# 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**

| | |
|---|---|
| **EUT** | 802.11a/n AP (Master) |
| **Frequency band (Operating)** | ☐ WLAN: 2.412GHz ~ 2.462GHz<br>☒ WLAN: 5.745GHz ~ 5.825GHz<br>☐ Others: Bluetooth: 2.402GHz ~ 2.480GHz |
| **Device category** | ☐ Portable (<20cm separation)<br>☒ Mobile (>20cm separation)<br>☐ Others |
| **Exposure classification** | ☐ Occupational/Controlled exposure (S = 5mW/cm2)<br>☒ General Population/Uncontrolled exposure (S=1mW/cm2) |
| **Antenna diversity** | ☐ Single antenna<br>☒ Multiple antennas<br>☐ Tx diversity<br>☐ Rx diversity<br>☒ Tx/Rx diversity |
| **Max. output power** | IEEE 802.11a mode: 20.31 dBm (107.4mW)<br>draft 802.11n Standard-20 MHz Channel mode: 14.76 dBm (29.9mW)<br>draft 802.11n Wide-40 MHz Channel mode: 16.26 dBm (42.2mW) |
| **Antenna gain (Max)** | Gain: IEEE 802.11a: 14.84 dBi (Numeric gain: 30.48)<br>Gain: MIMO: 14.84 dBi + 10 log (2) = 17.85 dBi (Numeric gain: 60.95) |
| **Evaluation applied** | ☒ MPE Evaluation<br>☐ SAR Evaluation<br>☐ N/A |

***Remark:***

1. *The maximum output power is 20.31dBm (107.4mW) at 5745MHz (with 30.48 numeric antenna gain.)*
2. *DTS device is not subject to routine RF evaluation; MPE estimate is used to justify the compliance.*
3. *For mobile or fixed location transmitters, no SAR consideration applied. The maximum power density is 1.0 mW/cm$^2$ even if the calculation indicates that the power density would be larger.*

## TEST RESULTS

*No non-compliance noted.*

**Calculation**

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

*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:

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

Changing to units of mW and cm, using:

*P (mW) = P (W) / 1000 and*

*d (cm) = d(m) / 100*

Yields

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

*Where* *d = Distance in cm*
*P = Power in mW*
*G = Numeric antenna gain*
*S = Power density in mW / cm²*

**Maximum Permissible Exposure**

EUT output power = 107.4mW

Numeric Antenna gain = 30.48

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

Yields

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

*Where* *P = Power in mW*
*G = Numeric antenna gain*
*S = Power density in mW / cm²*

*→ Power density = 0.6514 mW / cm²*

*(For mobile or fixed location transmitters, the maximum power density is 1.0 mW/cm² even if the calculation indicates that the power density would be larger.)*