

4 FCC §1.1310(d)(3) §2.1091 & §90.223 - RF Exposure

4.1 Applicable Standards

As per FCC §1.1310(d) (3), At operating frequencies above 6 GHz, the MPE limits listed in Table 1 in paragraph (e)(1) of this section shall be used in all cases to evaluate the environmental impact of human exposure to RF radiation as specified in §1.1307(b) of this part.

TABLE 1 TO §1.1310(E)(1)—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(i) 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
(ii) 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

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

4.2 MPE Prediction

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

$$S = \text{EIRP}/4\pi R^2$$

Where: S = power density

EIRP = Effective Isotropic Radiated Power

R = distance to the center of radiation of the antenna

4.3 RF exposure evaluation exemption for FCC

Prediction frequency[f] (MHz)	10529
Maximum rated output power (dBm)	42.55
Maximum EIRP (dBm)	70.55
Prediction distance[R] (m)	4.26
Maximum allowed antenna gain (dBi)	28
Power density of prediction frequency at 4.26 m (mW/cm²):	4.977
FCC MPE limit for Occupational/Controlled exposure at prediction frequency (mW/cm²):	5

Note: According to tune up procedure, the power can up to $15W \times (1+20\%) = 18W$ (42.55dBm).

Results

For 10529 MHz:

In order to pass the MPE exemption threshold limit of $5mW/cm^2$ with the Output Power being 42.55 dBm, and maximum Antenna Gain of 28dBi, the EUT must have a minimum separation distance of 4.26m