

APPLICATION FOR CONSTRUCTION PERMIT

LPFM STATION KSGC-LP
GARDEN CITY, KANSAS
FACILITY ID: 192967

ST. GABRIEL COMMUNICATIONS, INC.

FEBRUARY, 2017

© 2017 JEREMY RUCK & ASSOCIATES, INC.

JEREMY RUCK & ASSOCIATES, INC.

P.O. Box 415
221 S. 1st Avenue
Canton, IL 61520

Tel: 309.647.1200
Fax: 855.332.9537
jeremyruck.com

2.22.2017

APPLICATION FOR CONSTRUCTION PERMIT

The following engineering statement and attached exhibits have been prepared for **St. Gabriel Communications, Inc.** ("Gabriel"), licensee of low-power FM station KSGC-LP at Garden City, Kansas, and are in support of their application for construction permit.¹ This application seeks to relocate the facility to another tower in the vicinity of Garden City, Kansas. No change in the channel of operation is proposed under this application.

Under this application, KSGC-LP would be relocated from its current licensed location to the tower utilized by AM station KGGS at Garden City, Kansas.² The licensee of KGGS, Steckline Communications, Inc. has granted Gabriel permission to utilize KGGS tower. Exhibit E-1 illustrates the licensed and proposed site locations for KGGS. As this map demonstrates, the proposed transmitter site is located within 5.6 kilometers of the licensed site.

The elevation at the site is 2864 feet above mean sea level, which corresponds to 873.0 meters AMSL. The proposed center of radiation is at 199 feet above ground level, or 60.7 meters above ground level. Average terrain for the facility is determined through the following table.³

¹ The Facility ID for KSGC-LP at Garden City, Kansas is 192967.

² The Facility ID for KGGS at Garden City, Kansas is 160947.

³ Terrain data based on an eight radial sample of the Commission's 30-meter terrain database.

JEREMY RUCK & ASSOCIATES, INC.

P.O. Box 415
221 S. 1st Avenue
Canton, IL 61520

Tel: 309.647.1200
Fax: 855.332.9537
jeremyruck.com

Azimuth	Average Elevation	COR Above Average Terrain
0	878.6	55.0
45	877.6	56.3
90	871.0	62.6
135	877.3	56.3
180	886.8	46.8
225	895.7	37.9
270	885.2	48.4
315	889.8	43.8
	Average:	50.9

The proposed center of radiation is therefore located at 50.9 meters above average terrain. Utilizing the Commission' online utility for calculating contour distances, a maximum ERP of 33 Watts results for this elevation. This value is therefore respectfully requested.

The proposed facility would comply with the spacing requirements of Section 73.807 of the Commission's Rules to all facilities with the exception of KGBL at Lakin, Kansas.⁴ KGBL operates on channel 265, second adjacent to KSGC-LP, and as a result, a waiver of Section 73.807 with regard to KGBL is respectfully submitted.

Although the proposed facility would be short spaced to KGBL, no interference to that facility would occur in any populated region. Exhibit E-3 illustrates the proposed KSGC-LP transmitter site along with the KGBL 107.8 dBu service contour. Interference to KGBL would therefore be predicted to potentially occur in regions where the field strength of KSGC-LP is at least 147.8 dBu, or 40 dB above the KGBL field strength.

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

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

⁴ The Facility ID for KGBL at Lakin, Kansas is 170960.

JEREMY RUCK & ASSOCIATES, INC.

P.O. Box 415
221 S. 1st Avenue
Canton, IL 61520

Tel: 309.647.1200
Fax: 855.332.9537
jeremyruck.com

In this equation, S represents the calculated power density in Watts per square meter, E is the electric field intensity, and Z₀ is the characteristic impedance of free space of 377 ohms.

The power density is also given by:

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

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-4 under a worst-case scenario where the LPFM antenna radiates uniformly and at a relative field of 1.0 at all angles in a vertical plane. As this exhibit demonstrates, the predicted interference region is limited, under this worst-case analysis, to a radius of 1.64 meters from the antenna. From this extremely limited radius, it can be reasonably inferred that the potential interference region would intersect any populated region.

There are no FM translators located within 10 kilometers of the proposed site. As a result, the proposed facility would comply with the provisions of Section 73.827 of the Commission's Rules.

The proposed facility would not constitute a significant environmental impact, and is exempt from environmental processing. The proposed facility would utilize an existing tower. The addition

JEREMY RUCK & ASSOCIATES, INC.

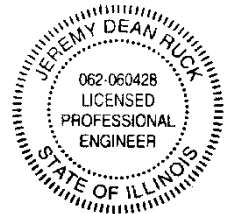
P.O. Box 415
221 S. 1st Avenue
Canton, IL 61520

Tel: 309.647.1200
Fax: 855.332.9537
jeremyruck.com

of the KSGC-LP antenna to this tower would not increase the environmental impact already present from the facility.

Additionally, the KSGC-LP facility would not result in human exposure to radiofrequency radiation in excess of the applicable safety standards. Under a worst-case scenario, the calculated power density at two meters above ground is $0.640 \mu\text{W}/\text{cm}^2$. This value is considerably less than the upper limit permissible under the uncontrolled environment condition, and is sufficiently low to categorically exclude the facility. Gabriel certifies that it will coordinate with all other users of the site to ensure that workers and other personnel 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, 2017

Jeremy D. Ruck, PE
February 22, 2017

JEREMY RUCK & ASSOCIATES, INC.

P.O. Box 415
221 S. 1st Avenue
Canton, IL 61520

Tel: 309.647.1200
Fax: 855.332.9537
jeremyruck.com

2.22.2017

KSGC-LP

BLL20150724ACB
Latitude: 37-59-07.90 N
Longitude: 100-53-55.40 W
ERP: 0.08 kW
Channel: 263
Frequency: 100.5 MHz
AMSL Height: 911.0 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

KSGC-LP.X

BLL20150724ACB
Latitude: 37-58-08.40 N
Longitude: 100-55-54.40 W
ERP: 0.033 kW
Channel: 263
Frequency: 100.5 MHz
AMSL Height: 933.6 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

Jeremy Ruck & Associates, Inc.

KSGC-LP Licensed
Transmitter Site

Circle R = 5.6 km

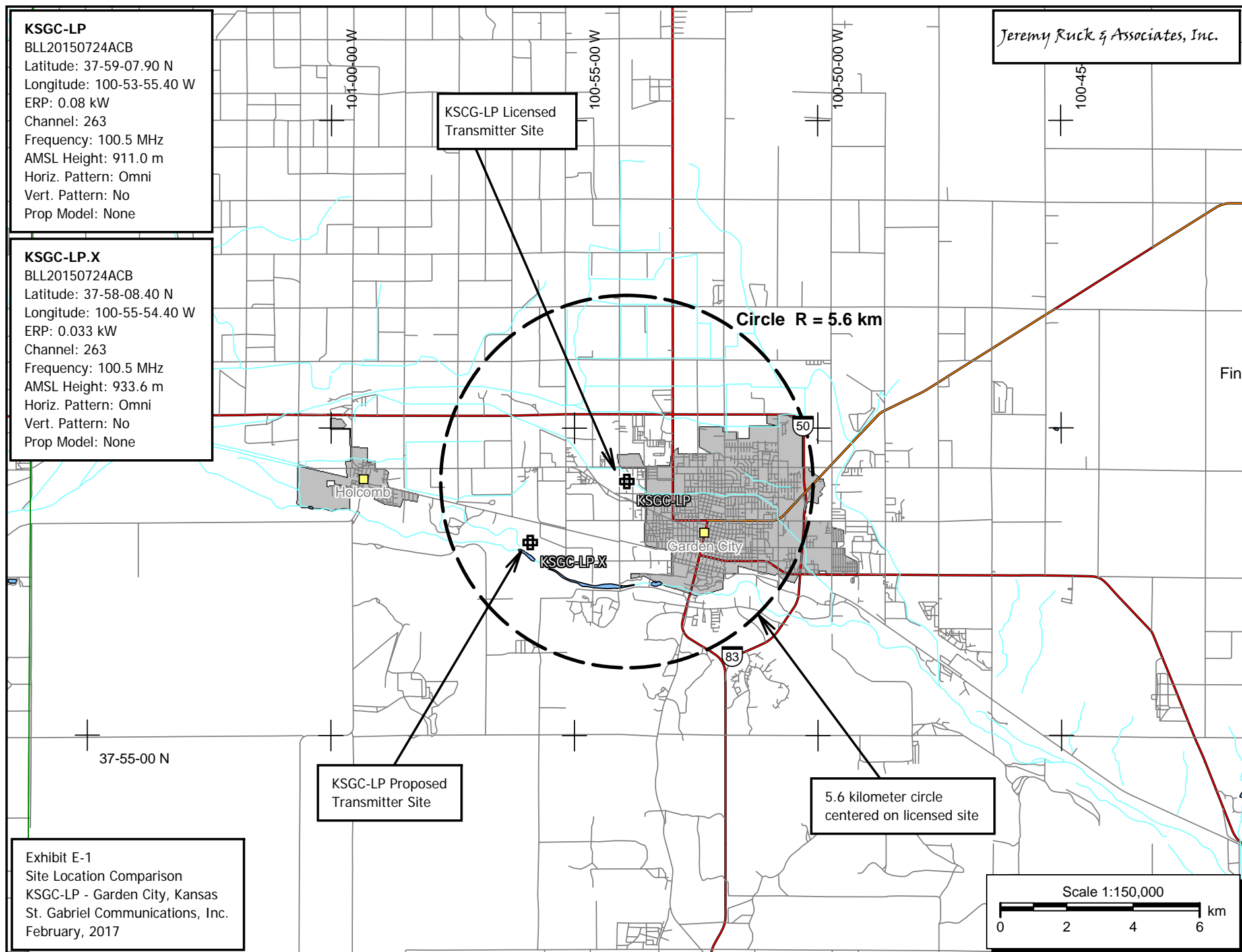
KSGC-LP Proposed
Transmitter Site

5.6 kilometer circle
centered on licensed site

Exhibit E-1
Site Location Comparison
KSGC-LP - Garden City, Kansas
St. Gabriel Communications, Inc.
February, 2017

Scale 1:150,000

0 2 4 6 km



Jeremy Ruck & Associates, Inc.
Consulting Engineers - Canton, Illinois
Exhibit E-2 - Single Channel Spacing Study
KSGC-LP - Garden City, Kansas

REFERENCE		DISPLAY DATES
37 58 08.4 N.	CLASS = L1	DATA 02-22-17
100 55 54.4 W.	Current Spacings to 2nd Adj.	SEARCH 02-22-17
----- Channel 263 - 100.5 MHz -----		

Call	Channel	Location		Azi	Dist	FCC	Margin	
KGBL	LIC	265C1	Lakin	KS	34.2	3.86	72.5	-68.6
KSGC-LP	LIC	263L1	Garden City	KS	57.6	3.43	23.5	-20.1
KQUI-LP	LIC	262L1	Ulysses	KS	221.6	57.15	13.5	43.7

Reference station has protected zone issue: AM tower
All separation margins include rounding

KSGC-LP.X

BLL20150724ACB
Latitude: 37-58-08.40 N
Longitude: 100-55-54.40 W
ERP: 0.033 kW
Channel: 263
Frequency: 100.5 MHz
AMSL Height: 933.6 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

KGBL

BLH20140917AAK
Latitude: 37-59-52 N
Longitude: 100-54-25 W
ERP: 100.00 kW
Channel: 265
Frequency: 100.9 MHz
AMSL Height: 1002.0 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

Jeremy Ruck & Associates, Inc.

KGBL Transmitter Site

KGBL 107.8 dBu
Service Contour

KSGC-LP Proposed
Transmitter Site

FCC F(50-50) 107.80 dBu (FCC HAAT)

Exhibit E-3
Interference Study
KSGC - Garden City, Kansas
St. Gabriel Communications, Inc.
February, 2017

Scale 1:100,000

0 1 2 3 km

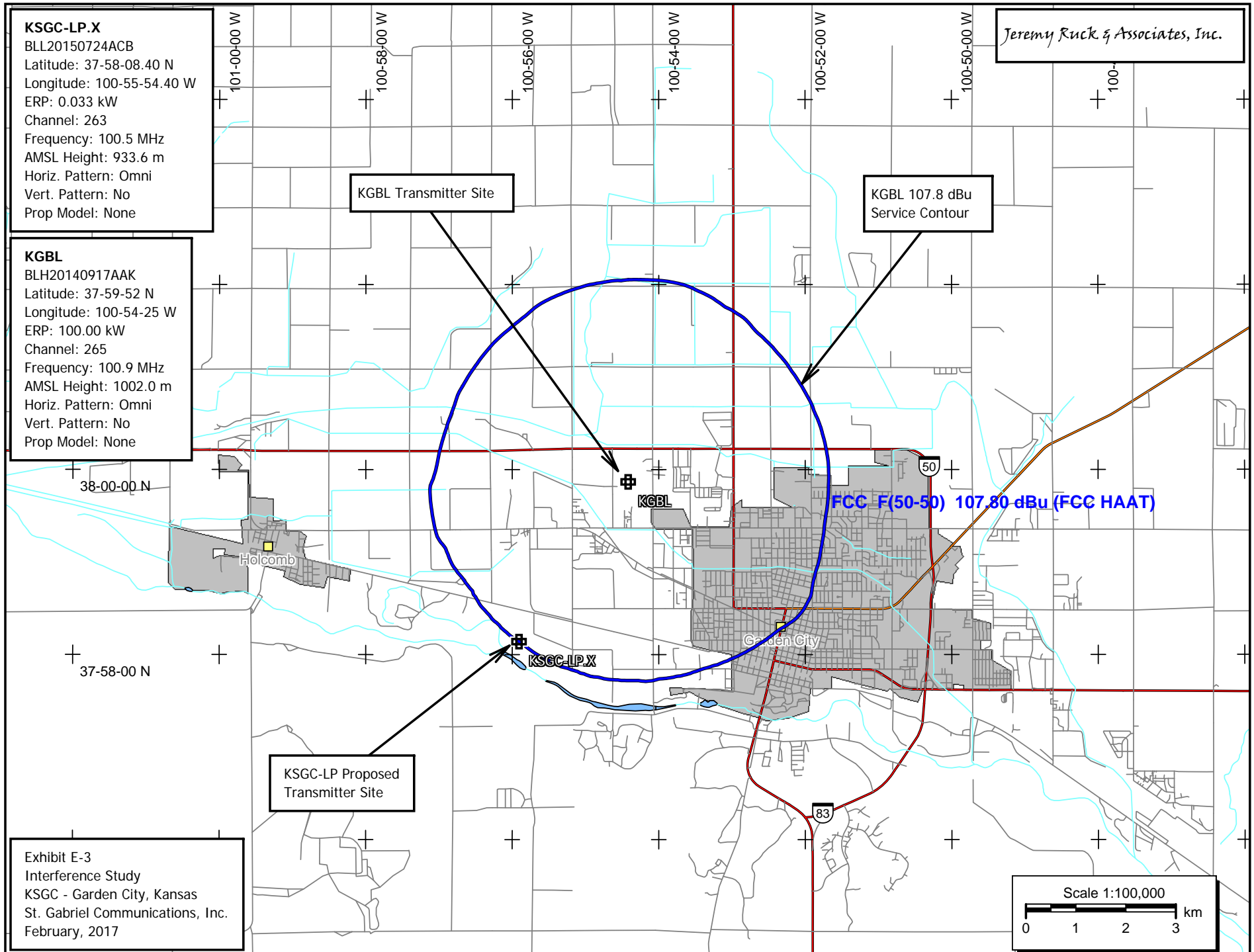
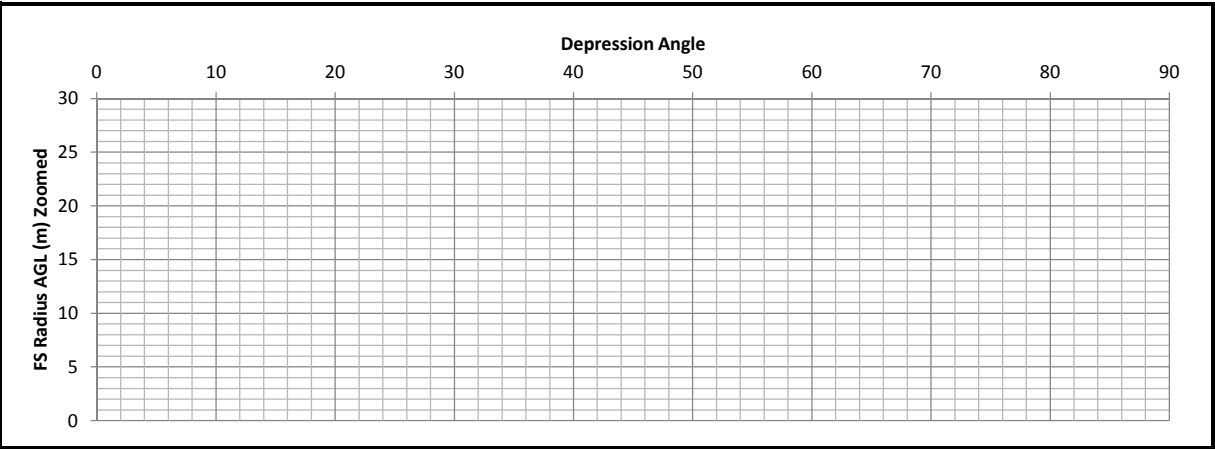
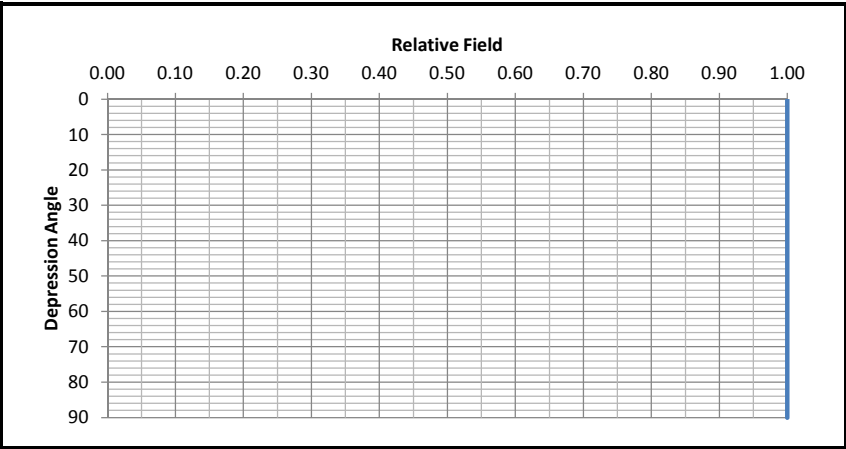


Exhibit E-4

Proximity Interference Analysis

KSGC-LP - Garden City, Kansas

Antenna No:	148	<div><div></div><div></div></div>	Center of Radiation:	60.7 m AGL
Manufacturer:	WORST CASE	<div><div></div><div></div></div>	Effective Radiated Power:	33 Watts
Model:	WORST CASE		FS Contour:	147.8 dBu
Number of Bays:	1		E Field Strength:	24.54709 V/m
Bay Spacing:	Lambda		Z0:	377 Ohms
			Power Density:	1.598301289 W/m^2



Depression Angle	Relative Field	Relative Power	ERP Watts	Radii in meters			
				Field Strength	Horizontal	Vertical	AGL
0	1.0000	1.0000	33.00	1.64	1.64	0.00	60.70
1	1.0000	1.0000	33.00	1.64	1.64	0.03	60.67
2	1.0000	1.0000	33.00	1.64	1.64	0.06	60.64
3	1.0000	1.0000	33.00	1.64	1.64	0.09	60.61
4	1.0000	1.0000	33.00	1.64	1.64	0.11	60.59
5	1.0000	1.0000	33.00	1.64	1.64	0.14	60.56
6	1.0000	1.0000	33.00	1.64	1.63	0.17	60.53
7	1.0000	1.0000	33.00	1.64	1.63	0.20	60.50
8	1.0000	1.0000	33.00	1.64	1.63	0.23	60.47
9	1.0000	1.0000	33.00	1.64	1.62	0.26	60.44
10	1.0000	1.0000	33.00	1.64	1.62	0.29	60.41
11	1.0000	1.0000	33.00	1.64	1.61	0.31	60.39
12	1.0000	1.0000	33.00	1.64	1.61	0.34	60.36
13	1.0000	1.0000	33.00	1.64	1.60	0.37	60.33
14	1.0000	1.0000	33.00	1.64	1.59	0.40	60.30
15	1.0000	1.0000	33.00	1.64	1.59	0.42	60.28
16	1.0000	1.0000	33.00	1.64	1.58	0.45	60.25
17	1.0000	1.0000	33.00	1.64	1.57	0.48	60.22
18	1.0000	1.0000	33.00	1.64	1.56	0.51	60.19
19	1.0000	1.0000	33.00	1.64	1.55	0.53	60.17
20	1.0000	1.0000	33.00	1.64	1.54	0.56	60.14
21	1.0000	1.0000	33.00	1.64	1.53	0.59	60.11
22	1.0000	1.0000	33.00	1.64	1.52	0.61	60.09
23	1.0000	1.0000	33.00	1.64	1.51	0.64	60.06
24	1.0000	1.0000	33.00	1.64	1.50	0.67	60.03
25	1.0000	1.0000	33.00	1.64	1.49	0.69	60.01
26	1.0000	1.0000	33.00	1.64	1.48	0.72	59.98
27	1.0000	1.0000	33.00	1.64	1.46	0.75	59.95
28	1.0000	1.0000	33.00	1.64	1.45	0.77	59.93
29	1.0000	1.0000	33.00	1.64	1.44	0.80	59.90
30	1.0000	1.0000	33.00	1.64	1.42	0.82	59.88
31	1.0000	1.0000	33.00	1.64	1.41	0.85	59.85
32	1.0000	1.0000	33.00	1.64	1.39	0.87	59.83
33	1.0000	1.0000	33.00	1.64	1.38	0.89	59.81
34	1.0000	1.0000	33.00	1.64	1.36	0.92	59.78
35	1.0000	1.0000	33.00	1.64	1.34	0.94	59.76
36	1.0000	1.0000	33.00	1.64	1.33	0.96	59.74
37	1.0000	1.0000	33.00	1.64	1.31	0.99	59.71
38	1.0000	1.0000	33.00	1.64	1.29	1.01	59.69
39	1.0000	1.0000	33.00	1.64	1.28	1.03	59.67
40	1.0000	1.0000	33.00	1.64	1.26	1.06	59.64
41	1.0000	1.0000	33.00	1.64	1.24	1.08	59.62
42	1.0000	1.0000	33.00	1.64	1.22	1.10	59.60
43	1.0000	1.0000	33.00	1.64	1.20	1.12	59.58
44	1.0000	1.0000	33.00	1.64	1.18	1.14	59.56
45	1.0000	1.0000	33.00	1.64	1.16	1.16	59.54

Depression Angle	Relative Field	Relative Power	ERP Watts	Radii in meters			
				Field Strength	Horizontal	Vertical	AGL
45	1.0000	1.0000	33.00	1.64	1.16	1.16	59.54
46	1.0000	1.0000	33.00	1.64	1.14	1.18	59.52
47	1.0000	1.0000	33.00	1.64	1.12	1.20	59.50
48	1.0000	1.0000	33.00	1.64	1.10	1.22	59.48
49	1.0000	1.0000	33.00	1.64	1.08	1.24	59.46
50	1.0000	1.0000	33.00	1.64	1.06	1.26	59.44
51	1.0000	1.0000	33.00	1.64	1.03	1.28	59.42
52	1.0000	1.0000	33.00	1.64	1.01	1.29	59.41
53	1.0000	1.0000	33.00	1.64	0.99	1.31	59.39
54	1.0000	1.0000	33.00	1.64	0.96	1.33	59.37
55	1.0000	1.0000	33.00	1.64	0.94	1.34	59.36
56	1.0000	1.0000	33.00	1.64	0.92	1.36	59.34
57	1.0000	1.0000	33.00	1.64	0.89	1.38	59.32
58	1.0000	1.0000	33.00	1.64	0.87	1.39	59.31
59	1.0000	1.0000	33.00	1.64	0.85	1.41	59.29
60	1.0000	1.0000	33.00	1.64	0.82	1.42	59.28
61	1.0000	1.0000	33.00	1.64	0.80	1.44	59.26
62	1.0000	1.0000	33.00	1.64	0.77	1.45	59.25
63	1.0000	1.0000	33.00	1.64	0.75	1.46	59.24
64	1.0000	1.0000	33.00	1.64	0.72	1.48	59.22
65	1.0000	1.0000	33.00	1.64	0.69	1.49	59.21
66	1.0000	1.0000	33.00	1.64	0.67	1.50	59.20
67	1.0000	1.0000	33.00	1.64	0.64	1.51	59.19
68	1.0000	1.0000	33.00	1.64	0.61	1.52	59.18
69	1.0000	1.0000	33.00	1.64	0.59	1.53	59.17
70	1.0000	1.0000	33.00	1.64	0.56	1.54	59.16
71	1.0000	1.0000	33.00	1.64	0.53	1.55	59.15
72	1.0000	1.0000	33.00	1.64	0.51	1.56	59.14
73	1.0000	1.0000	33.00	1.64	0.48	1.57	59.13
74	1.0000	1.0000	33.00	1.64	0.45	1.58	59.12
75	1.0000	1.0000	33.00	1.64	0.42	1.59	59.11
76	1.0000	1.0000	33.00	1.64	0.40	1.59	59.11
77	1.0000	1.0000	33.00	1.64	0.37	1.60	59.10
78	1.0000	1.0000	33.00	1.64	0.34	1.61	59.09
79	1.0000	1.0000	33.00	1.64	0.31	1.61	59.09
80	1.0000	1.0000	33.00	1.64	0.29	1.62	59.08
81	1.0000	1.0000	33.00	1.64	0.26	1.62	59.08
82	1.0000	1.0000	33.00	1.64	0.23	1.63	59.07
83	1.0000	1.0000	33.00	1.64	0.20	1.63	59.07
84	1.0000	1.0000	33.00	1.64	0.17	1.63	59.07
85	1.0000	1.0000	33.00	1.64	0.14	1.64	59.06
86	1.0000	1.0000	33.00	1.64	0.11	1.64	59.06
87	1.0000	1.0000	33.00	1.64	0.09	1.64	59.06
88	1.0000	1.0000	33.00	1.64	0.06	1.64	59.06
89	1.0000	1.0000	33.00	1.64	0.03	1.64	59.06
90	1.0000	1.0000	33.00	1.64	0.00	1.64	59.06

