

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
Minnesota Public Radio
ST PAUL, MN
Satellite Earth Station

Prepared By:
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147
June 26, 2014

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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. Operation will be limited to the bandwidth shown in Section 4 of this report.

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

BNSF Railway Company
Minnesota, State of (DOT)
New Cingular Wireless PCS LLC- Wisconsin
New Cingular Wireless PCS LLC-Minnesota
Rice County
St. Olaf College
T-Mobile License LLC
Verizon Wireless (VAW) LLC (ND,MN,SD,NE)

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 06/10/2014.

Company

AT&T COMMUNICATIONS OF THE MIDWEST INC

AT&T Mobility Wireless Ops Hldgs - MN

BNSF Railway Company

CTC Telcom, Inc.

Cooperative TV Assn of Southern Minn.

Dairyland Power Cooperative

Eden Prairie, City of (Fire Dept)

HENNEPIN COUNTY

Illinois Central Railroad

Le Sueur County of

MEEKER, COUNTY OF

Midwest Wireless Communications, LLC

Minnesota, State of (DOT)

New Cingular Wireless PCS LLC- Wisconsin

New Cingular Wireless PCS LLC-Minnesota

Northern Border Pipeline Company

Northern PCS Services, LLC

RCC Minnesota Inc. - MN NE ND SD

RIVERLAND COMMUNICATIONS, INC.

Redwood Tel Acquisition, Inc.

Rice County

St. Olaf College

Steele County Sheriff's Office

T-Mobile License LLC

USCOC OF WISCONSIN RSA #6, INC.

USCOC OF WISCONSIN RSA #7, INC.

Verizon Wireless (VAW) LLC (ND,MN,SD,NE)

Verizon Wireless (VAW) LLC - IA/IL/WI

Waseca, County of

Wisconsin Bell, Inc.

Wisconsin, State of

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: 06/26/2014
Job Number: 140610COMSTC03

Administrative Information

Licensee Name Minnesota Public Radio

Site Information

ST PAUL, MN

Latitude (NAD 83) 44° 56' 56.9" N
Longitude (NAD 83) 93° 5' 49.8" W
Climate Zone A
Rain Zone 2
Ground Elevation (AMSL) 240.79 m / 790.0 ft

Link Information

Satellite Type Geostationary
Mode TR - Transmit-Receive
Modulation Digital
Satellite Arc 93° W to 139° West Longitude
Azimuth Range 179.9° to 235.6°
Corresponding Elevation Angles 38.2° / 21.4°
Antenna Centerline (AGL) 20.12 m / 66.0 ft

Antenna Information

Receive

Transmit

Manufacturer	Prodelin	Prodelin
Model	1383	1383
Gain / Diameter	41.0 dBi / 3.8 m	45.9 dBi / 3.8 m
3-dB / 15-dB Beamwidth	1.20° / 2.40°	1.00° / 2.00°

		<u>76K8G7W - 1M85G7W</u>		<u>76K8G1D</u>	<u>150KF3D</u>
Max Available RF Power	(dBW/4 kHz)	-2.9	-12.5	-2.9	-5.7
	(dBW/MHz)	21.1	11.5	21.1	18.3
Maximum EIRP	(dBW/4 kHz)	43.0	33.4	43.0	40.2
	(dBW/MHz)	67.0	57.4	67.0	64.2
	(dBW)	55.83	60.06	55.83	55.94
Interference Objectives:	Long Term	-156.0 dBW/MHz	20%	-154.0 dBW/4 kHz	20%
	Short Term	-146.0 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)	76K8G7W - 1M85G7W / 3700.0 - 4200.0	76K8G7W - 1M85G7W / 5925.0 - 6261.0
	76K8G1D / 3700.0 - 4200.0	76K8G7W - 1M85G7W / 6311.0 - 6425.0
	150KF3D / 3700.0 - 4200.0	76K8G1D / 5925.0 - 6261.0
		76K8G1D / 6311.0 - 6425.0
		150KF3D / 5925.0 - 6261.0
		150KF3D / 6311.0 - 6425.0

Max Great Circle Coordination Distance	341.1 km / 211.9 mi	199.6 km / 124.0 mi
Precipitation Scatter Contour Radius	501.1 km / 311.4 mi	100.0 km / 62.1 mi

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Coordination Values

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Latitude (NAD 83) 44° 56' 56.9" N
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Ground Elevation (AMSL) 240.79 m / 790.0 ft
Antenna Centerline (AGL) 20.12 m / 66.0 ft
Antenna Mode Receive 4.0 GHz Transmit 6.1 GHz
Interference Objectives: Long Term -156.0 dBW/MHz 20% -154.0 dBW/4 kHz 20%
Short Term -146.0 dBW/MHz 0.01% -131.0 dBW/4 kHz 0.0025%
Max Available RF Power -2.9 (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	0.71	121.90	-10.00	236.74	-10.00	130.12
5	0.78	126.44	-10.00	232.43	-10.00	126.80
10	0.70	130.87	-10.00	237.31	-10.00	130.56
15	0.00	134.98	-10.00	285.28	-10.00	169.88
20	0.27	137.76	-10.00	276.04	-10.00	160.20
25	0.34	135.60	-10.00	268.47	-10.00	153.76
30	0.26	132.98	-10.00	277.73	-10.00	161.66
35	0.26	130.14	-10.00	277.68	-10.00	161.62
40	0.20	127.03	-10.00	284.93	-10.00	169.57
45	0.31	123.81	-10.00	272.22	-10.00	156.93
50	0.23	120.34	-10.00	281.45	-10.00	164.90
55	0.25	116.78	-10.00	279.00	-10.00	162.76
60	0.37	113.15	-10.00	264.60	-10.00	150.53
65	0.34	109.38	-10.00	268.56	-10.00	153.83
70	0.35	105.56	-10.00	266.89	-10.00	152.44
75	0.29	101.67	-10.00	274.03	-10.00	158.47
80	0.32	97.77	-10.00	269.84	-10.00	154.91
85	0.29	93.84	-10.00	273.55	-10.00	158.06
90	0.34	89.89	-10.00	267.78	-10.00	153.17
95	0.34	85.95	-10.00	268.56	-10.00	153.83
100	0.00	82.05	-10.00	285.28	-10.00	169.88
105	0.30	78.12	-10.00	273.10	-10.00	157.68
110	0.29	74.25	-10.00	274.42	-10.00	158.80
115	0.20	70.45	-10.00	285.08	-10.00	169.71
120	0.00	66.77	-10.00	285.28	-10.00	169.88
125	0.00	63.12	-10.00	285.28	-10.00	169.88
130	0.00	59.58	-10.00	285.28	-10.00	169.88
135	0.00	56.17	-10.00	285.28	-10.00	169.88
140	0.00	52.92	-10.00	285.28	-10.00	169.88
145	0.39	49.61	-10.00	261.81	-10.00	148.24
150	0.45	46.73	-9.74	256.62	-9.74	143.67
155	0.43	44.20	-9.14	263.13	-9.14	148.05
160	0.56	41.89	-8.55	254.65	-8.55	140.47
165	0.63	40.02	-8.06	252.95	-8.06	138.49
170	0.80	38.53	-7.64	244.80	-7.64	133.22
175	0.67	37.82	-7.44	253.76	-7.44	138.27
180	0.66	37.57	-7.37	255.21	-7.37	139.28
185	0.81	37.21	-7.27	245.94	-7.27	133.57

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Interference Objectives: Long Term	-156.0 dBW/MHz	20%	-154.0 dBW/4 kHz	20%
Short Term	-146.0 dBW/MHz	0.01%	-131.0 dBW/4 kHz	0.0025%
Max Available RF Power			-2.9 (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	0.80	36.60	-7.09	248.00	-7.09	133.60
195	0.71	35.67	-6.81	255.36	-6.81	138.61
200	0.43	34.54	-6.46	279.55	-6.46	157.44
205	0.00	33.19	-6.03	311.82	-6.03	185.27
210	0.00	31.14	-5.33	317.32	-5.33	187.95
215	0.00	28.82	-4.49	323.32	-4.49	191.18
220	0.00	26.26	-3.48	330.60	-3.48	195.05
225	0.00	23.78	-2.41	338.49	-2.41	199.16
230	0.23	21.88	-1.50	341.08	-1.50	199.57
235	0.32	21.10	-1.11	332.84	-1.11	192.82
240	0.57	21.28	-1.20	302.87	-1.20	170.03
245	0.90	22.47	-1.79	275.64	-1.79	147.41
250	0.97	24.82	-2.87	263.70	-2.87	139.79
255	0.94	27.91	-4.15	257.62	-4.15	136.84
260	0.93	31.45	-5.44	250.23	-5.44	134.23
265	0.87	35.33	-6.70	245.76	-6.70	132.71
270	0.75	39.46	-7.90	245.99	-7.90	133.17
275	0.60	43.75	-9.02	249.18	-9.02	137.01
280	0.40	48.16	-10.00	261.01	-10.00	147.58
285	0.38	52.59	-10.00	263.71	-10.00	149.79
290	0.30	57.10	-10.00	272.73	-10.00	157.36
295	0.31	61.64	-10.00	271.49	-10.00	156.31
300	0.26	66.23	-10.00	277.78	-10.00	161.70
305	0.29	70.84	-10.00	274.01	-10.00	158.45
310	0.28	75.47	-10.00	274.90	-10.00	159.21
315	0.26	80.12	-10.00	277.14	-10.00	161.15
320	0.23	84.78	-10.00	282.07	-10.00	165.44
325	0.45	89.44	-10.00	255.12	-10.00	142.83
330	0.50	94.11	-10.00	249.85	-10.00	138.80
335	0.69	98.78	-10.00	238.08	-10.00	131.14
340	0.98	103.47	-10.00	221.57	-10.00	118.09
345	1.22	108.16	-10.00	213.71	-10.00	111.41
350	0.73	112.73	-10.00	235.58	-10.00	129.24
355	0.36	117.26	-10.00	266.05	-10.00	151.73

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 26, 2014