

# 11 FCC Rules and Regulations Part 1.1307, 1.1310, 2.1091, 2.1093: RF Exposures

The manufacturer does not specify or sale any antenna with the radio identified in this report.

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:

$$E(V/m) = \frac{\sqrt{30 \times P \times G}}{d}$$

Power density:  $P_d (mW/cm^2) = \frac{E^2}{3770}$ 

Limit for occupational/controlled exposure (at 440 MHz) =  $f(MHz)/300 mW/cm^2$ 

Limit for general population/uncontrolled exposure (at 440 MHz) =  $f(MHz)/1500 mW/cm^2$ 

### **11.1 MPE Calculation**

Antennae: Typical land mobile antenna available on the market and commonly chosen by end-users for vehicle application.

# 11.1.1 MPE RADII FOR UHF BAND (440 - 470 MHz<sup>1</sup>) FOR OCCUPATIONAL/CONTROLLED EXPOSURE

| Frequency 440 MHz | Limit Occ. 1.47 |
|-------------------|-----------------|
|-------------------|-----------------|

| Power <sup>B</sup> | dBd Antenna Gain <sup>C</sup> |    |    |    |    |    |    |    |    |    |     |    |     |    |
|--------------------|-------------------------------|----|----|----|----|----|----|----|----|----|-----|----|-----|----|
| (Watt)             | 0                             |    | 1  |    | 2  |    | 3  |    | 4  |    | 5   |    | 6   |    |
|                    | cm                            | in | cm | in | cm | in | cm | in | cm | in | cm  | in | cm  | in |
| 10                 | 30                            | 12 | 33 | 13 | 38 | 15 | 42 | 17 | 47 | 19 | 53  | 21 | 59  | 23 |
| 30                 | 52                            | 20 | 58 | 23 | 65 | 26 | 73 | 29 | 82 | 32 | 92  | 36 | 103 | 41 |
| 40                 | 60                            | 24 | 67 | 26 | 75 | 30 | 84 | 33 | 94 | 37 | 106 | 42 | 119 | 47 |

NOTE:

<sup>A</sup> = Distances are calculated for the largest (worst-case) MPE radii

<sup>B</sup> = Power delivered to antenna

<sup>C</sup> = Gains are compared to an ideal 1/2-wave dipole (0 dBd = 2.15 dBi)

# 11.1.2 MPE RADII FOR UHF BAND (440 - 470 MHz1) FOR GENERAL POPULATION/UNCONTROLLED EXPOSURE

#### Limit Gen 0.29

| Power <sup>B</sup> | dBd Antenna Gain <sup>C</sup> |    |     |    |     |    |     |    |     |    |     |    |     |     |
|--------------------|-------------------------------|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|-----|
| (Watt)             | 0                             |    | ]   |    | 2   |    | 3   |    | 4   |    | 5   |    | 6   |     |
|                    | cm                            | in | cm  | in | cm  | in | cm  | in | cm  | in | cm  | in | cm  | in  |
| 10                 | 67                            | 26 | 75  | 30 | 84  | 33 | 95  | 37 | 106 | 42 | 119 | 47 | 134 | 53  |
| 30                 | 116                           | 46 | 130 | 51 | 146 | 57 | 164 | 65 | 184 | 72 | 207 | 81 | 232 | 91  |
| 40                 | 134                           | 53 | 151 | 59 | 169 | 67 | 190 | 75 | 213 | 84 | 239 | 94 | 268 | 106 |

NOTE:

<sup>A</sup> = Distances are calculated for the largest (worst-case) MPE radii

 $^{B}$  = Power delivered to antenna

<sup>C</sup> = Gains are compared to an ideal 1/2-wave dipole (0 dBd = 2.15 dBi)

Instructions will be placed in the user manual instructing installers and users to maintain the MPE distances during operation of the EUT. It is the responsibility of the licensee, when applying for a license, to demonstrate compliance with the FCC RF exposures requirements (MPE) using an antenna different from those specified by the manufacturer and reported on file at the FCC.