

# FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for  
**Denali 20020, LLC**  
**BREWSTER, WA**  
**(9 Meter C-band)**  
**Satellite Earth Station**

Prepared By:  
COMSEARCH  
19700 Janelia Farm Boulevard  
Ashburn, VA 20147  
July 17, 2012

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## 1. CONCLUSIONS

An interference study considering all existing, proposed and prior coordinated microwave facilities within the coordination contours of the proposed earth station demonstrates that this site will operate satisfactorily with the common carrier microwave environment. Further, there will be no restrictions of its operation due to interference considerations.

## 2. SUMMARY OF RESULTS

A number of great circle interference cases were identified during the interference study of the proposed earth station. Each of the cases, which exceeded the interference objective on a line-of-sight basis, was profiled and the propagation losses estimated using NBS TN101 (Revised) techniques. The losses were found to be sufficient to reduce the signal levels to acceptable magnitudes in every case.

The following companies reported potential great circle interference conflicts that did not meet the objectives on a line-of-sight basis. When over-the-horizon losses are considered on the interfering paths, sufficient blockage exists to negate harmful interference from occurring with the proposed transmit-receive earth station.

### Company

BNSF Railway Company  
Frontier Communications of the Northwest  
QWEST CORPORATION  
Time Warner Cable LLC  
Verizon Wireless (VAW) LLC - (WA)  
WASHINGTON STATE DOT

No other carriers reported potential interference cases.

### 3. SUPPLEMENTAL SHOWING

Pursuant to Part 25.203(c) of the FCC Rules and Regulations, the satellite earth station proposed in this application was coordinated by Comsearch using computer techniques and in accordance with Part 25 of the FCC Rules and Regulations.

Coordination data for this earth station was sent to the below listed carriers with a letter dated 05/17/2012.

Company

AT&T COMMUNICATIONS OF PACIFIC NORTHWEST  
BNSF Railway Company  
Boeing Company  
CenturyTel of Cowiche, Inc.  
CenturyTel of Washington, Inc.  
City of Tacoma / Tacoma Public Utilities  
Confederated Tribes of the Colville Res.  
Eastern Sub-RSA Limited Partnership  
Eastside Public Safety Com Agency  
Franklin County Sheriff  
Frontier Communications of the Northwest  
KING COUNTY DEPT OF TRANSPORTATION  
King, County of  
MULTI AGENCY COMMUNICATIONS CTR E911  
NCI Datacom, Inc.  
New Cingular Wireless PCS LLC-Washington  
New Cingular Wireless PCS-ID & WY Mkts  
Noel Communications, Inc  
Northwest Pipeline GP  
PACIFIC WIRELESS SYSTEMS LLC  
PIERCE, COUNTY OF  
PocketiNet Communications Inc.  
Puget Sound Energy  
QWEST CORPORATION  
SPOKANE COUNTY  
Seattle SMSA Limited Partnership  
Seattle, City of  
Selahv Farms, LLC  
Snohomish County Pub.Trans.Benefit Area  
TELUS COMMUNICATIONS,(B.C.)INC.  
Thurston 9-1-1 Communications  
Time Warner Cable LLC  
USCOC of Richland, Inc.  
Union Pacific Railroad Company  
Verizon Wireless (VAW) LLC - (WA)  
Verizon Wireless (VAW) LLC -CO/ID/MT/WY  
WASHINGTON STATE DOT  
Washington RSA No. 8 Limited Partnership  
Washington State Patrol  
Wenatchee Valley Medical Center  
Western Sub-RSA LTD Partnership  
Yakima MSA Limited Partnership

## **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: 07/17/2012  
Job Number: 120517COMSGE01

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### Administrative Information

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

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### Site Information BREWSTER, WA

Venue Name  
Latitude (NAD 83) 48° 8' 50.0" N  
Longitude (NAD 83) 119° 41' 28.0" W  
Climate Zone A  
Rain Zone 5  
Ground Elevation (AMSL) 377.01 m / 1236.9 ft

---

### Link Information

Satellite Type Geostationary  
Mode TR - Transmit-Receive  
Modulation Digital  
Satellite Arc 53° W to 182° West Longitude  
Azimuth Range 107.8° to 248.6°  
Corresponding Elevation Angles 6.7° / 9.5°  
Antenna Centerline (AGL) 4.57 m / 15.0 ft

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### Antenna Information

		Receive - FCC32		Transmit - FCC32	
Manufacturer		Vertex		Vertex	
Model		9 Meter		9 Meter	
Gain / Diameter		50.1 dBi / 9.0 m		53.6 dBi / 9.0 m	
3-dB / 15-dB Beamwidth		0.55° / 1.20°		0.40° / 0.80°	
Max Available RF Power	(dBW/4 kHz) (dBW/MHz)			-2.7 21.3	
Maximum EIRP	(dBW/4 kHz) (dBW/MHz)			50.9 74.9	
Interference Objectives:	Long Term	-156.0 dBW/MHz	20%	-154.0 dBW/4 kHz	20%
	Short Term	-146.0 dBW/MHz	0.01%	-131.0 dBW/4 kHz	0.0025%

---

### Frequency Information

	Receive 4.0 GHz	Transmit 6.1 GHz
Emission / Frequency Range (MHz)	200KG7D - 72M0G7W / 3625.0 - 4200.0 36M0F3F - 72M0G7W / 3625.0 - 4200.0	200KG7D - 72M0G7W / 5850.0 - 6425.0 36M0F3F - 72M0G7W / 5850.0 - 6425.0
Max Great Circle Coordination Distance	471.5 km / 293.0 mi	259.5 km / 161.2 mi
Precipitation Scatter Contour Radius	448.7 km / 278.8 mi	100.0 km / 62.1 mi

# COMSEARCH

## Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147  
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### Coordination Values

### BREWSTER, WA

Licensee Name Denali 20020, LLC  
Latitude (NAD 83) 48° 8' 50.0" N  
Longitude (NAD 83) 119° 41' 28.0" W  
Ground Elevation (AMSL) 377.01 m / 1236.9 ft  
Antenna Centerline (AGL) 4.57 m / 15.0 ft  
Antenna Model Vertex 9 Meter  
Antenna Mode Receive 4.0 GHz Transmit 6.1 GHz  
Interference Objectives: Long Term -156.0 dBW/MHz 20% -154.0 dBW/4 kHz 20%  
Short Term -146.0 dBW/MHz 0.01% -131.0 dBW/4 kHz 0.0025%  
Max Available RF Power -2.7 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 4.0 GHz		Transmit 6.1 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
0	1.15	107.71	-10.00	215.65	-10.00	113.69
5	1.08	102.73	-10.00	217.84	-10.00	115.56
10	0.73	97.75	-10.00	235.67	-10.00	129.90
15	1.37	92.78	-10.00	209.31	-10.00	108.10
20	1.68	87.80	-10.00	203.17	-10.00	100.20
25	0.61	82.84	-10.00	242.99	-10.00	134.17
30	0.59	77.86	-10.00	243.74	-10.00	134.74
35	0.74	72.89	-10.00	234.65	-10.00	129.12
40	1.22	67.90	-10.00	213.50	-10.00	111.82
45	1.57	62.91	-10.00	206.07	-10.00	102.91
50	1.61	57.94	-10.00	204.94	-10.00	101.85
55	1.89	52.95	-10.00	197.41	-10.00	100.00
60	1.82	47.98	-10.00	199.34	-10.00	100.00
65	2.16	42.99	-8.83	196.35	-8.83	100.00
70	2.19	38.02	-7.50	201.94	-7.50	100.00
75	2.45	33.04	-5.97	203.57	-5.97	100.00
80	2.64	28.06	-4.20	205.61	-4.20	100.00
85	2.61	23.13	-2.11	217.06	-2.11	106.03
90	2.78	18.20	0.50	228.07	0.50	112.32
95	2.92	13.32	3.88	246.92	3.88	122.70
100	2.86	8.67	8.55	284.81	8.55	140.08
105	2.47	5.05	14.43	348.55	14.43	178.89
110	2.24	4.94	14.65	471.53	14.65	259.52
115	2.23	7.96	9.48	311.78	9.48	157.95
120	2.64	10.67	6.30	272.85	6.30	135.52
125	2.75	13.52	3.73	250.60	3.73	125.33
130	1.82	17.09	1.18	259.50	1.18	134.11
135	1.11	20.37	-0.72	272.52	-0.72	144.44
140	0.46	23.43	-2.25	304.74	-2.25	174.12
145	0.32	25.90	-3.33	315.48	-3.33	183.95
150	0.00	28.30	-4.30	324.71	-4.30	192.69
155	0.00	30.17	-4.99	319.75	-4.99	190.03
160	0.00	31.76	-5.55	315.81	-5.55	187.89
165	0.00	33.03	-5.97	312.82	-5.97	186.25
170	0.00	33.96	-6.27	310.10	-6.27	185.09
175	0.00	34.52	-6.45	308.85	-6.45	184.40
180	0.00	34.71	-6.51	308.43	-6.51	184.17
185	0.00	34.52	-6.45	308.85	-6.45	184.40



# COMSEARCH

## Earth Station Data Sheet

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### Coordination Values

### BREWSTER, WA

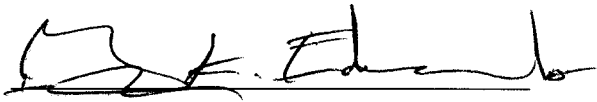
Licensee Name	Denali 20020, LLC			
Latitude (NAD 83)	48° 8' 50.0" N			
Longitude (NAD 83)	119° 41' 28.0" W			
Ground Elevation (AMSL)	377.01 m / 1236.9 ft			
Antenna Centerline (AGL)	4.57 m / 15.0 ft			
Antenna Model	Vertex 9 Meter			
Antenna Mode	Receive 4.0 GHz		Transmit 6.1 GHz	
Interference Objectives: Long Term	-156.0 dBW/MHz	20%	-154.0 dBW/4 kHz	20%
Short Term	-146.0 dBW/MHz	0.01%	-131.0 dBW/4 kHz	0.0025%
Max Available RF Power			-2.7 (dBW/4 kHz)	

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 4.0 GHz		Transmit 6.1 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.00	33.96	-6.27	310.09	-6.27	185.09
195	0.00	33.03	-5.97	312.82	-5.97	186.25
200	0.00	31.76	-5.55	315.81	-5.55	187.89
205	0.00	30.18	-4.99	319.74	-4.99	190.02
210	0.00	28.30	-4.30	324.71	-4.30	192.69
215	0.00	26.18	-3.45	330.84	-3.45	195.94
220	0.00	23.84	-2.43	338.31	-2.43	199.83
225	0.00	21.29	-1.20	347.46	-1.20	204.50
230	0.00	18.59	0.27	358.68	0.27	208.55
235	0.24	15.54	2.21	368.02	2.21	212.10
240	0.28	12.54	4.54	381.40	4.54	217.96
245	0.42	9.76	7.26	386.23	7.26	216.54
250	0.46	9.13	7.99	455.22	7.99	255.45
255	2.09	9.74	7.29	297.52	7.29	151.23
260	1.67	13.76	3.54	282.58	3.54	146.31
265	2.56	17.72	0.79	235.48	0.79	117.63
270	3.14	22.23	-1.68	207.75	-1.68	100.00
275	3.30	27.02	-3.79	196.27	-3.79	100.00
280	3.34	31.89	-5.59	186.26	-5.59	100.00
285	3.12	36.83	-7.16	183.29	-7.16	100.00
290	2.81	41.79	-8.53	183.18	-8.53	100.00
295	1.55	46.87	-9.77	205.25	-9.77	104.10
300	2.02	51.74	-10.00	193.99	-10.00	100.00
305	2.19	56.66	-10.00	190.27	-10.00	100.00
310	1.89	61.63	-10.00	197.43	-10.00	100.00
315	2.21	66.56	-10.00	189.66	-10.00	100.00
320	2.24	71.51	-10.00	189.09	-10.00	100.00
325	1.98	76.47	-10.00	194.98	-10.00	100.00
330	2.07	81.43	-10.00	192.91	-10.00	100.00
335	1.66	86.39	-10.00	203.78	-10.00	100.77
340	1.20	91.34	-10.00	214.24	-10.00	112.47
345	0.49	96.28	-10.00	250.73	-10.00	140.02
350	0.21	101.20	-10.00	284.02	-10.00	169.56
355	0.00	106.12	-10.00	285.28	-10.00	170.66

## 5. CERTIFICATION

I HEREBY CERTIFY THAT I AM THE TECHNICALLY QUALIFIED PERSON RESPONSIBLE FOR THE PREPARATION OF THE FREQUENCY COORDINATION DATA CONTAINED IN THIS APPLICATION, THAT I AM FAMILIAR WITH PARTS 101 AND 25 OF THE FCC RULES AND REGULATIONS, THAT I HAVE EITHER PREPARED OR REVIEWED THE FREQUENCY COORDINATION DATA SUBMITTED WITH THIS APPLICATION, AND THAT IT IS COMPLETE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

BY: \_



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

DATED: July 17, 2012

# **COMSEARCH**

## **Earth Station Data Sheet**

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

# FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for  
**Denali 20020, LLC**  
**BREWSTER, WA**  
**(9 Meter Ku-band)**  
**Satellite Earth Station**

Prepared By:  
COMSEARCH  
19700 Janelia Farm Boulevard  
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July 17, 2012

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# COMSEARCH

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## 1. CONCLUSIONS

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A number of great circle interference cases were identified during the interference study of the proposed earth station. Each of the cases, which exceeded the interference objective on a line-of-sight basis, was profiled and the propagation losses estimated using NBS TN101 (Revised) techniques. The losses were found to be sufficient to reduce the signal levels to acceptable magnitudes in every case.

The following companies reported potential great circle interference conflicts that did not meet the objectives on a line-of-sight basis. When over-the-horizon losses are considered on the interfering paths, sufficient blockage exists to negate harmful interference from occurring with the proposed transmit-receive earth station.

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Time Warner Cable LLC

No other carriers reported potential interference cases.

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19700 Janelia Farm Boulevard, Ashburn, VA 20147  
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### 3. SUPPLEMENTAL SHOWING

Pursuant to Part 25.203(c) of the FCC Rules and Regulations, the satellite earth station proposed in this application was coordinated by Comsearch using computer techniques and in accordance with Part 25 of the FCC Rules and Regulations.

Coordination data for this earth station was sent to the below listed carriers with a letter dated 05/17/2012.

Company

ACCEL NET, INC.  
Avista Utilities  
BENTON COUNTY EMERGENCY SERVICES  
BNSF Railway Company  
Benton Rural Electric Association  
Boeing Company  
Boingo Wireless, Inc.  
CITY OF TACOMA  
Cellco Partnership - Oregon  
Cellco Partnership - Washington  
CenturyTel of Washington, Inc.  
City of Tacoma / Tacoma Public Utilities  
Clearwire Spectrum Holdings II, LLC  
Clearwire Spectrum Holdings III, LLC  
Clearwire Spectrum Holdings LLC  
Columbia Rural Electric Association, Inc  
Cyberdyne Networks, Inc.  
Desert Winds Wireless LLC  
Eastern Sub-RSA Limited Partnership  
Eastside Public Safety Com Agency  
Ellensburg Telephone Company  
Energy Northwest  
Everett Clinic  
FIRST STEP INTERNET, LLC  
Fisher Broadcasting, Inc.  
Franklin County Sheriff  
Frontier Communications of the Northwest  
Hermiston, City of  
J & R Electronics Inc  
Jefferson Microwave, LLC  
KING COUNTY DEPT OF TRANSPORTATION  
KITSAP, COUNTY OF  
King, County of  
MTS Allstream Inc  
New Cingular Wireless PCS LLC -OR Region  
New Cingular Wireless PCS LLC-Washington  
Newmax, LLC  
Noel Communications, Inc

# COMSEARCH

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PACIFICORP  
PIERCE COUNTY COMMUNICATIONS DIVISION  
PIERCE TRANSIT  
PIERCE, COUNTY OF  
Pass Word, Inc.  
PocketiNet Communications Inc.  
Post Falls Police Department  
Providence Toppenish Community Hospital  
Ptera Wireless, Inc.  
Public Util Dist. #1 of Snohomish County  
Public Utility District No 1 of Okanogan  
Puget Sound Energy  
QWEST CORPORATION  
RCC Minnesota, Inc - Washington/Oregon  
Rivercom 911  
SADDLE MOUNTAIN WIRELESS INC  
SNOHOMISH COUNTY EMERGENCY RADIO SYSTEM  
SPOKANE COUNTY  
SW Networks  
Seattle City Light  
Seattle SMSA Limited Partnership  
Seattle, City of  
Selahv Farms, LLC  
Skotdal Brothers LLC (c/o CSI)  
Snohomish County Pub.Trans.Benefit Area  
Spectrum Networks Inc.  
St. Anthony Hospital  
Startouch, Inc.  
Stat Network Solutions  
Stevens County Fire District #2  
T-Mobile License LLC  
Thurston 9-1-1 Communications  
Time Warner Cable LLC  
USCOC of Richland, Inc.  
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Western Sub-RSA LTD Partnership  
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Whitman County Fire District #7  
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## **4. EARTH STATION COORDINATION DATA**

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Date: 07/17/2012  
Job Number: 120517COMSGE02

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### Administrative Information

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Call Sign  
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### Site Information BREWSTER, WA

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### Link Information

Satellite Type Geostationary  
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Satellite Arc 53° W to 182° West Longitude  
Azimuth Range 107.8° to 248.6°  
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Antenna Centerline (AGL) 4.57 m / 15.0 ft

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### Antenna Information

	Receive - FCC32	Transmit - FCC32
Manufacturer	Vertex	Vertex
Model	9 Meter	9 Meter
Gain / Diameter	58.5 dBi / 9.0 m	60.1 dBi / 9.0 m
3-dB / 15-dB Beamwidth	0.18° / 0.38°	0.16° / 0.34°
Max Available RF Power (dBW/4 kHz)		-14.0
(dBW/MHz)		10.0
Maximum EIRP (dBW/4 kHz)		46.1
(dBW/MHz)		70.1
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%

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### Frequency Information

	Receive 11.0 GHz	Transmit 14.0 GHz
Emission / Frequency Range (MHz)	200KG7D - 72M0G7W / 10950.0 - 11200.0 200KG7D - 72M0G7W / 11450.0 - 12200.0 36M0F3F - 36M0G7W / 10950.0 - 11200.0 36M0F3F - 36M0G7W / 11450.0 - 12200.0	200KG7D - 72M0G7W / 14000.0 - 14500.0 36M0F3F - 36M0G7W / 14000.0 - 14500.0
Max Great Circle Coordination Distance	419.5 km / 260.6 mi	176.8 km / 109.8 mi
Precipitation Scatter Contour Radius	403.4 km / 250.6 mi	100.0 km / 62.1 mi

# COMSEARCH

## Earth Station Data Sheet

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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)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 11.0 GHz		Transmit 14.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
0	1.15	107.71	-10.00	176.67	-10.00	100.00
5	1.08	102.73	-10.00	179.02	-10.00	100.00
10	0.73	97.75	-10.00	195.80	-10.00	100.00
15	1.37	92.78	-10.00	169.44	-10.00	100.00
20	1.68	87.80	-10.00	156.27	-10.00	100.00
25	0.61	82.84	-10.00	201.74	-10.00	100.00
30	0.59	77.86	-10.00	202.32	-10.00	100.00
35	0.74	72.89	-10.00	194.95	-10.00	100.00
40	1.22	67.90	-10.00	174.30	-10.00	100.00
45	1.57	62.91	-10.00	159.78	-10.00	100.00
50	1.61	57.94	-10.00	158.40	-10.00	100.00
55	1.89	52.95	-10.00	149.69	-10.00	100.00
60	1.82	47.98	-10.00	151.84	-10.00	100.00
65	2.16	42.99	-8.83	148.08	-8.83	100.00
70	2.19	38.02	-7.50	153.76	-7.50	100.00
75	2.45	33.04	-5.97	155.04	-5.97	100.00
80	2.64	28.06	-4.20	159.59	-4.20	100.00
85	2.61	23.13	-2.11	174.72	-2.11	100.00
90	2.78	18.20	0.50	184.00	0.50	100.00
95	2.92	13.32	3.88	197.67	3.88	100.00
100	2.86	8.67	8.55	219.10	8.55	100.00
105	2.47	5.05	14.43	263.68	14.43	105.86
110	2.24	4.94	14.65	419.50	14.65	175.76
115	2.23	7.96	9.48	238.46	9.48	100.00
120	2.64	10.67	6.30	212.27	6.30	100.00
125	2.75	13.52	3.73	200.52	3.73	100.00
130	1.82	17.09	1.18	206.29	1.18	100.00
135	1.11	20.37	-0.72	216.96	-0.72	100.00
140	0.46	23.43	-2.25	242.04	-2.25	114.99
145	0.32	25.90	-3.33	250.54	-3.33	123.08
150	0.00	28.30	-4.30	258.30	-4.30	130.29
155	0.00	30.17	-4.99	254.84	-4.99	128.49
160	0.00	31.76	-5.55	252.11	-5.55	127.06
165	0.00	33.03	-5.97	250.05	-5.97	125.97
170	0.00	33.96	-6.27	248.59	-6.27	125.20
175	0.00	34.52	-6.45	247.73	-6.45	124.74
180	0.00	34.71	-6.51	247.45	-6.51	124.58
185	0.00	34.52	-6.45	247.73	-6.45	124.74

# COMSEARCH

## Earth Station Data Sheet

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

### Coordination Values

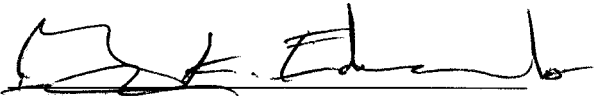
### BREWSTER, WA

Licensee Name Denali 20020, LLC  
Latitude (NAD 83) 48° 8' 50.0" N  
Longitude (NAD 83) 119° 41' 28.0" W  
Ground Elevation (AMSL) 377.01 m / 1236.9 ft  
Antenna Centerline (AGL) 4.57 m / 15.0 ft  
Antenna Model Vertex 9 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)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 11.0 GHz		Transmit 14.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.00	33.96	-6.27	248.59	-6.27	125.19
195	0.00	33.03	-5.97	250.04	-5.97	125.96
200	0.00	31.76	-5.55	252.11	-5.55	127.06
205	0.00	30.18	-4.99	254.84	-4.99	128.49
210	0.00	28.30	-4.30	258.30	-4.30	130.29
215	0.00	26.18	-3.45	262.60	-3.45	131.27
220	0.00	23.84	-2.43	267.86	-2.43	134.06
225	0.00	21.29	-1.20	274.35	-1.20	137.59
230	0.00	18.59	0.27	282.38	0.27	142.07
235	0.24	15.54	2.21	288.56	2.21	144.13
240	0.28	12.54	4.54	294.71	4.54	147.98
245	0.42	9.76	7.26	296.31	7.26	144.16
250	0.46	9.13	7.99	392.09	7.99	176.77
255	2.09	9.74	7.29	229.54	7.29	100.00
260	1.67	13.76	3.54	221.50	3.54	100.00
265	2.56	17.72	0.79	190.49	0.79	100.00
270	3.14	22.23	-1.68	161.01	-1.68	100.00
275	3.30	27.02	-3.79	146.15	-3.79	100.00
280	3.34	31.89	-5.59	136.94	-5.59	100.00
285	3.12	36.83	-7.16	134.77	-7.16	100.00
290	2.81	41.79	-8.53	135.10	-8.53	100.00
295	1.55	46.87	-9.77	161.61	-9.77	100.00
300	2.02	51.74	-10.00	146.02	-10.00	100.00
305	2.19	56.66	-10.00	142.23	-10.00	100.00
310	1.89	61.63	-10.00	149.72	-10.00	100.00
315	2.21	66.56	-10.00	141.63	-10.00	100.00
320	2.24	71.51	-10.00	141.07	-10.00	100.00
325	1.98	76.47	-10.00	147.07	-10.00	100.00
330	2.07	81.43	-10.00	144.91	-10.00	100.00
335	1.66	86.39	-10.00	157.00	-10.00	100.00
340	1.20	91.34	-10.00	175.13	-10.00	100.00
345	0.49	96.28	-10.00	205.09	-10.00	100.00
350	0.21	101.20	-10.00	230.39	-10.00	115.03
355	0.00	106.12	-10.00	231.37	-10.00	115.80

## 5. CERTIFICATION

I HEREBY CERTIFY THAT I AM THE TECHNICALLY QUALIFIED PERSON RESPONSIBLE FOR THE PREPARATION OF THE FREQUENCY COORDINATION DATA CONTAINED IN THIS APPLICATION, THAT I AM FAMILIAR WITH PARTS 101 AND 25 OF THE FCC RULES AND REGULATIONS, THAT I HAVE EITHER PREPARED OR REVIEWED THE FREQUENCY COORDINATION DATA SUBMITTED WITH THIS APPLICATION, AND THAT IT IS COMPLETE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

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

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

DATED: July 17, 2012