

FCC OET-65 RF Exposure Study - Satellite Uplink Facility
NBC 4.5 meter transportable digital Ku-band uplink

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	450.0 cm
Antenna surface area	calculated	159043 cm ²
Feed diameter	measured	12.000 cm ²
Feed area	calculated	113
Frequency	(entry)	14500 MHz
Wavelength (speed of light = 299,792,458 m/s)	calculated	2.068 cm
Transmit power at flange	Application	300000 milliwatts
Antenna gain	datasheet	53.9 dBi
Antenna gain factor	calculated	245471
Height of base of antenna above ground	measured	1.9 m
Height of center of antenna above ground	measured	4.15 m
Minimum Elevation Angle	(entry)	10 degrees
Minimum Elevation Angle	calculated	0.17453 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	7.55 mW/cm ²	Potential Hazard	Potential Hazard
Power density at feed flange	Eq. 11 Pg 27	10610.33 mW/cm ²	Potential Hazard	Potential Hazard
Extent of near-field	Eq. 12 Pg 27	24486 cm		
Maximum near-field power density	Eq. 13 Pg 28	3.96 mW/cm ²	Potential Hazard	Below FCC MPE
Aperture efficiency	Eq. 14 Pg 28	0.53		
Distance to beginning of far-field	Eq. 16 Pg 29	58765.65 cm		
Power density at end of the transition region	Eq. 17 Pg 29	1.65 mW/cm ²	Potential Hazard	Below FCC MPE
Maximum far-field power density	Eq. 18 Pg 29	1.697 mW/cm ²	Potential Hazard	Below FCC MPE

Main Beam Far-field region safe exposure distances

Minimum distance for public/uncontrolled exposure	Eq. 18 Pg 29	765.52 meters
Height at minimum antenna elevation angle	calculated	137.08 meters
Horizontal distance	calculated	753.89 meters
Minimum distance for occupational/controlled exposure	Eq. 18 Pg 29	342.35 meters
Height at minimum antenna elevation angle	calculated	63.6 meters
Horizontal distance	calculated	337.15 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.)				
Maximum off-axis near field power density	OET-65 Pg 30		Below FCC MPE	Below FCC MPE
	Eq. 13 Pg 28	0.0396 mW/cm ²		
Public/uncontrolled exposure off-axis distance	Diam/or Eq 17	4.5 meters		
Occupational/controlled exposure off-axis distance	Diam/or Eq 17	4.5 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)	2 degree(s)		
Off-axis antenna gain factor	OET-65 Pg 30*	280		
Minimum distance for public/uncontrolled exposure	Eq. 18 Pg 29 **	587.66 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.