

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
Space Exploration Holdings
LAWRENCE, KS
Satellite Earth Station

Prepared By:
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147
January 14, 2021

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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 12/10/2020.

Company

AMG Technology Investment Group LLC
BNSF Railway Company
Business Only Broadband, LLC
Butler County, KS
Cass County Emergency Service Board
CenturyTel of Missouri, LLC
City of Council Bluffs
City of La Vista
City of Wichita, Kansas
Clearwire Spectrum Holdings III, LLC
Council Bluffs City of
Council Bluffs Water Works
Cox Communications Kansas LLC
Entercom License, LLC
Farmers Telephone Company
IdeaTek Telcom, LLC
Johnson County Emergency Communications
KC Web, Inc.
Kansas City, City of
Kansas Department of Transportation
La Harpe Communications Inc
Mercury Wireless Kansas, LLC
Mercury Wireless, LLC
Mid-America Regional Council Emergency
Mid-America Reg Council Oper Greenlight
Midwest Connections, Inc.
NEXSTAR BROADCASTING, INC.
Network Tool And Die Company Inc
New Cingular Wireless PCS, LLC - KS, MO
Nex-Tech Telephone
Nex-Tech, LLC
Olympic Wireless, LLC
Packet Layer Consulting
Pottawattamie, County of
Prairie Village, City of
Skybeam Acquisition Corporation
Sprint PCS
Sprint Spectrum L.P.
Sprint Spectrum LP DBA Sprint PCS
Sprint Telephony PCS, L.P.

Sprintcom, Inc
T-Mobile License LLC
Tiger Computer Consulting, LLC
Total Highspeed LLC
USD 259
Union Pacific Railroad Company
Walsworth Publishing Company
Wave Wireless, LLC
Western Iowa Wireless
Wireless Investments LLC
Wisper ISP, LLC
Wisper Southwest MO No 1 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: 01/14/2021
Job Number: 201210COMSGE06

Administrative Information

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

Site Information

LAWRENCE, KS
Venue Name
Latitude (NAD 83) 39° 0' 50.0" N
Longitude (NAD 83) 95° 8' 57.8" W
Climate Zone A
Rain Zone 2
Ground Elevation (AMSL) 274.98 m / 902.2 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) 0.91 m / 3.0 ft

Antenna Information

	Receive - FCC32	Transmit - FCC32
Manufacturer	SpaceX	SpaceX
Model	1.47 meter	1.47 meter
Gain / Diameter	46.9 dBi / 1.5 m	49.5 dBi / 1.5 m
3-dB / 15-dB Beamwidth	0.77° / 1.70°	0.49° / 1.17°
Max Available RF Power (dBW/4 kHz)		-39.8
(dBW/MHz)		-15.8
Maximum EIRP (dBW/4 kHz)		9.7
(dBW/MHz)		33.7
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 18.0 GHz	Transmit 28.0 GHz
Emission / Frequency Range (MHz)	62M5D7W - 480MD7W / 17800.0 - 18600.0 62M5D7W - 480MD7W / 18800.0 - 19300.0	62M5D7W - 480MD7W / 27500.0 - 29100.0 62M5D7W - 480MD7W / 29500.0 - 30000.0
Max Great Circle Coordination Distance	262.0 km / 162.8 mi	125.0 km / 77.7 mi
Precipitation Scatter Contour Radius	100.0 km / 62.1 mi	100.0 km / 62.1 mi

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Coordination Values

LAWRENCE, KS

Licensee Name	Space Exploration Holdings		
Latitude (NAD 83)	39° 0' 50.0" N		
Longitude (NAD 83)	95° 8' 57.8" W		
Ground Elevation (AMSL)	274.98 m / 902.2 ft		
Antenna Centerline (AGL)	0.91 m / 3.0 ft		
Antenna Model	SpaceX 1.47 meter		
Antenna Mode	Receive 18.0 GHz		Transmit 28.0 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	-39.8 (dBW/4 kHz)		

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 18.0 GHz		Transmit 28.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
0	0.64	86.84	-3.00	262.00	-3.00	125.00
5	0.62	81.97	-3.00	262.00	-3.00	125.00
10	0.58	77.10	-3.00	262.00	-3.00	125.00
15	0.30	72.22	-3.00	262.00	-3.00	125.00
20	0.34	67.37	-3.00	262.00	-3.00	125.00
25	0.44	62.53	-3.00	262.00	-3.00	125.00
30	0.49	57.71	-3.00	262.00	-3.00	125.00
35	0.62	52.92	-3.00	262.00	-3.00	125.00
40	0.69	48.16	-3.00	262.00	-3.00	125.00
45	0.84	43.46	-3.00	262.00	-3.00	125.00
50	0.76	38.75	-3.00	262.00	-3.00	125.00
55	0.66	34.11	-3.00	262.00	-3.00	125.00
60	0.40	29.49	-3.00	262.00	-3.00	125.00
65	0.33	25.10	-3.00	262.00	-3.00	125.00
70	0.33	20.99	-3.00	262.00	-3.00	125.00
75	0.37	17.35	-3.00	262.00	-3.00	125.00
80	0.38	14.51	-3.00	262.00	-3.00	125.00
85	0.40	13.00	-3.00	262.00	-3.00	125.00
90	0.40	13.29	-3.00	262.00	-3.00	125.00
95	0.41	15.28	-3.00	262.00	-3.00	125.00
100	0.39	18.40	-3.00	262.00	-3.00	125.00
105	0.31	22.16	-3.00	262.00	-3.00	125.00
110	0.00	26.22	-3.00	262.00	-3.00	125.00
115	0.00	30.67	-3.00	262.00	-3.00	125.00
120	0.00	35.26	-3.00	262.00	-3.00	125.00
125	0.00	39.93	-3.00	262.00	-3.00	125.00
130	0.00	44.67	-3.00	262.00	-3.00	125.00
135	0.23	49.49	-3.00	262.00	-3.00	125.00
140	0.23	54.29	-3.00	262.00	-3.00	125.00
145	0.00	59.08	-3.00	262.00	-3.00	125.00
150	0.00	63.93	-3.00	262.00	-3.00	125.00
155	0.00	68.78	-3.00	262.00	-3.00	125.00
160	0.00	73.65	-3.00	262.00	-3.00	125.00
165	0.00	78.53	-3.00	262.00	-3.00	125.00
170	0.27	83.41	-3.00	262.00	-3.00	125.00
175	0.25	88.29	-3.00	262.00	-3.00	125.00
180	0.39	93.16	-3.00	262.00	-3.00	125.00
185	0.48	98.03	-3.00	262.00	-3.00	125.00

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Coordination Values

LAWRENCE, KS

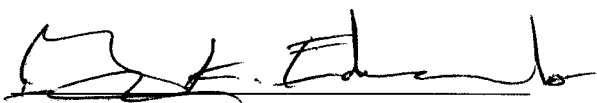
Licensee Name Space Exploration Holdings
Latitude (NAD 83) 39° 0' 50.0" N
Longitude (NAD 83) 95° 8' 57.8" W
Ground Elevation (AMSL) 274.98 m / 902.2 ft
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Antenna Mode Receive 18.0 GHz Transmit 28.0 GHz
Interference Objectives: Long Term -156.0 dBW/MHz 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 -39.8 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 18.0 GHz		Transmit 28.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.63	102.89	-3.00	262.00	-3.00	125.00
195	0.50	107.76	-3.00	262.00	-3.00	125.00
200	0.62	112.60	-3.00	262.00	-3.00	125.00
205	0.86	117.42	-3.00	262.00	-3.00	125.00
210	0.98	122.22	-3.00	262.00	-3.00	125.00
215	0.91	127.03	-3.00	262.00	-3.00	125.00
220	0.86	131.80	-3.00	262.00	-3.00	125.00
225	0.75	136.57	-3.00	262.00	-3.00	125.00
230	0.68	141.27	-3.00	262.00	-3.00	125.00
235	0.70	145.88	-3.00	262.00	-3.00	125.00
240	0.65	150.41	-3.00	262.00	-3.00	125.00
245	0.78	154.69	-3.00	262.00	-3.00	125.00
250	0.86	158.69	-3.00	262.00	-3.00	125.00
255	0.97	162.20	-3.00	262.00	-3.00	125.00
260	1.07	164.87	-3.00	262.00	-3.00	125.00
265	1.12	166.28	-3.00	262.00	-3.00	125.00
270	1.11	166.02	-3.00	262.00	-3.00	125.00
275	1.05	164.18	-3.00	262.00	-3.00	125.00
280	0.98	161.20	-3.00	262.00	-3.00	125.00
285	0.89	157.51	-3.00	262.00	-3.00	125.00
290	0.83	153.40	-3.00	262.00	-3.00	125.00
295	0.83	149.01	-3.00	262.00	-3.00	125.00
300	0.91	144.45	-3.00	262.00	-3.00	125.00
305	1.30	139.71	-3.00	262.00	-3.00	125.00
310	1.34	135.02	-3.00	262.00	-3.00	125.00
315	1.33	130.29	-3.00	262.00	-3.00	125.00
320	1.31	125.53	-3.00	262.00	-3.00	125.00
325	1.28	120.74	-3.00	262.00	-3.00	125.00
330	1.02	115.96	-3.00	262.00	-3.00	125.00
335	0.83	111.14	-3.00	262.00	-3.00	125.00
340	0.68	106.30	-3.00	262.00	-3.00	125.00
345	0.63	101.44	-3.00	262.00	-3.00	125.00
350	0.63	96.58	-3.00	262.00	-3.00	125.00
355	0.63	91.71	-3.00	262.00	-3.00	125.00

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.

BY: _



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

DATED: January 14, 2021