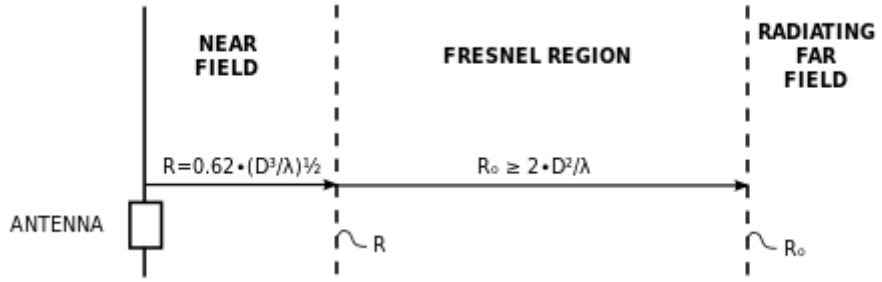
Radhaz Analysis of Data Link and Radar Transmitter

An analysis was done of the potential radiation hazard (RADHAZ) associated with electromagnetic radiation from a data link transmitter and a radar transmitter. The objective of the RADHAZ analysis was to define keep-out zones, as required, for protection of test personnel from hazardous radiation.

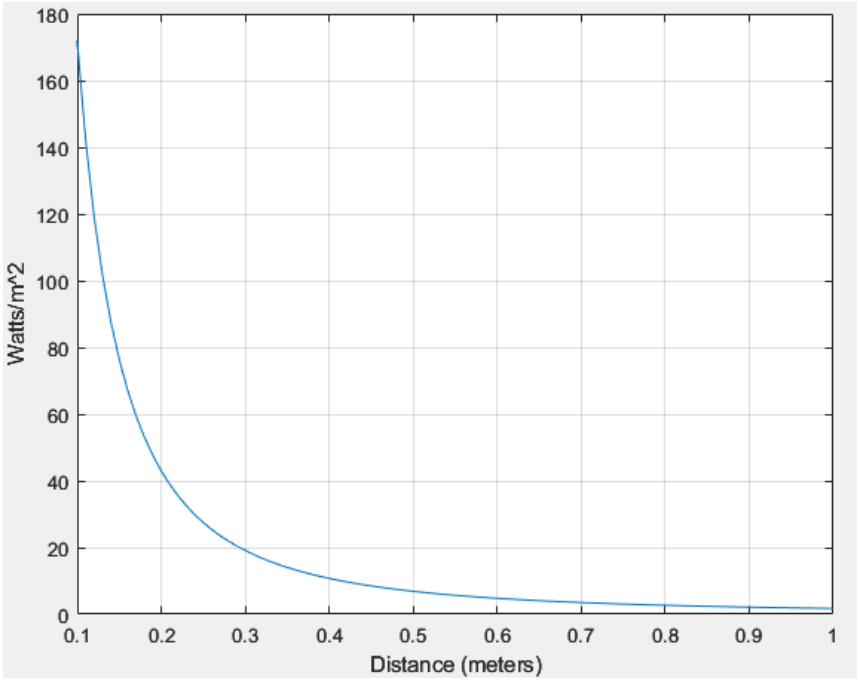
Radar Transmitter RADHAZ Analysis:

The radar transmitter generates a peak RMS power of 300 W, with a PRF of 1 kHz, a maximum duty factor of 7.2% (corresponding to a maximum total pulse time of 72 µs). The radar antenna is an 18 foot, end-fed slotted waveguide array with a far-field gain of 39 dBi. This antenna rotates in azimuth at a rotation rate of 5 rev/min. The radar transmitter operates at frequencies of 9.23 GHz or 9.47 GHz. The far-field distance is approximately 2.3 km.



Wavelength		
0.03165707	m	
Reactive Near Field Distance		
51.21335256	m	
Radiating Near Field Distance		
2274.37346539	m	
Far Field (Greater than this distance)		
2274.37346539	m	

The maximum exposure for the 9.2-9.5 GHz frequency band is 10 W/m^2 public and 50 W/m^2 occupational. Assuming worst case point source radiation of 21.6 Watts average power the occupational minimum safe distance is 18.6 centimeters and the public minimum safe distance is 41.5 centimeters. Both of these distances are substantially less than the length of the antenna and the mounting height.


180
160
140
120
100
80
60
40
20
0
Watts/m^2
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Distance (meters)