E080162 SES-STA-20150605-00331 IB2015001047
Denali 20020, LLC

Approved by OMB
3060–0678

# APPLICATION FOR EARTH STATION SPECIAL TEMPORARY AUTHORITY

APPLICANT INFORMATIONEnter a description of this application to identify it on the main menu:
STA to add Extended Ku–band frequencies to E080162

**1. Applicant**

| | | | |
|---|---|---|---|
| **Name:** | Denali 20020, LLC | **Phone Number:** | 509–689–1000 |
| **DBA Name:** | | **Fax Number:** | 509–689–3798 |
| **Street:** | 66 C Teleport Drive | **E–Mail:** | TOCC@usei–teleport.com |
| City: | Brewster | **State:** | WA |
| **Country:** | USA | **Zipcode:** | 98812 – |
| **Attention:** | Mr Darryl White | | |

GRANTED
International Bureau

File # SES-STA-20150605-00331
Call Sign E080162 Grant Date 7-21-15
(or other identifier)
Term Dates
From: 7-21-15 To: 8-6-15
Approved: Paul E Blais

Application: Denali 20020, LLC
Call Sign: E080162
File No.: SES-STA-20150605-00331
Special Temporary Authority (STA)

Denali 20020, LLC is granted a STA, beginning July 21 thru August 6, 2015, to use its Vernon Valley, NJ, Extended Ku-band fixed earth station, to transmit to the Telstar-11N satellite at 37.5° W.L. orbital location, on the following frequencies: 13.75-14.0 GHz (space-to-Earth) and 10.95-11.2 GHz and 11.45-12.20 GHz (Earth-to-space) under the following conditions:

1. Denali 20020, LLC will perform the operations in the uplink frequency band (Earth-to-space): 13750-14500 MHz (LCP) and the downlink frequency bands (space-to-Earth): 10950-11200 MHz and 11450-12200 MHz (LCP) within coordinated emission and power limits. The maximum EIRP shall not exceed 85 dBW per NTIA manual US 356.

2. Operations, shall not cause harmful interference to, and shall not claim protection from, interference caused to it by any other lawfully operating station and it shall cease transmission(s) immediately upon notice of such interference.

3. In the event of any harmful interference under this grant of STA, Denali 20020 LLC, (call sign: E080162) must cease operations immediately upon notification of such interference, and must inform the Commission, in writing, immediately of such an event.

4. Grant of this authorization is without prejudice to any determination that the Commission may make regarding pending or future Denali 20020 LLC applications.

5. Any action taken or expense incurred as a result of operations pursuant to this STA is solely 'at Denali 20020 LLC's risk.

6. Operations in the 13.75-14.00 GHz band may only exceed 85 dBw/carrier if an emergency situation exists and the applicant must notify FCCOperationCenter@fcc.gov of the situation with a copy to paul.blais@fcc.gov.

This action is issued pursuant to Section 0.261 of the Commission's rules on delegated authority, 47 C.F.R. §0.261, and is effective immediately.

GRANTED
International Bureau

File # SES-STA-20150605-00331
Call Sign E080162 Grant Date 7-21-15
(or other identifier)
Term Dates
From: 7-21-15 To: 8-6-15
Approved: Paul Blais

**2. Contact**

| | | | |
|---|---|---|---|
| **Name:** | Mr Darryl White | **Phone Number:** | 509-689-1000 |
| **Company:** | Denali 20020, LLC | **Fax Number:** | 509-689-3798 |
| **Street:** | 66 C Teleport Drive | E-Mail: | TOCC@usei-teleport.com |
| **City:** | Brewster | **State:** | WA |
| **Country:** | USA | **Zipcode:** | 98812 - |
| **Attention:** | | **Relationship:** | |

(If your application is related to an application filed with the Commission, enter either the file number or the IB Submission ID of the related application. Please enter only one.)
3. Reference File Number or Submission ID

4a. Is a fee submitted with this application?
◉ If Yes, complete and attach FCC Form 159. If No, indicate reason for fee exemption (see 47 C.F.R.Section 1.1114).
○ Governmental Entity ○ Noncommercial educational licensee
○ Other(please explain):

4b. Fee Classification CGX – Fixed Satellite Transmit/Receive Earth Station

5. Type Request

○ Use Prior to Grant ○ Change Station Location ◉ Other

| | |
|---|---|
| 6. Requested Use Prior Date<br>06/11/2015 | |
| 7. CityVernon Valley | 8. Latitude<br>(dd mm ss.s h) 41 12 10.0 N |

| 9. State NJ | 10. Longitude<br>(dd mm ss.s h) 74 31 39.0 W |
|---|---|

11. Please supply any need attachments.

Attachment 1: Extended Ku–band  Attachment 2: Coordination Report  Attachment 3:

12. Description. (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)

Denali requests Special Temporary Authority to transmit to Telstar 11N at 37.5 degrees West Longitude at Frequency 13.958 GHz with the 11 meter earth station licensed under Call Sign E080162. A modification of license will be filed for permanent authorization to use the 13.75 - 14.5 GHz transmit frequency range and 10.95 - 11.2 and 11.45 - 12.20 GHz

13. By checking Yes, the undersigned certifies that neither applicant nor any other party to the application is subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti–Drug Act of 1988, 21 U.S.C. Section 862, because of a conviction for possession or distribution of a controlled substance. See 47 CFR 1.2002(b) for the meaning of "party to the application" for these purposes.

(●) Yes ( ) No

| 14. Name of Person Signing<br>Darryl White | 15. Title of Person Signing<br>Manager |
|---|---|

WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND / OR IMPRISONMENT (U.S. Code, Title 18, Section 1001), AND/OR REVOCATION OF ANY STATION AUTHORIZATION (U.S. Code, Title 47, Section 312(a)(1)), AND/OR FORFEITURE (U.S. Code, Title 47, Section 503).

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**THE FOREGOING NOTICE IS REQUIRED BY THE PAPERWORK REDUCTION ACT OF 1995, PUBLIC LAW 104–13, OCTOBER 1, 1995, 44 U.S.C. SECTION 3507.**

**12. Description**

Denali requests Special Temporary Authority to transmit to Telstar 11N at 37.5 degrees West Longitude at Frequency 13.958 GHz with the 11 meter earth station licensed under Call Sign E080162. A modification of license will be filed for permanent authorization to use the 13.75 - 14.5 GHz transmit frequency range and 10.95 - 11.2 and 11.45 - 12.20 GHz receive frequency range on this antenna once the pending modification at the FCC to extend the satellite arc has been granted. This STA is necessary in order to support an expedited request for service at the Vernon Valley teleport.

**Exhibit For**
**Denali 20020, LLC**
**Vernon, New Jersey**
**(Call Sign: E080162)**
**Vertex / RSI 11.0 Meter KPK Earth Station**

**Compliance with FCC Report & Order (FCC96-377) for the 13.75 - 14.0 GHz Band**
**Analysis and Calculations**

## 1. Background

This Exhibit is presented to demonstrate the extent to which the licensed Denali 20020, LLC. satellite earth station (E080162), which is being modified in Vernon, New Jersey, is in compliance with FCC REPORT & ORDER 96-377. The potential interference from the earth station to US Navy shipboard radiolocation operations (RADAR) and the NASA space research activities in the 13.75 - 14.0 GHz Band is addressed in this exhibit. The parameters for the earth station are:

**Table 1. Earth Station Characteristics**

| | |
|---|---|
| • Coordinates (NAD83): | 41° 12' 10.0" N, 74° 31' 39.0" W |
| • Satellite Location for Earth Station: | From 3.0° W to 136.0° W<br>Telstar-11N (37.5° W) |
| • Frequency Band: | 13.75-14.0 GHz for uplink |
| • Polarizations: | Linear and Circular |
| • Emissions: | 1M00G7W<br>36M0G7W |
| • Modulation: | Digital |
| • Maximum Aggregate Uplink EIRP: | 71.0 dBW for the 1 MHz Carriers<br>76.9 dBW for the 36 MHz Carriers |
| • Transmit Antenna Characteristics | |
| Antenna Size: | 11.0 meters in Diameter |
| Antenna Type/Model: | Vertex/RSI |
| Gain: | 62.2 dBi |
| • RF power into Antenna Flange: | 1.0 MHz<br>8.8 dBW, or 8.8 dBW/MHz<br>or -15.2 dBW/4 kHz (Maximum) |

36 MHz
14.7 dBW or -0.9 dBW/MHz
or -24.9 dBW/4 kHz (Maximum)

- Minimum Elevation Angles:
  Vernon Valley, NJ — 29.3° @ 131.1° Az. (Telstar-11N) at 37.5° W
- Side Lobe Antenna Gain: — 32 - 25*log(θ)

Because the above uplink spectrum is shared with the Federal Government, coordination in this band requires resolution data pertaining to potential interference between the earth station and both Navy Department and NASA systems. Potential interference from the earth station could impact with the Navy and/or NASA systems in two areas. These areas are noted in FCC Report and Order 96-377 dated September 1996, and consist of (1) Radiolocation and radio navigation, (2) Data Relay Satellites.

Summary of Coordination Issues:

1) Potential Impact to Government Radiolocation (Shipboard Radar)
2) Potential Impact to NASA Data Relay Satellite Systems (TDRSS)

## 2. Potential Impact to Government Radiolocation (Shipboard Radar)

Radiolocation operations (RADAR) may occur anywhere in the 13.4 - 14 GHz frequency band aboard ocean going United States Navy ships. The Federal Communication Commission (FCC) order 96-377 allocates the top 250 MHz of this 600 MHz band to the Fixed Satellite Service (FSS) on a co-primary basis with the radiolocation operations and provides for an interference protection level of -167 dBW/m$^2$/4 kHz.

The closest distance to the shoreline from the Vernon, New Jersey earth station is approximately 71.62 km Southeast toward New York City, NY. The calculation of the power spectral density at this distance is given by:

| | 1 MHz | 36 MHz |
|---|---|---|
| 1. Clear Sky EIRP: | 71.0 dBW | 76.9 dBW |
| 2. Carrier Bandwidth: | 1 MHz | 36 MHz |
| 3. PD at antenna input: dBW/4 kHz | -15.2 | -24.90 |
| 4. Transmit Antenna Gain: | 62.2 dBi | |
| 5. Antenna Gain Horizon: | FCC Reference Pattern | |
| 6. Antenna Elevation Angle : | 29.3° | |

The earth station will radiate interference toward New York City, New York according to its off-axis side-lobe performance. A conservative analysis, using FCC standard reference pattern, results in off-axis antenna gains of -4.6 dBi toward the New York City, New York, harbor.

The signal density at the shoreline, through free space is:

1 MHz Carriers
PFD = Antenna Feed Power density (dBW/4 kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dBw-$m^2$).

= -15.2 dBw/4 kHz + (-4.6) dBi – 10*log[4Π*(71620m)$^2$]
= -127.9 dBW/$m^2$/4 kHz + Additional Path Losses (~72.8 dB)
= -200.7 dBW/$m^2$/4 kHz

36 MHz Carriers
PFD = Antenna Feed Power density (dBW/4 kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dBw-$m^2$).

= -24.9 dBw/4 kHz + (-4.6) dBi – 10*log[4Π*(71620m)$^2$]
= -137.6 dBW/$m^2$/4 kHz + Additional Path Losses (~72.8 dB)
= -210.4 dBW/$m^2$/4 kHz

Our calculations show additional path loss of approximately 72.8 dB including absorption loss and earth diffraction loss for the actual path profiles from the proposed earth station to the nearest shoreline.

The calculated PFD including additional path losses to the closest shoreline location is –200.7 dBW/$m^2$/4 kHz for the 1 MHz carriers. The calculated PFD including additional path losses to the closest shoreline location is –210.4 dBW/$m^2$/4 kHz for the 36 MHz carriers. This is 33.7 dB (1 MHz) and 43.4 dB (36 MHz) below the –167 dBW/$m^2$/4 kHz interference criteria of R&O 96-377. Therefore, there should be no interference to the US Navy RADAR from the Vernon earth station due to the distance and the terrain blockage between the site and the shore.

## 3. Potential Impact to NASA's Data Relay Satellite System (TDRSS)

The geographic location of the Denali 20020, LLC. earth station in Vernon, New Jersey is outside the 390 km radius coordination contour surrounding NASA's White Sands, New Mexico ground station complex. Therefore, the TDRSS space-to-earth link will not be impacted by the Denali 20020, LLC. earth station in Vernon, New Jersey.

The TDRSS space-to-space link in the 13.772 to 13.778 GHz band is assumed to be protected if an earth station produces an EIRP less than 71 dBW/6 MHz in this band. The 11.0 meter earth station antenna will have an EIRP less than 71 dBW/6 MHz for the 1 MHz carriers in this band. The EIRP for the 1 MHz carriers is 71.0 dBW. The equivalent EIRP per 6 MHz segment will be 70.83 dBW/6 MHz. Therefore, there should not be interference to the TDRSS space-to-space link for the 1 MHz carriers.

For the 36 MHz carriers, the EIRP of 76.9 dBW, will equate to an EIRP per 6 MHz of 70.9 dBW/6 MHz. Since this level will also be less than the 71.0 dBW/6 MHz threshold, there will not be interference to the TDRSS space-to-space link from the 36 MHz carriers. Therefore, at the 76.9 dBW power level, there should not be interference to the TDRSS space-to-space link for the 36 MHz carriers.

## 4. Coordination Issue Result Summary and Conclusions

The results of the analysis and calculations performed in this exhibit indicate that compatible operations between the earth station at the Vernon facility and the US Navy and NASA systems space-to-earth link and NASA systems space-to-space link (13772.0 to 13778.0 MHz) will be permitted for the 1 MHz through 36 MHz carriers.

# FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
**Denali 20020, LLC**
**VERNON VALLEY, NJ**
**Satellite Earth Station**
**E080162**

Prepared By:
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147
June 05, 2015

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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 06/05/2015.

Company
256Q Networks
ALBANY, COUNTY OF
ALGONQUIN GAS TRANSMISSION, LLC
AMFM Radio Licenses, LLC
AT&T Corporation
AWC Networks
Affiniti PA, LLC
Airband Communications Inc
Allentown SMSA Limited Partnership
Appalachian Broadcasting
Archdiocese of New York Dept of Educatio
Atlantic Telecommunications
Auburn Data Systems, LLC
BAY BROADBAND COMMUNICATIONS LLC
BFI Licenses, LLC
Baltimore Gas and Electric Company
Bergen, County of
Berks County Department of Emergency Ser
Blueline Communications
Buckeye Partners
Bucks County Dept. of Emergency Communic
Business Only Broadband, LLC
CBS Communication Services Inc
Capital Communications of America
Cellco Partnership - (W-NY)
Cellco Partnership - CT, W-MA, VT
Cellco Partnership- PA Region
Cellco Partnership-Newark-Dallas Verizon
Cellco Prtnrshp - Phil. Tri-State Rgn
Chester, County of
Chester, County of
China Cat Productions LLC
City of Albany
City of Bristol Mayor's Office
City of Jersey City
City of New Haven Police Services
City of New York
City of Springfield Police Department
Clearwire Spectrum Holdings III, LLC
Columbia, County
Columbia, County of

Community Products, LLC
Comprehensive Wireless LLC
Connect-Vision ltd.
Connecticut State Police Department
Conterra Ultra Broadband, LLC
Converge Towers LLC
Coralinks
County of Burlington
County of Burlington, Public Safety Cntr
County of Camden
County of Mercer
County of Warren, NJ
D&E Communications, Inc.
DAUPHIN COUNTY EMERGENCY MANAGEMENT
Delaware County (PA) Emergency Services
Delaware Division of Communications
Direct Broadcast Services, Inc.
EAST HAMPTON TOWN POLICE DEPARTMENT
ECW Wireless, LLC
EG Broadcast Newco Corp
East Brunswick, Township of, NJ
Eastern MLG LLC
Electric Railroad, LLC
Enoch Pratt Free Library
Essex County Sheriff's Office (NJ)
Exelon Generation Company, LLC
FORDHAM UNIVERSITY(WFUV)
Fundamental Broadcasting LLC
GAW High Speed Internet
Garden State Transmissions
Geodesic Networks LLC
Global Crossing Telecommunications, Inc.
Gloucester Township
Gloucester, County of
Goosetown Network Services, LLC
Greater Philadelphia Radio, Inc.
Green Line Networks
Greenwich, Town of (CT)
HARRIS CORPORATION
High Voltage Communications LLC (CFN)
Highway Networks, LLC
Holy Name Hospital
Hopewell Radiology Group
Hudson County MIS Department
Hudson County Prosecutors Office
Jefferson Microwave, LLC
Kryptick Technologies
LANline Communications, Inc.
Lackawanna County Dept. of Emergency Ser
Lackawanna, County of
Lancaster County-Wide Communications
Lehigh, County of
Limitless Mobile, LLC
Local Media TV Philadelphia
MB Microwave, LLC
MONMOUTH, COUNTY OF

MVC Research. LLC
Mahwah Communications
Manchester, Township of
Maryland State Highway Administration
Massachusetts Commonwealth of
Massachusetts, Commonwealth of
Metro Networks Communications, Inc.
Mid-Hudson Data Corp
Middlesex, County of
Mifflin Mobilecom
Monroe County Control Center (PA)
Montgomery County Of
Morris, County of
NBC Telemundo License LLC
NOROC Broadband LLC
NY Dept of Health and Mental Hygiene
NYC DOT Staten Island Ferry
Nassau County Police Department
National Tower Company LLC
NeXXCom Wireless LLC
New Britain, City of
New Cingular Wireless PCS LLC -NJ
New Cingular Wireless PCS - Maryland
New Cingular Wireless PCS LLC - MA
New Cingular Wireless PCS LLC-DE/NH/RI
New Cingular Wireless PCS of PA LLC
New Cingular Wireless PCS, LLC (NY)
New Cingular Wireless PCS, LLC - PA
New Jersey State Police
New Jersey Transit Rail Operations, Inc.
New Jersey Turnpike Authority-Pkwy Div
New Jersey, State of -NJ Transit
New Line Networks, LLC
New York City Police Department TARU
New York Communications Co., Inc
New York SMSA LP (Northern NJ)
New York SMSA Limited Partnership
New York, City of (Police Department)
Newark Police Department
Norcom Communications Corp.
Northeast Utilities Service Company
Northrop Grumman Systems Corp.
Northrop Grumman Systems Corporation Inc
Northumberland, County of
Norton, Douglas R
Ocean, County of - Div of Wireless Tech.
Office of Emergency Telecom Services, NJ
Orange Poughkeepsie SMSA LTD Partnership
Orange and Rockland Utilities, Inc.
Orangetown, Town of
PEG Bandwidth, LLC
PISCATAWAY, TOWNSHIP OF
PSEG Services Corporation
Peco Energy Company
Pennsylvania Turnpike Commission
PhillieCo, L.P.

Philly Sports Wireless
Pines Pantry, Inc.
Pitt Power
Port Authority of New York & New Jersey
QUALCOMM INC.
Qoncept Holdings LLC
Rendezvous Communications LLC
Rensselaer County
Rockland, County of
SANOFI PASTEUR
SCHUYLKILL, COUNTY OF
SCS Networks
SECOM NET
STAMFORD, CITY OF
STATE OF NEW JERSEY - OFFICE OF PUBLIC
SUFFOLK, COUNTY OF
SW Networks
Salem County Information Technology
Shenandoah Personal Communications, LLC
Somerset, County of - Emergency Manageme
Southeastern Pennsylvania Transit Auth
Spot On Networks
Sprint Spectrum L.P.
Standard Backhaul Communications LLC
State of Maryland, MIEMSS
State of New Jersey
State of New Jersey Infomation Technolog
State of New York, Div of State Police
Suffolk County Police Department
Sullivan County DPW
Sussex County Sheriffs Office
T-Mobile License LLC
THE BROOKLYN HOSPITAL CENTER
Telecom Transport Management, Inc
Thacher, Proffitt & Wood LLP
Thought Transmissions, LLC
Towerstream Corp.
Town of Colonie Police Department
Town of Thomaston
Town of Wethersfield
Town of Woodbridge, Police Department
Township of Jackson
Township of Middletown
Townsquare Media Monmouth-Ocean License
Transcontinental Gas Pipeline Corp.
Turtle Networks 6559
Turtle Networks 6562
Union County New Jersey
VTel Wireless, Inc.
Velox Networks LLC
Verizon New Jersey, Inc.
Verizon Wireless (VAW) LLC - NJ
Verizon Wireless (VAW) LLC-Pennsylvania
WESTCHESTER, COUNTY OF
WHYY, Inc.
Wayne, County of

Wayne, Township of
Webline Holdings LLC
West Haven, City of
White Rabbit Networks
Wireless Holdings Network, LLC
Wireless Internetwork LLC
World Class Wireless, LLC
Zen Networks, Inc
iSignal
xWave Engineering 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: | 06/05/2015 |
| Job Number: | 150605COMSGE02 |

### Administrative Information

| | |
|---|---|
| Status | ENGINEER PROPOSAL |
| Call Sign | |
| Licensee Code | DENALI |
| Licensee Name | Denali 20020, LLC |

### Site Information — VERNON VALLEY, NJ

| | |
|---|---|
| Venue Name | |
| Latitude (NAD 83) | 41° 12' 10.0" N |
| Longitude (NAD 83) | 74° 31' 39.0" W |
| Climate Zone | A |
| Rain Zone | 2 |
| Ground Elevation (AMSL) | 217.93 m / 715.0 ft |

### Link Information

| | |
|---|---|
| Satellite Type | Geostationary |
| Mode | TR - Transmit-Receive |
| Modulation | Digital |
| Satellite Arc | 3° W to 136° West Longitude |
| Azimuth Range | 102.4° to 250.3° |
| Corresponding Elevation Angles | 5.1° / 12.6° |
| Antenna Centerline (AGL) | 7.32 m / 24.0 ft |

| Antenna Information | | Receive - FCC32 | | Transmit - FCC32 | |
|---|---|---|---|---|---|
| Manufacturer | | Vertex/RSI | | Vertex/RSI | |
| Model | | 11.0 KPK | | 11.0 KPK | |
| Gain / Diameter | | 60.5 dBi / 11.0 m | | 62.2 dBi / 11.0 m | |
| 3-dB / 15-dB Beamwidth | | 0.20° / 0.30° | | 0.14° / 0.26° | |
| Max Available RF Power | (dBW/4 kHz) | | | -14.0 | |
| | (dBW/MHz) | | | 10.0 | |
| Maximum EIRP | (dBW/4 kHz) | | | 48.2 | |
| | (dBW/MHz) | | | 72.2 | |
| Interference Objectives: | Long Term | -156.0 dBW/MHz | 20% | -151.0 dBW/4 kHz | 20% |
| | Short Term | -146.0 dBW/MHz | 0.01% | -128.0 dBW/4 kHz | 0.0025% |

| Frequency Information | Receive 11.0 GHz | Transmit 14.0 GHz |
|---|---|---|
| Emission / Frequency Range (MHz) | 1M00G7W - 36M0G7W / 10950.0 - 11200.0<br>1M00G7W - 36M0G7W / 11450.0 - 12200.0 | 1M00G7W - 36M0G7W / 13750.0 - 14500.0 |
| Max Great Circle Coordination Distance | 683.3 km / 424.5 mi | 303.8 km / 188.7 mi |
| Precipitation Scatter Contour Radius | 605.8 km / 376.4 mi | 100.0 km / 62.1 mi |

# COMSEARCH

## Earth Station Data Sheet

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

| **Coordination Values** | **VERNON VALLEY, NJ** | | | |
|---|---|---|---|---|
| Licensee Name | Denali 20020, LLC | | | |
| Latitude (NAD 83) | 41° 12' 10.0" N | | | |
| Longitude (NAD 83) | 74° 31' 39.0" W | | | |
| Ground Elevation (AMSL) | 217.93 m / 715.0 ft | | | |
| Antenna Centerline (AGL) | 7.32 m / 24.0 ft | | | |
| Antenna Model | Vertex/RSI 11 Meter | | | |
| Antenna Mode | Receive 11.0 GHz | | Transmit 14.0 GHz | |
| Interference Objectives: Long Term | -156.0 dBW/MHz | 20% | -151.0 dBW/4 kHz | 20% |
| Short Term | -146.0 dBW/MHz | 0.01% | -128.0 dBW/4 kHz | 0.0025% |
| Max Available RF Power | | | -14.0 (dBW/4 kHz) | |

| | | | Receive 11.0 GHz | | Transmit 14.0 GHz | |
|---|---|---|---|---|---|---|
| Azimuth (°) | Horizon Elevation (°) | Antenna Discrimination (°) | Horizon Gain (dBi) | Coordination Distance (km) | Horizon Gain (dBi) | Coordination Distance (km) |
| 0 | 4.52 | 102.41 | -10.00 | 103.75 | -10.00 | 100.00 |
| 5 | 3.29 | 97.41 | -10.00 | 122.27 | -10.00 | 100.00 |
| 10 | 2.13 | 92.41 | -10.00 | 143.56 | -10.00 | 100.00 |
| 15 | 1.13 | 87.42 | -10.00 | 177.30 | -10.00 | 100.00 |
| 20 | 0.90 | 82.43 | -10.00 | 186.64 | -10.00 | 100.00 |
| 25 | 2.13 | 77.43 | -10.00 | 143.42 | -10.00 | 100.00 |
| 30 | 2.26 | 72.44 | -10.00 | 140.57 | -10.00 | 100.00 |
| 35 | 1.33 | 67.47 | -10.00 | 170.65 | -10.00 | 100.00 |
| 40 | 0.00 | 62.53 | -10.00 | 231.37 | -10.00 | 115.80 |
| 45 | 0.00 | 57.56 | -10.00 | 231.37 | -10.00 | 115.80 |
| 50 | 0.00 | 52.59 | -10.00 | 231.37 | -10.00 | 115.80 |
| 55 | 0.00 | 47.62 | -9.95 | 231.61 | -9.95 | 115.94 |
| 60 | 0.00 | 42.66 | -8.75 | 236.91 | -8.75 | 118.92 |
| 65 | 0.00 | 37.71 | -7.41 | 243.07 | -7.41 | 122.30 |
| 70 | 0.00 | 32.77 | -5.89 | 250.45 | -5.89 | 126.18 |
| 75 | 0.53 | 27.77 | -4.09 | 228.16 | -4.09 | 106.26 |
| 80 | 1.42 | 22.70 | -1.90 | 203.22 | -1.90 | 100.00 |
| 85 | 1.68 | 17.74 | 0.78 | 208.15 | 0.78 | 100.00 |
| 90 | 1.69 | 12.87 | 4.26 | 224.51 | 4.26 | 100.00 |
| 95 | 2.11 | 8.00 | 9.42 | 241.02 | 9.42 | 100.00 |
| 100 | 2.10 | 3.87 | 17.30 | 683.27 | 17.30 | 303.75 |
| 105 | 2.28 | 3.85 | 17.36 | 471.56 | 17.36 | 200.32 |
| 110 | 2.19 | 7.52 | 10.09 | 243.02 | 10.09 | 100.00 |
| 115 | 2.05 | 11.20 | 5.77 | 222.48 | 5.77 | 100.00 |
| 120 | 2.40 | 14.43 | 3.02 | 204.17 | 3.02 | 100.00 |
| 125 | 2.22 | 17.95 | 0.65 | 197.16 | 0.65 | 100.00 |
| 130 | 2.60 | 20.95 | -1.03 | 180.41 | -1.03 | 100.00 |
| 135 | 2.82 | 23.91 | -2.46 | 167.52 | -2.46 | 100.00 |
| 140 | 3.49 | 26.32 | -3.51 | 143.57 | -3.51 | 100.00 |
| 145 | 3.39 | 29.11 | -4.60 | 140.38 | -4.60 | 100.00 |
| 150 | 3.38 | 31.58 | -5.49 | 136.57 | -5.49 | 100.00 |
| 155 | 3.85 | 33.34 | -6.07 | 127.24 | -6.07 | 100.00 |
| 160 | 2.94 | 36.00 | -6.91 | 139.33 | -6.91 | 100.00 |
| 165 | 2.64 | 37.77 | -7.43 | 143.41 | -7.43 | 100.00 |
| 170 | 2.41 | 39.08 | -7.80 | 146.94 | -7.80 | 100.00 |
| 175 | 2.90 | 39.26 | -7.85 | 136.12 | -7.85 | 100.00 |
| 180 | 2.23 | 40.15 | -8.09 | 149.82 | -8.09 | 100.00 |
| 185 | 2.04 | 40.12 | -8.08 | 154.65 | -8.08 | 100.00 |

# COMSEARCH

## Earth Station Data Sheet

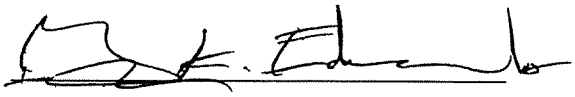
19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5500 http://www.comsearch.com

| **Coordination Values** | **VERNON VALLEY, NJ** | | | |
|---|---|---|---|---|
| Licensee Name | Denali 20020, LLC | | | |
| Latitude (NAD 83) | 41° 12' 10.0" N | | | |
| Longitude (NAD 83) | 74° 31' 39.0" W | | | |
| Ground Elevation (AMSL) | 217.93 m / 715.0 ft | | | |
| Antenna Centerline (AGL) | 7.32 m / 24.0 ft | | | |
| Antenna Model | Vertex/RSI 11 Meter | | | |
| Antenna Mode | Receive 11.0 GHz | | Transmit 14.0 GHz | |
| Interference Objectives: Long Term | -156.0 dBW/MHz | 20% | -151.0 dBW/4 kHz | 20% |
| Short Term | -146.0 dBW/MHz | 0.01% | -128.0 dBW/4 kHz | 0.0025% |
| Max Available RF Power | | | -14.0 (dBW/4 kHz) | |

| | | | Receive 11.0 GHz | | Transmit 14.0 GHz | |
|---|---|---|---|---|---|---|
| Azimuth (°) | Horizon Elevation (°) | Antenna Discrimination (°) | Horizon Gain (dBi) | Coordination Distance (km) | Horizon Gain (dBi) | Coordination Distance (km) |
| 190 | 1.18 | 40.28 | -8.13 | 184.73 | -8.13 | 100.00 |
| 195 | 0.00 | 40.25 | -8.12 | 239.79 | -8.12 | 120.51 |
| 200 | 0.00 | 38.67 | -7.68 | 241.80 | -7.68 | 121.61 |
| 205 | 0.00 | 36.71 | -7.12 | 244.57 | -7.12 | 123.04 |
| 210 | 0.00 | 34.42 | -6.42 | 247.88 | -6.42 | 124.82 |
| 215 | 0.00 | 31.86 | -5.58 | 251.95 | -5.58 | 126.97 |
| 220 | 0.27 | 28.84 | -4.50 | 250.35 | -4.50 | 124.44 |
| 225 | 0.94 | 25.34 | -3.09 | 212.20 | -3.09 | 100.00 |
| 230 | 1.87 | 21.49 | -1.31 | 196.52 | -1.31 | 100.00 |
| 235 | 1.68 | 18.35 | 0.41 | 206.60 | 0.41 | 100.00 |
| 240 | 1.47 | 15.09 | 2.53 | 221.97 | 2.53 | 100.00 |
| 245 | 2.24 | 11.59 | 5.39 | 216.27 | 5.39 | 100.00 |
| 250 | 3.62 | 8.95 | 8.20 | 204.61 | 8.20 | 100.00 |
| 255 | 4.55 | 9.29 | 7.80 | 186.41 | 7.80 | 100.00 |
| 260 | 7.27 | 11.04 | 5.92 | 135.39 | 5.92 | 100.00 |
| 265 | 9.01 | 15.12 | 2.51 | 106.64 | 2.51 | 100.00 |
| 270 | 9.56 | 19.92 | -0.48 | 100.00 | -0.48 | 100.00 |
| 275 | 9.59 | 24.87 | -2.89 | 100.00 | -2.89 | 100.00 |
| 280 | 9.63 | 29.83 | -4.87 | 100.00 | -4.87 | 100.00 |
| 285 | 9.64 | 34.81 | -6.54 | 100.00 | -6.54 | 100.00 |
| 290 | 9.57 | 39.80 | -8.00 | 100.00 | -8.00 | 100.00 |
| 295 | 9.25 | 44.80 | -9.28 | 100.00 | -9.28 | 100.00 |
| 300 | 8.58 | 49.82 | -10.00 | 100.00 | -10.00 | 100.00 |
| 305 | 7.98 | 54.83 | -10.00 | 100.00 | -10.00 | 100.00 |
| 310 | 8.07 | 59.81 | -10.00 | 100.00 | -10.00 | 100.00 |
| 315 | 7.80 | 64.80 | -10.00 | 100.00 | -10.00 | 100.00 |
| 320 | 7.08 | 69.80 | -10.00 | 100.00 | -10.00 | 100.00 |
| 325 | 6.48 | 74.79 | -10.00 | 100.00 | -10.00 | 100.00 |
| 330 | 7.35 | 79.75 | -10.00 | 100.00 | -10.00 | 100.00 |
| 335 | 8.20 | 84.72 | -10.00 | 100.00 | -10.00 | 100.00 |
| 340 | 8.09 | 89.70 | -10.00 | 100.00 | -10.00 | 100.00 |
| 345 | 8.14 | 94.69 | -10.00 | 100.00 | -10.00 | 100.00 |
| 350 | 7.02 | 99.66 | -10.00 | 100.00 | -10.00 | 100.00 |
| 355 | 5.77 | 104.60 | -10.00 | 100.00 | -10.00 | 100.00 |

# 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: June 05, 2015