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CE RF Exposure Report

Equipment	:	**45 Series WB module with Bluetooth**
Model No.	:	**WB45NBT**
Brand Name	:	**Laird Technologies**
Applicant	:	**Laird Technologies**
Address	:	**11160 Thompson Ave. / Lenexa, Kansas / 66219 / USA**
Standard	:	**EN 62311:2008**
Received Date	:	**May 03, 2013**
Tested Date	:	**May 15 ~ Jul. 15, 2013**

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.

Approved & Reviewed by:

Gary Chang / Manager

Testing Laboratory
2732

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Release Record

Report No.	Version	Description	Issued Date
EA350301	Rev. 01	Initial issue	Aug. 20, 2013

1 General Description

1.1 Information

1.1.1 Specification of the Equipment under Test (EUT)

WLAN	
Operating Frequency	802.11b/g/n: 2412 MHz ~ 2472 MHz 802.11a/n: 5180 MHz ~ 5240 MHz; 5260 MHz ~ 5320 MHz; 5500 MHz ~ 5700 MHz
Antenna Type	Refer to section 1.1.2
Modulaton Type	802.11b: DSSS (DBPSK / DQPSK / CCK) 802.11a/g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
BT	
Operating Frequency	2402 MHz ~ 2480 MHz
Antenna Type	Refer to section 1.1.2
Modulaton Type	GFSK / π/4-DQPSK / 8DPSK

1.1.2 Antenna Details

Ant. No.	Model	Type	Connector	Operating Frequencies (MHz) / Antenna Gain (dBi)			
				2400~2483.5	5150~5250	5250~5350	5470~5725
1	MAG.LAYERS EDA-1513-25GR 2-B2-CY	Dipole	SMA Jack Reverse	2	2	2	2
2	MAG.LAYERS PCA-4606-2G4C 1-A13-CY	PCB Dipole	UFL	2.21	2.21	2.21	2.21
3	Larid NanoBlade-IP04	PCB Dipole	UFL	2	3.9	3.9	4
4	Larid MAF95310 Mini NanoBlade Flex	PCB Dipole	UFL	2.79	3.38	3.38	3.38
5	Laird NanoBlue-IP04	PCB Dipole	UFL	2	---	---	---
6	Ethertronics WLAN_1000146	PIFA	UFL	2.5	3.5	3.5	3.5

1.1.3 EUT Operational Condition

Supply Voltage	☐ AC mains	☒ DC (3.3 & 1.8Vdc)	
Type of DC Source	☐ Internal DC supply	☐ External DC adapter	☒ From Host
Operational Voltage (1.8Vdc)	☒ Vnom (1.8 V)	☒ Vmax (1.89 V)	☒ Vmin (1.7 V)
Operational Voltage (3.3Vdc)	☒ Vnom (3.3 V)	☒ Vmax (3.46 V)	☒ Vmin (3.14 V)
Operational Climatic	☒ Tnom (20°C)	☒ Tmax (70°C)	☒ Tmin (-10°C)

2 RF exposure evaluation

2.1 Scope

This International Standard applies to electronic and electrical equipment for which no dedicated product- or product family standard regarding human exposure to electromagnetic fields applies. The frequency range covered is 0 Hz to 300 GHz.

The object of this generic standard is to provide assessment methods and criteria to evaluate such equipment against basic restrictions or reference levels on exposure of the general public related to electric, magnetic and electromagnetic fields and induced and contact current

2.2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies

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 197 of 30 July 1999).

2.3 Compliance Criteria

The electronic and electrotechnical apparatus shall comply with the basic restriction as specified in Annex III of Council Recommendation 1999/519/EC.

The reference levels in the Council Recommendation 1999/519/EC on public exposure to electromagnetic fields are derived from the basic restrictions using worst-case assumptions about exposure. If the reference levels are met, then the basic restrictions will be complied with, but if the reference levels are exceeded, that does not necessarily mean that the basic restrictions will not be met. In some situations, it will be necessary to show compliance with the basic restrictions directly, but it may also be possible to derive compliance criteria that allow a simple measurement or calculation to demonstrate compliance with the basic restriction. Often these compliance criteria can be derived using realistic assumptions about conditions under which exposures from a device may occur, rather than the conservative assumptions that underly the reference levels.

2.4 Limits

The base station 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 (μT)	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

Mode	Frequency band (MHz)	Maximum E.I.R.P. (dBm)	Evaluation E-Field Strength (V/m)	Limit (V/m)
WLAN 2.4G	2412-2472	19.88	8.54	61
WLAN 5G	5150-5350	20.78	9.47	61
WLAN 5G	5470-5725	21.82	10.68	61
BT EDR	2402-2480	9.95	2.72	61
BT LE	2402-2480	9.98	2.73	61

END