



## APPENDIX I RADIO FREQUENCY EXPOSURE

### LIMIT

According to §15.247(i), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this chapter.

### EUT Specification

|   |  |
|---|--|
| <b>EUT</b>  | Network Media Player   |
| <b>Frequency band (Operating)</b>   | <input checked="" type="checkbox"/> 802.11b/g/n HT20: 2.412GHz ~ 2.462GHz<br>802.11n HT40: 2.422GHz ~ 2.452GHz<br><input type="checkbox"/> Others  |
| <b>Device category</b>  | <input type="checkbox"/> Portable (<20cm separation)<br><input checked="" type="checkbox"/> Mobile (>20cm separation)<br><input type="checkbox"/> Others   |
| <b>Exposure classification</b>  | <input type="checkbox"/> Occupational/Controlled exposure ( $S = 5\text{mW/cm}^2$ )<br><input checked="" type="checkbox"/> General Population/Uncontrolled exposure ( $S=1\text{mW/cm}^2$ )  |
| <b>Antenna Specification</b>  | 1. Master Wave Technology CO., LTD / 98242MRSX000<br>Dipole Antenna / Gain: 2dBi (Numeric gain: 1.58)<br>(Reverse polarity SMA)<br>2. Dail Fong Electronics CO., LTD / P/N: AN-DF073007<br>Dipole Antenna / 2.4GHz Gain: 2dBi (Numeric gain: 1.58)<br>(Reverse polarity SMA) |
| <b>Max. output power</b>  | IEEE 802.11b : 11.59 dBm (14.421mW)<br>IEEE 802.11g : 12.59 dBm (18.155mW)<br>IEEE 802.11n HT20 : 11.68 dBm (14.723mW)<br>IEEE 802.11n HT40 : 11.83 dBm (15.240mW)   |
| <b>Evaluation applied</b>   | <input checked="" type="checkbox"/> MPE Evaluation*<br><input type="checkbox"/> SAR Evaluation<br><input type="checkbox"/> N/A   |
| <b>Remark:</b><br><i>The maximum output power is <u>12.59dBm (18.155mW) at 2462MHz (with 1.58numeric antenna gain.)</u></i> |  |



## **TEST RESULTS**

**No non-compliance noted.**

### **Calculation**

Given  $E = \frac{\sqrt{30 \times P \times G}}{d}$  &  $S = \frac{E^2}{377}$

Where  $E$  = Field strength in Volts / meter

$P$  = Power in Watts

$G$  = Numeric antenna gain

$d$  = Distance in meters

$S$  = Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

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

Changing to units of mW and cm, using:

$$P \text{ (mW)} = P \text{ (W)} / 1000 \text{ and}$$

$$d \text{ (cm)} = d \text{ (m)} / 100$$

Yields

$$S = \frac{30 \times (P/1000) \times G}{377 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2} \quad \textbf{Equation 1}$$

Where  $d$  = Distance in cm

$P$  = Power in mW

$G$  = Numeric antenna gain

$S$  = Power density in mW / cm<sup>2</sup>

**Maximum Permissible Exposure**

Substituting the MPE safe distance using  $d = 20$  cm into Equation 1:

$$S = 0.000199 \times P \times G$$

Where  $P$  = Power in mW

$G$  = Numeric antenna gain

$S$  = Power density in mW / cm<sup>2</sup>

**IEEE 802.11b mode:**

| Ch. | Frq.(MHz) | P (mW) | Gain (num.) | D (cm) | Power density in mW / cm <sup>2</sup> | Limit (mW/cm2) |
|-----|-----------|--------|-------------|--------|---------------------------------------|----------------|
| 11  | 2462      | 14.421 | 1.58        | 20     | 0.0045                                | 1              |

**IEEE 802.11g mode:**

| Ch. | Frq.(MHz) | P (mW) | Gain (num.) | D (cm) | Power density in mW / cm <sup>2</sup> | Limit (mW/cm2) |
|-----|-----------|--------|-------------|--------|---------------------------------------|----------------|
| 11  | 2462      | 18.155 | 1.58        | 20     | 0.0057                                | 1              |

**IEEE 802.11n HT20 mode:**

| Ch. | Frq.(MHz) | P (mW) | Gain (num.) | D (cm) | Power density in mW / cm <sup>2</sup> | Limit (mW/cm2) |
|-----|-----------|--------|-------------|--------|---------------------------------------|----------------|
| 1   | 2412      | 14.723 | 1.58        | 20     | 0.0046                                | 1              |

**IEEE 802.11n HT40 mode:**

| Ch. | Frq.(MHz) | P (mW) | Gain (num.) | D (cm) | Power density in mW / cm <sup>2</sup> | Limit (mW/cm2) |
|-----|-----------|--------|-------------|--------|---------------------------------------|----------------|
| 9   | 2452      | 15.240 | 1.58        | 20     | 0.0048                                | 1              |