# RF EXPOSURE REPORT

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|---|---|
| **REPORT NO.:** | SA110714C16 |
| **MODEL NO.:** | E4200 V2 |
| **FCC ID:** | Q87-E4200V2 |

| | |
|---|---|
| **APPLICANT:** | Cisco Consumer Products LLC |
| **ADDRESS:** | 121 Theory Drive Irvine California 92617 United States |

| | |
|---|---|
| **ISSUED BY:** | Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory |
| **LAB ADDRESS:** | No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan |

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# RELEASE CONTROL RECORD

| ISSUE NO. | REASON FOR CHANGE | DATE ISSUED |
|---|---|---|
| SA110714C16 | Original release | Sep. 09, 2011 |

# 1. CERTIFICATION

**PRODUCT:** 802.11 a/b/g/n AP

**MODEL:** E4200 V2

**BRAND:** Cisco

**APPLICANT:** Cisco Consumer Products LLC

**TEST SAMPLE:** ENGINEERING SAMPLE

**STANDARDS:** FCC Part 2 (Section 2.1091)
FCC OET Bulletin 65, Supplement C (01-01)
IEEE C95.1

The above equipment (Model: E4200 V2) 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** : Phoenix Huang, **DATE:** Sep. 09, 2011
( Phoenix Huang, Specialist )

**APPROVED BY** : , **DATE:** Sep. 09, 2011
( May Chen, Deputy Manager )

## 2. RF EXPOSURE LIMIT

### 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** | | | | |
| 300-1500 | … | … | F/1500 | 30 |
| 1500-100,000 | … | … | 1.0 | 30 |

F = Frequency in MHz

## 3. 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

## 4. CLASSIFICATION

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. So, this device is classified as **Mobile Device**.

## 5. ANTENNA GAIN

There are six antennas provided to this EUT, please refer to the following table:

| **For 2.4GHz** | | | | |
|---|---|---|---|---|
| Transmitter Circuit | Freq.(MHz) | Peak Gain (dBi) | Antenna Type | Connecter Type |
| Chain (0) | 2400 | 3.31 | PIFA | UFL |
| | 2450 | 2.27 | PIFA | UFL |
| | 2500 | 2.27 | PIFA | UFL |
| Chain (1) | 2400 | 3.45 | PIFA | UFL |
| | 2450 | 2.99 | PIFA | UFL |
| | 2500 | 2.81 | PIFA | UFL |
| Chain (2) | 2400 | 1.82 | PIFA | UFL |
| | 2450 | 1.96 | PIFA | UFL |
| | 2500 | 1.85 | PIFA | UFL |
| **For 5GHz** | | | | |
| Transmitter Circuit | Freq.(MHz) | Peak Gain (dBi) | Antenna Type | Connecter Type |
| Chain (0) | 5150 | 3.71 | PIFA | UFL |
| | 5350 | 3.05 | PIFA | UFL |
| | 5600 | 3.00 | PIFA | UFL |
| | 5730 | 3.39 | PIFA | UFL |
| | 5850 | 3.62 | PIFA | UFL |
| Chain (1) | 5150 | 3.28 | PIFA | UFL |
| | 5350 | 3.60 | PIFA | UFL |
| | 5600 | 3.29 | PIFA | UFL |
| | 5730 | 2.95 | PIFA | UFL |
| | 5850 | 2.65 | PIFA | UFL |
| Chain (2) | 5150 | 3.71 | PIFA | UFL |
| | 5350 | 3.40 | PIFA | UFL |
| | 5600 | 3.71 | PIFA | UFL |
| | 5730 | 4.27 | PIFA | UFL |
| | 5850 | 3.91 | PIFA | UFL |

The EUT incorporates CDD function with 802.11a, 802.11b, 802.11g.

## 6. CALCULATION RESULT OF MAXIMUM CONDUCTED POWER

### For 15.247(2.4GHz):

### 802.11b:

| FREQUENCY BAND (MHz) | MAX POWER (mW) | ANTENNA GAIN (dBi) | DISTANCE (cm) | POWER DENSITY (mW/ $cm^2$) | LIMIT (mW/$cm^2$) |
|---|---|---|---|---|---|
| 2412-2462 | 314.3 | 7.7 | 20 | 0.368 | 1.00 |

Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + $10^{G3/20}$)$^2$ / 3]

Effective Legacy Gain (dBi) = 7.7

### 802.11g:

| FREQUENCY BAND (MHz) | MAX POWER (mW) | ANTENNA GAIN (dBi) | DISTANCE (cm) | POWER DENSITY (mW/ $cm^2$) | LIMIT (mW/$cm^2$) |
|---|---|---|---|---|---|
| 2412-2462 | 314.9 | 7.7 | 20 | 0.369 | 1.00 |

Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + $10^{G3/20}$)$^2$ / 3]

Effective Legacy Gain (dBi) = 7.7

### 802.11n(20MHz):

| FREQUENCY BAND (MHz) | MAX POWER (mW) | ANTENNA GAIN (dBi) | DISTANCE (cm) | POWER DENSITY (mW/ $cm^2$) | LIMIT (mW/$cm^2$) |
|---|---|---|---|---|---|
| 2412-2462 | 682.2 | 3.5 | 20 | 0.304 | 1.00 |

### 802.11n(40MHz):

| FREQUENCY BAND (MHz) | MAX POWER (mW) | ANTENNA GAIN (dBi) | DISTANCE (cm) | POWER DENSITY (mW/ $cm^2$) | LIMIT (mW/$cm^2$) |
|---|---|---|---|---|---|
| 2422-2452 | 171.4 | 3.5 | 20 | 0.076 | 1.00 |

## For 15.247(5GHz):

### 802.11a:

| FREQUENCY BAND (MHz) | MAX POWER (mW) | ANTENNA GAIN (dBi) | DISTANCE (cm) | POWER DENSITY (mW/ $cm^2$) | LIMIT (mW/$cm^2$) |
|---|---|---|---|---|---|
| 5745 ~ 5825 | 434.6 | 8.4 | 20 | 0.598 | 1.00 |

Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + $10^{G3/20}$)$^2$ / 3]

Effective Legacy Gain (dBi) = 8.4

### 802.11n(20MHz):

| FREQUENCY BAND (MHz) | MAX POWER (mW) | ANTENNA GAIN (dBi) | DISTANCE (cm) | POWER DENSITY (mW/ $cm^2$) | LIMIT (mW/$cm^2$) |
|---|---|---|---|---|---|
| 5745 ~ 5825 | 431.0 | 4.3 | 20 | 0.231 | 1.00 |

### 802.11n(40MHz):

| FREQUENCY BAND (MHz) | MAX POWER (mW) | ANTENNA GAIN (dBi) | DISTANCE (cm) | POWER DENSITY (mW/ $cm^2$) | LIMIT (mW/$cm^2$) |
|---|---|---|---|---|---|
| 5755 ~ 5795 | 464.6 | 4.3 | 20 | 0.249 | 1.00 |

## For 15.407(5GHz):

### 802.11a:

| FREQUENCY BAND (MHz) | MAX POWER (mW) | ANTENNA GAIN (dBi) | DISTANCE (cm) | POWER DENSITY (mW/ $cm^2$) | LIMIT (mW/$cm^2$) |
|---|---|---|---|---|---|
| 5180 ~ 5240 | 24.6 | 6.7 | 20 | 0.023 | 1.00 |

Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$)$^2$ / 2]

Effective Legacy Gain (dBi) = 6.7

### 802.11n(20MHz):

| FREQUENCY BAND (MHz) | MAX POWER (mW) | ANTENNA GAIN (dBi) | DISTANCE (cm) | POWER DENSITY (mW/ $cm^2$) | LIMIT (mW/$cm^2$) |
|---|---|---|---|---|---|
| 5180 ~ 5240 | 29.6 | 3.7 | 20 | 0.014 | 1.00 |

### 802.11n(40MHz):

| FREQUENCY BAND (MHz) | MAX POWER (mW) | ANTENNA GAIN (dBi) | DISTANCE (cm) | POWER DENSITY (mW/ $cm^2$) | LIMIT (mW/$cm^2$) |
|---|---|---|---|---|---|
| 5190 ~ 5230 | 48.3 | 3.7 | 20 | 0.023 | 1.00 |

**CONCLUSION:**

Both of the 2.4GHz and 5GHz WLAN device can transmit simultaneously, the formula of calculated the MPE is:

**$CPD_1$ / $LPD_1$ + $CPD_2$ / $LPD_2$ + ……etc. < 1**

**CPD = Calculation power density**

**LPD = Limit of power density**

Therefore, the worst-case situation is 0.369 / 1 + 0.598 / 1= 0.967, which is less than “1”. This confirmed that the device comply with FCC 1.1310 MPE limit.

**--- END ---**