

APPLICATION FOR CONSTRUCTION PERMIT

NEW - FARGO, NORTH DAKOTA
BNPFT-20180129ADL
FACILITY ID: 202080
98.3 MHz / 250 W ERP ND

REAL PRESENCE RADIO

APRIL, 2018

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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

4.24.2018

APPLICATION FOR CONSTRUCTION PERMIT

The following engineering statement and attached exhibits have been prepared for **Real Presence Radio** ("Real Presence"), applicant for a new FM translator station to serve Fargo, North Dakota, and are in support of their application for construction permit.¹ This application is being filed as the initial long-form application for the short-form engineering proposal filed under Auction 100, and assigned FCC File No. BNPFT-20180129ADL.

The proposed facility would operate on FM channel 252 with a maximum effective radiated power of 250 Watts at a center of radiation of 381 meters above mean sea level, which corresponds to a height of 106 meters above ground level at the site of the proposed tower. Other than a change to the antenna model, no changes to the short-form engineering are proposed under this long-form application.

The primary facility for the proposed translator is KVXR at Moorhead, Minnesota.² Exhibit E-1 provides a comparison between the proposed translator 60 dBu service contour, the KVXR 2 mV/m daytime groundwave contour, and a twenty-five mile radius centered on the KVXR transmitter site. This site demonstrates that the proposed translator service contour would be wholly contained within both of the KVXR constructs.

The proposed facility complies with the provisions of Section 74.1204 of the Commission's Rules. Due to the channel of operation, Section 74.1205 is not applicable. Exhibit E-2 is a tabular interference study for the proposed facility. This study demonstrates that the Section 74.1204

¹ The Facility ID for the proposed translator at Fargo, North Dakota is 202080.

² The Facility ID for KVXR at Moorhead, Minnesota is 35863.

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contour overlap provisions would be met to all relevant authorizations with the exception of KLTA-FM at Moorhead, Minnesota, and KFNW-FM at Fargo, North Dakota.³ The provisions of Section 74.1204(d) will be utilized in relation to those two facilities. The tabular interference study is graphically depicted in the contour map that comprises Exhibit E-3.

Although normally prohibited contour overlap would exist between the proposed facility and both KLTA-FM and KFNW-FM, no interference to populated regions is predicted to occur. Exhibit E-4 illustrates the proposed translator transmitter site along with the KLTA-FM 87.60 dBu and KFNW-FM 77.37 dBu F(50,50) service contours. As depicted, these contours intersect the proposed translator site. These two facilities operate second adjacent to the proposed translator, and as a result, interference to either full power facility is predicted to potentially occur when the translator field strength is at least 40 dB greater. Specifically, interference is predicted to potentially occur to KLTA-FM in regions where the translator field strength is at least 127.60 dBu, and to KFNW-FM when at least 117.37 dBu. The latter is the more restrictive value of the two, and will be utilized as the basis for this study.

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.

³ The Facility ID for KLT-FM at Moorhead, Minnesota is 21191. The Facility ID for KFNW-FM at Fargo, North Dakota is 49772.

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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:

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

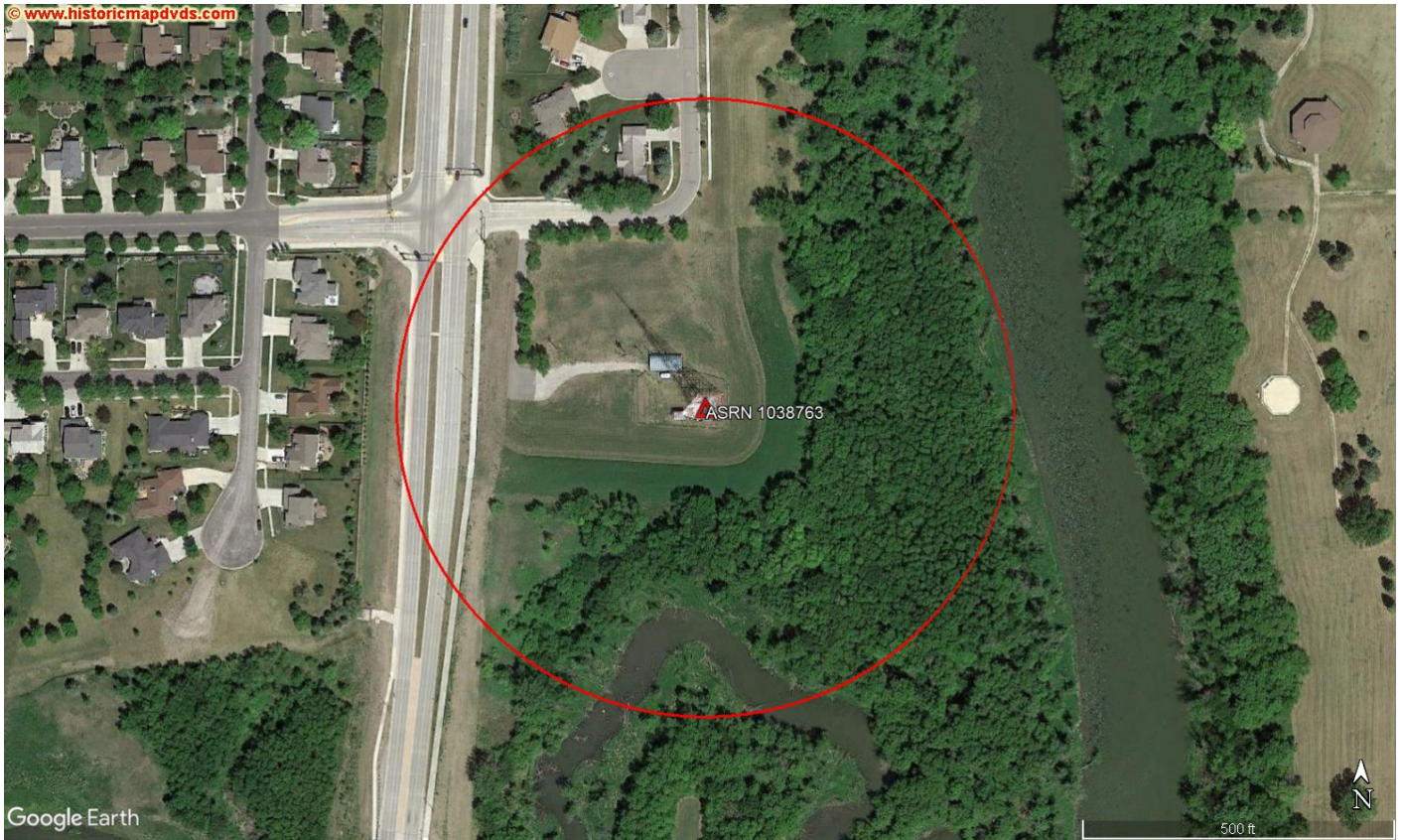
The results of these calculations for depression angles of 0 degrees to 90 degrees are tabulated in Exhibit E-5. The values listed for the relative field at the various depression angles were obtained from published manufacturer data for the proposed antenna. The listed radii values on this tabulation indicate the boundaries of the interference region at a given depression angle. The tabulation demonstrates that the predicted interference region is confined to a horizontal radius of 150.1 meters from the antenna. The following satellite image illustrates this radius along with the tower location.

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This image demonstrates that a portion of a highway and two structures either intersect or are contained within the predicted interference region. The interference region, however, is confined to elevations of at least 29 meters above site elevation, as is indicated in Exhibit E-6. The following is a street level image looking towards the northeast, from which it can be reasonably inferred that no structures exist, which would penetrate the lowest elevation at which interference may occur.

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From these images and described factors, it can be reasonably inferred that no population is present within the predicted interference region.

The proposed translator would be located near the border with Canada. Exhibit E-6 illustrates the predicted 34 dBu F(50,10) interference contour. As this map demonstrates, this contour resides fully within areas of the United States.

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

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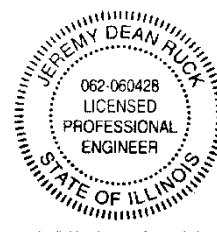
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Additionally, the proposed facility would not constitute a radiofrequency radiation hazard to persons at the site. The Commission's online *FM Model* utility returns a calculated maximum power density of $0.425 \mu\text{W}/\text{cm}^2$ at a distance of 106 meters from the tower. This value complies with the uncontrolled environment of the Commission's safety standard, and is sufficiently low to categorically exclude the facility. The Shively 6832-1 type antenna is considered a "type-2" antenna, and was analyzed as such.

Real Presence 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, 2019

Jeremy D. Ruck, PE
April 24, 2018

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221 S. 1st Avenue
Canton, IL 61520

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BNPFT20180129ADL
Latitude: 46-49-03 N
Longitude: 096-48-07 W
ERP: 0.25 kW
Channel: 252
Frequency: 98.3 MHz
AMSL Height: 381.0 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None




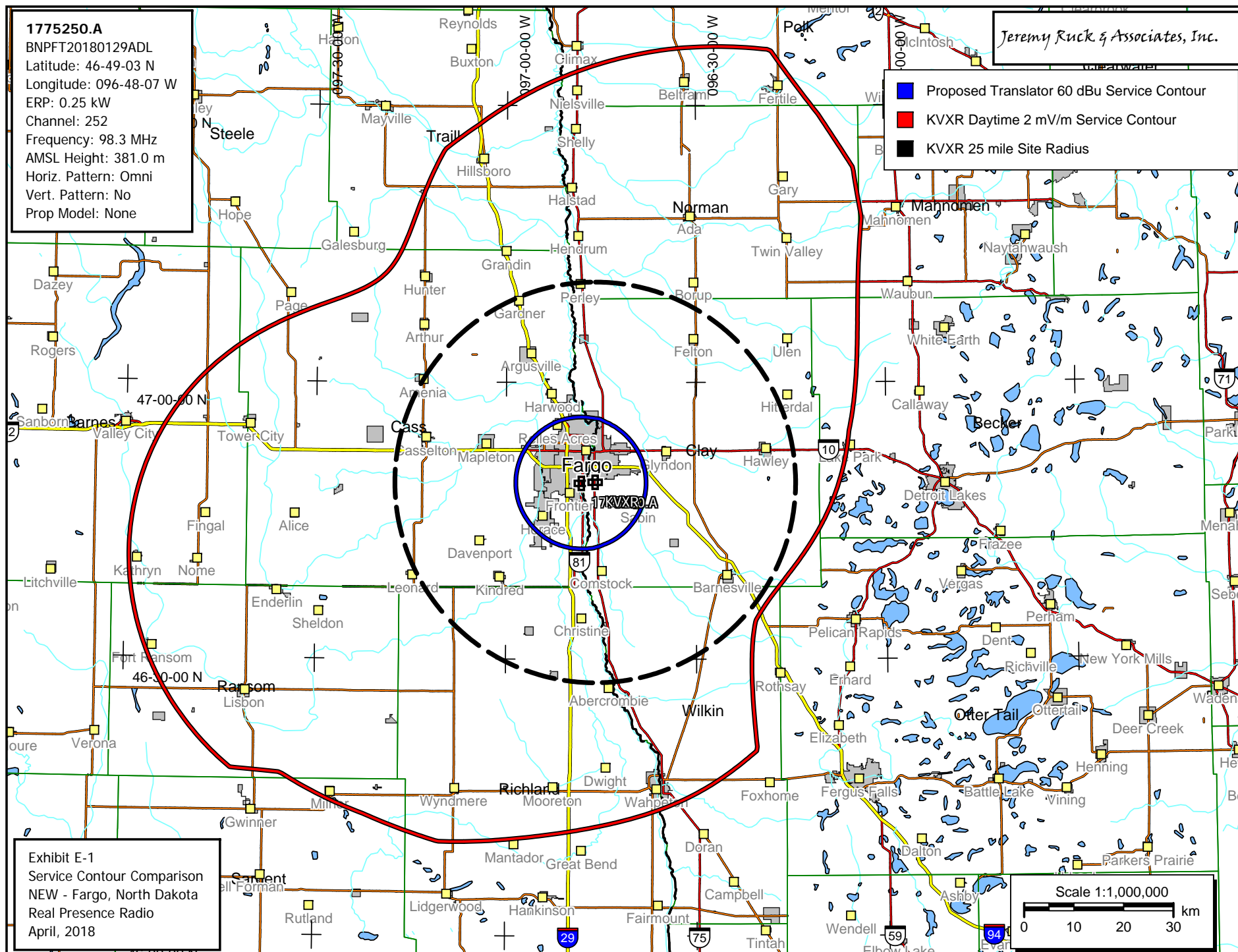
 Proposed Translator 60 dBu Service Contour
 KVXR Daytime 2 mV/m Service Contour
 KVXR 25 mile Site Radius

Exhibit E-1
Service Contour Comparison
NEW - Fargo, North Dakota
Real Presence Radio
April, 2018



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

Exhibit E-2 - Tabular Interference Study
NEW - Fargo, North Dakota
CH# 252D - 98.3 MHz, Pwr= 0.25 kW, HAAT= 0.0 M, COR= 381 M
Average Protected F(50-50)= 7.09 km
Omni-directional

DISPLAY DATES
DATA 04-24-18
SEARCH 04-24-18

REFERENCE
46 49 03.0 N.
96 48 07.0 W.

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*
252D Fargo	1775250	APP _C_ ND		0.0 0.0	0.00 BNPFT20180129ADL	46 49 03.0 96 48 07.0	0.250 381	0.00 381	0.00 Real Presence Radio	64.5R	-64.5M
254C1 Moorhead	KLTA-FM	LIC _CX MN		113.4 293.5	16.13 BMLH20140826ABA	46 45 35.0 96 36 27.0	100.000 177	7.9 463	62.4 Radio Fargo-moorhead, Inc.	-4.7	-47.3*
250C Fargo	KFNW-FM	LIC _CX ND		305.8 125.5	36.71 BMLED20061220ACI	47 00 36.0 97 11 41.0	100.000 305	10.4 595	73.6 University Of Northwestern	13.1	-38.0*
252C1 Carrington	KXGT	LIC _CN ND		281.1 99.5	172.32 BLH19961118KB	47 05 38.0 99 02 11.0	100.000 264	172.3 782	72.6 Two Rivers Broadcasting, I	-13.2	54.4
252C1 Blackduck	WBJI	LIC NCX MN		60.8 242.2	172.02 BLH20030825AFY	47 33 21.0 94 48 04.0	100.000 146	154.7 566	58.3 R.p. Broadcasting, Inc.	4.2	68.9

Terrain database is FCC 30 meter , 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.
Reference station has protected zone issue: AM tower

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ERP: 0.25 kW
Channel: 252
Frequency: 98.3 MHz
AMSL Height: 381.0 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None





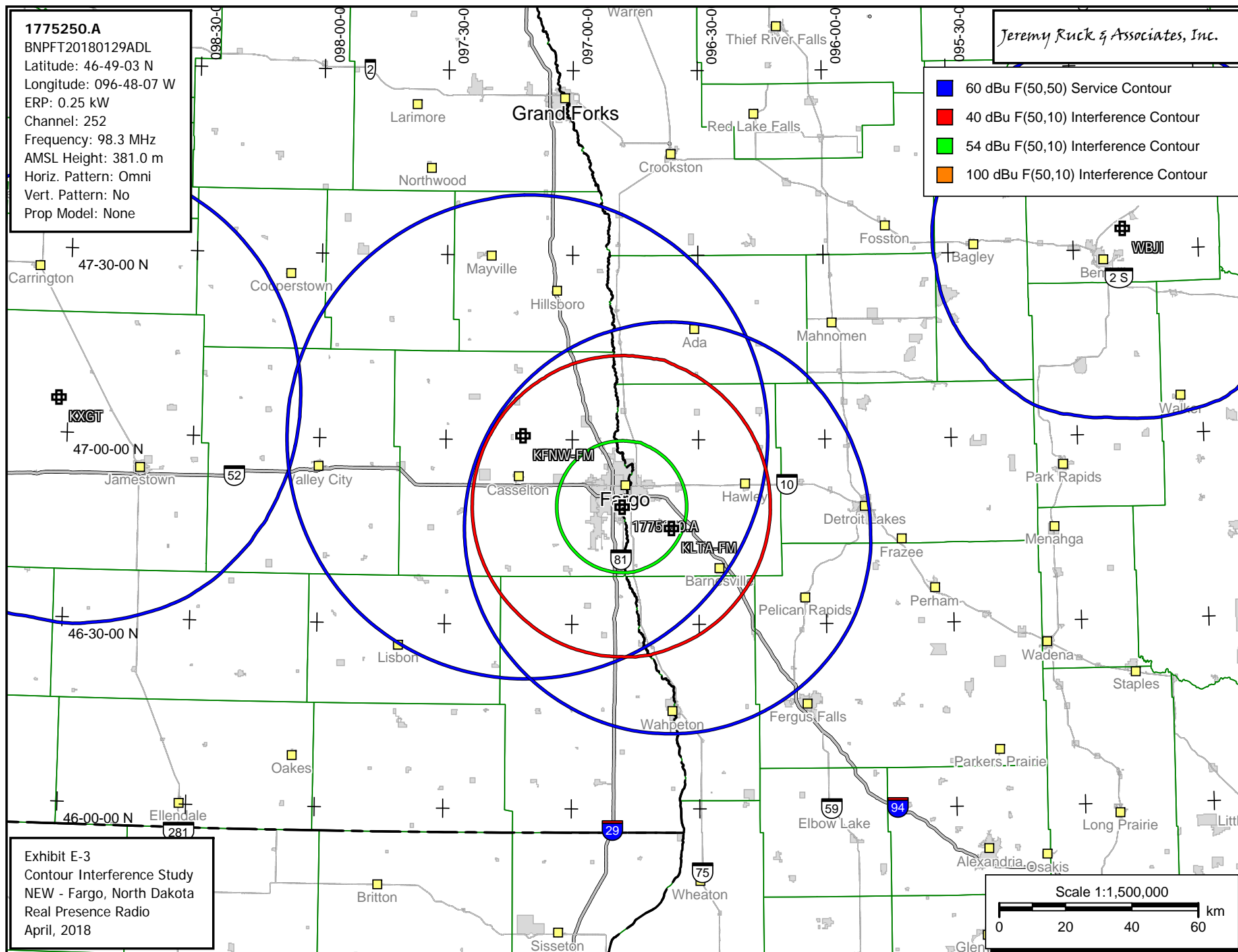
-  60 dBu F(50,50) Service Contour
-  40 dBu F(50,10) Interference Contour
-  54 dBu F(50,10) Interference Contour
-  100 dBu F(50,10) Interference Contour

Exhibit E-3
Contour Interference Study
NEW - Fargo, North Dakota
Real Presence Radio
April, 2018



1775250.A

BNPFT20180129ADL

Latitude: 46-49-03 N

Longitude: 096-48-07 W

ERP: 0.25 kW

Channel: 252

Frequency: 98.3 MHz

AMSL Height: 381.0 m

Elevation: 275.0 m

Horiz. Pattern: Omni

Vert. Pattern: No

Prop Model: None

Jeremy Ruck & Associates, Inc.

KLTA-FM 87.60 dBu F(50,50) Service Contour

KFNW-FM 77.37 dBu F(50,50) Service Contour

FCC F(50-50) 87.60 dBu (FCC HAAT)

FCC F(50-50) 77.37 dBu (FCC HAAT)

Oxbow

Prairie Rose

1775250.A

Frontier

Briarwood

Exhibit E-4

Interference Study

NEW - Fargo, North Dakota

Real Presence Radio

April, 2018

Scale 1:50,000

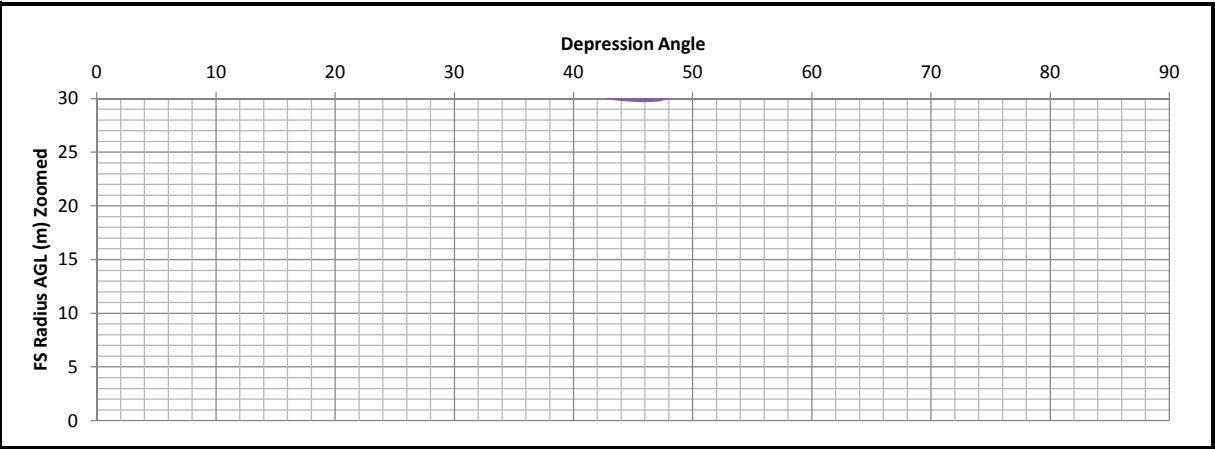
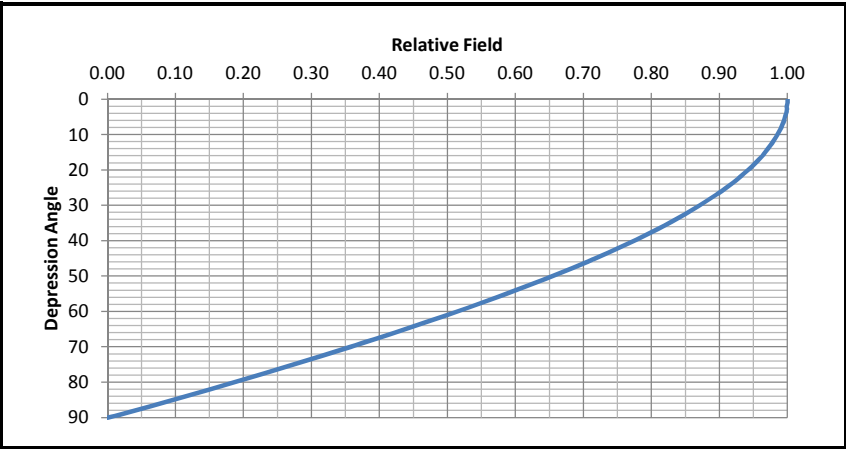
0 0.7 1.4 2.1 km

Exhibit E-5

Proximity Interference Analysis

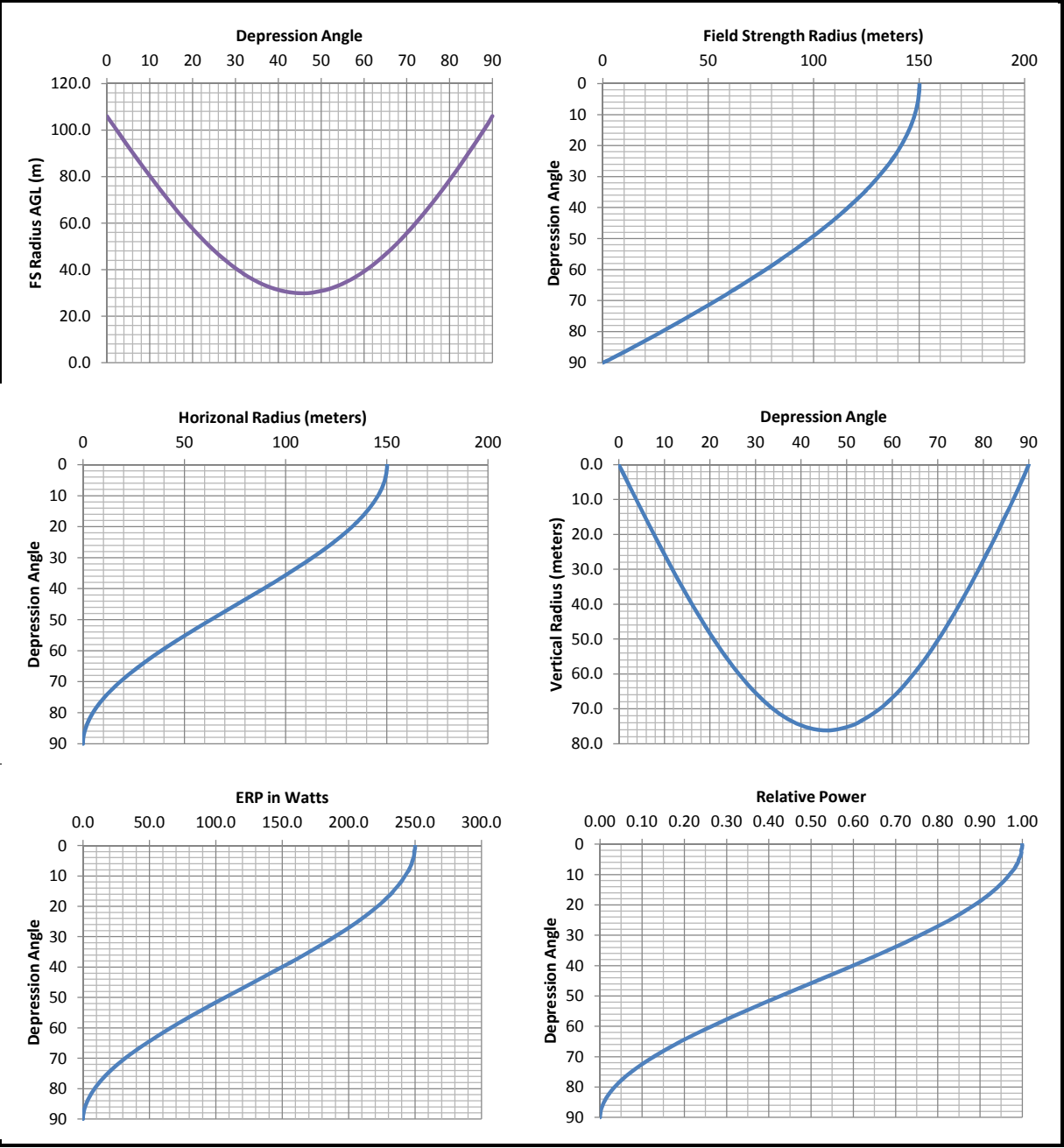
NEW - Fargo, North Dakota

Antenna No:	134	<div><div></div><div></div><div></div></div>	Center of Radiation:	106 m AGL
Manufacturer:	Shively	<div><div></div><div></div><div></div></div>	Effective Radiated Power:	250 Watts
Model:	6832-1		FS Contour:	117.37 dBu
Number of Bays:	1		E Field Strength:	0.73875 V/m
Bay Spacing:	Lambda		Z0:	377 Ohms
			Power Density:	0.001447634 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	150.13	150.13	0.00	106.00
1	1.0000	1.0000	250.00	150.13	150.10	2.62	103.38
2	0.9990	0.9980	249.50	149.98	149.89	5.23	100.77
3	0.9990	0.9980	249.50	149.98	149.77	7.85	98.15
4	0.9980	0.9960	249.00	149.83	149.46	10.45	95.55
5	0.9960	0.9920	248.00	149.53	148.96	13.03	92.97
6	0.9950	0.9900	247.51	149.38	148.56	15.61	90.39
7	0.9930	0.9860	246.51	149.08	147.96	18.17	87.83
8	0.9910	0.9821	245.52	148.78	147.33	20.71	85.29
9	0.9880	0.9761	244.04	148.33	146.50	23.20	82.80
10	0.9850	0.9702	242.56	147.87	145.63	25.68	80.32
11	0.9820	0.9643	241.08	147.42	144.72	28.13	77.87
12	0.9790	0.9584	239.61	146.97	143.76	30.56	75.44
13	0.9750	0.9506	237.66	146.37	142.62	32.93	73.07
14	0.9710	0.9428	235.71	145.77	141.44	35.27	70.73
15	0.9670	0.9351	233.77	145.17	140.23	37.57	68.43
16	0.9630	0.9274	231.84	144.57	138.97	39.85	66.15
17	0.9580	0.9178	229.44	143.82	137.54	42.05	63.95
18	0.9530	0.9082	227.05	143.07	136.07	44.21	61.79
19	0.9480	0.8987	224.68	142.32	134.57	46.33	59.67
20	0.9420	0.8874	221.84	141.42	132.89	48.37	57.63
21	0.9360	0.8761	219.02	140.52	131.19	50.36	55.64
22	0.9300	0.8649	216.23	139.62	129.45	52.30	53.70
23	0.9240	0.8538	213.44	138.72	127.69	54.20	51.80
24	0.9170	0.8409	210.22	137.67	125.76	55.99	50.01
25	0.9100	0.8281	207.03	136.62	123.82	57.74	48.26
26	0.9030	0.8154	203.85	135.56	121.84	59.43	46.57
27	0.8950	0.8010	200.26	134.36	119.72	61.00	45.00
28	0.8870	0.7868	196.69	133.16	117.58	62.52	43.48
29	0.8790	0.7726	193.16	131.96	115.42	63.98	42.02
30	0.8710	0.7586	189.66	130.76	113.24	65.38	40.62
31	0.8620	0.7430	185.76	129.41	110.93	66.65	39.35
32	0.8540	0.7293	182.33	128.21	108.73	67.94	38.06
33	0.8450	0.7140	178.51	126.86	106.39	69.09	36.91
34	0.8350	0.6972	174.31	125.36	103.92	70.10	35.90
35	0.8260	0.6823	170.57	124.00	101.58	71.13	34.87
36	0.8160	0.6659	166.46	122.50	99.11	72.01	33.99
37	0.8060	0.6496	162.41	121.00	96.64	72.82	33.18
38	0.7960	0.6336	158.40	119.50	94.17	73.57	32.43
39	0.7850	0.6162	154.06	117.85	91.59	74.17	31.83
40	0.7740	0.5991	149.77	116.20	89.01	74.69	31.31
41	0.7630	0.5822	145.54	114.55	86.45	75.15	30.85
42	0.7520	0.5655	141.38	112.90	83.90	75.54	30.46
43	0.7410	0.5491	137.27	111.24	81.36	75.87	30.13
44	0.7290	0.5314	132.86	109.44	78.73	76.03	29.97
45	0.7170	0.5141	128.52	107.64	76.11	76.11	29.89

Depression Angle	Relative Field	Relative Power	ERP Watts	Radii in meters			
				Field Strength	Horizontal	Vertical	AGL
45	0.7170	0.5141	128.52	107.64	76.11	76.11	29.89
46	0.7050	0.4970	124.26	105.84	73.52	76.13	29.87
47	0.6930	0.4802	120.06	104.04	70.95	76.09	29.91
48	0.6800	0.4624	115.60	102.09	68.31	75.86	30.14
49	0.6670	0.4449	111.22	100.13	65.69	75.57	30.43
50	0.6540	0.4277	106.93	98.18	63.11	75.21	30.79
51	0.6410	0.4109	102.72	96.23	60.56	74.79	31.21
52	0.6280	0.3944	98.60	94.28	58.04	74.29	31.71
53	0.6140	0.3770	94.25	92.18	55.47	73.62	32.38
54	0.6000	0.3600	90.00	90.08	52.95	72.87	33.13
55	0.5860	0.3434	85.85	87.97	50.46	72.06	33.94
56	0.5720	0.3272	81.80	85.87	48.02	71.19	34.81
57	0.5580	0.3114	77.84	83.77	45.62	70.26	35.74
58	0.5440	0.2959	73.98	81.67	43.28	69.26	36.74
59	0.5290	0.2798	69.96	79.42	40.90	68.07	37.93
60	0.5140	0.2642	66.05	77.17	38.58	66.83	39.17
61	0.4990	0.2490	62.25	74.91	36.32	65.52	40.48
62	0.4840	0.2343	58.56	72.66	34.11	64.16	41.84
63	0.4690	0.2200	54.99	70.41	31.97	62.74	43.26
64	0.4530	0.2052	51.30	68.01	29.81	61.12	44.88
65	0.4370	0.1910	47.74	65.61	27.73	59.46	46.54
66	0.4220	0.1781	44.52	63.35	25.77	57.88	48.12
67	0.4060	0.1648	41.21	60.95	23.82	56.11	49.89
68	0.3900	0.1521	38.03	58.55	21.93	54.29	51.71
69	0.3730	0.1391	34.78	56.00	20.07	52.28	53.72
70	0.3570	0.1274	31.86	53.60	18.33	50.36	55.64
71	0.3410	0.1163	29.07	51.19	16.67	48.40	57.60
72	0.3240	0.1050	26.24	48.64	15.03	46.26	59.74
73	0.3070	0.0942	23.56	46.09	13.48	44.08	61.92
74	0.2900	0.0841	21.03	43.54	12.00	41.85	64.15
75	0.2730	0.0745	18.63	40.98	10.61	39.59	66.41
76	0.2560	0.0655	16.38	38.43	9.30	37.29	68.71
77	0.2390	0.0571	14.28	35.88	8.07	34.96	71.04
78	0.2210	0.0488	12.21	33.18	6.90	32.45	73.55
79	0.2040	0.0416	10.40	30.63	5.84	30.06	75.94
80	0.1860	0.0346	8.65	27.92	4.85	27.50	78.50
81	0.1680	0.0282	7.06	25.22	3.95	24.91	81.09
82	0.1510	0.0228	5.70	22.67	3.15	22.45	83.55
83	0.1330	0.0177	4.42	19.97	2.43	19.82	86.18
84	0.1140	0.0130	3.25	17.11	1.79	17.02	88.98
85	0.0960	0.0092	2.30	14.41	1.26	14.36	91.64
86	0.0780	0.0061	1.52	11.71	0.82	11.68	94.32
87	0.0590	0.0035	0.87	8.86	0.46	8.85	97.15
88	0.0400	0.0016	0.40	6.01	0.21	6.00	100.00
89	0.0210	0.0004	0.11	3.15	0.06	3.15	102.85
90	0.0000	0.0000	0.00	0.00	0.00	0.00	106.00



1775250.A
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Latitude: 46-49-03 N
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ERP: 0.25 kW
Channel: 252
Frequency: 98.3 MHz
AMSL Height: 381.0 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

Proposed 34 dBu
F(50,10) Contour

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