

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
Harte Satellite Consultants
CLARKSVILLE, TN
Satellite Earth Station

Prepared By:
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147
August 26, 2021

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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 05/12/2021.

Company

3G Wireless, LLC
4SIWI, LLC
ABG Wireless, LLC
Advanced Broadband Capshaw LLC
Advantage Cellular Systems, Inc.
Aerial Video Systems
Alabama, State of Dept of Transportation
Alascom Inc
Ameren Services Company
American Internet & Communications
American Municipal Power, Inc
Antilles Wireless LLC
Arkansas State Police
Ascent Media Network Services, LLC
AT&T Mobility Spectrum LLC - Indiana
AT&T Mobility Spectrum LLC -IL/WI Mkts
Bellsouth Telecommunications, Inc.
Big River Broadband, LLC
Big Rivers Electric Corporation
BLIP Networks, LLC
Blue Mule Wireless
Bluegrass Network LLC
BluegrassNet
Borgeson, Tom R.
BreezeAir Networks LLC
Brentwood, City of (TN)
Broadband on Demand, LLC
Broadcast Sports Inc.
Bspeedy Wireless, Inc.
Bullitt County Emergency Services
Business Only Broadband, LLC
Cape Girardeau Fire Dept., City of
Cape Girardeau, County of
Carolina Telephone and Telegraph Co
Casper, John
Cellco Partnership - AL/SC
Cellco Partnership - IN & KY Mkts
Cellco Partnership - Indiana
Cellco Partnership - Tennessee
CenturyTel of the Southwest, Inc.

Chattanooga MSA Limited Partnership - GA
Chattanooga MSA Ltd Partnership -TN, KY
Chicago Comnet Corp
Cincinnati Bell Wireless LLC
City of Chattanooga
City of Clarksville
City of Elizabethtown
City of Gallatin
City of Shelbyville Public Works Dept
Citywide News Network, Inc.
Clearwire Spectrum Holdings II, LLC
Clearwire Spectrum Holdings III, LLC
Cocke County E911 Communications Dist
Community Wireless of Charlestown, LLC.
Contact Network, Inc.
Conterra Ultra Broadband, LLC
Cowboys Stadium LP
Cumberland Cellular Partnership
Cumberland County, TN
Cumulus Licensing LLC
DCI II, INC.
Direct Broadcast Services, Inc.
E. Ritter Communications Holdings LLC
East Gibson Schools
East Kentucky Power Cooperative, Inc.
Fastnet Wireless, LLC
FDF Communications, Inc.
FiberX LLC
First Hop
Forked Deer Electric Cooperative
Franklin County Of
Frontier California Inc.
Gallatin Public Utilities
Gentry Mechanical
Global Telecom & Technology Americas, In
Grundy, County of
Hallco Unlimited, Inc.
Hardin Memorial Hospital
Hawaiian Telecom Inc.
Heiden, William
Helix Technologies, Inc.
Henderson, City of (Kentucky)
HF Enterprises, Inc
Hoosier Energy Rec, Inc.
Huntsville Hospital System
Illinois Bell Telephone Company
Indiana Bell Telephone Company
Indiana, State of (IPSC)
Information & Display Systems, Inc.
Information Super Station, LLC
Inter-County Energy Cooperative Corp
International Communications Group, Inc.
Jenkins, Micheal H
JTM Broadband, LLC
Kenergy Corporation
Kentucky RSA #3 Cellular General Partner

Kentucky RSA #4 Cellular General Partner
Kentucky Utilities Company
Knox County Emergency Comm District
Knoxville Utilities Board
Lebanon City Fire Dept
Lewisport Telephone Company
Louisville Gas & Electric Company
Louisville Metro Government EMA/Metrosaf
Madison County Communications District
Madison County Sheriff Dept
Memphis, City - Communications Maintenanc
MERCURY COMMUNICATIONS
Meredith Corp Television Station WSMV-TV
Metropolitan Hartsville/Trousdale County
Michigan Bell Telephone Company
Middle Tennessee Electric Membership Cor
Monster Broadband, Inc
Moreen, Steven K
Navajo Communications Company
NetsurfUSA, Inc.
New Cingular Wireless PCS LLC - AL, MS
New Cingular Wireless PCS LLC - Indiana
New Cingular Wireless PCS LLC - KY
New Cingular Wireless PCS LLC - TN
New Cingular Wireless PCS, LLC - AR
New Cingular Wireless PCS, LLC - IL
New Cingular Wireless PCS, LLC - KS, MO
NEW ENGLAND DIGITAL DISTRIBUTION, INC.
Nexstar Media Inc.
Northstar Network Services, LLC
NorthWest Suburbs Community Access Corp
NSM Surveillance
Ohio Bell GTelephone Company
Olympic Wireless, LLC
Onboard Images
Orange County REMC
Outernet Broadband LLC
Pacific Bell Tel Com dba AT&T California
Paducah Television License LLC
Peachy Networks LLC
Penn Service Microwave Co., Inc.
Perry-Spencer Communications, Inc.
Plateau Telecommunications, Inc.
Plum TV, LLC
Production & Satellite Services, Inc.
Proxim Wireless Corporation
Quick Link Connections Inc.
Quickrelay Wireless Communications
Qwest Corporation
Q-Wireless, LLC
Radio Communications Systems, Inc.
Radiofone, Inc.
Randy Hermes Production
Raytheon Missile Systems
RCC Minnesota Inc. - MN NE ND SD
Remote Broadcasts, Inc.

REMOTE FACILITIES CONSULTING SERVICES

RF Central, LLC
RF Film, Inc
Ridgenet Network Group
River City Wireless, Inc
Rockwood Electric Utility
Rural Connect, LLC
Rutherford County, TN
Sevier County Emergency Comm District
SI Wireless, LLC
SkyFiNet, LLC
SmartSky Microwave, LLC
SM-WKHT, LLC
Southern Company Services, Inc.
Southern Illinois Power Cooperative
Southwestern Bell Telephone L.P.
Speedshotz, Inc
Sprint Spectrum LLC
Sprintcom, Inc
Startouch, Inc.
Stonecom Cookeville, LLC
Sumner County Emergency Management Agenc
Teach, Inc.
Tele-Page, Inc.
Tennessee Dept. Of Safety & Homeland Sec
Tennessee RSA No. 3 Limited Partnership
Tennessee Wireless, LLC
Texas Eastern Communications, LLC
T-Mobile License LLC
Traveller, Inc.
Tristate Internet
TTWN Networks, LLC
Unisat, Inc.
United Communications, Inc.
United Telephone - Southeast
University of Tennessee
US Cellular Operating Co. of Knoxville
US Cellular Telephone Co-Grtr Knoxville
Vanderburgh, County of
Velocity Internet & Technology, LLC
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 SOUTH INC.
Verizon Virginia, Inc.
Verizon Washington DC, Inc.
Verizon Wireless (VAW) LLC - Alabama
Verizon Wireless (VAW) LLC - Arkansas
Verizon Wireless (VAW) LLC- IN & KY Mkts
Verizon Wireless (VAW) LLC- Tennessee
Verizon Wireless Tennessee Partnership
VYVX, LLC

W.A.T.C.H. TV Company Inc.
Warrick Community School Corporation
Weigel Broadcasting Company
West Wilson Utility District
Westar Satellite Services LP
White County 911
Williamson County Joint Comm Auth
Winged Vision Inc
Wisconsin Bell Telephone Company
Wisper II, LLC
Wisper ISP, LLC
WispWave LLC
Wolfe Air Aviation
WUXP Licensee, LLC
WZTV Licensee, LLC
Xiber, LLC
Zayo Group, LLC
Zito Media Communications LLC

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: 05/12/2021
Job Number: 210512COMSGE09

Administrative Information

Status: ENGINEER PROPOSAL
Call Sign:
Licensee Code: HARSAT
Licensee Name: Harte Satellite Consultants

Site Information CLARKSVILLE, TN

Venue Name:
Latitude (NAD 83): 36° 35' 16.1" N
Longitude (NAD 83): 87° 16' 11.9" W
Climate Zone: A
Rain Zone: 1
Ground Elevation (AMSL): 158.39 m / 519.6 ft

Link Information

Satellite Type: Geostationary
Mode: TR - Transmit-Receive
Modulation: Digital
Satellite Arc: 15° W to 160° West Longitude
Azimuth Range: 100.8° to 259.5°
Corresponding Elevation Angles: 5.5° / 5.1°
Antenna Centerline (AGL): 1.49 m / 4.9 ft

Antenna Information

Receive - FCC32

Transmit - FCC32

Manufacturer	TTI	TTI
Model	27E01-1000-A	27E01-1000-A
Gain / Diameter	30.1 dBi / 0.45 m	30.6 dBi / 0.45 m
3-dB / 15-dB Beamwidth	4.40° / 9.00°	3.9° / 7.6°
Max Available RF Power (dBW/4 kHz)	-20.1	-20.1
(dBW/MHz)	3.9	3.9
Maximum EIRP (dBW/4 kHz)	10.5	10.5
(dBW/MHz)	34.5	34.5
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 11.0 GHz

Transmit 13.0 GHz

Emission / Frequency Range (MHz)	25M0G7W / 10700.0 - 10950.0 25M0G7W / 11200.0 - 11450.0	7M00G7W / 12750.0 - 13250.0
Max Great Circle Coordination Distance	388.2 km / 241.2 mi	171.4 km / 106.5 mi
Precipitation Scatter Contour Radius	669.3 km / 415.9 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

CLARKSVILLE, TN

Licensee Name Harte Satellite Consultants
Latitude (NAD 83) 36° 35' 16.1" N
Longitude (NAD 83) 87° 16' 11.9" W
Ground Elevation (AMSL) 158.39 m / 519.6 ft
Antenna Centerline (AGL) 1.49 m / 4.9 ft
Antenna Model TTI 0.45 meter
Antenna Mode Receive 11.0 GHz Transmit 13.0 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 -20.1 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 11.0 GHz		Transmit 13.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	100.46	-10.00	231.37	-10.00	101.03
5	0.21	95.77	-10.00	230.84	-10.00	100.63
10	0.25	90.79	-10.00	226.93	-10.00	100.00
15	0.00	85.81	-10.00	231.37	-10.00	101.03
20	0.00	80.83	-10.00	231.37	-10.00	101.03
25	0.00	75.86	-10.00	231.37	-10.00	101.03
30	0.00	70.88	-10.00	231.37	-10.00	101.03
35	0.21	65.90	-10.00	230.22	-10.00	100.15
40	0.22	60.93	-10.00	229.08	-10.00	100.00
45	0.27	55.95	-10.00	224.63	-10.00	100.00
50	0.24	50.99	-10.00	227.41	-10.00	100.00
55	0.27	46.02	-9.57	226.75	-9.57	100.00
60	0.29	41.06	-8.34	229.80	-8.34	100.00
65	0.24	36.13	-6.95	241.65	-6.95	105.61
70	0.00	31.23	-5.36	253.00	-5.36	112.19
75	0.00	26.33	-3.51	262.28	-3.51	116.77
80	0.00	21.47	-1.30	273.85	-1.30	122.33
85	0.00	16.70	1.43	288.88	1.43	129.33
90	0.00	12.10	4.93	306.89	4.93	137.70
95	0.00	7.98	9.45	340.07	9.45	152.28
100	0.00	5.55	13.39	380.70	13.39	168.35
105	0.00	6.92	11.00	353.08	11.00	157.83
110	0.00	10.62	6.35	316.48	6.35	141.99
115	0.00	14.48	2.98	294.77	2.98	132.17
120	0.00	18.27	0.46	283.41	0.46	126.81
125	0.00	21.99	-1.55	272.49	-1.55	121.68
130	0.21	25.45	-3.14	262.83	-3.14	116.70
135	0.22	28.92	-4.53	254.80	-4.53	112.50
140	0.28	32.19	-5.69	243.15	-5.69	105.26
145	0.30	35.29	-6.69	236.18	-6.69	101.14
150	0.32	38.15	-7.54	230.41	-7.54	100.00
155	0.36	40.70	-8.24	224.07	-8.24	100.00
160	0.44	42.85	-8.80	214.17	-8.80	100.00
165	0.39	44.71	-9.26	217.01	-9.26	100.00
170	0.45	46.00	-9.57	210.20	-9.57	100.00
175	0.64	46.64	-9.72	201.15	-9.72	100.00
180	0.55	47.00	-9.80	204.98	-9.80	100.00
185	0.51	46.77	-9.75	204.88	-9.75	100.00

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Coordination Values

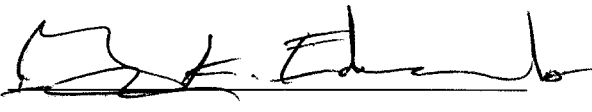
CLARKSVILLE, TN

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Antenna Centerline (AGL)	1.49 m / 4.9 ft				
Antenna Model	TTI 0.45 meter				
Antenna Mode	Receive 11.0 GHz		Transmit 13.0 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			-20.1 (dBW/4 kHz)		

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 11.0 GHz		Transmit 13.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.54	45.91	-9.55	204.34	-9.55	100.00
195	0.57	44.55	-9.22	204.35	-9.22	100.00
200	0.57	42.74	-8.77	205.69	-8.77	100.00
205	0.53	40.55	-8.20	210.12	-8.20	100.00
210	0.61	37.92	-7.47	209.20	-7.47	100.00
215	0.66	35.03	-6.61	210.45	-6.61	100.00
220	0.61	31.95	-5.61	216.94	-5.61	100.00
225	0.73	28.57	-4.40	216.36	-4.40	100.00
230	0.61	25.19	-3.03	229.13	-3.03	100.00
235	0.51	21.65	-1.39	242.26	-1.39	100.00
240	0.38	18.03	0.60	265.15	0.60	113.03
245	0.22	14.34	3.09	295.84	3.09	130.55
250	0.00	10.61	6.35	316.54	6.35	142.02
255	0.00	6.82	11.16	354.46	11.16	158.42
260	0.00	5.15	14.20	388.16	14.20	171.44
265	0.00	7.51	10.10	345.43	10.10	154.57
270	0.00	11.67	5.32	309.45	5.32	138.85
275	0.00	16.31	1.69	290.34	1.69	130.00
280	0.00	21.11	-1.11	274.86	-1.11	122.81
285	0.00	25.98	-3.36	263.03	-3.36	117.14
290	0.00	30.89	-5.24	253.59	-5.24	112.48
295	0.00	35.82	-6.85	245.82	-6.85	108.56
300	0.00	40.77	-8.26	239.16	-8.26	105.18
305	0.00	45.73	-9.50	233.55	-9.50	102.21
310	0.00	50.69	-10.00	231.37	-10.00	101.03
315	0.00	55.66	-10.00	231.37	-10.00	101.03
320	0.00	60.63	-10.00	231.37	-10.00	101.03
325	0.00	65.61	-10.00	231.37	-10.00	101.03
330	0.00	70.58	-10.00	231.37	-10.00	101.03
335	0.00	75.56	-10.00	231.37	-10.00	101.03
340	0.00	80.54	-10.00	231.37	-10.00	101.03
345	0.22	85.52	-10.00	229.76	-10.00	100.00
350	0.00	90.50	-10.00	231.37	-10.00	101.03
355	0.00	95.48	-10.00	231.37	-10.00	101.03

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: August 26, 2021