

FCC OET-65 RF Exposure Study - Satellite Uplink Facility
NBC "Surfboy" satellite news gathering truck with Vertex 1.8m SMK-LT antenna

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	180.0 cm
Antenna surface area	calculated	25447 cm ²
Sub-reflector diameter	measured	N/A cm
Sub-reflector area	calculated	N/A cm ²
Feed flange diameter	measured	8.855 cm
Feed flange area	calculated	62 cm ²
Frequency	(entry)	14250 MHz
Wavelength (speed of light = 299,792,458 m/s)	calculated	2.104 cm
Transmit power at flange	Application	400000 milliwatts
Antenna gain	datasheet	45.9 dBi
Antenna gain factor	calculated	38905
Height of base of antenna above ground	measured	3.48 m
Height of center of antenna above ground	measured	4.98 m
Minimum Elevation Angle	(entry)	15 degrees
Minimum Elevation Angle	calculated	0.26180 radians

FCC Maximum Permissible Exposure (MPE)

			FCC Maximum Permissible Exposure (MPE)	
			Uncontrolled	Controlled
Maximum power density at antenna surface	Eq. 11 Pg 27	62.8760269 mW/cm ²	Potential Hazard	Potential Hazard
Power density at subreflector	Eq. 11 Pg 27	N/A mW/cm ²		
Power density at feed flange	Eq. 11 Pg 27	25980.827 mW/cm ²	Potential Hazard	Potential Hazard
Extent of near-field	Eq. 12 Pg 27	3850 cm		
Maximum near-field power density	Eq. 13 Pg 28	33.8572759 mW/cm ²	Potential Hazard	Potential Hazard
Aperture efficiency	Eq. 14 Pg 28	0.53847671		
Distance to beginning of far-field	Eq. 16 Pg 29	9240.39257 cm		
Power density at end of the transition region	Eq. 17 Pg 29	14.1071983 mW/cm ²	Potential Hazard	Potential Hazard
Maximum far-field power density	Eq. 18 Pg 29	14.503 mW/cm ²	Potential Hazard	Potential Hazard

Main Beam Far-field region safe exposure distances

Minimum distance for public/uncontrolled exposure	Eq. 18 Pg 29	351.904697 meters
Height at minimum antenna elevation angle	calculated	96.0596377 meters
Horizontal distance	calculated	339.913835 meters
Minimum distance for occupational/controlled exposure	Eq. 18 Pg 29	157.376565 meters
Height at minimum antenna elevation angle	calculated	45.7120522 meters
Horizontal distance	calculated	152.014088 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	0.3386 mW/cm ²	Below FCC MPE	Below FCC MPE
Public/uncontrolled exposure off-axis distance	Diam/or Eq 17	1.8 meters		
Occupational/controlled exposure off-axis distance	Diam/or Eq 17	1.8 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)	15 degree(s)		
Off-axis antenna gain factor	OET-65 Pg 30*	2		
Minimum distance for uncontrolled MPE limit	calculated	2.40608513 meters	Not valid if distance less the start of the far field	
Minimum distance for public/uncontrolled exposure	Eq. 18 Pg 29 **	92.4039257 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.