

APPLICATION FOR CONSTRUCTION PERMIT

NEW FM TRANSLATOR STATION
SIOUX CITY, IOWA
BNPFT-20030317HCC
94.9 MHz / 0.250 kW ND

VSS CATHOLIC COMMUNICATIONS, INC.

MARCH, 2013

APPLICATION FOR CONSTRUCTION PERMIT

The following engineering statement and attached exhibits have been prepared for **VSS Catholic Communications, Inc.** ("VSS"), applicant for a new FM translator facility to serve Sioux City, Iowa, and are in support of their application for construction permit for that facility. This application is being filed as the long-form submission for the original short-form engineering proposal under FCC File No. BNPFT-20030317HCC.¹

The proposed facility would operate with an effective radiated power of 250 Watts at a center of radiation of 440.8 meters AMSL utilizing a non-directional antenna. The primary station for the proposed facility is KOLB(FM) at Hartington, Nebraska.² The proposed facility would not, however, function as a fill-in translator for KOLB(FM) due to the location of the 60 dBu contour of the facility relative to the proposed translator contour. Exhibit E-1 illustrates the predicted 60 dBu service contour of the proposed translator as well as the licensed KOLB(FM) 60 dBu service contour.

The proposed center of radiation elevation and effective radiated power are consistent with the power and height limitations in Section 74.1235 of the Commission's Rules. The average terrain was determined through a 12 radial sample of a 30-second linearly interpolated terrain database. That study indicated that the average elevation along the 270 degree true radial was the lowest of any of the sampled radials. The average elevation along that radial is 333.8 meters AMSL, which when combined with the afore mentioned center of radiation above mean sea level yields an antenna height above average terrain of 107 meters.

¹ The Facility ID for NEW / BNPFT-20030317HCC is 153258.

² The Facility ID for KOLB(FM) at Hartington, Nebraska is 173307.

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The transmitter site location proposed under this long-form application is the same as that proposed under the original short-form submission. A minor change in the submitted coordinates has resulted from the conversion of these values to integral form. This application does, however, propose a change in the channel of operation from that originally proposed in the short-form application. This change in the channel would qualify as a minor change under the Commission's Rules, and is necessary to avoid contour overlap with LPFM station KSOA-LP at Sloan, Iowa.³ The license for that facility was granted some eight months after the submission of the original short-form proposal.

Although a change in the channel of operation is proposed under this long-form application, the frequency change would not preclude future LPFM licensing operations in any Appendix A market. The closest Appendix A market to the proposed facility is the Omaha-Council Bluffs Market. As indicated in Exhibit E-2, the proposed site location is outside this market, outside the related market grid, and outside the market grid buffer.

The proposed facility would comply with the contour overlap and interference provisions of Section 74.1204 of the Commission's Rules. Exhibit E-3 is a tabular based allocation study for the proposed facility. As this study demonstrates, the proposed facility would meet all of the contour overlap requirements under the above referenced rule section, with the exception of overlap with KGLI(FM) at Sioux City, Iowa.⁴ This tabular study is graphically illustrated in Exhibit E-4.

³ The Facility ID for KSOA-LP at Sloan, Iowa is 133584. See FCC File No. BLL-20031112ADA.

⁴ The Facility ID for KGLI(FM) at Sioux City, Iowa is 8771.

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Although there would be normally prohibited contour overlap between the proposed facility and KGLI(FM) at Sioux City, Iowa, any interference that may occur would affect zero population. Exhibit E-5 illustrates that the predicted 95 dBu service contour from KGLI(FM) lies just beyond the proposed transmitter site for the translator. Thus, it can be assumed that the field strength from KGLI in the vicinity of the proposed translator is 95 dBu.

For interference to potentially occur, the field strength from the proposed translator would have to be equal to or greater than 135 dBu. Due to this very high field strength value, it is more accurate to determine the interference area through mathematical field strength calculations than the application of the Commission's propagation contours.

The power density for the proposed facility at a field strength of 135 dBu is given by the following equation:

$$S = \frac{E^2}{Z_0} = \frac{(5.623)^2}{377} = 0.0839$$

In this equation, S represents the calculated power density in Watts per square meter, E is the electric field intensity, which for 135 dBu is 5.623 Volts per meter, and Z_0 is the characteristic impedance of free space of 377 ohms.

The power density is also given by:

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

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Where S is the same units, P is the power in Watts (250 Watts in this case), 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:

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

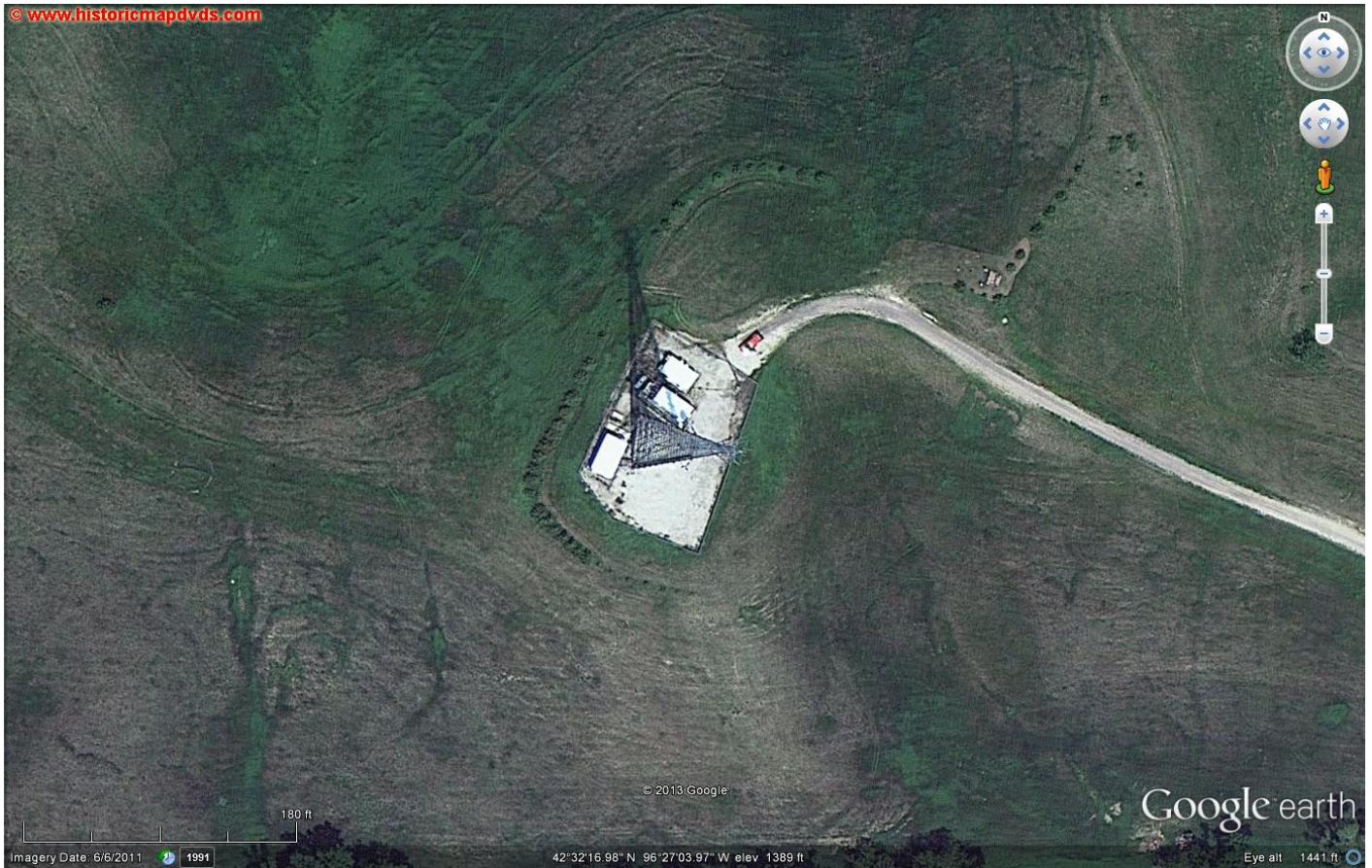
The results of these calculations for depression angles of 0 degrees to 90 degrees are tabulated in Exhibit E-6. The data in this exhibit is based on the use of a non-directional antenna. In addition to the tabular data in Exhibit E-6, several graphs are included, which graphically illustrate the interference situation for a given azimuth slice. As indicated on the form pages, a Shively model 6812B-1 antenna is proposed for use by the facility. The relative field values listed at the various depression angles are based on the published data for this antenna, and were obtained from the Shively web page.

The resulting radii values indicate the volume in which interference is predicted to potentially occur relative to the center of radiation of the antenna. As the values and tables indicate, this interference area is confined to a volume located greater than 23 meters above ground level, and with 15 meter horizontally of the antenna. It can reasonably be inferred from the satellite image on the next page that no population resides in, or is transient through this region. As a result, should any interference actually occur, it will affect zero population.

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

In addition, the proposed facility would not constitute a radiofrequency radiation hazard to persons at the site. As indicated on the form pages, the proposed facility would operate with a Shively model 6812B-1 antenna. The Commission's *FM Model* software package predicts a maximum power density of $4.280 \mu\text{W}/\text{cm}^2$ at a distance of 28 meters from the tower base for the proposed facility, which is considerably less than the upper limit permissible under the uncontrolled environment condition. No other broadcast facilities utilize the tower.

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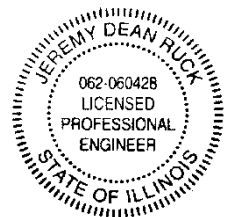
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3.22.2013

VSS certifies that it will coordinate with all other present and future users of the site to ensure that personnel and workers are not exposed to levels of radiofrequency radiation in excess of the applicable safety standards. Such coordination will include, but is 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, 2013

Jeremy D. Ruck, PE
March 22, 2013

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3.22.2013

646472.X
BNPFT20030317HCC
Latitude: 42-32-16 N
Longitude: 096-26-57.90 W
ERP: 0.25 kW
Channel: 235
Frequency: 94.9 MHz
AMSL Height: 440.8 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

KOLB
BLED20110718ACZ
Latitude: 42-23-43.90 N
Longitude: 097-37-16.90 W
ERP: 100.00 kW
Channel: 202
Frequency: 88.3 MHz
AMSL Height: 652.3 m
Horiz. Pattern: Directional
Vert. Pattern: No
Prop Model: None

Jeremy Ruck & Associates, Inc.

■ Proposed 60 dBu Service Contour
■ KOLB(FM) 60 dBu Service Contour

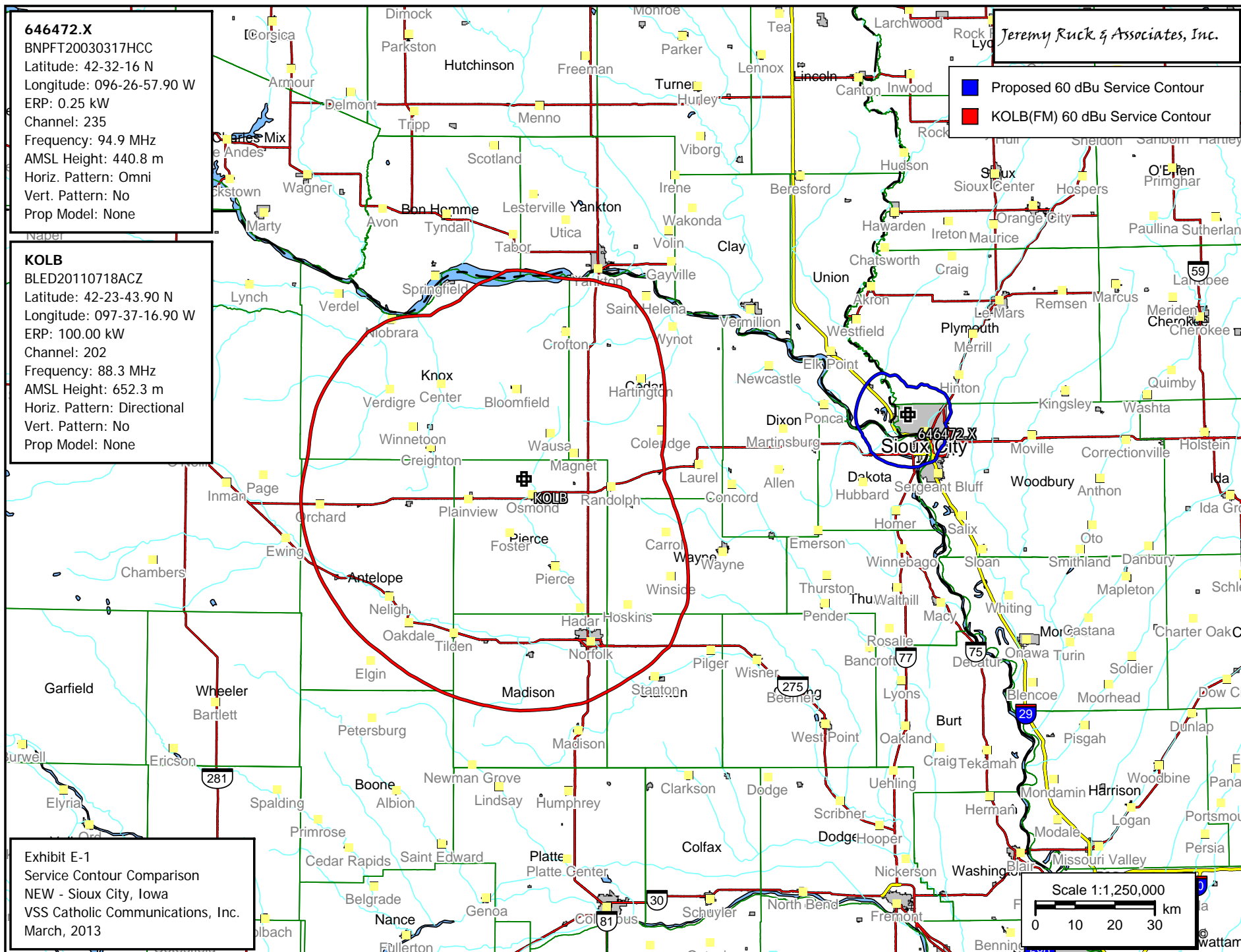


Exhibit E-1
Service Contour Comparison
NEW - Sioux City, Iowa
VSS Catholic Communications, Inc.
March, 2013

646472.X

BNPFT20030317HCC

Latitude: 42-32-16 N

Longitude: 096-26-57.90 W

ERP: 0.25 kW

Channel: 235

Frequency: 94.9 MHz

AMSL Height: 440.8 m

Horiz. Pattern: Omni

Vert. Pattern: No

Prop Model: None

Jeremy Ruck & Associates, Inc.

- Omaha-Council Bluffs Market Boundary
- Omaha-Council Bluffs Market Grid
- Omaha-Council Bluffs Market Grid Buffer

Proposed Transmitter
Site Location

Exhibit E-2

Market Illustration

NEW - Sioux City, Iowa

VSS Catholic Communications, Inc.

March, 2013

Scale 1:1,250,000

0 15 30 45 km

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

Exhibit E-3 - Tabular Allocation Study

NEW - Sioux City, Iowa

REFERENCE CH# 235D - 94.9 MHz, Pwr= 0.25 kW, HAAT= 80.9 M, COR= 440.8 M
42 32 16.0 N.
96 26 57.9 W.
Average Protected F(50-50)= 11.63 km
Omni-directional

DISPLAY DATES
DATA 03-21-13
SEARCH 03-21-13

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*
238C1 Sioux City	KGLI	LIC_CN IA		102.1 282.2	12.21 BMLH19891211KC	42 30 53.0 96 18 13.0	100.000 274	9.7 646	70.6 Amfm Radio Licenses, L.L.C	-7.6	-59.4*
233D Sioux City	646472	APP_C_ IA		0.0 0.0	0.00 BNPFT20030317HCC	42 32 16.0 96 26 57.9	0.100 68	0.7 428	5.6 Vss Catholic Communication	-7.8*	-6.7*
289C2 Winnnebago	KSUX«	LIC_NCN NE		195.0 15.0	22.46 BLH19910327KA	42 20 33.0 96 31 13.0	50.000 141	14.2 516	10.2 Ksux/kscj Radio Broadcasti	14.5R	8.0M
234C1 Norfolk	KNEN	LIC_CX NE		234.8 54.0	117.11 BLH20060420ABO	41 55 28.0 97 36 22.0	100.000 164	92.8 683	62.6 Red Beacon Communications,	11.4	35.9
232C2 Hartington	KDAM	LIC_NCX NE		285.7 105.0	80.90 BLH20100701AHP	42 43 49.0 97 24 11.8	50.000 103	5.7 539	50.6 Riverfront Broadcasting LI	62.2	29.4
236C1 Worthington	KUSQ	LIC_CN MN		27.1 207.6	136.72 BLH4646	43 37 48.0 95 40 32.0	100.000 198	91.9 686	61.8 Absolute Communications Li	35.9	63.0

Terrain database is FCC NGDC 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 protected contour.
« = Station meets FCC minimum distance spacing for its class.

646472.X
BNPFT20030317HCC
Latitude: 42-32-16 N
Longitude: 096-26-57.90 W
ERP: 0.25 kW
Channel: 235
Frequency: 94.9 MHz
AMSL Height: 440.8 m
Horiz. Pattern: Omni
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

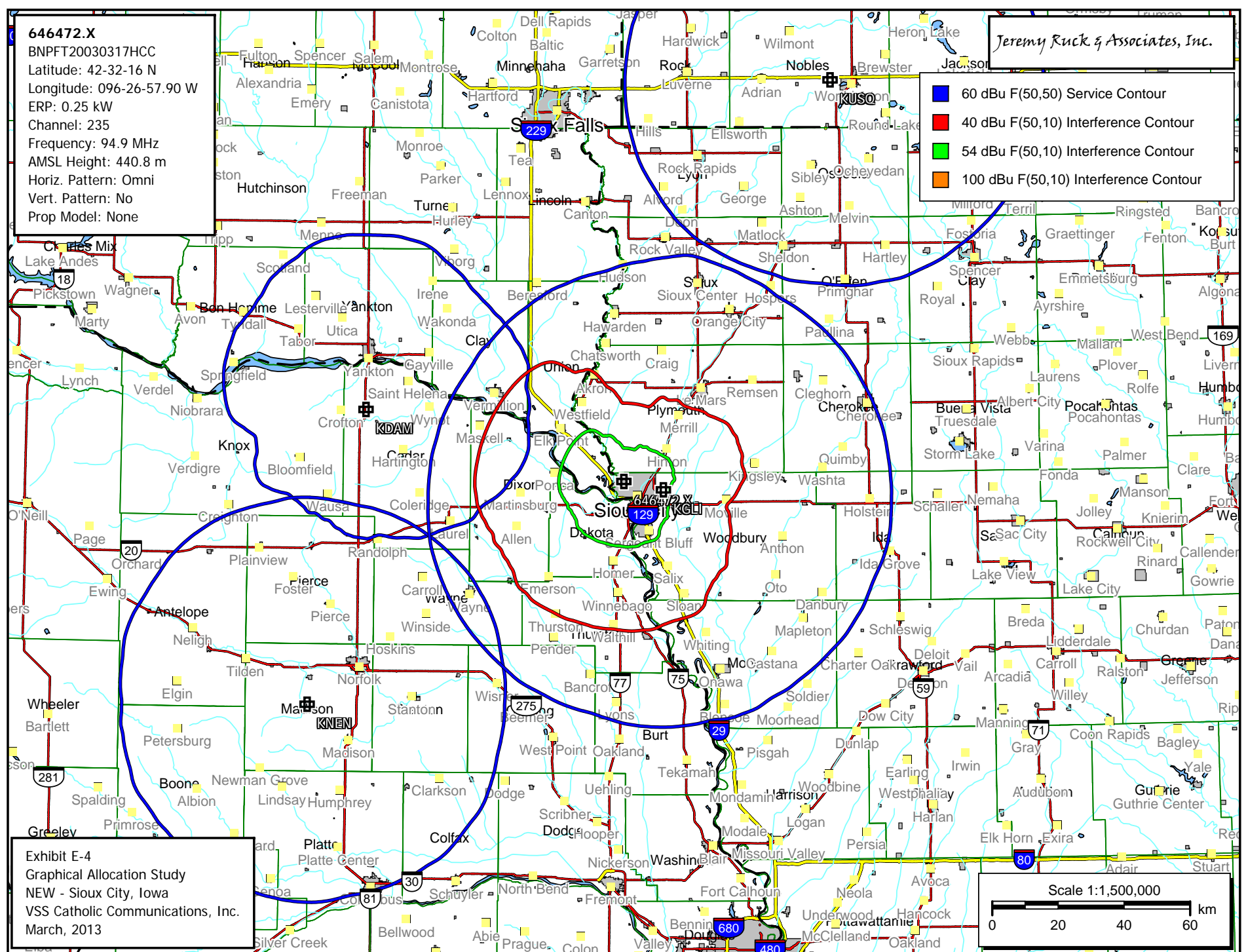
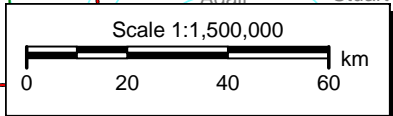


Exhibit E-4
Graphical Allocation Study
NEW - Sioux City, Iowa
VSS Catholic Communications, Inc.
March, 2013



646472.X

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Longitude: 096-26-57.90 W
ERP: 0.25 kW
Channel: 235
Frequency: 94.9 MHz
AMSL Height: 440.8 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

KGLI

BMLH19891211KC
Latitude: 42-30-53 N
Longitude: 096-18-13 W
ERP: 100.00 kW
Channel: 238
Frequency: 95.5 MHz
AMSL Height: 646.0 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

Jeremy Ruck & Associates, Inc.

KGLI(FM) 95 dBu
Service Contour

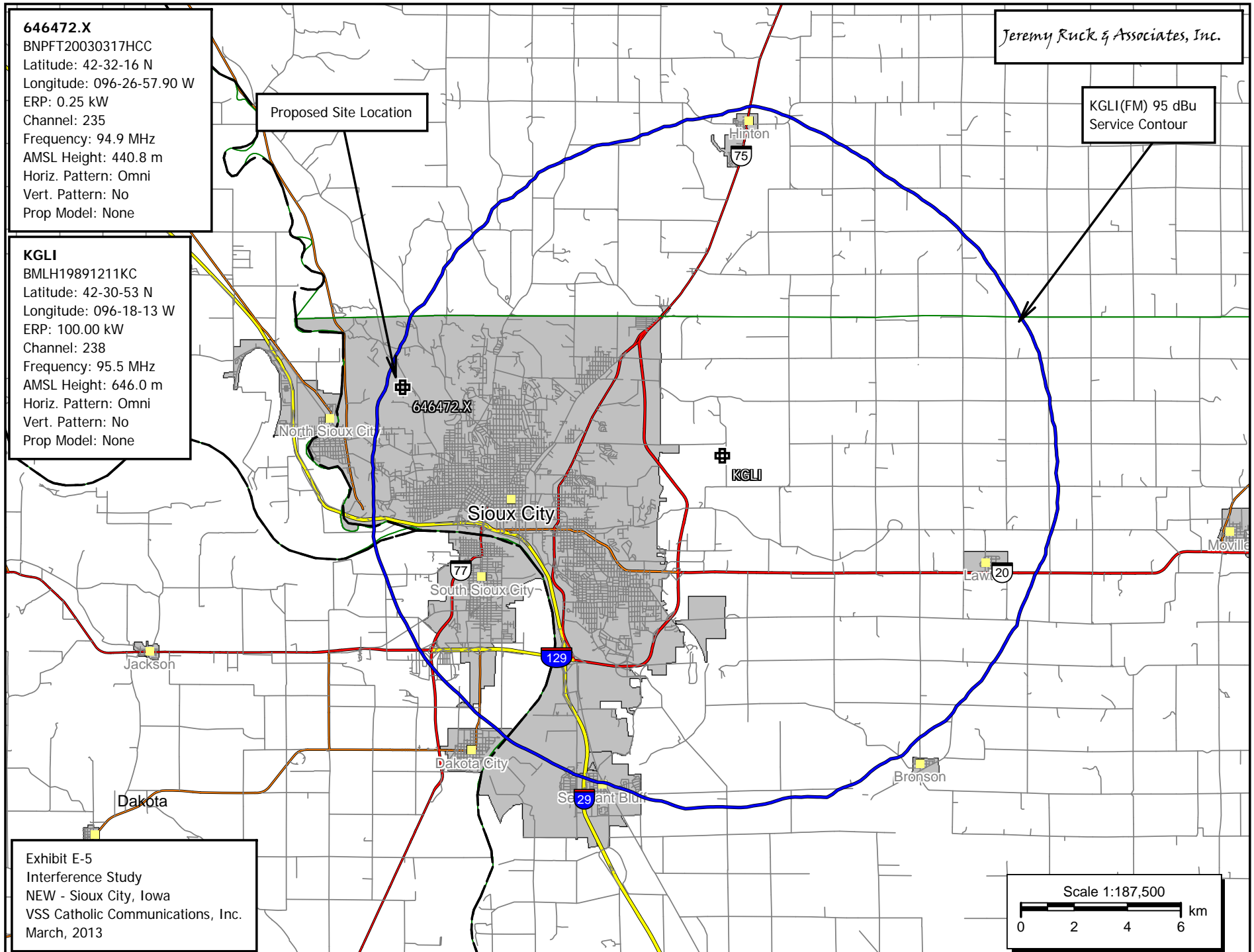


Exhibit E-5
Interference Study
NEW - Sioux City, Iowa
VSS Catholic Communications, Inc.
March, 2013

Scale 1:187,500

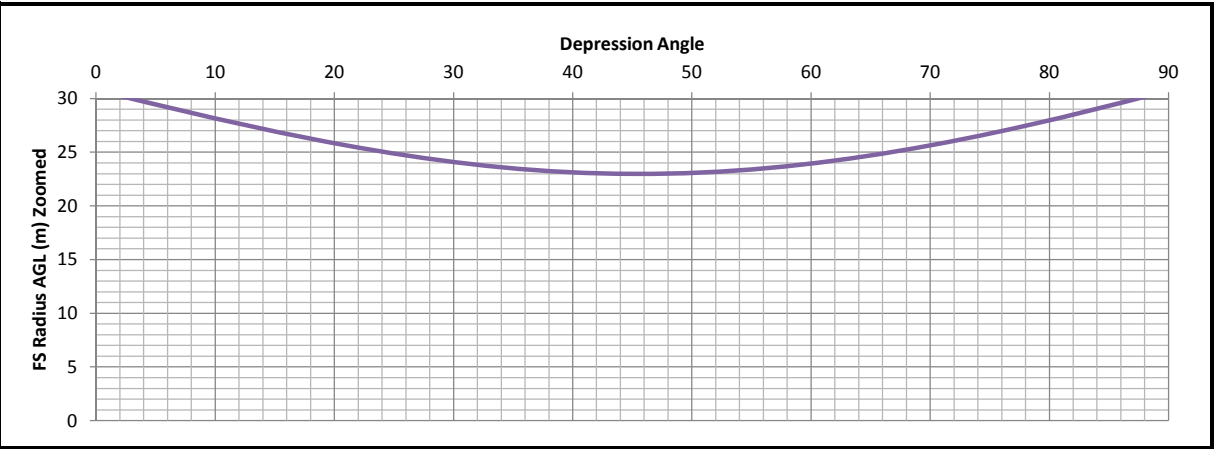
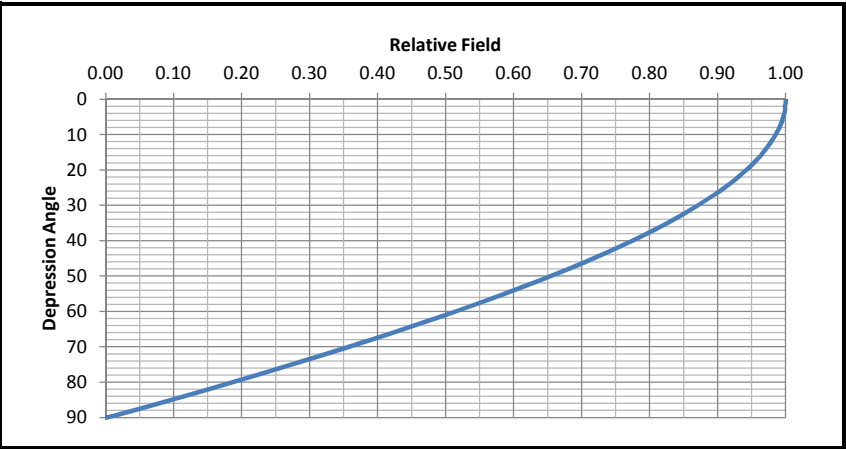
0 2 4 6 km

Exhibit E-6

Translator Proximity Interference Analysis

NEW - Sioux City, Iowa

Antenna No:	1	⋮	Center of Radiation:	30.8 m AGL
Manufacturer:	Shively	⋮	Effective Radiated Power:	250 Watts
Model:	6812-1	⋮	FS Contour:	135 dBu
Number of Bays:	1		E Field Strength:	5.62341 V/m
Bay Spacing:	Lambda		Z0 (Ohms):	377 Ohms
			Power Density:	0.083880044 W/m^2



Depression Angle	Relative Field	Relative Power	ERP Watts	Radii in meters			
				Field Strength	Horizontal	Vertical	AGL
0	1.0000	1.0000	250.00	15.40	15.40	0.00	30.80
1	1.0000	1.0000	250.00	15.40	15.40	0.27	30.53
2	0.9990	0.9980	249.50	15.39	15.38	0.54	30.26
3	0.9990	0.9980	249.50	15.39	15.36	0.81	29.99
4	0.9980	0.9960	249.00	15.37	15.33	1.07	29.73
5	0.9960	0.9920	248.00	15.34	15.28	1.34	29.46
6	0.9950	0.9900	247.51	15.32	15.24	1.60	29.20
7	0.9930	0.9860	246.51	15.29	15.18	1.86	28.94
8	0.9910	0.9821	245.52	15.26	15.11	2.12	28.68
9	0.9880	0.9761	244.04	15.22	15.03	2.38	28.42
10	0.9850	0.9702	242.56	15.17	14.94	2.63	28.17
11	0.9820	0.9643	241.08	15.12	14.85	2.89	27.91
12	0.9790	0.9584	239.61	15.08	14.75	3.13	27.67
13	0.9750	0.9506	237.66	15.02	14.63	3.38	27.42
14	0.9710	0.9428	235.71	14.95	14.51	3.62	27.18
15	0.9670	0.9351	233.77	14.89	14.38	3.85	26.95
16	0.9630	0.9274	231.84	14.83	14.26	4.09	26.71
17	0.9580	0.9178	229.44	14.75	14.11	4.31	26.49
18	0.9530	0.9082	227.05	14.68	13.96	4.54	26.26
19	0.9480	0.8987	224.68	14.60	13.80	4.75	26.05
20	0.9420	0.8874	221.84	14.51	13.63	4.96	25.84
21	0.9360	0.8761	219.02	14.41	13.46	5.17	25.63
22	0.9300	0.8649	216.23	14.32	13.28	5.37	25.43
23	0.9240	0.8538	213.44	14.23	13.10	5.56	25.24
24	0.9170	0.8409	210.22	14.12	12.90	5.74	25.06
25	0.9100	0.8281	207.03	14.01	12.70	5.92	24.88
26	0.9030	0.8154	203.85	13.91	12.50	6.10	24.70
27	0.8950	0.8010	200.26	13.78	12.28	6.26	24.54
28	0.8870	0.7868	196.69	13.66	12.06	6.41	24.39
29	0.8790	0.7726	193.16	13.54	11.84	6.56	24.24
30	0.8710	0.7586	189.66	13.41	11.62	6.71	24.09
31	0.8620	0.7430	185.76	13.28	11.38	6.84	23.96
32	0.8540	0.7293	182.33	13.15	11.15	6.97	23.83
33	0.8450	0.7140	178.51	13.01	10.91	7.09	23.71
34	0.8350	0.6972	174.31	12.86	10.66	7.19	23.61
35	0.8260	0.6823	170.57	12.72	10.42	7.30	23.50
36	0.8160	0.6659	166.46	12.57	10.17	7.39	23.41
37	0.8060	0.6496	162.41	12.41	9.91	7.47	23.33
38	0.7960	0.6336	158.40	12.26	9.66	7.55	23.25
39	0.7850	0.6162	154.06	12.09	9.40	7.61	23.19
40	0.7740	0.5991	149.77	11.92	9.13	7.66	23.14
41	0.7630	0.5822	145.54	11.75	8.87	7.71	23.09
42	0.7520	0.5655	141.38	11.58	8.61	7.75	23.05
43	0.7410	0.5491	137.27	11.41	8.35	7.78	23.02
44	0.7290	0.5314	132.86	11.23	8.08	7.80	23.00
45	0.7170	0.5141	128.52	11.04	7.81	7.81	22.99

Depression Angle	Relative Field	Relative Power	ERP Watts	Radii in meters			
				Field Strength	Horizontal	Vertical	AGL
45	0.7170	0.5141	128.52	11.04	7.81	7.81	22.99
46	0.7050	0.4970	124.26	10.86	7.54	7.81	22.99
47	0.6930	0.4802	120.06	10.67	7.28	7.81	22.99
48	0.6800	0.4624	115.60	10.47	7.01	7.78	23.02
49	0.6670	0.4449	111.22	10.27	6.74	7.75	23.05
50	0.6540	0.4277	106.93	10.07	6.47	7.72	23.08
51	0.6410	0.4109	102.72	9.87	6.21	7.67	23.13
52	0.6280	0.3944	98.60	9.67	5.95	7.62	23.18
53	0.6140	0.3770	94.25	9.46	5.69	7.55	23.25
54	0.6000	0.3600	90.00	9.24	5.43	7.48	23.32
55	0.5860	0.3434	85.85	9.02	5.18	7.39	23.41
56	0.5720	0.3272	81.80	8.81	4.93	7.30	23.50
57	0.5580	0.3114	77.84	8.59	4.68	7.21	23.59
58	0.5440	0.2959	73.98	8.38	4.44	7.10	23.70
59	0.5290	0.2798	69.96	8.15	4.20	6.98	23.82
60	0.5140	0.2642	66.05	7.92	3.96	6.86	23.94
61	0.4990	0.2490	62.25	7.68	3.73	6.72	24.08
62	0.4840	0.2343	58.56	7.45	3.50	6.58	24.22
63	0.4690	0.2200	54.99	7.22	3.28	6.44	24.36
64	0.4530	0.2052	51.30	6.98	3.06	6.27	24.53
65	0.4370	0.1910	47.74	6.73	2.84	6.10	24.70
66	0.4220	0.1781	44.52	6.50	2.64	5.94	24.86
67	0.4060	0.1648	41.21	6.25	2.44	5.76	25.04
68	0.3900	0.1521	38.03	6.01	2.25	5.57	25.23
69	0.3730	0.1391	34.78	5.74	2.06	5.36	25.44
70	0.3570	0.1274	31.86	5.50	1.88	5.17	25.63
71	0.3410	0.1163	29.07	5.25	1.71	4.97	25.83
72	0.3240	0.1050	26.24	4.99	1.54	4.75	26.05
73	0.3070	0.0942	23.56	4.73	1.38	4.52	26.28
74	0.2900	0.0841	21.03	4.47	1.23	4.29	26.51
75	0.2730	0.0745	18.63	4.20	1.09	4.06	26.74
76	0.2560	0.0655	16.38	3.94	0.95	3.83	26.97
77	0.2390	0.0571	14.28	3.68	0.83	3.59	27.21
78	0.2210	0.0488	12.21	3.40	0.71	3.33	27.47
79	0.2040	0.0416	10.40	3.14	0.60	3.08	27.72
80	0.1860	0.0346	8.65	2.86	0.50	2.82	27.98
81	0.1680	0.0282	7.06	2.59	0.40	2.56	28.24
82	0.1510	0.0228	5.70	2.33	0.32	2.30	28.50
83	0.1330	0.0177	4.42	2.05	0.25	2.03	28.77
84	0.1140	0.0130	3.25	1.76	0.18	1.75	29.05
85	0.0960	0.0092	2.30	1.48	0.13	1.47	29.33
86	0.0780	0.0061	1.52	1.20	0.08	1.20	29.60
87	0.0590	0.0035	0.87	0.91	0.05	0.91	29.89
88	0.0400	0.0016	0.40	0.62	0.02	0.62	30.18
89	0.0210	0.0004	0.11	0.32	0.01	0.32	30.48
90	0.0000	0.0000	0.00	0.00	0.00	0.00	30.80

