

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)	Maximum Allowed Output Power 5W ERP	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)
896.1	37.0	39.15	8222.4265	0.597	33.3
898.5	37.0	39.15	8222.4265	0.599	33.3
900.9	37.0	39.15	8222.4265	0.601	33.3

Note: The above output powers are selected until the maximum output power was reached as per Part 90.219(e)(1) 5 Watts ERP, as the antenna gain is unknown.

The Maximum allowed output ERP value of 37.00dBm is converted to an EIRP value (39.15dBm) by the addition of 2.15dBm.

Downlink

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Prediction Frequency (MHz)	Maximum Allowed Output Power 5W ERP	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)
935.1	37.0	39.15	8222.426499	0.623	32.5
937.5	37.0	39.15	8222.426499	0.625	32.5
939.9	37.0	39.15	8222.426499	0.627	32.5

Note: The above output powers are selected until the maximum output power was reached as per Part 90.219(e)(1) 5 Watts ERP, as the antenna gain is unknown.

The Maximum allowed output ERP value of 37.00dBm is converted to an EIRP value (39.15dBm) by the addition of 2.15dBm.