

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

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%

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 487.7 km / 303.0 mi

202.3 km / 125.7 mi
137.9 km / 85.7 mi

COMSEARCH

Earth Station Data Sheet

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

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

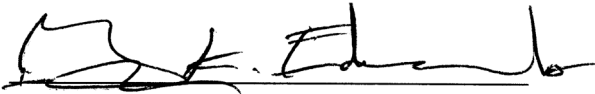
GREENVILLE, PA

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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