

**ENGINEERING STATEMENT**  
**PREPARED IN SUPPORT OF APPLICATION**  
**FOR CONSTRUCTION PERMIT**  
**BDJ RADIO ENTERPRISES, LLC**  
**0.42/50 kW DA-2U 1010 kHz**  
**ST. LOUIS, MISSOURI**

**JUNE 2008**

**ENGINEERING STATEMENT  
PREPARED IN SUPPORT OF APPLICATION FOR  
CONSTRUCTION PERMIT  
BDJ RADIO ENTERPRISES, LLC  
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ST. LOUIS, MISSOURI**

**JUNE 2008**

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FCC Form 301, Section III-A - E-filing

**ENGINEERING STATEMENT**

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**JUNE 2008**

**SUMMARY**

The following engineering statement has been prepared in support of an Application for Construction Permit by **BDJ Radio Enterprises, LLC** who proposes to construct modified, full-time, standard broadcast facilities for KXEN Radio, 1010 kHz at St. Louis, Missouri. A diplex operation with standard broadcast station WGNU, 920 kHz, Granite City, Illinois is proposed. This application is complete with the Forms, Exhibits and Figures found in the Table of Contents and is believed to comply with all applicable FCC Rules, Regulations and Policies unless stated herein.

**FCC FORM 301, SECTION III-A**

FCC Form 301, Section III-A has been completed. Questions requiring a narrative response are addressed below:

Questions 4d, 5d, 6d      The proposed overall structure heights exceed 200' (61 meters) and will require marking and lighting and FAA 7460-1 applications have been filed for each of the seven proposed towers. Array physical configuration data appears in *Exhibit I*. Array parameters for the daytime antenna system are found in *Exhibit II* and *Figure 8*. Array parameters for the night antenna system are found in *Exhibit III* and *Figure 9*. The daytime and critical hours power and pattern are identical. No clear channel facilities are located sufficiently close that detailed critical hours calculations are required for the power level proposed, however, a critical

hours allocation mapping is included as Figure 16.

*Section 73.24(g)* compliance is achieved due to the relatively rural nature of the site. Population in the proposed night 1 V/m contour is 0 persons. Population in the daytime 25 mV/m contour 1,272,776 persons and population within the 1 V/m contour is 5,399 persons or 0.42% of the 25 mV/m population. These values demonstrate compliance with *73.24(g)*. The applicant pledges to comply fully with *Rule Section 73.88*.

Question 8

Figure 5 depicts the proposed daytime 5 mV/m contour. The contour covers 100% of the community of St. Louis. Figure 6 depicts the licensed and proposed nighttime 6.1 mV/m nighttime interference-free contour. The licensed NIF envelops 141,310 persons in an area of 83.6 square kilometers within the corporate boundary of the City of St. Louis. The proposed nighttime interference-free contour envelops 191,379 persons in an area of 103 square kilometers within the corporate boundary of the city of St. Louis. The city of St. Louis has a land area of 160.4 square kilometers. Thus, the proposed facility will serve an additional 50,069 persons representing a 35.4% increase in population served within the city of license.

The proposed 1010 kHz 50% RSS night limit is computed as shown on Exhibit IV.

Question 10(a)

Figures 1 - 4 depict the proposed daytime allocation. It is noted that prohibited contour overlap exists to 1<sup>st</sup> adjacent channel WCIL, 1020 kHz, Carbondale, Illinois. Figure 2-A depicts the licensed and proposed 0.25 mV/m contours to the licensed WCIL 0.5 mV/m contour. Figure 2-

B depicts the licensed and proposed 0.5 mV/m contours and the WCIL licensed 0.25 mV/m contour. The overlap area and population data is tabulated below.

Figure 2-A KXEN overlap to WCIL:

Licensed 0.25 mV/m to WCIL 0.5 mV/m  
2,175.9 sq. km with a population of 37,236 persons

Proposed 0.25 mV/m to WCIL 0.5 mV/m  
1,919.6 sq. km with a population of 33,726 persons

Proposed reduction 256.3 sq. km and 3,510 persons

Figure 2-B WCIL overlap to KXEN:

Licensed 0.25 mV/m to KXEN 0.5 mV/m  
4,140.9 sq. km with a population of 212,446 persons

Licensed 0.25 mV/m to KXEN proposed 0.5 mV/m  
4,674.6 sq. km with a population of 221,309 persons

Proposed increase of 533.7 sq. km and 8,863 persons

The KXEN licensed 0.5 mV/m contour includes a population of 3,004,495 persons while population in the proposed 0.5 mV/m contour is 3,052,778 persons resulting in a 48,283 person gain in population served. The population gain associated with the proposed facility is 39,420 person when increased overlap from WCIL is considered.

Question 10(b)

Exhibit IV is an RSS of all nighttime stations studied demonstrating that the proposed facility does not enter the RSS of any currently authorized facility in an impermissible manner. RSS limitations to and from Class D

stations were not considered due to their secondary nature. The licensed KXEN facility is in the 25% RSS night limits of WFGW and KSIR. No increase in radiation is proposed to either facility.

1010 kHz Class A station CBR's Region II 0.5 mV/m 50% skywave contour is protected as depicted on Figure 14 with the proposed 0.025 mV/m 10% skywave contour. 1010 kHz Class A station CFRB's Region II 0.5 mV/m 50% skywave contour is protected as depicted on Figure 14A with the proposed 0.025 mV/m 10% skywave contour. This Class A station is not listed in either part VI or VI-A of Annex I of the 1984 U.S. Canadian Bilateral Agreement. The proposed KXEN facility protects CFRB based on paragraph 4.10.2.2 of Annex 2 of the agreement. Exhibit 5 is an RSS calculation for points on the 0.5 mV/m groundwave and skywave contours as well as locations inside the 0.5 mV/m skywave contour. The proposed facility is believed to fully protect CFRB.

First adjacent channel Class A station 0.5 mV/m groundwave contours are fully protected by the proposed 0.25 mV/m 10% skywave contour as depicted on Figure 15. Grandfathered overlap to WMVP from KXEN night is reduced from 4,389 to 372 square kilometers. Population in the overlap area is reduced from 211,955 persons to 3,411 persons.

Question 11

*Supplement A, Edition 97-01 to OET Bulletin No. 65*, has been referenced concerning appropriate fencing distances.

14.6 m by 14.6 m square wooden fences are planned for each tower and will be centered on each tower. These dimensions exceed the *Supplement*

*A, Edition 97-01, Section 1, Table 2* requirements. Power will be reduced or transmission ceased when workers are on or near the towers.

### **DIPLEX OPERATION**

Diplex operation with WGNU 920 kHz is proposed. Extensive studies have been undertaken to confirm that HD compatible diplex operation is feasible while meeting all required FCC standards for spurious emission.

### **MULTIPLE OWNERSHIP**

**BDJ Radio Enterprises, LLC** has no other AM or FM media interests other than WGNU, 920 kHz, Granite City, Illinois. Based on data publicly available at [www.arbitron.com](http://www.arbitron.com) there are 30 stations in the St. Louis market not including KXEN and WGNU. Ownership of the existing two facilities is believed to comply with the Commission's multiple ownership Rules and guidelines.

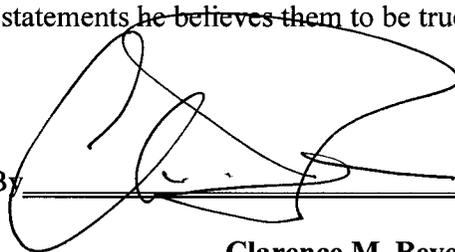
### **PUBLIC INTEREST SHOWING**

Grant of the facilities proposed herein would result in the following public interest benefits:

- An increase in population within the predicted 5 mV/m daytime contour of 134,730 persons.  
Licensed 5 mV/m = 2,029,156 persons, proposed 5 mV/m = 2,163,886 persons.
- An increase in population in the night interference free contour, over the city of St. Louis, of 50,069 persons. Licensed 6.1 mV/m = 141,310 persons. Proposed 6.1 mV/m = 191,379 persons.
- Reduction in caused overlap to WCIL1020 kHz, Carbondale, Illinois of 3,510 persons.
- Gain in population within proposed 0.5 mV/m daytime contour, after considering overlap from WCIL, of 39,420 persons.
- Reduction in caused overlap to WMVP, 1000 kHz, Chicago, Illinois, nighttime 0.5 mV/m groundwave contour of 208,544 persons in an area of 4,017 square kilometers.

**CONCLUSION**

The foregoing was prepared on behalf of **BDJ Radio Enterprises, LLC** by Clarence M. Beverage of *Communications Technologies, Inc.*, Marlton, New Jersey, whose qualifications are a matter of record with the Federal Communications Commission. The undersigned certifies, under penalty of perjury, that the statements herein are true and correct of his own knowledge, except such statements made on information and belief, and as to these statements he believes them to be true and correct.

By  \_\_\_\_\_

**Clarence M. Beverage**  
*for* Communications Technologies, Inc.  
Marlton, New Jersey

June 23, 2008

**EXHIBIT I**

**PHYSICAL DESCRIPTION OF  
DIRECTIONAL ANTENNA SYSTEM  
BDJ RADIO ENTERPRISES, LLC  
PROPOSED 1010 kHz 0.42/50 kW LS DA-2U  
ST. LOUIS, MISSOURI**

**JUNE 2008**

TRANSMITTER SITE: ARRAY CENTER (NAD27)	North Latitude: 38° 45' 58.0" West Longitude: 90° 03' 34.8"
TOWERS 1,3 & 5 (Total of three)	Electrical 96.0° 79.2 meters above base (260') tower steel 81.7 meters AGL (268') overall height
TOWERS 2, 4, 5N & 6 (Total of four)	Electrical 110.9° 91.4 meters above base (300') tower steel 93.9 meters AGL (308') overall height
RADIATOR TYPE:	Vertical, guyed, uniform cross section towers.
PATTERN ASSUMPTION:	Sinusoidal current distribution in all towers
GROUND SYSTEM:	Each tower to employ a ground system consisting of 6, essentially equally spaced, elevated copperweld radials, 81.5 meters (267') in length and elevated 7.6 meters (25') above ground. 4" copper strap to be buried in cable trenches to interconnect tower bases and transmitter building.
ARRAY PARAMETERS:	Daytime Exhibit II & Figure 8 Nighttime Exhibit III & Figure 9

**EXHIBIT II**

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**BDJ RADIO ENTERPRISES, LLC  
AM BROADCAST STATION KXEN  
ST. LOUIS, MISSOURI**

**1010 kHz 50 kW U DA-D**

**DAYTIME STANDARD RADIATION PATTERN DATA  
(Radiation Values at One Kilometer)**

TOWER Number	Field Ratio	Phase (deg)	Spacing (deg)	Bearing (deg)	Height (deg)
1	0.540	+7.0	0.0	0.0	96.0
2	0.462	+105.6	80.0	49.9	110.9
3	1.000	+0.0	180.0	138.6	96.0
4	1.000	+100.0	198.6	114.9	110.9
5	0.530	+0.0	360.0	138.6	96.0
6	0.479	+95.0	370.5	126.1	110.9

Input Power (kW)	Loop Loss (ohms)	Theoretical RMS (mV/m)	Q RSS (mV/m)	Q Factor (mV/m)	Standard RMS (mV/m)
50.0	1.00	2085.	2602.	70.7	2190.

Azimuth (deg)	Field (mV/m)	Azimuth (deg)	Field (mV/m)	Azimuth (deg)	Field (mV/m)	Azimuth (deg)	Field (mV/m)
0	190.	90	263.	180	955.	270	1323.
5	243.	95	237.	185	1437.	275	847.
10	294.	100	208.	190	2030.	280	491.
15	332.	105	185.	195	2717.	285	247.
20	348.	110	173.	200	3464.	290	107.
25	342.	115	169.	205	4223.	295	76.2
30	319.	120	167.	210	4936.	300	96.4
35	290.	125	164.	215	5540.	305	111.
40	266.	130	157.	220	5977.	310	119.
45	249.	135	149.	225	6202.	315	127.
50	234.	140	139.	230	6193.	320	136.
55	218.	145	129.	235	5948.	325	146.
60	205.	150	114.	240	5492.	330	155.
65	207.	155	95.3	245	4870.	335	159.
70	227.	160	92.1	250	4141.	340	157.
75	253.	165	164.	255	3367.	345	148.
80	273.	170	328.	260	2609.	350	142.
85	276.	175	588.	265	1916.	355	153.

**EXHIBIT III**  
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**BDJ RADIO ENTERPRISES, LLC**  
**AM BROADCAST STATION KXEN**  
**ST. LOUIS, MISSOURI**

**1010 kHz 0.42 kW, 50 kW-LS U DA-2**

**NIGHTTIME STANDARD RADIATION PATTERN DATA**  
**(Radiation Values at One Kilometer)**

TOWER Number	Field Ratio	Phase (deg)	Spacing (deg)	Bearing (deg)	Height (deg)
1	0.634	-145.3	0.0	0.0	96.0
2	1.000	+0.0	80.0	49.9	110.9
3	0.136	+22.7	180.0	138.6	96.0
4	0.448	-78.3	198.6	114.9	110.9
5	0.520	-22.6	140.7	183.0	110.9

Input Power (kW)	Loop Loss (ohms)	Theoretical RMS (mV/m)	Q RSS (mV/m)	Q Factor (mV/m)	Standard RMS (mV/m)
0.42	1.00	194.9	330.7	10.0	205.0

**EXHIBIT III**  
**Page 2 of 5**

**NIGHTTIME STANDARD RADIATION PATTERN DATA**  
**KXEN, ST. LOUIS, MISSOURI**

**STANDARD RADIATION**  
**(at One Kilometer)**

Azimuth Angle (deg)	-----Elevation Angle in Degrees-----						
	0 (mV/m)	5 (mV/m)	10 (mV/m)	15 (mV/m)	20 (mV/m)	25 (mV/m)	30 (mV/m)
0	221.	218.	210.	197.	180.	162.	145.
5	220.	217.	209.	195.	179.	161.	143.
10	210.	207.	199.	186.	170.	153.	136.
15	192.	189.	182.	170.	155.	139.	124.
20	166.	164.	157.	147.	134.	121.	109.
25	136.	134.	128.	119.	108.	98.0	89.6
30	102.	99.8	94.7	87.3	79.1	72.2	68.8
35	67.6	65.9	61.0	54.2	47.7	45.0	48.4
40	42.6	40.4	34.1	25.0	17.2	20.8	34.3
45	46.0	43.7	37.3	28.1	20.6	23.7	36.6
50	70.7	68.8	63.3	56.0	49.5	47.7	52.7
55	98.3	96.4	91.2	84.0	76.9	72.4	72.6
60	123.	121.	116.	109.	101.	95.3	92.4
65	144.	142.	137.	130.	122.	116.	111.
70	160.	159.	154.	148.	140.	133.	128.
75	173.	172.	168.	163.	156.	149.	143.
80	184.	183.	180.	175.	169.	163.	156.
85	194.	193.	191.	187.	181.	175.	168.
90	204.	203.	201.	197.	192.	186.	179.
95	213.	213.	210.	207.	202.	196.	189.
100	222.	221.	219.	215.	211.	204.	196.
105	228.	227.	225.	222.	217.	210.	202.
110	232.	231.	229.	225.	220.	213.	205.
115	231.	231.	229.	225.	220.	213.	205.
120	226.	226.	224.	221.	216.	210.	203.
125	217.	216.	215.	212.	209.	204.	197.
130	202.	202.	201.	200.	197.	194.	189.
135	184.	184.	184.	183.	183.	181.	178.
140	162.	162.	163.	164.	165.	166.	165.
145	138.	139.	141.	143.	146.	149.	151.
150	113.	114.	117.	122.	127.	133.	138.
155	90.6	92.0	95.9	102.	109.	117.	125.
160	75.3	76.8	81.3	88.2	96.8	106.	115.
165	75.8	76.9	80.3	85.8	93.3	102.	111.
170	93.8	94.1	95.1	97.3	101.	106.	112.
175	123.	122.	121.	119.	119.	119.	121.

**EXHIBIT III**  
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**NIGHTTIME STANDARD RADIATION PATTERN DATA**  
**KXEN, ST. LOUIS, MISSOURI**

**STANDARD RADIATION**  
**(at One Kilometer)**

Azimuth Angle (deg)	-----Elevation Angle in Degrees-----					
	35 (mV/m)	40 (mV/m)	45 (mV/m)	50 (mV/m)	55 (mV/m)	60 (mV/m)
0	129.	117.	109.	103.	98.4	92.7
5	127.	115.	106.	101.	96.7	91.5
10	121.	110.	103.	98.3	94.9	90.3
15	112.	103.	97.7	95.2	93.0	89.2
20	99.2	93.8	92.0	91.8	91.2	88.3
25	84.8	84.1	86.1	88.6	89.6	87.7
30	69.9	74.7	80.9	86.1	88.6	87.4
35	56.9	67.5	77.4	84.7	88.3	87.5
40	49.8	64.4	76.5	84.8	88.9	88.2
45	52.1	66.7	78.6	86.8	90.5	89.4
50	62.6	73.8	83.6	90.4	93.0	91.1
55	77.2	84.1	90.9	95.4	96.5	93.4
60	93.1	96.1	99.6	102.	101.	96.0
65	109.	109.	109.	108.	105.	99.0
70	124.	121.	119.	115.	110.	102.
75	137.	133.	128.	122.	115.	105.
80	150.	144.	137.	129.	120.	109.
85	161.	153.	145.	135.	124.	112.
90	171.	162.	152.	141.	128.	114.
95	180.	170.	159.	146.	132.	117.
100	187.	176.	164.	150.	135.	119.
105	192.	180.	167.	153.	137.	121.
110	195.	183.	170.	155.	139.	122.
115	195.	184.	170.	156.	140.	122.
120	193.	182.	169.	155.	139.	122.
125	189.	179.	167.	154.	139.	122.
130	182.	174.	163.	151.	137.	121.
135	173.	167.	159.	148.	135.	120.
140	163.	159.	153.	144.	133.	119.
145	152.	151.	147.	140.	130.	117.
150	141.	142.	140.	135.	127.	116.
155	131.	134.	135.	131.	125.	114.
160	123.	128.	130.	128.	122.	113.
165	118.	124.	127.	126.	121.	112.
170	118.	123.	125.	124.	120.	111.
175	123.	125.	126.	124.	119.	111.

**EXHIBIT III**  
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**NIGHTTIME STANDARD RADIATION PATTERN DATA**  
**KXEN, ST. LOUIS, MISSOURI**

**STANDARD RADIATION**  
**(at One Kilometer)**

Azimuth Angle (deg)	-----Elevation Angle in Degrees-----						
	0 (mV/m)	5 (mV/m)	10 (mV/m)	15 (mV/m)	20 (mV/m)	25 (mV/m)	30 mV/m)
180	156.	155.	152.	147.	142.	137.	134.
185	191.	189.	184.	176.	167.	158.	150.
190	224.	221.	215.	205.	193.	179.	167.
195	253.	250.	242.	230.	215.	199.	183.
200	277.	274.	265.	252.	234.	215.	196.
205	294.	291.	282.	267.	249.	228.	207.
210	304.	300.	291.	276.	257.	236.	214.
215	305.	302.	293.	278.	259.	238.	217.
220	299.	296.	287.	274.	256.	236.	216.
225	286.	284.	276.	264.	248.	230.	212.
230	268.	266.	260.	250.	237.	222.	207.
235	249.	247.	242.	234.	224.	213.	201.
240	231.	230.	226.	221.	214.	205.	196.
245	220.	219.	217.	213.	208.	201.	194.
250	218.	217.	216.	212.	208.	202.	195.
255	227.	226.	224.	220.	215.	208.	201.
260	244.	243.	240.	234.	227.	218.	208.
265	265.	263.	259.	251.	242.	230.	217.
270	285.	283.	277.	268.	256.	241.	226.
275	301.	299.	292.	281.	266.	250.	232.
280	310.	308.	300.	288.	272.	254.	235.
285	311.	308.	300.	288.	272.	253.	233.
290	303.	300.	292.	280.	264.	246.	227.
295	285.	282.	275.	264.	249.	233.	216.
300	258.	256.	250.	240.	228.	214.	200.
305	223.	222.	217.	210.	201.	191.	181.
310	183.	182.	180.	176.	171.	165.	160.
315	141.	141.	140.	139.	139.	138.	138.
320	101.	102.	104.	107.	110.	115.	119.
325	75.7	76.9	80.2	85.3	91.7	98.8	106.
330	80.5	81.0	82.7	85.6	89.8	95.1	101.
335	108.	108.	106.	105.	103.	103.	105.
340	141.	140.	136.	131.	124.	118.	114.
345	172.	170.	164.	156.	145.	134.	125.
350	196.	194.	187.	176.	163.	148.	135.
355	213.	210.	202.	190.	175.	158.	142.

**EXHIBIT III**  
**Page 5 of 5**

**NIGHTTIME STANDARD RADIATION PATTERN DATA**  
**KXEN, ST. LOUIS, MISSOURI**

**STANDARD RADIATION**  
**(at One Kilometer)**

Azimuth Angle (deg)	-----Elevation Angle in Degrees-----					
	35 (mV/m)	40 (mV/m)	45 (mV/m)	50 (mV/m)	55 (mV/m)	60 (mV/m)
180	132.	130.	129.	125.	120.	111.
185	143.	138.	133.	128.	121.	111.
190	155.	146.	138.	131.	122.	112.
195	168.	155.	144.	134.	124.	113.
200	178.	163.	149.	138.	126.	114.
205	187.	169.	154.	141.	128.	115.
210	193.	174.	158.	144.	130.	116.
215	196.	177.	161.	146.	132.	117.
220	196.	178.	162.	147.	133.	119.
225	195.	178.	163.	149.	134.	120.
230	192.	177.	163.	150.	136.	120.
235	188.	176.	164.	151.	137.	121.
240	186.	175.	164.	151.	138.	122.
245	186.	176.	165.	153.	139.	123.
250	187.	178.	167.	154.	140.	124.
255	192.	181.	169.	156.	141.	124.
260	197.	185.	172.	157.	142.	125.
265	204.	190.	175.	159.	142.	125.
270	210.	193.	177.	160.	143.	125.
275	214.	196.	178.	160.	143.	125.
280	215.	196.	178.	160.	142.	124.
285	213.	194.	176.	158.	140.	123.
290	208.	189.	172.	155.	138.	121.
295	198.	182.	166.	151.	135.	119.
300	186.	172.	159.	146.	132.	117.
305	171.	160.	150.	140.	128.	115.
310	154.	148.	141.	133.	124.	112.
315	137.	136.	132.	127.	120.	109.
320	122.	124.	124.	122.	116.	107.
325	112.	116.	118.	117.	112.	104.
330	106.	111.	113.	113.	109.	102.
335	107.	109.	110.	110.	106.	99.9
340	111.	110.	109.	108.	104.	98.2
345	118.	113.	109.	107.	103.	96.6
350	124.	115.	110.	106.	101.	95.2
355	128.	117.	110.	105.	99.9	93.9