



## 1 APPENDIX I radio frequency exposure

### LIMIT

According to §15.407(f), U-NII devices are subject to the radio frequency radiation exposure requirements specified in §§ 1.1307(b), 2.1091 and 2.1093 of this chapter, as appropriate. All equipment shall be considered to operate in a "general population/uncontrolled" environment. Applications for equipment authorization of devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

### EUT Specification

|  |   |
|--|---|
| <b>EUT</b>   | Wireless AP   |
| <b>Frequency band (Operating)</b>  | <input type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz<br><input type="checkbox"/> WLAN: 5.15GHz ~ 5.25GHz<br><input checked="" type="checkbox"/> WLAN: 5.25GHz ~ 5.35GHz<br><input checked="" type="checkbox"/> WLAN: 5.470GHz ~ 5.725GHz<br><input type="checkbox"/> Bluetooth: 2.402 GHz ~ 2.482 GHz<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>   | General Population/Uncontrolled exposure ( $S=1mW/cm^2$ )   |
| <b>Antenna diversity</b>   | <input type="checkbox"/> Single antenna<br><input checked="" type="checkbox"/> Multiple antennas<br><input type="checkbox"/> Tx diversity<br><input type="checkbox"/> Rx diversity<br><input checked="" type="checkbox"/> Tx/Rx diversity   |
| <b>Max. output power</b>   | IEEE 802.11a mode: 13.12dBm (20.51mW)<br>802.11n Standard-20 MHz Channel mode: 16.82 dBm (48.08mW)<br>802.11n Wide-40 MHz Channel mode: 17.35 dBm (54.33mW)   |
| <b>Antenna gain (Max)</b>  | 4 dBi (Numeric gain: 2.51)<br>Total antenna Gain =4.77dBi(Numeric gain: 3.00)   |
| <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>   |   |
| 1. The maximum output power is 17.35 dBm (54.33mW) at <u>5670MHz</u> (with <u>3.00 numeric antenna gain</u> .) |   |
| 2. For mobile or fixed location transmitters, no SAR consideration applied. The maximum power density is       |   |



1.0 mW/cm<sup>2</sup> even if the calculation indicates that the power density would be larger.

## **TEST RESULTS**

No non-compliance noted.

### **Calculation**

$$\text{Given } E = \frac{\sqrt{30 \times P \times G}}{d} \quad \& \quad S = \frac{E^2}{3770}$$

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:

$$S = \frac{30 \times P \times G}{3770d^2}$$

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

$$S = \frac{30 \times (P/1000) \times G}{3770 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2} \quad \text{Equation 1}$$

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**

#### **IEEE 802.11a:**

EUT output power = 20.51mW

Numeric Antenna gain = 2.51

$$\rightarrow \text{Power density} = 0.0102 \text{ mW / cm}^2$$

#### **802.11an Standard-20 MHz Channel mode / Chain 0+ Chain 1 +Chain 2**

EUT output power = 48.08mW

Numeric Antenna gain = 7.53

$$\rightarrow \text{Power density} = 0.0720 \text{ mW / cm}^2$$



**802.11an Wide-40 MHz Channel mode / Chain 0+ Chain 1 +Chain 2**

EUT output power =54.33mW

Numeric Antenna gain = 7.53

→ Power density = 0.0814 mW / cm<sup>2</sup>

(For mobile or fixed location transmitters, the maximum power density is 1.0 mW/cm<sup>2</sup> even if the calculation indicates that the power density would be larger.)

**END OF REPORT**