

# FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for  
**Denali 20020, LLC**  
**BREWSTER, WA**  
**Satellite Earth Station**

Prepared By:  
COMSEARCH  
19700 Janelia Farm Boulevard  
Ashburn, VA 20147  
June 17, 2010

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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

WASHINGTON STATE DOT  
Time Warner Cable LLC  
QWEST CORPORATION  
Washington State Patrol  
MULTI AGENCY COMMUNICATIONS CTR E911  
Verizon Wireless (VAW) LLC - (WA)  
VERIZON NORTHWEST INC.-FRONTIER

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 05/17/2010.

Company

AT&T COMMUNICATIONS OF PACIFIC NORTHWEST  
BNSF Railway Company  
Boeing Company  
CenturyTel of Cowiche, Inc.  
CenturyTel of Washington, Inc.  
City of Seattle  
City of Tacoma / Tacoma Public Utilities  
Confederated Tribes of the Colville Res.  
Eastern Sub-RSA Limited Partnership  
Eastside Public Safety Com Agency  
International Communications Group, Inc.  
KING COUNTY DEPT OF TRANSPORTATION  
King, County of  
METROPOLITAN AREA NETWORKS, INC.  
MTS Allstream Inc  
MULTI AGENCY COMMUNICATIONS CTR E911  
New Cingular Wireless PCS -AK,WA,OR, NID  
Noel Communications, Inc  
North East Washington Microwave  
Northwest Microwave Inc.  
PACIFIC WIRELESS SYSTEMS LLC  
PIERCE, COUNTY OF  
PUYALLUP, CITY OF  
PocketiNet Communications Inc.  
Puget Sound Energy  
QWEST CORPORATION  
SPOKANE COUNTY  
Seattle SMSA Limited Partnership  
Snohomish County Pub.Trans.Benefit Area  
Sprint Communications Co., LP  
Startouch, Inc.  
TELUS COMMUNICATIONS,(B.C.)INC.  
THURSTON, COUNTY OF  
Tacoma, City of  
Time Warner Cable LLC  
USCOC of Richland, Inc.  
Union Pacific Railroad Company  
VERIZON NORTHWEST INC.-FRONTIER  
Verizon Wireless (VAW) LLC - (WA)  
WASHINGTON STATE - MILITARY DEPT

WASHINGTON STATE DOT  
Washington RSA No. 8 Limited Partnership  
Washington State Patrol  
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: 06/17/2010  
Job Number: 100517COMSGE03

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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) 377.0 m / 1236.9 ft

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### Link Information

Satellite Type Geostationary  
Mode TR - Transmit-Receive  
Modulation Digital  
Satellite Arc 53° W to 186° West Longitude  
Azimuth Range 107.8° to 251.9°  
Corresponding Elevation Angles 6.7° / 6.9°  
Antenna Centerline (AGL) 5.49 m / 18.0 ft

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### Antenna Information

		Receive - FCC32		Transmit - FCC32	
Manufacturer		Vertex		Vertex	
Model		11 Meter		11 Meter	
Gain / Diameter		51.9 dBi / 11.0 m		55.4 dBi / 11.0 m	
3-dB / 15-dB Beamwidth		0.90° / 1.80°		0.60° / 1.20°	
Max Available RF Power	(dBW/4 kHz) (dBW/MHz)			1.1 25.1	
Maximum EIRP	(dBW/4 kHz) (dBW/MHz)			56.5 80.5	
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%

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### Frequency Information

	Receive 4.0 GHz	Transmit 6.1 GHz
Emission / Frequency Range (MHz)	2M40G7D - 36M0G7F / 3700.0 - 4200.0 36M0F3F / 3700.0 - 4200.0	2M40G7D - 36M0G7F / 5925.0 - 6425.0 36M0F3F / 5925.0 - 6425.0
Max Great Circle Coordination Distance	533.7 km / 331.6 mi	335.6 km / 208.5 mi
Precipitation Scatter Contour Radius	448.7 km / 278.8 mi	100.0 km / 62.1 mi



# COMSEARCH

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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) 377.0 m / 1236.9 ft  
Antenna Centerline (AGL) 5.49 m / 18.0 ft  
Antenna Model Vertex 11 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 1.1 (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	215.68	-10.00	125.26
5	1.07	102.73	-10.00	218.12	-10.00	127.34
10	0.72	97.75	-10.00	236.14	-10.00	140.88
15	1.36	92.78	-10.00	209.60	-10.00	119.92
20	1.70	87.80	-10.00	202.65	-10.00	111.28
25	0.60	82.84	-10.00	243.56	-10.00	147.18
30	0.58	77.87	-10.00	244.45	-10.00	147.94
35	0.79	72.89	-10.00	232.19	-10.00	137.60
40	1.22	67.90	-10.00	213.66	-10.00	123.51
45	1.56	62.91	-10.00	206.28	-10.00	114.66
50	1.61	57.94	-10.00	205.11	-10.00	113.57
55	1.88	52.95	-10.00	197.71	-10.00	106.74
60	1.83	47.98	-10.00	199.08	-10.00	107.99
65	2.13	42.99	-8.83	197.02	-8.83	105.08
70	2.18	38.02	-7.50	202.12	-7.50	108.70
75	2.44	33.04	-5.97	203.81	-5.97	109.12
80	2.63	28.06	-4.20	205.75	-4.20	111.81
85	2.60	23.14	-2.11	217.29	-2.11	120.27
90	2.74	18.21	0.49	229.06	0.49	127.58
95	2.91	13.33	3.88	247.17	3.88	135.66
100	2.85	8.68	8.54	285.10	8.54	157.48
105	2.46	5.05	14.41	348.69	14.41	197.65
110	2.27	4.92	14.71	484.32	14.71	296.43
115	2.21	7.97	9.46	312.83	9.46	179.00
120	2.60	10.71	6.26	273.84	6.26	152.27
125	2.73	13.53	3.72	250.94	3.72	138.49
130	1.93	17.00	1.24	256.14	1.24	145.47
135	1.11	20.36	-0.72	272.26	-0.72	160.69
140	0.47	23.43	-2.24	303.79	-2.24	189.63
145	0.32	25.90	-3.33	316.23	-3.33	199.81
150	0.00	28.30	-4.30	324.71	-4.30	205.58
155	0.00	30.17	-4.99	319.75	-4.99	204.56
160	0.00	31.76	-5.55	315.81	-5.55	202.44
165	0.00	33.03	-5.97	312.82	-5.97	200.82
170	0.00	33.96	-6.27	310.10	-6.27	199.67
175	0.00	34.52	-6.45	308.85	-6.45	198.98
180	0.00	34.71	-6.51	308.43	-6.51	198.76
185	0.00	34.52	-6.45	308.85	-6.45	198.98

# COMSEARCH

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### Coordination Values

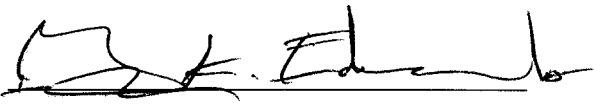
### BREWSTER, WA

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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 1.1 (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	199.67
195	0.00	33.03	-5.97	312.82	-5.97	200.82
200	0.00	31.76	-5.55	315.81	-5.55	202.44
205	0.00	30.18	-4.99	319.74	-4.99	204.55
210	0.00	28.30	-4.30	324.71	-4.30	205.58
215	0.00	26.18	-3.45	330.84	-3.45	208.87
220	0.00	23.84	-2.43	338.31	-2.43	212.94
225	0.00	21.29	-1.20	347.46	-1.20	218.00
230	0.00	18.59	0.27	358.68	0.27	224.34
235	0.00	15.73	2.08	372.78	2.08	232.46
240	0.00	12.76	4.35	390.35	4.35	243.21
245	0.38	9.41	7.67	394.28	7.67	240.55
250	0.40	6.78	11.22	533.71	11.22	335.56
255	2.14	5.69	13.12	347.09	13.12	198.50
260	1.65	9.65	7.38	315.36	7.38	184.16
265	2.53	13.80	3.50	254.77	3.50	141.58
270	3.18	18.47	0.34	217.81	0.34	118.94
275	3.33	23.36	-2.21	203.55	-2.21	106.30
280	3.30	28.31	-4.30	193.73	-4.30	100.00
285	3.20	33.29	-6.06	187.05	-6.06	100.00
290	2.79	38.29	-7.58	188.42	-7.58	100.00
295	1.55	43.37	-8.93	209.09	-8.93	118.46
300	2.01	48.29	-10.00	194.33	-10.00	103.70
305	2.12	53.25	-10.00	191.68	-10.00	101.34
310	1.84	58.24	-10.00	198.86	-10.00	107.78
315	2.17	63.20	-10.00	190.74	-10.00	100.52
320	2.19	68.18	-10.00	190.25	-10.00	100.09
325	1.97	73.17	-10.00	195.20	-10.00	104.48
330	2.04	78.15	-10.00	193.68	-10.00	103.12
335	1.63	83.13	-10.00	204.49	-10.00	112.98
340	1.18	88.11	-10.00	214.90	-10.00	124.59
345	0.47	93.08	-10.00	252.83	-10.00	155.16
350	0.00	98.04	-10.00	285.28	-10.00	185.38
355	0.00	103.00	-10.00	285.28	-10.00	185.38

## 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 17, 2010