#### LATHAM & WATKINS LLP

April 13, 2015

#### **VIA ELECTRONIC FILING**

Ms. Marlene H. Dortch Secretary Federal Communications Commission 445 12<sup>th</sup> Street, SW Washington, DC 20554 555 Eleventh Street, N.W., Suite 1000 Washington, D.C. 20004-1304 Tel: +1.202.637.2200 Fax: +1.202.637.2201

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Re: Inmarsat Inc. Notice of *Ex Parte* Presentation; Iridium Satellite LLC, File No. SES-MOD-20130416-00322, Call Sign E960132; Iridium Carrier

Services LLC, File No. SES-MOD-20130416-00323, Call Sign E960622

#### Dear Ms. Dortch:

On April 9, 2015, Chris Murphy and Louis Rosa of Inmarsat Inc. ("Inmarsat"), Charles LaBerge of EFCLEA, and John Janka and Elizabeth Park of Latham & Watkins LLP, met with Jose Albuquerque, Kerry Murray, Karl Kensinger, Stephen Duall, Cindy Spiers, Jesse Lively, Paul Blais, and Hsing Liu of the International Bureau. The topic of the meeting was the above-reference applications of Iridium Satellite LLC and Iridium Carrier Services LLC (together, "Iridium") seeking authority to operate AMS(R)S earth station terminals.

The meeting presentation slides attached here as Attachment A formed the basis for the conversation. Inmarsat reiterated its request that the Commission defer the processing of the above-referenced applications until Iridium submits the salient technical characteristics of the proposed terminals needed to assess the interference environment in which these terminals will operate. Inmarsat also discussed the issues raised in the Inmarsat Request and the Inmarsat Reply filed in this proceeding.

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See Inmarsat Request to Hold in Abeyance, SES-MOD-20130416-00322, Call Sign E960132; File No. SES-MOD-20130416-00323, Call Sign E960622 (filed Dec. 19, 2014) ("Inmarsat Request"); see also Reply of Inmarsat to Iridium Opposition, SES-MOD-20130416-00322, Call Sign E960132; File No. SES-MOD-20130416-00323, Call Sign E960622 (filed Jan. 22, 2015) ("Inmarsat Reply").

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In particular, Inmarsat explained that Iridium has failed to identify the salient parameters of its proposed AMS(R)S antenna with sufficient specificity to determine if its proposed operations are consistent with the interference environment for oceanic airspace studied by the Radio Technical Commission for Aeronautics, Inc. ("RTCA") with respect to Iridium's AMS(R)S antennas. Iridium identifies the proposed AMS(R)S terminals as being technically identical to the "portable handheld terminals" included in its licenses, but the antenna gain of that terminal type is not included in the electronically available versions of the licenses available in the IBFS database, copies of which are included in this submission as Attachment B.

Mr. LaBerge explained that the operating parameters for Iridium's AMS(R)S system developed in the RTCA process were based on an omni-directional, low-profile terminal that was assumed to have the receive performance characteristics of a GPS antenna, which has antenna gain of 0 dBi. As Inmarsat explained in its Reply to Iridium's Opposition, that type of a "puck" antenna mounted atop an aircraft would create a different interference operating environment profile than the "stick" antenna typically used with a handheld Iridium terminal, and the technical parameters of such a "portable handheld terminal" with a stick antenna are what Iridium indicated in its pleadings that its AMS(R)S application is based upon.<sup>2</sup>

Inmarsat urged the Commission to ensure that the interference environment is understood and will be suitably managed in this case, particularly in light of the safety functions of AMS(R)S communications. If the Commission determines that Iridium's AMS(R)S applications can be granted, Inmarsat respectfully requests that any license issued make clear that the AMS(R)S antennas must have the gain of 0 dBi that is assumed in the RTCA studies. In addition, as Inmarsat requested in its pleadings in this proceeding, any license that may be granted should be conditioned upon a requirement that Iridium warn users that install Inmarsat and Iridium AMS(R)S terminals on the same aircraft that the Iridium terminals may experience interference.<sup>3</sup>

If you have any questions regarding this submission, please do not hesitate to contact the undersigned.

Respectfully submitted,

/s/

John P. Janka Elizabeth R. Park

#### Attachments

cc: Jose Albuquerque Kerry Murray Karl Kensinger

Inmarsat Reply at 4.

<sup>&</sup>lt;sup>3</sup> See Id. at 7.

#### $LATHAM @WATKINS {\tt LLP}$

Stephen Duall Cindy Spiers Jesse Lively Paul Blais Hsing Liu Donna Bethea Murphy Joseph Godles







# Rationale for Additional Information on Iridium AMS(R)S

Chris Murphy, Inmarsat
E.F. Charles LaBerge, EFCLEA
April 9, 2015

### **Overview**

- Iridium is requesting approval to operate its AMS(R)S earth stations and claims that it has submitted all relevant information.
- Inmarsat has argued in this proceeding that all relevant information has not been submitted:
  - Iridium's application is based on an antenna for a hand-held mobile terminal that is not relevant for aeronautical applications
  - Iridium's application has no details about antenna patterns relevant to aeronautical installations
  - In the newly published RTCA DO-262B (June 2014) equipment standards relevant to Iridium, Iridium introduces two new antenna types with no details on their performance
  - Iridium has not demonstrated the effect of the new antennas on the interference analysis accepted by ICAO WGM in June 2008, which covered only oceanic airspace---not remote areas.



### The antenna pattern issues

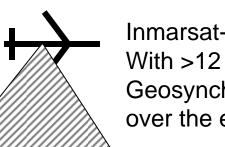
- The June 2008 ICAO Working Paper essentially assumes a nominal 0 dBi antenna pattern on Iridium-equipped aircraft, not on the pattern of a hand-held mobile terminal.
- Iridium has included (DO-262B, Appendix D, Table 2-3) Intermediate Gain and High Gain antennas in their MOPS, without providing salient technical details, *e.g.* directionality, sidelobes, etc.
- Use of Intermediate Gain (+6 dBi minimum) and High Gain (+10 dBi minimum gain) have the potential to invalidate the interference analysis accepted by ICAO in June 2008.
- The effect of IGA/HGA on same-airspace operations is unknown and unstudied. In general, higher gain will increase the separation distance required to provide interference protection.



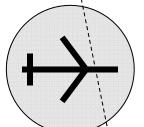
### The NAT interference problem (WGM WP07)

Notional "no interference"
Distance based on
MOPS antenna
Characteristics

WP-07 estimated the
Probability that Iridium
And Inmarsat Aircraft
Would be separated by
Less than this distance,
Under common air-traffic rules
for oceanic airspace



Inmarsat-equipped aircraft
With >12 dBi antenna, pointed to
Geosynchronous I-4
over the equator

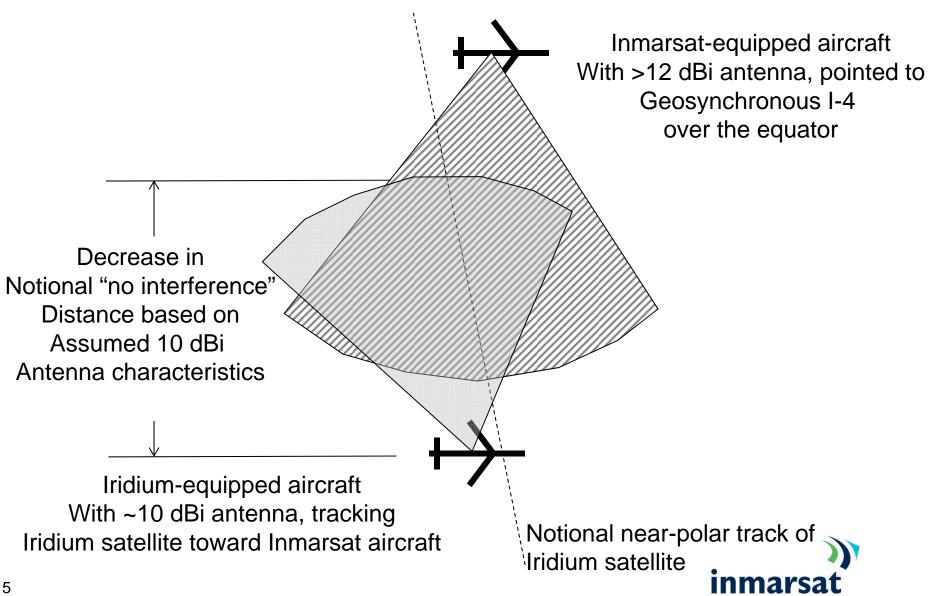


Iridium-equipped aircraft With ~0 dBi antenna

Notional near-polar track of Iridium satellite

inmarsat

### The NAT problem (DO-262B, App D)



### An incomplete, inconsistent application

- Iridium's application is based on a hand-held antenna pattern
- ...not a 0 dBi aero pattern (WP-07)
- ...not a 6 dBi aero pattern (DO-262B)
- ...not a 10 dbi aero pattern (DO-262B)
- Info about these patterns is not in the record.
- Therefore, it is impossible to perform any analysis about interference, or, in fact, to make any provision to avoid or preclude such interference.
- Management of the interference environment is the FCC responsibility, especially in the case of safety services, such as AMS(R)S.
- The information required to evaluate Iridium's proposed AMS(R)S terminals simply is not in the FCC or RTCA record.

### The same aircraft problem

- RTCA DO-262B, RTCA DO-270, and RTCA DO-343 all explicitly warn practitioners that there is a significant possibility of interference between Inmarsat AES and an Iridium AES on the same aircraft.
- This warning should be captured in any FCC authorization regarding AMS(R)S by Iridium mobile terminals.



### Inmarsat's Request

- Defer action on Iridium's application until Iridium provides the relevant data regarding the proposed AMS(R)S terminals to enable an assessment of the required separation distance <u>between different</u> aircraft.
  - This must be done for airspace over oceanic areas as well as airspace over remote areas.
- Explicitly warn users of the potential for interference when operating Inmarsat and Iridium independently on the same aircraft.







Current Authorization : FCC WEB Reproduction
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Name: IRIDIUM CARRIER SERVICES LLC Call Sign: E960622

**File Number:** SES-MOD-20120119-00068

**Authorization Type:** Modification of License

Common Carrier Grant Date: 05/09/2013 Expiration Date: 10/30/2021

Nature of Service: Mobile Satellite Service

Class of Station: Mobile Earth Station

#### A) Site Location(s)

# Site ID	Address	Latitude	Longitude	Elevation (Meters)	NAD	Special Provisions (Refer to Section H)
1) 1	portable handheld earth terminals MOBILE	0° 0' 0.0"	0° 0' 0.0"	0.0	NA	
2) OpenPort 2	50,000 (0.525 Mobile units) (CC)				NA	
	Licensee certifies antenna(s) for special conditions placed			refer to Section E		
3) LiveTV	50,000 (0.407 Mobile units) (LiveTV)				NA	

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.

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 Monday, October 30, 2006 (3 AM Eastern Standard Time) and ending Saturday, October 30, 2021 (3 AM Eastern Standard Time). The required date of completion of construction and commencement of operation is Friday, May 09, 2014 (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		Max	Max					
# Frequency	Polarization	Emission	Tx/Rx Mode	EIRP /Carrier	EIRP Density	Associated Antenna	Special Provisions (Refer to Section H)	Modulation/ Services
1) 1616.0000 - 1626.5000	R	41K7Q7W	T	11.95	3.99	1		
2) 1618.7250 - 1626.5000	R	41K7Q7W	R			CC		
3) 1618.7250 - 1626.5000	R	667KQ7W	R			CC		
4) 1618.7250 - 1626.5000	R	41K7Q7W	T	-2.70	-10.60	CC		
5) 1618.7250 - 1626.5000	R	667KQ7W	T	9.40	-10.60	CC		
6) 1618.7250 - 1626.5000	R	667KQ7W	T	10.70	4.70	LIVETV	TDMA/TI	DD .
7) 1618.7250 - 1626.5000	R	41K7Q7W	T	4.70	-3.30	LIVETV	TDMA/TI	DD .
8) 1618.7250 - 1626.5000	R	667KQ7W	R			LIVETV	NULL	
9) 1618.7250 - 1626.5000	H,V	41K7Q7W	T			LIVETV	NULL	



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**File Number:** SES-MOD-20120119-00068

**Authorization Type:** Modification of License

Common Carrier Grant Date: 05/09/2013 Expiration Date: 10/30/2021

#### **C) Frequency Coordination**

#	Frequency Limits(MHz)	Satellite Arc (Deg. Long.) East West Limit Limit	Elevation (Degrees) East West Limit Limit	Azimuth (Degrees) East West Limit Limit	Max EIRP Density toward Horizon (dBW/4kHz)	Associated Antenna(s)	
1)	1618.7250 - 1626.5000	NGSO			-1.0	CC	
2)	1618.7250 - 1626.5000	NGSO			-1.0	LIVETV	

#### **D) Point of Communications**

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

- 1) 1 to HIBLEO-2FL (66 NGSO Low Earth-Orbit) satellites of the IRIDIUM system. (U.S.-licensed)
- 2) OpenPort 2 to IRIDIUM NGSO satellite system (S2110) (U.S.-licensed)
- 3) LiveTV to IRIDIUM NGSO satellite system (S2110) (U.S.-licensed)

E) Antenna Facilites	
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Site ID	Antenna ID	Units	Diameter (Meters)		Model Number	Site Elevation	Antenna Height (Meters)	Special Provisions (Refer to Section H)
1	1 1	150	0.0	MOTOROLA (200,000)	TIME DOMAIN	DUPLEX 0.0	0.0 AGL/ 0.0 AMSL	

Max Gains(s):

Maximum total input power at antenna flange (Watts) = 0.0

Maximum aggregate output EIRP for all carriers (dBW)0.0

OpenPort 2 CC 50000 0.525 CELESTICA AT7521-2-A

Max Gains(s):10.7 dBi @ 1.6210 GHz

Maximum total input power at antenna flange (Watts) = 0.74

Maximum aggregate output EIRP for all carriers (dBW)9.4

LiveTV LIVETV 50000 0.407 LIVETV LV16-100301-

Max Gains(s):7.7 dBi @ 1.6210 GHz

Maximum total input power at antenna flange (Watts) = 0.74

Maximum aggregate output EIRP for all carriers (dBW)10.7

#### F) Remote Control

OpenPort 2	8440 South River Parkway Tempe, Maricopa, AZ, 85284 (240) 515-0148	Call Sign:	E960131
LiveTV	8440 South River Parkway Tempe, Maricopa, AZ, 85284 (240) 515-0148	Call Sign:	E960131



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IRIDIUM CARRIER SERVICES LLC Call Sign: E960622 Name:

> File Number: SES-MOD-20120119-00068

**Authorization Type:** Modification of License

05/09/2013 **Grant Date: Expiration Date:** 10/30/2021 Common Carrier

#### 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:

Iridium operations shall comply with coordination agreements with operators of radio astronomy observatories.

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 insure 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 shall be immediately suspended until the deviation is corrected, except the 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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**File Number:** SES-MOD-20120119-00068

**Authorization Type:** Modification of License

Common Carrier Grant Date: 05/09/2013 Expiration Date: 10/30/2021

#### H) Special and General Provisions

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 regulates 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.



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Name: IRIDIUM SATELLITE LLC Call Sign: E960132

**File Number:** SES-MOD-20120119-00069

**Authorization Type:** Modification of License

Non Common Carrier Grant Date: 05/09/2013 Expiration Date: 11/01/2021

Nature of Service: Mobile Satellite Service

Class of Station: Mobile Earth Station

#### A) Site Location(s)

# Site ID	Address	Latitude	Longitude	Elevation (Meters)	NAD	Special Provisions (Refer to Section H)
1) Non-CC	portable handheld earth terminals (Non-CC) MOBILE	0° 0' 0.0"	0° 0' 0.0"	0.0	NA	
2) OpenPort 1	50,000 (0.525 Mobile units) (OpenPort 1)				NA	
	Licensee certifies antenna(s) for special conditions placed	do not comply with upon antennas at the	Section 25.209. Please is site.	refer to Section E		
3) LiveTV	50,000 (0.407 Mobile units) (LiveTV)				NA	

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.

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 Wednesday, November 01, 2006 (3 AM Eastern Standard Time) and ending Monday, November 01, 2021 (3 AM Eastern Standard Time). The required date of completion of construction and commencement of operation is Friday, May 09, 2014 (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	to Section H		Max	Max				
# Frequency	Polarization	Emission	Tx/Rx Mode	EIRP /Carrier	EIRP Density	Associated Antenna	Special Provisions (Refer to Section H)	Modulation/ Services
1) 1618.7250 - 1626.5000	R	667KQ7W	T	10.70	-9.30	LIVETV	TDMA/TI	OD .
2) 1618.7250 - 1626.5000	R	41K7Q7W	T	4.70	-3.30	LIVETV	TDMA/TI	OD .
3) 1618.7250 - 1626.5000	R	667KQ7W	R			LIVETV	NULL	
4) 1618.7250 - 1626.5000	R	41K7Q7W	R			LIVETV	NULL	
5) 1618.7250 - 1626.5000	R	41K7Q7W	R			Non-CC		
6) 1618.7250 - 1626.5000	R	667KQ7W	R			Non-CC		
7) 1618.7250 - 1626.5000	R	41K7Q7W	T	-2.70	-10.60	OpenPort 1		
8) 1618.7250 - 1626.5000	R	667KQ7W	T	9.40	-10.60	OpenPort 1		



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Non Common Carrier Grant Date: 05/09/2013 Expiration Date: 11/01/2021

9) 1616.0000 - 1626.5000 R 41K7Q7W T 11.95 3.99 OpenPort 1

#### **C) Frequency Coordination**

#	Frequency Limits(MHz)	Satellite Arc (Deg. Long.) East West Limit Limit	Elevation (Degrees) East West Limit Limit	Azimuth (Degrees) East West Limit Limit	Density toward Horizon (dBW/4kHz)	Associated Antenna(s)	
1)	1616.0000 - 1626.5000	NGSO			-1.0	Non-CC	
2)	1618.7250 - 1626.5000	NGSO			-1.0	OpenPort 1	
3)	1618.7250 - 1626.5000	NGSO			-1.0	LIVETV	

#### **D) Point of Communications**

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

- 1) Non-CC to IRIDIUM NGSO satellite system (S2110) (U.S.-licensed)
- 2) OpenPort 1 to IRIDIUM NGSO satellite system (S2110) (U.S.-licensed)
- 3) LiveTV to IRIDIUM NGSO satellite system (S2110) (U.S.-licensed)

E) Antenn	a Facilites						Max Antenna	
Site ID	Antenna ID	Units	Diameter (Meters)		Model Number	Site Elevation	Height	Special Provisions (Refer to Section H)
LiveTV	LIVETV	50000	0.407	LIVETV	LV16-100301	FF.	25	

Max Gains(s):7.7 dBi @ 1.6210 GHz

Maximum total input power at antenna flange (Watts) = 0.74

Maximum aggregate output EIRP for all carriers (dBW)10.7

Non-CC Non-CC 200000 0.0 MOTOROLA(200,0 TIME DUPLEX 0.0 AGL/ 0.0 DOMAIN 0.0 AMSL

Max Gains(s):

Maximum total input power at antenna flange (Watts) = 0.0

Maximum aggregate output EIRP for all carriers (dBW)0.0

OpenPort 1 OpenPort 1 50000 0.525 CELESTICA AT7521-2-A

Max Gains(s):10.7 dBi @ 1.6210 GHz

Maximum total input power at antenna flange (Watts) = 0.74

Maximum aggregate output EIRP for all carriers (dBW)9.4

#### F) Remote Control

OpenPort 1	8440 South River Parkway (0.525 Mobile units) Tempe, Maricopa, AZ, 85284 (240) 515-0148	Call Sign:	E960131
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**File Number:** SES-MOD-20120119-00069

**Authorization Type:** Modification of License

Non Common Carrier Grant Date: 05/09/2013 Expiration Date: 11/01/2021

#### 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:
  - 517 Iridium operations shall comply with coordination agreements with operators of radio astronomy observatories.
  - 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 insure 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 shall be immediately suspended until the deviation is corrected, except the 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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**Authorization Type:** Modification of License

Non Common Carrier Grant Date: 05/09/2013 Expiration Date: 11/01/2021

#### H) Special and General Provisions

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.

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