

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
Space Exploration Holdings
HAWTHORNE, CA
Satellite Earth Station

Prepared By:
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147
March 22, 2019

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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

Bel Air Internet, LLC
California Internet, L.P
California Water Service Company
Franklin Technology Systems, Inc.
Los Angeles City Info Technology Agency
Los Angeles SMSA Ltd. Partnership
Los Angeles County Dept of Public Works
LT-WR, LLC
Skyriver Communications
Southern California Gas Company
Towerstream Corp.
W Cody
Wiline Spectrum Holdings LLC

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.

Coordination data for this earth station was sent to the below listed carriers with a letter dated 02/15/2019.

Company

ABC Holding Company Inc.
AC BidCO LLC
AT&T Corp.
AT&T Mobility Spectrum LLC - N CA
AT&T Mobility Spectrum LLC - Southern CA
Aera Energy LLC
Aerioconnect Inc
Aerioconnect, Inc.
Aerionet, Inc.
Affiniti LLC
Air Sites 2000 LLC
Airlink Internet Inc.
Alarmlink, Inc.
Anacapa Micro Products, Inc.
Antelecom, Inc.
Antilles Wireless, LLC
BNSF Railway Company
Bakersfield, City of
Bay City Television, Inc.
Beacon West Energy Group, LLC.
Bel Air Internet, LLC
Beta Operating Company LLC
CBS Broadcasting Inc
California Internet Solutions, Inc.
California Internet, L.P
California Lutheran University
California Resources Corporation
California Water Service Company
California, State of
Caritas Telecommunications
Catalina Broadband Solutions, LLC
CenturyTel of Eagle, Inc.
Chevron USA Inc.
Citicasters Licenses, Inc.
City of Los Angeles Dept Water & Power
City of Monrovia
City of Montebello
City of Newport Beach
City of Oceanside
City of Pasadena, California
City of Santa Barbara

City of Santa Barbara Fire Department
City of Santa Barbara Water Resources De
City of Santa Maria
City of West Covina
Clearwire Spectrum Holdings III, LLC
Coachella Valley Water District
Communication Services Inc.
Confire, JPA
Conterra Ultra Broadband, LLC
Corona, City of, Dept of Water & Power
County of Los Angeles
Cox Communications - San Diego Mkt
DM Ventures, Inc. dba Warp2Biz
DRS Global Enterprise Solutions, Inc.
Desert Winds Wireless
Desert Wireless Internet
EDF Renewable Services, Inc.
Eastern Municipal Water District
Eastern Riverside County Interoperable C
Educational Media Foundation
Elementis Global LLC
Entercom License, LLC
Exxon Communications Company
Financial Partners Credit Union
Fireline Network Solutions Inc.
Focused Internet
Franklin Technology Systems, Inc.
Frazier Mountain Internet Service, Inc.
Fresno MSA Limited Partnership
Frontier California Inc.
GTE Mobilnet of California LTD Partnersh
GTE Mobilnet of Santa Barbara LTD Ptnsh
Gilcomm, LLC
Gilmond, Daniel
Glendale City California
Global Telecom & Technology Americas
Global Telecom & Technology Americas, In
Go Creative Wireless
Grimmay Enterprises, Inc
H.F. Cox, Inc
Hammerking Productions Inc
Harris Corporation (Virginia)
High Wire Ops, Inc.
Iberdrola Renewables, LLC
Imperial Irrigation District
Impulse Advanced Communications
Indian Wells Valley ISP
J G BOSWELL COMPANY
JetWire, Inc.
Kern Community College District
Kern County Superintendent of Schools
Kern Ed Telecom Consortium
Kern Schools Federal Credit Union
Kern Valley Dispatch
Kern, County of
Kimtron, Inc.

Kiza, Inc
LT-WR, LLC
LasVegas.Net
Lemon Grove School District
Lightwave Broadband LLC
Lockheed Martin Corp - California
Long Beach, City of (WCD)
Los Angeles City Info Technology Agency
Los Angeles County Dept of Public Works
Los Angeles County FCC Licensing Section
Los Angeles County Metro Transit Auth
Los Angeles Regional Interoperable Comm
Los Angeles SMSA Ltd. Partnership
Los Angeles Unified School District
Los Angeles, City of (ITA)
MHO Networks
MJM Telecom Corp
Mediacom California LLC
Metropolitan Water Dist of So California
MiTec Solutions
Midland School
NRJ TV III CA License Co, LLC
New Cingular Wireless PCS - Los Angeles
New Cingular Wireless PCS LLC - N CAL
New Cingular Wireless PCS LLC -San Diego
New Cingular Wireless PCS, LLC - SE Cal
Nextel of California Inc.
Nextlink Wireless, LLC
Nextweb Inc
North County Transit District
OACYS Technology
Oacys.Com Incorporated
Olympic Wireless, LLC
Orange County Public Works
Orange County Transportation Authority
Orange, County of, CA
Outback Internet, LLC
Pacific Bell Tel Com dba AT&T California
Pacific Gas and Electric Company
Pacific Lightwave Inc
Pacific Television Center
Palomar Broadband
Paramount Farms
Peak WiFi, LLC
Polly Butte Networks
Port of Los Angeles
Qualcomm Inc.
RPM Wireless Internet, LLC
Race Communications
Ranch Wifi, LLC
Regents of the University of California
Regional 3Cs
Rincon Broadband
Riverside, City of
Riverside, County of
SBC-Wireless, Inc.

Sacramento Valley Limited Partnership
San Antonio Regional Hospital
San Bernardino Community Col Dis KVCR-TV
San Bernardino County of California
San Diego Broadband
San Diego County Super. of Schools
San Diego Gas & Electric Company
San Diego Unified School District
San Diego, City of
San Diego, County of
San Luis Obispo, County of
San Manuel Band of Mission Indians
Santa Barbara Cellular Systems, Ltd.
Santa Barbara, County of
Santa Fe Irrigation District
Santa Monica, City of
Sentinel Peak Resources California LLC
Siteserver, Inc.
Skyriver Communications
SmartSky Microwave, LLC
South Bay Regional Public Comm Authority
Southern California Edison Company
Southern California Gas Company
Southern California Regional Rail Auth.
Sprint Spectrum L.P.
Sprint Telephony PCS, L.P.
Sprintcom, Inc
Station Venture Operations, LP
Surfnet Communications, Inc.
T-Mobile License LLC
Te Conectamos LLC dba Tekwerks
Tejon Ranch Co
Temecula Valley Real Estate, Inc
Thira Solutions, Inc.
Towerstream Corp.
Trango Systems, Inc.
Tulare, County of
Turn Wireless, LLC
Ultimate Internet Access, Inc
Union Pacific Railroad Company
United States Gypsum Co
United Water Conservation District
University of California, HPWREN
Ventura County Office of Education
Ventura Regional Sanitation District
Ventura, County of
Venture Technologies Group, LLC
Verizon Wireless (VAW) LLC (Southern CA)
Verizon Wireless (VAW) LLC-N CA/NV
Vernon City of
W Cody
WT Consulting Group, LLC
Wancomm Technologies
Western Broadband Inc.
Wiline Spectrum Holdings LLC
Wilson Creek Communications, LLC

Wisprenn
XO Communications, LLC
ZRay Technologies Corporation
enXco Services Corporation
unWired Broadband, Inc

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: 03/22/2019
Job Number: 190215COMSGE06

Administrative Information

Status: ENGINEER PROPOSAL
Call Sign:
Licensee Code: SPACEX
Licensee Name: Space Exploration Holdings

Site Information

HAWTHORNE, CA

Venue Name:
Latitude (NAD 83): 33° 55' 16.3" N
Longitude (NAD 83): 118° 19' 33.9" W
Climate Zone: A
Rain Zone: 4
Ground Elevation (AMSL): 16.21 m / 53.2 ft

Link Information

Satellite Type: Low Earth Orbit
Mode: TR - Transmit-Receive
Modulation: Digital
Minimum Elevation Angle: 25.0°
Azimuth Range: 0.0° to 360°
Antenna Centerline (AGL): 24.99 m / 82.0 ft

Antenna Information

Receive - FCC32

Transmit - FCC32

Manufacturer	Cobham	Cobham	
Model	MK3 series	MK3 series	
Gain / Diameter	39.3 dBi / 1.0 m	40.1 dBi / 1.0 m	
3-dB / 15-dB Beamwidth	1.50° / 3.40°	1.20° / 2.80°	
Max Available RF Power (dBW/4 kHz)	-1.2	-1.2	
(dBW/MHz)	22.8	22.8	
Maximum EIRP (dBW/4 kHz)	38.9	38.9	
(dBW/MHz)	62.9	62.9	
Interference Objectives:	Long Term	-156.0 dBW/MHz 20%	-151.0 dBW/4 kHz 20%
	Short Term	-146.0 dBW/MHz 0.01%	-128.0 dBW/4 kHz 0.0025%

Frequency Information

Receive 11.0 GHz

Transmit 14.0 GHz

Emission / Frequency Range (MHz)	240MD7W / 10700.0 - 12700.0	62M5D7W - 240MD7W / 14000.0 - 14500.0
Max Great Circle Coordination Distance	265.5 km / 165.0 mi	202.3 km / 125.7 mi
Precipitation Scatter Contour Radius	356.3 km / 221.4 mi	127.5 km / 79.2 mi

COMSEARCH

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Coordination Values

HAWTHORNE, CA

Licensee Name	Space Exploration Holdings				
Latitude (NAD 83)	33° 55' 16.3" N				
Longitude (NAD 83)	118° 19' 33.9" W				
Ground Elevation (AMSL)	16.21 m / 53.2 ft				
Antenna Centerline (AGL)	24.99 m / 82.0 ft				
Antenna Model	Cobham 1 meter				
Antenna Mode	Receive 11.0 GHz		Transmit 14.0 GHz		
Interference Objectives: Long Term	-156.0 dBW/MHz	20%	-151.0 dBW/4 kHz	20%	
Short Term	-146.0 dBW/MHz	0.01%	-128.0 dBW/4 kHz	0.0025%	
Max Available RF Power			-1.2 (dBW/4 kHz)		

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 11.0 GHz		Transmit 14.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	75.66	-5.50	265.50	-5.50	202.30
5	0.00	71.42	-5.50	265.50	-5.50	202.30
10	0.00	67.23	-5.50	265.50	-5.50	202.30
15	0.00	63.10	-5.50	265.50	-5.50	202.30
20	0.00	59.03	-5.50	265.50	-5.50	202.30
25	0.00	55.06	-5.50	265.50	-5.50	202.30
30	0.00	51.21	-5.50	265.50	-5.50	202.30
35	0.00	47.51	-5.50	265.50	-5.50	202.30
40	0.00	44.01	-5.50	265.50	-5.50	202.30
45	0.00	40.74	-5.50	265.50	-5.50	202.30
50	0.00	37.79	-5.50	265.50	-5.50	202.30
55	0.00	35.23	-5.50	265.50	-5.50	202.30
60	0.00	33.15	-5.50	265.50	-5.50	202.30
65	0.00	31.65	-5.50	265.50	-5.50	202.30
70	0.00	30.82	-5.50	265.50	-5.50	202.30
75	0.00	30.71	-5.50	265.50	-5.50	202.30
80	0.00	31.32	-5.50	265.50	-5.50	202.30
85	0.00	32.63	-5.50	265.50	-5.50	202.30
90	0.00	34.54	-5.50	265.50	-5.50	202.30
95	0.00	36.96	-5.50	265.50	-5.50	202.30
100	0.00	39.81	-5.50	265.50	-5.50	202.30
105	0.00	42.98	-5.50	265.50	-5.50	202.30
110	0.00	46.42	-5.50	265.50	-5.50	202.30
115	0.00	50.07	-5.50	265.50	-5.50	202.30
120	0.00	53.88	-5.50	265.50	-5.50	202.30
125	0.00	57.81	-5.50	265.50	-5.50	202.30
130	0.00	61.85	-5.50	265.50	-5.50	202.30
135	0.00	65.97	-5.50	265.50	-5.50	202.30
140	0.00	70.14	-5.50	265.50	-5.50	202.30
145	0.00	74.36	-5.50	265.50	-5.50	202.30
150	0.00	78.62	-5.50	265.50	-5.50	202.30
155	0.00	82.90	-5.50	265.50	-5.50	202.30
160	0.00	87.20	-5.50	265.50	-5.50	202.30
165	0.00	91.50	-5.50	265.50	-5.50	202.30
170	0.00	95.79	-5.50	265.50	-5.50	202.30
175	0.00	100.08	-5.50	265.50	-5.50	202.30
180	0.00	104.34	-5.50	265.50	-5.50	202.30
185	0.00	108.58	-5.50	265.50	-5.50	202.30

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Coordination Values

HAWTHORNE, CA

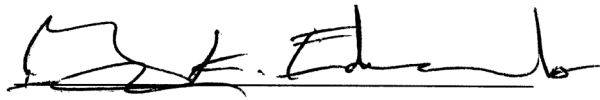
Licensee Name	Space Exploration Holdings				
Latitude (NAD 83)	33° 55' 16.3" N				
Longitude (NAD 83)	118° 19' 33.9" W				
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Antenna Mode	Receive 11.0 GHz		Transmit 14.0 GHz		
Interference Objectives: Long Term	-156.0 dBW/MHz	20%	-151.0 dBW/4 kHz	20%	
Short Term	-146.0 dBW/MHz	0.01%	-128.0 dBW/4 kHz	0.0025%	
Max Available RF Power			-1.2 (dBW/4 kHz)		

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 11.0 GHz		Transmit 14.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.00	112.77	-5.50	265.50	-5.50	202.30
195	0.00	116.90	-5.50	265.50	-5.50	202.30
200	0.00	120.97	-5.50	265.50	-5.50	202.30
205	0.00	124.94	-5.50	265.50	-5.50	202.30
210	0.00	128.79	-5.50	265.50	-5.50	202.30
215	0.00	132.49	-5.50	265.50	-5.50	202.30
220	0.00	135.99	-5.50	265.50	-5.50	202.30
225	0.00	139.26	-5.50	265.50	-5.50	202.30
230	0.00	142.21	-5.50	265.50	-5.50	202.30
235	0.00	144.77	-5.50	265.50	-5.50	202.30
240	0.00	146.85	-5.50	265.50	-5.50	202.30
245	0.00	148.35	-5.50	265.50	-5.50	202.30
250	0.00	149.18	-5.50	265.50	-5.50	202.30
255	0.00	149.29	-5.50	265.50	-5.50	202.30
260	0.00	148.68	-5.50	265.50	-5.50	202.30
265	0.00	147.37	-5.50	265.50	-5.50	202.30
270	0.00	145.46	-5.50	265.50	-5.50	202.30
275	0.00	143.04	-5.50	265.50	-5.50	202.30
280	0.00	140.19	-5.50	265.50	-5.50	202.30
285	0.00	137.02	-5.50	265.50	-5.50	202.30
290	0.00	133.58	-5.50	265.50	-5.50	202.30
295	0.00	129.93	-5.50	265.50	-5.50	202.30
300	0.00	126.12	-5.50	265.50	-5.50	202.30
305	0.00	122.19	-5.50	265.50	-5.50	202.30
310	0.00	118.15	-5.50	265.50	-5.50	202.30
315	0.00	114.03	-5.50	265.50	-5.50	202.30
320	0.00	109.86	-5.50	265.50	-5.50	202.30
325	0.00	105.64	-5.50	265.50	-5.50	202.30
330	0.00	101.38	-5.50	265.50	-5.50	202.30
335	0.00	97.10	-5.50	265.50	-5.50	202.30
340	0.00	92.80	-5.50	265.50	-5.50	202.30
345	0.00	88.50	-5.50	265.50	-5.50	202.30
350	0.00	84.21	-5.50	265.50	-5.50	202.30
355	0.00	79.92	-5.50	265.50	-5.50	202.30

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.

BY: _



Gary K. Edwards
Senior Manager
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147

DATED: March 22, 2019