

**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. List of Antennas Operating Configurations and Test Conditions**

<b>FCC 15.256 Antennas</b>	<b>Antenna Gain (dBi)</b>
95mm Horn Antenna	27.0
75mm Horn Antenna	24.5
75mm Filled Horn Antenna	23.6
75mm Plastic Horn Antenna	24.8
<u>245mm Parabolic Dish Antenna</u>	<u>32.8*</u>
<b>FCC 15.209 Antenna</b>	<b>Antenna Gain (dBi)</b>
75mm Filled Horn Antenna	23.6
75mm Plastic Horn Antenna	24.8
40mm Horn Antenna	19.5
48mm Horn Antenna	21.5
75mm Horn Antenna	24.5
95mm Horn Antenna	27.0
<u>245mm Parabolic Dish Antenna</u>	<u>32.8*</u>
48mm Filled Horn Antenna	19.8
40mm Plastic Horn Antenna	19.6

Note: \* Worst-case antenna gain used for RF Exposure calculations in the tables below.

Antenna Type	Worst-case EIRP Antenna-Gain (dBi)	Numeric Gain	Highest 50 MHz EIRP Power (dBm)	Bandwidth Power Integration Factor	Antenna Terminal Power (Watt)
245mm Parabolic Dish	32.8	1905.5	9.9	39.4	0.000201

Note:

- Power integration factor over bandwidth = bandwidth/ 50 MHz RBW= 1971.153 MHz/50MHz = 39.4; therefore, integrated EIRP multiply by bandwidth power integration factor = 9.77mW x 39.4 = 385.2 mW.
- Antenna terminal power calculation = integrated EIRP divided by the worst-case antenna numeric gain = 385.2 mW/1905.5 = 0.000201 mW.

FCC Rule Part	Antenna Type	Highest Antenna Gain (dBi)	Numeric Gain
15.256	245mm Parabolic Dish	32.8	1905.5
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 d, in centimeters, is calculated from the power density S, in mW/cm<sup>2</sup>, transmit power P in mW, and the transmit antenna numeric gain G. The limit for general population/uncontrolled exposure from 1500-100000 MHz is 1mW/cm<sup>2</sup>.

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

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

where: S = Power density (mW/cm<sup>2</sup>); 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 0.000201 W:

The RF exposure calculation below is for the FCC 15.256 report, and the FCC 15.209 report representing the worst-case RF Exposure distance and power density at 20cm.

Linear	Log
<u>Gain = 1905.5 Numeric</u>	32.8 dBi
<u>Power = 0.000201 mW</u>	-36.9680 dBm
Duty % = 100	0 dB
<u>EIRP = 385.2 mW</u>	385.2 mW
<u>d (cm) = 5.54 cm</u>	<u>S (20cm) = 0.0766 mW/cm<sup>2</sup></u>