

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
Universal Space Network, Inc.
NORTH POLE, AK
Satellite Earth Station

Prepared By:
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147
November 29, 2017

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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.

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 11/02/2017.

Company

3G Wireless, LLC
AERIAL VIDEO SYSTEMS
Alascom Inc
Ascent Media Network Services, LLC
Bellsouth Telecommunications, Inc.
Borgeson, Tom R.
Broadcast Sports Inc.
Carolina Telephone and Telegraph Co
Casper, John
CenturyTel of the Southwest, Inc.
Chicago Comnet Corp
Cincinnati Bell Wireless LLC
Citywide News Network, Inc.
Cohen, Elena
Cowboys Stadium LP
DCI II, INC.
Direct Broadcast Services, Inc.
Frontier California Inc.
Global Telecom & Technology Americas, In
Goodyear Tire & Rubber Company
Gray Televisions Licensee, LLC (KTVF)
HF Enterprises, Inc
Hallco Unlimited, Inc.
Hawaiian Telcom, Inc.
Heiden, William
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
MERCURY COMMUNICATIONS
Michigan Bell Telephone Company
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 GTelephone Company

Onboard Images
Pacific Bell Tel Com dba AT&T California
Penn Service Microwave Co., Inc.
Plateau Telecommunications, Inc.
Plum TV, LLC
Production & Satellite Services, Inc.
Quick Link Connections Inc.
Qwest Corporation
RCC Minnesota Inc. - MN NE ND SD
REMOTE FACILITIES CONSULTING SERVICES
RF Central, LLC
RF Film, Inc
Radiofone, Inc.
Randy Hermes Production
Remote Broadcasts, Inc.
SBE Coordinator
Southwestern Bell Telephone L.P.
Speedshotz, Inc
TTWN Networks, LLC
Unisat, Inc.
United Telephone - Southeast
VERIZON SOUTH 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
Vyvx, LLC
Westar Satellite Services LP
Western Technical Services
Wexler Video, Inc.
Winged Vision Inc
Wisconsin Bell Telephone Company
Wolfe Air Aviation

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: 11/29/2017
Job Number: 171102COMSGE03

Administrative Information

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

Site Information

NORTH POLE, AK

Venue Name CRYOSAT-2
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) 149.4 m / 490.2 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 - FCC32

Manufacturer Datron
Model 1453
Gain / Diameter 46.3 dBi / 13.0 m
3-dB / 15-dB Beamwidth 0.76° / 1.46°

Max Available RF Power (dBW/4 kHz) 1.7
(dBW/MHz) 25.7

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

Max Great Circle Coordination Distance 293.2 km / 182.2 mi
Precipitation Scatter Contour Radius 179.8 km / 111.7 mi

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Coordination Values

NORTH POLE, AK

Licensee Name Universal Space Network, Inc.
Latitude (NAD 83) 64° 48' 15.3" N
Longitude (NAD 83) 147° 30' 0.8" W
Ground Elevation (AMSL) 149.4 m / 490.2 ft
Antenna Centerline (AGL) 8.54 m / 28.0 ft
Antenna Model Datron 13 meter
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 1.7 (dBW/4 kHz)

| Azimuth (°) | Horizon Elevation (°) | Antenna Discrimination (°) | Transmit 2.0 GHz | |
|-------------|-----------------------|----------------------------|--------------------|----------------------------|
| | | | Horizon Gain (dBi) | Coordination Distance (km) |
| 0 | 0.23 | 44.29 | 4.50 | 293.20 |
| 5 | 0.00 | 40.65 | 4.50 | 293.20 |
| 10 | 0.00 | 37.42 | 4.50 | 293.20 |
| 15 | 0.28 | 34.76 | 4.50 | 293.20 |
| 20 | 0.69 | 32.72 | 4.50 | 293.20 |
| 25 | 0.33 | 30.58 | 4.50 | 293.20 |
| 30 | 0.00 | 29.09 | 4.50 | 293.20 |
| 35 | 0.00 | 28.67 | 4.50 | 293.20 |
| 40 | 0.00 | 29.04 | 4.50 | 293.20 |
| 45 | 0.00 | 30.18 | 4.50 | 293.20 |
| 50 | 0.00 | 31.99 | 4.50 | 293.20 |
| 55 | 0.00 | 34.38 | 4.50 | 293.20 |
| 60 | 0.00 | 37.23 | 4.50 | 293.20 |
| 65 | 0.00 | 40.45 | 4.50 | 293.20 |
| 70 | 0.00 | 43.94 | 4.50 | 293.20 |
| 75 | 0.00 | 47.65 | 4.50 | 293.20 |
| 80 | 0.00 | 51.53 | 4.50 | 293.20 |
| 85 | 0.00 | 55.55 | 4.50 | 293.20 |
| 90 | 0.00 | 59.66 | 4.50 | 293.20 |
| 95 | 0.00 | 63.85 | 4.50 | 293.20 |
| 100 | 0.00 | 68.11 | 4.50 | 293.20 |
| 105 | 0.00 | 72.41 | 4.50 | 293.20 |
| 110 | 0.00 | 76.74 | 4.50 | 293.20 |
| 115 | 0.00 | 81.10 | 4.50 | 293.20 |
| 120 | 0.00 | 85.48 | 4.50 | 293.20 |
| 125 | 0.00 | 89.87 | 4.50 | 293.20 |
| 130 | 0.00 | 94.25 | 4.50 | 293.20 |
| 135 | 0.00 | 98.63 | 4.50 | 293.20 |
| 140 | 0.00 | 102.99 | 4.50 | 293.20 |
| 145 | 0.00 | 107.33 | 4.50 | 293.20 |
| 150 | 0.00 | 111.64 | 4.50 | 293.20 |
| 155 | 0.00 | 115.89 | 4.50 | 293.20 |
| 160 | 0.00 | 120.09 | 4.50 | 293.20 |
| 165 | 0.00 | 124.21 | 4.50 | 293.20 |
| 170 | 0.00 | 128.23 | 4.50 | 293.20 |
| 175 | 0.00 | 132.12 | 4.50 | 293.20 |
| 180 | 0.00 | 135.84 | 4.50 | 293.20 |
| 185 | 0.00 | 139.35 | 4.50 | 293.20 |

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Coordination Values

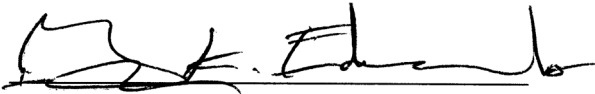
NORTH POLE, AK

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Max Available RF Power 1.7 (dBW/4 kHz)

| Azimuth (°) | Horizon Elevation (°) | Antenna Discrimination (°) | Transmit 2.0 GHz | |
|-------------|-----------------------|----------------------------|--------------------|----------------------------|
| | | | Horizon Gain (dBi) | Coordination Distance (km) |
| 190 | 0.00 | 142.58 | 4.50 | 293.20 |
| 195 | 0.00 | 145.46 | 4.50 | 293.20 |
| 200 | 0.00 | 147.88 | 4.50 | 293.20 |
| 205 | 0.00 | 149.73 | 4.50 | 293.20 |
| 210 | 0.00 | 150.91 | 4.50 | 293.20 |
| 215 | 0.00 | 151.33 | 4.50 | 293.20 |
| 220 | 0.00 | 150.96 | 4.50 | 293.20 |
| 225 | 0.00 | 149.82 | 4.50 | 293.20 |
| 230 | 0.00 | 148.01 | 4.50 | 293.20 |
| 235 | 0.00 | 145.62 | 4.50 | 293.20 |
| 240 | 0.00 | 142.77 | 4.50 | 293.20 |
| 245 | 0.00 | 139.55 | 4.50 | 293.20 |
| 250 | 0.00 | 136.06 | 4.50 | 293.20 |
| 255 | 0.00 | 132.35 | 4.50 | 293.20 |
| 260 | 0.00 | 128.47 | 4.50 | 293.20 |
| 265 | 0.00 | 124.45 | 4.50 | 293.20 |
| 270 | 0.00 | 120.34 | 4.50 | 293.20 |
| 275 | 0.00 | 116.15 | 4.50 | 293.20 |
| 280 | 0.00 | 111.89 | 4.50 | 293.20 |
| 285 | 0.00 | 107.59 | 4.50 | 293.20 |
| 290 | 0.00 | 103.26 | 4.50 | 293.20 |
| 295 | 0.00 | 98.90 | 4.50 | 293.20 |
| 300 | 0.00 | 94.52 | 4.50 | 293.20 |
| 305 | 0.00 | 90.13 | 4.50 | 293.20 |
| 310 | 0.00 | 85.75 | 4.50 | 293.20 |
| 315 | 0.00 | 81.37 | 4.50 | 293.20 |
| 320 | 0.00 | 77.01 | 4.50 | 293.20 |
| 325 | 0.00 | 72.67 | 4.50 | 293.20 |
| 330 | 0.43 | 68.46 | 4.50 | 293.20 |
| 335 | 0.58 | 64.26 | 4.50 | 293.20 |
| 340 | 0.52 | 60.08 | 4.50 | 293.20 |
| 345 | 0.41 | 55.94 | 4.50 | 293.20 |
| 350 | 0.58 | 52.02 | 4.50 | 293.20 |
| 355 | 0.53 | 48.14 | 4.50 | 293.20 |

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: November 29, 2017