

# FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for

**Universal Space Network, Inc.  
NAALEHU, HAWAII**

**Satellite Earth Station**

Prepared By:  
COMSEARCH  
19700 Janelia Farm Boulevard  
Ashburn, Virginia 20147  
March 9, 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, based upon the restrictions noted in the Summary of Results (Section 2).

## 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 most cases.

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 and frequency separation are considered on the interfering paths, sufficient losses exist to negate harmful interference from occurring with the proposed transmit-receive earth station. Further, the transmit spectrum will be limited to frequencies 5925.0 to 6048.2 MHz, 6079.2 to 6137.1 MHz, 6168.3 to 6300.2 MHz, 6331.5 to 6389.3 MHz, and 6420.4 to 6425.0 MHz.

Company

Hawaii County of  
New Cingular Wireless PCS, LLC - Hawaii

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 February 3, 2010.

#### Company

HAWAII COUNTY OF  
Hawaii State  
Hawaiian Telcom (debtor-in-possession)  
New Cingular Wireless PCS LLC - Hawaii  
Nextel WIP License Corp.  
University of Hawaii

## **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: 03/09/2010  
Job Number: 100202COMSJC01

**Administrative Information**

Status ENGINEER PROPOSAL  
Call Sign NAALEHU  
Licensee Code UNSPNE  
Licensee Name Universal Space Network, Inc.

**Site Information NAALEHU, HAWAII**

Venue Name  
Latitude (NAD 83) 19° 0' 50.3" N  
Longitude (NAD 83) 155° 39' 46.6" W  
Climate Zone C  
Rain Zone 4  
Ground Elevation (AMSL) 378.0 m / 1240.2 ft

**Link Information**

Satellite Type Geostationary  
Mode TR - Transmit-Receive  
Modulation Digital  
Satellite Arc 97° W to 180° West Longitude  
Azimuth Range 101.2° to 234.2°  
Corresponding Elevation Angles 21.4° / 54.4°  
Antenna Centerline (AGL) 2.74 m / 9.0 ft

**Antenna Information**

	<b>Receive</b>	<b>Transmit</b>
Manufacturer	Prodelin	Prodelin
Model	1383	1383
Gain / Diameter	42.1 dBi / 3.8 m	46.0 dBi / 3.8 m
3-dB / 15-dB Beamwidth	1.40° / 3.20°	0.90° / 2.00°

149KG1D to 2M00G1D

Max Available RF Power	(dBW/4 kHz)			-11.7	-23.0
	(dBW/MHz)			4.0	1.0
Maximum EIRP	(dBW/4 kHz)			34.3	23.0
	(dBW/MHz)			50.0	47.0
	(dBW)			50.0	50.0
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**

	<b>Receive 4.0 GHz</b>	<b>Transmit 6.1 GHz</b>
Emission / Frequency Range (MHz)	149KG1D - 2M00G1D / 3700.0 - 4200.0	149KG1D - 2M00G1D / 5925.0 - 6048.2 149KG1D - 2M00G1D / 6079.2 - 6137.1 149KG1D - 2M00G1D / 6168.3 - 6300.2 149KG1D - 2M00G1D / 6331.5 - 6389.3 149KG1D - 2M00G1D / 6420.4 - 6425.0

Max Great Circle Coordination Distance	908.5 km / 564.5 mi	312.2 km / 193.9 mi
Precipitation Scatter Contour Radius	423.6 km / 263.2 mi	100.0 km / 62.1 mi

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**Coordination Values****NAALEHU, HI**

Licensee Name Universal Space Network, Inc.  
 Latitude (NAD 83) 19° 0' 50.3" N  
 Longitude (NAD 83) 155° 39' 46.6" W  
 Ground Elevation (AMSL) 378.0 m / 1240.2 ft  
 Antenna Centerline (AGL) 2.74 m / 9.0 ft  
 Antenna Model Prodelin 1383  
 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 -11.7 (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	2.80	100.63	-10.00	226.45	-10.00	100.00
5	2.67	95.89	-10.00	234.67	-10.00	100.00
10	2.44	91.16	-10.00	250.04	-10.00	100.00
15	2.35	86.43	-10.00	256.64	-10.00	100.00
20	2.16	81.71	-10.00	270.58	-10.00	100.00
25	1.94	77.02	-10.00	287.88	-10.00	100.00
30	1.72	72.35	-10.00	310.09	-10.00	100.00
35	0.87	67.81	-10.00	418.70	-10.00	125.72
40	0.38	63.29	-10.00	591.58	-10.00	199.15
45	0.00	58.82	-10.00	710.92	-10.00	239.72
50	0.00	54.32	-10.00	710.92	-10.00	239.72
55	0.00	49.88	-10.00	710.92	-10.00	239.72
60	0.00	45.53	-9.46	722.42	-9.46	243.79
65	0.00	41.29	-8.40	745.20	-8.40	251.97
70	0.00	37.21	-7.27	769.92	-7.27	261.01
75	0.00	33.33	-6.07	796.51	-6.07	270.89
80	0.00	29.75	-4.84	821.55	-4.84	281.48
85	0.00	26.59	-3.62	850.33	-3.62	292.33
90	0.00	24.00	-2.51	877.27	-2.51	302.53
95	0.00	22.20	-1.66	898.30	-1.66	308.25
100	0.00	21.39	-1.25	908.53	-1.25	312.16
105	0.00	21.67	-1.40	904.92	-1.40	310.78
110	0.00	23.01	-2.05	888.60	-2.05	306.82
115	0.00	25.24	-3.05	863.95	-3.05	297.48
120	0.00	28.14	-4.23	835.66	-4.23	286.79
125	0.00	31.54	-5.47	806.98	-5.47	276.00
130	0.00	35.28	-6.69	782.71	-6.69	265.74
135	0.00	39.27	-7.85	757.04	-7.85	256.28
140	0.00	43.44	-8.95	733.32	-8.95	247.69
145	0.00	47.73	-9.97	711.58	-9.97	239.95
150	0.00	51.90	-10.00	710.92	-10.00	239.72
155	0.00	55.87	-10.00	710.92	-10.00	239.72
160	0.00	59.54	-10.00	710.92	-10.00	239.72
165	0.00	62.77	-10.00	710.92	-10.00	239.72
170	0.00	65.37	-10.00	710.92	-10.00	239.72
175	0.00	67.09	-10.00	710.92	-10.00	239.72
180	0.00	67.70	-10.00	710.92	-10.00	239.72
185	0.00	67.09	-10.00	710.92	-10.00	239.72



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Interference Objectives: Long Term	-156.0 dBW/MHz	20%	-154.0 dBW/4 kHz
Short Term	-146.0 dBW/MHz	0.01%	-131.0 dBW/4 kHz
Max Available RF Power			-11.7 (dBW/4 kHz)
			20%
			0.0025%

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	65.37	-10.00	710.92	-10.00	239.72
195	0.00	63.22	-10.00	710.92	-10.00	239.72
200	0.00	61.26	-10.00	710.92	-10.00	239.72
205	0.00	59.50	-10.00	710.92	-10.00	239.72
210	0.00	57.97	-10.00	710.92	-10.00	239.72
215	0.00	56.69	-10.00	710.92	-10.00	239.72
220	0.00	55.68	-10.00	710.92	-10.00	239.72
225	0.00	54.96	-10.00	710.92	-10.00	239.72
230	0.00	54.54	-10.00	710.92	-10.00	239.72
235	0.00	54.44	-10.00	710.92	-10.00	239.72
240	0.00	54.64	-10.00	710.92	-10.00	239.72
245	0.00	55.15	-10.00	710.92	-10.00	239.72
250	0.00	55.96	-10.00	710.92	-10.00	239.72
255	0.00	57.05	-10.00	710.92	-10.00	239.72
260	0.31	58.15	-10.00	639.85	-10.00	216.75
265	0.47	59.63	-10.00	537.35	-10.00	179.63
270	0.71	61.31	-10.00	458.84	-10.00	145.21
275	0.99	63.18	-10.00	390.34	-10.00	112.82
280	1.11	65.37	-10.00	374.37	-10.00	105.58
285	1.16	67.78	-10.00	368.29	-10.00	102.71
290	1.21	70.32	-10.00	362.41	-10.00	100.07
295	1.42	72.91	-10.00	338.66	-10.00	100.00
300	1.51	75.67	-10.00	328.74	-10.00	100.00
305	1.71	78.49	-10.00	310.99	-10.00	100.00
310	1.95	81.39	-10.00	287.13	-10.00	100.00
315	2.16	84.37	-10.00	270.25	-10.00	100.00
320	2.36	87.40	-10.00	256.15	-10.00	100.00
325	2.46	90.47	-10.00	248.96	-10.00	100.00
330	2.55	93.56	-10.00	242.73	-10.00	100.00
335	2.62	96.63	-10.00	237.75	-10.00	100.00
340	2.74	99.70	-10.00	230.48	-10.00	100.00
345	2.79	102.71	-10.00	226.72	-10.00	100.00
350	3.19	105.79	-10.00	205.12	-10.00	100.00
355	3.01	105.38	-10.00	212.81	-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.



Jeffrey E. Cowles  
Principal Frequency Planner  
COMSEARCH  
19700 Janelia Farm Boulevard  
Ashburn, Va. 20147

DATED: March 9, 2010