

## 4 FCC §15.407(f), §2.1091 & IC RSS-102 - RF Exposure

### 4.1 Applicable Standard

According to FCC §15.407(f) and §1.1307(b)(1), 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 level in excess of the Commission's guidelines.

#### Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minutes)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz

\* = Plane-wave equivalent power density

Before equipment certification is granted, the procedure of IC RSS-102 must be followed concerning the exposure of humans to RF fields.

According to RSS-102 Issue 2 section 4.1, RF limits used for general public will be applied to the EUT.

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m <sup>2</sup> )	Time Averaging (min)
0.003 - 1	280	2.19	-	6
1 - 10	280 / f	2.19 / f	-	6
10 - 30	28	2.19 / f	-	6
30 - 300	28	0.073	2*	6
300 - 1 500	1.585 f <sup>0.5</sup>	0.0042 f <sup>0.5</sup>	f / 150	6
1 500 - 15 000	61.4	0.163	10	6
15 000 - 150 000	61.4	0.163	10	616000 / f <sup>1.2</sup>
150 000- 300 000	0.158 f <sup>0.5</sup>	4.21 x 10 <sup>-4</sup> f <sup>0.5</sup>	6.67 x 10 <sup>-5</sup> f	616000 / f <sup>1.2</sup>

**Note:** f is frequency in MHz

\* Power density limit is applicable at frequencies greater than 100 MHz

## 4.2 MPE Prediction

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

## 4.3 MPE Results

**For 5 GHz Band, 6 dBi External Antenna:**

802.11a Mode

Channel & Frequency		Power Output (dBm)		Total Power (mW)	Total Power (dBm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )/ (W/m <sup>2</sup> )
		Chain 0	Chain 1				
36	5180	2.11	2.03	3.22	5.08	0.00255	1/10
40	5200	2.10	2.08	3.24	5.10	0.00257	1/10
48	5240	2.14	2.04	3.24	5.10	0.00257	1/10

802.11 n20 Mode

Channel & Frequency		Power Output (dBm)		Total Power (mW)	Total Power (dBm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )/ (W/m <sup>2</sup> )
		Chain 0	Chain 1				
36	5180	2.06	2.15	3.25	5.12	0.00257	1/10
40	5200	2.08	2.05	3.22	5.08	0.00255	1/10
48	5240	2.11	2.10	3.25	5.12	0.00257	1/10

802.11 n40 Mode

Channel & Frequency		Power Output (dBm)		Total Power (mW)	Total Power (dBm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )/ (W/m <sup>2</sup> )
		Chain 0	Chain 1				
38	5190	2.04	2.08	3.21	5.07	0.00254	1/10
46	5230	2.14	2.10	3.26	5.13	0.00258	1/10

**For 5 GHz Band, 16 dBi External Antenna:**

802.11a Mode

Channel & Frequency		Power Output (dBm)		Total Power (mW)	Total Power (dBm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )/ (W/m <sup>2</sup> )
		Chain 0	Chain 1				
36	5180	2.11	2.03	3.22	5.08	0.026	1/10
40	5200	2.10	2.08	3.24	5.10	0.026	1/10
48	5240	2.14	2.04	3.24	5.10	0.026	1/10

## 802.11 n20 Mode

Channel & Frequency		Power Output (dBm)		Total Power (mW)	Total Power (dBm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )/ (W/m <sup>2</sup> )
		Chain 0	Chain 1				
36	5180	2.06	2.15	3.25	5.12	0.026	1/10
40	5200	2.08	2.05	3.22	5.08	0.026	1/10
48	5240	2.11	2.10	3.25	5.12	0.026	1/10

## 802.11 n40 Mode

Channel & Frequency		Power Output (dBm)		Total Power (mW)	Total Power (dBm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )/ (W/m <sup>2</sup> )
		Chain 0	Chain 1				
38	5190	2.04	2.08	3.21	5.07	0.026	1/10
46	5230	2.14	2.10	3.26	5.13	0.026	1/10