E120188 SES-STA-20120929-00859 IB2012002273
Christian Heritage Broadcasting, Inc.

Approved by OMB
3060–0678

APPLICATION FOR EARTH STATION SPECIAL TEMPORARY AUTHORITY

APPLICANT INFORMATIONEnter a description of this application to identify it on the main menu:
E120188 Re–filing of SES–STA–20120918–00830

1. Applicant

Name:	Christian Heritage Broadcasting, Inc.	**Phone Number:**	320–859–3000
DBA Name:		**Fax Number:**	320–859–3010
Street:	P.O. Box 247	**E–Mail:**	Mail@praisefm.org
City:	Osakis	**State:**	MN
Country:	USA	**Zipcode:**	56360 –
Attention:			

GRANTED
International Bureau

SES-STA-20120929-00859
E120188 Call Sign (or other identifier) Grant Date 10-1-12
Term Dates From 10-1-12 To 12-1-12
Approved

2. Contact

Name:	Matthew H. McCormick	**Phone Number:**	703-812-0400
Company:	Fletcher, Heald & Hildreth, P.L.C.	**Fax Number:**	703-812-0486
Street:	1300 North 17th Street	E-Mail:	mccormick@fhhlaw.com
	11th Floor		
City:	Arlington	**State:**	VA
Country:	USA	**Zipcode:**	22209 -
Attention:		**Relationship:**	Legal Counsel

(If your application is related to an application filed with the Commission, enter either the file number or the IB Submission ID of the related application. Please enter only one.)
3. Reference File Number or Submission ID IB2012002272

4a. 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):

4b. Fee Classification CGX – Fixed Satellite Transmit/Receive Earth Station

5. Type Request

◉ Use Prior to Grant ○ Change Station Location ○ Other

6. Requested Use Prior Date 10/01/2012	
7. CityOsakis	8. Latitude (dd mm ss.s h) 45 51 50.5 N

9. State MN	10. Longitude (dd mm ss.s h) 95 8 37.2 W

11. Please supply any need attachments.

Attachment 1: Re–Filing Attachment 2: RadHaz Attachment 3:

12. Description. (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)

To fulfill contractual obligations and to provide service to the public, we request this prior use Special Temporary Authority beginning October 1, 2012.

13. 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

14. Name of Person Signing DAVID MCIVER	15. Title of Person Signing EXECUTIVE DIRECTOR

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).

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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.

Analysis of Non-Ionizing Radiation for a 2.4-Meter Earth Station System

This report analyzes the non-ionizing radiation levels for a 2.4-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	2.4	m
Antenna Surface Area	$A_{surface}$	$\pi D^2 / 4$	4.52	m^2
Feed Flange Diameter	D_{fa}	Input	8.1	cm
Area of Feed Flange	A_{fa}	$\pi D_{fa}^2/4$	51.53	cm^2
Frequency	F	Input	14250	MHz
Wavelength	λ	300 / F	0.021053	m
Transmit Power	P	Input	10.00	W
Antenna Gain (dBi)	G_{es}	Input	49.1	dBi
Antenna Gain (factor)	G	$10^{Ges/10}$	81283.1	n/a
Pi	π	Constant	3.1415927	n/a
Antenna Efficiency	η	$G\lambda^2/(\pi^2D^2)$	0.63	n/a

1. 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

$$R_{ff} = 0.60\ D^2 / \lambda = 164.2\ m \quad (1)$$

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

$$S_{ff} = G\ P / (4\ \pi\ R_{ff}^2) = 2.400\ W/m^2 = 0.240\ mW/cm^2 \quad (2)$$

2. 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

$$R_{nf} = D^2 / (4\ \lambda) = 68.4\ m \quad (3)$$

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

Near Field Power Density

$$S_{nf} = 16.0\ \eta\ P / (\pi\ D^2) = 5.603\ W/m^2 = 0.560\ mW/cm^2 \quad (4)$$

3. 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

$$S_t = S_{nf}\ R_{nf} / R_t = 0.560\ mW/cm^2 \quad (5)$$

4. Region between the Feed Assembly and the Antenna Reflector

Transmissions from the feed assembly are directed toward the antenna reflector surface, and are confined within a conical shape defined by the type of feed assembly. The most common feed assemblies are waveguide flanges, horns or subreflectors. The energy between the feed assembly and reflector surface can be calculated by determining the power density at the feed assembly surface. This can be determined from the following equation:

Power Density at the Feed Flange

$$S_{fa} = 4000\ P / A_{fa} = 776.247\ mW/cm^2 \quad (6)$$

5. Main Reflector Region

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

Power Density at the Reflector Surface

$$S_{surface} = 4\ P / A_{surface} = 8.842\ W/m^2 = 0.884\ mW/cm^2 \quad (7)$$

6. Region between the 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

$$S_g = P / A_{surface} = 2.210\ W/m^2 = 0.221\ mW/cm^2 \quad (8)$$

7. 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} = 164.2 m)	S_{ff}	0.240	Satisfies FCC MPE
2. Near Field (R_{nf} = 68.4 m)	S_{nf}	0.560	Satisfies FCC MPE
3. Transition Region ($R_{nf} < R_t < R_{ff}$)	S_t	0.560	Satisfies FCC MPE
4. Between Feed Assembly and Antenna Reflector	S_{fa}	776.247	Potential Hazard
5. Main Reflector	$S_{surface}$	0.884	Satisfies FCC MPE
6. Between Reflector and Ground	S_g	0.221	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} = 164.2 m)	S_{ff}	0.240	Satisfies FCC MPE
2. Near Field (R_{nf} = 68.4 m)	S_{nf}	0.560	Satisfies FCC MPE
3. Transition Region ($R_{nf} < R_t < R_{ff}$)	S_t	0.560	Satisfies FCC MPE
4. Between Feed Assembly and Antenna Reflector	S_{fa}	776.247	Potential Hazard
5. Main Reflector	$S_{surface}$	0.884	Satisfies FCC MPE
6. Between Reflector and Ground	S_g	0.221	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.

8. Conclusions

Based on the above analysis it is concluded that harmful levels of radiation will not exist in regions normally occupied by the public or the earth station's operating personnel. The transmitter will be turned off during antenna maintenance so that the FCC MPE of 5.0 mW/cm2 will be complied with for those regions with close proximity to the reflector that exceed acceptable levels.

Christian Heritage Broadcasting, Inc.
E120188

Resubmission of Dismissed Application

Christian Heritage Broadcasting, Inc. is re-filing identical applications to replace SES-LIC-201208918-00836 and SES-STA-20120918-00830 with a radiation hazard study. The only other change is the Submission ID of the related application, Item 3 in the STA request, to the Submission ID of the re-filed application.

The Submission ID of the original application was IB2012002167.