

APPLICATION FOR CONSTRUCTION PERMIT

K216GL - JONESBORO, ARKANSAS
FACILITY ID: 82546
91.1 MHz / 127 W ERP DA

FAMILY STATIONS, INC.

OCTOBER, 2017

APPLICATION FOR CONSTRUCTION PERMIT

The following engineering statement and attached exhibits have been prepared for **Family Stations, Inc.** ("Family Stations"), licensee of FM translator station K216GL at Jonesboro, Arkansas, and are in support of their application for construction permit.¹ This application is being filed to relocate the facility, and make other related changes to the technical parameters of the facility, including the primary station.

K216GL is licensed to operate on FM channel 216 with an effective radiated power of 10 Watts vertically polarized at a center of radiation of 191 meters above mean sea level utilizing a non-directional antenna. The proposed facility would continue to operate on channel 216, but the maximum effective radiated power would be increased to 127 Watts. A circularly polarized directional antenna is proposed for use, with a specified center of radiation of 238.3 meters above mean sea level. The specified maximum effective radiated power is due to the use of the directional antenna.

The primary station for the facility would be changed to KWCV at Walnut Ridge, Arkansas.² Exhibit E-1 provides a comparison between the KWCV 60 dBu service contour and the proposed 60 dBu service contour for the proposed facility. This map demonstrates that the translator contour would be located outside of the primary facility contour. The proposed facility therefore does not qualify as a fill-in translator for KWCV.³

¹ The Facility ID for K216GL at Jonesboro, Arkansas is 82546.

² The Facility ID for KWCV at Walnut Ridge, Arkansas is 175725.

³ All contours and related terrain calculations are based on appropriate samples of the GLOBE terrain database.

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The proposed maximum effective radiated power for K216GL complies with the power and height requirements of Section 74.1235 of the Commission's Rules. The proposed facility would utilize a directional antenna. The following table summarizes the antenna height above average terrain, and effective radiated power for the twelve cardinal translator radials.

Azimuth	HAAT (m)	ERP (W)	Az. MERP (W)
0	135.1	14	140
30	133.8	95	140
60	149.2	115	115
90	161.7	35	92
120	156.8	2	115
150	155.2	4	115
180	161.5	2	92
210	161.4	3	92
240	162.1	4	92
270	157.1	2	115
300	153.8	4	115
330	152.7	3	115

As previously stated, this application proposes a relocation of K216GL. Exhibit E-2 provides a comparison between the licensed and proposed K216GL 60 dBu service contours. As this map demonstrates, there is a large area of overlap between the proposed and licensed service contours confirming the proposal is a minor change.

The proposed facility complies with the provisions of Section 74.1204 of the Commission's Rules. Exhibit E-3 is a tabular interference study for the proposed facility. This study demonstrates that the contour overlap provisions of Section 74.1204 of the Commission's Rules would be met by the proposed facility to all relevant authorizations with the exception of KAOG at

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Jonesboro, Arkansas.⁴ This facility operates third adjacent to the proposed translator, and the situation between it and the proposed translator will be considered under the provisions of Section 74.1204(d). The tabular interference study is graphically illustrated in Exhibits E-4 and E-5.

Although normally prohibited contour overlap would exist between the proposed facility and KAOG, no interference is predicted to occur within any populated region. Exhibit E-6 illustrates the proposed K216GL transmitter site along with the KAOG 87.4 dBu F(50,50) service contour. As demonstrated by this map, this service contour intersects the proposed translator site. Since KAOG is third adjacent to the translator, interference to the full power facility would potentially occur in regions where there the field strength of the translator is at least 40 dB above the KAOG field strength. Specifically, this includes regions of at least 127.4 dBu.

The power density for the interfering field strength is given by the following equation:

$$S = \frac{E^2}{Z_0}$$

In this equation, S represents the calculated power density in Watts per square meter, E is the electric field intensity, and Z_0 is the characteristic impedance of free space of 377 ohms.

The power density is also given by:

$$S = \frac{P}{4\pi R^2}$$

⁴ The Facility ID for KAOG at Jonesboro, Arkansas is 1673.

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Where S is the same units, P is the total power in Watts and R is the distance from the antenna. Rearranging the terms in the equation, it can be solved for the distance to the desired power density as follows:

$$R^2 = \frac{P}{4\pi S}$$

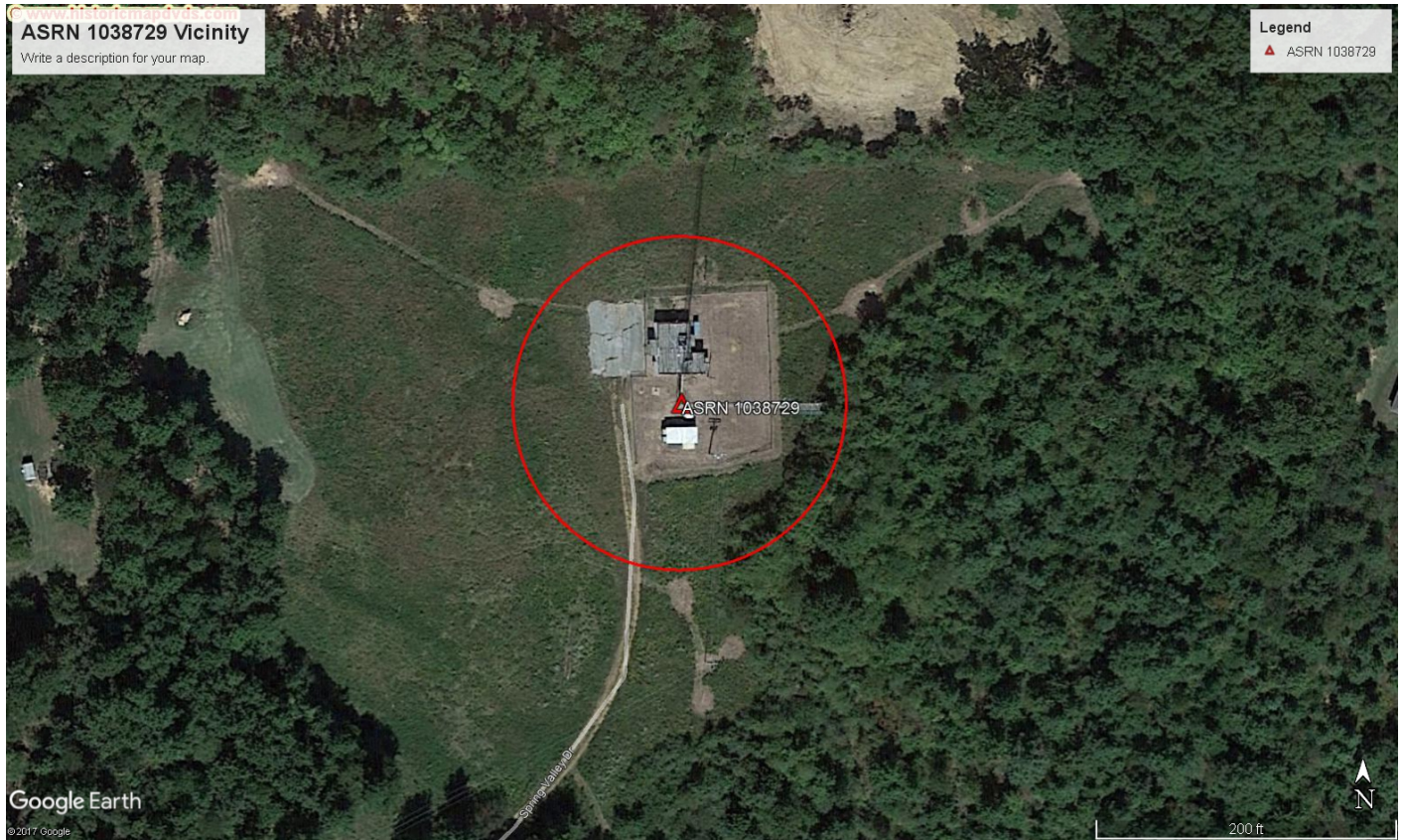
The results of these calculations for depression angles of 0 degrees to 90 degrees are tabulated in Exhibit E-7. The values listed for the relative field at the various depression angles were obtained from published manufacturer data for the proposed antenna. The listed radii values on this tabulation indicate the boundary of the potential interference region at 50 degrees true, which is the azimuth of the maximum ERP in the horizontal plane. As indicated in the tabulation, the potential interference region is confined to a radius of 33.7 meters from the antenna, and is no closer to the site elevation than 97 meters above ground level.

The following satellite image illustrates the tower proposed for use by K216GL. Drawn on this image is a circle representing the 33.7 meters radius from the antenna discussed in the previous paragraph. As indicated, this radius does not intersect any structures other than the transmitter building, and as was previously stated, the interference region is no closer to the site elevation than 97 meters above ground level.

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The proposed facility would comply with the television channel six interference provisions of Section 74.1205 of the Commission's Rules. There are no full-power television channel six facilities within the affected distance. A study of the Commission's database indicates that WPGF-LP at Memphis, Tennessee is located 106.3 kilometers from the proposed transmitter site.⁵ Exhibit E-8 illustrates the translator 80 dBu F(50,10) contour and the WPGF-LP 47 dBu F(50,50) contour. As is demonstrated, there is no overlap between these two contours.

The proposed facility would not constitute a significant environmental impact, and is exempt from environmental processing. The translator antenna would utilize an existing structure that is registered with the Commission. The addition of the translator antenna to this registered structure would not increase the existing environmental impact already present from the structure.

⁵ The Facility ID for WPGF-LP at Memphis, Tennessee is 23848.

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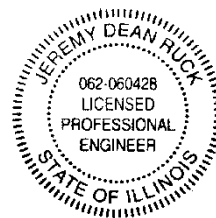
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In addition, the proposed facility would not constitute a radiofrequency radiation hazard to persons at the site. Using the equations in *OET Bulletin 65*, and assuming uniform radiation in all directions, the calculated power density at two meters above ground is $0.73 \mu\text{W}/\text{cm}^2$. This value complies with the uncontrolled environment condition of the Commission's safety standard, and is sufficiently low to categorically exclude the facility.

Family Stations certifies that it will coordinate with all other users of the site to ensure that workers and other persons are not exposed to levels of radiofrequency radiation in excess of the applicable safety standards. Coordination activities will include, but are not necessarily limited to, a reduction in transmitter power or cessation of operation.

The preceding statement and attached exhibits have been prepared by me, or under my direction, and are true and accurate to the best of my belief and knowledge.



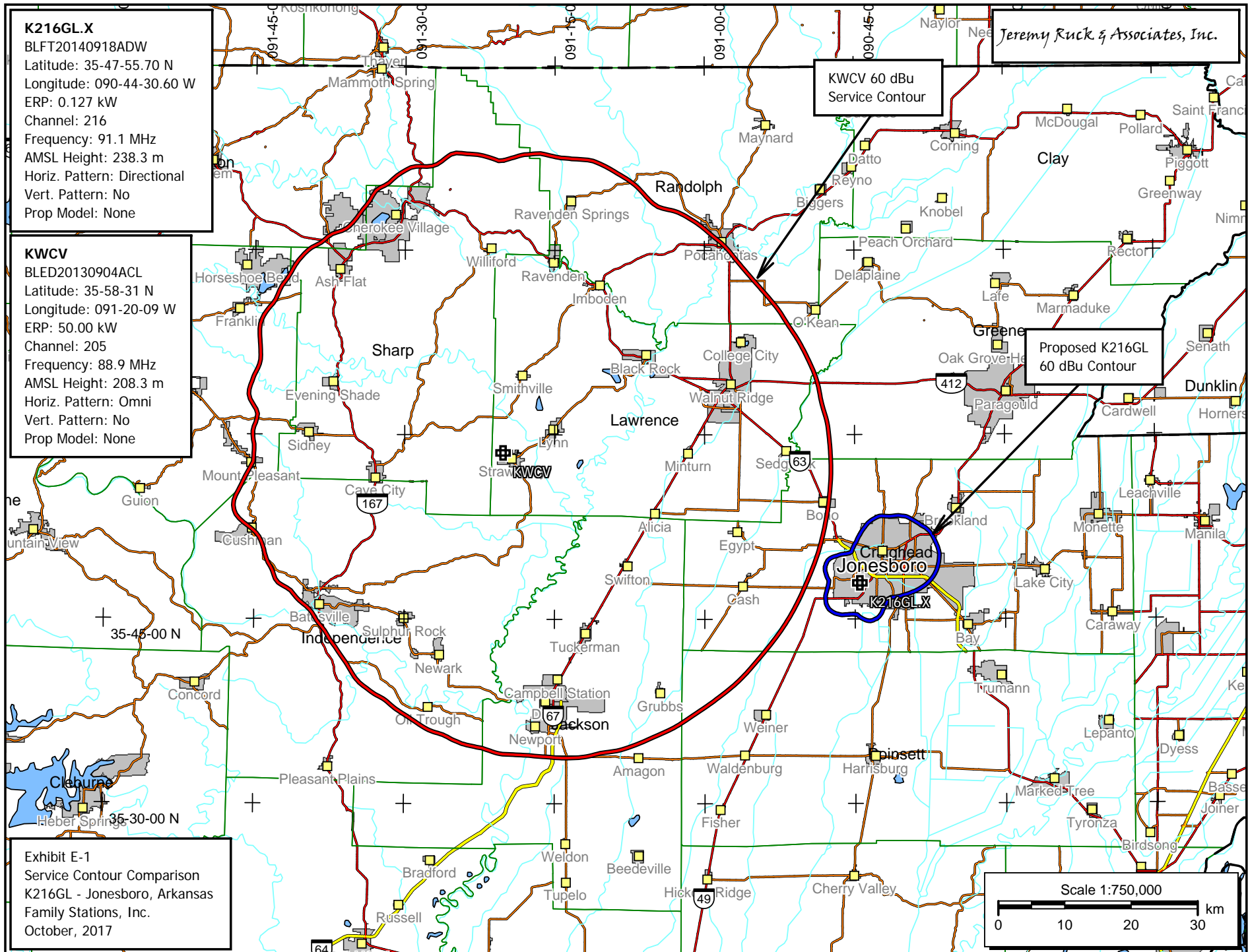
Above signature is digitized copy of actual signature
License Expires November 30, 2019

Jeremy D. Ruck, PE
October 4, 2017

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K216GL.X

BLFT20140918ADW
Latitude: 35-47-55.70 N
Longitude: 090-44-30.60 W
ERP: 0.127 kW
Channel: 216
Frequency: 91.1 MHz
AMSL Height: 238.3 m
Horiz. Pattern: Directional
Vert. Pattern: No
Prop Model: None

K216GL

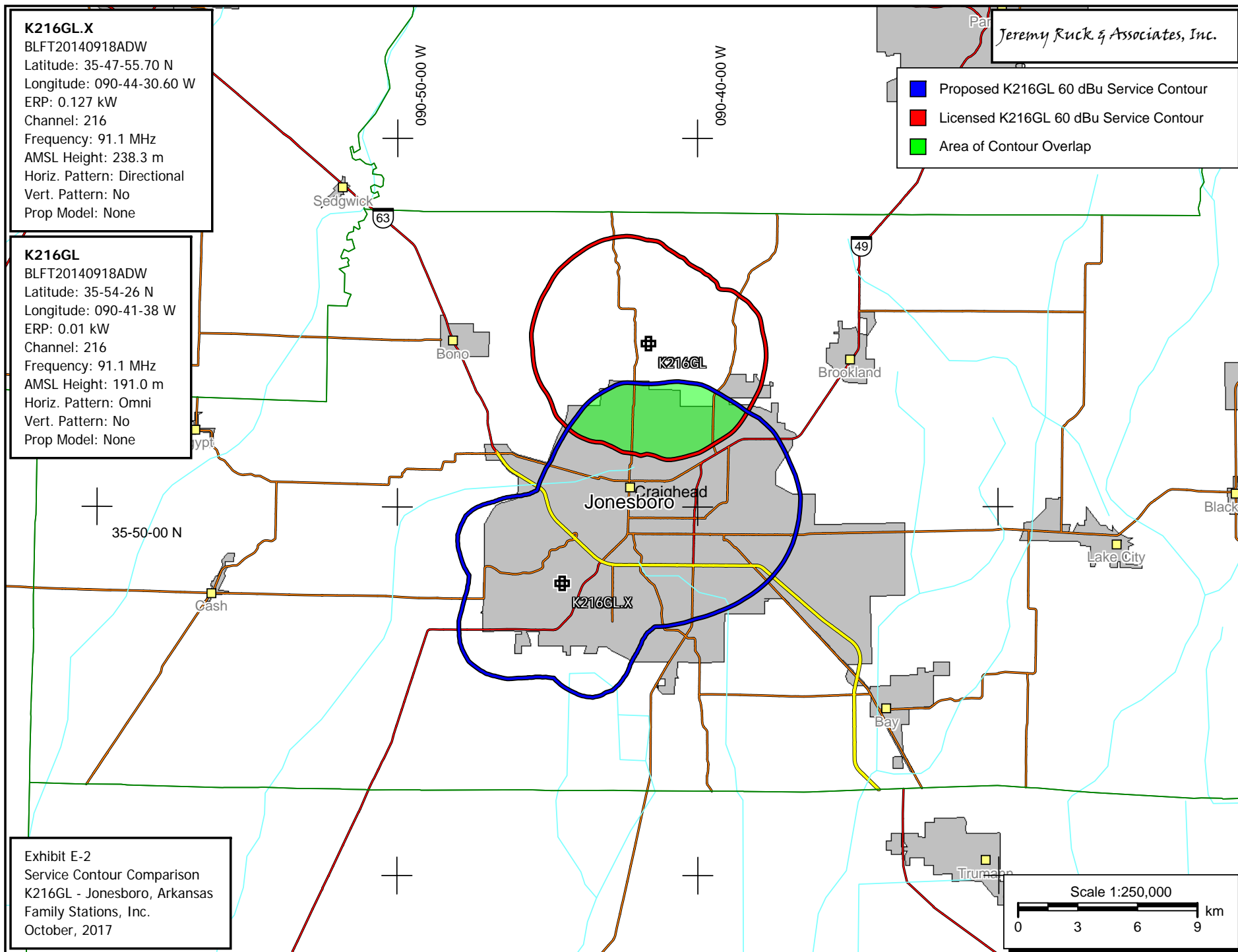
BLFT20140918ADW
Latitude: 35-54-26 N
Longitude: 090-41-38 W
ERP: 0.01 kW
Channel: 216
Frequency: 91.1 MHz
AMSL Height: 191.0 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

Jeremy Ruck & Associates, Inc.

- Proposed K216GL 60 dBu Service Contour
- Licensed K216GL 60 dBu Service Contour
- Area of Contour Overlap

Exhibit E-2
Service Contour Comparison
K216GL - Jonesboro, Arkansas
Family Stations, Inc.
October, 2017

Scale 1:250,000
0 3 6 9 km



Jeremy Ruck & Associates, Inc.
Consulting Engineers - Canton, Illinois

Exhibit E-3 - Tabular Interference Study
K216GL - Jonesboro, Arkansas
CH# 216D - 91.1 MHz, Pwr= 0.127 kW DA, HAAT= 143.4 M, COR= 228.3 M
Average Protected F(50-50)= 13.0 km
Standard Directional

REFERENCE
35 47 56.0 N.
90 44 31.0 W.

DISPLAY DATES
DATA 10-04-17
SEARCH 10-04-17

CH CITY	CALL	TYPE STATE	ANT	AZI <--	DIST FILE #	LAT LNG	PWR(kW) HAAT(M)	INT(km) COR(M)	PRO(km) LICENSEE	*IN* (Overlap in km)	*OUT*
216C1 Memphis	WKNO-FM	LIC _C_ TN		130.5 311.0	109.91 BLED20010418AAF	35 09 14.0 89 49 19.0	100.000 175	159.6 268	62.0 Mid-south Public Communica	-57.0*	31.9
216D Jonesboro	K216GL	LIC _V_ AR		19.8 199.8	12.79 BLFT20140918ADW	35 54 26.0 90 41 38.0	0.010	19.9 191	5.5 Family Stations, Inc.	-17.3*	-32.4*
213C2 Jonesboro	KAOG	LIC DC_ AR		281.0 101.0	6.48 BLED20000127AAM	35 48 36.0 90 48 45.0	40.000 121	3.0 200	30.5 American Family Associatio	-1.6	-24.1*
218D Jonesboro	K218DE	LIC _V_ AR		19.8 199.8	12.79 BLFT20010919AAN	35 54 26.0 90 41 38.0	0.250 91	1.1 186	11.8 Calvary Chapel Of Twin Fal	1.3	0.3
269C2 Walnut Ridge	KIYS	LIC ZCX AR		13.9 193.9	17.71 BLH20100916ACV	35 57 14.0 90 41 41.0	10.500 327	23.5 426	15.8 East Arkansas Broadcasters	14.5R	3.2M
215C3 Newark	KLLN	LIC _CN AR		262.7 82.3	63.92 BLED19860116KD	35 43 25.0 91 26 40.0	4.000 139	48.5 236	32.2 Cedar Ridge School Distric	10.1	24.7
218A Forrest City	KSIP	LIC DCX AR		185.9 5.9	69.20 BLED20130327AOC	35 10 47.0 90 49 15.0	5.500 104	2.4 180	25.5 Speak Onit Radio, Inc.	61.5	43.4
6 Memphis	-- WPGF-LP	LI __N TN		127.8 308.3	106.31 BLTVL-20100512AGGJ	35 12 34.0 89 49 01.1	3.000 -999	1.1 296	30.7 31.8R	31.8R	74.5M

Terrain database is GLOBE 30 Sec , R= 73.215 qualifying spacings or FCC minimum Spacings in KM, M= Margin in KM
In & Out distances between contours are shown at closest points. Reference zone= West Zone, Co to 3rd adjacent.
All separation margins (if shown) include rounding.
Ant Column: (D= DA Standard, Z= DA 73.215, N= Not DA 73.215, _= Omni), Polarization (C,H,V,E), Beamtilt(Y,N,X)
***affixed to 'IN' or 'OUT' values = site inside restricted contour.

K216GL.X

BLFT20140918ADW

Latitude: 35-47-55.70 N

Longitude: 090-44-30.60 W

ERP: 0.127 kW

Channel: 216

Frequency: 91.1 MHz

AMSL Height: 238.3 m

Horiz. Pattern: Directional

Vert. Pattern: No

Prop Model: None

Jeremy Ruck & Associates, Inc.

- 60 dBu F(50,50) Service Contour
- 40 dBu F(50,10) Interference Contour
- 54 dBu F(50,10) Interference Contour
- 100 dBu F(50,10) Interference Contour
- KIYS IF Spacing Limit

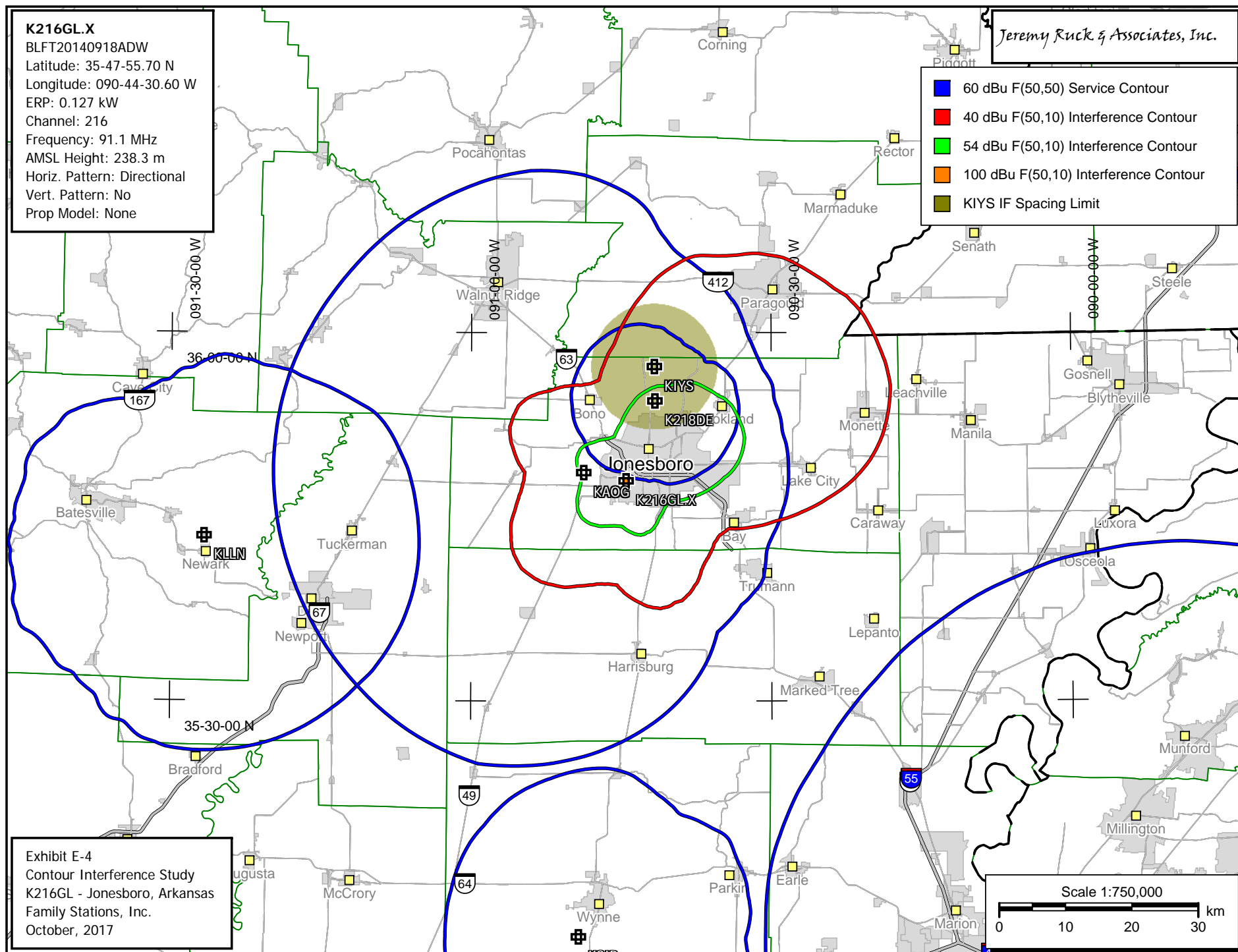


Exhibit E-4
Contour Interference Study
K216GL - Jonesboro, Arkansas
Family Stations, Inc.
October, 2017

Scale 1:750,000

0 10 20 30 km

K216GL.X

BLFT20140918ADW

Latitude: 35-47-55.70 N

Longitude: 090-44-30.60 W

ERP: 0.127 kW

Channel: 216

Frequency: 91.1 MHz

AMSL Height: 238.3 m

Horiz. Pattern: Directional

Vert. Pattern: No

Prop Model: None

Jeremy Ruck & Associates, Inc.

- 60 dBu F(50,50) Service Contour
- 40 dBu F(50,10) Interference Contour
- 54 dBu F(50,10) Interference Contour
- 100 dBu F(50,10) Interference Contour
- KIYS IF Spacing Limit

K216GL 100 dBu
F(50,10) ContourK218DE 60 dBu
F(50,50) ContourK216GL 54 dBu
F(50,10) Contour

Exhibit E-5
Contour Interference Study
K216GL - Jonesboro, Arkansas
Family Stations, Inc.
October, 2017

Scale 1:93,750

0 1 2 3 km

K216GL.X

BLFT20140918ADW
Latitude: 35-47-55.70 N
Longitude: 090-44-30.60 W
ERP: 0.127 kW
Channel: 216
Frequency: 91.1 MHz
AMSL Height: 238.3 m
Horiz. Pattern: Directional
Vert. Pattern: No
Prop Model: None

KAOG

BLED20000127AAM
Latitude: 35-48-36 N
Longitude: 090-48-45 W
ERP: 40.00 kW
Channel: 213
Frequency: 90.5 MHz
AMSL Height: 200.0 m
Horiz. Pattern: Directional
Vert. Pattern: No
Prop Model: None

Exhibit E-6
Interference Study
K216GL - Jonesboro, Arkansas
Family Stations, Inc.
October, 2017

K216GL Proposed
Transmitter Site

FCC F(50-50) 87.40 dBu (FCC HAAT)

K216GL.X

Jeremy Ruck & Associates, Inc.

Scale 1:50,000

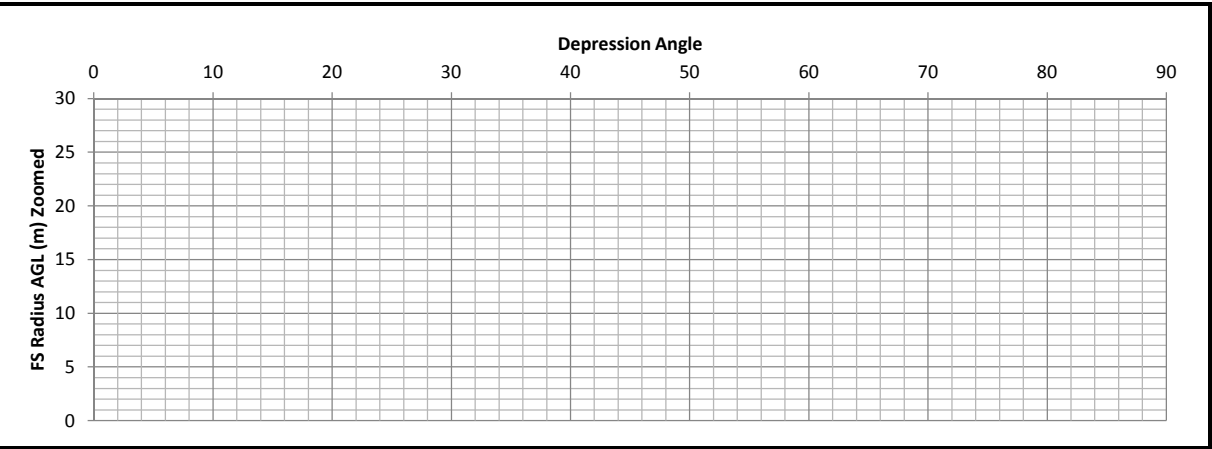
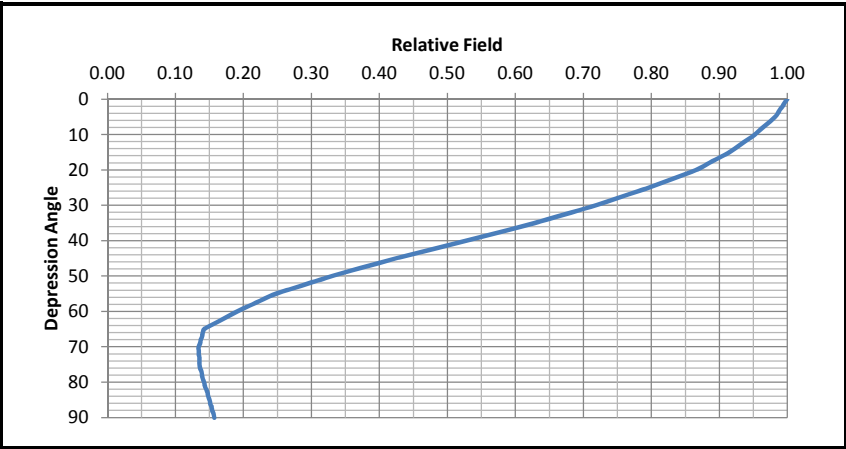
0 0.7 1.4 2.1 km

Exhibit E-7

Proximity Interference Analysis

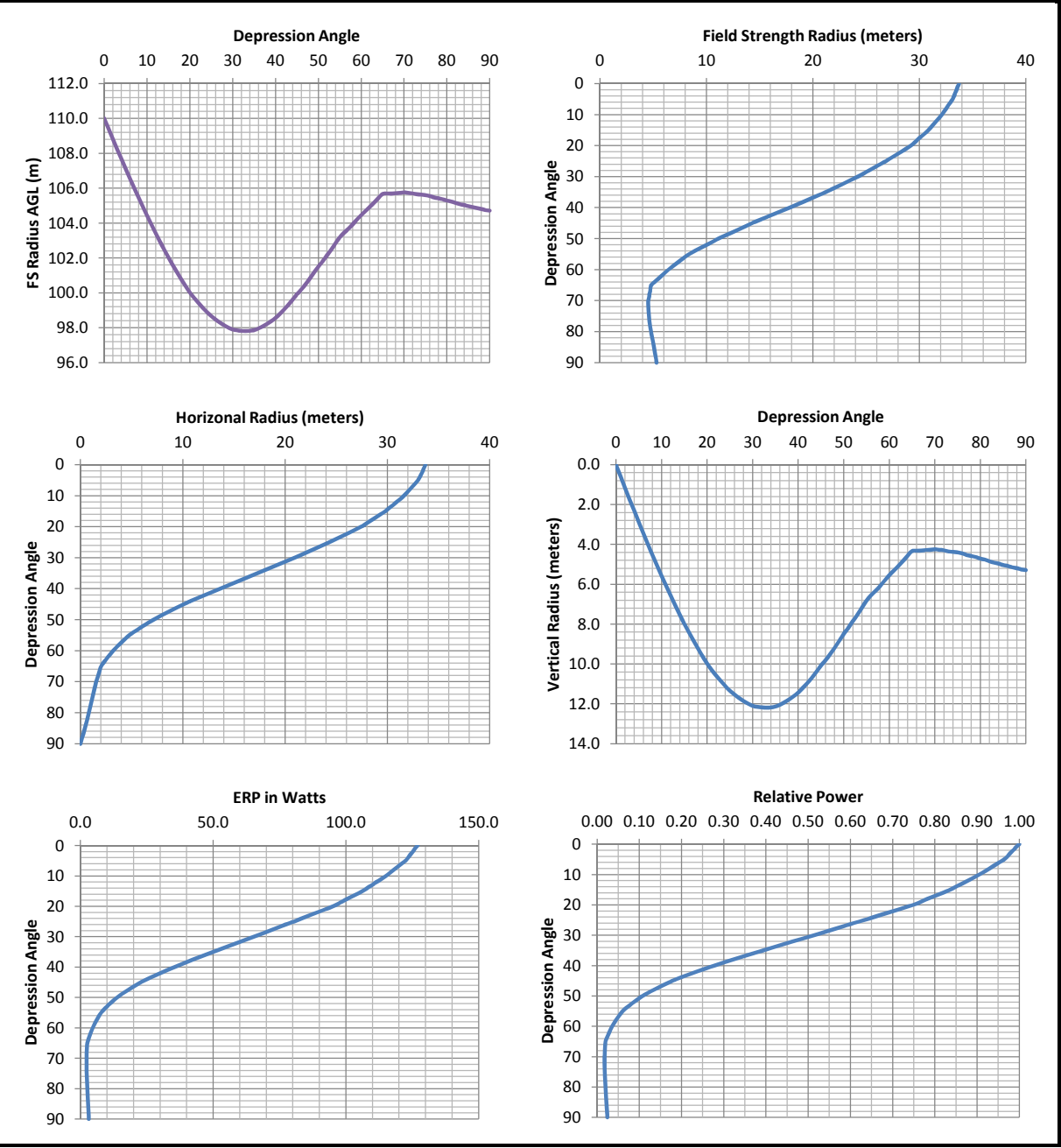
K216GL - Jonesboro, Arkansas

Antenna No:	96	⬆	⬆	Center of Radiation:	110 m AGL
Manufacturer:	Scala	⬆	⬆	Effective Radiated Power:	127 Watts
Model:	CA5-FM-CPRM			FS Contour:	127.4 dBu
Number of Bays:	N/A			E Field Strength:	2.34423 V/m
Bay Spacing:	Log			Z0:	377 Ohms
				Power Density:	0.014576681 W/m^2



Depression Angle	Relative Field	Relative Power	ERP Watts	Radii in meters			
				Field Strength	Horizontal	Vertical	AGL
0	1.0000	1.0000	127.00	33.72	33.72	0.00	110.00
1	0.9960	0.9920	125.99	33.59	33.58	0.59	109.41
2	0.9930	0.9860	125.23	33.48	33.46	1.17	108.83
3	0.9890	0.9781	124.22	33.35	33.30	1.75	108.25
4	0.9860	0.9722	123.47	33.25	33.17	2.32	107.68
5	0.9820	0.9643	122.47	33.11	32.99	2.89	107.11
6	0.9760	0.9526	120.98	32.91	32.73	3.44	106.56
7	0.9700	0.9409	119.49	32.71	32.46	3.99	106.01
8	0.9640	0.9293	118.02	32.51	32.19	4.52	105.48
9	0.9580	0.9178	116.56	32.30	31.91	5.05	104.95
10	0.9520	0.9063	115.10	32.10	31.61	5.57	104.43
11	0.9450	0.8930	113.41	31.87	31.28	6.08	103.92
12	0.9370	0.8780	111.50	31.60	30.91	6.57	103.43
13	0.9300	0.8649	109.84	31.36	30.56	7.05	102.95
14	0.9220	0.8501	107.96	31.09	30.17	7.52	102.48
15	0.9150	0.8372	106.33	30.85	29.80	7.99	102.01
16	0.9050	0.8190	104.02	30.52	29.33	8.41	101.59
17	0.8950	0.8010	101.73	30.18	28.86	8.82	101.18
18	0.8850	0.7832	99.47	29.84	28.38	9.22	100.78
19	0.8760	0.7674	97.46	29.54	27.93	9.62	100.38
20	0.8660	0.7500	95.24	29.20	27.44	9.99	100.01
21	0.8520	0.7259	92.19	28.73	26.82	10.30	99.70
22	0.8380	0.7022	89.18	28.26	26.20	10.59	99.41
23	0.8240	0.6790	86.23	27.79	25.58	10.86	99.14
24	0.8100	0.6561	83.32	27.31	24.95	11.11	98.89
25	0.7960	0.6336	80.47	26.84	24.33	11.34	98.66
26	0.7800	0.6084	77.27	26.30	23.64	11.53	98.47
27	0.7650	0.5852	74.32	25.80	22.98	11.71	98.29
28	0.7490	0.5610	71.25	25.26	22.30	11.86	98.14
29	0.7340	0.5388	68.42	24.75	21.65	12.00	98.00
30	0.7180	0.5155	65.47	24.21	20.97	12.11	97.89
31	0.7000	0.4900	62.23	23.60	20.23	12.16	97.84
32	0.6820	0.4651	59.07	23.00	19.50	12.19	97.81
33	0.6640	0.4409	55.99	22.39	18.78	12.19	97.81
34	0.6460	0.4173	53.00	21.78	18.06	12.18	97.82
35	0.6280	0.3944	50.09	21.18	17.35	12.15	97.85
36	0.6080	0.3697	46.95	20.50	16.59	12.05	97.95
37	0.5880	0.3457	43.91	19.83	15.83	11.93	98.07
38	0.5680	0.3226	40.97	19.15	15.09	11.79	98.21
39	0.5480	0.3003	38.14	18.48	14.36	11.63	98.37
40	0.5280	0.2788	35.41	17.80	13.64	11.44	98.56
41	0.5070	0.2570	32.65	17.10	12.90	11.22	98.78
42	0.4860	0.2362	30.00	16.39	12.18	10.97	99.03
43	0.4650	0.2162	27.46	15.68	11.47	10.69	99.31
44	0.4440	0.1971	25.04	14.97	10.77	10.40	99.60
45	0.4230	0.1789	22.72	14.26	10.09	10.09	99.91

Depression Angle	Relative Field	Relative Power	ERP Watts	Radii in meters			
				Field Strength	Horizontal	Vertical	AGL
45	0.4230	0.1789	22.72	14.26	10.09	10.09	99.91
46	0.4050	0.1640	20.83	13.66	9.49	9.82	100.18
47	0.3860	0.1490	18.92	13.02	8.88	9.52	100.48
48	0.3670	0.1347	17.11	12.38	8.28	9.20	100.80
49	0.3480	0.1211	15.38	11.73	7.70	8.86	101.14
50	0.3290	0.1082	13.75	11.09	7.13	8.50	101.50
51	0.3130	0.0980	12.44	10.55	6.64	8.20	101.80
52	0.2960	0.0876	11.13	9.98	6.15	7.87	102.13
53	0.2800	0.0784	9.96	9.44	5.68	7.54	102.46
54	0.2630	0.0692	8.78	8.87	5.21	7.17	102.83
55	0.2470	0.0610	7.75	8.33	4.78	6.82	103.18
56	0.2350	0.0552	7.01	7.92	4.43	6.57	103.43
57	0.2240	0.0502	6.37	7.55	4.11	6.33	103.67
58	0.2130	0.0454	5.76	7.18	3.81	6.09	103.91
59	0.2010	0.0404	5.13	6.78	3.49	5.81	104.19
60	0.1900	0.0361	4.58	6.41	3.20	5.55	104.45
61	0.1800	0.0324	4.11	6.07	2.94	5.31	104.69
62	0.1710	0.0292	3.71	5.77	2.71	5.09	104.91
63	0.1610	0.0259	3.29	5.43	2.46	4.84	105.16
64	0.1510	0.0228	2.90	5.09	2.23	4.58	105.42
65	0.1420	0.0202	2.56	4.79	2.02	4.34	105.66
66	0.1400	0.0196	2.49	4.72	1.92	4.31	105.69
67	0.1390	0.0193	2.45	4.69	1.83	4.31	105.69
68	0.1370	0.0188	2.38	4.62	1.73	4.28	105.72
69	0.1360	0.0185	2.35	4.59	1.64	4.28	105.72
70	0.1340	0.0180	2.28	4.52	1.55	4.25	105.75
71	0.1340	0.0180	2.28	4.52	1.47	4.27	105.73
72	0.1340	0.0180	2.28	4.52	1.40	4.30	105.70
73	0.1350	0.0182	2.31	4.55	1.33	4.35	105.65
74	0.1350	0.0182	2.31	4.55	1.25	4.38	105.62
75	0.1350	0.0182	2.31	4.55	1.18	4.40	105.60
76	0.1360	0.0185	2.35	4.59	1.11	4.45	105.55
77	0.1380	0.0190	2.42	4.65	1.05	4.53	105.47
78	0.1390	0.0193	2.45	4.69	0.97	4.58	105.42
79	0.1400	0.0196	2.49	4.72	0.90	4.63	105.37
80	0.1420	0.0202	2.56	4.79	0.83	4.72	105.28
81	0.1430	0.0204	2.60	4.82	0.75	4.76	105.24
82	0.1450	0.0210	2.67	4.89	0.68	4.84	105.16
83	0.1470	0.0216	2.74	4.96	0.60	4.92	105.08
84	0.1480	0.0219	2.78	4.99	0.52	4.96	105.04
85	0.1500	0.0225	2.86	5.06	0.44	5.04	104.96
86	0.1510	0.0228	2.90	5.09	0.36	5.08	104.92
87	0.1530	0.0234	2.97	5.16	0.27	5.15	104.85
88	0.1540	0.0237	3.01	5.19	0.18	5.19	104.81
89	0.1560	0.0243	3.09	5.26	0.09	5.26	104.74
90	0.1570	0.0246	3.13	5.29	0.00	5.29	104.71



BLFT20140918ADW
Latitude: 35-47-55.70 N
Longitude: 090-44-30.60 W
ERP: 0.127 kW
Channel: 216
Frequency: 91.1 MHz
AMSL Height: 238.3 m
Horiz. Pattern: Directional
Vert. Pattern: No
Prop Model: None

BLTVL-20100512AGGJ
Latitude: 35-12-33.98 N
Longitude: 089-49-01.09 W
ERP: 3.00 kW
Channel: 6
Frequency: 85.0 MHz
AMSL Height: 296.4 m
Horiz. Pattern: Omni
Vert. Pattern: Yes
Elec Tilt: 0.75
Prop Model: None

Exhibit E-8
Channel Six Interference Study
K216GL - Jonesboro, Arkansas
Family Stations, Inc.
October, 2017

Jeremy Ruck & Associates, Inc.

K216GL 80 dBu
F(50,10) Contour

WPGF-LP 47 dBu
F(50,50) Contour

FCC F(50-50) 47.00 dBu

