

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 ²)	Averaging Time E ² , H ² or S (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
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

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

Uplink

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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 ²)	Distance (R) cm required to be less than (S)
700MHz (Lower)						
698.000	-29.60	13	-16.60	0.0219	0.465	0.07
707.000	-29.61	13	-16.61	0.0218	0.471	0.07
716.000	-29.72	13	-16.72	0.0213	0.477	0.06
700MHz (Upper)						
777.000	-30.77	13	-17.77	0.0167	0.518	0.06
782.000	-30.79	13	-17.79	0.0166	0.521	0.06
787.000	-30.89	13	-17.89	0.0163	0.525	0.05
1700 MHz						
1710.000	-30.61	9	-21.61	0.0069	1.000	0.03
1732.500	-30.42	9	-21.42	0.0072	1.000	0.03
1755.000	-30.26	9	-21.26	0.0075	1.000	0.03

Downlink

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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 ²)	Distance (R) cm required to be less than (S)
700MHz						
728.000	22.84	13	35.84	3837.0725	0.485	26
742.000	24.85	13	37.85	6095.3690	0.495	32
756.000	23.92	13	36.92	4920.3954	0.504	28
2100 MHz						
2110.000	23.18	13	36.18	4149.5404	1.000	19
2132.500	23.15	13	36.15	4120.9752	1.000	19
2155.000	22.52	13	35.52	3564.5113	1.000	17