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November 21, 2022

BY ELECTRONIC DELIVERY

Marlene H. Dortch
Secretary
Federal Communications Commission
45 L Street NE
Washington D.C. 20554

Re: Request for Special Temporary Authority to Operate Two Cobham SAILOR Antennas

Dear Ms. Dortch:

KVH Industries, Inc. ("KVH"), by its counsel and pursuant to Section 25.120 of the Commission's rules, herein requests 30 days of Special Temporary Authority ("STA"),[1] commencing December 15, 2022, to temporarily operate one 1.03m, Cobham SAILOR 1000 XTR KU antenna and one 1.03m Cobham SAILOR 900 VSAT KU antenna mounted on a U.S. flagged vessel operating off the coast of Florida and in international waters in the Caribbean Sea and Gulf of Mexico. The proposed operation is being conducted to test new equipment and verify the capabilities of a new satellite-based broadband access capability being offered to KVH by Intelsat. Given the significant demand for innovative broadband capabilities to support maritime commerce, the grant of an STA would service the public interest.

The proposed tests will be a continuation of testing that has been initiated by Intelsat using the same two Cobham antennas pursuant to an STA that was issued by the FCC on November 13, 2022. *See* IBFS No. SES-STA-20221104-01182. KVH herein agrees to accept an STA pursuant to the same substantive conditions identified by the Commission in the STA grant that was issued to Intelsat.

The proposed operations will occur intermittently over a 30-day period beginning approximately on December 15, 2022. Specifically, KVH seeks STA to communicate with the

[1] KVH has filed its STA request, FCC Form 159, a $210.00 filing fee, and this supporting letter electronically via the International Bureau's Filing System.

Horizons 2 and Intelsat 37e satellites in the 14000-14500 MHz[2] and 11700-12200 MHz bands using the Cobham antennas.[3] The 24x7 contact information for the requested operations is:

KVH Network Technical Support
+1 401-851-3806
mvbsupport@kvh.com

In the extremely unlikely event that harmful interference should occur due to transmissions to or from the antenna, KVH will take all reasonable steps to eliminate the interference including suspending the testing while the source of the interference is investigated.

Thank you for your attention to these matters. Please contact the undersigned if you have any questions.

Sincerely,

Bruce A. Olcott

[2] All operations will occur more than 125 km away from the three U.S. Tracking and Data Relay Satellite System (TDRSS) sites—Blossom Point, MD, White Sands, AZ, and Dededo, Guam (Guam Remote Ground Terminal System).

[3] In support of this request KVH herein attaches Exhibit A-C, which provide operational information and a Radiation Hazard Report.

EXHIBIT A

KVH Industries, Inc.
Request for Special Temporary Authority to Operate Two Cobham SAILOR Antennas

Antenna	Cobham SAILOR 1000 XTR KU
Antenna Size (m)	1.03
Transmit Frequencies (MHz)	14000-14500
Receive Frequencies (MHz)	11700-12200
Emission Designator(s)	4M77G7W and 194KG7W
Polarization	Linear
Bandwidth	4.77 MHz and 194 kHz
Transmit Gain	41.6 dBi at 14.25 GHz
Maximum EIRP per Carrier (dBW)	50.1 and 36.2
Maximum EIRP Density per Carrier (dBW/4 kHz)	19.3 and 19.3
Site Location	International and U.S. territorial waters
Latitude/Longitude (NAD83)	not applicable
Satellite Point of Communication	Horizons 2
Satellite Call Sign	S2423
Location	73.8° W.L.
Satellite Point of Communication	Intelsat 37e
Satellite Call Sign	S2972
Location	18.0° W.L.

EXHIBIT B

KVH Industries, Inc.
Request for Special Temporary Authority to Operate Two Cobham SAILOR Antennas

Antenna	Cobham SAILOR 900 VSAT KU
Antenna Size (m)	1.03
Transmit Frequencies (MHz)	14000-14500
Receive Frequencies (MHz)	11700-12200
Emission Designator(s)	4M77G7W and 194KG7W
Polarization	Linear
Bandwidth	4.77 MHz and 194 kHz
Transmit Gain	41.6 dBi at 14.25 GHz
Maximum EIRP per Carrier (dBW)	50.1 and 36.2
Maximum EIRP Density per Carrier (dBW/4 kHz)	19.3 and 19.3
Site Location	International and U.S. territorial waters
Latitude/Longitude (NAD83)	Not applicable
Satellite Point of Communication	Horizons 2
Satellite Call Sign	S2423
Location	73.8° W.L.
Satellite Point of Communication	Intelsat 37e
Satellite Call Sign	S2972
Location	18.0° W.L.

Radiation Hazard Report

Analysis of Non-Ionizing Radiation for a 1 m Earth Station

This analysis provides the calculated non-ionizing radiation levels for a 1-meter earth station system.

The methods and calculations performed in this analysis are based on the FCC Office of Engineering and Technology Bulletin, No.65, October 1985 as 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 (Summarized in Annex 1). There are separate exposure limits applicable to the General Population/Uncontrolled Environment and the Occupational/Controlled Environment. The Maximum Permissible Exposure (MPE) limits for persons in a General Population/Uncontrolled environment for the frequency band of this antenna, is 1 mW/cm2 for a 30 minute or lower time period as shown in Annex 1 (a). The MPE limit for persons in an Occupational/Controlled environment for the frequency band of this antenna is 5 mW/cm2 for a 6 minute time or lower period as shown in Annex 1 (b). The purpose of this analysis described is to determine the power flux density levels of the earth station at the main reflector surface, the near-field, transition region, far-field, between the sub-reflector or feed and, at the main reflector surface, and between the antenna edge and the ground and to compare these levels to the specified MPEs.

The parameters of the antenna that is the subject of this analysis are shown in Table 1.
Intermediate calculated values and constants are provided in Table 2.

Table 1. Input Parameters Used for Determining Power Flux Densities

Parameter	Symbol	Formula	Value	Units
Antenna Diameter	D	Input	1	m
Frequency	F	Input	14250	MHz
Transmit Power	P	Input	8	W
Antenna Gain (dBi)	G_{es}	Input	41.6	dBi

Table 2. Calculated Values and Constants

Parameter	Symbol	Formula	Value	Units
Antenna Surface Area	$A_{surface}$	$\pi D^2/4$	0.79	m^2
Wavelength	λ	300/F	0.021053	m
Antenna Gain (factor)	G	$10^{Ges/10}$	14454.40	n/a
Pi	π	Constant	3.1415927	n/a
Antenna Efficiency	η	$G\lambda^2/(\pi^2 D^2)$	0.65	n/a

1. Antenna Main Reflector Surface

The power density in the main reflector is determined from the Power level and the area of the main reflector aperture. This is determined from the following equation:

Power Density at the Main Reflector Surface:

$$S_{surface} = 4P/A_{surface} \qquad (1)$$

$$= 40.744 \quad W/m^2$$

$$= 4.074 \quad mW/cm^2$$

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 is determined from the following equation:

Extent of the Near Field:

$$R_{nf} = D^2 / (4\lambda) \qquad (2)$$

$$= 11.88 \quad m$$

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

Near Field Density:

$$S_{nf} = 16.0\ \eta\ P / (\pi\ D^2) \qquad (3)$$

$$= 2.645 \quad mW/cm^2$$

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 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 is determined from the following equation:

Transition Region Power Density:

$$S_t = S_{nf}\, R_{nf} / R_t \qquad (4)$$

$$= 2.645 \quad mW/cm^2$$

4. Far Field Distance Calculation

The distance to the Far Field Region is calculated using the following equation:

Distance to Far Field Region:

$$R_{ff} = 0.6\, D^2 / \lambda \qquad (5)$$

$$= \quad 28.500 \quad \text{m}$$

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

On-axis Power Density in the Far Field:

$$S_{ff} = G\, P / (4\, \pi\, R_{ff}^2) \qquad (6)$$

$$= \quad 1.133 \quad \text{mW/cm}^2$$

5. Region between the Main Reflector and the Ground

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

Power Density between Reflector and Ground:

$$S_g = P / A_{surface} \qquad (7)$$

$$= \quad 1.019 \quad \text{mW/cm}^2$$

7. Summary of Calculations

Table 3. Summary of Expected Radiation levels for Uncontrolled Environment

Region	Symbol	Calculated Maximum Radiation Power Density Level (mW/cm^2)	Hazard Assessment
1. Main Reflector	$S_{surface}$	4.074	Potential Hazard
2. Near Field (R_{nf} = 11.88 m)	S_{nf}	2.645	Potential Hazard
3. Transition Region ($R_{nf} < R_t < R_{ff}$)	S_t	2.645	Potential Hazard
4. Far Field (R_{ff} = 28.5 m)	S_{ff}	1.133	Potential Hazard
5. Between Main Reflector and Ground	S_g	1.019	Potential Hazard

Table 4. Summary of Expected Radiation levels for Controlled Environment

Region	Symbol	Calculated Maximum Radiation Power Density Level (mW/cm^2)	Hazard Assessment
1. Main Reflector	$S_{surface}$	4.074	Satisfies FCC MPE
2. Near Field (R_{nf} = 11.88 m)	S_{nf}	2.645	Satisfies FCC MPE
3. Transition Region ($R_{nf} < R_t < R_{ff}$)	S_t	2.645	Satisfies FCC MPE
4. Far Field (R_{ff} = 28.5 m)	S_{ff}	1.133	Satisfies FCC MPE
5. Between Main Reflector and Ground	S_g	1.019	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. Conclusion

Based upon the above analysis, it is concluded that harmful levels of radiation may exist in those regions noted for the Uncontrolled (Table 3) Environment and the Controlled Environment (Table 4).

The tests will take place on a U.S. flagged vessel the owner and operator of which is cooperating with KVH in conducting the tests. KVH or its contractors will control the placement and installation of the antennas to ensure that they are placed in a secure elevated location that lacks routine access by the ship's crew and passengers. The earth station will be marked with the standard radiation hazard warnings, as well as the area in the vicinity of the earth station to inform crew and passengers who might be working or otherwise present in or near the direct path of the main beam.

The antennas will be installed and operated such that the main beam of the antenna will be pointed at least one diameter away from any portion of the vessel on or in which crew or passengers may be present. This precaution will ensure that no potential hazard will exist for either the public or the ship's crew given the fact that transmit power levels are down by at least 20 dB, or by a factor of 100, in areas that are one diameter removed from the center of the main beam.

Finally, the earth station's operating personnel will not have access to areas that exceed the MPE levels while the earth station is in operation. The transmitter will be turned off during those 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, which could be occupied by operating personnel.

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

ANNEX 1

(MPE Levels)

a) Limits for General Population/Uncontrolled Exposure (MPE)

Frequency Range (MHz)	**Power Density (mW/cm^2)**
30-300	0.2
300-1500	Frequency(MHz)*(4.0/1200)
1500-100,000	1

b) Limits for Occupational/Controlled Exposure (MPE)

Frequency Range (MHz)	**Power Density (mW/cm^2)**
30-300	1
300-1500	Frequency(MHz)*(4.0/1200)
1500-100,000	5