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	720P WIFI Cube Camera
Frequency band (Operating)	■802.11 b/g : 2412MHz – 2462MHz 802.11 n (2.4GHz) HT20: 2412MHz – 2462MHz 802.11 n (2.4GHz) HT40: 2422MHz – 2452MHz □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 Specification	PIFA Antenna, Peak Gain: 4.83dBi
Maximum Average output power	IEEE 802.11b Mode: 13.69 dBm (23.388 mW) IEEE 802.11g Mode: 13.82 dBm (24.099 mW) IEEE 802.11n HT 20 Mode 13.93 dBm (24.717 mW) IEEE 802.11n HT 40 Mode 13.92 dBm (24.660 mW)
Maximum Tune up Power	IEEE 802.11b Mode: 16.59 dBm (45.603 mW) IEEE 802.11g Mode: 20.69 dBm (117.220mW) IEEE 802.11n HT 20 Mode 20.58 dBm (114.288mW) IEEE 802.11n HT 40 Mode 20.72 dBm (118.032mW)
Evaluation applied	■MPE Evaluation* □SAR Evaluation □N/A

TEST RESULTS

No non-compliance noted.

Calculation

Given $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{377}$

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:

$$S = \frac{30 \times P \times G}{377 d^2}$$

Changing to units of mW and cm, using:

P (mW) = P (W) / 1000 and

d (cm) = d(m) / 100

Yields

$$S = \frac{30 \times (P/1000) \times G}{377 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2}$$ ***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:

$$S = 0.000199 \times P \times G$$

Where *P = Power in mW*
G = Numeric antenna gain
S = Power density in mW / cm²

IEEE 802.11b mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
1	2412	45.603	4.83	20	0.0438	1

IEEE 802.11g mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
6	2437	117.220	4.83	20	0.113	1

IEEE 802.11n HT20 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
6	2437	114.288	4.83	20	0.110	1

IEEE 802.11n HT40 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
6	2437	118.032	4.83	20	0.113	1