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ANALYSIS OF NON-IONIZING RADIATION FOR A 3.8 METER KU BAND EARTH STATION

This report analyzes the non-ionizing radiation levels for an earth station antenna. The OET Bulletin 65, Edit. 97-01, August 1997, Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields specifies that the maximun level of non-ionizing radiation that a person may be exposed to cover a six minute period is an average power density equal to 5 mw/cm2 in a controlled environment. For the general population, a person may be exposed to cover a thirty minute period is an average power density equal to 1mw/cm2 in an uncontrolled environment. It is the purpose of this report to determine the power flux densities of the earth station surface area, in the near field, transition region and far field.

P=Antenna Power(watts), G=Antenna Gain(db), D=Antenna Diameter(meters)
F=Ctr Frequency(gHz), Wl=WaveLength(meters)

Antenna Surface(m2) A=3.14*D2/4
Antenna Surface Density(w/m2) Ss=4*P/A

Wavelength Wl(m)=3/(F*10)
Near Field Region Rnf(m)=D2/(4*Wl)

Near Field Region Density Snf(m/m2)=16*.6*P/(3.14*D2)

Transition Region Rff(m)=.6*d2/Wl
Transition Region Density St(w/m2)=Snf*Rnf/Rff

Far Field Region Sff(m)=P*G/(4*3.14*Rff)

Earth Station Radiation Hazard Calculations

Freq(ghz)= 14.0 Power(w)=200.0 AntGain(db)= 53.0 AntSize(m)= 3.8
Wavelength(m)= .021 Antenna surface(m2)= 11.3

AntSurfDen Ss(w/m2)=	70.58	Ss(mw/cm2)=	7.06
Near-Field Region Rnf(m)=	168.47		
Near-Field Den Snf(w/m2)=	45.87	Snf(mw/cm2)=	4.59
Transition Region Rff(m)=	404.3		
Tran Region Den St(w/cm2)=	19.11	St(mw/cm2)=	1.91
Far Field Region Sff(w/cm2)=	.01	Sff(mw/cm2)=	.00

ANALYSIS RESULTS

LIMITS - 1mw/cm2 Uncontrolled, 5mw/cm2 Controlled

Antenna Surface Density	Ss(mw/cm 7.058	Potential Hazard, >= Limit
Near Field Density	Snf(mw/c 4.587	
Transition Region	St(mw/cm 1.911	
Far Field Density	Sff(mw/c .001	

For a minimum elevation angle of 5.7(deg) and a object height of 7.0(ft)
For radiation non-hazard, the minimum distance to object=100.3(ft)

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