

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
Space Exploration Holdings
GREENVILLE, PA
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.

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

123.Net, Inc.
AQ2AT LLC
AT&T Mobility Spectrum LLC-GAWV/NC/SC
Access MLP Operating LLC
Affiniti PA, LLC
Agile Network Builders LLC
Air Advantage, LLC
Allegany County Government
Allegany, County of
Allegheny County Dept of Emergency Svcs
American Electric Power Service Corp
Amplex Electric, Inc.
Argos Engineering, LLC
Atlantic Broadband (Penn), LLC
Austintown Township
BLHC LLC
Bascom Long Distance, Inc.
Bedford County of
Blackwater Telecom
Blair County 911
Blue Chip Broadcasting Licenses LTD
Blue Ridge Carriers
Blueline Communications
BrescoBroadBand
Buffalo, City of
Business Only Broadband, LLC
CNX Midstream, LLC
CNX Thermal Holdings, LLC
Cambria, County of
Capstar TX LLC
Cattaraugus, County of
Cellco Partnership - Ohio
Cellco Partnership - Bridgeville, PA/WV
Cellco Partnership- PA Region
City of Cleveland Div Water Pollution
Citynet Holdings, LLC
Clarion, County of
Clearfield, County of
Clearwire Spectrum Holdings III, LLC
Cleveland, City of
Commonwealth of Pennsylvania-Radio Proj.

Comprehensive Healthcare of Ohio
Comprehensive Wireless LLC
Conterra Ultra Broadband, LLC
Conxx, Inc.
County of Centre
County of Genesee
County of St Clair
County of Summit, Ohio
Crawford, County of
DC2A LLC
DSRC Networks
DTE Electric Company
Dominion Energy Transmission, Inc.
ECW Wireless, LLC
East Ohio Gas Company
Electric Railroad, LLC
Ericsson, Inc.
Erie County Emergency Services
Erie County Water Authority
FELHC, Inc.
Forest, County of
Fundamental Broadcasting LLC
GTT America LLC
Geauga, County of
Geodesic Networks LLC
General Motors Research Corp
Gernatt Asphalt Products Inc
Greater Cleveland RTA
Greene, County of (PA)
Hardy Cellular Telephone Company
Harris Corporation (Virginia)
High Voltage Communications LLC (CFN)
Highway Networks, LLC
Hilltower Tower Leasing, Inc
Holmes County
Huntingdon, County of
Huron, County of
In The Stix Broadband LLC
Indiana, County of
Jefferson County of Pennsylvania
Jefferson Microwave, LLC
Jefferson, County Of
Kryptick Technologies
Lawrence County Dept of Public Safety
Lorain County of, Ohio
Lorain, City of
MB Microwave, LLC
MLS Engineering
MVC Research. LLC
Macomb County Department of Roads
Medina County Ohio
Mercer County of
Metro Regional Transit Authority
Michigan, State of - DOT
Micrologic, Inc
Mobile Satellite Communications Inc

Morgan, County of
 Mountain View Communications, LLC
 National Grid USA Service Comp (NIMO)
 National Grid USA Service Company, Inc
 New Cingular Wireless PCS - Maryland
 New Cingular Wireless PCS LLC - Ohio
 New Cingular Wireless PCS LLC - WV,NC,SC
 New Cingular Wireless PCS, LLC (NY)
 New Cingular Wireless PCS, LLC - PA
 New Cingular Wireless PCS-Southern Ohio
 New Line Networks, LLC
 New Par - Ohio Region
 New York Power Authority
 NexGenAccess Inc.
 Niagara County Fire Coordinator
 Niagara Frontier Transportation Auth
 Niagara Reg Board of Comm of Police
 Niagara Regional Police Service
 North Coast Wireless Communications LLC
 Ohio RSA 2 Limited Partnership
 Ohio RSA 6 Limited Partnership
 One Connection Media Group
 Ontario Power Generation Inc.
 Ottawa County Commissioners
 Parma, City of - Fire Department
 Pierce Broadband, LLC
 Pittsburgh, City of (PA)
 Potter County of (PA)
 R. Fritz Enterprises Inc
 RAA Data Services, Inc
 Rogers Wireless Partnership (MW)
 Rooftop Data LLC
 Saia Communications, Inc.
 Shenandoah Personal Communications, LLC
 Smart Way Communications, LLC
 SmartSky Microwave, LLC
 Somerset, County of
 Spotlight Media Corporation
 Sprint Spectrum L.P.
 Sprintcom, Inc
 Staley Wireless LP
 Standard Backhaul Communications LLC
 State of Maryland, MIEMSS
 T-Mobile License LLC
 Texas Eastern Communications, LLC
 Thought Transmissions, LLC
 Tonawanda, Town of (NY)
 Torellco LLC
 Trango Systems, Inc.
 Transwave Communication Systems, Inc.
 Two Way Radio Inc.
 USCOC of Cumberland, Inc.
 Uniti Fiber PEG, LLC
 Valley Rural Electric Cooperative, Inc.
 Venango, County of
 Verizon Wireless (VAW) LLC - Maryland

Verizon Wireless (VAW) LLC - Michigan
Verizon Wireless (VAW) LLC - Ohio
Verizon Wireless (VAW) LLC-Pennsylvania
Verizon Wireless VAW LLC - West Virginia
W.A.T.C.H. TV Company Inc.
WPNT Media Subsidiary, LLC
WV DHHR BPH, Office of Ems, Com. Div.
Washington, County of
Weblin Holdings LLC
West Virginia Radio Corporation
Williams Energy Services
Wireless Internetwork LLC
World Class Wireless, LLC
Wyoming County
Zen Networks, Inc
iZone Broadband LLC
xWave Engineering LLC

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: 190215COMSGE02

Administrative Information

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

Site Information

GREENVILLE, PA

Venue Name:
Latitude (NAD 83): 41° 26' 0.8" N
Longitude (NAD 83): 80° 19' 59.6" W
Climate Zone: A
Rain Zone: 2
Ground Elevation (AMSL): 303.07 m / 994.3 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): 0.91 m / 3.0 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	487.7 km / 303.0 mi	137.9 km / 85.7 mi

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
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Coordination Values

GREENVILLE, PA

Licensee Name	Space Exploration Holdings				
Latitude (NAD 83)	41° 26' 0.8" N				
Longitude (NAD 83)	80° 19' 59.6" W				
Ground Elevation (AMSL)	303.07 m / 994.3 ft				
Antenna Centerline (AGL)	0.91 m / 3.0 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	96.43	-5.50	265.50	-5.50	202.30
5	0.00	91.43	-5.50	265.50	-5.50	202.30
10	0.00	86.43	-5.50	265.50	-5.50	202.30
15	0.00	81.44	-5.50	265.50	-5.50	202.30
20	0.00	76.44	-5.50	265.50	-5.50	202.30
25	0.00	71.44	-5.50	265.50	-5.50	202.30
30	0.00	66.44	-5.50	265.50	-5.50	202.30
35	0.00	61.44	-5.50	265.50	-5.50	202.30
40	0.00	56.45	-5.50	265.50	-5.50	202.30
45	0.00	51.45	-5.50	265.50	-5.50	202.30
50	0.00	46.45	-5.50	265.50	-5.50	202.30
55	0.00	41.45	-5.50	265.50	-5.50	202.30
60	0.00	36.46	-5.50	265.50	-5.50	202.30
65	0.00	31.46	-5.50	265.50	-5.50	202.30
70	0.00	26.47	-5.50	265.50	-5.50	202.30
75	0.00	21.48	-5.50	265.50	-5.50	202.30
80	0.00	16.50	-5.50	265.50	-5.50	202.30
85	0.00	11.53	-5.50	265.50	-5.50	202.30
90	0.00	6.60	-5.50	265.50	-5.50	202.30
95	0.00	2.05	-5.50	265.50	-5.50	202.30
100	0.00	3.85	-5.50	265.50	-5.50	202.30
105	0.00	8.69	-5.50	265.50	-5.50	202.30
110	0.00	13.64	-5.50	265.50	-5.50	202.30
115	0.00	18.62	-5.50	265.50	-5.50	202.30
120	0.00	23.61	-5.50	265.50	-5.50	202.30
125	0.00	28.60	-5.50	265.50	-5.50	202.30
130	0.00	33.59	-5.50	265.50	-5.50	202.30
135	0.00	38.59	-5.50	265.50	-5.50	202.30
140	0.00	43.59	-5.50	265.50	-5.50	202.30
145	0.00	48.58	-5.50	265.50	-5.50	202.30
150	0.00	53.58	-5.50	265.50	-5.50	202.30
155	0.00	58.58	-5.50	265.50	-5.50	202.30
160	0.00	63.58	-5.50	265.50	-5.50	202.30
165	0.00	68.57	-5.50	265.50	-5.50	202.30
170	0.00	73.57	-5.50	265.50	-5.50	202.30
175	0.00	78.57	-5.50	265.50	-5.50	202.30
180	0.00	83.57	-5.50	265.50	-5.50	202.30
185	0.00	88.57	-5.50	265.50	-5.50	202.30

COMSEARCH

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Coordination Values

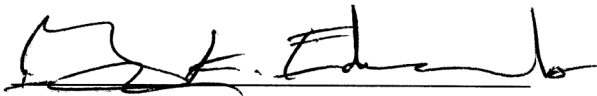
GREENVILLE, PA

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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	93.57	-5.50	265.50	-5.50	202.30
195	0.00	98.56	-5.50	265.50	-5.50	202.30
200	0.00	103.56	-5.50	265.50	-5.50	202.30
205	0.00	108.56	-5.50	265.50	-5.50	202.30
210	0.00	113.56	-5.50	265.50	-5.50	202.30
215	0.00	118.56	-5.50	265.50	-5.50	202.30
220	0.00	123.55	-5.50	265.50	-5.50	202.30
225	0.00	128.55	-5.50	265.50	-5.50	202.30
230	0.00	133.55	-5.50	265.50	-5.50	202.30
235	0.00	138.55	-5.50	265.50	-5.50	202.30
240	0.00	143.54	-5.50	265.50	-5.50	202.30
245	0.00	148.54	-5.50	265.50	-5.50	202.30
250	0.00	153.53	-5.50	265.50	-5.50	202.30
255	0.00	158.52	-5.50	265.50	-5.50	202.30
260	0.00	163.50	-5.50	265.50	-5.50	202.30
265	0.00	168.47	-5.50	265.50	-5.50	202.30
270	0.00	173.40	-5.50	265.50	-5.50	202.30
275	0.00	177.95	-5.50	265.50	-5.50	202.30
280	0.00	176.15	-5.50	265.50	-5.50	202.30
285	0.00	171.31	-5.50	265.50	-5.50	202.30
290	0.00	166.36	-5.50	265.50	-5.50	202.30
295	0.00	161.38	-5.50	265.50	-5.50	202.30
300	0.00	156.39	-5.50	265.50	-5.50	202.30
305	0.00	151.40	-5.50	265.50	-5.50	202.30
310	0.00	146.41	-5.50	265.50	-5.50	202.30
315	0.00	141.41	-5.50	265.50	-5.50	202.30
320	0.00	136.41	-5.50	265.50	-5.50	202.30
325	0.00	131.42	-5.50	265.50	-5.50	202.30
330	0.00	126.42	-5.50	265.50	-5.50	202.30
335	0.00	121.42	-5.50	265.50	-5.50	202.30
340	0.00	116.42	-5.50	265.50	-5.50	202.30
345	0.00	111.43	-5.50	265.50	-5.50	202.30
350	0.00	106.43	-5.50	265.50	-5.50	202.30
355	0.00	101.43	-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