

# *APPLICATION FOR CONSTRUCTION PERMIT*

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NEW - GRAND FORKS, NORTH DAKOTA  
BNPFT-20180129ADM  
FACILITY ID: 202079  
92.5 MHz / 250 W ERP ND

REAL PRESENCE RADIO

OCTOBER, 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

**10.5.2018**

## **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 Grand Forks, North Dakota, and are in support of their application for construction permit.<sup>1</sup> 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-20180129ADM.

The proposed facility would operate on FM channel 223 with a maximum effective radiated power of 250 Watts at a center of radiation of 272 meters above mean sea level, which corresponds to a height of 18 meters above ground at the site of the proposed tower. No change to the short-form engineering amendment is proposed under this long-form application.

The primary facility for the proposed translator is KWTL at Grand Forks, North Dakota.<sup>2</sup> Exhibit E-1 provides a comparison between the proposed translator 60 dBu service contour, and both the KWTL 2 mV/m daytime contour and a twenty-five mile radius centered on the KWTL transmitter site. This map demonstrates that the proposed translator service contour would be wholly contained within both of the KWTL 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 contour overlap provisions would be met to all relevant authorizations with the exception of KKXL-

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<sup>1</sup> The Facility ID for the proposed translator at Grand Forks, North Dakota is 202079.

<sup>2</sup> The Facility ID for KWTL at Grand Forks, North Dakota is 69201.

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FM at Grand Forks, North Dakota, and the pending application for a new translator at Crookston, Minnesota under FCC File No. BNPFT-20180126ACN.<sup>3</sup> 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 KKXL-FM and the pending translator application at Crookston, no interference to populated regions is predicted to occur. Exhibit E-4 illustrates the proposed translator site along with both the KKXL-FM 103.40 dBu F(50,50) and Crookston 90.65 dBu F(50,50) service contours. As depicted, these contours intersect the proposed translator site. These two facilities are authorized 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 above the full power field strength. Specifically, interference is predicted to potentially occur to KKXL in regions where the translator field strength is at least 143.40 dBu, and to the Crookston translator when at least 130.65 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<sub>0</sub> is the characteristic impedance of free space of 377 ohms.

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<sup>3</sup> The Facility ID for KXXL-FM at Grand Forks, North Dakota is 20325. The Facility ID for the Crookston, MN translator under BNPFT-20180126ACN is 202642.

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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:

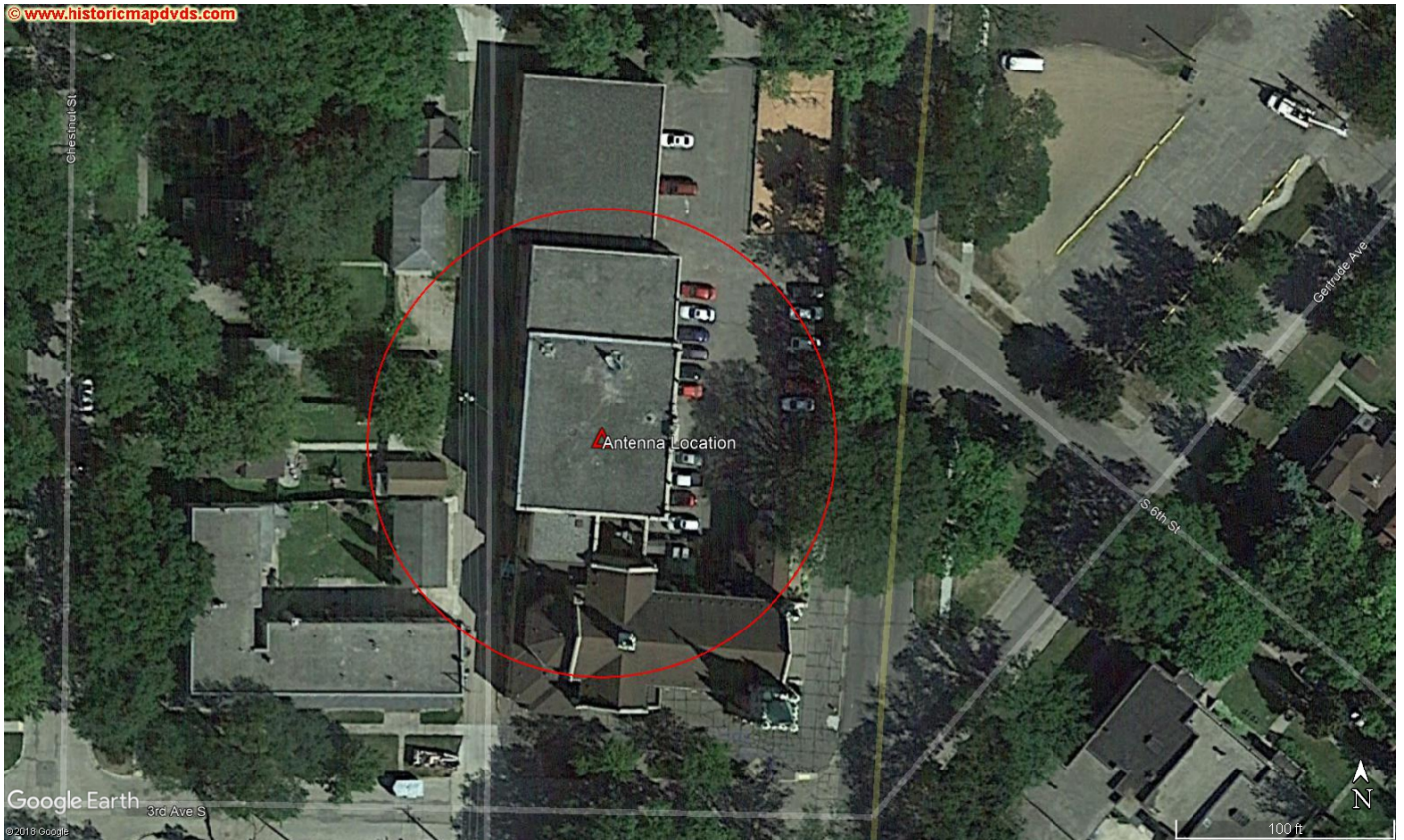
$$R^2 = \frac{P}{4\pi S}$$

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 32.54 meters from the antenna. The following satellite image illustrates this radius along with the tower location.

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As this image indicates, the predicted interference issue is generally confined to the campus of St. Mary's Church and School. To the west, other structures are impacted. The following street level image illustrates the view up the west side of the church.

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This image demonstrates that the structures potentially impacted west of the church are all garages, with the exception of the two-story residential building on the corner, where the interference region is tangential to the corner of the building. As indicated in the Exhibit E-3 tabulation, at the maximum interference radius, the elevation of the interference region would be greater than approximately 13 meters, or 42 feet above ground. By inspection, it can be seen that this residential building is of a lower height, and thus does not intersect the interference region.

The other structures west of the alley within the interference region are all shorter than the maximum elevation at which interference may occur. More importantly, however, each of these structures is unoccupied, serving as garages or other outbuildings. Closer to the antenna, the structures involved are part of St. Mary's School, where no radio listeners would be present, and of

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course St. Mary's Catholic Church where a similar situation exists. Finally, due to the elevation of the building on which the antenna is located and the high depression angle to the parking lots, streets, and sidewalks, interference to the reception of KKXL-FM or the proposed Crookston translator is not predicted because of signal obstruction. As a result, it is respectfully submitted that interference from the proposed translator would not impact populated regions, and thus complies with the provisions of Section 74.1204(d) of the Commission's Rules.

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 be mounted to the rooftop of an existing structure. The addition of the translator antenna to this structure would not increase the existing environmental impact already present.

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  $17.9 \mu\text{W}/\text{cm}^2$  at a distance of 16 meters from the antenna. This value complies with the uncontrolled environment of the Commission's safety standard. The antenna is mounted to the rooftop of a building. Due to the low effective radiated power, no concerns exist with regard to areas internal to the building. On the rooftop, access to the area in the immediate vicinity of the antenna will necessitate the cessation of operation of the translator in order to prevent exposure to levels of radiofrequency radiation in excess of the applicable standards.

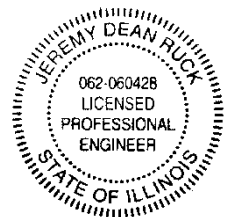
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Real Presence certifies that it will coordinate with all other users of the site to ensure that workers and other personnel are not exposed to levels of radiofrequency radiation in excess of the applicable safety standards. Coordination activities 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  
October 5, 2018

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**1786375.A**

BNPFT20180129ADM

Latitude: 47-55-12 N

Longitude: 097-01-44 W

ERP: 0.25 kW

Channel: 223

Frequency: 92.5 MHz

AMSL Height: 272.0 m

Horiz. Pattern: Omni

*Jeremy Ruck & Associates, Inc.*

- Translator 60 dBu Service Contour
- KWTL 2 mV/m Daytime Contour
- KWTL 25 mile Site Radius

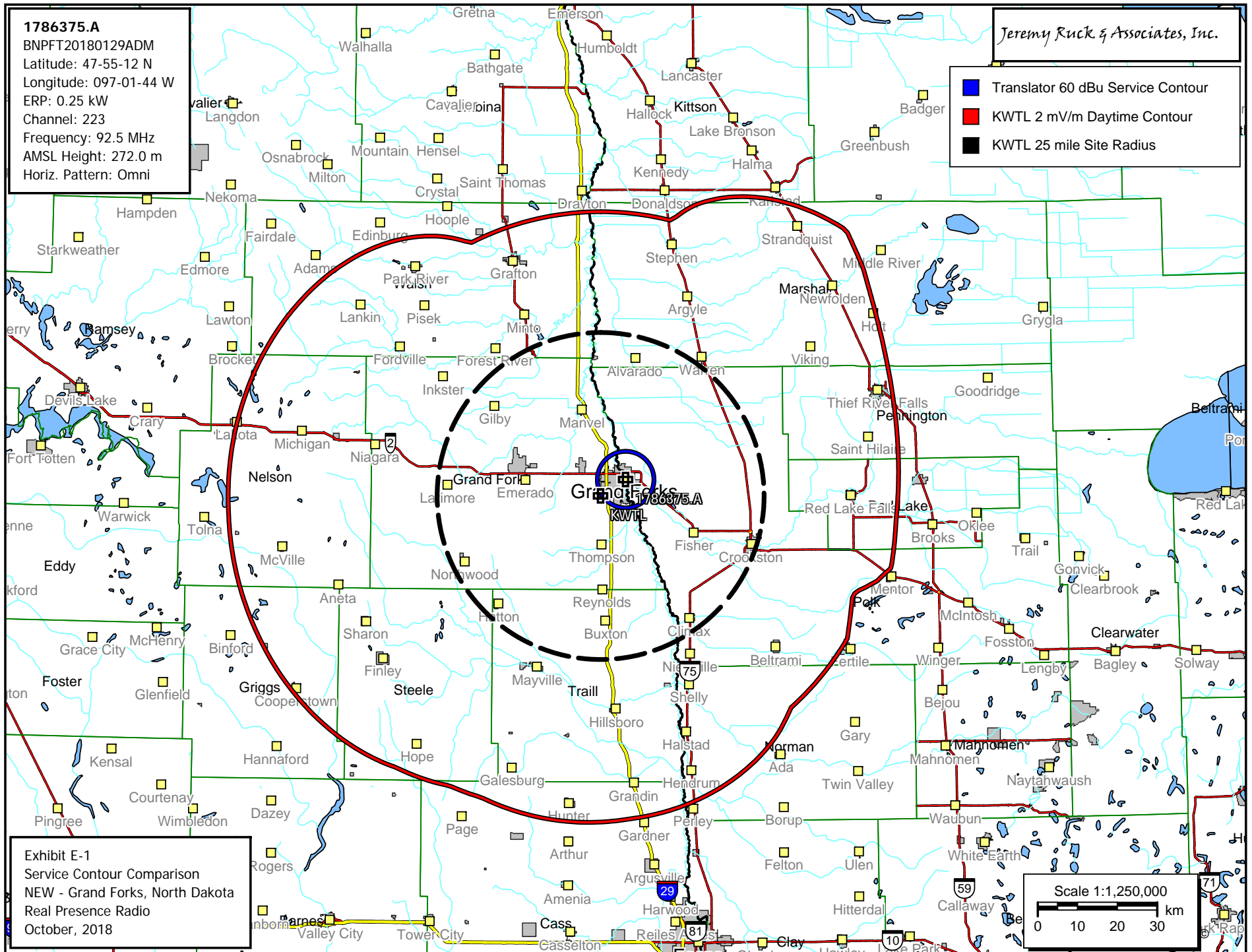


Exhibit E-1

Service Contour Comparison

NEW - Grand Forks, North Dakota

Real Presence Radio

October, 2018

Scale 1:1,250,000

0 10 20 30 km

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

Exhibit E-2 - Tabular Interference Study  
NEW - Grand Forks, North Dakota  
CH# 223D - 92.5 MHz, Pwr= 0.25 kW, HAAT= 0.0 M, COR= 272 M  
Average Protected F(50-50)= 7.09 km  
Omni-directional

DISPLAY DATES  
DATA 10-04-18  
SEARCH 10-04-18

REFERENCE  
47 55 12.0 N.  
97 01 44.0 W.

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*
225C1 Grand Forks	KKXL-FM	LIC _CN ND	359.5 179.5	4.94 BLH19980518KC	47 57 52.0 97 01 46.0	100.000 109	6.1 361	52.1 Citicasters Licenses, Inc.	-8.2*	-48.3*
223D Grand Forks	1786375	APP _C_ ND	0.0 0.0	0.00 BNPFT20180129ADM	47 55 12.0 97 01 44.0	0.250	272	---Reference---		Real Presence Radio
221D Crookston	1782752	APP DC_ MN	320.8 140.8	1.63 BNPFT20180126ACN	47 55 53.0 97 02 34.0	0.250	1.1 307	9.4 Gopher Communications Comp	-6.5*	-8.9*
223C1 Warroad	KKWQ	LIC _CN MN	49.6 230.8	157.73 BLH19890830KB	48 49 41.0 95 23 16.0	100.000 141	153.1 479	57.0 Border Broadcasting, Lp	-2.5	76.9
220C Fargo	KDSU«	LIC _CN ND	187.1 6.9	101.56 BLED19820621AB	47 00 48.0 97 11 37.0	100.000 302	10.2 593	72.6 North Dakota State Univers	18.5R	83.1M

Terrain database is NED 03 SEC , R= 73.215 qualifying spacings or FCC minimum Spacings in KM, M= Margin in KM  
Contour distances are on direct line to and from reference station. 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.

**1786375.A**

BNPFT20180129ADM

Latitude: 47-55-12 N

Longitude: 097-01-44 W

ERP: 0.25 kW

Channel: 223

Frequency: 92.5 MHz

AMS Height: 272.0 m

Horiz. Pattern: Omni

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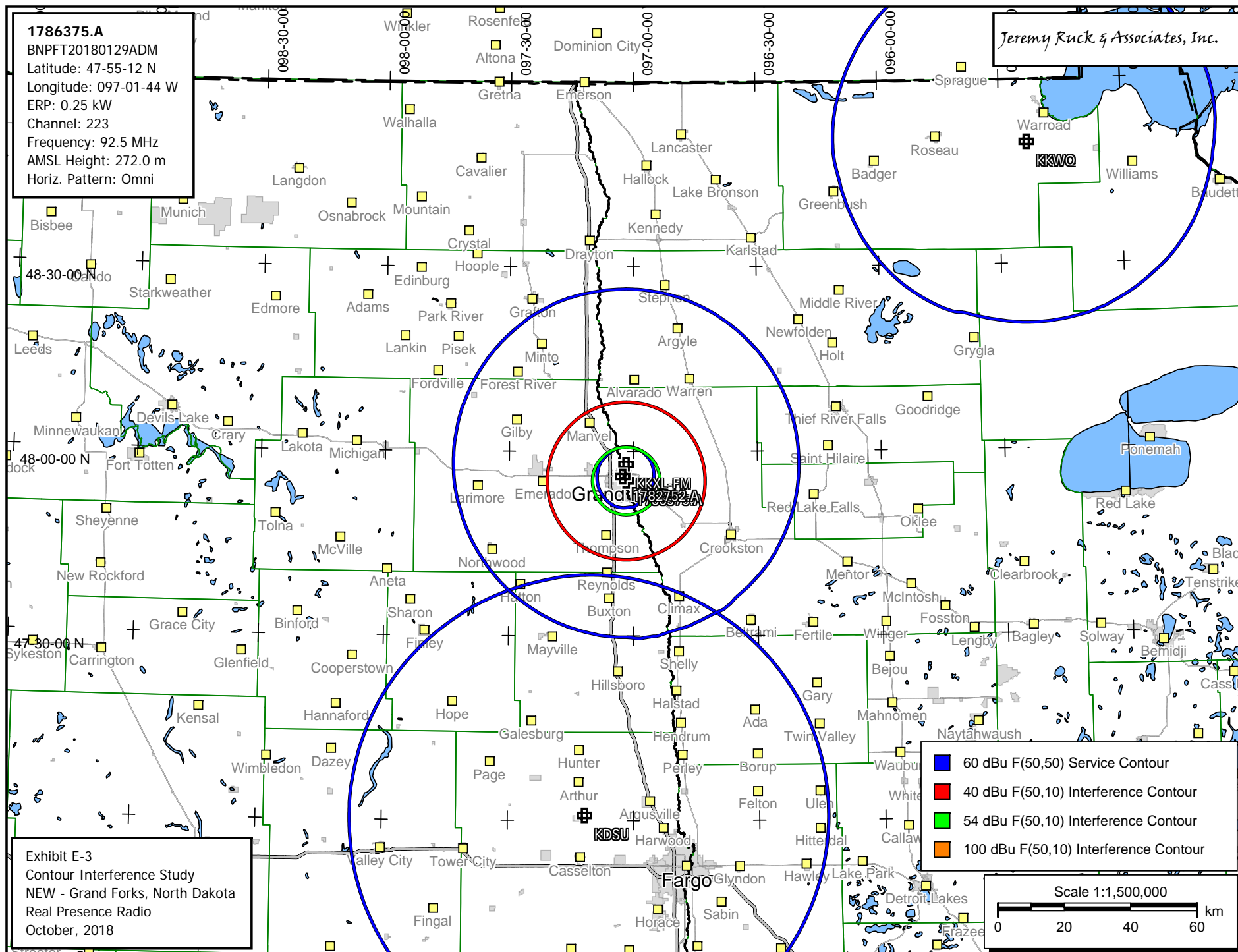


Exhibit E-3

Contour Interference Study

NEW - Grand Forks, North Dakota

Real Presence Radio

October, 2018

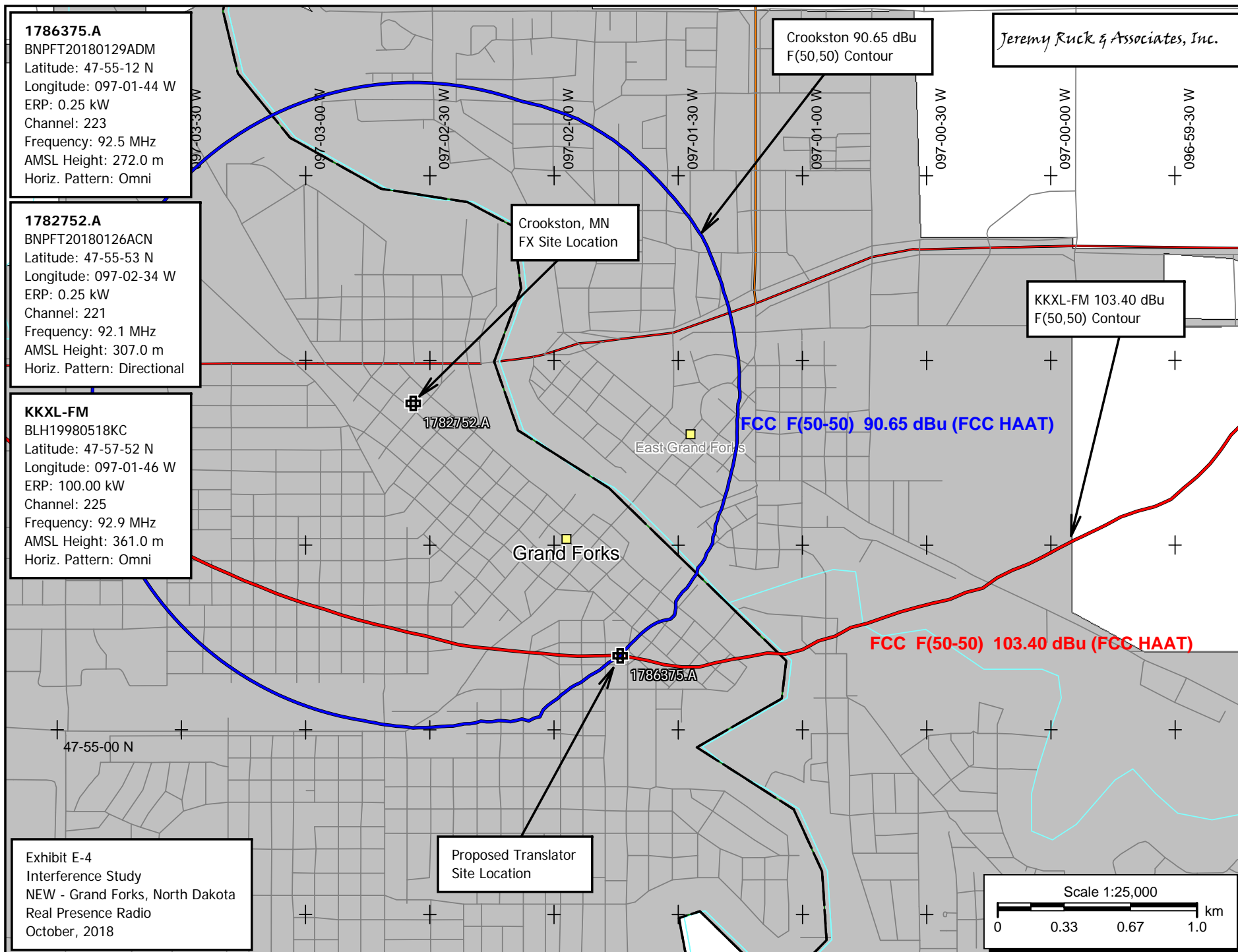
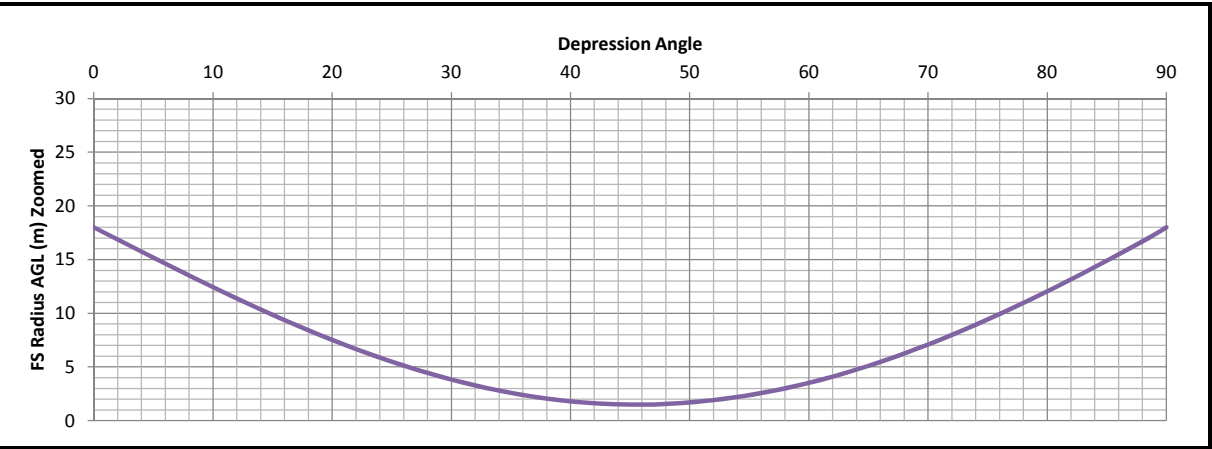
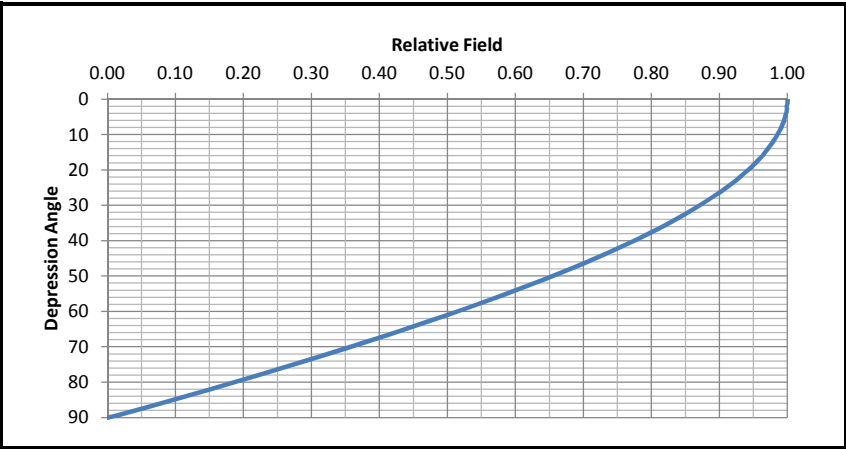


Exhibit -5

Proximity Interference Analysis

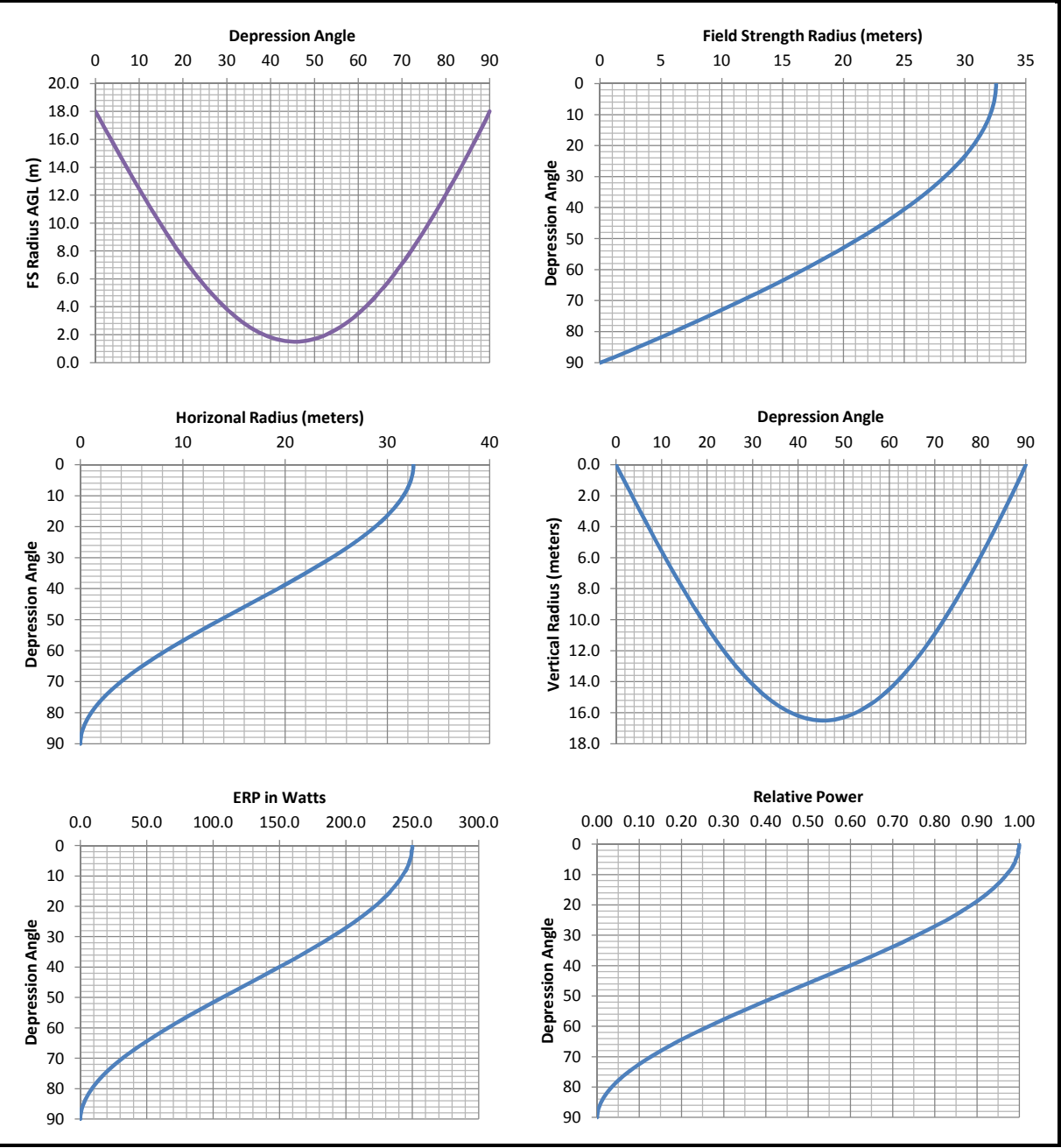
NEW - Grand Forks, North Dakota

Antenna No:	134	<div><div></div><div></div><div></div></div>	Center of Radiation:	18 m AGL
Manufacturer:	Shively	<div><div></div><div></div><div></div></div>	Effective Radiated Power:	250 Watts
Model:	6832-1		FS Contour:	130.65 dBu
Number of Bays:	1		E Field Strength:	3.40800 V/m
Bay Spacing:	Lambda		Z0:	377 Ohms
			Power Density:	0.030807656 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	32.54	32.54	0.00	18.00
1	1.0000	1.0000	250.00	32.54	32.54	0.57	17.43
2	0.9990	0.9980	249.50	32.51	32.49	1.13	16.87
3	0.9990	0.9980	249.50	32.51	32.47	1.70	16.30
4	0.9980	0.9960	249.00	32.48	32.40	2.27	15.73
5	0.9960	0.9920	248.00	32.41	32.29	2.82	15.18
6	0.9950	0.9900	247.51	32.38	32.20	3.38	14.62
7	0.9930	0.9860	246.51	32.32	32.07	3.94	14.06
8	0.9910	0.9821	245.52	32.25	31.94	4.49	13.51
9	0.9880	0.9761	244.04	32.15	31.76	5.03	12.97
10	0.9850	0.9702	242.56	32.05	31.57	5.57	12.43
11	0.9820	0.9643	241.08	31.96	31.37	6.10	11.90
12	0.9790	0.9584	239.61	31.86	31.16	6.62	11.38
13	0.9750	0.9506	237.66	31.73	30.92	7.14	10.86
14	0.9710	0.9428	235.71	31.60	30.66	7.64	10.36
15	0.9670	0.9351	233.77	31.47	30.40	8.14	9.86
16	0.9630	0.9274	231.84	31.34	30.12	8.64	9.36
17	0.9580	0.9178	229.44	31.18	29.81	9.12	8.88
18	0.9530	0.9082	227.05	31.01	29.50	9.58	8.42
19	0.9480	0.8987	224.68	30.85	29.17	10.04	7.96
20	0.9420	0.8874	221.84	30.66	28.81	10.48	7.52
21	0.9360	0.8761	219.02	30.46	28.44	10.92	7.08
22	0.9300	0.8649	216.23	30.26	28.06	11.34	6.66
23	0.9240	0.8538	213.44	30.07	27.68	11.75	6.25
24	0.9170	0.8409	210.22	29.84	27.26	12.14	5.86
25	0.9100	0.8281	207.03	29.61	26.84	12.52	5.48
26	0.9030	0.8154	203.85	29.39	26.41	12.88	5.12
27	0.8950	0.8010	200.26	29.13	25.95	13.22	4.78
28	0.8870	0.7868	196.69	28.87	25.49	13.55	4.45
29	0.8790	0.7726	193.16	28.61	25.02	13.87	4.13
30	0.8710	0.7586	189.66	28.34	24.55	14.17	3.83
31	0.8620	0.7430	185.76	28.05	24.05	14.45	3.55
32	0.8540	0.7293	182.33	27.79	23.57	14.73	3.27
33	0.8450	0.7140	178.51	27.50	23.06	14.98	3.02
34	0.8350	0.6972	174.31	27.17	22.53	15.20	2.80
35	0.8260	0.6823	170.57	26.88	22.02	15.42	2.58
36	0.8160	0.6659	166.46	26.56	21.48	15.61	2.39
37	0.8060	0.6496	162.41	26.23	20.95	15.79	2.21
38	0.7960	0.6336	158.40	25.90	20.41	15.95	2.05
39	0.7850	0.6162	154.06	25.55	19.85	16.08	1.92
40	0.7740	0.5991	149.77	25.19	19.30	16.19	1.81
41	0.7630	0.5822	145.54	24.83	18.74	16.29	1.71
42	0.7520	0.5655	141.38	24.47	18.19	16.38	1.62
43	0.7410	0.5491	137.27	24.11	17.64	16.45	1.55
44	0.7290	0.5314	132.86	23.72	17.07	16.48	1.52
45	0.7170	0.5141	128.52	23.33	16.50	16.50	1.50

Depression Angle	Relative Field	Relative Power	ERP Watts	Radii in meters			
				Field Strength	Horizontal	Vertical	AGL
45	0.7170	0.5141	128.52	23.33	16.50	16.50	1.50
46	0.7050	0.4970	124.26	22.94	15.94	16.50	1.50
47	0.6930	0.4802	120.06	22.55	15.38	16.49	1.51
48	0.6800	0.4624	115.60	22.13	14.81	16.45	1.55
49	0.6670	0.4449	111.22	21.71	14.24	16.38	1.62
50	0.6540	0.4277	106.93	21.28	13.68	16.30	1.70
51	0.6410	0.4109	102.72	20.86	13.13	16.21	1.79
52	0.6280	0.3944	98.60	20.44	12.58	16.10	1.90
53	0.6140	0.3770	94.25	19.98	12.03	15.96	2.04
54	0.6000	0.3600	90.00	19.53	11.48	15.80	2.20
55	0.5860	0.3434	85.85	19.07	10.94	15.62	2.38
56	0.5720	0.3272	81.80	18.61	10.41	15.43	2.57
57	0.5580	0.3114	77.84	18.16	9.89	15.23	2.77
58	0.5440	0.2959	73.98	17.70	9.38	15.01	2.99
59	0.5290	0.2798	69.96	17.22	8.87	14.76	3.24
60	0.5140	0.2642	66.05	16.73	8.36	14.49	3.51
61	0.4990	0.2490	62.25	16.24	7.87	14.20	3.80
62	0.4840	0.2343	58.56	15.75	7.39	13.91	4.09
63	0.4690	0.2200	54.99	15.26	6.93	13.60	4.40
64	0.4530	0.2052	51.30	14.74	6.46	13.25	4.75
65	0.4370	0.1910	47.74	14.22	6.01	12.89	5.11
66	0.4220	0.1781	44.52	13.73	5.59	12.55	5.45
67	0.4060	0.1648	41.21	13.21	5.16	12.16	5.84
68	0.3900	0.1521	38.03	12.69	4.75	11.77	6.23
69	0.3730	0.1391	34.78	12.14	4.35	11.33	6.67
70	0.3570	0.1274	31.86	11.62	3.97	10.92	7.08
71	0.3410	0.1163	29.07	11.10	3.61	10.49	7.51
72	0.3240	0.1050	26.24	10.54	3.26	10.03	7.97
73	0.3070	0.0942	23.56	9.99	2.92	9.55	8.45
74	0.2900	0.0841	21.03	9.44	2.60	9.07	8.93
75	0.2730	0.0745	18.63	8.88	2.30	8.58	9.42
76	0.2560	0.0655	16.38	8.33	2.02	8.08	9.92
77	0.2390	0.0571	14.28	7.78	1.75	7.58	10.42
78	0.2210	0.0488	12.21	7.19	1.50	7.03	10.97
79	0.2040	0.0416	10.40	6.64	1.27	6.52	11.48
80	0.1860	0.0346	8.65	6.05	1.05	5.96	12.04
81	0.1680	0.0282	7.06	5.47	0.86	5.40	12.60
82	0.1510	0.0228	5.70	4.91	0.68	4.87	13.13
83	0.1330	0.0177	4.42	4.33	0.53	4.30	13.70
84	0.1140	0.0130	3.25	3.71	0.39	3.69	14.31
85	0.0960	0.0092	2.30	3.12	0.27	3.11	14.89
86	0.0780	0.0061	1.52	2.54	0.18	2.53	15.47
87	0.0590	0.0035	0.87	1.92	0.10	1.92	16.08
88	0.0400	0.0016	0.40	1.30	0.05	1.30	16.70
89	0.0210	0.0004	0.11	0.68	0.01	0.68	17.32
90	0.0000	0.0000	0.00	0.00	0.00	0.00	18.00





**1786375.A**  
BNPFT20180129ADM  
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ERP: 0.25 kW  
Channel: 223  
Frequency: 92.5 MHz  
AMSL Height: 272.0 m  
Horiz. Pattern: Omni

Jeremy Ruck & Associates, Inc.

United States-Canada  
International Border

Proposed 34 dBu  
F(50,10) Contour

1786375.A

Exhibit E-6  
International Agreement Compliance  
NEW - Grand Forks, North Dakota  
Real Presence Radio  
October, 2018

Scale 1:3,000,000

0 40 80 120 km

