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	N300 Wireless N Router
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: 23.28 dBm (212.81 mW) IEEE 802.11g mode: 22.81 dBm (190.98 mW) IEEE 802.11n HT 20 MHz mode Channel mode: 21.93 dBm (155.95 mW) IEEE 802.11n HT 40 MHz mode: 21.83 dBm (152.40 mW)
Antenna gain (Max)	1. Gain: 4.9 dBi(Numeric gain: 3.09) 2. Gain: 3.7 dBi (Numeric gain: 2.34) Antenna Calculation for MIMO Mode 10*LOG(((10^(4.9/20)+10^(3.7/20))^2)/2)= 7.33dBi (Numeric gain: 5.40)
Evaluation applied	☒ MPE Evaluation* ☐ SAR Evaluation ☐ N/A

Remark:

1. *The maximum output power is 23.28 dBm (212.81 mW) at 2437MHz (with 5.40 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 $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{3770}$

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

IEEE 802.11b mode:

EUT output power = 212.81mW

Numeric Antenna gain = 3.09

→ Power density = 0.1309 mW / cm^2

IEEE 802.11g mode:

EUT output power = 190.98 mW

Numeric Antenna gain = 3.09

→ Power density = 0.117436 mW / cm^2

IEEE 802.11n HT 20 MHz mode Channel mode:

EUT output power =155.95 mW

Numeric Antenna gain = 5.40

→ Power density = 0.167584mW / cm2

IEEE 802.11n HT 40 MHz mode:

EUT output power = 152.40 mW

Numeric Antenna gain = 5.40

→ Power density = 0.163769 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.)