



**UNITED STATES OF AMERICA
FEDERAL COMMUNICATIONS COMMISSION
RADIO STATION AUTHORIZATION**

Name: KVH Industries, Inc.

Call Sign: E090001

Authorization Type: Modification of License

File Number: SES-MOD-20160823-00734

Non Common Carrier

Grant date: 10/24/2016

Expiration Date: 12/15/2024



Nature of Service: Earth Stations on-board Vessels

Class of Station: Earth Stations on-board Vessels/VSAT

A) Site Location(s)

#	Site ID	Address	Latitude	Longitude	Elevation (Meters)	Special Provisions NAD (Refer to Section H)
1)	ESV NET1	(MOBILE 0.6METER) 3500 UNITS, CARIBBEAN AND COASTAL AREA CONUS, GM, Licensee certifies antenna(s) do not comply with Section 25.209. Please refer to Section E for special conditions placed upon antennas at this site.			0	NA
2)	ESV NET2	(MOBILE 0.37METER) 50 ENTERPRISE CENTER VARIOUS (1000 UNITS), Licensee certifies antenna(s) do not comply with Section 25.209. Please refer to Section E for special conditions placed upon antennas at this site.			0	NA
3)	ESV NET3	(MOBILE 1.0METER) (250 UNITS) CONUS, HI, AK USTERR, Licensee certifies antenna(s) do not comply with Section 25.209. Please refer to Section E for special conditions placed upon antennas at this site.				NA
4)	ESV NET4	(MOBILE 1.0METER) 50 ENTERPRISE CENTER VARIOUS (500 UNITS), Licensee certifies antenna(s) do not comply with Section 25.209. Please refer to Section E for special conditions placed upon antennas at this site.				NA

Subject to the provisions of the Communications Act of 1934, The Communications Satellite Act of 1962, subsequent acts and treaties, and all present and future regulations made by this Commission, and further subject to the conditions and requirements set forth in this license, the grantee is authorized to construct, use and operate the radio facilities described below for radio communications for the term beginning December 15, 2009 (3 AM Eastern Standard Time) and ending December 15, 2024 (3 AM Eastern Standard Time) . The required date of completion of construction and commencement of operation is October 24, 2017 (3 AM Eastern Standard Time) . Grantee must file with the Commission a certification upon completion of construction and commencement of operation.



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B) Particulars of Operations

The General Provision 1010 applies to all receiving frequency bands.

The General Provision 1900 applies to all transmitting frequency bands.

For the text of these provisions, refer to Section H.

#	Frequency (MHz)	Polarization Code	Emission	Tx/Rx Mode	Max EIRP /Carrier (dBW)	Max EIRP Density /Carrier (dBW/4kHz)	Associated Antenna	Special Provisions (Refer to Section H)	Modulation/ Services
1)	14000.0000-14500.0000	H, V	1M80G7D	Tx	41.15	14.60	ESV1		DATA SERVICES
2)	14000.0000-14500.0000	H, V	27M0G7D	Tx	42.40	4.11	ESV1		SPREAD SPECTRUM CRMA OUTBOUND DATA SERVICES
3)	14000.0000-14500.0000	H, V	18M0G7D	Tx	42.40	5.87	ESV1		DIRECT SEQUENCE SPREAD SPECTRUM (DSSS) TECHNIQUE USING A RANDOM ACCESS METHOD CALLED CODE REUSE MULTIPLE ACCESS (CRMA) TO ACCESS THE SATELLITE. DATA SERVICES.
4)	14000.0000-14500.0000	H, V	36M0G7D	Tx	42.40	2.86	ESV1		DIRECT SEQUENCE SPREAD SPECTRUM (DSSS) TECHNIQUE USING A RANDOM ACCESS METHOD CALLED CODE REUSE MULTIPLE ACCESS (CRMA) TO ACCESS THE SATELLITE. DATA SERVICES.
5)	11700.0000-12200.0000	H, V	1M80G7D	Rx			ESV1		DATA SERVICES
6)	11700.0000-12200.0000	H, V	18M0G7D	Rx			ESV1		SPREAD SPECTRUM CRMA OUTBOUND DATA SERVICES
7)	11700.0000-12200.0000	H, V	27M0G7D	Rx			ESV1		SPREAD SPECTRUM CRMA OUTBOUND DATA SERVICES
8)	11700.0000-12200.0000	H, V	36M0G7D	Rx			ESV1		SPREAD SPECTRUM CRMA OUTBOUND DATA SERVICES
9)	11450.0000-11700.0000	H, V	1M80G7D	Rx			ESV1		DATA SERVICES
10)	11450.0000-11700.0000	H, V	27M0G7D	Rx			ESV1		SPREAD SPECTRUM CRMA OUTBOUND DATA SERVICES
11)	10950.0000-11200.0000	H, V	1M80G7D	Rx			ESV1		DATA SERVICES
12)	10950.0000-11200.0000	H, V	27M0G7D	Rx			ESV1		SPREAD SPECTRUM CRMA OUTBOUND DATA SERVICES
13)	14000.0000-14500.0000	H, V	18M0G7D	Tx	38.02	1.49	ESV2		DIRECT SEQUENCE SPREAD SPECTRUM (DSSS) TECHNIQUE USING A RANDOM ACCESS METHOD CALLED CODE REUSE MULTIPLE ACCESS (CRMA) TO ACCESS THE SATELLITE. DATA SERVICES.



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B) Particulars of Operations

The General Provision 1010 applies to all receiving frequency bands.

The General Provision 1900 applies to all transmitting frequency bands.

For the text of these provisions, refer to Section H.

#	Frequency (MHz)	Polarization Code	Emission	Tx/Rx Mode	Max EIRP /Carrier (dBW)	Max EIRP Density /Carrier (dBW/4kHz)	Associated Antenna	Special Provisions (Refer to Section H)	Modulation/ Services
14)	14000.0000-14500.0000	H, V	27M0G7D	Tx	38.02	4.11	ESV2		DIRECT SEQUENCE SPREAD SPECTRUM (DSSS) TECHNIQUE USING A RANDOM ACCESS METHOD CALLED CODE REUSE MULTIPLE ACCESS (CRMA) TO ACCESS THE SATELLITE. DATA SERVICES.
15)	14000.0000-14500.0000	H, V	36M0G7D	Tx	38.02	-1.52	ESV2		DIRECT SEQUENCE SPREAD SPECTRUM (DSSS) TECHNIQUE USING A RANDOM ACCESS METHOD CALLED CODE REUSE MULTIPLE ACCESS (CRMA) TO ACCESS THE SATELLITE. DATA SERVICES.
16)	11700.0000-12200.0000	H, V	18M0G7D	Rx			ESV2		DATA SERVICES
17)	11700.0000-12200.0000	H, V	36M0G7D	Rx			ESV2		DATA SERVICES
18)	11700.0000-12200.0000	H, V	27M0G7D	Rx			ESV2		SPREAD SPECTRUM CRMA OUTBOUND DATA SERVICES
19)	11450.0000-11700.0000	H, V	27M0G7D	Rx			ESV2		SPREAD SPECTRUM CRMA OUTBOUND DATA SERVICES
20)	10950.0000-11200.0000	H, V	27M0G7D	Rx			ESV2		SPREAD SPECTRUM CRMA OUTBOUND DATA SERVICES
21)	14000.0000-14500.0000	H, V	18M0G7D	Tx	49.00	9.50	ESV3		DIRECT SEQUENCE SPREAD SPECTRUM (DSSS) TECHNIQUE USING A RANDOM ACCESS METHOD CALLED CODE REUSE MULTIPLE ACCESS (CRMA) TO ACCESS THE SATELLITE. DATA SERVICES.
22)	14000.0000-14500.0000	H, V	36M0G7D	Tx	49.00	9.50	ESV3		DIRECT SEQUENCE SPREAD SPECTRUM (DSSS) TECHNIQUE USING A RANDOM ACCESS METHOD CALLED CODE REUSE MULTIPLE ACCESS (CRMA) TO ACCESS THE SATELLITE. DATA SERVICES.
23)	14000.0000-14500.0000	H, V	27M0G7D	Tx	49.00	10.70	ESV3		DIRECT SEQUENCE SPREAD SPECTRUM (DSSS) TECHNIQUE USING A RANDOM ACCESS METHOD CALLED CODE REUSE MULTIPLE ACCESS (CRMA) TO ACCESS THE SATELLITE. DATA SERVICES.



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For the text of these provisions, refer to Section H.

#	Frequency (MHz)	Polarization Code	Emission	Tx/Rx Mode	Max EIRP /Carrier (dBW)	Max EIRP Density /Carrier (dBW/4kHz)	Associated Antenna	Special Provisions (Refer to Section H)	Modulation/ Services
24)	11700.0000-12200.0000	H, V	18M0G7D	Rx			ESV3		SPREAD OUTBOUND 10 MBPS CARRIER, DATA SERVICE
25)	11700.0000-12200.0000	H, V	27M0G7D	Rx			ESV3		SPREAD OUTBOUND 10 MBPS CARRIER, DATA SERVICE
26)	11700.0000-12200.0000	H, V	36M0G7D	Rx			ESV3		SPREAD OUTBOUND 10 MBPS CARRIER, DATA SERVICE
27)	11450.0000-11700.0000	H, V	18M0G7D	Rx			ESV3		SPREAD OUTBOUND 10 MBPS CARRIER, DATA SERVICE
28)	11450.0000-11700.0000	H, V	27M0G7D	Rx			ESV3		SPREAD OUTBOUND 10 MBPS CARRIER, DATA SERVICE
29)	11450.0000-11700.0000	H, V	36M0G7D	Rx			ESV3		SPREAD OUTBOUND 10 MBPS CARRIER, DATA SERVICE
30)	10950.0000-11200.0000	H, V	18M0G7D	Rx			ESV3		SPREAD OUTBOUND 10 MBPS CARRIER, DATA SERVICE
31)	10950.0000-11200.0000	H, V	27M0G7D	Rx			ESV3		SPREAD OUTBOUND 10 MBPS CARRIER, DATA SERVICE
32)	10950.0000-11200.0000	H, V	36M0G7D	Rx			ESV3		SPREAD OUTBOUND 10 MBPS CARRIER, DATA SERVICE
33)	14000.0000-14500.0000	H, V	18M0G7D	Tx	46.30	9.80	ESV4		DIRECT SEQUENCE SPREAD SPECTRUM (DSSS) TECHNIQUE USING A RANDOM ACCESS METHOD CALLED CODE REUSE MULTIPLE ACCESS (CRMA) TO ACCESS THE SATELLITE. DATA SERVICES.
34)	14000.0000-14500.0000	H, V	27M0G7D	Tx	46.30	8.00	ESV4		DIRECT SEQUENCE SPREAD SPECTRUM (DSSS) TECHNIQUE USING A RANDOM ACCESS METHOD CALLED CODE REUSE MULTIPLE ACCESS (CRMA) TO ACCESS THE SATELLITE. DATA SERVICES.
35)	14000.0000-14500.0000	H, V	36M0G7D	Tx	46.30	6.80	ESV4		DIRECT SEQUENCE SPREAD SPECTRUM (DSSS) TECHNIQUE USING A RANDOM ACCESS METHOD CALLED CODE REUSE MULTIPLE ACCESS (CRMA) TO ACCESS THE SATELLITE. DATA SERVICES.
36)	11700.0000-12200.0000	H, V	18M0G7D	Rx			ESV4		SPREAD SPECTRUM CRMA OUTBOUND DATA SERVICES



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For the text of these provisions, refer to Section H.

#	Frequency (MHz)	Polarization Code	Emission	Tx/Rx Mode	Max EIRP /Carrier (dBW)	Max EIRP Density /Carrier (dBW/4kHz)	Associated Antenna	Special Provisions (Refer to Section H)	Modulation/ Services
37)	11700.0000-12200.0000	H, V	27M0G7D	Rx			ESV4		SPREAD SPECTRUM CRMA OUTBOUND DATA SERVICES
38)	11700.0000-12200.0000	H, V	36M0G7D	Rx			ESV4		SPREAD SPECTRUM CRMA OUTBOUND DATA SERVICES
39)	11450.0000-11700.0000	H, V	27M0G7D	Rx			ESV4		SPREAD SPECTRUM CRMA OUTBOUND DATA SERVICES
40)	10950.0000-11200.0000	H, V	27M0G7D	Rx			ESV4		SPREAD SPECTRUM CRMA OUTBOUND DATA SERVICES

C) Frequency Coordination Limits

#	Frequency Limits (MHz)	Satellite Arc (Deg. Long.)		Elevation (Degrees)		Azimuth (Degrees)		Max EIRP Density toward Horizon (dBW/4kHz)	Associated Antenna(s)
		East Limit	West Limit	East Limit	West Limit	East Limit	West Limit		
1)	14000.0000-14500.0000	172.0W	172.0W	05.0	05.0			-17.8	ESV3
2)	14000.0000-14500.0000	105.0W	105.0W	05.0	05.0			-17.8	ESV3
3)	14000.0000-14500.0000	60.0W	172.0W	05.0	05.0			-17.8	ESV3
4)	14000.0000-14500.0000	37.5W	37.5W	05.0	05.0			-19.5	ESV3
5)	14000.0000-14500.0000	125.0W	125.0W	05.0	05.0			-17.8	ESV3
6)	11700.0000-12200.0000	125.0W	125.0W	05.0	05.0				ESV3
7)	11700.0000-12200.0000	105.0W	105.0W	05.0	05.0				ESV3
8)	11700.0000-12200.0000	60.0W	172.0W	05.0	05.0				ESV3
9)	11450.0000-11700.0000	172.0W	172.0W	05.0	05.0				ESV3
10)	11450.0000-11700.0000	37.5W	37.5W	05.0	05.0				ESV3
11)	10950.0000-11200.0000	172.0W	172.0W	05.0	05.0				ESV3
12)	10950.0000-11200.0000	37.5W	37.5W	05.0	05.0				ESV3
13)	14000.0000-14500.0000	172.0W	172.0W	05.0	05.0			-20	ESV1
14)	14000.0000-14500.0000	125.0W	125.0W	05.0	05.0			-20	ESV1
15)	14000.0000-14500.0000	105.0W	105.0W	05.0	05.0			-20	ESV1
16)	14000.0000-14500.0000	60.0W	172.0W	05.0	05.0			-20	ESV1
17)	11700.0000-12200.0000	172.0W	172.0W	05.0	05.0				ESV1
18)	11700.0000-12200.0000	125.0W	125.0W	05.0	05.0				ESV1
19)	11700.0000-12200.0000	105.0W	105.0W	05.0	05.0				ESV1



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C) Frequency Coordination Limits

#	Frequency Limits (MHz)	Satellite Arc (Deg. Long.)		Elevation (Degrees)		Azimuth (Degrees)		Max EIRP Density toward Horizon (dBW/4kHz)	Associated Antenna(s)
		East Limit	West Limit	East Limit	West Limit	East Limit	West Limit		
20)	11700.0000-12200.0000	60.0W-172.0W		05.0-05.0					ESV1
21)	11450.0000-11700.0000	172.0W-172.0W		05.0-05.0					ESV1
22)	10950.0000-11200.0000	172.0W-172.0W		05.0-05.0					ESV1
23)	14000.0000-14500.0000	172.0W-172.0W		05.0-05.0				-8.19	ESV1
24)	11700.0000-12200.0000	172.0W-172.0W		05.0-05.0					ESV1
25)	11450.0000-11700.0000	172.0W-172.0W		05.0-05.0					ESV1
26)	10950.0000-11200.0000	172.0W-172.0W		05.0-05.0					ESV1
27)	14000.0000-14500.0000	172.0W-172.0W		10.0-10.0				-27.7	ESV2
28)	14000.0000-14500.0000	125.0W-125.0W		10.0-10.0				-27.7	ESV2
29)	14000.0000-14500.0000	105.0W-105.0W		10.0-10.0				-27.7	ESV2
30)	14000.0000-14500.0000	60.0W-172.0W		10.0-10.0				-27.7	ESV2
31)	11700.0000-12200.0000	172.0W-172.0W		10.0-10.0					ESV2
32)	11700.0000-12200.0000	125.0W-125.0W		10.0-10.0					ESV2
33)	11700.0000-12200.0000	105.0W-105.0W		10.0-10.0					ESV2
34)	11700.0000-12200.0000	60.0W-172.0W		10.0-10.0					ESV2
35)	11450.0000-11700.0000	172.0W-172.0W		10.0-10.0					ESV2
36)	10950.0000-11200.0000	172.0W-172.0W		10.0-10.0					ESV2
37)	14000.0000-14500.0000	172.0W-172.0W		05.0-05.0				-20.9	ESV4
38)	14000.0000-14500.0000	125.0W-125.0W		05.0-05.0				-20.9	ESV4
39)	14000.0000-14500.0000	105.0W-105.0W		05.0-05.0				-20.9	ESV4
40)	14000.0000-14500.0000	60.0W-172.0W		05.0-05.0				-20.9	ESV4
41)	14000.0000-14500.0000	37.5W-37.5W		05.0-05.0				-20.9	ESV4
42)	11700.0000-12200.0000	125.0W-125.0W		05.0-05.0					ESV4
43)	11700.0000-12200.0000	105.0W-105.0W		05.0-05.0					ESV4
44)	11700.0000-12200.0000	60.0W-172.0W		05.0-05.0					ESV4
45)	11450.0000-11700.0000	172.0W-172.0W		05.0-05.0					ESV4
46)	11450.0000-11700.0000	37.5W-37.5W		05.0-05.0					ESV4
47)	10950.0000-11200.0000	172.0W-172.0W		05.0-05.0					ESV4
48)	10950.0000-11200.0000	37.5W-37.5W		05.0-05.0					ESV4

D) Points of Communications

The following stations located in the Satellite orbits consistent with Sections B and C of this Entry:

- 1) ESV NET3 to EUTELSAT 172A (S2610) @ 172 degrees E.L. (formerly GE-23) (U.S.-licensed)



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D) Points of Communications

The following stations located in the Satellite orbits consistent with Sections B and C of this Entry:

- 2) ESV NET3 to TELSTAR 11N (S2357) @ 37.55 degrees W.L. (U.S.-licensed)
- 3) ESV NET1 to EUTELSAT 172A (S2610) @ 172 degrees E.L. (formerly GE-23) (U.S.-licensed)
- 4) ESV NET1 to Permitted Space Station List
- 5) ESV NET2 to Permitted Space Station List
- 6) ESV NET2 to EUTELSAT 172A (S2610) @ 172 degrees E.L. (formerly GE-23) (U.S.-licensed)
- 7) ESV NET4 to TELSTAR 11N (S2357) @ 37.55 degrees W.L. (U.S.-licensed)
- 8) ESV NET4 to EUTELSAT 172A (S2610) @ 172 degrees E.L. (formerly GE-23) (U.S.-licensed)

E) Antenna Facilities

Site ID	Antenna ID	Units	Diameter (meters)	Manufacturer	Model number	Site Elevation (Meters)	Max Antenna Height (Meters)	Special Provisions (Refer to Section H)
ESV NET1	ESV1	3500	0.6	KVH INDUSTRIES, INC.	TRACPHONE V7	0	0.6 AGL/ 0.6 AMSL	
		Max Gains(s):	37.4 dBi @	14.2500 GHz	35.5 dBi @	11.9500 GHz		
		Maximum total input power at antenna flange (Watts) =			4.00			
		Maximum aggregate output EIRP for all carriers (dBW) =			42.40			
ESV NET2	ESV2	1000	0.37	KVH INDUSTRIES, INC.	TRACPHONE V3	0	0.4 AGL/ 0.4 AMSL	
		Max Gains(s):	33.3 dBi @	14.2500 GHz	31.6 dBi @	11.9500 GHz		
		Maximum total input power at antenna flange (Watts) =			3.00			
		Maximum aggregate output EIRP for all carriers (dBW) =			38.02			
ESV NET3	ESV3	250	1	MELCO	KU-MATE (SX-5300)		1 AGL/ 1 AMSL	
		Max Gains(s):	41.8 dBi @	14.2500 GHz	40.2 dBi @	11.9500 GHz		
		Maximum total input power at antenna flange (Watts) =			5.29			
		Maximum aggregate output EIRP for all carriers (dBW) =			49.00			
ESV NET4	ESV4	500	1	KVH INDUSTRIES	TRACPHONE V11		1 AGL/ 1 AMSL	
		Max Gains(s):	42.2 dBi @	14.2500 GHz	40.4 dBi @	11.8500 GHz		
		Maximum total input power at antenna flange (Watts) =			2.58			
		Maximum aggregate output EIRP for all carriers (dBW) =			46.30			



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F) Remote Control Point:

<p>ESV NET1 6155 EL CAMINO REAL, (0.6M.) SAN DIEGO, CARLSBAD, CA 92009 760-476-2583</p>	<p>Call Sign: VARIOUS</p>
<p>ESV NET2 6155 EL CAMINO REAL, (V.37M.) SAN DIEGO, CARLSBAD, CA 92009 760-476-2583</p>	<p>Call Sign: VARIOUS</p>
<p>ESV NET3 50 ENTERPRISE CENTER, (1.0M.) MIDDLETOWN, NEWPORT, RI 02842 401-847-3327</p>	<p>Call Sign: CONUS</p>
<p>ESV NET4 6155 EL CAMINO REAL, (1.0METER) CARLSBAD, SAN DIEGO, CA 92009 760-476-2583</p>	<p>Call Sign: 030131</p>

G) Antenna Structure marking and lighting requirements:

None unless otherwise specified under Special and General Provisions

H) Special and General Provisions

A) This RADIO STATION AUTHORIZATION is granted subject to the following special provisions and general conditions:

- 105 --- Subject to Rule Making: This license is subject to the outcome of any future rule making concerning ESV operations. Grant of this authorization shall not prejudice the outcome of any rulemaking.
- 167 --- This authorization is limited to the total number of terminals listed in Section A of this license for this Site ID.
- 300 --- With respect to antenna size and pointing accuracy, licensee is authorized to operate in accordance with Article 4.4 of the ITU Radio Regulations. The operations authorized herein shall not cause harmful interference to, and shall not claim protection from harmful interference caused by, a station operating in accordance with the provisions of the ITU Constitution, the ITU Convention, and the ITU Radio Regulations. The operations authorized herein are otherwise consistent with ITU provisions.
- 301 --- KVH Industries, Inc. shall maintain a point of contact for discussing interference concerns with other licensees and U.S. Government agencies and shall submit a letter to be included in its license file with the name and telephone number of the contact prior to commencing operation.



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H) Special and General Provisions

A) This RADIO STATION AUTHORIZATION is granted subject to the following special provisions and general conditions:

- 302 --- KVH Industries, Inc. shall notify the Commission of the date when commercial operation of its ESV networks commences. Twelve months after commencing commercial operation, KVH Industries shall file a report on the system's aggregate off-axis radiation performance since the commencement of commercial operation, based on the most recent available data and taking into account all relevant variables.
- 303 --- All operating ESVs must be monitored, and operations adjusted if necessary, to ensure that no more interference in the geostationary plane is caused by the entire network of ESVs at any time (accumulating the interference caused by all correctly pointed and all mispointed higher-power ESV antennas) than would be caused by a single earth station transmitting in compliance with Sections 25.222(a)(1), 25.222(a)(3), and 25.222(a)(4) of the Commission's rules, using $N=1$.
- 304 --- Pursuant to this authorization operations in the 14.47-14.5 GHz (Earth-to-Space) frequency band within 45 km of the radio observatory on St. Croix, Virgin Islands, 125 Km of the radio observatory on Mauna Kea, Hawaii and 90 km of the Arecibo observatory on Puerto Rico are prohibited unless KVH reaches an agreement with the National Science Foundation permitting such operations, and this agreement is approved by NTIA and the FCC.
- 354 --- The licensee must coordinate its operations with Ku-band Non-Geostationary Satellite Orbit (NGSO) Fixed Satellite Service (FSS) systems, and obtain an affidavit from any Ku-band NGSO FSS licensee that the ESV licensee's operations are acceptable. In the absence of such an affidavit, the licensee's ESV system must cease service immediately upon launch and operation of the first satellite in a Ku-band NGSO FSS system, or demonstrate that it will not cause harmful interference to the new NGSO FSS system. Failure to make such a demonstration may subject the licensee's ESVs to further conditions by the Commission designed to address potential harmful interference.
- 355 --- The KVH ESV networks shall operate in compliance with any pertinent limits established by the International Telecommunication Union (ITU) to protect other services allocated internationally.
- 356 --- The licensee shall maintain a point of contact, available 24 hours a day, seven days a week, with authority and ability to cease all emissions from the ESVs, either directly or through the facilities of a U.S. Hub or a Hub located in another country with which the United States has a bilateral agreement that enables such cessation of emissions, for discussing interference concerns with other licensees and U.S. Government agencies and shall submit a letter to be included in its license file with the name and telephone number of the contact prior to commencing operation.
- 357 --- Twelve months from the date of the grant of this authorizations, the licensee shall file a report on the system's aggregate off-axis radiation performance, based on the most recent available data and taking into account all relevant variables.
- 358 --- KVH shall operate a maximum of 7 ESV NET 1 antennas transmitting simultaneously in the same satellite receiving beam. KVH shall operate a maximum of 13 ESV NET 2 antennas (36 MHz bandwidth) or 6 ESV NET 2 antennas (18 MHz bandwidth) transmitting simultaneously in the same satellite receiving beam. All operating ESVs must be monitored, and operations adjusted if necessary, to ensure that no more interference in the geostationary plane is caused by the entire network of ESVs at any time (accumulating the interference caused by all correctly pointed and all mispointed ESV antennas) than would be caused by a single earth station transmitting in compliance with Sections 25.222(a)(1)(i)(A)-(C) of the Commission's rules, using $N=1$.



UNITED STATES OF AMERICA
FEDERAL COMMUNICATIONS COMMISSION

RADIO STATION AUTHORIZATION

Name: KVH Industries, Inc.

Call Sign: E090001

Authorization Type: Modification of License

File Number: SES-MOD-20160823-00734

Non Common Carrier

Grant date: 10/24/2016

Expiration Date: 12/15/2024

H) Special and General Provisions

A) This RADIO STATION AUTHORIZATION is granted subject to the following special provisions and general conditions:

- 359 --- Pursuant to this authorization operations in the 14.47-14.5 GHz (Earth-to-Space) frequency band within 45 km of the radio observatory on St. Croix, Virgin Islands, 125 km of the radio observatory on Mauna Kea, Hawaii and 90 km of the Arecibo observatory on Puerto Rico are prohibited unless the licensee reaches an agreement with the National Science Foundation permitting such operations, and this agreement is approved by the National Telecommunications and Information Administration's Interdepartment Radio Advisory Committee and the FCC.
- 360 --- This license is subject to the revised ESV rules adopted in Procedures to Govern the Use of Satellite Earth Stations on Board Vessels in the 5925-6425 MHz/3700-4200 MHz Bands and 14.0-14.5 GHz/11.7-12.2 GHz Bands, IB Docket No. 02-10, ESV Order on Reconsideration, FCC 09-63 (released July 31, 2009).
- 361 --- KVH, Inc. may decline this authorization as conditioned within 30 days from the date of release of this Order and Authorization. Failure to respond within that period will constitute formal acceptance of the authorization as conditioned.
- 362 --- This Order and Authorization is issued on delegated authority pursuant to Sections 0.51 and 0.261 of the Commission's rules, 47 C.F.R. §§ 0.51 and 0.261, and is effective upon release. Petitions for reconsideration under Section 1.106 or applications for review under Section 1.115 of the Commission's rules, 47 C.F.R. §§ 1.106, 1.115, may be filed within 30 days of the date of the public notice indicating that this action was taken.
- 503 --- Pursuant to this authorization operations in the 14.0-14.2 GHz (Earth-to-space) frequency band within 125 km of the NASA TDRSS facilities on Guam (located at latitude: 13°36'55" N, longitude 144°51'22" E) or White Sands, New Mexico (latitude: 32°20'59" N, longitude 106°36'31" W and latitude: 32°32'40" N, longitude 106°36'48" W), as well as future TDRSS sites, are prohibited unless the licensee reaches an agreement with NASA permitting such operations, and this agreement is approved by the National Telecommunications and Information Administration's Interdepartment Radio Advisory Committee and the FCC.
- 1010 --- Applicable to all receiving frequency bands. Emission designator indicates the maximum bandwidth of received signal at associated station(s). Maximum EIRP and maximum EIRP density are not applicable to receive operations.
- 1900 --- Applicable to all transmitting frequency bands. Authority is granted to transmit any number of RF carriers with the specified parameters on any discrete frequencies within associated band in accordance with the other terms and conditions of this authorization, subject to any additional limitations that may be required to avoid unacceptable levels of inter-satellite interference.
- 2300 --- Authority is granted to operate this station by remote control provided that: (1) the parameters of the transmissions of this station monitored at the remote control point, and the operational functions sufficient to ensure that the operations of this station are in full compliance with the station authorization at all times; (2) upon detection by the grantee, or upon notification from the Commission, of a deviation of the operation of this station, transmissions shall be immediately suspended until the deviation is corrected, except that transmissions concerning the immediate safety of life or property may be conducted for the duration of such emergency; and (3) the grantee shall have available, at all times, the technical personnel necessary to perform the technical servicing and maintenance of this station expeditiously. See also Public Notice "The International Bureau Provides Guidance Concerning the Relocation of Earth Station Remote Control Points", DA 06-978 (rel. May 4, 2006).



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H) Special and General Provisions

A) This RADIO STATION AUTHORIZATION is granted subject to the following special provisions and general conditions:

- 2916 --- Transmitter(s) must be turned off during antenna maintenance to ensure compliance with the FCC-specified safety guidelines for human exposure to radiofrequency radiation in the region between the antenna feed and the reflector. Appropriate measures must also be taken to restrict access to other regions in which the earth station's power flux density levels exceed the specified guidelines.
- 2938 --- Upon completion of construction, each licensee must file with the Commission a certification including the following information: (1) name of the licensee, (2) file number of the application, (3) call sign of the antenna, (4) date of the license, (5) certification that the facility as authorized has been completed, (6) certification that each antenna facility has been tested and is within 2 dB of the pattern specified in Section 25.209, and (7) certification that the station is operational (including the date of commencement of service) and will remain operational during the license period unless the license is submitted for cancellation.
- 5208 --- 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.
- 5216 --- All operations shall be on a non-common carrier basis.
- 90013 --- The licensee shall not operate in the band 14.0-14.2 GHz within 125 km of the NASA TDRSS facilities on Guam (located at latitude 13°36'55" N, longitude 144°51'22" E) or White Sands, New Mexico (located at latitude 32°20'59" N, longitude 106°36'31" W and latitude 32°32'40" N, longitude 106°36'48" W), or any future TDRSS facility NTIA notifies to the FCC, unless and until the licensee enters into an agreement with NASA that NTIA has approved. The licensee must conform its operations to the terms of any coordination agreement with the NASA and must file a copy of the agreement with the Commission within 30 days of execution.
- 90014 --- The licensee shall not operate in the band 14.47-14.50 GHz within (a) 45 km of the radio observatory on St. Croix, Virgin Islands (located at latitude 17°46' N, longitude 64°35' W); (b) 125 km of the radio observatory on Mauna Kea, Hawaii (located at latitude 19°48' N, longitude 155°28' W); and (c) 90 km of the Arecibo Observatory on Puerto Rico (located at latitude 18°20'46" W, longitude 66°45'11" N) unless and until the licensee enters into an agreement with the National Science Foundation that has been approved by NTIA. The licensee must conform its operations to the terms of any coordination agreement with the National Science Foundation and must file a copy of the agreement with the Commission within 30 days of execution.



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B) This RADIO STATION AUTHORIZATION is granted subject to the additional conditions specified below:

This authorization is issued on the grantee's representation that the statements contained in the application are true and that the undertakings described will be carried out in good faith.

This authorization shall not be construed in any manner as a finding by the Commission on the question of marking or lighting of the antenna system should future conditions require. The grantee expressly agrees to install such marking or lighting as the Commission may require under the provisions of Section 303(q) of the Communications Act. 47 U.S.C. § 303(q).

Neither this authorization nor the right granted by this authorization shall be assigned or otherwise transferred to any person, firm, company or corporation without the written consent of the Commission. This authorization is subject to the right of use or control by the government of the United States conferred by Section 706 of the Communications Act. 47 U.S.C. § 706. Operation of this station is governed by Part 25 of the Commission's Rules. 47 C.F.R. Part 25.

This authorization shall not vest in the licensee any right to operate this station nor any right in the use of the designated frequencies beyond the term of this license, nor in any other manner than authorized herein.

This authorization is issued on the grantee's representation that the station is in compliance with environmental requirements set forth in Section 1.1307 of the Commission's Rules. 47 C.F.R. § 1.1307.

This authorization is issued on the grantee's representation that the station is in compliance with the Federal Aviation Administration (FAA) requirements as set forth in Section 17.4 of the Commission's Rules. 47 C.F.R. § 17.4.

The following condition applies when this authorization permits construction of or modifies the construction permit of a radio station.

This authorization shall be automatically forfeited if the station does not meet each required construction deadline by the required date of completion unless, before such date(s), a specific application is timely filed to request an extension of the construction deadline(s), supported with good cause why that failure to construct by the required date was due to factors not under control of the grantee.

Licensees are required to pay annual regulatory fees related to this authorization. The requirement to collect annual regulatory fees from regulatees is contained in Public Law 103-66, "The Omnibus Budget Reconciliation Act of 1993." These regulatory fees, which are likely to change each fiscal year, are used to offset costs associated with the Commission's enforcement, public service, international and policy and rulemaking activities. The Commission issues a Report and Order each year, setting the new regulatory fee rates. Receive only earth stations are exempt from payment of regulatory fees.

