

# FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for  
**Charter Communications Operating, LLC**  
**BROOMFIELD, CO**  
**Satellite Earth Station**

Prepared By:  
COMSEARCH  
19700 Janelia Farm Boulevard  
Ashburn, VA 20147  
June 26, 2018

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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 06/26/2018.

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: 06/26/2018  
Job Number: 180626COMSTC13

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### Administrative Information

Licensee Code: CHCOPE  
Licensee Name: Charter Communications Operating, LLC

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### Site Information

#### BROOMFIELD, CO

Latitude (NAD 83): 39° 54' 54.2" N  
Longitude (NAD 83): 105° 6' 31.3" W  
Climate Zone: A  
Rain Zone: 2  
Ground Elevation (AMSL): 1699.3 m / 5575.1 ft

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### Link Information

Satellite Type: Geostationary  
Mode: RO - Receive-Only  
Modulation: Digital  
Satellite Arc: 60° W to 143° West Longitude  
Azimuth Range: 122.6° to 230.5°  
Corresponding Elevation Angles: 24.9° / 29.7°  
Antenna Centerline (AGL): 3.66 m / 12.0 ft

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### 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%

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### Frequency Information

#### Receive 4.0 GHz

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

Max Great Circle Coordination Distance: 334.5 km / 207.8 mi  
Precipitation Scatter Contour Radius: 495.6 km / 307.9 mi

# COMSEARCH

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### Coordination Values

### BROOMFIELD, CO

Licensee Name Charter Communications Operating, LLC  
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Longitude (NAD 83) 105° 6' 31.3" W  
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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	0.00	119.25	-10.00	285.28
5	0.00	114.84	-10.00	285.28
10	0.00	110.39	-10.00	285.28
15	0.00	105.91	-10.00	285.28
20	0.00	101.40	-10.00	285.28
25	0.00	96.88	-10.00	285.28
30	0.00	92.35	-10.00	285.28
35	0.00	87.81	-10.00	285.28
40	0.00	83.28	-10.00	285.28
45	0.00	78.76	-10.00	285.28
50	0.00	74.25	-10.00	285.28
55	0.00	69.77	-10.00	285.28
60	0.00	65.32	-10.00	285.28
65	0.00	60.91	-10.00	285.28
70	0.00	56.56	-10.00	285.28
75	0.00	52.28	-10.00	285.28
80	0.00	48.10	-10.00	285.28
85	0.00	44.04	-9.10	291.09
90	0.00	40.16	-8.09	297.70
95	0.00	36.49	-7.05	304.71
100	0.00	33.12	-6.00	311.98
105	0.00	30.15	-4.98	319.81
110	0.00	27.71	-4.07	326.37
115	0.00	25.95	-3.35	331.54
120	0.00	25.01	-2.95	334.45
125	0.00	25.00	-2.95	334.51
130	0.00	25.90	-3.33	331.69
135	0.00	27.63	-4.04	326.59
140	0.00	30.05	-4.95	320.06
145	0.00	32.89	-5.93	313.15
150	0.00	35.54	-6.77	306.67
155	0.00	37.91	-7.47	301.89
160	0.38	39.61	-7.94	276.01
165	0.66	40.98	-8.31	249.27
170	0.67	42.17	-8.63	246.93
175	0.98	42.60	-8.73	227.88
180	0.97	42.85	-8.80	227.99
185	1.09	42.49	-8.71	224.05



# COMSEARCH

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### Coordination Values

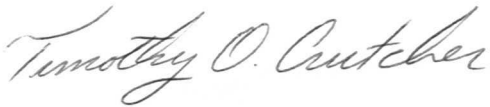
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Antenna Mode Receive 4.0 GHz  
Interference Objectives: Long Term -156.0 dBW/MHz 20%  
Short Term -146.0 dBW/MHz 0.01%

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 4.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
190	0.97	41.88	-8.55	229.31
195	0.87	40.79	-8.26	236.92
200	1.01	39.04	-7.79	231.52
205	1.00	37.06	-7.22	235.10
210	1.02	34.71	-6.51	238.60
215	0.93	32.36	-5.75	248.01
220	0.90	30.50	-5.11	254.09
225	0.87	29.30	-4.67	258.38
230	0.86	28.84	-4.50	260.16
235	0.86	29.16	-4.62	259.63
240	0.95	30.15	-4.98	251.26
245	0.98	31.90	-5.59	245.97
250	0.94	34.28	-6.38	243.81
255	0.99	37.06	-7.22	235.58
260	0.88	40.32	-8.14	236.83
265	1.00	43.72	-9.02	225.56
270	1.12	47.35	-9.88	217.12
275	0.65	51.43	-10.00	240.45
280	0.59	55.44	-10.00	244.26
285	0.51	59.55	-10.00	249.20
290	0.46	63.72	-10.00	254.13
295	0.41	67.95	-10.00	260.02
300	0.36	72.23	-10.00	266.04
305	0.23	76.55	-10.00	282.05
310	0.00	80.90	-10.00	285.28
315	0.00	85.23	-10.00	285.28
320	0.00	89.57	-10.00	285.28
325	0.00	93.91	-10.00	285.28
330	0.00	98.25	-10.00	285.28
335	0.00	102.57	-10.00	285.28
340	0.00	106.86	-10.00	285.28
345	0.00	111.12	-10.00	285.28
350	0.00	115.33	-10.00	285.28
355	0.00	119.48	-10.00	285.28

## 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.

A handwritten signature in cursive script that reads "Timothy O. Crutcher".

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

DATED: June 26, 2018