

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
Comcast Cable Communications Mgt LLC
(National Digital Television Center, Inc.)
LITTLETON, CO
Satellite Earth Station

Prepared By:
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147
April 21, 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.

The following companies reported potential great circle interference conflicts that did not meet the objectives on a line-of-sight basis. When over-the-horizon losses are considered on the interfering paths, sufficient blockage exists to negate harmful interference from occurring with the proposed transmit-receive earth station.

Company

AT&T Mobility Spectrum LLC – CO
Community Radio for Northern Colorado
New Cingular Wireless PCS LLC -Colorado
Tribune Broadcasting Denver License, LLC
LP Broadband, Inc.
City of Lakewood, CO
State of Colorado

No other carriers reported potential interference cases.

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 03/09/2018.

Company

AC BidCO LLC
AT&T Mobility Spectrum LLC - CO
AirLife Denver
Arvada Police Dept.
BNSF Railway Company
Basin Electric Power Cooperative
Black Hawk Police Department
Black Hills Power and Light
Bonanza Creek Energy Inc
Boulder, County of
CBS Communications Services Inc
CBS Television Stations
Cellular Inc. Network Corporation
Cellular, Inc. Financial Corporation
Chaffee County Telecom, LLC
Citicasters Licenses, Inc.
City of Aurora
City of Colorado Springs
City of Lakewood, CO
Colorado Interstate Gas Company
Colorado Springs Utilities
Community Radio for Northern Colorado
Directlink, LLC
Douglas County Sheriff's Office
Elbert County Communications Authority
Entravision Holdings, LLC
Fones West Digital Systems Inc.
Front Range Internet, Inc.
Gilpin County Sheriff's Office
Gray Television Licensee, LLC
Holy Cross Electric Association, Inc.
Industrial Tower and Wireless, LLC
Intermountain Rural Electric Association
KSE Radio Ventures, LLC
Kellin Communications
LP Broadband, Inc.
Larimer County Technical Communications
Live Wire Networks, Inc.
MHO Networks
Morgan County Communications
Morgan County Rural Electric Association

Mountain Broadband LLC
Mountain Parks Electric Inc.
Mountain View Electric Association, Inc.
Multimedia Holdings Corporation
NE Colorado Cellular, Inc.
New Cingular Wireless PCS - ID, WY
New Cingular Wireless PCS LLC -Colorado
Nex-Tech Wireless, LLC
Olympic Wireless, LLC
Pitkin County
Platte River Power Authority
Qwest Corporation
Roggen Telephone Enterprises, Inc.
Sangre de Cristo Communications, LLC
Sprint Communications Company, LP
Sprint Spectrum L.P.
State of Colorado
T-Mobile License LLC
Tallgrass Operations, LLC
Tri-State Generation & Transmission Assn
Tribune Broadcasting Denver License, LLC
Union Pacific Railroad Company
Union Telephone Company, Inc.
University Corp for Atmospheric Research
Verizon Wireless (VAW) LLC -CO/ID/MT/WY
Xcel Energy Services, Inc.
Y-W Electric Association, 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: 04/18/2018
Job Number: 180309COMSGE01

Administrative Information

Status ENGINEER PROPOSAL
Call Sign E930368
Licensee Code COMGTL
Licensee Name Comcast Cable Communications Mgt LLC (**National Digital Television Center, Inc**)

Site Information

LITTLETON, CO
Venue Name
Latitude (NAD 83) 39° 34' 45.3" N
Longitude (NAD 83) 104° 56' 19.4" W
Climate Zone A
Rain Zone 2
Ground Elevation (AMSL) 1731.6 m / 5681.1 ft

Link Information

Satellite Type Geostationary
Mode TR - Transmit-Receive
Modulation Digital
Satellite Arc 65° W to 145° West Longitude
Azimuth Range 127.3° to 232.8°
Corresponding Elevation Angles 28.6° / 28.5°
Antenna Centerline (AGL) 8.99 m / 29.5 ft

Antenna Information

		Receive - FCC32		Transmit - FCC32	
Manufacturer		Vertex		Vertex	
Model		9 meter		9 meter	
Gain / Diameter		50.1 dBi / 9.0 m		53.5 dBi / 9.0 m	
3-dB / 15-dB Beamwidth		0.55° / 1.20°		0.40° / 0.80°	
Max Available RF Power	(dBW/4 kHz) (dBW/MHz)			-2.7 21.3	
Maximum EIRP	(dBW/4 kHz) (dBW/MHz)			50.8 74.8	
Interference Objectives:	Long Term	-144.0 dBW/MHz	20%	-154.0 dBW/4 kHz	20%
	Short Term	-134.0 dBW/MHz	0.01%	-131.0 dBW/4 kHz	0.0025%

Frequency Information

	Receive 4.0 GHz	Transmit 6.1 GHz
Emission / Frequency Range (MHz)	2M50G7W - 36M0G7W / 3700.0 - 4200.0	2M50G7W - 36M0G7W / 5925.0 - 6425.0
Max Great Circle Coordination Distance	247.7 km / 153.9 mi	192.3 km / 119.5 mi
Precipitation Scatter Contour Radius	457.4 km / 284.2 mi	100.0 km / 62.1 mi

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Coordination Values

LITTLETON, CO

Licensee Name Comcast Cable Communications Mgt LLC
Latitude (NAD 83) 39° 34' 45.3" N
Longitude (NAD 83) 104° 56' 19.4" W
Ground Elevation (AMSL) 1731.6 m / 5681.1 ft
Antenna Centerline (AGL) 8.99 m / 29.5 ft
Antenna Model Vertex 9 meter
Antenna Mode Receive 4.0 GHz Transmit 6.1 GHz
Interference Objectives: Long Term -144.0 dBW/MHz 20% -154.0 dBW/4 kHz 20%
Short Term -134.0 dBW/MHz 0.01% -131.0 dBW/4 kHz 0.0025%
Max Available RF Power -2.7 (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	0.00	122.05	-10.00	220.54	-10.00	170.66
5	0.00	117.96	-10.00	220.54	-10.00	170.66
10	0.00	113.72	-10.00	220.54	-10.00	170.66
15	0.00	109.44	-10.00	220.54	-10.00	170.66
20	0.00	105.11	-10.00	220.54	-10.00	170.66
25	0.00	100.76	-10.00	220.54	-10.00	170.66
30	0.00	96.38	-10.00	220.54	-10.00	170.66
35	0.00	92.00	-10.00	220.54	-10.00	170.66
40	0.00	87.61	-10.00	220.54	-10.00	170.66
45	0.00	83.22	-10.00	220.54	-10.00	170.66
50	0.00	78.85	-10.00	220.54	-10.00	170.66
55	0.00	74.49	-10.00	220.54	-10.00	170.66
60	0.00	70.17	-10.00	220.54	-10.00	170.66
65	0.00	65.89	-10.00	220.54	-10.00	170.66
70	0.24	61.59	-10.00	216.26	-10.00	164.40
75	0.35	57.38	-10.00	206.03	-10.00	153.12
80	0.40	53.27	-10.00	204.23	-10.00	148.55
85	0.46	49.27	-10.00	198.76	-10.00	142.90
90	0.43	45.45	-9.44	203.60	-9.44	147.42
95	0.49	41.77	-8.52	202.46	-8.52	145.49
100	0.48	38.37	-7.60	206.60	-7.60	149.19
105	0.48	35.30	-6.69	208.39	-6.69	153.00
110	0.53	32.58	-5.82	208.28	-5.82	152.13
115	0.53	30.43	-5.08	211.83	-5.08	155.43
120	0.55	28.89	-4.52	212.82	-4.52	156.06
125	0.61	28.07	-4.21	211.41	-4.21	154.32
130	0.67	28.05	-4.20	208.18	-4.20	150.86
135	0.86	28.71	-4.45	200.19	-4.45	140.20
140	0.92	30.25	-5.02	194.67	-5.02	135.32
145	1.24	32.22	-5.70	180.11	-5.70	124.40
150	1.23	34.84	-6.55	176.67	-6.55	122.18
155	0.80	37.54	-7.36	190.51	-7.36	133.22
160	0.99	39.40	-7.89	178.09	-7.89	124.32
165	1.33	40.71	-8.24	163.67	-8.24	114.31
170	0.87	42.34	-8.67	180.88	-8.67	127.18
175	0.90	43.05	-8.85	178.71	-8.85	125.51
180	0.97	43.23	-8.89	174.64	-8.89	122.20
185	1.22	42.74	-8.77	164.87	-8.77	115.65

COMSEARCH

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Coordination Values

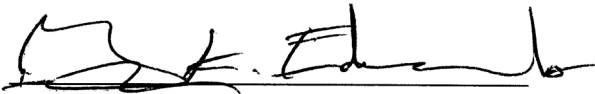
LITTLETON, CO

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Short Term -134.0 dBW/MHz 0.01% -131.0 dBW/4 kHz 0.0025%
Max Available RF Power -2.7 (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	1.29	41.94	-8.57	163.58	-8.57	114.46
195	0.98	41.04	-8.33	176.89	-8.33	123.64
200	0.95	39.43	-7.90	180.12	-7.90	126.01
205	0.95	37.42	-7.33	183.14	-7.33	128.14
210	0.84	35.15	-6.65	191.76	-6.65	133.79
215	0.76	32.61	-5.83	199.18	-5.83	140.07
220	0.55	30.56	-5.13	210.45	-5.13	153.96
225	0.42	29.08	-4.59	223.25	-4.59	168.92
230	0.24	28.40	-4.33	242.98	-4.33	188.00
235	0.00	28.59	-4.40	247.70	-4.40	192.28
240	0.00	29.32	-4.68	246.24	-4.68	191.22
245	0.00	30.79	-5.21	243.46	-5.21	189.18
250	0.00	32.90	-5.93	239.77	-5.93	186.42
255	0.00	35.53	-6.76	235.60	-6.76	183.20
260	0.00	38.57	-7.66	231.27	-7.66	179.75
265	0.00	41.93	-8.56	227.00	-8.56	176.24
270	0.00	45.54	-9.46	222.92	-9.46	172.75
275	0.00	49.35	-10.00	220.54	-10.00	170.66
280	0.00	53.30	-10.00	220.54	-10.00	170.66
285	0.00	57.37	-10.00	220.54	-10.00	170.66
290	0.00	61.54	-10.00	220.54	-10.00	170.66
295	0.00	65.77	-10.00	220.54	-10.00	170.66
300	0.00	70.05	-10.00	220.54	-10.00	170.66
305	0.00	74.38	-10.00	220.54	-10.00	170.66
310	0.00	78.73	-10.00	220.54	-10.00	170.66
315	0.00	83.11	-10.00	220.54	-10.00	170.66
320	0.00	87.50	-10.00	220.54	-10.00	170.66
325	0.00	91.89	-10.00	220.54	-10.00	170.66
330	0.00	96.28	-10.00	220.54	-10.00	170.66
335	0.00	100.66	-10.00	220.54	-10.00	170.66
340	0.00	105.02	-10.00	220.54	-10.00	170.66
345	0.00	109.35	-10.00	220.54	-10.00	170.66
350	0.00	113.64	-10.00	220.54	-10.00	170.66
355	0.00	117.88	-10.00	220.54	-10.00	170.66

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: April 21, 2018