b>	FCC 2.1091: 2013
<b>Dates of test</b>	October 08 to November 06, 2013
<b>No of Units</b>	#1
<b>Equipment Category</b>	DTS
<b>Trade Name</b>	MXCHIP
<b>RF Operating Frequency (ies)</b>	WIFI: 802.11b/g/n: 2412-2462 MHz
<b>Number of Channels</b>	802.11b/g /n: 11CH
<b>Modulation</b>	CCK/OFDM
<b>FCC ID</b>	P53-EMW3162

### 3. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

#### 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 <sup>2</sup> )	Averaging Time (minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	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/cm<sup>2</sup>)

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)



**Note: base on different type antenna and their gain, the bellow result is the worst case.**

**802.11b:**

Maximum peak output power at antenna input terminal: 15.35(dBm)  
Maximum peak output power at antenna input terminal: 34.28 (mW)

Prediction distance: >20 (cm)  
Prediction frequency: 2412 (MHz)  
Antenna Gain (typical): 2 (dBi)  
Antenna Gain (typical): 1.585 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.011 (mW/cm<sup>2</sup>)  
MPE limit for general population exposure at prediction frequency: 1.0 (mW/cm<sup>2</sup>)

0.011(mW/cm<sup>2</sup>) < 1.0(mW/cm<sup>2</sup>)

**802.11g:**

Maximum peak output power at antenna input terminal: 12.37 (dBm)  
Maximum peak output power at antenna input terminal: 17.26 (mW)

Prediction distance: >20 (cm)  
Prediction frequency: 2412 (MHz)  
Antenna Gain (typical): 2 (dBi)  
Antenna Gain (typical): 1.585 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.005 (mW/cm<sup>2</sup>)  
MPE limit for general population exposure at prediction frequency: 1.0 (mW/cm<sup>2</sup>)

0.005(mW/cm<sup>2</sup>) < 1.0(mW/cm<sup>2</sup>)

**802.11n:**

Maximum peak output power at antenna input terminal: 11.52 (dBm)  
Maximum peak output power at antenna input terminal: 14.19 (mW)

Prediction distance: >20 (cm)  
Prediction frequency: 2412 (MHz)  
Antenna Gain (typical): 2 (dBi)  
Antenna Gain (typical): 1.585 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.004 (mW/cm<sup>2</sup>)  
MPE limit for general population exposure at prediction frequency: 1.0 (mW/cm<sup>2</sup>)

0.004 (mW/cm<sup>2</sup>) < 1.0(mW/cm<sup>2</sup>)

**Result: Pass**