SES-STA-20180220-00151 IB2018000445
Intelsat License LLC

Approved by OMB
3060–0678

# APPLICATION FOR EARTH STATION SPECIAL TEMPORARY AUTHORITY

APPLICANT INFORMATIONEnter a description of this application to identify it on the main menu:
Request for Special Temporary Authority for an 18–inch Ku–band Vehicle–mounted Earth Station Antenna

**1. Applicant**

| | | | |
|---|---|---|---|
| **Name:** | Intelsat License LLC | **Phone Number:** | 703–559–7848 |
| **DBA Name:** | | **Fax Number:** | 703–559–8539 |
| **Street:** | c/o Intelsat Corporation<br>7900 Tysons One Place | **E–Mail:** | susan.crandall@intelsat.com |
| City: | McLean | **State:** | VA |
| **Country:** | USA | **Zipcode:** | 22102 –5972 |
| **Attention:** | Susan H. Crandall | | |

GRANTED
International Bureau

File # SES-STA-20180220-00151
Call Sign _____ Grant Date 4-24-18
(or other identifier)
Term Dates
From: 4-24-18 To: 5-24-18
Approved:

Applicant: Intelsat License LLC
File No.: SES-STA-20180220-00151
Call Sign: N/A
Special Temporary Authority

Intelsat License LLC- is granted a special temporary authority for 30 days, beginning April 24, 2018, to utilize a vehicle-mounted 18-inch Rantec Airborne SATCOM terminal to communicate with Intelsat 29e (S2913) while the vehicle is in motion in Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida and West Virginia in order to test a new product. All testing will occur on the ground and will be performed in the following frequency bands: 14.0-14.5 GHz (Earth-to-space) and 11.7-12.2 GHz (space-to-Earth), under the following conditions:

1. Operations under this authority are on a non-interference basis only.

2. Operations under this authority are on a non-protected basis only.

3. License must comply with 47 C.F.R. 25.204(i), within 125 km of the TDRSS sites identified in §25.222(d), transmissions in the 14.0-14.2 GHz (Earth-to-space) band shall not exceed an e.i.r.p. spectral density towards the horizon of 12.5 dBW/MHz, and shall not exceed an e.i.r.p. towards the horizon of 16.3 d BW.

4. All operations under this grant of special temporary authority shall be on an unprotected and non-harmful interference basis. Intelsat License LLC- shall not cause harmful interference to, and shall not claim protection from interference caused to it by, any other lawfully operating radio communication system.

5. In the event of any harmful interference under this grant of special temporary authority, Intelsat License LLC- 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 Intelsat License LLC's risk.

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

GRANTED
International Bureau

File # SES-STA-20180220-00151

Call Sign _____ Grant Date 4-24-18
(or other identifier)

Term Dates
From: 4-24-18 To: 5-24-18

Approved: [signature]

**2. Contact**

| | | | |
|---|---|---|---|
| **Name:** | Susan H.Crandall | **Phone Number:** | 703−559−7848 |
| **Company:** | Intelsat Corporation | **Fax Number:** | 703−559−8539 |
| **Street:** | 7900 Tysons One Place | E−Mail: | susan.crandall@intelsat.com |
| **City:** | McLean | **State:** | VA |
| **Country:** | USA | **Zipcode:** | 22102 −5972 |
| **Attention:** | | **Relationship:** | 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?
◉ If Yes, complete and attach FCC Form 159. If No, indicate reason for fee exemption (see 47 C.F.R.Section 1.1114).
○ Governmental Entity ○ Noncommercial educational licensee
○ Other(please explain):

4b. Fee Classification CGB − Mobile Satellite Earth Stations

5. Type Request

○ Use Prior to Grant ○ Change Station Location ◉ Other

| | |
|---|---|
| 6. Requested Use Prior Date | |
| 7. City | 8. Latitude<br>(dd mm ss.s h) 0 0 0.0 |

| 9. State | 10. Longitude<br>(dd mm ss.s h) 0 0 0.0 |
|---|---|

11. Please supply any need attachments.

Attachment 1: STA Request | Attachment 2: Exhibit A | 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.)

Intelsat License LLC herein requests Special Temporary Authority for 30 days commencing March 20, 2018 to utilize a vehicle-mounted 18-inch Rantec Airborne SATCOM terminal to communicate with Intelsat 29e (Call Sign S2913) while the vehicle is in motion in Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida to

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 ○ No

| 14. Name of Person Signing | 15. Title of Person Signing |
|---|---|
| Susan H.Crandall | Assoc. General Counsel, Intelsat Corporation |

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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**12. Description**

Intelsat License LLC herein requests Special Temporary Authority for 30 days commencing March 20, 2018 to utilize a vehicle-mounted 18-inch Rantec Airborne SATCOM terminal to communicate with Intelsat 29e (Call Sign S2913) while the vehicle is in motion in Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida to test a new product. All testing will occur on the ground and will be performed in the frequency bands, 14.0-14.5 GHz and 11.7-12.2 GHz.

INTELSAT
Envision. Connect. Transform.

February 20, 2018

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: Request for Special Temporary Authority
18-inch Ku-band Vehicle-mounted Earth Station Antenna, Call Sign E170121

Dear Ms. Dortch:

Intelsat License LLC ("Intelsat") herein requests Special Temporary Authority ("STA")[1] for 30 days commencing March 20, 2018 to utilize a vehicle-mounted 18-inch Rantec Airborne SATCOM terminal to communicate with Intelsat 29e (Call Sign S2913) while the vehicle is in motion in Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida to test a new product. All testing will occur on the ground and will be performed in the following frequency bands: 14.0-14.5 GHz and 11.7-12.2 GHz.

The Federal Communications Commission has previously granted Intelsat STA to operate the Rantec Airborne SATCOM terminal (Call Sign E170121)[2] to communicate with Intelsat 29e in Maryland, Virginia, North Carolina, South Carolina, Georgia, and Florida while the vehicle is in motion.[3] In this application, Intelsat requests STA to operate in West Virginia in addition to these six states. Intelsat intends for this STA, upon grant, to replace Intelsat's existing STA to operate the Rantec terminal while the vehicle is in motion.

In further support of this request, Intelsat attaches herewith a radiation hazard analysis report as Exhibit A. Additionally, Intelsat will not operate within 125 km of any Tracking and Data Relay

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1 Intelsat has filed its STA request, FCC Form 159, a $200.00 filing fee and this supporting letter electronically via the International Bureau's Filing System ("IBFS").

2 The FCC authorized Intelsat to operate the Rantec Airborne SATCOM terminal to provide advanced mobile broadband services to aircraft using Ku-band frequencies under an earth stations aboard aircraft blanket license. *See Policy Branch Information; Actions Taken,* Public Notice, Report No. SES-01999, File No. SES-LIC-20170626-00682 (Oct. 11, 2017).

3 *See Policy Branch Information; Actions Taken,* Public Notice, Report No. SES-01977, File No. SES-STA-20170706-00739 (July 26, 2017); *Policy Branch Information; Actions Taken,* Public Notice, Report No. SES-01991, File No. SES-STA-20170830-00968 (Sept. 13, 2017); *Policy Branch Information; Actions Taken,* Public Notice, Report No. SES-01999, File No. SES-STA-20171003-01105 (Oct. 11, 2017); *Policy Branch Information; Actions Taken,* Public Notice, Report No. SES-02007, File No. SES-STA-20171031-01226 (Nov. 8, 2017); *Policy Branch Information; Actions Taken,* Public Notice, Report No. SES-02017, File No. SES-STA-20171204-01302 (Dec. 13, 2017); *Policy Branch Information; Actions Taken,* Public Notice, Report No. SES-02025, File No. SES-STA-20180103-00007 (Jan. 10, 2018).

Intelsat Corporation
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Satellite System sites. To minimize any potential interference, operations under this STA will conform to the Commission's Part 25 Vehicle-Mounted Earth Stations rules.

Grant of this STA request will assist Intelsat in testing a new product. This, in turn, will help provide customer service and thereby promotes the public interest.

Please direct any questions regarding this STA request to the undersigned at (703) 559-7848.

Respectfully submitted,

*/s/ Susan H. Crandall*
Susan H. Crandall
Associate Counsel
Intelsat Corporation

cc: Paul Blais

**EXHIBIT A**

# Radiation Hazard Report

## Analysis of Non-Ionizing Radiation for a 0.45 m Earth Station

This analysis provides the calculated non-ionizing radiation levels for a 0.45-meter earth station system.

The methods and calculations performed in this analysis are based on the FCC Office of Engineering and Technology Bulletin, No.65, October 1985 as revised in 1997 in Edition 97-01. The radiation safety limits used in the analysis are in conformance with the FCC R&O 96-326 (Summarized in Annex 1). There are separate exposure limits applicable to the General Population/Uncontrolled Environment and the Occupational/Controlled Environment. The Maximum Permissible Exposure (MPE) limits for persons in a General Population/Uncontrolled environment for the frequency band of this antenna, is 1 mW/cm2 for a 30 minute or lower time period as shown in Annex 1 (a). The MPE limit for persons in an Occupational/Controlled environment for the frequency band of this antenna is 5 mW/cm2 for a 6 minute time or lower period as shown in Annex 1 (b). The purpose of this analysis described is to determine the power flux density levels of the earth station at the main reflector surface, the near-field, transition region, far-field, between the sub-reflector or feed and, at the main reflector surface, and between the antenna edge and the ground and to compare these levels to the specified MPEs.

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

Table 1. Input Parameters Used for Determining Power Flux Densities

| Parameter | Symbol | Formula | Value | Units |
|---|---|---|---|---|
| Antenna Diameter | D | Input | 0.45 | m |
| Frequency | F | Input | 14250 | MHz |
| Transmit Power | P | Input | 11 | W |
| Antenna Gain (dBi) | $G_{es}$ | Input | 34 | dBi |

Table 2. Calculated Values and Constants

| Parameter | Symbol | Formula | Value | Units |
|---|---|---|---|---|
| Antenna Surface Area | $A_{surface}$ | $\pi D^2/4$ | 0.16 | m^2 |
| Wavelength | $\lambda$ | 300/F | 0.021053 | m |
| Antenna Gain (factor) | G | $10^{Ges/10}$ | 2511.89 | n/a |
| Pi | $\pi$ | Constant | 3.1415927 | n/a |
| Antenna Efficiency | $\eta$ | $G\lambda^2/(\pi^2D^2)$ | 0.56 | n/a |

## 1. Antenna Main Reflector Surface

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

Power Density at the Main Reflector Surface:

$$S_{surface} = 4P/A_{surface} \quad (1)$$
$$= 276.655 \quad W/m^2$$
$$= 27.665 \quad mW/cm^2$$

## 2. Near Field Calculation

Power Flux density is considered to be at a maximum value throughout the entire length of the defined Near Field region. The region is contained within a cylindrical volume having the same diameter as the antenna. Past the boundary of the Near Field region, the power density from the antenna decreases linearly with respect to increasing distance. The distance to the end of the Near Field is determined from the following equation:

Extent of the Near Field:

$$R_{nf} = D^2 / (4\lambda) \quad (2)$$
$$= 2.40 \quad m$$

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

Near Field Density:

$$S_{nf} = 16.0\ \eta\ P / (\pi\ D^2) \quad (3)$$
$$= 15.411 \quad mW/cm^2$$

## 3. Transition Region Calculation

The Transition Region is located between the Near and Far Field regions. The power density begins to decrease linearly with increasing distance in the Transition region. While the power density decreases inversely with distance in the Transition region, the power density decreases inversely with the square of the distance in the Far Field region. The power density calculated in Section 1 is the highest power density the antenna can produce in any of the regions away from the antenna. The power density at a distance $R_t$ is determined from the following equation:

Transition Region Power Density:

$$S_t = S_{nf} R_{nf} / R_t \quad (4)$$
$$= 15.411 \quad mW/cm^2$$

## 4. Far Field Distance Calculation

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

Distance to Far Field Region:

$$R_{ff} = 0.6\ D^2 / \lambda \qquad (5)$$
$$= \quad 5.771 \quad m$$

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

On-axis Power Density in the Far Field:

$$S_{ff} = G\ P / (4\ \pi\ R_{ff}^2) \qquad (6)$$
$$= \quad 6.602 \quad mW/cm^2$$

## 5. Region between the Main Reflector and the Ground

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

Power Density between Reflector and Ground:

$$S_g = P / A_{surface} \qquad (7)$$
$$= \quad 6.916 \quad mW/cm^2$$

## 7. Summary of Calculations

Table 3. Summary of Expected Radiation levels for Uncontrolled Environment

| Region | Symbol | Calculated Maximum Radiation Power Density Level ($mW/cm^2$) | Hazard Assessment |
|---|---|---|---|
| 1. Main Reflector | $S_{surface}$ | 27.665 | Potential Hazard |
| 2. Near Field ($R_{nf}$ = 2.4 m) | $S_{nf}$ | 15.411 | Potential Hazard |
| 3. Transition Region ($R_{nf} < R_t < R_{ff}$) | $S_t$ | 15.411 | Potential Hazard |
| 4. Far Field ($R_{ff}$ = 5.77 m) | $S_{ff}$ | 6.602 | Potential Hazard |
| 5. Between Main Reflector and Ground | $S_g$ | 6.916 | Potential Hazard |

Table 4. Summary of Expected Radiation levels for Controlled Environment

| Region | Symbol | Calculated Maximum Radiation Power Density Level ($mW/cm^2$) | Hazard Assessment |
|---|---|---|---|
| 1. Main Reflector | $S_{surface}$ | 27.665 | Potential Hazard |
| 2. Near Field ($R_{nf}$ = 2.4 m) | $S_{nf}$ | 15.411 | Potential Hazard |
| 3. Transition Region ($R_{nf} < R_t < R_{ff}$) | $S_t$ | 15.411 | Potential Hazard |
| 4. Far Field ($R_{ff}$ = 5.77 m) | $S_{ff}$ | 6.602 | Potential Hazard |
| 5. Between Main Reflector and Ground | $S_g$ | 6.916 | Potential Hazard |

It is the applicant's responsibility to ensure that the public and operational personnel are not exposed to harmful levels of radiation.

## 8. Conclusion

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

The antenna will be vehicle-mounted and will be located in Maryland, Virginia, North Carolina, South Carolina, The antenna is in a facility with secured access in and around the proposed antenna. The earth station will be marked with the standard radiation hazard warnings, as well as the area in the vicinity of the earth station to inform those in the general population, who might be working or otherwise present in or near the direct path of the main beam.

The applicant will ensure that the main beam of the antenna will be pointed at least one diameter away from any building, or other obstacles in those area that exceed the MPE levels. Since one diameter removed from the center of the main beam the levels are down by at least 20 dB, or by a factor of 100, these potential hazards do not exist for either the public, or for earth station personnel.

Finally, the earth station's operating personnel will not have access to areas that exceed the MPE levels, while the earth station is in operation. The transmitter will be turned off during those periods of maintenance, so that the MPE standard of 5.0 $mW/cm^2$ will be complied with for those regions in close proximity to the main reflector, which could be occupied by operating personnel.

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

# ANNEX 1

(MPE Levels)

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

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

b) Limits for Occupational/Controlled Exposure (MPE)

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