

CE RF Exposure Report

Equipment : 802.11 ac/a/b/g/n + Bluetooth 4.2 module
(please refer to section 1.1.1 for more details.)

Model No. : ST60-2230C
(please refer to section 1.1.1 for more details.)

Brand Name : Laird Technologies

Applicant : Laird Technologies

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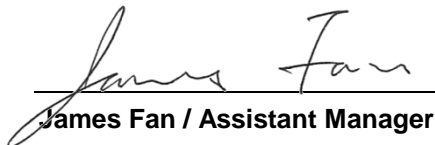
Standard : EN 62311:2008
EN 50385:2002

Received Date : Apr. 07, 2017

Tested Date : Apr. 24 ~ Jun. 09, 2017

We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by:


James Fan / Assistant Manager

Approved by:


Gary Chang / Manager



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Release Record

Report No.	Version	Description	Issued Date
EA740701	Rev. 01	Initial issue	Jul. 13, 2017
EA740701	Rev. 02	Revised model name	Jul. 24, 2017

1 General Description

1.1 Information

1.1.1 Product Details

The following models are provided to this EUT.

Brand Name	Model Name	Product Name	Description	
Laird Technologies	ST60-SIPT	802.11 ac/a/b/g/n + Bluetooth 4.2 module	SIPT only	For marketing purpose
	SU60-SIPT			
	ST60-2230C	802.11 ac/a/b/g/n M.2 2230 + Bluetooth 4.2 module	with carrier board	
	SU60-2230C			
† The above models, model ST60-2230C was selected as a representative one for the final test and only its data was recorded in this report.				

1.1.2 Specification of the Equipment under Test (EUT)

WLAN	
Operating Frequency	802.11b/g/n: 2412 MHz ~ 2472 MHz 802.11a/n/ac: 5180 MHz ~ 5240 MHz; 5260 MHz ~ 5320 MHz; 5500 MHz ~ 5700 MHz
Modulation Type	802.11b: DSSS (DBPSK / DQPSK / CCK) 802.11a/g/n/ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
BT	
Operating Frequency	2402 MHz ~ 2480 MHz
Modulation Type	Bluetooth 4.2 LE: GFSK Bluetooth BR(1Mbps): GFSK Bluetooth EDR (2Mbps): $\pi/4$ -DQPSK Bluetooth EDR (3Mbps): 8-DPSK

1.1.3 Antenna Details

Ant. No.	Model	Type	Connector	Operating Frequencies (MHz) / Antenna Gain (dBi)				
				2400~2483.5	5150~5250	5250~5350	5470~5725	5725~5850
1	LSR/001-0009	Dipole	IPEX U.FL	2	2	2	2	2
2	Laird NanoBlade-IP04	PCB Dipole	IPEX U.FL	2	3.9	3.9	4	4
3	Laird MAF95310 Mini NanoBlade Flex	PCB Dipole	IPEX U.FL	2.79	3.38	3.38	3.38	3.38
4	LSR/FlexPIFA 001-0016	PIFA	IPEX U.FL	2.5	3	3	3	3
5	Ethertronics WLAN_1000146	Isolated Magnetic Dipole	IPEX U.FL	2.5	3.5	3.5	3.5	3.5

1.1.4 EUT Operational Condition

Power Supply Type	DC 3.3V from host
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2 RF exposure evaluation

2.1 Scope

The object of this standard is to demonstrate the compliance of such product with the basic restrictions (directly or indirectly via compliance with reference levels) related to general public exposure to radio frequency electromagnetic fields.

2.2 Normative References

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 50383, Basic standard for the calculation and measurement of human exposure to electromagnetic fields from radio base stations and fixed terminal stations for wireless telecommunication systems (110 MHz – 40 GHz).

IEC 60050-161, International Electrotechnical Vocabulary – Chapter 161: Electromagnetic compatibility.

Council Recommendation 1999/519/EC of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz) (Official Journal L 199 of 30 July 1999).

2.3 Conditions for Calculation and Measurement

The station shall be operating in accordance with the manufacturer's specification. Calculations and/or measurements on base stations intended for use with external antennas shall be performed for at least one typical system configuration consisting of a combination of the base station and an antenna system representative of the intended final use.

2.4 Limits

The device shall comply with the relevant limits for general public exposure specified as basic restrictions or reference levels in the Council Recommendation 1999/519/EC as below table.

Reference levels for electric, magnetic and electromagnetic fields
(0 Hz to 300 GHz, unperturbed rms values)

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (μ T)	Equivalent plane wave power density S_{eq} (W/m ²)
0-1 Hz	—	$3,2 \times 10^4$	4×10^4	—
1-8 Hz	10 000	$3,2 \times 10^4/f^2$	$4 \times 10^4/f^2$	—
8-25 Hz	10 000	$4\,000/f$	$5\,000/f$	—
0,025-0,8 kHz	$250/f$	$4/f$	$5/f$	—
0,8-3 kHz	$250/f$	5	6,25	—
3-150 kHz	87	5	6,25	—
0,15-1 MHz	87	$0,73/f$	$0,92/f$	—
1-10 MHz	$87/f^{1/2}$	$0,73/f$	$0,92/f$	—
10-400 MHz	28	0,073	0,092	2
400-2 000 MHz	$1,375 f^{1/2}$	$0,0037 f^{1/2}$	$0,0046 f^{1/2}$	$f/200$
2-300 GHz	61	0,16	0,20	10

Notes:

1. f as indicated in the frequency range column.
2. For frequencies between 100 kHz and 10 GHz, S_{eq} , E^2 , H^2 , and B^2 are to be averaged over any six-minute period.
3. For frequencies exceeding 10 GHz, S_{eq} , E^2 , H^2 , and B^2 are to be averaged over any $68/f^{1.05}$ -minute period (f in GHz).
4. No E-field value is provided for frequencies < 1 Hz, which are effectively static electric fields. For most people the annoying perception of surface electric charges will not occur at field strengths less than 25 kV/m. Spark discharges causing stress or annoyance should be avoided.

2.5 Evaluation Formula for Far-Field

Follow below formula to evaluate E-field strength.

$$E = \frac{\sqrt{30 * P * G}}{R}$$

Where

P(W) is the input power of antenna

G is the gain of antenna

R(m) Is the distance between the human body and the antenna

2.6 Evaluation Results

Frequency Range (MHz)	Maximum E.I.R.P. (dBm)	Distance (m)	Evaluation E-Field Strength (V/m)	Limit (V/m)	PASS / FAIL
2402-2480 BR	14.81	0.2	4.76	61	Pass
2402-2480 LE	9.85	0.2	2.69	61	Pass
2412-2472	19.86	0.2	8.52	61	Pass
5180-5240	22.87	0.2	12.05	61	Pass
5260-5320	22.76	0.2	11.90	61	Pass
5500-5700	22.89	0.2	12.08	61	Pass

3 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corp (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website <http://www.icertifi.com.tw>.

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