

RADIO FREQUENCY RADIATION EXPOSURE

FCC KDB 447498 D03

47 CFR §§1.1307 and 2.1091 and RSS-102

Radio frequency radiation exposure evaluation.

Devices that operate under CFR47 Part 90 and RSS-131 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

ERP = EUT Maximum power

| Prediction Frequency (MHz) | Maximum ERP (mW) | Maximum EIRP (mW) | Power density limit (S) (mW/cm ²) | Distance (R) cm required to be less than (S) mW/cm ² |
|----------------------------|------------------|-------------------|-----------------------------------------------|-----------------------------------------------------------------|
| 150 | 5000 | 8200 | 0.2 | 58 |
| 173 | 5000 | 8200 | 0.2 | 58 |

Result

The EUT meets the limit requirements at the distances specified based on the maximum allowed ERP for a booster as per 90.219.

LIMITS

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

4.2 RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

| Frequency Range (MHz) | Electric Field (V/m rms) | Magnetic Field (A/m rms) | Power Density (W/m ²) | Averaging Time (minutes) |
|-----------------------|--------------------------|------------------------------------------|-----------------------------------|--------------------------|
| 0.003-1 | 280 | 2.19 | - | 6 |
| 1-10 | 280/f | 2.19/f | - | 6 |
| 10-30 | 28 | 2.19/f | - | 6 |
| 30-300 | 28 | 0.073 | 2 | 6 |
| 300-1500 | 1.585 f ^{0.5} | 0.0042 f ^{0.5} | f/150 | 6 |
| 1500-15000 | 61.4 | 0.163 | 10 | 6 |
| 15000-150000 | 61.4 | 0.163 | 10 | 616000/f ^{1.2} |
| 150000-300000 | 0.158 f ^{0.5} | 4.21 x 10 ⁻⁴ f ^{0.5} | 6.67 x 10 ⁻⁵ f | 616000/f ^{1.2} |