APPENDIX A: RF EXPOSURE CALCULATIONS FOR APERTURE ANTENNAS

From FCC 1.1310 table 1A, the maximum permissible RF exposure for an uncontrolled environment is 1mW/cm$^{2.}$

From OET Bulletin 65, the maximum power density directly in front of an aperture antenna can be approximated by equation (11), page 27:

$$S_{surface} = \frac{4P}{A}$$

where:
S_{urface} = maximum power density at the antenna surface
P = power fed to the antenna
A = physical area of the aperture antenna

Maximum peak power into the antenna:	24.6 dBm
Maximum peak power into the antenna:	288 mW
Antenna area:	2810 cm^2
Antenna gain (theoretical maximum):	23.5 dBi
Antenna gain (typical):	21 dBi
FCC limit for CFR47 Part 15 devices:	1mW/cm^2 @ 20cm
Power density:	**0.411 mW/cm^2**

Since physical area is used rather than effective area, this is a conservative estimate and will tend to overestimate power density for a real antenna with losses. As noted in OET 65 equation (13), page 28, aperture efficiency is typically 0.5-0.75 for aperture antennas.