

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
HUGHES NETWORK SYSTEMS LIMITED
SAN DIEGO, CA
Satellite Earth Station

Prepared By:
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147
March 03, 2017

TABLE OF CONTENTS

1. CONCLUSIONS	3
2. SUMMARY OF RESULTS	4
3. SUPPLEMENTAL SHOWING	5
4. EARTH STATION COORDINATION DATA.....	7
5. CERTIFICATION.....	11

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 02/15/2017.

Company

AT&T Mobility Spectrum LLC - Southern CA
AirSites2000, LLC
Antilles Wireless, LLC
Bahia Hotel
CCS Wireless, Inc.
California, State of
City of Irvine Public Safety
City of Oceanside
City of Poway
Conterra Ultra Broadband, LLC
DRS Global Enterprise Solutions, Inc.
EASTERN MUNICIPAL WATER DISTRICT
Energia Costa Azul S. de R.L. de C.V.
Fireline Network Solutions Inc.
Global Telecom & Technology Americas
International Communications Network Inc
LEMON GROVE SCHOOL DISTRICT
LT-WR, LLC
Lightwave Broadband LLC
Los Angeles SMSA Ltd. Partnership
MEXICO UNITED MEXICAN STATES
MHO Networks
Mark Hopperton
Metropolitan Water Dist of So California
Moulton Niguel Water District
New Cingular Wireless PCS - Los Angeles
New Cingular Wireless PCS LLC - N CAL
New Cingular Wireless PCS LLC -San Diego
Nextel of California Inc.
Nextweb Inc
Olympic Wireless, LLC
Palomar Broadband
Quest Diagnostics Incorporated
Regents of the University of California
Regional 3Cs
SAN DIEGO UNIVERSITY
San Diego Broadband
San Diego Gas & Electric Company
San Diego Unified School District
San Diego, City of

San Diego, County of
Santa Fe Irrigation District
Santa Margarita Water District
Scripps Media, Inc. - KGTV
Sempra Global
Sky Valley Network LLC
Skyriver Communications
Southern California Telephone Company
Sprint Telephony PCS, L.P.
Sprintcom, Inc. Puerto Rico
Sweetwater Authority
T-Mobile License LLC
TRANGO SYSTEMS, INC.
Turn Wireless, LLC
Vectus, Inc
Verizon California Inc.
Verizon Wireless (VAW) LLC (Southern CA)
WT Consulting Group, LLC
Webpass Inc.
Western Broadband Inc.
Western Municipal Water District
Wiline Spectrum Holdings LLC
Zray Technologies 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.

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5500 <http://www.comsearch.com>

Date: 03/03/2017
Job Number: 170215COMSGE04

Administrative Information

Status: ENGINEER PROPOSAL
Call Sign: E150088
Licensee Code: HUNESY
Licensee Name: HUGHES NETWORK SYSTEMS LIMITED

Site Information

SAN DIEGO, CA

Venue Name
Latitude (NAD 83): 32° 59' 21.8" N
Longitude (NAD 83): 117° 4' 22.0" W
Climate Zone: A
Rain Zone: 4
Ground Elevation (AMSL): 209.07 m / 685.9 ft

Link Information

Satellite Type: Geostationary
Mode: TR - Transmit-Receive
Modulation: Digital
Satellite Arc: 97.1° W to 97.1° West Longitude
Azimuth Range: 146.3° to 146.3°
Corresponding Elevation Angles: 46.0° / 46.0°
Antenna Centerline (AGL): 3.66 m / 12.0 ft

Antenna Information

Receive - FCC32

Transmit - FCC32

Manufacturer	ASC Signal	ASC Signal
Model	5.6m	5.6m
Gain / Diameter	58.6 dBi / 5.6 m	62.0 dBi / 5.6 m
3-dB / 15-dB Beamwidth	1.00° / 2.00°	0.14° / 0.32°
Max Available RF Power (dBW/4 kHz)	-20.5	-20.5
(dBW/MHz)	3.5	3.5
Maximum EIRP (dBW/4 kHz)	41.5	41.5
(dBW/MHz)	65.5	65.5
Interference Objectives:	Long Term	-156.0 dBW/MHz 20%
	Short Term	-146.0 dBW/MHz 0.01%
		-151.0 dBW/4 kHz 20%
		-128.0 dBW/4 kHz 0.0025%

Frequency Information

Receive 18.0 GHz

Transmit 28.0 GHz

Emission / Frequency Range (MHz)	100KG7W - 250MG7W / 18300.0 - 19300.0	100KG7W - 250MG7W / 27850.0 - 30000.0
	100KG7W - 250MG7W / 19700.0 - 20200.0	
Max Great Circle Coordination Distance	125.2 km / 77.8 mi	100.0 km / 62.1 mi
Precipitation Scatter Contour Radius	100.0 km / 62.1 mi	100.0 km / 62.1 mi

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
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Coordination Values

SAN DIEGO, CA

Licensee Name HUGHES NETWORK SYSTEMS LIMITED
Latitude (NAD 83) 32° 59' 21.8" N
Longitude (NAD 83) 117° 4' 22.0" W
Ground Elevation (AMSL) 209.07 m / 685.9 ft
Antenna Centerline (AGL) 3.66 m / 12.0 ft
Antenna Model ASC Signal 5.6 meter
Antenna Mode Receive 18.0 GHz Transmit 28.0 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 -20.5 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 18.0 GHz		Transmit 28.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
0	3.78	128.02	-10.00	100.00	-10.00	100.00
5	3.77	125.29	-10.00	100.00	-10.00	100.00
10	3.76	122.35	-10.00	100.00	-10.00	100.00
15	3.67	119.19	-10.00	100.00	-10.00	100.00
20	3.70	115.95	-10.00	100.00	-10.00	100.00
25	3.86	112.64	-10.00	100.00	-10.00	100.00
30	3.97	109.20	-10.00	100.00	-10.00	100.00
35	4.07	105.66	-10.00	100.00	-10.00	100.00
40	4.23	102.07	-10.00	100.00	-10.00	100.00
45	4.26	98.39	-10.00	100.00	-10.00	100.00
50	4.41	94.69	-10.00	100.00	-10.00	100.00
55	4.60	90.96	-10.00	100.00	-10.00	100.00
60	4.69	87.21	-10.00	100.00	-10.00	100.00
65	3.83	83.55	-10.00	100.00	-10.00	100.00
70	3.69	79.90	-10.00	100.00	-10.00	100.00
75	3.56	76.30	-10.00	100.00	-10.00	100.00
80	3.30	72.80	-10.00	100.00	-10.00	100.00
85	2.87	69.47	-10.00	100.00	-10.00	100.00
90	2.57	66.23	-10.00	100.00	-10.00	100.00
95	3.38	62.59	-10.00	100.00	-10.00	100.00
100	1.92	60.23	-10.00	100.00	-10.00	100.00
105	1.55	57.56	-10.00	100.00	-10.00	100.00
110	1.34	55.02	-10.00	100.00	-10.00	100.00
115	0.78	52.99	-10.00	102.43	-10.00	100.00
120	0.79	50.83	-10.00	102.01	-10.00	100.00
125	0.59	49.15	-10.00	110.46	-10.00	100.00
130	0.47	47.75	-9.97	116.79	-9.97	100.00
135	0.61	46.47	-9.68	110.29	-9.68	100.00
140	0.60	45.74	-9.51	111.19	-9.51	100.00
145	0.69	45.33	-9.41	107.64	-9.41	100.00
150	0.55	45.57	-9.47	113.27	-9.47	100.00
155	0.55	46.10	-9.59	113.01	-9.59	100.00
160	0.41	47.17	-9.84	120.83	-9.84	100.00
165	0.35	48.54	-10.00	125.21	-10.00	100.00
170	0.35	50.21	-10.00	125.01	-10.00	100.00
175	0.57	52.02	-10.00	111.32	-10.00	100.00
180	0.92	54.03	-10.00	100.00	-10.00	100.00
185	1.91	55.91	-10.00	100.00	-10.00	100.00

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Coordination Values

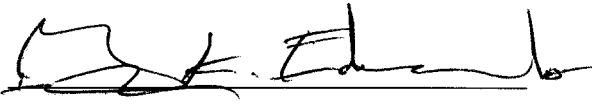
SAN DIEGO, CA

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Antenna Model	ASC Signal 5.6 meter				
Antenna Mode	Receive 18.0 GHz				
Interference Objectives: Long Term	-156.0 dBW/MHz	20%	Transmit 28.0 GHz	-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	-20.5 (dBW/4 kHz)				

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 18.0 GHz		Transmit 28.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
190	2.31	58.49	-10.00	100.00	-10.00	100.00
195	1.88	61.73	-10.00	100.00	-10.00	100.00
200	1.69	64.95	-10.00	100.00	-10.00	100.00
205	0.92	68.49	-10.00	100.00	-10.00	100.00
210	0.76	71.83	-10.00	103.19	-10.00	100.00
215	1.41	75.02	-10.00	100.00	-10.00	100.00
220	1.52	78.46	-10.00	100.00	-10.00	100.00
225	1.89	81.93	-10.00	100.00	-10.00	100.00
230	1.91	85.49	-10.00	100.00	-10.00	100.00
235	2.96	89.06	-10.00	100.00	-10.00	100.00
240	3.08	92.72	-10.00	100.00	-10.00	100.00
245	3.17	96.38	-10.00	100.00	-10.00	100.00
250	3.33	100.04	-10.00	100.00	-10.00	100.00
255	4.00	103.80	-10.00	100.00	-10.00	100.00
260	4.84	107.63	-10.00	100.00	-10.00	100.00
265	6.03	111.61	-10.00	100.00	-10.00	100.00
270	6.18	115.24	-10.00	100.00	-10.00	100.00
275	6.16	118.71	-10.00	100.00	-10.00	100.00
280	6.24	122.09	-10.00	100.00	-10.00	100.00
285	6.13	125.23	-10.00	100.00	-10.00	100.00
290	6.13	128.22	-10.00	100.00	-10.00	100.00
295	6.07	130.95	-10.00	100.00	-10.00	100.00
300	7.27	134.39	-10.00	100.00	-10.00	100.00
305	7.94	137.20	-10.00	100.00	-10.00	100.00
310	8.54	139.64	-10.00	100.00	-10.00	100.00
315	8.50	141.08	-10.00	100.00	-10.00	100.00
320	7.98	141.55	-10.00	100.00	-10.00	100.00
325	8.39	142.37	-10.00	100.00	-10.00	100.00
330	8.56	142.40	-10.00	100.00	-10.00	100.00
335	6.64	139.84	-10.00	100.00	-10.00	100.00
340	7.06	139.08	-10.00	100.00	-10.00	100.00
345	5.91	136.43	-10.00	100.00	-10.00	100.00
350	4.18	133.02	-10.00	100.00	-10.00	100.00
355	4.56	131.10	-10.00	100.00	-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: March 03, 2017