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MPE Calculation For Symbol Hydra Wireless LAN

A 2.4GHz Spread Spectrum device has a measured output power of 50.7mW with a worst-case antenna gain of 2.5dBi. The equipment operates in the 2.4GHz ISM band. The equipment is proposed as meeting the OET65 requirements for use at 20cm.

The wavelength of the equipment is:

$$\frac{3\times10^{8}}{2462\times10^{6}} = 0.12\text{m}$$

Thus, the far field region is defined as being:

$$\frac{\lambda}{2\pi} = \frac{0.12}{6.283} = 0.019\text{m or } 19\text{mm}$$

Therefore, the formula below is applicable as any distance greater than 19mm is in the far field. Thus, predicting the worst case RF Power Density at 20cm from the antenna would be:

$$S = \frac{P \times G}{4\pi R^{2}} = \frac{50.7 \times 1.78}{12.57 \times 20^{2}} = 0.018\text{mW/cm}^{2}$$

where:

P = power measured in mW
G = antenna gain as numeric gain, (1.78 numeric / 2.5dBi)
R = distance in cm

MPE for Occupational/Controlled Exposure at 2462MHz is 5mW/cm^2

MPE for General Population/Uncontrolled Exposure at 2462MHz is 1mW/cm^2

Therefore, the unit under test has a power density, which is less than both the General Population and Occupational exposure limits. This is the case for the equipment under test in all conditions of operation. The table below shows the Power Density result for each channel and antenna configuration.

Frequency (MHz)	Measured Conducted Power (mW)	Antenna Gain		Power Density (mW/cm^2)
		dBi	Numeric	
2412	46.77	2.5	1.78	0.017
2412	46.77	2	1.58	0.015
2437	47.32	2.5	1.78	0.017
2437	47.32	2	1.58	0.015
2462	50.70	2.5	1.78	0.018
2462	50.70	2	1.58	0.016