

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for

DIRECTV Enterprises, LLC
Long Beach, California

Satellite Earth Station

Prepared By:
COMSEARCH

19700 Janelia Farm Boulevard
Ashburn, Virginia 20147
July 26, 2013

TABLE OF CONTENTS

1. CONCLUSIONS	3
2. SUMMARY OF RESULTS	4
3. SUPPLEMENTAL SHOWING	5
4. EARTH STATION COORDINATION DATA.....	9
5. CERTIFICATION.....	13

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-only earth station.

Company

Boeing Company
California, State of
Los Angeles County FCC Licensing Section
Southern California Gas Company
Union Pacific Railroad Company

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 August 16, 2012, and a PCN extension notice was forwarded on February 15, 2013.

Company

AT&T California
AirSites2000, LLC
BNSF Railway Company
Boeing Company
CBS Broadcasting Inc
CBS Communications Services Inc.
CCO SoCal I, LLC
CITY OF POMONA COMMUNICATIONS
California, State of
City Of Los Angeles, Dept Water & Power
Glendale, City of
HARRIS CORPORATION
INCOMM DIVISION CHURCH OF SCIENTOLOGY
Kern, County of
LOS ANGELES UNIFIED SCHOOL DISTRICT
Los Angeles City Info Technology Agency
Los Angeles County Dept of Public Works
Los Angeles County FCC Licensing Section
Los Angeles County Metro Transit Auth
Los Angeles SMSA Ltd. Partnership
MOBILE RELAY ASSOCIATES INC
Metropolitan Water Dist of So California
Mile High Inc
New Cingular Wireless PCS - Los Angeles
New Cingular Wireless PCS LLC - N CAL
New Cingular Wireless PCS LLC -San Diego
ORANGE, COUNTY OF, CA
Riverside, County of
San Bernardino County of California
San Diego County
San Diego Gas & Electric Company
Southern California Edison Company
Southern California Gas Company
Southern California Regional Rail Auth.
Sprint Telephony PCS, L.P.

Company (Continued)

Union Pacific Railroad Company
University of California, HPWREN
VENOCO, INC.
Ventura, County of
Verizon California Inc.
Verizon Wireless (VAW) LLC (CA)
3G Wireless, LLC
AERIAL VIDEO SYSTEMS
Alltel Communications, LLC
ANAHEIM CITY, COMMUNICATIONS DIVISION
Alascom Inc
Ascent Media Network Services, LLC
Bay City Television, Inc.
Bellsouth Telecommunications, Inc.
BFI Licenses, LLC
Borgeson, Tom R.
Broadcast Sports Inc.
CNG Communications, Inc.
Carolina Telephone and Telegraph Co
Casper, John
CenturyTel of the Southwest, Inc.
Chicago Comnet Corp
Cincinnati Bell Wireless LLC
Citywide News Network, Inc.
Cohen, Elana
Cowboys Stadium LP
CP Communications PA, LLC
DCI II, INC.
Direct Broadcast Services, Inc.
GOODYEAR TIRE AND RUBBER COMPANY
GSN New, Inc
Global Microwave Systems Inc
HF Enterprises, Inc
Hallco Unlimited, Inc.
Hawaiian Telcom, Inc.
Heiden, William
Illinois Bell Telephone Company
Indiana Bell Telephone Company
Information & Display Systems, Inc.
Information Super Station, LLC
International Communications Group, Inc.
KRCA License, LLC
KTLA, LLC
Kentucky RSA #3 Cellular General Partner
Kentucky RSA #4 Cellular General Partner
LOS ANGELES TELEVISION STATION KCAL LLC
MERCURY COMMUNICATIONS
Metro Networks Communications, Inc.
Metrosat Communications, Inc.
Michigan Bell Telephone Company
Moreen, Steven K

Company (Continued)

NBC TELEMUNDO LICENSE LLC
NEW ENGLAND DIGITAL DISTRIBUTION, INC.
NEW ENGLAND SATELLITE SYSTEMS INC
NSM Surveillance
Navajo Communications Company
NorthWest Suburbs Community Access Corp
Ohio Bell Telephone Company
On Scene Video Production
Onboard Images
Pacific Television Center
Penn Service Microwave Co., Inc.
Plateau Telecommunications, Inc.
Plum TV, LLC
Production & Satellite Services, Inc.
Public Television Communications Center
QUICK LINK CONNECTIONS INC
QWEST CORPORATION
RCC Minnesota Inc. - MN NE ND SD
REMOTE FACILITIES CONSULTING SERVICES
RF Central, LLC
RF Film, Inc
RF Technology, LLC
Radiofone, Inc.
Randy Hermes Production
Regulus Media Services, Inc.
Remote Broadcasts, Inc.
South Bay Regional Public Comm Authority
Southern California License, LLC
Southwestern Bell Telephone L.P.
Speedshotz, Inc
Time Warner NY Cable LLC
Total RF Marketing Inc
Unisat, Inc.
United Telephone - Southeast
VERIZON SOUTH INC.
Verizon Maryland, Inc.
Verizon New England Inc.
Verizon New Jersey, Inc.
Verizon New York, Inc.
Verizon North Inc.
Verizon Northwest Inc.
Verizon Pennsylvania, Inc.
Verizon Virginia, Inc.
Verizon Washington DC, Inc.
Village Video Productions Inc
Vyvx, LLC
Westar Satellite Services LP
Western Technical Services
Wexler Video, Inc.
Winged Vision Inc
Wisconsin Bell, Inc.
Wolfe Air Aviation

Society of Broadcast Engineers Frequency Coordinators:

Fred Swift - San Diego Area

Howard Fine - Southern California Area

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: 07/26/2013
Job Number: 130215COMSJC01

Administrative Information

Status	ENGINEER PROPOSAL
Call Sign	
Licensee Code	ZDIRTV
Licensee Name	DIRECTV Enterprises, LLC

Site Information **LONG BEACH, CALIFORNIA**

Venue Name	
Latitude (NAD 83)	33° 49' 45.5" N
Longitude (NAD 83)	118° 12' 39.1" W
Climate Zone	B
Rain Zone	4
Ground Elevation (AMSL)	13.7 m / 45.0 ft

Link Information

Satellite Type	Geostationary
Mode	TO - Transmit-Only
Modulation	Digital
Satellite Arc	95° W to 95° West Longitude
Azimuth Range	142.4° to 142.4°
Corresponding Elevation Angles	43.5° / 43.5°
Antenna Centerline (AGL)	5.49 m / 18.0 ft

Antenna Information **Transmit - FCC32**

Manufacturer	General Dynamics
Model	9.2 Meter
Gain / Diameter	53.6 dBi / 9.2 m
3-dB / 15-dB Beamwidth	0.40° / 0.80°

Max Available RF Power	(dBW/4 kHz)	-20.6
	(dBW/MHz)	3.4

Maximum EIRP	(dBW/4 kHz)	33.0
	(dBW/MHz)	57.0

Interference Objectives:	Long Term	-154.0 dBW/4 kHz	20%
	Short Term	-131.0 dBW/4 kHz	0.0025%

Frequency Information **Transmit 6.7 GHz**

Emission / Frequency Range (MHz)	24M0G7W - 36M0G7W / 6425.0 - 6675.0
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Max Great Circle Coordination Distance	126.5 km / 78.6 mi
Precipitation Scatter Contour Radius	100.0 km / 62.1 mi

COMSEARCH

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Coordination Values

LONG BEACH, CA

Licensee Name DIRECTV Enterprises, LLC
Latitude (NAD 83) 33° 49' 45.5" N
Longitude (NAD 83) 118° 12' 39.1" W
Ground Elevation (AMSL) 13.72 m / 45.0 ft
Antenna Centerline (AGL) 5.49 m / 18.0 ft
Antenna Model General Dynamics 9.2 Meter
Antenna Mode Transmit 6.7 GHz
Interference Objectives: Long Term -154.0 dBW/4 kHz 20%
Short Term -131.0 dBW/4 kHz 0.0025%
Max Available RF Power -20.6 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Transmit 6.7 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	125.10	-10.00	123.44
5	0.00	122.29	-10.00	123.44
10	0.00	119.30	-10.00	123.44
15	0.00	116.15	-10.00	123.44
20	0.00	112.88	-10.00	123.44
25	0.00	109.51	-10.00	123.44
30	0.00	106.05	-10.00	123.44
35	0.00	102.53	-10.00	123.44
40	0.00	98.96	-10.00	123.44
45	0.00	95.36	-10.00	123.44
50	0.00	91.74	-10.00	123.44
55	0.38	88.10	-10.00	109.96
60	0.48	84.45	-10.00	101.73
65	0.55	80.81	-10.00	100.00
70	0.65	77.18	-10.00	100.00
75	0.66	73.62	-10.00	100.00
80	0.70	70.12	-10.00	100.00
85	0.67	66.71	-10.00	100.00
90	0.61	63.43	-10.00	100.00
95	0.62	60.25	-10.00	100.00
100	0.60	57.23	-10.00	100.00
105	0.51	54.45	-10.00	100.00
110	0.45	51.88	-10.00	104.21
115	0.30	49.64	-10.00	116.23
120	0.41	47.50	-9.92	107.58
125	0.86	45.39	-9.42	100.00
130	0.45	44.44	-9.19	106.86
135	0.00	43.97	-9.08	126.21
140	0.00	43.52	-8.97	126.55
145	0.00	43.53	-8.97	126.54
150	0.00	44.00	-9.09	126.18
155	0.00	44.91	-9.31	125.51
160	0.00	46.23	-9.62	124.56
165	0.00	47.93	-10.00	123.44
170	0.00	49.97	-10.00	123.44
175	0.00	52.31	-10.00	123.44
180	0.00	54.90	-10.00	123.44
185	0.00	57.71	-10.00	123.44

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Antenna Mode Transmit 6.7 GHz
Interference Objectives: Long Term -154.0 dBW/4 kHz 20%
Short Term -131.0 dBW/4 kHz 0.0025%
Max Available RF Power -20.6 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Transmit 6.7 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
190	0.00	60.70	-10.00	123.44
195	0.00	63.85	-10.00	123.44
200	0.00	67.12	-10.00	123.44
205	0.00	70.49	-10.00	123.44
210	0.00	73.95	-10.00	123.44
215	0.00	77.47	-10.00	123.44
220	0.00	81.04	-10.00	123.44
225	0.00	84.64	-10.00	123.44
230	0.00	88.26	-10.00	123.44
235	0.00	91.89	-10.00	123.44
240	0.00	95.51	-10.00	123.44
245	0.00	99.11	-10.00	123.44
250	0.00	102.68	-10.00	123.44
255	0.00	106.20	-10.00	123.44
260	0.00	109.65	-10.00	123.44
265	0.00	113.02	-10.00	123.44
270	0.00	116.29	-10.00	123.44
275	0.00	119.42	-10.00	123.44
280	0.00	122.41	-10.00	123.44
285	0.00	125.21	-10.00	123.44
290	0.00	127.79	-10.00	123.44
295	0.00	130.12	-10.00	123.44
300	0.00	132.14	-10.00	123.44
305	0.00	133.83	-10.00	123.44
310	0.00	135.14	-10.00	123.44
315	0.23	136.25	-10.00	120.88
320	0.42	136.90	-10.00	106.73
325	0.52	136.99	-10.00	100.00
330	0.57	136.56	-10.00	100.00
335	0.58	135.65	-10.00	100.00
340	0.61	134.33	-10.00	100.00
345	0.30	132.32	-10.00	116.80
350	0.00	130.03	-10.00	123.44
355	0.00	127.69	-10.00	123.44

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
Engineer III, Telecommunications
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, Va. 20147

DATED: July 26, 2013