

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
Denali 20020, LLC
BREWSTER, WA
(11.1 Meter)
Satellite Earth Station

Prepared By:
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147
July 08, 2014

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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

Verizon Wireless (VAW) LLC - (WA)
Washington State Patrol
Washington State of Dept of Transportat

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 06/04/2014.

Company

AT&T COMMUNICATIONS OF PACIFIC NORTHWEST
BNSF Railway Company
CASCADE NATURAL GAS CORPORATION
Cellco Partnership - Washington
CenturyTel of Washington, Inc.
City of Tacoma / Tacoma Public Utilities
Colville Confederated Tribes
Confederated Tribes of the Colville Res.
Eastside Public Safety Com Agency
EcliptixNet Broadband, Inc.
Frontier Communications Northwest Inc.
Inland Cellular LLC
King County DOT Metro Transit Division
King, County of
MULTI AGENCY COMMUNICATIONS CTR E911
NCI Datacom, Inc.
New Cingular Wireless PCS LLC-Washington
New Cingular Wireless PCS, LLC (NY)
Noel Communications, Inc
Northwest Pipeline GP
Pierce County
Puget Sound Energy
Qwest Corporation
SILKE COMMUNICATIONS, INC
Seattle SMSA Limited Partnership
Seattle, City of
Selahv Farms, LLC
Snohomish County Emergency Radio System
Snohomish County Pub.Trans.Benefit Area
Spokane Regional Emergency Communication
Startouch, Inc.
TELUS COMMUNICATIONS,(B.C.)INC.
Tribune Broadcasting Seattle, LLC
USCOC of Richland, Inc.
Verizon Wireless (VAW) LLC - (WA)
Vulcan Wireless, LLC
Washington State Patrol
Washington State of Dept of Transportat
Wenatchee Valley Medical Center
Western Sub-RSA LTD 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: 07/08/2014
Job Number: 140604COMSGE08

Administrative Information

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

Site Information BREWSTER, WA

Venue Name:
Latitude (NAD 83): 48° 8' 55.2" N
Longitude (NAD 83): 119° 42' 1.9" W
Climate Zone: A
Rain Zone: 5
Ground Elevation (AMSL): 385.23 m / 1263.9 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): 5.49 m / 18.0 ft

Antenna Information

Receive - FCC32

Manufacturer: General Dynamics
Model: Satcom
Gain / Diameter: 51.9 dBi / 11.1 m
3-dB / 15-dB Beamwidth: 0.43° / 0.90°

Transmit - FCC32

General Dynamics
Satcom
55.7 dBi / 11.1 m
0.28° / 0.59°

Max Available RF Power (dBW/4 kHz)
(dBW/MHz)

(1) -10.2
13.8 (2) -6.0
18.0

Maximum EIRP (dBW/4 kHz)
(dBW/MHz)

45.5 49.7
69.5 73.7

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

-154.0 dBW/4 kHz 20%
-131.0 dBW/4 kHz 0.0025%

Frequency Information

Receive 4.0 GHz

Emission / Frequency Range (MHz): 36M0G7W - 72M0G7W / 3625.0 - 4200.0

Transmit 6.1 GHz

(1) 36M0G7W - 72M0G7W / 5850.0 - 6425.0
(2) 20M0G7W / 6425.5 - 6875.0

Max Great Circle Coordination Distance: 665.8 km / 413.7 mi
Precipitation Scatter Contour Radius: 461.4 km / 286.7 mi

323.8 km / 201.2 mi
100.0 km / 62.1 mi

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Coordination Values

BREWSTER, WA

Licensee Name Denali 20020, LLC
Latitude (NAD 83) 48° 8' 55.2" N
Longitude (NAD 83) 119° 42' 1.9" W
Ground Elevation (AMSL) 385.23 m / 1263.9 ft
Antenna Centerline (AGL) 5.49 m / 18.0 ft
Antenna Model General Dynamics 11.1 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 -10.2 (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	2.66	106.49	-10.00	179.46	-10.00	100.00
5	1.64	102.74	-10.00	204.29	-10.00	100.00
10	0.84	97.75	-10.00	228.91	-10.00	103.21
15	0.66	92.77	-10.00	239.51	-10.00	111.37
20	1.15	87.80	-10.00	215.73	-10.00	100.00
25	1.84	82.81	-10.00	198.93	-10.00	100.00
30	0.50	77.86	-10.00	250.14	-10.00	119.10
35	0.24	72.90	-10.00	280.56	-10.00	139.08
40	0.65	67.92	-10.00	240.01	-10.00	111.74
45	1.16	62.92	-10.00	215.34	-10.00	100.00
50	1.38	57.94	-10.00	209.04	-10.00	100.00
55	1.33	52.98	-10.00	210.41	-10.00	100.00
60	1.26	48.02	-10.00	212.41	-10.00	100.00
65	1.46	43.04	-8.85	212.04	-8.85	100.00
70	1.99	38.03	-7.50	206.24	-7.50	100.00
75	1.85	33.10	-6.00	214.99	-6.00	100.00
80	2.17	28.12	-4.23	215.93	-4.23	100.00
85	2.30	23.18	-2.13	224.25	-2.13	100.00
90	2.30	18.30	0.44	239.89	0.44	100.00
95	2.49	13.44	3.79	257.99	3.79	102.56
100	2.53	8.81	8.37	293.18	8.37	118.55
105	2.14	5.31	13.88	353.87	13.88	146.04
110	1.89	5.26	13.97	488.02	13.97	219.04
115	1.61	8.45	8.83	329.35	8.83	138.67
120	1.69	11.43	5.55	297.55	5.55	126.01
125	1.22	14.75	2.78	293.93	2.78	128.24
130	0.68	18.03	0.60	308.84	0.60	140.67
135	0.40	20.96	-1.04	322.94	-1.04	153.87
140	0.27	23.60	-2.32	329.18	-2.32	161.54
145	0.00	26.18	-3.45	330.84	-3.45	165.34
150	0.29	28.04	-4.19	313.37	-4.19	152.90
155	0.00	30.17	-4.99	319.75	-4.99	159.50
160	0.00	31.76	-5.55	315.81	-5.55	157.46
165	0.00	33.03	-5.97	312.83	-5.97	155.93
170	0.00	33.95	-6.27	310.10	-6.27	154.86
175	0.00	34.52	-6.45	308.85	-6.45	154.23
180	0.00	34.71	-6.51	308.44	-6.51	154.02
185	0.00	34.52	-6.45	308.85	-6.45	154.23

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Coordination Values

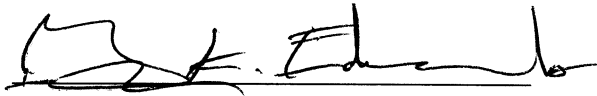
BREWSTER, WA

Licensee Name	Denali 20020, LLC				
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Longitude (NAD 83)	119° 42' 1.9" W				
Ground Elevation (AMSL)	385.23 m / 1263.9 ft				
Antenna Centerline (AGL)	5.49 m / 18.0 ft				
Antenna Model	General Dynamics 11.1 Meter				
Antenna Mode	Receive 4.0 GHz				
Interference Objectives: Long Term	-156.0 dBW/MHz	20%	Transmit 6.1 GHz	-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				-10.2 (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	154.86
195	0.00	33.03	-5.97	312.82	-5.97	155.93
200	0.00	31.76	-5.55	315.82	-5.55	157.47
205	0.00	30.18	-4.99	319.74	-4.99	159.50
210	0.00	28.30	-4.30	324.71	-4.30	162.09
215	0.00	26.18	-3.45	330.84	-3.45	165.34
220	0.00	23.83	-2.43	338.32	-2.43	170.93
225	0.00	21.29	-1.20	347.46	-1.20	175.69
230	0.00	18.58	0.27	358.69	0.27	181.40
235	0.00	15.73	2.08	372.78	2.08	188.38
240	0.00	12.76	4.35	390.35	4.35	197.09
245	1.82	8.28	9.05	323.18	9.05	134.36
250	3.21	4.08	16.75	498.54	16.75	221.84
255	3.34	2.74	21.07	665.82	21.07	323.77
260	3.31	6.91	11.01	291.85	11.01	114.08
265	3.88	11.64	5.35	233.16	5.35	100.00
270	4.18	16.58	1.51	204.40	1.51	100.00
275	4.42	21.55	-1.33	187.67	-1.33	100.00
280	4.19	26.55	-3.60	179.28	-3.60	100.00
285	4.16	31.54	-5.47	169.63	-5.47	100.00
290	3.97	36.55	-7.07	162.81	-7.07	100.00
295	2.76	41.59	-8.48	184.67	-8.48	100.00
300	1.75	46.64	-9.72	202.45	-9.72	100.00
305	2.58	51.58	-10.00	181.24	-10.00	100.00
310	2.76	56.56	-10.00	177.04	-10.00	100.00
315	1.90	61.58	-10.00	197.21	-10.00	100.00
320	1.63	66.57	-10.00	204.50	-10.00	100.00
325	1.80	71.56	-10.00	199.97	-10.00	100.00
330	2.06	76.54	-10.00	193.21	-10.00	100.00
335	1.96	81.53	-10.00	195.48	-10.00	100.00
340	1.46	86.52	-10.00	206.59	-10.00	100.00
345	2.23	91.51	-10.00	189.34	-10.00	100.00
350	3.14	96.51	-10.00	166.41	-10.00	100.00
355	3.35	101.50	-10.00	161.71	-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: July 08, 2014