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:
E030115 STA (IOT Testing)

1. Applicant

Name:	Hawaii Pacific Teleport, L.P.	**Phone Number:**	808–674–9157
DBA Name:		**Fax Number:**	808–674–1826
Street:	P.O. Box 693	**E–Mail:**	lsmith–ryland@hawaiiteleport.com
City:	Rumson	**State:**	NJ
Country:	USA	**Zipcode:**	07760 –
Attention:	Ms Leeana A Smith–Ryland		

GRANTED
International Bureau

File # SES-STA-20171004-01102
E030115
Call Sign _____ Grant Date 10-6-17
(or other identifier)
Term Dates
From: 10-15-17 To: 11-14-17
Approved: [signature]

Applicant: Hawaii Pacific Teleport, L.P.
File No.: SES-STA-20171004-01102
Call Sign: E030115
Special Temporary Authority

Hawaii Pacific Teleport, L.P. is granted a special temporary authority for 30 days, beginning October 15, 2017, to operate its C-band and Ku-band earth stations in Kapolei, Honolulu, Hawaii, to provide in-orbit testing ("IOT") services for Eutelsat 172B satellite at 176° E.L licensed by France, orbital location in the 3700-4200 MHz (H,V) and 12200-12700 MHz (H,V) (space-to-Earth); and 5925-6425 MHz (H,V) and 14000-14500 MHz (H,V) (Earth-to-space) frequency bands, under the following conditions:

1. All operations under this grant of STA shall be on an unprotected and non-harmful interference basis. Hawaii Pacific Teleport L.P. shall not cause harmful interference to, and shall not claim protection from interference by any other lawfully operating radio communication system.

2. All 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. Currently the 24x7 contact information for the Eutelsat 172B operations contact Leeana Smith-Ryland at (917) 750-5358.

3. In the event of any harmful interference as a result of operations under this grant of special temporary authority, Hawaii Pacific Teleport, L.P, shall cease operations immediately upon notification of such interference and shall immediately inform the Commission, in writing, of such an event.

4. Grant of this authorization is without prejudice to any determination that the Commission may make regarding pending or future Hawaii Pacific Teleport's applications.

5. Any action taken or expense incurred as a result of operations pursuant to this special temporary authority is solely at Hawaii Pacific Teleport, L.P. risk.

6. 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-20171004-01102
E030115
Call Sign _____ Grant Date 10-6-17
(or other identifier)
Term Dates
From: 10-15-17 To: 11-14-17
Approved: Paul E Hart

2. Contact

Name:	Frank R. Jazzo, Esq	**Phone Number:**	703-812-0470
Company:	Fletcher, Heald & Hildreth, PLC	**Fax Number:**	703-812-0486
Street:	1300 N 17th Street	E-Mail:	jazzo@fhhlaw.com
	11th Floor		
City:	Arlington	**State:**	VA
Country:	USA	**Zipcode:**	22209 -
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 CGX – Fixed Satellite Transmit/Receive Earth Station

5. Type Request

○ Use Prior to Grant ○ Change Station Location ◉ Other

6. Requested Use Prior Date	
7. City	8. Latitude (dd mm ss.s h) 0 0 0.0

9. State	10. Longitude (dd mm ss.s h) 0 0 0.0

11. Please supply any need attachments.

Attachment 1: STA Request Attachment 2: Sched B & Exhs 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.)

This application requests special temporary authority to operate C-band and Ku-band earth stations on 176E to provide in-orbit testing services to support the E172B satellite.

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
Leeana A. Smith–Ryland	Chief Executive Officer

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.

STA Request
E030115

Hawaii Pacific Teleport (HPT) requests special temporary authority ("STA") to operate the subject C-band and Ku-band earth stations to provide in-orbit testing ("IOT") services for certain C-band and Ku-band transponders on the recently launched EUTELSAT 172B ("E172B") satellite[1] at the 176° E.L. orbital location. HPT requests this STA for the period of October 15, 2017 to November 15, 2017.

E172B is designed as a replacement for the EUTELSAT 172A ("E172A") satellite at 172° E.L. and the subject transponders will be operated at its final location by ES 172 LLC, an indirect subsidiary of Eutelsat, S.A. (collectively, "Eutelsat") (*see* FCC File No. SAT-RPL-20170927-00136). The information provided in Eutelsat's replacement satellite application is hereby incorporated by reference.

The subject earth stations will test E172B's C-band and Ku-band functionality in the 5925-6425 MHz (Earth-to-space) and 3700-4200 MHz (space-to-Earth) bands, and the 14.0-14.5 GHz (Earth-to-space) and 10.95-11.20 GHz, 11.45-11.7 GHz and 12.20-12.75 GHz (space-to-Earth) bands. HPT understands that, based on Eutelsat's analysis and consultations with potentially affected parties, there is no reason to conclude that E172B's temporary IOT operations in these bands at 176° E.L. will raise interference or other concerns. Nonetheless, to the extent harmful interference may occur, HPT commits to modifying or suspending its earth

[1] EUTELSAT 172B launched under authority granted by France pursuant to the well-settled licensing processes of that nation and will arrive shortly at its IOT location. Because France is a WTO member nation, there is a presumption in favor of granting market access to allow U.S. earth stations to communicate with French-licensed satellites (assuming compliance with other applicable Commission rules and policies).

station transmissions to resolve such interference. Thus, HPT acknowledges that its earth station operations will be conducted on an unprotected, non-harmful interference basis.

After IOT, the E172B satellite will be located at 172° E.L. to support long-term service throughout the Asia-Pacific region, including Ku-band mobility applications, as indicated in the above-referenced replacement satellite application and an STA request filed by Panasonic Avionics to access the satellite (*see* FCC File No. SES-STA-INTR2017-02798). This request for short-term earth station operating authority to support IOT for E172B is essential to ensure proper functioning of the satellite and permit the near-term transition of traffic from E172A.

Attached is an Exhibit 1 – Technical Exhibit (Schedule B of Form 312) – detailing the requested operating parameters for IOT on the C-band and Ku-band operations. Attached as Exhibits 2 and 3 are Radiation Hazard Reports for IOT on the C-band and Ku-band operations. Attached as Exhibit 4 are Frequency Coordination Reports for IOT earth station operations.

FCC 312
Schedule B

Page 1: Location

FEDERAL COMMUNICATIONS COMMISSION
APPLICATION FOR SATELLITE SPACE AND EARTH STATION AUTHORIZATIONS
Technical and Operational Description)
(Place an "X" in one of the blocks below)

STA Request

B1. Location of Earth Station Site. If temporary-fixed, mobile, or VSAT remote facility, specify area of operation and point of contact. If VSAT hub station, give its location For VSAT networks attach individual Schedule B, Page 1 sheets for each hub station and each remote station. Individually provide the Location, Points of Communications, and Destination Points for each hub and remote station.

B1a. Station Call Sign	B1b. Site identifier (HUB, REMOTE1, etc.)	B1c. Telephone Number	B1j. Geographic Coordinates N/S, Deg. - Min. - Sec. - E/W	B1k. Lat./Lon. Coordinates are:
E030115		(917)-750-5358	Lat. 21° - 20' - 8.9" N. Lon. 158° - 05' - 17.8" W.	☐ NAD-27 ☒ NAD-83
B1d. Mailing Street Address of Station or Area of Operation: 91-340 Farrington Highway		B1e. Name of Contact Person: Leeana A. Smith-Ryland		

B1f. City	B1g. County	B1h. State	B1i. Zip Code	B1l. Site Elevation (AMSL)
Kapolei	Honolulu	HI	96707	36.58

B2. Points of Communications: List the names and orbit locations of all satellites with which this earth station will communicate. The entry "ALSAT" is sufficient to identify the names and locations of all satellite facilities licensed by the U.S. All non-U.S. licensed satellites must be listed individually.

Satellite Name and Orbit Location	Satellite Name and Orbit Location	Satellite Name and Orbit Location
Eutelsat 172B at 176° E.L. for IOT testing		

B3. Destination points for communications using non-U.S. licensed satellites. For each non-U.S. licensed satellite facility identified in section B2 above, specify the destination point(s) (countries) where the services will be provided by this earth station via each non-U.S. license satellite system. Use additional sheets as needed.

Satellite Name	List of Destination Points
Eutelsat 176 E IOT testing	

B4. Earth Station Antenna Facilities: Use additional pages as needed.

(a) Site ID*	(b) Antenna ID**	(c) Quantity	(d) Manufacturer	(e) Model	(f) Antenna Size (meters)	(g) Antenna Gain Transmit and/or Receive (____dBi at____GHz)
4.5M		1	Andrew Corp	ESA45	4.5M	44.0 dBi @ 4 GHz
						47.1 dBi @ 6 GHz
4.8M		1	Vertex	KPK	4.8M	53.0 dBi @12 GHz
						55.0 dBi @ 14.25 GHz

B5. Antenna Heights and Maximum Power Limits: (The corresponding Antenna ID in tables B4 and B5 applies to the same antenna)

(a) Antenna ID**	(b) Antenna Structure Registration No.	Maximum Antenna Height		(c) Building Height Above Ground Level (meters)***	(f) Maximum Antenna Height Above Rooftop (meters)***	(g) Total Input Power at antenna flange (Watts)	(h) Total EIRP for all carriers (dBW)
		(c) Above Ground Level (meters)	(d) Above Mean Sea Level (meters)				
4.5M		5.0	41.58	N/A	N/A	180	69.65
4.8M		5.8	42.4	N/A	N/A	180	77.55

B6. Frequency Coordination Limits: Use additional pages as needed.

(a) Antenna ID*	(b) Frequency Limits (MHz)	(c) Range of Satellite Arc Eastern Limit**	(d) Range of Satellite Arc Western Limit**	(e) Antenna Elevation Angle Eastern Limit	(f) Antenna Elevation Angle Western Limit	(g) Earth Station Azimuth Angle Eastern Limit	(h) Earth Station Azimuth Angle Western Limit	(i) Maximum EIRP Density toward the Horizon (dBW/4kHz)
4.5M	3700.00 – 4200.00	176.0°E.L.	176.0° E.L.	51.5°	51.5°	233.2°	233.2°	
4.5M	5925.00 – 6425.00	176.0°E.L.	176.0° W.L.	51.5°	51.5°	233.2°	233.2°	-20.3
4.8M	12200.00 – 12700.00	176.0°E.L.	176.0° E.L.	51.5°	51.5°	233.2°	233.2°	
4.8M	14000.00 – 14500.00	176.0°E.L.	176.0° W.L.	51.5°	51.5°	233.2°	233.2°	-20.3

(a) Antenna ID*	(b) Frequency Limits (MHz)	(c) T/R Mode **	(d) Antenna Polarization (H,V,L,R)	(e) Emission Designator	(f) Maximum EIRP per Carrier (dBW)	(g) Maximum EIRP Density per Carrier (dBW/4kHz)	(h) Description of Modulation and Services
4.5M	3700.00 – 4200.00	R	H,V	36M0G7W			Digital Data, Various FEC, Various Mod., Various Information
4.5M	3700.00 – 4200.00	R	H,V	72M0G7W			Digital Data, Various FEC, Various Mod., Various Information
4.5M	5925.00 – 6425.00	T	H,V	36M0G7W	66.64	27.1	Digital Data, Various FEC, Various Mod., Various Information
4.5M	5925.00 – 6425.00	T	H,V	72M0G7W	69.65	27.1	Digital Data, Various FEC, Various Mod., Various Information
4.8M	12200.00 – 12700.00	R	H,V	36M0G7W			Digital Data, Various FEC, Various Mod., Various Information
4.8M	12200.00 – 12700.00	R	H,V	72M0G7W			Digital Data, Various FEC, Various Mod., Various Information
4.8M	14000.00 – 14500.00	T	H,V	36M0G7W	74.54	35.0	Digital Data, Various FEC, Various Mod., Various Information
4.8M	14000.00 – 14500.00	T	H,V	72M0G7W	77.55	35.0	Digital Data, Various FEC, Various Mod., Various Information

B8. If the proposed antenna(s) operate in the Fixed Satellite Service (FSS) with **geostationary** satellites, do(es) the proposed antenna(s) comply with the antenna gain patterns specified in Section 25.209(a) and (b) as demonstrated by the manufacturer's qualification measurements? If NO, provide as an exhibit, a technical analysis showing compliance with two-degree spacing policy.	☒ YES	☐ NO
B9. If the proposed antenna(s) do not operate in the Fixed Satellite Service (FSS), or if they operate in the Fixed Satellite Service (FSS) with **non-geostationary** satellites, do(es) the proposed antenna(s) comply with the antenna gain patterns specified in Section 25.209(a2) and (b) as demonstrated by the manufacturer's qualification measurement?	☐ YES N/A	☐ NO
B10. Is the facility operated by remote control? If YES, provide the location and telephone number of the control point.	☐ YES	☒ NO

Remote Control Point Location:

B10a. Street Address			
B10b. City	B10c. County	B10.d. State/Country	B10e. Zip Code
B10f. Telephone Number	B10g. Call Sign of Control Station (if appropriate)		

B11. Is frequency coordination required? If YES, attach a frequency coordination report as an exhibit.	☒ YES	☐ NO
B12. Is coordination with another country required? If YES, attach the name of the country(ies) and plot of coordination contours as an exhibit.	☐ YES	☒ NO
B13. FAA Notification - (See 47 CFR Part 17and 47 CFR Part 25.113(c)) **Where FAA notification is required, have you attached a copy of a completed FCC Form 854 and/or the FAA's study regarding the potential hazard of the structure to aviation? EXISTING FACILITY FAILURE TO COMPLY WITH 47 CFR PARTS 17 AND 25 WILL RESULT IN THE RETURN OF THIS APPLICATION**	☐ YES	☒ NO

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
Hawaii Pacific Teleport, L.P.
KAPOLEI, HI
Satellite Earth Station

Prepared By:
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147
August 31, 2017

TABLE OF CONTENTS

1. CONCLUSIONS

An interference study considering all existing, proposed and prior coordinated microwave facilities within the coordination contours of the proposed earth station demonstrates that this site will operate satisfactorily with the common carrier microwave environment. Further, there will be no restrictions of its operation due to interference considerations.

2. SUMMARY OF RESULTS

A number of great circle interference cases were identified during the interference study of the proposed earth station. Each of the cases, which exceeded the interference objective on a line-of-sight basis, was profiled and the propagation losses estimated using NBS TN101 (Revised) techniques. The losses were found to be sufficient to reduce the signal levels to acceptable magnitudes in every case.

The following companies reported potential great circle interference conflicts that did not meet the objectives on a line-of-sight basis. When over-the-horizon losses are considered on the interfering paths, sufficient blockage exists to negate harmful interference from occurring with the proposed transmit-receive earth station.

Company
Hawaii State

No other carriers reported potential interference cases.

3. SUPPLEMENTAL SHOWING

Pursuant to Part 25.203(c) of the FCC Rules and Regulations, the satellite earth station proposed in this application was coordinated by Comsearch using computer techniques and in accordance with Part 25 of the FCC Rules and Regulations.

A temporary earth station coordination was conducted with the below listed carriers. Revised data was forwarded on 08/31/2017.

Company
AT&T Corp.
Federal Communication Commission
Hawaii State
Hawaiian Electric Company, Inc
Hawaiian Telcom, Inc.
Honolulu City & County Dept of Info Tech
Maui, County of
NEXSTAR BROADCASTING, INC.
New Cingular Wireless PCS LLC - Hawaii
University of Hawaii

4. EARTH STATION COORDINATION DATA

This section presents the data pertinent to frequency coordination of the proposed earth station that was circulated to all carriers within its coordination contours.

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5500 http://www.comsearch.com

Date:	08/31/2017
Job Number:	170831COMSTC03

Administrative Information

Status	TEMPORARY (Operation from 10/01/2017 to 04/01/2018)
Call Sign	E030115
Licensee Name	Hawaii Pacific Teleport, L.P.

Site Information — KAPOLEI, HI

Latitude (NAD 83)	21° 20' 8.9" N
Longitude (NAD 83)	158° 5' 17.8" W
Climate Zone	A
Rain Zone	4
Ground Elevation (AMSL)	36.58 m / 120.0 ft

Link Information

Satellite Type	Geostationary
Mode	TR - Transmit-Receive
Modulation	Digital
Satellite Arc	184° W to 184° West Longitude same as 176° W to 1764° East Longitude
Azimuth Range	233.2° to 233.2°
Corresponding Elevation Angles	51.5° / 51.5°
Antenna Centerline (AGL)	3.0 m / 9.8 ft

Antenna Information		Receive		Transmit	
Manufacturer		Andrew Corp		Andrew Corp	
Gain / Diameter		44.0 dBi / 4.5 m		47.1 dBi / 4.5 m	
3-dB / 15-dB Beamwidth		0.80° / 1.60°		0.40° / 0.80°	
				36M0G7W	72M0G7W
Max Available RF Power	(dBW/4 kHz)			-20.0	-20.0
	(dBW/MHz)			4.0	4.0
Maximum EIRP	(dBW/4 kHz)			27.1	27.1
	(dBW/MHz)			51.1	51.1
	(dBW)			66.64	69.65
Interference Objectives:	Long Term	-156.0 dBW/MHz	20%	-154.0 dBW/4 kHz	20%
	Short Term	-146.0 dBW/MHz	0.01%	-131.0 dBW/4 kHz	0.0025%

Frequency Information	Receive 4.0 GHz	Transmit 6.1 GHz
Emission / Frequency Range (MHz)	36M0G7W - 72M0G7W / 3700.0 - 4200.0	36M0G7W - 72M0G7W / 5925.0 - 6425.0
Max Great Circle Coordination Distance	285.3 km / 177.2 mi	117.1 km / 72.7 mi
Precipitation Scatter Contour Radius	100.0 km / 62.1 mi	100.0 km / 62.1 mi

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5500 http://www.comsearch.com

Coordination Values	**KAPOLEI, HI**			
Licensee Name	Hawaii Pacific Teleport, L.P.			
Latitude (NAD 83)	21° 20' 8.9" N			
Longitude (NAD 83)	158° 5' 17.8" W			
Ground Elevation (AMSL)	36.58 m / 120.0 ft			
Antenna Centerline (AGL)	3.0 m / 9.8 ft			
Antenna Mode	Receive 4.0 GHz		Transmit 6.1 GHz	
Interference Objectives: Long Term	-156.0 dBW/MHz	20%	-154.0 dBW/4 kHz	20%
Short Term	-146.0 dBW/MHz	0.01%	-131.0 dBW/4 kHz	0.0025%
Max Available RF Power			-20.0 (dBW/4 kHz)	

			Receive 4.0 GHz		Transmit 6.1 GHz	
Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
0	9.64	116.51	-10.00	100.00	-10.00	100.00
5	9.59	119.75	-10.00	100.00	-10.00	100.00
10	10.66	123.48	-10.00	100.00	-10.00	100.00
15	10.24	126.22	-10.00	100.00	-10.00	100.00
20	10.74	129.34	-10.00	100.00	-10.00	100.00
25	11.24	132.27	-10.00	100.00	-10.00	100.00
30	11.57	134.82	-10.00	100.00	-10.00	100.00
35	11.13	136.36	-10.00	100.00	-10.00	100.00
40	11.22	137.96	-10.00	100.00	-10.00	100.00
45	9.95	137.79	-10.00	100.00	-10.00	100.00
50	9.28	137.67	-10.00	100.00	-10.00	100.00
55	8.75	137.21	-10.00	100.00	-10.00	100.00
60	7.56	135.63	-10.00	108.35	-10.00	100.00
65	6.87	134.14	-10.00	115.73	-10.00	100.00
70	5.81	131.95	-10.00	127.00	-10.00	100.00
75	4.94	129.65	-10.00	134.41	-10.00	100.00
80	0.00	123.74	-10.00	285.28	-10.00	117.07
85	0.00	121.92	-10.00	285.28	-10.00	117.07
90	0.30	120.09	-10.00	272.92	-10.00	109.07
95	0.00	117.63	-10.00	285.28	-10.00	117.07
100	0.00	115.20	-10.00	285.28	-10.00	117.07
105	0.00	112.62	-10.00	285.28	-10.00	117.07
110	0.00	109.91	-10.00	285.28	-10.00	117.07
115	0.00	107.09	-10.00	285.28	-10.00	117.07
120	0.00	104.17	-10.00	285.28	-10.00	117.07
125	0.00	101.19	-10.00	285.28	-10.00	117.07
130	0.00	98.15	-10.00	285.28	-10.00	117.07
135	0.00	95.07	-10.00	285.28	-10.00	117.07
140	0.00	91.97	-10.00	285.28	-10.00	117.07
145	0.00	88.86	-10.00	285.28	-10.00	117.07
150	0.00	85.75	-10.00	285.28	-10.00	117.07
155	0.00	82.67	-10.00	285.28	-10.00	117.07
160	0.00	79.62	-10.00	285.28	-10.00	117.07
165	0.00	76.62	-10.00	285.28	-10.00	117.07
170	0.00	73.69	-10.00	285.28	-10.00	117.07
175	0.00	70.84	-10.00	285.28	-10.00	117.07
180	0.00	68.09	-10.00	285.28	-10.00	117.07
185	0.00	65.48	-10.00	285.28	-10.00	117.07

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5500 http://www.comsearch.com

Coordination Values	**KAPOLEI, HI**			
Licensee Name	Hawaii Pacific Teleport, L.P.			
Latitude (NAD 83)	21° 20' 8.9" N			
Longitude (NAD 83)	158° 5' 17.8" W			
Ground Elevation (AMSL)	36.58 m / 120.0 ft			
Antenna Centerline (AGL)	3.0 m / 9.8 ft			
Antenna Model	FCC Reference 32-25LOG(THETA)			
Antenna Mode	Receive 4.0 GHz		Transmit 6.1 GHz	
Interference Objectives: Long Term	-156.0 dBW/MHz	20%	-154.0 dBW/4 kHz	20%
Short Term	-146.0 dBW/MHz	0.01%	-131.0 dBW/4 kHz	0.0025%
Max Available RF Power			-20.0 (dBW/4 kHz)	

			Receive 4.0 GHz		Transmit 6.1 GHz	
Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.00	63.00	-10.00	285.28	-10.00	117.07
195	0.00	60.71	-10.00	285.28	-10.00	117.07
200	0.00	58.60	-10.00	285.28	-10.00	117.07
205	0.00	56.73	-10.00	285.28	-10.00	117.07
210	0.00	55.10	-10.00	285.28	-10.00	117.07
215	0.00	53.75	-10.00	285.28	-10.00	117.07
220	0.00	52.70	-10.00	285.28	-10.00	117.07
225	0.00	51.97	-10.00	285.28	-10.00	117.07
230	0.00	51.58	-10.00	285.28	-10.00	117.07
235	0.00	51.53	-10.00	285.28	-10.00	117.07
240	0.00	51.83	-10.00	285.28	-10.00	117.07
245	0.00	52.47	-10.00	285.28	-10.00	117.07
250	0.00	53.44	-10.00	285.28	-10.00	117.07
255	0.00	54.71	-10.00	285.28	-10.00	117.07
260	0.00	56.26	-10.00	285.28	-10.00	117.07
265	0.00	58.08	-10.00	285.28	-10.00	117.07
270	0.00	60.12	-10.00	285.28	-10.00	117.07
275	0.00	62.37	-10.00	285.28	-10.00	117.07
280	0.26	64.64	-10.00	277.38	-10.00	111.98
285	0.25	67.25	-10.00	279.15	-10.00	113.13
290	0.54	69.85	-10.00	247.41	-10.00	100.00
295	0.87	72.58	-10.00	227.28	-10.00	100.00
300	1.61	75.32	-10.00	205.12	-10.00	100.00
305	2.28	78.25	-10.00	188.12	-10.00	100.00
310	4.38	81.08	-10.00	142.13	-10.00	100.00
315	5.69	84.32	-10.00	128.18	-10.00	100.00
320	7.82	87.71	-10.00	105.65	-10.00	100.00
325	8.98	91.35	-10.00	100.00	-10.00	100.00
330	9.31	95.05	-10.00	100.00	-10.00	100.00
335	9.85	98.81	-10.00	100.00	-10.00	100.00
340	9.51	102.43	-10.00	100.00	-10.00	100.00
345	9.51	106.04	-10.00	100.00	-10.00	100.00
350	9.50	109.59	-10.00	100.00	-10.00	100.00
355	9.45	113.05	-10.00	100.00	-10.00	100.00

5. CERTIFICATION

I HEREBY CERTIFY THAT I AM THE TECHNICALLY QUALIFIED PERSON RESPONSIBLE FOR THE PREPARATION OF THE FREQUENCY COORDINATION DATA CONTAINED IN THIS APPLICATION, THAT I AM FAMILIAR WITH PARTS 101 AND 25 OF THE FCC RULES AND REGULATIONS, THAT I HAVE EITHER PREPARED OR REVIEWED THE FREQUENCY COORDINATION DATA SUBMITTED WITH THIS APPLICATION, AND THAT IT IS COMPLETE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

Timothy O. Crutcher
Frequency Planner
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147

DATED: August 31, 2017

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
Hawaii Pacific Teleport, L.P.
KAPOLEI, HI
Satellite Earth Station

Prepared By:
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147
August 31, 2017

CONCLUSIONS & SUMMARY OF RESULTS

There were no great circle interference cases identified during the interference study of the proposed earth station.

SUPPLEMENTAL SHOWING

There were no great circle interference cases identified during the interference study of the proposed earth station. No carriers were identified in this band.

EARTH STATION COORDINATION DATA

This section presents the data pertinent to the earth station.

Date:	08/31/2017
Job Number:	170831COMSTC04

Administrative Information	
Call Sign	E030115
Licensee Name	Hawaii Pacific Teleport, L.P.

Site Information	**KAPOLEI, HI**
Latitude (NAD 83)	21° 20' 8.9" N
Longitude (NAD 83)	158° 5' 17.8" W
Climate Zone	A
Rain Zone	4
Ground Elevation (AMSL)	36.58 m / 120.0 ft

Link Information	
Satellite Type	Geostationary
Mode	RO - Receive-Only
Modulation	Digital
Satellite Arc	83° W to 194° West Longitude
Azimuth Range	95.5° to 243.3°
Corresponding Elevation Angles	5.2° / 42.6°
Antenna Centerline (AGL)	5.2 m / 17.1 ft

Antenna Information		**Receive**	
Manufacturer		Vertex	
Gain / Diameter		53.0 dBi / 4.8 m	
3-dB / 15-dB Beamwidth		0.34° / 0.68°	
Interference Objectives:	Long Term	-156.0 dBW/MHz	20%
	Short Term	-146.0 dBW/MHz	0.01%

Frequency Information	**Receive 12.2 GHz**
Emission / Frequency Range (MHz)	36M0G7W / 12200.0 - 12700.0 72M0G7W / 12200.0 - 12700.0
Max Great Circle Coordination Distance	551.8 km / 342.9 mi
Precipitation Scatter Contour Radius	418.1 km / 259.7 mi

Timothy O. Crutcher
Frequency Planner
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147

DATED: August 31, 2017

Analysis of Non-Ionizing Radiation for a 4.5-Meter Earth Station System

This report analyzes the non-ionizing radiation levels for a 4.5-meter earth station system. The analysis and calculations performed in this report comply with the methods described in the FCC Office of Engineering and Technology Bulletin, No. 65 first published in 1985 and 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. Bulletin No. 65 and the FCC R&O specifies that there are two separate tiers of exposure limits that are dependant on the situation in which the exposure takes place and/or the status of the individuals who are subject to the exposure. The Maximum Permissible Exposure (MPE) limits for persons in a General Population/Uncontrolled environment are shown in Table 1. The General Population/Uncontrolled MPE is a function of transmit frequency and is for an exposure period of thirty minutes or less. The MPE limits for persons in an Occupational/Controlled environment are shown in Table 2. The Occupational MPE is a function of transmit frequency and is for an exposure period of six minutes or less. The purpose of the analysis described in this report is to determine the power flux density levels of the earth station in the far-field, near-field, transition region, between the subreflector or feed and main reflector surface, at the main reflector surface, and between the antenna edge and the ground and to compare these levels to the specified MPEs.

Table 1. Limits for General Population/Uncontrolled Exposure (MPE)

Frequency Range (MHz)	Power Density (mW/cm^2)
30-300	0.2
300-1500	Frequency (MHz)*(0.8/1200)
1500-100,000	1.0

Table 2. Limits for Occupational/Controlled Exposure (MPE)

Frequency Range (MHz)	Power Density (mW/cm^2)
30-300	1.0
300-1500	Frequency (MHz)*(4.0/1200)
1500-100,000	5.0

Table 3. Formulas and Parameters Used for Determining Power Flux Densities

Parameter	Symbol	Formula	Value	Units
Antenna Diameter	D	Input	4.5	m
Antenna Surface Area	$A_{surface}$	$\pi D^2 / 4$	15.90	m^2
Subreflector Diameter	D_{sr}	Input	60.5	cm
Area of Subreflector	A_{sr}	$\pi D_{sr}^2/4$	2874.75	cm^2
Frequency	F	Input	6175	MHz
Wavelength	λ	300 / F	0.048583	m
Transmit Power	P	Input	180.00	W
Antenna Gain (dBi)	G_{es}	Input	47.1	dBi
Antenna Gain (factor)	G	$10^{Ges/10}$	51286.1	n/a
Pi	π	Constant	3.1415927	n/a
Antenna Efficiency	η	$G\lambda^2/(\pi^2D^2)$	0.61	n/a

1. Far Field Distance Calculation

The distance to the beginning of the far field can be determined from the following equation:

Distance to the Far Field Region

$$R_{ff} = 0.60\ D^2 / \lambda \quad (1)$$
$$= 250.1\ \text{m}$$

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

On-Axis Power Density in the Far Field

$$S_{ff} = G\ P / (4\ \pi\ R_{ff}^2) \quad (2)$$
$$= 11.746\ \text{W/m}^2$$
$$= 1.175\ \text{mW/cm}^2$$

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 can be determined from the following equation:

Extent of the Near Field

$$R_{nf} = D^2 / (4\ \lambda) \quad (3)$$
$$= 104.2\ \text{m}$$

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

Near Field Power Density

$$S_{nf} = 16.0\ \eta\ P / (\pi\ D^2) \quad (4)$$
$$= 27.420\ \text{W/m}^2$$
$$= 2.742\ \text{mW/cm}^2$$

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 maximum power density in the Transition region will not exceed that calculated for the Near 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 can be determined from the following equation:

Transition Region Power Density

$$S_t = S_{nf}\ R_{nf} / R_t \quad (5)$$
$$= 2.742\ \text{mW/cm}^2$$

Region between the Main Reflector and the Subreflector

Transmissions from the feed assembly are directed toward the subreflector surface, and are reflected back toward the main reflector. The most common feed assemblies are waveguide flanges, horns or subreflectors. The energy between the subreflector and the reflector surfaces can be calculated by determining the power density at the subreflector surface. This can be determined from the following equation:

Power Density at the Subreflector

$$S_{sr} = 4000\ P / A_{sr} \quad (6)$$
$$= 250.456\ mW/cm^2$$

4. Main Reflector Region

The power density in the main reflector is determined in the same manner as the power density at the subreflector. The area is now the area of the main reflector aperture and can be determined from the following equation:

Power Density at the Main Reflector Surface

$$S_{surface} = 4\ P / A_{surface} \quad (7)$$
$$= 45.271\ W/m^2$$
$$= 4.527\ mW/cm^2$$

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 can be determined from the following equation:

Power Density between Reflector and Ground

$$S_g = P / A_{surface} \quad (8)$$
$$= 11.318\ W/m^2$$
$$= 1.132\ mW/cm^2$$

6. Summary of Calculations

Table 4. Summary of Expected Radiation levels for Uncontrolled Environment

Region		Calculated Maximum Radiation Power Density Level (mW/cm^2)	Hazard Assessment
1. Far Field (R_{ff} = 250.1 m)	S_{ff}	1.175	Potential Hazard
2. Near Field (R_{nf} = 104.2 m)	S_{nf}	2.742	Potential Hazard
3. Transition Region ($R_{nf} < R_t < R_{ff}$)	S_t	2.742	Potential Hazard
4. Between Main Reflector and Subreflector	S_{sr}	250.456	Potential Hazard
5. Main Reflector	$S_{surface}$	4.527	Potential Hazard
6. Between Main Reflector and Ground	S_g	1.132	Potential Hazard

Table 5. Summary of Expected Radiation levels for Controlled Environment

Region		Calculated Maximum Radiation Power Density Level (mW/cm^2)	Hazard Assessment
1. Far Field (R_{ff} = 250.1 m)	S_{ff}	1.175	Satisfies FCC MPE
2. Near Field (R_{nf} = 104.2 m)	S_{nf}	2.742	Satisfies FCC MPE
3. Transition Region ($R_{nf} < R_t < R_{ff}$)	S_t	2.742	Satisfies FCC MPE
4. Between Main Reflector and Subreflector	S_{sr}	250.456	Potential Hazard
5. Main Reflector	$S_{surface}$	4.527	Satisfies FCC MPE
6. Between Main Reflector and Ground	S_g	1.132	Satisfies FCC MPE

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

7. Conclusions

Based on the above analysis it is concluded that the FCC MPE guidelines have been exceeded (or met) in the regions of Table 4 and 5. The applicant proposes to comply with the MPE limits by one or more of the following methods.

Means of Compliance Uncontrolled Areas

This antenna will be located in a fenced area. The area will be sufficient to prohibit access to the areas that exceed the MPE limited. The general public will not have access to areas within ½ diameter removed from the edge of the antenna.

Since one diameter removed from the main beam of the antenna or ½ diameter removed from the edge of the antenna the RF levels are reduced by a factor of 100 or 20 dB. None of the areas exceeding the MPE levels will be accessible by the general public.

Radiation hazard signs will be posted while this earth station is in operation.

The applicant will ensure that no buildings or other obstacles will be in the areas that exceed the MPE levels.

Means of Compliance Controlled Areas

The earth stations operational will not have access to the areas that exceed the MPE levels while the earth station is in operation.

The transmitters will be turned off during antenna maintenance.

The applicant agrees to abide by the conditions specified in Condition 5208 provided below:

Condition 5208 - 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 worker.

Prepared by:

Timothy O. Crutcher
Telecom Engineer
COMSEARCH

Analysis of Non-Ionizing Radiation for a 4.8-Meter Earth Station System

This report analyzes the non-ionizing radiation levels for a 4.8-meter earth station system. The analysis and calculations performed in this report comply with the methods described in the FCC Office of Engineering and Technology Bulletin, No. 65 first published in 1985 and 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. Bulletin No. 65 and the FCC R&O specifies that there are two separate tiers of exposure limits that are dependant on the situation in which the exposure takes place and/or the status of the individuals who are subject to the exposure. The Maximum Permissible Exposure (MPE) limits for persons in a General Population/Uncontrolled environment are shown in Table 1. The General Population/Uncontrolled MPE is a function of transmit frequency and is for an exposure period of thirty minutes or less. The MPE limits for persons in an Occupational/Controlled environment are shown in Table 2. The Occupational MPE is a function of transmit frequency and is for an exposure period of six minutes or less. The purpose of the analysis described in this report is to determine the power flux density levels of the earth station in the far-field, near-field, transition region, between the subreflector or feed and main reflector surface, at the main reflector surface, and between the antenna edge and the ground and to compare these levels to the specified MPEs.

Table 1. Limits for General Population/Uncontrolled Exposure (MPE)

Frequency Range (MHz)	Power Density (mW/cm^2)
30-300	0.2
300-1500	Frequency (MHz)*(0.8/1200)
1500-100,000	1.0

Table 2. Limits for Occupational/Controlled Exposure (MPE)

Frequency Range (MHz)	Power Density (mW/cm^2)
30-300	1.0
300-1500	Frequency (MHz)*(4.0/1200)
1500-100,000	5.0

Table 3. Formulas and Parameters Used for Determining Power Flux Densities

Parameter	Symbol	Formula	Value	Units
Antenna Diameter	D	Input	4.8	m
Antenna Surface Area	$A_{surface}$	$\pi D^2 / 4$	18.10	m^2
Subreflector Diameter	D_{sr}	Input	60.5	cm
Area of Subreflector	A_{sr}	$\pi D_{sr}^2/4$	2874.75	cm^2
Frequency	F	Input	14250	MHz
Wavelength	λ	300 / F	0.021053	m
Transmit Power	P	Input	180.00	W
Antenna Gain (dBi)	G_{es}	Input	55.0	dBi
Antenna Gain (factor)	G	$10^{Ges/10}$	316227.8	n/a
Pi	π	Constant	3.1415927	n/a
Antenna Efficiency	η	$G\lambda^2/(\pi^2D^2)$	0.62	n/a

1. Far Field Distance Calculation

The distance to the beginning of the far field can be determined from the following equation:

Distance to the Far Field Region $R_{ff} = 0.60\ D^2 / \lambda$ (1)
$= 656.6$ m

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

On-Axis Power Density in the Far Field $S_{ff} = G\ P / (4\ \pi\ R_{ff}^2)$ (2)
$= 10.505$ W/m^2
$= 1.051$ 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 can be determined from the following equation:

Extent of the Near Field $R_{nf} = D^2 / (4\ \lambda)$ (3)
$= 273.6$ m

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

Near Field Power Density $S_{nf} = 16.0\ \eta\ P / (\pi\ D^2)$ (4)
$= 24.524$ W/m^2
$= 2.452$ 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 maximum power density in the Transition region will not exceed that calculated for the Near 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 can be determined from the following equation:

Transition Region Power Density $S_t = S_{nf}\ R_{nf} / R_t$ (5)
$= 2.452$ mW/cm^2

4. Region between the Main Reflector and the Subreflector

Transmissions from the feed assembly are directed toward the subreflector surface, and are reflected back toward the main reflector. The most common feed assemblies are waveguide flanges, horns or subreflectors. The energy between the subreflector and the reflector surfaces can be calculated by determining the power density at the subreflector surface. This can be determined from the following equation:

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$$S_{sr} = 4000\ P / A_{sr} \quad (6)$$
$$= 250.456\ mW/cm^2$$

5. Main Reflector Region

The power density in the main reflector is determined in the same manner as the power density at the subreflector. The area is now the area of the main reflector aperture and can be determined from the following equation:

Power Density at the Main Reflector Surface

$$S_{surface} = 4\ P / A_{surface} \quad (7)$$
$$= 39.789\ W/m^2$$
$$= 3.979\ mW/cm^2$$

6. Region between the Main Reflector and the Ground

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

Power Density between Reflector and Ground

$$S_g = P / A_{surface} \quad (8)$$
$$= 9.947\ W/m^2$$
$$= 0.995\ mW/cm^2$$

7. Summary of Calculations

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5. Main Reflector	$S_{surface}$	3.979	Potential Hazard
6. Between Main Reflector and Ground	S_g	0.995	Satisfies FCC MPE

Table 5. Summary of Expected Radiation levels for Controlled Environment

Region		Calculated Maximum Radiation Power Density Level (mW/cm^2)	Hazard Assessment
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It is the applicant's responsibility to ensure that the public and operational personnel are not exposed to harmful levels of radiation.

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Based on the above analysis it is concluded that the FCC MPE guidelines have been exceeded (or met) in the regions of Table 4 and 5. The applicant proposes to comply with the MPE limits by one or more of the following methods.

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