

APPLICATION FOR CONSTRUCTION PERMIT

PROPOSED NEW FM TRANSLATOR STATION
JOPLIN, MISSOURI
FACILITY ID: 138433
100.5 MHz / 0.170 kW ERP / ND

COMMUNITY BROADCASTING, INC.

AUGUST, 2013

APPLICATION FOR CONSTRUCTION PERMIT

The following engineering statement and attached exhibits have been prepared for **Community Broadcasting, Inc.** ("CBI"), applicant for a new FM translator station to serve Joplin, Missouri, and are in support of their application for construction permit.¹

This application is being submitted as the long-form application for construction permit for the original short-form engineering proposal submitted in 2003. The original short-form proposal was assigned FCC File No. BNPFT-20030317KPU. Upon initial review, this proposal was found to be mutually exclusive with other applications in the vicinity. In June of 2013, CBI submitted an amendment to the short-form proposal, which eliminated the mutual exclusivities between its application and the other applications.²

The June 2013 amendment proposed several changes to the original short-form proposal. Some of these changes were necessitated by the dismantling of the tower originally proposed. The remaining changes pertained to the elimination of the mutual exclusivities. The sum of the proposed changes was minor in nature.

The proposed facility would operate on channel 263 with a maximum effective radiated power of 170 Watts at a center of radiation of 398.2 meters AMSL utilizing a non-directional antenna.³ At this height, the center of radiation would be 130.0 meters above average terrain. The

¹ The Facility ID for NEW at Joplin, Missouri is 138433.

² The Joplin short-form proposal was part of MX Group 287.

³ It should be noted that the site elevation is 318.5 meters AMSL, while the proposed center of radiation is 79.7 meters AGL. Due to the limitation of integral values on FCC Form 349, it is necessary to specify a site elevation of 319 meters AMSL and a COR of 80 meters AGL, resulting in an apparent COR of 399 meters AMSL, when in fact the actual COR is 398.2 meters AMSL or 398 meters if rounded to an integral value.

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

average terrain is defined by the 330 degree true radial, on which the average elevation is 268.2 meters AMSL as determined through sampling the FCC 30-second terrain database.

The primary station for the proposed facility would be KSCV(FM) at Springfield, Missouri.⁴ The proposed 60 dBu service contour would lie outside of the KSCV(FM) 60 dBu service contour. As a result, the proposed translator would not be considered a fill-in translator for KSCV(FM). Exhibit E-1 depicts the proposed 60 dBu service contour of the translator along with the licensed 60 dBu service contour of KSCV(FM).

No change to the channel originally specified in 2003 has been proposed under the short-form amendment, or under this long-form application. A change in the originally specified location was proposed at the short-form amendment stage. The proposed facility would not impact LPFM licensing opportunities within any of the Appendix A markets. The closest Appendix A market to the proposed facility is the Springfield, Missouri market. Exhibit E-2 illustrates the site location relative to the grid for that market, and demonstrates that the proposed site would be outside of the grid buffer.⁵ This exhibit also demonstrates that the proposed facility would be located outside of the Tulsa, OK grid buffer, which is the next closest Appendix A market to the proposed facility.

The proposed facility would comply with the provisions of Section 74.1204 of the Commission's Rules to all relevant facilities. Contour protection under that section of the rules would be met to all facilities with the exception of the pending VCY America, Inc. translator application under FCC File No. BNPFT-20030310BCV. To that application, Section 74.1204(d) will

⁴ The Facility ID for KSCV(FM) at Springfield, Missouri is 1622.

⁵ The Springfield, Missouri market is a spectrum available market at the 20x20 size grid.

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

be utilized. Exhibit E-3 is a tabular allocation study for the proposed facility, which is graphically illustrated by the contour study in Exhibit E-4.

Since both the proposed facility and the proposed VCY facility are at the application stage, it is necessary to demonstrate that neither facility would cause interference to the other. In order to demonstrate this fact, a U/D study for both facilities relative to the other has been completed. Exhibit E-5 illustrates that the proposed translator has a predicted field strength of 85 dBu in the vicinity of the VCY translator, while that translator has a field strength of 78.5 dBu in the vicinity of the CBI translator. Since the two facilities are third adjacent to each other, interference to the reception of the CBI translator would occur in areas at the VCY site where the VCY field strength equals or exceeds 125 dBu. Similarly, in the vicinity of the CBI site, interference to VCY will be predicted to occur when the CBI field strength is 118.5 dBu or greater.

In calculating the interference area, the power density for the interfering station is calculated by the following:

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

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:

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

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

Where S is the same units, P is the 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 the area in the immediate vicinity of the VCY site are tabulated in Exhibit E-6. As this tabulation demonstrates, the predicted interference area in the vicinity of the VCY site would be confined to regions of 54.3 meters or greater above ground level, or within 0.7 meters of the antenna.



The coordinates for the VCY application place it on the high-rise building in the above street level image. From this photograph it can be reasonably inferred that no resident population will be

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

8.26.2013

present within 0.7 meters of the proposed VCY transmit antenna. As a result, the proposed CBI facility is not expected to receive interference from the proposed VCY translator.

For the converse situation, where CBI is the interfering signal in the vicinity of its site, interference is predicted to occur when the CBI field strength is 118.5 dBu or greater. Following the same calculations, Exhibit E-7 tabulates the results for this permutation. As demonstrated in this exhibit, the predicted interference area would reside in a region of at least 36.7 meters AGL. The following street level photograph demonstrates that no structures would be present in this region, thus no populated areas would be impacted by the proposed facility.



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

JEREMY RUCK & ASSOCIATES, INC.

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

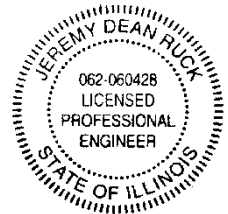
Tel: 309.647.1200
Fax: 855.332.9537
jeremyruck.com

8.26.2013

registered with the Commission. The addition of the CBI antenna to this structure will not increase the existing environmental impact already present.

In addition, the proposed facility would not constitute a radiofrequency radiation exposure hazard to the general population. The Commission's *FM Model* software package predicts a maximum power density from the proposed facility at ground level of $0.40 \mu\text{W}/\text{cm}^2$. This value is sufficiently low that the proposed translator is categorically excluded. CBI certifies, however, that it will coordinate with all other users of the site to ensure that workers and personnel having access to the site 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
August 26, 2013

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

8.26.2013

BNPFT20030317KPU
Latitude: 37-04-37 N
Longitude: 094-32-15 W
ERP: 0.17 kW
Channel: 263
Frequency: 100.5 MHz
AMSL Height: 398.2 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

BLED20011217ABA
 Latitude: 37-17-41 N
 Longitude: 093-09-10 W
 ERP: 9.00 kW
 Channel: 211
 Frequency: 90.1 MHz
 AMSL Height: 551.0 m
 Horiz. Pattern: Omni
 Vert. Pattern: None
 Prop Model: None

Proposed 60 dBu
Service Contour

KSCV Licensed 60 dBu
Service Contour

Exhibit E-1
Service Contour Comparison
NEW - Joplin, Missouri
Community Broadcasting, Inc.
August, 2013

Scale 1:1,000,000

1561001.A

BNPFT20030317KPU

Latitude: 37-04-37 N

Longitude: 094-32-15 W

ERP: 0.17 kW

Channel: 263

Frequency: 100.5 MHz

AMSL Height: 398.2 m

Horiz. Pattern: Omni

Vert. Pattern: No

Prop Model: None

Jeremy Ruck & Associates, Inc.

Springfield, MO Market
Grid and Grid Buffer

Proposed Site Location

Tulsa, OK Market
Grid and Buffer

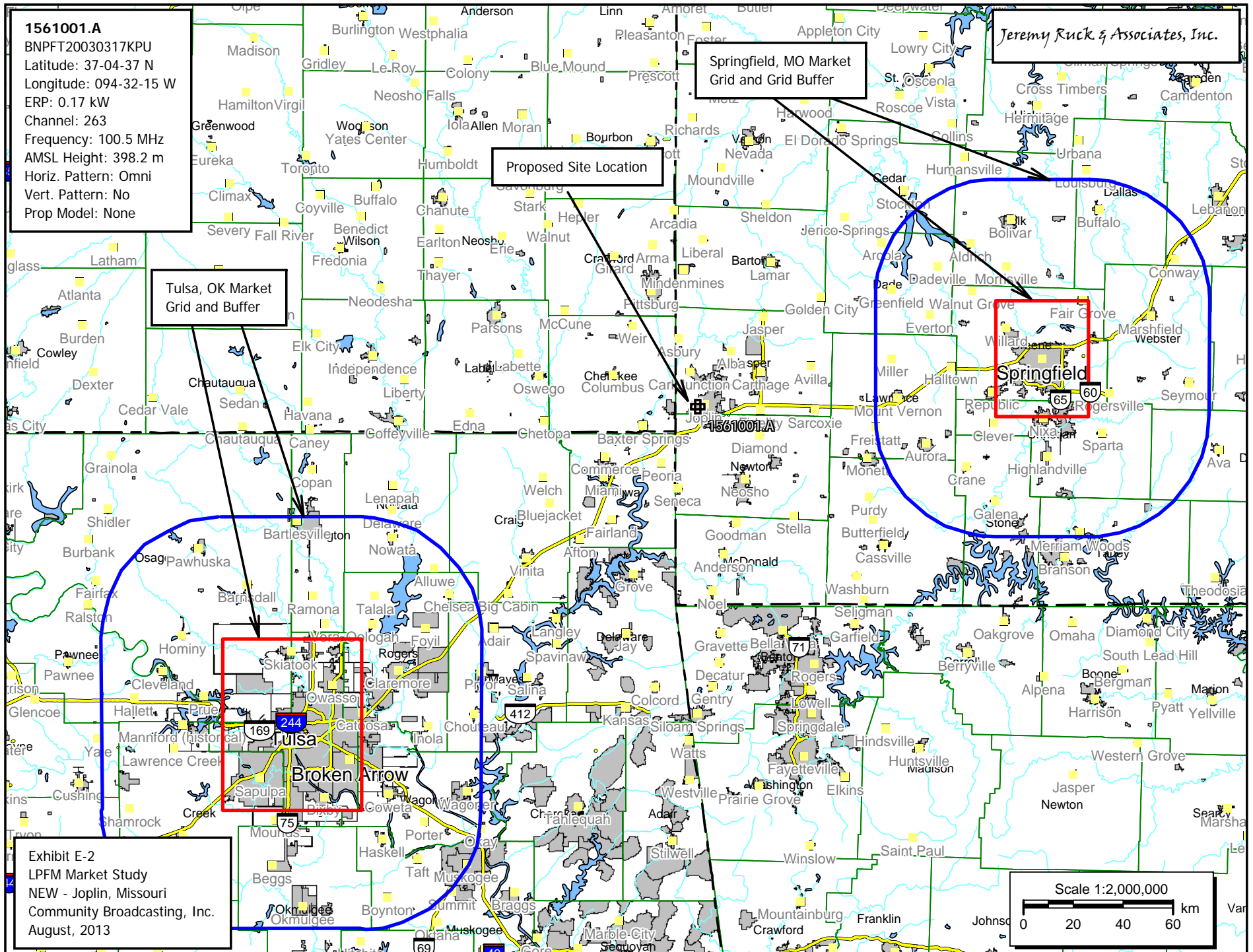
Springfield

Broken Arrow

Exhibit E-2
LPFM Market Study
NEW - Joplin, Missouri
Community Broadcasting, Inc.
August, 2013

Scale 1:2,000,000

0 20 40 60 km



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

Exhibit E-3 - Tabular Allocation Study

NEW - Joplin, Missouri

REFERENCE CH# 263D - 100.5 MHz, Pwr= 0.17 kW, HAAT= 0.0 M, COR= 399 M
37 04 37.0 N.
94 32 15.0 W.
Average Protected F(50-50)= 6.44 km
Omni-directional

DISPLAY DATES
DATA 08-22-13
SEARCH 08-26-13

CH CITY	CALL	TYPE ANT STATE	AZI <--	DIST FILE #	LAT LNG	PWR(kW) HAAT(M)	INT(km) COR(M)	PRO(km) LICENSEE	*IN* (Overlap in km)	*OUT*
263D Joplin	1561001	APP _C_ MO	0.0 0.0	0.00 BNPFT20030317KPU	37 04 37.0 94 32 15.0	0.170 183	43.3 399	12.7 Community Broadcasting, In	-56.0*	-56.0*
263C2 Aurora	KSWF	LIC _CN MO	88.5 269.1	90.43 BLH19920615KB	37 05 39.0 93 31 05.0	33.000 183	131.3 565	50.7 Clear Channel Broadcasting	-51.6*	2.3
266D Joplin	629397	APP _C_ MO	56.8 236.8	2.59 BNPFT20030310BCV	37 05 23.0 94 30 47.0	0.050 71	0.5 368	7.6 Vcy America, Inc.	-9.4*	-5.9*
264C3 Deerfield	KSHQ	LIC _CX MO	350.8 170.7	72.27 BLH20130709ABL	37 43 07.0 94 40 07.0	17.700 119	59.5 382	39.2 Parker, Patrick	-0.1	13.6
265A Miami	KGLC	LIC NCX OK	226.7 46.6	30.28 BLH20110325ACM	36 53 24.0 94 47 08.0	6.000 84	2.5 335	25.2 Northeast Oklahoma Broadca	15.3	3.9
261D Pittsburg	K261DZ	CP _C_ KS	8.6 188.7	18.64 BNPFT20130306ADN	37 14 34.0 94 30 21.0	0.250 305	1.1 397	13.7 Edgewater Broadcasting, In	5.0	4.0
210C Pittsburg	KRPS	LIC _CN KS	316.8 136.6	35.95 BLED19880518KC	37 18 44.0 94 48 58.0	100.000 305	75.3 579	50.0 Pittsburg State University	28.5R	7.5M
262A Gravette	AL6683	RSV-A _ AR	178.2 358.2	71.77 RM11319	36 25 54.0 94 30 46.0	6.000 100	49.9 439	31.3 Kerm, Inc.	11.5	24.4
262A Gravette	KURM-FM	LIC _CX AR	178.2 358.2	71.77 BLH20061208AAS	36 25 54.0 94 30 46.0	1.750 186	46.8 526	30.0 Kerm, Inc.	14.5	26.4
266D Granby	1564544	APP DC_ MO	136.2 316.3	28.14 BNPFT20030317BJR	36 53 39.0 94 19 05.5	0.075 429	0.2 429	6.5 Radio Training Network, In	16.1	20.7
263L1 Thayer	KTHA-LP	LIC _ KS	299.0 118.4	94.52 BLL20020402AAM	37 29 07.0 95 28 29.0	0.084 33	18.1 326	5.5 Thayer Seventh-day Adventi	63.2	44.5

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.

1561001.A

BNPFT20030317KPU

Latitude: 37-04-37 N

Longitude: 094-32-15 W

ERP: 0.17 kW

Channel: 263

Frequency: 100.5 MHz

AMSL Height: 398.2 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

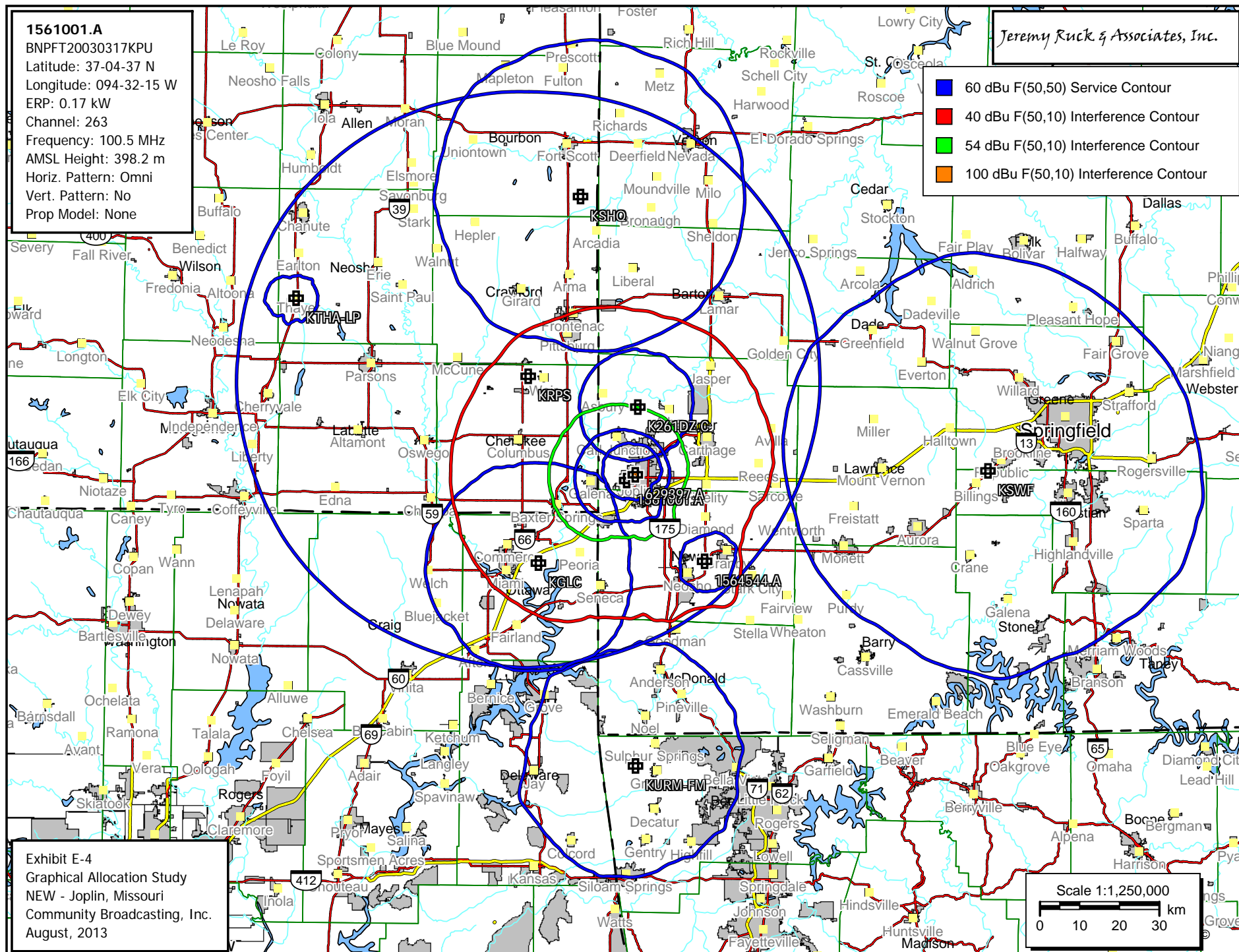


Exhibit E-4

Graphical Allocation Study

NEW - Joplin, Missouri

Community Broadcasting, Inc.

August, 2013

Scale 1:1,250,000

0 10 20 30 km

1561001.A

BNPFT20030317KPU
Latitude: 37-04-37 N
Longitude: 094-32-15 W
ERP: 0.17 kW
Channel: 263
Frequency: 100.5 MHz
AMSL Height: 398.2 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

629397.A

BNPFT20030310BCV
Latitude: 37-05-23 N
Longitude: 094-30-47 W
ERP: 0.05 kW
Channel: 266
Frequency: 101.1 MHz
AMSL Height: 368.0 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

Exhibit E-5
Interference Study
NEW - Joplin, Missouri
Community Broadcasting, Inc.
August, 2013

Proposed 85 dBu
F(50,50) Contour

Jeremy Ruck & Associates, Inc.

VCY 78.5 dBu
F(50,50) Contour

FCC F(50-50) 78.50 dBu (FCC HAAT)

FCC F(50-50) 85.00 dBu (FCC HAAT)

629397.A

Joplin

1561001.A

Iron Gates

Duquesne

Dennis Acres

Shoal Creek Drive

Leawood

Silver Creek

Saginaw

Redings Mill

Scale 1:75,000

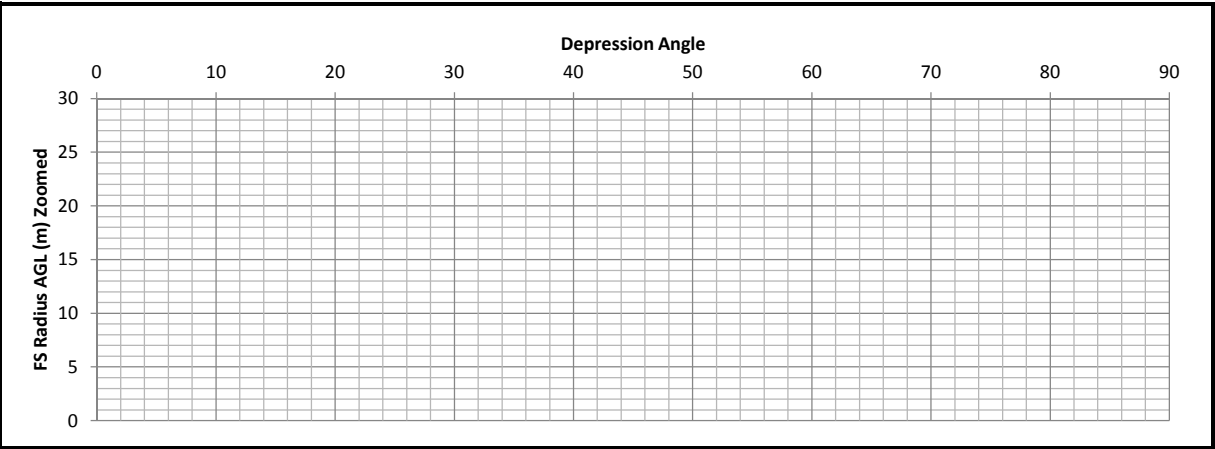
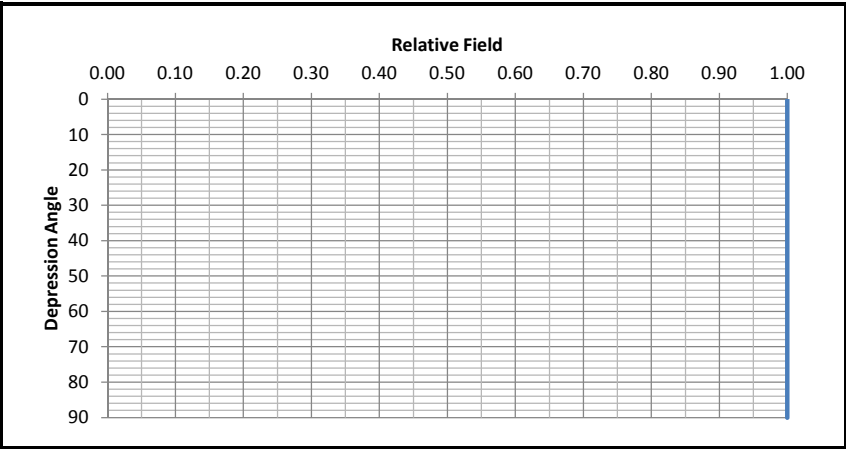
0 1 2 3 km

Exhibit E-6

Translator Proximity Interference Analysis

NEW - Joplin, Missouri (CBI Desired / VCY Interference Case)

Antenna No:	53	⬆	⬆	Center of Radiation:	55 m AGL
Manufacturer:	Scala	⬆⬆	⬆⬆	Effective Radiated Power:	0.05 Watts
Model:	FMO			FS Contour:	125 dBu
Number of Bays:	1			E Field Strength:	1.77828 V/m
Bay Spacing:	N/A			Z0 (Ohms):	377 Ohms
				Power Density:	0.008388004 W/m^2



Depression Angle	Relative Field	Relative Power	ERP Watts	Radii in meters			
				Field Strength	Horizontal	Vertical	AGL
0	1.0000	1.0000	0.05	0.69	0.69	0.00	55.00
1	1.0000	1.0000	0.05	0.69	0.69	0.01	54.99
2	1.0000	1.0000	0.05	0.69	0.69	0.02	54.98
3	1.0000	1.0000	0.05	0.69	0.69	0.04	54.96
4	1.0000	1.0000	0.05	0.69	0.69	0.05	54.95
5	1.0000	1.0000	0.05	0.69	0.69	0.06	54.94
6	1.0000	1.0000	0.05	0.69	0.68	0.07	54.93
7	1.0000	1.0000	0.05	0.69	0.68	0.08	54.92
8	1.0000	1.0000	0.05	0.69	0.68	0.10	54.90
9	1.0000	1.0000	0.05	0.69	0.68	0.11	54.89
10	1.0000	1.0000	0.05	0.69	0.68	0.12	54.88
11	1.0000	1.0000	0.05	0.69	0.68	0.13	54.87
12	1.0000	1.0000	0.05	0.69	0.67	0.14	54.86
13	1.0000	1.0000	0.05	0.69	0.67	0.15	54.85
14	1.0000	1.0000	0.05	0.69	0.67	0.17	54.83
15	1.0000	1.0000	0.05	0.69	0.67	0.18	54.82
16	1.0000	1.0000	0.05	0.69	0.66	0.19	54.81
17	1.0000	1.0000	0.05	0.69	0.66	0.20	54.80
18	1.0000	1.0000	0.05	0.69	0.66	0.21	54.79
19	1.0000	1.0000	0.05	0.69	0.65	0.22	54.78
20	1.0000	1.0000	0.05	0.69	0.65	0.24	54.76
21	1.0000	1.0000	0.05	0.69	0.64	0.25	54.75
22	1.0000	1.0000	0.05	0.69	0.64	0.26	54.74
23	1.0000	1.0000	0.05	0.69	0.63	0.27	54.73
24	1.0000	1.0000	0.05	0.69	0.63	0.28	54.72
25	1.0000	1.0000	0.05	0.69	0.62	0.29	54.71
26	1.0000	1.0000	0.05	0.69	0.62	0.30	54.70
27	1.0000	1.0000	0.05	0.69	0.61	0.31	54.69
28	1.0000	1.0000	0.05	0.69	0.61	0.32	54.68
29	1.0000	1.0000	0.05	0.69	0.60	0.33	54.67
30	1.0000	1.0000	0.05	0.69	0.60	0.34	54.66
31	1.0000	1.0000	0.05	0.69	0.59	0.35	54.65
32	1.0000	1.0000	0.05	0.69	0.58	0.36	54.64
33	1.0000	1.0000	0.05	0.69	0.58	0.38	54.62
34	1.0000	1.0000	0.05	0.69	0.57	0.39	54.61
35	1.0000	1.0000	0.05	0.69	0.56	0.40	54.60
36	1.0000	1.0000	0.05	0.69	0.56	0.40	54.60
37	1.0000	1.0000	0.05	0.69	0.55	0.41	54.59
38	1.0000	1.0000	0.05	0.69	0.54	0.42	54.58
39	1.0000	1.0000	0.05	0.69	0.54	0.43	54.57
40	1.0000	1.0000	0.05	0.69	0.53	0.44	54.56
41	1.0000	1.0000	0.05	0.69	0.52	0.45	54.55
42	1.0000	1.0000	0.05	0.69	0.51	0.46	54.54
43	1.0000	1.0000	0.05	0.69	0.50	0.47	54.53
44	1.0000	1.0000	0.05	0.69	0.50	0.48	54.52
45	1.0000	1.0000	0.05	0.69	0.49	0.49	54.51

Depression Angle	Relative Field	Relative Power	ERP Watts	Radii in meters			
				Field Strength	Horizontal	Vertical	AGL
45	1.0000	1.0000	0.05	0.69	0.49	0.49	54.51
46	1.0000	1.0000	0.05	0.69	0.48	0.50	54.50
47	1.0000	1.0000	0.05	0.69	0.47	0.50	54.50
48	1.0000	1.0000	0.05	0.69	0.46	0.51	54.49
49	1.0000	1.0000	0.05	0.69	0.45	0.52	54.48
50	1.0000	1.0000	0.05	0.69	0.44	0.53	54.47
51	1.0000	1.0000	0.05	0.69	0.43	0.54	54.46
52	1.0000	1.0000	0.05	0.69	0.42	0.54	54.46
53	1.0000	1.0000	0.05	0.69	0.41	0.55	54.45
54	1.0000	1.0000	0.05	0.69	0.40	0.56	54.44
55	1.0000	1.0000	0.05	0.69	0.40	0.56	54.44
56	1.0000	1.0000	0.05	0.69	0.39	0.57	54.43
57	1.0000	1.0000	0.05	0.69	0.38	0.58	54.42
58	1.0000	1.0000	0.05	0.69	0.36	0.58	54.42
59	1.0000	1.0000	0.05	0.69	0.35	0.59	54.41
60	1.0000	1.0000	0.05	0.69	0.34	0.60	54.40
61	1.0000	1.0000	0.05	0.69	0.33	0.60	54.40
62	1.0000	1.0000	0.05	0.69	0.32	0.61	54.39
63	1.0000	1.0000	0.05	0.69	0.31	0.61	54.39
64	1.0000	1.0000	0.05	0.69	0.30	0.62	54.38
65	1.0000	1.0000	0.05	0.69	0.29	0.62	54.38
66	1.0000	1.0000	0.05	0.69	0.28	0.63	54.37
67	1.0000	1.0000	0.05	0.69	0.27	0.63	54.37
68	1.0000	1.0000	0.05	0.69	0.26	0.64	54.36
69	1.0000	1.0000	0.05	0.69	0.25	0.64	54.36
70	1.0000	1.0000	0.05	0.69	0.24	0.65	54.35
71	1.0000	1.0000	0.05	0.69	0.22	0.65	54.35
72	1.0000	1.0000	0.05	0.69	0.21	0.66	54.34
73	1.0000	1.0000	0.05	0.69	0.20	0.66	54.34
74	1.0000	1.0000	0.05	0.69	0.19	0.66	54.34
75	1.0000	1.0000	0.05	0.69	0.18	0.67	54.33
76	1.0000	1.0000	0.05	0.69	0.17	0.67	54.33
77	1.0000	1.0000	0.05	0.69	0.15	0.67	54.33
78	1.0000	1.0000	0.05	0.69	0.14	0.67	54.33
79	1.0000	1.0000	0.05	0.69	0.13	0.68	54.32
80	1.0000	1.0000	0.05	0.69	0.12	0.68	54.32
81	1.0000	1.0000	0.05	0.69	0.11	0.68	54.32
82	1.0000	1.0000	0.05	0.69	0.10	0.68	54.32
83	1.0000	1.0000	0.05	0.69	0.08	0.68	54.32
84	1.0000	1.0000	0.05	0.69	0.07	0.68	54.32
85	1.0000	1.0000	0.05	0.69	0.06	0.69	54.31
86	1.0000	1.0000	0.05	0.69	0.05	0.69	54.31
87	1.0000	1.0000	0.05	0.69	0.04	0.69	54.31
88	1.0000	1.0000	0.05	0.69	0.02	0.69	54.31
89	1.0000	1.0000	0.05	0.69	0.01	0.69	54.31
90	1.0000	1.0000	0.05	0.69	0.00	0.69	54.31

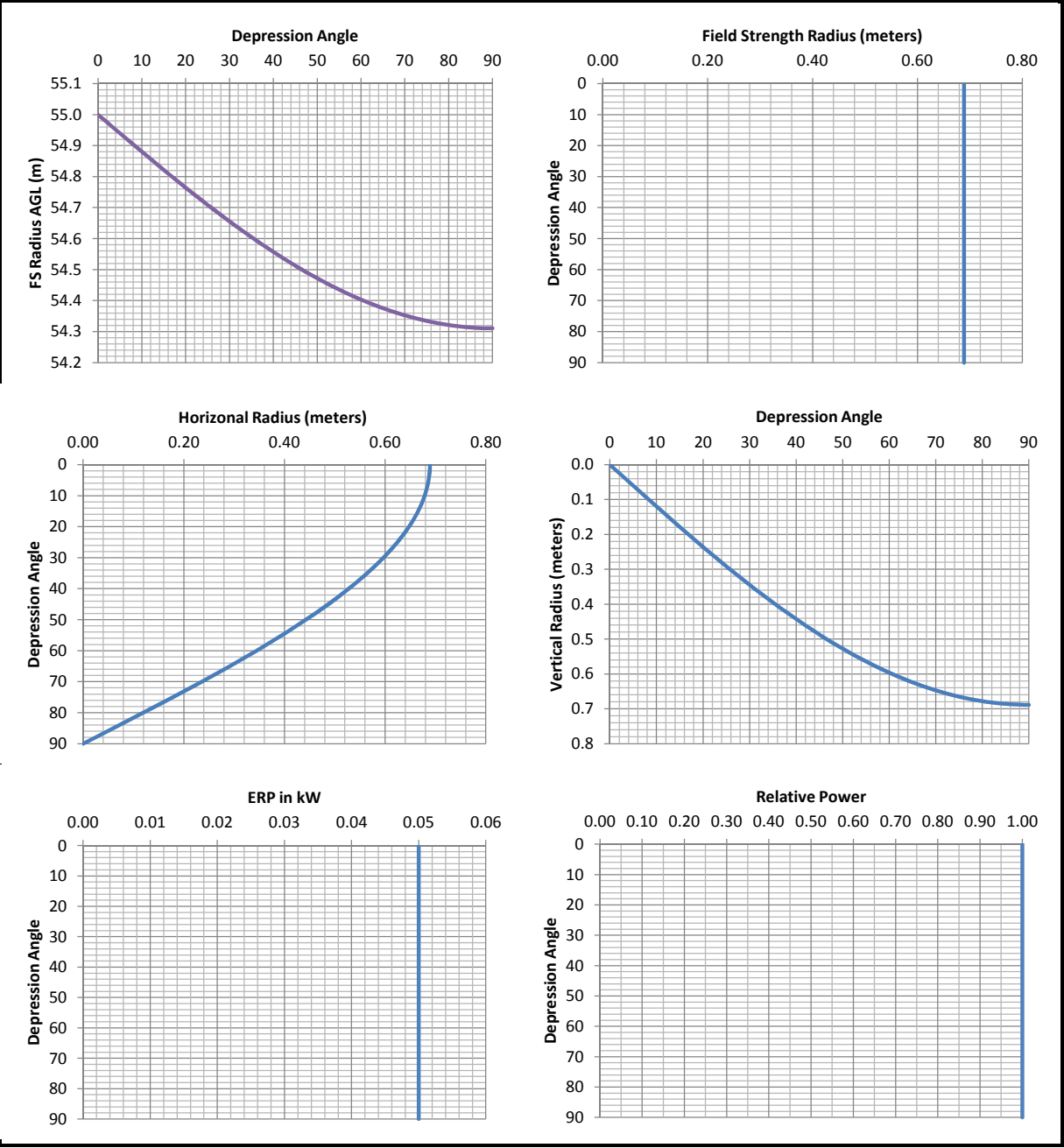


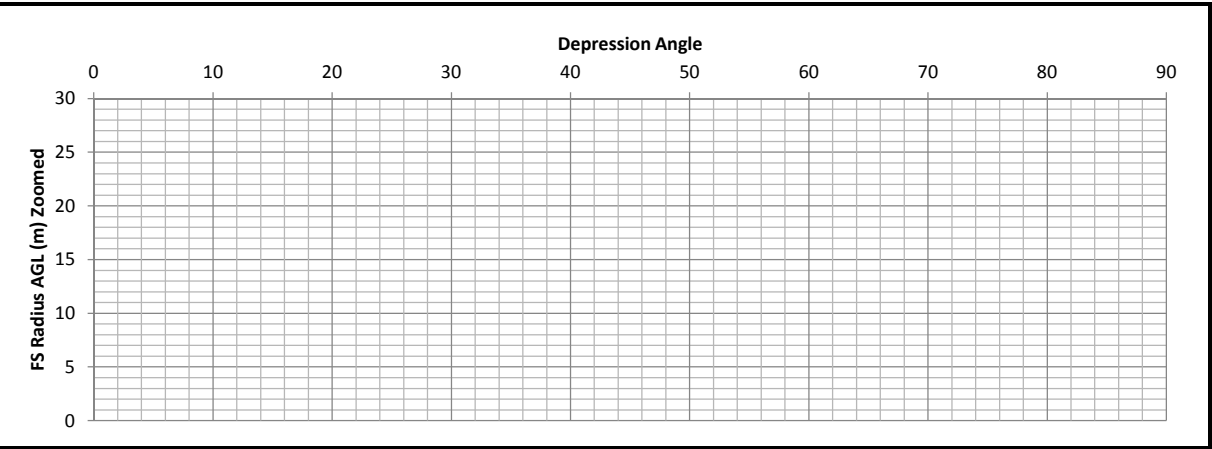
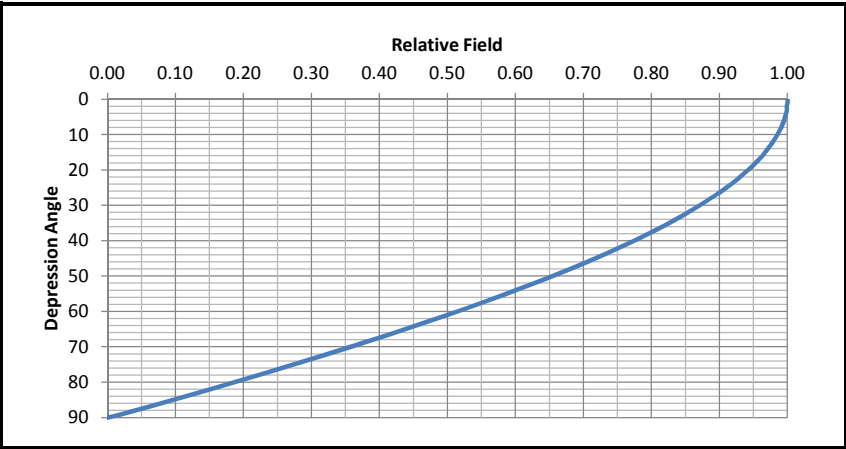


Exhibit E-7

Translator Proximity Interference Analysis

NEW - Joplin, Missouri (VCY Desired / CBI Undesired Case)

Antenna No:	69		Center of Radiation:	79.7 m AGL
Manufacturer:	Shively		Effective Radiated Power:	170 Watts
Model:	6812-1		FS Contour:	118.5 dBu
Number of Bays:	1		E Field Strength:	0.84140 V/m
Bay Spacing:	Lambda		Z0 (Ohms):	377 Ohms
			Power Density:	0.00187784 W/m^2



Depression Angle	Relative Field	Relative Power	ERP Watts	Radii in meters			
				Field Strength	Horizontal	Vertical	AGL
0	1.0000	1.0000	170.00	84.88	84.88	0.00	79.70
1	1.0000	1.0000	170.00	84.88	84.86	1.48	78.22
2	0.9990	0.9980	169.66	84.79	84.74	2.96	76.74
3	0.9990	0.9980	169.66	84.79	84.68	4.44	75.26
4	0.9980	0.9960	169.32	84.71	84.50	5.91	73.79
5	0.9960	0.9920	168.64	84.54	84.22	7.37	72.33
6	0.9950	0.9900	168.30	84.45	83.99	8.83	70.87
7	0.9930	0.9860	167.63	84.28	83.65	10.27	69.43
8	0.9910	0.9821	166.95	84.11	83.29	11.71	67.99
9	0.9880	0.9761	165.94	83.86	82.83	13.12	66.58
10	0.9850	0.9702	164.94	83.60	82.33	14.52	65.18
11	0.9820	0.9643	163.94	83.35	81.82	15.90	63.80
12	0.9790	0.9584	162.93	83.09	81.28	17.28	62.42
13	0.9750	0.9506	161.61	82.76	80.63	18.62	61.08
14	0.9710	0.9428	160.28	82.42	79.97	19.94	59.76
15	0.9670	0.9351	158.97	82.08	79.28	21.24	58.46
16	0.9630	0.9274	157.65	81.74	78.57	22.53	57.17
17	0.9580	0.9178	156.02	81.31	77.76	23.77	55.93
18	0.9530	0.9082	154.40	80.89	76.93	25.00	54.70
19	0.9480	0.8987	152.78	80.46	76.08	26.20	53.50
20	0.9420	0.8874	150.85	79.95	75.13	27.35	52.35
21	0.9360	0.8761	148.94	79.44	74.17	28.47	51.23
22	0.9300	0.8649	147.03	78.94	73.19	29.57	50.13
23	0.9240	0.8538	145.14	78.43	72.19	30.64	49.06
24	0.9170	0.8409	142.95	77.83	71.10	31.66	48.04
25	0.9100	0.8281	140.78	77.24	70.00	32.64	47.06
26	0.9030	0.8154	138.62	76.64	68.89	33.60	46.10
27	0.8950	0.8010	136.17	75.96	67.69	34.49	45.21
28	0.8870	0.7868	133.75	75.29	66.47	35.34	44.36
29	0.8790	0.7726	131.35	74.61	65.25	36.17	43.53
30	0.8710	0.7586	128.97	73.93	64.02	36.96	42.74
31	0.8620	0.7430	126.32	73.16	62.71	37.68	42.02
32	0.8540	0.7293	123.98	72.48	61.47	38.41	41.29
33	0.8450	0.7140	121.38	71.72	60.15	39.06	40.64
34	0.8350	0.6972	118.53	70.87	58.76	39.63	40.07
35	0.8260	0.6823	115.99	70.11	57.43	40.21	39.49
36	0.8160	0.6659	113.20	69.26	56.03	40.71	38.99
37	0.8060	0.6496	110.44	68.41	54.64	41.17	38.53
38	0.7960	0.6336	107.71	67.56	53.24	41.60	38.10
39	0.7850	0.6162	104.76	66.63	51.78	41.93	37.77
40	0.7740	0.5991	101.84	65.69	50.33	42.23	37.47
41	0.7630	0.5822	98.97	64.76	48.88	42.49	37.21
42	0.7520	0.5655	96.14	63.83	47.43	42.71	36.99
43	0.7410	0.5491	93.34	62.89	46.00	42.89	36.81
44	0.7290	0.5314	90.34	61.88	44.51	42.98	36.72
45	0.7170	0.5141	87.40	60.86	43.03	43.03	36.67

Depression Angle	Relative Field	Relative Power	ERP Watts	Radii in meters			
				Field Strength	Horizontal	Vertical	AGL
45	0.7170	0.5141	87.40	60.86	43.03	43.03	36.67
46	0.7050	0.4970	84.49	59.84	41.57	43.04	36.66
47	0.6930	0.4802	81.64	58.82	40.11	43.02	36.68
48	0.6800	0.4624	78.61	57.72	38.62	42.89	36.81
49	0.6670	0.4449	75.63	56.61	37.14	42.73	36.97
50	0.6540	0.4277	72.71	55.51	35.68	42.52	37.18
51	0.6410	0.4109	69.85	54.41	34.24	42.28	37.42
52	0.6280	0.3944	67.05	53.30	32.82	42.00	37.70
53	0.6140	0.3770	64.09	52.11	31.36	41.62	38.08
54	0.6000	0.3600	61.20	50.93	29.93	41.20	38.50
55	0.5860	0.3434	58.38	49.74	28.53	40.74	38.96
56	0.5720	0.3272	55.62	48.55	27.15	40.25	39.45
57	0.5580	0.3114	52.93	47.36	25.79	39.72	39.98
58	0.5440	0.2959	50.31	46.17	24.47	39.16	40.54
59	0.5290	0.2798	47.57	44.90	23.13	38.49	41.21
60	0.5140	0.2642	44.91	43.63	21.81	37.78	41.92
61	0.4990	0.2490	42.33	42.35	20.53	37.04	42.66
62	0.4840	0.2343	39.82	41.08	19.29	36.27	43.43
63	0.4690	0.2200	37.39	39.81	18.07	35.47	44.23
64	0.4530	0.2052	34.89	38.45	16.86	34.56	45.14
65	0.4370	0.1910	32.46	37.09	15.68	33.62	46.08
66	0.4220	0.1781	30.27	35.82	14.57	32.72	46.98
67	0.4060	0.1648	28.02	34.46	13.46	31.72	47.98
68	0.3900	0.1521	25.86	33.10	12.40	30.69	49.01
69	0.3730	0.1391	23.65	31.66	11.35	29.56	50.14
70	0.3570	0.1274	21.67	30.30	10.36	28.47	51.23
71	0.3410	0.1163	19.77	28.94	9.42	27.37	52.33
72	0.3240	0.1050	17.85	27.50	8.50	26.15	53.55
73	0.3070	0.0942	16.02	26.06	7.62	24.92	54.78
74	0.2900	0.0841	14.30	24.61	6.78	23.66	56.04
75	0.2730	0.0745	12.67	23.17	6.00	22.38	57.32
76	0.2560	0.0655	11.14	21.73	5.26	21.08	58.62
77	0.2390	0.0571	9.71	20.29	4.56	19.77	59.93
78	0.2210	0.0488	8.30	18.76	3.90	18.35	61.35
79	0.2040	0.0416	7.07	17.31	3.30	17.00	62.70
80	0.1860	0.0346	5.88	15.79	2.74	15.55	64.15
81	0.1680	0.0282	4.80	14.26	2.23	14.08	65.62
82	0.1510	0.0228	3.88	12.82	1.78	12.69	67.01
83	0.1330	0.0177	3.01	11.29	1.38	11.20	68.50
84	0.1140	0.0130	2.21	9.68	1.01	9.62	70.08
85	0.0960	0.0092	1.57	8.15	0.71	8.12	71.58
86	0.0780	0.0061	1.03	6.62	0.46	6.60	73.10
87	0.0590	0.0035	0.59	5.01	0.26	5.00	74.70
88	0.0400	0.0016	0.27	3.40	0.12	3.39	76.31
89	0.0210	0.0004	0.07	1.78	0.03	1.78	77.92
90	0.0000	0.0000	0.00	0.00	0.00	0.00	79.70

