Approved by OMB
3060-0678

Date & Time Filed: May 16 2011 11:56:31:736AM
File Number: SES-MOD-INTR2011-01405

FCC APPLICATION FOR SPACE AND EARTH STATION:MOD OR AMD - MAIN FORM FCC 312 MAIN FORM FOR OFFICIAL USE ONLY	FCC Use Only

APPLICANT INFORMATION

Enter a description of this application to identify it on the main menu:
E070072 VSAT modification to add Andrew 2.4-m

1-8. Legal Name of Applicant

Name:	Infosat Able Holdings, Inc.	Phone Number:	202-429-4900
DBA Name:		Fax Number:	202-429-4912
Street:	1229 19th Street, NW	E-Mail:	
City:	Washington	State:	DC
Country:	USA	Zipcode:	20036 -2413
Attention:			

9-16. Name of Contact Representative

Name:	Joseph A. Godles	Phone Number:	202-429-4900
Company:	Goldberg Godles Wiener & Wright	Fax Number:	202-429-4912
Street:	1229 19th Street, NW	E-Mail:	jgodles@g2w2.com
City:	Washington	State:	DC
Country:	USA	Zipcode:	20036-2413
Attention:		Relationship:	Legal Counsel

CLASSIFICATION OF FILING

17. Choose the button next to the classification that applies to this filing for both questions a. and b. Choose only one for 17a and only one for 17b.

(N/A) b1. Application for License of New Station
(N/A) b2. Application for Registration of New Domestic Receive-Only Station
○ b3. Amendment to a Pending Application

◉ a1. Earth Station

○ a2. Space Station	◉ b4. Modification of License or Registration b5. Assignment of License or Registration b6. Transfer of Control of License or Registration ○ b7. Notification of Minor Modification (N/A) b8. Application for License of New Receive-Only Station Using Non-U.S. Licensed Satellite (N/A) b9. Letter of Intent to Use Non-U.S. Licensed Satellite to Provide Service in the United States (N/A) b10. Other (Please specify) (N/A) b11. Application for Earth Station to Access a Non-U.S.satellite Not Currently Authorized to Provide the Proposed Service in the Proposed Frequencies in the United States.

17c. Is a fee submitted with this application?

◉ If Yes, complete and attach FCC Form 159.

If No, indicate reason for fee exemption (see 47 C.F.R.Section 1.1114).

○ Governmental Entity ○ Noncommercial educational licensee

○ Other(please explain):

17d.

Fee Classification CGV - Fixed Satellite VSAT System

18. If this filing is in reference to an existing station, enter: (a) Call sign of station: E070072	19. If this filing is an amendment to a pending application enter both fields, if this filing is a modification please enter only the file number: (a) Date pending application was filed: (b) File number: SESMFS2008100301286

TYPE OF SERVICE

20. NATURE OF SERVICE: This filing is for an authorization to provide or use the following type(s) of service(s): Select all that apply:

☒ a. Fixed Satellite
☐ b. Mobile Satellite
☐ c. Radiodetermination Satellite
☐ d. Earth Exploration Satellite
☐ e. Direct to Home Fixed Satellite
☐ f. Digital Audio Radio Service
☐ g. Other (please specify)

21. STATUS: Choose the button next to the applicable status. Choose only one. ○ Common Carrier ◉ Non-Common Carrier	22. If earth station applicant, check all that apply. ☒ Using U.S. licensed satellites ☒ Using Non-U.S. licensed satellites

23. If applicant is providng INTERNATIONAL COMMON CARRIER service, see instructions regarding Sec. 214 filings. Choose one. Are these facilities:

○ Connected to a Public Switched Network ○ Not connected to a Public Switched Network ◉ N/A

24. FREQUENCY BAND(S): Place an 'X' in the box(es) next to all applicable frequency band(s).

☐ a. C-Band (4/6 GHz) ☒ b. Ku-Band (12/14 GHz)

☐ c.Other (Please specify upper and lower frequencies in MHz.)

Frequency Lower: Frequency Upper: (Please specify additional frequencies in an attachment)

TYPE OF STATION

25. CLASS OF STATION: Choose the button next to the class of station that applies. Choose only one.

○ a. Fixed Earth Station
○ b. Temporary-Fixed Earth Station
◉ c. 12/14 GHz VSAT Network
○ d. Mobile Earth Station
○ e. Geostationary Space Station
○ f. Non-Geostationary Space Station
○ g. Other (please specify)

26. TYPE OF EARTH STATION FACILITY:

◉ Transmit/Receive ○ Transmit-Only ○ Receive-Only ○ N/A

"For Space Station applications, select N/A."

PURPOSE OF MODIFICATION

27. The purpose of this proposed modification is to: (Place an 'X' in the box(es) next to all that apply.)

☐ a -- authorization to add new emission designator and related service
☐ b -- authorization to change emission designator and related service
☐ c -- authorization to increase EIRP and EIRP density
☐ d -- authorization to replace antenna
☒ e -- authorization to add antenna
☐ f -- authorization to relocate fixed station
☐ g -- authorization to change frequency(ies)
☐ h -- authorization to add frequency
☐ i -- authorization to add Points of Communication (satellites & countries)
☐ j -- authorization to change Points of Communication (satellites & countries)
☐ k -- authorization for facilities for which environmental assessment and radiation hazard reporting is required
☐ l -- authorization to change orbit location
☐ m -- authorization to perform fleet management
☐ n -- authorization to extend milestones
☐ o -- Other (Please specify)

ENVIRONMENTAL POLICY

28. Would a Commission grant of any proposal in this application or amendment have a significant environmental impact as defined by 47 CFR 1.1307? If YES, submit the statement as required by Sections 1.1308 and 1.1311 of the Commission's rules, 47 C.F.R. 1.1308 and 1.1311, as an exhibit to this application.A Radiation Hazard Study must accompany all applications for new transmitting facilities, major modifications, or major amendments.	○ **Yes** ◉ **No** **Rad Haz report**

ALIEN OWNERSHIP Earth station applicants not proposing to provide broadcast, common carrier, aeronautical en route or aeronautical fixed radio station services are not required to respond to Items 30-34.

29. Is the applicant a foreign government or the representative of any foreign government?	○ **Yes** ◉ **No**
30. Is the applicant an alien or the representative of an alien?	○ **Yes** ○ **No** ◉ **N/A**
31. Is the applicant a corporation organized under the laws of any foreign government?	○ **Yes** ○ **No** ◉ **N/A**
32. Is the applicant a corporation of which more than one-fifth of the capital stock is owned of record or voted by aliens or their representatives or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?	○ **Yes** ○ **No** ◉ **N/A**
33. Is the applicant a corporation directly or indirectly controlled by any other corporation of which more than one-fourth of the capital stock is owned of record or voted by aliens, their representatives, or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?	○ **Yes** ○ **No** ◉ **N/A**
34. If any answer to questions 29, 30, 31, 32 and/or 33 is Yes, attach as an exhibit an identification of the aliens or foreign entities, their nationality, their relationship to the applicant, and the percentage of stock they own or vote.	

BASIC QUALIFICATIONS

35. Does the Applicant request any waivers or exemptions from any of the Commission's Rules? If Yes, attach as an exhibit, copies of the requests for waivers or exceptions with supporting documents.	○ **Yes** ◉ **No**
36. Has the applicant or any party to this application or amendment had any FCC station authorization or license revoked or had any application for an initial, modification or renewal of FCC station authorization, license, or construction permit denied by the Commission? If Yes, attach as an exhibit, an explination of circumstances.	○ **Yes** ◉ **No**
37. Has the applicant, or any party to this application or amendment, or any party directly or indirectly controlling the applicant ever been convicted of a felony by any state or federal court? If Yes, attach as an exhibit, an explination of circumstances.	○ **Yes** ◉ **No**
38. Has any court finally adjudged the applicant, or any person directly or indirectly controlling the applicant, guilty of unlawfully monopolizing or attemptiing unlawfully to monopolize radio communication, directly or indirectly, through control of manufacture or sale of radio apparatus, exclusive traffic arrangement or any other means or unfair methods of competition?If Yes, attach as an exhibit, an explanation of circumstances	○ **Yes** ◉ **No**
39. Is the applicant, or any person directly or indirectly controlling the applicant, currently a party in any pending matter referred to in the preceding two items? If yes, attach as an exhinit, an explanation of the circumstances.	○ **Yes** ◉ **No**
40. If the applicant is a corporation and is applying for a space station license, attach as an exhibit the names, address, and citizenship of those stockholders owning a record and/or voting 10 percent or more of the Filer's voting stock and the percentages so held. In the case of fiduciary control, indicate the beneficiary(ies) or class of beneficiaries. Also list the names and addresses of the officers and directors of the Filer.	
41. By checking Yes, the undersigned certifies, that neither applicant nor any other party to the application is subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Act of 1988, 21 U.S.C. Section 862, because of a conviction for possession or distribution of a controlled substance. *See 47 CFR 1.2002(b) for the meaning of "party to the application" for these purposes.*	◉ **Yes** ○ **No**
42a. Does the applicant intend to use a non-U.S. licensed satellite to provide service in the United States? If Yes, answer 42b and attach an exhibit providing the information specified in *47 C.F.R. 25.137, as appropriate*. If No, proceed to question 43.	◉ **Yes** ○ **No**
42b. What administration has licensed or is in the process of licensing the space station? If no license will be issued, what administration has coordinated or is in the process of coordinating the space station?Canada	

43. Description. (Summarize the nature of the application and the services to be provided). Applicant seeks herein to add a new terminal type to its existing VSAT authority.

43a. Geographic Service Rule Certification

By selecting A, the undersigned certifies that the applicant is not subject to the geographic service or geographic coverage requirements specified in 47 C.F.R. Part 25. (●) **A**

By selecting B, the undersigned certifies that the applicant is subject to the geographic service or geographic coverage requirements specified in 47 C.F.R. Part 25 and will comply with such requirements. ( ) **B**

By selecting C, the undersigned certifies that the applicant is subject to the geographic service or geographic coverage requirements specified in 47 C.F.R. Part 25 and will not comply with such requirements because it is not feasible as a technical matter to do so, or that, while technically feasible, such services would require so many compromises in satellite design and operation as to make it economically unreasonable. A narrative description and technical analysis demonstrating this claim are attached. ( ) **C**

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CERTIFICATION

The Applicant waives any claim to the use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise, and requests an authorization in accordance with this application. The applicant certifies that grant of this application would not cause the applicant to be in violation of the spectrum aggregation limit in 47 CFR Part 20. All statements made in exhibits are a material part hereof and are incorporated herein as if set out in full in this application. The undersigned, individually and for the applicant, hereby certifies that all statements made in this application and in all attached exhibits are true, complete and correct to the best of his or her knowledge and belief, and are made in good faith.

44. Applicant is a (an): (Choose the button next to applicable response.)

- ( ) Individual
- ( ) Unincorporated Association
- ( ) Partnership
- (●) Corporation
- ( ) Governmental Entity
- ( ) Other (please specify)

45. Name of Person Signing	46. Title of Person Signing
Bryan Hetlinger	Director, Network Services

WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND / OR IMPRISONMENT (U.S. Code, Title 18, Section 1001), AND/OR REVOCATION OF ANY STATION AUTHORIZATION (U.S. Code, Title 47, Section 312(a)(1)), AND/OR FORFEITURE (U.S. Code, Title 47, Section 503).

SATELLITE EARTH STATION AUTHORIZATIONS
FCC Form 312 - Schedule B:(Technical and Operational Description)

FOR OFFICIAL USE ONLY

Location of Earth Station Site				
E1: Site Identifier:	Remote2	E5. Call Sign:	E070072	
E2: Contact Name	Bryan Hetlinger	E6. Phone Number:	281-598-3314	
E3. Street:		E7. City:		
		E8. County:		
E4. State		E9. Zip Code		
E10. Area of Operation:		CONUS and AK		
E11. Latitude:	0 ° 0 ' 0.0 "			
E12. Longitude:	0 ° 0 ' 0.0 "			
E13. Lat/Lon Coordinates are:		○ NAD-27	○ NAD-83	◉ N/A
E14. Site Elevation (AMSL):		0.0 meters		

E15. If the proposed antenna(s) operate in the Fixed Satellite Service (FSS) with geostationary satellites, do(es) the proposed antenna(s) comply with the antenna gain patterns specified in Section 25.209(a) and (b) as demonstrated by the manufacturer's qualification measurement? If NO, provide as a technical analysis showing compliance with two-degree spacing policy.	◉ Yes ○ No ○ N/A
E16. If the proposed antenna(s) do not operate in the Fixed Satellite Service (FSS), or if they operate in the Fixed Satellite Service (FSS) with non-geostationary satellites, do(es) the proposed antenna(s) comply with the antenna gain patterns specified in Section 25.209(a2) and (b) as demonstrated by the manufacturer's qualification measurements?	○ Yes ○ No ◉ N/A
E17. Is the facility operated by remote control? If YES, provide the location and telephone number of the control point.	○ Yes ◉ No
E18. Is frequency coordination required? If YES, attach a frequency coordination report as	○ Yes ◉ No
E19. Is coordination with another country required? If YES, attach the name of the country(ies) and plot of coordination contours as	○ Yes ◉ No
E20. FAA Notification - (See 47 CFR Part 17 and 47 CFR part 25.113(c)) Where FAA notification is required, have you attached a copy of a completed FCC Form 854 and/or the FAA's study regarding the potential hazard of the structure to aviation? **FAILURE TO COMPLY WITH 47 CFR PARTS 17 AND 25 WILL RESULT IN THE RETURN OF THIS APPLICATION.**	○ Yes ◉ No

POINTS OF COMMUNICATION

Satellite Name:ALSAT | ALL AUTHORIZED U.S. | ALSAT If you selected OTHER, please enter the following:	
E21. Common Name:	E22. ITU Name:

E23. Orbit Location:	E24. Country:

POINTS OF COMMUNICATION (Destination Points)

E25. Site Identifier:	
E26. Common Name:	E27. Country:

ANTENNA

Site ID	E28. Antenna Id	E29. Quantity	E30. Manufacturer	E31. Model	E32. Antenna Size	E41/42. Antenna Gain Transmint and/or Recieve(____dBi at _____GHz)
Remote2	Remote 2	50	Andrew	Type 243	2.4	47.4 dBi at 11.95
Remote2	Remote 2	50	Andrew	Type 243	2.4	49.2 dBi at 14.25

E28. Antenna Id	E33/34. Diameter Minor/Major(meters)	E35. Above Ground Level(meters)	E36. Above Sea Level(meters)	E37. Building Height Above Ground Level(meters)	E38. Total Input Power at antenna flange(Watts)	E39. Maximum Antenna Height Above Rooftop(meters)	E40. Total EIRP for al carriers(dBW)
Remote 2	0.0/0.0	4.0	0.0	0.0	3.0	0.0	54.0

FREQUENCY

E28. Antenna Id	E43/44. Frequency Bands(MHz)	E45. T/R Mode	E46. Antenna Polarization(H,V,L,R)	E47. Emission Designator	E48. Maximum EIRP per Carrier(dBW)	E49. Maximum ERIP Density per Carrier(dBW/4kHz)
Remote 2	11700 12200	R	Horizontal	6M81G7W	0.0	0.0
E50. Modulation and Services 9000 KBPS R .793 QPSK, DIGITAL DATA						
Remote 2	14000 14500	T	Vertical	518KG7W	45.0	23.9
E50. Modulation and Services 518 KBPS R .66 QPSK, DIGITAL DATA						

FREQUENCY COORDINATION

E28. Antenna Id	E51. Satellite Orbit Type	E52/53. Frequency Limits(MHz)	E54/55. Range of Satellite Arc Eastern/Western Limit	E56. Earth Station Azimuth Angle Eastern Limit	E57. Antenna Elevation Angle Eastern Limit	E58. Earth Station Azimuth Angle Western Limit	E59. Antenna Elevation Angle Western Limit	E60. Maximum EIRP Density toward the Horizon(dBW/4kHz)
Remote 2	Geostationary	11700 12200	99.0/133.0	0.0	0.0	0.0	0.0	0.0
	Geostationary	14000 14500	99.0/133.0	0.0	0.0	0.0	0.0	0.0

REMOTE CONTROL POINT LOCATION

E61. Call Sign NOTE: Please enter the callsign of the controlling station, not the callsign for which this application is being filed.	E66. Phone Number

E62. Street Address			
E63. City	E68. County	E67/68. State/Country /	E64. Zip Code

FCC NOTICE REQUIRED BY THE PAPERWORK REDUCTION ACT

The public reporting for this collection of information is estimated to average 2 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the required data, and completing and reviewing the collection of information. If you have any comments on this burden estimate, or how we can improve the collection and reduce the burden it causes you, please write to the Federal Communications Commission, AMD-PERM, Paperwork Reduction Project (3060-0678), Washington, DC 20554. We will also accept your comments regarding the Paperwork Reduction Act aspects of this collection via the Internet if you send them to PRA@fcc.gov. PLEASE DO NOT SEND COMPLETED FORMS TO THIS ADDRESS.

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THE FOREGOING NOTICE IS REQUIRED BY THE PAPERWORK REDUCTION ACT OF 1995, PUBLIC LAW 104-13, OCTOBER 1, 1995, 44 U.S.C. SECTION 3507.

Radiation Hazard Study

1.0 Introduction

This study analyzes the radiation hazard environment produced by 2.4 meter Ku-band offset antennas with a maximum of 3 Watts into the antenna feed. The antennas may be operated in uncontrolled access areas. The reference document for this study is OET Bulletin No. 65, Edition 97-01, *Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields*, August 1997.

2.0 Earth Station Antenna Parameters

Antenna diameter (D) = 2.4 meters

Wavelength (λ) = 0.021 meters at 14.25 GHz

Maximum power to the antenna (P) = 3 Watts

2.4 meter antenna gain (G) = 49.2 dBi at 14.25 GHz

2.4 meter antenna efficiency (η) = 0.65

3.0 Region Definition

The limit of the near field (R_{nf}) and the beginning of the far field (R_{ff}) are calculated as follows:

Near Field Extent

$$R_{nf} = \frac{D^2}{4\lambda}$$

$$R_{nf} = 2.4^2 / (4 * 0.021) = 68.5 \text{ m}$$

Far Field Extent

$$R_{ff} = 0.6 \frac{D^2}{\lambda}$$

$$R_{ff} = (0.6)(2.4^2)/(0.021) = 164.3 \text{ m}$$

The region between 68.5 m and 164.3 m is designated as the transition region.

4.0 Power Density Calculations

4.1 Near Field Region

The on-axis near field power density is calculated as follows:

$$S_{nf} = \frac{16\eta P}{\pi D^2}$$

$$S_{nf} = \frac{(16)(0.65)(3)}{(3.14)(2.4^2)}$$

$$S_{nf} = 1.72\ W/m^2 = 0.172\ mW/cm^2$$

The maximum on-axis power density in the far field region is is $S_{nf} = 0.172\ mW/cm^2$. This meets the Uncontrolled Exposure limit of $1.0 mW/cm^2$ found in Appendix A or OET Bulletin 65. The off-axis power density in the near field will always be less than the on-axis power density and therefore all volumes within the near field will meet the Uncontrolled Exposure limit of 1.0 mW/cm^2.

4.2 Transition Region

The on-axis power density in the transition region is calculated as follows:

$$S_t = \frac{S_{nf} R_{nf}}{R}$$

The maximum on-axis power density in the transition region is when $R = R_{nf}$ at which point the power density is $S_t = S_{nf} = 0.172\ mW/cm^2$. This meets the Uncontrolled Exposure limit of $1.0 mW/cm^2$ found in Appendix A or OET Bulletin 65. The off-axis power density in the transition region will always be less than the on-axis power density and therefore all volumes within the transition region will meet the Uncontrolled Exposure limit of 1.0 mW/cm^2 found in Appendix A of OET Bulletin 65.

4.3 Far Field Region

The on-axis power density in the far field region is calculated as follows:

$$S_{ff} = \frac{PG}{4\pi R^2}$$

$$S_{ff} = \frac{(3)(10^{(49.2/10)})}{(4)(3.14)(164.3)^2}$$

$$S_{ff} = 0.737 \text{ W/m}^2 = 0.0737 \text{ mW/cm}^2$$

The maximum on-axis power density in the far field region is is $S_{ff} = 0.0737$ mW/cm^2. This meets the Uncontrolled Exposure limit of 1.0mW/cm^2 found in Appendix A of OET Bulletin 65. The off-axis power density in the far field will always be less than the on-axis power density and therefore all volumes within the far field will meet the Uncontrolled Exposure limit of 1.0 mW/cm^2.

4.4 Region between the Feed Flange and Main Reflector

Transmissions from the feed horn are directed toward the reflector surface. The maximum power density between the feed and reflector surface can be calculated as:

$$S_{fl} = 4P/A = 16P/(\pi D^2)$$

$$S_{fl} = (16)(3)/(3.14 * 0.12^2)$$

$$S_{fl} = 1061 \text{ W/m}^2 = 106.1 \text{ mW/cm}^2$$

This value exceeds the Uncontrolled Exposure limit of 1.0 mW/cm^2 found in Appendix A of OET Bulletin 65 and represents a potential hazard. Therefore, a warning label will be affixed to the surface of the reflector to warn people to avoid the region between the antenna feed and the surface of the reflector.

4.5 Reflector Surface Region

The power density at the surface of the reflector is approximated by:

$$S_r = 4P/A = 16P/(\pi D^2)$$

$$S_r = (16)(3)/(3.14)(2.4^2)$$

$S_r = 2.65\ W/m^2 = 0.265\ mW/cm^2$

This value meets the Uncontrolled Exposure limit of 1.0 mW/cm^2 found in Appendix A of OET Bulletin 65.

4.5 Region Between Antenna and Ground

Assuming uniform illumination of the reflector surface, the power density between the antenna and the ground can be calculated as follows:

$$S_g = P/A = 4P/(\pi D^2)$$

$$S_g = (4)(3)/(3.14)(2.4^2) = 0.66\ W/m^2 = 0.066\ mW/cm^2$$

This value meets the Uncontrolled Exposure limit found in Appendix A of OET Bulletin 65.

5.0 Summary

Table 1. Summary of Expected Radiation Levels

		General Population/Uncontrolled Exposure **Maximum Radiation Level (1.0 mW/cm²)**	**Occupational/Controlled Exposure** **Maximum Radiation Level (5.0 mW/cm²)**
Region	**Radiation Level (mW/cm^2)**	**Hazard Assessment**	**Hazard Assessment**
Near Field R_{nf} = 68.5 m	0.172	Satisfies FCC MPE	Satisfies FCC MPE
Far Field R_{ff} = 164.3 m	0.0737	Satisfies FCC MPE	Satisfies FCC MPE
Transition Region $R_{nf} < R_t < R_{ff}$	0.172	Satisfies FCC MPE	Satisfies FCC MPE
Region between Feed and Reflector	106.1	Potential Hazard	Potential Hazard
Reflector Surface	0.265	Satisfies FCC MPE	Satisfies FCC MPE
Region between Antenna and Ground	0.066	Satisfies FCC MPE	Satisfies FCC MPE

6.0 Conclusion

Using the methods outlined in OET Bulletin 65, the 2.4 m antennas meet the Uncontrolled and Controlled Exposure limits in all regions except in the region between the antenna feed and the reflector. A warning label will be affixed to the surface of the reflectors to warn people to avoid the region between the antenna's flange and the surface of the reflector.

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$$S_{nf} = \frac{(16)(0.65)(3)}{(3.14)(2.4^2)}$$

$$S_{nf} = 1.72\ W/m^2 = 0.172\ mW/cm^2$$

The maximum on-axis power density in the far field region is is $S_{nf} = 0.172\ mW/cm^2$. This meets the Uncontrolled Exposure limit of $1.0 mW/cm^2$ found in Appendix A or OET Bulletin 65. The off-axis power density in the near field will always be less than the on-axis power density and therefore all volumes within the near field will meet the Uncontrolled Exposure limit of 1.0 mW/cm^2.

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The on-axis power density in the transition region is calculated as follows:

$$S_t = \frac{S_{nf} R_{nf}}{R}$$

The maximum on-axis power density in the transition region is when $R = R_{nf}$ at which point the power density is $S_t = S_{nf} = 0.172\ mW/cm^2$. This meets the Uncontrolled Exposure limit of $1.0 mW/cm^2$ found in Appendix A or OET Bulletin 65. The off-axis power density in the transition region will always be less than the on-axis power density and therefore all volumes within the transition region will meet the Uncontrolled Exposure limit of 1.0 mW/cm^2 found in Appendix A of OET Bulletin 65.

4.3 Far Field Region

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$$S_{ff} = \frac{PG}{4\pi R^2}$$

$$S_{ff} = \frac{(3)(10^{(49.2/10)})}{(4)(3.14)(164.3)^2}$$

$$S_{ff} = 0.737 \text{ W/m}^2 = 0.0737 \text{ mW/cm}^2$$

The maximum on-axis power density in the far field region is is $S_{ff} = 0.0737$ mW/cm^2. This meets the Uncontrolled Exposure limit of 1.0mW/cm^2 found in Appendix A of OET Bulletin 65. The off-axis power density in the far field will always be less than the on-axis power density and therefore all volumes within the far field will meet the Uncontrolled Exposure limit of 1.0 mW/cm^2.

4.4 Region between the Feed Flange and Main Reflector

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$$S_{fl} = 4P/A = 16P/(\pi D^2)$$

$$S_{fl} = (16)(3)/(3.14 * 0.12^2)$$

$$S_{fl} = 1061 \text{ W/m}^2 = 106.1 \text{ mW/cm}^2$$

This value exceeds the Uncontrolled Exposure limit of 1.0 mW/cm^2 found in Appendix A of OET Bulletin 65 and represents a potential hazard. Therefore, a warning label will be affixed to the surface of the reflector to warn people to avoid the region between the antenna feed and the surface of the reflector.

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$$S_r = (16)(3)/(3.14)(2.4^2)$$

$S_r = 2.65\ W/m^2 = 0.265\ mW/cm^2$

This value meets the Uncontrolled Exposure limit of 1.0 mW/cm^2 found in Appendix A of OET Bulletin 65.

4.5 Region Between Antenna and Ground

Assuming uniform illumination of the reflector surface, the power density between the antenna and the ground can be calculated as follows:

$$S_g = P/A = 4P/(\pi D^2)$$

$$S_g = (4)(3)/(3.14)(2.4^2) = 0.66\ W/m^2 = 0.066\ mW/cm^2$$

This value meets the Uncontrolled Exposure limit found in Appendix A of OET Bulletin 65.

5.0 Summary

Table 1. Summary of Expected Radiation Levels

		General Population/Uncontrolled Exposure **Maximum Radiation Level (1.0 mW/cm²)**	**Occupational/Controlled Exposure** **Maximum Radiation Level (5.0 mW/cm²)**
Region	**Radiation Level (mW/cm^2)**	**Hazard Assessment**	**Hazard Assessment**
Near Field R_{nf} = 68.5 m	0.172	Satisfies FCC MPE	Satisfies FCC MPE
Far Field R_{ff} = 164.3 m	0.0737	Satisfies FCC MPE	Satisfies FCC MPE
Transition Region $R_{nf} < R_t < R_{ff}$	0.172	Satisfies FCC MPE	Satisfies FCC MPE
Region between Feed and Reflector	106.1	Potential Hazard	Potential Hazard
Reflector Surface	0.265	Satisfies FCC MPE	Satisfies FCC MPE
Region between Antenna and Ground	0.066	Satisfies FCC MPE	Satisfies FCC MPE

6.0 Conclusion

Using the methods outlined in OET Bulletin 65, the 2.4 m antennas meet the Uncontrolled and Controlled Exposure limits in all regions except in the region between the antenna feed and the reflector. A warning label will be affixed to the surface of the reflectors to warn people to avoid the region between the antenna's flange and the surface of the reflector.