

## **Comprehensive Engineering Exhibit**

**K279AZ Cottage Grove, Minnesota**

### **Modification Application to BPFT-20100208ABV**

**June 2010**

This application seeks a modification to permit BPFT-20100208ABV to specify a different antenna at the same location, the use of a directional antenna, and an increase in power. The present permit anticipated use of an existing shared antenna, however technical and financial issues necessitate the use of a new antenna to be used by K279AZ only.

It is proposed to use a directional antenna mounted 253 meters above ground level, on the currently permitted structure identified by registration number 1029018. This height is 17 meters lower than the presently permitted height, with a power of 250 watts.

At this location K279AZ is within the protected contour of second-adjacent station KZJK, with a signal level of 93.8 dBu at the site as demonstrated in Figure 1, the interfering signal level is calculated at 133.8 dBu. This proposal is to utilize a Shively Labs 6812-B, two bay, half-wave spaced antenna. As can be seen in Figure 2 the interfering contour produced by this antenna has been determined it will not reach the rooftop, or beyond the roof edge, impacting no habitable area and is thus devoid of any population which would receive interference. To prevent prohibited contour overlap with co-channel station KLZZ a directional antenna will be employed. Figure 3 is a spacing and separation study that indicates the other facility or authorization of concern is that of KLZZ. The contour map of Figure 4 demonstrates that the 60 dBu of KLZZ will not be overlapped by the 40 dbu (F50:10) of the proposal.

#### **Radio Frequency Radiation Study and Statement**

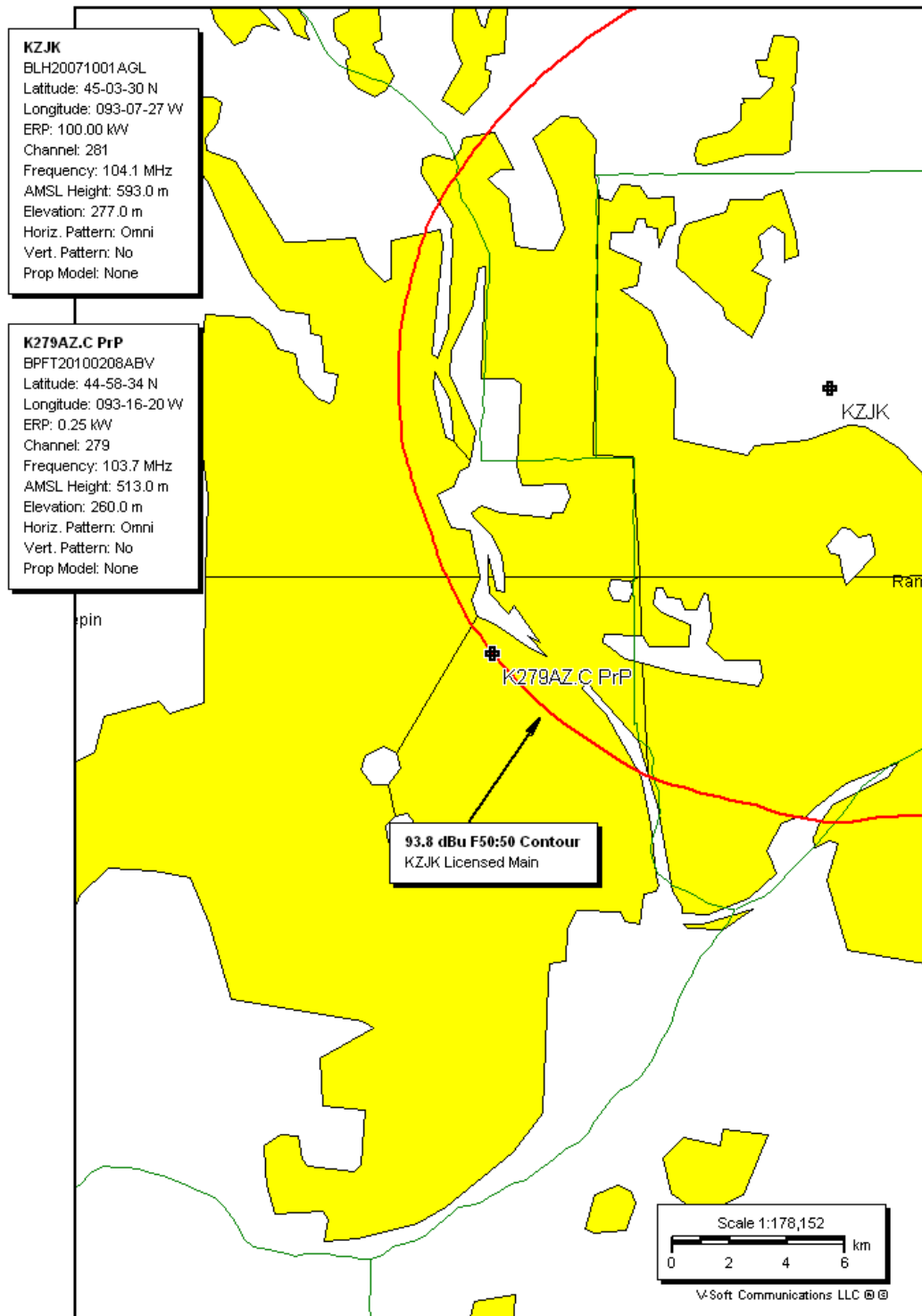
The proposed facilities were evaluated in terms of potential radio frequency radiation exposure at ground level in accordance with OET Bulletin No. 65, "Evaluating Compliance With FCC-Specified Guidelines for Human Exposure to Radio frequency Radiation."

The proposed antenna system is a Shively Labs 6812-B, two bay, half-wave spaced antenna mounted 18 meters above building rooftop. For purposes of this analysis the FM Model program has been set to calculate values for a "worst case" element of a "Ring Stub" EPA type 1, 2- bay, half (1/2) wave spaced, antenna mounted with its center of radiation height of 18 meters, and will operate with an effective radiated power of 0.250 Kilowatts in both the horizontal and vertical planes. At 2 meters above the surface, at 24 meters from the base of the tower, this proposal will contribute worst case, 7.73 microwatts per square centimeter, or 0.77 percent of the allowable ANSI limit for controlled exposure, and 3.9 percent of the allowable limit for uncontrolled exposure. This figure is less than 5% of the applicable FCC exposure limit at all locations extending out from the base of the tower. Section 1.1307(b)(3) excludes applications when the calculated level is predicted to be less than 5% of the

applicable exposure limit. It is therefore believed that this proposal is in compliance with OET Bulletin Number 65 as required by the Federal Communications Commission.

Further, the applicant will see that signs are posted in the vicinity of the tower, warning of potential radio frequency hazards at the site. The site itself is restricted from public access. The applicant will cooperate with other users of the tower to reduce power of the facility, or discontinue operation, as necessary to limit human exposure to levels less than specified by the Federal Communications Commission should anyone be required to climb the tower for maintenance or inspection.

**Figure 1. KZJK Signal at K279AZ**



**Figure 2. Distance to Interfering Contour**

<b>Proposed Antenna:</b> Shively Labs 6812B 2-Bay 1/2 wave spaced. <b>Proposed Power:</b> 0.25 kW <b>Height Above Roof:</b> 17 meters <b>Interference Contour:</b> 133.8 dBu <b>Artificial Rcv Antenna Height:</b> 2 meters  <b>Distance (Free Space) Equation:</b> $=(10^{((106.92-[\text{desired dBu}]+[\text{ERP in dBk}])/20))} \times 1000$ <b>Field Strength (dBu) Equation</b> $=106.92-(20 \times (\text{LOG}_{10}[\text{DistMeters}/1000]))+[\text{ERP in dBk}]$								
<b>Depression</b>				<b>Distance</b>				
<b>Angle</b>	<b>Antenna</b>			<b>from Ant.</b>	<b>Distance</b>	<b>Field</b>	<b>Distance</b>	<b>Field</b>
<b>Below</b>	<b>Relative</b>	<b>ERP</b>	<b>ERP</b>	<b>to Interf</b>	<b>from Ant. to</b>	<b>Strength</b>	<b>from Ant.</b>	<b>Strength</b>
<b>Horizon</b>	<b>Field</b>	<b>in kW</b>	<b>in dBk</b>	<b>Contour</b>	<b>Artificial Plane</b>	<b>in dBu @</b>	<b>to Roof Level</b>	<b>in dBu @</b>
						<b>Artificial Plane</b>		<b>Roof Level</b>
0°	1.000	0.250	-6.02	22.64 m	infinite	---	infinite	---
-5°	0.990	0.245	-6.11	22.42 m	172.11 m	116.10 dBu	195.05 m	115.01 dBu
-10°	0.595	0.089	-10.53	13.47 m	86.38 m	117.66 dBu	97.90 m	116.57 dBu
-15°	0.910	0.207	-6.84	20.61 m	57.96 m	124.82 dBu	65.68 m	123.73 dBu
-20°	0.846	0.179	-7.47	19.16 m	43.86 m	126.61 dBu	49.70 m	125.52 dBu
-25°	0.770	0.148	-8.29	17.44 m	35.49 m	127.63 dBu	40.23 m	126.54 dBu
-30°	0.685	0.117	-9.31	15.51 m	30.00 m	128.07 dBu	34.00 m	126.98 dBu
-35°	0.596	0.089	-10.52	13.50 m	26.15 m	128.05 dBu	29.64 m	126.97 dBu
-40°	0.508	0.065	-11.90	11.50 m	23.34 m	127.66 dBu	26.45 m	126.57 dBu
-45°	0.422	0.045	-13.51	9.56 m	21.21 m	126.87 dBu	24.04 m	125.79 dBu
-50°	0.342	0.029	-15.34	7.74 m	19.58 m	125.74 dBu	22.19 m	124.66 dBu
-55°	0.271	0.018	-17.36	6.14 m	18.31 m	124.30 dBu	20.75 m	123.22 dBu
-60°	0.208	0.011	-19.66	4.71 m	17.32 m	122.49 dBu	19.63 m	121.40 dBu
-65°	0.156	0.006	-22.16	3.53 m	16.55 m	120.39 dBu	18.76 m	119.30 dBu
-70°	0.112	0.003	-25.04	2.54 m	15.96 m	117.82 dBu	18.09 m	116.73 dBu
-75°	0.077	0.001	-28.29	1.74 m	15.53 m	114.81 dBu	17.60 m	113.72 dBu
-80°	0.048	0.001	-32.40	1.09 m	15.23 m	110.87 dBu	17.26 m	109.78 dBu
-85°	0.023	0.000	-38.79	0.52 m	15.06 m	104.58 dBu	17.06 m	103.49 dBu
-90°	0.001	0.000	-66.02	0.02 m	15.00 m	77.38 dBu	17.00 m	76.29 dBu

**Figure 3 Spacing and Separation Study**

ComStudy 2.2 search of channel 279 (103.7 MHz Class D) at 44-58-34.0 N, 93-16-20.0 W.							
Callsign	State	Channel	ERP_w	ARN	Class	Status	Clr
KZJK	MN	281	100000	BLH20071001AGL	C0	LIC	-35.22 dB
KLZZ	MN	279	9000	BMLH20021008ABS	C3	LIC	0.58 dB
KYSM-FM	MN	278	100000	BLH19930802KD	C1	LIC	6.66 dB
WWIB	WI	279	100000	BLH20000207ABP	C1	LIC	12.38 dB
W225AP	MN	225	170	BLFT20070730ABV	D	LIC	17.7 km
K277AS	MN	277	10	BLFT20070504AGN	D	LIC	20.71 dB
K280EC	MN	280	205	BLFT19990804TF	D	LIC	23.89 dB
KLKK	IA	279	25000	BLH20070410ACT	C3	LIC	25.58 dB
WWIB	WI	279	0		C1	USE	25.99 dB
KDCZ	MN	280	1300	BLH20080314AEH	A	LIC	27.60 dB
KYSM-FM	MN	278	0		C1	USE	28.46 dB
K280ET	MN	280	170	BLFT20070511AAS	D	LIC	30.44 dB

**Figure 4 Contour Map**

