

RF Exposure Compliance Requirements IntegraTR UHF Wireless Radio Modem

FCC Rule: 1.1307, 1.1310, 2.1091 (b) (d), 2.1093
IC Rule: RSS 119 Section 9, RSS-102 Section 2.2

Description of Compliance:

The OSMAC base station is intended for use in the Irrigation Monitoring and Control. It will be professionally installed using a 2.5 dBi gain antenna in such a way that a minimum separation distance of more than 33.8 cm will be maintained between the radiating structure and any person to be classified as a mobile. **Note: It is the responsibility of the user to guarantee compliance with the FCC MPE regulations when operating this device in a way other than described above.**

Antenna Gain vs. Recommended Safety Distance

Antenna Gain	2.5 dBi
Min Safety Distance (max power)	33.8 cm

Limits for General Population/Uncontrolled Exposure:

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (mins)
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 (MHz)/1500 (MHz)	30
1500-100000	---	---	1.0	30

Environmental Specification: $f(\text{MHz})/(1500 \text{ mW/cm}^2)$
 $450.0 \text{ MHz}/(1500 \text{ MHz mW/cm}^2) = 0.3 \text{ mW/cm}^2$ (worst case)

$$S = (PG)/(4\pi R^2) \quad (\text{OET Bulletin 65})$$

Where:

S = Power Density (mW/cm²)

P = Power input to the antenna (mW)

G = Power Gain of the antenna in the direction of interest relative to an isotropic radiator

R = Distance to the center of radiation of the antenna (cm)

Distance Calculation for 2.5dBi antenna:

$$R = \sqrt{(PG)/(4\pi S)}$$

$$\text{Antenna Gain: } 2.5 \text{ dBi} \quad 10^{(2.5 \text{ dBi}/10)} = 1.78$$

$$\text{Power input to Antenna } +20\% = 33.81 \text{ dBm}$$

$$\text{Power input to the Antenna: } 33.81 \text{ dBm} = 10^{(33.81 \text{ dBm}/10)} = 2400 \text{ mW}$$

$$R = \sqrt{(2400 \text{ mW} * 1.78)/(4\pi * 0.3 \text{ mW/cm}^2)} = 33.66 \text{ cm (Minimum Distance)}$$

Minimum Distance Rounded Up = 33.8cm Minimum Distance