

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for

**Brigham Young University
Provo, Utah
(Call Sign: E110056)**

Satellite Earth Station

Prepared By:
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, Virginia 20147
August 8, 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, based upon the restrictions noted in the Summary of Results (Section 2).

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 most cases.

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 and frequency separation are considered on the interfering paths, sufficient losses exist to negate harmful interference from occurring with the proposed transmit-receive earth station. Further, the transmit spectrum will be limited to frequencies 5925.0 to 6107.0 MHz, 6141.0 to 6270.0 MHz, 6303.0 to 6359.0 MHz, and 6392.0 to 6425.0 MHz.

Company

None

No 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.

Expedited coordination data for this earth station was sent to the below listed carriers with a letter dated June 25, 2014. A minor revision was forwarded for the earth station on August 2, 2014.

Company

AT&T Mobility Wireless Operations Hldgs
All West Communications, Inc.
Beehive Telephone Company, Inc.
Bonneville International Corporation
Brigham Young University
Carbon County
Cellular, Inc. Financial Corporation
Citizens Telecommunications Co of Utah
Deseret Generation and Transmission Coop
Emery County Sheriff's Office
Great Basin Electronics, Inc.
Intermountain Health Care
New Cingular Wireless PCS LLC-Utah
Nextel License Holdings 4 Inc.
PacifiCorp
Questar Infocomm, Inc.
Qwest Corporation
SALT LAKE COUNTY OF
Sprint Spectrum L.P.
T-MOBILE LIC LLC - VOICESTREAM PCS BTA I
T-Mobile License LLC
TOOELE COUNTY DEPT OF EMERGENCY MGMT
UTAH, COUNTY OF
Union Pacific Railroad Company
Union Telephone Company, Inc.
Utah Communications Agency Network
Utah Transit Authority, State of Utah
Utah, State of
Verizon Wireless (VAW) LLC - (UTAH)
Wasatch Utah RSA No. 2 Ltd Partnership

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: 08/08/2014
Job Number: 140802COMSJC01

Administrative Information

Status ENGINEER PROPOSAL
Call Sign E110056
Licensee Code BYUBRD
Licensee Name Brigham Young University

Site Information

PROVO, UTAH
Venue Name
Latitude (NAD 83) 40° 15' 16.9" N
Longitude (NAD 83) 111° 38' 52.3" W
Climate Zone A
Rain Zone 5
Ground Elevation (AMSL) 1433.78 m / 4704.0 ft

Link Information

Satellite Type Geostationary
Mode TR - Transmit-Receive
Modulation Digital
Satellite Arc 90° W to 92° West Longitude
Azimuth Range 148.4° to 151.1°
Corresponding Elevation Angles 38.4° / 39.2°
Antenna Centerline (AGL) 21.34 m / 70.0 ft

Antenna Information

	Receive	Transmit
Manufacturer	ASC Signal	ASC Signal
Model	4.5 Meter	4.5 Meter
Gain / Diameter	43.8 dBi / 4.5 m	46.6 dBi / 4.5 m
3-dB / 15-dB Beamwidth	1.10° / 2.10°	0.80° / 1.50°

5M06G7W to 30M0G7W

Max Available RF Power	(dBW/4 kHz)	-16.3	-16.3		
	(dBW/MHz)	7.7	7.7		
Maximum EIRP	(dBW/4 kHz)	30.3	30.3		
	(dBW/MHz)	54.3	54.3		
	(dBW)	61.3	69.05		
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)	5M06G7W - 30M0G7W / 3700.0 - 4200.0	5M06G7W - 30M0G7W / 5925.0 - 6107.0 5M06G7W - 30M0G7W / 6141.0 - 6270.0 5M06G7W - 30M0G7W / 6303.0 - 6359.0 5M06G7W - 30M0G7W / 6392.0 - 6425.0

Max Great Circle Coordination Distance	298.3 km / 185.3 mi	132.0 km / 82.0 mi
Precipitation Scatter Contour Radius	383.4 km / 238.2 mi	100.0 km / 62.1 mi

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Coordination Values

PROVO, UT

Licensee Name Brigham Young University
Latitude (NAD 83) 40° 15' 16.9" N
Longitude (NAD 83) 111° 38' 52.3" W
Ground Elevation (AMSL) 1433.78 m / 4704.0 ft
Antenna Centerline (AGL) 21.34 m / 70.0 ft
Antenna Model ASC Signal 4.5 Meter
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 -16.3 (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	1.87	133.23	-10.00	198.17	-10.00	100.00
5	2.54	130.64	-10.00	182.12	-10.00	100.00
10	3.54	127.90	-10.00	157.39	-10.00	100.00
15	4.52	124.82	-10.00	140.13	-10.00	100.00
20	6.00	121.67	-10.00	125.27	-10.00	100.00
25	6.97	118.06	-10.00	114.62	-10.00	100.00
30	8.78	114.47	-10.00	100.00	-10.00	100.00
35	11.07	110.70	-10.00	100.00	-10.00	100.00
40	13.15	106.63	-10.00	100.00	-10.00	100.00
45	13.71	102.20	-10.00	100.00	-10.00	100.00
50	14.85	97.74	-10.00	100.00	-10.00	100.00
55	15.98	93.18	-10.00	100.00	-10.00	100.00
60	13.57	88.59	-10.00	100.00	-10.00	100.00
65	12.22	84.12	-10.00	100.00	-10.00	100.00
70	11.75	79.68	-10.00	100.00	-10.00	100.00
75	13.01	75.08	-10.00	100.00	-10.00	100.00
80	17.70	69.89	-10.00	100.00	-10.00	100.00
85	18.61	65.12	-10.00	100.00	-10.00	100.00
90	19.82	60.26	-10.00	100.00	-10.00	100.00
95	19.04	55.80	-10.00	100.00	-10.00	100.00
100	17.22	51.78	-10.00	100.00	-10.00	100.00
105	15.18	48.14	-10.00	100.00	-10.00	100.00
110	15.27	43.91	-9.06	100.00	-9.06	100.00
115	15.72	39.64	-7.95	100.00	-7.95	100.00
120	14.38	36.55	-7.07	100.00	-7.07	100.00
125	12.93	34.06	-6.30	100.00	-6.30	100.00
130	11.90	31.88	-5.59	100.00	-5.59	100.00
135	10.33	30.86	-5.24	103.53	-5.24	100.00
140	8.36	31.07	-5.31	119.59	-5.31	100.00
145	6.19	32.35	-5.75	139.15	-5.75	100.00
150	3.80	34.61	-6.48	171.61	-6.48	100.00
155	0.73	38.13	-7.53	249.61	-7.53	100.00
160	0.00	39.82	-8.00	298.31	-8.00	132.03
165	0.00	41.24	-8.38	295.77	-8.38	131.01
170	0.00	42.88	-8.81	292.99	-8.81	129.88
175	0.00	44.91	-9.31	289.71	-9.31	128.54
180	0.00	47.31	-9.87	286.09	-9.87	127.05

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Short Term -146.0 dBW/MHz 0.01% -131.0 dBW/4 kHz 0.0025%
Max Available RF Power -16.3 (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)
185	0.00	49.99	-10.00	285.28	-10.00	126.71
190	0.00	52.93	-10.00	285.28	-10.00	126.71
195	0.00	56.08	-10.00	285.28	-10.00	126.71
200	0.00	59.40	-10.00	285.28	-10.00	126.71
205	0.00	62.86	-10.00	285.28	-10.00	126.71
210	0.00	66.43	-10.00	285.28	-10.00	126.71
215	0.00	70.09	-10.00	285.28	-10.00	126.71
220	0.00	73.82	-10.00	285.28	-10.00	126.71
225	0.00	77.61	-10.00	285.28	-10.00	126.71
230	0.00	81.44	-10.00	285.28	-10.00	126.71
235	0.00	85.29	-10.00	285.28	-10.00	126.71
240	0.00	89.16	-10.00	285.28	-10.00	126.71
245	0.00	93.03	-10.00	285.28	-10.00	126.71
250	0.00	96.90	-10.00	285.28	-10.00	126.71
255	0.00	100.74	-10.00	285.28	-10.00	126.71
260	0.00	104.55	-10.00	285.28	-10.00	126.71
265	0.00	108.31	-10.00	285.28	-10.00	126.71
270	0.00	112.00	-10.00	285.28	-10.00	126.71
275	0.00	115.61	-10.00	285.28	-10.00	126.71
280	0.00	119.12	-10.00	285.28	-10.00	126.71
285	0.00	122.50	-10.00	285.28	-10.00	126.71
290	0.00	125.73	-10.00	285.28	-10.00	126.71
295	0.00	128.76	-10.00	285.28	-10.00	126.71
300	0.00	131.56	-10.00	285.28	-10.00	126.71
305	0.00	134.09	-10.00	285.28	-10.00	126.71
310	0.00	136.29	-10.00	285.28	-10.00	126.71
315	0.00	138.10	-10.00	285.28	-10.00	126.71
320	0.00	139.49	-10.00	285.28	-10.00	126.71
325	0.00	140.38	-10.00	285.28	-10.00	126.71
330	0.00	140.76	-10.00	285.28	-10.00	126.71
335	0.00	140.61	-10.00	285.28	-10.00	126.71
340	0.00	139.94	-10.00	285.28	-10.00	126.71
345	0.41	139.08	-10.00	260.36	-10.00	110.10
350	1.17	137.80	-10.00	215.11	-10.00	100.00
355	2.01	136.08	-10.00	194.26	-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.



Jeffrey E. Cowles
Engineer III, Telecommunications
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, Virginia 20147

DATED: August 8, 2014