

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
Charter Communications Operating, LLC
CENTENNIAL, CO
Satellite Earth Station

Prepared By:
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147
June 22, 2018

TABLE OF CONTENTS

1. CONCLUSIONS	3
2. SUMMARY OF RESULTS	4
3. SUPPLEMENTAL SHOWING	5
4. EARTH STATION COORDINATION DATA.....	6
5. CERTIFICATION.....	10

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 06/22/2018.

Company

AT&T Corp.

Qwest Corporation

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: 06/22/2018
Job Number: 180622COMSTC24

Administrative Information

Licensee Code CHCOPE
Licensee Name Charter Communications Operating, LLC

Site Information

CENTENNIAL, CO

Latitude (NAD 83) 39° 35' 57.9" N
Longitude (NAD 83) 104° 51' 37.6" W
Climate Zone A
Rain Zone 2
Ground Elevation (AMSL) 1729.28 m / 5673.5 ft

Link Information

Satellite Type Geostationary
Mode RO - Receive-Only
Modulation Digital
Satellite Arc 60° W to 143° West Longitude
Azimuth Range 122.6° to 230.9°
Corresponding Elevation Angles 25.2° / 29.8°
Antenna Centerline (AGL) 3.66 m / 12.0 ft

Antenna Information

Receive

Manufacturer Simulsat
Gain / Diameter 44.0 dBi / 5.0 m
3-dB / 15-dB Beamwidth 0.80° / 2.20°

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

Frequency Information

Receive 4.0 GHz

Emission / Frequency Range (MHz) 36M0G7W / 3700.0 - 4200.0

Max Great Circle Coordination Distance 302.5 km / 187.9 mi
Precipitation Scatter Contour Radius 495.1 km / 307.6 mi

COMSEARCH

Earth Station Data Sheet

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

Coordination Values

CENTENNIAL, CO

Licensee Name Charter Communications Operating, LLC
Latitude (NAD 83) 39° 35' 57.9" N
Longitude (NAD 83) 104° 51' 37.6" W
Ground Elevation (AMSL) 1729.28 m / 5673.5 ft
Antenna Centerline (AGL) 3.66 m / 12.0 ft
Antenna Mode Receive 4.0 GHz
Interference Objectives: Long Term -156.0 dBW/MHz 20%
Short Term -146.0 dBW/MHz 0.01%

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 4.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
0	0.61	119.36	-10.00	242.56
5	0.43	114.91	-10.00	257.84
10	0.43	110.45	-10.00	257.24
15	0.33	105.95	-10.00	269.78
20	0.00	101.42	-10.00	285.28
25	0.00	96.91	-10.00	285.28
30	0.00	92.39	-10.00	285.28
35	0.00	87.87	-10.00	285.28
40	0.00	83.35	-10.00	285.28
45	0.22	78.82	-10.00	282.36
50	0.23	74.31	-10.00	281.21
55	0.26	69.83	-10.00	277.91
60	0.29	65.38	-10.00	274.18
65	0.32	60.97	-10.00	270.90
70	0.29	56.62	-10.00	273.69
75	0.32	52.34	-10.00	270.23
80	0.30	48.16	-10.00	272.61
85	0.25	44.13	-9.12	284.10
90	0.32	40.21	-8.11	282.18
95	0.44	36.48	-7.05	275.28
100	0.48	33.06	-5.98	276.89
105	0.33	30.20	-5.00	302.48
110	0.40	27.69	-4.06	300.08
115	0.52	25.81	-3.29	291.52
120	0.67	24.71	-2.82	284.43
125	0.82	24.53	-2.74	274.43
130	0.98	25.29	-3.07	262.08
135	0.89	27.14	-3.84	262.69
140	1.00	29.51	-4.75	249.82
145	0.96	32.39	-5.76	246.14
150	0.89	35.09	-6.63	245.25
155	0.99	37.36	-7.31	235.09
160	0.93	39.43	-7.90	235.55
165	0.92	41.07	-8.34	233.44
170	0.78	42.41	-8.69	239.92
175	0.79	43.13	-8.87	237.98
180	0.77	43.41	-8.94	239.04
185	0.82	43.10	-8.86	236.10

COMSEARCH

Earth Station Data Sheet

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

Coordination Values

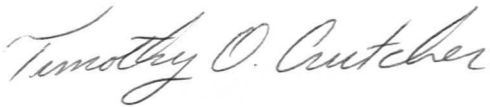
CENTENNIAL, CO

Licensee Name Charter Communications Operating, LLC
Latitude (NAD 83) 39° 35' 57.9" N
Longitude (NAD 83) 104° 51' 37.6" W
Ground Elevation (AMSL) 1729.28 m / 5673.5 ft
Antenna Centerline (AGL) 3.66 m / 12.0 ft
Antenna Mode Receive 4.0 GHz
Interference Objectives: Long Term -156.0 dBW/MHz 20%
Short Term -146.0 dBW/MHz 0.01%

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 4.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
190	0.99	42.20	-8.63	227.94
195	1.01	40.98	-8.32	228.65
200	1.09	39.29	-7.86	228.50
205	1.11	37.26	-7.28	231.04
210	1.02	34.99	-6.60	238.08
215	1.08	32.47	-5.79	240.67
220	1.14	30.47	-5.10	242.64
225	1.27	29.05	-4.58	241.24
230	1.25	28.52	-4.38	243.18
235	1.37	28.66	-4.43	238.84
240	1.46	29.60	-4.78	233.73
245	1.57	31.24	-5.37	226.70
250	1.46	33.68	-6.18	225.71
255	1.46	36.49	-7.06	221.08
260	1.44	39.70	-7.97	216.92
265	1.54	43.12	-8.87	209.78
270	1.49	46.86	-9.77	206.94
275	1.45	50.76	-10.00	206.95
280	1.38	54.80	-10.00	208.82
285	1.39	58.91	-10.00	208.62
290	1.42	63.10	-10.00	207.73
295	1.47	67.35	-10.00	206.45
300	1.53	71.66	-10.00	204.93
305	1.55	76.00	-10.00	206.55
310	1.42	80.39	-10.00	207.91
315	1.46	84.78	-10.00	206.68
320	1.59	89.18	-10.00	205.46
325	1.61	93.59	-10.00	204.94
330	1.69	98.00	-10.00	202.89
335	1.60	102.38	-10.00	205.19
340	1.53	106.73	-10.00	204.82
345	1.35	111.02	-10.00	209.77
350	1.09	115.23	-10.00	217.63
355	0.79	119.35	-10.00	232.21

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.



Timothy O. Crutcher
Frequency Planner
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147

DATED: June 22, 2018