

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
Comcast Cable Communications, LLC
BLAIRSVILLE, PA
(4.5 meter)
Satellite Earth Station

Prepared By:
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147
July 25, 2018

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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 07/24/2018.

Company

Mountain State Communications, llc
MCI Communications Services Inc.

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: 07/24/2018
Job Number: 180724COMSGE02

Administrative Information

Status ENGINEER PROPOSAL
Call Sign E180512
Licensee Code ZCATEC
Licensee Name Comcast Cable Communications, LLC

Site Information

BLAIRSVILLE, PA

Venue Name
Latitude (NAD 83) 40° 26' 12.8" N
Longitude (NAD 83) 79° 14' 55.0" W
Climate Zone A
Rain Zone 2
Ground Elevation (AMSL) 343.56 m / 1127.2 ft

Link Information

Satellite Type Geostationary
Mode RO - Receive-Only
Modulation Digital
Satellite Arc 60° W to 143° West Longitude
Azimuth Range 151.7° to 252.3°
Corresponding Elevation Angles 39.2° / 11.1°
Antenna Centerline (AGL) 2.74 m / 9.0 ft

Antenna Information

Receive - S40452

Manufacturer SCIENTIFIC-ATLANTA, INC
Model 8346 4.6 METER
Gain / Diameter 43.3 dBi / 4.6 m
3-dB / 15-dB Beamwidth 1.20° / 2.50°

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) 36M0G7W / 3700.0 - 4200.0

Max Great Circle Coordination Distance 296.6 km / 184.3 mi
Precipitation Scatter Contour Radius 534.6 km / 332.1 mi

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Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5500 <http://www.comsearch.com>

| | | | |
|------------------------------------|--|-------|--|
| Coordination Values | BLAIRSVILLE, PA | | |
| Licensee Name | Comcast Cable Communications, LLC | | |
| Latitude (NAD 83) | 40° 26' 12.8" N | | |
| Longitude (NAD 83) | 79° 14' 55.0" W | | |
| Ground Elevation (AMSL) | 343.56 m / 1127.2 ft | | |
| Antenna Centerline (AGL) | 2.74 m / 9.0 ft | | |
| Antenna Model | SCIENTIFIC-ATLANTA, INC 8346 4.6 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 | 1.01 | 107.45 | -10.19 | 218.93 |
| 5 | 1.29 | 112.39 | -12.61 | 202.02 |
| 10 | 1.35 | 117.30 | -15.62 | 186.62 |
| 15 | 1.16 | 122.18 | -17.57 | 183.26 |
| 20 | 1.18 | 121.61 | -17.34 | 183.66 |
| 25 | 0.94 | 117.99 | -15.90 | 198.57 |
| 30 | 0.79 | 114.32 | -14.15 | 210.90 |
| 35 | 0.79 | 110.62 | -11.19 | 225.36 |
| 40 | 0.00 | 106.65 | -10.03 | 285.09 |
| 45 | 0.24 | 102.91 | -9.70 | 282.71 |
| 50 | 0.36 | 99.09 | -9.70 | 267.37 |
| 55 | 0.49 | 95.23 | -9.70 | 253.04 |
| 60 | 0.53 | 91.33 | -9.70 | 249.60 |
| 65 | 1.07 | 87.41 | -9.70 | 219.47 |
| 70 | 1.56 | 83.44 | -9.70 | 205.34 |
| 75 | 1.70 | 79.49 | -9.70 | 203.91 |
| 80 | 1.97 | 75.53 | -9.70 | 196.66 |
| 85 | 1.93 | 71.66 | -9.70 | 197.81 |
| 90 | 2.14 | 67.78 | -9.70 | 192.78 |
| 95 | 2.27 | 63.97 | -9.70 | 189.75 |
| 100 | 2.39 | 60.26 | -9.70 | 187.03 |
| 105 | 2.54 | 56.63 | -9.70 | 183.64 |
| 110 | 2.20 | 53.40 | -9.70 | 191.29 |
| 115 | 2.43 | 50.05 | -9.70 | 186.24 |
| 120 | 2.36 | 47.09 | -9.70 | 187.73 |
| 125 | 2.99 | 43.89 | -9.70 | 173.18 |
| 130 | 2.75 | 41.65 | -9.70 | 178.77 |
| 135 | 2.66 | 39.69 | -9.70 | 180.76 |
| 140 | 2.78 | 38.01 | -9.70 | 178.08 |
| 145 | 3.20 | 36.54 | -9.70 | 166.49 |
| 150 | 2.92 | 36.32 | -9.70 | 174.79 |
| 155 | 2.47 | 36.86 | -9.77 | 184.77 |
| 160 | 2.23 | 37.77 | -9.71 | 190.70 |
| 165 | 2.01 | 39.18 | -10.24 | 193.25 |
| 170 | 1.69 | 40.62 | -10.70 | 199.70 |
| 175 | 1.16 | 41.84 | -10.70 | 212.05 |
| 180 | 1.03 | 42.21 | -10.70 | 216.03 |
| 185 | 0.29 | 42.71 | -11.62 | 264.57 |

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| | | | |
|----------------------------|--|----------------|-------|
| Coordination Values | BLAIRSVILLE, PA | | |
| Licensee Name | Comcast Cable Communications, LLC | | |
| Latitude (NAD 83) | 40° 26' 12.8" N | | |
| Longitude (NAD 83) | 79° 14' 55.0" W | | |
| Ground Elevation (AMSL) | 343.56 m / 1127.2 ft | | |
| Antenna Centerline (AGL) | 2.74 m / 9.0 ft | | |
| Antenna Model | SCIENTIFIC-ATLANTA, INC 8346 4.6 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) |
| 190 | 0.00 | 42.25 | -12.70 | 268.69 |
| 195 | 0.00 | 41.05 | -12.70 | 268.69 |
| 200 | 0.36 | 39.11 | -12.70 | 250.36 |
| 205 | 0.73 | 36.79 | -12.70 | 221.09 |
| 210 | 0.79 | 34.44 | -12.43 | 219.41 |
| 215 | 0.81 | 31.83 | -10.53 | 227.88 |
| 220 | 0.65 | 29.12 | -8.70 | 247.74 |
| 225 | 0.62 | 26.10 | -8.70 | 249.86 |
| 230 | 0.43 | 23.02 | -8.70 | 265.94 |
| 235 | 0.43 | 19.66 | -8.63 | 265.86 |
| 240 | 0.54 | 16.12 | -7.92 | 259.53 |
| 245 | 0.36 | 12.97 | -5.67 | 293.12 |
| 250 | 0.40 | 10.97 | -4.70 | 295.80 |
| 255 | 0.50 | 10.98 | -4.70 | 283.54 |
| 260 | 0.32 | 13.27 | -5.97 | 296.63 |
| 265 | 0.50 | 16.54 | -8.01 | 261.95 |
| 270 | 0.53 | 20.58 | -8.70 | 255.34 |
| 275 | 0.34 | 25.05 | -8.70 | 276.41 |
| 280 | 0.00 | 29.73 | -8.70 | 293.68 |
| 285 | 0.22 | 34.32 | -9.70 | 284.15 |
| 290 | 0.35 | 39.03 | -9.70 | 268.15 |
| 295 | 0.54 | 43.79 | -9.70 | 249.12 |
| 300 | 0.81 | 48.58 | -9.70 | 232.53 |
| 305 | 0.61 | 53.47 | -9.70 | 244.29 |
| 310 | 0.77 | 58.33 | -9.70 | 234.57 |
| 315 | 0.98 | 63.20 | -9.70 | 223.00 |
| 320 | 0.85 | 68.12 | -9.70 | 230.27 |
| 325 | 1.54 | 72.99 | -9.70 | 205.78 |
| 330 | 1.59 | 77.91 | -9.70 | 204.65 |
| 335 | 1.19 | 82.85 | -9.70 | 216.07 |
| 340 | 1.19 | 87.77 | -9.70 | 216.07 |
| 345 | 1.01 | 92.70 | -9.70 | 221.40 |
| 350 | 1.07 | 97.62 | -9.70 | 219.60 |
| 355 | 1.09 | 102.54 | -9.70 | 219.10 |

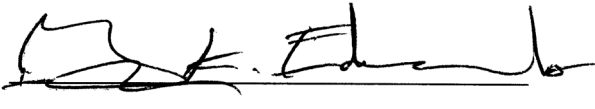
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Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5500 <http://www.comsearch.com>

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: July 25, 2018

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Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5500 <http://www.comsearch.com>

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
Comcast Cable Communications, LLC
BLAIRSVILLE, PA
(Prodelin 3.7 meter)
Satellite Earth Station

Prepared By:
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147
July 25, 2018

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Earth Station Data Sheet

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Earth Station Data Sheet

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

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.

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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.

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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 07/24/2018.

Company

Mountain State Communications, llc
MCI Communications Services Inc.

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Earth Station Data Sheet

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

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.

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Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5500 <http://www.comsearch.com>

Date: 07/24/2018
Job Number: 180724COMSGE03

Administrative Information

Status ENGINEER PROPOSAL
Call Sign BLAIRSVI
Licensee Code ZCATEC
Licensee Name Comcast Cable Communications, LLC

Site Information

BLAIRSVILLE, PA
Venue Name
Latitude (NAD 83) 40° 26' 12.8" N
Longitude (NAD 83) 79° 14' 55.0" W
Climate Zone A
Rain Zone 2
Ground Elevation (AMSL) 343.56 m / 1127.2 ft

Link Information

Satellite Type Geostationary
Mode RO - Receive-Only
Modulation Digital
Satellite Arc 60° W to 143° West Longitude
Azimuth Range 151.7° to 252.3°
Corresponding Elevation Angles 39.2° / 11.1°
Antenna Centerline (AGL) 2.74 m / 9.0 ft

Antenna Information

Receive - P40372
Manufacturer PRODELIN CORPORATION
Model 136-750-06
Gain / Diameter 41.7 dBi / 3.7 m
3-dB / 15-dB Beamwidth 1.50° / 3.00°

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) 36M0G7W / 3700.0 - 4200.0

Max Great Circle Coordination Distance 376.7 km / 234.1 mi
Precipitation Scatter Contour Radius 534.6 km / 332.1 mi

COMSEARCH

Earth Station Data Sheet

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

Coordination Values**BLAIRSVILLE, PA**

Licensee Name Comcast Cable Communications, LLC
Latitude (NAD 83) 40° 26' 12.8" N
Longitude (NAD 83) 79° 14' 55.0" W
Ground Elevation (AMSL) 343.56 m / 1127.2 ft
Antenna Centerline (AGL) 2.74 m / 9.0 ft
Antenna Model PRODELIN CORPORATION 136-750-06
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 | 1.01 | 107.45 | -10.30 | 218.39 |
| 5 | 1.29 | 112.39 | -10.30 | 210.11 |
| 10 | 1.35 | 117.30 | -10.30 | 208.50 |
| 15 | 1.16 | 122.18 | -10.30 | 213.91 |
| 20 | 1.18 | 121.61 | -10.30 | 213.28 |
| 25 | 0.94 | 117.99 | -10.30 | 221.97 |
| 30 | 0.79 | 114.32 | -10.30 | 230.05 |
| 35 | 0.79 | 110.62 | -10.30 | 230.04 |
| 40 | 0.00 | 106.65 | -10.30 | 283.38 |
| 45 | 0.24 | 102.91 | -10.30 | 278.93 |
| 50 | 0.36 | 99.09 | -10.30 | 263.73 |
| 55 | 0.49 | 95.23 | -10.30 | 249.42 |
| 60 | 0.53 | 91.33 | -10.30 | 246.14 |
| 65 | 1.07 | 87.41 | -10.30 | 216.50 |
| 70 | 1.56 | 83.44 | -10.30 | 205.04 |
| 75 | 1.70 | 79.49 | -10.30 | 201.20 |
| 80 | 1.97 | 75.53 | -10.30 | 193.87 |
| 85 | 1.93 | 71.66 | -10.30 | 195.03 |
| 90 | 2.14 | 67.78 | -10.30 | 189.95 |
| 95 | 2.27 | 63.97 | -10.30 | 186.87 |
| 100 | 2.39 | 60.26 | -10.30 | 184.12 |
| 105 | 2.54 | 56.63 | -10.30 | 180.69 |
| 110 | 2.20 | 53.40 | -10.30 | 188.43 |
| 115 | 2.43 | 50.05 | -10.30 | 183.32 |
| 120 | 2.36 | 47.09 | -9.72 | 187.64 |
| 125 | 2.99 | 43.89 | -9.08 | 176.35 |
| 130 | 2.75 | 41.65 | -8.63 | 184.09 |
| 135 | 2.66 | 39.69 | -8.18 | 188.26 |
| 140 | 2.78 | 38.01 | -7.51 | 188.98 |
| 145 | 3.20 | 36.54 | -6.92 | 182.55 |
| 150 | 2.92 | 36.32 | -6.83 | 189.19 |
| 155 | 2.47 | 36.86 | -7.04 | 197.93 |
| 160 | 2.23 | 37.77 | -7.41 | 201.56 |
| 165 | 2.01 | 39.18 | -7.97 | 203.80 |
| 170 | 1.69 | 40.62 | -8.42 | 207.63 |
| 175 | 1.16 | 41.84 | -8.67 | 222.07 |
| 180 | 1.03 | 42.21 | -8.74 | 225.94 |
| 185 | 0.29 | 42.71 | -8.84 | 281.77 |

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Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5500 <http://www.comsearch.com>

| | |
|------------------------------------|-----------------------------------|
| Coordination Values | BLAIRSVILLE, PA |
| Licensee Name | Comcast Cable Communications, LLC |
| Latitude (NAD 83) | 40° 26' 12.8" N |
| Longitude (NAD 83) | 79° 14' 55.0" W |
| Ground Elevation (AMSL) | 343.56 m / 1127.2 ft |
| Antenna Centerline (AGL) | 2.74 m / 9.0 ft |
| Antenna Model | PRODELIN CORPORATION 136-750-06 |
| 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) |
| 190 | 0.00 | 42.25 | -8.75 | 293.35 |
| 195 | 0.00 | 41.05 | -8.51 | 294.93 |
| 200 | 0.36 | 39.11 | -7.94 | 279.13 |
| 205 | 0.73 | 36.79 | -7.02 | 252.56 |
| 210 | 0.79 | 34.44 | -6.19 | 254.11 |
| 215 | 0.81 | 31.83 | -5.67 | 255.93 |
| 220 | 0.65 | 29.12 | -4.95 | 271.19 |
| 225 | 0.62 | 26.10 | -3.74 | 281.60 |
| 230 | 0.43 | 23.02 | -2.11 | 310.54 |
| 235 | 0.43 | 19.66 | -0.10 | 325.75 |
| 240 | 0.54 | 16.12 | 2.03 | 330.46 |
| 245 | 0.36 | 12.97 | 4.73 | 372.59 |
| 250 | 0.40 | 10.97 | 5.73 | 376.73 |
| 255 | 0.50 | 10.98 | 5.72 | 363.93 |
| 260 | 0.32 | 13.27 | 4.43 | 375.84 |
| 265 | 0.50 | 16.54 | 1.78 | 331.72 |
| 270 | 0.53 | 20.58 | -0.65 | 309.73 |
| 275 | 0.34 | 25.05 | -3.32 | 313.64 |
| 280 | 0.00 | 29.73 | -5.19 | 318.33 |
| 285 | 0.22 | 34.32 | -6.16 | 307.69 |
| 290 | 0.35 | 39.03 | -7.91 | 279.42 |
| 295 | 0.54 | 43.79 | -9.06 | 253.01 |
| 300 | 0.81 | 48.58 | -10.02 | 230.83 |
| 305 | 0.61 | 53.47 | -10.30 | 240.90 |
| 310 | 0.77 | 58.33 | -10.30 | 231.33 |
| 315 | 0.98 | 63.20 | -10.30 | 219.96 |
| 320 | 0.85 | 68.12 | -10.30 | 227.10 |
| 325 | 1.54 | 72.99 | -10.30 | 205.48 |
| 330 | 1.59 | 77.91 | -10.30 | 204.35 |
| 335 | 1.19 | 82.85 | -10.30 | 213.17 |
| 340 | 1.19 | 87.77 | -10.30 | 213.17 |
| 345 | 1.01 | 92.70 | -10.30 | 218.39 |
| 350 | 1.07 | 97.62 | -10.30 | 216.63 |
| 355 | 1.09 | 102.54 | -10.30 | 216.13 |

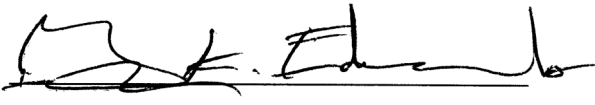
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5. CERTIFICATION

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BY: 

Gary K. Edwards
Senior Manager
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147

DATED: July 24, 2018

COMSEARCH

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FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
Comcast Cable Communications, LLC
BLAIRSVILLE, PA
(Patriot 3.8 meter)
Satellite Earth Station

Prepared By:
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19700 Janelia Farm Boulevard
Ashburn, VA 20147
July 25, 2018

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Date: 07/24/2018
Job Number: 180724COMSGE04

Administrative Information

Status ENGINEER PROPOSAL
Call Sign BLAIRSVI
Licensee Code ZCATEC
Licensee Name Comcast Cable Communications, LLC

Site Information

BLAIRSVILLE, PA
Venue Name
Latitude (NAD 83) 40° 26' 12.8" N
Longitude (NAD 83) 79° 14' 55.0" W
Climate Zone A
Rain Zone 2
Ground Elevation (AMSL) 343.56 m / 1127.2 ft

Link Information

Satellite Type Geostationary
Mode RO - Receive-Only
Modulation Digital
Satellite Arc 60° W to 143° West Longitude
Azimuth Range 151.7° to 252.3°
Corresponding Elevation Angles 39.2° / 11.1°
Antenna Centerline (AGL) 2.74 m / 9.0 ft

Antenna Information

Receive - P40381
Manufacturer Patriot
Model 3.8 meter
Gain / Diameter 42.1 dBi / 3.8 m
3-dB / 15-dB Beamwidth 1.40° / 2.80°

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) 36M0G7W / 3700.0 - 4200.0

Max Great Circle Coordination Distance 380.1 km / 236.1 mi
Precipitation Scatter Contour Radius 534.6 km / 332.1 mi

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5500 <http://www.comsearch.com>

| | | | |
|------------------------------------|-----------------------------------|-------|--|
| Coordination Values | BLAIRSVILLE, PA | | |
| Licensee Name | Comcast Cable Communications, LLC | | |
| Latitude (NAD 83) | 40° 26' 12.8" N | | |
| Longitude (NAD 83) | 79° 14' 55.0" W | | |
| Ground Elevation (AMSL) | 343.56 m / 1127.2 ft | | |
| Antenna Centerline (AGL) | 2.74 m / 9.0 ft | | |
| Antenna Model | Patriot 3.8 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 | 1.01 | 107.45 | -9.90 | 220.38 |
| 5 | 1.29 | 112.39 | -9.90 | 211.99 |
| 10 | 1.35 | 117.30 | -9.90 | 210.36 |
| 15 | 1.16 | 122.18 | -9.90 | 215.85 |
| 20 | 1.18 | 121.61 | -9.90 | 215.20 |
| 25 | 0.94 | 117.99 | -9.90 | 224.01 |
| 30 | 0.79 | 114.32 | -9.90 | 232.18 |
| 35 | 0.79 | 110.62 | -9.90 | 232.17 |
| 40 | 0.00 | 106.65 | -9.90 | 285.92 |
| 45 | 0.24 | 102.91 | -9.90 | 281.45 |
| 50 | 0.36 | 99.09 | -9.90 | 266.15 |
| 55 | 0.49 | 95.23 | -9.90 | 251.87 |
| 60 | 0.53 | 91.33 | -9.90 | 248.44 |
| 65 | 1.07 | 87.41 | -9.90 | 218.47 |
| 70 | 1.56 | 83.44 | -9.90 | 204.44 |
| 75 | 1.70 | 79.49 | -9.90 | 203.01 |
| 80 | 1.97 | 75.53 | -9.90 | 195.73 |
| 85 | 1.93 | 71.66 | -9.90 | 196.88 |
| 90 | 2.14 | 67.78 | -9.90 | 191.84 |
| 95 | 2.27 | 63.97 | -9.90 | 188.79 |
| 100 | 2.39 | 60.26 | -9.90 | 186.06 |
| 105 | 2.54 | 56.63 | -9.90 | 182.66 |
| 110 | 2.20 | 53.40 | -9.90 | 190.34 |
| 115 | 2.43 | 50.05 | -9.90 | 185.27 |
| 120 | 2.36 | 47.09 | -9.32 | 189.56 |
| 125 | 2.99 | 43.89 | -8.68 | 178.38 |
| 130 | 2.75 | 41.65 | -8.23 | 186.07 |
| 135 | 2.66 | 39.69 | -7.84 | 189.91 |
| 140 | 2.78 | 38.01 | -7.50 | 188.99 |
| 145 | 3.20 | 36.54 | -7.21 | 181.06 |
| 150 | 2.92 | 36.32 | -7.16 | 187.52 |
| 155 | 2.47 | 36.86 | -7.27 | 196.84 |
| 160 | 2.23 | 37.77 | -7.45 | 201.35 |
| 165 | 2.01 | 39.18 | -7.74 | 204.88 |
| 170 | 1.69 | 40.62 | -8.02 | 209.52 |
| 175 | 1.16 | 41.84 | -8.27 | 224.16 |
| 180 | 1.03 | 42.21 | -8.34 | 228.07 |
| 185 | 0.29 | 42.71 | -8.44 | 284.34 |

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Earth Station Data Sheet

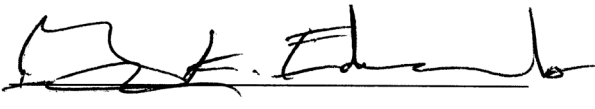
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| Antenna Mode | Receive 4.0 GHz | | |
| Interference Objectives: Long Term | -156.0 dBW/MHz | 20% | |
| Short Term | -146.0 dBW/MHz | 0.01% | |

| Azimuth (°) | Horizon Elevation (°) | Antenna Discrimination (°) | Receive 4.0 GHz | |
|-------------|-----------------------|----------------------------|--------------------|----------------------------|
| | | | Horizon Gain (dBi) | Coordination Distance (km) |
| 190 | 0.00 | 42.25 | -8.35 | 295.99 |
| 195 | 0.00 | 41.05 | -8.11 | 297.58 |
| 200 | 0.36 | 39.11 | -7.72 | 280.56 |
| 205 | 0.73 | 36.79 | -7.26 | 251.11 |
| 210 | 0.79 | 34.44 | -6.68 | 251.12 |
| 215 | 0.81 | 31.83 | -5.63 | 256.14 |
| 220 | 0.65 | 29.12 | -4.55 | 273.84 |
| 225 | 0.62 | 26.10 | -3.34 | 284.35 |
| 230 | 0.43 | 23.02 | -2.11 | 310.57 |
| 235 | 0.43 | 19.66 | -0.70 | 321.19 |
| 240 | 0.54 | 16.12 | 1.43 | 325.74 |
| 245 | 0.36 | 12.97 | 4.13 | 367.68 |
| 250 | 0.40 | 10.97 | 6.13 | 380.08 |
| 255 | 0.50 | 10.98 | 6.12 | 367.29 |
| 260 | 0.32 | 13.27 | 3.83 | 370.95 |
| 265 | 0.50 | 16.54 | 1.18 | 327.02 |
| 270 | 0.53 | 20.58 | -1.13 | 306.10 |
| 275 | 0.34 | 25.05 | -2.92 | 316.56 |
| 280 | 0.00 | 29.73 | -4.79 | 321.17 |
| 285 | 0.22 | 34.32 | -6.63 | 304.49 |
| 290 | 0.35 | 39.03 | -7.71 | 280.75 |
| 295 | 0.54 | 43.79 | -8.66 | 255.40 |
| 300 | 0.81 | 48.58 | -9.62 | 232.99 |
| 305 | 0.61 | 53.47 | -9.90 | 243.15 |
| 310 | 0.77 | 58.33 | -9.90 | 233.48 |
| 315 | 0.98 | 63.20 | -9.90 | 221.97 |
| 320 | 0.85 | 68.12 | -9.90 | 229.21 |
| 325 | 1.54 | 72.99 | -9.90 | 204.89 |
| 330 | 1.59 | 77.91 | -9.90 | 206.14 |
| 335 | 1.19 | 82.85 | -9.90 | 215.09 |
| 340 | 1.19 | 87.77 | -9.90 | 215.09 |
| 345 | 1.01 | 92.70 | -9.90 | 220.38 |
| 350 | 1.07 | 97.62 | -9.90 | 218.60 |
| 355 | 1.09 | 102.54 | -9.90 | 218.10 |

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: July 24, 2018