

## RADIO FREQUENCY EXPOSURE

### LIMIT

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) of this chapter.

### EUT Specification

<b>EUT</b>	Mi Home Security Camera Basic 1080P
<b>Frequency band (Operating)</b>	<input checked="" type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz <input type="checkbox"/> WLAN: 5.15GHz ~ 5.25GHz <input type="checkbox"/> WLAN: 5.25GHz ~ 5.35GHz <input type="checkbox"/> WLAN: 5.47GHz ~ 5.725GHz <input type="checkbox"/> WLAN: 5.725GHz ~ 5.85GHz <input type="checkbox"/> Bluetooth: 2.402GHz ~ 2.480GHz <input type="checkbox"/> Others
<b>Device category</b>	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others
<b>Exposure classification</b>	<input type="checkbox"/> Occupational/Controlled exposure (S = 5mW/cm <sup>2</sup> ) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm <sup>2</sup> )
<b>Antenna diversity</b>	<input checked="" type="checkbox"/> Single antenna <input type="checkbox"/> Multiple antennas <ul style="list-style-type: none"> <li><input type="checkbox"/> Tx diversity</li> <li><input type="checkbox"/> Rx diversity</li> <li><input type="checkbox"/> Tx/Rx diversity</li> </ul>
<b>Max. Average Output power</b>	WIFI:2.412-2.462GHz IEEE 802.11b mode: 17.36dBm IEEE 802.11g mode: 10.82dBm IEEE 802.11n HT20 mode: 9.97dBm IEEE 802.11n HT40 mode: 9.81dBm
<b>Antenna gain (Max)</b>	PCB antenna Gain: 1.79 dBi
<b>Evaluation applied</b>	<input checked="" type="checkbox"/> MPE Evaluation* <input type="checkbox"/> SAR Evaluation <input type="checkbox"/> N/A

#### Remark:

1. The maximum output power is 17.36dBm (54.450mW) at 2412MHz (with 1.510 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/cm<sup>2</sup> even if the calculation indicates that the power density would be larger.

**TEST RESULTS**

No non-compliance noted.

**Calculation**

$$\text{Given } E = \frac{\sqrt{30 \times P \times G}}{d} \quad \& \quad S = \frac{E^2}{3770}$$

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:

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

Changing to units of mW and cm, using:

$$P \text{ (mW)} = P \text{ (W)} / 1000 \text{ and}$$

$$d \text{ (cm)} = d \text{ (m)} / 100$$

Yields

$$S = \frac{30 \times (P/1000) \times G}{3770 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2} \quad \text{Equation 1}$$

Where  $d$  = Distance in cm

$P$  = Power in mW

$G$  = Numeric antenna gain

$S$  = Power density in mW / cm<sup>2</sup>

**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<sup>2</sup>

**For WLAN:**

Modulation Mode	Frequency band (MHz)	Max. tune up power(dBm)	Antenna gain (dBi)	Distance (cm)	Power density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
IEEE802.11b	2412-2462	17.5	1.79	20	0.0169	1
IEEE802.11g		11	1.79	20	0.0038	1
IEEE802.11 n(20MHz)		10	1.79	20	0.0030	1
IEEE802.11 n(40MHz)		10	1.79	20	0.0030	1

**Note:**

Only WLAN can transmit, the formula of calculated the MPE is:

$$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$$

CPD = Calculation power density

LPD = Limit of power density

WLAN = 0.0169mW/cm<sup>2</sup>

(For mobile or fixed location transmitters, the maximum power density is 1.0 mW/cm<sup>2</sup> even if the calculation indicates that the power density would be larger.)