

## RADIO FREQUENCY RADIATION EXPOSURE

FCC KDB 447498 D03

Radio frequency radiation exposure evaluation.

Devices that operate under CFR47 Part 20 are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use if they operate at frequencies of 1.5 GHz or below and their effective radiated power (ERP) is 1.5 watts or more for FCC requirements and 2.5 Watts or more for Industry Canada Requirements.

### Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = \frac{EIRP}{4\pi R^2} \text{ re - arranged } R = \sqrt{\frac{EIRP}{S4\pi}}$$

where:

S = power density

R = distance to the centre of radiation of the antenna

EIRP = EUT Maximum power

## LIMITS

### FCC LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

#### (B) Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f <sub>2</sub> )*	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

## Uplink

### FCC

Prediction Frequency (MHz)	Conducted Output Power dBm	Maximum Antenna Gain (dBi)	Peak Output Power EIRP (dBm)	Peak Output Power EIRP (mW)	Power Density limit (S) (mW/cm <sup>2</sup> )	Distance (R) cm required to be less than (S)
850 MHz						
817.000	-30.31	13	-17.31	0.0186	0.545	0.06
833.000	-30.31	13	-17.31	0.0186	0.555	0.06
849.000	-30.50	13	-17.50	0.0178	0.566	0.06
1800 MHz						
1880.000	-30.59	13	-17.59	0.0174	1.000	0.04
1897.500	-30.93	13	-17.93	0.0161	1.000	0.04
1915.000	-30.93	13	-17.93	0.0161	1.000	0.04

## Downlink

### FCC

Prediction Frequency (MHz)	Conducted Output Power dBm	Maximum Antenna Gain (dBi)	Peak Output Power EIRP (dBm)	Peak Output Power EIRP (mW)	Power Density limit (S) (mW/cm <sup>2</sup> )	Distance (R) cm required to be less than (S)
850 MHz						
862.000	23.54	13	36.54	4508.1670	0.575	25
878.000	23.80	13	36.80	4786.3009	0.585	26
894.000	20.75	13	33.75	2371.3737	0.596	18
1900 MHz						
1930.000	21.69	13	34.69	2944.4216	1.000	16
1962.500	19.79	13	32.79	1901.0783	1.000	13
1995.000	22.24	13	35.24	3341.9504	1.000	17