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	4 Channel wireless Video Server
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: 16.48 dBm (44.4631 mW) IEEE 802.11g mode: 20.72 dBm (118.0321 mW) IEEE 802.11n HT 20 MHz mode: 20.20 dBm (104.7129 mW) IEEE 802.11n HT 40 MHz mode: 20.56 dBm (113.7627 mW)
Antenna gain (Max)	4.53 dBi (Numeric gain: 2.83) MIMO Total ANT=10*LOG(((10^(4.27/20)+10^(4.53/20))^2)/2)= 7.41 dBi (Numeric gain: 5.5)
Evaluation applied	☒ MPE Evaluation* ☐ SAR Evaluation ☐ N/A
Remark: *The maximum output power is <u>20.72 dBm (118.0321 mW) at 2462MHz (with 2.83numeric antenna gain</u>.)*	

TEST RESULTS

No non-compliance noted.

MPE EVALUATION

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 / cm²

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 / cm²

IEEE 802.11b mode:

EUT output power = 44.4631 mW

Numeric Antenna gain = 2.83

→ *Power density =0.02504 mW / cm^2*

IEEE 802.11g mode:

EUT output power = 118.0321 mW

Numeric Antenna gain = 2.83

→ *Power density = 0.066472 mW / cm^2*

IEEE 802.11n HT 20 MHz mode:

EUT output power = 104.7129 mW

Numeric Antenna gain = 5.5

→ *Power density = 0.114608 mW / cm^2*

IEEE 802.11n HT 40 MHz mode:

EUT output power = 113.7627 mW

Numeric Antenna gain = 5.5

→ *Power density = 0.124513 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.)