

# RF Exposure Evaluation Report

**Equipment** : Internet of Things Gateway  
**Brand Name** : DELL  
**Model No.** : N03G001  
**FCC ID** : E2K-N03G001  
**Standard** : 47 CFR Part 2.1091  
**Applicant/  
Manufacturer** : Dell Inc.  
One Dell Way, Round Rock, Texas 78682, USA

The product sample received on Jan. 26, 2017 and completely tested on May 03, 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.

Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

  
\_\_\_\_\_  
**Jordan Hsiao**  
SPORTON INTERNATIONAL INC.





## **TABLE OF CONTENTS**

|          |                                             |          |
|----------|---------------------------------------------|----------|
| <b>1</b> | <b>GENERAL DESCRIPTION .....</b>            | <b>4</b> |
| 1.1      | EUT General Information .....               | 4        |
| 1.2      | Testing Location .....                      | 4        |
| <b>2</b> | <b>MAXIMUM PERMISSIBLE EXPOSURE .....</b>   | <b>5</b> |
| 2.1      | Limit of Maximum Permissible Exposure ..... | 5        |
| 2.2      | MPE Calculation Method .....                | 5        |
| 2.3      | Calculated Result and Limit.....            | 6        |

### **PHOTOGRAPHS OF EUT v01**

[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           | 2412-2472                 | 802.11b: DSSS (DBPSK, DQPSK, CCK)<br>802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) |
| Bluetooth              | 2400-2483.5           | 2402-2480                 | BR / EDR: FHSS (GFSK)<br>LE: DSSS (GFSK)                                        |

## 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.)<br>TEL : 886-3-327-3456 FAX : 886-3-327-0973    |
| <input type="checkbox"/>            | JHUBEI | ADD : No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County, Taiwan (R.O.C.)<br>TEL : 886-3-656-9065 FAX : 886-3-656-9085 |

## 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)*                               | 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)*                                 | 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   | 1.30        | 13.78          | 15.08         | 0.03221     | 20               | 0.00641                    | 1.00000                          | 0.00641            |
| 2.4G;BT-BR | 1.30        | 12.91          | 14.21         | 0.02636     | 20               | 0.00524                    | 1.00000                          | 0.00524            |