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	Wireless-N ADSL2+ Gateway
Frequency band (Operating)	☒ WLAN: 2.412GHz ~ 2.462GHz ☐ WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz ☐ WLAN: 5.745GHz ~ 5.825GHz ☐ Others
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm^2) ☒ General Population/Uncontrolled exposure (S=1mW/cm^2)
Antenna diversity	☐ Single antenna ☒ Multiple antennas 　☐ Tx diversity 　☐ Rx diversity 　☒ Tx/Rx diversity
Max. output power	IEEE 802.11b mode: 18.25 dBm (66.87 mW) IEEE 802.11g mode: 17.63dBm (57.99 mW) draft 802.11n Standard-20 MHz Channel mode: 17.61 dBm (57.66 mW) draft 802.11n Wide-40 MHz Channel mode: 15.16 dBm (32.78 mW)
Antenna gain (Max)	MIMO Mode: 0.9dBi (including cable loss) (Numeric gain: 1.23) 0.95dBi (including cable loss) (Numeric gain: 1.24) CDD Mode: 0.9dBi (including cable loss)+ 10 log (2) = 3.91 dBi (Numeric gain: 2.46) 0.95dBi (including cable loss) + 10 log (2) = 3.96 dBi (Numeric gain: 2.49)
Evaluation applied	☒ MPE Evaluation* ☐ SAR Evaluation ☐ N/A

Remark:
1. *The maximum output power is 18.25dBm (66.87mW) at 2437MHz (with 2.49 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/cm2 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:

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

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

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

IEEE 802.11b mode:

EUT output power = 66.87mW

Numeric Antenna gain = 2.49

→ *Power density = 0.0331 mW / cm²*

IEEE 802.11g mode:

EUT output power = 57.99 mW

Numeric Antenna gain = 2.49

→ *Power density = 0.0287 mW / cm²*

draft 802.11n Standard-20 MHz Channel mode:

EUT output power =57.66 mW

Numeric Antenna gain = 1.24

→ *Power density = 0.0142mW / cm²*

draft 802.11n Wide-40 MHz Channel mode:

EUT output power = 32.78mW

Numeric Antenna gain = 1.24

→ *Power density = 0.0081 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.)