

Appendix A: RF Exposure Compliance FCC Rules and Regulations §1.1307, §1.1310, §2.1091, §2.1093, IC RSS-102

1. General Information

Environment: General Population/Uncontrolled Exposure
 Device category: Level Probing Radar
 Modulation Type/Mode: Pulsed Radar

2. Operating Configurations and Test Conditions

Antenna Type	Highest Gain Antenna Used (dBi)	Numeric Gain	Highest 50 MHz EIRP Power (Watt)	Highest 50 MHz ERP Power (Watt)
1 1/2" Encapsulated Horn	24.3	269.2	0.0724	0.0441

3. MPE Calculation

The maximum distance from the antenna at which MPE is met or exceeded, is calculated from the equation relating field strength E in V/m, transmit power P in Watts, transmit antenna numeric gain G, and separation distance in meters. The limit for general population/uncontrolled exposure from 1500-100000 MHz is 1mW/cm² or 10W/m². The Electric field generated for a 1 mW/cm² exposure (S) is calculated as follows:

$$S = \frac{E^2}{Z} \quad \text{or} \quad E = \sqrt{S \cdot Z} = \sqrt{10 \cdot 377} = 61.4 \text{ V/m}$$

where:

S = Power density (W/m)

E = Electric field (V/m)

Z = Impedance of free space (377 ohms)

MPE Calculation solving for distance (d):

$$E = \frac{\sqrt{30 \cdot EIRP}}{d} \quad \text{or} \quad d = \frac{\sqrt{30 \cdot EIRP}}{E} = \frac{\sqrt{30 \cdot 72.4E^{-3}}}{61.4} = 2.4 \text{ cm}$$

where:

E = Electric field (V/m)

P = Power (W)

G = Antenna numeric gain

d = distance (m)

Separation Distance = 2.4 cm

Additionally, the power density at 20 cm is: $S = \frac{(V/m)^2}{377} = 0.014 \text{ mW/cm}^2$

4. Conclusion

The device complies with the MPE requirements by providing a safe separation distance between the antenna, including any radiating structure, and any persons.