ITC Global

Modification of VSAT Blanket License

<u>Technical Appendix</u>

Radiation Hazard Study

Prodelin 2.4m Ku (1241)

This study analyzes the potential Radio Frequency (RF) human exposure levels caused by the Electro Magnetic (EM) fields of the above-captioned antenna. The mathematical analysis performed below complies with the methods described in the Federal Communications Commission Office of Engineering and Technology Bulletin No. 65 (1985 rev. 1997) R&O 96-326.

Maximum Permisible Exposure

There are two separate levels of exposure limits. The first applies to persons in the general population who are in an uncontrolled environment. The second applies to trained personnel in a controlled environment. According to 47 C.F.R. § 1.1310, the Maximum Permissible Exposure (MPE) limits for frequencies above 1.5 GHz are as follows:

- General Population / Uncontrolled Exposure 1.0 mW/cm2
- Occupational / Controlled Exposure 5.0 mW/cm2

The purpose of this study is to determine the power flux density levels for the earth station under study as compared with the MPE limits. This comparison is done in each of the following regions:

1. Far-field region
2. Near-field region
3. Transition region
4. The region between the feed and the antenna surface
5. The main reflector region
6. The region between the antenna edge and the ground

Input Parameters

The following input parameters were used in the calculations:

Parameter	Value	Unit	Symbol
Atenna Diameter:	2.4	m	D
Antenna Transmit Gain:	49.20	dBi	G
Trasmit Frequency:	14250	MHz	f
Feed Flange Diameter:	22.00	cm	d
Power Input to the Antenna:	40.00	W	P

Calculated Parameters

The following values were calculated using the above input parameters and the corresponding formulas.

Parameter	Value	Unit	Symbol	Formula
Anenna Surface Area:	4.52	m^2	A	$\pi D^2/4$
Area of Feed Flange:	380.13	cm^2	a	$\pi d^2/4$
Antenna Efficiency:	0.65		η	$G\lambda^2/(\pi^2 D^2)$
Gain Factor:	83176.38		g	$10^{G/10}$
Wavelength:	0.0211	m	λ	$300/f$

Behavior of EM Fields as a Function of Distance

The behavior of the characteristics of EM fields varies depending on the distance from the radiating antenna. These characteristics are analyzed in three primary regions: the near-field region, the far-field region and the transition region. Of interest also are the region between the antenna main reflector and the subreflector, the region of the main reflector area and the region between the main reflector and ground.

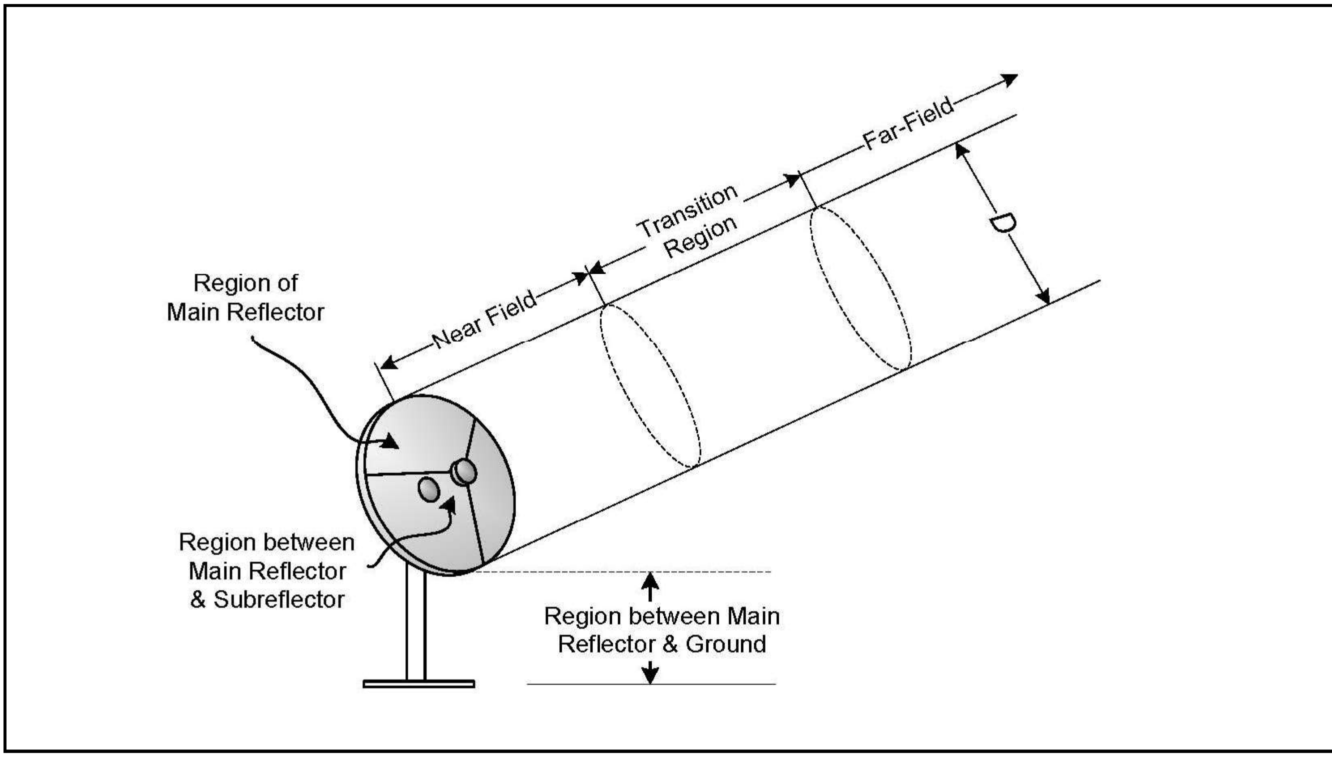

Figure 1. EM Fields as a Function of Distance

For parabolic aperture antennas with circular cross sections, such as the antenna under study, the near-field, far-field and transition region distances are calculated as follows:

Parameter	Value	Unit	Formula
Near Field Distance:	68.400	m	$R_{nf} = D^2/(4\lambda)$
Distance to Far Field:	164.160	m	Rff = 0.60D2/(λ)
Distance of Trasition Region	68.400	m	Rt = Rnf

The distance in the transition region is between the near and far fields. Thus, Rnf ≤ Rt ≤ Rff . However, the power density in the transition region will not exceed the power density in the near-field. Therefore, for purposes of the present analysis, the distance of the transition region can equate the distance to the near-field.

Power Flux Density Calculations

The power flux density is considered to be at a maximum through the entire length of the near-field. This region is contained within a cylindrical volume with a diameter, D, equal to the diameter of the antenna. In the transition region and the far-field, the power density decreases inversely with the square of the distance. The following equations are used to calculate power density in these regions.

Parameter	Value	Unit	Symbol	Formula
Power Density in the Near-Field	2.293	mW/cm^2	S_{nf}	$16.0\ \eta\ P/(\pi D^2)$
Power Density in the Far-Field	0.982	mW/cm^2	S_{ff}	$GP/(4\pi R_{ff}^2)$
Power Density in the Trans. Region	2.293	mW/cm^2	S_t	$S_{nf} R_{nf} /(R_t)$

The region between the main reflector and the subreflector is confined within a conical shape defined by the feed assembly. The most common feed assemblies are waveguide flanges. This energy is determined as follows:

Parameter	Value	Unit	Symbol	Formula
Power Density at the Feed Flange	420.9	mW/cm^2	S_{fa}	$4P\ /\ a$

The power density in the main reflector is determined similarly to the power density at the feed flange; except that the area of the reflector is used.

Parameter	Value	Unit	Symbol	Formula
Power Density at Main Reflector	3.537	mW/cm^2	$S_{surface}$	$4P\ /\ A$

The power density between the reflector and ground, assuming uniform illumination of the reflector surface, is calculated as follows:

Parameter	Value	Unit	Symbol	Formula
Power Density between Reflector and Ground	0.884	mW/cm^2	S_g	$P\ /\ A$

Table 1 summarizes the calculated power flux density values for each region. In a controlled environment, the only regions that exceed FCC limitations are shown below. These regions are only accessible by trained technicians who, as a matter of procedure, turn off transmit power before performing any work in these areas.

Power Densities	**mW/cm2**	**Controlled Environment (5 mW/cm2)**
Far Field Calculation	0.982	Satisfies FCC Requirements
Near Field Calculation	2.293	Satisfies FCC Requirements
Transition Region	2.293	Satisfies FCC Requirements
Region between Main and Subreflector	420.9	Exceeds Limitations
Main Reflector Region	3.537	Satisfies FCC Requirements
Region between Main Reflector and Ground	0.884	Satisfies FCC Requirements

Table 1. Power Flux Density for Each Region

In conclusion, the results show that the antenna, in a controlled environment, and under the proper mitigation procedures, meets the guidelines specified in 47 C.F.R. § 1.1310.

II. GD Satcom 1244 Radiation Hazard Analysis

Radiation Hazard Study

Prodelin 1244 Ku

This study analyzes the potential Radio Frequency (RF) human exposure levels caused by the Electro Magnetic (EM) fields of the above-captioned antenna. The mathematical analysis performed below complies with the methods described in the Federal Communications Commission Office of Engineering and Technology Bulletin No. 65 (1985 rev. 1997) R&O 96-326.

Maximum Permisible Exposure

There are two separate levels of exposure limits. The first applies to persons in the general population who are in an uncontrolled environment. The second applies to trained personnel in a controlled environment. According to 47 C.F.R. § 1.1310, the Maximum Permissible Exposure (MPE) limits for frequencies above 1.5 GHz are as follows:

- General Population / Uncontrolled Exposure 1.0 mW/cm2
- Occupational / Controlled Exposure 5.0 mW/cm2

The purpose of this study is to determine the power flux density levels for the earth station under study as compared with the MPE limits. This comparison is done in each of the following regions:

1. Far-field region
2. Near-field region
3. Transition region
4. The region between the feed and the antenna surface
5. The main reflector region
6. The region between the antenna edge and the ground

Input Parameters

The following input parameters were used in the calculations:

Parameter	Value	Unit	Symbol
Atenna Diameter:	2.4	m	D
Antenna Transmit Gain:	49.26	dBi	G
Trasmit Frequency:	14250	MHz	f
Feed Flange Diameter:	13.10	cm	d
Power Input to the Antenna:	55.00	W	P

Calculated Parameters

The following values were calculated using the above input parameters and the corresponding formulas.

Parameter	Value	Unit	Symbol	Formula
Anenna Surface Area:	4.52	m^2	A	$\pi D^2/4$
Area of Feed Flange:	134.78	cm^2	a	$\pi d^2/4$
Antenna Efficiency:	0.66		η	$G\lambda^2/(\pi^2 D^2)$
Gain Factor:	84333.48		g	$10^{G/10}$
Wavelength:	0.0211	m	λ	$300/f$

Behavior of EM Fields as a Function of Distance

The behavior of the characteristics of EM fields varies depending on the distance from the radiating antenna. These characteristics are analyzed in three primary regions: the near-field region, the far-field region and the transition region. Of interest also are the region between the antenna main reflector and the subreflector, the region of the main reflector area and the region between the main reflector and ground.

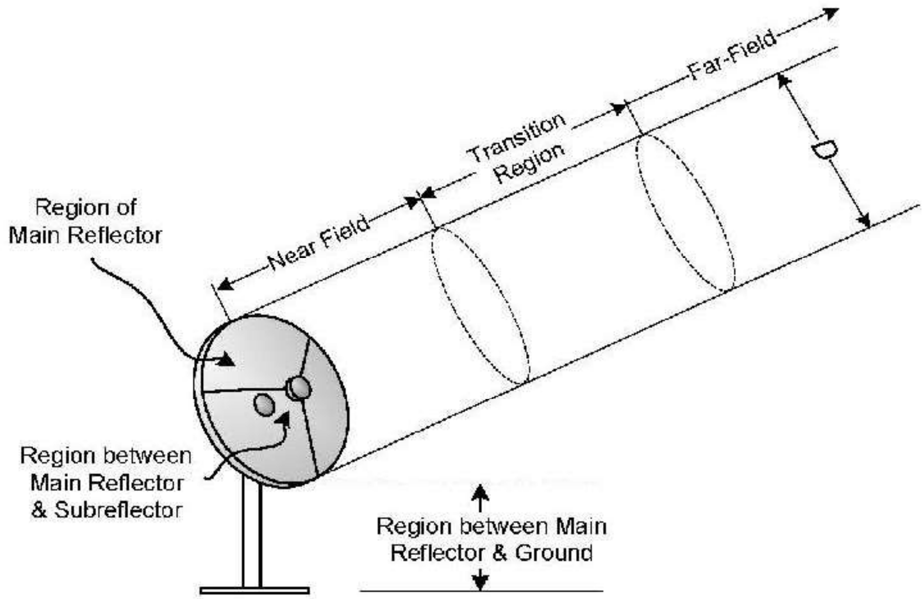

Figure 1. EM Fields as a Function of Distance

For parabolic aperture antennas with circular cross sections, such as the antenna under study, the near-field, far-field and transition region distances are calculated as follows:

Parameter	Value	Unit	Formula
Near Field Distance:	68.400	m	$R_{nf} = D^2/(4\lambda)$
Distance to Far Field:	164.160	m	Rff = 0.60D2/(λ)
Distance of Trasition Region	68.400	m	Rt = Rnf

The distance in the transition region is between the near and far fields. Thus, Rnf ≤ Rt ≤ Rff . However, the power density in the transition region will not exceed the power density in the near-field. Therefore, for purposes of the present analysis, the distance of the transition region can equate the distance to the near-field.

Power Flux Density Calculations

The power flux density is considered to be at a maximum through the entire length of the near-field. This region is contained within a cylindrical volume with a diameter, D, equal to the diameter of the antenna. In the transition region and the far-field, the power density decreases inversely with the square of the distance. The following equations are used to calculate power density in these regions.

Parameter	Value	Unit	Symbol	Formula
Power Density in the Near-Field	3.197	mW/cm^2	S_{nf}	$16.0\ \eta\ P/(\pi D^2)$
Power Density in the Far-Field	1.370	mW/cm^2	S_{ff}	$GP/(4\pi\ R_{ff}^2)$
Power Density in the Trans. Region	3.197	mW/cm^2	S_t	$S_{nf}\ R_{nf}\ /(R_t)$

The region between the main reflector and the subreflector is confined within a conical shape defined by the feed assembly. The most common feed assemblies are waveguide flanges. This energy is determined as follows:

Parameter	Value	Unit	Symbol	Formula
Power Density at the Feed Flange	1632.3	mW/cm^2	S_{fa}	$4P\ /\ a$

The power density in the main reflector is determined similarly to the power density at the feed flange; except that the area of the reflector is used.

Parameter	Value	Unit	Symbol	Formula
Power Density at Main Reflector	4.863	mW/cm^2	$S_{surface}$	$4P\ /\ A$

The power density between the reflector and ground, assuming uniform illumination of the reflector surface, is calculated as follows:

Parameter	Value	Unit	Symbol	Formula
Power Density between Reflector and Ground	1.216	mW/cm^2	S_g	$P\ /\ A$

Table 1 summarizes the calculated power flux density values for each region. In a controlled environment, the only regions that exceed FCC limitations are shown below. These regions are only accessible by trained technicians who, as a matter of procedure, turn off transmit power before performing any work in these areas.

Power Densities	**mW/cm2**	**Controlled Environment (5 mW/cm2)**
Far Field Calculation	1.370	Satisfies FCC Requirements
Near Field Calculation	3.197	Satisfies FCC Requirements
Transition Region	3.197	Satisfies FCC Requirements
Region between Main and Subreflector	1632.3	Exceeds Limitations
Main Reflector Region	4.863	Satisfies FCC Requirements
Region between Main Reflector and Ground	1.216	Satisfies FCC Requirements

Table 1. Power Flux Density for Each Region

In conclusion, the results show that the antenna, in a controlled environment, and under the proper mitigation procedures, meets the guidelines specified in 47 C.F.R. § 1.1310.

III. Thrane & Thrane Sailor 900 Radiation Hazard Analysis

Radiation Hazard Study

Sailor 900B

This study analyzes the potential Radio Frequency (RF) human exposure levels caused by the Electro Magnetic (EM) fields of the above-captioned antenna. The mathematical analysis performed below complies with the methods described in the Federal Communications Commission Office of Engineering and Technology Bulletin No. 65 (1985 rev. 1997) R&O 96-326.

Maximum Permisible Exposure

There are two separate levels of exposure limits. The first applies to persons in the general population who are in an uncontrolled environment. The second applies to trained personnel in a controlled environment. According to 47 C.F.R. § 1.1310, the Maximum Permissible Exposure (MPE) limits for frequencies above 1.5 GHz are as follows:

- General Population / Uncontrolled Exposure 1.0 mW/cm2
- Occupational / Controlled Exposure 5.0 mW/cm2

The purpose of this study is to determine the power flux density levels for the earth station under study as compared with the MPE limits. This comparison is done in each of the following regions:

1. Far-field region
2. Near-field region
3. Transition region
4. The region between the feed and the antenna surface
5. The main reflector region
6. The region between the antenna edge and the ground

Input Parameters

The following input parameters were used in the calculations:

Parameter	Value	Unit	Symbol
Atenna Diameter:	1.03	m	D
Antenna Transmit Gain:	41.60	dBi	G
Trasmit Frequency:	14250	MHz	f
Feed Flange Diameter:	5.30	cm	d
Power Input to the Antenna:	8.00	W	P

Calculated Parameters

The following values were calculated using the above input parameters and the corresponding formulas.

Parameter	Value	Unit	Symbol	Formula
Anenna Surface Area:	0.83	m^2	A	$\pi D^2/4$
Area of Feed Flange:	22.06	cm^2	a	$\pi d^2/4$
Antenna Efficiency:	0.58		η	$G\lambda^2/(\pi^2 D^2)$
Gain Factor:	13803.84		g	$10^{G/10}$
Wavelength:	0.0211	m	λ	$300/f$

Behavior of EM Fields as a Function of Distance

The behavior of the characteristics of EM fields varies depending on the distance from the radiating antenna. These characteristics are analyzed in three primary regions: the near-field region, the far-field region and the transition region. Of interest also are the region between the antenna main reflector and the subreflector, the region of the main reflector area and the region between the main reflector and ground.

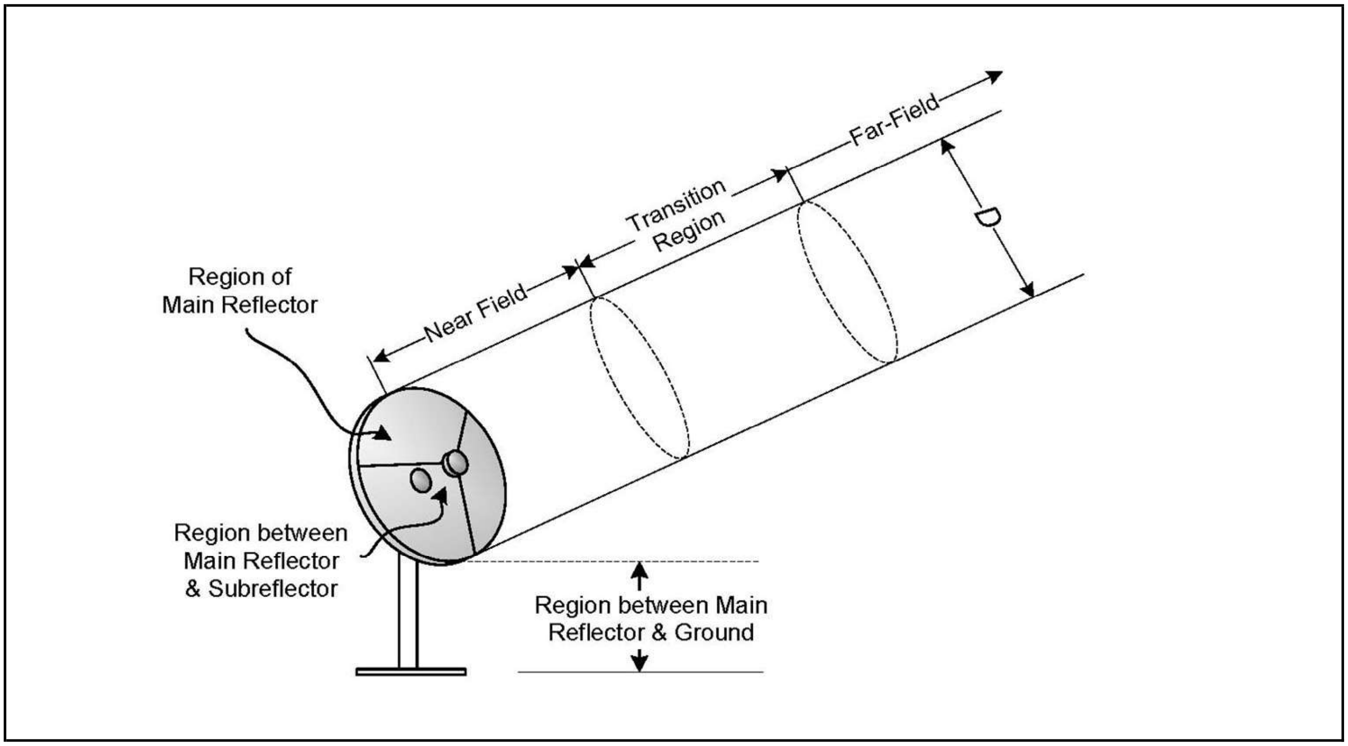

Figure 1. EM Fields as a Function of Distance

For parabolic aperture antennas with circular cross sections, such as the antenna under study, the near-field, far-field and transition region distances are calculated as follows:

Parameter	Value	Unit	Formula
Near Field Distance:	12.598	m	$R_{nf} = D^2/(4\lambda)$
Distance to Far Field:	30.236	m	Rff = 0.60D2/(λ)
Distance of Trasition Region	12.598	m	Rt = Rnf

The distance in the transition region is between the near and far fields. Thus, Rnf ≤ Rt ≤ Rff . However, the power density in the transition region will not exceed the power density in the near-field. Therefore, for purposes of the present analysis, the distance of the transition region can equate the distance to the near-field.

Power Flux Density Calculations

The power flux density is considered to be at a maximum through the entire length of the near-field. This region is contained within a cylindrical volume with a diameter, D, equal to the diameter of the antenna. In the transition region and the far-field, the power density decreases inversely with the square of the distance. The following equations are used to calculate power density in these regions.

Parameter	Value	Unit	Symbol	Formula
Power Density in the Near-Field	2.244	mW/cm^2	S_{nf}	$16.0\ \eta\ P/(\pi D^2)$
Power Density in the Far-Field	0.961	mW/cm^2	S_{ff}	$GP/(4\pi R_{ff}^2)$
Power Density in the Trans. Region	2.244	mW/cm^2	S_t	$S_{nf} R_{nf} /(R_t)$

The region between the main reflector and the subreflector is confined within a conical shape defined by the feed assembly. The most common feed assemblies are waveguide flanges. This energy is determined as follows:

Parameter	Value	Unit	Symbol	Formula
Power Density at the Feed Flange	1450.5	mW/cm^2	S_{fa}	$4P\ /\ a$

The power density in the main reflector is determined similarly to the power density at the feed flange; except that the area of the reflector is used.

Parameter	Value	Unit	Symbol	Formula
Power Density at Main Reflector	3.840	mW/cm^2	$S_{surface}$	$4P\ /\ A$

The power density between the reflector and ground, assuming uniform illumination of the reflector surface, is calculated as follows:

Parameter	Value	Unit	Symbol	Formula
Power Density between Reflector and Ground	0.960	mW/cm^2	S_g	$P\ /\ A$

Table 1 summarizes the calculated power flux density values for each region. In a controlled environment, the only regions that exceed FCC limitations are shown below. These regions are only accessible by trained technicians who, as a matter of procedure, turn off transmit power before performing any work in these areas.

Power Densities	**mW/cm2**	**Controlled Environment (5 mW/cm2)**
Far Field Calculation	0.961	Satisfies FCC Requirements
Near Field Calculation	2.244	Satisfies FCC Requirements
Transition Region	2.244	Satisfies FCC Requirements
Region between Main and Subreflector	1450.5	Exceeds Limitations
Main Reflector Region	3.840	Satisfies FCC Requirements
Region between Main Reflector and Ground	0.960	Satisfies FCC Requirements

Table 1. Power Flux Density for Each Region

In conclusion, the results show that the antenna, in a controlled environment, and under the proper mitigation procedures, meets the guidelines specified in 47 C.F.R. § 1.1310. Only personnel with knowledge of the radiation hazards associated with the antennas at this facility will have access to those regions that exceed the MPE levels. The antenna transmitter will be turned off during maintenance in order to comply with the MPE limit of 5 mW/cm2 for Controlled Areas.

Analysis of Non-Ionizing Radiation for a 1.2-Meter Earth Station System – AZU-12

This report analyzes the non-ionizing radiation levels for a 1.2-meter earth station system. The analysis and calculations performed in this report comply with the methods described in the FCC Office of Engineering and Technology Bulletin, No. 65 first published in 1985 and revised in 1997 in Edition 97-01. The radiation safety limits used in the analysis are in conformance with the FCC R&O 96-326. Bulletin No. 65 and the FCC R&O specifies that there are two separate tiers of exposure limits that are dependant on the situation in which the exposure takes place and/or the status of the individuals who are subject to the exposure. The Maximum Permissible Exposure (MPE) limits for persons in a General Population/Uncontrolled environment are shown in Table 1. The General Population/Uncontrolled MPE is a function of transmit frequency and is for an exposure period of thirty minutes or less. The MPE limits for persons in an Occupational/Controlled environment are shown in Table 2. The Occupational MPE is a function of transmit frequency and is for an exposure period of six minutes or less. The purpose of the analysis described in this report is to determine the power flux density levels of the earth station in the far-field, near-field, transition region, between the subreflector or feed and main reflector surface, at the main reflector surface, and between the antenna edge and the ground and to compare these levels to the specified MPEs.

Table 1. Limits for General Population/Uncontrolled Exposure (MPE)

Frequency Range (MHz)	Power Density (mW/cm^2)
30-300	0.2
300-1500	Frequency (MHz)*(0.8/1200)
1500-100,000	1.0

Table 2. Limits for Occupational/Controlled Exposure (MPE)

Frequency Range (MHz)	Power Density (mW/cm^2)
30-300	1.0
300-1500	Frequency (MHz)*(4.0/1200)
1500-100,000	5.0

Table 3. Formulas and Parameters Used for Determining Power Flux Densities

Parameter	Symbol	Formula	Value	Units
Antenna Diameter	D	Input	1.2	m
Antenna Surface Area	$A_{surface}$	$\pi D^2 / 4$	1.13	m^2
Subreflector Diameter	D_{sr}	Input	19.0	cm
Area of Subreflector	A_{sr}	$\pi D_{sr}{}^2/4$	283.53	cm^2
Frequency	F	Input	14250	MHz
Wavelength	λ	300 / F	0.021053	m
Transmit Power	P	Input	6.00	W
Antenna Gain (dBi)	G_{es}	Input	43.2	dBi
Antenna Gain (factor)	G	$10^{Ges/10}$	20893.0	n/a
Pi	π	Constant	3.1415927	n/a
Antenna Efficiency	η	$G\lambda^2/(\pi^2D^2)$	0.65	n/a

25. Far Field Distance Calculation

The distance to the beginning of the far field can be determined from the following equation:

Distance to the Far Field Region $R_{ff} = 0.60\ D^2 / \lambda$ (1)
$= 41.0$ m

The maximum main beam power density in the far field can be determined from the following equation:

On-Axis Power Density in the Far Field $S_{ff} = G\ P / (4\ \pi\ R_{ff}^{\ 2})$ (2)
$= 5.923\ W/m^2$
$= 0.592\ mW/cm^2$

26. Near Field Calculation

Power flux density is considered to be at a maximum value throughout the entire length of the defined Near Field region. The region is contained within a cylindrical volume having the same diameter as the antenna. Past the boundary of the Near Field region, the power density from the antenna decreases linearly with respect to increasing distance.

The distance to the end of the Near Field can be determined from the following equation:

Extent of the Near Field $R_{nf} = D^2 / (4\ \lambda)$ (3)
$= 17.1$ m

The maximum power density in the Near Field can be determined from the following equation:

Near Field Power Density $S_{nf} = 16.0\ \eta\ P / (\pi\ D^2)$ (4)
$= 13.826\ W/m^2$
$= 1.383\ mW/cm^2$

27. Transition Region Calculation

The Transition region is located between the Near and Far Field regions. The power density begins to decrease linearly with increasing distance in the Transition region. While the power density decreases inversely with distance in the Transition region, the power density decreases inversely with the square of the distance in the Far Field region. The maximum power density in the Transition region will not exceed that calculated for the Near Field region. The power density calculated in Section 1 is the highest power density the antenna can produce in any of the regions away from the antenna. The power density at a distance R_t can be determined from the following equation:

Transition Region Power Density $S_t = S_{nf}\ R_{nf} / R_t$ (5)
$= 1.383\ mW/cm^2$

28. Region between the Main Reflector and the Subreflector

Transmissions from the feed assembly are directed toward the subreflector surface, and are reflected back toward the main reflector. The most common feed assemblies are waveguide flanges, horns or subreflectors. The energy between the subreflector and the reflector surfaces can be calculated by determining the power density at the subreflector surface. This can be determined from the following equation:

Power Density at the Subreflector $S_{sr} = 4000\ P / A_{sr}$ (6)
$= 84.648\ mW/cm^2$

29. Main Reflector Region

The power density in the main reflector is determined in the same manner as the power density at the subreflector. The area is now the area of the main reflector aperture and can be determined from the following equation:

Power Density at the Main Reflector Surface $S_{surface} = 4\ P / A_{surface}$ (7)
$= 21.221\ W/m^2$
$= 2.122\ mW/cm^2$

30. Region between the Main Reflector and the Ground

Assuming uniform illumination of the reflector surface, the power density between the antenna and the ground can be determined from the following equation:

Power Density between Reflector and Ground $S_g = P / A_{surface}$ (8)
$= 5.305\ W/m^2$
$= 0.531\ mW/cm^2$

31. Summary of Calculations

Table 4. Summary of Expected Radiation levels for Uncontrolled Environment

Region	Calculated Maximum Radiation Power Density Level (mW/cm^2)		Hazard Assessment
1. Far Field (R_{ff} = 41.0 m)	S_{ff}	0.592	Satisfies FCC MPE
2. Near Field (R_{nf} = 17.1 m)	S_{nf}	1.383	Potential Hazard
3. Transition Region ($R_{nf} < R_t < R_{ff}$)	S_t	1.383	Potential Hazard
4. Between Main Reflector and Subreflector	S_{sr}	84.648	Potential Hazard
5. Main Reflector	$S_{surface}$	2.122	Potential Hazard
6. Between Main Reflector and Ground	S_g	0.531	Satisfies FCC MPE

Table 5. Summary of Expected Radiation levels for Controlled Environment

Region	Calculated Maximum Radiation Power Density Level (mW/cm^2)		Hazard Assessment
1. Far Field (R_{ff} = 41.0 m)	S_{ff}	0.592	Satisfies FCC MPE
2. Near Field (R_{nf} = 17.1 m)	S_{nf}	1.383	Satisfies FCC MPE
3. Transition Region ($R_{nf} < R_t < R_{ff}$)	S_t	1.383	Satisfies FCC MPE
4. Between Main Reflector and Subreflector	S_{sr}	84.648	Potential Hazard
5. Main Reflector	$S_{surface}$	2.122	Satisfies FCC MPE
6. Between Main Reflector and Ground	S_g	0.531	Satisfies FCC MPE

It is the applicant's responsibility to ensure that the public and operational personnel are not exposed to harmful levels of radiation.

32. Conclusions

Based on the above analysis it is concluded that the FCC MPE guidelines have been exceeded (or met) in the regions of Table 4 and 5. The applicant proposes to comply with the MPE limits by one or more of the following methods.

Radiation hazard signs will be posted while this earth station is in operation and the antennas will be mounted above ground for security reasons, which in turn, will prevent public access in and around the earth station.

Means of Compliance Controlled Areas

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

Radiation Hazard Report

The transmitters will be turned off during antenna maintenance

The applicant agrees to abide by the conditions specified in Condition 5208 provided below:

> *Condition 5208 - The licensee shall take all necessary measures to ensure that the antenna does not create potential exposure of humans to radiofrequency radiation in excess of the FCC exposure limits defined in 47 CFR 1.1307(b) and 1.1310 wherever such exposures might occur. Measures must be taken to ensure compliance with limits for both occupational/controlled exposure and for general population/uncontrolled exposure, as defined in these rule sections. Compliance can be accomplished in most cases by appropriate restrictions such as fencing. Requirements for restrictions can be determined by predictions based on calculations, modeling or by field measurements. The FCC's OET Bulletin 65 (available on-line at www.fcc.gov/oet/rfsafety) provides information on predicting exposure levels and on methods for ensuring compliance, including the use of warning and alerting signs and protective equipment for worker.*