2.7 MPE CALCULATION

2.7.1 FCC Part 80 Section 1.1307(b)/80.227

2.7.2 Equipment Under Test
RAY240

2.7.3 Date of Test
N/A

2.7.4 Test Equipment Used (See Section 3.1 for details)
N/A

2.7.5 MPE Calculation

A Raymarine device, RAY 240, has a maximum output power of 25 W. The manufacturer declares a duty cycle of 50% with a worst-case antenna gain of 3.0dBi. The equipment is proposed as meeting the OET65 requirements for use at 1.5m.

The wavelength of the equipment is:

$$\frac{3 \times 10^8}{156.025 \times 10^6} = 1.92\text{m}$$

Thus, the far field region is defined as being:

$$\frac{\lambda}{2\pi} = \frac{1.92}{6.283} = 0.306\text{m or } 30.60\text{cm}$$

Therefore, the formula below is applicable as any distance greater than 30.60cm is in the far field. Thus, at a distance of 1.5m from the antenna, the Power Density is calculated as:

$$S = \frac{P \times G}{4\pi R^2} = \frac{25000 \times 2.0}{12.57 \times 150^2} = 0.177\text{mW/cm}^2$$

where:

P = power measured in mW
G = antenna gain as numeric gain, (2.0 numeric / 3.0dBi)
R = distance in cm

MPE for Occupational/Controlled Exposure at 156.025 MHz is 1mW/cm^2

MPE for General Population/Uncontrolled Exposure at 156.025 MHz is 0.2mW/cm^2

Therefore, the unit under test has a power density, which is less than both the General Population and Occupational exposure limits where a separation distance of 1.5m from the antenna exists. The table below shows the Power Density result for the bottom channel and manufacturer declared antenna configuration.

Frequency (MHz)	Measured Conducted Power (mW)	Antenna Gain		Power Density (mW/cm^2)
		dBi	Numeric	
156.025	25000	3.0	2.0	0.177