

Fujian Flaircomm Microelectronics, Inc.

WiFi and BT combo module

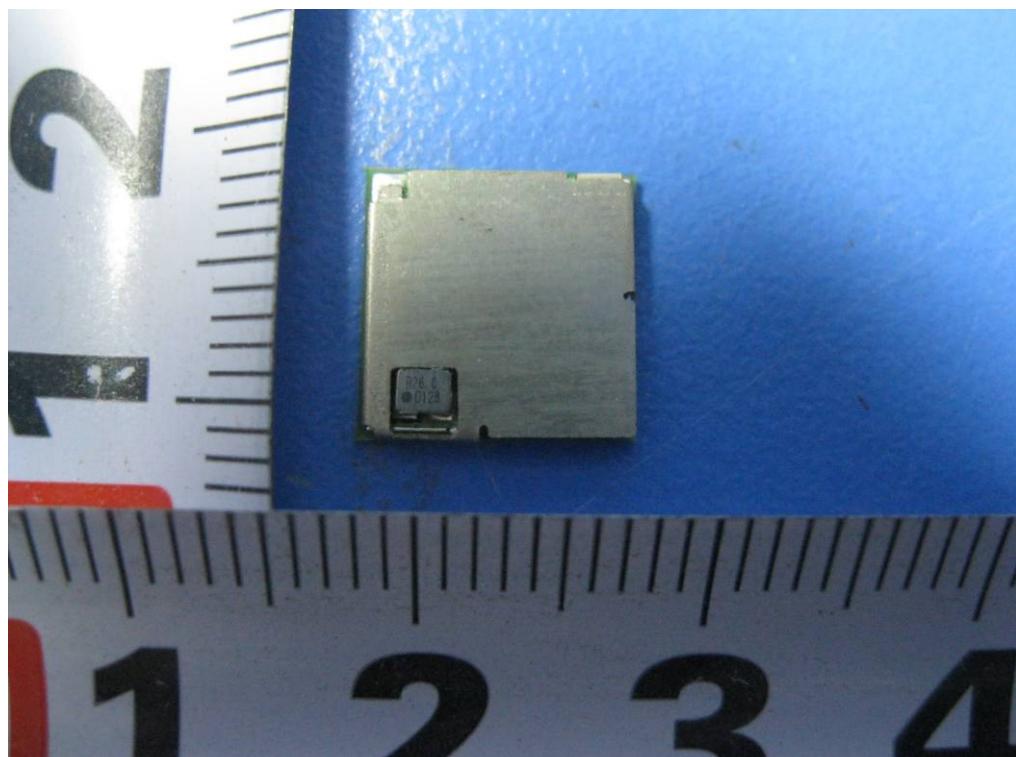
Main Model: FLC-CBM202

Serial Model: See P5

January 25, 2013

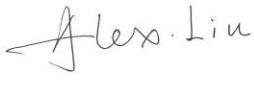
Report No.: 12021036-FCC-H1

(This report supersedes NONE)



Modifications made to the product : None

This Test Report is Issued Under the Authority of:

		
Alan Lv 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: 2012

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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1. EXECUTIVE SUMMARY & EUT INFORMATION

The purpose of this test programme was to demonstrate compliance of the Fujian Flaircomm Microelectronics, Inc. WiFi and BT combo module and model: FLC-CBM202 against the current Stipulated Standards. The WiFi and BT combo module has demonstrated compliance with the FCC 2.1091: 2012.

EUT Information

EUT : WiFi and BT combo module
Description : WiFi and BT combo module
Main Model : FLC-CBM202
Serial Model : FLC-CBM202IL2B; FLC-CBM202VL2B; FLC-CBM202CL2B
Antenna Gain : 2.8 dBi
Input Power : 1.8 ~ 3.3V DC
Maximum Conducted Peak Power to Antenna : 802.11b:18.2 dBm
802.11g:19.0 dBm
802.11n:19.2 dBm
BLE:7.00 dBm
Classification Per Stipulated Test Standard : FCC 2.1091: 2012

NOTE: in this report, we choice the model FLC-CBM202 to test, and the difference between all of them please refer to Annex E. DECLARATION OF SIMILARITY of 12021036-FCC-R2.

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2. TECHNICAL DETAILS

Purpose	Compliance testing of WiFi and BT combo module with stipulated standard
Applicant / Client	Fujian Flaircomm Microelectronics,Inc. 7F,Guomai Building,116 East JiangBin Ave,Fuzhou,Fujian,China
Manufacturer	Fujian Flaircomm Microelectronics,Inc. 7F,Guomai Building,116 East JiangBin Ave,Fuzhou,Fujian,China
Laboratory performing the tests	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:info@siemic.com
Test report reference number	12021036-FCC-H1
Date EUT received	December 12, 2012
Standard applied	FCC 2.1091: 2012
Dates of test	January 21, 2013
No of Units	#1
Equipment Category	DTS& DSS
Trade Name	N/A
RF Operating Frequency (ies)	Bluetooth & BLE: 2402-2480 MHz WIFI: 802.11b/g/n: 2412-2462 MHz
Number of Channels	Bluetooth: 79CH 802.11b/g /n: 11CH BLE: 40CH
Modulation	Bluetooth: GFSK, $\pi/4$ -DQPSK, 8DPSK DSSS/OFDM BLE: GFSK
FCC ID	P4ICBM202

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 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)

802.11b:

Maximum peak output power at antenna input terminal: 18.2 (dBm)

Maximum peak output power at antenna input terminal: 66.07 (mW)



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Prediction distance: >20 (cm)
Prediction frequency: 2412 (MHz)
Antenna Gain (typical): 2.8 (dBi)
Antenna Gain (typical): 1.905 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.025 (mW/cm²)
MPE limit for general population exposure at prediction frequency: 1.0 (mW/cm²)

0.025(mW/cm²) < 1.0(mW/cm²)

802.11g:

Maximum peak output power at antenna input terminal: 19.0 (dBm)
Maximum peak output power at antenna input terminal: 79.43 (mW)

Prediction distance: >20 (cm)
Prediction frequency: 2412 (MHz)
Antenna Gain (typical): 2.8 (dBi)
Antenna Gain (typical): 1.905 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.030 (mW/cm²)
MPE limit for general population exposure at prediction frequency: 1.0 (mW/cm²)

0.030 (mW/cm²) < 1.0(mW/cm²)

802.11n:

Maximum peak output power at antenna input terminal: 19.2 (dBm)
Maximum peak output power at antenna input terminal: 83.18 (mW)

Prediction distance: >20 (cm)
Prediction frequency: 2412 (MHz)
Antenna Gain (typical): 2.8 (dBi)
Antenna Gain (typical): 1.905 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.032 (mW/cm²)
MPE limit for general population exposure at prediction frequency: 1.0 (mW/cm²)

0.032 (mW/cm²) < 1.0(mW/cm²)

Bluetooth:

Maximum peak output power at antenna input terminal: 5.95 (dBm)
Maximum peak output power at antenna input terminal: 3.94 (mW)

Prediction distance: >20 (cm)
Prediction frequency: 2402 (MHz)
Antenna Gain (typical): 2.8 (dBi)
Antenna Gain (typical): 1.905 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.001 (mW/cm²)
MPE limit for general population exposure at prediction frequency: 1.0 (mW/cm²)

0.001 (mW/cm²) < 1.0(mW/cm²)

BLE:

Maximum peak output power at antenna input terminal: 7.00 (dBm)
Maximum peak output power at antenna input terminal: 5.01 (mW)



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Prediction distance: >20 (cm)
Prediction frequency: 2402 (MHz)
Antenna Gain (typical): 2.8 (dBi)
Antenna Gain (typical): 1.905 (numeric)

The worst case is power density at prediction frequency at 20 cm: 0.002 (mW/cm²)
MPE limit for general population exposure at prediction frequency: 1.0 (mW/cm²)

0.002 (mW/cm²) < 1.0 (mW/cm²)

BT and WIFI transmit at the same time:

BT: The worst case is power density at prediction frequency at 20 cm: **0.002** (mW/cm²)
WIFI: The worst case is power density at prediction frequency at 20 cm: **0.032** (mW/cm²)

BT+WIFI: The worst case is power density at prediction frequency at 20 cm: **0.034** (mW/cm²)

MPE limit for general population exposure at prediction frequency: 1.0 (mW/cm²)

0.034 (mW/cm²) < 1.0 (mW/cm²)

Result: Pass