

FREQUENCY COORDINATION AND INTERFERENCE
ANALYSIS REPORT

Prepared for
RAYTHEON COMPANY
OAHU, HI
Satellite Earth Station

Prepared By:
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July 28, 2004

TABLE OF CONTENTS

1. CONCLUSIONS	3
2. SUMMARY OF RESULTS	4
3. SUPPLEMENTAL SHOWING	5
4. EARTH STATION COORDINATION DATA	6
5. CERTIFICATION	10

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 Hawaii. Inc.
AT&T Wireless Services of Hawaii, Inc.

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 06/10/2004.

Company

AT&T Corp-Govt Mkts Hawaii Inf Transfer
AT&T Wireless Services of Hawaii, Inc.
Hawaii State
Honolulu City & County
University of Hawaii
Verizon Hawaii, Inc.

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.

Date: 06/10/2004

Job Number: 040610COMSTC06

Administrative Information

Licensee Name RAYTHEON COMPANY

Site Information OAHU, HI

Venue Name KUNIA NAVAL STATION

Latitude (NAD 83) 21° 28' 21.7" N

Longitude (NAD 83) 158° 3' 18.7" W

Climate Zone A

Rain Zone 4

Ground Elevation (AMSL) 261.4 m / 857.6 ft

Link Information

Satellite Type Geostationary

Mode TR - Transmit-Receive

Modulation Digital

Satellite Arc 83° W to 194° West Longitude

Azimuth Range 95.6° to 243.2°

Corresponding Elevation Angles 5.2° / 42.5°

Antenna Centerline (AGL) 2.44 m / 8.0 ft

Antenna Information Receive - FCC32 Transmit - FCC32

Manufacturer PRODELIN 1383 PRODELIN 1383

Gain / Diameter 41.8 dBi / 3.8 m 46.2 dBi / 3.8 m

3-dB / 15-dB Beamwidth 1.00° / 2.00° 0.80° / 1.60°

Max Available RF Power (dBW/4 kHz) -16.8
(dBW/MHz) 7.2

Maximum EIRP (dBW/4 kHz) 29.4
(dBW/MHz) 53.4

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 Receive 4.0 GHz Transmit 6.1 GHz

Emission / Frequency Range (MHz) 4M80G7W / 3700.0 - 4200.0 4M80G7W / 5925.0000 - 5930.1000

4M80G7W / 5989.9500 - 6115.4125

4M80G7W / 6145.6125 - 6182.1400

4M80G7W / 6241.9900 - 6248.8525

4M80G7W / 6279.0525 - 6367.4400

4M80G7W / 6419.9900 - 6425.0000

Max Great Circle Coordination Distance 558.4 km / 346.9 mi 219.9 km /
136.6 mi
Precipitation Scatter Contour Radius 430.7 km / 267.6 mi 100.0 km /
62.1 mi

Coordination Values OAHU, HI
Licensee Name RAYTHEON COMPANY
Latitude (NAD 83) 21° 28' 21.7" N
Longitude (NAD 83) 158° 3' 18.7" W
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Antenna Centerline (AGL) 2.44 m / 8.0 ft
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 -16.8 (dBW/4 kHz)

	Horizon	Receive 4.0 GHz Antenna	Horizon	Transmit 6.1 GHz Coordination	Horizon	
	Coordination					
Azimuth (°)	Elevation (°)		Discrimination (°)		Gain (dBi)	Distance (km)
	Gain (dBi)	Distance (km)				
0	0.00	95.56	-10.00	285.28	-10.00	125.39
5	0.26	90.58	-10.00	277.93	-10.00	120.60
10	0.31	85.60	-10.00	271.97	-10.00	116.65
15	0.44	80.62	-10.00	256.60	-10.00	106.20
20	0.50	75.63	-10.00	250.23	-10.00	101.74
25	0.52	70.65	-10.00	248.58	-10.00	100.66
30	0.53	65.67	-10.00	248.06	-10.00	100.29
35	0.53	60.69	-10.00	247.83	-10.00	100.13
40	0.67	55.71	-10.00	239.11	-10.00	100.00
45	0.71	50.73	-10.00	236.85	-10.00	100.00
50	0.83	45.75	-9.51	232.40	-9.51	100.00
55	0.71	40.79	-8.26	246.71	-8.26	100.00
60	0.80	35.82	-6.85	249.49	-6.85	100.00
65	0.68	30.89	-5.24	266.88	-5.24	105.42
70	0.45	25.99	-3.37	298.57	-3.37	122.99
75	0.35	21.13	-1.12	328.48	-1.12	136.11
80	0.30	16.32	1.68	356.41	1.68	149.53
85	0.30	11.66	5.33	386.38	5.33	163.36
90	0.00	7.64	9.92	438.28	9.92	193.15
95	0.00	5.26	13.98	558.42	13.98	219.92
100	0.00	6.84	11.13	449.30	11.13	197.76
105	0.00	10.76	6.21	405.77	6.21	178.84
110	0.00	15.30	2.38	375.19	2.38	162.40
115	0.00	19.88	-0.46	353.09	-0.46	152.11
120	0.00	24.43	-2.70	336.33	-2.70	144.69
125	0.00	28.95	-4.54	322.96	-4.54	139.05
130	0.00	33.40	-6.09	311.34	-6.09	134.60
135	0.00	37.79	-7.43	302.13	-7.43	132.22
140	0.00	42.08	-8.60	294.33	-8.60	129.09
145	0.00	46.25	-9.63	287.66	-9.63	126.38

150	0.00	50.24	-10.00	285.28	-10.00	125.39
155	0.00	54.01	-10.00	285.28	-10.00	125.39
160	0.00	57.44	-10.00	285.28	-10.00	125.39
165	0.00	60.42	-10.00	285.28	-10.00	125.39
170	0.00	62.78	-10.00	285.28	-10.00	125.39
175	0.00	64.31	-10.00	285.28	-10.00	125.39
180	0.00	64.84	-10.00	285.28	-10.00	125.39
185	0.00	64.31	-10.00	285.28	-10.00	125.39

Coordination Values OAHU, HI
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 20%
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 Max Available RF Power -16.8 (dBW/4 kHz)

Horizon		Receive 4.0 GHz	Transmit 6.1 GHz	Horizon		
Coordination		Antenna	Coordination	Horizon		
Azimuth (°)	Elevation (°)		Discrimination (°)	Gain (dBi)	Distance (km)	
Gain (dBi)	Distance (km)					
190	0.00	62.78	-10.00	285.28	-10.00	125.39
195	0.21	60.30	-10.00	284.36	-10.00	124.80
200	0.73	57.06	-10.00	235.41	-10.00	100.00
205	1.82	53.42	-10.00	199.48	-10.00	100.00
210	3.09	49.72	-10.00	169.40	-10.00	100.00
215	4.49	46.01	-9.57	142.33	-9.57	100.00
220	4.22	43.81	-9.04	148.79	-9.04	100.00
225	4.42	41.59	-8.47	148.31	-8.47	100.00
230	5.32	39.12	-7.81	139.36	-7.81	100.00
235	5.44	37.82	-7.44	139.74	-7.44	100.00
240	6.26	36.34	-7.01	134.26	-7.01	100.00
245	6.69	35.83	-6.86	130.28	-6.86	100.00
250	5.66	37.35	-7.31	137.99	-7.31	100.00
255	5.57	38.49	-7.63	137.53	-7.63	100.00
260	6.24	39.45	-7.90	130.93	-7.90	100.00
265	5.73	41.93	-8.56	133.51	-8.56	100.00
270	4.17	45.54	-9.46	147.73	-9.46	100.00
275	4.56	47.89	-10.00	139.57	-10.00	100.00
280	3.84	51.28	-10.00	151.15	-10.00	100.00
285	4.00	54.29	-10.00	147.93	-10.00	100.00
290	3.02	58.09	-10.00	171.05	-10.00	100.00
295	2.65	61.64	-10.00	179.69	-10.00	100.00
300	2.57	65.16	-10.00	181.46	-10.00	100.00
305	2.85	68.65	-10.00	174.92	-10.00	100.00
310	3.45	72.17	-10.00	159.48	-10.00	100.00
315	2.16	76.21	-10.00	190.76	-10.00	100.00
320	1.68	80.04	-10.00	203.09	-10.00	100.00
325	1.42	83.82	-10.00	207.95	-10.00	100.00
330	0.61	87.61	-10.00	242.56	-10.00	100.00

335	0.39	91.33	-10.00	261.66	-10.00	109.69
340	0.28	95.02	-10.00	274.75	-10.00	118.50
345	0.25	98.70	-10.00	278.73	-10.00	121.12
350	0.32	102.36	-10.00	270.64	-10.00	115.77
355	0.23	100.54	-10.00	281.31	-10.00	122.81

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. I AM FAMILIAR WITH PARTS 101 AND 25 OF THE FCC RULES AND REGULATIONS. 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.

Timothy O. Crutcher
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DATED: July 28, 2004
Frequency Coordination and Interference Analysis Report 07/28/2004 Page 10
of 10

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Earth Station Data Sheet
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