FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
Microsoft Infrastructure Group, LLC
QUINCY, WA
Satellite Earth Station

Prepared By:
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147
June 30, 2020

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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, with the exception of cases identified with shared band Broadcast receive sites at the KNDU “Jump Off Joe” receivers. Multiple attempts were made to contact the SBE coordinator for this location during the coordination period, but no response was received. Although this case missed the objective by 16 dB after terrain pathloss, it is expected that above ground clutter would account for this remaining shortfall to margin.

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 05/22/2020.

Company
3G Wireless, LLC
Aerial Video Systems
Apple Valley Broadcasting Inc.
Borgeson, Tom R.
Broadcast Sports Inc.
Casper, John
CenturyTel of the Southwest, Inc.
Chicago Comnet Corp
Cincinnati Bell Wireless LLC
Citywide News Network, Inc.
Cowboys Stadium LP
DCI II, INC.
Direct Broadcast Services, Inc.
Frontier California Inc.
Global Telecom & Technology Americas, In
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
KHQ, Incorporated
KIRO-TV, Inc
Kentucky RSA #3 Cellular General Partner
Kentucky RSA #4 Cellular General Partner
King Broadcasting Company
King Broadcasting Company - KREM TV
MERCURY COMMUNICATIONS
Mountain Licenses, L.P.
NEW ENGLAND DIGITAL DISTRIBUTION, INC.
NSM Surveillance
Onboard Images
Pacific Bell Tel Com dba AT&T California
Production & Satellite Services, Inc.
REMOTE FACILITIES CONSULTING SERVICES
RF Film, Inc
Radiofone, Inc.
Randy Hermes Production

SBE Coordinator
Sinclair Seattle Licensee, LLC
Sinclair Yakima Licensee, LLC (WA)
Speedshotz, Inc
Spokane Television Inc.
TTWN Networks, LLC
The CW Television Stations Inc.
Unisat, Inc.
Vyvx, LLC
Winged Vision Inc
Wisconsin Bell Telephone Company
Wolfe Air Aviation

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:	06/25/2020
Job Number:	200522COMSGE03

Administrative Information

Status	ENGINEER PROPOSAL
Call Sign	
Licensee Code	MICIG
Licensee Name	Microsoft Infrastructure Group, LLC

Site Information — QUINCY, WA

Venue Name	
Latitude (NAD 83)	47° 14' 22.0" N
Longitude (NAD 83)	119° 53' 5.5" W
Climate Zone	A
Rain Zone	5
Ground Elevation (AMSL)	406.05 m / 1332.2 ft

Link Information

Satellite Type	Low Earth Orbit
Mode	TO - Transmit-Only
Modulation	Digital
Minimum Elevation Angle	5.0°
Azimuth Range	0.0° to 360°
Antenna Centerline (AGL)	2.74 m / 9.0 ft

Antenna Information — Transmit - FCC32

Manufacturer		Comtech
Model		T361SXUHFR
Gain / Diameter		37.5 dBi / 6.1 m
3-dB / 15-dB Beamwidth		0.50° / 1.00°
Max Available RF Power	(dBW/4 kHz)	11.1
	(dBW/MHz)	35.1
Maximum EIRP	(dBW/4 kHz)	48.6
	(dBW/MHz)	72.6
Interference Objectives:	Long Term	-154.0 dBW/4 kHz 20%
	Short Term	-131.0 dBW/4 kHz 0.0025%

Frequency Information — Transmit 2.0 GHz

Emission / Frequency Range (MHz)	10K0G7D - 5M00G7D / 2025.0 - 2110.0
Max Great Circle Coordination Distance	334.9 km / 208.1 mi
Precipitation Scatter Contour Radius	187.5 km / 116.5 mi

COMSEARCH

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Coordination Values	**QUINCY, WA**	
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Ground Elevation (AMSL)	406.05 m / 1332.2 ft	
Antenna Centerline (AGL)	2.74 m / 9.0 ft	
Antenna Model	Comtech 6.1 meter	
Antenna Mode	Transmit 2.0 GHz	
Interference Objectives: Long Term	-154.0 dBW/4 kHz	20%
Short Term	-131.0 dBW/4 kHz	0.0025%
Max Available RF Power	11.1 (dBW/4 kHz)	

Transmit 2.0 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	69.83	-1.00	334.90
5	0.00	65.50	-1.00	334.90
10	0.00	61.22	-1.00	334.90
15	0.00	57.00	-1.00	334.90
20	0.00	52.87	-1.00	334.90
25	0.00	48.86	-1.00	334.90
30	0.00	44.98	-1.00	334.90
35	0.00	41.30	-1.00	334.90
40	0.00	37.86	-1.00	334.90
45	0.00	34.73	-1.00	334.90
50	0.00	32.03	-1.00	334.90
55	0.00	29.85	-1.00	334.90
60	0.00	28.32	-1.00	334.90
65	0.00	27.56	-1.00	334.90
70	0.00	27.62	-1.00	334.90
75	0.00	28.50	-1.00	334.90
80	0.00	30.14	-1.00	334.90
85	0.00	32.40	-1.00	334.90
90	0.00	35.18	-1.00	334.90
95	0.00	38.35	-1.00	334.90
100	0.00	41.83	-1.00	334.90
105	0.00	45.55	-1.00	334.90
110	0.00	49.45	-1.00	334.90
115	0.00	53.48	-1.00	334.90
120	0.00	57.62	-1.00	334.90
125	0.00	61.85	-1.00	334.90
130	0.00	66.14	-1.00	334.90
135	0.00	70.48	-1.00	334.90
140	0.00	74.86	-1.00	334.90
145	0.00	79.26	-1.00	334.90
150	0.00	83.68	-1.00	334.90
155	0.00	88.11	-1.00	334.90
160	0.00	92.55	-1.00	334.90
165	0.00	96.98	-1.00	334.90
170	0.00	101.40	-1.00	334.90
175	0.00	105.80	-1.00	334.90
180	0.00	110.17	-1.00	334.90
185	0.00	114.50	-1.00	334.90

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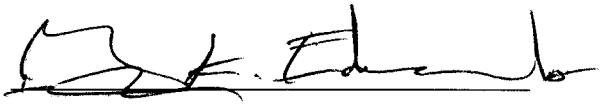
Antenna Mode	Transmit 2.0 GHz
Interference Objectives: Long Term	-154.0 dBW/4 kHz 20%
Short Term	-131.0 dBW/4 kHz 0.0025%
Max Available RF Power	11.1 (dBW/4 kHz)

		Transmit 2.0 GHz		
Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.00	118.78	-1.00	334.90
195	0.00	123.00	-1.00	334.90
200	0.00	127.13	-1.00	334.90
205	0.00	131.14	-1.00	334.90
210	0.00	135.02	-1.00	334.90
215	0.00	138.70	-1.00	334.90
220	0.00	142.14	-1.00	334.90
225	0.00	145.27	-1.00	334.90
230	0.00	147.97	-1.00	334.90
235	0.00	150.15	-1.00	334.90
240	0.00	151.68	-1.00	334.90
245	0.00	152.44	-1.00	334.90
250	0.00	152.38	-1.00	334.90
255	0.00	151.50	-1.00	334.90
260	0.00	149.86	-1.00	334.90
265	0.00	147.60	-1.00	334.90
270	0.00	144.82	-1.00	334.90
275	0.00	141.65	-1.00	334.90
280	0.00	138.17	-1.00	334.90
285	0.00	134.45	-1.00	334.90
290	0.00	130.55	-1.00	334.90
295	0.00	126.52	-1.00	334.90
300	0.00	122.38	-1.00	334.90
305	0.00	118.15	-1.00	334.90
310	0.00	113.86	-1.00	334.90
315	0.00	109.52	-1.00	334.90
320	0.00	105.14	-1.00	334.90
325	0.00	100.74	-1.00	334.90
330	0.00	96.32	-1.00	334.90
335	0.00	91.89	-1.00	334.90
340	0.00	87.45	-1.00	334.90
345	0.00	83.02	-1.00	334.90
350	0.00	78.60	-1.00	334.90
355	0.00	74.20	-1.00	334.90

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
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19700 Janelia Farm Boulevard
Ashburn, VA 20147

DATED: June 25, 2020