

Appendix A: RF Exposure FCC Rules and Regulations Part 1.1307, 1.1310, 2.1091, 2.1093

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	Worst-case EIRP Antenna-Gain (dBi)	Numeric Gain	Highest 50 MHz EIRP Power (dBm)	Power Integrated Factor over Band-Width	Power at Antenna Terminal (Watt)
75mm Horn	24.5	281.38	9.9	22.3	0.000806

FCC Rule Part	Antenna Type	Highest Gain Antenna Used (dBi)	Numeric Gain
15.256	95mm Horn	27	501.2
15.209	245mm Parabolic Horn	32.8	1905.5

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 d, separation distance in meters. The limit for general population/uncontrolled exposure from 1500-100000 MHz is 1mW/cm².

$$S = \text{EIRP (mW)} / (4 * \pi * d^2)$$

$$d = \text{SQRT} ((\text{EIRP (mw)} / S * 4\pi))$$

where: S = Power density (mW/cm²); EIRP = Effective Isotropic Radiated Power (mW); d = distance

MPE Calculation solving for distance (d) for 245mm parabolic horn (32.8 dBi) antenna using worst-case power of 0.000806 W:

Linear	Log
Gain = 1905.5 Numeric	32.8 dBi
Power = 0.000806 mW	-30.9366 dBm
Duty % = 100	0 dB
EIRP = 154 mW	1.54 mW
R (cm) = 0.349 cm	S (20cm) = 00003055 mW/cm ²

MPE Calculation solving for distance (d) for 95mm horn (27.0 dBi) antenna using worst-case power of 0.000806 W:

Linear	Log
Gain = 501.2 Numeric	27.0 dBi
Power = 0.000806 mW	-30.9366 dBm
Duty % = 100	0 dB
EIRP = 0.40 mW	0.40 mW
R (cm) = 0.179 cm	S (20cm) = 8.037E-05 mW/cm ²

Note: Conducted power from the worst case EIRP from Table 4 (9.9dBm) was used in conjunction with the highest gain antenna value (27dBi) for the FCC 15.256 report, and the highest gain antenna value (32.8dBi) for the FCC 15.209 report to calculate worst-case RF Exposure distances and power densities at 20cm.