

APPLICATION FOR EARTH STATION SPECIAL TEMPORARY AUTHORITY

APPLICANT INFORMATION Enter a description of this application to identify it on the main menu:
Request for 30-day STA To Use Riverside, California Earth Station E060384 to Provide TT&C Services for Intelsat 5 (S2704)
Satellite

1. Applicant

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



File # SES-STA-20180504-00489

Call Sign E060384 Grant Date 5/11/2018

Term Dates


From 5/13/2018 To: 6/12/2018

Approved: [Signature]

Applicant: Intelsat License LLC ("Intelsat")
File No: SES-STA-20180504-00489
Call Sign: E060384
Special Temporary Authority (STA)

Intelsat License LLC ("Intelsat") is granted special temporary authorization for 30 days beginning May 13, 2018 to operate its Riverside, CA earth station antenna to perform tracking, telemetry and command ("TT&C") and for Intelsat 5 (Call Sign S2704) during its drift from 156.9° E.L. to 137.0° W.L. on center frequencies: 14498 MHz (H) and 13999 MHz (RHCP) (Earth-to-space); and 11451 MHz (H, V, and RHCP), 11452 MHz (H, V, and RHCP), and 11454 MHz (RHCP, and LHCP) in the downlink. 13999 MHz (space-to-Earth) under the following conditions.

1. Operations shall be on an unprotected, non-interference basis with respect to other authorized stations, including federal stations.
2. Any future requests or extensions will need to submit applications to the FCC to be re-coordinated with NTIA.
3. Any action taken or expense incurred as a result of operations pursuant to this STA is solely at Intelsat's risk.
4. This grant is issued pursuant to Section 0.261 of the Commission's rules on delegated authority, 47 C.F.R. § 0.261, and is effective upon release.

 GRANTED International Bureau	File # <u>SES-STA-20180504-00489</u>
	Call Sign <u>E060384</u> Grant Date <u>5/11/2018</u> (or other identifier)
	Term Dates From <u>5/13/2018</u> To: <u>6/12/2018</u>
	Approved: <u>Paul Eblano</u>

2. Contact			
Name:	Cynthia J. Grady	Phone Number:	703-559-6949
Company:	Intelsat Corporation	Fax Number:	703-559-8539
Street:	7900 Tysons One Place	E-Mail:	cynthia.grady@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?			
<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 Riverside			
8. Latitude (dd mm ss.s h) 33 47 47.3 N			

9. State CA	10. Longitude (dd mm ss.h) 117 5 15.0 W
11. Please supply any need attachments. Attachment 1: STA Request Attachment 2: Exhibit A - D Attachment 3: 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;"> <p>Intelsat License LLC herein requests 30 days, beginning May 13, 2018, of Special Temporary Authority to use its Riverside, California Ku-band earth station, call sign E060384, to provide telemetry, tracking, and command services for Intelsat 5 (Call Sign S2704) during its drift from 156.9 E.L. to 137.0 W.L. and on station at 137.0 W.L.</p> </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"; party to the application; for these purposes. <p style="text-align: center;"> <input checked="" type="radio"/> Yes <input type="radio"/> No </p>	
14. Name of Person Signing Cynthia J. Grady	15. Title of Person Signing Regulatory 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).	

FCC NOTICE REQUIRED BY THE PAPERWORK REDUCTION ACT

The public reporting for this collection of information is estimated to average 2 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the required data, and completing and reviewing the collection of information. If you have any comments on this burden estimate, or how we can improve the collection and reduce the burden it causes you, please write to the Federal Communications Commission, AMD-PERM, Paperwork Reduction Project (3060-0678), Washington, DC 20554. We will also accept your comments regarding the Paperwork Reduction Act aspects of this collection via the Internet if you send them to PRA@fcc.gov. PLEASE DO NOT SEND COMPLETED FORMS TO THIS ADDRESS.

Remember – You are not required to respond to a collection of information sponsored by the Federal government, and the government may not conduct or sponsor this collection, unless it displays a currently valid OMB control number or if we fail to provide you with this notice. This collection has been assigned an OMB control number of 3060-0678.

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.



INTELSAT

Envision. Connect. Transform.

May 4, 2017

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Re: Request for Special Temporary Authority
Riverside, California Earth Station E060384

Dear Ms. Dortch:

Intelsat License LLC (“Intelsat”) herein requests 30 days, beginning May 13, 2018, of Special Temporary Authority (“STA”)¹ to use its Riverside, California Ku-band earth station—call sign E060384—to provide telemetry, tracking, and command (“TT&C”) services for Intelsat 5 (Call Sign S2704) during its drift from 156.9° E.L. to 137.0° W.L.² and on station at 137.0° W.L. Intelsat 5 is currently drifting using non-U.S. antennas and is expected to require the use of U.S. antennas on May 13, 2018.³

TT&C operations will be performed in the following frequencies: 14498 MHz (H) and 13999 MHz (RHCP) in the uplink; and 11451 MHz (H, V, and RHCP), 11452 MHz (H, V, and RHCP), and 11454 MHz (RHCP, and LHCP) in the downlink. The drift operations will be coordinated with all operators of satellites that use the same frequency bands and are in the drift path.⁴ Once on-station at 137.0° W.L., Intelsat will operate in conformance with FCC rules and any relevant coordination agreements. All

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

² Intelsat originally intended to redeploy Intelsat 5 to 93.2° W.L. *See Policy Branch Information; Actions Taken*, Report No. SAT-01311, File No. SAT-STA-20180410-00027 (Apr. 20, 2018) (Public Notice). When the FCC recently made available for reassignment the C-band frequencies at 137° W.L., Intelsat filed to modify the authorization for the Intelsat 5 satellite to instead redeploy it to 137.0° W.L. Intelsat has also filed two STAs in support of the new redeployment. *See Intelsat License LLC, Modification of authorization to Redeploy to, and Operate Intelsat 5 (S2704) at, 137.0 W.L.*, File No. SAT-MOD-20180501-00036 (filed May 1, 2018); *Intelsat License LLC, Request for 30-Day Special Temporary Authority to Drift Intelsat 5 and Operate at, 137.0 W.L., Call Sign S2704*, File No. SAT-STA-20180502-00039 (filed May 2, 2018); *Intelsat License LLC, Request for 180-Day Special Temporary Authority to Operate Intelsat 5 at 137.0 W.L., Call Sign S2704*, File No. SAT-STA-20180502-00040 (filed May 2, 2018).

³ Intelsat is concurrently filing STA requests for earth stations KL92, E140121, and KA258 to support Intelsat 5’s redeployment to 137° W.L.

⁴ Intelsat will handle the coordination.

Ms. Marlene H. Dortch
May 4, 2018
Page 2

operators of satellites in that path will be provided with an emergency phone number where the licensee can be reached in the event that harmful interference occurs.

The 24x7 contact information is as follows:

Ph.: (703) 559-7701 – East Coast Operations Center (primary)
(310) 525-5591 – West Coast Operations Center (back-up)

Request to speak with Harry Burnham or Kevin Bell.

In further support of this request, Intelsat herewith attaches Exhibits A-D, which contain technical information that demonstrates that the operation of the earth station will be compatible with its electromagnetic environment and will not cause harmful interference into any lawfully operating terrestrial facility, or into Federal systems operating in the 13.75 -14.00 GHz band. To provide sufficient interference protection to U.S. Navy shipboard radiolocation operations, Intelsat will operate based on the table provided below for uplink operation in band 13.75-14.00 GHz from Riverside, CA. Using the below mentioned power levels, the earth station's signal flux density toward the shoreline will always be less than $-167.0 \text{ dBW/m}^2/4\text{KHz}$. Therefore, there should be no interference to the U.S. Navy radar systems.

<i>Arc</i>	<i>Power</i>
<i>45 to 190 W</i>	<i>76 dBW</i>
<i>45 to 185 W</i>	<i>82 dBW</i>
<i>45 to 180 W</i>	<i>86 dBW</i>
<i>45 to 175 W</i>	<i>88 dBW</i>

In the extremely unlikely event that harmful interference should occur due to transmissions to or from its earth station, Intelsat will take all reasonable steps to eliminate the interference.

Grant of this STA request will allow Intelsat to drift Intelsat 5 to, and safely station-keep the satellite at, its new location. This, in turn, will help meet a new service demand at the 137.0° W.L. orbital location and thereby promotes the public interest.

Please direct any questions regarding this STA request to the undersigned at (703) 559-6949.

Respectfully submitted,

/s/ Cynthia J. Grady

Cynthia J. Grady
Regulatory Counsel
Intelsat Corporation

cc: Paul Blais

**Intelsat License LLC
Riverside, California****Vertex/RSI 9 Meter Earth Station****1. Background**

This Exhibit is presented to demonstrate the extent to which the Intelsat License LLC ("Intelsat") satellite earth station in Riverside, California is in compliance with the Federal Communications Commission ("FCC") Report and Order 96-377. The potential interference from the earth station to U.S. Navy shipboard radiolocation operations ("RADAR") and the National Aeronautics and Space Administration ("NASA") space research activities in the 13.75-14.0 GHz band is addressed in this exhibit. The parameters for the earth station are:

Coordinates (NAD83):	33° 47' 47.3" N, 117° 5' 15" W
Satellite Arc Range for Earth Station:	Intelsat 5 at 45°W to 190°W
Frequency Band:	13.75-14.00 GHz
Polarizations:	Linear & Circular
Emissions:	850KF7D
Modulation:	FM/BPSK/NRZ-L
Maximum Aggregate Uplink EIRP:	76dBW for all Carriers
Transmit Antenna Characteristics	
Antenna Size:	9 Meters in Diameter
Antenna Type/Model:	Vertex/RSI
Gain:	60.1 dBi
RF Power into Antenna Flange:	15.9 dBW or -7.4 dBW/4kHz
Minimum Elevation Angle:	5.47° @ 260.3° Azimuth 6.16° @ 100.19° Azimuth
Side Lobe Antenna Gain	FCC Reference Pattern

Because the above uplink spectrum is shared with the Federal Government, coordination in this band requires resolution data pertaining to potential interference between the earth stations and both U.S. Navy Department and NASA systems. Potential interference from the earth station could impact the U.S. Navy and/or NASA systems in two areas. These areas are noted in FCC Report and Order 96-377 dated September 1996, and consist of (1) Radiolocation and Radio Navigation, (2) Data Relay Satellites.

Summary of Coordination Issues:

- a.) Potential Impact to Government Radiolocation (Shipboard Radar)
- b.) Potential Impact to NASA Tracking and Data Relay Satellite Systems ("TDRSS")

2. Potential Impact to Government Radiolocation (Shipboard Radar)

Radiolocation operations ("RADAR") may occur anywhere in the 13.4-14.0 GHz frequency band aboard ocean-going U.S. Navy ships. FCC order 96-377 allocates the top 250MHz of this 600 MHz band to the Fixed Satellite Service ("FSS") on a co-primary basis with the radiolocation operations and provides for an interference protection level of $-167 \text{ dBW/m}^2/4\text{kHz}$.

The closest distance to the shoreline from Riverside, California earth station is approximately 63 km southwest toward the Pacific Ocean. The calculation of the power spectral density at this distance is given by:

- | | |
|------------------------------|--|
| 1. Clear Sky EIRP: | 76 dBW |
| 2. Carrier Bandwidth: | 850 kHz |
| 3. PD at antenna input: | -7.4 dBW/4kHz |
| 4. Transmit Antenna Gain: | 60.1 dBi |
| 5. Antenna Gain to Horizon: | 10.6 dBi |
| 6. Antenna Elevation Angles: | 5.5° @ 260.3° azimuth
6.2° @ 100.2° azimuth |

The earth station will radiate interference toward the ocean according to its off-axis side-lobe performance. A conservative analysis, using FCC standard reference pattern, results in an off-axis antenna gain of 10.6 towards the Pacific Ocean.

The signal density at the shoreline, through free space is:

$$\begin{aligned} \text{PFD} &= \text{Antenna Feed Power density (dBW/4kHz)} + \text{Antenna Off-Axis Gain (dBi)} - \text{Spread Loss (dBW/m}^2\text{)} \\ &= -7.4\text{dBW/4kHz} + 10.6\text{dBi} - (10*\log[4*PI*[63\text{km}]^2]) \\ &= -103.8 \text{ dBW/m/4kHz} - \text{Additional Path Losses (63.4 dB)} \end{aligned}$$

Our calculation indicate additional path loss of approximately 63.4 dB including absorption loss and earth diffraction loss for the actual path profiles from the earth station to the nearest shoreline.

The calculated PFD, including additional path losses to the closest shoreline, is $-167.2\text{dBW/ m}^2/4 \text{ kHz}$. This is 0.2dB below the $-167.0 \text{ dBW/ m}^2/4 \text{ kHz}$ interference criteria of the R&O 96-377. Therefore, there should be no interference to the U.S. Navy RADAR from the Riverside, California earth station due to the distance and the terrain blockage between the site and the shore.

3. Potential Impact to NASA's Tracking and Data Relay Satellite System

The geographic location of the Intelsat earth station in Riverside, California is outside the 390 km radius coordination contour surrounding NASA's White Sands, New Mexico ground station complex. Therefore the TDRSS space-to-earth link will not be impacted by the Intelsat earth station in Riverside, California.

The TDRSS space-to-space link in the 13.772 to 13.778 GHz band is assumed to be protected if an earth station produces an EIRP of less than 71 dBW/6MHz in this band. The 9 meter earth station antenna will not transmit in this band. Therefore, there will be no potential interference to the TDRSS space-to-space link.

4. Coordination Result Summary and Conclusions

The results of the analysis and calculation performed in this exhibit indicate that compatible operation between the earth station at the Riverside, California facility and U.S. Navy and NASA TDRSS space-to-earth and space-to-space links are possible. No interference to U.S. Navy RADAR or NASA TDRSS operations from the Riverside, California site earth station should occur.

**Intelsat License LLC
Riverside, California****Vertex/RSI 9 Meter Earth Station****1. Background**

This Exhibit is presented to demonstrate the extent to which the Intelsat License LLC ("Intelsat") satellite earth station in Riverside, California is in compliance with the Federal Communications Commission ("FCC") Report and Order 96-377. The potential interference from the earth station to U.S. Navy shipboard radiolocation operations ("RADAR") and the National Aeronautics and Space Administration ("NASA") space research activities in the 13.75-14.0 GHz band is addressed in this exhibit. The parameters for the earth station are:

Coordinates (NAD83):	33° 47' 47.3" N, 117° 5' 15" W
Satellite Arc Range for Earth Station:	Intelsat 5 at 45°W to 185°W
Frequency Band:	13.75-14.00 GHz
Polarizations:	Linear & Circular
Emissions:	850KF7D
Modulation:	FM/BPSK/NRZ-L
Maximum Aggregate Uplink EIRP:	82dBW for all Carriers
Transmit Antenna Characteristics	
Antenna Size:	9 Meters in Diameter
Antenna Type/Model:	Vertex/RSI
Gain:	60.1 dBi
RF Power into Antenna Flange:	21.9 dBW or -1.4 dBW/4kHz
Minimum Elevation Angle:	9.63° @ 257.28° Azimuth 6.16° @ 100.19° Azimuth
Side Lobe Antenna Gain	FCC Reference Pattern

Because the above uplink spectrum is shared with the Federal Government, coordination in this band requires resolution data pertaining to potential interference between the earth stations and both U.S. Navy Department and NASA systems. Potential interference from the earth station could impact the U.S. Navy and/or NASA systems in two areas. These areas are noted in GCC Report and Order 96-377 dated September 1996, and consist of (1) Radiolocation and Radio Navigation, (2) Data Relay Satellites.

Summary of Coordination Issues:

- a.) Potential Impact to Government Radiolocation (Shipboard Radar)
- b.) Potential Impact to NASA Tracking and Data Relay Satellite Systems ("TDRSS")

2. Potential Impact to Government Radiolocation (Shipboard Radar)

Radiolocation operations ("RADAR") may occur anywhere in the 13.4-14.0 GHz frequency band aboard ocean-going U.S. Navy ships. FCC order 96-377 allocates the top 250MHz of this 600 MHz band to the Fixed Satellite Service ("FSS") on a co-primary basis with the radiolocation operations and provides for an interference protection level of $-167 \text{ dBW/m}^2/4\text{kHz}$.

The closest distance to the shoreline from Riverside, California earth station is approximately 63 km southwest toward the Pacific Ocean. The calculation of the power spectral density at this distance is given by:

- | | |
|------------------------------|--|
| 1. Clear Sky EIRP: | 82 dBW |
| 2. Carrier Bandwidth: | 850 kHz |
| 3. PD at antenna input: | -1.4 dBW/4kHz |
| 4. Transmit Antenna Gain: | 60.1 dBi |
| 5. Antenna Gain to Horizon: | 4.4 dBi |
| 6. Antenna Elevation Angles: | 9.6° @ 257.3° azimuth
6.2° @ 100.2° azimuth |

The earth station will radiate interference toward the ocean according to its off-axis side-lobe performance. A conservative analysis, using FCC standard reference pattern, results in an off-axis antenna gain of 4.4 towards the Pacific Ocean.

The signal density at the shoreline, through free space is:

$$\begin{aligned} \text{PFD} &= \text{Antenna Feed Power density (dBW/4kHz)} + \text{Antenna Off-Axis Gain (dBi)} - \text{Spread Loss (dBW/m}^2\text{)} \\ &= -1.4\text{dBW/4kHz} + 4.4\text{dBi} - (10 \cdot \log[4 \cdot \text{PI} \cdot (63\text{km})^2]) \\ &= -103.9 \text{ dBW/m/4kHz} - \text{Additional Path Losses (63.4 dB)} \end{aligned}$$

Our calculation indicate additional path loss of approximately 63.4 dB including absorption loss and earth diffraction loss for the actual path profiles from the earth station to the nearest shoreline.

The calculated PFD, including additional path losses to the closest shoreline, is $-167.3 \text{ dBW/m}^2/4 \text{ kHz}$. This is 0.3dB below the $-167.0 \text{ dBW/m}^2/4 \text{ kHz}$ interference criteria of the R&O 96-377. Therefore, there should be no interference to the U.S. Navy RADAR from the Riverside, California earth station due to the distance and the terrain blockage between the site and the shore.

3. Potential Impact to NASA's Tracking and Data Relay Satellite System

The geographic location of the Intelsat earth station in Riverside, California is outside the 390 km radius coordination contour surrounding NASA's White Sands, New Mexico ground station complex. Therefore the TDRSS space-to-earth link will not be impacted by the Intelsat earth station in Riverside, California.

The TDRSS space-to-space link in the 13.772 to 13.778 GHz band is assumed to be protected if an earth station produces an EIRP of less than 71 dBW/6MHz in this band. The 9 meter earth station antenna will not transmit in this band. Therefore, there will be no potential interference to the TDRSS space-to-space link.

4. Coordination Result Summary and Conclusions

The results of the analysis and calculation performed in this exhibit indicate that compatible operation between the earth station at the Riverside, California facility and U.S. Navy and NASA TDRSS space-to-earth and space-to-space links are possible. No interference to U.S. Navy RADAR or NASA TDRSS operations from the Riverside, California site earth station should occur.

**Intelsat License LLC
Riverside, California**

Vertex/RSI 9 Meter Earth Station

1. Background

This Exhibit is presented to demonstrate the extent to which the Intelsat License LLC ("Intelsat") satellite earth station in Riverside, California is in compliance with the Federal Communications Commission ("FCC") Report and Order 96-377. The potential interference from the earth station to U.S. Navy shipboard radiolocation operations ("RADAR") and the National Aeronautics and Space Administration ("NASA") space research activities in the 13.75-14.0 GHz band is addressed in this exhibit. The parameters for the earth station are:

Coordinates (NAD83):	33° 47' 47.3" N, 117° 5' 15" W
Satellite Arc Range for Earth Station:	Intelsat 5 at 45°W to 180°W
Frequency Band:	13.75-14.00 GHz
Polarizations:	Linear & Circular
Emissions:	850KF7D
Modulation:	FM/BPSK/NRZ-L
Maximum Aggregate Uplink EIRP:	86dBW for all Carriers
Transmit Antenna Characteristics	
Antenna Size:	9 Meters in Diameter
Antenna Type/Model:	Vertex/RSI
Gain:	60.1 dBi
RF Power into Antenna Flange:	25.9 dBW or 2.6 dBW/4kHz
Minimum Elevation Angle:	13.79° @ 254.12° Azimuth 6.16° @ 100.19° Azimuth
Side Lobe Antenna Gain	FCC Reference Pattern

Because the above uplink spectrum is shared with the Federal Government, coordination in this band requires resolution data pertaining to potential interference between the earth stations and both U.S. Navy Department and NASA systems. Potential interference from the earth station could impact the U.S. Navy and/or NASA systems in two areas. These areas are noted in GCC Report and Order 96-377 dated September 1996, and consist of (1) Radiolocation and Radio Navigation, (2) Data Relay Satellites.

Summary of Coordination Issues:

- a.) Potential Impact to Government Radiolocation (Shipboard Radar)
- b.) Potential Impact to NASA Tracking and Data Relay Satellite Systems ("TDRSS")

2. Potential Impact to Government Radiolocation (Shipboard Radar)

Radiolocation operations ("RADAR") may occur anywhere in the 13.4-14.0 GHz frequency band aboard ocean-going U.S. Navy ships. FCC order 96-377 allocates the top 250MHz of this 600 MHz band to the Fixed Satellite Service ("FSS") on a co-primary basis with the radiolocation operations and provides for an interference protection level of $-167 \text{ dBW/m}^2/4\text{kHz}$.

The closest distance to the shoreline from Riverside, California earth station is approximately 63 km southwest toward the Pacific Ocean. The calculation of the power spectral density at this distance is given by:

- | | |
|------------------------------|---|
| 1. Clear Sky EIRP: | 86 dBW |
| 2. Carrier Bandwidth: | 850 kHz |
| 3. PD at antenna input: | 2.6 dBW/4kHz |
| 4. Transmit Antenna Gain: | 60.1 dBi |
| 5. Antenna Gain to Horizon: | 0.5 dBi |
| 6. Antenna Elevation Angles: | 13.8° @ 254.1° azimuth
6.2° @ 100.2° azimuth |

The earth station will radiate interference toward the ocean according to its off-axis side-lobe performance. A conservative analysis, using FCC standard reference pattern, results in an off-axis antenna gain of 0.5 towards the Pacific Ocean.

The signal density at the shoreline, through free space is:

$$\begin{aligned} \text{PFD} &= \text{Antenna Feed Power density (dBW/4kHz)} + \text{Antenna Off-Axis Gain (dBi)} - \text{Spread Loss (dBW/m}^2\text{)} \\ &= 2.6\text{dBW/4kHz} + 0.5\text{dBi} - (10 \cdot \log[4 \cdot \pi \cdot (63\text{km})^2]) \\ &= -103.8 \text{ dBW/m/4kHz} - \text{Additional Path Losses (63.4 dB)} \end{aligned}$$

Our calculation indicate additional path loss of approximately 63.4 dB including absorption loss and earth diffraction loss for the actual path profiles from the earth station to the nearest shoreline.

The calculated PFD, including additional path losses to the closest shoreline, is $-167.2 \text{ dBW/m}^2/4 \text{ kHz}$. This is 0.2dB below the $-167.0 \text{ dBW/m}^2/4 \text{ kHz}$ interference criteria of the R&O 96-377. Therefore, there should be no interference to the U.S. Navy RADAR from the Riverside, California earth station due to the distance and the terrain blockage between the site and the shore.

3. Potential Impact to NASA's Tracking and Data Relay Satellite System

The geographic location of the Intelsat earth station in Riverside, California is outside the 390 km radius coordination contour surrounding NASA's White Sands, New Mexico ground station complex. Therefore the TDRSS space-to-earth link will not be impacted by the Intelsat earth station in Riverside, California.

The TDRSS space-to-space link in the 13.772 to 13.778 GHz band is assumed to be protected if an earth station produces an EIRP of less than 71 dBW/6MHz in this band. The 9 meter earth station antenna will not transmit in this band. Therefore, there will be no potential interference to the TDRSS space-to-space link.

4. Coordination Result Summary and Conclusions

The results of the analysis and calculation performed in this exhibit indicate that compatible operation between the earth station at the Riverside, California facility and U.S. Navy and NASA TDRSS space-to-earth and space-to-space links are possible. No interference to U.S. Navy RADAR or NASA TDRSS operations from the Riverside, California site earth station should occur.

**Intelsat License LLC
Riverside, California**

Vertex/RSI 9 Meter Earth Station

1. Background

This Exhibit is presented to demonstrate the extent to which the Intelsat License LLC ("Intelsat") satellite earth station in Riverside, California is in compliance with the Federal Communications Commission ("FCC") Report and Order 96-377. The potential interference from the earth station to U.S. Navy shipboard radiolocation operations ("RADAR") and the National Aeronautics and Space Administration ("NASA") space research activities in the 13.75-14.0 GHz band is addressed in this exhibit. The parameters for the earth station are:

Coordinates (NAD83):	33° 47' 47.3" N, 117° 5' 15" W
Satellite Arc Range for Earth Station:	Intelsat 5 at 45°W to 175°W
Frequency Band:	13.75-14.00 GHz
Polarizations:	Linear & Circular
Emissions:	850KF7D
Modulation:	FM/BPSK/NRZ-L
Maximum Aggregate Uplink EIRP:	88dBW for all Carriers
Transmit Antenna Characteristics	
Antenna Size:	9 Meters in Diameter
Antenna Type/Model:	Vertex/RSI
Gain:	60.1 dBi
RF Power into Antenna Flange:	27.9 dBW or 4.6 dBW/4kHz
Minimum Elevation Angle:	17.92° @ 250.77° Azimuth 6.16° @ 100.19° Azimuth
Side Lobe Antenna Gain	FCC Reference Pattern

Because the above uplink spectrum is shared with the Federal Government, coordination in this band requires resolution data pertaining to potential interference between the earth stations and both U.S. Navy Department and NASA systems. Potential interference from the earth station could impact the U.S. Navy and/or NASA systems in two areas. These areas are noted in GCC Report and Order 96-377 dated September 1996, and consist of (1) Radiolocation and Radio Navigation, (2) Data Relay Satellites.

Summary of Coordination Issues:

- a.) Potential Impact to Government Radiolocation (Shipboard Radar)
- b.) Potential Impact to NASA Tracking and Data Relay Satellite Systems ("TDRSS")

2. Potential Impact to Government Radiolocation (Shipboard Radar)

Radiolocation operations ("RADAR") may occur anywhere in the 13.4-14.0 GHz frequency band aboard ocean-going U.S. Navy ships. FCC order 96-377 allocates the top 250MHz of this 600 MHz band to the Fixed Satellite Service ("FSS") on a co-primary basis with the radiolocation operations and provides for an interference protection level of $-167 \text{ dBW/m}^2/4\text{kHz}$.

The closest distance to the shoreline from Riverside, California earth station is approximately 63 km southwest toward the Pacific Ocean. The calculation of the power spectral density at this distance is given by:

- | | |
|------------------------------|---|
| 1. Clear Sky EIRP: | 88 dBW |
| 2. Carrier Bandwidth: | 850 kHz |
| 3. PD at antenna input: | 4.6 dBW/4kHz |
| 4. Transmit Antenna Gain: | 60.1 dBi |
| 5. Antenna Gain to Horizon: | -2.3 dBi |
| 6. Antenna Elevation Angles: | 17.9° @ 250.8° azimuth
6.2° @ 100.2° azimuth |

The earth station will radiate interference toward the ocean according to its off-axis side-lobe performance. A conservative analysis, using FCC standard reference pattern, results in an off-axis antenna gain of -2.3 towards the Pacific Ocean.

The signal density at the shoreline, through free space is:

$$\begin{aligned} \text{PFD} &= \text{Antenna Feed Power density (dBW/4kHz)} + \text{Antenna Off-Axis Gain (dBi)} - \text{Spread Loss (dBW/m}^2\text{)} \\ &= 4.6\text{dBW/4kHz} + -2.3\text{dBi} - (10 \cdot \log[4 \cdot \text{PI} \cdot [63\text{km}]^2]) \\ &= -104.7 \text{ dBW/m/4kHz} - \text{Additional Path Losses (63.4 dB)} \end{aligned}$$

Our calculation indicate additional path loss of approximately 63.4 dB including absorption loss and earth diffraction loss for the actual path profiles from the earth station to the nearest shoreline.

The calculated PFD, including additional path losses to the closest shoreline, is $-168.1 \text{ dBW/m}^2/4 \text{ kHz}$. This is 1.1dB below the $-167.0 \text{ dBW/m}^2/4 \text{ kHz}$ interference criteria of the R&O 96-377. Therefore, there should be no interference to the U.S. Navy RADAR from the Riverside, California earth station due to the distance and the terrain blockage between the site and the shore.

3. Potential Impact to NASA's Tracking and Data Relay Satellite System

The geographic location of the Intelsat earth station in Riverside, California is outside the 390 km radius coordination contour surrounding NASA's White Sands, New Mexico ground station complex. Therefore the TDRSS space-to-earth link will not be impacted by the Intelsat earth station in Riverside, California.

The TDRSS space-to-space link in the 13.772 to 13.778 GHz band is assumed to be protected if an earth station produces an EIRP of less than 71 dBW/6MHz in this band. The 9 meter earth station antenna will not transmit in this band. Therefore, there will be no potential interference to the TDRSS space-to-space link.

4. Coordination Result Summary and Conclusions

The results of the analysis and calculation performed in this exhibit indicate that compatible operation between the earth station at the Riverside, California facility and U.S. Navy and NASA TDRSS space-to-earth and space-to-space links are possible. No interference to U.S. Navy RADAR or NASA TDRSS operations from the Riverside, California site earth station should occur.