

AS/NZS RF Exposure Report

Equipment : 802.11ac Professional Wi-Fi + BT5.0 Module
Model No. : SU60-SOMC (453-00003),
SU60-SOMC-2G (453-00004)
(please refer to section 1.1.1 for more details.)
Brand Name : Laird
Applicant : Laird Technologies
Address : W66N220 Commerce Court, Cedarburg,
Wisconsin 53012, USA
Standard : AS/NZS 2772.2:2011
Radiation Protection Standard for Maximum
Exposure Levels to Radiofrequency Fields
- 3 kHz to 300 GHz
Received Date : Apr. 11, 2018
Tested Date : Sep. 18 ~ Oct. 03, 2018

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 |
|------------|---------|---------------|---------------|
| AA841101 | Rev. 01 | Initial issue | Dec. 21, 2018 |

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 | SU60-SOMC (453-00003) | 802.11ac Professional Wi-Fi + BT5.0 Module | 2G/1G MCP |
| | SU60-SOMC-2G (453-00004) | | 4G/2G MCP |
| ✦ The above models, both options were assessed and SU60-SOMC-2G (453-00004) was found to be worst case and was selected for the final testing. | | | |

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; 5745 ~ 5825 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

For WLAN

| Brand | Model | Type | Connector | Operating Frequency (MHz) / Gain (dBi) | | | | | |
|--------------|------------------------------|-----------------|-----------|--|-----------|-----------|-----------|-----------|--|
| | | | | 2400~2483.5 | 5150~5250 | 5250~5350 | 5470~5725 | 5725~5850 | |
| LSR | 001-0009 | Dipole | IPEX U.FL | 2 | 2 | | | | |
| Laird | NanoBlade-IP04 | PCB Dipole | IPEX U.FL | 2 | 3.9 | 3.9 | 4 | | |
| Laird | MAF95310 Mini NanoBlade Flex | PCB Dipole | IPEX U.FL | 2.79 | 3.38 | | | | |
| LSR | FlexPIFA 001-0016 | PIFA | IPEX U.FL | 2.5 | 3 | | | | |
| Ethertronics | WLAN_1000146 | Magnetic Dipole | IPEX U.FL | 2.5 | 3.5 | | | | |
| Laird | MIMO FlexPIFA Antenna | PIFA | IPEX U.FL | 2 | 3 | | | | |
| LSR | 001-0009 (with filter) | Dipole | IPEX U.FL | 2 | 2 | | | | |

For Bluetooth

| Brand | Model | Type | Connector | Gain (dBi) |
|--------------|------------------------------|-----------------|-----------|------------|
| LSR | 001-0009 | Dipole | IPEX U.FL | 2 |
| Laird | NanoBlade-IP04 | PCB Dipole | IPEX U.FL | 2 |
| Laird | MAF95310 Mini NanoBlade Flex | PCB Dipole | IPEX U.FL | 2.79 |
| LSR | FlexPIFA 001-0016 | PIFA | IPEX U.FL | 2.5 |
| Ethertronics | WLAN_1000146 | Magnetic Dipole | IPEX U.FL | 2.5 |
| Laird | MIMO FlexPIFA Antenna | PIFA | IPEX U.FL | 2 |
| LSR | 001-0009 (with filter) | Dipole | IPEX U.FL | 2 |

1.1.4 EUT Operational Condition

| | |
|-------------------|------------------|
| Power Supply Type | 3.3Vdc from host |
|-------------------|------------------|

2 RF exposure evaluation

2.1 Scope

This Standard specifies requirements for, and provides guidance on, assessing compliance with the exposure limits of radio frequency (RF) safety standards such as ARPANSA Standard RPS3 or New Zealand Standard NZS 2772.1. This includes methodologies for making an assessment (by measurement or computation) of human exposure to ambient RF fields and induced body currents in the frequency range of 3 kHz to 300 GHz.

This Standard also sets out processes for calculating the basic restrictions quantities (such as specific absorption rate and induced current density) in the relevant standards, but does not address their measurement.

This Standard may also be used as a guide for making low-level environmental exposure assessments in areas around RF sources, or for other purposes. This Standard provides appropriate methodologies, including measurement techniques and instrumentation selection, computational techniques and the determination of assessment uncertainty and its use in assessing compliance with applicable exposure limits. The assessment methodologies provided in this Standard may be applied for all types of RF exposure situations including exposure to—

- (a) leakage fields;
- (b) radiated fields; and
- (c) reactive fields.

This Standard is applicable to the compliance assessment of RF exposures from most kinds of RF sources including—

- (i) broadcast installations;
- (ii) cellular base stations;
- (iii) radio-communications facilities;
- (iv) radar installations;
- (v) medical applications such as diathermy machines;
- (vi) industrial applications, including RF welders, heaters and induction heaters; and
- (vii) scientific applications.

2.2 Limits

The device shall comply with the relevant limits as below table.

| Exposure category | Frequency Range | E-field strength (V/m) | H-field strength (A/m) | Equivalent plane wave power flux density $S_{eq}(W/m^2)$ |
|-------------------|-----------------|------------------------|------------------------|--|
| Occupational | 400 MHz~2GHz | $3.07 * f^{0.5}$ | $0.00814 * f^{0.5}$ | $f / 40$ |
| | 2GHz ~ 300 GHz | 137 | 0.364 | 50 |
| General public | 400 MHz~2GHz | $1.37 * f^{0.5}$ | $0.00364 * f^{0.5}$ | $f / 200$ |
| | 2GHz ~ 300 GHz | 61.4 | 0.163 | 10 |

Note: f is the frequency in MHz

2.3 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

2.4 Evaluation Results

| Mode | Frequency Range (MHz) | Maximum E.I.R.P. (dBm) | Distance (m) | Evaluation E-Field Strength (V/m) | Limit (V/m) | PASS / FAIL |
|--------|-----------------------|------------------------|--------------|-----------------------------------|-------------|-------------|
| BT LE | 2402-2480 | 9.98 | 0.20 | 2.73 | 61 | Pass |
| BT EDR | 2402-2480 | 12.50 | 0.20 | 3.65 | 61 | Pass |
| Wi-Fi | 2412-2472 | 19.09 | 0.20 | 7.80 | 61 | Pass |
| | 5180-5240 | 21.94 | 0.20 | 10.83 | 61 | Pass |
| | 5260-5320 | 21.81 | 0.20 | 10.67 | 61 | Pass |
| | 5500-5700 | 22.05 | 0.20 | 10.97 | 61 | Pass |
| | 5745-5825 | 21.30 | 0.20 | 10.06 | 61.4 | 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>.

Linkou

Tel: 886-2-2601-1640

No. 30-2, Ding Fwu Tsuen, Lin
Kou District, New Taipei City,
Taiwan, R.O.C.

Kwei Shan

Tel: 886-3-271-8666

No. 3-1, Lane 6, Wen San 3rd St.,
Kwei Shan District, Tao Yuan City
333, Taiwan, R.O.C.

Kwei Shan Site II

Tel: 886-3-271-8640

No. 14-1, Lane 19, Wen San 3rd
St., Kwei Shan District, Tao Yuan
City 333, Taiwan, R.O.C..

If you have any suggestion, please feel free to contact us as below information

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