# RF Exposure Report

**Report No.:** SA170503E08

**FCC ID:** 2AHKM-CODA4589

**Test Model:** CODA-4589

**Received Date:** May 03, 2017

**Test Date:** June 23, 2017

**Issued Date:** June 23, 2017

**Applicant:** HitronTechnologies

**Address:** NO. 1-8, LISING 1ST RD., HSINCHU SCIENCE PARK, HSINCHU, 300, TAIWAN.

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory

**Lab Address:** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.

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**Release Control Record**

| Issue No. | Description | Date Issued |
|---|---|---|
| SA170503E08 | Original release. | June 23, 2017 |

# 1    Certificate of Conformity

**Product:** DOCSIS 3.1 WiFi Emta

**Brand:** Hitron

**Test Model:** CODA-4589

**Sample Status:** ENGINEERING SAMPLE

**Applicant:** HitronTechnologies

**Test Date:** June 23, 2017

**Standards:** FCC Part 2 (Section 2.1091)

KDB 447498 D01 General RF Exposure Guidance v06

IEEE C95.1-1992

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**Prepared by :**  _Cindy Hsin_  ,  **Date:** June 23, 2017

Cindy Hsin / Specialist

**Approved by :**  ,  **Date:** June 23, 2017

May Chen / Manager

## 2   RF Exposure

### 2.1   Limits For Maximum Permissible Exposure (MPE)

| Frequency Range (MHz) | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm$^2$) | Average Time (minutes) |
|---|---|---|---|---|
| Limits For General Population / Uncontrolled Exposure | | | | |
| 0.3-1.34 | 614 | 1.63 | (100)* | 30 |
| 1.34-30 | 824/f | 2.19/f | (180/f$^2$)* | 30 |
| 30-300 | 27.5 | 0.073 | 0.2 | 30 |
| 300-1500 | … | … | f/1500 | 30 |
| 1500-100,000 | … | … | 1.0 | 30 |

f = Frequency in MHz ; *Plane-wave equivalent power density

### 2.2   MPE Calculation Formula

$Pd = (Pout*G) / (4*pi*r^2)$

where

Pd = power density in mW/cm$^2$

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

### 2.3   Classification

The antenna of this product, under normal use condition, is at least 40cm away from the body of the user. So, this device is classified as **Mobile Device**.

### 2.4   Antenna Gain

| Antenna Set. | Transmitter Circuit | Brand | Model | Antenna Net. Gain(dBi) | Frequency range (GHz) | Antenna Type | Connecter Type | Cable Length |
|---|---|---|---|---|---|---|---|---|
| A1 | Chain (2) | AirGain | M2420SL0 | 3.69 | 2.4~2.4835 | Dipole | i-pex(MHF) | 50 |
| A2 | Chain (0) | AirGain | M2410CM | 3.23 | 2.4~2.4835 | Dipole | i-pex(MHF) | 115 |
| A3 | Chain (1) | AirGain | M2420SL0 | 4.28 | 2.4~2.4835 | Dipole | i-pex(MHF) | 85 |
| A4 | Chain (2) | AirGain | M5X05C | 4.51 | 5.15~5.85 | Dipole | i-pex(MHF) | 120 |
| A5 | Chain (1) | AirGain | M5X05C | 6.1 | 5.15~5.85 | Dipole | i-pex(MHF) | 110 |
| A6 | Chain (0) | AirGain | M5X05C | 4.94 | 5.15~5.85 | Dipole | i-pex(MHF) | 40 |
| A7 | Chain (3) | AirGain | M5X05C | 4.83 | 5.15~5.85 | Dipole | i-pex(MHF) | 60 |

## 2.5 Calculation Result of Maximum Conducted Power

| Frequency (MHz) | Max Power (mW) | Antenna Gain (dBi) | Distance (cm) | Power Density (mW/cm$^2$) | Limit (mW/cm$^2$) |
|---|---|---|---|---|---|
| 2412-2462 | 628.703 | 8.52 | 40 | 0.22239 | 1 |
| 5180-5240 | 548.147 | 11.14 | 40 | 0.35446 | 1 |
| 5745-5825 | 965.11 | 11.14 | 40 | 0.62409 | 1 |

NOTE:

2.4GHz: $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 8.52$dBi

5.GHz:

UNII-1 & UNII-3 Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 11.14$dBi

**Conclusion:**

The formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1

CPD = Calculation power density

LPD = Limit of power density

WLAN 2.4GHz + WLAN 5GHz = 0.22239/1 + 0.62409/1 = 0.84648

**Therefore the maximum calculations of above situations are less than the "1" limit.**

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