

# 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  
December 12, 2020

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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 12/12/2020.

Company

10Band LLC  
AT&T Mobility Spectrum LLC - ID, MT, WY  
AT&T Mobility Spectrum LLC - Washington  
AT&T Mobility Wireless Ops Hldgs - WA  
Accel Net, Inc.  
Advanced Internet  
Atlas Networks Corporation  
Avista Corporation  
BNSF Railway Company  
Bain, Robert B  
Bearclaw, LLC  
Benton County Emergency Services  
Benton Rural Electric Association  
Boeing Company  
Bookbinder, LLC  
Brigadier, LLC  
Cascade Natural Gas Corporation  
Cellco Partnership - CO/ID/MT/WY/UT  
Cellco Partnership - Oregon  
Cellco Partnership - Washington  
Cencom - Kitsap 911  
CenturyTel of Washington, Inc.  
Chelan County PUD #1  
City of Post Falls Police Department  
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  
Community Transit Snohomish County PTBA  
Computer 5, Inc.  
Cutting Edge Communications, Inc.  
Cyberdyne Networks, Inc.  
Darrington Internet Users Association  
Day Management Corporation  
Desert Winds Wireless  
Eastside Public Safety Com Agency  
EcliptixNet Broadband, Inc.  
Electron Hydro LLC  
Ellensburg Telephone Company

Everett MSO, Inc  
Everett MSO, Inc.  
First Step Internet, LLC  
Fisher Broadcasting, Inc. KOMO TV  
Franklin County Sheriff  
Frontier Communications Northwest Inc.  
Gigabeam Internet  
Hermiston, City of  
Hispanavision, LLC  
Inland Cellular LLC  
J & R Electronics Inc  
J&R Electronics, Inc.  
KGY, Inc.  
King Broadcasting Company - KTVB TV  
King County DOT Metro Transit Division  
King, County of  
Kootenai, County of  
Leader Communications LLC  
Mason County PUD No 3  
McDaniel Cellular Telephone Company  
Medicine Wheel Website Design, Inc.  
Microsoft Corp  
NCI Datacom, Inc.  
New Cingular Wireless PCS - ID, WY  
New Cingular Wireless PCS LLC-Washington  
Newmax, LLC  
Noel Communications, Inc.  
Northwest Open Access Network  
Northwest Pipeline GP  
Olympic Wireless, LLC  
PacifiCorp  
Pacific Public Media  
Pick Two LLC  
Pierce County  
PocketiNet Communications Inc.  
Ptera, Inc.  
Public Util Dist. #1 of Snohomish County  
Public Utility District No 1 of Okanogan  
Puget Sound Energy, Inc  
Quicktel Internet  
Qwest Corporation  
RSN Wireless, LLC  
Rivercom 911  
Seattle City Light  
Seattle FCC License Sub, LLC  
Seattle SMSA Limited Partnership  
Seattle's Best Internet, LLC  
Seattle, City of  
Simplified Technologies, LLC  
Sinclair Radio of Seattle Licensee, LLC  
Skotdal Brothers LLC (c/o CSI)  
SmartSky Microwave, LLC  
Snohomish County Emergency Radio System  
Spectrum Communications Inc  
Spectrum Networks Inc. - T  
Spokane Regional Emergency Communication

Spokane Tribe Telecommunications Exchang  
Sprint Spectrum L.P.  
Sprintcom, Inc  
St. Anthony Hospital  
Startouch, Inc.  
Stevens County Sheriff's Office  
Summit Towers LLC  
Sunheaven Farms, LLC  
T-Mobile Lic LLC - Voicestream PCS BTA I  
T-Mobile License LLC  
THE Corporation  
Thurston 9-1-1 Communications  
Towerstream Corp.  
USCOC of Washington 4 Inc.  
USCOC of Richland, Inc.  
Umatilla Morrow Radio & Data District  
Union Pacific Railroad Company  
United Telephone Co. of the Northwest  
VelociMAX Wireless  
Verizon Wireless (VAW) LLC - Idaho  
Warden Hutterian Brethren Inc  
Washington Broadband, Inc.  
Washington State Dept of Natural Resourc  
Washington State of Dept of Transportat  
Washington, State of  
Western Sub-RSA LTD Partnership  
Whitman County Fire District #11  
Wholesail Networks LLC  
Wind Wireless, Inc.  
Wired or Wireless, Inc.  
Yakima City Washington  
Yakima County Fire District # 5  
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: 12/12/2020  
Job Number: 201212COMSGE02

### Administrative Information

Status ENGINEER PROPOSAL  
Call Sign E060416  
Licensee Code DENALI  
Licensee Name Denali 20020, LLC

### Site Information BREWSTER, WA

Venue Name  
Latitude (NAD 83) 48° 8' 47.9" N  
Longitude (NAD 83) 119° 41' 34.8" W  
Climate Zone A  
Rain Zone 5  
Ground Elevation (AMSL) 380.0 m / 1246.7 ft

### Link Information

Satellite Type Geostationary  
Mode TR - Transmit-Receive  
Modulation Digital  
Satellite Arc 53° W to 188° West Longitude  
Azimuth Range 107.8° to 253.5°  
Corresponding Elevation Angles 6.7° / 5.6°  
Antenna Centerline (AGL) 9.5 m / 31.2 ft

### Antenna Information

	Receive - FCC32	Transmit - FCC32
Manufacturer	Vertex	Vertex
Model	11 KPK	11 KPK
Gain / Diameter	61.0 dBi / 11.0 m	62.4 dBi / 11.0 m
3-dB / 15-dB Beamwidth	0.16° / 0.32°	0.14° / 0.26°
Max Available RF Power (dBW/4 kHz)		-14.0
(dBW/MHz)		10.0
Maximum EIRP (dBW/4 kHz)		48.4
(dBW/MHz)		72.4
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)	1M00F8W - 72M0G7W / 10950.0 - 11200.0 1M00F8W - 72M0G7W / 11450.0 - 12200.0	1M00F8W - 72M0G7W / 13750.0 - 14500.0
Max Great Circle Coordination Distance	652.8 km / 405.6 mi	285.4 km / 177.3 mi
Precipitation Scatter Contour Radius	414.0 km / 257.2 mi	100.0 km / 62.1 mi

# COMSEARCH

## Earth Station Data Sheet

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### Coordination Values

### BREWSTER, WA

Licensee Name Denali 20020, LLC  
Latitude (NAD 83) 48° 8' 47.9" N  
Longitude (NAD 83) 119° 41' 34.8" W  
Ground Elevation (AMSL) 380.0 m / 1246.7 ft  
Antenna Centerline (AGL) 9.5 m / 31.2 ft  
Antenna Model Vertex 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)

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	0.83	106.45	-10.00	190.37	-10.00	100.00
5	0.88	102.73	-10.00	187.88	-10.00	100.00
10	0.60	97.75	-10.00	201.83	-10.00	100.00
15	1.16	92.78	-10.00	176.40	-10.00	100.00
20	1.85	87.80	-10.00	150.86	-10.00	100.00
25	0.46	82.84	-10.00	207.41	-10.00	100.00
30	0.38	77.87	-10.00	214.37	-10.00	101.81
35	0.67	72.89	-10.00	198.49	-10.00	100.00
40	1.18	67.90	-10.00	175.85	-10.00	100.00
45	1.37	62.92	-10.00	169.46	-10.00	100.00
50	1.45	57.94	-10.00	163.98	-10.00	100.00
55	1.71	52.96	-10.00	155.44	-10.00	100.00
60	1.68	47.99	-10.00	156.29	-10.00	100.00
65	2.05	42.99	-8.84	150.89	-8.84	100.00
70	2.08	38.03	-7.50	156.69	-7.50	100.00
75	2.32	33.05	-5.98	158.15	-5.98	100.00
80	2.55	28.07	-4.21	161.95	-4.21	100.00
85	2.50	23.15	-2.11	177.46	-2.11	100.00
90	2.65	18.23	0.48	187.01	0.48	100.00
95	2.80	13.36	3.86	200.06	3.86	100.00
100	2.61	8.78	8.41	223.81	8.41	100.00
105	2.29	5.20	14.11	266.07	14.11	108.16
110	2.16	5.02	14.49	438.54	14.49	183.78
115	2.16	8.01	9.41	239.63	9.41	100.00
120	2.27	10.96	6.00	218.61	6.00	100.00
125	2.60	13.64	3.63	203.07	3.63	100.00
130	1.49	17.36	1.01	214.30	1.01	100.00
135	0.85	20.58	-0.84	226.83	-0.84	100.52
140	0.38	23.51	-2.28	250.60	-2.28	121.71
145	0.23	25.98	-3.37	260.24	-3.37	130.60
150	0.00	28.31	-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	250.04	-5.97	125.97
170	0.00	33.96	-6.27	248.59	-6.27	125.19
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

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### Coordination Values

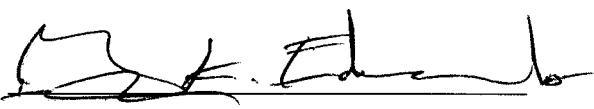
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Max Available RF Power -14.0 (dBW/4 kHz)

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	28.31	-4.30	258.30	-4.30	130.29
215	0.00	26.18	-3.45	262.59	-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	0.00	15.73	2.08	292.55	2.08	147.92
240	0.00	12.76	4.35	303.12	4.35	155.82
245	0.29	9.47	7.59	313.32	7.59	157.87
250	0.65	6.07	12.42	481.15	12.42	210.94
255	2.39	3.56	18.21	652.84	18.21	285.35
260	1.78	7.55	10.05	254.17	10.05	105.51
265	2.37	11.95	5.06	212.02	5.06	100.00
270	3.04	16.70	1.43	182.96	1.43	100.00
275	3.34	21.62	-1.37	157.80	-1.37	100.00
280	3.34	26.60	-3.62	146.05	-3.62	100.00
285	3.38	31.58	-5.48	136.69	-5.48	100.00
290	3.04	36.59	-7.08	136.59	-7.08	100.00
295	2.08	41.63	-8.49	151.77	-8.49	100.00
300	1.55	46.64	-9.72	161.99	-9.72	100.00
305	2.06	51.60	-10.00	145.18	-10.00	100.00
310	1.81	56.59	-10.00	152.26	-10.00	100.00
315	1.77	61.58	-10.00	153.56	-10.00	100.00
320	1.91	66.56	-10.00	149.19	-10.00	100.00
325	1.76	71.55	-10.00	153.84	-10.00	100.00
330	2.32	76.53	-10.00	139.29	-10.00	100.00
335	1.81	81.53	-10.00	152.15	-10.00	100.00
340	1.34	86.52	-10.00	170.51	-10.00	100.00
345	0.85	91.50	-10.00	189.62	-10.00	100.00
350	0.21	96.48	-10.00	230.78	-10.00	115.33
355	0.00	101.45	-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: December 12, 2020