

# RF Exposure Evaluation Report

**Equipment** : Control and Automation Controller CA-1  
**Brand Name** : Control4  
**Model No.** : C4-CA1  
**FCC ID** : R33C4CA1  
**Standard** : 47 CFR Part 2.1091  
**Applicant** : Control4  
11734 S. Election Road Draper, UT 84020  
**Manufacturer** : Lite-On Network Communication (Dongguan) Limited  
30#Keji Rd., Yin Hu Industrial Area, Qingxi Town,  
DongGuan City, Guangdong, China 523648

The product sample received on Aug. 08, 2017 and completely tested on Sep. 11, 2017. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with 47 CFR Part 2.1091, and pass the limit.

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Kevin Liang  
SPORTON INTERNATIONAL INC.



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## REVISION HISTORY

[illegible]

# 1 General Description

## 1.1 EUT General Information

| RF General Information |                       |                           |                                   |
|------------------------|-----------------------|---------------------------|-----------------------------------|
| Evaluation Mode        | Frequency Range (MHz) | Operating Frequency (MHz) | Modulation Type                   |
| 2.4GHz WLAN            | 2400-2483.5           | 2412-2462                 | 802.11b: DSSS (DBPSK, DQPSK, CCK) |
| Bluetooth              | 2400-2483.5           | 2402-2480                 | LE: DSSS (GFSK)                   |
| ZigBee                 | 2400-2483.5           | 2405-2475                 | DSSS (O-QPSK)                     |

## 1.2 Testing Location

| Testing Location                           |        |                                                                              |                      |
|--------------------------------------------|--------|------------------------------------------------------------------------------|----------------------|
| <input checked="" type="checkbox"/>        | HWA YA | ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)    |                      |
|                                            |        | TEL : 886-3-327-3456                                                         | FAX : 886-3-327-0973 |
| Test site Designation No. TW1190 with FCC. |        |                                                                              |                      |
| <input type="checkbox"/>                   | JHUBEI | ADD : No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County, Taiwan (R.O.C.) |                      |
|                                            |        | TEL : 886-3-656-9065                                                         | FAX : 886-3-656-9085 |
| Test site Designation No. TW0006 with FCC. |        |                                                                              |                      |

## 2 Maximum Permissible Exposure

### 2.1 Limit of Maximum Permissible Exposure

(A) Limits for Occupational / Controlled Exposure

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/ cm <sup>2</sup> ) | Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|------------------------------------------|------------------------------------------------------------------|
| 0.3-3.0               | 614                               | 1.63                              | (100)*                                   | 6                                                                |
| 3.0-30                | 1842 / f                          | 4.89 / f                          | (900 / f <sup>2</sup> )*                 | 6                                                                |
| 30-300                | 61.4                              | 0.163                             | 1.0                                      | 6                                                                |
| 300-1500              | -                                 | -                                 | F/300                                    | 6                                                                |
| 1500-100,000          | -                                 | -                                 | 5                                        | 6                                                                |

(B) Limits for General Population / Uncontrolled Exposure

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/ cm <sup>2</sup> ) | Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (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                                                               |

Note: f = frequency in MHz ; \*Plane-wave equivalent power density

### 2.2 MPE Calculation Method

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

**E** = Electric field (V/m)

**P** = RF output power (W)

**G** = EUT Antenna numeric gain (numeric)

**d** = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$



## 2.3 Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

| Mode             | DG<br>(dBi) | Power<br>(dBm) | EIRP<br>(dBm) | EIRP<br>(W) | Distance<br>(cm) | S<br>(mW/cm <sup>2</sup> ) | S Limit<br>(mW/cm <sup>2</sup> ) | Ratio<br>(S/Limit) |
|------------------|-------------|----------------|---------------|-------------|------------------|----------------------------|----------------------------------|--------------------|
| 2.4G;G1D(Zigbee) | 2.00        | 22.02          | 24.02         | 0.25235     | 20               | 0.05020                    | 1.00000                          | 0.05020            |
| 2.4G;BT-LE       | 1.45        | 5.09           | 6.54          | 0.00451     | 20               | 0.00090                    | 1.00000                          | 0.00090            |
| 2.4G;G1D(11b)    | 1.45        | 16.45          | 17.90         | 0.06166     | 20               | 0.01227                    | 1.00000                          | 0.01227            |
|                  |             |                |               |             |                  |                            | Sum Ratio                        | 0.06337            |
|                  |             |                |               |             |                  |                            | Ratio Limit                      | 1                  |