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ANALYSIS OF NON – IONIZING RADIATION FOR A 3.8METER EARTH STATION

This report analyzes the non – ionizing radiation levels for a 3.8meter earth station .

The Office of Engineering and Technology Bulletin , No. 65 , edition 97-01 , specifies that there are two separate tiers of exposure limits that are dependent on the situation in which exposure take place and/or the status of the individuals who are subject to the exposure .

The Maximum Permissible Exposure (MPE) limit for person in a Uncontrolled/Public environment to non – ionizing radiation over a thirty minute period is a power density equal to 1 mW/cm**2 (one milliwatt per centimeter squared) .

The Maximum Permissible Exposure (MPE) limit for persons in a Controlled/Occupational environment to non – ionizing radiation over a six minute period is a power density equal to 5 mW/cm**2 (five milliwatts per centimeter squared) .

It is the purpose of this report to determine the power flux densities of the earth station in the far field , near field , transition region , between the feed horn and the main reflector surface , at the main reflector surface , and between the antenna edge and the ground .

The parameters that were used to calculate the various power flux densities for this earth stations , together with the results of the calculations and the Hazard Assessments are listed in the following table .

FCC 312
RADIO MARIA, INC.
RF RADIATION
HAZARD STUDY
EXHIBIT A

SYSTEM SPECS

Antenna diameter	D	3.800	m
Antenna surface area	Sa	11.335	m**2
Feed Horn Diameter	Ds	12.000	cm
Area of Feed Horn	As	113.040	cm**2
Frequency	f	6175.00	Mhz
		0	
Wavelength	lambda	0.049	m
	a		
Transmit Power at Flange	P	4.000	W
Antenna Gain dBi	G	45.880	
Antenna Gain (Times)	Ges	38725.7	
		64	
Antenna aperture efficiency	eta	0.550	

EXPECTED RADIATION LEVELS

HAZARD ASSESSMENT	HAZARD ASSESSMENT
MPE for Uncontrolled Environment	MPE for Controlled Environment
LIMIT = 1 mW/cm**2	LIMIT = 5 mW/cm**2

Far Field Calculations

Distance to the Far Field Region	Rf	178.334	m
On-Axis Power Density in the Far Field	Wf	0.388	W/m**2
		0.039	mW/cm**2
			SATISFIES ANSI
			SATISFIES ANSI

Near Field Calculations

Extent of the near field	Rn	74.306	
Near Field Power Density	Wn	0.776	W/m**2
		0.078	mW/cm**2
			SATISFIES ANSI
			SATISFIES ANSI

Transition Region Calculations

Main reflector and Feed Horn

Power Density at Feed Horn	Ws		mW/cm ²
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Main reflector Region

Power Density at Main Reflector Surface	Wm	1.412	W/m ²
		0.141	mW/cm ² SATISFIES ANSI
			SATISFIES ANSI

Main Reflector and Ground

Power Density between Reflector and Ground	Wg	0.353	W/m ²
		0.035	mW/cm ² SATISFIES ANSI
			SATISFIES ANSI



SYSTEM PARAMETERS

Antenna diameter	D	2.400	m
Antenna surface area	Sa	4.522	m ²
Feed Horn Diameter	Ds	12.000	cm
Area of Feed Horn	As	113.040	cm ²
Frequency	f	6175.000	Mhz
Wavelength	lambda	0.049	m
Transmit Power at Flange	P	4.000	W
Antenna Gain dBi	G	48.100	
Antenna Gain (Times)	Ges	64565.423	
Antenna aperture efficiency	eta	0.550	

EXPECTED RADIATION LEVELS

HAZARD ASSESSMENT	HAZARD ASSESSMENT
MPE for Uncontrolled Environment LIMIT = 1 mW/cm ²	MPE for Controlled Environment LIMIT = 5 mW/cm ²

Far Field Calculations					
Distance to the Far Field Region	Rf	71.136	m		
On-Axis Power Density in the Far Field	Wf	4.063	W/m ²		
		0.406	mW/cm ²	SATISFIES ANSI	SATISFIES ANSI

Near Field Calculations					
Extent of the near field	Rn	29.640			
Near Field Power Density	Wn	1.946	W/m ²		
		0.196	mW/cm ²	SATISFIES ANSI	SATISFIES ANSI

Transition Region Calculations

Main reflector and Feed Horn

Power Density at Feed Horn	Ws		mW/cm ²		
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Main reflector Region

Power Density at Main Reflector Surface	Wm	3.539	W/m ²		
		0.354	mW/cm ²	SATISFIES ANSI	SATISFIES ANSI

Main Reflector and Ground

Power Density between Reflector and Ground	Wg	0.885	W/m**2		
		0.086	mW/cm**2	SATISFIES ANSI	SATISFIES ANSI



Based on this analysis it is concluded that the FCC RF Guidelines have been exceeded only in the region between the feed horn and the antenna surface .

The applicant proposes to comply with the Maximum Permissible Exposure (MPE) limits of 1 mW/cm2 for the Uncontrolled areas and the MPE limits of 5 mW/cm2 for the Controlled areas by one or more of the following methods :

MEANS OF COMPLIANCE UNCONTROLLED AREAS

This antenna will be located in a fenced area .

The fenced area will be sufficient to prohibit access to the areas that exceed the MPE limits .

The general public will not have access to areas within ½ diameter removed from the edge of the antenna .

Since one diameter removed from the main beam of the antenna or ½ diameter removed from the edge of the antenna the RF levels are reduced by a factor of 100 (20 dB) .

None of the areas exceeding the MPE levels will be accessible by the general public .

Radiation hazard signs will be posted while this earth station is in operation .

The applicant will ensure that no buildings or other obstacles will be in the areas that exceed the MPE levels .

MEANS OF COMPLIANCE CONTROLLED AREAS

The earth station's operational will not have access to the areas that exceed the MPE levels while the earth station is in operation .

The transmitter will be turned off during antenna maintenance .

CERTIFICATION

I hereby certify that I am the technically qualified person responsible for the preparation of the hazard assessment , and that I have reviewed this radiation hazard assessment , and that it is complete and correct to the best of my knowledge .

BY :

Claudio Re

Claudio Fulvio Roberto Re
University Degree in Electronics and Telecommunications
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DATED : August 10 , 1999