



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



Name: ISAT US Inc.

Call Sign: E140114

Authorization Type: Modification of License

File Number: SES-MFS-20150923-00605

Non Common Carrier

Grant date: 02/12/2016

Expiration Date: 08/11/2030



Nature of Service: Fixed Satellite Service

Class of Station: Other

A) Site Location(s)

#	Site ID	Address	Latitude	Longitude	Elevation (Meters)	Special Provisions NAD (Refer to Section H)
1)	Aero 1	OPERATE UP TO 4000 TERMINALS CONUS, PR, USVI + AOR, POR				NA
2)	Aero 2	OPERATE UP TO 4000 TERMINALS CONUS, PR, USVI + AOR, POR				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 August 11, 2015 (3 AM Eastern Standard Time) and ending August 11, 2030 (3 AM Eastern Standard Time). The required date of completion of construction and commencement of operation is February 12, 2017 (3 AM Eastern Standard Time). Grantee must file with the Commission a certification upon completion of construction and commencement of operation.

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)	29500.0000-30000.0000	R	460KG7W	Tx	32.60	12.00	MCS 8000		Various Modulations up to 32APSK; Digital Data Link
2)	29500.0000-30000.0000	R	5M00G1W	Tx	7.00	-24.00	MCS 8000		Various Modulations up to 32APSK; Digital Data Link
3)	29500.0000-30000.0000	R	7M34G7W	Tx	44.60	12.00	MCS 8000		Various Modulations up to 32APSK; Digital Data Link
4)	19700.0000-20200.0000	L	32M0G7W	Rx	0.00	0.00	MCS 8000		Various Modulations up to 32APSK; Digital Data Link



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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.

Table with 9 columns: #, 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. Contains 4 rows of data for frequencies 29500.0000-30000.0000 and 19700.0000-20200.0000.

C) Frequency Coordination Limits

Table with 9 columns: #, Frequency Limits (MHz), Satellite Arc (Deg. Long.) East/West Limit, Elevation (Degrees) East/West Limit, Azimuth (Degrees) East/West Limit, Max EIRP Density toward Horizon (dBW/4kHz), Associated Antenna(s). Contains 4 rows of data for frequencies 29500.0000-30000.0000 and 19700.0000-20200.0000.

D) Points of Communications

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

- 1) Aero 1 to INMARSAT 5F2 satellite @ 55 W.L. (U. K. licensed)
2) Aero 1 to INMARSAT 5F3 satellite @ 179.6 E.L. (U. K. licensed)
3) Aero 2 to INMARSAT 5F2 satellite @ 55 W.L. (U. K. licensed)
4) Aero 2 to INMARSAT 5F3 satellite @ 179.6 E.L. (U. K. licensed)



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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)
Aero 2	MCS 8000	4000	0.3	Honeywell	MCS 8000		0 AGL	
Max Gains (s): 32.7 dBi @ 19.7000 GHz 32.8 dBi @ 19.9500 GHz 32.6 dBi @ 20.2000 GHz 37.0 dBi @ 29.5000 GHz 37.0 dBi @ 29.7500 GHz 37.0 dBi @ 30.0000 GHz								
Maximum total input power at antenna flange (Watts) = 12.00								
Maximum aggregate output EIRP for all carriers (dBW) = 47.80								
Aero 1	MCS 8200	4000		Honeywell	MCS 8200		0 AGL	
Max Gains (s): 36.9 dBi @ 19.9500 GHz 36.9 dBi @ 20.2000 GHz 39.8 dBi @ 29.5000 GHz 39.8 dBi @ 29.7500 GHz 39.8 dBi @ 30.0000 GHz 36.8 dBi @ 19.7000 GHz								
Maximum total input power at antenna flange (Watts) = 12.60								
Maximum aggregate output EIRP for all carriers (dBW) = 50.80								

F) Remote Control Point:

Aero 1	6211 Glen Circle Lino Lakes, Anoka, MN 55014 808-469-7104	Call Sign: E120072
Aero 2	6211 Glen Circle Lino Lakes, Anoka, MN 55014 808-469-7104	Call Sign: E120072

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:

- 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.



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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:

- 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.
- 90053 --- 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. 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. The licensee shall ensure installation of terminals on aircraft by qualified installers who have an understanding of the antenna's radiation environment and the measures best suited to maximize protection of the general public and persons operating the aircraft and equipment. A terminal exhibiting radiation exposure levels exceeding 1.0 mW/cm² in accessible areas, such as at the exterior surface of the radome, shall have a label attached to the surface of the terminal warning about the radiation hazard and shall include thereon a diagram showing the regions around the terminal where the radiation levels could exceed 1.0 mW/cm².
- 90054 --- Operations authorized pursuant to this license are operations by U.S.-registered aircraft anywhere within the coverage area/frequency bands identified in the application for the satellites listed as points of communication. Operations authorized pursuant to this license also include operations by non-U.S.-registered aircraft within U.S. territory, including territorial waters.
- 90066 --- Stations authorized herein must not be used to provide air traffic control communications.
- 90067 --- Operation in the territory or airspace of any country other than the United States must be in compliance with the applicable laws, regulations, and licensing procedures of that country, as well as with the conditions of this authorization.
- 90075 --- Licensee is afforded 30 days from the date of release of this grant and authorization to decline this authorization as conditioned. Failure to respond within this period will constitute formal acceptance of the authorization as conditioned.
- 90079 --- Antenna elevation for all operations must be at least 5 degrees above the geographic horizon while the aircraft is on the ground.
- 90095 --- The licensee shall comply with any pertinent limits established by the International Telecommunication Union to protect other services allocated internationally.



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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:

- 90101 --- In the 17.8-20.2 GHz frequency range, in order to protect Federal satellite services, the licensee shall communicate only with satellites whose operator has completed an agreement with Federal operators pursuant to footnote US334 of the U.S. Table of Frequency Allocations, 47 C.F.R. § 2.106, and that agreement has been approved by both the Federal Communications Commission and the National Telecommunications and Information Administration. The licensee's operations pursuant to this authorization shall be consistent with such US334 agreements.
- 90116 --- The licensee must maintain a U.S. point of contact available 24 hours per day, seven days per week, with the authority and ability to terminate operations authorized herein. The licensee shall have available, at all times, the technical personnel necessary to perform supervision of remote station operations.
- 90122 --- The earth stations in this blanket license are operated by remote control. The remote control point is a material term of the license and may not be changed without prior authorization under Section 25.117 of the Commission's rules. Public Notice "The International Bureau Provides Guidance Concerning the Relocation of Earth Station Remote Control Points," DA 06-978 (rel. May 4, 2006).
- 90123 --- Operations authorized pursuant to this license are operations by U.S.-registered aircraft anywhere within the coverage area/frequency bands identified in the application for the satellites listed as points of communication. Operations authorized pursuant to this license also include operations by non-U.S.-registered aircraft within U.S. territory, including territorial waters. Authorization for operations by U.S.-registered aircraft outside U.S. territory, pursuant to this license, does not constitute a grant of access to the market in the United States under the Commission's DISCO II policies.
- 90209 --- ISAT US, Inc. is granted a waiver of the Table of Frequency Allocations, Section 2.106 of the Commission's rules, and a waiver of the Ka-band Band Plan, see Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band to Reallocate the 29.5-30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Services and for Fixed Satellite Services, First Report and Order and Fourth Notice of Proposed Rulemaking, 11 FCC Rcd 19005 (1996). ISAT US, Inc. is authorized to operate in the 19.7-20.2 GHz and 29.5-30.0 GHz frequency bands on a non-harmful interference basis. ISAT US, Inc. must not cause harmful interference to any authorized radio station operating in conformance with the U.S. Table of Frequency Allocations.
- 90211 --- The antenna performance specifications do not comply with Sections 25.138(a) and 25.209 of the FCC Rules. The operation of these antennas will not be protected from harmful interference caused by other geostationary satellite networks to the extent that harmful interference would not be expected to be caused to an antenna that is compliant with the antenna performance standards of Section 25.209.
- 90212 --- The licensee shall maintain records of the following data for each operating aircraft earth station (AES), a record of the aircraft location (i.e., latitude/longitude/altitude), transmit frequency, channel bandwidth and satellite used shall be time annotated and maintained for a period of not less than one year. Records shall be recorded at time intervals no greater than one (1) minute while the AES is transmitting. The operator shall make this data available, in the form of a comma delimited electronic spreadsheet, within 24 hours of a request from the Commission, NTIA, or a frequency coordinator for purposes of resolving harmful interference events. A description of the units (i.e., degrees, minutes, MHz ...) in which the records values are recorded will be supplied along with the records.
- 90213 --- This authorization is subject to an overall limit of 8000 remote terminals, of the types identified in Section A above, operating at one time.



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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:

90234 --- This authorization and any licenses related thereto are subject to compliance with the provisions of the Agreement between Inmarsat on the one hand and the U.S. Department of Justice (DOJ) and the Department of Homeland Security (DHS) on the other, dated September 23, 2008, as amended.

90245 --- When the ESAA network is put into operation, the licensee must file with the Commission a certification including the following information: name of the licensee, file number of the application, call sign of the antenna, date of the license and certification that the network was put into operation and will remain operational during the license period unless the license is submitted for cancellation.

90246 --- ESAAs authorized herein must employ a tracking algorithm that is resistant to capturing and tracking adjacent satellite signals, and each station must be capable of inhibiting its own transmission in the event it detects unintended satellite tracking.

90247 --- ESAAs authorized herein must be monitored and controlled by a ground-based network control and monitoring center. Such stations must be able to receive "enable transmission" and "disable transmission" commands from the network control center and must cease transmission immediately after receiving a "parameter change" command until receiving an "enable transmission" command from the network control center. The network control center must monitor operation of each ESAA to determine if it is malfunctioning, and each ESAA must self-monitor and automatically cease transmission on detecting an operational fault that could cause harmful interference to a fixed-satellite service network.

90253 --- When operating in airspace within line-of-sight of the territory of a foreign administration where Fixed Service networks have an allocation in the 28.35- 29.1 GHz or 29.5-30.0 GHz frequency bands, the ESAAs must not exceed the following EIRP limits:
+64 dBW in any 1 MHz band for Theta is less than or equal to $0^\circ + 64 + 3 * \text{Theta}$ dBW in any 1 MHz band for Theta is greater than 0° but less than or equal to 5° where Theta is the angle of elevation of the horizon viewed from the center of radiation of the antenna of the earth station and measured in degrees as positive above the horizontal plane and negative below it.

90256 --- Operation of ESAAs authorized herein are subject to any requirements the Commission may adopt in any future proceeding concerning operations in the 18.3-19.3 GHz, 19.7-20.2 GHz, 28.35-29.1 GHz, and 29.5-30.0 GHz band frequencies including, but not limited to, ESAAs communicating with geostationary orbit space stations.

90259 --- For purposes of this authorization, the term earth stations aboard aircraft, or ESAA, is used to refer to any earth station on aircraft communicating with Fixed-Satellite Service (FSS) geostationary-orbit (GSO) space stations, without reference to the technical and licensing rules specifically adopted for earth stations on aircraft in the 10.95-11.2 GHz, 11.45-11.7 GHz, 11.7-12.2 GHz, and 14.0-14.5 GHz frequency bands. See 47 C.F.R. § 25.227; Revisions to Parts 2 and 25 of the Commission's Rules to Govern the Use of Earth Stations Aboard Aircraft Communicating with Fixed-Satellite Service Geostationary-Orbit Space Stations Operating in the 10.95-11.2 GHz, 11.34-11.7 GHz, 11.7-12.2 GHz and 14.0-14.5 GHz Frequency Bands, IB Docket No. 12-376, Notice of Proposed Rulemaking and Report and Order, FCC 12-161, 27 FCC Rcd 16510 (2012); Revisions of Parts 2 and 25 of the Commission's Rules to Govern the Use of Earth Stations Aboard Aircraft Communicating with Fixed-Satellite Service Geostationary-Orbit Space Stations Operating in the 10.95-11.2 GHz, 11.45-11.7 GHz, 11.7-12.2 GHz and 14.0-14.5 GHz Frequency Bands, IB Docket No. 12-376, Second Report and Order on Reconsideration, FCC 14-45, 29 FCC Rcd 4226 (2014). Nothing in this authorization extends those technical and licensing rules to earth stations on aircraft not operating in those specified frequency bands.



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- 90286 --- Communications between ISAT US, Inc.'s ESAAs and Inmarsat-5 F2 and Inmarsat-5 F3 must be in compliance with all existing and future space station coordination agreements reached between the United Kingdom and other Administrations.
- 90287 --- This grant is based upon a finding that the Inmarsat 5-F2 and Inmarsat 5-F3 satellites are and will be subject to direct and effective regulation by the United Kingdom concerning orbital debris mitigation. This grant will remain effective only to the extent that launch and space operations continue to be authorized by the United Kingdom Space Agency under the United Kingdom Outer Space Act. See In the Matter of Inmarsat Mobile Networks, Inc., Order and Authorization and Declaratory Ruling, DA 15-392 (rel. March 30, 2015), IBFS File Nos. SES-LIC-20130426-00397, SES-AMD-20120823-00781, and SES- AMD-20150114-00008, and IBFS File Nos SES-LIC-20150402-00188 .
- 90288 --- The ESAAs are authorized, on a non-protected and non-harmful interference basis, to transmit to the following geostationary-orbit space stations: Inmarsat-5 F2 at 55° W.L. and Inmarsat-5 F3 at 179.6° W.L. using the 29.5-30.0 GHz frequency band. The aircraft earth stations authorized herein must immediately terminate operations upon notification that such operation is causing harmful interference to any other radio system lawfully operating in the 29.5-30.0 GHz frequency band. The aircraft earth stations authorized herein cannot claim protection from harmful interference from any radio system lawfully operating in the 29.5-30.0 GHz frequency band.
- 90289 --- The ESAAs are authorized, on a non-protected and non-harmful interference basis, to receive downlink transmissions from the following geostationary-orbit space stations: Inmarsat-5 F2 at 55° W.L. and Inmarsat-5 F3 at 179.6° W.L. in the 19.7-20.2 GHz frequency band. The aircraft earth station operation authorized herein must accept interference from any radio system lawfully operating in the 19.7-20.2 GHz frequency band.



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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 is not ready for operation by the required date of completion of construction unless an application for modification of authorization to request additional time to complete construction is filed by that date, together with a showing that failure to complete construction 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.