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Approved by OMB
3060-0678

Date & Time Filed: Jan 13 2015 3:10:23:683PM
File Number: SES-AMD-INTR2015-00050

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

APPLICANT INFORMATION

Enter a description of this application to identify it on the main menu:

Amendment to SES-MOD-20141022-00804 to add a 3.7 m transmit/receive antenna under call sign E080120

1-8. Legal Name of Applicant			
Name:	EchoStar Broadcasting Corporation	Phone Number:	202-293-0981
DBA Name:		Fax Number:	
Street:	100 Inverness Terrace East	E-Mail:	
City:	Englewood	State:	CO
Country:	USA	Zipcode:	80112 -
Attention:			

9-16. Name of Contact Representative			
Name:	Jennifer A. Manner	Phone Number:	301-428-5893
Company:	EchoStar Broadcasting Corporation	Fax Number:	301-428-2818
Street:	11717 Exploration Lane	E-Mail:	jennifer.manner@echostar.com
City:	Germantown	State:	MD
Country:	USA	Zipcode:	20876-
Attention:	Relationship:		

CLASSIFICATION OF FILING

<p>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.</p> <p><input checked="" type="radio"/> a1. Earth Station</p> <p><input type="radio"/> a2. Space Station</p>	<p>(N/A) b1. Application for License of New Station</p> <p>(N/A) b2. Application for Registration of New Domestic Receive-Only Station</p> <p><input checked="" type="radio"/> b3. Amendment to a Pending Application</p> <p><input type="radio"/> b4. Modification of License or Registration</p> <p>b5. Assignment of License or Registration</p> <p>b6. Transfer of Control of License or Registration</p> <p><input type="radio"/> b7. Notification of Minor Modification</p> <p>(N/A) b8. Application for License of New Receive-Only Station Using Non-U.S. Licensed Satellite</p> <p>(N/A) b9. Letter of Intent to Use Non-U.S. Licensed Satellite to Provide Service in the United States</p> <p>(N/A) b10. Other (Please specify)</p> <p>(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.</p>
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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 CGX - Fixed Satellite Transmit/Receive Earth Station

<p>18. If this filing is in reference to an existing station, enter:</p> <p>(a) Call sign of station: E080120</p>	<p>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:</p> <p>(a) Date pending application was filed: 10/22/2014</p> <p>(b) File number: SESMOD2014102200804</p>
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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)
 BSS

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 providing 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: 12200 Frequency Upper: 17800 (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

Yes No

Rad. Haz. Study

accompany all applications for new transmitting facilities, major modifications, or major amendments.

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?	<input type="radio"/> Yes <input checked="" type="radio"/> No
30. Is the applicant an alien or the representative of an alien?	<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> N/A
31. Is the applicant a corporation organized under the laws of any foreign government?	<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> 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?	<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> 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?	<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> 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.	<input type="radio"/> Yes <input checked="" type="radio"/> 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 explanation of circumstances.	<input checked="" type="radio"/> Yes <input type="radio"/> No Q. 36 Response
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 explanation of circumstances.	<input type="radio"/> Yes <input checked="" type="radio"/> No
38. Has any court finally adjudged the applicant, or any person directly or indirectly controlling the applicant, guilty of unlawfully monopolizing or attempting 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	<input type="radio"/> Yes <input checked="" type="radio"/> 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 exhibit, an explanation of the circumstances.	<input type="radio"/> Yes <input checked="" type="radio"/> 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. <i>See 47 CFR 1.2002(b) for the meaning of "party to the application" for these purposes.</i>	<input checked="" type="radio"/> Yes <input type="radio"/> 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.	<input checked="" type="radio"/> Yes <input type="radio"/> 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? Mexico and Canada	
43. Description. (Summarize the nature of the application and the services to be provided). Amendment to SES-MOD-20141022-00804 to add a 3.7 m transmit/receive antenna under call sign E080120. Narrative	

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
Jennifer A. Manner

46. Title of Person Signing
Vice President, Regulatory Affairs

**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:	Cheyenne	E5. Call Sign:	E080120
E2. Contact Name	Silas Cole	E6. Phone Number:	307-633-5225
E3. Street:	530 EchoStar Drive	E7. City:	Cheyenne
E4. State	WY	E8. County:	Laramie
E10. Area of Operation:		E9. Zip Code	82007
E11. Latitude:	41 ° 7 ' 54.4 " N		
E12. Longitude:	104 ° 44 ' 13.0 " W		
E13. Lat/Lon Coordinates are:		<input checked="" type="radio"/> NAD-27	<input checked="" type="radio"/> NAD-83 <input type="radio"/> N/A
E14. Site Elevation (AMSL):		1810.5 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.	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
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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?	<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> N/A
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E17. Is the facility operated by remote control? If YES, provide the location and telephone number of the control point.	<input type="radio"/> Yes <input checked="" type="radio"/> No
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E18. Is frequency coordination required? If YES, attach a frequency coordination report as Freq. Coordination	<input checked="" type="radio"/> Yes <input type="radio"/> No
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E19. Is coordination with another country required? If YES, attach the name of the country(ies) and	
---	--

plot of coordination contours as	<input type="radio"/> Yes <input checked="" type="radio"/> 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.	<input type="radio"/> Yes <input checked="" type="radio"/> No

POINTS OF COMMUNICATION

Satellite Name: 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)
Cheyenne	B1	1	Andrew Corporation	ES37MPJK-1	3.7	52.1 dBi at 12.2
Cheyenne	B1	1	Andrew Corporation	ES37MPJK-1	3.7	54.1 dBi at 17.8

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)
B1	3.7/3.7	4.7	1815.2	1810.5	189.0	0.0	76.96

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)
B1	12200 12210	R	Left and Right Circular	800KG2D	0.0	0.0

E50. Modulation and Services Telemetry						
B1	12690 12700	R	Left Hand Circular	800KG2D	0.0	0.0
E50. Modulation and Services Telemetry						
B1	17300 17310	T	Left and Right Circular	800KG2D	69.3	46.3
E50. Modulation and Services Telecommand						
B1	17300 17800	T	Left and Right Circular	N0N	68.9	68.9
E50. Modulation and Services Tracking Beacon						
B1	17790 17800	T	Left and Right Circular	800KG2D	69.3	46.3
E50. Modulation and Services Telecommand						
B1	12200 12210	R	Left and Right Circular	1M50F3D	0.0	0.0
E50. Modulation and Services Ranging Tones						
B1	12690 12700	R	Left and Right Circular	1M50F3D	0.0	0.0
E50. Modulation and Services Ranging Tones						
B1	17300 17310	T	Left and Right Circular	1M50F3D	72.0	46.3
E50. Modulation and Services Ranging Tones						
B1	17790 17800	T	Left and Right Circular	1M50F3D	72.0	46.3
E50. Modulation and Services Ranging Tones						
B1	12200 12700	R	Left and Right Circular	24M0G7W	0.0	0.0
E50. Modulation and Services Digital Data and Compressed Video						
B1	17300 17800	T	Left and Right Circular	24M0G7W	73.9	36.1

E50. Modulation and Services Digital Data and Compressed Video

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)
B1	Geostationary	12200 12700	42.0/148.0	108.7	11.7	235.0	25.4	0.0
	Geostationary	17300 17800	42.0/148.0	108.7	11.7	235.0	25.4	20.06
	Geostationary	17300 17800	42.0/148.0	108.7	11.7	235.0	25.4	-2.54

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.

Remember - You are not required to respond to a collection of information sponsored by the Federal government, and the government may not conduct or sponsor this collection, unless it displays a currently valid OMB control number or if we fail to provide you with this notice. This collection has been assigned an OMB control number of 3060-0678.

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.

Narrative Statement

Description of Application

Pursuant to Section 25.116(a) of the Commission's rules,¹ EchoStar Broadcasting Corporation ("EBC") hereby amends its earth station license modification application (SES-MOD-20141022-00804) to add a single 3.7 m transmit/receive antenna under call sign E080120.² The antenna will communicate in the same bands and with the same points of contacts as other antennas under this call sign. Specifically, it will transmit in the 17.2-17.8 GHz band and receive in the 12.20-12.70 GHz band.

FAA Notification

According to section 17.7(e)(3) antenna structures of less than 6.10 meters in height do not require FAA registration. The total height of the proposed antenna will be 4.7 meters above ground. Therefore this antenna does not require FAA notification.

Radiation Hazard Analysis

A radiation hazard analysis was performed for the 3.7 meter antenna, with a maximum possible 189.0 Watts of power applied at the flange, using the methodology from OET Bulletin 65. The results of this analysis, which is in the Radiation Hazard Exhibit attached hereto, shows that the maximum permissible exposure limit (MPE) for

¹ 47 C.F.R. § 25.116(a).

² This application is being filed as an amendment to SES-MOD-20141022-00804 because it involves the same call sign (E080120). Nothing in this amendment application is meant to change the information EBC submitted in SES-MOD-20141022-00804. EBC incorporates all of the information in the form and exhibits in the pending modification, SES-MOD-20141022-00804, by reference. Furthermore, EBC requests that the International Bureau grant this amendment and the pending modification separately to the extent necessary in order to expedite processing.

protection to the general public of 1 mW/cm^2 is exceeded in the near field, transition region, far field and in the region between the reflector and the ground. The controlled environment levels of 5 mW/cm^2 are also exceeded in the near field, transition region, the area of the main reflector and the area between the main reflector and the sub-reflector. EBC will ensure that the public and operational personnel are not exposed to harmful levels of radiation by one or both the following methods:

- 1) The earth station will be located in a gated and fenced facility with secured access in and around the proposed antenna. Since the proposed earth station will not transmit at an antenna elevation of less than 21.8 degrees, and since one diameter removed from the center of main beam the levels are down at least 20 dB, or by a factor of 100, public safety will be ensured for the near and far field regions.
- 2) Occupational exposure will be limited by turning off the transmitter during periods of maintenance, so that the MPE standard of 5.0 mW/cm^2 will be complied with for regions in close proximity to the main reflector as well as the subreflector, which could be occupied by operating personnel.

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
EchoStar Corporation
CHEYENNE, WY
(3.7 Meter)
Satellite Earth Station

Prepared By:
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147
January 05, 2015

TABLE OF CONTENTS

1. CONCLUSIONS	3
2. SUMMARY OF RESULTS	4
3. SUPPLEMENTAL SHOWING	5
4. EARTH STATION COORDINATION DATA.....	6
5. CERTIFICATION.....	10

1. CONCLUSIONS

An interference study considering all existing, proposed and prior coordinated microwave facilities within the coordination contours of the proposed earth station demonstrates that this site will operate satisfactorily with the common carrier microwave environment. Further, there will be no restrictions of its operation due to interference considerations.

2. SUMMARY OF RESULTS

A number of great circle interference cases were identified during the interference study of the proposed earth station. Each of the cases, which exceeded the interference objective on a line-of-sight basis, was profiled and the propagation losses estimated using NBS TN101 (Revised) techniques. The losses were found to be sufficient to reduce the signal levels to acceptable magnitudes in every case.

3. SUPPLEMENTAL SHOWING

Pursuant to Part 25.203(c) of the FCC Rules and Regulations, the satellite earth station proposed in this application was coordinated by Comsearch using computer techniques and in accordance with Part 25 of the FCC Rules and Regulations.

Coordination data for this earth station was sent to the below listed carriers with a letter dated 12/11/2014.

Company

ACS Communications
Action Communications Inc.
Anadarko Petroleum Corporation
Board of Public Utilities
Boulder, County of
Cheyenne Light, Fuel & Power
City of Boulder
City of Cheyenne
Clearwire Spectrum Holdings III, LLC
Eagle-Net Alliance
High West Energy
Inventive Wireless of Nebraska, LLC
LP Broadband, Inc.
Laramie County
Laurence Brett Glass
MOBILE RELAY ASSOCIATES INC
MPX
Millhouse Electronics Inc
NE Colorado Cellular, Inc.
New Cingular Wireless PCS LLC -Colorado
State of Colorado
Thompson School District R2-J
Union Telephone Company, Inc.
Verizon Wireless (VAW) LLC -CO/ID/MT/WY
Vyvx , LLC - Colorado
WERCS Communications Inc.
Weld County Colorado
Weld County District RE3J

4. EARTH STATION COORDINATION DATA

This section presents the data pertinent to frequency coordination of the proposed earth station that was circulated to all carriers within its coordination contours.

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5500 <http://www.comsearch.com>

Date: 12/11/2014
Job Number: <PCNJobCode>

Administrative Information

Status: ENGINEER PROPOSAL
Call Sign: <PCNCallSign>
Licensee Code: ZECHOS
Licensee Name: EchoStar Corporation

Site Information

CHEYENNE, WY
Venue Name
Latitude (NAD 83): 41° 7' 54.4" N
Longitude (NAD 83): 104° 44' 13.0" W
Climate Zone: A
Rain Zone: 2
Ground Elevation (AMSL): 1810.51 m / 5940.0 ft

Link Information

Satellite Type: Geostationary
Mode: TR - Transmit-Receive
Modulation: Digital
Satellite Arc: 42° W to 148° West Longitude
Azimuth Range: 108.7° to 235.0°
Corresponding Elevation Angles: 11.7° / 25.4°
Antenna Centerline (AGL): 2.74 m / 9.0 ft

Antenna Information

	Receive - FCC32	Transmit - FCC32
Manufacturer	Andrew	Andrew
Model	ES37MPK-1	ES37MPK-1
Gain / Diameter	52.1 dBi / 3.7 m	54.1 dBi / 3.7 m
3-dB / 15-dB Beamwidth	0.50° / 1.30°	0.32° / 0.78°

Max Available RF Power	(dBW/4 kHz)						
	(dBW/MHz)		(1) -7.8	(2) 14.8			
			16.2	38.8			

Maximum EIRP	(dBW/4 kHz)						
	(dBW/MHz)		46.3	68.9			
			70.3	92.9			

Interference Objectives:	Long Term	-156.0 dBW/MHz	20%	-151.0 dBW/4 kHz	20%
	Short Term	-146.0 dBW/MHz	0.01%	-128.0 dBW/4 kHz	0.0025%

Frequency Information

	Receive 12.2 GHz	Transmit 17.3 GHz
Emission / Frequency Range (MHz)	800KG2D - 24M0G1W / 12200.0 - 12700.0	800KG2D - 24M0G1W / 17300.0 - 17800.0 NON/ 17300.0 - 17800.0

Max Great Circle Coordination Distance	303.8 km / 188.7 mi	282.0 km / 175.2 mi
Precipitation Scatter Contour Radius	520.2 km / 323.2 mi	528.3 km / 328.2 mi

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5500 <http://www.comsearch.com>

Coordination Values	CHEYENNE, WY		
Licensee Name	EchoStar Corporation		
Latitude (NAD 83)	41° 7' 54.4" N		
Longitude (NAD 83)	104° 44' 13.0" W		
Ground Elevation (AMSL)	1810.51 m / 5940.0 ft		
Antenna Centerline (AGL)	2.74 m / 9.0 ft		
Antenna Model	Andrew 3.7 Meter		
Antenna Mode	Receive 12.2 GHz		Transmit 17.3 GHz
Interference Objectives:	Long Term	-156.0 dBW/MHz 20%	-151.0 dBW/4 kHz 20%
	Short Term	-146.0 dBW/MHz 0.01%	-128.0 dBW/4 kHz 0.0025%
Max Available RF Power	14.8 (dBW/4 kHz)		

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 12.2 GHz		Transmit 17.3 GHz		Coordination Distance (km)
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)	
0	0.86	108.38	-10.00	184.48	-10.00		164.54
5	0.91	103.48	-10.00	182.05	-10.00		160.51
10	0.88	98.57	-10.00	183.37	-10.00		163.37
15	0.84	93.66	-10.00	185.92	-10.00		166.05
20	0.86	88.75	-10.00	184.48	-10.00		164.53
25	0.86	83.84	-10.00	184.68	-10.00		164.75
30	0.90	78.93	-10.00	182.44	-10.00		160.90
35	0.80	74.03	-10.00	187.77	-10.00		168.01
40	0.77	69.13	-10.00	189.57	-10.00		169.94
45	0.70	64.24	-10.00	192.91	-10.00		173.54
50	0.71	59.36	-10.00	192.55	-10.00		173.15
55	0.59	54.51	-10.00	198.25	-10.00		179.42
60	0.47	49.68	-10.00	202.66	-10.00		187.09
65	0.42	44.87	-9.30	209.41	-9.30		194.40
70	0.38	40.09	-8.08	218.52	-8.08		202.67
75	0.36	35.36	-6.71	226.59	-6.71		210.30
80	0.40	30.68	-5.17	229.61	-5.17		212.89
85	0.46	26.10	-3.42	232.14	-3.42		214.93
90	0.46	21.72	-1.42	242.63	-1.42		224.34
95	0.00	17.94	0.65	280.28	0.65		257.78
100	0.00	14.53	2.94	292.96	2.94		269.48
105	0.00	12.24	4.81	300.96	4.81		279.52
110	0.00	11.73	5.26	303.79	5.26		282.05
115	0.34	12.92	4.22	284.85	4.22		261.31
120	0.51	15.81	2.03	256.51	2.03		236.11
125	0.59	19.18	-0.07	240.37	-0.07		222.01
130	0.70	22.40	-1.76	225.79	-1.76		208.45
135	0.71	25.56	-3.19	218.68	-3.19		201.83
140	0.82	28.47	-4.36	207.99	-4.36		192.01
145	0.72	31.34	-5.40	208.06	-5.40		192.31
150	0.81	33.82	-6.23	203.21	-6.23		184.48
155	0.90	35.99	-6.91	195.90	-6.91		176.49
160	0.89	37.94	-7.48	194.04	-7.48		174.57
165	1.03	39.37	-7.88	186.05	-7.88		166.14
170	1.08	40.46	-8.17	183.15	-8.17		163.13
175	1.13	41.10	-8.35	180.63	-8.35		159.05
180	1.24	41.22	-8.38	177.03	-8.38		155.51
185	1.34	40.89	-8.29	174.28	-8.29		152.92

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5500 <http://www.comsearch.com>

Coordination Values	CHEYENNE, WY		
Licensee Name	EchoStar Corporation		
Latitude (NAD 83)	41° 7' 54.4" N		
Longitude (NAD 83)	104° 44' 13.0" W		
Ground Elevation (AMSL)	1810.51 m / 5940.0 ft		
Antenna Centerline (AGL)	2.74 m / 9.0 ft		
Antenna Model	Andrew 3.7 Meter		
Antenna Mode	Receive 12.2 GHz		Transmit 17.3 GHz
Interference Objectives: Long Term	-156.0 dBW/MHz	20%	-151.0 dBW/4 kHz 20%
Short Term	-146.0 dBW/MHz	0.01%	-128.0 dBW/4 kHz 0.0025%
Max Available RF Power		14.8 (dBW/4 kHz)	

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 12.2 GHz		Transmit 17.3 GHz		Coordination Distance (km)
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)		
190	1.32	40.22	-8.11	175.79	-8.11		154.34
195	1.37	39.04	-7.79	175.80	-7.79		154.33
200	1.41	37.47	-7.34	176.82	-7.34		155.21
205	1.41	35.56	-6.77	179.53	-6.77		157.72
210	1.23	33.46	-6.11	187.92	-6.11		167.73
215	1.27	30.90	-5.25	190.69	-5.25		170.48
220	1.31	28.17	-4.25	194.02	-4.25		173.83
225	1.24	26.06	-3.40	199.55	-3.40		179.73
230	0.96	24.94	-2.92	207.75	-2.92		191.43
235	0.99	24.42	-2.69	206.98	-2.69		190.54
240	1.19	24.69	-2.82	203.50	-2.82		184.05
245	0.87	26.37	-3.53	209.18	-3.53		193.10
250	0.85	28.51	-4.38	206.49	-4.38		190.40
255	0.90	31.21	-5.36	202.32	-5.36		183.28
260	1.01	34.35	-6.40	193.09	-6.40		173.32
265	1.23	37.77	-7.43	181.71	-7.43		160.05
270	1.24	41.60	-8.48	176.65	-8.48		155.14
275	1.45	45.53	-9.46	162.38	-9.46		144.63
280	1.64	49.64	-10.00	153.86	-10.00		137.51
285	1.49	53.97	-10.00	158.40	-10.00		141.29
290	1.40	58.36	-10.00	161.57	-10.00		143.94
295	1.66	62.72	-10.00	153.04	-10.00		136.83
300	1.33	67.26	-10.00	166.25	-10.00		145.77
305	1.11	71.80	-10.00	173.73	-10.00		152.38
310	0.89	76.34	-10.00	182.94	-10.00		161.43
315	0.73	80.88	-10.00	191.52	-10.00		172.03
320	0.62	85.42	-10.00	196.86	-10.00		177.87
325	0.69	89.96	-10.00	193.22	-10.00		173.88
330	0.70	94.50	-10.00	193.10	-10.00		173.75
335	0.79	99.04	-10.00	188.25	-10.00		168.52
340	0.95	103.58	-10.00	179.65	-10.00		158.07
345	0.85	108.08	-10.00	185.02	-10.00		165.11
350	0.84	112.56	-10.00	185.56	-10.00		165.67
355	1.08	113.30	-10.00	174.69	-10.00		153.27

5. CERTIFICATION

I HEREBY CERTIFY THAT I AM THE TECHNICALLY QUALIFIED PERSON RESPONSIBLE FOR THE PREPARATION OF THE FREQUENCY COORDINATION DATA CONTAINED IN THIS APPLICATION, THAT I AM FAMILIAR WITH PARTS 101 AND 25 OF THE FCC RULES AND REGULATIONS, THAT I HAVE EITHER PREPARED OR REVIEWED THE FREQUENCY COORDINATION DATA SUBMITTED WITH THIS APPLICATION, AND THAT IT IS COMPLETE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

BY: 

Gary K. Edwards
Senior Manager
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147

DATED: January 05, 2015

Response to Question 36

On July 26, 2011, the FCC declared null and void an authorization of EchoStar Corporation, the parent company of EchoStar Satellite Operating Corporation (together with their affiliates, “EchoStar”), to construct, launch, and operate a new Direct Broadcast Satellite at 86.5° W.L. for failure to meet the critical design review milestone, and rejected EchoStar’s request to modify its 86.5° W.L. authorization to allow the in-orbit EchoStar 8 satellite to provide service from that orbital location.¹

The FCC also has denied a few of EchoStar’s applications for initial license or modification.²

The FCC has dismissed, but not denied on the merits, a few of EchoStar’s license applications without prejudice to refile.³

¹ See *EchoStar Corporation*, Memorandum Opinion and Order, 26 FCC Rcd 10,442 (IB 2011).

² See *Satellite Communications Services Information Re: Actions Taken*, Public Notice, Rpt. No. SES-00847 (IB rel. Aug. 16, 2006) (denying HNS License Sub, LLC’s, request for extension of construction milestones regarding File Nos. SES-MOD-20060404-00560 and SES-MOD-20060404-00561); *EchoStar Satellite LLC*, Memorandum Opinion and Order, 19 FCC Rcd 7846 (IB 2004) (denying applications to launch and operate four geostationary satellites because of interference concerns); *EchoStar Satellite LLC*, Order, 20 FCC Rcd 12,027 (IB 2005); *EchoStar Satellite Corporation*, Memorandum Opinion and Order, 17 FCC Rcd 8831 (IB 2002) (denying request to extend construction milestone dates); *EchoStar Satellite Corporation*, Memorandum Opinion and Order, 16 FCC Rcd 14,300 (IB 2001).

³ See, e.g., Letter from Robert G. Nelson, Chief, Satellite Division, to Pantelis Michalopoulos, Counsel for EchoStar Corporation, 24 FCC Rcd 7132 (IB 2009); *EchoStar Corporation, Application to Operate a C-Band Geostationary Satellite Orbit Satellite in the Fixed-Satellite Service at the 84.9° W.L. Orbital Location*, Memorandum Opinion and Order, 25 FCC Rcd 10,193 (IB 2010); Letter from Paul E. Blais, Chief, Systems Analysis Branch, Satellite Division, to Alison Minea, Corporate Counsel, EchoStar Broadcasting Corporation, 28 FCC Rcd 10,214 (IB 2013); Letter from Paul E. Blais, Chief, Systems Analysis Branch, Satellite Division, to Alison Minea, Corporate Counsel, EchoStar Broadcasting Corporation, 28 FCC Rcd 10,216 (IB 2013).

Analysis of Non-Ionizing Radiation for a 3.7-Meter Earth Station System

This report analyzes the non-ionizing radiation levels for a 3.7-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	3.7	m
Antenna Surface Area	A _{surface}	$\pi D^2 / 4$	10.75	m ²
Subreflector Diameter	D _{sr}	Input	36.5	cm
Area of Subreflector	A _{sr}	$\pi D_{sr}^2 / 4$	1046.35	cm ²
Frequency	F	Input	17550	MHz
Wavelength	λ	300 / F	0.017094	m
Transmit Power	P	Input	250.00	W
Antenna Gain (dBi)	G _{es}	Input	54.2	dBi
Antenna Gain (factor)	G	10 ^{G_{es}/10}	263026.8	n/a
Pi	π	Constant	3.1415927	n/a
Antenna Efficiency	η	$G\lambda^2 / (\pi^2 D^2)$	0.57	n/a

1. Far Field Distance Calculation

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

$$\begin{aligned} \text{Distance to the Far Field Region} \quad R_{\text{ff}} &= 0.60 D^2 / \lambda \\ &= 480.5 \text{ m} \end{aligned} \quad (1)$$

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

$$\begin{aligned} \text{On-Axis Power Density in the Far Field} \quad S_{\text{ff}} &= G P / (4 \pi R_{\text{ff}}^2) \\ &= 22.663 \text{ W/m}^2 \\ &= 2.266 \text{ mW/cm}^2 \end{aligned} \quad (2)$$

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:

$$\begin{aligned} \text{Extent of the Near Field} \quad R_{\text{nf}} &= D^2 / (4 \lambda) \\ &= 200.2 \text{ m} \end{aligned} \quad (3)$$

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

$$\begin{aligned} \text{Near Field Power Density} \quad S_{\text{nf}} &= 16.0 \eta P / (\pi D^2) \\ &= 52.904 \text{ W/m}^2 \\ &= 5.290 \text{ mW/cm}^2 \end{aligned} \quad (4)$$

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:

$$\begin{aligned} \text{Transition Region Power Density} \quad S_t &= S_{\text{nf}} R_{\text{nf}} / R_t \\ &= 5.290 \text{ mW/cm}^2 \end{aligned} \quad (5)$$

4. 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:

$$\begin{aligned} \text{Power Density at the Subreflector} \quad S_{sr} &= 4000 P / A_{sr} & (6) \\ &= 955.706 \text{ mW/cm}^2 \end{aligned}$$

5. 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:

$$\begin{aligned} \text{Power Density at the Main Reflector Surface} \quad S_{\text{surface}} &= 4 P / A_{\text{surface}} & (7) \\ &= 93.005 \text{ W/m}^2 \\ &= 9.301 \text{ mW/cm}^2 \end{aligned}$$

6. 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:

$$\begin{aligned} \text{Power Density between Reflector and Ground} \quad S_g &= P / A_{\text{surface}} & (8) \\ &= 23.251 \text{ W/m}^2 \\ &= 2.325 \text{ mW/cm}^2 \end{aligned}$$

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 ($R_{ff} = 480.5$ m)	S_{ff}	2.266	Potential Hazard
2. Near Field ($R_{nf} = 200.2$ m)	S_{nf}	5.290	Potential Hazard
3. Transition Region ($R_{nf} < R_t < R_{ff}$)	S_t	5.290	Potential Hazard
4. Between Main Reflector and Subreflector	S_{sr}	955.706	Potential Hazard
5. Main Reflector	$S_{surface}$	9.301	Potential Hazard
6. Between Main Reflector and Ground	S_g	2.325	Potential Hazard

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 ($R_{ff} = 480.5$ m)	S_{ff}	2.266	Satisfies FCC MPE
2. Near Field ($R_{nf} = 200.2$ m)	S_{nf}	5.290	Potential Hazard
3. Transition Region ($R_{nf} < R_t < R_{ff}$)	S_t	5.290	Potential Hazard
4. Between Main Reflector and Subreflector	S_{sr}	955.706	Potential Hazard
5. Main Reflector	$S_{surface}$	9.301	Potential Hazard
6. Between Main Reflector and Ground	S_g	2.325	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 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.

The earth station will be located in a Gated and Fenced facility with secured access in and around the proposed antenna. Since the proposed earth station will not transmit at an antenna elevation of less than 21.8 degrees, and since one diameter removed from the center of main beam the levels are down at least 20 dB, or by a factor of 100, public safety will be ensured for the near and far field regions.

Finally, occupational exposure will be limited, and the transmitter will be turned off during periods of maintenance, so that the MPE standard of 5.0 mw/cm² will be complied with for those regions in close proximity to the main reflector, and subreflector, which could be occupied by operating personnel.



April 21, 2015

VIA IBFS

Marlene H. Dortch, Secretary
Federal Communications Commission
445 Twelfth Street, SW
Washington, DC 20554

Re: Correction to EchoStar Broadcasting Corporation Application – SES-AMD-20150114-00009

Dear Ms. Dortch:

EchoStar Broadcasting Corporation (EBC) hereby makes a correction to its application – IBFS File No. SES-AMD-20150114-00009. On page one of Narrative Statement, EBC inadvertently stated that the earth station will transmit in the 17.2-17.8 GHz band. The correct transmit band is 17.3-17.8 GHz.

Please contact the undersigned with any questions.

Sincerely,

/s/ Jesse Jachman

Jesse Jachman
Senior Counsel, Regulatory Affairs
EchoStar Broadcasting Corporation
11717 Exploration Lane
Germantown, MD 20876
(301)428-5506

cc: Merissa Velez