

FCC OET-65 RF Exposure Study - Satellite Uplink Facility  
**WMAQ-TV Digital Ku-band transportable uplink - "MC #9"**

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	120.0 cm
Antenna surface area	calculated	11310 cm <sup>2</sup>
Sub-reflector diameter	measured	N/A cm
Sub-reflector area	calculated	N/A cm <sup>2</sup>
Feed flange diameter	estimated	5.400 cm <sup>2</sup>
Feed flange area	calculated	23
Frequency	(entry)	14125 MHz
Wavelength (speed of light = 299,792,458 m/s)	calculated	2.122 cm
Transmit power at flange	Application	125000 milliwatts
Antenna gain	datasheet	43.2 dBi
Antenna gain factor	calculated	20893
Height of base of antenna above ground	measured	2.91 m
Height of center of antenna above ground	measured	3.51 m
Minimum Elevation Angle	(entry)	5 degrees
Minimum Elevation Angle	calculated	0.08727 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	44.21 mW/cm <sup>2</sup>	Potential Hazard	Potential Hazard
Power density at subreflector	Eq. 11 Pg 27	0 mW/cm <sup>2</sup>	N/A	N/A
Power density at feed flange	Eq. 11 Pg 27	21831.95 mW/cm <sup>2</sup>	Potential Hazard	Potential Hazard
Extent of near-field	Eq. 12 Pg 27	1696 cm		
Maximum near-field power density	Eq. 13 Pg 28	29.28 mW/cm <sup>2</sup>	Potential Hazard	Potential Hazard
Aperture efficiency	Eq. 14 Pg 28	0.66		
Distance to beginning of far-field	Eq. 16 Pg 29	4070.82 cm		
Power density at end of the transition region	Eq. 17 Pg 29	12.2 mW/cm <sup>2</sup>	Potential Hazard	Potential Hazard
Maximum far-field power density	Eq. 18 Pg 29	12.541 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	144.16 meters
Height at minimum antenna elevation angle	calculated	16.07 meters
Horizontal distance	calculated	143.61 meters
Minimum distance for occupational/controlled exposure	Eq. 18 Pg 29	64.47 meters
Height at minimum antenna elevation angle	calculated	9.13 meters
Horizontal distance	calculated	64.23 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
Public/uncontrolled exposure off-axis distance	Eq. 13 Pg 28	0.2928 mW/cm <sup>2</sup>		
Occupational/controlled exposure off-axis distance	Diam/or Eq 17	1.2 meters		
		1.2 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 public/uncontrolled exposure	Eq. 18 Pg 29 **	40.71 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.