

# FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for  
**HUGHES NETWORK SYSTEMS LIMITED**  
**TUKWILA, WA**  
**(E150081)**  
**Satellite Earth Station**

Prepared By:  
COMSEARCH  
19700 Janelia Farm Boulevard  
Ashburn, VA 20147  
February 09, 2017

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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 01/25/2017.

#### Company

AT&T Mobility Spectrum LLC - Washington  
Accel Net, Inc.  
Bain, Robert B  
Bates Technical College  
Bellevue Community College (KBCS)  
Boeing Company  
Boingo Wireless, Inc.  
CENCOM - Kitsap 911  
COMMUNITY TRANSIT SNOHOMISH COUNTY PTBA  
City of Tacoma  
Clearwire Spectrum Holdings II, LLC  
Clearwire Spectrum Holdings III, LLC  
Clearwire Spectrum Holdings LLC  
Cortland Electronics Corp.  
Cyberdyne Networks, Inc.  
DAY MANAGEMENT CORPORATION  
Eastside Public Safety Com Agency  
Everett Clinic  
Everett MSO, Inc.  
GW Networks  
KIRO-TV, Inc  
KUOW / Puget Sound Public Radio  
King Broadcasting Company  
Mobilisa Enterprise Wireless  
New Cingular Wireless PCS LLC-Washington  
Olympia Cellular Limited Partnership  
Olympic Wireless, LLC  
Onvia  
Orcas Power And Light Cooperative  
PACIFIC WIRELESS SYSTEMS LLC  
Port of Tacoma  
Puget Sound Energy  
Qwest Corporation  
Rendezvous Communications LLC  
Seattle FCC License Sub, LLC  
Seattle SMSA Limited Partnership  
Seattle's Best Internet, LLC  
Seattle, City of  
Seattle, City of (King)  
Selahv Farms, LLC

Sinclair Seattle Licensee, LLC  
Snohomish County Emergency Radio System  
Soos Creek Water & Sewer District  
Sprint Spectrum L.P.  
Sprint Spectrum LP Seattle  
St. Anthony Hospital  
Startouch, Inc.  
T-MOBILE LIC LLC - VOICESTREAM PCS BTA I  
T-Mobile License LLC  
Towerstream Corp.  
UNIVERSITY OF WASHINGTON  
Verizon Wireless (VAW) LLC - (WA)  
Washington State Patrol  
Washington State of Dept of Transportat

## **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: 01/25/2017  
Job Number: 170125COMSGE08

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### Administrative Information

Status ENGINEER PROPOSAL  
Call Sign E150081  
Licensee Code HUNESY  
Licensee Name HUGHES NETWORK SYSTEMS LIMITED

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### Site Information

**TUKWILA, WA**  
Venue Name  
Latitude (NAD 83) 47° 29' 37.7" N  
Longitude (NAD 83) 122° 17' 41.0" W  
Climate Zone A  
Rain Zone 3  
Ground Elevation (AMSL) 33.94 m / 111.4 ft

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### Link Information

Satellite Type Geostationary  
Mode RO - Receive-Only  
Modulation Digital  
Satellite Arc 97° W to 97° West Longitude  
Azimuth Range 147.3° to 147.3°  
Corresponding Elevation Angles 30.1° / 30.1°  
Antenna Centerline (AGL) 5.49 m / 18.0 ft

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### Antenna Information

**Receive - FCC32**  
Manufacturer General Dynamics  
Model 8.1 meter  
Gain / Diameter 62.0 dBi / 8.1 m  
3-dB / 15-dB Beamwidth 1.00° / 2.00°

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

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### Frequency Information

**Receive 18.0 GHz**  
Emission / Frequency Range (MHz) 100KG7W - 250MG7W / 18300.0 - 19300.0  
100KG7W - 250MG7W / 19700.0 - 20200.0

Max Great Circle Coordination Distance 144.2 km / 89.6 mi  
Precipitation Scatter Contour Radius 100.0 km / 62.1 mi



# COMSEARCH

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<b>Coordination Values</b>	<b>TUKWILA, WA</b>		
Licensee Name	HUGHES NETWORK SYSTEMS LIMITED		
Latitude (NAD 83)	47° 29' 37.7" N		
Longitude (NAD 83)	122° 17' 41.0" W		
Ground Elevation (AMSL)	33.94 m / 111.4 ft		
Antenna Centerline (AGL)	5.49 m / 18.0 ft		
Antenna Model	General Dynamics 8.1 meter		
Antenna Mode	Receive 18.0 GHz		
Interference Objectives: Long Term	-156.0 dBW/MHz	20%	
Short Term	-146.0 dBW/MHz	0.01%	

Receive 18.0 GHz				
Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
0	0.41	136.98	-10.00	120.85
5	0.50	133.48	-10.00	114.41
10	0.57	129.77	-10.00	111.05
15	0.70	125.92	-10.00	105.56
20	0.50	121.82	-10.00	114.17
25	0.00	117.56	-10.00	136.18
30	0.50	113.53	-10.00	114.33
35	0.64	109.32	-10.00	108.22
40	0.56	105.02	-10.00	111.67
45	0.57	100.71	-10.00	111.09
50	0.87	96.40	-10.00	100.00
55	1.32	92.05	-10.00	100.00
60	1.89	87.66	-10.00	100.00
65	2.03	83.25	-10.00	100.00
70	1.96	78.86	-10.00	100.00
75	1.93	74.49	-10.00	100.00
80	1.73	70.19	-10.00	100.00
85	1.69	65.91	-10.00	100.00
90	1.53	61.72	-10.00	100.00
95	1.59	57.54	-10.00	100.00
100	1.57	53.48	-10.00	100.00
105	1.23	49.68	-10.00	100.00
110	0.66	46.20	-9.62	108.41
115	0.60	42.69	-8.76	112.98
120	0.23	39.65	-7.96	139.74
125	0.00	36.88	-7.17	144.24
130	0.34	34.08	-6.31	135.30
135	0.60	31.79	-5.56	121.16
140	0.76	30.21	-5.00	116.20
145	1.06	29.16	-4.62	105.71
150	1.24	29.01	-4.56	101.53
155	1.59	29.47	-4.73	100.00
160	1.99	30.65	-5.16	100.00
165	2.58	32.35	-5.75	100.00
170	3.18	34.66	-6.50	100.00
175	4.25	37.17	-7.26	100.00
180	5.13	40.28	-8.13	100.00
185	6.33	43.59	-8.99	100.00

# COMSEARCH

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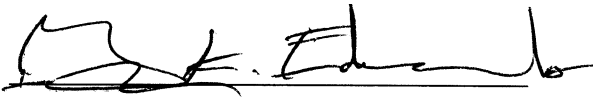
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Antenna Mode	Receive 18.0 GHz
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Azimuth (°)	Receive 18.0 GHz			
	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
190	6.85	47.51	-9.92	100.00
195	7.93	51.42	-10.00	100.00
200	8.06	55.80	-10.00	100.00
205	9.01	60.07	-10.00	100.00
210	9.80	64.49	-10.00	100.00
215	10.50	69.02	-10.00	100.00
220	11.35	73.61	-10.00	100.00
225	11.50	78.32	-10.00	100.00
230	11.62	83.04	-10.00	100.00
235	11.72	87.78	-10.00	100.00
240	11.81	92.52	-10.00	100.00
245	11.87	97.27	-10.00	100.00
250	11.94	102.02	-10.00	100.00
255	11.56	106.71	-10.00	100.00
260	11.13	111.36	-10.00	100.00
265	11.19	116.04	-10.00	100.00
270	10.26	120.50	-10.00	100.00
275	9.84	124.96	-10.00	100.00
280	9.15	129.25	-10.00	100.00
285	8.70	133.47	-10.00	100.00
290	8.17	137.50	-10.00	100.00
295	7.34	141.16	-10.00	100.00
300	6.75	144.62	-10.00	100.00
305	6.02	147.59	-10.00	100.00
310	5.23	149.97	-10.00	100.00
315	4.71	151.91	-10.00	100.00
320	3.56	152.50	-10.00	100.00
325	2.50	152.27	-10.00	100.00
330	1.17	150.92	-10.00	100.00
335	0.24	149.23	-10.00	132.64
340	0.00	147.54	-10.00	136.18
345	0.00	145.49	-10.00	136.18
350	0.36	143.22	-10.00	124.64
355	0.59	140.40	-10.00	110.37

## 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: February 09, 2017