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	Notebook Computer
Frequency band (Operating)	☒ WLAN: 2.412GHz ~ 2.462GHz ☐ WLAN: 5.745GHz ~ 5.825GHz ☐ Others: Bluetooth: 2.402GHz ~ 2.480GHz
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm2) ☒ General Population/Uncontrolled exposure (S=1mW/cm2)
Antenna diversity	☒ Single antenna ☐ Multiple antennas 　　☐ Tx diversity 　　☐ Rx diversity 　　☐ Tx/Rx diversity
Max. output power	IEEE 802.11b mode: 14.77 dBm (29.99mW) IEEE 802.11g mode: 15.64 dBm (36.64mW)
Antenna gain (Max)	IEEE 802.11b/g: -4.29 dBi (Numeric gain: 0.37)
Evaluation applied	☒ MPE Evaluation ☐ SAR Evaluation ☐ N/A

Remark:
1. *The maximum output power is 15.64dBm (36.64mW) at 2462MHz (with 0.37 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 $\quad E = \dfrac{\sqrt{30 \times P \times G}}{d} \quad \& \quad S = \dfrac{E^2}{3770}$

$\quad\quad$ *Where* $\quad$ *E = Field strength in Volts / meter*
$\quad\quad\quad\quad\quad\quad$ *P = Power in Watts*
$\quad\quad\quad\quad\quad\quad$ *G = Numeric antenna gain*
$\quad\quad\quad\quad\quad\quad$ *d = Distance in meters*
$\quad\quad\quad\quad\quad\quad$ *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:

$\quad\quad$ *P (mW) = P (W) / 1000 and*

$\quad\quad$ *d (cm) = d(m) / 100*

Yields

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

$\quad\quad$ *Where* $\quad$ *d = Distance in cm*
$\quad\quad\quad\quad\quad\quad$ *P = Power in mW*
$\quad\quad\quad\quad\quad\quad$ *G = Numeric antenna gain*
$\quad\quad\quad\quad\quad\quad$ *S = Power density in mW / cm^2*

Maximum Permissible Exposure

EUT output power = 36.64mW

Numeric Antenna gain = 0.37

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

Yields

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

Where $\quad$ *P = Power in mW*
$\quad\quad\quad\quad$ *G = Numeric antenna gain*
$\quad\quad\quad\quad$ *S = Power density in mW / cm^2*

➔ *Power density = 0.00269 mW / cm^2*

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

EUT	Notebook Computer
Frequency band (Operating)	☐ WLAN: 2.412GHz ~ 2.462GHz ☒ WLAN: 5.745GHz ~ 5.825GHz ☐ Others: Bluetooth: 2.402GHz ~ 2.480GHz
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm2) ☒ General Population/Uncontrolled exposure (S=1mW/cm2)

Antenna diversity	☒ Single antenna
	☐ Multiple antennas
	   ☐ Tx diversity
	   ☐ Rx diversity
	   ☐ Tx/Rx diversity

Max. output power	IEEE 802.11a mode: 18.15 dBm (65.31mW)
Antenna gain (Max)	IEEE 802.11a: -2.53 dBi (Numeric gain: 0.56)
Evaluation applied	☒ MPE Evaluation ☐ SAR Evaluation ☐ N/A

Remark:

1. *The maximum output power is 18.15dBm (65.31mW) at 5785MHz (with 0.56 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 $\quad E = \dfrac{\sqrt{30 \times P \times G}}{d} \quad \& \quad S = \dfrac{E^2}{3770}$

$\qquad$ Where $\quad$ E = Field strength in Volts / meter

$\qquad\qquad\qquad$ P = Power in Watts

$\qquad\qquad\qquad$ G = Numeric antenna gain

$\qquad\qquad\qquad$ d = Distance in meters

$\qquad\qquad\qquad$ 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:

$\qquad$ *P (mW) = P (W) / 1000 and*

$\qquad$ *d (cm) = d(m) / 100*

Yields

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

$\qquad$ Where $\quad$ d = Distance in cm

$\qquad\qquad\qquad$ P = Power in mW

$\qquad\qquad\qquad$ G = Numeric antenna gain

$\qquad\qquad\qquad$ S = Power density in mW / cm^2

Maximum Permissible Exposure

EUT output power = 65.31mW

Numeric Antenna gain = 0.56

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

Yields

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

Where $\quad$ *P = Power in mW*

$\qquad\qquad$ *G = Numeric antenna gain*

$\qquad\qquad$ *S = Power density in mW / cm^2*

→ *Power density = 0.00727 mW / cm^2*

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