1.1 Health & Safety

Exposure to Non Ionizing (RF) Radiation/Safe Working Distances

The safe working distance from a transmitting antenna may be calculated from the relationship:

$$D = \sqrt{\frac{P_T . G_R}{4\pi.w}}$$

In which   D = safe working distance (meters)
       PT = transmitter or combiner power output (watts)
       GR = antenna gain ratio = anti log (gain dBi $\div$10)
       w = power density (watts/square meter)

The RF power density value is determined by reference to safety guidelines for exposure of the human body to non-ionizing radiation. It is important to note that the guidelines adopted differ throughout the world and are from time-to-time re-issued with revised guidelines. For RF Central use, a maximum power density limit of 1w/m² is to be applied when calculating minimum safe working distances. Appendix A refers.

Important Note: It must be remembered that any transmitting equipment radiating power at frequencies of 100 KHz and higher, has the potential to produce thermal and athermal effects upon the human body.

To be safe:

a)   Operators should not stand or walk in front of any antenna, nor should they allow anyone else to do so.

b)   Operators should not operate any RF transmitter or power amplifier with any of its covers removed, nor should they allow anyone else to do so.

Worked examples

Antenna			Transmitter Power			
Type	Gain (dBi)	Gain Ratio	2W	4W	10W	30W
OMNI	4	2.5	1	1	1.5	2.5
HELIX	20	100	4	5.6	9	15.5
PARABOLIC DISH	35	3,162	22.5	32	50	87
			MINIMUM SAFE DISTANCE (METERS)			