

RADIATION HAZARD EXHIBITS

FCC OET-65 RF Exposure Study - Satellite Uplink Facility
4.57m Ku Band Antenna - The Wellness Network, Melbourne, FL

FCC Maximum Permissible Exposure Levels	Source	Units
Public/uncontrolled area exposure limit	47CFR §1.1310	1 mW/cm ²
Occupational/controlled area exposure limit	47CFR §1.1310	5 mW/cm ²

Input Data

Antenna Diameter	datasheet	457.0 cm
Antenna surface area	calculated	164030 cm ²
Sub-reflector diameter	measured	74.000 cm
Sub-reflector area	calculated	4301 cm ²
Feed flange diameter	measured	17.800 cm
Feed flange area	calculated	249 cm ²
Frequency	(entry)	14250 MHz
Wavelength (speed of light = 299,792,458 m/s)	calculated	2.104 cm
Transmit power at flange	Application	40000 milliwatts
Antenna gain	datasheet	54.9 dBi
Antenna gain factor	calculated	309030
Height of base of antenna above ground	measured	0.68 m
Height of center of antenna above ground	measured	2.3 m
Minimum Elevation Angle	(entry)	20 degrees
Minimum Elevation Angle	calculated	0.34907 radians

Results calculated using FCC Bulletin OET-65 (Edition 97-01 August 1997)

			FCC Maximum Permissible Exposure (MPE)	
			Uncontrolled	Controlled
Maximum power density at antenna surface	Eq. 11 Pg 27	0.97543358 mW/cm ²	Below FCC MPE	Below FCC MPE
Power density at subreflector	Eq. 11 Pg 27	37.202032 mW/cm ²	Potential Hazard	Potential Hazard
Power density at feed flange	Eq. 11 Pg 27	642.969092 mW/cm ²	Potential Hazard	Potential Hazard
Extent of near-field	Eq. 12 Pg 27	24818 cm		
Maximum near-field power density	Eq. 13 Pg 28	0.64725771 mW/cm ²	Below FCC MPE	Below FCC MPE
Aperture efficiency	Eq. 14 Pg 28	0.66355898		
Distance to beginning of far-field	Eq. 16 Pg 29	59563.1712 cm		
Power density at end of the transition region	Eq. 17 Pg 29	0.26969071 mW/cm ²	Below FCC MPE	Below FCC MPE
Maximum far-field power density	Eq. 18 Pg 29	0.277 mW/cm ²	Below FCC MPE	Below FCC MPE

Main Beam Far-field region safe exposure distances

Minimum distance for public/uncontrolled exposure	Eq. 18 Pg 29	313.635391 meters
Height at minimum antenna elevation angle	calculated	109.569622 meters
Horizontal distance	calculated	294.720863 meters
Minimum distance for occupational/controlled exposure	Eq. 18 Pg 29	140.262011 meters
Height at minimum antenna elevation angle	calculated	50.2724331 meters
Horizontal distance	calculated	131.803177 meters

Off-Axis Near Field/Transition Region safe exposure distances from antenna

(20 dB reduction in power density at distances greater than one antenna diameter from the main beam center.)				
	OET-65 Pg 30			
Maximum off-axis near field power density	Eq. 13 Pg 28	0.0065 mW/cm ²	Below FCC MPE	Below FCC MPE
Public/uncontrolled exposure off-axis distance	Diam/or Eq 17	4.57 meters		
Occupational/controlled exposure off-axis distance	Diam/or Eq 17	4.57 meters		

Off-Axis Far Field safe exposure distances from the antenna

(Based on side lobe attenuation required by FCC 25.209(a)(2))				
Angle off main beam axis (1 to 48 degrees)	(entry)	20 degree(s)		
Off-axis antenna gain factor	OET-65 Pg 30*	1		
Minimum distance for uncontrolled MPE limit	calculated	0.53105264	meters	Not valid if distance less the start of the far field
Minimum distance for public/uncontrolled exposure	Eq. 18 Pg 29 **	595.631712	meters	
* Gain converted from dBi to linear multiple				
** If calculated distance is less than the start of the far field region, the distance to the start of the far field region is used.				

FCC OET-65 RF Exposure Study - Satellite Uplink Facility
2.4m Ku Band Antenna - The Wellness Network, Melbourne, FL

FCC Maximum Permissible Exposure Levels	Source	Units
Public/uncontrolled area exposure limit	47CFR §1.1310	1 mW/cm ²
Occupational/controlled area exposure limit	47CFR §1.1310	5 mW/cm ²

Input Data

Antenna Diameter	datasheet	240.0 cm
Antenna surface area	calculated	45239 cm ²
Sub-reflector diameter	measured	24.000 cm
Sub-reflector area	calculated	11 cm ²
Feed flange diameter	measured	8.000 cm ²
Feed flange area	calculated	50
Frequency	(entry)	14250 MHz
Wavelength (speed of light = 299,792,458 m/s)	calculated	2.104 cm
Transmit power at flange	Application	9170 milliwatts
Antenna gain	datasheet	48.9 dBi
Antenna gain factor	calculated	77625
Height of base of antenna above ground	measured	0.68 m
Height of center of antenna above ground	measured	2.3 m
Minimum Elevation Angle	(entry)	20 degrees
Minimum Elevation Angle	calculated	0.34907 radians

Results calculated using FCC Bulletin OET-65 (Edition 97-01 August 1997)

			FCC Maximum Permissible Exposure (MPE)	
			Uncontrolled	Controlled
Maximum power density at antenna surface	Eq. 11 Pg 27	0.81080602 mW/cm ²	Below FCC MPE	Below FCC MPE
Power density at subreflector	Eq. 11 Pg 27	3334.54545 mW/cm ²	Potential Hazard	Potential Hazard
Power density at feed flange	Eq. 11 Pg 27	729.725414 mW/cm ²	Potential Hazard	Potential Hazard
Extent of near-field	Eq. 12 Pg 27	6845 cm		
Maximum near-field power density	Eq. 13 Pg 28	0.49001166 mW/cm ²	Below FCC MPE	Below FCC MPE
Aperture efficiency	Eq. 14 Pg 28	0.60435128		
Distance to beginning of far-field	Eq. 16 Pg 29	16427.3646 cm		
Power density at end of the transition region	Eq. 17 Pg 29	0.20417152 mW/cm ²	Below FCC MPE	Below FCC MPE
Maximum far-field power density	Eq. 18 Pg 29	0.210 mW/cm ²	Below FCC MPE	Below FCC MPE

Main Beam Far-field region safe exposure distances

Minimum distance for public/uncontrolled exposure	Eq. 18 Pg 29	75.2626899 meters
Height at minimum antenna elevation angle	calculated	28.041356 meters
Horizontal distance	calculated	70.7237943 meters
Minimum distance for occupational/controlled exposure	Eq. 18 Pg 29	33.6584981 meters
Height at minimum antenna elevation angle	calculated	13.8118844 meters
Horizontal distance	calculated	31.6286423 meters

Off-Axis Near Field/Transition Region safe exposure distances from antenna

(20 dB reduction in power density at distances greater than one antenna diameter from the main beam center.)				
	OET-65 Pg 30			
Maximum off-axis near field power density	Eq. 13 Pg 28	0.0049 mW/cm ²	Below FCC MPE	Below FCC MPE
Public/uncontrolled exposure off-axis distance	Diam/or Eq 17	2.4 meters		
Occupational/controlled exposure off-axis distance	Diam/or Eq 17	2.4 meters		

Off-Axis Far Field safe exposure distances from the antenna

(Based on side lobe attenuation required by FCC 25.209(a)(2))				
Angle off main beam axis (1 to 48 degrees)	(entry)	20 degree(s)		
Off-axis antenna gain factor	OET-65 Pg 30*	1		
Minimum distance for uncontrolled MPE limit	calculated	0.25426831	meters	Not valid if distance less the start of the far field
Minimum distance for public/uncontrolled exposure	Eq. 18 Pg 29 **	164.273646	meters	
* Gain converted from dBi to linear multiple				
** If calculated distance is less than the start of the far field region, the distance to the start of the far field region is used.				