

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for

**Google Fiber, Inc.
Council Bluffs, Iowa**

Satellite Earth Station

Prepared By:
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, Virginia 20147
November 27, 2011

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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 receive-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.

Coordination data for this earth station was sent to the below listed carriers with a letter dated November 2, 2011.

Company

AT&T CORP
BorderCOMM Partners LP (XC)
Great Western Communications, 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: 11/27/2011
Job Number: 111102COMSJC07

Administrative Information

Status ENGINEER PROPOSAL
Call Sign
Licensee Code GOOFIB
Licensee Name Google Fiber, Inc.

Site Information

COUNCIL BLUFFS, IOWA

Venue Name
Latitude (NAD 83) 41° 13' 14.2" N
Longitude (NAD 83) 95° 52' 1.3" W
Climate Zone A
Rain Zone 2
Ground Elevation (AMSL) 300.0 m / 984.3 ft

Link Information

Satellite Type Geostationary
Mode RO - Receive-Only
Modulation Analog and Digital
Satellite Arc 60° W to 143° West Longitude
Azimuth Range 132.3° to 238.5°
Corresponding Elevation Angles 30.0° / 22.8°
Antenna Centerline (AGL) 3.05 m / 10.0 ft

Antenna Information

Receive

Manufacturer ViaSat
Model 4.5 Meter
Gain / Diameter 43.6 dBi / 4.5 m
3-dB / 15-dB Beamwidth 1.14° / 2.14°

Interference Objectives: Long Term -156.0 dBW/MHz 20%
Short Term -146.0 dBW/MHz 0.01%

Frequency Information

Receive 4.0 GHz

Emission / Frequency Range (MHz)
36M0F8W / 3700.0 - 4200.0
36M0G7W / 3700.0 - 4200.0

Max Great Circle Coordination Distance 319.9 km / 198.7 mi
Precipitation Scatter Contour Radius 498.9 km / 310.0 mi

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Coordination Values

COUNCIL BLUFFS, IA

Licensee Name Google Fiber, Inc.
Latitude (NAD 83) 41° 13' 14.2" N
Longitude (NAD 83) 95° 52' 1.3" W
Ground Elevation (AMSL) 300.0 m / 984.3 ft
Antenna Centerline (AGL) 3.05 m / 10.0 ft
Antenna Model ViaSat 4.5 Meter
Antenna Mode Receive 4.0 GHz
Interference Objectives: Long Term -156.0 dBW/MHz 20%
Short Term -146.0 dBW/MHz 0.01%

| Azimuth (°) | Horizon Elevation (°) | Antenna Discrimination (°) | Receive 4.0 GHz | |
|-------------|-----------------------|----------------------------|--------------------|----------------------------|
| | | | Horizon Gain (dBi) | Coordination Distance (km) |
| 0 | 0.00 | 118.76 | -10.00 | 285.28 |
| 5 | 0.00 | 121.68 | -10.00 | 285.28 |
| 10 | 0.53 | 117.75 | -10.00 | 247.88 |
| 15 | 0.57 | 113.58 | -10.00 | 245.38 |
| 20 | 0.60 | 109.34 | -10.00 | 243.25 |
| 25 | 0.70 | 105.07 | -10.00 | 237.20 |
| 30 | 1.01 | 100.78 | -10.00 | 220.13 |
| 35 | 1.02 | 96.42 | -10.00 | 219.79 |
| 40 | 1.11 | 92.06 | -10.00 | 216.98 |
| 45 | 0.96 | 87.68 | -10.00 | 222.63 |
| 50 | 0.90 | 83.32 | -10.00 | 225.67 |
| 55 | 0.84 | 78.98 | -10.00 | 229.24 |
| 60 | 0.40 | 74.72 | -10.00 | 261.57 |
| 65 | 0.57 | 70.41 | -10.00 | 245.38 |
| 70 | 0.59 | 66.16 | -10.00 | 244.11 |
| 75 | 0.53 | 61.99 | -10.00 | 247.52 |
| 80 | 0.47 | 57.90 | -10.00 | 252.70 |
| 85 | 0.44 | 53.90 | -10.00 | 256.06 |
| 90 | 0.60 | 49.94 | -10.00 | 243.54 |
| 95 | 0.54 | 46.22 | -9.62 | 249.37 |
| 100 | 0.39 | 42.76 | -8.78 | 270.08 |
| 105 | 0.00 | 39.74 | -7.98 | 298.45 |
| 110 | 0.00 | 36.80 | -7.15 | 304.07 |
| 115 | 0.00 | 34.28 | -6.37 | 309.39 |
| 120 | 0.00 | 32.25 | -5.71 | 314.63 |
| 125 | 0.00 | 30.84 | -5.23 | 318.07 |
| 130 | 0.00 | 30.12 | -4.97 | 319.89 |
| 135 | 0.00 | 30.14 | -4.98 | 319.83 |
| 140 | 0.00 | 30.91 | -5.25 | 317.90 |
| 145 | 0.00 | 32.36 | -5.75 | 314.38 |
| 150 | 0.00 | 34.41 | -6.42 | 309.08 |
| 155 | 0.00 | 36.69 | -7.11 | 304.30 |
| 160 | 0.00 | 38.65 | -7.68 | 300.47 |
| 165 | 0.00 | 40.24 | -8.12 | 297.55 |
| 170 | 0.00 | 41.40 | -8.43 | 295.49 |
| 175 | 0.00 | 42.12 | -8.61 | 294.26 |
| 180 | 0.00 | 42.36 | -8.68 | 293.85 |

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Coordination Values

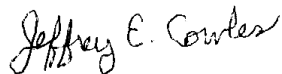
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Short Term -146.0 dBW/MHz 0.01%

| Azimuth (°) | Horizon Elevation (°) | Antenna Discrimination (°) | Receive 4.0 GHz | |
|-------------|-----------------------|----------------------------|--------------------|----------------------------|
| | | | Horizon Gain (dBi) | Coordination Distance (km) |
| 185 | 0.00 | 42.12 | -8.61 | 294.25 |
| 190 | 0.00 | 41.40 | -8.43 | 295.49 |
| 195 | 0.25 | 40.00 | -8.05 | 291.43 |
| 200 | 0.46 | 38.23 | -7.56 | 268.96 |
| 205 | 0.58 | 36.19 | -6.97 | 263.14 |
| 210 | 0.55 | 33.95 | -6.27 | 269.61 |
| 215 | 0.47 | 31.46 | -5.44 | 281.34 |
| 220 | 0.45 | 28.69 | -4.44 | 291.37 |
| 225 | 0.33 | 26.02 | -3.38 | 313.63 |
| 230 | 0.41 | 23.85 | -2.44 | 309.78 |
| 235 | 0.46 | 22.57 | -1.84 | 308.81 |
| 240 | 0.42 | 22.39 | -1.75 | 314.81 |
| 245 | 0.40 | 23.23 | -2.15 | 314.20 |
| 250 | 0.50 | 24.91 | -2.91 | 296.21 |
| 255 | 0.48 | 27.45 | -3.96 | 290.71 |
| 260 | 0.40 | 30.60 | -5.14 | 292.23 |
| 265 | 0.52 | 34.03 | -6.30 | 271.03 |
| 270 | 0.54 | 37.84 | -7.45 | 262.66 |
| 275 | 0.55 | 41.87 | -8.55 | 255.42 |
| 280 | 0.57 | 46.06 | -9.58 | 247.97 |
| 285 | 0.61 | 50.35 | -10.00 | 242.78 |
| 290 | 0.65 | 54.74 | -10.00 | 240.40 |
| 295 | 0.50 | 59.24 | -10.00 | 249.49 |
| 300 | 0.39 | 63.78 | -10.00 | 262.66 |
| 305 | 0.32 | 68.33 | -10.00 | 270.85 |
| 310 | 0.00 | 72.94 | -10.00 | 285.28 |
| 315 | 0.00 | 77.53 | -10.00 | 285.28 |
| 320 | 0.00 | 82.12 | -10.00 | 285.28 |
| 325 | 0.00 | 86.73 | -10.00 | 285.28 |
| 330 | 0.00 | 91.34 | -10.00 | 285.28 |
| 335 | 0.00 | 95.95 | -10.00 | 285.28 |
| 340 | 0.00 | 100.55 | -10.00 | 285.28 |
| 345 | 0.00 | 105.14 | -10.00 | 285.28 |
| 350 | 0.00 | 109.71 | -10.00 | 285.28 |
| 355 | 0.00 | 114.25 | -10.00 | 285.28 |

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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DATED: November 27, 2011