

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
EchoStar Corporation
WINCHESTER, VA
Satellite Earth Station

Prepared By:
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147
March 30, 2012

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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.

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.

Coordination data for this earth station was sent to the below listed carriers with a letter dated 03/09/2012.

Company

ACC License, LLC
ADAMS COUNTY EMERGENCY MANAGEMENT AGENCY
ALLEGANY COUNTY GOVERNMENT
APC Realty and Equipment CO LLC
ARLINGTON COUNTY EMERGENCY COMM CTR
AT&T CORP
Airband Communications Inc
B.F. SAUL COMPANY
Clearwire Spectrum Holdings III, LLC
ECW Wireless, LLC
Eduro Networks LLC
Franklin County Dept. of Emergency Servi
George Washington University
Last Mile Inc.
Loudoun Wireless LLC
Loudoun, County of
MARYLAND, STATE OF - MDOT - MTA
NBC TELEMUNDO LICENSE LLC
National Radio Astronomy Observatory
New Cingular Wireless PCS LLC - DC
New Cingular Wireless PCS LLC- WV/NC/SC
PENNSYLVANIA TURNPIKE COMMISSION
Prince William, County of
RapidDSL & Wireless, Inc.
Red Zebra Broadcasting Licensee, LLC
Roadstar Internet, Inc.
SHIPPENSBURG AREA SCHOOL DISTRICT
Shenandoah Personal Communications Co
Virginia Electric & Power Company
WASHINGTON CABLE SYSTEMS INC
WKYSFM, INC
Washington Metro Area Transit Police Dep
World Class Wireless LLC

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: 03/09/2012
Job Number: <PCNJobCode>

Administrative Information

Status ENGINEER PROPOSAL
Call Sign <PCNCallSign>
Licensee Code ZECHOS
Licensee Name EchoStar Corporation

Site Information WINCHESTER, VA

Venue Name
Latitude (NAD 83) 39° 7' 56.3" N
Longitude (NAD 83) 78° 12' 13.2" W
Climate Zone A
Rain Zone 2
Ground Elevation (AMSL) 245.06 m / 804.0 ft

Link Information

Satellite Type Geostationary
Mode TR - Transmit-Receive
Modulation Digital
Satellite Arc 61° W to 148° West Longitude
Azimuth Range 153.9° to 256.9°
Corresponding Elevation Angles 41.3° / 6.9°
Antenna Centerline (AGL) 7.92 m / 26.0 ft

Antenna Information

Receive - FCC32

Transmit - FCC32

| | | | |
|------------------------------------|-------------------|----------------------|--------------------------|
| Manufacturer | Vertex | Vertex | |
| Model | 13.2 Meter | 13.2 Meter | |
| Gain / Diameter | 62.0 dBi / 13.2 m | 65.0 dBi / 13.2 m | |
| 3-dB / 15-dB Beamwidth | 0.10° / 0.20° | 0.10° / 0.30° | |
| Max Available RF Power (dBW/4 kHz) | | -5.7 | |
| (dBW/MHz) | | 18.3 | |
| Maximum EIRP (dBW/4 kHz) | | 59.3 | |
| (dBW/MHz) | | 83.3 | |
| Interference Objectives: | Long Term | -156.0 dBW/MHz 20% | -151.0 dBW/4 kHz 20% |
| | Short Term | -146.0 dBW/MHz 0.01% | -128.0 dBW/4 kHz 0.0025% |

Frequency Information

Receive 12.2 GHz

Transmit 17.3 GHz

| | | |
|--|---------------------------------------|---------------------------------------|
| Emission / Frequency Range (MHz) | 800KG2D - 24M0G7W / 12200.0 - 12700.0 | 800KG2D - 24M0G7W / 17300.0 - 17800.0 |
| Max Great Circle Coordination Distance | 429.5 km / 266.8 mi | 250.7 km / 155.8 mi |
| Precipitation Scatter Contour Radius | 568.6 km / 353.2 mi | 100.0 km / 62.1 mi |

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Coordination Values

WINCHESTER, VA

Licensee Name EchoStar Corporation
Latitude (NAD 83) 39° 7' 56.3" N
Longitude (NAD 83) 78° 12' 13.2" W
Ground Elevation (AMSL) 245.06 m / 804.0 ft
Antenna Centerline (AGL) 7.92 m / 26.0 ft
Antenna Model Vertex 13.2 Meter
Antenna Mode Receive 12.2 GHz Transmit 17.3 GHz
Interference Objectives: Long Term -156.0 dBW/MHz 20% -151.0 dBW/4 kHz 20%
Short Term -146.0 dBW/MHz 0.01% -128.0 dBW/4 kHz 0.0025%
Max Available RF Power -5.7 (dBW/4 kHz)

| Azimuth (°) | Horizon Elevation (°) | Antenna Discrimination (°) | Receive 12.2 GHz | | Transmit 17.3 GHz | |
|-------------|-----------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|
| | | | Horizon Gain (dBi) | Coordination Distance (km) | Horizon Gain (dBi) | Coordination Distance (km) |
| 0 | 0.51 | 102.99 | -10.00 | 202.24 | -10.00 | 113.23 |
| 5 | 0.47 | 107.96 | -10.00 | 202.57 | -10.00 | 115.76 |
| 10 | 0.20 | 112.91 | -10.00 | 226.99 | -10.00 | 135.97 |
| 15 | 0.00 | 117.86 | -10.00 | 227.19 | -10.00 | 136.14 |
| 20 | 0.28 | 121.53 | -10.00 | 219.69 | -10.00 | 129.65 |
| 25 | 0.00 | 118.13 | -10.00 | 227.19 | -10.00 | 136.14 |
| 30 | 0.00 | 114.76 | -10.00 | 227.19 | -10.00 | 136.14 |
| 35 | 0.00 | 111.27 | -10.00 | 227.19 | -10.00 | 136.14 |
| 40 | 0.00 | 107.70 | -10.00 | 227.19 | -10.00 | 136.14 |
| 45 | 0.00 | 104.06 | -10.00 | 227.19 | -10.00 | 136.14 |
| 50 | 0.00 | 100.38 | -10.00 | 227.19 | -10.00 | 136.14 |
| 55 | 0.00 | 96.65 | -10.00 | 227.19 | -10.00 | 136.14 |
| 60 | 0.00 | 92.91 | -10.00 | 227.19 | -10.00 | 136.14 |
| 65 | 0.00 | 89.15 | -10.00 | 227.19 | -10.00 | 136.14 |
| 70 | 0.00 | 85.40 | -10.00 | 227.19 | -10.00 | 136.14 |
| 75 | 0.00 | 81.66 | -10.00 | 227.19 | -10.00 | 136.14 |
| 80 | 0.00 | 77.95 | -10.00 | 227.19 | -10.00 | 136.14 |
| 85 | 0.00 | 74.29 | -10.00 | 227.19 | -10.00 | 136.14 |
| 90 | 0.00 | 70.68 | -10.00 | 227.19 | -10.00 | 136.14 |
| 95 | 0.00 | 67.14 | -10.00 | 227.19 | -10.00 | 136.14 |
| 100 | 0.00 | 63.70 | -10.00 | 227.19 | -10.00 | 136.14 |
| 105 | 0.00 | 60.38 | -10.00 | 227.19 | -10.00 | 136.14 |
| 110 | 0.00 | 57.20 | -10.00 | 227.19 | -10.00 | 136.14 |
| 115 | 0.00 | 54.20 | -10.00 | 227.19 | -10.00 | 136.14 |
| 120 | 0.00 | 51.40 | -10.00 | 227.19 | -10.00 | 136.14 |
| 125 | 0.00 | 48.85 | -10.00 | 227.19 | -10.00 | 136.14 |
| 130 | 0.00 | 46.60 | -9.71 | 228.45 | -9.71 | 136.98 |
| 135 | 0.00 | 44.69 | -9.25 | 230.46 | -9.25 | 138.33 |
| 140 | 0.00 | 43.16 | -8.88 | 232.14 | -8.88 | 139.46 |
| 145 | 0.00 | 42.07 | -8.60 | 233.40 | -8.60 | 140.31 |
| 150 | 0.00 | 41.44 | -8.44 | 234.13 | -8.44 | 140.81 |
| 155 | 0.00 | 41.30 | -8.40 | 234.30 | -8.40 | 140.92 |
| 160 | 0.00 | 41.66 | -8.49 | 233.87 | -8.49 | 140.63 |
| 165 | 0.00 | 42.50 | -8.71 | 232.89 | -8.71 | 139.97 |
| 170 | 0.00 | 43.67 | -9.00 | 231.57 | -9.00 | 139.08 |
| 175 | 0.00 | 44.44 | -9.19 | 230.73 | -9.19 | 138.51 |
| 180 | 0.00 | 44.70 | -9.26 | 230.45 | -9.26 | 138.32 |
| 185 | 0.00 | 44.44 | -9.19 | 230.73 | -9.19 | 138.51 |

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(703)726-5500 <http://www.comsearch.com>

Coordination Values

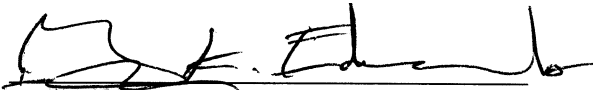
WINCHESTER, VA

| | | | |
|------------------------------------|----------------------|-------|--------------------------|
| Licensee Name | EchoStar Corporation | | |
| Latitude (NAD 83) | 39° 7' 56.3" N | | |
| Longitude (NAD 83) | 78° 12' 13.2" W | | |
| Ground Elevation (AMSL) | 245.06 m / 804.0 ft | | |
| Antenna Centerline (AGL) | 7.92 m / 26.0 ft | | |
| Antenna Model | Vertex 13.2 Meter | | |
| Antenna Mode | Receive 12.2 GHz | | Transmit 17.3 GHz |
| Interference Objectives: Long Term | -156.0 dBW/MHz | 20% | -151.0 dBW/4 kHz 20% |
| Short Term | -146.0 dBW/MHz | 0.01% | -128.0 dBW/4 kHz 0.0025% |
| Max Available RF Power | -5.7 (dBW/4 kHz) | | |

| Azimuth (°) | Horizon Elevation (°) | Antenna Discrimination (°) | Receive 12.2 GHz | | Transmit 17.3 GHz | |
|-------------|-----------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|
| | | | Horizon Gain (dBi) | Coordination Distance (km) | Horizon Gain (dBi) | Coordination Distance (km) |
| 190 | 0.00 | 43.67 | -9.00 | 231.58 | -9.00 | 139.08 |
| 195 | 0.00 | 42.41 | -8.69 | 233.00 | -8.69 | 140.04 |
| 200 | 1.55 | 39.35 | -7.87 | 169.63 | -7.87 | 100.00 |
| 205 | 1.27 | 37.57 | -7.37 | 181.05 | -7.37 | 100.00 |
| 210 | 2.12 | 34.50 | -6.45 | 156.95 | -6.45 | 100.00 |
| 215 | 2.12 | 31.86 | -5.58 | 161.37 | -5.58 | 100.00 |
| 220 | 2.12 | 28.97 | -4.55 | 169.32 | -4.55 | 100.00 |
| 225 | 0.29 | 27.20 | -3.87 | 246.80 | -3.87 | 146.64 |
| 230 | 0.25 | 23.93 | -2.47 | 258.63 | -2.47 | 156.17 |
| 235 | 0.29 | 20.46 | -0.77 | 263.40 | -0.77 | 158.42 |
| 240 | 0.39 | 16.85 | 1.34 | 264.63 | 1.34 | 156.43 |
| 245 | 0.47 | 13.15 | 4.03 | 271.38 | 4.03 | 159.03 |
| 250 | 0.39 | 9.50 | 7.56 | 297.24 | 7.56 | 182.95 |
| 255 | 0.46 | 6.73 | 11.31 | 429.48 | 11.31 | 250.70 |
| 260 | 0.47 | 7.13 | 10.68 | 308.20 | 10.68 | 187.73 |
| 265 | 0.49 | 10.30 | 6.68 | 284.21 | 6.68 | 169.25 |
| 270 | 0.49 | 14.54 | 2.93 | 263.25 | 2.93 | 152.66 |
| 275 | 0.64 | 19.10 | -0.02 | 237.49 | -0.02 | 133.87 |
| 280 | 0.64 | 23.87 | -2.45 | 225.77 | -2.45 | 128.20 |
| 285 | 0.87 | 28.67 | -4.43 | 205.17 | -4.43 | 112.34 |
| 290 | 1.00 | 33.54 | -6.14 | 194.54 | -6.14 | 102.18 |
| 295 | 1.16 | 38.44 | -7.62 | 182.98 | -7.62 | 100.00 |
| 300 | 1.46 | 43.35 | -8.93 | 167.14 | -8.93 | 100.00 |
| 305 | 1.61 | 48.30 | -10.00 | 154.64 | -10.00 | 100.00 |
| 310 | 1.60 | 53.26 | -10.00 | 154.88 | -10.00 | 100.00 |
| 315 | 1.44 | 58.24 | -10.00 | 159.94 | -10.00 | 100.00 |
| 320 | 1.29 | 63.22 | -10.00 | 167.58 | -10.00 | 100.00 |
| 325 | 1.03 | 68.20 | -10.00 | 176.14 | -10.00 | 100.00 |
| 330 | 1.12 | 73.17 | -10.00 | 173.22 | -10.00 | 100.00 |
| 335 | 1.12 | 78.14 | -10.00 | 173.34 | -10.00 | 100.00 |
| 340 | 1.07 | 83.11 | -10.00 | 174.79 | -10.00 | 100.00 |
| 345 | 0.77 | 88.09 | -10.00 | 189.13 | -10.00 | 101.68 |
| 350 | 0.73 | 93.06 | -10.00 | 191.20 | -10.00 | 103.43 |
| 355 | 0.47 | 98.03 | -10.00 | 202.72 | -10.00 | 115.89 |

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: March 30, 2012