

# FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for  
**Comcast Cable Communications, LLC**  
**LAS VEGAS, NM**  
**Satellite Earth Station**

Prepared By:  
COMSEARCH  
19700 Janelia Farm Boulevard  
Ashburn, VA 20147  
July 31, 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**

No great circle interference cases were identified during the interference study of the proposed earth station.

### 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 07/31/2018.

Company

Comsearch

## **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: 07/31/2018  
Job Number: 180731COMSTW08

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### Administrative Information

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

---

### Site Information LAS VEGAS, NM

Venue Name  
Latitude (NAD 83) 35° 35' 57.6" N  
Longitude (NAD 83) 105° 14' 1.9" W  
Climate Zone A  
Rain Zone 5  
Ground Elevation (AMSL) 1973.97 m / 6476.3 ft

---

### Link Information

Satellite Type Geostationary  
Mode RO - Receive-Only  
Modulation Digital  
Satellite Arc 70° W to 140° West Longitude  
Azimuth Range 129.5° to 230.0°  
Corresponding Elevation Angles 34.5° / 34.8°  
Antenna Centerline (AGL) 2.74 m / 9.0 ft

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### Antenna Information

Manufacturer COMTECH  
Model 4.0 METER  
Gain / Diameter 42.4 dBi / 4.0 m  
3-dB / 15-dB Beamwidth 1.30° / 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) 36M0F9W / 3700.0 - 4200.0

Max Great Circle Coordination Distance 308.2 km / 191.5 mi

Precipitation Scatter Contour Radius 384.8 km / 239.1 mi

# COMSEARCH

## Earth Station Data Sheet

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

### Coordination Values

### LAS VEGAS, NM

Licensee Name Comcast Cable Communications, LLC  
Latitude (NAD 83) 35° 35' 57.6" N  
Longitude (NAD 83) 105° 14' 1.9" W  
Ground Elevation (AMSL) 1973.97 m / 6476.3 ft  
Antenna Centerline (AGL) 2.74 m / 9.0 ft  
Antenna Model COMTECH 4.0 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           | 0.79                  | 121.96                     | -10.00             | 232.15                     |
| 5           | 0.64                  | 118.07                     | -10.00             | 240.81                     |
| 10          | 0.69                  | 114.16                     | -10.00             | 238.13                     |
| 15          | 0.77                  | 110.18                     | -10.00             | 233.15                     |
| 20          | 0.70                  | 106.11                     | -10.00             | 237.39                     |
| 25          | 0.61                  | 102.00                     | -10.00             | 242.81                     |
| 30          | 0.47                  | 97.86                      | -10.00             | 252.94                     |
| 35          | 0.41                  | 93.72                      | -10.00             | 260.33                     |
| 40          | 0.37                  | 89.58                      | -10.00             | 264.09                     |
| 45          | 0.36                  | 85.44                      | -10.00             | 265.10                     |
| 50          | 0.46                  | 81.31                      | -10.00             | 253.92                     |
| 55          | 0.53                  | 77.19                      | -10.00             | 247.83                     |
| 60          | 0.50                  | 73.11                      | -10.00             | 249.42                     |
| 65          | 0.56                  | 69.06                      | -10.00             | 245.69                     |
| 70          | 0.58                  | 65.07                      | -10.00             | 244.59                     |
| 75          | 0.61                  | 61.16                      | -10.00             | 243.00                     |
| 80          | 0.90                  | 57.23                      | -10.00             | 225.74                     |
| 85          | 0.75                  | 53.60                      | -10.00             | 234.46                     |
| 90          | 0.75                  | 50.06                      | -10.00             | 234.36                     |
| 95          | 0.78                  | 46.69                      | -9.73              | 233.83                     |
| 100         | 0.72                  | 43.63                      | -8.99              | 241.58                     |
| 105         | 0.67                  | 40.86                      | -8.28              | 248.88                     |
| 110         | 0.60                  | 38.48                      | -7.63              | 257.70                     |
| 115         | 0.54                  | 36.54                      | -7.07              | 264.98                     |
| 120         | 0.44                  | 35.16                      | -6.65              | 277.43                     |
| 125         | 0.48                  | 34.23                      | -6.36              | 274.08                     |
| 130         | 0.36                  | 34.10                      | -6.32              | 289.78                     |
| 135         | 0.00                  | 34.84                      | -6.55              | 308.17                     |
| 140         | 0.00                  | 35.83                      | -6.86              | 306.07                     |
| 145         | 0.00                  | 37.38                      | -7.32              | 302.92                     |
| 150         | 0.00                  | 39.44                      | -7.90              | 299.01                     |
| 155         | 0.00                  | 41.89                      | -8.55              | 294.65                     |
| 160         | 0.37                  | 43.89                      | -9.06              | 270.42                     |
| 165         | 0.54                  | 45.60                      | -9.47              | 250.03                     |
| 170         | 0.75                  | 46.79                      | -9.75              | 235.41                     |
| 175         | 0.93                  | 47.46                      | -9.91              | 224.45                     |
| 180         | 1.55                  | 47.12                      | -9.83              | 204.97                     |
| 185         | 1.72                  | 46.67                      | -9.73              | 203.20                     |



# COMSEARCH

## Earth Station Data Sheet

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### Coordination Values

### LAS VEGAS, NM

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Longitude (NAD 83) 105° 14' 1.9" W  
Ground Elevation (AMSL) 1973.97 m / 6476.3 ft  
Antenna Centerline (AGL) 2.74 m / 9.0 ft  
Antenna Model COMTECH 4.0 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         | 1.95                  | 45.65                      | -9.49              | 198.17                     |
| 195         | 2.14                  | 44.16                      | -9.13              | 195.42                     |
| 200         | 2.28                  | 42.26                      | -8.65              | 194.64                     |
| 205         | 2.26                  | 40.07                      | -8.07              | 197.73                     |
| 210         | 2.32                  | 37.55                      | -7.36              | 199.81                     |
| 215         | 2.73                  | 35.04                      | -6.62              | 194.43                     |
| 220         | 3.36                  | 32.82                      | -5.90              | 184.39                     |
| 225         | 3.28                  | 31.85                      | -5.58              | 187.75                     |
| 230         | 3.01                  | 31.76                      | -5.55              | 193.62                     |
| 235         | 3.44                  | 31.69                      | -5.52              | 184.43                     |
| 240         | 3.81                  | 32.39                      | -5.76              | 175.26                     |
| 245         | 4.26                  | 33.68                      | -6.18              | 162.41                     |
| 250         | 3.96                  | 36.18                      | -6.96              | 163.61                     |
| 255         | 3.74                  | 39.04                      | -7.79              | 164.11                     |
| 260         | 3.66                  | 42.14                      | -8.62              | 161.70                     |
| 265         | 3.80                  | 45.37                      | -9.42              | 154.65                     |
| 270         | 4.12                  | 48.77                      | -10.00             | 146.09                     |
| 275         | 4.39                  | 52.40                      | -10.00             | 141.98                     |
| 280         | 4.75                  | 56.17                      | -10.00             | 136.90                     |
| 285         | 4.58                  | 60.27                      | -10.00             | 139.27                     |
| 290         | 3.88                  | 64.58                      | -10.00             | 150.25                     |
| 295         | 3.20                  | 68.88                      | -10.00             | 164.97                     |
| 300         | 2.75                  | 73.13                      | -10.00             | 177.34                     |
| 305         | 2.54                  | 77.34                      | -10.00             | 182.20                     |
| 310         | 2.52                  | 81.54                      | -10.00             | 182.67                     |
| 315         | 2.01                  | 85.79                      | -10.00             | 194.23                     |
| 320         | 1.72                  | 89.99                      | -10.00             | 202.04                     |
| 325         | 1.23                  | 94.15                      | -10.00             | 213.22                     |
| 330         | 1.04                  | 98.29                      | -10.00             | 219.18                     |
| 335         | 0.72                  | 102.37                     | -10.00             | 235.96                     |
| 340         | 0.91                  | 106.49                     | -10.00             | 225.01                     |
| 345         | 0.70                  | 110.48                     | -10.00             | 237.22                     |
| 350         | 1.13                  | 114.59                     | -10.00             | 216.34                     |
| 355         | 1.61                  | 118.68                     | -10.00             | 205.11                     |

## 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: \_\_\_\_\_

Twila Meyer  
DB Technician IV  
COMSEARCH  
19700 Janelia Farm Boulevard  
Ashburn, VA 20147

DATED: July 31, 2018

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Prepared for  
**Comcast Cable Communications, LLC**  
**LAS VEGAS, NM**  
**Satellite Earth Station**

Prepared By:  
COMSEARCH  
19700 Janelia Farm Boulevard  
Ashburn, VA 20147  
July 31, 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**

No great circle interference cases were identified during the interference study of the proposed earth station.

### 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 07/31/2018.

Company

Comsearch

## **4. EARTH STATION COORDINATION DATA**

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# COMSEARCH

## Earth Station Data Sheet

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

Date: 07/31/2018  
Job Number: 180731COMSTW13

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### Administrative Information

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

---

### Site Information LAS VEGAS, NM

Venue Name  
Latitude (NAD 83) 35° 35' 57.6" N  
Longitude (NAD 83) 105° 14' 1.9" W  
Climate Zone A  
Rain Zone 5  
Ground Elevation (AMSL) 1973.97 m / 6476.3 ft

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### Link Information

Satellite Type Geostationary  
Mode RO - Receive-Only  
Modulation Digital  
Satellite Arc 70° W to 140° West Longitude  
Azimuth Range 129.5° to 230.0°  
Corresponding Elevation Angles 34.5° / 34.8°  
Antenna Centerline (AGL) 2.74 m / 9.0 ft

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### Antenna Information

Manufacturer SCIENTIFIC ATLANTA  
Model 3125  
Gain / Diameter 43.5 dBi / 4.6 m  
3-dB / 15-dB Beamwidth 1.12° / 2.20°

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

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### Frequency Information Receive 4.0 GHz

Emission / Frequency Range (MHz) 36M0F9W / 3700.0 - 4200.0

Max Great Circle Coordination Distance 308.2 km / 191.5 mi  
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Antenna Model SCIENTIFIC ATLANTA 3125  
Antenna Mode Receive 4.0 GHz  
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| Azimuth (°) | Horizon Elevation (°) | Antenna Discrimination (°) | Receive 4.0 GHz    |                            |
|-------------|-----------------------|----------------------------|--------------------|----------------------------|
|             |                       |                            | Horizon Gain (dBi) | Coordination Distance (km) |
| 0           | 0.79                  | 121.96                     | -10.00             | 232.15                     |
| 5           | 0.64                  | 118.07                     | -10.00             | 240.81                     |
| 10          | 0.69                  | 114.16                     | -10.00             | 238.13                     |
| 15          | 0.77                  | 110.18                     | -10.00             | 233.15                     |
| 20          | 0.70                  | 106.11                     | -10.00             | 237.39                     |
| 25          | 0.61                  | 102.00                     | -10.00             | 242.81                     |
| 30          | 0.47                  | 97.86                      | -10.00             | 252.94                     |
| 35          | 0.41                  | 93.72                      | -10.00             | 260.33                     |
| 40          | 0.37                  | 89.58                      | -10.00             | 264.09                     |
| 45          | 0.36                  | 85.44                      | -10.00             | 265.10                     |
| 50          | 0.46                  | 81.31                      | -10.00             | 253.92                     |
| 55          | 0.53                  | 77.19                      | -10.00             | 247.83                     |
| 60          | 0.50                  | 73.11                      | -10.00             | 249.42                     |
| 65          | 0.56                  | 69.06                      | -10.00             | 245.69                     |
| 70          | 0.58                  | 65.07                      | -10.00             | 244.59                     |
| 75          | 0.61                  | 61.16                      | -10.00             | 243.00                     |
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| 85          | 0.75                  | 53.60                      | -10.00             | 234.46                     |
| 90          | 0.75                  | 50.06                      | -10.00             | 234.36                     |
| 95          | 0.78                  | 46.69                      | -9.73              | 233.83                     |
| 100         | 0.72                  | 43.63                      | -8.99              | 241.58                     |
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| 145         | 0.00                  | 37.38                      | -7.32              | 302.92                     |
| 150         | 0.00                  | 39.44                      | -7.90              | 299.01                     |
| 155         | 0.00                  | 41.89                      | -8.55              | 294.65                     |
| 160         | 0.37                  | 43.89                      | -9.06              | 270.42                     |
| 165         | 0.54                  | 45.60                      | -9.47              | 250.03                     |
| 170         | 0.75                  | 46.79                      | -9.75              | 235.41                     |
| 175         | 0.93                  | 47.46                      | -9.91              | 224.45                     |
| 180         | 1.55                  | 47.12                      | -9.83              | 204.97                     |
| 185         | 1.72                  | 46.67                      | -9.73              | 203.20                     |

# COMSEARCH

## Earth Station Data Sheet

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

### Coordination Values

### LAS VEGAS, NM

Licensee Name Comcast Cable Communications, LLC  
Latitude (NAD 83) 35° 35' 57.6" N  
Longitude (NAD 83) 105° 14' 1.9" W  
Ground Elevation (AMSL) 1973.97 m / 6476.3 ft  
Antenna Centerline (AGL) 2.74 m / 9.0 ft  
Antenna Model SCIENTIFIC ATLANTA 3125  
Antenna Mode Receive 4.0 GHz  
Interference Objectives: Long Term -156.0 dBW/MHz 20%  
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| Azimuth (°) | Horizon Elevation (°) | Antenna Discrimination (°) | Receive 4.0 GHz    |                            |
|-------------|-----------------------|----------------------------|--------------------|----------------------------|
|             |                       |                            | Horizon Gain (dBi) | Coordination Distance (km) |
| 190         | 1.95                  | 45.65                      | -9.49              | 198.17                     |
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| 205         | 2.26                  | 40.07                      | -8.07              | 197.73                     |
| 210         | 2.32                  | 37.55                      | -7.36              | 199.81                     |
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| 230         | 3.01                  | 31.76                      | -5.55              | 193.62                     |
| 235         | 3.44                  | 31.69                      | -5.52              | 184.43                     |
| 240         | 3.81                  | 32.39                      | -5.76              | 175.26                     |
| 245         | 4.26                  | 33.68                      | -6.18              | 162.41                     |
| 250         | 3.96                  | 36.18                      | -6.96              | 163.61                     |
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| 265         | 3.80                  | 45.37                      | -9.42              | 154.65                     |
| 270         | 4.12                  | 48.77                      | -10.00             | 146.09                     |
| 275         | 4.39                  | 52.40                      | -10.00             | 141.98                     |
| 280         | 4.75                  | 56.17                      | -10.00             | 136.90                     |
| 285         | 4.58                  | 60.27                      | -10.00             | 139.27                     |
| 290         | 3.88                  | 64.58                      | -10.00             | 150.25                     |
| 295         | 3.20                  | 68.88                      | -10.00             | 164.97                     |
| 300         | 2.75                  | 73.13                      | -10.00             | 177.34                     |
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| 315         | 2.01                  | 85.79                      | -10.00             | 194.23                     |
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## 5. CERTIFICATION

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BY: \_\_\_\_\_

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DB Technician IV  
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DATED: July 31, 2018

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

Date: 07/31/2018  
Job Number: 180731COMSTW12

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### Administrative Information

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

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### Site Information LAS VEGAS, NM

Venue Name  
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Rain Zone 5  
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Modulation Digital  
Satellite Arc 70° W to 140° West Longitude  
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Corresponding Elevation Angles 34.5° / 34.8°  
Antenna Centerline (AGL) 2.74 m / 9.0 ft

---

### Antenna Information Receive - S40281

Manufacturer SCIENTIFIC-ATLANTA, INC  
Model 9000  
Gain / Diameter 39.0 dBi / 2.8 m  
3-dB / 15-dB Beamwidth 1.90° / 3.80°

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) 36M0F9W / 3700.0 - 4200.0

Max Great Circle Coordination Distance 305.5 km / 189.8 mi  
Precipitation Scatter Contour Radius 384.8 km / 239.1 mi

# COMSEARCH

## Earth Station Data Sheet

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

### Coordination Values

### LAS VEGAS, NM

Licensee Name Comcast Cable Communications, LLC  
Latitude (NAD 83) 35° 35' 57.6" N  
Longitude (NAD 83) 105° 14' 1.9" W  
Ground Elevation (AMSL) 1973.97 m / 6476.3 ft  
Antenna Centerline (AGL) 2.74 m / 9.0 ft  
Antenna Model SCIENTIFIC-ATLANTA, INC 9000  
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           | 0.79                  | 121.96                     | -11.00             | 226.88                     |
| 5           | 0.64                  | 118.07                     | -11.00             | 235.31                     |
| 10          | 0.69                  | 114.16                     | -11.00             | 232.70                     |
| 15          | 0.77                  | 110.18                     | -11.00             | 227.85                     |
| 20          | 0.70                  | 106.11                     | -11.00             | 231.98                     |
| 25          | 0.61                  | 102.00                     | -11.00             | 237.27                     |
| 30          | 0.47                  | 97.86                      | -11.00             | 247.05                     |
| 35          | 0.41                  | 93.72                      | -11.00             | 254.42                     |
| 40          | 0.37                  | 89.58                      | -11.00             | 258.12                     |
| 45          | 0.36                  | 85.44                      | -11.00             | 259.12                     |
| 50          | 0.46                  | 81.31                      | -11.00             | 248.00                     |
| 55          | 0.53                  | 77.19                      | -11.00             | 242.17                     |
| 60          | 0.50                  | 73.11                      | -11.00             | 243.73                     |
| 65          | 0.56                  | 69.06                      | -11.00             | 240.08                     |
| 70          | 0.58                  | 65.07                      | -11.00             | 239.00                     |
| 75          | 0.61                  | 61.16                      | -11.00             | 237.45                     |
| 80          | 0.90                  | 57.23                      | -11.00             | 220.65                     |
| 85          | 0.75                  | 53.60                      | -11.00             | 229.12                     |
| 90          | 0.75                  | 50.06                      | -11.00             | 229.03                     |
| 95          | 0.78                  | 46.69                      | -10.34             | 230.57                     |
| 100         | 0.72                  | 43.63                      | -9.45              | 239.00                     |
| 105         | 0.67                  | 40.86                      | -8.34              | 248.52                     |
| 110         | 0.60                  | 38.48                      | -7.70              | 257.30                     |
| 115         | 0.54                  | 36.54                      | -7.31              | 263.48                     |
| 120         | 0.44                  | 35.16                      | -7.03              | 274.96                     |
| 125         | 0.48                  | 34.23                      | -6.69              | 271.93                     |
| 130         | 0.36                  | 34.10                      | -6.64              | 287.63                     |
| 135         | 0.00                  | 34.84                      | -6.93              | 305.53                     |
| 140         | 0.00                  | 35.83                      | -7.17              | 303.95                     |
| 145         | 0.00                  | 37.38                      | -7.48              | 301.84                     |
| 150         | 0.00                  | 39.44                      | -7.89              | 299.08                     |
| 155         | 0.00                  | 41.89                      | -8.76              | 293.32                     |
| 160         | 0.37                  | 43.89                      | -9.56              | 267.35                     |
| 165         | 0.54                  | 45.60                      | -10.12             | 246.18                     |
| 170         | 0.75                  | 46.79                      | -10.36             | 232.14                     |
| 175         | 0.93                  | 47.46                      | -10.49             | 221.47                     |
| 180         | 1.55                  | 47.12                      | -10.42             | 204.70                     |
| 185         | 1.72                  | 46.67                      | -10.33             | 200.44                     |

# COMSEARCH

## Earth Station Data Sheet

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

### Coordination Values

### LAS VEGAS, NM

Licensee Name Comcast Cable Communications, LLC  
Latitude (NAD 83) 35° 35' 57.6" N  
Longitude (NAD 83) 105° 14' 1.9" W  
Ground Elevation (AMSL) 1973.97 m / 6476.3 ft  
Antenna Centerline (AGL) 2.74 m / 9.0 ft  
Antenna Model SCIENTIFIC-ATLANTA, INC 9000  
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         | 1.95                  | 45.65                      | -10.13             | 195.18                     |
| 195         | 2.14                  | 44.16                      | -9.66              | 192.89                     |
| 200         | 2.28                  | 42.26                      | -8.90              | 193.42                     |
| 205         | 2.26                  | 40.07                      | -8.03              | 197.93                     |
| 210         | 2.32                  | 37.55                      | -7.51              | 199.13                     |
| 215         | 2.73                  | 35.04                      | -7.01              | 192.51                     |
| 220         | 3.36                  | 32.82                      | -6.13              | 183.24                     |
| 225         | 3.28                  | 31.85                      | -5.74              | 186.92                     |
| 230         | 3.01                  | 31.76                      | -5.71              | 192.84                     |
| 235         | 3.44                  | 31.69                      | -5.67              | 183.65                     |
| 240         | 3.81                  | 32.39                      | -5.95              | 174.22                     |
| 245         | 4.26                  | 33.68                      | -6.47              | 160.90                     |
| 250         | 3.96                  | 36.18                      | -7.24              | 162.17                     |
| 255         | 3.74                  | 39.04                      | -7.81              | 164.00                     |
| 260         | 3.66                  | 42.14                      | -8.86              | 160.49                     |
| 265         | 3.80                  | 45.37                      | -10.07             | 151.55                     |
| 270         | 4.12                  | 48.77                      | -10.75             | 142.80                     |
| 275         | 4.39                  | 52.40                      | -11.00             | 137.81                     |
| 280         | 4.75                  | 56.17                      | -11.00             | 134.21                     |
| 285         | 4.58                  | 60.27                      | -11.00             | 135.23                     |
| 290         | 3.88                  | 64.58                      | -11.00             | 145.74                     |
| 295         | 3.20                  | 68.88                      | -11.00             | 159.97                     |
| 300         | 2.75                  | 73.13                      | -11.00             | 172.33                     |
| 305         | 2.54                  | 77.34                      | -11.00             | 177.28                     |
| 310         | 2.52                  | 81.54                      | -11.00             | 177.75                     |
| 315         | 2.01                  | 85.79                      | -11.00             | 189.54                     |
| 320         | 1.72                  | 89.99                      | -11.00             | 197.50                     |
| 325         | 1.23                  | 94.15                      | -11.00             | 208.55                     |
| 330         | 1.04                  | 98.29                      | -11.00             | 214.30                     |
| 335         | 0.72                  | 102.37                     | -11.00             | 230.59                     |
| 340         | 0.91                  | 106.49                     | -11.00             | 219.95                     |
| 345         | 0.70                  | 110.48                     | -11.00             | 231.81                     |
| 350         | 1.13                  | 114.59                     | -11.00             | 211.56                     |
| 355         | 1.61                  | 118.68                     | -11.00             | 200.62                     |

## 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: \_\_\_\_\_

Twila Meyer  
DB Technician IV  
COMSEARCH  
19700 Janelia Farm Boulevard  
Ashburn, VA 20147

DATED: July 31, 2018

# FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for  
**Comcast Cable Communications, LLC**  
**LAS VEGAS, NM**  
**Satellite Earth Station**

Prepared By:  
COMSEARCH  
19700 Janelia Farm Boulevard  
Ashburn, VA 20147  
July 31, 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**

No great circle interference cases were identified during the interference study of the proposed earth station.

### 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 07/31/2018.

Company

Comsearch

## **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: 07/31/2018  
Job Number: 180731COMSTW11

---

### Administrative Information

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

---

### Site Information LAS VEGAS, NM

Venue Name  
Latitude (NAD 83) 35° 35' 57.6" N  
Longitude (NAD 83) 105° 14' 1.9" W  
Climate Zone A  
Rain Zone 5  
Ground Elevation (AMSL) 1973.97 m / 6476.3 ft

---

### Link Information

Satellite Type Geostationary  
Mode RO - Receive-Only  
Modulation Digital  
Satellite Arc 70° W to 140° West Longitude  
Azimuth Range 129.5° to 230.0°  
Corresponding Elevation Angles 34.5° / 34.8°  
Antenna Centerline (AGL) 2.74 m / 9.0 ft

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### Antenna Information

Manufacturer PATRIOT  
Model 3.5 METER  
Gain / Diameter 41.9 dBi / 3.5 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) 36M0F9W / 3700.0 - 4200.0

Max Great Circle Coordination Distance 308.2 km / 191.5 mi  
Precipitation Scatter Contour Radius 384.8 km / 239.1 mi

# COMSEARCH

## Earth Station Data Sheet

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

### Coordination Values

### LAS VEGAS, NM

Licensee Name Comcast Cable Communications, LLC  
Latitude (NAD 83) 35° 35' 57.6" N  
Longitude (NAD 83) 105° 14' 1.9" W  
Ground Elevation (AMSL) 1973.97 m / 6476.3 ft  
Antenna Centerline (AGL) 2.74 m / 9.0 ft  
Antenna Model PATRIOT 3.5 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           | 0.79                  | 121.96                     | -10.00             | 232.15                     |
| 5           | 0.64                  | 118.07                     | -10.00             | 240.81                     |
| 10          | 0.69                  | 114.16                     | -10.00             | 238.13                     |
| 15          | 0.77                  | 110.18                     | -10.00             | 233.15                     |
| 20          | 0.70                  | 106.11                     | -10.00             | 237.39                     |
| 25          | 0.61                  | 102.00                     | -10.00             | 242.81                     |
| 30          | 0.47                  | 97.86                      | -10.00             | 252.94                     |
| 35          | 0.41                  | 93.72                      | -10.00             | 260.33                     |
| 40          | 0.37                  | 89.58                      | -10.00             | 264.09                     |
| 45          | 0.36                  | 85.44                      | -10.00             | 265.10                     |
| 50          | 0.46                  | 81.31                      | -10.00             | 253.92                     |
| 55          | 0.53                  | 77.19                      | -10.00             | 247.83                     |
| 60          | 0.50                  | 73.11                      | -10.00             | 249.42                     |
| 65          | 0.56                  | 69.06                      | -10.00             | 245.69                     |
| 70          | 0.58                  | 65.07                      | -10.00             | 244.59                     |
| 75          | 0.61                  | 61.16                      | -10.00             | 243.00                     |
| 80          | 0.90                  | 57.23                      | -10.00             | 225.74                     |
| 85          | 0.75                  | 53.60                      | -10.00             | 234.46                     |
| 90          | 0.75                  | 50.06                      | -10.00             | 234.36                     |
| 95          | 0.78                  | 46.69                      | -9.73              | 233.83                     |
| 100         | 0.72                  | 43.63                      | -8.99              | 241.58                     |
| 105         | 0.67                  | 40.86                      | -8.28              | 248.88                     |
| 110         | 0.60                  | 38.48                      | -7.63              | 257.70                     |
| 115         | 0.54                  | 36.54                      | -7.07              | 264.98                     |
| 120         | 0.44                  | 35.16                      | -6.65              | 277.43                     |
| 125         | 0.48                  | 34.23                      | -6.36              | 274.08                     |
| 130         | 0.36                  | 34.10                      | -6.32              | 289.78                     |
| 135         | 0.00                  | 34.84                      | -6.55              | 308.17                     |
| 140         | 0.00                  | 35.83                      | -6.86              | 306.07                     |
| 145         | 0.00                  | 37.38                      | -7.32              | 302.92                     |
| 150         | 0.00                  | 39.44                      | -7.90              | 299.01                     |
| 155         | 0.00                  | 41.89                      | -8.55              | 294.65                     |
| 160         | 0.37                  | 43.89                      | -9.06              | 270.42                     |
| 165         | 0.54                  | 45.60                      | -9.47              | 250.03                     |
| 170         | 0.75                  | 46.79                      | -9.75              | 235.41                     |
| 175         | 0.93                  | 47.46                      | -9.91              | 224.45                     |
| 180         | 1.55                  | 47.12                      | -9.83              | 204.97                     |
| 185         | 1.72                  | 46.67                      | -9.73              | 203.20                     |

# COMSEARCH

## Earth Station Data Sheet

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

### Coordination Values

### LAS VEGAS, NM

Licensee Name Comcast Cable Communications, LLC  
Latitude (NAD 83) 35° 35' 57.6" N  
Longitude (NAD 83) 105° 14' 1.9" W  
Ground Elevation (AMSL) 1973.97 m / 6476.3 ft  
Antenna Centerline (AGL) 2.74 m / 9.0 ft  
Antenna Model PATRIOT 3.5 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) |
| 190         | 1.95                  | 45.65                      | -9.49              | 198.17                     |
| 195         | 2.14                  | 44.16                      | -9.13              | 195.42                     |
| 200         | 2.28                  | 42.26                      | -8.65              | 194.64                     |
| 205         | 2.26                  | 40.07                      | -8.07              | 197.73                     |
| 210         | 2.32                  | 37.55                      | -7.36              | 199.81                     |
| 215         | 2.73                  | 35.04                      | -6.62              | 194.43                     |
| 220         | 3.36                  | 32.82                      | -5.90              | 184.39                     |
| 225         | 3.28                  | 31.85                      | -5.58              | 187.75                     |
| 230         | 3.01                  | 31.76                      | -5.55              | 193.62                     |
| 235         | 3.44                  | 31.69                      | -5.52              | 184.43                     |
| 240         | 3.81                  | 32.39                      | -5.76              | 175.26                     |
| 245         | 4.26                  | 33.68                      | -6.18              | 162.41                     |
| 250         | 3.96                  | 36.18                      | -6.96              | 163.61                     |
| 255         | 3.74                  | 39.04                      | -7.79              | 164.11                     |
| 260         | 3.66                  | 42.14                      | -8.62              | 161.70                     |
| 265         | 3.80                  | 45.37                      | -9.42              | 154.65                     |
| 270         | 4.12                  | 48.77                      | -10.00             | 146.09                     |
| 275         | 4.39                  | 52.40                      | -10.00             | 141.98                     |
| 280         | 4.75                  | 56.17                      | -10.00             | 136.90                     |
| 285         | 4.58                  | 60.27                      | -10.00             | 139.27                     |
| 290         | 3.88                  | 64.58                      | -10.00             | 150.25                     |
| 295         | 3.20                  | 68.88                      | -10.00             | 164.97                     |
| 300         | 2.75                  | 73.13                      | -10.00             | 177.34                     |
| 305         | 2.54                  | 77.34                      | -10.00             | 182.20                     |
| 310         | 2.52                  | 81.54                      | -10.00             | 182.67                     |
| 315         | 2.01                  | 85.79                      | -10.00             | 194.23                     |
| 320         | 1.72                  | 89.99                      | -10.00             | 202.04                     |
| 325         | 1.23                  | 94.15                      | -10.00             | 213.22                     |
| 330         | 1.04                  | 98.29                      | -10.00             | 219.18                     |
| 335         | 0.72                  | 102.37                     | -10.00             | 235.96                     |
| 340         | 0.91                  | 106.49                     | -10.00             | 225.01                     |
| 345         | 0.70                  | 110.48                     | -10.00             | 237.22                     |
| 350         | 1.13                  | 114.59                     | -10.00             | 216.34                     |
| 355         | 1.61                  | 118.68                     | -10.00             | 205.11                     |

## 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: \_\_\_\_\_

Twila Meyer  
DB Technician IV  
COMSEARCH  
19700 Janelia Farm Boulevard  
Ashburn, VA 20147

DATED: July 31, 2018



# FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for  
**Comcast Cable Communications, LLC**  
**LAS VEGAS, NM**  
**Satellite Earth Station**

Prepared By:  
COMSEARCH  
19700 Janelia Farm Boulevard  
Ashburn, VA 20147  
July 31, 2018

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| 4. EARTH STATION COORDINATION DATA..... | 6  |
| 5. CERTIFICATION.....                   | 10 |

## 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**

No great circle interference cases were identified during the interference study of the proposed earth station.

### 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 07/31/2018.

Company

Comsearch

## **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: 07/31/2018  
Job Number: 180731COMSTW09

---

### Administrative Information

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

---

### Site Information LAS VEGAS, NM

Venue Name  
Latitude (NAD 83) 35° 35' 57.6" N  
Longitude (NAD 83) 105° 14' 1.9" W  
Climate Zone A  
Rain Zone 5  
Ground Elevation (AMSL) 1973.97 m / 6476.3 ft

---

### Link Information

Satellite Type Geostationary  
Mode RO - Receive-Only  
Modulation Digital  
Satellite Arc 70° W to 140° West Longitude  
Azimuth Range 129.5° to 230.0°  
Corresponding Elevation Angles 34.5° / 34.8°  
Antenna Centerline (AGL) 2.74 m / 9.0 ft

---

### Antenna Information Receive - F40504

Manufacturer MICRODYNE CORPORATION  
Model 5-METER  
Gain / Diameter 44.0 dBi / 5.0 m  
3-dB / 15-dB Beamwidth 1.02° / 2.20°

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) 36M0F9W / 3700.0 - 4200.0

Max Great Circle Coordination Distance 305.5 km / 189.8 mi  
Precipitation Scatter Contour Radius 384.8 km / 239.1 mi

# COMSEARCH

## Earth Station Data Sheet

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

### Coordination Values

### LAS VEGAS, NM

Licensee Name Comcast Cable Communications, LLC  
Latitude (NAD 83) 35° 35' 57.6" N  
Longitude (NAD 83) 105° 14' 1.9" W  
Ground Elevation (AMSL) 1973.97 m / 6476.3 ft  
Antenna Centerline (AGL) 2.74 m / 9.0 ft  
Antenna Model MICRODYNE CORPORATION 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           | 0.79                  | 121.96                     | -14.00             | 212.05                     |
| 5           | 0.64                  | 118.07                     | -14.00             | 219.80                     |
| 10          | 0.69                  | 114.16                     | -14.00             | 217.40                     |
| 15          | 0.77                  | 110.18                     | -14.00             | 212.95                     |
| 20          | 0.70                  | 106.11                     | -14.00             | 216.73                     |
| 25          | 0.61                  | 102.00                     | -14.00             | 221.61                     |
| 30          | 0.47                  | 97.86                      | -14.00             | 230.71                     |
| 35          | 0.41                  | 93.72                      | -14.00             | 237.52                     |
| 40          | 0.37                  | 89.58                      | -14.00             | 241.02                     |
| 45          | 0.36                  | 85.44                      | -14.00             | 241.97                     |
| 50          | 0.46                  | 81.31                      | -14.00             | 231.61                     |
| 55          | 0.53                  | 77.19                      | -14.00             | 226.16                     |
| 60          | 0.50                  | 73.11                      | -14.00             | 227.61                     |
| 65          | 0.56                  | 69.06                      | -14.00             | 224.21                     |
| 70          | 0.58                  | 65.07                      | -14.00             | 223.22                     |
| 75          | 0.61                  | 61.16                      | -14.00             | 221.78                     |
| 80          | 0.90                  | 57.23                      | -13.45             | 208.88                     |
| 85          | 0.75                  | 53.60                      | -12.72             | 220.27                     |
| 90          | 0.75                  | 50.06                      | -12.01             | 223.74                     |
| 95          | 0.78                  | 46.69                      | -11.34             | 225.33                     |
| 100         | 0.72                  | 43.63                      | -10.45             | 233.52                     |
| 105         | 0.67                  | 40.86                      | -9.34              | 242.72                     |
| 110         | 0.60                  | 38.48                      | -8.39              | 253.09                     |
| 115         | 0.54                  | 36.54                      | -7.62              | 261.56                     |
| 120         | 0.44                  | 35.16                      | -7.06              | 274.75                     |
| 125         | 0.48                  | 34.23                      | -6.69              | 271.93                     |
| 130         | 0.36                  | 34.10                      | -6.64              | 287.63                     |
| 135         | 0.00                  | 34.84                      | -6.93              | 305.53                     |
| 140         | 0.00                  | 35.83                      | -7.33              | 302.82                     |
| 145         | 0.00                  | 37.38                      | -7.95              | 298.63                     |
| 150         | 0.00                  | 39.44                      | -8.77              | 293.20                     |
| 155         | 0.00                  | 41.89                      | -9.76              | 286.84                     |
| 160         | 0.37                  | 43.89                      | -10.56             | 261.30                     |
| 165         | 0.54                  | 45.60                      | -11.12             | 240.55                     |
| 170         | 0.75                  | 46.79                      | -11.36             | 226.86                     |
| 175         | 0.93                  | 47.46                      | -11.49             | 216.49                     |
| 180         | 1.55                  | 47.12                      | -11.42             | 200.17                     |
| 185         | 1.72                  | 46.67                      | -11.33             | 195.84                     |



# COMSEARCH

## Earth Station Data Sheet

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

### Coordination Values

### LAS VEGAS, NM

Licensee Name Comcast Cable Communications, LLC  
Latitude (NAD 83) 35° 35' 57.6" N  
Longitude (NAD 83) 105° 14' 1.9" W  
Ground Elevation (AMSL) 1973.97 m / 6476.3 ft  
Antenna Centerline (AGL) 2.74 m / 9.0 ft  
Antenna Model MICRODYNE CORPORATION 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) |
| 190         | 1.95                  | 45.65                      | -11.13             | 190.49                     |
| 195         | 2.14                  | 44.16                      | -10.66             | 188.15                     |
| 200         | 2.28                  | 42.26                      | -9.90              | 188.65                     |
| 205         | 2.26                  | 40.07                      | -9.03              | 193.19                     |
| 210         | 2.32                  | 37.55                      | -8.02              | 196.72                     |
| 215         | 2.73                  | 35.04                      | -7.02              | 192.46                     |
| 220         | 3.36                  | 32.82                      | -6.13              | 183.24                     |
| 225         | 3.28                  | 31.85                      | -5.74              | 186.92                     |
| 230         | 3.01                  | 31.76                      | -5.71              | 192.84                     |
| 235         | 3.44                  | 31.69                      | -5.67              | 183.65                     |
| 240         | 3.81                  | 32.39                      | -5.95              | 174.22                     |
| 245         | 4.26                  | 33.68                      | -6.47              | 160.90                     |
| 250         | 3.96                  | 36.18                      | -7.47              | 160.95                     |
| 255         | 3.74                  | 39.04                      | -8.62              | 159.86                     |
| 260         | 3.66                  | 42.14                      | -9.86              | 155.56                     |
| 265         | 3.80                  | 45.37                      | -11.07             | 146.98                     |
| 270         | 4.12                  | 48.77                      | -11.75             | 138.46                     |
| 275         | 4.39                  | 52.40                      | -12.48             | 132.98                     |
| 280         | 4.75                  | 56.17                      | -13.23             | 125.17                     |
| 285         | 4.58                  | 60.27                      | -14.00             | 124.40                     |
| 290         | 3.88                  | 64.58                      | -14.00             | 134.23                     |
| 295         | 3.20                  | 68.88                      | -14.00             | 145.62                     |
| 300         | 2.75                  | 73.13                      | -14.00             | 155.32                     |
| 305         | 2.54                  | 77.34                      | -14.00             | 160.13                     |
| 310         | 2.52                  | 81.54                      | -14.00             | 160.61                     |
| 315         | 2.01                  | 85.79                      | -14.00             | 174.72                     |
| 320         | 1.72                  | 89.99                      | -14.00             | 183.20                     |
| 325         | 1.23                  | 94.15                      | -14.00             | 197.38                     |
| 330         | 1.04                  | 98.29                      | -14.00             | 202.98                     |
| 335         | 0.72                  | 102.37                     | -14.00             | 215.45                     |
| 340         | 0.91                  | 106.49                     | -14.00             | 205.77                     |
| 345         | 0.70                  | 110.48                     | -14.00             | 216.57                     |
| 350         | 1.13                  | 114.59                     | -14.00             | 200.36                     |
| 355         | 1.61                  | 118.68                     | -14.00             | 186.53                     |

## 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: \_\_\_\_\_

Twila Meyer  
DB Technician IV  
COMSEARCH  
19700 Janelia Farm Boulevard  
Ashburn, VA 20147

DATED: July 31, 2018