

FCC OET-65 RF Exposure Study - Satellite Uplink Facility

NBC Digital Ku-band transportable uplink - "Cowboy-Jr"

Antenna Vendor/Model	AVL 1810K
Antenna Size:	1.8m
Amplifier Make/Model:	CPI-400W
Amplifier Power at output flange:	350w.
Feed Flange Power after system loss of 0.25 dB	330.4w

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
Feed flange diameter	estimated	7.303 cm
Feed flange area	calculated	42
Frequency	(entry)	14125 MHz
Wavelength (speed of light = 299,792,458 m/s)	calculated	2.122 cm
Transmit power at flange	Application	330400 milliwatts
Antenna gain	datasheet	46.5 dBi
Antenna gain factor	calculated	44668
Height of base of antenna above ground	measured	3.51 m
Height of center of antenna above ground	measured	4.29 m
Minimum Elevation Angle	(entry)	10 degrees
Minimum Elevation Angle	calculated	0.17453 radians

FCC Maximum Permissible Exposure (MPE)

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	51.94 mW/cm ²	Potential Hazard	Potential Hazard
Power density at feed flange	Eq. 11 Pg 27	31554.92 mW/cm ²	Potential Hazard	Potential Hazard
Extent of near-field	Eq. 12 Pg 27	3816 cm		
Maximum near-field power density	Eq. 13 Pg 28	32.68 mW/cm ²	Potential Hazard	Potential Hazard
Aperture efficiency	Eq. 14 Pg 28	0.63		
Distance to beginning of far-field	Eq. 16 Pg 29	9159.34 cm		
Power density at end of the transition region	Eq. 17 Pg 29	13.62 mW/cm ²	Potential Hazard	Potential Hazard
Maximum far-field power density	Eq. 18 Pg 29	13.999 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	342.7 meters
Height at minimum antenna elevation angle	calculated	63.8 meters
Horizontal distance	calculated	337.49 meters
Minimum distance for occupational/controlled exposure	Eq. 18 Pg 29	153.26 meters
Height at minimum antenna elevation angle	calculated	30.9 meters
Horizontal distance	calculated	150.93 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	0.3268 mW/cm ²	Below FCC MPE
Public/uncontrolled exposure off-axis distance	Diam/or Eq 17	1.8 meters	Below FCC MPE
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)	10 degree(s)
Off-axis antenna gain factor	OET-65 Pg 30*	5
Minimum distance for public/uncontrolled exposure	Eq. 18 Pg 29 **	91.59 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.