

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
Learfield Communications Inc.
JEFFERSON CITY, MO
(4.8 meter)
Satellite Earth Station

Prepared By:
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147
June 14, 2019

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.

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 06/06/2019.

Company

Ameren Services Company
Cellco Partnership - Missouri
KCP&L Greater Missouri Operations Co
Kansas City Power & Light Company
Missouri RSA 11/12 Limited Partnership
Missouri RSA 8 Limited Partnership
Missouri, State of
New Cingular Wireless PCS, LLC - KS, MO
Panhandle Eastern Pipe Line Company, L.P
St. Charles County Government, MO
T-Mobile License LLC
USCOC of Greater Missouri, LLC
Verizon Wireless (VAW) LLC (KS,MO,MN)
Washington County Central Dispatch 911
Wisper Mo No. 2 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: 06/14/2019
Job Number: 190606COMSGE04

Administrative Information

Status ENGINEER PROPOSAL
Call Sign E5184
Licensee Code ZLEARF
Licensee Name Learfield Communications Inc.

Site Information

JEFFERSON, MO
Venue Name
Latitude (NAD 83) 38° 34' 52.1" N
Longitude (NAD 83) 92° 15' 16.7" W
Climate Zone A
Rain Zone 2
Ground Elevation (AMSL) 237.74 m / 780.0 ft

Link Information

Satellite Type Geostationary
Mode TR - Transmit-Receive
Modulation Digital
Satellite Arc 70° W to 145° West Longitude
Azimuth Range 146.7° to 244.6°
Corresponding Elevation Angles 39.7° / 20.1°
Antenna Centerline (AGL) 2.74 m / 9.0 ft

Antenna Information

		Receive - FCC32		Transmit - FCC32	
Manufacturer		GD Satcom		GD Satcom	
Model		4.8 meter		4.8 meter	
Gain / Diameter		44.2 dBi / 4.8 m		48.1 dBi / 4.8 m	
3-dB / 15-dB Beamwidth		1.17° / 2.00°		0.78° / 1.56°	
Max Available RF Power	(dBW/4 kHz) (dBW/MHz)			-15.0 9.0	
Maximum EIRP	(dBW/4 kHz) (dBW/MHz)			33.1 57.1	
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)	2M50G7W - 4M00G7W / 3700.0 - 4200.0	4M00G7W / 5925.0 - 6425.0
Max Great Circle Coordination Distance	298.5 km / 185.5 mi	134.4 km / 83.5 mi
Precipitation Scatter Contour Radius	503.5 km / 312.8 mi	100.0 km / 62.1 mi

COMSEARCH

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Coordination Values

JEFFERSON, MO

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Latitude (NAD 83) 38° 34' 52.1" N
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Antenna Centerline (AGL) 2.74 m / 9.0 ft
Antenna Model GD Satcom 4.8 meter
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 -15.0 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 4.0 GHz		Transmit 6.1 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
0	1.16	113.92	-10.00	215.38	-10.00	100.00
5	0.57	118.47	-10.00	245.18	-10.00	102.86
10	0.46	123.05	-10.00	254.30	-10.00	109.27
15	0.42	121.03	-10.00	259.09	-10.00	112.61
20	0.43	117.60	-10.00	257.65	-10.00	111.61
25	0.36	114.02	-10.00	265.65	-10.00	117.12
30	0.37	110.37	-10.00	264.23	-10.00	116.15
35	0.00	106.56	-10.00	285.28	-10.00	130.16
40	0.00	102.80	-10.00	285.28	-10.00	130.16
45	0.00	99.01	-10.00	285.28	-10.00	130.16
50	0.00	95.18	-10.00	285.28	-10.00	130.16
55	0.20	91.34	-10.00	284.77	-10.00	129.83
60	0.59	87.46	-10.00	244.22	-10.00	102.16
65	0.75	83.57	-10.00	234.03	-10.00	100.00
70	0.96	79.68	-10.00	222.56	-10.00	100.00
75	0.00	76.03	-10.00	285.28	-10.00	130.16
80	0.00	72.29	-10.00	285.28	-10.00	130.16
85	0.00	68.62	-10.00	285.28	-10.00	130.16
90	0.00	65.02	-10.00	285.28	-10.00	130.16
95	0.00	61.52	-10.00	285.28	-10.00	130.16
100	0.00	58.15	-10.00	285.28	-10.00	130.16
105	0.20	54.82	-10.00	285.11	-10.00	130.05
110	0.31	51.70	-10.00	271.03	-10.00	120.75
115	0.00	49.10	-10.00	285.28	-10.00	130.16
120	0.00	46.56	-9.70	287.19	-9.70	130.96
125	0.00	44.34	-9.17	290.61	-9.17	132.38
130	0.00	42.50	-8.71	293.62	-8.71	133.63
135	0.00	41.08	-8.34	296.05	-8.34	133.37
140	0.00	40.13	-8.09	297.74	-8.09	134.06
145	0.00	39.69	-7.97	298.54	-7.97	134.40
150	0.00	39.77	-7.99	298.39	-7.99	134.33
155	0.00	40.37	-8.15	297.31	-8.15	133.89
160	0.00	41.47	-8.44	295.37	-8.44	133.09
165	0.00	42.99	-8.83	292.81	-8.83	133.29
170	0.21	44.06	-9.10	289.14	-9.10	131.33
175	0.00	45.05	-9.34	289.50	-9.34	131.92
180	0.00	45.32	-9.41	289.08	-9.41	131.75
185	0.34	44.71	-9.26	272.67	-9.26	120.74

COMSEARCH

Earth Station Data Sheet

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

Coordination Values

JEFFERSON, MO

Licensee Name	Learfield Communications Inc.			
Latitude (NAD 83)	38° 34' 52.1" N			
Longitude (NAD 83)	92° 15' 16.7" W			
Ground Elevation (AMSL)	237.74 m / 780.0 ft			
Antenna Centerline (AGL)	2.74 m / 9.0 ft			
Antenna Model	GD Satcom 4.8 meter			
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			-15.0 (dBW/4 kHz)	

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 4.0 GHz		Transmit 6.1 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.27	44.01	-9.09	282.76	-9.09	127.16
195	0.21	42.79	-8.78	291.83	-8.78	132.59
200	0.44	40.88	-8.29	266.94	-8.29	115.36
205	0.79	38.49	-7.63	245.40	-7.63	100.00
210	1.27	35.68	-6.81	228.53	-6.81	100.00
215	1.62	32.70	-5.86	222.58	-5.86	100.00
220	1.67	29.72	-4.83	226.65	-4.83	100.00
225	3.15	25.50	-3.16	202.53	-3.16	100.00
230	3.38	22.05	-1.59	205.58	-1.59	100.00
235	3.54	19.07	-0.01	208.25	-0.01	100.00
240	3.62	17.08	1.19	213.15	1.19	100.00
245	3.78	16.30	1.70	212.55	1.70	100.00
250	3.88	17.04	1.21	207.81	1.21	100.00
255	3.93	19.12	-0.04	202.72	-0.04	100.00
260	4.35	21.86	-1.49	188.02	-1.49	100.00
265	3.28	26.18	-3.45	198.37	-3.45	100.00
270	3.15	30.19	-5.00	193.42	-5.00	100.00
275	2.96	34.46	-6.43	190.35	-6.43	100.00
280	2.73	38.90	-7.75	188.82	-7.75	100.00
285	2.80	43.33	-8.92	181.51	-8.92	100.00
290	2.83	47.87	-10.00	175.39	-10.00	100.00
295	3.53	52.32	-10.00	157.72	-10.00	100.00
300	3.54	57.00	-10.00	157.39	-10.00	100.00
305	3.32	61.75	-10.00	162.30	-10.00	100.00
310	3.02	66.53	-10.00	171.08	-10.00	100.00
315	2.53	71.32	-10.00	182.29	-10.00	100.00
320	2.82	76.05	-10.00	175.71	-10.00	100.00
325	2.49	80.83	-10.00	183.30	-10.00	100.00
330	2.22	85.60	-10.00	189.55	-10.00	100.00
335	2.14	90.36	-10.00	191.39	-10.00	100.00
340	1.88	95.11	-10.00	197.72	-10.00	100.00
345	1.67	99.84	-10.00	203.31	-10.00	100.00
350	1.40	104.55	-10.00	208.30	-10.00	100.00
355	1.00	109.21	-10.00	220.36	-10.00	100.00

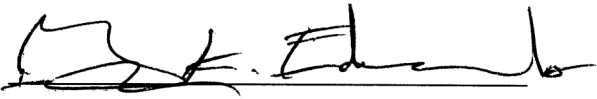
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(703)726-5500 <http://www.comsearch.com>

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: June 14, 2019

COMSEARCH

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FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

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Learfield Communications Inc.
JEFFERSON CITY, MO
(10 meter)
Satellite Earth Station

Prepared By:
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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.

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Missouri RSA 11/12 Limited Partnership
Missouri RSA 8 Limited Partnership
Missouri, State of
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Panhandle Eastern Pipe Line Company, L.P
St. Charles County Government, MO
T-Mobile License LLC
USCOC of Greater Missouri, LLC
USCOC of Missouri RSA #5, Inc.
Verizon Wireless (VAW) LLC (KS,MO,MN)
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Wisper Mo No. 2 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.

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Date: 06/14/2019
Job Number: 190606COMSGE03

Administrative Information

Status ENGINEER PROPOSAL
Call Sign E5184
Licensee Code ZLEARF
Licensee Name Learfield Communications Inc.

Site Information

JEFFERSON, MO
Venue Name
Latitude (NAD 83) 38° 34' 52.1" N
Longitude (NAD 83) 92° 15' 16.7" W
Climate Zone A
Rain Zone 2
Ground Elevation (AMSL) 237.74 m / 780.0 ft

Link Information

Satellite Type Geostationary
Mode TR - Transmit-Receive
Modulation Analog
Satellite Arc 70° W to 145° West Longitude
Azimuth Range 146.7° to 244.6°
Corresponding Elevation Angles 39.7° / 20.1°
Antenna Centerline (AGL) 5.49 m / 18.0 ft

Antenna Information

		Receive - FCC32		Transmit - FCC32	
Manufacturer		Scientific-Atlanta		Scientific-Atlanta	
Model		8015		8015	
Gain / Diameter		51.2 dBi / 10.0 m		54.4 dBi / 10.0 m	
3-dB / 15-dB Beamwidth		0.60° / 1.20°		0.60° / 1.20°	
Max Available RF Power	(dBW/4 kHz) (dBW/MHz)			-14.5 9.5	
Maximum EIRP	(dBW/4 kHz) (dBW/MHz)			39.9 63.9	
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)	1M50G7W - 4M00G7W / 3700.0 - 4200.0	1M50G7W - 4M00G7W / 5925.0 - 6425.0
Max Great Circle Coordination Distance	298.5 km / 185.5 mi	135.8 km / 84.4 mi
Precipitation Scatter Contour Radius	503.5 km / 312.8 mi	100.0 km / 62.1 mi

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Antenna Centerline (AGL) 5.49 m / 18.0 ft
Antenna Model Scientific-Atlanta 10 meter
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 -14.5 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 4.0 GHz		Transmit 6.1 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	113.74	-10.00	285.28	-10.00	131.50
5	0.00	118.36	-10.00	285.28	-10.00	131.50
10	0.00	122.94	-10.00	285.28	-10.00	131.50
15	0.00	120.83	-10.00	285.28	-10.00	131.50
20	0.00	117.41	-10.00	285.28	-10.00	131.50
25	0.00	113.88	-10.00	285.28	-10.00	131.50
30	0.00	110.26	-10.00	285.28	-10.00	131.50
35	0.00	106.56	-10.00	285.28	-10.00	131.50
40	0.00	102.80	-10.00	285.28	-10.00	131.50
45	0.00	99.01	-10.00	285.28	-10.00	131.50
50	0.00	95.18	-10.00	285.28	-10.00	131.50
55	0.00	91.33	-10.00	285.28	-10.00	131.50
60	0.31	87.47	-10.00	271.93	-10.00	122.69
65	0.47	83.60	-10.00	252.60	-10.00	109.39
70	0.68	79.72	-10.00	238.51	-10.00	100.00
75	0.00	76.03	-10.00	285.28	-10.00	131.50
80	0.00	72.29	-10.00	285.28	-10.00	131.50
85	0.00	68.62	-10.00	285.28	-10.00	131.50
90	0.00	65.02	-10.00	285.28	-10.00	131.50
95	0.00	61.52	-10.00	285.28	-10.00	131.50
100	0.00	58.15	-10.00	285.28	-10.00	131.50
105	0.00	54.93	-10.00	285.28	-10.00	131.50
110	0.00	51.90	-10.00	285.28	-10.00	131.50
115	0.00	49.10	-10.00	285.28	-10.00	131.50
120	0.00	46.56	-9.70	287.19	-9.70	132.31
125	0.00	44.34	-9.17	290.61	-9.17	133.73
130	0.00	42.50	-8.71	293.62	-8.71	133.73
135	0.00	41.08	-8.34	296.05	-8.34	134.74
140	0.00	40.13	-8.09	297.74	-8.09	135.45
145	0.00	39.69	-7.97	298.54	-7.97	135.79
150	0.00	39.77	-7.99	298.39	-7.99	135.73
155	0.00	40.37	-8.15	297.31	-8.15	135.27
160	0.00	41.47	-8.44	295.37	-8.44	134.46
165	0.00	42.99	-8.83	292.81	-8.83	133.39
170	0.00	44.26	-9.15	290.73	-9.15	133.78
175	0.00	45.05	-9.34	289.50	-9.34	133.27
180	0.00	45.32	-9.41	289.08	-9.41	133.10
185	0.28	44.77	-9.27	279.38	-9.27	126.56

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
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Coordination Values

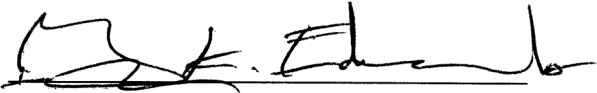
JEFFERSON, MO

Licensee Name	Learfield Communications Inc.			
Latitude (NAD 83)	38° 34' 52.1" N			
Longitude (NAD 83)	92° 15' 16.7" W			
Ground Elevation (AMSL)	237.74 m / 780.0 ft			
Antenna Centerline (AGL)	5.49 m / 18.0 ft			
Antenna Model	Scientific-Atlanta 10 meter			
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			-14.5 (dBW/4 kHz)	

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 4.0 GHz		Transmit 6.1 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.20	44.07	-9.10	290.53	-9.10	133.58
195	0.00	42.99	-8.83	292.81	-8.83	133.39
200	0.00	41.26	-8.39	295.73	-8.39	134.61
205	0.42	38.80	-7.72	273.36	-7.72	120.13
210	0.90	35.98	-6.90	243.14	-6.90	100.00
215	1.25	32.99	-5.96	233.96	-5.96	100.00
220	1.14	30.12	-4.97	243.58	-4.97	100.00
225	2.04	26.31	-3.50	223.09	-3.50	100.00
230	2.27	22.89	-1.99	225.83	-1.99	100.00
235	2.42	20.03	-0.54	230.58	-0.54	100.00
240	2.73	17.94	0.65	230.45	0.65	100.00
245	2.75	17.34	1.03	232.28	1.03	100.00
250	2.77	18.10	0.56	228.70	0.56	100.00
255	2.82	20.06	-0.56	220.93	-0.56	100.00
260	3.23	22.66	-1.88	204.75	-1.88	100.00
265	2.17	26.87	-3.73	218.58	-3.73	100.00
270	2.08	30.76	-5.20	213.10	-5.20	100.00
275	2.12	34.85	-6.55	205.44	-6.55	100.00
280	2.18	39.11	-7.81	200.81	-7.81	100.00
285	2.24	43.52	-8.97	193.87	-8.97	100.00
290	2.27	48.03	-10.00	188.25	-10.00	100.00
295	2.41	52.58	-10.00	185.08	-10.00	100.00
300	2.43	57.22	-10.00	184.72	-10.00	100.00
305	2.21	61.94	-10.00	189.82	-10.00	100.00
310	1.90	66.68	-10.00	197.17	-10.00	100.00
315	1.42	71.45	-10.00	207.84	-10.00	100.00
320	1.70	76.14	-10.00	202.53	-10.00	100.00
325	1.38	80.89	-10.00	209.09	-10.00	100.00
330	1.10	85.63	-10.00	217.11	-10.00	100.00
335	1.05	90.36	-10.00	218.60	-10.00	100.00
340	1.07	95.08	-10.00	218.12	-10.00	100.00
345	0.86	99.79	-10.00	227.98	-10.00	100.00
350	0.29	104.45	-10.00	274.34	-10.00	124.30
355	0.44	109.14	-10.00	256.34	-10.00	112.02

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: June 14, 2019