

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for

**Universal Space Network, Inc.
North Pole, Alaska**

Satellite Earth Station

Prepared By:

COMSEARCH

19700 Janelia Farm Boulevard

Ashburn, Virginia 20147

February 23, 2015

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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-only earth station.

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 emailed and sent to the below listed carriers with a letter dated February 11, 2015.

Company

3G Wireless, LLC
AERIAL VIDEO SYSTEMS
America's Cup Event Authority, LLC
AT&T California
Affiliated Media, Inc. FCC Trust
Alascom Inc
Alaska Public Telecommunications, Inc.
Ascent Media Network Services, LLC
Bellsouth Telecommunications, Inc.
Borgeson, Tom R.
Broadcast Sports Inc.
CHENA BROADCASTING, LLC
Circuit of the Americas, LLC
CNG Communications, Inc.
Carolina Telephone and Telegraph Co
Casper, John
CenturyTel of the Southwest, Inc.
Chicago Comnet Corp
Cincinnati Bell Wireless LLC
Citywide News Network, Inc.
Coastal Television Broadcasting Company
Cohen, Elena
Cowboys Stadium LP
CP Communications, LLC
DCI II, INC.
Denali Media Anchorage, Corp
Direct Broadcast Services, Inc.
Fishman Brothers Enterprises
GOODYEAR TIRE AND RUBBER COMPANY
GSN New, Inc
HF Enterprises, Inc
Hallco Unlimited, Inc.
Hawaiian Telcom, Inc.
Heiden, William

Company (Continued)

Illinois Bell Telephone Company
Indiana Bell Telephone Company
Information & Display Systems, Inc.
Information Super Station, LLC
International Communications Group, Inc.
Kentucky RSA #3 Cellular General Partner
Kentucky RSA #4 Cellular General Partner
Lancellotti, Inc.
Loop Inc.
MERCURY COMMUNICATIONS
Metrosat Communications Inc.
Metro Networks Communications, Inc.
Michigan Bell Telephone Company
Microwave Video Systems, LLC
Moreen, Steven K
NEW ENGLAND DIGITAL DISTRIBUTION, INC.
NEW ENGLAND SATELLITE SYSTEMS INC
NSM Surveillance
Navajo Communications Company
NorthWest Suburbs Community Access Corp
Northern Lights Media, Inc.
OHIO BELL TELEPHONE COMPANY
Onboard Images
Pacific Television Center
Penn Service Microwave Co., Inc.
Plateau Telecommunications, Inc.
Plum TV, LLC
Production & Satellite Services, Inc.
Public Television Communications Center
QUICK LINK CONNECTIONS INC
Qwest Corporation
RCC Minnesota Inc. - MN NE ND SD
REMOTE FACILITIES CONSULTING SERVICES
RF Central, LLC
RF Film, Inc
RF Technology, LLC
Radiofone, Inc.
Randy Hermes Production
Regulus Media Services, Inc.
Remote Broadcasts, Inc.
Southwestern Bell Telephone L.P.
Speedshotz, Inc
Steinert, Christine
Telemovil Del Caribe Inc.
Total RF Marketing Inc
Unisat, Inc.
United Telephone - Southeast
VERIZON SOUTH INC.
VISION ALASKA I LLC

Company (Continued)

Verizon California Inc.
Verizon Maryland, Inc.
Verizon New England Inc.
Verizon New Jersey, Inc.
Verizon New York, Inc.
Verizon North Inc.
Verizon Northwest Inc.
Verizon Pennsylvania, Inc.
Verizon Virginia, Inc.
Verizon Washington DC, Inc.
Village Video Productions Inc
Vitec Broadcast Services, Inc.
Vyvx, LLC
Westar Satellite Services LP
Western Technical Services
Wexler Video, Inc.
Winged Vision Inc
Wisconsin Bell, Inc.
Wolfe Air Aviation

Society of Broadcast Engineers (SBE)

Alaska Region: Entire State

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: 02/23/2015
Job Number: 150211COMSJC02

Administrative Information

Status ENGINEER PROPOSAL
Call Sign NORTH PO
Licensee Code UNSPNE
Licensee Name Universal Space Network, Inc.

Site Information

NORTH POLE, ALASKA

Venue Name
Latitude (NAD 83) 64° 48' 15.3" N
Longitude (NAD 83) 147° 30' 0.8" W
Climate Zone A
Rain Zone 2
Ground Elevation (AMSL) 140.66 m / 461.5 ft

Link Information

Satellite Type Low Earth Orbit
Mode TO - Transmit-Only
Modulation Digital
Minimum Elevation Angle 5.0°
Azimuth Range 0.0° to 360°
Antenna Centerline (AGL) 8.54 m / 28.0 ft

Antenna Information

Transmit

Manufacturer Datron
Model 1453
Gain / Diameter 45.9 dBi / 13.0 m
3-dB / 15-dB Beamwidth 0.76° / 1.46°

Max Available RF Power (dBW/4 kHz) 2.1
(dBW/MHz) 26.1

Maximum EIRP (dBW/4 kHz) 48.0
(dBW/MHz) 72.0
(dBW) 68.0

Interference Objectives: Long Term -154.0 dBW/4 kHz 20%
Short Term -131.0 dBW/4 kHz 0.0025%

Frequency Information

Transmit 2.0 GHz

Emission / Frequency Range (MHz) 400KG1D / 2026.75
400KG1D / 2075.65

Max Great Circle Coordination Distance 476.4 km / 296.0 mi
Precipitation Scatter Contour Radius 188.5 km / 117.1 mi

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Coordination Values

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Longitude (NAD 83) 147° 30' 0.8" W
Ground Elevation (AMSL) 140.66 m / 461.5 ft
Antenna Centerline (AGL) 8.54 m / 28.0 ft
Antenna Model Datron 1453
Antenna Mode Transmit 2.0 GHz
Interference Objectives: Long Term -154.0 dBW/4 kHz 20%
Short Term -131.0 dBW/4 kHz 0.0025%
Max Available RF Power 2.1 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Transmit 2.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
0	0.85	44.64	4.50	340.80
5	1.20	41.42	4.50	317.10
10	1.19	38.28	4.50	317.70
15	1.02	35.36	4.50	328.60
20	0.94	32.94	4.50	331.10
25	0.76	30.98	4.50	348.10
30	0.75	29.83	4.50	348.90
35	0.48	29.15	4.50	375.60
40	0.32	29.36	4.50	396.90
45	0.00	30.18	4.50	476.40
50	0.00	31.99	4.50	476.40
55	0.00	34.38	4.50	476.40
60	0.00	37.23	4.50	476.40
65	0.00	40.45	4.50	476.40
70	0.00	43.94	4.50	476.40
75	0.00	47.65	4.50	476.40
80	0.00	51.53	4.50	476.40
85	0.00	55.55	4.50	476.40
90	0.00	59.66	4.50	476.40
95	0.00	63.85	4.50	476.40
100	0.00	68.11	4.50	476.40
105	0.00	72.41	4.50	476.40
110	0.00	76.74	4.50	476.40
115	0.00	81.10	4.50	476.40
120	0.00	85.48	4.50	476.40
125	0.00	89.87	4.50	476.40
130	0.00	94.25	4.50	476.40
135	0.00	98.63	4.50	476.40
140	0.00	102.99	4.50	476.40
145	0.00	107.33	4.50	476.40
150	0.00	111.64	4.50	476.40
155	0.00	115.89	4.50	476.40
160	0.00	120.09	4.50	476.40
165	0.00	124.21	4.50	476.40
170	0.00	128.23	4.50	476.40
175	0.00	132.12	4.50	476.40
180	0.00	135.84	4.50	476.40

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Max Available RF Power 2.1 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Transmit 2.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
185	0.00	139.35	4.50	476.40
190	0.00	142.58	4.50	476.40
195	0.00	145.46	4.50	476.40
200	0.00	147.88	4.50	476.40
205	0.00	149.73	4.50	476.40
210	0.00	150.91	4.50	476.40
215	0.00	151.33	4.50	476.40
220	0.00	150.96	4.50	476.40
225	0.00	149.82	4.50	476.40
230	0.00	148.01	4.50	476.40
235	0.00	145.62	4.50	476.40
240	0.00	142.77	4.50	476.40
245	0.00	139.55	4.50	476.40
250	0.00	136.06	4.50	476.40
255	0.00	132.35	4.50	476.40
260	0.00	128.47	4.50	476.40
265	0.00	124.45	4.50	476.40
270	0.00	120.34	4.50	476.40
275	0.00	116.15	4.50	476.40
280	0.00	111.89	4.50	476.40
285	0.00	107.59	4.50	476.40
290	0.00	103.26	4.50	476.40
295	0.00	98.90	4.50	476.40
300	0.00	94.52	4.50	476.40
305	0.00	90.13	4.50	476.40
310	0.35	85.76	4.50	392.50
315	0.96	81.45	4.50	327.70
320	0.60	77.08	4.50	362.70
325	0.80	72.81	4.50	344.80
330	0.82	68.54	4.50	343.20
335	0.69	64.29	4.50	354.20
340	0.94	60.21	4.50	334.10
345	1.16	56.23	4.50	319.50
350	1.18	52.29	4.50	318.30
355	1.23	48.50	4.50	315.30

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
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COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, Va. 20147

DATED: February 23, 2015