

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for

**Universal Space Network, Inc.
Naalehu, Hawaii**

Satellite Earth Station

Prepared By:
COMSEARCH

19700 Janelia Farm Boulevard
Ashburn, Virginia 20147
July 8, 2015

TABLE OF CONTENTS

1. CONCLUSIONS	3
2. SUMMARY OF RESULTS	4
3. SUPPLEMENTAL SHOWING	5
4. EARTH STATION COORDINATION DATA.....	8
5. CERTIFICATION.....	12

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 frequency coordination data for this earth station was emailed and sent to the below listed carriers with a letter dated June 17, 2015.

Company

3G Wireless, LLC
AERIAL VIDEO SYSTEMS
Alascom Inc
Americas Cup Event Authority, LLC
Ascent Media Network Services, LLC
Bellsouth Telecommunications, Inc.
Borgeson, Tom R.
Broadcast Sports Inc.
CNG Communications, Inc.
Carolina Telephone and Telegraph Co
Casper, John
CenturyTel of the Southwest, Inc.
Chicago Comnet Corp
Cincinnati Bell Wireless LLC
Circuit of the Americas, LLC
Citywide News Network, Inc.
Cohen, Elena
Cowboys Stadium LP
CP Communications LLC
DCI II, INC.
Direct Broadcast Services, Inc.
Express Lane Traffic LLC
GOODYEAR TIRE AND RUBBER COMPANY
GSN News, Inc
HAWAII PUBLIC TELEVISION FOUNDATION
HF Enterprises, Inc
Hallco Unlimited, Inc.
Hawaiian Telcom, Inc.
Hearst -Argyle Stations, Inc (KITV-TV)
Heiden, William
Illinois Bell Telephone Company
Indiana Bell Telephone Company
Information & Display Systems, Inc.
Information Super Station, LLC
Interlink Network Corp.
International Communications Group, Inc.

Company (Continued)

KHNL/KGMB License Subsidiary, LLC
Kentucky RSA #3 Cellular General Partner
Kentucky RSA #4 Cellular General Partner
Lancellotti, Inc.
Lin License Company - Hawaii
Loop Inc.
MERCURY COMMUNICATIONS
Metro Networks Communications, Inc.
Metrosat 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
OHIO BELL TELEPHONE COMPANY
Oceanic Time Warner Cable LLC
Onboard Images
Pacific Bell Tel Com dba AT&T California
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
Total Video Houston, LLC
Unisat, Inc.
United Telephone - Southeast
VERIZON SOUTH INC.
Verizon California Inc.
Verizon Maryland, Inc.
Verizon New England Inc.

Company (Continued)

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)

Hawaii 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: 07/08/2015
Job Number: 150617COMSJC01

Administrative Information

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

Site Information

NAALEHU, HAWAII
Venue Name
Latitude (NAD 83) 19° 0' 50.3" N
Longitude (NAD 83) 155° 39' 46.6" W
Climate Zone C
Rain Zone 4
Ground Elevation (AMSL) 378.0 m / 1240.2 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) 5.1
(dBW/MHz) 29.1

Maximum EIRP (dBW/4 kHz) 51.0
(dBW/MHz) 75.0
(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) 200KG2D / 2040.399
200KG2D / 2046.051
200KG2D / 2048.887

Max Great Circle Coordination Distance 760.0 km / 472.2 mi
Precipitation Scatter Contour Radius 176.0 km / 109.3 mi

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Coordination Values

NAALEHU, HI

Licensee Name Universal Space Network, Inc.
Latitude (NAD 83) 19° 0' 50.3" N
Longitude (NAD 83) 155° 39' 46.6" W
Ground Elevation (AMSL) 378.0 m / 1240.2 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 5.1 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Transmit 2.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
0	2.78	76.33	4.50	365.00
5	2.62	74.59	4.50	374.40
10	2.39	72.89	4.50	388.60
15	2.30	71.39	4.50	394.30
20	2.17	69.98	4.50	403.00
25	2.03	68.70	4.50	412.70
30	1.68	67.37	4.50	439.30
35	0.90	65.80	4.50	517.90
40	0.33	64.56	4.50	619.40
45	0.00	63.74	4.50	760.00
50	0.00	63.44	4.50	760.00
55	0.00	63.37	4.50	760.00
60	0.00	63.51	4.50	760.00
65	0.00	63.87	4.50	760.00
70	0.00	64.44	4.50	760.00
75	0.00	65.22	4.50	760.00
80	0.00	66.19	4.50	760.00
85	0.00	67.34	4.50	760.00
90	0.00	68.67	4.50	760.00
95	0.00	70.15	4.50	760.00
100	0.00	71.77	4.50	760.00
105	0.00	73.53	4.50	760.00
110	0.00	75.39	4.50	760.00
115	0.00	77.35	4.50	760.00
120	0.00	79.39	4.50	760.00
125	0.00	81.51	4.50	760.00
130	0.00	83.67	4.50	760.00
135	0.00	85.87	4.50	760.00
140	0.00	88.10	4.50	760.00
145	0.00	90.34	4.50	760.00
150	0.00	92.58	4.50	760.00
155	0.00	94.80	4.50	760.00
160	0.00	96.99	4.50	760.00
165	0.00	99.14	4.50	760.00
170	0.00	101.24	4.50	760.00
175	0.00	103.26	4.50	760.00
180	0.00	105.19	4.50	760.00

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Max Available RF Power 5.1 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Transmit 2.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
185	0.00	107.02	4.50	760.00
190	0.00	108.73	4.50	760.00
195	0.00	110.32	4.50	760.00
200	0.00	111.75	4.50	760.00
205	0.00	113.03	4.50	760.00
210	0.00	114.13	4.50	760.00
215	0.00	115.04	4.50	760.00
220	0.00	115.75	4.50	760.00
225	0.00	116.26	4.50	760.00
230	0.00	116.56	4.50	760.00
235	0.00	116.63	4.50	760.00
240	0.00	116.49	4.50	760.00
245	0.00	116.13	4.50	760.00
250	0.00	115.56	4.50	760.00
255	0.00	114.78	4.50	760.00
260	0.00	113.81	4.50	760.00
265	0.34	112.37	4.50	616.80
270	0.54	110.91	4.50	573.30
275	0.79	109.28	4.50	532.80
280	1.04	107.54	4.50	500.90
285	0.98	105.89	4.50	508.00
290	1.14	104.01	4.50	489.70
295	1.30	102.06	4.50	473.20
300	1.42	100.07	4.50	461.80
305	1.68	97.99	4.50	439.30
310	1.86	95.92	4.50	425.20
315	2.05	93.83	4.50	411.30
320	2.17	91.75	4.50	403.00
325	2.35	89.69	4.50	391.10
330	2.46	87.64	4.50	384.10
335	2.59	85.64	4.50	376.20
340	2.68	83.67	4.50	370.80
345	2.73	81.74	4.50	367.90
350	3.10	80.01	4.50	347.30
355	2.96	78.15	4.50	354.90

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
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19700 Janelia Farm Boulevard
Ashburn, VA 20147

DATED: July 8, 2015