

POWER DENSITY ESTIMATIONS BASED ON POWER OUTPUT, ANTENNA GAIN, AND DISTANCE FROM ANTENNA

$$(P G) / (4 R ^ 2 \pi) = S$$

where:	S =	maximum power density (mW/cm ²)	transmitter operating variables:	<small>must be blank if dB values are entered</small>	
	P =	power input to the antenna ----->>	=	13.5	(dBm) - or - (mW)
	G =	gain of the antenna - worst case ----->>	=	1.2	(dBi) - or - (numeric gain)
	R =	distance to the center of the radiation of the antenna -->	=	20	(cm)

$$(P \quad G) / (4 * R ^ 2 * \pi) = S \quad (mW/cm^2)$$

$$(\underset{(mw)}{22.3872114} \quad \underset{(gain)}{1.31826}) / (4 * \underset{(cm)}{20}^2 * \pi) = S \quad (mW/cm^2)$$

$$(\underset{(dBm)}{29.51209227}) / (4 * \underset{(cm)}{400} * \pi) = S \quad (mW/cm^2)$$

$$(\underset{(dBm)}{29.51209227}) / (\underset{(cm)}{5026.548246}) = \underset{(mW/cm^2)}{0.005871}$$

Power Density Based on 20 separation distance (cm)

920	Frequency (MHz)
13.5	Power to Antenna (dBm)
1.2	Antenna gain (dBi)

FCC

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

0.005871
 Power Density (mW/cm²)

Canada	FCC	Limit (mW/cm ²)
0.27606	0.60800	Limit (mW/cm ²)
0.27018	0.60213	Margin
0.02127	0.00966	MPE Ratio

(General Population)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f ²	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) 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 ²	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

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Canada

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10 ²¹	83	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}	0.02619f ^{0.6834}	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ f ^{1.2}
150000-300000	0.158 f ^{0.5}	4.21 x 10 ⁻⁴ f ^{0.5}	6.67 x 10 ⁻⁵ f	616000/ f ^{1.2}
Note: f is frequency in MHz. *Based on nerve stimulation (NS). ** Based on specific absorption rate (SAR).				