

Prediction of MPE at a given distance

1. Limits

The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

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 Exposures				
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
300–1500			f/300	6
1500–100,000			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
300–1500			f/1500	30
1500–100,000			1.0	30

2. Test Procedure

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

$$S = \frac{P \times G}{4 \times \pi \times R^2}$$

Where:

S = power density

P = power input to the antenna

G = numeric gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the centre of radiation of the antenna

3. Result

For 30 dBi antenna

EIRP	S	Distance	Distance	Limit for controled	Limit for public
mW	mW/cm ²	cm	Feet	mW/cm ²	mW/cm ²
117110.208	0.103600679	300	9.842519685	5	1
117110.208	0.149184978	250	8.202099738		
117110.208	0.233101529	200	6.56167979		
117110.208	0.414402718	150	4.921259843		
117110.208	0.932406115	100	3.280839895		
117110.208	1.15111866	90	2.952755906		
117110.208	1.456884554	80	2.624671916		
117110.208	1.902869622	70	2.296587927		
117110.208	2.590016985	60	1.968503937		
117110.208	3.729624459	50	1.640419948		
117110.208	5.827538217	40	1.312335958		
117110.208	10.36006794	30	0.984251969		
117110.208	23.31015287	20	0.656167979		

For 23 dBi antenna

EIRP	S	Distance	Distance	Limit for controled	Limit for public
mW	mW/cm ²	cm	Feet	mW/cm ²	mW/cm ²
37346.99	0.033038738	300	9.842519685	5	1
37346.99	0.047575783	250	8.202099738		
37346.99	0.074337162	200	6.56167979		
37346.99	0.132154954	150	4.921259843		
37346.99	0.297348646	100	3.280839895		
37346.99	0.367097094	90	2.952755906		
37346.99	0.46460726	80	2.624671916		
37346.99	0.606833972	70	2.296587927		
37346.99	0.825968462	60	1.968503937		
37346.99	1.189394586	50	1.640419948		
37346.99	1.858429041	40	1.312335958		
37346.99	3.30387385	30	0.984251969		
37346.99	7.433716162	20	0.656167979		

For 19 dBi antenna

EIRP	S	Distance	Distance	Limit for controlled	Limit for public
mW	mW/cm ²	cm	Feet	mW/cm ²	mW/cm ²
18689.039	0.01653312	300	9.842519685	5	1
18689.039	0.023807693	250	8.202099738		
18689.039	0.03719952	200	6.56167979		
18689.039	0.066132481	150	4.921259843		
18689.039	0.148798081	100	3.280839895		
18689.039	0.183701335	90	2.952755906		
18689.039	0.232497002	80	2.624671916		
18689.039	0.303669553	70	2.296587927		
18689.039	0.413328003	60	1.968503937		
18689.039	0.595192325	50	1.640419948		
18689.039	0.929988008	40	1.312335958		
18689.039	1.653312013	30	0.984251969		
18689.039	3.71995203	20	0.656167979		

For 12 dBi antenna

EIRP	S	Distance	Distance	Limit for controlled	Limit for public
mW	mW/cm ²	cm	Feet	mW/cm ²	mW/cm ²
7554.827	0.006683322	300	9.842519685	5	1
7554.827	0.009623983	250	8.202099738		
7554.827	0.015037474	200	6.56167979		
7554.827	0.026733287	150	4.921259843		
7554.827	0.060149896	100	3.280839895		
7554.827	0.074259131	90	2.952755906		
7554.827	0.093984213	80	2.624671916		
7554.827	0.122754891	70	2.296587927		
7554.827	0.167083046	60	1.968503937		
7554.827	0.240599586	50	1.640419948		
7554.827	0.375936853	40	1.312335958		
7554.827	0.668332183	30	0.984251969		
7554.827	0.962398344	25	0.820209974		
7554.827	1.503747412	20	0.656167979		
7554.827	2.673328733	15	0.492125984		
7554.827	4.177076146	12	0.393700787		
7554.827	6.01498965	10	0.32808399		

For 3 dBi antenna

EIRP	S	Distance	Distance	Limit for controlled	Limit for public
mW	mW/cm ²	cm	Feet	mW/cm ²	mW/cm ²
1446.704	0.011518344	100	3.280839895	5	1
1446.704	0.014220178	90	2.952755906		
1446.704	0.017997412	80	2.624671916		
1446.704	0.023506824	70	2.296587927		
1446.704	0.0319954	60	1.968503937		
1446.704	0.046073376	50	1.640419948		
1446.704	0.07198965	40	1.312335958		
1446.704	0.127981599	30	0.984251969		
1446.704	0.184293503	25	0.820209974		
1446.704	0.287958599	20	0.656167979		
1446.704	0.511926398	15	0.492125984		
1446.704	0.799884996	12	0.393700787		
1446.704	0.951929252	11	0.360892388		
1446.704	1.151834395	10	0.32808399		
1446.704	4.60733758	5	0.164041995		
1446.704	7.198964968	4	0.131233596		
1446.704	12.79815994	3	0.098425197		

Remark:

- : Distance for Population/Uncontrolled Exposure
- : Distance for Occupational/Controlled Exposure