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	Compact HD (11N) Wireless Network Camera
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: 17.01 dBm (50.23mW) IEEE 802.11g mode: 23.75 dBm (237.13 mW) IEEE 802.11n HT 20 MHz mode: 27.53 dBm (566.23 mW) IEEE 802.11n HT 40 MHz mode: 25.79 dBm(379.31 mW)
Antenna gain (Max)	5.85 dBi (Numeric gain: 3.84)
Evaluation applied	☒ MPE Evaluation* ☐ SAR Evaluation ☐ N/A

Remark:
1. *The maximum output power is <u>27.53dBm (566.23mW) at 2412MHz (with 3.84 numeric antenna gain.</u>)*
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 $E = \dfrac{\sqrt{30 \times P \times G}}{d}$ & $S = \dfrac{E^2}{3770}$

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 / 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 = 50.23mW

Numeric Antenna gain = 3.84

→ *Power density = 0.0384 mW / cm2*

IEEE 802.11g mode:

EUT output power = 237.13 mW

Numeric Antenna gain = 3.84

→ *Power density = 0.1812 mW / cm2*

IEEE 802.11n HT 20 MHz mode:

EUT output power = 566.23 mW

Numeric Antenna gain = 3.84

→ *Power density = 0.4327 mW / cm2*

IEEE 802.11n HT 40 MHz mode:

EUT output power = 379.31 mW

Numeric Antenna gain = 3.84

→ *Power density =0.2899 mW / cm2*

(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.)