



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	11n Dual Band Wireless Access Point		
Frequency band (Operating)	<input checked="" type="checkbox"/> 802.11b/g/n HT20: 2.412GHz ~ 2.462GHz 802.11n HT40: 2.422GHz ~ 2.452GHz 802.11a: 5150 ~ 5250MHz / 5725 ~ 5850MHz 802.11 HT20: 5150 ~ 5250MHz / 5725 ~ 5850MHz 802.11 HT40: 5150 ~ 5250MHz / 5725 ~ 5850MHz <input type="checkbox"/> Others		
Device category	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others		
Exposure classification	<input type="checkbox"/> Occupational/Controlled exposure (S = 5mW/cm ²) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm ²)		
Antenna Specification	5GHz: Antenna Gain : 3.37 dBi (Numeric gain 2.17) 2.4GHz: Antenna Gain : 2.05 dBi (Numeric gain 1.60)		
Measurement Average output power	Mode	Power	
	IEEE 802.11b (2TX):	19.03 dBm	(79.983 mW)
	IEEE 802.11g (2TX):	21.13 dBm	(129.718 mW)
	IEEE 802.11n HT 20 (2TX):	19.63 dBm	(91.833 mW)
	IEEE 802.11n HT 40 (2TX):	19.78 dBm	(95.060 mW)
	IEEE 802.11a (2TX):	16.96 dBm	(49.659 mW)
	IEEE 802.11n HT20 (2TX):	19.41 dBm	(87.297 mW)
	IEEE 802.11n HT40 (2TX):	19.52 dBm	(89.536 mW)
Max Power Target / Tolerance	Mode	Target Power	Tolerance
	IEEE 802.11b (2TX):	20.00 dBm	± 2.0 dB
	IEEE 802.11g (2TX):	22.00 dBm	± 2.0 dB
	IEEE 802.11n HT 20 (2TX):	20.00 dBm	± 2.0 dB
	IEEE 802.11n HT 40 (2TX):	20.00 dBm	± 2.0 dB
	IEEE 802.11a (2TX):	18.00 dBm	± 2.0 dB
	IEEE 802.11n HT20 (2TX):	20.00 dBm	± 2.0 dB
	IEEE 802.11n HT40 (2TX):	20.00 dBm	± 2.0 dB



Max tune up Power	Mode	Max Tune-up Power	
	IEEE 802.11b (2TX):	22.00 dBm	(158.489 mW)
	IEEE 802.11g (2TX):	24.00 dBm	(251.189 mW)
	IEEE 802.11n HT 20 (2TX):	22.00 dBm	(158.489 mW)
	IEEE 802.11n HT 40 (2TX):	22.00 dBm	(158.489 mW)
	IEEE 802.11a (2TX):	20.00 dBm	(100.000 mW)
	IEEE 802.11n HT20 (2TX):	22.00 dBm	(158.489 mW)
	IEEE 802.11n HT40 (2TX):	22.00 dBm	(158.489 mW)
Evaluation applied	<input checked="" type="checkbox"/> MPE Evaluation*		
	<input type="checkbox"/> SAR Evaluation		
	<input type="checkbox"/> 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:

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

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

$$S = \frac{30 \times (P/1000) \times G}{377 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2} \quad \text{Equation 1}$$

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:

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

Where $P =$ Power in mW

$G =$ Numeric antenna gain

$S =$ Power density in mW / cm²

IEEE 802.11b mode(2TX):

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
1	2412	158.489	1.6	20	0.0505	1

IEEE 802.11g mode(2TX):

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
6	2437	251.189	1.6	20	0.0800	1

IEEE 802.11n HT20 mode(2TX):

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
6	2437	158.489	1.6	20	0.0505	1

IEEE 802.11n HT40 mode(2TX):

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
6	2437	158.489	1.6	20	0.0505	1

IEEE 802.11a mode(2TX):

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
48	5240	100	2.17	20	0.0432	1

IEEE 802.11a HT20 mode(2TX):

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
157	5785	158.489	2.17	20	0.0684	1

IEEE 802.11a HT40 mode(2TX):

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
159	5795	158.489	2.17	20	0.0684	1