

# FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for  
**Intelsat License LLC**  
**CASTLE ROCK, CO**  
**(E881304)**  
**Satellite Earth Station**

Prepared By:  
COMSEARCH  
19700 Janelia Farm Boulevard  
Ashburn, VA 20147  
June 15, 2016

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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 05/02/2016.

Company

AT&T Corp.  
AT&T Mobility Spectrum LLC - CO  
AirLife Denver  
Arvada Police Dept.  
BNSF Railway Company  
Black Hawk Police Department  
Black Hills Corporation  
Boulder, County of  
CBS Communication Services Inc  
CBS Television Stations  
Cellular Inc. Network Corporation  
City of Aurora  
City of Colorado Springs  
City of Lakewood, CO  
Colorado Interstate Gas Company  
Colorado Springs Utilities  
County of Pueblo  
Directlink, LLC  
Douglas County Sheriff's Office  
Entravision Holdings, LLC  
FONES WEST DIGITAL SYSTEMS INC.  
Gilpin County Sheriff's Office  
Gogo LLC  
Gray Television Licensee, LLC  
Infrastructure Networks, Inc.  
Intermountain Rural Electric Association  
Kellin Communications  
Live Wire Networks, Inc.  
MHO Networks  
Multimedia Holdings Corporation  
NE Colorado Cellular, Inc.  
New Cingular Wireless PCS LLC -Colorado  
Nex-Tech Wireless, LLC  
Olympic Wireless, LLC  
Qwest Corporation  
Roggen Telephone Enterprises, Inc.  
Sangre de Cristo Communications, LLC  
Sprint Communications Company, LP  
Sprint Spectrum L.P.  
Sprint Spectrum LP DBA Sprint PCS

State of Colorado  
Tallgrass Operations, LLC  
Tri-State Generation & Transmission Assn  
Tribune Broadcasting Denver License, LLC  
University Corp for Atmospheric Research  
Verizon Wireless (VAW) LLC -CO/ID/MTWY  
Xcel Energy Services, Inc.

## **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: 06/15/2016  
Job Number: 160502COMSGE02

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### Administrative Information

Status ENGINEER PROPOSAL  
Call Sign E881304  
Licensee Code INTELS  
Licensee Name Intelsat License LLC

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### Site Information CASTLE ROCK, CO

Venue Name  
Latitude (NAD 83) 39° 16' 34.0" N  
Longitude (NAD 83) 104° 48' 27.0" W  
Climate Zone A  
Rain Zone 2  
Ground Elevation (AMSL) 2084.83 m / 6840.0 ft

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### Link Information

Satellite Type Geostationary  
Mode TR - Transmit-Receive  
Modulation Analog and Digital  
Satellite Arc 50° W to 139° West Longitude  
Azimuth Range 114.1° to 227.0°  
Corresponding Elevation Angles 18.2° / 32.5°  
Antenna Centerline (AGL) 6.0 m / 19.7 ft

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### Antenna Information

#### Receive - FCC32

#### Transmit - FCC32

Manufacturer	ViaSat	ViaSat
Model	8009A	8009A
Gain / Diameter	50.3 dBi / 9.0 m	53.8 dBi / 9.0 m
3-dB / 15-dB Beamwidth	0.60° / 1.20°	0.30° / 0.60°
Max Available RF Power (dBW/4 kHz)		3.7
(dBW/MHz)		27.7
Maximum EIRP (dBW/4 kHz)		57.5
(dBW/MHz)		81.5
(dBW)		80.8
Interference Objectives: Long Term	-158.0 dBW/MHz 20%	-154.0 dBW/4 kHz 20%
Short Term	-148.0 dBW/MHz 0.01%	-131.0 dBW/4 kHz 0.0025%

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### Frequency Information

#### Receive 4.0 GHz

#### Transmit 6.1 GHz

Emission / Frequency Range (MHz)	300KFXD - 300KFXD / 3700.0 - 4200.0	850KFXD - 1M20FXD / 6422.0 - 6424.5
Max Great Circle Coordination Distance	370.3 km / 230.1 mi	232.9 km / 144.7 mi
Precipitation Scatter Contour Radius	510.5 km / 317.2 mi	267.2 km / 166.0 mi



# COMSEARCH

## Earth Station Data Sheet

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### Coordination Values

### CASTLE ROCK, CO

Licensee Name: Intelsat License LLC  
Latitude (NAD 83): 39° 16' 34.0" N  
Longitude (NAD 83): 104° 48' 27.0" W  
Ground Elevation (AMSL): 2084.83 m / 6840.0 ft  
Antenna Centerline (AGL): 6.0 m / 19.7 ft  
Antenna Model: ViaSat 9 Meter  
Antenna Mode: Receive 4.0 GHz  
Interference Objectives: Long Term: -158.0 dBW/MHz 20%  
Short Term: -148.0 dBW/MHz 0.01%  
Transmit 6.1 GHz: -154.0 dBW/4 kHz 20%  
-131.0 dBW/4 kHz 0.0025%  
Max Available RF Power: 3.7 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 4.0 GHz		Transmit 6.1 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
0	4.48	113.33	-10.00	149.67	-10.00	100.00
5	4.52	108.50	-10.00	149.02	-10.00	100.00
10	4.70	103.66	-10.00	146.25	-10.00	100.00
15	4.82	98.81	-10.00	144.48	-10.00	100.00
20	4.55	93.95	-10.00	148.54	-10.00	100.00
25	4.02	89.09	-10.00	157.05	-10.00	100.00
30	3.53	84.26	-10.00	169.58	-10.00	100.00
35	3.52	79.42	-10.00	169.87	-10.00	100.00
40	3.44	74.60	-10.00	171.58	-10.00	100.00
45	2.89	69.84	-10.00	184.17	-10.00	100.00
50	2.15	65.15	-10.00	200.50	-10.00	109.71
55	1.88	60.44	-10.00	204.49	-10.00	115.58
60	1.39	55.82	-10.00	218.45	-10.00	127.85
65	1.10	51.23	-10.00	227.63	-10.00	134.04
70	0.00	46.96	-9.79	299.70	-9.79	196.15
75	0.00	42.48	-8.71	307.10	-8.71	200.31
80	0.00	38.11	-7.53	315.96	-7.53	204.80
85	0.00	33.88	-6.25	325.05	-6.25	208.08
90	0.00	29.86	-4.88	335.02	-4.88	213.56
95	0.26	25.97	-3.36	338.36	-3.36	213.99
100	0.24	22.70	-1.90	352.14	-1.90	222.25
105	0.27	20.06	-0.56	358.87	-0.56	225.42
110	0.23	18.44	0.36	370.32	0.36	232.89
115	0.31	17.95	0.65	362.24	0.65	226.19
120	0.47	18.70	0.20	338.27	0.20	209.15
125	0.29	20.93	-1.02	352.33	-1.02	221.14
130	0.64	23.57	-2.31	304.44	-2.31	190.38
135	0.45	27.00	-3.78	309.59	-3.78	195.93
140	0.51	30.07	-4.96	294.37	-4.96	185.84
145	0.52	32.99	-5.96	286.61	-5.96	180.90
150	0.72	35.51	-6.76	267.60	-6.76	164.16
155	0.90	37.75	-7.42	252.18	-7.42	151.67
160	1.01	39.68	-7.97	242.10	-7.97	143.93
165	1.09	41.26	-8.39	236.92	-8.39	140.10
170	1.51	42.05	-8.59	221.92	-8.59	129.58
175	1.45	42.84	-8.80	222.79	-8.80	130.45
180	1.56	42.97	-8.83	219.19	-8.83	127.54
185	1.79	42.50	-8.71	213.06	-8.71	122.28

# COMSEARCH

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### Coordination Values

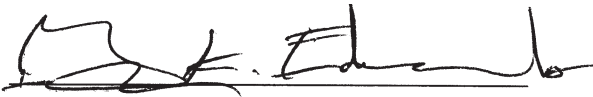
### CASTLE ROCK, CO

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Latitude (NAD 83)	39° 16' 34.0" N			
Longitude (NAD 83)	104° 48' 27.0" W			
Ground Elevation (AMSL)	2084.83 m / 6840.0 ft			
Antenna Centerline (AGL)	6.0 m / 19.7 ft			
Antenna Model	ViaSat 9 Meter			
Antenna Mode	Receive 4.0 GHz		Transmit 6.1 GHz	
Interference Objectives: Long Term	-158.0 dBW/MHz	20%	-154.0 dBW/4 kHz	20%
Short Term	-148.0 dBW/MHz	0.01%	-131.0 dBW/4 kHz	0.0025%
Max Available RF Power			3.7 (dBW/4 kHz)	

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 4.0 GHz		Transmit 6.1 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
190	1.75	41.83	-8.54	215.26	-8.54	124.03
195	1.84	40.55	-8.20	214.31	-8.20	122.97
200	1.89	38.90	-7.75	215.24	-7.75	123.41
205	2.48	36.39	-7.03	205.04	-7.03	113.94
210	2.70	33.91	-6.26	206.45	-6.26	112.54
215	3.11	31.53	-5.47	201.76	-5.47	107.78
220	3.19	30.06	-4.95	202.83	-4.95	108.41
225	2.67	29.88	-4.88	211.64	-4.88	118.34
230	2.96	29.66	-4.80	205.77	-4.80	113.14
235	3.06	30.39	-5.07	204.81	-5.07	110.28
240	2.99	31.99	-5.63	203.62	-5.63	109.55
245	3.16	33.98	-6.28	196.79	-6.28	103.88
250	3.06	36.69	-7.11	194.81	-7.11	102.67
255	3.14	39.66	-7.96	188.69	-7.96	100.00
260	3.25	42.95	-8.82	182.01	-8.82	100.00
265	3.22	46.56	-9.70	178.18	-9.70	100.00
270	3.45	50.24	-10.00	171.50	-10.00	100.00
275	3.52	54.15	-10.00	169.88	-10.00	100.00
280	4.02	58.04	-10.00	157.06	-10.00	100.00
285	4.65	62.04	-10.00	147.03	-10.00	100.00
290	4.36	66.38	-10.00	151.56	-10.00	100.00
295	4.44	70.68	-10.00	150.28	-10.00	100.00
300	4.59	75.01	-10.00	147.87	-10.00	100.00
305	4.64	79.39	-10.00	147.18	-10.00	100.00
310	4.29	83.82	-10.00	152.72	-10.00	100.00
315	4.02	88.22	-10.00	157.08	-10.00	100.00
320	4.76	92.64	-10.00	145.40	-10.00	100.00
325	5.39	97.10	-10.00	137.79	-10.00	100.00
330	5.90	101.59	-10.00	134.08	-10.00	100.00
335	5.83	106.01	-10.00	134.81	-10.00	100.00
340	5.42	110.34	-10.00	137.57	-10.00	100.00
345	4.54	114.49	-10.00	148.69	-10.00	100.00
350	4.10	118.61	-10.00	155.72	-10.00	100.00
355	4.20	118.11	-10.00	154.10	-10.00	100.00

## 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: June 15, 2016