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	AP
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)
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: 23.16 dBm (207.01mW) IEEE 802.11g mode: 19.00 dBm (79.43mW)
Antenna gain (Max)	4.5 dBi (Numeric gain: 2.82)
Evaluation applied	☒ MPE Evaluation* ☐ SAR Evaluation ☐ N/A

Remark:
1. *The maximum output power is 23.16dBm (207.01mW) at 2462MHz (with 2.82 numeric antenna gain.)*
2. *DTS device is not subject to routine RF evaluation; MPE estimate is used to justify the compliance.*

TEST RESULTS

No non-compliance noted.

MPE

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 = 207.01mW

Numeric Antenna gain = 2.82

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 = 0.11617 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	AP
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)
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: 20.89 dBm (122.74mW)
Antenna gain (Max)	6 dBi (Numeric gain: 3.98)
Evaluation applied	☒ MPE Evaluation* ☐ SAR Evaluation ☐ N/A

Remark:
1. *The maximum output power is 20.89dBm (122.74mW) at 5825MHz (with 3.98 numeric antenna gain.)*
2. *DTS device is not subject to routine RF evaluation; MPE estimate is used to justify the compliance.*

TEST RESULTS

No non-compliance noted.

MPE

No non-compliance noted.

Calculation

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

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

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

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 = 122.74mW

Numeric Antenna gain = 3.98

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

$\rightarrow$ *Power density = 0.09721 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.)