

# 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  
Aeriocconnect Inc  
Aeriocconnect, 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.  
Wilne 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

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### Administrative Information

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

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### 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

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### 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

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### Antenna Information

Manufacturer Cobham  
Model MK3 series  
Gain / Diameter 39.3 dBi / 1.0 m  
3-dB / 15-dB Beamwidth 1.50° / 3.40°

### Transmit - FCC32

Cobham  
MK3 series  
40.1 dBi / 1.0 m  
1.20° / 2.80°

Max Available RF Power (dBW/4 kHz)  
(dBW/MHz)

-1.2  
22.8

Maximum EIRP (dBW/4 kHz)  
(dBW/MHz)

38.9  
62.9

Interference Objectives: Long Term -156.0 dBW/MHz 20%  
Short Term -146.0 dBW/MHz 0.01%

-151.0 dBW/4 kHz 20%  
-128.0 dBW/4 kHz 0.0025%

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### Frequency Information

Emission / Frequency Range (MHz) 240MD7W / 10700.0 - 12700.0

### Transmit 14.0 GHz

62M5D7W - 240MD7W / 14000.0 - 14500.0

Max Great Circle Coordination Distance 265.5 km / 165.0 mi  
Precipitation Scatter Contour Radius 356.3 km / 221.4 mi

202.3 km / 125.7 mi  
127.5 km / 79.2 mi

# COMSEARCH

## Earth Station Data Sheet

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

### 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

# COMSEARCH

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19700 Janelia Farm Boulevard, Ashburn, VA 20147  
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### Coordination Values

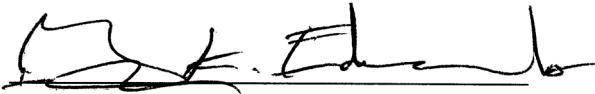
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Interference Objectives: Long Term	-156.0 dBW/MHz	20%	-151.0 dBW/4 kHz	20%
Short Term	-146.0 dBW/MHz	0.01%	-128.0 dBW/4 kHz	0.0025%
Max Available RF Power	-1.2 (dBW/4 kHz)			

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