EXHIBIT A: RF EXPOSURE ASSESSMENT

A.1 MAXIMUM PERMISSIBLE EXPOSURE (MPE) - FCC

FCC Part 15 Subpart C §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

FCC Part 15 Subpart C §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.

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minutes)
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	$*180/f^2$	30
30-300	27.5	0.073	0.2	30
300-1,500	/	/	f/1500	30
1,500-100,000	/	/	1.0	30

f = frequency in MHz, * = Plane-wave equivalent power density

Maximum Permissible Exposure (MPE) Evaluation Formula

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

Where S = Power density in mW/cm^2
P = Power input to antenna in mW
G = Antenna gain relative to isotropic
R = Separation distance from the transmitting antenna in cm

Maximum Permissible Exposure (MPE) Evaluation Results

Modulation Mode	Frequency Range (MHz)	Maximum Conducted Output Power		Antenna Gain		Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
		(dBm)	(mW)	(dBi)	(Numeric)			
802.11b	2412-2462	16.0	39.81	2	1.585	20	0.0126	1
802.11g	2412-2462	10.5	11.22	2	1.585	20	0.0035	1
802.11n (HT20)	2412-2462	8.5	7.08	2	1.585	20	0.0022	1
802.11n (HT40)	2422-2452	7.5	5.62	2	1.585	20	0.0018	1

Modulation Mode	Frequency Range (MHz)	Maximum Conducted Output Power		Antenna Gain		Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
		(dBm)	(mW)	(dBi)	(Numeric)			
802.11a	5180-5240	13.5	22.39	2.0	1.585	20	0.0071	1
	5745-5825	11.5	14.13	2.0	1.585	20	0.0045	1
802.11n (HT20)	5180-5240	13.5	22.39	2.0	1.585	20	0.0071	1
	5745-5825	11.5	14.13	2.0	1.585	20	0.0045	1
802.11n (HT40)	5190-5230	7.5	5.62	2.0	1.585	20	0.0018	1
	5755-5795	6.5	4.47	2.0	1.585	20	0.0014	1

A.2 MAXIMUM PERMISSIBLE EXPOSURE (MPE) - IC

RSS-102 Issue 5 (March 2015) § 4 Exposure Limits

Industry Canada has adopted the SAR and RF field strength limits established in Health Canada's RF exposure guideline, Safety Code 6.

RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

Frequency Range (MHz)	Electric Field Strength (V/m rms)	Magnetic Field Strength (A/m rms)	Power Density (W/m^2)	Averaging Time (minutes)
0.003-10	86	90	-	Instantaneous *
0.1-10	-	$0.73/f$	-	6**
1.1-10	$87/f^{0.5}$	-	-	6**
10-20	27.46	0.0728	2	6
20-48	$58.07/f^{0.25}$	$0.1540/f^{0.25}$	$8.944/f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	$3.142 f^{0.3417}$	$0.008335 f^{0.3417}$	$0.02619 f^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	$616000/f^{1.2}$
150000-300000	$0.58 f^{0.5}$	$4.21 \times 10^{-4} f^{0.5}$	$6.67 \times 10^{-5} f$	$616000/f^{1.2}$

Note: f is frequency in MHz
*Based on nerve stimulation (NS)
**Based on specific absorption rate (SAR)

Maximum Permissible Exposure (MPE) Evaluation Formula

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

Where S = Power density in W/m^2
P = Power input to antenna in W
G = Antenna gain relative to isotropic
R = Separation distance from the transmitting antenna in m

Maximum Permissible Exposure (MPE) Evaluation Results

Modulation Mode	Frequency Range (MHz)	Maximum Conducted Output Power		Antenna Gain		Distance (m)	Power Density (W/m^2)	Limit (W/m^2)
		(dBm)	(W)	(dBi)	(Numeric)			
802.11b	2412-2462	15.9	0.0389	2	1.585	0.2	0.123	5.37
802.11g	2412-2462	10.3	0.0107	2	1.585	0.2	0.034	5.37
802.11n (HT20)	2412-2462	8.1	0.0065	2	1.585	0.2	0.020	5.37
802.11n (HT40)	2422-2452	7.2	0.0052	2	1.585	0.2	0.017	5.37

Modulation Mode	Frequency Range (MHz)	Maximum Conducted Output Power		Antenna Gain		Distance (m)	Power Density (W/m^2)	Limit (W/m^2)
		(dBm)	(W)	(dBi)	(Numeric)			
802.11a	5180-5240	13.3	0.0214	2.0	1.585	0.2	0.067	9.05
	5745-5825	11.5	0.0141	2.0	1.585	0.2	0.045	9.05
802.11n (HT20)	5180-5240	13.2	0.0209	2.0	1.585	0.2	0.066	9.05
	5745-5825	11.4	0.0138	2.0	1.585	0.2	0.044	9.05
802.11n (HT40)	5190-5230	7.4	0.0055	2.0	1.585	0.2	0.017	9.05
	5755-5795	6.3	0.0043	2.0	1.585	0.2	0.013	9.05

Power Density Limit Calculation:

For operation in the 300 to 6000 MHz frequency range:

Power Density = $0.02619\ f^{0.6834}$; where f in MHz

For 2412 – 2462 MHz:

At lowest frequency (2412 MHz) with lowest limit:
Power Density = $0.02619\ (2412)^{0.6834} = 5.37\ W/m^2$

For 5180 – 5825 MHz:

At lowest frequency (5180 MHz) with lowest limit:
Power Density = $0.02619\ (5180)^{0.6834} = 9.05\ W/m^2$