

ISAT US Inc.

Approved by OMB  
3060-0678

APPLICATION FOR EARTH STATION SPECIAL TEMPORARY AUTHORITY

APPLICANT INFORMATION Enter a description of this application to identify it on the main menu:  
Request for STA - Lino Lakes

1. Applicant

<b>Name:</b>	ISAT US Inc.	<b>Phone Number:</b>	202-248-5158
<b>DBA Name:</b>		<b>Fax Number:</b>	202-248-5186
<b>Street:</b>	1101 Connecticut Avenue NW Suite 1200	<b>E-Mail:</b>	chris.murphy@immarsat.com
<b>City:</b>	Washington	<b>State:</b>	DC
<b>Country:</b>	USA	<b>Zipcode:</b>	20036 -
<b>Attention:</b>	Mr. Chris Murphy		



File # SES-STA-20150731-00484  
 Call Sign 8-2015 Grant Date 8-20-15  
 (or other identifier)  
 Term Dates From: 8-20-15 To: 9-19-15  
 Approved: David E. Hayes

Applicant: ISAT US Inc.  
File No.: SES-STA-20150731-00484  
Special Temporary Authority (STA)

ISAT US Inc. is granted a STA, for 30 days, beginning August 20, 2015, to operate a 3.5 meter earth station located at Lino Lakes, Minnesota to facilitate over-the-air site acceptance testing (OSAT) and end-to-end testing of the 30.0-31.0 GHz and 20.2-21.2 GHz payload on the Inmarsat Global Xpress Ka-band network, using the Inmarsat 5 F2 (I5F2) satellite located at 55° W.L., under the following conditions:

1. Operations are limited to the following frequency bands and emissions:

Frequency Band	Emissions	Input Power	Maximum E.I.R.P Density
20.2-21.2 GHz	1G00G1D	11.5 dBW	52 dBW/4kHz
30.0-31.0 GHz	1G00G1D	11.5 dBW	52 dBW/4kHz

2. Operations under this authorization must comport with Inmarsat 5 F2 technical operating parameters and the Federal Communication Commission's rules.

3. All operations shall be on an unprotected and non-harmful interference basis, ISAT US Inc. shall not cause harmful interference to, and shall not claim protection from, interference caused to it by any other lawfully operating station and it shall cease transmission(s) immediately upon notice of such interference.

4. All operations under this grant of special temporary authority must be on an unprotected and non-harmful interference basis, *i.e.*, ISAT US Inc. must not cause harmful interference to, and shall not claim protection from interference caused to it by, any other lawfully operating station.

5. In the event of any harmful interference under this grant of special temporary authority, ISAT US Inc. must cease operations immediately upon notification of such interference, and must inform the Commission, in writing, immediately of such an event.

6. Any action taken or expense incurred as a result of operations pursuant to this special temporary authority is solely at ISAT US Inc.'s risk.

7. This action is issued pursuant to Section 0.261 of the Commission's rules on delegated authority, 47 C.F.R. § 0.26 1, and is effective immediately



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From: 8-20-15 To: 9-19-15  
Approved: [Signature]

<b>2. Contact</b>	
<b>Name:</b> Chris Murphy	<b>Phone Number:</b> 202-248-5158
<b>Company:</b> ISAT US Inc.	<b>Fax Number:</b> 202-248-5186
<b>Street:</b> 1101 Connecticut Ave NW Suite 1200	<b>E-Mail:</b> chris.murphy@inmarsat.com
<b>City:</b> Washington	<b>State:</b> DC
<b>Country:</b> USA	<b>Zipcode:</b> 20036
<b>Attention:</b>	<b>Relationship:</b> Legal Counsel
(If your application is related to an application filed with the Commission, enter either the file number or the IB Submission ID of the related application. Please enter only one.)	
3. Reference File Number or Submission ID	
4a. Is a fee submitted with this application?	
<input checked="" type="radio"/> If Yes, complete and attach FCC Form 159. If No, indicate reason for fee exemption (see 47 C.F.R. Section 1.1114).	
<input type="radio"/> Governmental Entity <input type="radio"/> Noncommercial educational licensee	
<input type="radio"/> Other (please explain):	
4b. Fee Classification CGX – Fixed Satellite Transmit/Receive Earth Station	
5. Type Request	
<input type="radio"/> Use Prior to Grant <input type="radio"/> Change Station Location <input checked="" type="radio"/> Other	
6. Requested Use Prior Date	
7. City/Lino Lakes	8. Latitude (dd mm ss.s h) 45 15 37.0 N

9. State MN	10. Longitude (dd mm ss.s h) 93 5 20.0 W
11. Please supply any need attachments. Attachment 1: Exhibit A Attachment 2: Attachment 3:	
12. Description. (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.) <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">See Exhibit A.</div>	
13. 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. See 47 CFR 1.2002(b) for the meaning of "party to the application"; for these purposes. Yes <input checked="" type="radio"/> No <input type="radio"/>	
14. Name of Person Signing Chris Murphy	15. Title of Person Signing Director, Government 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).	

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**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.**

## Exhibit A

### I. DESCRIPTION OF STA REQUEST

ISAT US Inc. (“ISAT US”) hereby requests special temporary authority (“STA”) to operate a 3.5 meter earth station located at Lino Lakes, Minnesota to facilitate over-the-air site acceptance testing (OSAT) and end-to-end testing of the 30.0-31.0 GHz and 20.2-21.2 GHz payload on the Inmarsat Global Xpress Ka-band network, using the Inmarsat 5 F2 (I5F2) satellite located at 55° W.L. The earth station antenna type is the ASC Signal 3.5 Ka-band Earth Station antenna (“Antenna”), a summary of which is attached as Annex A. All operations would be at a fixed location at the Lino Lakes site, which site has been previously authorized for use with the I5F2 satellite.<sup>1</sup> This testing would be done in consultation with an element of the U.S. armed forces.

As explained in the application for the Lino Lakes and I5F2 U.S. market access authority, in addition to the “conventional” part of the Ka band, the I5F2 spacecraft also includes the capability of communicating in certain beams in the 30.0-31.0 GHz and 20.2-21.2 GHz bands, which are not allocated for commercial service in the United States and for which U.S. market access authority has not been sought. Operation of this part of the spacecraft will occur under the authority of Norway, pursuant to ITU filings submitted by the Norwegian Administration.<sup>2</sup> Inmarsat acknowledges that it or one of its authorized military customers would need to obtain separate authority prior to initiating U.S. service in those bands. The I5F2 satellite has been fully coordinated with the relevant parties in the United States Executive Branch for the 55° W.L. orbital location, including for the frequency bands limited to military use (i.e., 30.0-31.0/20.2-21.2 GHz) under the U.S. Table of Frequency Allocations. This additional terminal will be used for the purposes of testing the capabilities of the spacecraft only in the 20.2-21.2 GHz and 30.0-31.0 GHz band segments and is not intended for regular or permanent use in those bands.

ISAT US will be responsible for the operation of the Antenna during the tests. The operations will be closely monitored by the Inmarsat Network Operations Center (NOC) and various engineering teams associated with the OSAT and testing campaign to ensure compliance with the requested testing authority. It is expected that the Antenna will be used starting August 14, 2015 for up to 30 days.

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<sup>1</sup> See, Inmarsat Mobile Networks, Inc., Granted March 30, 2015, (Call Sign E120072; IBFS File No. SES-LIC-20120426-00397) (“*Lino Lakes Order*”).

<sup>2</sup> The Norwegian Administration has submitted on behalf of Inmarsat an ITU filing under the filing name SE-KA-55W, as published by the ITU in IFIC 2717 (CR/C/3054) on 17 April 2012 (date of receipt November 11, 2011).

**II. ISAT US SEEKS AUTHORITY TO TEST THE ANTENNA AT 20.2-21.2 GHZ AND 30.0-31.0 GHZ AND, TO THE EXTENT IT APPLIES, GOOD CAUSE EXISTS FOR A WAIVER OF SECTION 2.106**

ISAT US seeks authority to test the Antenna on the following frequency bands: 30.0-31.0 GHz (uplink) and 20.2-21.2 GHz (downlink). ISAT US requests this authority on a non-interference and non-protected basis. ISAT US requests a waiver of the U.S. Table of Frequency Allocations, as necessary, to allow the proposed STA operations in the 30.0-31.0 GHz and 20.1-20.2 GHz frequencies.<sup>3</sup> Grant of a waiver would serve the public interest because it would allow end-to-end network testing of the portion of the I5F2 spacecraft that uses these band segments and associated Global Xpress network components with the OSAT, facilitating the deployment of satellite broadband services in these band segments to approved military users. As discussed below, grant of the requested waiver would not undermine the policy objective of the rule, as regular or permanent authority for this Antenna is not being sought and the primary operators in these bands under the U.S. Table would be protected from harmful interference.

ISAT US seeks authorization only for limited testing of the 30.0-31.0 GHz and 20.1-20.2 GHz capabilities of I5F2. As noted above, the Commission granted market access for I5F2's other communications capabilities, and, in that context, all of the information required by Sections 25.137 and 25.114 was provided. Below, ISAT US provides the following additional information that it is relevant to the proposed OSAT and end-to-end testing:

**Technical Parameters**

**EARTH-to-SPACE:**

Transmit Frequencies: 30.0-31.0 GHz

Transmit Polarization: RHCP or LHCP

Maximum EIRP: 70 dBW

RF Modulation: 64QAM (max)

Minimum Elevation for Transmission: Pointed to I5F2 at 55° W.L. – El = 26 degrees

**SPACE-to-EARTH:**

Receive Frequencies: 20.2-21.2 GHz

Receive Polarization: LHCP or RHCP

Maximum Spacecraft EIRP: 58dBW

RF Modulation: 64QAM

Azimuth Range: Fixed Pointed to I5F2 at 55° W.L. – Az = 132.2 degrees

Duration of Communications: approximately 30 days

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<sup>3</sup> See 47 C.F.R. § 2.106, footnote G117 (in the bands 7.25-7.75 GHz, 7.9-8.4 GHz, 17.375-17.475 GHz, 17.6-21.2 GHz, 30-31 GHz, 33-36 GHz, 39.5-41 GHz, 43.5-45.5 GHz, and 50.4-51.4 GHz, the Federal fixed-satellite and mobile-satellite services are limited to military systems).

## Space Station Coordination

The coordination of communications for the use of the additional frequencies (30.0-31.0 GHz/20.2-21.2 GHz) with the I5F2 spacecraft at the 55° W.L. orbital location with existing spacecraft operators, including the U.S. Government, during the proposed testing is the responsibility of Inmarsat and ISAT US. ISAT US has undertaken coordination of communications for the support of the OSAT and end-to-end testing of I5F2 with other spacecraft operators that may be potentially affected during testing.

All the preparatory activities and contacts for such coordination have been made and all issues have been satisfactorily resolved. ISAT US also has undertaken to review the need for coordination based on any changed circumstances that may occur. In accordance with normal industry practices, communications with other operators will be kept open in the period leading to and throughout the testing activities, to ensure that the testing will be conducted on a non-interference basis. Grant of the proposed STA on a non-interference, non-protected basis would not prejudice any future operations in this band.

\* \* \* \* \*

Grant of the requested STA will serve the public interest, convenience and necessity because it will enable ISAT US to conduct essential network testing and the I5F2 spacecraft, within technical parameters consistent with the parameters described herein using the identified Antenna, without creating any risk of harmful interference. ISAT US respectfully requests that the Commission grant STA beginning August 14, 2015 for a period of 30 days.



## ANNEX A

## SPECIFICATIONS

### 3.5 Meter Ka-band, K-band Earth Station Antenna

#### Electrical Performance

	Ka-band 4-Port Circular Pol Feed		Ka-band 4-Port Wideband Circular Pol Feed		Ka-band 4-Port Linear Pol Feed		Ka-band 4-Port Linear Pol Feed Eutelsat Frequency		K-band 2-Port Linear Pol Feed		K-band 4-Port Linear Pol Feed	
	Receive	Transmit	Receive	Transmit	Receive	Transmit	Receive	Transmit	Receive	Transmit	Receive	Transmit
Frequency (GHz)	20.200- 21.200	30.000- 31.000	18.300- 20.200	28.300- 30.000	17.700- 20.200	27.000- 30.050	21.400- 22.000	27.000- 30.050	10.700- 12.750	17.300- 18.100	10.700- 12.750	17.300- 18.400
Antenna Gain at Midband	55.10 dB	58.50 dB	54.70 dB	58.30 dB	54.30 dB	58.00 dB	55.50 dB	58.00 dB	51.10 dB	54.70 dB	50.90 dB	54.50 dB
Antenna Noise Temperature (Midband, Clear Sky Conditions at 68°F (20°C, Water Vapor Density < 7.5 g/m <sup>3</sup> )												
10° Elevation	171 K		145 K		130 K		202 K		44 K		58 K	
30° Elevation	137 K		111 K		96 K		168 K		31 K		45 K	
50° Elevation	130 K		104 K		89 K		161 K		29 K		43 K	
Cross Polarization On Axis	N/A	N/A	N/A	N/A	35 dB	35 dB	35 dB	35 dB	35 dB	35 dB	35 dB	35 dB
Within 1 dB Beamwidth	N/A	N/A	N/A	N/A	35 dB	35 dB	35 dB	35 dB	35 dB	35 dB	35 dB	35 dB
Axial Ratio	0.50 dB	0.50 dB	0.50 dB	0.50 dB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VSWR Performance	1.30:1	1.30:1	1.30:1	1.30:1	1.30:1	1.30:1	1.30:1	1.30:1	1.30:1	1.30:1	1.30:1	1.30:1
Port-to-Port Isolation												
Rx to Rx	18 dB		18 dB		35 dB		35 dB				35 dB	
Tx to Rx	85 dB		85 dB		85 dB		85 dB				85 dB	
Tx to Tx	18 dB		18 dB		35 dB		35 dB		40 dB		35 dB	
Waveguide Interface Flange	WR42	WR28	WR42	WR28	WR42	WR28	WR42	WR28	WR75	WR62	WR75	WR62
Tx Power Capacity	500 W/Port		500 W/Port		500 W/Port		500 W/Port		1 kW		750 W/Port	

#### Mechanical Performance

Optics Type .....	Dual Reflector, Gregorian
Reflector Material .....	Precision Formed Aluminum
Reflector Segments .....	1
Mount Type .....	Tubular Post Pedestal
Antenna Pointing Range, Course/(Continuous) .....	360° Coarse, 30° Steps (±24° Continuous) 0° to 90° Continuous

#### Environmental Performance

Operational Temperature .....	-40°C to 50°C (-40°F to 125°F)
Wind Loading, Survival .....	150 mph Any Position 88 mph with Ice
Rain .....	102 mm (4 in per hour)
Solar Radiation .....	360 BTU/h/ft <sup>2</sup> (1135 W/m <sup>2</sup> )
Relative Humidity .....	100%
Shock and Vibration .....	As Encountered by Commercial Air, Rail and Truck
Atmospheric Conditions .....	As Encountered by Moderately Corrosive Coastal and Industrial Areas



ASC Signal Corporation  
620 North Greenfield Parkway  
Garner, NC 27529 USA

Telephone: +1-919-329-8700  
Fax: +1-919-329-8701

Internet: [www.ascsignal.com](http://www.ascsignal.com)

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