Narrative

Pursuant to Section 25.117 of the Federal Communications Commission's rules,[1] EchoStar Broadcasting Corporation (EBC) submits this application to modify call sign E050373 (SES-MOD-20130206-00160). The purpose of this application is to add an additional antenna facility designated VAT1, correct existing licensed antenna information, add a point of communications, and correct other points of communications. Further details are provided below.

Additional Antenna

EBC proposes to add an additional antenna, VAT1, to call sign E050373 that will operate under the technical parameters in the form 312 schedule B. The new antenna will be located within +/- 1 second latitude/longitude of the existing licensed earth stations under this call sign. In addition, the new antenna will operate at the same technical parameters as the existing license antennas, VAT3 and VAT4.

The new antenna will operate within the quiet zone in 47 C.F.R. § 1.924(a)(1). Pursuant to 47 C.F.R. § 1.924(a)(2), EBC notified the National Radio Astronomy Observatory (NRAO) of the planned operation on April 10, 2015. A copy of that notification is attached hereto. At the request of NRA staff, EBC subsequently sent a complete draft form 312 to the NRAO on April 14, 2015. When available, EBC will supplement this application with copy of the NRAO's consent letter.

Corrections to Information for VAT3 and VAT4

EBC requests that the Commission change the existing licensed emission designator, 24M0M1F, for VAT3 and VAT4 to 24M0G7W. The bandwidth is not changing.

EBC requests that the Commission change the existing licensed antenna manufacturer for VAT3 and VAT4 from TIW to GDSatcom.

Finally, there is duplicate "max gain" information for VAT4 because "65.0 dBi @ 17.3000 GHz" is listed twice. EBC requests that the Commission move the second "65.0 dBi @ 17.3000 GHz" so that it is correctly listed under VAT3.

Add a Point of Communication

EBC proposes to add EchoStar 15 at 45.1° W.L. as a point of communication.

[1] 47 C.F.R. § 25.117.

Correct Points of Communications

EBC requests that the Commission delete points of communication 1-9 on the license. Specifically, EBC requests that the FCC delete the following points of communication:

1) Mt. Jackson, VA to ECHOSTAR 1 @ 148.0 W.L. of the Direct Broadcast Satellite system (U.S.-licensed)

2) Mt. Jackson, VA to ECHOSTAR 2 @ 148 W.L. of the Direct Broadcast satellite system (U.S.-licensed)

3) Mt. Jackson, VA to ECHOSTAR 3 (S2741) @ 61.5 W.L. of the Direct Broadcast Satellite system (U.S.-licensed)

4) Mt. Jackson, VA to ECHOSTAR 5 satellite @129 W.L. of the Direct Broadcast Satellite system (U.S.-licensed)

5) Mt. Jackson, VA to ECHOSTAR 6 @ 110 W.L. of the Direct Broadcast satellite system (U.S.-licensed)

6) Mt. Jackson, VA to ECHOSTAR 7 @ 119 W.L. of the Direct Broadcast satellite system (U.S.-licensed)

7) Mt. Jackson, VA to ECHOSTAR 8 @ 110 W.L. of the Direct Broadcast satellite system (U.S.-licensed)

8) Mt. Jackson, VA to RAINBOW 1 @ 61.5 W.L. (Direct Broadcast Satellite) (U.S.-licensed)

9) Mt. Jackson, VA to ECHOSTAR 10 satellite @ W.L. of the Direct Broadcast satellite system (U.S.-licensed)

FAA Notification

Notification to the FAA is not required for the proposed antenna facility because the structure passes slope. EBC has attached the TOWAIR report.

Radiation Hazard Study

A copy of the radiation hazard study is attached to this application.

ECHOSTAR

April 10, 2015

Anthony Beasley
Director
National Radio Astronomy Observatory
Post Office Box No. 2
Green Bank, West Virginia 24944

Dear Mr. Beasley,

Pursuant to 47 C.F.R. § 1.924(a)(2), this letter is to inform you that EchoStar Broadcasting Corporation (EBC) is planning to construct a new earth station antenna within the boundaries identified in 47 C.F.R. § 1.924(a)(1). This new antenna will be located within +/- 1 second latitude/longitude of existing facilities licensed under Federal Communications Commission call sign E050373. EBC provides the information required under 47 C.F.R. § 1.924(a)(1) below:

- geographical coordinates of the antenna location: 38° 43' 22.4" N, 78° 39' 58.5" W
- address: 1335 Wissler Road, Quicksburg, Shenandoah, VA, 22847
- the antenna height (above ground level): 13.2m
- the antenna site ground elevation above mean sea level: 282.2m
- antenna directivity (if any): 3dB beamwidth = 0.09°
- the channel: Transmit, 17300-17800 MHz; Receive, 12200-12700 MHz
- the emission type: 24M0G7W, 1M50G2D, 300KG2D
- power: 84.7 dBW EIRP

EBC will notify the National Radio Astronomy Observatory when the application for the new antenna is filed with the FCC. Please contact the undersigned with any questions.

Sincerely,

Jesse Jachman
EchoStar Broadcasting Corporation
Senior Counsel, Regulatory Affairs
11717 Exploration Lane
Germantown, MD 20876
(301)428-5975

cc: nrqz@gb.nrao.edu

Analysis of Non-Ionizing Radiation for a 13.2-Meter Earth Station System

This report analyzes the non-ionizing radiation levels for a 13.2-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	13.2	m
Antenna Surface Area	$A_{surface}$	$\pi D^2 / 4$	136.85	m^2
Subreflector Diameter	D_{sr}	Input	172.7	cm
Area of Subreflector	A_{sr}	$\pi D_{sr}{}^2/4$	23424.73	cm^2
Frequency	F	Input	17550	MHz
Wavelength	λ	300 / F	0.017094	m
Transmit Power	P	Input	1600.00	W
Antenna Gain (dBi)	G_{es}	Input	65.0	dBi
Antenna Gain (factor)	G	$10^{Ges/10}$	3162277.7	n/a
Pi	π	Constant	3.1415927	n/a
Antenna Efficiency	η	$G\lambda^2/(\pi^2D^2)$	0.54	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

$$R_{ff} = 0.60\ D^2 / \lambda \quad (1)$$
$$= 6115.8\ \text{m}$$

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

$$S_{ff} = G\ P / (4\ \pi\ R_{ff}^{\ 2}) \quad (2)$$
$$= 10.765\ \text{W/m}^2$$
$$= 1.076\ \text{mW/cm}^2$$

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

$$R_{nf} = D^2 / (4\ \lambda) \quad (3)$$
$$= 2548.3\ \text{m}$$

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

Near Field Power Density

$$S_{nf} = 16.0\ \eta\ P / (\pi\ D^2) \quad (4)$$
$$= 25.129\ \text{W/m}^2$$
$$= 2.513\ \text{mW/cm}^2$$

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

$$S_t = S_{nf}\ R_{nf} / R_t \quad (5)$$
$$= 2.513\ \text{mW/cm}^2$$

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:

Power Density at the Subreflector

$$S_{sr} = 4000\ P / A_{sr} = 273.216\ mW/cm^2 \quad (6)$$

5. Main Reflector Region

The power density in the main reflector is determined in the same manner as the power density at the 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

$$S_{surface} = 4\ P / A_{surface} = 46.767\ W/m^2 = 4.677\ mW/cm^2 \quad (7)$$

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:

Power Density between Reflector and Ground

$$S_g = P / A_{surface} = 11.692\ W/m^2 = 1.169\ mW/cm^2 \quad (8)$$

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} = 6115.8 m)	S_{ff}	1.076	Potential Hazard
2. Near Field (R_{nf} = 2548.3 m)	S_{nf}	2.513	Potential Hazard
3. Transition Region ($R_{nf} < R_t < R_{ff}$)	S_t	2.513	Potential Hazard
4. Between Main Reflector and Subreflector	S_{sr}	273.216	Potential Hazard
5. Main Reflector	$S_{surface}$	4.677	Potential Hazard
6. Between Main Reflector and Ground	S_g	1.169	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} = 6115.8 m)	S_{ff}	1.076	Satisfies FCC MPE
2. Near Field (R_{nf} = 2548.3 m)	S_{nf}	2.513	Satisfies FCC MPE
3. Transition Region ($R_{nf} < R_t < R_{ff}$)	S_t	2.513	Satisfies FCC MPE
4. Between Main Reflector and Subreflector	S_{sr}	273.216	Potential Hazard
5. Main Reflector	$S_{surface}$	4.677	Satisfies FCC MPE
6. Between Main Reflector and Ground	S_g	1.169	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 23.9 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/cm**2 will be complied with for those regions in close proximity to the main reflector, and subreflector, which could be occupied by operating personnel.

Antenna Structure Registration

TOWAIR Determination Results

HELP

New Search Printable Page

A routine check of the coordinates, heights, and structure type you provided indicates that this structure does not require registration.

*** NOTICE ***

TOWAIR's findings are not definitive or binding, and we cannot guarantee that the data in TOWAIR are fully current and accurate. In some instances, TOWAIR may yield results that differ from application of the criteria set out in 47 C.F.R. Section 17.7 and 14 C.F.R. Section 77.13. A positive finding by TOWAIR recommending notification should be given considerable weight. On the other hand, a finding by TOWAIR recommending either for or against notification is not conclusive. It is the responsibility of each ASR participant to exercise due diligence to determine if it must coordinate its structure with the FAA. TOWAIR is only one tool designed to assist ASR participants in exercising this due diligence, and further investigation may be necessary to determine if FAA coordination is appropriate.

DETERMINATION Results

PASS SLOPE(50:1): NO FAA REQ-RWY 10499 MTRS OR LESS & 7898.89 MTRS (7.89890) KM AWAY

Type	C/R	Latitude	Longitude	Name	Address	Lowest Elevation (m)	Runway Length (m)
AIRP	R	38-39-30.00N	078-42-16.00W	NEW MARKET	SHENANDOAH NEW MARKET, VA	293.3	890.0

Your Specifications

NAD83 Coordinates	
Latitude	38-43-22.4 north
Longitude	078-39-58.5 west
Measurements (Meters)	
Overall Structure Height (AGL)	13.2
Support Structure Height (AGL)	13.2
Site Elevation (AMSL)	282.2
Structure Type	
LTOWER - Lattice Tower	

Tower Construction Notifications
Notify Tribes and Historic Preservation Officers of your plans to build a tower.

ASR Help	ASR License Glossary - FAQ - Online Help - Documentation - Technical Support
ASR Online Systems	TOWAIR- CORES - ASR Online Filing - Application Search - Registration Search
About ASR	Privacy Statement - About ASR - ASR Home

FCC | Wireless | ULS | CORES

Help | Tech Support

Federal Communications Commission
445 12th Street SW
Washington, DC 20554

Phone: 1-877-480-3201
TTY: 1-717-338-2824
Submit Help Request

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 86.5º W.L. for failure to meet the critical design review milestone, and rejected EchoStar's request to modify its 86.5º 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 refiling.[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 84.9º 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).