



APPENDIX I RADIO FREQUENCY EXPOSURE

LIMIT

According to §15.407(f), U-NII devices are subject to the radio frequency radiation exposure requirements specified in §§ 1.1307(b), 2.1091 and 2.1093 of this chapter, as appropriate. All equipment shall be considered to operate in a "general population/uncontrolled" environment. Applications for equipment authorization of devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

EUT Specification

EUT	Cisco Small Business Telepresence				
Frequency band (Operating)	<input type="checkbox"/> WLAN: 2412 MHz ~ 2462 MHz <input checked="" type="checkbox"/> WLAN: 5150 MHz ~ 5350 MHz <input checked="" type="checkbox"/> WLAN: 5500 MHz ~ 5700 MHz <input checked="" type="checkbox"/> WLAN: 5725 MHz ~ 5850 MHz				
Device category	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others: _____				
Exposure classification	General Population/Uncontrolled exposure ($S=1mW/cm^2$)				
Antenna diversity	<input checked="" type="checkbox"/> Single antenna <input type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input type="checkbox"/> Tx/Rx diversity				
Max. output power		Mode	Frequency Range (MHz)	Output Power (dBm)	Output Power (mw)
	UNII Band I	IEEE 802.11a	5180 – 5240	10.04	10.0925
		IEEE 802.11n HT 20 MHz	5180 – 5240	9.84	9.6383
	UNII Band II	IEEE 802.11a	5260 - 5320	9.82	9.5940
		IEEE 802.11n HT 20 MHz	5260 - 5320	10.33	10.7895
	UNII Band III	IEEE 802.11a	5500 - 5700	11.14	13.0017
IEEE 802.11n HT 20 MHz		5500 – 5700	10.45	11.0917	
Antenna gain (Max)	Antenna Gain: IEEE 802.11a: 4.61 dBi (Numeric gain: 2.89)				
Evaluation applied	<input checked="" type="checkbox"/> MPE Evaluation* <input type="checkbox"/> SAR Evaluation <input type="checkbox"/> N/A				
Remark:					
1. The maximum output power is 11.14dBm (13.0017mW) at 5500MHz (with 2.89 numeric antenna gain.)					
2. For mobile or fixed location transmitters, no SAR consideration applied. The maximum power density is 1.0 mW/cm ² 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:

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

Changing to units of mW and cm, using:

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

d (cm) = d (m) / 100

Yields

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

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



UNII Band I

IEEE 802.11a mode:

EUT output power = 10.0925 mW

Numeric Antenna gain = 2.89

→ Power density = 0.005804 mW / cm²

IEEE 802.11n HT 20 MHz mode:

EUT output power = 9.6383 mW

Numeric Antenna gain = 2.89

→ Power density = 0.005543 mW / cm²

UNII Band II

IEEE 802.11a mode:

EUT output power = 9.5940 mW

Numeric Antenna gain = 2.89

→ Power density = 0.005518 mW / cm²

IEEE 802.11n HT 20 MHz mode:

EUT output power = 10.7895 mW

Numeric Antenna gain = 2.89

→ Power density = 0.006205 mW / cm²

UNII Band III

IEEE 802.11a mode:

EUT output power = 13.0017 mW

Numeric Antenna gain = 3.43

→ Power density = 0.007477 mW / cm²

IEEE 802.11n HT 20 MHz mode:

EUT output power = 11.0917 mW

Numeric Antenna gain = 6.87

→ Power density = 0.006379 mW / cm²

(For mobile or fixed location transmitters, the maximum power density is 1.0 mW/cm² even if the calculation indicates that the power density would be larger.)