

FCC OET-65 RF Exposure Study - Satellite Uplink Facility

**NBC Digital Ku-band transportable uplink - "FrontlineR"**

<b>Antenna Vendor/Model</b>	AVL 1810K
<b>Antenna Size:</b>	1.8m
<b>Amplifier Make/Model:</b>	MCL MT3400
<b>Amplifier Max Output Power:</b>	360w.
<b>Feed Flange Power after system loss of 0.1 dB</b>	352w

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

**Input Data**

Antenna Diameter	datasheet	180.0 cm
Antenna surface area	calculated	25447 cm <sup>2</sup>
Feed flange diameter	estimated	6.350 cm <sup>2</sup>
Feed flange area	calculated	32
Frequency	(entry)	14125 MHz
Wavelength (speed of light = 299,792,458 m/s)	calculated	2.122 cm
Transmit power at flange	Application	352000 milliwatts
Antenna gain	datasheet	46.5 dBi
Antenna gain factor	calculated	44668
Height of base of antenna above ground	measured	3.47 m
Height of center of antenna above ground	measured	4.37 m
Minimum Elevation Angle	(entry)	5 degrees
Minimum Elevation Angle	calculated	0.08727 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	55.33 mW/cm <sup>2</sup>	Potential Hazard	Potential Hazard
Power density at feed flange	Eq. 11 Pg 27	44459.58 mW/cm <sup>2</sup>	Potential Hazard	Potential Hazard
Extent of near-field	Eq. 12 Pg 27	3816 cm		
Maximum near-field power density	Eq. 13 Pg 28	34.82 mW/cm <sup>2</sup>	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	14.51 mW/cm <sup>2</sup>	Potential Hazard	Potential Hazard
Maximum far-field power density	Eq. 18 Pg 29	14.914 mW/cm <sup>2</sup>	Potential Hazard	Potential Hazard

**Main Beam Far-field region safe exposure distances**

Minimum distance for public/uncontrolled exposure	Eq. 18 Pg 29	353.73 meters
Height at minimum antenna elevation angle	calculated	35.2 meters
Horizontal distance	calculated	352.38 meters
Minimum distance for occupational/controlled exposure	Eq. 18 Pg 29	158.19 meters
Height at minimum antenna elevation angle	calculated	18.16 meters
Horizontal distance	calculated	157.59 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	0.3482 mW/cm <sup>2</sup>	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)	5 degree(s)
Off-axis antenna gain factor	OET-65 Pg 30*	28
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.